

# Quality of Surface Waters of the United States 1957

Parts 7 and 8. Lower Mississippi River Basin  
and Western Gulf of Mexico Basins

*Prepared under the direction of S. K. LOVE, Chief, Quality of Water Branch*

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GEOLOGICAL SURVEY WATER-SUPPLY PAPER 1522

*Prepared in cooperation with the States  
of Arkansas, Louisiana, New Mexico,  
Oklahoma, and Texas, and with other  
agencies*



**UNITED STATES DEPARTMENT OF THE INTERIOR**

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## PREFACE

This report was prepared by the Geological Survey in cooperation with the States of Arkansas, Louisiana, New Mexico, Oklahoma, and Texas, and with other agencies by personnel of the Water Resources Division under the direction of L. B. Leopold, chief hydraulic engineer, and S. K. Love, chief, Quality of Water Branch. The data were collected and computed under the supervision of the following engineers or district chemists:

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# QUALITY OF SURFACE WATERS OF THE UNITED STATES, 1957

## PARTS 7 and 8

### INTRODUCTION

The quality-of-water investigations of the United States Geological Survey are concerned with chemical and physical characteristics of the surface and ground water supplies of the Nation. Most of the investigations carried on in cooperation with States and other Federal agencies deal with the amounts of matter in solution and in suspension in streams.

The records of chemical analysis, suspended sediment, and temperature for surface waters given in this volume serve as a basis for determining the suitability of the waters examined for industrial, agricultural, and domestic uses insofar as such use is affected by the dissolved or suspended mineral matter in the waters. The discharge of a stream and, to a lesser extent, the chemical quality are related to variations in rainfall and other forms of precipitation. In general, lower concentrations of dissolved solids may be expected during the periods of high flow than during periods of low flow. The concentration in some streams may change materially with relatively small variations in flow, whereas for other streams the quality may remain relatively uniform throughout large ranges in discharge. The quantities of suspended sediment carried by streams are also related to discharge, and during flood periods the sediment concentrations in many streams vary over wide ranges.

Publication of annual records of chemical analyses, suspended sediment, and water temperature was begun by the Geological Survey in 1941. The records prior to 1948 were published each year in a single volume for the entire country. Beginning in 1948, the records were published in two volumes, and beginning in 1950, in four volumes, covering the drainage basins shown in Figure 1. The samples for which data are given in this volume were collected from October 1, 1956, to September 30, 1957. The records are arranged by drainage basins according to Geological Survey practice in reporting records of streamflow: Stations on tributary

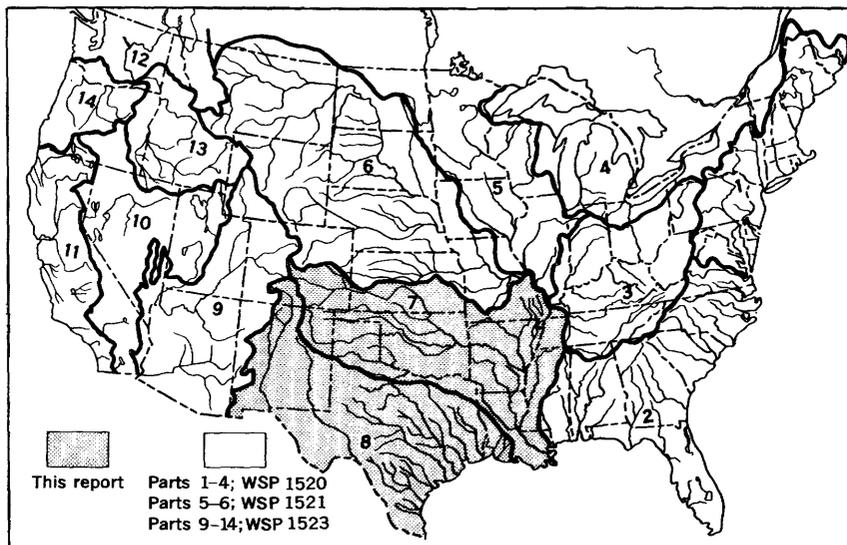


Figure 1.--Map of the United States showing basins covered by the four water-supply papers on quality of surface waters in 1957. The shaded portion represents the section of the country covered by this volume; the unshaded portion represents the section of the country covered by other water-supply papers.

streams are listed between stations on the main stem in the order in which those tributaries enter the main stem. Descriptive statements are given for each sampling station for which regular series of chemical analyses, temperature observations, or sediment determinations have been made. These statements include the location of the stream-sampling station, drainage area, length of time for which records are available, extremes of mineralization, hardness, water temperature, sediment loads, and other pertinent data. Records of water discharge of the streams at or near the sampling period are included in most tables of analyses.

During the year ending September 30, 1957, 152 regular sampling stations on 91 streams for the study of the chemical character of surface waters were maintained by the Geological Survey in the area covered by this volume. Samples were collected less frequently during the year at many other points. Water temperatures were measured daily at 95 stations. Not all analyses of samples of surface water collected during the year have been included. Single analyses of an incomplete nature generally have been omitted. Also, analyses made of the daily samples before compositing have not been reported. The specific conductance of almost all daily samples was determined, and as noted in the table head-

ings this information is available for reference at the district offices listed under Division of Work, on page 22.

Quantities of suspended sediment are reported for 26 stations during the year ending September 30, 1957. The sediment samples were collected one or more times daily at most stations, depending on the rate of flow and changes in stage of the stream. Sediment samples were collected less frequently during the year at many other points. In connection with measurements of sediment discharge, sizes of sediment particles were determined at 25 of the stations.

Material which is transported almost in continuous contact with the stream bed and the material that bounces along the bed in short skips or leaps is termed "bedload" and is not considered in this report. All other undissolved fragmental material in transport is termed "suspended sediment" and generally constitutes the major part of the total sediment load. At the present time no reliable routine method has been developed for determining bedload.

## COLLECTION AND EXAMINATION OF SAMPLES

### CHEMICAL QUALITY

Samples of chemical analyses were usually collected at or near points on streams where gaging stations are maintained for measurement of water discharge. Two methods of compositing water samples for analysis are used by the Geological Survey: (1) Equal volume method—Three composite samples were usually prepared each month by mixing together equal volumes of daily samples collected from the 1st to the 10th, from the 11th to the 20th, and from the 21st to the end of the month. Composite samples were prepared for shorter periods if the specific conductance of the daily samples indicated that the mineral content of the water had changed significantly. Conversely, composite samples were occasionally prepared for longer periods if the specific conductance of the daily samples indicated that the mineral content had remained nearly uniform. (2) Discharge method—Composite samples were prepared by mixing together a volume from each sample in proportion to the product of the rate of water discharge at the time of sampling and the time interval represented by that sample. Generally, each daily sample is assumed to represent an equal time interval; therefore, the volume from each sample is proportional only to the water discharge at the time of sampling. Compositing samples by the discharge method was limited to some streams west of the Mississippi River.

The samples were analyzed according to methods regularly used by the Geological Survey. These methods are essentially the same as, or are modifications of, methods described in recognized authoritative publications for the mineral analysis of water samples (Collins, 1928; Am. Public Health Assoc., 1955).

## TEMPERATURE

Daily water temperatures were measured at most of the stations when chemical quality or sediment samples were collected. So far as practicable, the water temperatures were taken at about the same time each day for an individual station in order that the data would be relatively unaffected by diurnal variations in temperature. Most large, swiftly flowing streams probably have a small diurnal variation in water temperature, whereas sluggish or shallow streams may have a daily range of several degrees and may follow closely the changes in air temperature. The thermometers used for determining water temperature were accurate to plus or minus 0.5° F.

At stations where thermographs are located, the records consist of maximum and minimum temperatures for each day, and the monthly averages of maximum daily and minimum daily temperatures.

## SEDIMENT

In general, suspended-sediment samples were collected daily with U. S. depth-integrating cable-suspended samplers (U. S. Interagency, 1948, p. 70-76 and U. S. Interagency, 1952, p. 86-90) from a fixed sampling point at one vertical in the cross section. The US DH-48 hand sampler was used at many stations during periods of low flow. Depth-integrated samples were collected periodically at three or more verticals in the cross section to determine the cross-sectional distribution of the concentration of suspended sediment with respect to that at the daily sampling vertical. In streams where transverse distribution of sediment concentration ranges widely, samples were taken regularly at two or more verticals to determine the average concentration across the section. During periods of high flow, samples were taken two or more times throughout the day at many sampling stations, and during periods of rapidly changing flow samples were taken hourly at some stations.

Sediment concentrations were determined by filtration or evaporation of the samples as required. At many stations the daily mean concentration for some days was obtained by plotting the instantaneous concentrations on the original or copies of the original gage-height chart. The plotted concentrations, adjusted if necessary for cross-sectional distribution with respect to that at the daily sampling vertical, were connected or averaged by continuous curves

to obtain a concentration graph. This graph represented the estimated concentration at any time and, for most periods, daily mean concentrations were determined from the graph. When the concentration and water discharge were changing rapidly, the day was often subdivided for this computation. For some periods when the day-to-day variation in the concentration was negligible, the data were not plotted, and the average concentration of the samples was used as the mean concentration for the day. For certain stations, when the discharge and concentrations were relatively low and varied only slightly from day to day, the samples for a number of days were composited and the mean daily concentrations and mean daily loads are shown.

For some periods when no samples were collected, daily loads of suspended sediment were estimated on the basis of water discharge, sediment concentrations observed immediately preceding and following the periods, and suspended-sediment loads for other periods of similar discharge. The estimates were further guided by weather conditions and sediment discharge for other stations.

In many instances where there were no observations for several days, the suspended-sediment loads for individual days are not estimated, because numerous factors influencing the quantities of transported sediment made it very difficult to make accurate estimates for individual days. However, estimated loads of suspended sediment for missing days in otherwise continuous period of sampling have been included in monthly and annual totals for most streams to provide a complete record. For some streams, samples were collected about weekly, monthly, or less frequently, and only rates of sediment discharge at the time of sampling are shown.

In addition to the records of quantities of suspended sediment transported, records of the particle sizes of sediment are included. The particle sizes of the suspended sediments for many of the stations, and the particle sizes of the bed material for some of the stations were determined periodically. As much of the material carried in suspension is finer than 0.062 mm, the pipet method (Kilmer and Alexander, 1949) or the bottom withdrawal tube method (U. S. Interagency, 1943, p. 82-90) were used in most of the analyses. For most samples, material between 1.0 mm and 0.062 mm was analyzed by the visual accumulation tube method (U. S. Interagency 1957). Separation of sand from the silt-clay-colloid fraction was by sieve. For some samples all sediment coarser than 0.062 mm was analyzed by the sieve method. For material finer than 0.062 mm the settling medium used was native water or distilled water to which a dispersing agent had been added. Because sedimentation diameters of the clay and colloidal fractions are often affected by the chemical character of the settling medium, analyses made with native water may more nearly simulate particle sizes existing in the stream. Results of analyses with dis-

tilled water containing a dispersing agent approximate ultimate particle sizes of the finer fractions. The concentration of sediment suspension for analysis was reduced to less than 5,000 parts per million where necessary by means of a sample splitter, in order to stay within limits recommended for the bottom-withdrawal tube or pipet method; therefore, the concentration of sediment for analyses was often different from the concentration in the stream. The concentration at which analyses were made is indicated in the appropriate tables.

## EXPRESSION OF RESULTS

The dissolved mineral constituents are reported in parts per million. A part per million is a unit weight of a constituent in a million unit weights of water. Equivalents per million are not given in this report although the expression of analyses in equivalents per million is sometimes preferred. An equivalent per million is a unit chemical combining weight of a constituent in a million unit weights of water. Equivalents per million are calculated by dividing the concentration in parts per million by the chemical combining weights of the individual constituents. For convenience in making this conversion the reciprocals of chemical combining weights of the most commonly reported constituents (ions) are given in the following table:

Constituent	Factor	Constituent	Factor
Iron ( $\text{Fe}^{++}$ ).....	0.0358	Carbonate ( $\text{CO}_3^{--}$ ) ..	0.0333
Iron ( $\text{Fe}^{+++}$ ).....	.0537	Bicarbonate ( $\text{HCO}_3^-$ ) .	.0164
Calcium ( $\text{Ca}^{++}$ ).....	.0499	Sulfate ( $\text{SO}_4^{--}$ ).....	.0208
Magnesium ( $\text{Mg}^{++}$ )... .	.0822	Chloride ( $\text{Cl}^-$ ).....	.0282
Sodium ( $\text{Na}^+$ ).....	.0435	Fluoride ( $\text{F}^-$ ).....	.0526
Potassium ( $\text{K}^+$ ).....	.0256	Nitrate ( $\text{NO}_3^-$ ).....	.0161

Results given in parts per million can be converted to grains per United States gallon by dividing by 17.12. A calculated quantity of sodium and potassium is given in some analyses and is the quantity of sodium needed in addition to the calcium and magnesium to balance the acid constituents.

The hardness, expressed in terms of an equivalent quantity of calcium carbonate ( $\text{CaCO}_3$ ), is calculated from the equivalents of calcium and magnesium, or is determined by direct titration. The hardness caused by calcium and magnesium (and other ions if significant) equivalent to the carbonate and bicarbonate is called carbonate hardness; the hardness in excess of this quantity is called noncarbonate hardness.

The value usually reported as dissolved solids is the residue

on evaporation after drying at 180°C for 1 hour. For some waters, particularly those containing moderately large quantities of soluble salts, the value reported is calculated from the quantities of the various determined constituents using the carbonate equivalent of the reported bicarbonate. The calculated sum of the constituents may be given instead of or in addition to the residue. In the analyses of most waters used for irrigation, the quantity of dissolved solids is given in tons per acre-foot as well as in parts per million.

Percent sodium is computed for those analyses where sodium and potassium are reported separately by dividing the equivalents per million of sodium by the sum of the equivalents per million of calcium, magnesium, sodium, and potassium and multiplying the quotient by 100. In analyses where sodium and potassium were calculated and reported as a combined value, the value reported for percent sodium will include the equivalent quantity of potassium. In most waters of moderate to high concentration the proportion of potassium is much smaller than that of sodium.

Specific conductance is given for most analyses and was determined by means of a conductance bridge and using a standard potassium chloride solution as reference. Specific conductance values are expressed in micromhos per centimeter at 25°C. Specific conductance in micromhos is 1 million times the reciprocal of specific resistance at 25°C. Specific resistance is the resistance, in ohms, of a column of water 1 centimeter long and 1 square centimeter in cross section. The discharge of the streams is reported in cubic feet per second (see Streamflow, p. 17) and the temperature in degrees Fahrenheit. Color is expressed in units of the platinum-cobalt scale proposed by Hazen (1892, p. 427-428). Hydrogen-ion concentration is expressed in terms of pH units. By definition the pH value of a solution is the negative logarithm of the concentration of gram ions of hydrogen. However, the pH meter that is generally used in Survey laboratories determines the activity of the hydrogen ions as distinguished from concentration.

An average of analyses for the water year is given for most daily sampling stations. Most of these averages are arithmetical or time-weighted; when analyses during a year are all on 10-day composites of daily samples with no missing days, the arithmetical and time-weighted averages are equivalent. A time-weighted average represents the composition of water that would be contained in a vessel or reservoir that had received equal quantities of water from the river each day for the water year. A discharge-weighted average approximates the composition of water that would be found in a reservoir containing all of the water passing a given station during the year after thorough mixing in the reservoir. A discharge-weighted average is computed by multiplying the discharge for the sampling period by the concentrations of the individual constituents for the corresponding period and dividing the sum of the products

by the sum of the discharges. Discharge-weighted averages are usually lower than arithmetical averages for most streams because at times of high discharge the rivers generally have lower concentrations of dissolved solids.

The concentration of sediment in parts per million is computed as 1,000,000 times the ratio of the weight of sediment to the weight of water-sediment mixture. Daily sediment loads are expressed in tons per day and except for subdivided days are usually obtained by multiplying daily mean sediment concentration in parts per million by the daily mean discharge, and the appropriate conversion factor, normally 0.0027.

Particle-size analyses are expressed in percentages of material finer than indicated sizes in millimeters. The size classification used in this report is that recommended by the American Geophysical Union subcommittee on Terminology (Lane and others, 1947, p. 937). Other data included as pertinent to the size analyses for many streams are the date of collection, the stream discharge and sediment concentration when sample was collected, the concentration of the suspension during analysis, and the method of analysis.

## COMPOSITION OF SURFACE WATERS

All natural waters contain dissolved mineral matter. Water in contact with soils or rock, even for only a few hours, will dissolve some rock materials. The quantity of dissolved mineral matter in a natural water depends primarily on the type of rocks or soils with which the water has been in contact and the length of time of contact. Some streams are fed by both surface runoff and ground water from springs or seeps. Such streams reflect the chemical character of their concentrated underground sources during dry periods and are more dilute during periods of heavy rainfall. Ground water is generally more highly mineralized than surface runoff because it remains in contact with the rocks and soils for much longer periods. The concentration of dissolved solids in a river water is frequently increased by drainage from mines or oil fields, by the addition of industrial or municipal wastes, or--in irrigated regions--by drainage from irrigated lands.

The mineral constituents and physical properties of natural waters reported in the tables of analyses include those that have a practical bearing on the value of the waters for most purposes. The analyses generally include results for silica, iron, calcium, magnesium, sodium, potassium (or sodium and potassium together as sodium), bicarbonate, sulfate, chloride, fluoride, nitrate, boron, pH, and dissolved solids. Aluminum, manganese, color, acidity, oxygen consumed, and other dissolved constituents and physical properties are reported for certain streams. Phenolic

material and minor elements including strontium, chromium, nickel, copper, lead, zinc, cobalt, arsenic, cadmium, and others are occasionally determined for a few streams in connection with specific problems in local areas and the results are reported when appropriate. The source and significance of the different constituents and properties of natural waters are discussed in the following paragraphs.

### MINERAL CONSTITUENTS IN SOLUTION

#### Silica ( $\text{SiO}_2$ )

Silica is dissolved from practically all rocks. Some natural surface waters contain less than 5 parts per million of silica and a few contain more than 50 parts, but most waters contain from 1 to 30 parts per million. Silica affects the usefulness of a water because it contributes to the formation of boiler scale; it usually is removed from feed water for high-pressure boilers. Silica also forms troublesome deposits on the blades of stream turbines.

#### Aluminum (Al)

Aluminum is generally present only in negligible quantities in natural waters except in areas where the waters have been in contact with the more soluble rocks of high aluminum content such as bauxite and certain shales. Acid waters often contain large amounts of aluminum. It may be troublesome in feed waters where it tends to be deposited as a scale on boiler tubes.

#### Manganese (Mn)

Manganese is dissolved in appreciable quantities from rocks in some sections of the country. Waters impounded in large reservoirs may contain manganese that has been dissolved from the mud on the bottom of the reservoir by action of carbon dioxide produced by anaerobic fermentation of organic matter. Manganese is not regularly determined in areas where it is not present in the waters in appreciable amounts. It is especially objectionable in water used in laundry work and in textile processing. Concentrations as low as 0.2 part per million may cause a dark-brown or black stain on fabrics and porcelain fixtures. Appreciable quantities of manganese are often found in waters containing objectionable quantities of iron.

### Iron (Fe)

Iron is dissolved from many rocks and soils. On exposure to the air, normal basic waters that contain more than 1 part per million of iron soon become turbid with the insoluble reddish ferric oxide produced by oxidation. Surface waters, therefore, seldom contain as much as 1 part per million of dissolved iron, although some acid waters carry large quantities of iron in solution. Iron causes reddish-brown stains on white porcelain or enameled ware and fixtures and on fabrics washed in the water.

### Calcium (Ca)

Calcium is dissolved from almost all rocks and soils, but the highest concentrations are usually found in waters that have been in contact with limestone, dolomite, and gypsum. Calcium and magnesium make water hard and are largely responsible for the formation of boiler scale. Most waters associated with granite or silicious sands contain less than 10 parts per million of calcium; waters in areas where rocks are composed of dolomite and limestone contain from 30 to 100 parts per million; and waters that have come in contact with deposits of gypsum may contain several hundred parts per million.

### Magnesium (Mg)

Magnesium is dissolved from many rocks, particularly from dolomitic rocks. Its effect in water is similar to that of calcium. The magnesium in soft waters may amount to only 1 or 2 parts per million, but water in areas that contain large quantities of dolomite or other magnesium-bearing rocks may contain from 20 to 100 parts per million or more of magnesium.

### Sodium and potassium (Na and K)

Sodium and potassium are dissolved from almost all rocks. Sodium is the predominant cation in some of the more highly mineralized waters found in the Western United States. Natural waters that contain only 3 or 4 parts per million of the two together are likely to carry almost as much potassium as sodium. As the total quantity of these constituents increases, the proportion of sodium becomes much greater. Moderate quantities of sodium and potassium have little effect on the usefulness of the water for most purposes, but waters that carry more than 50 or 100 parts per million of the two may require careful operation of steam boilers

to prevent foaming. More highly mineralized waters that contain a large proportion of sodium salts may be unsatisfactory for irrigation.

### Carbonate and bicarbonate ( $\text{CO}_3$ and $\text{HCO}_3$ )

Bicarbonate occurs in waters largely through the action of carbon dioxide, which enables the water to dissolve carbonates of calcium and magnesium. Carbonate as such is not usually present in appreciable quantities in natural waters. The bicarbonate in waters that come from relatively insoluble rocks may amount to less than 50 parts per million; many waters from limestone contain from 200 to 400 parts per million. Bicarbonate in moderate concentrations in water has no effect on its value for most uses. Bicarbonate or carbonate is an aid in coagulation for the removal of suspended matter from water.

### Sulfate ( $\text{SO}_4$ )

Sulfate is dissolved from many rocks and soils but in especially large quantities from gypsum and from beds of shale. It is formed also by the oxidation of sulfides of iron and is therefore present in considerable quantities in waters from mines. Sulfate in waters that contain much calcium and magnesium causes the formation of hard scale in steam boilers and may increase the cost of softening the water.

### Chloride (Cl)

Chloride is dissolved from rock materials in all parts of the country. Surface waters in the humid regions are usually low in chloride content, whereas streams in arid or semiarid regions may contain several hundred parts per million of chloride leached from soils and rocks, especially where the streams receive return drainage from irrigated lands or are affected by ground-water inflow carrying appreciable quantities of chloride. Large quantities of chloride may affect the industrial use of water by increasing the corrosiveness of waters that contain large quantities of calcium and magnesium.

### Fluoride (F)

Fluoride has been reported as being present in some rocks in about the same amount as chloride. However, the quantity of

fluoride in natural surface waters is ordinarily very small compared to that of chloride. Recent investigations indicate that the incidence of dental caries is less when there are small amounts of fluoride present in the water supply than when there is none. However, excess fluoride in water is associated with the dental defect known as mottled enamel if the water is used for drinking by young children during calcification or formation of the teeth. (Dean, 1936, p. 1269-1272). This defect becomes increasingly noticeable as the quantity of fluoride in water increases above 1.5 to 2.0 parts per million.

### Nitrate ( $\text{NO}_3$ )

Nitrate in water is considered a final oxidation product of nitrogenous material and may indicate contamination by sewage or other organic matter. The quantities of nitrate present in surface waters are generally less than 5 parts per million (as  $\text{NO}_3$ ) and have no effect on the value of the water for ordinary uses.

It has been reported that as much as 2 parts per million of nitrate in boiler water tends to decrease intercrystalline cracking of boiler steel. Studies made in Illinois indicate that nitrates in excess of 70 parts per million (as  $\text{NO}_3$ ) may contribute to methemoglobinemia ("blue babies") (Faucett and Miller, 1946, p. 593), and more recent investigations conducted in Ohio show that drinking water containing nitrates in the range of 44 to 88 parts per million or more (as  $\text{NO}_3$ ) may cause methemoglobinemia (Waring, 1949). In a report published by the National Research Council, Maxcy (1950, p. 271) concludes that a nitrate content in excess of 44 parts per million (as  $\text{NO}_3$ ) should be regarded as unsafe for infant feeding.

### Boron (B)

Boron in small quantities has been found essential for plant growth, but irrigation water containing more than 1 part per million of boron is detrimental to citrus and other boron-sensitive crops. Boron is reported in Survey analyses of surface waters in arid and semiarid regions where irrigation is practiced or contemplated, but few of the surface waters analyzed have harmful concentrations of boron.

### Dissolved solids

The reported quantity of dissolved solids--the residue on evaporation--consists mainly of the dissolved mineral constituents in the water. It may also contain some organic matter and water of crystallization. Waters with less than 500 parts per million of dissolved solids are usually satisfactory for domestic and some industrial uses. Water containing several thousand parts per million of dissolved solids are sometimes successfully used for irrigation where practices permit the removal of soluble salts through the application of large volumes of water on well-drained lands, but generally water containing more than about 2,000 ppm is considered to be unsuitable for long-term irrigation under average conditions.

## PROPERTIES AND CHARACTERISTICS OF WATER

### Temperature

Large quantities of water are used in industrial operation; therefore temperature and seasonal fluctuations of that temperature are major considerations in planning the use of water for cooling in industrial plants. Water at high temperature can carry less oxygen in solution than at low temperature. Consequently water temperature can affect or determine the pollution characteristics of a stream. Temperature data are required in studies of water intended for aquatic life. A few degrees rise in temperature may seriously limit the capacity of a stream to support fish life.

### Oxygen consumed

The amount of oxygen consumed furnishes an approximation of the oxidizable matter in the unfiltered and filtered samples and gives a partial measure of polluting materials such as sewage and oxidizable industrial wastes. Waters of naturally high color may have relatively high values for oxygen consumed, and waters that are not noticeably colored may contain oxidizable material.

### Color

In water analysis the term "color" refers to the appearance of water that is free from suspended solids. Many turbid waters

that appear yellow, red, or brown when viewed in the stream show very little color after the suspended matter has been removed. The yellow-to-brown color of some waters is usually caused by organic matter extracted from leaves, roots, and other organic substances in the ground. In some areas objectionable color in water results from industrial wastes and sewage. Clear deep water may appear blue as the result of a scattering of sunlight by the water molecules. Water for domestic use and some industrial uses should be free from any perceptible color. A color less than 10 units generally passes unnoticed. Some swamp waters have natural color of 200 to 300 units or more.

#### Hydrogen-ion concentration (pH)

The degree of acidity or alkalinity of water, as indicated by the hydrogen-ion concentration, expressed as pH (see p.7 ), is related to the corrosive properties of water and is useful in determining the proper treatment for coagulation that may be necessary at water-treatment plants. A pH of 7.0 indicates that the water is neither acid nor alkaline. pH readings progressively lower than 7.0 denote increasing acidity and those progressively higher than 7.0 denote increasing alkalinity. The pH of most natural surface waters ranges between 6 and 8. Some alkaline surface waters have pH values greater than 8.0, and waters containing free mineral acid usually have pH values less than 4.5.

#### Specific conductance (micromhos per centimeter at 25° C)

The specific conductance of a water is a measure of its capacity to conduct a current of electricity (see p.7 ). The conductance varies with the concentration and degree of ionization of the different minerals in solution and with the temperature of the water. When considered in conjunction with results of determinations for other constituents, specific conductance is a useful determination and plays an important part in indicating changes in concentration of the total quantity of dissolved minerals in surface waters.

#### Hardness

Hardness is the characteristic of water that receives the most attention in industrial and domestic use. It is commonly recognized by the increased quantity of soap required to produce lather. The use of hard water is also objectionable because it contributes to the formation of scale in boilers, water heaters, radiators, and

pipes, with the resultant decrease in rate of heat transfer, possibility of boiler failure, and loss of flow.

Hardness is caused almost entirely by compounds of calcium and magnesium. Other constituents--such as iron, manganese, aluminum, barium, strontium, and free acid--also cause hardness, although they usually are not present in quantities large enough to have any appreciable effect. Water that has less than 60 parts per million of hardness is usually rated as soft and suitable for many purposes without further softening. Waters with hardness ranging from 61 to 120 parts per million may be considered moderately hard, but this degree of hardness does not seriously interfere with the use of water for many purposes except for use in high-pressure steam boilers and in some industrial processes. Waters with hardness ranging from 121 to 200 parts per million are considered hard, and laundries and industries may profitably soften such supplies. Water with hardness above 200 parts per million generally requires some softening before being used for most purposes.

### Acidity

The acidity of a natural water represents the content of free carbon dioxide and other uncombined gases, organic acids, mineral acids and salts of strong acids and weak bases that hydrolyze to give hydrogen ions. Sulfates of iron and aluminum in mine and industrial wastes are common sources of acidity.

### Corrosiveness

The corrosiveness of a water is that property which makes the water aggressive to metal surfaces and frequently results in the appearance of the "red-water" caused by solution of iron. The disadvantages of iron in water have been discussed previously. Additionally, corrosion causes the deterioration of water pipes, steam boilers, and water-heating equipment. Many waters that do not appreciably corrode cold-water lines will aggressively attack hot-water lines. Oxygen, carbon dioxide, free acid, and acid-generating salts are the principal constituents in water that cause corrosion. In a general way, very soft waters of low mineral content tend to be more corrosive than hard waters containing appreciable quantities of carbonates and bicarbonates of calcium and magnesium.

### Percent sodium

The proportion of sodium to the total cation concentration is termed "percent sodium", and is reported in most of the analyses

of waters collected from streams in the western part of the country where irrigation is practiced extensively. The proportion of sodium to all the constituents in the water is explained on page 10 under "Sodium and potassium". Waters in which the percent sodium is more than 60 may be injurious when applied to certain types of soils, particularly when adequate drainage is not provided (Magistad and Christiansen, 1944, p. 8-9).

### Sodium-adsorption-ratio

Of more significance than percent sodium for use as an index of the sodium or alkali hazard to the soil is the sodium-adsorption-ratio because it relates more directly to the adsorption of sodium by the soil. The term, "sodium-adsorption-ratio (SAR)" was introduced by the U. S. Salinity Laboratory Staff (1954), and is a ratio expressing the relative activity of sodium ions in exchange reactions with the soil. It is expressed by the equation:

$$\text{SAR} = \frac{\text{Na}^+}{\sqrt{\frac{\text{Ca}^{++} + \text{Mg}^{++}}{2}}}$$

where the concentrations of the ions are expressed in milliequivalents per liter (or equivalents per million for most irrigation waters).

Waters are divided into four classes with respect to sodium or alkali hazard: low, medium, high, and very high, depending upon the SAR and the specific conductance. At a conductance of 100 micromhos per centimeter the dividing points are at SAR values of 10, 18, and 26, but at 5,000 micromhos the corresponding dividing points are SAR values of approximately 2.5, 6.5, and 11. Waters range in respect to sodium hazard from those which can be used for irrigation on almost all soils to those which are generally unsatisfactory for irrigation.

### SEDIMENT

Fluvial sediment is generally regarded as that sediment which is transported by, suspended in, or deposited by water. Suspended sediment is that part of it which remains in suspension in water owing to the upward components of turbulent currents or by colloidal suspension. Most fluvial sediment results from the normal process of erosion, which in turn is part of the geologic cycle of

rock transformation. In some instances, this normal process may have been accelerated by agricultural practices. Sediment also results from a number of industrial activities. In certain sections, waste materials from mining, logging, oil-field, and other industrial operations introduce large quantities of suspended as well as dissolved material.

The quantity of sediment, transported or available for transportation, is affected by climatic conditions, form or nature of precipitation, plant cover, topography, and land use. An important property of fluvial sediment is the fall velocity of the particles in transport. Particle sizes, as determined by various methods, represent mechanical diameters, which are related to sedimentation diameters indirectly. Sediment particles in the sand-size (larger than 0.062 mm) range do not appear to be affected by flocculation or dispersion resulting from the mineral constituents in solution. The sedimentation diameter of clay and silt particles in suspension may vary considerably from point to point in a stream or reservoir, depending on the mineral matter in solution and in suspension and the degree of turbulence present. The size of sediment particles in transport at any point depends on the type of erodible and soluble material in the drainage area, the degree of flocculation present, time in transport, and characteristics of the transporting flow. The flow characteristics include velocity of water, turbulence, and the depth, width, and roughness of the channel. As a result of these variable characteristics, the size of particles transported, as well as the total sediment load, is in constant adjustment with the characteristics and physical features of the stream and drainage area.

## STREAMFLOW

Most of the records of stream discharge, used in conjunction with the chemical analyses and in the computation of sediment loads in this volume, are published in Geological Survey reports on the surface-water supply of the United States. The discharge reported for a composite sample is usually the average of daily mean discharges for the composite period. The discharges reported in the tables of single analyses are either daily mean discharges or discharges for the time at which samples were collected, computed from a stage-discharge relation or from a discharge measurement.

## PUBLICATIONS

Reports giving records of chemical quality and temperatures of surface waters and suspended-sediment loads of streams in the

area covered by this volume for the water years 1941-57, are listed below:

Numbers of water-supply papers containing records for  
Parts 7 and 8, 1941-57

Year	WSP	Year	WSP	Year	WSP	Year	WSP
1941	942	1946	1050	1951	1199	1956	1452
1942	950	1947	1102	1952	1252	1957	1522
1943	970	1948	1133	1953	1292		
1944	1022	1949	1163	1954	1352		
1945	1030	1950	1188	1955	1402		

Geological Survey reports containing chemical quality, temperature, and sediment data obtained before 1941 are listed below. Publications dealing largely with the quality of ground-water supplies and only incidentally covering the chemical composition of surface waters are not included. Publications that are out of print are preceded by an asterisk.

PROFESSIONAL PAPER

- \*135. Composition of river and lake waters of the United States, 1924.

BULLETINS

- \*479. The geochemical interpretation of water analyses, 1911.  
770. The data of geochemistry, 1924.

WATER-SUPPLY PAPERS

- \*108. Quality of water in the Susquehanna river drainage basin, with an introductory chapter on physiographic features, 1904.  
\*161. Quality of water in the upper Ohio River basin and at Erie, Pa., 1906.  
\*193. The quality of surface waters in Minnesota, 1907.  
\*236. The quality of surface waters in the United States, Part 1, Analyses of waters east of the one hundredth meridian, 1909.  
\*237. The quality of the surface waters of California, 1910.  
\*239. The quality of the surface waters of Illinois, 1910.  
\*273. Quality of the water supplies of Kansas, with a preliminary report on stream pollution by mine waters in south-eastern Kansas, 1911.

- \*274. Some stream waters of the western United States, with chapters on sediment carried by the Rio Grande and the industrial application of water analyses, 1911.
- \*339. Quality of the surface waters of Washington, 1914.
- \*363. Quality of the surface waters of Oregon, 1914.
- \*418. Mineral springs of Alaska, with a chapter on the chemical character of some surface waters of Alaska, 1917.
- \*596-B. Quality of water of Colorado River in 1925-26, 1928.
- \*596-D. Quality of water of Pecos River in Texas, 1928.
- \*596-E. Quality of the surface waters of New Jersey, 1928.
- \*636-A. Quality of water of the Colorado River in 1926-28, 1930.
- \*636-B. Suspended matter in the Colorado River in 1925-28, 1930.
- \*638-D. Quality of water of the Colorado River in 1928-30, 1932.
- \*839. Quality of water of the Rio Grande basin above Fort Quitman, Tex., 1938.
- \*889-E. Chemical character of surface water of Georgia, 1944.
- \*998. Suspended sediment in the Colorado River, 1925-41, 1947.
- 1048. Discharge and sediment loads in the Boise River drainage basin, Idaho, 1939-40, 1948.
- 1110-C. Quality of water of Conchas Reservoir, New Mexico, 1939-49, 1952.

Many of the reports listed are available for consultation in the larger public and institutional libraries. Copies of Geological Survey publications still in print may be purchased at a nominal cost from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., who will, upon request, furnish lists giving prices.

## COOPERATION

The table on p. 20 lists State and local agencies that cooperated in quality-of-water investigations in drainage basins included in this volume. The locations of quality-of-water district or regional offices responsible for the data collected are also given in this table.

Financial assistance was furnished by the Bureau of Reclamation of the United States Department of the Interior for some of the investigations in Oklahoma and New Mexico and by the Corps of Engineers, Department of the Army, for some investigations in Texas. The Corps also provided financial assistance and made most determinations of sediment concentrations and of particle-size of bed material in connection with the sedimentation investigations of the Mississippi River at St. Louis, Mo. The Soil Conservation Service of the United States Department of Agriculture assisted on special sedimentation studies in the Rio Grande basin in New Mexico and the United States Public Health Service assisted

State	Cooperating agency	Drainage basin	District or regional office
Arkansas	Engineering Experiment Station University of Arkansas, Dean George F. Branigan, director.	Lower Mississippi River.	P. O. Box 32, University Station 205 Ozark St. Fayetteville, Ark.
Louisiana	Louisiana Department of Public Works, L. M. Wimberly, director.	Lower Mississippi River, Western Gulf of Mexico.	807 Brazos St. Austin 14, Tex.
Missouri	Corps of Engineers, Department of Army.	Lower Mississippi River (sediment investigations at St. Louis).	510 Rudge-Guenzel Bldg. Lincoln, Nebr.
New Mexico	New Mexico Interstate Stream Commission, S. E. Reynolds, secretary. Pecos River Commission, J. H. Bliss, commissioner for New Mexico, J. C. Wilson, commissioner for Texas. Sherman O. Decker, secretary.	Lower Mississippi River, Western Gulf of Mexico	P. O. Box 4217, Albuquerque, N. Mex.

State	Cooperating agency	Drainage basin	District or regional office
Oklahoma	<p>Oklahoma Water Resources Board, Francis J. Borelli, executive director.</p> <p>Division of Sanitary Engineering, Oklahoma State Department of Health, Harold L. Malone, Division of Sanitary Engineers.</p>	Lower Mississippi River.	P. O. Box 4355 Oklahoma City, Okla.
Texas	<p>Texas Board of Water Engineers, consisting of R. M. Dixon, chairman, H. A. Beckwith, and O. F. Dent; the Brazos River Authority, The Canadian River Municipal Water Authority, the Chambers-Liberty Counties Navigation District, the Cities of Dallas and Fort Worth, the Green- belt Municipal and Industrial Water Association, the West Central Texas Municipal Water District, the Lower Colorado River Author- ity, the Lower Neches River Au- thority, the Red Bluff Water Pow- er Control District, the Sabine River Authority, and the Tarrant County Water Control and Improve- ment District No. 1.</p>	Lower Mississippi River, Western Gulf of Mexico.	807 Brazos St. Austin 14, Tex.

in the operation of two stations in the Red River basin in Arkansas. Assistance in collecting data was given by many individuals and by municipal, State, and Federal agencies.

In addition, many of the investigations were supported by funds appropriated directly to the Geological Survey. Studies of suspended-sediment loads in the middle Rio Grande in New Mexico were begun in 1948 as a Federal project.

## DIVISION OF WORK

The quality-of-water program was conducted by the Water Resources Division of the Geological Survey, L. B. Leopold, chief hydraulic engineer, and S. K. Love, chief of the Quality of Water Branch. The data were collected and prepared for publication under the supervision of engineers or district chemists as follows: In Missouri--P. C. Benedict succeeded by D. M. Culbertson; in Oklahoma and the Arkansas River basin in Kansas--T. B. Dover; in Texas and Louisiana--Burge Irelan; in Arkansas--M. E. Schroeder; in New Mexico and the Rio Grande and Arkansas River basins in Colorado--J. M. Stow. Any additional information on file can be obtained by writing the responsible Survey district office.

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## MISSISSIPPI RIVER MAIN STEM--Continued

## MISSISSIPPI RIVER AT ST. LOUIS, MO.--Continued

Suspended sediment, water year October 1956 to September 1957

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Suspended sediment Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Suspended sediment Mean concentration (ppm)	Tons per day
1.....	59,400	220	a35,000	58,000	200	a31,000	54,200	120	a18,000
2.....	59,400	233	37,400	56,800	214	32,800	52,200	150	a21,000
3.....	58,700	245	38,800	54,800	200	a30,000	50,900	162	22,300
4.....	59,400	240	a38,000	54,800	180	a27,000	50,900	150	a21,000
5.....	56,700	230	36,500	54,800	153	22,600	49,800	120	16,100
6.....	58,000	240	a38,000	56,800	200	a31,000	51,600	150	a21,000
7.....	58,700	220	a35,000	58,000	262	41,000	56,100	333	50,400
8.....	58,700	260	a41,000	57,400	190	a29,000	57,400	380	a59,000
9.....	60,000	277	44,900	54,800	161	23,800	59,400	210	a34,000
10.....	60,000	252	40,800	54,200	170	a25,000	57,400	140	a22,000
11.....	59,400	240	a38,000	54,800	150	a22,000	54,800	115	17,000
12.....	58,700	234	37,000	55,400	150	22,400	54,200	105	15,400
13.....	58,700	240	a38,000	56,800	140	a21,000	52,800	95	a14,000
14.....	58,000	240	a38,000	56,100	150	a23,000	52,200	82	11,600
15.....	56,800	276	42,300	58,000	150	a23,000	52,200	75	a11,000
16.....	56,100	351	53,200	60,600	160	a26,000	52,200	75	a11,000
17.....	55,400	244	36,500	60,000	240	a39,000	51,600	95	a13,000
18.....	54,800	220	a33,000	60,600	220	a36,000	51,600	101	14,100
19.....	54,800	238	35,200	61,300	196	32,400	50,900	85	11,700
20.....	56,800	260	a40,000	63,200	180	a31,000	51,600	65	a9,100
21.....	59,400	240	a38,000	63,200	199	34,000	52,800	59	8,410
22.....	61,300	274	45,300	63,900	220	a38,000	54,800	65	a9,600
23.....	63,200	260	a44,000	61,300	158	26,200	57,400	75	a12,000
24.....	63,200	334	57,000	60,600	140	a23,000	62,600	85	14,400
25.....	61,300	360	a60,000	60,600	130	a21,000	62,600	100	a17,000
26.....	62,000	273	45,700	61,300	120	a20,000	62,000	122	20,400
27.....	62,000	280	a47,000	60,600	114	18,700	61,300	85	a14,000
28.....	58,000	240	a38,000	58,700	110	a17,000	60,600	86	14,100
29.....	57,400	228	35,300	57,400	100	a15,000	61,300	75	a12,000
30.....	57,400	220	a34,000	55,400	100	15,000	61,300	95	a16,000
31.....	56,800	200	30,700	--	--	--	62,600	86	14,500
Total.	1,822,500	--	1,251,600	1,750,200	--	796,900	1,723,100	--	565,110
Day	January			February			March		
	Mean discharge (cfs)	Suspended sediment Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Suspended sediment Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Suspended sediment Mean concentration (ppm)	Tons per day
1.....	62,000	95	a16,000	59,400	122	19,600	119,000	720	231,000
2.....	61,300	87	14,400	58,700	100	a16,000	109,000	650	a190,000
3.....	60,000	95	a15,000	56,800	100	a15,000	102,000	550	a150,000
4.....	59,400	97	15,600	55,400	110	a16,000	92,800	380	a95,000
5.....	58,700	100	a16,000	56,100	108	16,400	88,000	300	a71,000
6.....	58,700	100	a16,000	57,400	110	a17,000	82,000	216	47,800
7.....	59,400	120	a19,000	57,400	124	19,200	76,300	160	a33,000
8.....	58,700	130	a21,000	58,000	110	17,200	72,100	144	28,000
9.....	58,700	142	22,500	58,700	110	a17,000	71,400	130	a25,000
10.....	58,700	160	a25,000	59,400	100	a16,000	71,400	130	a25,000
11.....	58,000	170	a27,000	61,300	112	18,500	72,100	146	28,400
12.....	56,800	190	a29,000	65,800	110	a20,000	71,400	150	a29,000
13.....	54,800	190	a28,000	70,000	130	a25,000	70,700	156	29,800
14.....	52,800	190	a27,000	74,200	190	a38,000	70,700	160	30,500
15.....	51,600	190	a26,000	79,100	151	32,200	71,400	179	34,500
16.....	49,000	150	a20,000	81,200	130	a29,000	71,400	170	a33,000
17.....	47,000	135	17,100	77,700	110	a23,000	70,700	200	a38,000
18.....	45,000	75	a9,100	70,000	120	22,700	70,700	175	33,400
19.....	45,700	51	6,300	68,600	110	a20,000	70,000	130	a25,000
20.....	46,400	49	6,140	67,200	122	22,100	70,000	113	21,400
21.....	49,600	60	8,040	67,900	120	a22,000	77,700	110	a23,000
22.....	55,400	85	a13,000	70,000	160	30,200	91,200	141	34,700
23.....	56,100	135	20,400	72,100	170	a33,000	85,000	150	a34,000
24.....	53,500	110	a16,000	70,000	180	a34,000	81,200	140	a31,000
25.....	55,400	103	15,400	69,300	164	30,700	96,000	324	84,000
26.....	60,000	110	a18,000	74,900	240	a49,000	138,000	540	201,000
27.....	62,000	180	a30,000	96,800	703	184,000	156,000	675	284,000
28.....	63,900	160	a28,000	118,000	847	270,000	143,000	497	192,000
29.....	65,800	130	a23,000	--	--	--	129,000	403	140,000
30.....	64,600	126	22,000	--	--	--	124,000	371	124,000
31.....	62,000	158	26,400	--	--	--	116,000	320	a100,000
Total.	1,751,000	--	596,380	1,931,400	--	1,072,800	2,830,200	--	2,446,500

a Computed from estimated concentration graph based on daily turbidity readings.

LOWER MISSISSIPPI RIVER BASIN

MISSISSIPPI RIVER MAIN STEM--Continued

MISSISSIPPI RIVER AT ST. LOUIS, MO.--Continued

Suspended sediment, water year October 1956 to September 1957--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	114,000	262	80,600	218,000	438	257,000	240,000	700	a 450,000
2.....	114,000	200	a 62,000	201,000	420	a 230,000	224,000	750	a 450,000
3.....	113,000	238	72,600	196,000	420	222,000	218,000	668	393,000
4.....	144,000	500	a 190,000	200,000	380	a 210,000	213,000	582	335,000
5.....	203,000	480	a 260,000	199,000	380	a 200,000	215,000	508	295,000
6.....	219,000	527	312,000	184,000	388	193,000	218,000	480	a 280,000
7.....	212,000	550	a 310,000	172,000	414	192,000	218,000	830	484,000
8.....	224,000	500	a 300,000	165,000	500	a 220,000	240,000	900	a 580,000
9.....	259,000	1,150	804,000	162,000	445	195,000	275,000	1,300	a 970,000
10.....	263,000	1,300	a 920,000	166,000	320	a 140,000	249,000	800	538,000
11.....	230,000	954	592,000	177,000	310	148,000	219,000	750	a 440,000
12.....	203,000	963	528,000	169,000	320	a 150,000	225,000	1,200	729,000
13.....	178,000	1,100	a 530,000	159,000	302	130,000	245,000	807	534,000
14.....	165,000	750	a 330,000	156,000	300	a 130,000	239,000	1,140	736,000
15.....	153,000	608	251,000	159,000	320	a 140,000	312,000	1,930	1,630,000
16.....	146,000	598	238,000	163,000	380	a 170,000	314,000	1,700	a 1,400,000
17.....	141,000	461	176,000	169,000	380	173,000	270,000	1,220	889,000
18.....	140,000	400	a 150,000	216,000	500	a 290,000	237,000	900	a 580,000
19.....	156,000	430	181,000	271,000	998	730,000	216,000	786	458,000
20.....	160,000	550	a 240,000	306,000	1,230	1,020,000	201,000	800	a 430,000
21.....	184,000	550	a 240,000	308,000	1,070	884,000	215,000	1,070	621,000
22.....	193,000	715	373,000	327,000	1,000	a 880,000	252,000	1,380	939,000
23.....	224,000	716	433,000	325,000	1,030	904,000	262,000	1,400	a 990,000
24.....	206,000	650	a 360,000	330,000	883	796,000	245,000	1,760	1,160,000
25.....	199,000	464	249,000	321,000	900	a 780,000	218,000	1,600	a 940,000
26.....	199,000	451	242,000	327,000	1,000	a 880,000	196,000	1,620	857,000
27.....	206,000	550	a 310,000	338,000	1,100	1,000,000	190,000	1,600	a 820,000
28.....	230,000	550	a 340,000	323,000	948	827,000	227,000	1,800	1,100,000
29.....	251,000	501	340,000	297,000	736	590,000	252,000	2,000	a 1,400,000
30.....	243,000	450	a 300,000	278,000	700	a 530,000	252,000	1,400	a 950,000
31.....	--	--	--	265,000	790	565,000	--	--	--
Total.	5,652,000	--	9,712,200	7,245,000	--	13,776,000	7,095,000	--	22,378,000
Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	318,000	1,500	a 1,300,000	174,000	600	a 280,000	96,000	200	a 52,000
2.....	327,000	1,470	1,300,000	168,000	587	266,000	101,000	180	a 49,000
3.....	314,000	1,240	1,050,000	158,000	550	a 230,000	102,000	190	52,300
4.....	294,000	1,100	a 870,000	159,000	380	160,000	96,000	226	56,600
5.....	254,000	1,170	802,000	162,000	380	166,000	92,800	240	a 60,000
6.....	240,000	950	a 620,000	152,000	320	a 130,000	85,200	260	66,800
7.....	246,000	800	a 530,000	139,000	412	155,000	100,000	360	a 97,000
8.....	248,000	786	526,000	124,000	480	a 160,000	102,000	500	a 140,000
9.....	242,000	850	a 580,000	116,000	350	110,000	102,000	556	153,000
10.....	224,000	990	593,000	112,000	360	a 110,000	102,000	560	a 150,000
11.....	218,000	1,000	a 590,000	106,000	280	a 80,000	102,000	436	120,000
12.....	213,000	950	a 550,000	97,600	240	a 63,000	102,000	500	a 140,000
13.....	207,000	856	478,000	91,200	220	54,200	100,000	650	a 180,000
14.....	209,000	850	a 370,000	90,400	180	a 44,000	99,200	650	a 170,000
15.....	215,000	708	411,000	93,600	180	a 45,000	94,400	600	a 150,000
16.....	212,000	650	a 370,000	91,200	240	a 59,000	93,600	438	111,000
17.....	207,000	706	395,000	92,800	218	54,600	94,400	320	a 82,000
18.....	206,000	650	a 360,000	95,200	260	a 67,000	95,200	460	a 120,000
19.....	197,000	470	250,000	97,600	464	122,000	92,800	400	100,000
20.....	186,000	350	a 180,000	99,200	400	a 110,000	89,600	412	99,700
21.....	182,000	300	a 150,000	101,000	232	63,300	85,800	480	a 110,000
22.....	184,000	326	162,000	97,600	226	60,100	92,000	400	a 99,000
23.....	182,000	360	a 180,000	96,800	180	a 47,000	90,400	380	92,800
24.....	178,000	362	174,000	92,000	190	a 47,000	94,400	440	a 110,000
25.....	181,000	380	a 190,000	88,000	340	a 81,000	102,000	476	131,000
26.....	162,000	700	a 340,000	81,200	404	88,600	99,200	550	a 150,000
27.....	182,000	900	a 440,000	80,500	300	a 65,000	94,400	800	a 200,000
28.....	172,000	800	a 370,000	83,500	400	90,200	92,000	600	a 150,000
29.....	218,000	736	433,000	85,000	560	a 130,000	90,400	600	a 150,000
30.....	224,000	668	525,000	86,500	432	101,000	82,000	384	85,000
31.....	194,000	739	387,000	92,800	260	a 65,000	--	--	--
Total.	6,858,000	--	15,456,000	3,403,700	--	3,304,000	2,874,800	--	3,429,200

Total discharge for year (cfs-days) ..... 44,934,900  
 Total load for year (tons) ..... 74,784,690

a Computed from estimated concentration graph based on daily turbidity readings.

MISSISSIPPI RIVER MAIN STEM--Continued  
MISSISSIPPI RIVER AT ST. LOUIS, MO.--Continued

Particle-size analyses of suspended sediment, water year October 1956 to September 1957

(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipet; S, sieve; N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date of Collection	Time	Discharge (cfs)	Water temperature (°F)	Concentration of suspension analyzed (ppm)		Percent finer than indicated size, in millimeters								Methods of analysis				
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250		0.350	0.500	1.000	
																		Suspended sediment
Oct. 2, 1956	9:50 a. m.	59,400	69	209	211	57	59	75	75	81	81	87	87	87	87	87	87	EWCM
Nov. 5	10:30 a. m.	54,800	58	141	591	31	59	54	54	59	59	66	66	66	66	66	66	EWCM
Nov. 5	12:45 p. m.	54,800	58	142	883	27	31	60	60	66	66	71	71	71	71	71	71	SEW/CM
Mar. 26, 1957	10:30 a. m.	136,000	47	502	2,830	42	27	41	41	56	56	66	66	66	66	66	66	SEW/CM
Apr. 9	10:40 a. m.	259,000	49	1,280	5,670	27	42	57	57	76	76	83	83	83	83	83	83	SEW/CM
May 7	10:30 a. m.	172,000	66	384	2,720	41	41	68	68	84	84	89	89	89	89	89	89	SEW/CM
May 21	9:50 a. m.	299,000	65	1,060	6,450	19	19	52	52	85	85	88	88	88	88	88	88	SEN
May 21	9:50 a. m.	299,000	65	1,060	6,470	42	42	64	64	85	85	88	88	88	88	88	88	SEW/CM
June 5	9:20 a. m.	215,000	72	524	5,340	42	42	63	63	79	79	79	79	79	79	79	79	SEW/CM
June 28	9:35 a. m.	219,000	77	1,790	9,860	57	57	75	75	96	96	98	98	98	98	98	98	SEW/CM

Particle-size analyses of bed material, water year October 1956 to September 1957

(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; M, mechanically dispersed;  
N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time	Discharge (cfs)	Number of sampling points	Percent finer than indicated size, in millimeters								Methods of analysis							
				Bed material															
				0.062	0.125	0.250	0.500	1.000	2.000	4.000	8.000		16.000						
Oct. 2, 1956		59,400	10																
Nov. 6		57,400	12	0	1	46	87	97	97	99	100								S
Jan. 21, 1957		49,600	13	0	2	41	80	94	94	98	100								S
Mar. 20		69,300	13	0	1	35	72	91	98	100									S
Mar. 28		140,000	15	2	6	58	89	96	99	100									S
Apr. 9		263,000	15	1	3	61	91	99	100										S
Apr. 23		227,000	14	2	6	56	92	98	99	100									S
May 8		165,000	15	0	3	38	83	94	96	97	99	100							S
May 21		302,000	14	5	6	44	86	97	98	99	100								S
June 5		215,000	14	0	2	32	85	96	99	100									S
June 27		190,000	16	4	8	25	76	92	96	98	99	100							S

ST. FRANCIS RIVER BASIN  
 MISCELLANEOUS ANALYSES OF STREAMS IN ST. FRANCIS RIVER BASIN IN ARKANSAS  
 Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue on evaporation at 180°C)	Hardness as CaCO <sub>3</sub>		Specific conductance (micro-mhos at 25°C)	pH	Color
														Calcium	Non-carbonate			
ST. FRANCIS RIVER AT ST. FRANCIS																		
June 27, 1957 .....	4,510							57	5.0	1.5		1.9		50	3	112	7.7	
ST. FRANCIS RIVER AT LAKE CITY																		
June 28, 1957 .....	8,110							99	5.0	2.0		0.9		85	4	173	7.9	
RIGHT HAND CHUTE LITTLE RIVER AT RIVERVALE																		
June 26, 1957 .....	4,900							152	21	7.5		1.9		130	5	275	8.1	
ST. FRANCIS FLOODWAY AT MARKED TREE																		
June 19, 1957 .....	19,100							104	5.0	4.5		1.1		96	11	200	7.9	
ST. FRANCIS RIVER AT MARKED TREE																		
June 18, 1957 .....	1,170							188	22	5.0		0.7		164	10	341	8.2	
ST. FRANCIS RIVER AT PARKIN																		
June 26, 1957 .....	4,230							180	8.0	5.0		0.5		158	10	313	8.2	
ST. FRANCIS BAY AT RIVERFRONT																		
June 26, 1957 .....	20,900							102	5.0	4.0		1.2		88	2	182	7.9	

WHITE RIVER BASIN

WAR EAGLE CREEK NEAR HINDSVILLE, ARK.

LOCATION:--At gaging station at bridge on State Highway 45, 4 miles downstream from Poyner Hollow Creek, and 4 miles north of Hindsville, Madison County. DRAINAGE AREA.--262 square miles. RECORDS AVAILABLE.--Chemical analyses: October 1953 to September 1957. REMARKS.--Records of discharge for water year October 1956 to September 1957 given in WSP 1511.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue on evaporation at 180°C)	Hardness as CaCO <sub>3</sub>		Specific conductance (micro-mhos at 25°C)	pH	Color
														Calcium magnesium	Non-carbonate			
Oct. 1, 1956	2.8			40	2.6	3.0	--	131	2.8	4.5		2.1	135	110	3	231	7.7	5
Nov. 14	5.8		44	44	1.9	3.0	--	149	2.8	3.5		1.9	149	118	3	240	8.2	5
Dec. 27	57		26	26	2.4	2.3	--	78	7.6	3.5		2.3	96	75	11	165	7.8	5
Jan. 8, 1957	33		27	27	2.5	2.3	--	82	7.8	4.0		2.5	98	78	10	166	8.0	5
Feb. 21	378		15	15	1.5	2.0	2.2	47	6.0	3.0		3.2	70	44	5	104	7.5	15
Mar. 20	209		18	18	3.8	2.1	1.2	68	4.0	2.8		2.1	80	61	5	124	7.9	1
Apr. 15	618		15	15	3.3	1.6	1.0	57	3.0	2.2		1.9	68	51	4	92.5	7.5	5
May 2	1,450		15	15	2.1	2.0	.9	48	4.6	2.5		2.3	72	46	7	97.3	6.8	15
June 13	2,240		15	15	1.3	1.5	1.2	48	2.8	2.0		1.9	66	43	3	94.2	6.8	10
July 1	1,500		13	13	1.5	1.4	2.1	44	3.4	1.5		2.2	76	39	3	96.3	7.1	35
Aug. 5	73		35	35	3.5	3.0	1.4	123	5.4	4.0		1.7	128	102	1	207	7.5	7
Aug. 28	25		29	29	1.7	2.2	1.4	83	3.2	3.0		1.6	98	80	4	163	7.2	6
Sept. 16	136		28	28	1.6	1.8	2.2	83	4.4	2.8		3.0	104	74	6	147	7.0	24

WHITE RIVER BASIN--Continued  
KINGS RIVER NEAR BERRYVILLE, ARK.

LOCATION.--At gaging station at bridge on county road, 1½ miles downstream from Bee Creek, 2½ miles upstream from Clabber Creek, and 5½ miles northwest of Berryville, Carroll County.  
DRAINAGE AREA.--532 square miles.  
RECORDS AVAILABLE.--Chemical analyses: October 1953 to September 1957 given in WSP 1511.  
REMARKS.--Records of discharge for water year October 1956 to September 1957.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue on evap- oration at 180°C)	Hardness as CaCO <sub>3</sub>		Specific conduct- ance (micro- mhos at 25°C)	pH	Color
														Calcium, mag- nesium	Non- carbon- ate			
Oct. 2, 1956	1.3			42	14	2.8	--	189	4.8	4.0		2.6	182	162	7	313	7.4	5
Nov. 13	18			41	12	3.2	--	176	4.8	4.2		.7	173	152	7	300	7.5	5
Dec. 11	250			38	11	2.2	--	152	7.8	4.0		7.0	174	140	16	279	7.5	5
Jan. 7, 1957	66			39	10	2.5	--	158	8.4	3.8		3.5	166	138	9	275	7.8	5
Feb. 20	857			29	7.7	1.8	--	114	8.0	2.8		6.1	134	104	11	217	7.6	5
Mar. 20	453			29	9.6	1.8	1.1	128	7.6	2.5		2.2	127	112	7	204	8.2	1
Apr. 30	5,520			19	3.8	1.3	.9	70	5.2	1.5		2.4	86	63	6	132	7.2	5
July 2	2,240			20	4.2	1.1	1.5	76	4.8	1.5		1.6	96	67	5	132	7.2	35
July 23	86			35	7.8	2.3	1.4	148	5.0	2.0		.5	135	119	0	234	7.7	8
Aug. 8	67			34	7.8	2.8	1.5	146	3.2	2.0		1.3	136	117	0	235	7.7	8
Aug. 28	54			32	6.1	1.9	1.5	127	3.6	2.2		.6	120	105	1	200	7.7	5
Sept. 16	396			29	6.3	2.2	2.1	111	6.8	3.0		3.0	121	98	8	188	7.3	13



## LOWER MISSISSIPPI RIVER BASIN

## WHITE RIVER BASIN--Continued

## WHITE RIVER AT BULL SHOALS DAM, ARK.--Continued

Temperature (°F) of water, water year October 1956 to September 1957

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	48	49	--	--	48	47	48	48	--	48	52	56
2	48	49	--	48	--	--	47	47	--	48	52	55
3	48	--	51	48	--	--	48	47	47	48	52	55
4	48	--	51	48	48	48	48	--	47	--	53	55
5	48	49	51	--	48	47	47	--	47	--	53	55
6	--	49	51	--	48	47	--	47	47	--	54	55
7	--	50	--	48	48	--	--	47	48	--	54	55
8	48	50	--	48	49	47	47	47	--	49	54	54
9	48	50	--	48	--	--	47	47	--	49	54	55
10	48	--	--	49	--	--	47	48	48	49	54	56
11	48	--	--	49	49	47	--	--	48	49	54	57
12	48	--	--	--	49	47	--	--	48	49	54	57
13	--	51	--	--	48	46	--	47	48	50	55	57
14	--	51	--	48	48	47	--	47	44	49	55	58
15	48	50	--	48	49	47	--	48	--	49	55	57
16	--	51	--	48	--	--	--	47	--	50	55	58
17	49	--	50	48	--	--	--	47	44	50	54	57
18	48	--	50	48	48	--	--	47	45	49	55	57
19	50	51	50	--	47	46	--	47	51	50	55	57
20	--	51	50	--	47	47	--	47	50	50	55	57
21	--	50	50	48	47	46	--	48	--	49	--	--
22	50	--	--	49	--	48	48	48	--	49	55	--
23	50	51	--	48	--	--	47	48	--	50	54	57
24	49	--	--	48	--	--	48	48	49	50	55	57
25	50	--	--	48	48	47	48	--	48	50	--	57
26	50	50	50	--	48	47	47	--	49	51	55	58
27	--	51	48	--	47	47	--	48	49	51	55	58
28	--	52	48	49	47	47	--	48	48	52	56	57
29	49	52	--	48	--	47	47	48	--	52	55	57
30	49	--	--	48	--	--	--	--	--	51	55	57
31	49	--	48	48	--	--	--	48	--	52	55	--
Average	--	--	--	--	--	--	--	--	--	50	54	56

WHITE RIVER BASIN--Continued  
WHITE RIVER AT COTTER, ARK.

LOCATION--At bridge on U.S. Highway 62 at Cotter, Baxter County, about 5 miles downstream from gaging station near Flippin. DRAINAGE AREA, 6,067 square miles (above gaging station).

RECORDS AVAILABLE.--Chemical analyses, October 1947 to September 1957.

TEMPERATURES: October 1947 to May 1955; December 1955 to September 1957.

EXTREMES, 1936-57.--Dissolved solids: Maximum, 205 ppm Oct. 20; minimum, 144 ppm Sept. 1-30.

Hardness: Maximum, 141 ppm Oct. 20; minimum, 120 ppm Sept. 1-30.

Specific conductance: Maximum daily, 343 micromhos Oct. 20; minimum daily, 197 micromhos Sept. 25.

Water temperatures: Maximum, 71° F July 15, 16; minimum, 44° F on several days in January.

EXTREMES, 1951-57.--Dissolved solids: Maximum, 344 ppm Feb. 3, 7, 1954; minimum, 140 ppm May 13-17, 19-21, 23, 25-29, 31, 1955.

Hardness: Maximum, 191 ppm Feb. 11-29, Mar. 11-19, 1955; minimum, 118 ppm May 13-17, 19-21, 23, 25-29, 31, 1955.

Specific conductance: Maximum daily, 696 micromhos Nov. 23, 1954; minimum daily, 180 micromhos May 28, 1955.

Water temperatures: Maximum, 79° F Sept. 20, 1954; minimum, 35° F Feb. 11, 1955.

REMARKS.--Records of specific conductance of daily samples available in District office at Fayetteville, Ark. Records of discharge for gaging station near Flippin for water year October 1956 to September 1957 given in WSP 1511. Flow regulated by Bull Shoals Reservoir since July 1951.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue on evaporation at 180°C)	Hardness as CaCO <sub>3</sub>		Specific conductance (micro-mhos at 25°C)	pH	Color
														Calcium-magnesium	Non-carbonate			
Oct. 1-19, 21-31, 1956	3,042			37	11	3.2	--	157	6.0	4.5		2.2	182	138	9	275	7.6	10
Oct. 20	2,460			--	--	--	--	158	10	5.0		1.8	205	141	11	343	8.2	--
Nov. 1-30	3,369			37	9.9	2.4	--	197	7.6	2.8		1.9	146	133	4	256	8.0	10
Dec. 1-31	3,814			37	10	2.7	--	b155	6.4	3.8		1.4	152	133	6	254	8.4	10
Jan. 1-31, 1957	2,949			33	13	3.2	--	152	9.6	4.0		2.3	160	136	11	252	7.9	7
Feb. 1-28	2,594			31	15	3.4	1.4	162	7.6	3.2		1.2	166	139	6	216	8.2	13
Mar. 1-31	7,854			32	13	4.2	1.3	166	7.6	4.8		.9	166	133	5	272	8.0	8
Apr. 1-30	9,780			31	15	3.4	1.3	160	8.6	2.4		1.3	166	139	6	274	7.7	8
May 1-30	9,402			36	12	3.1	1.8	169	6.0	4.0		1.8	166	139	9	265	7.3	8
June 1-30	15,430			34	12	3.1	1.6	152	7.4	3.5		1.8	166	134	10	285	7.6	8
July 1-31	22,900			33	9.8	2.7	1.7	140	6.6	3.5		1.0	146	123	8	237	7.5	5
Aug. 1-31	19,130			32	10	3.6	1.7	138	7.0	5.0		1.5	150	121	8	242	7.9	10
Sept. 1-30	22,390			32	9.8	3.0	1.7	138	9.6	4.0		1.2	144	120	7	235	7.9	8
Average	10,250			34	12	3.2	--	153	7.7	4.0		1.5	166	134	9	265	--	9

a. Estimated from specific conductance.

b. Includes equivalent of 4 parts per million of carbonate (CO<sub>3</sub>).

LOWER MISSISSIPPI RIVER BASIN  
 WHITE RIVER BASIN--Continued  
 WHITE RIVER AT COTTER, ARK.--Continued

Temperature (°F) of water, water year October 1956 to September 1957

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	65	63	59	51	--	54	53	57	61	68	69	69
2	64	61	58	47	--	50	53	57	61	68	69	69
3	65	59	56	52	--	50	53	58	58	70	68	70
4	65	63	57	49	--	50	55	58	57	70	68	70
5	65	63	62	53	--	51	55	55	60	70	68	70
6	67	63	60	54	--	52	56	55	60	69	68	70
7	63	63	56	49	47	50	55	55	60	70	68	68
8	63	53	--	46	48	49	55	55	61	70	68	68
9	62	58	50	50	49	49	54	56	58	70	68	--
10	68	62	54	48	54	50	54	57	59	70	68	68
11	64	63	54	49	54	49	55	58	62	70	69	69
12	66	61	55	50	--	50	55	58	64	70	70	70
13	63	61	52	50	--	51	52	57	63	70	69	70
14	66	63	53	51	50	50	52	57	64	70	70	70
15	64	59	54	56	48	50	49	60	65	71	65	70
16	66	58	54	49	48	50	49	60	66	71	65	70
17	65	59	55	48	51	51	54	60	66	70	69	70
18	64	58	53	57	50	52	55	60	66	70	70	70
19	63	59	53	50	50	52	55	57	66	70	70	69
20	65	60	55	46	49	50	55	57	67	70	70	69
21	65	53	55	54	50	50	55	60	67	68	68	68
22	64	60	53	44	50	49	55	60	67	69	68	68
23	64	60	--	44	53	48	55	62	66	68	68	68
24	65	59	54	45	51	52	55	63	66	68	68	68
25	63	54	--	45	52	52	58	61	--	64	70	69
26	61	50	55	44	50	47	58	61	68	--	70	69
27	64	57	51	44	54	57	55	60	66	66	68	69
28	63	57	50	45	50	52	55	60	66	68	68	68
29	63	58	51	44	--	53	57	59	67	68	68	68
30	63	53	53	44	--	53	57	60	68	68	68	68
31	64	--	54	45	--	53	--	--	--	68	69	--
Average	64	59	54	48	--	51	54	58	64	69	68	69

BUFFALO RIVER NEAR ST. JOE, ARK.

LOCATION.--At gaging station at bridge on U. S. Highway 65, 1 1/4 miles downstream from Mill Creek, 4 miles upstream from Bear Creek, and 4 1/2 miles southeast of St. Joe, Seary County.

DRAINAGE AREA.--825 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1953 to September 1957.

Water temperatures: October 1956 to September 1957.

EXTREMES, 1956-57.--Dissolved solids: Maximum, 219 ppm June 19; minimum, 62 ppm Apr. 22-28, 30.

Hardness: Maximum, 204 ppm June 19; minimum, 62 ppm Apr. 22-28, 30.

Specific conductance: Maximum daily, 348 microhos June 19; minimum daily, 112 microhos Mar. 25, Apr. 30.

Water temperatures: Maximum, 89°F July 25; minimum, 34°F Jan. 17, 18.

REMARKS.--Records of specific conductance of daily samples available in district office at Fayetteville, Ark. Records of discharge for water year October 1956 to September 1957 given in WSP 1511.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Hardness as CaCO <sub>3</sub>		Specific conductance (micro-mhos at 25°C)	pH	Color	
													Calcium-magnesium	Non-carbonate				
Oct. 1-10, 1956	13.2	4.8	0.02	43	5.1	3.4	1.4	141	8.6	4.5	0.2	1.9	146	126	10	239	7.3	7
Oct. 11-20	12.5	4.3	.01	43	4.0	3.2	1.8	137	10	3.5	.3	3.0	151	124	11	242	7.5	5
Oct. 21-31	22.9	4.2	.01	43	4.4	3.0	1.3	140	7.2	4.8	.1	2.0	150	125	11	244	7.5	7
Nov. 1-10	32.5	4.4	.01	50	2.6	3.4	1.4	148	9.2	5.5	.1	3.0	160	135	14	254	8.1	7
Nov. 11-20	36.8	5.6	.00	45	5.1	3.2	2.1	154	4.8	4.0	.1	2.2	159	133	7	262	8.2	5
Nov. 21-30	108	4.2	.00	46	5.5	3.7	2.3	160	5.2	4.0	.1	3.1	166	137	6	273	7.9	7
Dec. 1-10	79.0	3.7	.00	45	4.6	2.8	1.6	148	11	3.0	.1	1.9	156	131	10	259	7.9	5
Dec. 11-20	136	3.9	.00	39	4.9	2.7	1.8	134	6.0	3.0	.1	2.2	144	117	8	236	7.9	5
Dec. 21-31	199	3.7	.00	39	4.1	2.9	1.7	116	7.6	3.5	.1	4.1	144	114	11	230	7.9	6
Jan. 1-10, 1957	124	2.0	.00	37	4.5	2.7	1.5	111	16	3.0	.1	2.9	146	111	16	226	7.7	7
Jan. 11-22	65.4	---	---	38	4.3	3.2	---	126	5.6	3.5	---	2.9	148	112	9	223	7.9	7
Jan. 23-31	1,190	---	---	25	2.2	2.6	---	77	4.4	3.5	---	3.5	99	71	8	153	7.6	17
Feb. 1-10	2,326	4.6	.00	22	2.5	2.3	.7	71	8.8	2.0	.1	2.4	80	65	7	143	6.7	13
Feb. 11-20	1,172	---	---	25	2.5	2.2	---	76	8.6	3.0	---	2.9	90	73	10	149	7.7	8
Feb. 21-23, 25-28	3,108	---	---	25	1.9	2.1	---	77	4.4	3.5	---	5.7	90	70	7	147	7.8	20
Feb. 24	849	---	---	---	---	---	---	a154	4.0	2.8	---	2.2	b161	138	12	257	8.6	---
Mar. 1-10	1,270	3.9	.00	27	2.0	3.4	.5	85	8.8	3.0	.0	2.8	92	78	6	158	7.4	7
Mar. 11-24	576	---	---	27	5.5	2.9	1.2	98	8.4	5.8	---	1.2	136	90	10	201	7.2	8
Mar. 25-31	1,953	---	---	21	3.5	2.3	.9	75	6.4	2.8	---	1.0	93	67	5	149	7.3	15
Apr. 1-10	9,009	3.7	.00	27	2.2	2.5	.9	82	5.6	3.5	.1	2.9	94	76	9	155	7.4	17
Apr. 11-20	1,750	---	---	27	4.3	2.6	.6	94	7.0	2.5	---	1.0	101	85	8	174	7.4	10
Apr. 21	3,180	---	---	---	---	---	---	142	5.0	2.5	---	1.0	b138	123	7	219	7.9	---
Apr. 22-28, 30	9,988	---	---	21	2.4	2.4	1.2	72	3.6	2.2	---	2.0	98	62	3	126	7.3	20
Apr. 29	11,900	---	---	---	---	---	---	140	5.0	1.5	---	1.0	b126	120	5	201	7.8	---

a Includes equivalent of 6 parts per million of carbonate (CO<sub>3</sub>).

b Estimated from specific conductance.

WHITE RIVER BASIN--Continued  
 BUFFALO RIVER NEAR ST. JOE, ARK.--Continued

Chemical analyses, in parts per million, water year October 1956 to September 1957.--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Hardness as CaCO <sub>3</sub>		Specific conductance (micro-mhos at 25°C)	pH	Color	
													Calcium, mg-nesium	Non-carbonate				
May 1-10, 1957	4,066	4.0	0.00	29	2.6	2.2	0.8	96	6.0	2.5	0.2	1.4	104	83	4	187	7.5	7
May 11-13	2,870	--	--	38	2.3	2.8	1.4	124	2.6	3.0	--	--	140	104	3	215	7.9	10
May 14-20	8,007	--	--	25	2.1	2.1	1.0	86	3.4	1.5	--	1.5	102	71	1	152	7.5	10
May 21-31	7,765	--	--	29	2.4	2.3	1.1	100	4.2	2.0	--	1.6	110	82	0	173	7.5	10
June 1	1,960	--	--	29	2.4	2.3	1.1	150	5.0	2.0	--	1.6	b148	126	3	238	8.0	--
June 2-9	3,660	4.3	.00	30	2.5	2.4	.8	99	6.6	1.5	.2	2.3	112	85	4	170	7.4	8
June 10	10,700	--	--	--	--	--	--	158	3.0	2.0	--	1.2	b158	142	12	251	8.1	--
June 11	5,260	--	--	--	--	--	--	169	2.0	3.0	--	3.8	b189	144	5	269	8.1	--
June 12-18, 20	3,978	--	--	30	2.9	2.4	1.4	108	4.8	2.2	--	1.3	116	87	0	182	7.9	8
June 19	1,450	--	--	--	--	--	--	201	2.0	2.0	--	1.0	b219	204	38	348	8.1	--
June 21-30	1,572	--	--	40	3.5	2.5	1.7	120	4.0	3.5	--	3.3	152	114	8	238	7.4	8
July 1-10	684	4.6	.00	38	3.2	2.7	1.1	124	5.6	2.0	.1	1.7	136	108	6	208	7.3	8
July 11-20	206	--	--	40	4.8	3.0	1.4	144	4.8	2.5	--	1.1	124	120	2	236	8.0	7
July 21-31	229	--	--	42	3.6	3.1	1.0	142	4.8	2.5	--	1.2	142	120	3	221	7.7	7
Aug. 1-10	143	4.2	.15	44	3.5	3.0	.9	146	4.8	2.0	.1	1.6	150	128	5	244	7.9	7
Aug. 11-15, 17-19	682	--	--	33	2.6	2.4	.9	116	4.2	2.0	--	2.0	128	96	3	194	8.1	7
Aug. 16, 20-31	245	--	--	43	3.1	3.4	1.0	138	4.2	3.0	--	2.9	152	120	7	236	7.6	5
Sept. 1-10	183	4.6	.12	43	3.6	2.8	.8	142	5.8	3.0	.0	.9	144	122	6	238	7.9	5
Sept. 11-14, 16-20	118	--	--	42	4.1	3.1	.8	143	6.0	2.8	--	1.2	148	122	4	236	8.1	6
Sept. 15	116	--	--	--	--	--	--	240	2.0	1.5	--	.1	b186	173	0	316	8.2	--
Sept. 21-30	314	--	--	43	3.9	3.0	1.0	142	6.0	3.2	--	.9	146	123	7	237	8.1	6
Average	1,694	--	--	35	3.5	2.8	1.2	126	5.8	2.9	--	2.0	135	102	0	215	--	9

b Estimated from specific conductance.

## WHITE RIVER BASIN--Continued

## BUFFALO RIVER NEAR ST. JOE, ARK.--Continued

Temperature (°F) of water, water year October 1956 to September 1957

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	72	65	45	45	44	--	55	64	--	75	80	78
2	66	55	40	42	44	50	55	63	66	75	80	76
3	66	57	43	45	45	49	57	62	65	78	78	76
4	64	56	46	46	48	48	54	66	68	80	78	78
5	59	59	54	45	45	49	55	65	68	79	76	78
6	61	62	55	46	47	49	50	64	64	79	75	78
7	62	52	56	46	48	48	55	--	73	80	75	77
8	58	57	50	44	50	48	54	65	73	79	76	76
9	66	52	41	49	54	46	50	67	74	80	76	74
10	59	41	42	41	54	51	51	70	69	81	76	74
11	57	55	45	42	52	52	61	69	67	79	76	73
12	70	57	45	40	51	53	50	73	76	79	75	73
13	66	46	45	40	49	52	50	65	73	80	78	73
14	62	55	49	40	49	55	52	65	75	81	78	74
15	63	60	50	40	49	51	55	--	74	82	77	70
16	62	46	48	36	46	52	56	--	75	68	76	70
17	69	46	46	34	45	54	60	62	74	85	75	76
18	65	50	45	34	47	56	60	69	75	85	75	73
19	60	52	48	40	47	57	63	--	76	84	74	73
20	66	54	50	40	47	55	69	72	75	82	74	73
21	63	45	52	47	45	53	68	67	73	82	75	73
22	69	44	49	52	46	51	64	68	76	80	76	73
23	65	48	51	45	48	52	69	--	75	83	76	72
24	61	45	47	43	48	52	66	--	74	83	76	73
25	65	47	48	45	50	--	63	--	78	89	76	73
26	56	44	44	41	53	50	64	--	78	80	76	73
27	60	46	46	41	49	47	60	--	77	81	76	73
28	50	40	--	41	49	50	62	70	76	82	--	73
29	59	45	44	44	--	51	59	69	76	83	84	72
30	59	44	43	43	--	50	60	65	--	80	80	72
31	57	--	45	44	--	50	--	67	--	80	82	--
Average	62	51	47	43	48	51	58	--	73	81	77	74

WHITE RIVER BASIN--Continued  
NORTH FORK RIVER AT NORFORK DAM, NEAR NORFORK, ARK.

LOCATION.--At gaging station at Norfolk Dam, 4.3 miles northeast of Norfolk, Baxter County.  
DRAINAGE AREA.--1,806 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1946 to August 1957.

REMARKS.--Records of discharge for water year October 1956 to September 1957 given in WSP 1511.

Chemical analyses, in parts per million, October 1956 to August 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Hardness as CaCO <sub>3</sub>		Specific conductance (micro-mhos at 25°C)	pH	Color	
													Calcium-magnesium	Non-carbonate				
Oct. 12, 1956	1,950	2.6	0.00	36	21	1.7	1.4	208	4.4	2.5	0.0	1.8	177	176	6	335	7.5	7
Nov. 30	1,670	3.7	.00	33	21	1.4	1.6	200	4.0	2.0	.0	1.3	171	168	5	315	7.8	7
Dec. 21	647	3.3	.00	33	21	1.3	1.3	196	5.6	1.5	.0	1.3	166	168	8	313	7.6	5
Jan. 4, 1957	978	2.9	.00	33	21	1.2	1.5	194	8.4	1.5	.0	2.5	158	168	10	314	7.5	5
Mar. 7	138	2.3	.00	33	21	1.5	1.6	200	5.2	2.5	.0	1.4	165	169	5	312	8.0	5
Apr. 9	4,390	2.8	.00	34	21	1.2	1.5	200	4.0	2.0	.0	1.0	158	171	7	311	8.0	5
Apr. 19	4,540	2.8	.00	33	21	1.4	1.6	196	5.0	2.0	.0	1.3	166	169	8	313	7.9	5
Apr. 25	4,600	2.8	.00	34	21	1.4	1.7	196	7.2	2.5	.0	1.3	160	171	11	313	8.0	8
May 3	4,620	2.8	.00	33	21	1.2	1.8	196	8.4	2.0	.2	1.7	158	169	8	311	8.1	7
July 16	4,800	1.8	.24	32	17	1.8	1.2	179	2.2	2.0	.0	2.6	154	150	3	279	7.6	15
Aug. 28	1,640	2.6	.00	28	16	1.5	1.5	157	5.0	.5	.3	1.7	144	136	7	241	7.2	8

WHITE RIVER BASIN--Continued  
BLACK RIVER NEAR CORNING, ARK.

LOCATION:--At gaging station at bridge on U. S. Highway 62, 2 1/2 miles east of Corning, Clay County, 13.9 miles downstream from Cane Creek, and at mile 152.2. DRAINAGE AREA.--1,749 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1954 to September 1957.

Water temperatures: October 1956 to September 1957.

EXTREMES, 1956-57.--Dissolved solids: Maximum, 164 ppm Oct. 1-10, 21-31; minimum, 38 ppm Jan. 24.

Hardness: Maximum, 154 ppm Nov. 11-20; minimum, 25 ppm Jan. 24.

Specific conductance: Maximum daily, 323 micromhos Oct. 23; minimum daily, 54.5 micromhos Apr. 7.

Water temperatures: Maximum, 80°F Aug. 3; minimum, 33°F Jan. 16.

REMARKS.--Records of specific conductance of daily samples available in district office at Fayetteville, Ark. Records of discharge for water year October 1956 to September 1957 given in WSP 1511.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue on evaporation at 180°C)	Hardness as CaCO <sub>3</sub>		Specific conductance (micromhos at 25°C)	pH	Color
														Calcium	Non-carbonate			
Oct. 1-10, 1956	272	5.2	0.00	30	17	4.2	1.2	169	6.4	5.0	0.0	2.2	184	145	6	283	7.4	7
Oct. 11-20	263	6.3	.00	31	17	4.0	1.1	174	6.8	4.0	0.0	1.9	157	147	6	279	8.1	8
Oct. 21-31	272	4.8	.00	31	17	4.0	1.0	174	6.8	5.0	0.0	1.6	164	147	5	283	8.0	7
Nov. 1-10, 1957	284	2.8	.01	33	17	3.3	.9	173	7.2	5.0	0.0	1.3	163	152	10	283	7.6	10
Nov. 11-20	295	4.6	.00	32	18	3.0	.9	177	7.2	3.5	.3	1.4	162	154	9	280	8.0	5
Nov. 21-30	459	4.6	.00	30	16	3.3	1.0	166	6.8	4.5	0.0	1.9	150	141	5	288	8.0	7
Dec. 1-10	458	2.8	.00	30	17	3.1	.9	164	7.0	4.5	0.0	1.4	152	145	10	270	7.7	8
Dec. 11-20	770	5.2	.00	28	17	3.0	.8	160	6.6	3.5	0.0	1.5	150	140	9	261	7.5	7
Dec. 21-31	691	6.0	.00	28	16	2.4	.9	151	7.6	3.0	1.1	1.9	140	136	12	248	7.5	8
Jan. 1-10, 1957	530	3.3	.00	30	15	4.6	.8	158	8.0	5.0	0.0	1.9	140	137	7	266	8.0	7
Jan. 11-20	447	--	--	29	16	2.2	--	157	4.4	4.5	--	2.7	133	138	10	260	7.6	5
Jan. 23, 25-28	2,944	--	--	8.7	4.5	2.4	--	42	4.8	2.5	--	4.6	83	83	6	87.6	7.7	33
Jan. 24	2,620	--	--	--	--	--	--	87	18.5	1.2	--	5.6	439	25	7	38.1	7.3	--
Jan. 29-31, Feb. 1-6	2,229	--	--	16	9.5	2.4	--	87	4.0	3.5	--	5.1	117	79	8	165	7.7	27
Feb. 7-11, 28	2,398	--	--	12	5.9	2.3	--	56	5.6	2.5	--	3.1	92	54	8	118	7.7	20
Feb. 12-27	1,956	2.6	.00	18	9.6	3.4	.9	94	7.4	3.5	2.2	2.8	98	84	7	176	6.9	23
Mar. 1-9	2,616	--	--	30	8.6	2.1	1.4	78	7.0	3.5	--	2.0	173	110	46	267	6.8	20
Mar. 10-25	1,211	4.0	.00	21	11.1	3.0	1.8	110	6.8	2.8	--	2.3	116	98	8	189	6.8	6
Mar. 26-31	1,750	--	--	15	8.6	3.2	1.6	84	8.0	3.0	--	2.9	98	73	4	164	7.6	20
Apr. 1-3	2,737	--	--	16	8.1	2.1	1.4	84	7.6	2.8	--	2.1	106	73	4	158	7.4	20
Apr. 4-5, 13-20	4,788	2.5	.44	11	4.6	2.4	1.7	52	7.2	2.0	1.3	1.3	72	47	5	108	7.6	25
Apr. 6-12	13,030	--	--	6.0	2.8	1.8	2.1	30	3.2	3.0	--	1.3	43	26	2	68.8	6.9	40
Apr. 21-30	4,979	--	--	10	5.3	2.2	1.6	53	6.4	3.0	--	1.5	80	47	3	109	7.0	40

a Estimated from specific conductance.

WHITE RIVER BASIN--Continued  
 BLACK RIVER NEAR CORNING, ARK.--Continued

Chemical analyses, in parts per million, water year October 1956 to September 1957--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue on evaporation at 180°C)	Hardness as CaCO <sub>3</sub>		Specific conductance (micro-mhos at 25°C)	pH	Color
														Calcium, nesium	Non-carbonate			
May 1-4, 20-21, 1957..	4,845	--	--	11	5.1	1.7	1.6	54	5.2	2.5	--	1.5	77	48	4	111	7.1	40
May 5-19 .....	3,275	2.8	0.32	15	6.3	3.4	1.1	74	3.4	3.5	0.1	2.4	89	63	3	138	7.4	35
May 22-31 .....	11,660	--	--	8.1	3.3	1.5	1.8	38	3.2	2.0	--	1.4	52	33	3	79.8	6.7	40
June 1-10 .....	4,287	3.3	.00	13	6.3	1.9	1.5	66	6.0	2.0	.5	2.7	86	58	4	124	7.5	18
June 11-20 .....	3,255	--	--	14	7.1	2.1	1.3	76	6.0	2.2	--	1.2	101	64	2	138	7.0	22
June 21-30 .....	3,117	--	--	14	6.8	2.0	1.2	72	4.8	2.0	--	1.3	98	63	4	139	7.0	25
July 1-8 .....	6,934	--	--	10	4.1	2.0	1.6	46	4.8	3.0	--	3.2	78	42	4	94.4	7.0	35
July 9-20 .....	2,507	6.8	.29	16	7.2	2.6	1.1	84	4.0	2.5	.1	1.8	94	70	1	140	7.8	15
July 21-31 .....	3,095	--	--	16	7.0	2.0	1.1	84	3.0	2.0	--	2.2	92	69	0	136	7.6	15
Aug. 1-10 .....	3,385	5.6	.26	16	7.0	2.0	1.2	84	2.8	2.2	.1	1.5	90	69	0	138	7.2	12
Aug. 11-20 .....	3,371	--	--	18	7.5	1.9	1.1	90	2.8	1.8	--	1.0	96	76	2	149	7.2	12
Aug. 21-31 .....	3,064	--	--	23	6.4	2.2	1.2	96	3.6	2.5	--	2.8	104	84	5	158	7.2	10
Sept. 1-10 .....	2,592	2.6	.15	21	9.5	2.1	1.1	108	3.4	2.5	.1	1.6	112	91	3	176	7.8	10
Sept. 11-20 .....	1,936	--	--	22	10	2.8	1.1	113	4.8	3.0	--	2.1	121	96	3	193	7.8	8
Sept. 21-30 .....	1,819	--	--	24	10	2.5	1.1	122	3.6	2.0	--	1.8	122	101	1	186	7.9	7
Average .....	2,653	--	--	20	9.9	2.6	1.2	101	5.8	3.8	--	2.1	112	90	8	178	--	18

a Estimated from specific conductance.

## WHITE RIVER BASIN

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## WHITE RIVER BASIN--Continued

## BLACK RIVER NEAR CORNING, ARK.--Continued

Temperature (°F) of water, water year October 1956 to September 1957

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	70	62	44	42	40	50	48	72	73	74	77	76
2	70	62	45	39	41	47	50	71	68	73	79	77
3	71	63	50	41	43	46	57	67	70	75	80	77
4	72	63	52	41	42	47	61	--	70	77	79	76
5	72	64	54	42	42	45	56	62	71	77	76	75
6	72	62	56	42	43	46	57	67	72	78	74	74
7	69	62	52	42	44	47	61	65	75	78	75	71
8	65	57	46	43	46	44	57	65	75	79	76	70
9	64	53	45	51	50	45	52	68	75	78	77	70
10	64	54	46	41	50	47	60	69	75	77	78	71
11	64	55	46	41	48	50	61	70	76	76	78	73
12	65	53	46	42	51	52	52	70	76	76	79	78
13	65	56	43	38	50	54	51	67	75	77	77	74
14	66	59	44	35	46	55	53	70	77	77	78	75
15	66	54	47	36	45	54	54	71	77	76	79	75
16	65	--	45	33	45	55	55	71	78	77	77	73
17	65	49	47	39	47	55	61	72	78	77	76	73
18	65	52	43	35	45	55	62	72	78	77	75	74
19	64	50	45	36	44	52	67	68	75	78	75	75
20	65	68	49	36	43	52	69	69	75	77	75	75
21	64	50	49	45	45	50	68	70	76	78	75	75
22	65	44	48	49	47	49	71	--	75	78	75	72
23	65	50	49	44	49	52	72	70	75	77	75	71
24	66	46	46	43	52	58	72	70	74	77	74	70
25	66	47	45	42	52	52	72	72	73	76	74	70
26	63	42	47	48	45	49	69	72	74	77	76	70
27	60	42	48	39	51	52	72	71	75	77	77	70
28	60	44	43	39	47	55	71	71	75	77	77	69
29	60	41	43	37	--	56	72	71	76	76	78	68
30	62	40	44	37	--	56	72	72	73	76	78	69
31	61	--	45	38	--	57	--	73	--	77	79	--
Average	66	53	47	41	46	51	62	70	74	77	77	73

WHITE RIVER BASIN--Continued  
CURRENT RIVER NEAR POCAHONTAS, ARK.

LOCATION --At bridge on U. S. Highway 67 near Pocahontas, Randolph County.  
RECORDS AVAILABLE--Chemical analyses: October 1954 to September 1957.  
REMARKS.--No records of discharge available for this station.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue on evaporation at 180°C)	Hardness as CaCO <sub>3</sub>		Specific conductance (micro-mhos at 25°C)	pH	Color
														Calcium-magnesium	Non-carbonate			
Oct. 25, 1956	.....			37	22	1.9	--	215	4.0	2.8		1.9	214	183	7	341	7.8	5
Nov. 29	.....			19	22	1.6	--	a165	2.8	2.5		1.2	146	138	3	261	8.4	5
Dec. 19	.....			36	22	2.2	--	211	4.4	2.5		2.1	198	180	7	338	7.5	5
Jan. 17, 1957	.....			36	22	1.9	--	211	4.0	2.5		2.6	183	180	7	335	7.9	5
Feb. 13	.....			25	15	1.7	--	139	4.4	2.5		3.2	134	124	10	238	8.2	15
Mar. 14	.....			24	18	1.8	1.0	152	5.6	2.5		2.4	144	134	9	227	7.7	2
Apr. 9	.....			12	8.2	.9	1.6	74	4.0	1.0		1.8	92	64	3	128	7.4	1
June 20	.....			27	16	4.8	1.2	a162	5.4	2.0		1.6	156	133	0	251	8.4	5
July 11	.....			23	14	1.5	1.2	140	3.8	1.5		1.9	128	115	0	216	7.9	2
Aug. 8	.....			31	18	2.4	1.0	184	4.4	2.5		1.0	164	151	1	289	8.0	--
Sept. 25	.....			37	19	2.1	1.0	202	4.6	2.6		1.1	171	170	5	303	8.0	2

a Includes equivalent of 3 parts per million of carbonate (CO<sub>3</sub>).

WHITE RIVER BASIN--Continued  
 SPRING RIVER AT IMBODEN, ARK.

LOCATION.--At gaging station at bridge on U.S. Highway 62 at Imboden, Lawrence County, 3.9 miles downstream from Janes Creek, 8.5 miles upstream from Eleven Point River, and 12.1 miles upstream from mouth.

DRAINAGE AREA.--1,162 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1953 to September 1957.

Water temperatures: December 1955 to September 1957.

EXTREMES, 1956-57.--Dissolved solids: Maximum, 239 ppm Aug. 21-31; minimum, 81 ppm Apr. 5.

Hardness: Maximum, 227 ppm Sept. 21-30; minimum, 69 ppm Apr. 5.

Specific conductance: Maximum daily, 460 micromhos Dec. 17; minimum daily, 145 micromhos Apr. 5.

Water temperatures: Maximum, 79°F July 17, 18, 23, Aug. 3; minimum, 34°F Jan. 17-19.

EXTREMES, 1955-57.--Dissolved solids: Maximum, 312 ppm Jan. 6, 1956; minimum, 81 ppm Apr. 5, 1957.

Hardness: Maximum, 248 ppm Jan. 21-31, 1956; minimum, 69 ppm Apr. 5, 1957.

Specific conductance: Maximum daily, 557 micromhos Jan. 6, 1956; minimum daily, 145 micromhos Apr. 5, 1957.

Water temperatures: Maximum, 82°F on several days during July and August 1956; minimum, 34°F Jan. 17-19, 1957.

REMARKS.--Records of specific conductance of daily samples available in district office at Fayetteville, Ark. Records of discharge for water year October 1956 to September 1957 given in WSP 1511.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue on evaporation at 180°C)	Hardness as CaCO <sub>3</sub>		Specific conductance (micro-mhos at 25°C)	pH	Color
															Calcium, magnesium	Non-carbonate			
Oct. 1-10, 1956.....	282	5.8	0.00	30	30	2.4	1.0	232	0	7.2	3.5	0.0	2.0	190	198	8	351	8.1	5
Oct. 11-20.....	272	--	--	30	30	2.6	--	236	0	10	4.0	--	1.8	194	198	5	364	7.6	5
Oct. 21-31.....	289	--	--	36	30	2.4	--	250	0	8.8	3.5	--	1.4	209	213	6	381	8.0	5
Nov. 1-10.....	305	--	--	34	28	2.1	--	240	0	9.2	2.5	--	1.3	190	200	3	358	8.2	5
Nov. 11-20.....	294	--	--	40	29	2.1	--	266	0	1.8	2.0	--	1.6	209	219	1	398	7.8	5
Nov. 21-30.....	372	--	--	37	29	3.2	--	252	0	7.6	3.0	--	1.3	194	212	5	387	8.0	7
Dec. 1-10.....	374	--	--	35	30	2.0	--	250	0	8.8	2.0	--	1.9	200	211	6	375	8.2	5
Dec. 11-20.....	377	--	--	40	29	3.0	--	259	0	4.0	4.0	--	1.6	229	219	7	394	8.0	8
Dec. 21-31.....	385	--	--	39	29	2.7	--	256	0	4.0	2.0	--	1.8	213	217	7	391	8.0	5
Jan. 1-10, 1957.....	353	4.6	0.00	33	30	3.3	1.3	244	0	4.4	2.5	0.0	1.2	198	206	6	365	7.8	10
Jan. 11-20.....	306	--	--	31	29	2.6	--	235	0	4.8	2.5	--	2.0	197	197	4	363	7.9	7
Jan. 21-31.....	879	--	--	36	25	3.1	--	222	2	3.2	4.5	--	3.5	207	193	7	357	8.3	7
Jan. 22.....	5,910	--	--	--	--	--	--	162	0	4.0	1.5	--	1.3	148	150	17	264	8.2	--
Jan. 23.....	2,570	--	--	--	--	--	--	129	3	6.0	2.5	--	1.3	138	128	17	232	8.3	--
Feb. 1-5, 10-15.....	1,296	--	--	44	25	2.0	--	241	2	3.6	2.8	--	4.7	210	213	12	379	8.3	8
Feb. 6-9, 16-18.....	3,179	--	--	32	16	2.2	--	166	0	4.6	3.5	--	4.8	154	146	10	276	8.2	27
Feb. 19-28.....	1,796	--	--	41	22	2.3	--	220	0	3.4	2.8	--	5.1	200	193	12	347	8.1	13
Mar. 1-10.....	1,268	--	--	35	26	1.9	0.9	220	0	6.8	2.5	--	3.7	195	164	14	350	8.2	8
Mar. 11-30.....	788	--	--	33	26	2.6	1.0	222	0	4.8	3.0	--	2.0	199	189	7	360	7.8	8
Mar. 21-31.....	735	--	--	31	30	2.7	1.0	235	0	5.2	2.5	--	2.7	201	201	8	374	7.7	8

a Estimated from specific conductance.

WHITE RIVER BASIN--Continued  
 SPRING RIVER AT IMBODEN, ARK.--Continued

Chemical analyses, in parts per million, water year October 1956 to September 1957--Continued

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Mag-nesium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Car-bonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue on evaporation at 180° C)	Hardness as CaCO <sub>3</sub>		Specific conductance (micro-mhos at 25° C)	pH	Color
															Calcium	Non-carbonate			
Apr. 1-2, 7-15, 1957	2,577	6.7	0.00	43	22	3.2	1.0	228	0	9.2	3.5	0.1	3.7	208	198	11	359	7.9	7
Apr. 3	15,700							128	2	7.0	4.2		3.3	a135	120	12	240	8.3	
Apr. 4	47,800							85	0	8.0	2.2		3.5	a90	78	8	161	8.0	
Apr. 5	18,800							76	0	8.0	5		3.9	a81	69	7	145	8.0	
Apr. 6	5,790							155	5	4.0	2.5		5.3	a157	116	0	279	8.5	
Apr. 16-22, 25-26, 30	3,669					1.8	1.2	219	0	5.2	2.5		3.0	a199	191	12	358	7.6	10
Apr. 23	8,430							104	0	3.0	5		3.4	a106	94	9	169	8.0	
Apr. 24, 27-29	10,450					1.9	1.4	144	0	3.8	2.0		2.1	a139	124	6	244	8.2	28
Apr. 1-10	3,259					3.2	2.0	199	2	3.4	3.0		3.1	a182	170	3	312	8.3	10
May 11-27	6,234					3.6	1.9	188	0	5.4	3.0		2.8	a174	158	4	288	7.4	5
May 28-31	3,023					3.9	1.9	211	0	7.2	3.0		3.0	a190	179	7	325	8.2	5
June 1-10	2,378					3.4	2.1	214	0	7.4	2.0		2.4	a184	179	3	328	7.9	5
June 11-20	1,868					3.6	2.3	225	0	7.2	3.0		2.4	a195	187	2	343	8.1	5
June 21-30	1,920					3.9	2.3	244	0	7.0	2.0		2.1	a216	205	5	374	7.6	5
July 1-10	5.6		15	22	25	2.5	2.9	168	8	3.4	1.8	0	3.2	a164	158	7	287	8.4	7
July 11-20	730					2.7	1.3	172	10	4.0	2.2		3.5	a168	162	4	292	8.5	7
July 21-31	741					2.6	1.1	188	8	4.0	2.5		2.3	a180	168	0	309	8.5	6
Aug. 1-10	598					2.5	.9	192	10	4.4	2.0		3.2	a186	182	8	323	8.5	5
Aug. 11-20	562					2.8	1.9	220	8	3.6	2.0		1.8	a202	198	4	348	8.4	7
Aug. 21-31	494					2.4	1.1	210	10	4.2	2.2		2.9	a239	195	6	343	8.6	7
Sept. 1-10	501					2.8	1.0	228	12	3.8	1.8		2.9	a208	214	7	371	8.5	5
Sept. 11-20	497					2.2	.9	216	14	3.8	2.5		2.2	a201	207	7	364	8.6	6
Sept. 21-30	379					2.5	.9	248	12	2.2	2.0		2.2	a225	227	3	399	8.5	5
Average	1,624					2.7	--	206	3	5.4	2.6		2.7	a184	184	22	327	--	8

a Estimated from specific conductance.

WHITE RIVER BASIN--Continued  
 SPRING RIVER AT IMBODEN, ARK.--Continued

Temperature (°F) of water, water year October 1956 to September 1957

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	67	59	40	42	42	47	56	66	69	74	78	74
2	69	58	41	41	40	49	58	66	67	74	78	75
3	70	60	43	40	44	48	56	64	66	73	79	74
4	70	61	44	43	46	46	55	60	67	76	78	73
5	68	62	50	42	44	47	54	60	68	76	72	73
6	67	62	52	42	45	49	51	60	69	75	70	72
7	68	60	56	42	44	47	55	62	71	76	72	70
8	63	67	53	42	48	43	55	63	73	76	74	68
9	62	51	48	46	52	45	53	65	73	77	73	67
10	62	50	45	43	52	47	54	58	73	76	74	68
11	61	51	46	42	52	53	55	66	73	76	76	68
12	63	53	45	41	51	52	56	66	75	76	76	71
13	63	51	45	40	49	52	47	67	75	77	75	70
14	63	54	45	39	49	56	52	66	75	78	76	71
15	63	57	46	38	49	52	58	68	75	78	75	71
16	63	50	46	36	45	52	54	68	76	78	78	70
17	63	49	46	34	43	55	55	68	77	79	75	69
18	63	47	45	34	45	53	59	69	77	79	72	70
19	62	48	45	34	46	53	60	66	75	78	71	70
20	63	52	47	36	44	51	64	65	74	78	70	71
21	63	49	50	42	44	51	65	68	74	78	71	72
22	64	47	49	50	45	50	65	69	75	78	70	71
23	63	45	50	45	48	50	66	65	73	79	68	67
24	63	45	47	43	49	52	66	68	73	77	71	67
25	62	45	46	42	53	51	66	67	72	75	71	67
26	62	44	45	42	54	50	66	68	72	75	72	67
27	59	42	45	--	51	49	65	66	73	77	73	67
28	58	42	45	40	48	51	63	68	73	78	72	65
29	58	42	44	40	--	53	65	66	74	77	72	65
30	59	40	43	39	--	55	66	68	74	77	73	64
31	60	--	43	40	--	56	--	69	--	77	75	--
Average	63	51	46	41	47	50	59	68	73	77	74	70

## WHITE RIVER BASIN--Continued

## ELEVEN POINT RIVER NEAR RAVENDEN SPRINGS, ARK.

LOCATION.--At gaging station at bridge on State Highway 90, 4 1/4 miles downstream from small tributary, 6 1/2 miles northeast of Ravenden Springs, Randolph County, and 21 miles upstream from mouth.

DRAINAGE AREA.--1,123 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1953 to September 1957.

Water temperatures: October 1956 to September 1957.

EXTREMES, 1956-57.--Dissolved solids: Maximum, 230 ppm Nov. 11-20; minimum, 60 ppm May 23.

Hardness: Maximum, 223 ppm Oct. 11-20, Nov. 1-10; minimum, 51 ppm Apr. 3-5.

Specific conductance: Maximum daily, 434 micromhos Jan. 16; minimum daily, 89.5 micromhos Apr. 4.

Water temperatures: Maximum, 78°F Aug. 11; minimum, 39°F Jan. 19.

REMARKS.--Records of specific conductance of daily samples available in district office at Fayetteville, Ark. Records of discharge for water year October 1956 to September 1957 given in WSP 1511.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue on evaporation at 180°C)	Hardness as CaCO <sub>3</sub>		Specific conductance (micro-mhos at 25°C)	pH	Color
															Calcium, magnesium	Non-carbonate			
Oct. 1-10, 1956.....	279	3.7	0.00	43	27	2.4	1.2	256	0	6.8	2.0	0.0	2.4	224	218	8	380	8.2	5
Oct. 11-20.....	264	4.8	0.00	45	27	2.7	1.2	262	0	6.4	3.2	0.0	2.2	228	223	9	396	8.0	5
Oct. 21-31.....	273	4.3	0.00	42	28	2.2	1.4	257	0	6.4	3.5	0.0	2.1	228	220	9	392	7.7	10
Nov. 1-10.....	274	4.3	0.00	45	27	2.4	1.2	257	0	6.2	3.0	0.0	1.9	224	223	13	394	7.7	8
Nov. 11-20.....	273	4.6	0.00	45	26	2.1	1.4	254	3	2.0	2.0	0.0	1.9	230	219	6	384	8.5	5
Nov. 21-30.....	307	5.3	0.00	36	26	2.1	1.6	228	2	2.4	2.5	1.1	2.2	202	197	6	353	8.3	5
Dec. 1-10.....	284	4.6	0.00	36	26	2.1	1.5	236	0	2.6	2.0	1.1	2.2	204	197	3	361	8.0	5
Dec. 11-20.....	312	3.7	0.00	38	25	1.9	1.5	232	2	1.6	2.0	0.0	2.1	260	198	4	354	8.3	5
Dec. 21-31.....	310	5.6	0.00	37	25	1.9	1.4	232	0	2.0	1.5	0.0	2.5	202	195	5	355	8.2	5
Jan. 1-10, 1957.....	273	3.7	0.00	47	24	3.5	1.4	260	0	6.4	2.5	0.0	1.7	219	216	3	387	8.2	8
Jan. 11-20.....	253	---	---	46	24	3.8	---	236	12	2.8	2.2	---	2.3	224	213	0	354	8.5	10
Jan. 21-31.....	720	---	---	34	20	2.1	---	196	0	4.2	2.2	---	3.7	182	167	6	312	8.2	20
Feb. 1-10.....	912	5.1	0.00	41	22	3.0	1.3	205	4	7.8	2.5	0.0	2.8	192	193	10	342	8.4	10
Feb. 11-20.....	850	---	---	39	21	2.2	---	213	0	4.8	2.5	---	4.9	186	184	9	335	8.2	8
Feb. 21-28.....	874	---	---	37	21	2.9	1.1	208	0	4.0	2.5	---	4.8	198	179	8	318	8.1	13
Mar. 1-10.....	853	3.2	0.00	38	21	3.1	0.9	206	0	8.8	2.0	0.0	4.0	186	181	13	326	8.0	7
Mar. 11-20.....	600	---	---	37	22	2.6	1.2	213	0	4.0	3.0	---	2.8	191	183	8	344	7.5	8
Mar. 21-31.....	588	---	---	37	23	2.3	1.1	218	0	3.2	2.0	---	3.4	192	187	8	340	7.7	10
Apr. 1, 6-10.....	3,135	4.2	0.00	29	15	2.9	1.2	156	0	6.8	2.5	0.0	3.8	139	134	6	254	8.0	13
Apr. 2.....	628	---	---	---	---	---	---	189	6	2.0	2.2	---	2.8	184	181	16	328	8.5	---
Apr. 3-5.....	16,380	---	---	12	5.2	1.0	2.2	46	0	4.0	1.0	---	2.6	196	181	2	188	7.1	17
Apr. 11-22.....	1,882	---	---	28	20	3.0	2.2	175	2	4.4	3.2	---	2.7	178	152	6	267	8.3	8

Apr. 23-30, 1967.....	5,139	--	24	12	1.8	1.5	126	0	4.8	1.5	--	2.6	146	109	6	218	7.4	7
May 1-11 .....	2,654	6.4	.00	15	1.6	1.2	148	0	4.4	2.0	.2	3.2	141	129	8	243	7.4	7
May 12 .....	4,710	--	--	--	--	--	114	2	3.0	1.8	--	3.8	a111	107	10	188	8.3	--
May 13-20 .....	2,714	--	--	31	3.2	1.6	153	0	4.0	2.5	--	3.2	154	131	1	210	7.3	8
May 21-22, 25-31 .....	4,553	--	22	16	2.0	1.4	82	0	6.6	1.5	--	3.6	135	121	9	215	7.9	5
May 23 .....	20,500	--	--	--	--	--	62	0	5.0	1.0	--	2.7	80	52	1	102	7.5	--
May 24 .....	14,600	--	--	--	--	--	90	0	5.0	1.5	--	1.0	84	78	4	142	7.8	--
June 1-10 .....	2,305	6.9	.02	29	1.9	.9	162	0	4.6	2.5	.2	2.8	154	142	10	280	7.6	8
June 11-20 .....	7,765	--	--	17	2.2	1.4	175	0	4.4	2.2	--	3.5	167	144	0	271	8.2	5
June 21-30 .....	1,360	--	--	28	2.2	1.3	193	0	4.0	2.2	--	3.0	173	187	0	291	7.9	5
July 1-10 .....	1,160	6.4	.00	29	2.1	.9	181	0	4.0	2.5	.0	4.1	158	155	6	284	7.7	8
July 11-20 .....	1,019	--	--	31	2.5	1.3	205	0	4.0	2.5	--	3.5	204	168	0	314	7.9	7
July 21-31 .....	969	--	--	33	2.4	1.3	216	0	4.2	2.5	--	3.2	192	177	0	312	8.1	7
Aug. 1-10 .....	865	5.7	.00	38	2.1	1.0	220	0	4.0	1.8	.0	2.0	193	185	5	331	7.9	4
Aug. 11-20 .....	776	--	--	39	2.3	1.2	226	0	2.6	2.5	--	2.7	174	188	3	342	8.2	7
Aug. 21-31 .....	690	--	--	39	2.3	1.1	228	0	3.0	6.5	--	2.5	206	200	13	346	8.2	12
Sept. 1-10 .....	748	5.1	.12	38	2.5	.9	223	0	3.4	2.0	.0	2.3	197	189	7	337	8.2	6
Sept. 11-20 .....	618	--	--	42	2.4	.9	238	0	3.4	2.5	--	1.8	206	204	6	356	8.2	5
Sept. 21-30 .....	583	--	--	42	2.6	.8	216	12	2.8	2.5	--	1.8	206	204	6	356	8.3	7
Average .....	1,313	--	--	36	2.4	1.3	197	1	4.3	2.3	--	2.8	180	176	14	308	--	8

a Estimated from specific conductance.

## LOWER MISSISSIPPI RIVER BASIN

## WHITE RIVER BASIN--Continued

## ELEVEN POINT RIVER NEAR RAVENDEN SPRINGS, ARK.--Continued

Temperature (°F) of water, water year October 1956 to September 1957

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	65	62	48	--	46	55	60	67	68	70	73	71
2	67	61	50	--	50	54	60	64	65	69	74	70
3	67	65	50	48	48	51	60	63	67	71	74	70
4	68	65	50	45	50	49	60	65	65	73	73	70
5	70	62	60	50	50	50	54	60	66	72	72	70
6	68	63	48	48	50	50	55	60	63	70	71	68
7	70	62	50	47	52	50	60	65	67	72	64	65
8	63	60	55	50	52	48	58	64	70	72	71	65
9	65	58	50	44	57	49	59	65	69	74	70	65
10	61	55	48	50	58	50	59	65	69	72	75	64
11	62	60	50	46	55	55	59	64	70	70	78	68
12	61	54	50	48	57	55	55	68	71	70	76	70
13	61	55	50	45	53	55	54	65	69	72	74	69
14	62	60	50	44	58	60	56	65	71	74	75	69
15	65	60	50	44	50	53	55	68	71	72	75	68
16	63	60	50	42	50	56	54	67	72	72	75	70
17	63	55	50	40	51	55	56	66	73	73	71	68
18	64	55	48	40	50	57	60	65	69	73	71	68
19	64	55	48	39	50	55	60	64	65	71	70	71
20	64	55	50	40	48	55	55	64	71	72	69	69
21	64	55	55	42	49	53	58	68	69	73	70	70
22	65	55	54	50	49	53	65	62	70	71	69	65
23	64	50	50	45	50	52	67	69	70	74	69	68
24	64	52	50	46	53	53	65	68	69	73	69	69
25	65	50	49	45	58	51	65	69	69	73	70	67
26	60	50	49	--	58	55	64	62	67	73	68	68
27	60	50	48	--	52	50	64	66	70	72	72	68
28	60	48	51	--	50	58	65	65	70	72	71	64
29	60	45	49	--	--	58	68	70	71	70	70	65
30	60	42	48	--	--	59	68	70	70	72	70	60
31	61	--	45	48	--	59	--	--	--	72	70	--
Average	64	56	50	--	52	54	60	65	69	72	72	68

WHITE RIVER BASIN--Continued  
 STRAWBERRY RIVER NEAR POUKKEEPSIE, ARK.

LOCATION.--At gaging station at bridges on State Highway 58, half a mile downstream from Hurricane Creek, and 2½ miles northeast of Poughkeepsie, Sharp County.

DRAINAGE AREA.--476 square miles.

RECORDS AVAILABLE.--Chemical analyses: November 1953 to September 1957.

Water temperatures: October 1956 to September 1957.

EXTREMES, 1956-57.--Dissolved solids: Maximum, 250 ppm Nov. 1-10; minimum, 106 ppm Apr. 2-4, 27-28.

Hardness: Maximum, 240 ppm Nov. 1-10; minimum, 55 ppm Apr. 2-4, 27-28.

Specific conductance: Maximum daily, 456 micromhos Nov. 7; minimum Apr. 4.

Water temperatures: Maximum, 92°F July 7, 15; minimum, 36°F Jan. 16, 18.

REMARKS.--Records of specific conductance of daily samples available in district office at Fayetteville, Ark. Records of discharge for water year October 1956 to September 1957 given in WSP 1511.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal-cium (Ca)	Mag-ne-sium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Car-bonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue on evap-orating at 180°C)	Hardness as CaCO <sub>3</sub>		Specific conduct-ance (micro-mhos/cm at 25°C)	pH	Color
															Calcium, mag-nesium	Non-carbon-ate			
Oct. 1-10, 1956.....	42.7	6.0	0.00	40	29	3.8	2.0	254	0	8.0	4.0	0.1	4.9	225	219	11	394	8.0	7
Oct. 11-20.....	39.6	4.6	.01	43	28	3.2	1.8	262	0	6.8	1.5	.1	3.5	226	222	8	391	8.1	5
Oct. 21-31.....	44.3	3.2	.01	45	28	3.6	.6	264	0	7.6	4.0	.1	2.3	231	237	11	406	8.0	8
Nov. 1-10.....	50.0	3.7	.00	50	28	2.4	1.4	280	0	8.0	3.5	0	1.6	250	240	10	418	7.7	7
Nov. 11-20.....	47.2	5.1	.00	41	29	3.1	1.6	253	0	7.6	2.5	0	1.3	218	222	14	385	8.1	8
Nov. 21-29.....	72.7	4.8	.00	26	28	3.3	1.2	200	0	9.2	2.5	0	1.5	174	172	8	315	8.0	8
Nov. 30, Dec. 1-9..	66.5	3.4	.00	39	28	3.8	1.6	242	2	8.4	2.5	0	1.0	219	212	11	374	8.3	10
Dec. 10-20.....	67.2	4.1	.00	30	26	3.0	1.2	209	0	9.2	3.0	0	1.2	183	182	10	328	7.8	8
Dec. 21-26, 28-31..	92.1	3.7	.00	31	26	3.3	1.3	211	0	7.4	2.5	0	1.1	181	182	9	334	7.9	8
Dec. 27.....	84.0	--	--	--	--	--	--	219	20	2.0	3.8	--	7.7	a246	223	11	412	8.6	--
Jan. 1-7, 11, 13-16,	63.6	5.6	.00	30	25	2.8	1.1	207	0	8.4	2.5	0	1.5	175	178	8	320	8.1	6
18, 1957.....	62.6	--	.00	44	29	2.9	1.4	274	0	5.6	2.5	--	1.9	227	239	4	416	8.0	13
Jan. 8-10, 12, 17 ..	1,459	--	--	12	6.8	1.2	2.9	65	0	4.0	8	--	3.0	c118	58	5	127	7.1	37
Jan. 19-23.....	670	--	--	--	--	--	--	141	2	3.0	1.8	--	5.5	a146	132	15	245	8.4	--
Jan. 24.....	507	--	--	--	--	2.7	1.4	187	0	11	2.5	--	4.4	187	189	15	307	7.5	10
Jan. 26-31.....	647	3.2	.32	39	20	3.2	1.2	202	0	7.6	3.0	0	14	192	180	14	325	7.8	10
Feb. 1-6, 9-13.....	1,005	--	--	20	10	3.4	2.6	106	0	9.4	2.5	0	5.0	130	91	4	198	7.8	15
Feb. 7, 14-16.....	1,010	--	--	--	--	--	--	142	4	3.0	3.0	--	6.0	a153	139	16	307	8.4	--
Feb. 8.....	919	--	--	33	16	3.2	1.7	170	0	11	2.0	--	3.6	166	148	9	274	7.6	10
Feb. 17-28.....	507	3.3	.17	40	21	3.0	1.0	210	0	8.2	2.5	0	3.7	186	186	14	331	8.2	8
Mar. 1-9.....	264	--	--	39	23	3.9	1.7	219	0	9.0	2.5	0	3.7	197	188	8	347	8.2	5
Mar. 10-20.....	265	--	--	37	23	3.5	1.5	216	0	9.0	2.2	--	2.7	187	187	10	344	7.4	5
Mar. 21-31.....	265	--	--	37	23	3.5	1.5	216	0	9.0	2.2	--	2.7	187	187	10	344	7.4	5

a Estimated from specific conductance.  
 c Includes organic matter present.

WHITE RIVER BASIN--Continued  
 STRAWBERRY RIVER NEAR POUHKEEPSIE, ARK.--Continued

Chemical analyses, in parts per million, water year October 1956 to September 1957.--Continued

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Mag-nesium (Mg)	So-dium (Na)	Potas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Car-bonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue on evap-oration at 180°C)	Hardness as CaCO <sub>3</sub>		Specific conductance (micro-mhos at 25°C)	pH	Color
															Calcium, mag-nesium	Non-carbonate			
Apr. 1, 1957.....	439	--	--	--	--	--	--	167	0	2.0	2.5	--	1.9	a 228	146	9	382	8.0	--
Apr. 2-4, 27-28....	11,860	--	--	13	5.4	1.9	2.6	66	0	3.4	1.0	--	2.1	c 1068	55	1	126	7.3	45
Apr. 5-20.....	1,472	6.5	0.00	27	2.1	2.1	1.8	168	0	6.0	2.5	0.3	3.8	155	150	12	287	8.1	9
Apr. 21-26, 29-30..	3,482	--	--	26	14	1.8	1.8	142	0	6.0	2.0	--	2.5	143	122	6	229	8.0	10
May 1-10.....	900	7.7	.00	36	20	2.3	1.0	200	0	6.0	3.0	.3	3.5	178	172	8	302	7.7	10
May 11-19.....	728	--	--	36	20	2.6	2.0	192	6	6.2	3.5	--	3.6	203	172	5	314	8.4	8
May 20-31.....	2,359	--	--	34	16	2.6	1.6	174	4	5.2	2.5	--	2.2	181	151	1	288	8.3	8
June 1-10.....	712	8.0	.01	30	20	2.7	1.1	184	0	5.6	2.0	.0	2.3	168	157	6	282	7.7	5
June 11-19.....	261	--	--	22	22	2.8	1.6	170	3	3.6	2.5	--	2.0	170	145	1	278	8.3	5
June 20-30.....	171	--	--	30	15	1.9	1.7	158	0	4.8	2.8	--	3.7	165	137	7	263	7.5	8
July 1-10.....	278	6.3	.01	26	24	2.6	1.1	194	0	5.6	2.5	.0	1.7	188	164	5	294	7.8	5
July 11-20.....	113	--	--	28	24	2.6	1.1	182	8	4.0	2.0	--	1.9	170	169	6	309	8.4	5
July 21-31.....	164	--	--	37	23	2.6	1.1	202	10	4.4	2.5	--	1.8	188	187	5	328	8.5	6
Aug. 1-10.....	91.1	4.5	.15	31	23	2.3	1.0	188	8	4.0	2.0	.0	1.0	172	172	5	312	8.4	6
Aug. 24-31.....	70.5	--	--	31	25	2.5	1.1	188	12	4.4	2.5	--	3.0	180	180	6	323	8.5	7
Sept. 1-10.....	135	3.0	.15	38	25	3.1	1.3	202	14	3.6	2.5	.0	4.6	202	198	9	355	8.6	7
Sept. 11-20.....	75.0	--	--	43	25	3.1	1.2	226	10	4.4	2.0	--	1.4	206	210	8	363	8.6	8
Sept. 21-30.....	68.4	--	--	38	24	2.3	1.4	204	12	4.2	2.5	--	1.3	188	194	6	338	8.5	10
Average.....	b 648	--	--	33	22	2.6	1.5	194	3	6.2	2.5	---	3.2	185	173	9	315	--	10

a Estimated from specific conductance.

b Represents 96 percent of runoff for water year October 1956 to September 1957.

c Includes organic matter present.

## WHITE RIVER BASIN--Continued

## STRAWBERRY RIVER NEAR POUGHKEEPSIE, ARK.--Continued

Temperature (°F) of water, water year October 1956 to September 1957

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	69	62	40	45	40	54	62	69	71	84	75	83
2	70	63	46	45	42	56	--	68	67	89	79	75
3	69	63	47	44	44	55	56	69	70	85	83	80
4	71	60	44	43	41	56	56	68	69	89	80	81
5	75	61	45	--	46	52	55	66	72	90	81	81
6	73	60	46	43	47	50	56	65	76	81	87	85
7	71	61	45	44	51	51	55	67	76	92	79	79
8	71	54	44	42	52	52	57	68	77	87	80	77
9	70	52	46	41	--	53	58	68	75	89	81	80
10	65	53	47	46	52	55	56	69	80	82	80	75
11	67	52	46	40	54	57	57	73	82	64	--	73
12	68	62	45	46	54	60	54	73	85	90	--	79
13	68	60	47	45	55	57	55	74	85	89	--	73
14	66	59	46	39	--	61	47	71	79	86	--	70
15	67	52	45	39	47	59	49	72	85	92	--	71
16	70	52	44	36	45	60	55	73	83	90	--	75
17	67	52	47	50	44	47	56	69	71	--	--	72
18	66	44	46	36	43	55	60	--	71	75	--	70
19	--	45	47	46	46	50	63	73	72	79	--	70
20	--	46	46	--	45	56	66	74	73	78	--	72
21	--	46	45	54	46	57	67	73	74	80	--	71
22	--	43	46	54	49	55	66	72	71	83	--	72
23	--	46	47	47	50	56	69	71	73	78	--	79
24	67	45	46	43	49	57	70	69	75	79	81	70
25	67	40	45	40	47	56	69	70	75	80	79	69
26	66	42	45	43	55	59	--	71	71	85	83	73
27	60	40	44	42	53	60	65	69	75	81	82	69
28	61	41	45	41	54	60	77	70	79	80	78	70
29	60	42	44	42	--	61	74	69	81	80	80	61
30	61	42	46	43	--	60	69	68	85	79	81	71
31	61	--	44	41	--	62	--	70	--	81	84	--
Average	67	51	45	43	48	56	61	70	76	83	--	74

## WHITE RIVER BASIN--Continued

## WHITE RIVER AT NEWPORT, ARK.

LOCATION.--At gaging station at bridge on U.S. Highway 67 at Newport, Jackson County, 7.2 miles downstream from Black River, and at mile 257.6.

DRAINAGE AREA.--19,812 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1957.

Water temperatures: October 1945 to September 1957.

EXTREMES, 1956-57.--Dissolved solids: Maximum, 215 ppm Mar. 15; minimum, 98 ppm Apr. 4-5, 9-11.

Hardness: Maximum, 175 ppm Oct. 11-20; minimum, 82 ppm Apr. 4-5, 9-11.

Specific conductance: Maximum daily, 357 microhos Mar. 15; minimum daily, 143 microhos Jan. 24.

Water temperatures: Maximum, 74°F June 13; minimum, 36°F Jan. 17, 18.

EXTREMES, 1945-57.--Dissolved solids: Maximum, 388 ppm Jan. 20-21, '23, 30, 1954; minimum, 98 ppm Feb. 1-3, 1949, Apr. 4-5, 9-11, 1957.

Hardness: Maximum, 193 ppm Oct. 4-7, 10, 1945; minimum, 51 ppm Jan. 25-31, 1949.

Specific conductance: Maximum daily, 695 microhos Jan. 30, 1954; minimum daily, 103 microhos Jan. 28, 1949.

Water temperatures: Maximum, 87°F Aug. 4, 9, 1947; Aug. 1, 1952; minimum, 34°F Feb. 2-4, 1951.

REMARKS.--Records of specific conductance of daily samples available in district office at Fayetteville, Ark. Records of discharge for water year

October 1956 to September 1957 given in WSP 1511.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue on evaporation at 180°C)	Hardness as CaCO <sub>3</sub>		Specific conductance (microhos at 25°C)	pH	Color
														Calcium	Non-carbonate			
Oct. 1-10, 1956.....	6,305	2.8	0.00	38	18	4.4	1.9	186	8.4	9.0	0.1	3.7	188	173	12	336	7.8	8
Oct. 11-20.....	6,150	--	--	39	19	3.6	--	203	7.2	4.5	--	2.5	184	175	9	328	7.9	10
Oct. 21-31.....	6,211	--	--	40	17	4.2	--	194	6.8	6.0	--	4.2	186	170	11	322	8.2	10
Nov. 1-10.....	7,086	--	--	39	16	3.7	--	193	6.4	4.5	--	3.1	183	163	10	310	7.9	18
Nov. 11-20.....	6,779	--	--	37	18	3.6	--	188	8.8	4.5	--	3.4	187	168	12	315	7.7	8
Nov. 21-30.....	7,416	--	--	35	18	3.6	--	186	9.6	4.5	--	3.0	186	161	9	310	7.7	7
Dec. 1-10.....	7,688	--	--	35	18	3.4	--	186	8.4	4.0	--	2.9	182	161	9	316	8.1	26
Dec. 11-20.....	8,772	--	--	38	17	3.0	--	186	8.0	3.5	--	2.4	178	187	5	304	7.9	7
Dec. 21-31.....	8,311	--	--	36	16	3.0	--	184	9.6	3.5	--	2.1	174	161	10	299	8.0	8
Jan. 1-10, 1957.....	6,968	6.1	.00	37	17	3.5	1.2	191	5.8	3.2	.0	1.0	170	162	6	297	8.3	5
Jan. 11-22.....	7,158	--	--	37	16	3.7	--	187	9.0	5.0	--	2.2	178	158	5	305	8.1	5
Jan. 23-31.....	21,330	--	--	23	9.2	1.8	--	105	9.0	2.0	--	3.2	188	95	9	187	7.8	7
Feb. 1-10.....	21,700	--	--	26	11	1.9	--	126	8.8	2.5	--	3.2	185	110	7	218	7.8	27
Feb. 11-20.....	20,540	--	--	29	11	3.6	2.0	136	8.2	2.5	--	3.9	148	118	6	231	7.1	5
Feb. 21-28.....	21,610	--	--	30	12	4.0	2.1	147	8.6	3.5	--	3.9	150	124	4	208	8.2	5
Mar. 1-10.....	23,710	--	--	31	13	3.4	1.8	150	9.8	3.5	--	3.4	148	131	8	234	8.1	5
Mar. 11-14, 16-20.....	16,790	--	--	33	13	4.1	2.0	156	9.2	3.0	--	2.1	160	136	8	254	8.1	5
Mar. 15.....	16,200	--	--	--	--	--	--	b208	2.0	4.2	--	2.8	c215	140	0	287	8.1	5
Mar. 21-31.....	19,020	--	--	36	12	4.0	2.1	160	7.8	3.0	--	3.0	163	139	8	263	7.5	5
Apr. 1-3, 6-8.....	62,550	--	--	32	8.8	2.6	3.8	133	6.6	2.5	--	5.1	159	116	7	238	8.9	5
Apr. 4-5, 9-11.....	80,020	--	--	20	7.9	2.6	2.5	91	8.6	2.0	--	2.8	98	82	8	180	7.9	18
Apr. 12-20.....	62,520	2.6	.18	25	9.4	2.4	1.5	120	4.2	1.5	.0	2.1	118	101	3	206	7.9	26
Apr. 21-30, May 1-6.....	78,100	--	--	26	9.4	3.3	2.2	118	7.8	2.5	--	2.4	115	104	7	197	7.9	19



LOWER MISSISSIPPI RIVER BASIN  
WHITE RIVER BASIN--Continued  
WHITE RIVER AT NEWPORT, ARK.--Continued

Temperature (°F) of water, water year October 1956 to September 1957

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	68	60	45	45	40	49	54	67	71	70	69	73
2	68	60	46	43	40	50	54	66	71	69	70	72
3	68	61	47	44	41	49	56	67	69	69	70	71
4	69	61	50	44	43	50	56	65	67	70	71	72
5	70	62	51	44	43	48	55	64	68	71	70	72
6	70	61	53	44	44	48	55	64	68	71	69	71
7	--	61	55	44	45	47	55	64	70	71	69	70
8	68	60	56	44	46	46	54	64	71	72	69	68
9	67	56	52	45	47	45	55	65	71	73	69	68
10	65	54	49	46	48	47	55	65	72	73	69	69
11	64	54	48	44	49	48	56	66	71	73	69	68
12	64	54	47	43	51	49	55	67	72	72	70	69
13	64	55	45	44	51	50	53	67	74	73	69	69
14	65	56	46	41	51	53	53	67	73	73	68	70
15	67	58	47	40	50	53	53	66	--	72	71	70
16	66	55	48	38	47	53	53	66	72	72	73	70
17	66	53	48	36	46	54	54	67	--	72	72	69
18	66	53	48	36	47	52	55	66	73	72	71	69
19	65	51	48	37	45	52	56	66	72	72	71	69
20	66	52	49	38	45	51	57	66	72	73	72	68
21	65	52	49	40	45	51	59	67	72	72	72	69
22	64	50	55	45	46	49	60	68	71	70	72	68
23	64	49	50	46	47	49	60	67	70	69	70	66
24	65	48	49	46	46	50	64	66	69	68	70	67
25	65	48	47	--	49	50	65	66	70	68	69	67
26	64	46	46	43	50	49	64	67	70	69	69	67
27	62	44	46	41	50	49	65	67	70	69	70	68
28	60	45	46	38	50	50	64	68	69	69	72	67
29	60	44	45	39	--	50	63	68	70	69	72	68
30	61	44	45	40	--	52	66	69	70	69	72	67
31	63	--	46	41	--	54	--	70	--	68	73	--
Average	65	54	48	42	46	50	57	66	71	71	70	69

WHITE RIVER BASIN--Continued  
LITTLE RED RIVER NEAR HEBER SPRINGS, ARK.

LOCATION --At gaging station, 2 1/2 miles downstream from Peter Creek, and 3 miles northeast of Heber Springs, Cleburne County.  
DRAINAGE AREA --141 square miles.  
RECORDS AVAILABLE --Chemical analyses: November 1949 to September 1952, October 1954 to September 1957.  
Water temperatures: November 1949 to September 1952. Maximum, 58 ppm Aug. 21-24, 1950; minimum, 21 ppm Mar. 17-20, 1951.  
EXTREMES, 1949-52. --Dissolved solids: Maximum, 31 ppm Nov. 11-16, 1950, Aug. 21-31, 1952; minimum, 10 ppm Jan. 4-6, 1952.  
Hardness: Maximum, 126 micromhos Jan. 21, 1951; minimum daily, 25.2 micromhos Jan. 3, 1952.  
Specific conductance: Maximum, 92.7 July 25-28, 1952; minimum, freezing point Feb. 2, 1951.  
Water temperatures: Maximum, 92.7 July 25-28, 1952; minimum, freezing point Feb. 2, 1951.  
REMARKS --Records of specific conductance of daily samples available in district office at Fayetteville, Ark. Records of discharge for water year October 1956 to September 1957 given in WSP 1511.

Chemical analyses, in parts per million, November 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue on evaporation at 180°C)	Hardness as CaCO <sub>3</sub>		Specific conductance (micro-mhos at 25°C)	pH	Color
														Calcium, mg-nessium	Non-carbonate			
Nov. 13, 1956	0.2			4.6	1.5	2.9	1.0	26	2.4	2.0		1.2	28	18	0	53.1	7.3	2
Dec. 18	256			6.2	1.5	1.6	.9	22	3.4	2.5		1.1	40	22	4	55.9	7.2	4
Jan. 1, 1957	458			4.9	1.3	1.5	.6	18	2.8	3.0		1.0	36	18	3	48.1	7.2	3
Feb. 13	2,500			3.6	1.4	1.2	.7	16	2.8	1.8		1.1	32	15	2	38.4	7.2	3
Mar. 5	2,060			4.8	.9	1.4	.5	16	2.6	1.5		1.1	34	18	3	41.4	7.3	7
Apr. 18	1,760			6.4	1.6	1.5	.7	21	6.0	1.8		1.1	38	23	5	51.4	7.3	8
June 19	989			5.8	1.1	1.4	.6	19	1.6	1.8		.6	38	19	1	46.5	6.9	7
Aug. 6	102			6.2	1.2	1.8	1.2	26	1.0	2.2		.7	38	20	0	53.7	7.0	8
Sept. 25	238			6.4	1.4	1.8	1.0	27	1.0	2.5		1.2	41	22	0	54.9	6.8	6

WHITE RIVER BASIN--Continued  
WHITE RIVER AT CLARENDON, ARK.

LOCATION --At gaging station on Cottonbelt Railroad bridge at Clarendon, Monroe County.

DRAINAGE AREA --25,497 square miles.

RECORDS AVAILABLE --Chemical analyses: October 1947 to September 1957.

Water temperatures: October 1948 to September 1957.

EXTRIMES, 1956-57 --Dissolved solids: Maximum, 282 ppm Oct. 14; minimum, 84 ppm Feb. 1-10, 11-20, May 28-31, June 1-11.

Hardness: Maximum, 184 ppm Oct. 14; minimum, 36 ppm Feb. 1-10.

Specific conductance: Maximum daily, 429 micromhos Oct. 14; minimum daily, 81.4 micromhos Feb. 6.

Water temperatures: Maximum, 86° F June 12; minimum, 34° F Jan. 30.

EXTRIMES, 1947-57 --Dissolved solids: Maximum, 349 ppm Nov. 12, 1955; minimum, 38 ppm Feb. 1-9, 1950.

Hardness: Maximum, 202 ppm Apr. 25, 1956; minimum, 29 ppm Mar. 1-10, 1948.

Specific conductance: Maximum daily, 544 micromhos Nov. 12, 1955; minimum daily, 60.7 micromhos Feb. 3, 1950.

Water temperatures, 1948-57: Maximum, 90° F on several days during June and July 1954; minimum, 34° F Dec. 23, 1953, Dec. 20, 1955, Jan. 20, 1956, Jan. 30, 1957.

REMARKS --Records of specific conductance of daily samples available in district office at Fayetteville, Ark. Records of discharge for water year October 1956 to September 1957 furnished by District Office, Corps of Engineers, Memphis, Tenn.

Chemical analyses, in parts per million, water year October 1958 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue on evaporation at 180°C)	Hardness as CaCO <sub>3</sub>		Specific conductance (micro-mhos at 25°C)	pH	Color
														Calcium	Non-carbonate			
Oct. 1-10, 1956	7,576	4.6	0.00	38	18	4.7	1.3	186	11	5.5	0.0	7.2	184	169	16	317	7.8	5
Oct. 11-13, 15-20	6,799	--	--	40	17	4.1	--	a188	5.8	4.5	--	--	182	170	7	316	8.4	10
Oct. 14	6,500	--	--	--	--	--	--	b199	6.0	36	--	5	c282	184	21	439	8.3	--
Oct. 21-31	6,697	--	--	40	17	5.2	--	200	6.0	7.5	--	--	196	170	6	328	8.2	10
Nov. 1-10	7,249	--	--	38	16	3.8	--	184	8.4	4.5	--	1.5	160	158	5	306	7.5	7
Nov. 11-20	7,417	--	--	38	17	3.5	--	186	8.6	4.0	--	--	188	160	7	305	7.9	10
Nov. 21-30	7,562	--	--	38	16	3.9	--	b185	9.8	5.0	--	1.5	181	156	4	286	8.3	7
Dec. 1-10	7,924	--	--	37	16	5.0	--	183	9.8	7.5	--	1.3	171	158	8	312	7.8	7
Dec. 11-20	10,460	--	--	33	15	4.8	--	166	11	7.5	--	1.2	164	144	8	289	7.6	10
Dec. 21-24, 26-31	10,720	--	--	30	13	4.3	--	148	10	5.2	--	2.2	149	123	7	259	7.8	10
Dec. 25	11,200	--	--	--	--	--	--	180	0.0	29	--	6	c232	127	26	353	8.2	--
Jan. 1-10, 1957	9,405	5.7	.00	33	14	3.7	1.5	183	9.6	4.8	.1	1.0	136	140	6	272	7.8	--
Jan. 11-24	8,751	--	--	32	15	4.3	--	184	11	3.5	--	1.4	146	142	7	275	8.0	10
Jan. 25-31	32,030	--	--	13	5.3	2.5	--	61	4.8	3.0	--	2.2	100	54	4	126	7.2	23
Feb. 1-10	50,350	--	--	8.7	3.6	3.8	--	39	6.4	5.2	--	1.5	94	36	5	97.6	7.0	37
Feb. 11-20	43,710	--	--	10	4.7	2.8	--	30	6.0	2.8	--	1.7	94	44	3	105	7.4	37
Feb. 21-28	37,680	--	--	13	3.5	4.4	--	60	7.0	7.0	--	1.8	106	55	6	134	7.7	40
Mar. 1-10	32,820	--	--	15	3.8	4.6	2.5	66	11	3.5	--	2.2	108	61	7	130	7.2	30
Mar. 11-20	31,280	--	--	19	7.1	4.6	2.5	80	7.8	3.0	--	1.8	116	77	3	166	6.7	25
Mar. 21-29	25,080	--	--	23	9.0	4.4	2.0	109	4.4	5.5	--	1.9	118	94	5	199	6.9	20



## LOWER MISSISSIPPI RIVER BASIN

## WHITE RIVER BASIN--Continued

## WHITE RIVER AT CLARENDON, ARK.--Continued

Temperature (°F) of water, water year October 1956 to September 1957

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	73	64	50	47	43	54	55	70	76	79	79	79
2	71	64	51	--	44	50	60	70	77	78	81	79
3	71	68	52	45	48	50	60	68	74	79	80	78
4	72	67	55	46	47	52	--	62	74	81	78	77
5	73	65	55	44	45	51	55	64	75	79	77	78
6	74	64	56	45	45	48	58	66	77	80	76	77
7	--	63	58	--	48	45	62	68	77	80	78	72
8	69	59	53	52	55	46	55	69	78	80	79	74
9	70	58	50	54	55	50	59	70	78	82	79	73
10	68	61	49	43	54	53	59	70	79	80	81	73
11	69	58	50	44	54	55	60	73	80	80	79	75
12	69	58	53	47	54	55	47	73	88	81	79	72
13	67	59	45	45	55	62	54	70	79	82	78	74
14	69	60	47	--	51	58	56	74	80	80	80	75
15	68	59	52	--	51	55	58	74	80	83	77	73
16	69	55	50	39	50	58	59	71	80	82	79	73
17	69	55	51	39	50	54	62	75	83	--	79	84
18	69	56	44	39	49	50	61	76	84	80	79	--
19	69	54	50	41	47	58	66	73	82	80	77	73
20	70	58	51	43	45	54	70	75	78	80	76	75
21	69	56	49	49	48	54	68	76	83	80	78	74
22	69	51	50	47	51	53	67	76	77	80	77	70
23	69	53	50	42	52	54	68	78	78	81	78	71
24	69	54	48	41	53	53	70	75	77	79	75	72
25	69	52	49	45	54	53	--	75	75	79	78	70
26	65	48	50	42	58	50	69	74	78	80	78	70
27	65	48	50	43	47	53	70	73	80	80	79	70
28	65	48	49	45	51	55	70	70	80	80	78	68
29	65	46	47	44	--	55	70	74	81	79	79	70
30	65	48	40	34	--	57	75	75	80	78	80	68
31	64	--	50	42	--	58	--	77	--	--	78	--
Average	69	57	50	44	50	53	62	72	79	80	78	74

WHITE RIVER BASIN--Continued  
 MISCELLANEOUS ANALYSES OF STREAMS IN WHITE RIVER BASIN IN ARKANSAS

Chemical analyses, in parts per million, water year October 1956 to September 1957.--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (calculated)	Hardness as CaCO <sub>3</sub>		Specific conductance (micro-mhos at 25°C)	pH	Color
														Calcium-magnesium	Non-carbonate			
BAYOU DE VIEW NEAR BRASFIELD																		
Dec. 5, 1956	.....		8.7	10	3.8	10	3.6	34	18	10		2.2	73	37	10	149	6.5	40
Jan. 9, 1957	.....		6.1	7.3	3.1	3.5	3.5	35	7.2	7.5		1.3	53	28	0	94.2	6.7	3
Feb. 7	.....		2.4	3.1	1.4	2.5	18	4.8	4.8	2.0		1.1	26	12	0	45.6	7.4	2
Mar. 5	.....		5.0	3.6	2.3	3.2	28	6.0	6.0	2.5		1.4	38	22	0	65.5	7.1	1
Apr. 2	.....		6.2	4.0	2.9	2.6	31	5.0	5.0	5.0		2.0	43	27	2	75.2	7.7	4
June 16	.....		9.2	5.5	3.9	3.5	59	1.6	1.6	3.5		3.2	59	50	0	101	6.8	45
July 17	.....		9.0	5.8	4.1	3.2	61	3.2	3.2	2.0		2.4	60	30	0	96.8	7.0	--
Aug. 5	.....		10	7.9	4.6	3.6	64	3.6	3.6	5.0		2.0	69	44	0	125	7.2	--
Sept. 10	.....		11	4.0	4.0	7.0	3.6	63	2.2	4.2		2.0	65	44	0	117	6.8	70

## ARKANSAS RIVER BASIN

## ARKANSAS RIVER BELOW JOHN MARTIN RESERVOIR, COLO.

LOCATION. --At gaging station 1 mile upstream from Caddoa Creek, 1½ miles downstream from John Martin Dam, Bent County, and 3 miles southeast of Hasty. DRAINAGE AREA. --18,917 square miles, of which 785 square miles is probably noncontributing.

RECORDS AVAILABLE. --Chemical analyses: August 1942 to August 1943, October 1945 to July 1949 (intermittent and weekly samples); January 1951 to September 1957 (daily samples)

WATER TEMPERATURES. --January 1951 to September 1957.

Hardness. 1956-57. --Dissolved solids: Maximum, 4,140 ppm Dec. 8-10; minimum, 617 ppm Aug. 1-31.

Specific conductance: Maximum, 1,900 ppm Dec. 8-10; minimum, 335 ppm Aug. 1-31.

Water temperatures: Maximum daily, 4,610 micromhos Dec. 9; minimum daily, 818 micromhos Aug. 17, 20.

Hardness. 1951-57. --Dissolved solids: Maximum, 80°F on several days during August; minimum, freezing point Mar. 24, 20.

Hardness. 1951-57. --Dissolved solids: Maximum, 4,280 ppm Aug. 8, 1955; minimum, 609 ppm June 11, 1956.

Hardness: Maximum, 1,910 ppm Aug. 8, 1955; minimum, 335 ppm Aug. 1-31, 1957.

Specific conductance: Maximum daily, 5,180 micromhos Apr. 21, 1945; minimum daily, 818 micromhos Aug. 17, 20, 1957.

Water temperatures: Maximum, 85°F Aug. 6, 1951; minimum, freezing point on several days during winter months.

REMARKS. --Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of discharge for water year October 1956 to September 1957 given in WSP 1511.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>		Per cent sodium	Specific conductance (micro-mhos at 25°C)	pH	
															Parts per million	Tons per acre-foot	Calcium	Non-carbonate				
Oct. 1-31, 1956	18.7	18	0.01	397	176	478	8.2	317	2,200	133	0.8	4.0	0.86	3,770	5.13	190	1,710	1,450	38	5.0	4,080	7.7
Nov. 1-19	26.4	---	---	387	170	442	---	328	---	---	---	---	---	3,460	4.71	247	1,610	1,350	37	4.8	3,800	7.8
Nov. 20-24	24.8	---	---	405	181	476	---	355	---	---	---	---	---	3,770	5.13	252	1,760	1,460	37	4.9	4,080	7.7
Nov. 25-30	26.5	---	---	341	162	420	---	283	---	---	---	---	---	3,290	4.47	235	1,520	1,280	38	4.7	3,640	7.8
Dec. 1-7	18.7	---	---	383	177	458	---	332	---	---	---	---	---	3,630	4.94	183	1,680	1,410	37	4.9	4,000	7.9
Dec. 8-10	1.33	---	---	439	196	537	---	355	---	---	---	---	---	4,140	5.63	14.9	1,900	1,610	38	5.4	4,450	7.7
Dec. 11-31	2.24	---	---	375	189	480	---	372	---	---	---	---	---	3,730	5.97	22.5	1,110	1,410	38	5.0	4,070	7.9
Jan. 1-31, 1957	1.67	18	.01	383	191	488	7.6	388	2,190	138	.8	2.6	.79	3,890	5.29	17.5	1,740	1,420	38	5.1	4,180	7.7
Feb. 1-28	1.88	---	---	377	185	468	---	380	---	---	---	---	---	3,850	5.24	19.5	1,700	1,390	38	5.1	4,130	7.8
Mar. 1-31	1.53	---	---	343	177	476	---	366	---	---	---	---	---	3,650	4.96	15.1	1,860	1,280	40	5.2	3,960	7.9
Apr. 1-12	1.92	---	---	341	174	473	---	347	---	---	---	---	---	3,610	4.81	18.7	1,970	1,280	40	5.2	3,940	7.8
Apr. 13-22	688	---	---	234	92	256	---	161	---	---	---	---	---	2,090	2.84	3,880	962	830	37	3.6	2,460	7.7
Apr. 23-May 9	402	17	.02	185	66	145	6.2	219	779	41	.8	9.7	.21	1,440	1.96	1,560	733	554	30	2.3	1,770	7.7
May 10-16	564	---	---	146	43	97	---	209	---	---	---	---	---	991	1.35	1,510	542	370	28	1.8	1,300	7.8
May 17-26	2.77	---	---	288	137	400	---	282	---	---	---	---	---	3,080	4.19	23.0	1,310	1,080	40	4.8	3,460	7.9
May 27-June 2	194	---	---	158	47	101	---	156	---	---	---	---	---	1,120	1.52	405	588	460	27	1.8	1,390	7.8
June 3-13	3.95	---	---	318	144	400	---	347	---	---	---	---	---	3,210	4.37	34.2	1,380	1,100	39	4.7	3,540	8.0
June 14-30	324	---	---	141	39	98	---	135	---	---	---	---	---	997	1.36	872	512	402	29	1.9	1,290	7.8
July 1-31	997	15	---	119	26	91	---	152	433	18	.7	1.6	.11	607	1.10	2,040	404	280	33	2.0	1,070	7.5
Aug. 1-31	1,117	---	---	93	25	85	---	127	---	---	---	---	---	617	1.84	1,860	335	231	36	2.0	852	7.7
Sept. 1-30	430	---	---	107	29	72	---	151	---	---	---	---	---	732	1.00	1,850	386	282	29	1.6	967	8.1
Weighted average	281	---	---	128	37	108	---	153	---	---	---	---	---	881	1.27	706	472	346	33	2.2	1,200	--

## ARKANSAS RIVER BASIN

## ARKANSAS RIVER BASIN--Continued

## ARKANSAS RIVER BELOW JOHN MARTIN RESERVOIR, COLO.--Continued

Temperature (°F) of water, water year October 1956 to September 1957  
 /Once-daily measurement at 8 a. m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	62	48	39	39	35	45	48	58	58	75	78	77
2	60	59	37	37	36	45	45	49	58	76	78	75
3	60	38	35	36	37	45	41	59	65	73	75	75
4	60	38	36	39	36	45	46	49	68	71	75	75
5	60	38	39	39	36	45	46	52	68	75	76	70
6	59	41	33	37	35	40	43	54	68	72	80	71
7	58	48	34	35	37	36	43	60	70	73	80	70
8	62	41	37	37	40	41	37	59	66	76	80	70
9	56	41	36	34	41	44	50	59	67	76	80	68
10	55	43	37	33	43	46	54	59	68	76	76	68
11	58	44	43	34	41	49	47	52	68	76	76	70
12	60	44	40	38	42	45	38	54	68	76	80	68
13	56	45	35	37	43	49	41	50	70	74	77	67
14	57	44	35	34	50	42	44	50	68	73	80	65
15	57	37	36	35	45	43	50	56	64	76	80	65
16	55	35	36	34	42	45	54	50	66	--	75	65
17	57	36	40	34	44	43	53	55	70	77	76	66
18	55	39	36	35	42	47	58	54	70	77	76	66
19	55	39	--	35	44	48	58	59	70	77	75	65
20	55	34	37	36	45	48	54	60	70	--	75	62
21	52	33	37	37	45	46	56	58	70	74	78	63
22	53	39	38	37	35	50	50	58	70	77	78	62
23	52	35	36	33	35	37	54	58	68	75	75	63
24	57	37	36	33	43	32	52	58	70	77	75	64
25	49	40	37	33	46	37	55	52	73	76	75	64
26	48	39	36	36	46	42	54	51	74	76	75	63
27	49	37	37	37	45	48	51	65	74	72	78	62
28	50	37	40	37	45	51	48	58	70	76	75	61
29	56	37	40	35	--	48	52	65	71	78	75	61
30	50	38	39	33	--	46	53	59	71	77	77	64
31	48	--	39	37	--	45	--	61	--	79	73	--
Average	55	39	37	36	41	44	49	56	68	75	77	67

ARKANSAS RIVER BASIN--Continued  
 ARKANSAS RIVER AT ARKANSAS CITY, KANS.

LOCATION.--At gaging station at bridge on U. S. Highway 166, 0.1 mile downstream from St. Louis and San Francisco Railroad bridge, 0.5 mile west of Arkansas City, Cowley County, and 5.4 miles upstream from Walnut River.  
 DRAINAGE AREA.--43,713 square miles, of which 7,607 square miles is probably noncontributing.  
 RECORDS AVAILABLE.--Chemical analyses: October 1951 to September 1957.

Water temperatures: October 1951 to September 1957.  
 EXTREMES, 1956-57.--Dissolved solids: Maximum, 3,380 ppm Jan. 16; minimum, 192 ppm May 15-20.  
 Hardness: Maximum, 760 ppm Jan 16; minimum, 96 ppm May 15-20.  
 Specific conductance: Maximum daily, 5,770 micromhos Jan. 16; minimum daily, 275 micromhos May 19.  
 Water temperatures: Maximum, 85°F July 31, Aug. 1, 15; minimum, freezing point on many days during November to March.  
 EXTREMES, 1951-57.--Dissolved solids: Maximum, 3,380 ppm Jan 16, 1957; minimum, 172 ppm Oct. 1-6, 1955.  
 Hardness: Maximum, 760 ppm Jan. 16, 1957; minimum, 84 ppm Oct. 1-6, 1955.  
 Specific conductance: Maximum daily, 5,770 micromhos Jan. 16, 1957; minimum daily, 259 micromhos Oct. 4, 1955.  
 Water temperatures: Maximum, 85°F July 31, Aug. 1, 15, 1957; minimum freezing point on many days during winter months.  
 REMARKS.--Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records for water year October 1956 to September 1957 given in WSP 1511.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (residue at 180° C)			Hardness as CaCO <sub>3</sub>		Percent sodium	Specific conductance (micro-mhos at 25°C)
															Parts per million	Tons per acre-foot	Tons per day	Calcium	Non-carbonate		
Oct. 1-10, 1956	28.1	26	0.01	152	42	706	9.5	304	0	220	1,170	0.7	--	0.48	193	550	301	73	13	4,370	8.0
Oct. 11-13	36.7	--	--	156	46	700	7.00	316	0	213	1,150	--	--	--	2,460	3,47	244	72	13	4,330	7.7
Oct. 14, 16-20	98.3	--	--	88	26	328	3.28	222	0	127	500	--	18	--	1,210	1.65	321	89	7.9	2,180	7.3
Oct. 15	89.0	--	--	116	39	450	4.50	262	0	94	780	--	19	--	1,780	2.42	428	88	9.2	3,100	7.8
Oct. 21-26	90.8	--	--	101	26	404	4.04	244	0	141	620	--	22	--	1,500	2.04	368	71	9.3	2,630	8.0
Oct. 27-31	79.2	--	--	110	28	471	4.71	256	0	148	730	--	26	--	1,700	2.31	384	160	72	2,970	7.8
Nov. 1-7	149	--	--	82	26	312	3.12	212	0	120	480	--	16	--	1,180	1.60	475	310	89	2,110	8.1
Nov. 8-10	135	--	--	98	26	391	3.91	228	0	138	605	--	22	--	1,430	1.94	521	350	71	2,550	8.1
Nov. 11-20	121	13	0.1	104	24	412	4.12	246	0	143	640	6	2	0.12	1,500	2.04	490	360	158	71	9.4
Nov. 21-30	130	--	--	108	24	397	3.97	260	0	135	610	--	24	--	1,470	2.00	476	370	157	70	9.0
Dec. 1-10	131	--	--	110	23	437	4.37	250	0	143	670	--	26	--	1,570	2.14	513	370	165	72	9.9
Dec. 11-19	137	--	--	108	23	408	4.08	246	0	145	625	--	24	--	1,520	2.07	462	365	164	71	9.3
Dec. 20	178	--	--	118	26	311	3.11	244	14	171	465	--	24	--	1,260	1.71	606	400	176	83	8.2
Dec. 21-31	174	--	--	100	22	392	3.92	234	0	143	590	--	23	--	1,450	1.97	681	340	148	71	9.2
Jan. 1-10, 1957	168	--	--	103	21	388	3.88	248	0	142	580	--	23	--	1,450	1.97	619	345	142	71	9.1
Jan. 11-15, 17-20	119	--	--	133	30	516	5.16	294	0	179	800	--	26	--	1,910	2.60	614	455	214	71	11
Jan. 16	86.0	--	--	216	54	948	9.48	390	42	303	1,500	--	--	--	3,380	4.60	785	760	370	73	15
Jan. 21-23	133	--	--	102	22	355	3.55	242	0	132	580	--	32	--	1,390	1.89	489	345	146	62	6.0
Jan. 24-27	88.8	--	--	136	29	570	5.70	286	0	193	880	--	29	--	2,070	2.82	498	460	286	73	12
Jan. 28-31	110	--	--	116	28	452	4.52	278	0	158	700	--	10	--	1,690	2.30	502	405	177	71	9.8

ARKANSAS RIVER BASIN

Feb. 1-4, 1957	190	26	388	250	0	141	610	--	19	--	1,520	2.07	780	385	180	69	8.6	2,600	8.2
Feb. 5-8	223	18	309	208	0	114	470	--	25	--	1,190	1.62	716	300	130	89	7.8	2,060	8.2
Feb. 9-12	291	80	289	198	0	140	405	--	14	--	1,030	1.40	809	265	102	89	7.2	1,820	8.4
Feb. 13-20	238	117	337	220	6	131	510	--	22	--	1,290	1.75	829	330	140	89	8.1	2,270	8.4
Feb. 21-28	218	108	347	242	0	151	540	.13	18	--	1,360	1.85	800	345	146	69	8.1	2,360	8.1
Mar. 1-10	282	102	334	220	6	143	505	--	17	--	1,370	1.86	1,040	340	150	68	7.9	2,310	8.4
Mar. 11-14	267	108	348	230	6	153	515	--	16	--	1,400	1.90	1,010	345	146	69	8.1	2,360	8.4
Mar. 15-20	224	110	411	248	0	170	620	--	19	--	1,570	2.14	950	375	172	70	9.2	2,660	7.4
Mar. 21-27	371	94	366	200	6	160	560	--	12	--	1,420	1.93	1,480	330	156	71	8.8	2,440	8.4
Mar. 28-31	1,202	86	239	180	2	118	360	--	4.8	--	987	1.34	3,200	285	114	66	6.4	1,720	8.3
Apr. 1-2	1,034	82	310	174	0	131	480	--	4.3	--	1,180	1.60	3,290	285	142	70	8.0	2,120	8.2
Apr. 3	4,560	41	111	96	0	50	189	--	7.5	--	1,440	1.60	5,440	134	56	64	4.2	820	7.9
Apr. 4-10	2,379	58	149	150	0	78	223	--	3.5	--	639	.87	4,100	200	77	62	4.6	1,150	8.2
Apr. 11-12	1,260	74	189	172	0	118	278	--	9.1	--	819	1.11	2,790	250	109	62	5.2	1,420	8.2
Apr. 13-20	905	98	291	212	0	222	420	--	8.7	--	1,260	1.71	3,080	370	186	63	6.6	2,110	8.2
Apr. 21-22	2,355	69	210	154	0	149	300	--	2.5	--	898	1.22	5,710	250	124	65	5.8	1,560	8.1
Apr. 23-28	4,148	52	82	142	0	78	128	--	2.3	--	456	.82	5,110	200	84	47	2.5	801	8.0
Apr. 29-30	1,775	72	145	164	0	102	220	--	5.5	--	697	.95	3,340	240	106	57	4.1	1,200	8.0
May 1-10	1,528	82	228	192	0	139	320	.4	6.9	.15	935	1.27	3,860	275	116	64	5.9	1,800	7.8
May 11-12	1,890	86	283	180	10	158	415	--	6.4	--	1,110	1.51	5,060	305	140	67	7.0	1,970	8.5
May 13-14	9,480	62	138	148	8	83	195	--	3.5	--	590	.80	15,100	200	65	60	4.2	1,070	8.5
May 15-20	33,450	31	31	104	2	19	38	--	2.0	--	192	.28	17,340	98	8	41	1.4	347	8.3
May 21-23	13,840	--	60	146	0	36	76	--	3.0	--	297	.40	11,100	138	16	49	2.2	521	8.1
May 24-27	6,385	43	107	156	0	82	158	--	7.6	--	507	.69	8,740	210	82	53	3.2	834	8.1
May 28-30	4,190	--	149	168	0	109	230	--	5.7	--	678	.92	7,670	255	118	56	4.1	1,230	8.2
May 31	4,940	54	86	136	0	75	125	--	4.4	--	426	.56	5,660	182	70	51	2.8	1,764	8.1
June 1-2	4,590	80	157	176	6	141	232	--	4.5	--	757	1.03	9,390	290	138	54	4.0	1,290	8.0
June 3-7	6,440	48	73	128	0	56	105	--	4.8	--	378	.52	8,640	156	51	51	2.6	665	8.3
June 8-10	3,410	68	135	170	0	99	200	--	4.6	--	636	.86	5,890	230	92	56	3.9	1,110	8.2
June 11	3,900	87	128	156	0	121	188	--	5.0	--	643	.88	6,790	245	116	53	3.6	1,100	8.2
June 12-14	12,970	--	44	112	0	44	62	--	3.9	--	280	.38	9,810	132	40	42	1.7	478	8.0
June 15	7,360	31	71	146	0	70	100	--	3.9	--	361	.52	7,570	182	62	46	2.3	682	8.2

a. Values above 200 ppm reported to the nearest 5 ppm.

## LOWER MISSISSIPPI RIVER BASIN

 ARKANSAS RIVER BASIN--Continued  
 ARKANSAS RIVER AT ARKANSAS CITY, KANS.--Continued

Chemical analyses, in parts per million, water year October 1956 to September 1957--Continued

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> ) (Fe)	Iron (Fe)	Cal-cium (Ca)	Mag-nesium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> ) (K)	Car-bonate (CO <sub>3</sub> ) (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> ) (B)	Dissolved solids (residue at 180° C)			Hardness as CaCO <sub>3</sub>		Per-cent so-lidum	So-lidum adsorp-tion ratio	Specific conductance (micro-mhos at 25°C)	pH
													Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
June 16, 1957.....	3,860	--	--	69	18	133		170	0	113	--	6.9	632	0.86	6,590	2.30	108	54	3.7	1,120	8.2
June 17-19.....	3,917	--	--	84	22	51		187	0	125	--	5.9	821	1.12	8,680	300	146	40	2.3	1,380	8.2
June 20.....	7,660	--	--	48	12	59		136	0	84	--	4.4	343	0.47	7,090	168	56	43	2.0	806	8.1
June 21-23.....	6,020	--	--	58	12	61		89	0	124	--	5.0	494	0.67	8,030	194	71	51	2.9	821	8.2
June 24-27.....	13,680	--	--	45	8.6	57		136	0	72	--	4.3	334	0.45	12,340	148	36	45	2.0	553	8.1
June 28, 30.....	32,900	--	--	30	5.7	34		104	0	47	--	4.4	199	0.27	17,680	106	21	41	1.4	338	8.1
June 29.....	40,700	--	--	70	17	171		156	0	25	--	4.5	745	1.01	31,870	245	118	60	4.8	1,330	8.2
July 1-4.....	24,780	--	--	42	4.6	41		130	0	53	--	3.7	253	0.34	16,930	124	18	42	1.6	428	7.7
July 5-7.....	12,540	--	--	56	7.9	69		160	0	86	--	3.9	387	0.53	13,100	172	41	46	2.3	651	7.5
July 8-10.....	5,613	--	--	82	14	125		202	0	170	--	4.9	629	0.86	9,530	260	96	51	3.4	1,090	7.8
July 11-13.....	3,627	--	--	96	20	179		214	0	168	--	4.5	851	1.16	8,330	320	144	55	4.4	1,450	7.8
July 14-17.....	2,615	--	--	114	21	233		234	0	200	--	4.0	1,050	1.43	7,410	370	178	58	5.3	1,790	7.6
July 18-19.....	2,020	--	--	116	23	256		240	0	211	--	4.9	1,140	1.55	6,220	385	188	59	5.7	1,830	7.9
July 20-31.....	2,464	22	0.03	99	25	221	--	212	0	165	0.6	6.4	975	1.33	6,490	325	150	60	5.3	1,680	8.2
Aug. 1-6.....	1,945	--	--	82	18	175		204	0	116	260	7.8	813	1.11	4,270	280	113	58	4.6	1,400	7.7
Aug. 7-10.....	1,242	--	--	110	29	271		242	0	195	410	7.0	1,190	1.62	3,980	395	198	60	5.9	2,030	7.8
Aug. 11-17.....	1,014	--	--	112	31	323		240	0	213	485	7.3	1,350	1.84	3,700	405	208	63	7.0	2,310	7.7
Aug. 18.....	1,750	--	--	83	26	240		246	0	186	355	7.0	997	1.36	4,710	340	156	61	5.7	1,780	7.9
Aug. 19.....	1,770	--	--	81	16	155		224	0	105	225	7.6	668	0.91	3,180	215	98	61	4.6	1,180	7.6
Aug. 20.....	1,120	--	--	91	27	204		204	0	181	410	9.0	1,140	1.55	3,450	340	173	64	6.5	1,980	7.8
Aug. 21-31.....	851	--	--	104	32	359		218	0	111	548	4.8	1,430	1.94	3,260	390	212	67	7.9	2,460	7.6
Sept. 1-6.....	675	--	--	110	29	375		224	0	216	565	6.2	1,480	2.01	2,700	395	212	67	8.2	2,550	7.9
Sept. 7-10.....	750	--	--	102	27	327		212	0	194	490	4.6	1,320	1.77	2,630	360	186	66	7.5	2,280	7.7
Sept. 11-12.....	729	--	--	102	27	330		218	0	192	495	7.1	1,320	1.80	2,600	385	188	66	7.5	2,280	7.9
Sept. 13-14.....	988	--	--	85	21	258		194	0	149	395	7.1	1,030	1.40	2,750	300	141	65	6.4	1,820	7.9
Sept. 15-17.....	2,213	--	--	89	13	108		174	0	151	442	5.0	511	0.69	3,080	200	60	54	3.3	910	7.7
Sept. 18-20.....	5,833	--	--	48	6.8	153		154	0	72	152	4.2	307	0.42	4,930	148	22	44	1.9	542	7.7
Sept. 21-25.....	6,208	--	--	43	7.3	69		166	0	84	77	5.0	339	0.46	5,600	150	14	50	2.5	573	7.7
Sept. 26-30.....	1,950	--	--	75	16	147		180	0	117	205	7.1	677	0.92	3,560	250	98	58	4.0	1,200	7.8
Weighted Average	2,900	--	--	55	11	101		b148	--	86	145	4.6	483	0.66	3,780	182	60	55	3.2	840	--

a Values above 200 ppm reported to the nearest 5 ppm.

b Includes equivalent of individual carbonate values shown above.

ARKANSAS RIVER BASIN--Continued

ARKANSAS RIVER AT ARKANSAS CITY, KANS.--Continued

Temperature (°F) of water, water year October 1956 to September 1957

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	60	53	35	38	32	44	55	65	71	78	85	76
2	62	55	37	34	33	46	55	66	67	81	84	78
3	60	46	38	36	35	42	50	66	68	83	83	74
4	64	47	--	42	33	44	43	57	68	82	83	78
5	63	47	--	38	35	43	46	58	72	79	76	76
6	64	46	--	40	35	42	46	60	75	78	77	75
7	55	49	33	35	41	32	50	62	76	78	77	69
8	56	39	32	40	45	34	43	62	77	78	79	74
9	56	37	32	41	52	44	47	65	75	80	79	69
10	55	42	32	32	47	45	48	65	--	82	80	78
11	58	46	33	32	43	53	53	61	75	81	81	78
12	60	48	33	32	--	50	38	63	73	79	84	69
13	65	46	32	32	43	48	40	67	72	80	85	75
14	62	56	32	32	45	48	45	66	74	80	83	68
15	61	45	33	32	50	41	50	68	76	81	85	68
16	--	35	33	32	42	43	52	67	75	82	84	66
17	64	36	35	32	42	49	56	62	75	82	75	68
18	62	39	32	32	47	46	59	62	72	81	73	70
19	65	42	33	32	42	44	63	63	70	83	76	71
20	63	45	45	34	39	46	65	65	72	82	80	69
21	56	33	37	39	40	46	64	66	75	81	76	69
22	55	34	34	36	35	45	67	68	73	79	81	62
23	56	37	34	32	34	44	62	64	70	81	76	64
24	60	38	33	32	36	44	63	65	70	80	77	66
25	58	40	34	--	45	42	64	66	70	80	76	67
26	50	33	35	32	37	38	--	68	72	79	77	68
27	51	33	36	32	42	43	60	70	71	81	76	70
28	51	36	40	32	42	46	64	72	72	81	73	65
29	58	32	38	32	--	49	63	71	73	83	75	65
30	61	33	38	32	--	52	63	72	76	83	78	65
31	51	--	37	32	--	55	--	72	--	85	80	--
Average	59	42	35	34	40	45	54	65	73	81	79	70

ARKANSAS RIVER BASIN--Continued  
SALT FORK ARKANSAS RIVER NEAR JET, OKLA.

LOCATION.--At gaging station at county highway bridge, 0.6 mile downstream from Great Salt Plains Dam, 4 miles upstream from Wagon Creek, and 6 miles northeast of Jet, Alfalfa County.  
DRAINAGE AREA.--3,202 square miles of which 8 square miles is probably noncontributing.  
RECORDS AVAILABLE.--October 1952 to September 1954, October 1955 to September 1957.  
REMARKS.--Records of discharge for water year October 1956 to September 1957 given in WSP 1511.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Discharge (cfs)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Chloride (Cl)	Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conduct- ance (micro- mhos at 25°C)	pH
								Calcium, magne- sium	Non- carbonate				
Oct. 1, 1956.....	3.51	340	103	--	136		9,400	1,270	1,160	--	--	28,300	7.9
Oct. 17.....	3.01	356	122	--	184		9,410	1,390	1,240	--	--	27,400	7.9
Nov. 1.....	3.79	352	100	--	160		9,410	1,290	1,160	--	--	27,500	7.8
Nov. 15.....	3.56	418	116	--	166		12,400	1,520	1,380	--	--	34,500	8.1
Dec. 3.....	3.57	356	134	--	182		10,900	1,440	1,290	--	--	31,000	8.0
Dec. 18.....	3.87	418	121	--	187		12,200	1,540	1,390	--	--	34,100	7.9
Jan. 8, 1957.....	4.05	399	113	--	192		11,500	1,460	1,300	--	--	31,800	8.1
Jan. 29.....	4.05	144	44	1,180	104		1,950	540	455	83	22	6,550	8.1
Feb. 12.....	3.95	480	149	8,930	208		13,300	1,810	1,640	91	91	38,000	8.2
Feb. 27.....	3.25	356	98	--	168		10,100	1,290	1,150	--	--	29,000	7.7
Mar. 18.....	3.89	410	131	8,150	171		12,000	1,560	1,420	92	90	34,700	7.8
Apr. 6.....	4.45	332	132	6,930	83		10,400	1,370	1,300	92	81	30,200	8.0
Apr. 22.....	1,470	274	84	5,050	147		7,580	1,030	910	68	68	22,800	7.8
Apr. 29.....	1,450	183	58	2,720	118		4,080	600	89	45	45	13,300	7.9
May 6.....	1,200	195	51	2,530	135		3,880	697	586	89	42	12,600	8.0
May 13.....	2,240	191	51	2,060	138		3,140	688	575	87	34	10,400	8.0
May 16.....	4,780	184	37	1,340	122		2,050	610	510	83	24	7,290	8.0
May 20.....	8,840	88	20	241	92		445	300	224	64	6.1	1,740	7.8
May 31.....	3,920	128	15	416	108		630	380	292	70	9.3	2,760	7.9
June 19.....	2,760	152	32	456	132		680	510	402	66	8.8	3,090	8.0
July 3.....	6,540	116	15	150	118		150	350	254	38	2.3	1,170	7.9
July 16.....	1,170	134	28	325	128		460	560	345	61	6.7	2,420	7.5
July 29.....	3,315	160	39	588	140		860	446	446	70	11	3,870	8.0
Aug. 14.....	31.2	184	46	990	158		1,400	650	520	77	17	5,750	8.0
Sept. 24.....	770	144	32	708	96		1,000	490	412	76	14	4,270	7.7

ARKANSAS RIVER BASIN--Continued  
CHIKASKIA RIVER NEAR BLACKWELL, OKLA.

LOCATION.--At gaging station on St. Louis-San Francisco Railway Co. bridge at northeast edge of city of Blackwell, Kay County, 0.2 mile downstream from Bitter Creek.

DRAINAGE AREA.--1,859 square miles.

RECORDS AVAILABLE.--Chemical analyses: November 1952 to September 1957.

REMARKS.--Records of discharge for water year October 1956 to September 1957 given in WSP 1511.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Discharge (cfs)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Chloride (Cl)	Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
								Total	Non-carbonate				
Oct. 2, 1956	0.86	1,480	330	--	111	0	9,410	5,050	4,960	--	--	25,100	7.8
Oct. 15	.54	416	83	--	82	0	2,100	1,420	1,350	--	--	6,880	7.5
Nov. 2	.65	1,150	268	--	115	0	6,700	3,970	3,880	--	--	18,500	7.8
Nov. 14	.89	718	194	--	134	0	5,360	2,590	2,480	--	--	12,400	7.8
Nov. 27	.57	994	243	--	111	0	5,090	3,480	3,390	--	--	17,800	7.8
Dec. 11	1.23	1,090	273	--	151	0	6,830	3,530	3,710	--	--	19,300	7.8
Jan. 31, 1957	2.35	560	132	--	221	0	2,950	1,940	1,760	--	--	9,880	7.8
Jan. 13	6.41	468	125	--	96	0	2,700	1,730	1,650	--	--	8,350	7.8
Feb. 5	1.26	700	156	--	163	0	2,380	2,360	2,240	--	--	8,070	7.8
Feb. 18	17.1	134	53	269	263	0	555	600	384	49	4.8	2,350	8.0
Mar. 6	26.8	62	27	110	108	0	240	284	176	48	2.9	1,170	8.2
Mar. 18	13.6	64	43	215	68	0	445	336	264	58	5.1	1,830	7.8
Apr. 11	67.4	63	23	67	152	0	153	252	136	37	1.8	830	8.2
May 1	357	74	20	40	190	8	74	268	99	25	1.1	681	8.4
May 6	218	79	23	64	196	8	121	282	118	32	1.6	861	8.4
June 7	379	58	30	81	136	0	150	268	156	40	2.1	1,100	8.2
July 11	359	82	36	100	168	0	212	214	352	38	2.3	1,310	8.3
July 25	232	98	25	83	180	0	225	348	200	34	1.9	1,170	7.7
Aug. 9	78.0	148	57	251	106	0	620	605	518	47	4.4	2,020	7.9
Aug. 19	207	50	21	77	72	0	177	153	44	2.3	799	7.7	
Sept. 10	48.5	164	51	263	114	0	625	620	526	48	4.6	2,500	7.8

ARKANSAS RIVER BASIN--Continued  
ARKANSAS RIVER AT RALSTON, OKLA.

LOCATION.--At gaging station at bridge on State Highway 18 at Ralston, Pawnee County, 2 miles downstream from Salt Creek, and 2 miles upstream from Grayhose Creek.

DRAINAGE AREA.--54,465 square miles, of which 7,615 square miles is probably noncontributing.

RECORDS AVAILABLE.--Chemical analyses: January 1950 to September 1957.

Water temperatures: January 1950 to September 1957.

EXTREMES, 1956-57.--Dissolved solids: Maximum, 3,260 ppm May 1-2; minimum 218 ppm June 23-26.

Hardness: Maximum, 455 ppm Feb. 1-10; minimum, 96 ppm June 23-26.

Specific conductance: Maximum daily, 5,650 microhms May 1; minimum daily, 286 microhms June 25.

Water temperatures: Maximum, 92°F Aug. 1-2; minimum, 33°F on several days during December and January.

EXTREMES, 1950-57.--Dissolved solids: Maximum, 3,390 ppm Sept. 11-16, 1955; minimum, 166 ppm Oct. 3-6, 1955.

Hardness: Maximum, 562 ppm Jan. 5, 1951; minimum, 76 ppm Oct. 3-6, 1955.

Specific conductance: Maximum daily, 7,510 microhms Sept. 14, 1955; minimum daily, 251 microhms Oct. 5, 1955.

Water temperatures: Maximum, 98°F July 28, 1956; minimum, freezing point on many days during winter months.

REMARKS.--Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of discharge for water year October 1956 to September 1957 given in WSP 1511.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Mag-nesium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Car-bonate (CO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> )	Bo-ron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Per-cent dis-sol-dium ratio	Specific conduct-ance (microhms at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium	Non-magne-sium			
Oct. 1-10, 1956.....	17.2	13	0.01	108	34	518	5.9	190	0	179	860	0.4	2.8	0.22	86	410	254	73	11	3,300	8.0	
Oct. 11-18.....	22.8	--	--	112	38	518	5.9	192	0	182	860	--	2.0	--	1,860	2.53	115	435	72	11	3,300	8.0
Oct. 19.....	57.0	--	--	82	329	329	180	0	119	540	540	--	3.3	--	1,250	1.70	192	320	69	8.0	2,220	8.0
Oct. 20.....	51.0	--	--	84	35	414	6.4	184	0	146	690	--	3.6	--	1,550	2.11	213	380	70	9.2	2,220	8.0
Oct. 21-29.....	54.4	--	--	107	34	517	5.9	188	0	181	840	--	2.0	--	1,880	2.56	276	405	74	11	3,220	7.8
Oct. 30-31.....	96.0	--	--	98	30	435	6.4	244	0	160	700	--	2.4	--	1,550	2.11	402	370	210	10	2,740	7.7
Nov. 1-4.....	82.8	--	--	108	34	474	6.4	216	0	170	770	--	1.7	--	1,740	2.37	389	410	233	10	3,080	8.0
Nov. 5-10.....	159	--	--	104	32	420	6.4	210	0	182	680	--	5.5	--	1,570	2.14	674	390	218	7.0	2,730	7.8
Nov. 11-20.....	140	5.8	0.1	120	29	469	6.4	228	0	170	780	4	3.9	1.7	1,730	2.35	654	420	233	7.0	3,040	7.8
Nov. 21-30.....	100	--	--	112	33	481	6.4	244	0	171	765	--	4.3	--	1,750	2.38	472	415	215	10	3,080	7.9
Dec. 1-10.....	107	--	--	116	32	462	6.4	238	6	163	740	--	6.6	--	1,700	2.31	491	420	215	7.0	2,970	8.4
Dec. 11-20.....	136	--	--	120	32	472	6.4	246	0	167	760	12	2.7	--	1,740	2.37	680	480	228	7.0	3,040	8.2
Dec. 21-31.....	191	--	--	120	34	620	6.4	232	0	167	990	--	7.8	--	2,140	2.91	1,100	440	250	7.5	3,790	8.1
Jan. 1-10, 1957.....	182	12	0.1	164	24	478	--	196	0	169	760	1.6	7.3	--	1,760	2.39	912	360	198	7.4	3,090	7.8
Jan. 11-20.....	152	--	--	120	32	492	--	224	0	172	800	--	11	--	1,830	2.49	751	480	246	7.1	3,160	7.9
Jan. 21-31.....	127	--	--	122	34	553	--	226	0	179	900	--	8.2	--	1,980	2.69	679	445	260	7.3	3,390	7.7
Feb. 1-10.....	201	--	--	144	23	483	--	236	0	157	760	--	14	--	1,800	2.45	977	455	282	6.8	3,110	8.1
Feb. 11-20.....	288	--	--	140	15	404	--	232	8	147	655	--	11	--	1,610	2.19	1,060	410	266	6.8	2,670	8.4
Feb. 21-28.....	266	--	--	144	17	419	--	232	6	160	685	--	9.6	--	1,670	2.27	1,160	400	230	6.8	2,870	8.0
Mar. 1-10.....	305	--	--	116	27	448	--	240	0	163	710	--	9.0	--	1,670	2.27	1,360	430	204	7.1	2,900	8.3

ARKANSAS RIVER BASIN

Mar. 11-20, 1957.....	315	--	--	116	29	495	234	0	182	780	--	--	5.9	--	1,810	2.46	1,540	410	218	72	11	3,120	8.0
Mar. 21-27.....	384	--	102	26	436	680	200	6	163	680	7.6	7.6	7.6	7.6	1,620	2.20	1,680	360	186	72	10	2,760	8.4
Mar. 28-30.....	489	--	104	34	530	840	182	6	182	840	8.0	8.0	8.0	8.0	1,440	2.560	400	228	74	12	3,320	8.4	
Mar. 31.....	721	--	88	18	362	164	10	138	585	362	8.0	8.0	8.0	8.0	1,440	1.96	2,800	295	144	74	9.7	2,470	8.7
Apr. 1-4.....	1,730	--	78	20	250	172	0	117	390	390	6.9	6.9	6.9	6.9	1,030	1.40	4,810	275	134	66	6.6	1,800	8.1
Apr. 5-7.....	9,030	--	41	10	93	128	0	44	146	146	2.3	2.3	2.3	2.3	422	.57	10,290	144	52	58	3.4	758	7.9
Apr. 8.....	3,010	--	90	24	469	138	0	120	475	475	11	11	11	11	1,170	1.59	12,040	325	220	64	6.5	2,000	8.2
Apr. 9-10.....	3,200	--	69	17	186	136	0	89	308	308	8.3	8.3	8.3	8.3	814	1.11	7,030	240	128	63	5.2	1,430	8.1
Apr. 11-15.....	2,480	--	64	18	164	154	0	89	260	260	7.6	7.6	7.6	7.6	728	.99	4,890	235	109	60	4.7	1,290	8.0
Apr. 16-17.....	1,595	--	85	24	233	180	0	149	360	360	7.0	7.0	7.0	7.0	1,020	1.39	4,390	310	162	62	5.7	1,760	8.2
Apr. 18-20.....	3,730	--	37	8.1	85	98	0	43	130	130	2.5	2.5	2.5	2.5	378	.51	3,810	126	46	59	3.3	691	7.8
Apr. 21-23.....	13,540	--	29	8.6	49	98	0	24	76	76	2.3	2.3	2.3	2.3	249	.84	9,100	108	28	50	2.0	450	8.0
Apr. 24-25.....	27,650	--	40	9.7	213	92	0	44	340	340	3.8	3.8	3.8	3.8	757	1.03	56,920	140	64	77	7.8	1,410	7.8
Apr. 26.....	24,900	--	46	11	324	90	0	67	510	510	3.0	3.0	3.0	3.0	1,140	1.55	76,640	160	86	62	11	2,150	8.0
Apr. 27-28.....	11,640	--	68	20	556	110	0	120	860	860	3.9	3.9	3.9	3.9	1,770	2.41	55,630	250	160	83	15	3,200	8.0
Apr. 29-30.....	7,360	--	96	22	860	128	0	185	1,390	1,390	4.0	4.0	4.0	4.0	2,770	3.77	55,050	330	225	85	21	4,860	8.2
May 1-2.....	5,980	--	101	25	1,070	140	0	209	1,670	1,670	4.3	4.3	4.3	4.3	2,260	4.43	52,640	355	240	87	25	5,620	8.0
May 3-7.....	7,304	--	66	17	486	128	0	112	770	770	6.2	6.2	6.2	6.2	1,590	2.16	31,360	235	129	82	14	2,860	8.1
May 8-10.....	4,333	--	102	26	857	162	2	202	1,330	1,330	6.0	6.0	6.0	6.0	2,720	3.70	31,920	360	224	84	20	2,720	8.3
May 11.....	5,660	--	86	21	563	154	4	139	910	910	9.1	9.1	9.1	9.1	1,920	2.61	30,360	300	168	81	15	3,340	8.4
May 12-15.....	7,955	--	82	21	436	152	2	140	680	680	5.9	5.9	5.9	5.9	1,560	2.12	30,860	290	162	77	11	2,770	8.3
May 16.....	46,500	--	40	8.8	163	166	0	46	248	248	4.0	4.0	4.0	4.0	568	.80	73,220	126	41	75	6.3	1,080	8.2
May 17-20.....	87,850	--	32	8.8	89	86	0	36	133	133	1.6	1.6	1.6	1.6	369	.50	86,930	104	32	63	3.6	681	7.6
May 21.....	91,900	--	46	8.8	138	116	0	54	215	215	3.7	3.7	3.7	3.7	535	.73	132,100	136	61	66	4.6	1,090	8.0
May 22.....	40,300	--	56	16	229	122	0	101	350	350	3.5	3.5	3.5	3.5	630	1.13	90,310	205	104	71	7.0	1,580	8.2
May 23.....	48,000	--	67	6.6	152	128	0	95	225	225	4.4	4.4	4.4	4.4	613	.83	79,440	194	89	63	4.7	1,110	8.1
May 24-25.....	44,200	--	50	8.5	103	98	0	78	155	155	3.9	3.9	3.9	3.9	432	.61	53,940	160	80	58	3.5	836	8.0
May 26-28.....	43,920	--	38	8.0	78	86	0	52	119	119	3.0	3.0	3.0	3.0	341	.46	40,450	128	56	57	3.0	684	7.9
May 29-31.....	17,700	--	67	13	165	126	0	111	238	238	4.2	4.2	4.2	4.2	663	.90	31,680	220	116	61	4.0	1,200	8.1
June 1-2.....	30,900	--	62	13	114	124	0	90	182	182	4.8	4.8	4.8	4.8	588	.80	49,060	210	106	54	3.4	986	8.2

a Values above 200 ppm are reported to the nearest 5 ppm.

ARKANSAS RIVER BASIN--Continued  
 ARKANSAS RIVER AT RALSTON, OKLA.--Continued

Chemical analyses, in parts per million, water year October 1956 to September 1957.--Continued

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal-cium (Ca)	Mag-ne-sium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Car-bonate (CO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> )	Bo-ron (B)	Dissolved solids, (residue at 180° C.)		Hardness as CaCO <sub>3</sub>	Per-cent ad-sorp-tion	So-dium con-duct-ance (micro-mhos at 25° C)	pH			
															Parts per mil-lion	Tons per acre-foot					Calcium magne-sium	Non-carbon-ate	
June 3-10, 1957	19,060	--	--	66	15	148	120	0	108	238	238	--	5.1	--	700	0.95	36,020	230	130	4.3	1,210	8.1	
June 11-16	48,750	--	--	39	7.4	51	106	0	41	76	76	--	3.3	--	283	38	37,250	128	41	2.0	508	7.9	
June 17	15,600	--	--	69	14	110	136	0	109	170	170	--	4.0	--	581	79	24,470	230	116	3.2	886	8.1	
June 18-20	29,830	--	--	54	9.1	82	108	0	72	130	130	--	3.8	--	435	59	35,040	172	84	2.7	751	8.0	
June 21-22	19,450	--	--	50	10	88	118	0	66	136	136	--	3.6	--	445	61	23,370	168	72	3.0	764	8.0	
June 23-26	55,300	--	--	26	7.5	41	80	0	33	58	58	--	2.8	--	218	30	32,550	96	30	1.8	368	6.9	
June 27-30	76,820	--	--	36	7.8	47	96	0	43	69	69	--	3.0	--	292	40	60,860	122	44	1.8	485	7.9	
July 1-6	60,630	--	--	54	8.1	73	118	0	71	109	109	--	2.6	--	333	53	64,330	168	72	2.4	696	7.1	
July 7-10	17,550	--	--	91	15	140	168	0	148	212	212	--	3.8	--	731	99	34,640	290	152	3.6	1,230	7.7	
July 11-20	7,920	20	0.07	101	29	227	204	0	186	350	350	0.7	3.3	0.27	1,060	1.47	23,090	370	203	5.1	1,780	8.1	
July 21-31	5,523	--	--	104	21	240	204	0	157	378	378	--	4.0	--	1,050	1.43	15,660	345	178	5.6	1,800	7.7	
Aug. 1-10	3,437	--	--	106	21	272	210	0	146	435	435	--	4.3	--	1,150	1.56	10,070	350	178	6.3	1,980	7.5	
Aug. 11-20	2,178	--	--	99	32	353	200	0	184	560	560	--	2.8	--	1,400	1.90	8,230	360	216	6.7	2,430	7.7	
Aug. 21-23	2,133	--	--	90	31	251	204	0	148	405	405	--	5.0	--	1,150	1.56	6,020	350	183	6.1	1,900	7.7	
Aug. 24-31	1,451	--	--	95	32	370	186	0	179	580	580	--	3.2	--	1,440	1.96	5,940	370	218	6.6	2,500	7.7	
Sept. 1-10	1,166	--	--	93	35	412	166	0	187	665	665	--	2.4	--	1,540	2.09	4,930	375	239	7.0	2,710	7.4	
Sept. 11-16	1,713	--	--	90	32	328	172	0	156	540	540	--	5.6	--	1,310	1.78	6,060	355	214	6.7	2,310	7.7	
Sept. 17	5,980	--	--	82	23	256	160	0	108	430	430	--	7.0	--	1,010	1.37	16,310	300	169	6.5	1,840	7.8	
Sept. 18-21	6,355	--	--	56	15	161	122	0	93	248	248	--	5.0	--	669	.91	11,450	200	100	6.4	5.0	1,210	7.6
Sept. 22-25	10,740	--	--	56	13	130	120	0	74	210	210	--	5.8	--	575	.78	16,070	194	96	5.9	4.0	1,040	7.5
Sept. 26-30	4,906	--	--	74	17	208	146	0	129	320	320	--	4.5	--	868	1.18	11,500	255	136	6.4	5.7	1,550	7.6
Weighted average	8,646	--	--	52	11	135	b116	--	74	208	208	--	3.4	--	573	0.78	13,380	174	80	4.4	1,010	--	

a Values above 200 ppm are reported to the nearest 5 ppm.

b Includes equivalent of carbonate values shown above.

## ARKANSAS RIVER BASIN--Continued

## ARKANSAS RIVER AT RALSTON, OKLA.--Continued

Temperature (\*F) of water, water year October 1956 to September 1957

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	73	64	50	47	35	59	60	70	81	80	92	88
2	80	60	52	44	44	48	63	70	67	85	92	--
3	83	55	54	46	--	47	56	67	70	88	87	87
4	80	--	55	47	43	53	53	65	74	84	--	83
5	79	52	53	43	43	45	50	68	78	84	83	79
6	72	55	44	41	47	41	55	70	81	85	83	78
7	--	53	37	45	55	47	--	70	81	--	84	72
8	73	50	33	51	62	54	55	70	80	86	86	77
9	70	53	33	39	58	62	59	75	--	87	87	--
10	73	58	35	33	--	--	62	68	78	86	88	78
11	72	62	40	35	52	63	58	65	78	88	90	--
12	73	69	41	37	58	63	39	--	76	87	91	76
13	70	61	35	35	68	67	51	72	78	87	91	78
14	--	65	38	33	55	54	56	76	78	--	87	70
15	73	50	41	33	55	60	54	76	79	89	88	--
16	76	50	--	33	53	54	57	70	--	89	89	75
17	76	52	41	33	54	55	63	67	83	87	77	74
18	71	--	40	34	50	59	68	66	78	85	--	75
19	70	59	42	33	47	59	68	67	77	89	85	78
20	69	47	45	--	46	52	70	69	79	90	85	76
21	70	45	48	59	49	50	70	72	80	--	86	68
22	73	--	47	33	39	52	70	71	79	87	84	70
23	72	48	--	35	38	49	65	69	71	88	83	71
24	68	52	41	40	45	--	78	68	73	86	85	--
25	62	--	--	33	51	42	68	71	75	85	--	75
26	64	44	47	33	51	--	66	70	73	87	88	74
27	67	47	47	--	55	65	68	73	75	90	83	73
28	63	41	46	33	55	63	68	76	80	--	83	73
29	68	41	50	33	--	64	66	77	76	91	83	--
30	80	45	--	33	--	61	69	--	80	81	84	73
31	64	--	45	33	--	64	--	--	--	90	84	--
Average	71	53	44	38	50	55	62	70	77	87	66	--

ARKANSAS RIVER BASIN--Continued  
BLACK BEAR CREEK AT PAWNEE, OKLA.

LOCATION --At gaging station at bridge on State Highway 18 in north Pawnee, Pawnee County, 50 feet downstream from Stedee Creek.  
DRAINAGE AREA --576 square miles  
RECORDS AVAILABLE --Chemical analyses: November 1951 to August 1952, October 1955 to August 1956, November 1956 to September 1957.  
REMARKS --Records of discharge for water year October 1956 to September 1957 given in WSP 1511.

Chemical analyses, in parts per million, November 1956 to September 1957

Date of collection	Discharge (cfs)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Chloride (Cl)	Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micro- mhos at 25°C)	pH
								Calcium, magnesium	Non- carbonate				
Nov. 15, 1956	1.77	46	14	52	120		118	172	74	40	1.7	639	7.7
Jan. 8, 1957	.28	74	16	106	179		209	250	104	48	3.0	1,010	8.2
Jan. 21	.14	52	18	56	118		197	202	106	38	1.6	612	7.3
Feb. 4	.17	46	27	97	132		210	226	120	48	2.8	1,000	8.1
Feb. 21	.80	136	43	208	128		535	515	410	47	4.0	2,040	7.8
Mar. 5	3.95	92	39	209	66		530	390	336	54	4.6	1,980	8.1
Apr. 2	7.75	276	90	493	122		1,300	1,060	960	50	6.6	4,380	8.1
Apr. 4	804	34	13	23	160		34	140	9	26	.8	323	7.5
Apr. 10	485	39	15	68	102		138	160	76	48	2.3	637	8.1
Apr. 18	3,460	14	3.2	9.7	56		9.6	48	0	30	.6	118	6.9
Apr. 19	3,370	11	3.0	7.0	44		11	40	4	27	.5	104	7.4
Apr. 22	2,990	13	5.2	16	60		20	54	5	39	1.0	188	7.6
Apr. 23	5,010	14	4.6	12	56		19	54	8	32	.7	187	6.8
Apr. 24	3,370	17	6.4	12	72		21	69	10	27	.6	188	7.1
Apr. 30	27.2	56	21	59	164		149	224	90	36	1.7	756	8.2
May 7	84.1	36	11	39	128		74	134	29	39	1.5	446	8.1
May 27	6,340	15	5.3	11	64		19	60	8	29	.6	164	7.7
June 20	3,800	20	8.3	14	0		33	84	24	24	.7	263	3.6
July 10	46.4	42	34	83	170		185	224	104	43	2.3	1,120	8.2
July 22	17.6	96	49	137	390		280	440	120	40	2.8	1,990	7.6
Aug. 19	22.4	124	66	196	388		430	560	262	42	3.5	1,900	7.5
Sept. 9	4.59	33	44	160	208		280	264	94	57	4.3	1,300	8.2
Sept. 18	95.1	30	7.5	35	90		72	106	32	42	1.5	394	7.0
Sept. 30	5.74	56	21	61	222		117	224	42	37	1.8	716	8.1

ARKANSAS RIVER BASIN

ARKANSAS RIVER BASIN--Continued  
CIMARRON RIVER NEAR KENTON, OKLA.

LOCATION.--At gaging station on highway bridge, 1.5 miles upstream from Carrizo Creek, 1.7 miles northeast of Kenton, Cimarron County, and 2.2 miles downstream from Carrizo Creek.  
DRAINAGE AREA.--1,106 square miles, of which 68 square miles is probably noncontributing.  
RECORDS AVAILABLE.--Chemical analyses: November 1953 to August 1956, October 1956 to September 1957.  
REMARKS.--Records of discharge for water year October 1956 to September 1957 given in WSP 1511.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Discharge (cfs)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Chloride (Cl)	Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
								Calcium, magnesium	Non-carbonate				
Oct. 30, 1956	1.45	84	85	343	264		62	560	344	57	6.3	2,500	7.9
Nov. 7	.73	96	102	275	370		67	660	357	48	4.7	2,320	7.8
Nov. 29	1.56	80	78	207	334		42	520	248	46	3.9	1,770	7.7
Dec. 5	1.47	84	89	256	372		60	575	270	49	4.6	2,060	8.1
Dec. 18	1.23	108	94	262	386		66	665	338	47	4.5	2,220	7.5
Jan. 9, 1957	1.26	48	57	183	222		52	355	173	53	4.2	1,430	8.0
Jan. 18	.65	96	117	327	482		90	720	325	50	5.3	2,690	7.9
Jan. 29	1.32	104	89	253	458		66	625	250	47	4.4	2,130	7.5
Mar. 20	.54	110	113	407	412		88	740	402	54	6.5	2,690	8.2
May 7	2.94	66	94	256	260		57	600	387	48	4.5	1,980	7.6
June 1	38.6	96	56	115	268		24	470	250	35	2.3	1,220	7.9
July 10	34.0	75	23	39	502		9.8	280	32	23	1.0	677	7.8
July 24	1.46	67	43	138	344		31	346	226	47	3.2	1,210	7.7
July 26	501	90	23	19	336		4.2	320	43	11	5.5	650	7.5
July 31	959	111	37	32	310		6.4	430	176	14	.7	847	7.5
Aug. 5	76.2	117	29	45	302		10	410	182	19	1.0	891	7.3
Aug. 16	851	90	21	27	344		5.4	310	26	16	1.7	687	7.5
Aug. 20	19.3	66	24	66	140		19	245	130	37	1.8	769	7.5
Aug. 28	5.19	68	50	144	76		34	370	306	46	3.3	1,340	6.9
Sept. 11	19.9	35	117	185	272		34	570	347	39	3.0	1,610	7.3
Sept. 18	1.69	65	85	234	272		51	510	287	50	4.5	1,650	8.0

ARKANSAS RIVER BASIN--Continued  
CIMARRON RIVER NEAR MOCANE, OKLA.

LOCATION ---At gaging station at bridge on county highway 64 miles northeast of Mokane, Beaver county, and 14.7 miles upstream from Crooked Creek.  
DRAINAGE AREA --8,670 (revised) square miles of which 4,365 square miles is probably noncontributing.  
RECORDS AVAILABLE.--Chemical analyses, October 1946 to September 1957.

Water temperatures, October 1946 to September 1948.  
EXTREMES, 1946-48.--Dissolved solids: Maximum, 2,010 ppm Jan. 1-3, 1948; minimum, 435 ppm Oct. 6, 8-11, 17, 1946.

Hardness: Maximum, 580 ppm Jan. 3, 1948; minimum, 182 ppm Nov. 5, 1946.  
Water temperatures: Maximum, 78 F Aug. 3, 28, 1948; minimum, freezing point on many days during winter months.

REMARKS.--Records of discharge for water year October 1956 to September 1957 given in WSP 1511.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Discharge (cfs)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Chloride (Cl)	Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micro- mhos at 25°C)	pH
								Calcium magnesium	Non- carbonate				
Oct. 2, 1956	29.9	96	39	347	198		990	400	238	65	7.5	2,870	7.3
Oct. 8	29.7	94	41	357	272		800	405	182	66	7.7	2,870	7.1
Oct. 17	56.3	148	58	477	316		800	610	351	66	8.4	3,370	7.4
Oct. 31	50.7	40	11	103	102		150	146	62	61	3.7	1,780	7.5
Nov. 19	58.3	48	21	141	150		215	205	82	60	4.3	1,070	7.7
Nov. 30	58.9	100	37	321	300		520	400	154	64	7.0	2,380	7.6
Dec. 3	68.7	96	38	343	268		495	395	176	65	7.5	2,320	7.4
Dec. 21	67.0	94	39	287	262		450	395	180	61	6.3	2,840	7.5
Jan. 7, 1957	63.4	72	35	280	212		450	325	152	65	6.8	2,070	7.8
Feb. 6	71.9	74	57	348	300		485	374	174	64	7.4	2,280	7.7
Mar. 13	62.8	92	56	328	292		515	460	220	61	6.7	2,430	7.7
Apr. 1	126	86	62	305	306		470	470	219	59	6.1	2,870	7.4
Apr. 9	81.0	116	74	269	322		420	595	331	60	4.8	2,370	7.5
Apr. 18	71.0	92	61	318	286		505	480	246	59	6.3	2,880	7.9
May 1	170	92	61	213	320		315	480	218	49	4.2	1,880	7.9
May 13	84.2	100	58	308	284		480	460	258	58	6.1	2,490	7.5
May 22	58.9	100	44	227	298		375	430	186	53	4.8	1,910	7.7
May 27	71.4	98	51	282	300		415	455	209	56	3.3	2,100	7.8

June 25, 1957	391	74	44	98	328	125	365	96	37	2.2	1,120	7.9
July 9	36.6	83	42	325	76	250	380	318	65	7.3	2,270	7.0
July 16	30.8	98	72	278	356	410	540	248	53	5.2	2,250	7.5
Aug. 8	128	109	64	110	272	138	535	312	31	2.1	1,420	7.8
Aug. 22	74	85	70	117	394	150	500	186	34	2.3	1,330	7.5
Aug. 30	32.5	84	68	307	344	475	490	208	58	6.0	2,350	7.6
Sept. 5	79.6	74	44	144	338	220	365	88	46	3.3	1,340	7.5
Sept. 12	471	69	36	66	374	92	320	14	31	1.6	837	7.5
Sept. 19	65.3	122	29	172	368	265	425	124	47	3.6	1,540	7.3
Sept. 25	45.0	106	35	289	330	420	410	140	61	6.2	2,090	7.5

a. Values above 200 ppm are reported to the nearest 5 ppm.

ARKANSAS RIVER BASIN--Continued  
 CIMARRON RIVER NEAR WAYNOKA, OKLA.

LOCATION.--At gaging station at bridge on U. S. Highway 281, three-quarters of a mile downstream from Maine Creek, and 5 miles south of Waynoka, Wood County.

DRAINAGE AREA.--13,334 square miles of which 4,380 square miles is probably noncontributing.

RECORDS AVAILABLE.--Chemical analyses: September 1951 to August 1956, November 1956 to September 1957.

REMARKS.--Records of discharge for water year October 1956 to September 1957 given in WSP 1511.

Chemical analyses, in parts per million, November 1956 to September 1957

Date of collection	Discharge (cfs)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Chloride (Cl)	Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
								Calcium, mg- neq/lm	Non- carbonate				
Nov. 1, 1956	0.24	892	283	--	171	0	63,200	3,440	3,300	--	--	125,000	8.0
Nov. 15	.07	191	63	--	312	6	6,950	735	470	--	--	20,900	8.4
Dec. 3	4.43	52	35	--	306	0	2,250	350	99	--	--	7,600	8.1
Dec. 18	1.81	134	33	--	380	0	2,150	445	134	--	--	7,190	8.2
Jan. 6, 1957	3.34	128	39	--	284	11	2,800	480	229	--	--	9,130	8.4
Jan. 27	3.99	37	21	909	140	4	1,360	180	59	92	29	4,700	8.4
Feb. 12	24.3	380	178	--	244	0	26,700	1,680	1,480	--	--	65,800	8.0
Feb. 27	24.8	570	393	--	207	0	44,800	3,040	2,870	--	--	100,000	7.8
Mar. 13	56.5	280	120	8,800	221	16	11,300	1,140	932	94	113	37,500	8.4
Mar. 18	30.9	309	206	12,300	117	0	17,400	1,620	1,520	94	133	49,200	8.0
Mar. 22	187	518	284	27,000	225	0	41,900	2,500	2,350	96	235	92,700	8.1
Mar. 29	205	187	82	4,060	284	0	6,360	804	572	91	60	18,800	8.2
Apr. 1	235	268	98	7,710	221	0	12,000	1,070	889	94	103	32,300	8.2
Apr. 4	865	261	136	5,760	197	0	1,040	1,210	1,040	72	72	25,100	8.0
Apr. 15	127	245	184	8,060	197	0	12,600	1,370	1,210	93	95	34,300	8.0
Apr. 19	1,660	248	107	887	152	0	1,400	1,060	936	65	12	5,620	7.9
Apr. 22	502	282	177	3,780	197	0	6,180	1,430	1,270	85	43	18,300	8.0
May 3	4,490	260	116	417	130	0	685	1,130	1,020	45	5.4	3,750	7.3
May 6	1,070	320	156	1,620	128	0	2,650	1,440	1,340	71	19	9,140	7.9
May 13	15,200	323	83	650	104	0	1,010	920	635	62	9.3	4,220	7.8
May 16	94.5	379	210	3,870	97	0	6,360	1,810	1,720	82	40	19,800	7.6
July 29	77.8	124	100	1,200	176	0	1,920	720	576	78	19	6,540	7.9
Aug. 13	50.8	365	112	5,330	288	0	7,790	1,370	1,130	90	65	25,100	7.9
Sept. 1	1,230	212	34	1,640	136	0	2,200	670	558	84	28	8,380	8.0
Sept. 24	528	110	31	1,510	188	0	2,120	400	246	89	33	7,710	8.0

ARKANSAS RIVER BASIN--Continued  
 TURKEY CREEK NEAR DRUMMOND, OKLA.

LOCATION.--At gaging station on county highway bridge, 2 1/2 miles northeast of Drummond, Garfield County, 2 1/2 miles downstream from Clear Creek, and 9 miles southwest of Ehid, Garfield County.  
 DRAINAGE AREA.--248 square miles.  
 RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1948, October 1952 to August 1953, November 1954 to June 1956, December 1956 to September 1957.  
 REMARKS.--Records of discharge for water year October 1956 to September 1957 given in WSP 1511.

Chemical analyses, in parts per million, December 1956 to September 1957

Date of collection	Discharge (cfs)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Chloride (Cl)	Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
								Calcium, mg/lum	Non-carbonate				
Dec. 3, 1956	0.16	80	93	496	230	6	980	560	382	65	9.0	3,770	8.4
Jan 8, 1957	.34	108	141	1,230	132	0	2,000	850	742	76	18	7,020	8.2
Feb. 12	.46	112	147	1,170	164	0	1,780	885	750	74	17	6,860	8.1
Mar. 18	.36	104	125	1,060	184	0	1,550	775	634	75	17	6,140	8.1
Apr. 4	207	14	3.6	20	58	0	34	50	2	47	1.2	218	7.5
Apr. 15	.60	95	52	350	220	0	570	450	270	63	7.2	2,490	8.2
Apr. 21	730	16	3.4	8.0	68	0	6.6	54	0	24	.5	140	7.5
Apr. 22	258	14	3.2	12	64	0	14	48	0	35	.8	156	7.1
Apr. 26	33.5	34	13	80	106	0	151	140	52	55	2.6	675	7.8
May 13	21.4	36	14	70	142	0	164	148	32	52	2.7	664	7.6
May 19	2,170	10	4.6	7.2	46	0	7.4	44	6	26	.5	103	7.2
June 1	40.5	83	45	235	278	0	350	390	162	57	5.2	1,850	8.2
June 19	958	15	6.2	14	70	0	20	63	6	33	.8	201	7.5
June 24	2.26	6.6	2.9	6.8	46	0	7.4	36	0	29	.5	107	7.2
Aug. 14	5.01	66	116	417	325	0	580	640	374	59	7.2	4,470	8.2
Sept. 16	265	14	4.6	16	70	0	19	54	0	42	1.1	210	7.6

a Values above 200 ppm are reported to the nearest 5 ppm.

ARKANSAS RIVER BASIN.--Continued  
COTTONWOOD CREEK NEAR GUTHRIE, OKLA.

LOCATION.--At county highway bridge, 2 miles southwest of Guthrie, Logan County.  
DRAINAGE AREA.--366 square miles.  
RECORDS AVAILABLE.--Chemical analyses: October 1953 to July 1954, October 1955 to July 1956, October 1956 to September 1957.  
REMARKS.--Discharge data obtained at time of sampling. Records of discharge given in WSP 1511.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Discharge (cfs)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Chloride (Cl)	Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micro- mhos at 25°C)	pH
								Calcium, magnesium	Non- carbonate				
Oct. 17, 1956	23.9	35	10	26	108	0	10	130	42	30	1.0	376	7.8
Nov. 14	.37	47	11	41	190	0	31	162	6	35	1.4	493	8.0
Dec. 5	.23	80	17	49	326	0	47	270	3	26	1.3	715	8.1
Jan. 7, 1957	17.0	59	41	102	196	4	92	314	147	41	2.5	1,060	8.4
Feb. 6	3.55	86	63	131	260	36	98	472	199	38	2.6	1,310	8.8
Mar. 1	29.4	96	46	133	274	6	108	428	194	40	2.8	1,350	8.3
Apr. 29	1,130	65	36	74	208	0	89	308	138	34	1.8	991	8.1
May 8	67,900	57	38	38	182	0	77	300	151	36	1.9	994	8.0
June 17	2,700	40	55	112	186	0	144	328	192	43	2.7	1,340	7.9
July 24	31.8	72	61	138	184	0	140	430	296	41	2.9	1,590	7.8
Aug. 8	11.1	49	51	102	196	0	94	332	172	40	2.4	1,310	7.9
Sept. 11	8.01	40	63	118	220	0	120	360	180	42	2.7	1,260	8.0

ARKANSAS RIVER BASIN--Continued  
CIMARRON RIVER NEAR GUTHRIE, OKLA.

LOCATION --At gaging station 125 feet upstream from Atchinson, Topeka and Santa Fe Railway Co. bridge, 1.2 miles downstream from Cottonwood Creek, and 2½ miles north of Guthrie, Logan County, DRAINAGE AREA --16,892 square miles, of which 4,926 square miles is probably contributing. RECORDS AVAILABLE --Chemical analyses: November 1953 to September 1957. --Chemical analyses: November 1953 to September 1957. --Records of discharge for water year October 1956 to September 1957 given in WSP 1511.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Discharge (cfs)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Chloride (Cl)	Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH
								Calcium Magnesium	Non-Carbonate				
Oct. 1, 1956	1.07	196	90	--	336	0	2,300	860	584	--	--	8,040	8.1
Nov. 6	241	104	29	--	132	0	1,030	380	272	--	--	3,760	7.7
Nov. 15	9.30	148	44	--	232	0	1,620	550	360	--	--	5,780	8.1
Nov. 23	4.42	224	73	--	272	0	3,000	860	637	--	--	8,940	8.1
Dec. 5	3.88	236	80	--	280	0	3,000	920	690	--	--	9,810	7.9
Dec. 28	14.0	180	56	--	260	0	2,000	680	467	--	--	6,820	8.0
Jan. 7, 1957	17.0	194	65	--	254	6	2,300	750	532	--	--	7,990	8.3
Jan. 14	0.56	204	76	--	254	16	2,580	820	588	--	--	8,540	8.5
Feb. 6	15.0	172	41	--	284	0	1,980	620	448	--	--	6,970	7.9
Feb. 20	17.1	243	63	--	250	0	4,430	948	738	--	--	14,200	7.9
Mar. 1	28.4	167	80	2,810	174	5	4,460	796	645	86	43	13,800	8.3
Mar. 15	65.9	260	129	6,360	103	0	10,800	1,180	1,100	94	106	35,800	8.0
Mar. 26	203	207	87	3,650	103	0	4,320	874	790	91	57	18,800	7.9
Mar. 29	491	277	85	4,700	215	0	7,760	1,040	864	81	63	27,600	8.1
Apr. 5	1,620	106	43	1,160	188	0	1,920	440	286	85	24	6,100	7.9
Apr. 15	187	214	80	3,580	224	0	5,460	904	720	90	52	17,100	8.0
Apr. 29	1,130	176	80	1,350	166	0	2,120	770	634	79	21	7,210	8.0
May 8	2,170	228	49	1,660	188	0	2,600	770	616	82	26	8,660	8.1
May 14	4,940	188	68	792	146	0	1,230	750	630	70	13	4,820	7.9
June 5	6,390	126	46	931	196	0	1,450	505	344	80	18	5,210	8.1
June 17	2,700	164	63	963	196	0	1,520	670	510	76	16	5,380	8.1
July 16	699	220	90	1,580	162	0	2,000	920	787	79	23	8,860	7.9
Aug. 12	408	110	97	1,330	244	0	2,120	675	475	81	22	7,290	8.1
Sept. 11	230	110	80	1,860	284	0	2,650	880	648	82	27	9,710	8.0
Sept. 24	1,380	93	31	874	204	0	1,180	360	193	84	20	4,650	8.1

ARKANSAS RIVER BASIN--Continued  
 CIMARRON RIVER AT PERKINS, OKLA.

LOCATION.--At gaging station at bridge on State Highway 40, 1 mile south of Perkins, Payne County, 1½ miles upstream from Dugout Creek, and 4 miles downstream from Wildhorse Creek.

DRAINAGE AREA.--17,852 square miles, of which 4,926 square miles is probably noncontributing.

RECORDS AVAILABLE.--Chemical analyses: October 1952 to September 1957.

Water temperatures: October 1952 to September 1957.

EXTREMES 1956-57.--Dissolved solids: Maximum, 19,600 ppm Mar. 18-20; minimum, 277 ppm May 17.

Hardness: Maximum, 1,120 ppm Mar. 17, 18-20; minimum, 105 ppm May 17.

Specific conductance: Maximum daily, 32,400 micromhos Mar. 18; minimum daily, 497 micromhos May 17.

Water temperatures: Maximum, 85°F Aug. 3; minimum, freezing point Jan. 16-17.

EXTREMES 1952-57.--Dissolved solids: Maximum, 20,500 ppm Feb. 18, 20, 1955; minimum, 277 ppm May 17, 1957.

Hardness: Maximum, 1,980 Aug. 27-29, 1954; minimum, 92 ppm May 20, 1955.

Specific conductance: Maximum daily, 32,400 micromhos Mar. 18, 1956; minimum daily, 438 micromhos Oct. 5, 1955.

Water temperatures: Maximum, 88°F Oct. 1, 1954; minimum, freezing point on many days during winter months.

REMARKS.--Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of discharge for water year October 1956 to September 1957 given in WSP 1511.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonyl (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>		Percent sodium absorption ratio	Specific conductance (micro-mhos at 25°C)	pH	
															Parts per million	Tons per acre-foot	Calcium magnesium	Non-carbonate				
Oct. 1-10, 1956.....	3.07	17	0.00	245	89	2,200	9.8	227	0	446	3,640	0.2	--	0.45	6,930	9.42	87	980	83	31	11,500	7.9
Oct. 11-14.....	5.90	--	--	259	91	2,220	0	239	0	438	3,690	--	--	--	7,070	9.62	113	1,020	83	30	11,800	8.0
Oct. 15.....	488	--	--	37	7.7	114	118	0	30	172	0	--	--	--	485	6.6	639	124	29	67	4.4	7.4
Oct. 16.....	278	--	--	80	26	552	148	0	158	860	0	--	7.8	--	1,780	2.43	1,340	305	184	80	4.4	7.6
Oct. 17, 19-20.....	158	--	--	38	10	147	118	0	83	215	0	--	3.3	--	537	7.3	229	138	42	70	5.4	7.4
Oct. 18.....	228	--	--	120	31	715	150	0	238	1,140	0	--	--	--	2,400	3.26	1,480	425	302	79	15	7.5
Oct. 21-23.....	50.7	--	--	58	16	243	156	0	82	370	0	--	3.1	--	887	1.21	121	210	82	72	7.3	7.5
Oct. 24-25.....	31.0	--	--	82	21	414	202	0	114	610	0	--	3.5	--	1,400	1.90	117	290	124	76	11	7.7
Oct. 26-28.....	22.3	--	--	106	31	575	232	0	145	920	0	--	3.5	--	1,960	2.64	117	360	200	76	13	7.9
Oct. 29-31.....	23.0	--	--	118	35	740	236	0	170	1,190	0	--	--	--	2,460	3.35	153	440	266	78	15	7.9
Nov. 1-4.....	24.0	--	--	182	46	949	214	0	203	1,350	0	--	--	--	3,090	4.20	200	510	384	80	16	8.0
Nov. 5, 9.....	90.0	--	--	66	23	404	126	0	108	650	0	--	6.4	--	1,340	1.82	326	260	136	77	11	7.8
Nov. 6-8, 10.....	66.2	--	--	100	24	685	164	0	182	1,040	0	--	--	--	2,110	2.87	502	350	215	60	15	8.2
Nov. 11-12.....	45.0	--	--	104	29	613	186	8	181	960	0	--	6.4	--	2,040	2.77	248	360	214	78	14	8.5
Nov. 13-16.....	27.5	--	--	96	26	506	230	2	156	770	0	--	5.9	--	1,660	2.28	125	345	153	76	12	8.5
Nov. 17-20.....	16.8	--	--	119	32	669	244	6	163	1,060	0	--	--	--	2,220	3.02	101	420	210	78	14	8.5
Nov. 21-24.....	12.5	--	--	138	43	892	256	6	186	1,450	0	--	--	--	2,910	3.96	98	520	288	79	17	8.4
Nov. 25-30.....	10.1	--	--	166	49	1,120	288	4	223	1,920	0	--	--	--	3,640	4.95	99	615	372	80	20	8.4



## ARKANSAS RIVER BASIN--Continued

## CIMARRON RIVER AT PERKINS, OKLA.--Continued

Chemical analyses, in parts per million, water year October 1956 to September 1957.--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Percent adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	
															Parts per million	Tons per acre-foot	Tons per foot	Calcium	Non-magnesium				
Apr. 24-25, 1957...	17,550	--	--	63	8.5	177	132	0	113	248	248	--	2.3	--	739	1.01	35,020	192	84	67	5.6	1,270	7.9
Apr. 26 .....	4,680	--	--	134	16	487	120	0	295	745	745	--	4.2	--	1,910	2.60	23,220	400	302	73	11	3,180	8.1
Apr. 27-28 .....	2,355	--	--	98	13	337	106	0	221	505	505	--	3.2	--	1,950	1.94	8,580	300	211	71	8.5	2,300	8.1
Apr. 29-30 .....	1,475	--	--	166	23	912	122	0	322	1,460	1,460	--	--	--	3,080	4.19	12,270	510	410	80	18	5,240	7.8
May 1 .....	1,520	--	--	160	15	1,180	132	0	281	1,850	1,850	--	--	--	3,700	5.03	13,190	460	336	85	24	6,250	8.4
May 2 .....	3,510	--	--	107	24	762	144	12	212	1,180	1,180	--	--	--	2,470	3.38	24,080	365	227	82	17	4,250	8.5
May 3-5 .....	16,030	--	--	83	13	328	120	0	173	490	490	--	4.2	--	1,230	1.67	53,240	260	162	73	8.8	2,140	7.7
May 6 .....	7,050	--	--	104	13	478	106	0	223	730	730	--	7.2	--	1,700	2.31	32,360	315	228	77	12	2,890	8.2
May 7 .....	4,380	--	--	142	33	862	116	6	356	1,940	1,940	--	--	--	2,970	4.04	35,120	490	385	79	17	4,950	8.4
May 8-10 .....	2,347	--	--	182	31	1,400	144	4	413	2,180	2,180	--	--	--	4,410	6.00	27,950	580	456	84	25	7,460	8.3
May 11-13 .....	2,870	--	--	196	39	1,430	156	20	447	2,220	2,220	--	--	--	4,590	6.24	35,570	650	488	83	24	7,760	8.6
May 14-15 .....	5,810	--	--	172	28	708	120	20	426	1,070	1,070	--	--	--	2,520	3.43	39,530	545	413	74	13	4,340	8.6
May 16 .....	18,100	--	--	212	33	1,010	124	16	482	1,560	1,560	--	--	--	3,460	4.71	169,100	665	537	77	17	5,760	8.6
May 17 .....	108,000	--	--	34	4.9	86	112	8	25	80	80	--	4.0	--	277	.38	80,770	105	0	58	2.8	497	8.5
May 18-20 .....	47,200	--	--	38	6.1	100	108	6	32	144	144	--	2.6	--	412	.56	52,510	120	22	64	4.0	737	8.5
May 21 .....	61,900	--	--	47	7.4	78	142	0	30	118	118	--	3.3	--	381	.52	63,680	148	32	53	2.8	706	7.7
May 22-23 .....	15,900	--	--	62	14	204	140	0	83	320	320	--	2.8	--	761	1.03	32,670	210	98	68	6.1	1,440	8.0
May 24 .....	7,900	--	--	91	21	407	160	0	182	620	620	--	5.4	--	1,480	2.01	31,570	315	184	74	10	2,680	7.8
May 26 .....	23,900	--	--	102	28	503	164	0	230	770	770	--	6.2	--	1,730	2.35	111,600	370	236	75	11	3,040	8.1
May 25 .....	8,790	--	--	77	21	383	166	0	147	380	380	--	5.1	--	1,080	1.47	25,630	280	144	66	6.6	1,940	7.8
May 27-29 .....	9,030	--	--	94	31	368	130	0	223	580	580	--	4.0	--	1,440	1.96	35,100	360	254	69	8.4	2,500	7.5
May 30 .....	6,400	--	--	136	39	600	158	0	313	1,080	1,080	--	--	--	2,410	3.28	41,640	500	370	75	13	4,100	8.1
May 31 .....	24,700	--	--	83	20	307	164	0	138	480	480	--	5.1	--	1,150	1.56	76,690	290	156	70	7.8	2,050	7.7
June 1 .....	23,100	--	--	98	31	522	144	0	174	850	850	--	8.7	--	1,830	2.49	114,100	370	252	75	12	3,170	8.2
June 2-3 .....	11,720	--	--	118	38	840	102	0	278	1,350	1,350	--	--	--	2,840	3.86	89,570	450	366	80	17	4,950	8.1
June 4 .....	6,910	--	--	107	29	500	188	0	244	750	750	--	8.3	--	1,750	2.38	80,560	385	231	74	11	3,000	8.2
June 5-8 .....	6,310	--	--	114	35	519	168	0	226	1,150	1,150	--	--	--	2,410	3.28	44,310	430	292	78	15	4,240	8.2
June 7-8 .....	4,085	--	--	109	30	577	174	0	284	900	900	--	4.0	--	2,010	2.73	22,170	395	252	76	13	3,520	8.2
June 9 .....	3,240	--	--	135	51	873	168	0	139	1,400	1,400	--	--	--	3,040	4.13	26,590	545	408	78	16	5,160	8.1
June 10 .....	14,900	--	--	77	23	348	138	0	130	560	560	--	5.4	--	1,270	1.73	49,030	285	172	73	9.0	2,260	8.2
June 11 .....	35,100	--	--	131	35	755	162	0	249	1,220	1,220	--	--	--	2,590	3.52	245,500	470	337	78	15	4,480	8.2
June 12 .....	21,000	--	--	95	20	215	116	0	214	330	330	--	3.7	--	2,990	1.85	56,130	390	225	59	5.2	1,670	7.4

ARKANSAS RIVER BASIN

June 13, 1957	11,000	--	--	77	14	148	114	0	147	228	--	4.4	--	707	0.96	21,000	250	156	56	4.1	7.9
June 14	7,530	--	88	20	189	380	130	0	275	295	--	5.0	--	916	1.25	18,620	300	154	58	4.7	7.9
June 15	7,160	--	128	27	310	358	144	0	177	610	--	3.6	--	1,610	2.19	31,210	430	312	66	8.0	7.9
June 16-17	4,035	--	173	46	858	168	0	1,400	1,400	1,400	--	5.5	--	3,060	4.16	33,340	620	482	75	15	8.0
June 18	10,300	--	101	26	502	130	0	203	800	800	--	5.5	--	1,760	2.39	48,950	360	254	75	11	7.9
June 19-20	13,950	--	69	16	251	122	0	123	390	390	--	3.8	--	956	1.30	36,010	235	136	70	7.1	7.9
June 21	7,500	--	78	19	205	124	0	142	330	330	--	3.3	--	919	1.25	18,710	270	170	62	5.4	7.9
June 22	4,750	--	139	34	868	168	0	247	1,400	1,400	--	7.8	--	2,830	3.85	36,140	485	348	80	17	8.0
June 23	16,100	--	74	19	984	152	0	116	600	600	--	4.5	--	1,310	1.78	56,950	265	140	76	10	7.9
June 24	42,600	--	46	15	83	124	0	56	154	154	--	4.5	--	458	.62	52,680	178	76	53	3.0	7.8
June 25-30	21,680	--	75	18	204	120	0	145	320	320	--	2.6	--	878	1.19	51,390	260	162	63	5.5	7.8
July 1-2	9,370	--	87	28	288	168	0	154	450	450	--	4.6	--	1,160	1.58	29,350	310	172	67	7.1	7.9
July 3-7	9,450	--	117	26	539	148	0	252	840	840	--	5.0	--	1,880	2.56	47,970	400	278	75	12	7.2
July 8-10	1,997	--	163	46	719	240	0	339	1,140	1,140	--	--	--	2,650	3.80	14,390	595	398	72	13	8.1
July 11-13	1,353	--	198	60	1,000	264	0	432	1,600	1,600	--	--	--	3,570	4.86	13,040	740	524	75	16	8.0
July 14-20	1,876	--	200	78	1,260	224	0	487	2,080	2,080	--	--	--	4,440	6.04	10,500	820	646	77	20	7.7
July 21-23	777	--	234	53	1,430	188	0	491	2,300	2,300	--	--	--	4,760	6.47	9,980	800	646	80	22	8.0
July 24, 27-28	1,391	--	134	74	925	242	0	324	1,500	1,500	--	--	--	3,180	4.32	11,940	640	442	76	16	8.2
July 29, 30	1,155	--	107	56	627	172	0	241	980	980	--	4.8	--	2,160	2.84	6,740	415	274	77	13	7.7
July 29-31	614	--	208	63	1,320	220	0	468	2,100	2,100	--	--	--	4,400	5.98	7,380	750	600	79	21	7.4
Aug. 1	673	--	198	79	1,510	160	0	535	2,430	2,430	--	--	--	4,490	6.72	8,980	820	689	80	23	7.8
Aug. 2-3	646	--	233	84	2,120	180	0	582	3,360	3,360	--	--	--	4,570	9.07	11,630	925	777	83	30	7.8
Aug. 4	795	--	152	51	1,400	194	0	333	2,220	2,220	--	--	--	4,340	5.90	9,320	560	439	84	25	7.8
Aug. 5-6	664	--	132	45	982	210	0	281	1,550	1,550	--	--	--	3,140	4.27	5,630	515	343	81	19	7.8
Aug. 7	546	--	134	54	1,280	200	0	348	1,950	1,950	--	--	--	3,120	3.33	3,780	605	441	82	22	7.9
Aug. 8-10	744	--	180	66	1,670	218	0	408	2,650	2,650	--	--	--	5,190	7.06	10,430	720	562	83	27	7.9
Aug. 11	619	--	201	62	2,380	213	0	450	3,390	3,390	--	--	--	6,330	8.29	11,340	760	584	87	36	8.2
Aug. 12-20	421	--	166	62	1,390	246	0	342	2,200	2,200	--	--	--	4,390	5.97	4,980	670	468	82	23	8.2

a Values above 200 ppm are reported to the nearest 5 ppm.

ARKANSAS RIVER BASIN--Continued  
CIMARRON RIVER AT PERKINS, OKLA.--Continued

Chemical analyses, in parts per million, water year October 1956 to September 1957.--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Percent sodium ratio	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium-sulfate	Non-carbonate			
Aug. 21-26, 1957...	301	--	--	200	80	1,810	244	0	437	2,920	--	--	--	--	5,850	7.96	4,750	830	630	83	9,890	8.0
Aug. 27-31 .....	235	--	--	221	86	2,350	297	0	475	3,780	--	--	--	--	7,230	9.83	4,590	805	712	85	12,100	8.1
Sept. 1-10 .....	213	26	0.01	215	88	1,980	247	0	551	3,190	0.1	--	--	0.50	6,280	8.35	5,620	695	694	88	10,500	7.9
Sept. 11 .....	295	--	--	207	58	2,590	177	0	532	4,030	--	--	--	--	7,670	10.43	6,110	735	612	86	13,000	8.0
Sept. 12 .....	348	--	--	128	60	1,110	208	0	234	1,800	--	--	--	--	3,540	4.81	3,330	960	390	81	6,270	8.0
Sept. 13 .....	327	--	--	120	101	1,470	240	0	281	2,420	--	--	--	--	4,740	6.45	4,160	715	518	82	8,190	8.1
Sept. 14 .....	2,200	--	--	142	45	1,020	254	0	275	1,600	--	--	--	--	3,220	4.38	19,130	540	332	80	5,630	8.1
Sept. 15, 17 .....	10,090	--	--	69	16	234	136	0	128	350	--	--	5.5	--	927	1.26	25,250	235	123	68	1,660	7.7
Sept. 16, 18 .....	10,550	--	--	115	27	454	144	0	251	710	--	--	6.8	--	1,670	2.27	47,570	400	282	71	2,900	7.8
Sept. 19-20 .....	2,050	--	--	157	34	787	132	0	356	1,250	--	--	--	--	2,750	3.74	15,220	530	422	76	4,710	7.7
Sept. 21-30 .....	1,059	--	--	123	36	982	178	0	249	1,550	--	--	--	--	3,060	4.16	8,750	455	309	82	5,370	7.4
Weighted average	3,450	--	--	85	20	403	b141	--	161	629	--	--	--	--	1,430	1.94	13,320	295	179	75	2,460	--

a Values above 200 ppm are reported to the nearest 5 ppm  
b Includes equivalent of individual carbonate values shown above.

ARKANSAS RIVER BASIN--Continued

CIMARRON RIVER AT PERKINS, OKLA.--Continued

Temperature (°F) of water, water year October 1956 to September 1957

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	68	62	40	46	36	47	61	69	69	80	84	77
2	68	60	43	43	37	50	57	69	65	82	84	78
3	68	58	46	44	46	48	60	69	66	83	85	73
4	70	53	52	44	38	50	52	63	67	83	78	74
5	69	53	52	44	46	48	48	62	70	79	77	74
6	70	52	50	46	45	49	50	64	74	78	77	73
7	62	52	46	41	47	42	58	65	77	83	75	68
8	64	47	38	51	53	46	49	67	79	80	75	64
9	67	45	35	45	58	43	50	66	77	82	77	66
10	63	48	35	54	58	52	55	68	72	83	80	68
11	63	50	35	34	51	60	57	63	77	84	80	70
12	66	56	36	34	50	58	43	67	76	83	82	67
13	70	58	36	36	51	55	40	70	77	84	82	68
14	68	68	38	35	53	55	46	66	80	84	82	68
15	66	58	38	34	50	49	55	72	78	84	82	66
16	67	46	36	32	53	53	56	71	79	83	77	66
17	67	49	43	32	52	53	62	68	78	83	81	66
18	66	46	37	33	52	53	62	65	73	83	78	69
19	66	51	43	35	48	49	66	66	73	84	75	72
20	65	54	45	38	46	54	68	65	74	84	73	72
21	62	45	43	47	45	49	66	67	77	83	76	70
22	62	43	46	51	44	48	66	71	75	82	76	66
23	64	44	46	35	40	52	83	68	73	82	77	63
24	65	44	42	37	42	48	60	68	67	82	76	63
25	63	46	40	35	43	46	66	69	71	82	74	65
26	56	44	43	34	47	43	68	68	73	82	77	66
27	58	42	41	33	44	48	67	69	73	84	77	67
28	57	44	45	35	47	47	65	68	75	83	76	67
29	62	36	40	37	--	48	65	73	80	84	77	65
30	58	41	47	34	--	55	65	72	82	84	76	--
31	57	--	46	36	--	56	--	71	--	84	72	--
Average	64	50	42	39	47	50	58	68	74	83	78	69

## ARKANSAS RIVER BASIN--Continued

## ARKANSAS RIVER AT SAND SPRINGS BRIDGE, NEAR TULSA, OKLA.

LOCATION --At bridge on State Highway 33 in Sand Springs, 7 miles downstream from Cimarron River, and 10 miles above gaging station at Tulsa, Tulsa County. DRAINAGE AREA --74,615 square miles above gaging station, of which 12,541 square miles is probably noncontributing.

RECORDS AVAILABLE --Chemical analyses: October 1946 to September 1957.

Water temperatures: October 1946 to September 1957.

EXTREMES 1956-57--Dissolved solids: Maximum, 13,500 ppm Oct. 19; minimum, 396 ppm May 18.

Hardness: Maximum, 2,600 ppm Oct. 19; minimum, 120 ppm May 22.

Specific conductance: Maximum, 21,200 microhms Oct. 19; minimum daily, 694 microhms May 22.

Water temperatures: Maximum, 90°F July 13; minimum, freezing point Jan. 10, 14, 15, 26-30.

EXTREMES 1946-57--Dissolved solids: Maximum, 13,500 ppm Oct. 19, 1956; minimum, 232 ppm July 18-20, 1950.

Hardness: Maximum, 2,600 ppm Oct. 19, 1956; minimum, 106 ppm July 2, 1947.

Specific conductance: Maximum daily, 21,200 microhms Oct. 19, 1956; minimum daily, 379 microhms July 19, 1950.

Water temperatures: Maximum, 96°F Aug. 7, 1947; minimum, freezing point on many days during winter months.

REMARKS --Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of discharge for gaging station at Tulsa for water year October 1956 to September 1957 given in WSP 1511. No appreciable inflow between sampling station and gaging station except during periods of heavy local runoff.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Bohemian iron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (microhms at 25°C)	pH		
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium				Non-carbonate	
Oct. 1-10, 1956	49.7	12	0.01	208	63	1,170	11	176	0	232	2,100	0.2	--	0.30	4,060	5.52	545	780	636	76	18	6,840	7.7
Oct. 11-15	66.6	--	--	184	59	886	148	148	0	205	1,780	--	--	--	3,400	4.62	611	700	880	75	16	5,980	7.5
Oct. 16-18	130	--	--	304	90	1,810	839	289	0	289	3,300	--	--	--	6,170	8.39	2,170	1,130	1,030	78	23	10,400	7.5
Oct. 19	298	--	--	705	205	5,830	109	323	0	323	7,450	--	--	--	13,950	18.36	10,860	2,600	2,510	76	33	21,300	7.6
Oct. 20	237	--	--	307	101	2,010	100	0	0	318	3,640	--	--	--	6,780	9.22	4,340	1,180	1,100	79	25	11,300	7.5
Oct. 21	292	--	--	166	40	1,100	110	0	0	195	1,900	--	--	--	3,800	4.90	2,840	585	495	80	20	6,280	7.9
Oct. 22-23	334	--	--	154	36	827	128	0	0	144	1,470	--	--	--	2,840	3.86	2,560	530	425	77	16	5,030	7.5
Oct. 24-27	165	--	--	136	34	717	138	0	0	145	1,260	--	--	--	2,500	3.40	1,110	480	367	76	14	4,430	7.7
Oct. 28-31	128	--	--	164	38	836	134	0	0	178	1,480	--	--	--	2,940	4.00	1,020	565	455	76	15	5,140	7.7
Nov. 1-8	301	--	--	164	46	858	136	0	0	149	1,560	--	--	--	3,130	4.26	2,540	600	488	76	15	5,270	7.8
Nov. 9-10	334	--	--	120	32	606	100	0	0	144	1,040	--	--	--	2,170	2.95	1,960	430	359	75	13	3,720	7.9
Nov. 11-20	259	--	--	124	39	658	164	0	0	153	1,140	--	--	--	2,380	3.24	1,660	470	338	75	13	4,080	7.6
Nov. 21-30	170	--	--	160	44	799	198	0	0	174	1,400	--	--	--	2,810	3.82	1,290	580	418	75	14	4,910	7.8
Dec. 1-10	163	--	--	170	49	851	203	0	0	173	1,510	--	--	--	3,030	4.11	1,330	625	460	75	15	5,260	7.8
Dec. 11-20	208	--	--	196	54	936	180	0	0	170	1,700	--	--	--	3,430	4.68	1,910	710	540	74	15	6,870	8.1
Dec. 21-31	258	5.8	0.00	168	48	833	8.5	187	0	176	1,500	.4	--	.20	3,030	4.12	2,090	615	462	74	15	5,310	7.7
Jan. 1-10, 1957	276	--	--	148	40	763	180	0	0	177	1,390	--	--	--	2,890	3.93	2,150	535	388	76	14	4,790	7.6
Jan. 11-18	184	--	--	152	44	796	198	0	0	176	1,380	--	--	--	2,830	3.85	1,410	560	398	76	15	4,830	8.1
Jan. 19-24	158	--	--	188	54	988	212	0	0	189	1,750	--	--	--	3,490	4.75	1,490	690	516	76	16	6,910	8.1
Jan. 25-28	298	--	--	160	44	798	190	0	0	173	1,400	--	--	--	2,960	4.03	2,380	580	424	75	14	4,920	8.0
Jan. 29-31	137	--	--	192	57	1,040	198	0	0	196	1,850	--	--	--	3,850	5.24	1,420	715	552	76	17	6,170	7.9

ARKANSAS RIVER BASIN

Feb. 1-10, 1957	242	--	--	172	46	828	160	0	168	1,500	--	--	3,070	4.18	2,010	620	489	74	14	5,180 8.2
Feb. 11-20	326	--	168	32	32	721	180	4	158	1,280	--	--	2,680	3.64	2,360	550	402	74	13	4,520 7.9
Feb. 21-28	378	--	140	46	630	194	184	0	159	1,280	--	--	2,400	3.26	2,450	540	374	72	12	4,030 8.3
Mar. 1-20	368	--	132	34	671	180	173	10	173	1,160	--	--	2,960	3.48	2,540	520	356	74	13	4,210 8.6
Mar. 21-30	442	--	128	41	1,030	154	0	208	1,700	2,380	--	--	3,400	4.62	4,060	490	364	82	20	5,780 8.2
Mar. 31	844	--	152	34	1,480	152	4	233	2,380	--	--	--	4,630	6.30	10,550	520	389	86	28	7,790 8.3
Apr. 1	1,220	--	144	34	1,500	152	6	223	2,400	--	--	--	4,580	6.23	15,080	500	366	87	29	7,790 8.4
Apr. 2	3,640	--	96	27	812	146	8	143	1,300	--	--	--	2,530	3.44	24,860	350	217	83	19	4,500 8.4
Apr. 3	4,380	--	70	15	4,447	120	4	73	725	--	6.4	--	1,510	2.05	17,860	235	131	80	13	2,660 8.3
Apr. 4-5	3,145	--	98	28	1,030	132	8	152	1,650	--	--	--	3,170	4.31	26,920	360	238	86	24	5,510 8.4
Apr. 6	11,700	--	92	20	1,743	148	0	107	1,200	--	--	--	2,470	3.36	78,030	310	188	84	18	4,170 8.2
Apr. 7	12,400	--	112	27	1,400	144	8	167	2,220	--	--	--	4,200	5.71	140,600	390	258	89	31	7,370 8.4
Apr. 8-10	7,260	--	82	17	536	156	0	116	840	--	7.8	--	1,740	2.37	34,110	275	146	81	14	3,160 8.2
Apr. 11-17	3,609	--	85	21	608	116	0	133	980	--	7.1	--	2,000	2.72	19,490	300	205	81	15	3,540 8.2
Apr. 18, 20	9,820	--	62	12	293	140	0	57	470	--	2.8	--	1,070	1.46	28,660	200	88	76	9.0	1,910 8.0
Apr. 19	14,800	--	34	9.5	144	104	0	25	230	--	2.9	--	581	.79	23,220	124	39	72	5.6	1,030 7.9
Apr. 21	31,400	--	48	11	208	148	0	32	325	--	2.8	--	779	1.06	66,040	164	42	73	7.1	1,360 8.2
Apr. 22	31,400	--	86	18	558	178	0	143	855	--	2.3	--	1,840	2.50	156,000	290	144	81	14	3,250 8.2
Apr. 23-27	42,320	--	58	11	219	136	0	83	330	--	3.3	--	830	1.13	94,840	190	78	71	6.9	1,490 8.2
Apr. 28-30	13,570	--	79	19	462	116	6	151	720	--	3.9	--	1,550	2.11	56,790	225	171	78	12	2,740 8.3
May 1-3	12,130	--	97	17	572	134	0	163	900	--	4.8	--	1,880	2.56	61,570	310	200	80	14	3,340 7.9
May 4-7	28,380	--	94	16	353	120	0	195	540	--	4.9	--	1,280	1.74	98,080	300	202	72	8.9	2,250 8.0
May 8-10	11,430	--	107	18	574	122	0	205	900	--	5.5	--	1,940	2.64	59,870	340	240	79	14	3,400 7.8
May 11	7,950	--	117	24	795	152	0	222	1,250	--	--	--	2,640	3.59	56,670	390	266	82	18	4,540 8.2
May 12-13	13,800	--	74	15	444	132	0	135	680	--	5.6	--	1,480	2.01	55,140	245	138	80	12	2,600 8.1
May 14-16	17,000	--	110	23	601	146	0	219	940	--	5.8	--	2,060	2.80	94,550	370	250	78	14	3,570 7.9
May 17	99,300	--	66	8.6	242	132	0	101	360	--	8.2	--	885	1.20	237,300	200	92	72	7.5	1,570 8.0
May 18	169,000	--	41	6.7	89	116	0	35	134	--	3.5	--	396	.54	180,700	130	35	60	3.4	697 7.3
May 19	205,000	--	90	13	270	128	0	159	420	--	4.4	--	1,100	1.50	608,800	280	175	68	7.0	1,860 8.1
May 20	135,000	--	57	7.3	168	128	0	64	260	--	5.4	--	702	.91	244,900	172	72	68	5.6	1,170 7.9
May 21	205,000	--	60	7.4	174	134	0	67	260	--	15	--	672	.95	388,600	180	70	68	5.6	1,200 8.1
May 22	171,000	--	38	6.1	93	108	0	33	140	--	3.0	--	410	.56	189,300	120	32	63	3.7	694 8.0

a Values above 200 ppm are reported to the nearest 5 ppm.

ARKANSAS RIVER BASIN--Continued  
 ARKANSAS RIVER AT SAND SPRINGS BRIDGE, NEAR TULSA, OKLA.--Continued  
 Chemical analyses, in parts per million, water year October 1956 to September 1957--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Percent adsorption	Specific conductance (micro-mhos at 25°C)	pH	
															Parts per million	Tons per acre-foot	Tons per day	Calcium	Non-carbonate				
May 23-26, 1957	79,120	--	--	51	9.0	--	120	124	0	55	185	--	6.2	--	540	0.73	115,400	165	62	61	4.1	968	7.8
May 27	80,200	--	--	90	16	361	154	154	0	142	560	--	13	--	1,330	0.81	288,000	290	164	73	9.2	2,280	8.2
May 28-31	37,280	--	--	77	17	218	132	132	0	138	340	--	3.2	--	976	1.33	96,240	260	152	65	5.9	1,650	7.7
June 1-10	36,840	16	0.01	76	21	330	1	148	0	124	300	0.5	4.9	0.14	1,230	1.87	122,900	275	154	72	8.7	2,160	7.7
June 11	53,800	--	--	62	14	190	--	148	0	74	300	--	5.4	--	742	1.01	107,800	210	92	66	5.7	1,860	8.1
June 12	87,200	--	--	99	21	344	132	132	0	228	520	--	5.5	--	1,310	1.78	308,400	335	227	69	8.2	2,330	8.1
June 13-15	87,430	--	--	59	8.5	88	120	0	88	120	135	--	3.7	--	460	.63	108,600	182	84	51	2.8	1,792	8.0
June 16-20	46,880	--	--	98	6.2	209	138	0	124	0	340	--	4.0	--	918	1.25	116,200	270	157	63	5.5	1,560	8.1
June 21-23	40,100	--	--	73	8.3	149	130	0	88	240	0	--	4.5	--	688	.94	74,490	215	110	60	4.4	1,170	8.1
June 24	95,400	--	--	91	14	361	148	0	94	600	--	--	6.4	--	1,320	1.80	340,000	285	164	73	9.3	2,350	8.1
June 25-26	117,000	--	--	92	9.8	184	124	0	152	290	--	--	3.3	--	847	1.15	267,600	270	168	60	4.9	1,450	8.0
June 27-30	94,320	--	--	62	6.2	118	120	0	78	180	--	--	3.1	--	556	.76	141,600	180	82	59	3.8	935	8.0
July 1-3	103,400	--	--	50	9.5	94	120	0	56	148	--	--	4.2	--	458	.62	127,900	164	66	56	3.2	824	7.7
July 4-10	45,800	--	--	82	17	217	144	0	141	340	--	--	4.5	--	942	1.28	116,500	275	158	63	5.7	1,660	7.6
July 11-12	16,900	--	--	117	17	278	108	0	178	435	--	--	4.3	--	1,170	1.59	53,390	360	198	63	6.4	2,010	8.0
July 13-20	11,680	--	--	140	24	383	212	0	223	620	--	--	3.6	--	1,560	2.12	49,110	450	276	65	7.8	2,640	7.8
July 21-26	8,253	--	--	132	37	477	210	0	233	780	--	--	2.5	--	1,830	2.49	40,780	480	308	68	9.5	3,130	8.1
July 27-31	6,966	--	--	116	26	383	208	0	174	620	--	--	3.8	--	1,460	1.99	27,460	395	224	68	8.4	2,500	8.2
Aug. 1-5	5,184	--	--	126	33	476	210	0	201	780	--	--	4.5	--	1,810	2.46	25,330	450	278	70	9.8	3,150	8.0
Aug. 6	5,110	--	--	144	34	630	222	0	240	1,020	--	--	--	--	2,320	3.03	30,770	500	318	73	12	3,800	8.1
Aug. 7	4,930	--	--	156	39	811	212	0	268	1,320	--	--	--	--	2,260	3.84	37,540	550	376	76	15	4,800	8.0
Aug. 8-10	4,210	--	--	117	31	484	202	0	169	800	--	--	4.4	--	1,760	2.42	29,230	420	254	71	10	3,100	7.9
Aug. 11-16	3,580	--	--	128	34	670	182	0	297	1,100	--	--	--	--	2,730	3.22	22,910	450	311	76	14	4,140	7.9
Aug. 17-20	3,195	--	--	128	37	579	204	0	198	960	--	--	3.0	--	2,060	2.63	17,610	470	303	73	12	3,660	7.9
Aug. 21-31	2,675	--	--	128	44	587	160	0	202	890	--	--	2.8	--	2,060	2.94	15,080	480	332	73	12	3,660	7.2
Sept. 1-10	2,912	10	.03	128	36	671	174	0	217	1,150	5	--	--	.28	2,500	3.40	18,030	500	358	74	13	4,310	7.5
Sept. 11-15	3,150	--	--	109	36	614	172	0	169	940	--	--	--	--	2,120	2.88	15,350	420	279	76	13	3,710	7.7
Sept. 16-18	17,000	--	--	87	23	385	196	0	111	640	--	--	2.0	--	1,940	65,640	310	182	73	9.5	2,550	7.7	
Sept. 19-20	10,870	--	--	85	20	234	136	0	186	350	--	--	4.8	--	1,010	1.37	28,640	285	162	63	5.9	1,770	7.7
Sept. 21-30	9,438	--	--	94	23	438	142	0	168	700	--	--	4.6	--	1,560	2.12	39,750	330	214	74	10	2,750	7.4
Weighted average	14,450	--	--	76	14	246	b136	--	113	392	--	--	--	--	976	1.33	38,060	245	136	68	6.8	1,700	--

a Values above 200 ppm are reported to the nearest 5 ppm.

b Includes equivalent of individual carbonate values shown above.

ARKANSAS RIVER BASIN--Continued

ARKANSAS RIVER AT SAND SPRINGS BRIDGE, NEAR TULSA, OKLA.--Continued

Temperature (°F) of water, water year October 1956 to September 1957

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	68	57	37	42	34	61	60	70	70	85	84	80
2	71	56	43	35	33	50	62	69	68	85	74	81
3	70	52	42	39	51	--	59	69	67	83	84	88
4	74	51	51	44	42	--	59	66	68	86	81	76
5	73	51	54	38	43	--	51	65	69	86	78	76
6	73	50	50	44	45	--	57	66	73	82	75	74
7	67	50	40	39	49	--	55	68	76	88	75	72
8	66	45	36	42	61	--	50	67	82	81	74	75
9	66	52	34	47	56	--	57	69	81	82	76	68
10	65	52	35	32	52	--	--	68	80	83	85	68
11	66	54	37	39	50	--	--	64	80	83	85	71
12	72	55	40	41	49	--	54	70	78	83	82	76
13	70	54	36	35	44	--	54	66	80	90	84	68
14	65	52	35	32	50	--	54	74	81	86	83	77
15	64	52	35	32	52	--	51	76	76	85	82	71
16	65	44	33	29	45	--	53	86	84	83	84	65
17	67	40	34	31	46	--	51	67	85	84	80	63
18	65	46	34	36	45	--	56	65	80	84	77	66
19	68	50	36	33	44	--	53	66	79	84	75	70
20	63	49	42	35	44	--	60	69	75	85	77	71
21	62	42	45	52	42	--	53	68	78	83	78	70
22	68	41	45	45	42	--	57	67	76	83	74	68
23	63	43	44	33	39	--	54	68	73	84	76	64
24	64	47	43	34	46	--	67	68	70	81	81	68
25	62	46	42	34	50	--	66	68	73	82	76	67
26	61	41	39	32	51	--	67	73	72	81	73	69
27	63	40	40	32	56	54	66	76	75	85	79	73
28	56	43	47	32	53	58	68	73	79	87	76	74
29	61	35	50	32	--	65	67	75	80	84	77	61
30	62	44	40	32	--	62	70	75	81	85	77	59
31	55	--	41	34	--	61	--	78	--	83	78	--
Average	66	48	41	37	47	--	58	70	76	84	79	71

ARKANSAS RIVER BASIN--Continued  
VERDIGRIS RIVER NEAR LENAPAH, OKLA.

LOCATION.--At gaging station at bridge on county highway, 2½ miles east of Lenapah, Nowata County, and 4½ miles upstream from Cedar Creek. DRAINAGE AREA.--3,639 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1951 to September 1957.

Water temperatures: October 1951 to September 1957.

EXTREMES, 1956-57.--Dissolved solids: Maximum, 937 ppm Feb. 25-28; minimum, 127 ppm June 9-10.

Hardness: Maximum, 276 ppm Apr. 5-6; minimum, 76 ppm June 9-10.

Specific conductance: Maximum daily, 1,620 micromhos Feb. 27; minimum daily, 207 micromhos May 18.

Water temperatures: Maximum, 94°F July 22, Aug. 15; minimum, 34°F Jan. 14.

EXTREMES, 1951-57.--Dissolved solids: Maximum, 937 ppm Feb. 25-28, 1956; minimum, 121 ppm Oct. 3-4, 1955.

Hardness: Maximum, 304 ppm Oct. 4-5, 9-10, 1951; minimum, 48 ppm Oct. 3-4, 1955.

Specific conductance: Maximum daily, 1,620 micromhos Feb. 27, 1957; minimum daily, 134 micromhos Oct. 3, 1955.

Water temperatures: Maximum, 94°F July 22, Aug. 15, 1957; minimum, freezing point Dec. 21, 22, 1951, Jan. 3, 1952.

REMARKS.--Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of discharge for water year October 1956 to September 1957 given in WSP 1511. No flow Oct. 1-15.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>		Percent adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH		
															Paris per million	Tons per acre-foot	Calcium magnesium	Non-carbonate					
Oct. 16-20, 1956	4.66	--	--	46	8.5	89	108	0	20	166	--	--	1.3	--	397	0.84	5.0	150	52	56	3.2	709	7.5
Oct. 21-31	3.71	--	--	43	10	80	112	0	19	150	--	--	.9	--	386	.83	3.9	150	56	54	2.6	710	7.5
Nov. 1-10	37.1	7.5	0.03	48	12	70	134	0	23	142	0.4	0.4	1.7	0.09	401	.85	4.9	170	60	46	2.3	715	7.5
Nov. 11-20	4.07	--	--	53	11	114	168	0	35	178	--	--	1.1	--	486	.66	5.4	178	40	36	3.7	941	7.5
Nov. 21-30	2.35	--	--	56	11	131	184	0	36	198	--	--	.8	--	531	.72	3.4	184	33	61	4.2	1,020	7.7
Dec. 1-10	4.68	--	--	70	3.3	139	184	0	37	212	--	--	2.4	--	580	.79	7.6	188	37	82	4.4	1,070	7.7
Dec. 11-20	6.73	--	--	60	13	143	170	0	49	228	--	--	4.4	--	628	.85	11	205	66	60	4.3	1,130	7.6
Dec. 21-31	15.0	--	--	60	18	151	186	0	53	258	--	--	6.4	--	679	.92	27	225	96	59	4.4	1,226	7.7
Jan. 1-10, 1957	8.74	--	--	60	15	137	160	0	53	258	--	--	2.8	--	649	.88	15	210	81	82	4.7	1,220	8.0
Jan. 11-20	5.30	--	--	62	19	147	166	0	50	258	--	--	2.4	--	655	.89	9.4	235	98	58	4.2	1,230	8.0
Jan. 21-31	5.94	--	--	62	16	126	160	0	43	225	--	--	2.2	--	600	.82	9.6	220	91	55	3.7	1,090	8.0
Feb. 1-10	8.99	4.0	.01	64	9.8	126	160	0	44	208	.4	3.1	.27	580	.79	14	200	69	58	3.9	1,030	8.1	
Feb. 11-15	16.5	--	--	67	15	117	150	2	48	215	--	--	6.8	--	642	.87	29	230	104	53	3.4	1,060	8.3
Feb. 16	665	--	--	51	13	46	110	2	39	95	--	--	14	--	376	.51	675	180	86	36	1.5	914	8.7
Feb. 17-18	272	--	--	62	20	162	136	0	71	275	--	--	4.5	--	781	1.06	574	235	122	60	4.6	1,200	8.2
Feb. 19-20	91.0	--	--	61	24	170	130	0	47	178	--	--	7.9	--	543	.74	183	250	144	39	2.1	898	8.2
Feb. 21-24	48.8	--	--	54	20	113	116	0	57	215	--	--	4.2	--	623	.65	62	215	120	53	3.4	1,050	7.8
Feb. 25-28	31.8	--	--	62	28	196	118	0	65	375	--	--	7.4	--	937	1.27	80	275	176	61	6.1	1,860	7.8

ARKANSAS RIVER BASIN

Mar. 1-6, 1957.....	13.2	--	--	74	16	183	128	0	44	350	--	6.0	--	821	1.12	29	250	145	62	5.1	1,460	7.8
Mar. 7-10.....	10.5	--	--	66	17	137	138	0	33	275	--	4.4	--	690	.94	20	240	129	55	3.8	1,220	7.9
Mar. 11-20.....	11.0	--	--	60	15	113	118	0	32	230	--	3.2	--	592	.79	17	210	116	54	3.4	1,050	7.3
Mar. 21-26.....	161.0	--	--	62	10	50	140	0	39	103	--	4.7	--	380	.52	165	198	82	36	1.5	662	7.9
Mar. 27-31.....	82.0	--	--	50	22	92	140	0	55	170	--	6.6	--	546	.74	121	215	102	48	2.7	915	7.7
Apr. 1-2.....	456	--	--	66	8.6	97	132	10	44	185	--	9.9	--	554	.75	682	200	76	51	3.0	895	8.6
Apr. 3-4.....	2,315	--	--	34	5.6	29	83	2	20	52	--	5.7	--	206	.28	1,280	108	96	37	1.2	367	8.4
Apr. 5-6.....	2,005	--	--	84	16	124	160	16	68	222	--	4.0	--	674	.92	3,650	273	118	49	3.2	1,100	8.8
Apr. 7-10.....	1,522	--	--	57	8.3	76	104	8	42	140	--	7.2	--	402	.53	1,650	176	18	49	2.6	693	8.6
Apr. 11-18.....	183	--	--	54	18	52	128	0	31	126	--	6.9	--	433	.59	2,14	210	103	35	1.6	702	7.9
Apr. 19-20.....	5,350	--	--	30	5.6	28	84	0	29	39	--	5.2	--	175	.24	2,530	98	29	38	1.2	286	7.7
Apr. 21-25.....	5,070	--	--	48	7.5	31	108	0	30	66	--	7.5	--	297	.40	4,070	151	62	31	1.1	465	7.9
Apr. 26-30.....	2,330	--	--	43	15	71	122	0	33	130	--	6.5	--	457	.62	2,870	168	68	48	2.4	706	7.9
May 1-2.....	3,910	--	--	34	6.6	24	90	0	24	44	--	5.1	--	221	.30	2,330	112	38	32	1.0	357	8.0
May 3-10.....	1,100	--	--	70	12	66	152	0	35	142	--	8.0	--	493	.67	1,460	225	100	39	1.9	808	7.9
May 11-15.....	1,359	--	--	74	5.7	64	144	0	37	132	--	6.6	--	460	.63	1,690	210	90	40	1.9	734	8.1
May 16-20.....	21,330	--	--	35	4.5	22	98	0	16	38	--	4.6	--	202	.27	11,630	106	26	31	.9	311	7.8
May 21-31.....	16,920	8.8	.09	34	7.1	20	98	0	21	36	.3	7.1	.09	202	.27	9,230	114	34	28	.8	329	6.9
June 1-5.....	23,380	--	--	32	4.4	14	92	0	12	26	--	4.6	--	152	.21	9,600	98	22	23	.6	257	7.3
June 6-8.....	6,703	--	--	62	9.1	28	162	0	26	52	--	5.7	--	311	.42	5,630	182	59	24	.9	509	7.7
June 9-10.....	15,000	--	--	24	3.9	12	72	0	11	20	--	4.0	--	127	.17	5,420	76	17	25	.6	213	7.2
June 11-17.....	22,990	--	--	31	5.0	18	95	0	13	30	--	4.3	--	160	.22	9,930	98	20	29	.8	270	6.9
June 18.....	10,200	--	--	50	9.0	26	144	0	25	48	--	7.7	--	286	.39	7,880	162	44	26	.9	430	7.6
June 19.....	19,200	--	--	30	4.6	16	90	0	8.6	29	--	5.4	--	176	.24	9,120	94	20	27	.7	265	7.4

a Values above 200 ppm are reported to the nearest 5 ppm.

ARKANSAS RIVER BASIN--Continued  
VERDIGRIS RIVER NEAR LENAPAH, OKLA.--Continued

Chemical analyses, in parts per million, water year October 1956 to September 1957--Continued

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal-cium (Ca)	Mag-ne-sium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Car-bonate (CO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> )	Bo-ron (B)	Dissolved solids (residue at 180° C)		Hardness as CaCO <sub>3</sub>		Per-cent so-dium	Specific conductance (micro-mhos at 25° C)	pH		
															Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate					
June 20, 1957.....	16,000	--	--	49	6.7	24		140	0	23	40	--	8.6	--	244	0.33	10,540	150	36	26	0.8	386	7.6
June 21-30.....	9,202	16	0.02	50	6.6	24		136	0	21	50	0.7	5.2	0.28	251	.34	6,240	152	40	25	.8	418	7.9
July 1-10.....	2,676	--	--	63	11	38		176	0	26	79	--	5.5	--	366	.50	2,640	205	60	29	1.2	566	8.1
July 11-20.....	235	--	--	67	15	64		188	0	58	107	--	2.6	--	424	.58	269	230	74	38	1.8	691	7.8
July 21-31.....	311	--	--	72	18	67		288	0	40	119	--	2.4	--	443	.60	372	250	65	37	1.9	748	7.8
Aug. 1-10.....	65.2	--	--	51	26	55		180	0	38	116	--	1.0	--	413	.56	73	230	84	34	1.6	740	7.2
Aug. 11-20.....	125	--	--	65	17	57		180	0	36	121	--	1.0	--	432	.59	146	230	84	35	1.6	745	7.9
Aug. 21-31.....	61.7	--	--	50	12	35		154	0	25	71	--	.6	--	295	.40	49	176	50	30	1.2	525	7.8
Sept. 1-10.....	9.78	--	--	56	11	35		164	0	23	72	--	1.0	--	298	.41	7.9	184	50	30	1.1	542	7.9
Sept. 11-20.....	56.0	--	--	57	12	43		170	0	26	83	--	1.1	--	322	.44	49	190	50	33	1.4	580	7.7
Sept. 21-30.....	414	--	--	72	14	64		182	0	39	130	--	1.7	--	447	.61	500	235	87	37	1.8	787	7.9
Weighted average...	2,550	--	--	39	6.4	23		b108	--	19	44	--	5.5	--	219	0.30	1,510	124	36	29	0.9	357	--

a Values above 200 ppm are reported to the nearest 5 ppm.

b Includes equivalent of individual carbonate values shown above.

## ARKANSAS RIVER BASIN--Continued

## VERDIGRIS RIVER NEAR LENAPAH, OKLA.--Continued

Temperature (°F) of water, water year October 1956 to September 1957

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	72	63	46	45	40	50	58	68	70	78	90	85
2	73	59	47	42	40	50	60	69	68	80	90	82
3	72	59	47	42	39	51	58	68	68	81	90	83
4	--	57	50	44	40	53	56	68	68	83	87	80
5	71	57	55	42	42	52	--	68	72	82	85	84
6	73	58	50	45	--	50	58	70	73	83	81	78
7	72	58	40	41	--	44	54	74	78	86	84	72
8	69	54	37	45	55	45	52	72	79	87	85	78
9	--	54	38	40	54	50	55	72	75	90	86	78
10	67	57	38	37	51	50	60	69	74	--	87	78
11	67	54	43	38	50	60	57	68	74	--	--	78
12	72	56	40	40	54	60	49	--	75	--	86	75
13	--	59	--	--	55	63	48	71	75	--	89	77
14	--	60	--	34	52	58	48	74	74	--	93	73
15	--	56	41	--	50	--	51	75	79	--	94	75
16	--	52	42	35	50	57	51	70	79	--	87	--
17	72	48	41	36	50	56	55	73	80	90	79	--
18	70	50	40	40	51	56	58	67	79	90	84	73
19	69	53	42	37	48	57	63	70	76	91	85	75
20	70	51	45	--	46	56	65	69	80	93	86	76
21	67	49	45	46	50	54	65	69	80	93	88	72
22	69	49	46	43	44	53	65	70	78	94	87	72
23	68	48	43	37	45	53	66	66	73	90	84	72
24	--	48	43	38	49	50	68	67	73	92	85	72
25	67	48	42	38	48	47	69	68	75	89	84	72
26	68	47	41	38	47	49	65	70	75	92	85	73
27	62	46	44	35	50	53	66	72	76	90	83	73
28	63	43	45	37	--	54	67	70	78	92	85	73
29	67	42	45	37	--	60	68	71	--	90	85	70
30	60	43	47	36	--	60	--	70	76	91	85	70
31	60	--	46	37	--	56	--	71	--	90	85	--
Average	--	53	44	39	48	54	59	70	75	--	86	76

ARKANSAS RIVER BASIN--Continued  
VERDIGRIS RIVER NEAR INOLA, OKLA.

LOCATION.--At gaging station at bridge on State Highway 33, 6 miles downstream from Dog Creek, and 6 miles west of Inola, Rogers County.  
DRAINAGE AREA.--7,911 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1957.

Water temperatures: October 1950 to September 1957.

EXTREMES 1956-57.--Dissolved solids: Maximum, 2,930 Oct. 11-13; minimum, 144 ppm May 17-20.

Hardness: Maximum, 360 ppm Oct. 11-13; minimum, 74 ppm May 17-20.

Specific conductance: Maximum daily, 5,610 micromhos Oct. 13; minimum daily, 167 micromhos June 14.

Water temperatures: Maximum 89°F Aug. 13; minimum freezing point Jan. 14-18, 22-29.

EXTREMES 1947-57.--Dissolved solids: Maximum, 3,060 ppm Sept. 21-24, 1956; minimum, 91 ppm June 22-30, July 1-2, 1948.

Hardness: Maximum, 580 ppm Sept. 21-24, 1956; minimum, 48 ppm Oct. 4, 1953.

Specific conductance: Maximum daily, 6,030 micromhos Sept. 22, 1956; minimum daily, 143 micromhos June 24, 1948.

Water temperatures: Maximum 95°F on several days during July, 1954; minimum freezing point on many days during winter months.

REMARKS.--Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of discharge for water year October 1956 to September 1957 given in WSP 1511.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>	Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	
														Parts per million	Tons per acre-foot	Tons per day						Calcium magnesium
Oct. 1-3, 7-10, 1956.....	7.36	--	--	120	34	635		194	24	1,160	--	5.0	--	2,260	3.07	45	440	221	76	13	4,000	7.6
Oct. 4-6.....	7.40	--	--	104	32	493		202	22	900	--	5.4	--	1,820	2.48	36	390	224	73	11	3,210	7.5
Oct. 11-13.....	8.87	--	--	140	51	934		210	21	1,700	--	5.0	--	2,930	3.98	70	560	388	78	17	5,040	7.9
Oct. 14.....	21.0	--	--	104	34	548		192	19	1,000	--	4.6	--	1,980	2.69	112	400	242	71	9.7	3,420	7.9
Oct. 15.....	72.0	--	--	80	24	352		202	22	620	--	4.6	--	1,300	1.77	253	300	134	72	8.8	2,320	7.9
Oct. 16-20.....	51.6	--	--	64	12	150		210	21	238	--	6.9	--	616	.84	86	210	38	61	4.5	1,160	7.6
Oct. 21-22.....	25.0	--	--	64	20	164		208	20	282	--	10	--	695	.95	47	240	70	60	4.6	1,300	7.9
Oct. 23-28.....	20.5	--	--	72	20	237		200	23	408	--	15	--	919	1.25	51	260	96	66	6.4	1,700	7.4
Oct. 29.....	18.0	--	--	92	26	391		192	26	700	--	18	--	1,480	2.01	72	335	178	72	9.3	2,630	7.8
Oct. 30.....	28.0	--	--	76	17	257		176	24	452	--	15	--	1,010	1.37	76	260	116	68	6.9	1,830	7.8
Oct. 31.....	55.0	--	--	68	15	183		170	27	915	--	19	--	1,778	1.06	116	230	90	63	5.2	1,410	7.7
Nov. 1.....	97.0	--	--	68	16	199		172	38	330	--	22	--	838	1.13	217	230	89	65	5.7	1,540	7.7
Nov. 2-3.....	44.0	--	--	52	15	110		152	42	170	--	26	--	540	.73	64	190	66	56	3.5	972	8.1
Nov. 4-10.....	54.7	--	--	46	8.5	81		122	33	325	--	25	--	411	.56	61	155	55	53	2.8	756	7.7
Nov. 11.....	14.0	--	--	48	11	97		116	36	160	--	22	--	478	.65	18	165	70	56	3.3	868	7.8
Nov. 12-13.....	11.5	--	--	52	12	139		122	37	230	--	23	--	561	.79	18	180	80	63	4.3	1,100	7.8
Nov. 14-15.....	11.0	--	--	70	18	275		124	36	490	--	21	--	1,020	1.39	30	230	146	70	7.6	1,950	7.9
Nov. 16-17.....	14.0	--	--	61	17	198		124	35	350	--	23	--	1,732	1.08	30	220	118	66	3.8	1,300	7.9

ARKANSAS RIVER BASIN

Nov. 18-20, 1956.	19.7	--	--	77	20	326	122	35	590	--	19	--	1,220	1.66	65	275	175	72	8.6	2,280	7.7
Nov. 21-23.....	78.0	--	82	23	373	124	35	680	660	--	16	--	1,380	1.85	286	300	198	73	9.4	2,500	7.9
Nov. 24-25.....	56.2	--	46	11	94	108	36	160	160	--	16	--	452	.61	69	160	72	56	3.2	844	7.7
Nov. 26-29.....	18.8	--	57	18	224	108	37	410	410	--	14	--	884	1.20	45	230	142	68	6.4	1,670	7.8
Nov. 30.....	23.0	--	68	15	140	112	38	258	258	--	16	--	634	.86	39	205	113	60	4.2	1,160	7.3
Dec. 1-3.....	23.0	--	62	13	204	116	37	360	360	--	16	--	808	1.10	50	210	115	68	6.1	1,530	7.8
Dec. 4.....	21.0	--	92	22	417	126	36	760	760	--	18	--	1,450	1.97	82	320	216	74	10	2,730	8.1
Dec. 5-6.....	20.0	--	57	12	151	116	35	265	265	--	16	--	626	.85	34	190	95	63	4.8	1,170	7.8
Dec. 7.....	21.0	--	61	17	188	116	34	345	345	--	15	--	790	1.07	45	220	125	65	5.5	1,430	8.0
Dec. 8-9.....	61.5	--	83	24	414	108	32	760	760	--	14	--	1,470	2.00	244	305	216	75	10	2,710	7.7
Dec. 10.....	123	--	54	9.8	115	116	41	195	195	--	16	--	532	.72	177	175	80	59	3.8	978	7.9
Dec. 11-12.....	60.5	--	54	7.2	93	118	43	148	148	--	20	--	470	.64	77	164	68	55	3.2	828	8.0
Dec. 13-14.....	41.0	--	60	12	123	122	49	210	210	--	22	--	598	.81	66	198	98	57	3.8	1,060	8.0
Dec. 15-20.....	38.2	--	72	-8	175	120	49	325	325	--	34	--	837	1.14	86	255	156	60	4.8	1,460	7.9
Dec. 21-31.....	81.1	7.4	.00	59	17	137	113	46	250	--	30	.32	664	.90	145	215	122	56	4.1	1,180	7.7
Jan. 1-4, 1957....	64.8	--	76	20	171	176	38	320	320	--	16	--	803	1.09	140	275	132	57	4.5	1,350	7.9
Jan. 5-10.....	56.7	--	99	27	186	92	49	440	440	--	16	--	1,150	1.56	176	355	280	53	4.3	1,780	7.8
Jan. 11-20.....	39.6	--	97	31	202	134	40	460	460	--	12	--	1,180	1.60	126	370	260	54	4.6	1,830	7.5
Jan. 21-22.....	41.5	--	92	26	243	140	37	495	495	--	16	--	1,140	1.55	128	335	222	61	5.8	1,990	8.1
Jan. 23-31.....	59.7	--	76	16	142	132	42	280	280	--	22	--	750	1.02	121	255	148	55	3.9	1,300	7.1
Feb. 1-6.....	63.7	--	70	21	144	132	47	275	275	--	34	--	744	1.01	128	260	152	55	3.9	1,320	7.5
Feb. 7-8.....	87.0	--	93	20	270	124	44	520	520	--	28	--	1,660	1.58	272	315	214	65	6.6	2,050	8.1
Feb. 9-10.....	212	--	58	23	87	88	55	200	200	--	22	--	631	.86	361	240	168	44	2.4	1,040	8.1
Feb. 11-20.....	235	5.5	.01	78	13	119	134	56	230	0.5	6.9	.10	704	.96	447	250	140	51	3.3	1,130	7.5
Feb. 21-28.....	152	--	78	19	142	150	59	290	290	--	9.5	--	754	1.03	309	270	149	53	3.7	1,300	7.4
Mar. 1-10, 1957...	83.5	--	66	32	145	152	54	300	300	--	10	--	848	1.15	191	295	172	52	3.7	1,390	7.1
Mar. 11-20.....	61.8	--	74	40	216	154	59	440	440	--	11	--	1,120	1.52	187	350	222	57	5.0	1,840	7.9
Mar. 21-24.....	123	--	69	31	225	148	116	380	380	--	11	--	985	1.34	327	300	176	62	5.7	1,630	8.1
Mar. 25-31.....	815	--	59	22	127	128	114	200	200	--	7.5	--	618	.84	1,360	235	131	54	3.6	966	7.9
Apr. 1.....	5,040	--	61	10	78	b116	54	148	148	--	6.2	--	520	.71	7,080	195	100	47	2.4	811	8.3

a Values above 200 ppm are reported to the nearest 5 ppm.  
 b Includes equivalent of 2 parts per million of carbonate (CO<sub>3</sub>).

ARKANSAS RIVER BASIN--Continued  
VERDIGRIS RIVER NEAR INOLA, OKLA.--Continued

Chemical analyses, in parts per million, water year October 1956 to September 1957--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	
													Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
Apr. 2, 1957.....	4,540	--	--	63	14	114	100	100	47	235	--	1.0	1,060	0.90	8,090	215	133	54	3.4	1,060	7.5
Apr. 3.....	5,620	--	--	47	13	374	110	110	34	108	--	2.2	374	.51	5,680	170	80	39	1.7	608	7.7
Apr. 4.....	13,300	--	--	32	4.9	33	80	21	58	58	--	2.4	250	.34	8,680	100	34	42	1.4	377	8.1
Apr. 5-8.....	5,865	--	--	46	10	378	98	36	114	114	--	5.8	51	5,990	158	78	44	2.0	627	8.1	
Apr. 9.....	3,460	--	--	74	15	79	162	45	165	165	--	6.0	586	.80	5,470	245	112	41	2.2	904	8.2
Apr. 10.....	1,870	--	--	61	10	66	126	33	137	137	--	8.4	488	.66	2,460	195	92	42	2.0	740	8.2
Apr. 11-18.....	1,286	--	--	63	10	65	126	41	132	132	--	8.4	468	.64	1,620	198	94	42	2.0	743	7.9
Apr. 19-27.....	22,450	--	--	31	5.5	25	80	21	46	46	--	3.4	212	.29	12,850	100	34	35	1.1	344	7.5
Apr. 28-30.....	7,767	--	--	51	9.0	47	108	33	98	98	--	6.2	377	.51	7,910	164	76	38	1.6	586	8.2
May 1.....	9,850	--	--	50	8.5	39	112	29	82	82	--	7.8	352	.48	9,360	160	68	34	1.3	535	8.1
May 2-4.....	21,000	--	--	28	5.6	21	76	18	39	39	--	3.2	196	.27	11,110	93	30	33	.9	300	7.5
May 5-11.....	6,410	--	--	45	10	31	121	25	65	65	--	5.5	315	.43	5,450	154	55	30	1.1	484	7.6
May 12-16.....	8,902	--	--	46	9.0	44	112	25	90	90	--	4.2	340	.46	8,170	152	60	30	1.1	532	7.7
May 17-20.....	34,650	--	--	24	3.4	19	70	10	31	31	--	3.5	144	.20	13,470	74	16	35	.9	243	7.6
May 21-31.....	53,480	8.0	0.06	24	5.1	14	74	14	26	26	0.2	3.3	145	.20	20,940	81	20	27	.7	236	6.9
June 1-10.....	35,360	--	--	33	4.3	19	92	12	12	35	--	3.5	182	.25	17,380	100	24	29	.8	296	7.6
June 11-30.....	51,900	12	.06	26	6.8	15	77	12	29	29	.9	3.7	156	.21	21,900	93	30	26	.7	245	7.5
June 21-31.....	36,850	--	--	31	5.2	20	92	11	37	37	--	3.1	189	.26	18,600	99	24	30	.9	289	7.8
July 1-10.....	15,260	--	--	44	6.1	22	128	15	41	41	--	3.1	232	.32	9,560	135	30	26	.8	378	7.7
July 11-13.....	8,680	--	--	45	6.2	18	144	15	30	30	--	2.3	194	.26	4,550	138	20	22	.7	360	7.5
July 14-20.....	2,503	--	--	59	12	45	170	27	88	88	--	3.2	349	.47	2,360	196	56	33	1.4	590	7.5
July 21-31.....	5,567	--	--	74	13	66	182	35	132	132	--	2.9	464	.63	710	240	82	37	1.8	785	7.3
Aug. 1-9.....	362	--	--	72	16	82	172	48	160	160	--	5.9	531	.72	519	245	103	42	2.3	864	7.4
Aug. 10-16.....	186	--	--	78	19	115	182	36	228	228	--	5.8	677	.92	358	270	114	46	3.0	1,090	7.7
Aug. 17-20.....	389	--	--	66	14	66	166	36	132	132	--	6.2	471	.64	495	220	86	39	1.9	777	7.5
Aug. 21-31.....	286	--	--	78	20	90	194	40	190	190	--	4.6	573	.80	442	275	117	42	2.4	968	7.5
Sept. 1-10.....	162	--	--	74	15	90	180	30	180	180	--	4.0	550	.75	241	240	92	44	2.5	958	7.3
Sept. 11-20.....	745	--	--	70	16	81	152	46	172	172	--	4.6	540	.73	1,090	240	118	42	2.3	922	7.7
Sept. 21-27.....	383	--	--	82	17	113	158	51	238	238	--	4.0	655	.89	677	275	146	47	3.0	1,200	7.7
Sept. 28-30.....	441	--	--	70	14	84	170	31	170	170	--	3.8	515	.70	613	230	92	44	2.4	895	7.8
Weighted average	7,305	--	--	31	5.9	21	88	15	41	41	--	3.7	195	0.27	3,850	102	30	31	0.9	313	--

a. Values above 200 ppm are reported to the nearest 5 ppm.

## ARKANSAS RIVER BASIN--Continued

## VERDIGRIS RIVER NEAR INOLA, OKLA.--Continued

Temperature (°F) of water, water year October 1956 to September 1957

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	72	60	47	41	34	48	49	57	68	80	88	84
2	72	60	48	41	36	44	51	58	66	81	88	84
3	72	60	48	40	36	46	48	56	66	82	88	84
4	76	60	49	39	37	46	46	57	68	82	88	84
5	76	--	49	37	38	48	48	59	68	80	88	83
6	76	64	49	39	39	46	48	60	70	82	86	83
7	74	58	49	39	39	42	48	62	70	83	85	83
8	74	54	46	39	40	41	48	64	74	84	86	79
9	74	54	47	36	42	41	48	66	--	84	86	78
10	74	54	47	34	40	40	49	64	74	84	87	78
11	74	51	47	33	46	46	46	--	72	85	88	76
12	--	51	44	35	46	52	48	64	--	84	--	74
13	74	51	40	33	47	57	--	64	71	--	89	74
14	--	51	44	32	48	48	50	65	72	85	88	75
15	72	45	44	32	48	46	51	65	76	85	--	74
16	--	45	37	32	46	49	53	65	78	85	88	72
17	70	48	37	32	46	49	53	63	72	85	86	74
18	70	48	38	32	46	50	55	61	76	86	86	71
19	68	48	39	33	46	58	52	61	76	86	--	74
20	68	42	39	33	46	50	52	61	76	86	84	70
21	68	44	39	34	46	46	53	61	76	86	83	70
22	--	44	40	32	41	46	54	61	76	86	82	70
23	68	44	38	32	44	47	54	62	76	86	82	70
24	68	42	40	32	42	47	52	61	77	86	83	69
25	68	42	40	32	42	46	57	64	74	86	84	68
26	64	40	40	32	42	47	55	66	74	86	84	68
27	66	49	40	32	44	46	58	66	76	--	84	67
28	66	49	40	32	46	47	57	68	77	87	84	66
29	66	47	39	32	--	47	60	68	79	88	84	66
30	62	48	41	33	--	48	59	68	79	87	84	66
31	61	--	41	33	--	48	--	70	--	87	84	--
Average	70	50	43	34	43	47	52	63	73	85	86	75

ARKANSAS RIVER BASIN--Continued  
NEOSHO (GRAND) RIVER NEAR LANGLEY, OKLA.

LOCATION.--At gaging station at bridge on State Highway 82, 1 1/2 miles southwest of Langley, Mayes County, 4.1 miles downstream from Pennsacola Dam, and 5.8 miles upstream from Big Cabin Creek.  
DRAINAGE AREA.--10,335 square miles.  
RECORDS AVAILABLE.--Chemical analyses: May 1956 to September 1957.  
Water temperatures: May 1956 to September 1957.  
EXTREMES, 1956-57.--Dissolved solids: Maximum, 293 ppm Nov. 22; minimum, 128 ppm June 11-20.

Hardness: Maximum, 170 ppm Nov. 22; minimum, 78 ppm June 1-10.  
Specific conductance: Maximum, 84°F Aug. 10; minimum, freezing point Jan. 27.  
Water temperatures: Maximum daily, 508 microhms Nov. 22; minimum, 188 microhms June 1-10.

EXTREMES, May 1956 to September 1957.--Dissolved solids: Maximum, 293 ppm Nov. 22, 24-30, 1956; minimum, 128 ppm June 11-20, 1957.  
Hardness: Maximum, 170 ppm Nov. 22, 24-30, 1956; minimum, 78 ppm June 1-10, 1957.  
Specific conductance: Maximum daily, 508 microhms Nov. 22, 1956; minimum daily, 148 microhms Apr. 23, 1957.

Water temperatures: Maximum, 88°F Aug. 9, 1956; minimum, freezing point Jan. 27, 1957.  
REMARKS.--Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of discharge for water year October 1956 to September 1957 given in WSP 1511.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (microhms at 25°C)	pH		
														Parts per million	Tons per acre-foot	Calcium, mg.	Non-carbonate					
Oct. 1-10, 1956	56.4	10	0.02	45	7.7	12	3.5	118	51	14	0.2	1.0	0.10	203	0.28	31	144	15	0.4	335	7.5	
Oct. 11-20	57.4	--	--	46	6.6	15	--	123	51	14	--	2.2	2.2	203	28	31	142	41	19	335	7.4	
Oct. 21-31	62.7	--	--	46	6.6	19	--	124	51	19	--	1.9	--	206	28	35	142	40	22	338	7.3	
Nov. 1-10	64.8	9.0	.02	49	6.7	8.7	3.2	118	53	14	2	1.6	.08	204	28	36	150	54	11	3	341	7.6
Nov. 11-20	61.8	--	--	48	6.8	18	--	121	51	23	--	2.6	--	194	29	35	148	49	21	6	374	7.6
Nov. 21, 23-30	62.5	--	--	47	6.4	13	--	123	50	12	--	2.8	--	194	26	33	144	43	17	5	337	7.8
Nov. 22	62.3	--	--	54	8.6	34	--	118	51	66	--	3.1	--	293	40	49	170	74	31	1.2	508	7.8
Dec. 1-10	451	7.2	.00	46	5.4	12	3.2	124	47	17	1	2.0	.08	203	28	247	142	40	15	.4	346	8.1
Dec. 11-20	552	--	--	47	7.4	13	--	123	52	13	--	2.9	--	196	27	292	148	47	16	.5	344	7.5
Dec. 21-31	1,172	--	--	48	6.1	3.7	--	124	29	14	--	2.3	--	205	28	649	145	44	5	1.1	342	7.4
Jan. 1-10, 1957	86.7	5.5	.00	48	7.9	13	--	126	52	16	4	3.5	.04	210	29	30	152	49	16	5	353	7.9
Jan. 11-20	132	--	--	50	6.6	5.3	--	122	46	16	--	1.9	--	212	29	104	132	52	11	3	345	7.4
Jan. 21-31	1,406	--	--	52	6.9	8.7	--	124	46	13	--	2.0	--	206	28	781	158	56	7	2	339	7.4
Feb. 1-10	355	5.0	.01	50	8.5	12	--	127	50	13	3	2.6	.04	204	28	196	160	56	14	.4	345	7.2
Feb. 11-20	2,944	--	--	49	8.1	6.7	6.7	129	46	11	--	2.3	--	198	27	1,570	156	51	9	2	334	7.6
Feb. 21-28	2,195	--	--	54	4.7	6.7	--	124	48	11	--	2.0	--	209	28	1,240	154	52	9	.2	340	7.6
Mar. 1-10	2,094	6.4	.00	48	6.8	11	--	128	48	14	3	3.3	.06	209	28	1,180	148	43	14	.4	339	7.9
Mar. 11-20	2,409	--	--	58	2.8	6.9	--	128	47	11	--	1.9	--	197	27	1,280	150	51	9	.2	334	8.1
Mar. 21-31	1,559	--	--	48	8.3	7.8	--	132	43	10	--	4.8	--	198	27	833	154	46	10	.3	330	8.0

Apr. 1-10, 1957...	6,214	5.2	.00	48	5.8	12	--	128	46	13	.3	3.9	--	205	0.28	3,440	144	40	15	.4	339	8.0
Apr. 11-20 .....	8,640	--	--	46	4.6	12	--	116	43	12	--	3.9	--	198	.27	4,620	134	39	16	.4	330	7.7
Apr. 21-30 .....	16,630	--	--	44	1.7	7.4	--	100	31	9.9	--	5.4	--	169	.23	7,590	117	35	12	.3	272	7.6
May 1-10 .....	11,780	8.0	.00	38	4.6	8.1	--	94	34	8.8	.2	10	.10	165	.22	5,250	114	37	13	.3	265	7.5
May 11-20 .....	9,072	--	--	42	1.7	5.3	--	96	26	9.6	--	5.3	--	162	.22	3,970	112	34	9	.2	239	7.4
May 21-31 .....	76,070	--	--	32	3.6	10	--	76	30	14	--	2.6	--	148	.20	30,400	95	30	19	.5	227	7.4
June 1-10 .....	41,120	11	.08	27	2.6	6.2	1	71	22	7.0	.5	5.7	.12	132	.18	14,660	78	20	15	.3	188	7.0
June 11-20 .....	39,630	--	--	28	3.4	8.3	--	78	25	5.6	--	4.9	--	128	.17	13,700	84	20	18	.4	207	7.2
June 21-30 .....	16,710	--	--	28	3.4	7.1	--	78	23	5.7	--	4.5	--	133	.18	6,000	84	20	16	.3	205	7.3
July 1-10 .....	14,430	11	.06	29	3.8	6.2	1	79	26	6.5	.3	5.5	.14	138	.19	5,380	88	24	13	.3	199	7.4
July 11-20 .....	11,340	--	--	30	3.9	7.8	--	82	23	8.3	--	7.0	--	134	.18	4,100	91	24	16	.4	212	7.1
July 21-31 .....	4,920	--	--	31	4.0	9.2	--	85	24	9.7	--	7.7	--	140	.19	1,860	94	24	18	.4	235	6.7
Aug. 1-10 .....	2,258	10	.05	32	4.4	6.9	1	90	25	7.6	.3	6.3	.29	156	.21	951	98	24	13	.3	225	7.3
Aug. 11-20 .....	2,187	--	--	34	4.4	6.2	--	94	21	8.4	--	6.6	--	143	.19	844	103	26	12	.3	228	7.2
Aug. 21-31 .....	2,793	--	--	32	5.4	9.0	--	96	23	10.2	--	6.0	--	143	.19	1,060	102	24	16	.4	233	7.1
Sept. 1-10 .....	2,154	8.5	.01	34	4.9	7.6	1	98	26	8.2	.1	4.6	.16	163	.22	948	106	24	14	.3	239	7.4
Sept. 11-20 .....	2,174	--	--	34	5.1	7.8	--	100	23	9.5	--	4.5	--	144	.20	1,230	106	24	14	.3	244	6.9
Sept. 21-30 .....	2,239	--	--	35	5.0	9.0	--	104	25	9.6	--	3.9	--	146	.20	883	108	23	15	.4	248	6.9
Weighted average	8,096	--	--	33	3.6	9.4	--	86	29	9.8	--	4.6	--	149	0.20	3,260	98	27	17	0.4	233	--

## LOWER MISSISSIPPI RIVER BASIN

## ARKANSAS RIVER BASIN--Continued

## NEOSHO (GRAND) RIVER NEAR LANGLEY, OKLA.--Continued

Temperature (° F) of water, water year October 1956 to September 1957.

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	71	60	49	44	40	43	--	60	66	73	76	74
2	70	63	45	43	40	44	--	60	67	73	--	77
3	72	58	45	40	42	45	50	58	68	71	77	76
4	73	58	50	43	43	49	49	62	67	74	79	78
5	73	56	55	43	43	48	46	60	67	73	76	--
6	70	57	54	44	42	44	48	62	66	78	75	77
7	87	50	49	44	44	42	50	60	67	76	77	75
8	86	56	40	43	44	42	50	60	69	73	76	70
9	--	57	37	39	44	48	49	60	69	76	76	75
10	75	53	40	38	48	41	48	58	73	78	84	75
11	65	55	44	37	43	42	46	60	69	79	80	75
12	65	58	43	37	43	45	48	60	70	76	82	75
13	73	59	--	39	42	45	47	58	--	76	--	75
14	70	59	--	35	44	45	48	60	70	76	79	74
15	65	--	46	40	44	45	49	60	71	75	75	74
16	68	55	46	35	41	44	46	60	71	75	76	76
17	69	53	45	37	44	46	50	60	72	75	--	75
18	62	52	45	37	--	47	--	60	72	--	75	75
19	67	50	45	39	43	46	52	65	72	76	76	75
20	66	55	--	40	41	--	53	65	72	76	76	74
21	65	50	47	38	44	40	57	--	73	78	76	74
22	65	49	46	41	43	46	54	--	72	76	--	75
23	64	52	45	35	43	49	58	64	74	76	75	75
24	66	--	44	39	43	47	56	64	--	78	77	74
25	67	--	44	39	45	48	54	67	74	78	76	74
26	63	--	44	34	45	44	54	65	73	76	78	73
27	60	--	44	32	43	44	56	65	75	82	--	74
28	60	--	--	--	43	45	58	65	75	80	75	72
29	63	--	44	--	--	47	58	66	75	--	76	74
30	60	--	46	37	--	46	60	66	75	--	75	73
31	61	--	45	--	--	--	--	66	--	76	74	--
Average	61	--	45	39	43	45	52	62	71	76	77	75

ARKANSAS RIVER BASIN--Continued  
NEOSHO (GRAND) RIVER NEAR CHOUTEAU, OKLA.

LOCATION.--At bridge on country road between Locust Grove and Pryor, 5 miles upstream from Pryor Creek, and 7½ miles northeast of Chouteau, Mayes County Area --11,546 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1950 to September 1955, October 1956 to September 1957.

Water temperatures: October 1950 to September 1951.

EXTREMES.--1950-51, Dissolved solids: Maximum, 215 ppm. May 21-31; minimum, 134 ppm Feb. 18-20.

Hardness: Maximum, 137 ppm Apr. 1-10, May 21-31; minimum, 68 ppm Feb. 21-23.

Specific conductance: Maximum daily, 362 micromhos May 5; minimum daily, 145 micromhos Oct. 4.

Water temperatures: Maximum, 85 F July 31, Aug. 5, 6, 14, 19-20, 31, Sept. 2, 3; minimum, freezing point Dec. 6, Jan. 10, 30, 31, Feb. 1.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Discharge (cfs)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Chloride (Cl)	Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
								Calcium, magnesium	Non-carbonate				
Oct. 29, 1956.....	70.0	40	5.8	13	95		17	124	46	19	0.5	315	7.8
Dec. 6.....	1.74	48	6.3	8.2	126		12	146	42	11	.3	330	7.6
Jan. 7, 1957.....	--	40	5.8	12	48		25	124	84	17	.5	368	7.3
Feb. 7.....	200	50	6.1	8.6	126		11	150	46	11	.3	345	7.3
Mar. 4.....	140	44	6.3	10	50		8.0	136	95	14	.4	333	6.7
Apr. 8.....	7,200	46	6.1	7.8	112		11	140	48	11	.3	321	7.5
May 6.....	9,500	39	4.5	4.5	92		8.7	116	40	10	.2	266	6.6
June 13.....	1,640	23	3.0	3.6	0		4.4	70	175	9	.2	175	3.6
July 29.....	1,908	38	3.6	5.4	97		8.8	110	30	9	.2	251	6.5
Sept. 5.....	5,400	28	5.8	5.4	83		7.2	89	20	11	.2	205	7.2

ARKANSAS RIVER BASIN--Continued  
NEOSHO (GRAND) RIVER AT FORT GIBSON RESERVOIR, NEAR FORT GIBSON, OKLA.

LOCATION. --Immediately below dam on Neosho (Grand) River, 1.1 miles upstream from gaging station and 4 miles north of Fort Gibson, Wagoner County. DRAINAGE AREA. --12,492 square miles above sampling station, 12,495 square miles above gaging station.

RECORDS AVAILABLE. --Chemical analyses: October 1951 to September 1957.

Water temperatures: October 1951 to September 1957.

EXTREMES, 1956-57. --Dissolved solids: Maximum, 224 ppm June 1-10.

Hardness: Maximum, 158 ppm Jan. 1-31; minimum, 82 ppm June 1-10.

Specific conductance: Maximum daily, 417 micromhos Oct. 7; minimum daily, 176 micromhos June 20.

Water temperatures: Maximum, 86°F July 26 to Aug. 3; minimum, 38°F Jan. 28.

EXTREMES, 1951-57. --Dissolved solids: Maximum, 233 ppm Nov. 1-30, 1952; minimum 128 ppm June 1-10, 1957.

Hardness: Maximum, 171 ppm Dec. 1-31, 1952; minimum 82 ppm June 1-10, 1957.

Specific conductance: Maximum daily, 424 micromhos Feb. 16, 1953; minimum daily, 176 micromhos June 20, 1957.

Water temperatures: Maximum, 89°F July 31, Aug. 1, 1955, Aug. 15, 1956; minimum, 34°F Dec. 21, 1951.

REMARKS. --Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records for discharge for gaging station near Fort Gibson for water year October 1956 to September 1957 given in WSP 1511. No appreciable inflow between sampling station and gaging station except during periods of heavy local runoff.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>	Percent sodium carbonate	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH			
													Parts per million	Tons per acre-foot						Tons per day		
Oct. 1-31, 1956...	128	5.0	0.02	46	7.5	13	2.2	126	46	18	0.2	1.4	0.07	201	0.27	69	146	42	16	0.5	357	7.5
Nov. 1-30	310	8.0	0.03	46	8.5	13	3.2	124	47	16	3	1.3	0.06	204	0.28	171	150	48	16	5	345	7.4
Dec. 1-31	513	7.2	0.00	47	6.0	12	3.5	126	50	15	1	1.8	0.10	205	0.28	284	142	38	15	4	346	7.4
Jan. 1-31, 1957...	487	5.0	0.00	50	8.0	14	--	130	50	16	3	1.7	0.04	219	0.30	288	158	52	16	5	359	7.7
Feb. 1-28	2,344	5.5	0.00	50	6.6	15	--	129	50	19	3	2.4	0.06	216	0.29	1,370	152	46	18	5	366	7.9
Mar. 1-31	2,120	5.0	0.00	46	7.1	17	--	124	48	19	2	4.8	0.05	234	0.30	1,280	144	42	20	6	367	8.0
Apr. 1-30	13,490	4.8	0.00	38	6.6	12	--	106	38	14	2	6.0	0.02	181	0.25	6,580	122	35	18	5	297	7.8
May 1-31	42,130	8.4	0.01	34	4.6	8.2	--	90	30	8.5	3	6.5	0.03	156	0.21	17,750	104	30	15	4	244	7.4
June 1-10	48,180	13	0.05	26	4.3	6.4	--	74	21	7.8	3	5.0	0.24	128	0.17	16,650	82	22	15	3	192	7.5
July 1-31	22,640	12	0.03	28	4.9	6.2	--	83	22	7.2	1	4.3	0.19	134	0.18	8,190	90	22	13	3	204	7.4
Aug. 1-31	2,460	8.7	0.01	31	4.5	8.6	--	94	24	11	0	3.9	0.15	149	0.20	990	96	22	16	4	231	7.3
Sept. 1-30	2,863	5.8	0.02	33	4.3	8.9	--	94	25	11	0	3.7	0.21	182	0.21	1,180	100	23	16	4	237	6.8
Weighted average	11,500	10	0.03	31	4.8	7.9	--	86	27	9.1	0.2	5.3	0.14	147	0.20	4,560	97	26	15	0.3	229	7.9

## ARKANSAS RIVER BASIN--Continued

NEOSHO (GRAND) RIVER AT FORT GIBSON RESERVOIR NEAR FORT GIBSON, OKLA.--Continued

Temperature (°F) of water, water year October 1956 to September 1957

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	72	64	49	44	40	46	52	65	70	77	86	80
2	73	64	49	44	40	46	52	65	70	78	86	80
3	72	62	49	44	40	46	54	66	70	78	86	81
4	73	62	50	45	41	46	54	65	70	80	84	81
5	73	62	50	45	40	47	--	63	70	80	83	81
6	72	62	52	45	41	47	52	63	72	74	82	80
7	72	61	51	45	42	46	52	64	74	76	81	78
8	--	59	50	45	43	--	52	64	72	80	82	78
9	71	59	46	46	44	46	54	65	72	80	82	77
10	71	58	46	43	44	47	54	66	72	82	82	78
11	70	58	46	44	44	48	55	66	74	82	82	78
12	71	58	47	43	45	49	--	66	75	83	82	77
13	70	58	46	42	45	50	56	67	74	84	82	78
14	70	57	46	42	45	50	56	67	77	84	84	76
15	70	59	46	43	45	50	57	67	75	84	82	75
16	69	57	46	40	45	50	--	68	74	84	82	75
17	69	56	46	40	45	50	58	68	74	85	81	75
18	69	56	46	39	45	50	--	68	76	85	81	74
19	69	56	46	40	46	50	58	68	76	85	81	74
20	69	57	46	42	46	50	58	68	76	84	80	74
21	68	55	46	43	46	50	--	69	75	84	80	74
22	68	53	46	42	46	52	--	70	75	83	80	73
23	68	52	46	40	46	50	59	69	75	84	80	73
24	68	52	45	41	46	50	60	69	75	85	80	73
25	--	52	45	42	46	49	60	68	75	84	80	74
26	66	50	45	42	46	48	60	68	75	86	80	73
27	66	51	45	40	47	49	62	68	76	86	80	73
28	66	50	46	38	48	49	--	69	76	86	80	72
29	65	50	45	39	--	50	--	69	76	86	80	72
30	65	49	45	39	--	51	64	70	76	86	80	72
31	64	--	45	39	--	51	--	70	--	86	80	--
Average	69	57	47	42	44	49	--	67	74	83	82	76

ARKANSAS RIVER BASIN--Continued  
 ARKANSAS RIVER AT WEBBERS FALLS, OKLA.

LOCATION:--At bridge on U.S. Highway 64 at Webbers Falls, Muskogee County.

DRAINAGE AREA.--97,049 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1948 to September 1949, October 1956 to September 1957.

Water temperatures: October 1948 to September 1956 to September 1957.

EXTREMES: 1956-57.--Dissolved solids: Maximum, 3,500 ppm Nov. 2-3; minimum, 207 ppm May 27-29.

Hardness: Maximum, 650 ppm Nov. 2-3; minimum, 104 ppm June 17-19.

Specific conductance: Maximum daily, 6,070 micromhos Nov. 2; minimum daily, 344 micromhos May 27-28.

Water temperatures: Maximum, 88°F July 18; minimum, 34°F Jan. 16-18, 27.

EXTREMES: 1948-49, 1956-57.--Dissolved solids: Maximum, 3,500 ppm Nov. 2-3, 1956; minimum, 207 ppm May 27-29, 1957.

Hardness: Maximum, 650 ppm Nov. 2-3, 1956; minimum, 104 ppm June 17-19, 1957.

Specific conductance: Maximum daily, 6,070 micromhos Nov. 2, 1956; minimum point Jan. 20, 1949.

Water temperatures: Maximum, 88°F July 18, 1957; minimum, freezing point Jan. 20, 1949.

REMARKS.--Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. No discharge records available for this station.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal-cium (Ca)	Mag-ne-sium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bio-car-bonate (HCO <sub>3</sub> )	Car-bonate (CO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> ) (B)	Bo-ron (B)	Dissolved solids (residue at 100°C)		Hardness as CaCO <sub>3</sub>		Per-cent so-lidum ratio	Specific conductance (micro-mhos at 25°C)	pH		
															Parts per million	Tons per acre-foot	Calcium magnesium	Non-carbonate					
Oct. 1-6, 1956				70	21	282		136	0	91	410	--	1.2	--	923	1.26	454	260	148	67	6.5	1,730	7.5
Oct. 7-8				86	24	389		128	0	119	660	--	1.8	--	1,360	1.85	367	315	210	73	9.5	2,520	7.6
Oct. 9-10				104	31	542		118	0	148	930	--	2.3	--	1,860	2.53	495	385	238	75	12	3,370	7.5
Oct. 11-15				102	32	545		132	0	143	930	--	2.0	--	1,860	2.53	1,330	385	277	75	12	3,370	7.5
Oct. 16-17, 19				84	26	375		144	0	104	640	--	1.1	--	1,340	1.82	1,360	315	197	72	9.2	2,460	7.4
Oct. 18, 20				74	21	268		140	0	86	460	--	1.1	--	1,010	1.37	1,160	270	156	68	7.1	1,900	7.5
Oct. 21-23				75	18	281		144	0	84	460	--	1.6	--	1,020	1.39	1,020	260	142	69	7.0	1,860	7.7
Oct. 24-26				99	27	483		140	0	121	850	--	3.3	--	1,730	2.35	1,900	360	246	74	11	3,150	7.6
Oct. 27-30				94	24	412		140	0	99	730	--	2.0	--	1,510	2.05	1,260	335	220	73	9.8	2,730	7.5
Oct. 31				122	28	556		150	0	119	1,000	--	4.5	--	2,010	2.73	2,810	420	297	74	12	3,530	7.7
Nov. 1				147	42	761		114	0	142	1,400	--	4.0	--	2,720	3.70	3,750	540	446	75	14	4,740	7.6
Nov. 2-3				192	42	996		96	0	152	1,800	--	3.0	--	3,500	4.76	5,340	650	572	77	17	6,020	7.4
Nov. 4-5				110	33	549		140	0	105	875	--	3.2	--	1,940	2.64	2,810	410	296	74	12	3,510	7.7
Nov. 6-8				95	20	357		150	0	87	620	--	2.2	--	1,340	1.82	3,720	317	187	71	8.8	2,420	7.6
Nov. 9-10				81	18	250		176	0	74	440	--	3.2	--	1,020	1.39	2,400	285	141	66	6.4	1,840	7.9
Nov. 11-15				88	17	286		150	0	80	500	--	3.0	--	1,100	1.50	1,850	290	167	68	7.3	2,000	8.0
Nov. 16-17				112	28	420		174	0	88	760	--	2.9	--	1,600	2.18	3,050	395	252	70	9.2	2,830	8.0
Nov. 18-20				98	23	298		188	0	76	535	--	1.4	--	1,190	1.62	1,840	340	186	66	7.0	2,170	8.1
Nov. 21-23				80	20	208		180	0	66	362	--	1.4	--	858	1.17	1,330	280	132	62	5.3	1,590	8.0
Nov. 24-30				96	20	282		194	0	79	480	--	1.6	--	1,110	1.51	1,540	320	161	66	6.9	2,020	7.9

ARKANSAS RIVER BASIN

Dec. 1, 1956	81	21	216	178	14	73	370	--	2.2	--	907	1.23	1,310	280	120	62	5.5	1,650	8.5
Dec. 2-9	85	21	207	178	0	83	470	--	2.3	--	1,080	1.47	1,540	300	154	66	6.6	1,970	7.9
Dec. 10	78	16	270	156	0	74	350	--	1.4	--	853	1.16	1,400	280	132	63	5.6	1,540	8.2
Dec. 11-13	80	18	245	172	0	74	410	--	3.3	--	950	1.29	2,180	275	134	66	6.4	1,740	8.1
Dec. 14-15	84	22	315	154	0	85	530	--	5.6	--	1,180	1.60	3,070	300	174	70	7.9	2,150	8.2
Dec. 16-20	70	17	153	162	2	63	272	1.18	2.4	1.18	699	.95	1,270	245	108	58	4.3	1,280	8.3
Dec. 21-22	96	17	303	148	0	82	540	--	3.8	--	1,230	1.67	3,980	310	172	68	7.5	2,180	8.2
Dec. 23-25	78	16	199	164	0	71	350	--	3.0	--	863	1.17	2,490	260	126	62	5.4	1,550	8.2
Dec. 26-29	92	20	259	180	0	78	455	--	2.9	--	1,060	1.44	3,320	310	162	65	6.4	1,910	8.2
Dec. 27-28, 30-31	80	15	212	182	0	69	380	--	2.9	--	921	1.25	2,830	260	127	64	5.7	1,660	7.9
Jan. 1-4, 1957	80	18	226	160	0	74	410	2.4	2.4	2.4	955	1.30	3,020	275	144	64	5.9	1,730	8.1
Jan. 5-8	74	13	187	148	0	71	330	1.19	3.0	1.19	821	1.12	2,220	240	118	63	5.2	1,470	8.2
Jan. 9-10	84	18	261	156	0	82	480	--	3.0	--	1,070	1.46	2,800	285	157	67	6.7	1,900	8.1
Jan. 11-17	96	17	236	178	0	81	400	2.6	2.6	2.6	958	1.30	1,730	285	139	64	6.1	1,750	8.2
Jan. 18-20	92	21	307	190	0	88	500	--	3.7	--	1,140	1.55	1,560	315	180	68	7.5	2,090	8.2
Jan. 21-22	82	12	291	156	0	79	385	--	4.9	--	895	1.22	1,320	255	127	65	6.0	1,670	8.0
Jan. 23-24	57	12	171	112	0	55	285	--	3.8	--	686	1.65	1,850	190	68	66	5.4	1,200	7.9
Jan. 25, 28	84	11	220	162	0	71	360	--	4.3	--	898	1.22	2,500	255	122	65	6.0	1,640	8.0
Jan. 26, 31	97	14	163	156	0	58	280	--	4.6	--	703	1.96	2,580	225	97	61	4.7	1,300	8.0
Jan. 27-28	74	16	169	176	0	62	300	--	1.2	--	744	1.01	1,700	250	106	60	4.6	1,360	8.0
Feb. 1-5	61	11	125	136	0	54	215	--	5.5	--	562	.76	2,920	186	84	58	3.9	1,040	8.1
Feb. 6-7	46	8.5	70	114	0	47	110	--	2.5	--	347	.47	1,690	150	56	50	2.5	656	7.9
Feb. 8-9	56	9.8	108	128	0	52	175	--	4.0	--	482	.66	2,160	180	73	57	3.5	899	7.9
Feb. 10	69	12	165	136	0	60	300	--	3.7	--	732	1.00	2,430	220	108	65	5.4	1,310	8.1
Feb. 11, 13-15	55	9.5	83	134	0	54	128	--	2.2	--	412	.56	3,060	176	66	51	2.7	744	8.0
Feb. 12, 16, 19	66	13	142	136	0	64	260	--	2.8	--	655	.89	6,840	220	108	58	4.2	1,200	8.0
Feb. 17-18, 20	57	9.7	81	126	0	57	140	--	4.6	--	430	.58	4,280	182	78	49	2.6	788	7.9
Feb. 21-23	62	9.8	101	134	0	59	176	3.5	3.5	3.5	506	.69	6,600	195	85	53	3.1	919	7.9
Feb. 24	52	7.4	46	130	0	54	75	--	3.0	--	318	.43	1,430	160	54	38	1.6	561	8.0
Feb. 25-27	59	13	95	136	0	59	170	4.0	4.0	4.0	498	.68	6,040	200	88	51	2.9	900	7.9
Feb. 28	53	6.8	43	128	0	46	70	--	2.9	--	312	.42	3,410	160	60	37	1.5	545	8.1

a Values above 200 ppm are reported to the nearest 5 ppm.

ARKANSAS RIVER BASIN--Continued  
 ARKANSAS RIVER AT WEBBERS FALLS, OKLA.--Continued

Chemical analyses, in parts per million, water year October 1956 to September 1957--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	
															Parts per million	Tons per acre-foot	Calcium	Non-carbonate					
Mar. 1-4, 1957.....				59	6.8	62	136	0	56	106			3.2	0.00	386	0.52	2,770	175	64	44	2.0	886	7.9
Mar. 5.....				70	12	159	148	0	69	272			4.3	0.00	708	0.96	7,000	225	104	61	4.6	1,250	8.0
Mar. 6-9.....				59	8.0	77	132	0	59	132			4.8	0.00	436	5.9	3,400	180	72	48	3.5	769	7.7
Mar. 10.....				72	12	129	168	0	34	225			4.8	0.00	660	9.0	2,980	230	92	55	3.7	1,130	8.1
Mar. 11-18.....				64	12	85	142	0	61	156			3.9	0.00	488	6.6	3,960	210	94	47	2.6	866	7.8
Mar. 19.....				74	13	196	144	0	80	330			5.5	--	825	1.12	6,640	240	122	64	5.5	1,470	7.9
Mar. 20.....				53	12	49	128	0	55	82			4.3	--	338	4.6	2,570	180	75	37	1.6	596	7.9
Mar. 21.....				64	13		134	0	68	240			1.7	--	647	8.8	7,320	215	104	59	4.2	1,140	8.2
Mar. 22-25.....				49	8.6	69	116	0	52	112			2.3	1.4	385	5.2	2,110	158	63	49	2.4	684	8.1
Mar. 26-28.....				60	11	112	128	0	62	190			2.0	4.7	552	7.5	6,590	196	91	55	3.5	881	8.1
Mar. 29-31.....				61	14	158	126	0	64	270			2.5	2.2	691	9.4	9,100	210	104	62	4.8	1,230	8.1
Apr. 1.....				65	14	190	130	2	72	315			4.2	--	798	1.09	24,990	220	110	65	5.6	1,430	8.3
Apr. 2-4.....				45	6.7	108	98	0	44	178			4.2	1.8	467	6.4	28,710	140	66	63	4.0	838	7.8
Apr. 5.....				50	10	208	98	0	51	342			5.5	--	792	1.08	50,890	168	88	73	7.0	1,410	8.0
Apr. 6-7.....				43	6.9	104	92	0	44	168			3.5	--	459	6.2	38,230	136	60	62	3.9	810	7.7
Apr. 8.....				62	13	246	130	0	68	398			3.7	--	915	1.24	115,600	205	100	72	7.5	1,660	8.2
Apr. 9.....				57	11	156	126	0	55	255			4.8	--	649	8.8	48,860	186	82	65	5.0	1,170	8.0
Apr. 10.....				58	12	286	120	0	63	460			4.5	--	1,010	1.37	48,940	194	96	76	8.9	1,840	8.2
Apr. 11-12.....				66	11	269	136	0	78	405			7.8	--	903	1.23	40,230	210	96	73	7.8	1,680	8.2
Apr. 13-16.....				56	7.1	162	114	0	70	260			7.1	--	678	9.2	26,380	186	92	65	5.2	1,200	8.0
Apr. 17-20.....				40	8.3	95	102	0	45	180			4.5	--	420	9.7	45,980	130	94	61	3.6	763	7.9
Apr. 21-23.....				36	8.3	91	108	0	30	126			4.5	--	391	5.3	70,810	124	36	59	3.2	667	7.8
Apr. 24.....				44	8.8	175	112	4	48	272			6.5	--	685	9.3	165,300	156	58	71	6.1	1,200	8.3
Apr. 25-28.....				48	7.3	111	120	0	46	165			6.5	--	489	6.7	97,070	140	42	63	4.1	844	7.6
Apr. 29-30.....				53	7.3	187	114	0	50	250			5.6	--	642	8.7	93,600	162	68	68	5.4	1,160	8.1
May 1-4.....				44	6.6	101	96	0	48	158			4.8	--	440	6.0	104,100	137	58	61	3.7	802	7.9
May 5-7.....				67	12	280	126	0	100	390			4.8	--	976	1.33	163,200	220	114	71	7.3	1,720	8.1
May 8-10.....				54	10	168	112	0	74	262			4.5	--	669	9.1	87,550	176	84	68	5.5	1,230	7.8
May 11-14.....				70	13	284	122	0	100	450			5.2	--	1,110	5.1	105,200	225	126	73	8.2	1,930	7.9
May 15-16.....				53	9.2	186	112	0	60	295			5.5	--	726	9.9	81,350	170	78	70	6.2	1,310	8.2
May 17.....				70	13	302	122	0	99	480			4.8	--	1,150	1.56	219,600	230	128	74	8.7	2,000	8.2
May 18.....				61	11	189	122	0	90	290			8.3	--	779	1.06	384,900	198	98	67	5.8	1,390	8.2

ARKANSAS RIVER BASIN

May 19, 1957.....	50	4.6	98	128	0	39	148	--	4.0	--	449	.61	283,700	144	39	60	3.5	797	8.2
May 20.....	67	9.0	173	122	2	95	265	--	4.8	--	758	1.03	452,300	215	100	65	5.3	1,300	8.3
May 21-22.....	50	7.1	103	124	0	50	160	--	3.6	--	432	.61	250,800	134	52	60	3.7	842	8.0
May 23-25.....	40	4.9	63	110	0	29	98	--	2.9	--	318	.43	179,700	120	30	54	2.6	568	7.9
May 26.....	46	5.6	78	108	0	48	118	--	3.6	--	389	.53	375,000	138	50	55	2.9	694	8.1
May 27-29.....	35	4.5	34	92	0	30	50	--	3.8	--	207	.28	135,600	106	30	41	1.4	382	7.9
May 30-31.....	38	5.1	50	92	0	40	74	--	3.7	--	275	.37	112,900	116	40	48	2.0	486	7.9
June 1.....	42	5.6	55	100	0	45	82	--	3.5	--	303	.41	130,900	128	46	48	2.1	548	8.0
June 2-5.....	50	5.6	93	116	0	51	142	--	3.9	--	440	.60	178,000	148	53	58	3.3	772	7.9
June 6.....	53	8.3	132	124	0	57	205	--	4.5	--	569	.77	224,300	166	64	63	4.5	1,010	8.2
June 7-10.....	46	6.1	77	114	0	46	115	--	3.7	--	381	.52	141,800	140	46	54	2.8	687	7.9
June 11.....	43	7.9	70	112	0	41	108	--	5.6	--	358	.49	133,400	140	48	52	2.6	625	8.1
June 12.....	58	11	126	136	0	61	200	--	5.6	--	580	.79	241,200	188	76	59	4.0	994	7.5
June 13-14.....	46	7.1	80	118	0	49	118	--	4.5	--	396	.54	164,700	144	48	55	2.9	687	8.1
June 15-16.....	39	3.5	45	104	0	35	60	--	4.2	--	260	.35	115,100	112	27	47	1.8	443	8.0
June 17-19.....	34	4.6	34	90	0	29	51	--	3.5	--	230	.31	102,000	104	30	42	1.5	378	8.0
June 20.....	51	10	87	120	0	63	135	--	3.7	--	473	.64	209,400	168	70	53	2.9	772	8.2
June 21-30.....	16	0.01	71	112	0	50	108	.5	2.9	.15	382	.52	159,800	146	54	51	2.6	645	7.7
July 1-4.....	43	8.4	51	124	0	34	80	--	3.0	--	296	.40	110,400	142	40	44	1.9	536	8.0
July 5-10.....	51	9.0	78	120	0	60	121	--	3.9	--	389	.53	120,800	164	66	51	2.7	715	8.0
July 11-14.....	54	14	61	128	0	66	104	.4	3.6	.22	404	.55	77,720	192	87	41	1.9	740	8.2
July 15-20.....	77	21	131	162	0	116	218	.6	2.6	.16	753	1.02	45,890	280	147	50	3.4	1,320	8.2
July 21-26.....	73	22	146	152	0	113	245	.3	2.6	.24	796	1.08	35,500	275	150	54	3.8	1,400	8.2
July 27-31.....	93	34	262	174	6	162	435	.3	3.6	.23	1,290	1.75	40,330	370	218	61	5.9	2,220	8.3
Aug. 1-3.....	82	26	181	184	0	116	305	.1	2.2	.23	946	1.29	19,740	310	161	56	4.5	1,670	8.0
Aug. 4-10.....	85	30	285	164	0	144	475	.1	1.9	.26	1,290	1.75	25,000	335	202	65	6.8	2,260	8.0
Aug. 11-12.....	74	24	241	180	0	105	400	.3	2.5	.22	1,070	1.46	16,480	285	153	65	6.2	1,910	8.0
Aug. 13-15.....	58	20	155	128	0	81	265	.2	1.6	.24	767	1.04	14,900	230	123	60	4.4	1,370	7.7
Aug. 16-21.....	70	24	252	136	0	109	420	.3	1.8	.19	1,120	1.52	18,080	270	160	67	6.7	1,980	7.7
Aug. 22-23.....	53	18	159	116	0	73	270	.2	2.0	.43	1,760	1.03	16,050	210	113	62	4.7	1,370	7.9

a. Values above 200 ppm are reported to the nearest 5 ppm.

ARKANSAS RIVER BASIN--Continued  
 ARKANSAS RIVER AT WEBBERS FALLS, OKLA.--Continued

Chemical analyses, in parts per million, water year October 1956 to September 1957--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> ) (Fe)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> ) (K)	Carbonate (CO <sub>3</sub> ) (SO <sub>4</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
Aug. 24, 1957.....				74	29	277		132	0	114	480	--	1.9	--	1,150	1.56	20,930	300	194	87	7.0	2,110	8.0
Aug. 25.....				51	20	150		112	0	71	280	--	2.0	--	642	87	7,050	210	116	61	4.5	1,210	8.0
Aug. 26.....				65	26	241		136	0	106	405	--	1.8	--	936	1.34	17,280	270	158	66	6.4	1,810	8.0
Aug. 27.....				93	41	380		162	0	181	655	--	1.8	--	1,510	2.05	30,580	400	267	67	8.3	2,710	8.1
Aug. 28-30.....				51	16	144		104	0	70	245	0.3	1.0	0.22	595	81	8,110	192	107	62	4.5	1,130	7.8
Aug. 31.....				62	23	258		110	0	100	435	--	1.4	--	990	1.35	16,490	250	158	69	7.1	1,850	7.2
Sept. 1-3.....				54	18	164		112	0	70	282	.4	1.2	.18	684	.93	6,270	210	116	63	4.9	1,270	7.9
Sept. 4-5.....				84	34	353		136	0	130	615	.0	1.1	.57	1,390	1.89	19,970	350	238	69	8.2	2,500	8.1
Sept. 6.....				62	21	221		114	0	85	380	--	1.9	--	872	1.19	16,570	240	148	67	6.2	1,620	7.9
Sept. 7-9.....				53	18	134		112	0	68	265	.1	1.6	.20	644	.88	6,280	205	112	62	4.7	1,220	7.9
Sept. 10-12.....				66	27	338		108	0	116	570	.2	1.8	.27	1,190	1.62	17,370	280	192	72	8.6	2,210	7.9
Sept. 13-14.....				54	20	191		106	0	74	330	.1	2.3	.38	756	1.03	13,920	215	129	86	5.7	1,420	7.5
Sept. 15-17.....				50	16	151		110	0	56	262	.4	1.6	.21	635	.86	32,970	192	102	63	4.7	1,160	7.9
Sept. 18-20.....				75	20	278		144	0	100	460	.4	3.9	.19	1,040	1.41	55,040	270	152	69	7.4	1,920	7.9
Sept. 21-24.....				63	21	154		126	0	99	260	.3	3.2	.19	687	.93	26,670	240	138	58	4.3	1,260	8.0
Sept. 25-26.....				74	15	209		142	0	108	332	.3	5.7	.50	828	1.13	41,360	250	132	65	5.7	1,530	7.9
Sept. 27-28.....				61	14	138		120	0	73	235	.2	3.6	.50	594	.81	22,530	210	112	59	4.1	1,110	7.9
Sept. 29-30.....				69	19	218		130	0	89	370	.2	5.0	.54	881	1.20	22,720	250	146	65	6.0	1,610	7.9

a Values above 200 ppm are reported to the nearest 5 ppm.

## ARKANSAS RIVER BASIN--Continued

## ARKANSAS RIVER AT WEBBERS FALLS, OKLA.--Continued

Temperature (°F) of water, water year October 1956 to September 1957

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	--	58	40	45	38	49	56	66	71	78	86	82
2	--	60	44	40	39	54	56	66	71	79	86	80
3	--	58	42	40	42	49	57	69	69	81	87	81
4	75	60	52	42	44	54	58	64	70	82	83	82
5	74	58	55	45	46	49	58	64	70	79	83	80
6	73	58	56	45	45	53	54	65	72	80	80	80
7	70	58	48	44	46	42	55	65	72	80	80	79
8	65	52	45	45	48	51	54	65	74	78	82	74
9	68	48	38	48	54	59	54	67	76	81	82	80
10	64	52	38	37	54	50	55	68	74	83	83	80
11	64	54	42	38	52	60	59	68	75	82	84	80
12	68	55	44	38	53	62	49	69	76	83	83	80
13	69	55	38	39	48	60	45	69	75	83	83	80
14	68	62	42	38	50	60	50	69	76	84	83	80
15	67	56	44	38	50	62	50	70	75	85	83	75
16	68	48	38	34	49	60	52	67	76	86	83	75
17	68	48	44	34	46	54	56	71	77	85	82	85
18	68	48	42	34	49	53	56	70	77	88	80	75
19	68	48	44	38	49	50	62	66	77	85	80	79
20	67	55	48	38	47	50	63	67	77	85	82	80
21	60	48	48	45	45	50	63	69	77	84	82	75
22	64	45	44	47	48	50	64	70	77	85	82	74
23	65	48	46	40	48	42	65	68	77	85	80	75
24	66	47	44	40	48	48	65	68	75	84	80	72
25	66	48	39	39	50	48	65	69	74	83	81	72
26	58	45	42	37	45	46	66	70	75	81	82	72
27	60	39	40	34	45	50	66	70	74	82	83	72
28	58	40	44	38	46	50	67	76	75	84	82	72
29	60	40	40	35	--	52	68	70	76	85	82	70
30	64	39	40	36	--	55	67	70	78	86	82	70
31	60	--	45	40	--	55	--	70	--	85	82	--
Average	66	51	44	40	47	53	58	68	75	83	82	77

## ARKANSAS RIVER BASIN--Continued

## ILLINOIS RIVER AT TENKILLER RESERVOIR, NEAR GORE, OKLA.

LOCATION --Immediately below dam on Illinois River. 4.3 miles upstream from gaging station, and 6 miles northeast of Gore, Sequoyah County. DRAINAGE AREA 1,610 square miles above sampling station (1,628 square miles above gaging station).

RECORDS AVAILABLE --Chemical analyses: October 1953 to September 1957.

Water temperatures: October 1953 to September 1957.

EXTREMES, 1956-57.--Dissolved solids: Maximum, 158 ppm Aug. 1-31; minimum, 105 ppm May 1-13.

Hardness: Maximum, 102 ppm Feb. 1-28; minimum, 44 F Feb. 24.

Specific conductance: Maximum daily, 396 micromhos Aug. 12; minimum daily, 123 micromhos July 14.

Water temperatures: Maximum, 72 F Aug. 14; minimum, 44 F Feb. 24.

EXTREMES, 1953-57.--Dissolved solids: Maximum, 158 ppm Aug. 1-31, 1956; minimum, 100 ppm Dec. 1-31, 1953.

Hardness: Maximum, 107 ppm Sept. 1-30, 1956; minimum, 61 ppm July 1-31, 1957.

Specific conductance: Maximum daily, 396 micromhos Aug. 12, 1956; minimum daily, 123 micromhos July 14, 1957.

Water temperatures: Maximum, 72 F Aug. 14, 1956; minimum, 42 F Feb. 13, 20, 1955, Feb. 3-4, 12, 15, 1956.

REMARKS --Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of discharge for gaging station near Gore for water year October 1956 to September 1957 given in WSP 1511. No appreciable inflow between sampling station and gaging station except during periods of heavy local runoff.

Chemical analyses, in parts per million, water year October 1956 to September 1957.

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)			
													Parts per million	Tons per acre-foot	Tons per day	Calcium, mg-nessum	Non-carbonate					
																				Boiron (B)	Per-cent-dium	
Oct. 1-31, 1956	130	7.6	0.02	34	2.4	7.1	2.2	113	4.9	10	0.1	2.2	0.00	130	0.18	46	95	2	14	0.3	226	7.3
Nov. 1-30	319	6.4	.01	35	2.1	5.7	2.3	110	5.4	11	.0	2.6	.04	125	.17	108	96	6	11	.3	224	7.4
Dec. 1-31, 1957	537	5.8	.00	34	2.7	7.8	1.9	111	5.4	13	.1	1.2	.04	127	.17	157	96	5	15	.3	226	7.9
Jan. 1-31, 1957	524	5.0	.03	35	3.3	6.9	--	114	8.0	11	.1	1.2	.32	127	.17	111	101	8	13	.3	224	7.6
Feb. 1-28	435	2.5	.03	34	4.1	6.2	--	113	7.6	10	.1	1.2	.16	122	.17	143	102	10	12	.3	224	7.9
Mar. 1-31	1,120	6.5	.01	35	3.0	5.4	--	113	7.6	8.8	.1	1.2	.37	124	.17	375	100	8	10	.2	216	7.9
Apr. 1-30	6,979	4.2	.00	33	1.3	7.3	--	104	7.9	9.7	.1	2.5	.09	121	.16	2,280	88	3	15	.3	210	7.7
May 1-31	4,287	5.6	.11	27	2.1	6.8	--	90	3.3	11	.1	4.0	.07	105	.14	1,220	76	2	16	.3	179	7.0
June 1-30	7,177	10	.03	25	1.3	6.5	--	72	7.5	8.8	.3	5.6	.18	109	.15	2,110	68	9	17	.3	170	7.1
July 1-31	8,046	13	.03	23	3.9	5.6	--	68	6.0	7.8	.4	3.8	.13	107	.15	2,320	61	6	16	.3	150	6.9
Aug. 1-31	810	14	.01	28	2.9	13	--	82	7.8	22	.0	3.5	.25	138	.21	3,462	82	15	26	.6	234	7.4
Sept. 1-30	1,512	12	.02	28	1.9	9.0	--	87	5.8	17	.0	3.1	.17	136	.18	555	78	6	20	.4	200	6.8
Weighted average	2,636	8.7	0.03	28	1.5	6.7	--	85	6.5	9.8	0.2	3.2	0.14	114	0.16	811	76	6	16	0.3	182	--

## ARKANSAS RIVER BASIN--Continued

## ILLINOIS RIVER AT TENKILLER RESERVOIR, NEAR GORE, OKLA.--Continued

Temperature (°F) of water, water year October 1956 to September 1957

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	52	53	--	50	46	46	48	56	58	66	66	64
2	52	53	52	50	46	46	48	54	57	66	66	--
3	52	--	53	50	47	46	50	54	57	67	66	65
4	52	53	53	50	45	46	50	54	58	66	64	68
5	52	53	53	50	46	46	50	54	58	68	68	67
6	52	53	53	51	46	46	50	56	58	67	66	68
7	53	53	53	51	46	46	--	54	56	68	66	--
8	52	53	--	50	46	48	52	57	58	64	66	64
9	--	52	50	50	47	48	--	54	58	64	69	64
10	52	47	53	48	46	46	52	55	60	68	66	64
11	52	53	53	--	46	48	--	55	60	68	66	66
12	52	53	53	50	46	48	54	55	62	68	68	66
13	51	52	52	48	46	48	52	54	62	70	68	65
14	52	52	52	48	46	48	51	54	60	67	72	64
15	--	52	52	48	46	48	52	52	60	68	68	64
16	52	52	54	47	46	48	52	56	60	68	68	64
17	52	53	52	47	46	46	--	58	60	--	68	68
18	52	51	52	47	46	48	53	56	60	68	68	64
19	52	52	52	49	46	48	53	54	62	70	68	66
20	52	53	52	48	46	48	54	54	62	68	66	68
21	51	52	52	50	46	48	53	57	64	69	64	69
22	53	--	52	50	46	48	52	54	63	68	66	67
23	52	52	52	50	46	48	53	55	64	68	65	68
24	52	53	51	50	44	46	53	54	64	68	68	68
25	52	51	51	50	46	48	52	54	64	68	68	68
26	52	54	50	51	46	48	53	56	65	66	68	68
27	53	53	50	51	46	48	56	56	64	66	64	68
28	52	54	50	50	46	48	50	56	65	66	68	70
29	52	52	--	50	--	48	52	57	65	66	67	69
30	--	52	51	48	--	49	--	56	65	66	66	69
31	53	--	50	48	--	46	--	58	--	66	64	--
Average	52	52	52	49	46	47	52	55	61	67	67	67

ARKANSAS RIVER BASIN--Continued  
 CANADIAN RIVER AT LOGAN, N. MEX.

LOCATION.--At bridge on U. S. Highway 54, 1,100 feet below gaging station which is half a mile south of Logan, Quay County, 1½ miles upstream from Chicago, Rock Island and Pacific Railroad Co. Bridge, 4½ miles upstream from Revuelto Creek, and 5½ miles downstream from Ute Creek.  
 DRAINAGE AREA.--11,141 square miles, of which 1,110 square miles is probably noncontributing.  
 RECORDS AVAILABLE.--Chemical analyses: July to September 1957.  
 Water temperatures: July to September 1957.  
 REMARKS.--Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of discharge for water year October 1956 to September 1957 given in WSP 1511.

Chemical analyses, in parts per million, July to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (Calculated)			Hardness as CaCO <sub>3</sub>		Percent sodium ratio	Specific conductance (micro-mhos at 25°C)	pH	
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
July 9, 1957	461	14		69	29	228		641	73	132		0.2	--	860	1.17	1,070	281	0	83	5.8	1,350	7.5
July 10	383	21		51	17	118		390	77	39		0.3	0.27	516	.70	506	197	0	57	3.7	735	7.6
July 11-12	46.5	25		46	15	99		255	111	47		1.2	.25	469	.64	58.9	176	0	55	3.2	744	8.2
July 13	1	24		56	19	227		227	193	229		0.9	0.31	861	1.17	2.32	218	32	89	6.6	1,410	7.6
July 14	a	8		37	9.5	55		173	55	37		1.6	0.23	294	.40	6.35	132	0	48	2.1	1,480	7.7
July 20-22	11.5	11		40	11	118		162	170	65		1.3	0.21	487	.68	15.4	144	0	64	4.3	717	7.2
July 23-24	8.0	74		42	9.5	176		228	208	88		2.2	0.29	654	.89	14.1	144	0	73	6.4	1,030	8.1
July 25		74		18	18	279		216	299	233		2.8	0.44	1,020	1.39	204	214	36	74	8.3	1,620	8.4
July 26	4,070	14		37	8.6	46		191	29	29		4	0.17	258	.35	2,840	128	0	44	1.8	398	7.5
July 27-30	456	19		41	9.5	82		219	62	53		1.6	0.16	376	.51	463	142	0	56	3.0	616	7.9
July 31	3,210	17		41	14	63		283	39	18		1.1	0.21	331	.45	2,870	160	0	46	2.2	499	8.0
Aug. 1-2	290	23		43	10	63		235	60	22		0.8	0.24	338	.46	265	148	0	48	2.3	543	7.9
Aug. 3	98	16		41	10	93		197	89	64		2.0	0.16	412	.56	109	144	0	58	3.4	664	8.2
Aug. 4	952	14		35	6.2	151		197	38	16		0.7	0.15	257	.35	661	113	0	49	2.1	385	7.7
Aug. 5-7	2,115	22		39	10	65		223	60	24		1.1	0.18	331	.45	1,890	138	0	50	2.4	524	8.1
Aug. 8	138	17		41	12	88		c192	110	50		1.7	0.12	414	.56	154	152	0	56	3.1	666	8.3
Aug. 9	135	10		59	17	131		116	188	92		0.0	0.28	603	.82	220	217	40	57	3.9	972	8.1
Aug. 10	304	15		48	14	104		199	144	64		1.1	0.20	487	.66	400	178	14	56	3.4	774	8.2
Aug. 11-21	560	22		39	9.7	61		202	56	32		1.0	0.23	320	.44	484	188	0	49	2.3	521	7.9
Aug. 22-27	265	12		47	14	118		212	104	105		0.6	0.24	514	.70	369	175	2	59	3.9	858	7.8
Aug. 28	35	18		50	14	156		194	123	167		1.1	0.21	623	.85	58.9	182	24	65	5.0	1,060	7.7
Aug. 29	28	20		63	23	253		220	169	315		1.0	0.25	952	1.29	72.0	252	71	69	7.0	1,568	7.6
Aug. 30-Sept. 3	108	22		37	10	74		197	79	35		0.5	0.17	355	.48	104	134	0	55	2.8	568	7.8

Sept. 4-5, 1957.....	38.0	20	45	11	117	189	109	101	.2	.22	496	0.87	50.9	156	2	62	4.0	814	8.2
Sept. 6.....	19	18	72	19	277	216	300	262	1.0	.41	1,060	1.44	54.4	256	60	70	7.5	1,710	8.1
Sept. 7-9.....	841	19	37	8.6	64	222	42	29	1.2	.18	310	.42	704	128	0	52	2.5	504	7.7
Sept. 10.....	14	17	46	8.1	120	193	108	97	3.2	.25	495	.67	18.7	148	0	64	4.3	803	7.9
Sept. 11-20.....	1.7	24	113	26	544	264	288	748	1.3	.36	1,870	2.54	8.88	369	172	75	12	3,180	7.8
Sept. 21-27.....	a 1.0	18	246	94	1,860	347	522	3,040	--	.46	5,980	8.13	16.1	1,000	716	80	26	9,800	7.8

a No flow July 1-8, 15-19, Sept. 28-30.

b Includes equivalent of 4 parts per million of carbonate (CO<sub>3</sub>).

c Includes equivalent of 1 part per million of carbonate (CO<sub>3</sub>).

Temperature (°F) of water, July to September 1957  
Once-daily measurement, generally in p.m.

Day	July	Aug.	Sept.	Day	July	Aug.	Sept.	Day	July	Aug.	Sept.	Day	July	Aug.	Sept.				
1	--	87	78	9	a 78	85	74	17	--	b 68	80	25	84	81	79				
2	--	87	82	10	b 71	89	76	18	--	b 70	79	26	b 70	85	81				
3	--	92	80	11	b 71	b 73	72	19	--	83	75	27	84	87	79				
4	--	90	83	12	85	89	80	20	--	82	73	28	89	84	--				
5	--	a 73	81	13	84	85	b 88	21	b 73	85	77	29	84	82	--				
6	--	82	74	14	85	80	82	22	88	83	77	30	89	79	--				
7	--	84	68	15	--	80	77	23	82	85	78	31	b 73	74	--				
8	--	82	72	16	--	80	76	24	87	76	73				--				
Average																82			76

a Measurement obtained after 6 p.m.

b Measurement obtained in a.m.

ARKANSAS RIVER BASIN--Continued  
CANADIAN RIVER NEAR AMARILLO, TEX.

LOCATION --At gaging station at bridge on U.S. Highways 87 and 287, 2,000 feet downstream from Pitcher Creek, 2.0 miles downstream from Panhandle and Santa Fe Railway bridge, and 19 miles north of Amarillo, Potter County.

DRAINAGE AREA --19,445 square miles of which 4,069 square miles is probably noncontributing.

RECORDS AVAILABLE --Chemical analyses: July 1948 to October 1949, February 1950 to September 1957.

Water temperatures: August 1949, September 1957.

Stream periods: August 1949 to September 1952.

EXTREMES, 1956-57.--Dissolved solids: Maximum, 3,000 ppm Mar. 21; minimum, 252 ppm Sept. 21-30.

Hardness: Maximum, 974 ppm Mar. 21; minimum, 69 ppm Sept. 6.

Specific conductance: Maximum daily, 4,490 micromhos Mar. 21; minimum daily, 372 micromhos Aug. 17, Sept. 24.

Water temperatures: Maximum, 76 F July 31; minimum, freezing point, on many days, during winter months.

EXTREMES, 1948-57.--Dissolved solids: Maximum, 3,000 ppm Mar. 21, 1957; minimum, 252 ppm Sept. 21-30, 1957.

Hardness: Maximum, 974 ppm Mar. 21, 1957; minimum, 69 ppm Sept. 6, 1957.

Specific conductance: Maximum daily, 4,490 micromhos Mar. 21, 1957; minimum daily, 372 micromhos Aug. 17, Sept. 24, 1957.

Water temperatures:(1949-57): Maximum, 95 F June 29, 1951; minimum, freezing point on many days during winter months.

REMARKS.--Values reported for dissolved solids concentrations less than 1,000 ppm are residues on evaporation and for concentrations more than 1,000 ppm are calculated from determined constituents unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1956 to September 1957 given in WSP 1511.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent adsorbable sodium	Specific conductance (micro-mhos at 25° C)		
														Parts per million	Tons per acre-foot	Tons per day	Calcium-magnesium	Non-carbonate				
Oct. 1-10, 1956	4.71	58	58	60	31	125	286	93	110	3.5	66	66	8.97	705	0.96	8.97	277	42	50	3.3	1,090	7.5
Oct. 11-20	11.8	60	59	59	30	129	285	96	108	3.2	69	69	22.1	a 684	.84	22.1	271	37	51	3.4	1,100	7.0
Oct. 21-30	5.77	58	58	58	32	119	273	94	105	3.6	69	69	10.5	a 673	.92	10.5	276	52	48	3.1	1,100	7.4
Nov. 1-10	9.68	56	61	61	29	125	288	89	112	3.6	58	58	17.7	a 676	.92	17.7	272	36	50	3.3	1,080	7.2
Nov. 11-20	7.82	65	56	56	33	141	291	108	117	3.6	71	71	15.6	a 738	1.00	15.6	276	38	53	3.7	1,190	7.1
Nov. 21-30	9.30	61	64	64	36	132	286	125	118	3.6	69	69	19.3	a 770	1.05	19.3	308	74	48	3.3	1,230	7.7
Dec. 1-10	9.14	72	67	67	36	147	297	127	132	4.0	78	78	20.6	835	1.14	20.6	316	72	50	3.6	1,240	8.0
Dec. 11-20	11.7	68	76	76	34	139	310	142	120	4.0	82	82	28.3	a 831	1.13	28.3	330	76	48	3.3	1,230	7.6
Dec. 21-31	11.7	65	69	69	35	132	282	120	120	4.0	85	85	25.4	805	1.09	25.4	318	85	48	3.2	1,250	7.7
Jan. 1-10, 1957	9.38	67	64	64	36	126	15	274	117	3.6	82	82	19.5	a 771	1.05	19.5	308	83	46	3.1	1,230	7.7
Jan. 11-20	8.14	71	59	59	36	133	15	284	112	3.2	85	85	17.2	a 781	1.06	17.2	295	62	48	3.4	1,250	7.5
Jan. 21-31	9.95	73	60	60	38	137	16	277	120	3.6	102	102	21.8	a 810	1.10	21.8	306	79	48	3.4	1,330	7.7
Feb. 1-10	12.5	72	59	59	34	128	270	111	104	3.6	92	92	25.1	745	1.01	25.1	288	66	49	3.3	1,190	7.1
Feb. 11-17, 22-23, 26-28	11.1	70	63	63	36	138	365	114	114	4.0	19	19	22.6	755	1.03	22.6	304	5	50	3.4	1,290	7.2
Feb. 18-21, 24-25	11.2	67	112	112	46	272	247	300	332	3.2	84	84	40.5	1,340	1.82	40.5	468	266	56	5.4	2,200	7.1
Mar. 1-9	14.2	53	104	104	41	236	248	250	292	3.2	72	72	46.9	1,170	1.59	46.9	428	225	55	5.0	1,920	6.8
Mar. 10-20	7.36	64	70	70	34	145	276	124	134	4.0	93	93	16.3	1,170	1.12	16.3	314	88	50	3.5	1,340	7.2

ARKANSAS RIVER BASIN

Mar. 21, 1957	37	79	170	888	945	2.0	38	3,000	4.08	300	974	834	60	9.3	4,490	8.2
Mar. 22-25	31.2	25	218	139	135	2.4	45	724	.98	61.0	250	72	55	3.9	1,160	7.1
Mar. 26-31	22.0	37	280	260	270	2.8	21	1,100	1.50	65.3	394	164	56	5.1	1,820	7.2
Apr. 1-4	10.5	46	249	358	398	2.4	58	1,480	2.01	42.0	514	310	57	6.0	2,350	7.2
Apr. 5-10	10.9	35	276	123	135	3.2	94	1,826	1.12	24.3	318	92	49	3.5	1,310	6.8
Apr. 11-20	8.66	70	61	276	123	3.2	94	844	1.15	19.7	312	93	52	3.9	1,380	7.1
Apr. 21-26	14.5	60	287	124	154	3.2	97	788	1.07	30.9	308	46	50	3.6	1,350	7.2
Apr. 27	469	30	370	120	149	3.2	21	1,560	2.12	1,980	328	8	75	11.6	2,440	8.2
Apr. 28-30	985	40	187	110	130	1.2	2.2	555	.75	1,450	158	4	65	4.8	938	7.5
May 1-10	76.6	33	223	326	375	1.2	11	1,290	1.75	287	365	182	66	7.3	2,150	8.1
May 11, 14-15, 23-24	2,685	38	229	338	452	1.6	12	1,440	1.96	10,360	390	202	67	8.1	2,390	7.8
May 26-30	330	20	191	172	189	1.6	6.4	752	1.02	670	212	56	65	5.5	1,230	8.0
May 16-17, 25, 31	1,310	13	201	76	76	1.6	2.2	432	.59	1,530	144	0	60	3.6	1,707	7.9
June 1-5	3,254	15	217	127	154	1.4	2.0	635	.86	5,590	172	0	68	5.5	1,090	7.8
June 6-10	234	19	213	241	258	1.4	7.9	868	1.94	624	255	80	68	6.8	1,910	7.9
June 11-20	25.9	65	252	349	600	2.0	26	2,020	2.75	141	696	490	58	7.2	3,220	8.1
June 21-22, 27-30	25.1	44	279	330	342	2.4	35	1,340	1.82	90.8	476	254	56	5.6	2,130	7.9
July 1-3	502	16	176	115	114	1.6	3.8	520	.71	705	174	30	60	3.9	896	7.9
June 23-26	5.61	36	322	129	131	3.2	34	768	1.07	11.9	302	38	51	3.7	1,240	7.6
July 4-10	8.77	68	354	102	128	3.6	50	a 744	1.01	17.6	326	60	46	3.1	1,220	7.7
July 11-14, 18-22	18	41	373	214	428	2.0	1.0	1,410	1.92	68.5	398	22	67	8.1	2,420	8.5
July 15	76.3	26	274	287	260	1.6	13	1,090	1.48	225	303	68	66	6.8	1,770	7.8
July 16-17, 23-25	1,036	14	229	113	114	1.4	1.5	594	.79	1,650	152	0	68	5.1	942	7.8
July 26-29, 31	1,498	17	189	94	78	1.4	1.5	453	.62	1,850	137	0	63	3.9	730	7.8
July 30, Aug. 1-3, 7-10																

a Calculated from determined constituents.

b Includes equivalent of 17 parts per million of carbonate (CO<sub>3</sub>).

ARKANSAS RIVER BASIN--Continued  
CANADIAN RIVER NEAR AMARILLO, TEX.--Continued

Chemical analyses, in parts per million, water year October 1956 to September 1957--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
Aug. 4-6, 1957	4,357	16		20	6.8		70	162	46	32	1.4	2.5		293	0.40	3,450	78	0	66	3.4	448	7.8
Aug. 11-14	383	18		48	16	135	191	109	146	146	1.2	2.0		608	.83	629	186	30	61	4.3	1,020	8.0
Aug. 15-21	3,341	17		34	11	72	185	62	47	47	.8	1.0		342	.47	3,090	130	0	54	2.7	561	8.1
Aug. 22-31	347	18		46	16	123	187	123	113	113	.8	7.5		549	.75	514	181	28	60	4.0	909	8.0
Sept. 1-5, 7-10	332	18		56	19	159	199	162	160	160	.8	5.1		678	.92	608	218	54	61	4.7	1,130	7.9
Sept. 6	723	--		17	6.7	--	184	--	35	35	1.6	.5		--	--	--	70	0	--	--	460	8.2
Sept. 11-13	214	18		42	14	138	210	125	111	111	.8	2.5		a554	.75	320	162	0	65	4.7	935	7.9
Sept. 14-17	473	20		34	11	81	189	66	56	56	.8	3.0		a365	.50	466	130	0	58	3.1	615	8.0
Sept. 18-20	30	28		96	32	258	212	288	315	315	1.0	14		1,140	1.55	82.3	371	198	60	5.8	1,860	7.9
Sept. 21-30	13.0	30		47	9.3	27	218	16	12	12	.4	2.5		252	.34	8.6	156	0	28	1.0	400	8.2
Weighted average	313	19		46	17	148	200	130	141	141	1.3	5.0		613	0.83	518	185	21	64	4.7	1,010	--

a Calculated from determined constituents.

ARKANSAS RIVER BASIN

ARKANSAS RIVER BASIN--Continued

CANADIAN RIVER NEAR AMARILLO, TEX.--Continued

Temperature (°F) of water, water year October 1956 to September 1957  
 Once-daily temperature measurement, usually between 5 a. m. and 9 a. m. <sup>7</sup>

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	56	42	34	32	32	45	48	60	61	73	75	69
2	57	45	32	36	34	45	54	58	55	75	71	68
3	55	38	32	34	37	43	45	58	60	72	72	65
4	54	38	36	41	40	43	40	54	62	75	70	65
5	53	37	38	37	37	47	38	50	62	66	70	63
6	56	38	41	38	42	40	43	51	61	69	--	60
7	50	48	32	35	50	--	45	52	65	65	72	59
8	54	38	32	47	52	--	32	55	68	67	71	58
9	46	--	32	45	--	38	40	54	67	72	70	60
10	53	38	32	32	--	42	45	55	60	68	70	62
11	51	39	32	32	45	45	46	58	66	70	72	62
12	52	43	36	35	41	48	35	54	61	67	71	57
13	57	42	32	36	--	42	35	52	61	70	69	63
14	55	46	32	32	43	37	37	55	67	67	69	58
15	55	36	34	32	46	39	42	57	68	67	68	52
16	61	32	34	32	42	43	50	55	65	67	72	44
17	55	32	34	32	40	50	57	58	60	66	69	--
18	--	36	32	--	43	44	57	57	60	70	69	60
19	53	36	34	32	40	43	55	58	62	72	70	59
20	51	35	32	32	41	46	50	59	64	--	70	58
21	45	32	32	34	44	42	53	55	60	--	68	57
22	38	32	32	32	32	45	58	54	65	70	68	54
23	48	34	32	32	35	35	45	54	64	70	66	50
24	50	32	32	32	41	32	47	60	67	69	71	50
25	43	34	32	32	40	32	49	55	71	72	70	66
26	43	32	32	32	40	32	47	62	69	67	65	54
27	44	--	32	32	--	39	55	64	71	--	68	53
28	54	34	35	32	40	38	47	61	--	70	69	--
29	59	--	35	32	--	42	50	65	72	73	70	53
30	45	--	32	34	--	50	53	65	71	72	67	56
31	--	--	34	34	--	45	--	62	--	76	67	--
Average	51	37	33	34	41	42	47	57	64	70	70	58

ARKANSAS RIVER BASIN--Continued  
CANADIAN RIVER AT BRIDGEPORT, OKLA.

LOCATION --At gaging station at Chicago, Rock Island and Pacific Railroad bridge, 1 mile north of Bridgeport, Caddo County, and 2½ miles upstream from Lummouth Creek.

DRAINAGE AREA 25,229 square miles of which 4,801 square miles is probably noncontributing.

RECORDS AVAILABLE--Chemical analyses: October 1948 to September 1957.

Water temperatures: October 1948 to September 1957.

EXTREMS, 1956-57.--Dissolved solids: Maximum, 1,340 ppm Mar. 11-14; minimum, 245 ppm June 20.

Hardness: Maximum, 370 ppm Jan. 15-16; minimum, 156 ppm June 20.

Specific conductance: Maximum daily, 2,260 micromhos Mar. 14; minimum daily, 409 micromhos June 20.

Water temperatures: Maximum, 80°F July 11, 27; minimum, freezing point Jan. 22, 27.

EXTREMS, 1948-57.--Dissolved solids: Maximum, 2,450 ppm Oct. 11, 1954; minimum, 173 ppm May 19, 1955.

Hardness: Maximum, 778 ppm Jan. 28-31, 1951; minimum, 120 ppm May 19, 1955.

Specific conductance: Maximum daily, 4,000 micromhos Oct. 11, 1954; minimum daily, 226 micromhos May 23, 1952.

Water temperatures: Maximum, 97°F July 11, 1952; minimum, freezing point on many days during winter months.

REMARKS--Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of discharge for water year October 1956 to September 1957 given in WSP 1511. No flow Oct. 1-14.

Chemical analyses, in parts per million, water year October, 1956 to September, 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>		Percent sodium ratio	Specific conductance (micro-mhos at 25°C)	pH	
															Parts per million	Tons per acre-foot	Calcium magnesium	Non-carbonate				
Oct. 15, 1956	176	--	--	47	13	58		166	0	48	77	--	1.0	--	338	0.46	170	34	42	1.9	529	7.5
Oct. 16-20	80.4	--	--	75	18	27		132	0	172	20	--	4.2	--	388	.53	84	260	18	.7	602	7.5
Oct. 21, 30	33.0	--	--	104	6.1	30		184	0	130	32	--	3.6	--	406	.55	36	270	19	.8	630	8.0
Oct. 22-29, 31	12.3	--	--	94	13	30		252	0	121	14	--	3.7	--	421	.57	14	290	84	.8	633	7.9
Nov. 1-10	9.55	16	0.02	106	16	25	3.9	258	0	158	14	0.2	2.6	0.02	471	.64	12	330	118	.6	709	7.9
Nov. 11-16	8.15	--	--	108	17	30		262	4	160	12	--	.8	--	461	.63	10	340	119	.7	716	8.3
Nov. 17	7.80	--	--	104	22	39		256	6	166	28	--	1.8	--	495	.67	10	350	130	.9	769	8.4
Nov. 18-20	8.50	--	--	108	22	32		274	6	168	14	--	1.1	--	488	.66	11	360	126	.7	745	8.3
Nov. 21-30	8.73	--	--	116	22	34		286	8	177	15	--	1.1	--	520	.71	12	380	132	.8	779	8.3
Dec. 1-10	9.85	20	.00	125	20	34	3.7	298	0	203	15	.1	1.3	.09	569	.77	15	395	151	.7	823	8.1
Dec. 11-20	13.3	--	--	124	24	32		272	8	211	16	--	2.2	--	575	.78	21	410	174	.7	854	8.4
Dec. 21-31	15.0	--	--	130	24	33		272	6	233	14	--	2.0	--	596	.81	24	425	192	.7	863	8.3
Jan. 1-3, 5-9, 1957	16.1	--	--	134	28	26		260	12	241	14	--	2.4	--	635	.86	28	450	217	.5	866	8.5
Jan. 4	21.0	--	--	122	21	28		190	8	262	36	--	2.6	--	651	.89	37	390	221	2.1	913	8.5
Jan. 10	10.0	--	--	120	17	37		150	4	312	24	--	4.0	--	681	.93	18	410	280	1.7	1,040	8.4
Jan. 11-14	13.2	--	--	162	27	31		292	0	265	16	--	3.3	--	697	.95	25	475	236	1.2	934	8.2
Jan. 15-16	11.5	--	--	180	29	59		292	18	354	40	--	4.4	--	892	1.21	28	570	300	1.8	1,170	8.7
Jan. 17-18	11.0	--	--	158	33	38		254	8	339	24	--	4.6	--	806	1.10	24	530	308	1.3	1,050	8.4

ARKANSAS RIVER BASIN

Jan. 19-20, 1957.....	13.0	--	--	--	148	24	31	256	18	261	16	--	4.3	--	685	.93	24	470	230	13	0.6	907.	8.7
Jan. 21-31.....	14.5	--	--	--	152	29	30	274	14	278	17	--	3.8	--	721	.98	28	500	252	11	.6	951	8.5
Feb. 1.....	18.0	--	--	--	114	16	29	186	8	207	18	--	4.9	--	533	.72	26	305	184	15	.7	759	8.5
Feb. 2.....	20.0	--	--	--	83	21	24	102	0	233	13	--	3.9	--	499	.68	27	295	212	15	.6	831	8.1
Feb. 3.....	20.0	--	--	--	88	22	23	106	0	243	13	--	1.8	--	518	.70	28	310	223	14	.6	856	8.1
Feb. 4-10.....	18.3	--	--	--	142	29	22	244	0	287	14	--	1.2	--	693	.94	34	470	272	9	.4	921	8.2
Feb. 11-17.....	14.7	--	--	--	151	27	25	242	8	298	14	--	1.0	--	720	.98	29	490	276	10	.5	935	8.4
Feb. 18-19.....	21.5	--	--	--	144	28	29	246	10	269	17	--	1.1	--	703	.96	41	475	257	12	.6	949	8.2
Feb. 20.....	20.0	--	--	--	89	23	26	132	0	233	14	--	1.2	--	519	.71	28	315	207	15	.6	868	8.4
Feb. 21-23.....	16.3	--	--	--	92	24	25	118	0	257	14	--	1.7	--	548	.75	24	330	234	14	.6	914	8.2
Feb. 24-25.....	21.0	--	--	--	137	26	34	244	10	249	33	--	1.6	--	684	.93	39	450	234	14	.7	926	8.5
Feb. 26-28.....	15.0	--	--	--	144	29	27	266	0	281	19	--	1.8	--	704	.96	29	480	262	11	.5	938	8.2
Mar. 1, 3.....	25.0	--	--	--	117	21	44	198	2	254	32	--	1.3	--	610	.83	41	380	214	20	1.0	882	8.3
Mar. 2.....	26.0	--	--	--	100	22	66	164	6	265	43	--	1.8	--	590	.80	41	340	196	30	1.5	876	8.4
Mar. 4-6.....	36.3	--	--	--	114	26	43	220	6	231	37	--	1.7	--	606	.82	59	390	200	20	1.0	887	8.4
Mar. 7-10.....	37.2	--	--	--	95	32	256	208	4	243	350	--	3.8	--	1,130	1.54	1,130	370	193	60	5.8	1,910	8.4
Mar. 11-14.....	133	--	--	--	114	40	301	228	8	282	430	--	4.8	--	1,481	1.82	1,481	450	250	59	6.2	2,240	8.5
Mar. 15-16.....	45.5	--	--	--	130	38	257	248	12	300	355	--	3.3	--	1,280	1.74	157	480	257	54	5.1	2,080	8.5
Mar. 17.....	23.0	--	--	--	96	33	203	138	4	299	272	--	3.3	--	1,050	1.43	65	375	256	54	4.6	1,800	8.4
Mar. 18.....	20.0	--	--	--	94	33	146	144	4	268	185	--	2.5	--	925	1.26	50	370	246	46	3.3	1,580	8.4
Mar. 19.....	20.0	--	--	--	90	31	105	120	2	261	130	--	1.4	--	752	1.02	41	350	248	40	2.4	1,310	8.3
Mar. 20.....	33.0	--	--	--	91	27	60	108	2	283	58	--	2.0	--	629	.86	56	340	248	28	1.4	1,060	8.3
Mar. 21-23.....	93.0	--	--	--	71	25	110	120	4	215	135	--	1.4	--	657	.89	165	280	175	46	2.9	1,090	8.4
Mar. 24-26.....	290	--	--	--	84	28	152	132	4	261	190	--	1.4	--	826	1.12	647	325	210	50	3.7	1,350	8.5
Mar. 27-31.....	804	--	--	--	54	26	257	82	0	241	340	--	1.8	--	1,000	1.36	2,170	480	173	70	7.2	1,740	7.6
Apr. 1-2.....	378	--	--	--	112	34	269	220	0	253	395	--	5.2	--	1,240	1.69	1,270	420	240	58	5.7	2,090	8.2
Apr. 3.....	1,810	--	--	--	86	39	232	182	0	244	333	--	3.2	--	1,090	1.48	5,330	375	296	57	5.2	1,840	8.2
Apr. 4-10.....	628	--	--	--	107	36	166	194	0	263	235	--	3.2	--	1,020	1.39	1,730	425	268	46	4.5	1,610	8.2
Apr. 11-18.....	65.2	--	--	--	117	43	207	250	6	290	295	--	2.9	--	1,170	1.59	2,026	470	272	49	4.1	1,820	8.4
Apr. 19-20.....	2,195	--	--	--	66	22	42	136	0	150	37	--	1.2	--	445	.61	2,640	260	147	26	1.1	1,702	8.2
Apr. 21.....	5,640	--	--	--	67	17	23	148	0	113	31	--	2.8	--	348	.47	5,300	335	114	18	.7	535	7.9
Apr. 22.....	2,820	--	--	--	94	27	53	128	0	250	66	--	4.0	--	604	.82	4,600	345	240	23	1.2	904	8.2
Apr. 23.....	7,260	--	--	--	78	16	9.7	120	0	156	12	--	3.5	--	351	.48	6,860	260	162	7	.3	530	8.1

a Values above 200 ppm are reported to the nearest 5 ppm.

ARKANSAS RIVER BASIN--Continued  
CANADIAN RIVER AT BRIDGEPORT, OKLA.--Continued

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal-cium (Ca)	Mag-nes-ium (Mg)	So-dium (Na)	Pot-assium (K)	Bicar-bonate (HCO <sub>3</sub> )	Car-bonate (CO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> ) (B)	Bo-ron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		So-dium adsorp-tion ratio	Specific conduct-ance (micro-mhos at 25°C)	pH	
															Parts per mil-lion	Tons per acre-foot	Tons per day	Calcium	Non-carbon-ate				
															Parts per mil-lion	Tons per acre-foot	Tons per day	Calcium	Non-carbon-ate				
Apr. 24, 1957	1,840	--	--	86	28	56	130	0	241	64	--	--	6.3	--	0.80	2,910	330	224	27	884	8.1		
Apr. 25-26, 28-30	1,245	--	--	90	84	89	168	0	239	120	120	120	2.5	--	0.98	2,420	365	228	35	1,100	8.2		
Apr. 27	6,731	--	--	64	18	41	124	0	141	52	52	52	3.7	--	.56	803	235	134	28	1,648	8.2		
May 2	6,370	--	--	110	55	282	214	20	258	395	395	395	2.6	--	1,270	21,840	420	211	59	2,108	8.8		
May 2-10	2,950	--	--	93	27	176	186	12	222	230	230	230	2.6	--	881	7,020	345	172	53	1,490	8.4		
May 11-16	1,252	--	--	98	27	133	152	8	257	172	172	172	2.0	--	1.12	2,740	360	222	45	1,310	8.4		
May 17	4,670	--	--	85	23	104	140	8	209	130	130	130	3.6	--	.65	3,000	305	177	43	1,070	8.6		
May 18-20	4,967	--	--	83	26	166	188	12	182	252	252	252	5.0	--	1.17	1,560	310	138	57	1,480	8.6		
May 21-24	4,978	--	--	89	22	218	220	0	209	272	272	272	7.5	--	1.27	2,460	310	132	60	1,600	8.1		
May 25	5,180	--	--	77	18	155	228	0	160	172	172	172	5.1	--	.97	9,980	265	77	58	1,170	8.1		
May 26	12,600	--	--	97	26	100	160	0	239	115	115	115	5.1	--	.96	24,020	350	219	38	1,090	7.9		
May 27-30	5,942	--	--	90	31	198	220	0	233	250	250	250	5.0	--	1.27	15,000	350	170	55	1,580	8.0		
May 31	5,260	--	--	96	24	83	152	0	245	98	98	98	5.2	--	.88	9,230	340	216	35	1,010	8.0		
June 1	3,440	--	--	98	23	129	178	0	230	162	162	162	8.3	--	1.03	7,050	340	194	45	1,210	7.9		
June 2-9	2,900	--	--	100	29	184	220	0	223	252	252	252	1.8	--	.930	7,980	370	190	52	1,550	7.9		
June 10	1,350	--	--	116	31	137	238	0	268	170	170	170	0	--	.856	1.16	3,120	415	220	42	1,300	7.7	
June 11	558	--	--	110	29	156	164	0	304	195	195	195	11	--	.913	1,980	395	280	46	1,420	8.1		
June 12-13	878	--	--	102	29	184	180	0	256	250	250	250	3.5	--	1.30	2,260	375	221	52	1,560	7.8		
June 14-17	503	--	--	102	31	235	189	0	252	332	332	332	5.5	--	1,080	1,470	380	224	57	1,820	7.8		
June 18	6,460	--	--	65	8.3	21	136	0	92	20	20	20	6.9	--	.39	4,990	196	84	19	442	7.7		
June 19	1,700	--	--	98	18	58	144	0	222	67	67	67	4.2	--	.556	2,550	320	202	28	844	7.7		
June 20	802	--	--	47	9.4	33	196	0	31	23	23	23	1.8	--	.33	531	156	0	31	1.1	409	7.9	
June 21-23	978	--	--	68	17	53	208	0	104	51	51	51	1.6	--	.405	555	632	240	68	32	1.5	854	8.0
June 24-28	590	--	--	94	26	94	158	0	230	122	122	122	3.1	--	.670	1,680	340	210	37	2.2	1,060	7.8	
June 29-30	139	--	--	98	28	155	188	0	223	220	220	220	1.3	--	.853	1.16	320	360	206	48	3.6	1,380	7.9

July 1, 1957	223	--	--	101	27	152	190	0	212	225	--	4.5	--	895	1.22	539	365	210	48	3.5	1,480	7.9
July 2-5	86.0	--	--	122	35	212	188	0	292	320	--	2.8	--	1,180	1.60	274	450	296	51	4.4	1,940	7.9
July 6	30.0	--	--	110	38	155	140	0	332	215	--	5.4	--	1,020	1.39	83	430	316	44	3.3	1,680	7.8
July 7	21.0	--	--	102	38	103	140	0	320	130	--	2.3	--	833	1.13	47	410	296	35	2.2	1,360	7.8
July 8	15.0	--	--	104	34	55	124	0	320	58	--	3.2	--	688	.95	28	400	298	23	1.2	1,100	7.8
July 9-10	13.5	--	--	128	34	32	204	0	316	22	--	2.5	--	648	.88	24	460	293	13	.6	941	8.0
July 11-20	9.36	26	.00	106	43	36	210	0	295	22	.3	1.7	.33	677	.92	17	440	268	15	.7	897	8.0
July 21-31	13.9	--	--	126	28	25	186	0	291	19	--	2.0	--	657	.89	25	430	278	11	.5	879	8.1
Aug. 1-5	896	--	--	99	34	187	228	0	259	235	--	3.3	--	966	1.31	2,340	385	198	51	4.1	1,560	7.4
Aug. 6-10	2,200	--	--	82	26	243	248	0	217	288	--	3.8	--	968	1.36	5,930	310	107	63	6.0	1,680	7.6
Aug. 11-20	731	--	--	66	24	202	214	0	191	230	--	5.9	--	868	1.18	1,710	265	88	62	5.4	1,430	7.3
Aug. 21-31	1,095	--	--	66	23	185	234	0	172	200	--	6.0	--	769	1.05	2,270	255	64	61	5.0	1,320	7.2
Sept. 1-3	11.2	--	--	59	28	169	230	0	176	180	--	6.8	--	771	1.05	23	265	76	58	4.5	1,260	8.0
Sept. 4	5.70	--	--	47	36	99	188	0	164	108	--	2.6	--	605	.82	9.3	265	110	45	2.6	960	8.0
Sept. 5-6	7.60	--	--	71	22	56	232	0	127	45	--	1.7	--	465	.63	9.5	265	76	31	1.5	743	8.0
Sept. 7-10	17.2	--	--	75	27	190	220	0	198	225	--	6.3	--	870	1.18	40	295	116	58	5.8	1,470	8.0
Sept. 11-12	13.0	--	--	80	23	75	220	0	162	76	--	1.8	--	558	.76	20	295	114	36	1.9	1,873	8.0
Sept. 13	86.0	--	--	94	35	291	240	0	291	370	--	3.2	--	1,250	1.70	290	380	184	62	6.5	2,060	8.0
Sept. 14-20	832	--	--	65	2.4	203	198	0	159	200	--	3.0	--	761	1.03	1,710	172	10	72	6.7	1,320	8.0
Sept. 21-22	756	--	--	66	17	73	166	0	130	97	--	2.9	--	466	.66	992	240	102	40	2.0	920	7.8
Sept. 23-27	42.4	--	--	87	25	109	192	0	184	145	--	3.6	--	694	.94	79	320	162	42	2.6	1,120	8.0
Sept. 28-30	12.0	--	--	108	24	36	282	0	161	33	--	3.6	--	541	.74	16	370	139	17	.8	803	8.2
Weighted average..	689	--	--	87	26	156	b196	--	212	198	--	3.6	--	808	1.10	1,520	325	164	51	3.8	1,330	--

a Values above 200 ppm are reported to the nearest 5 ppm.  
 b Includes equivalent of individual carbonate values shown above.

## LOWER MISSISSIPPI RIVER BASIN

## ARKANSAS RIVER BASIN--Continued

## CANADIAN RIVER AT BRIDGEPORT, OKLA.--Continued

Temperature (°F) of water, water year October 1956 to September 1957

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	--	50	37	--	35	41	54	64	69	75	77	74
2	--	50	41	35	34	51	54	63	64	79	78	73
3	--	44	40	36	44	43	51	65	64	77	79	68
4	--	44	51	44	40	46	45	--	66	73	77	70
5	--	47	45	37	38	44	--	57	68	66	75	70
6	--	50	43	42	41	40	43	60	72	72	71	71
7	--	49	36	39	35	48	52	57	73	77	72	--
8	--	37	33	45	53	35	43	61	74	72	70	67
9	--	38	34	43	53	42	47	62	72	73	73	68
10	--	42	34	33	50	54	52	60	73	75	75	66
11	--	45	35	33	45	55	52	59	78	80	76	66
12	--	48	36	35	42	50	35	66	77	77	79	67
13	--	47	33	34	45	49	33	65	74	75	75	66
14	--	47	36	34	45	45	36	63	71	78	77	67
15	59	38	34	35	56	43	48	69	75	75	75	--
16	64	34	35	33	41	45	56	71	--	73	79	--
17	--	34	35	34	40	51	62	67	--	73	74	64
18	--	40	33	33	--	47	67	--	67	75	71	--
19	60	--	36	35	43	43	63	63	70	77	68	69
20	59	48	39	36	40	48	62	67	68	76	73	64
21	50	48	37	42	41	51	59	69	73	77	73	65
22	48	40	36	32	--	45	62	64	73	75	72	60
23	50	42	38	33	--	47	60	64	70	77	73	55
24	66	37	34	34	45	--	59	66	65	76	73	58
25	51	45	34	35	44	40	62	65	69	77	75	61
26	43	35	35	33	42	49	57	69	70	78	75	62
27	50	34	35	32	40	43	60	72	73	80	72	61
28	52	37	36	34	45	42	61	67	75	78	71	--
29	60	33	34	34	--	47	59	70	79	78	71	59
30	57	39	36	34	--	53	62	67	77	78	71	57
31	46	--	39	35	--	55	--	69	--	75	72	--
Average	--	42	37	36	43	46	54	65	71	76	74	65

ARKANSAS RIVER BASIN--Continued  
LITTLE RIVER BELOW HOG CREEK, NEAR NORMAN, OKLA.

LOCATION--At gaging station at bridge on county road just downstream from Hog Creek, three-quarters of a mile upstream from Prairie Creek, 0.8 mile south of Little Area, and 13 miles east of Norman, Cleveland County.

DRAINAGE AREA, 257 square miles  
RECORDS AVAILABLE--Chemical analyses: October 1953 to September 1957.

Water temperatures: May 1956 to September 1957.  
Sediment records: October 1953 to September 1957.

EXTREMES, 1956-57--Dissolved solids: Maximum, 1,460 ppm Nov. 1-3; minimum, 80 ppm May 24-25.  
Hardness: Maximum, 390 ppm Nov. 1-3; minimum, 52 ppm Sept. 21.

Specific conductance: Maximum daily, 2,770 micromhos Nov. 3; minimum, freezing point Jan. 29.  
Water temperatures: Maximum daily, 10.550 ppm Apr. 3; minimum daily, 0 tons on many days.

Sediment concentrations: Maximum daily, 280,000 tons May 25; minimum daily, 0 tons on many days.  
Sediment loads: Maximum daily, 280,000 tons May 25; minimum daily, 0 tons on many days.

EXTREMES, 1953-57--Dissolved solids: Maximum, 1,460 ppm Nov. 1-3, 1956; minimum, 80 ppm May 24-25, 1957.  
Hardness: Maximum, 390 ppm Nov. 1-3, 1955; minimum, 52 ppm Sept. 21, 1957.

Specific conductance: Maximum daily, 2,770 micromhos Nov. 3, 1956; minimum daily, 100 micromhos May 25, 1957.  
Water temperatures: Maximum, 98° F July 11-12, 1954; minimum, freezing point Feb. 2, 1956, Jan. 29, 1957.

Sediment concentrations (May 1956 to September 1957): Maximum daily, 10,550 ppm Apr. 3, 1957; minimum daily, 0 tons on many days.  
Sediment loads (May 1956 to September 1957): Maximum daily, 280,000 tons May 25, 1957; minimum daily, 0 tons on many days.

REMARKS--Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. No flow during August and September 1956; suspended-sediment tabulation omitted for these months. Records of discharge for water year October 1956 to September 1957 given in WSP 1511. No flow Oct. 2-18, 20-29, 1957.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal-cium (Ca)	Mag-ne-sium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Car-bonate (CO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> )	Bo-ron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Per-cent sodium	So-lu-tion ratio	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium	Non-carbon-ate				
Oct. 1, 1956	0.10	9.0	0.03	60	44	329	4.3	304	0	178	440	0.2	1.4	0.86	1,210	1.65	0.3	315	66	69	8.1	2,170	8.1
Oct. 16	0.20	..	..	54	40	316	..	304	0	168	408	..	1.6	..	1,140	1.55	..6	315	66	69	7.7	2,040	8.0
Oct. 30-31	..45	..	..	56	41	338	..	312	0	178	428	..	1.1	..	1,200	1.63	1.5	310	54	70	8.4	2,130	8.0
Nov. 1-3	..10	..	..	62	57	402	..	286	14	220	550	..	..8	..	1,460	1.99	..4	390	132	69	8.8	2,600	8.6
Nov. 4	..99.0	..	..	27	16	110	..	108	0	52	160	..	3.2	..	423	..58	113	..	44	64	4.2	828	7.9
Nov. 5-7	..20.8	..	..	21	13	27	..	130	0	13	28	..	2.9	..	174	..24	9.8	104	0	36	1.1	311	8.1
Nov. 8-10	..67	..	..	27	16	65	..	162	0	51	77	..	2.0	..	298	..41	..5	134	1	51	2.4	549	8.2
Nov. 11-15	..38	..	..	34	20	111	..	204	0	54	132	..	1.2	..	456	..62	..5	168	1	59	3.7	824	8.0
Nov. 16-20	..40	..	..	42	27	166	..	248	0	83	203	..	..7	..	644	..88	..3	215	13	62	4.9	1,170	8.0
Nov. 21-30	..45	..	..	44	30	218	..	278	4	121	245	..	..7	..	800	1.09	..0	230	0	67	6.3	1,380	8.4
Dec. 1-10	..90	..	..	49	32	172	..	338	0	80	190	..	1.7	..	698	..95	1.7	255	0	59	4.7	1,240	8.2
Dec. 11-20	..1.44	..	..	72	31	101	..	408	0	49	100	..	1.2	..	555	..75	2.2	310	0	42	2.5	972	8.1
Dec. 21-31	..	..	..	56	37	81	..	364	4	40	86	..	1.1	..	484	..66	2.1	290	0	38	2.1	861	8.3
Jan. 1-10, 1957	..1.65	..	..	59	48	69	..	396	0	40	90	..	..6	..	531	..72	2.4	345	20	30	1.6	927	8.1
Jan. 11-20	..1.63	..	..	62	35	93	..	364	12	50	105	..3	..7	..44	553	..75	2.4	300	0	40	2.3	954	8.5
Jan. 21-23	..3.80	..	..	45	41	..	..	348	0	44	102	..	..5	..	494	..67	5.1	280	0	41	2.3	900	8.1
Jan. 24-31	..3.08	..	..	38	33	..	..	240	0	23	49	..	3.2	..	320	..44	2.7	230	36	21	..8	585	8.0

a Values above 200 ppm are reported to the nearest 5 ppm.

ARKANSAS RIVER BASIN--Continued  
 LITTLE RIVER BELOW HOG CREEK, NEAR NORMAN, OKLA.--Continued

Chemical analyses, in parts per million, water year October 1956 to September 1957--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH		
															Parts per million	Tons per acre-foot	Calcium	Non-carbonate					
Feb. 1-10, 1957	2.08	13	0.01	53	35	69		332	10	39	74	0.3	1.1	0.30	0.62	458	2.6	275	0	35	1.8	800	8.4
Feb. 11-20	1.72	--	--	51	45	77		348	14	42	90	--	1.1	--	.69	510	2.4	310	4	35	1.9	897	8.5
Feb. 21-28	1.98	--	--	47	47	75		366	10	37	83	--	.8	--	.488	466	2.6	310	0	34	1.8	879	8.4
Mar. 1-10	2.33	--	--	47	45	71		342	20	37	74	--	.5	--	.482	63	2.9	305	0	34	1.8	825	8.6
Mar. 11-20	1.94	--	--	46	47	83		328	30	41	90	--	.6	--	.503	68	2.6	310	0	37	2.1	893	8.7
Mar. 21-30	1.86	--	--	49	41	62		356	0	34	71	--	.6	--	.450	61	2.4	290	0	32	1.6	808	8.2
Mar. 31	9.00	--	--	30	17	19		180	0	10	18	--	4.9	--	.213	.29	5.2	146	0	22	.7	374	7.6
Apr. 1-2	19.3	--	--	40	31	39		268	0	26	46	--	1.1	--	.336	.46	18	230	8	27	1.1	605	7.6
Apr. 3-4	646	--	--	23	9.8	18		102	0	4.1	32	--	4.3	--	.161	.72	281	98	14	28	.8	294	7.2
Apr. 5-10	6.80	--	--	38	24	49		280	0	17	51	--	5.1	--	.371	.42	5.6	192	0	36	1.5	541	7.3
Apr. 11-18	2.49	--	--	46	35	32		266	0	28	56	--	1.0	--	.365	.32	2.6	260	42	21	.9	694	7.6
Apr. 19-20	166	--	--	23	9.6	3.5		116	0	3.8	10	--	1.2	--	.194	.18	60	102	7	11	.2	237	7.2
Apr. 21-24	1,067	--	--	21	11	15		136	0	6.2	17	--	2.8	--	.152	.21	446	112	0	22	.6	268	7.5
Apr. 25-30	96.0	--	--	39	24	20		210	0	11	38	--	2.4	--	.278	.38	72	196	24	18	.6	476	7.0
May 1-4	325	--	--	34	11	19		160	4	6.2	20	--	2.4	--	.190	.26	167	132	0	24	.7	321	8.3
May 5-8	49.0	--	--	51	26	31		256	8	13	44	--	1.4	--	.317	.43	42	230	8	23	.9	556	8.4
May 9-10	262	--	--	27	11	14		132	0	6.0	19	--	2.8	--	.156	.21	110	112	4	22	.6	283	8.0
May 11-12	270	--	--	34	14	20		172	0	7.4	26	--	3.2	--	.202	.27	147	144	3	23	.7	357	8.2
May 13	3,340	--	--	27	8.4	6.2		128	0	2.3	4.0	--	3.0	--	.120	1,080	102	0	12	.3	145	8.0	
May 14	3,345	--	--	33	10	13		152	2	5.4	12	--	2.9	--	.169	.23	157	124	0	19	.5	288	8.3
May 15-16	81.0	--	--	48	24	24		248	8	13	28	--	2.6	--	.276	.38	60	220	4	19	.7	484	8.5
May 17-18	2,690	--	--	17	5.2	3.7		80	0	4.0	3.8	--	1.3	--	.83	.11	603	64	0	14	.3	141	7.8
May 19	376	--	--	32	13	14		148	4	4.7	18	--	3.5	--	.150	.24	183	132	4	18	.5	299	8.3
May 20	86.0	--	--	51	25	24		236	12	13	35	--	3.9	--	.296	.40	69	230	14	18	.7	525	8.7
May 21-23	210	--	--	37	6.2	38		196	0	8.0	21	--	2.9	--	.212	.29	120	168	0	41	1.5	372	8.2
May 24-25	10,760	--	--	16	4.9	1.6		68	0	0	4.0	--	3.3	--	.80	.11	2,330	60	4	6	.1	100	7.8
May 26-31	252	--	--	48	24	20		244	8	10	26	--	2.6	--	.278	.38	189	220	6	16	.6	501	8.5
June 1-2	548	--	--	42	22	20		208	6	7.4	34	--	3.0	--	.236	.32	349	196	16	18	.6	430	8.4
June 3-5	1,118	--	--	37	13	12		176	0	5.6	14	--	2.9	--	.174	.24	525	146	2	15	.4	310	8.2
June 6-7	138	--	--	57	35	138		274	14	12	30	--	3.1	--	.303	.41	113	285	36	7	.3	537	8.5
June 8-10	62.3	--	--	53	39	40		340	8	19	45	--	3.2	--	.374	.51	63	290	0	23	1.0	871	8.4
June 11-14	130	--	--	39	45	29		304	8	21	42	--	3.2	--	.336	.46	118	280	20	18	.8	620	8.4

ARKANSAS RIVER BASIN

June 15, 1957.....	9,320	--	17	7.2	2.5	82	0	2.1	4.7	--	2.4	--	98	.13	2,470	72	5	7	.1	136	7.8
June 16-17.....	286	--	44	33	20	242	16	16	30	--	4.2	--	290	.39	224	245	20	15	.5	513	8.5
June 18-19.....	266	--	42	23	15	198	14	12	20	--	4.8	--	228	.31	184	198	12	14	.5	411	8.5
June 20-21.....	101	--	34	37	25	242	12	17	36	--	4.8	--	285	.39	78	235	18	19	.7	522	8.5
June 22-24.....	2,251	--	27	13	8.3	144	0	5.6	9.5	--	2.8	--	139	.19	845	122	4	13	.3	257	8.2
June 25-30.....	103	--	47	45	30	320	10	19	47	--	4.2	--	361	.49	100	305	26	18	.7	653	8.4
July 1-10.....	28.4	21	.00	37	58	398	0	31	60	1.1	2.6	.55	459	.62	35	330	4	26	1.3	767	8.0
July 11-20.....	14.5	--	31	57	58	370	6	33	64	--	1.2	--	434	.59	17	310	0	29	1.4	794	8.3
July 21-25.....	14.0	--	54	41	57	366	0	33	66	--	1.2	--	432	.59	16	305	4	29	1.4	759	7.9
July 26.....	13.0	--	22	67	74	312	0	26	148	--	1.7	--	562	.76	20	330	76	33	1.8	1,140	7.9
July 27-31.....	9.72	--	37	55	74	388	0	37	87	--	3.3	--	484	.66	13	320	2	34	1.8	856	7.9
Aug. 1-3.....	7.67	--	40	55	76	408	0	39	80	--	4.3	--	495	.67	10	325	0	34	1.8	870	7.9
Aug. 4-5.....	63.0	--	30	23	36	208	0	16	39	--	7.1	--	253	.34	43	170	0	31	1.2	461	7.5
Aug. 6-10.....	7.32	--	45	41	86	328	0	52	102	--	1.3	--	460	.63	9.1	280	11	40	2.2	829	7.8
Aug. 11-14.....	5.40	--	46	54	89	384	0	39	124	--	5.4	--	545	.74	7.9	335	22	37	2.1	873	8.1
Aug. 15-20.....	11.3	--	42	40	49	332	0	26	54	--	.8	--	384	.52	12	270	0	29	1.3	673	8.1
Aug. 21-31.....	4.11	--	40	54	85	406	0	46	88	--	.1	--	532	.72	5.9	320	0	37	2.1	941	8.1
Sept. 1-10.....	3.49	--	29	52	107	346	10	56	112	--	.6	--	538	.73	5.1	285	0	45	2.7	966	8.4
Sept. 11-13.....	4.40	--	45	53	104	412	4	56	108	--	.7	--	574	.78	6.8	330	0	41	2.5	1,010	8.3
Sept. 14-17.....	1,001	--	29	9.1	13	136	0	9.3	12	--	1.4	--	144	.20	389	110	0	21	.6	256	7.8
Sept. 18-20.....	14.3	--	46	27.1	44	260	0	18	63	--	2.3	--	347	.47	13	225	13	30	1.3	618	8.1
Sept. 21.....	1,220	--	14	4.1	6.7	66	0	2.5	5.3	--	3.0	--	97	.13	320	52	0	22	.4	120	7.5
Sept. 22-30.....	33.0	--	53	34	39	322	0	22	47	--	1.4	--	355	.48	32	270	6	24	1.0	636	8.2
Weighted average ..	215	--	24	11	9.2	b123	--	4.4	12	--	2.8	--	136	0.18	79	105	4	16	0.4	221	--

a Values above 200 ppm are reported to the nearest 5 ppm.  
 b Includes equivalent of individual carbonate values shown above.

## LOWER MISSISSIPPI RIVER BASIN

## ARKANSAS RIVER BASIN--Continued

## LITTLE RIVER BELOW HOG CREEK, NEAR NORMAN, OKLA.--Continued

Temperature (°F) of water, water year October 1956 to September 1957

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	64	60	40	48	35	58	64	66	69	86	90	81
2	72	57	46	44	40	51	65	71	65	94	86	85
3	63	--	42	47	52	47	55	67	64	88	85	86
4	68	48	57	44	43	48	53	65	67	84	77	87
5	70	53	55	44	45	60	48	67	69	92	76	90
6	66	54	55	44	46	47	50	71	80	85	75	82
7	63	59	49	47	48	47	60	68	75	87	84	73
8	60	54	42	50	55	42	52	67	78	89	83	76
9	75	54	35	45	61	54	54	65	82	82	87	78
10	63	48	36	35	61	58	58	67	76	80	86	78
11	74	54	37	40	45	65	64	65	83	90	87	74
12	64	52	41	39	54	63	46	64	77	81	89	76
13	74	50	37	43	57	66	47	63	78	92	88	77
14	67	45	45	37	58	60	48	68	85	90	86	70
15	68	49	46	39	57	62	56	68	70	92	84	66
16	65	51	42	37	50	55	61	77	80	90	84	65
17	72	43	45	40	53	53	62	65	80	90	78	74
18	60	50	40	41	49	57	71	62	75	90	77	76
19	62	48	40	37	47	56	67	63	78	--	78	74
20	68	42	41	52	50	50	63	75	80	90	80	80
21	65	48	48	50	51	48	63	76	77	90	83	67
22	60	45	46	42	57	55	65	68	67	87	82	69
23	58	51	45	39	43	55	60	66	--	84	79	74
24	62	42	43	37	54	50	65	64	74	82	--	63
25	64	45	41	34	56	47	76	66	68	83	86	70
26	56	--	40	33	54	55	65	69	77	84	86	70
27	65	48	40	34	57	47	64	67	79	86	85	67
28	--	48	47	36	60	60	63	72	84	91	86	68
29	69	43	45	32	--	63	65	78	77	92	89	73
30	63	48	51	--	--	58	77	67	77	91	86	70
31	55	--	48	37	--	65	--	67	--	91	83	--
Average	65	50	44	41	51	55	60	68	76	88	84	75

Suspended sediment, May to September 1956

Day	May			June			July		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	12	--	--	13	1,350	47	0.3	38	(t)
2.....	6.5	--	e50	5.4	391	5.7	.2	41	(t)
3.....	5.4	--	--	7.7	532	11	.2	44	(t)
4.....	4.0	144	1.6	9.7	630	16	.2	57	(t)
5.....	3.2	99	.9	4.9	262	3.5	.1	50	(t)
6.....	2.9	92	.7	2.5	134	.9	11	292	9.3
7.....	2.5	112	.8	2.5	110	.7	2.5	62	.4
8.....	2.5	121	.8	3.2	83	.7	.3	36	(t)
9.....	2.5	109	.7	3.2	106	.9	.3	52	(t)
10.....	2.2	94	.6	3.2	96	.8	.2	66	(t)
11.....	2.2	75	.4	2.5	87	.6	.3	77	.1
12.....	2.2	110	.7	2.2	76	.5	.1	65	(t)
13.....	1.9	79	.4	1.9	82	.4	0	--	0
14.....	1.9	91	.5	1.9	100	.5	0	--	0
15.....	9.7	298	s7.8	1.9	91	.5	0	--	0
16.....	3.2	97	.8	1.7	102	.5	0	--	0
17.....	1.1	80	.2	1.7	106	.5	2.2	2,140	s30
18.....	1.1	57	.2	1.1	60	.2	7.1	2,000	38
19.....	1.1	85	.3	.9	75	.2	13	1,980	69
20.....	.9	53	.1	.6	65	.1	5.9	1,600	25
21.....	1.1	63	.2	.5	64	.1	4.5	542	6.6
22.....	1.3	59	.2	.4	92	.1	3.6	228	2.2
23.....	13	272	s70	.4	64	.1	.4	115	.1
24.....	124	4,700	s2,640	.7	71	s.3	.3	100	.1
25.....	152	4,120	s3,360	1.5	93	.4	.3	74	.1
26.....	164	3,080	s3,400	.7	132	.3	.3	50	(t)
27.....	215	4,580	s2,980	.4	117	.1	.2	42	(t)
28.....	78	1,480	s376	.4	91	.1	.1	36	(t)
29.....	15	431	17	.4	85	.1	.1	58	(t)
30.....	9.0	251	6.1	.4	54	(t)	.1	59	(t)
31.....	31	992	s83	--	--	--	.1	76	(t)
Total.	872.4	--	13,000	77.5	--	92.8	53.9	--	181.2

Total discharge for period May 1 to Sept. 30, 1956 (cfs-days)..... 1,003.8

Total load for period May 1 to Sept. 30, 1956 (tons)..... 13,274.0

e Estimated.

s Computed by subdividing day.

t Less than 0.05 ton.

ARKANSAS RIVER BASIN--Continued

LITTLE RIVER BELOW HOG CREEK, NEAR NORMAN, OKLA.--Continued

Suspended sediment, water year October 1956 to September 1957

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	0.1	83	(t)	0.1	34	(t)	0.6	48	0.1
2.....	0	--	0	.1	63	(t)	.6	45	.1
3.....	0	--	0	.1	34	(t)	.6	45	.1
4.....	0	--	0	99	2,500	s 1,740	.5	65	.1
5.....	0	--	0	57	2,510	s 578	.3	59	(t)
6.....	0	--	0	3.6	1,120	11	.6	45	.1
7.....	0	--	0	1.7	480	2.2	.7	39	.1
8.....	0	--	0	.9	320	.8	1.7	73	.1
9.....	0	--	0	.6	201	.3	1.7	91	.4
10.....	0	--	0	.5	150	--	1.7	70	.3
11.....	0	--	0	.4	111	--	1.5	61	.2
12.....	0	--	0	.4	102	--	1.3	75	.3
13.....	0	--	0	.4	103	.1	.9	56	.1
14.....	0	--	0	.4	98	.1	.6	56	.1
15.....	0	--	0	.3	107	.1	.4	48	.1
16.....	0	--	0	.1	82	--	.3	48	(t)
17.....	0	--	0	.1	75	(t)	.2	48	(t)
18.....	0	--	0	.1	98	(t)	1.1	48	.1
19.....	.2	93	.1	.3	95	.1	3.2	346	s 3.9
20.....	0	--	0	.4	89	.1	4.9	301	s 4.2
21.....	0	--	0	.4	85	.1	3.2	84	.7
22.....	0	--	0	.4	83	.1	2.5	155	1.0
23.....	0	--	0	.4	107	.1	2.2	63	.4
24.....	0	--	0	.4	73	.1	1.7	50	.2
25.....	0	--	0	.5	71	.1	1.3	43	.2
26.....	0	--	0	.4	68	--	1.3	47	.2
27.....	0	--	0	.4	65	--	1.3	42	.1
28.....	0	--	0	.5	62	.1	1.3	44	.2
29.....	0	--	0	.6	63	.1	1.3	49	.2
30.....	.8	110	.2	.5	59	.1	1.1	43	.1
31.....	.1	39	(t)	--	--	--	1.7	54	.2
Total.	1.2	--	.3	171.0	--	2,385.2	41.3	--	14.3
	January			February			March		
1.....	0.9	55	0.1	2.2	65	0.4	1.9	94	0.5
2.....	.9	64	.2	2.2	67	.4	3.2	95	.8
3.....	.9	59	.1	1.9	74	.4	3.2	83	.7
4.....	2.5	96	--	2.5	66	.4	2.9	86	.7
5.....	2.5	63	--	2.5	78	.5	2.5	83	.6
6.....	2.2	69	.4	1.9	81	.5	2.2	76	.5
7.....	1.7	83	.4	1.9	92	.5	1.9	71	.4
8.....	1.7	79	.4	1.9	95	.5	1.9	63	.3
9.....	1.7	76	.4	1.9	108	.6	1.7	69	.3
10.....	1.5	69	.3	1.9	93	.5	1.9	79	.4
11.....	1.5	62	.3	1.7	85	.4	1.9	84	.4
12.....	1.7	58	.3	1.7	75	.3	1.9	70	.4
13.....	1.9	50	.3	1.7	75	.3	1.7	68	.3
14.....	1.9	55	.3	1.7	78	.4	1.7	63	.3
15.....	1.7	60	.3	1.7	75	.3	1.7	61	.3
16.....	1.3	72	--	1.7	82	.4	1.7	58	.3
17.....	1.1	69	.2	1.7	70	.3	2.2	60	.4
18.....	1.3	78	.3	1.7	78	.4	2.2	66	.4
19.....	1.7	83	.4	1.9	88	.5	1.9	54	.3
20.....	2.2	85	.5	1.7	89	.4	2.5	67	.5
21.....	2.2	64	.4	1.9	91	.5	3.2	231	2.0
22.....	2.9	64	.5	1.9	90	.5	1.7	82	.4
23.....	6.3	63	s 1.3	2.2	98	.6	1.7	76	.3
24.....	5.9	182	--	1.9	90	.5	1.7	79	.4
25.....	2.9	222	--	1.9	104	.5	1.7	62	.3
26.....	1.9	158	.8	1.9	103	.5	1.7	59	.3
27.....	1.9	270	1.4	2.2	94	.6	1.9	62	.3
28.....	1.9	132	.7	1.9	99	.5	1.9	71	.4
29.....	5.4	342	s 4.7	--	--	--	1.9	91	.5
30.....	2.5	566	s 3.9	--	--	--	2.2	153	s .9
31.....	2.2	162	s .5	--	--	--	9.0	2,850	s 75.0
Total.	68.8	--	25.3	53.8	--	12.6	71.3	--	89.6

s Computed by subdivided day.  
t Less than 0.05 ton.

## LOWER MISSISSIPPI RIVER BASIN

## ARKANSAS RIVER BASIN--Continued

## LITTLE RIVER BELOW HOG CREEK, NEAR NORMAN, OKLA.--Continued

## Suspended sediment, water year October 1956 to September 1957--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm.)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	3.6	350	3.4	220	2,730	s 1,910	154	525	s 233
2.....	3.5	826	s 376	256	1,560	4,120	943	4,960	s 16,300
3.....	1,190	10,550	s 43,900	725	4,310	s 12,000	1,230	5,530	s 23,500
4.....	101	--	s 650	98	--	s 193	1,640	4,260	22,600
5.....	20	440	24	67	246	44	483	397	s 560
6.....	8.3	285	6.4	32	113	10	174	--	138
7.....	4.9	110	1.5	23	115	7.1	102	--	74
8.....	2.9	80	.6	74	438	s 226	75	206	42
9.....	2.5	115	.8	458	3,470	s 5,570	60	188	27
10.....	2.2	57	.3	67	423	77	52	189	24
11.....	1.9	86	.4	296	2,250	s 3,230	46	175	22
12.....	2.5	112	.8	244	1,480	s 1,200	41	155	17
13.....	2.5	104	.7	3,340	7,030	s 79,800	38	134	14
14.....	2.9	99	.8	345	1,780	2,230	393	626	6,470
15.....	2.9	84	.7	57	495	76	9,320	5,540	s 128,000
16.....	2.5	89	.6	105	894	s 781	401	2,020	s 2,450
17.....	2.5	74	.5	2,060	--	s 63,400	172	625	302
18.....	2.2	68	.4	3,320	7,400	s 80,900	337	2,300	s 2,340
19.....	129	4,530	s 2,820	376	988	s 1,080	196	1,237	s 682
20.....	204	4,940	s 4,220	86	308	72	114	268	82
21.....	1,030	7,910	s 29,500	170	1,740	s 908	88	191	45
22.....	234	1,700	s 4,230	266	2,040	s 1,970	3,740	--	s 101,000
23.....	2,920	8,240	s 82,400	193	1,220	s 732	2,250	5,300	s 36,400
24.....	165	2,330	s 1,040	4,860	2,610	s 109,000	764	2,320	s 5,620
25.....	40	475	s 58	16,700	6,240	s 280,000	196	657	348
26.....	284	3,340	s 2,810	526	2,640	s 4,480	118	433	138
27.....	78	705	148	166	987	442	96	242	63
28.....	36	208	20	100	394	106	81	214	47
29.....	26	116	8.1	77	260	54	72	193	38
30.....	112	840	s 1,030	250	1,730	1,910	54	169	25
31.....	--	--	--	391	2,460	s 2,780	--	--	--
Total.	6,648.3	--	173,252.0	35,948	--	659,298.1	23,430	--	347,602
Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm.)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	45	148	18	7.8	163	3.4	4.8	325	4.2
2.....	39	121	13	7.8	107	2.3	5.6	79	1.2
3.....	34	132	12	7.4	101	2.0	4.4	74	.9
4.....	32	117	10	98	3,280	s 1,220	2.9	76	.6
5.....	29	124	9.7	28	488	37	2.6	63	.4
6.....	24	110	7.1	10	183	4.9	2.6	83	.6
7.....	22	115	6.8	7.0	102	1.9	2.9	95	.7
8.....	20	117	6.3	7.0	120	2.3	2.9	111	.9
9.....	20	109	5.9	6.5	121	2.1	2.9	83	.6
10.....	19	132	6.8	6.1	134	2.2	3.3	98	.9
11.....	18	122	5.9	5.6	288	4.4	5.2	166	2.3
12.....	17	115	5.3	5.6	140	2.1	4.0	102	1.1
13.....	16	119	5.1	5.6	124	1.9	4.0	93	1.0
14.....	16	109	4.7	4.8	109	1.4	1,580	2,090	s 5,390
15.....	15	105	4.3	18	--	s 76	2,170	6,270	s 46,500
16.....	14	111	4.2	12	662	s 23	221	1,380	s 1,030
17.....	13	103	3.6	16	669	s 34	32	343	30
18.....	12	108	3.5	6.7	274	6.4	18	120	5.8
19.....	12	107	3.5	6.5	150	2.6	13	116	4.1
20.....	12	103	3.3	6.5	152	2.7	12	--	s 4.7
21.....	12	90	2.9	5.6	142	2.1	1,220	3,270	s 13,500
22.....	14	98	3.7	5.2	136	1.9	156	1,020	s 471
23.....	17	114	5.2	4.8	131	1.7	44	254	6.0
24.....	14	106	4.0	4.4	132	1.6	21	106	30
25.....	13	134	4.7	4.4	128	1.5	16	81	3.5
26.....	13	103	3.6	4.0	103	1.1	14	82	3.1
27.....	12	87	2.8	4.0	101	1.1	13	82	2.9
28.....	10	81	2.2	3.7	100	1.0	12	85	2.8
29.....	9.2	107	2.7	3.3	72	.6	11	114	3.4
30.....	8.7	130	3.1	2.9	85	.7	10	125	3.4
31.....	8.7	115	2.7	2.9	81	.6	--	--	--
Total.	560.6	--	176.6	320.1	--	1,446.5	5,611.1	--	67,006.1

Total discharge for year (cfs-days)..... 72,925.5

Total load for year (tons)..... 1,251,258.6

s Computed by subdividing day.

a Computed from estimated concentration graph.

ARKANSAS RIVER BASIN--Continued

LITTLE RIVER BELOW HOG CREEK, NEAR NORMAN, OKLA.--Continued

Particle-size analyses of suspended sediment, water year October 1956 to September 1957

(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipet; S, sieve; N, in native water; W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date of collection	Time	Discharge (cfs)	Water temperature (°F)	Suspended sediment										Methods of analysis		
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters										
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250		0.350	0.500
Apr. 23, 1957 ..	3:40 p.m.	1,750	75	5,650	3,080	33	34	43	55	67	81	88	99	100	100	SPWC
May 25 .....	2:10 p.m.	10,000	73	7,380	4,280	33	37	45	59	74	88	99	100	100	SPWC	

ARKANSAS RIVER BASIN--Continued  
LITTLE RIVER NEAR SASAKWA, OKLA.

LOCATION.--At gaging station on highway bridge, 2½ miles northwest of Sasakwa, Seminole County, and 8.7 miles downstream from Salt Creek.  
DRAINAGE AREA.--865 square miles.  
RECORDS AVAILABLE.--Chemical analyses: September 1951 to September 1955 (monthly), October 1955 to September 1957 (daily).  
Water temperatures: October 1955 to September 1957.  
EXTREMES, 1956-57.--Dissolved solids: Maximum, 129,000 ppm Oct. 30-31; minimum, 189 ppm June 11.  
Hardness: Maximum, 24,400 ppm Oct. 30-31; Nov. 1-2; minimum, 112 ppm June 11.  
Specific conductance: Maximum, 138,000 microhms Oct. 31; minimum, 112 ppm June 11.  
EXTREMES, 1955-57.--Dissolved solids: Maximum, 129,000 ppm Oct. 30-31, 1956; minimum, 189 ppm June 11, 1957.  
Hardness: Maximum, 24,400 ppm Oct. 30-31, Nov. 1-2, 1956; minimum, 112 ppm June 11, 1957.  
Specific conductance: Maximum, 138,000 microhms Oct. 31, 1956; minimum, 112 ppm June 11, 1957.  
Water temperatures: Maximum, 93°F July 27, Aug. 14, 1956; minimum, 33°F Dec. 16, 1955, Jan. 18, Feb. 3, 1956.  
REMARKS.--Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of discharge for water year October 1956 to September 1957 given in WSP 1511, No flow Oct. 1-22, 28-29.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Boiron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (microhms at 25°C)	pH	
															Parts per million	Tons per acre-foot	Tons per day	Calcium magnesium sum <sup>a</sup>				Non-carbonate
Oct. 23, 1956	0.20	--	--	2,330	763	12,200	93	0	64	25,100	--	--	--	--	44,600	60.66	24	8,980	8,870	75	59,200	7.2
Oct. 24-26	.43	--	--	1,650	575	8,040	73	0	39	16,900	--	--	--	--	30,500	41.48	35	6,460	6,420	73	42,600	7.7
Oct. 27	1.10	--	--	3,020	794	14,600	49	0	97	30,000	--	--	--	--	52,100	70.86	14	10,800	10,800	75	61,870	7.3
Oct. 30-31	14.8	--	--	6,760	1,830	33,200	63	0	228	68,300	--	--	--	--	129,000	175.44	5,150	24,400	24,400	75	82,129,000	6.8
Nov. 1-2	6.65	--	--	1,800	564	9,630	51	0	246	73,100	--	--	--	--	121,000	164.95	2,960	24,400	24,400	76	101,300,000	7.1
Nov. 3-4	9.05	--	--	1,800	564	9,630	51	0	85	19,600	--	--	--	--	33,200	45.13	596	6,810	6,760	75	51,45,900	7.2
Nov. 5-7	130	--	--	1,050	241	5,110	22	0	43	10,400	--	--	--	--	18,100	24.52	6,350	3,610	3,590	75	37,27,600	7.0
Nov. 8-10	20.7	--	--	343	96	1,760	68	0	33	3,540	--	--	--	--	6,380	8.68	357	1,250	1,190	75	22,10,400	7.5
Nov. 11-15	4.78	--	--	343	89	1,760	74	0	37	3,490	--	--	--	--	6,370	8.66	82	1,220	1,160	76	22,10,500	7.5
Nov. 16-20	5.20	--	--	447	118	2,290	74	0	46	4,590	--	--	--	--	8,390	11.41	118	1,600	1,540	76	25,13,500	7.6
Nov. 21-24	2.38	--	--	371	101	1,890	68	0	41	3,790	--	--	--	--	7,100	9.66	46	1,340	1,280	75	22,11,300	7.6
Nov. 25-30	1.03	--	--	746	175	3,500	52	0	49	7,160	--	--	--	--	13,100	17.82	36	2,580	2,540	75	30,19,800	7.3
Dec. 1-3	1.57	--	--	833	207	4,170	48	0	57	8,430	--	--	--	--	16,200	22.03	69	2,930	2,890	76	33,23,100	6.8
Dec. 4	3.30	--	--	597	151	2,980	67	0	49	6,020	--	--	--	--	11,500	15.64	102	2,110	2,060	75	28,16,800	7.7
Dec. 5	2.90	--	--	403	111	2,070	96	0	34	4,140	--	--	--	--	8,020	10.91	63	1,460	1,380	75	24,12,000	7.8
Dec. 6-8	71.4	--	--	1,170	312	6,210	26	0	55	12,500	--	--	--	--	22,300	30.33	4,300	4,200	4,180	76	42,32,900	6.3
Dec. 9-10	71.0	--	--	1,920	501	9,930	10	0	93	20,100	--	--	--	--	36,900	50.05	7,050	6,850	6,850	76	50,30,000	4.3
Dec. 11-16	6.82	--	--	1,050	258	5,280	19	0	50	10,700	--	--	--	--	19,600	26.66	361	3,680	3,660	76	38,28,900	6.6
Dec. 17-18	2.25	--	--	104	24	447	66	0	7.4	900	--	--	--	1.8	1,790	2.43	11	360	306	73	10,3,030	7.8
Dec. 19-20	436	--	--	284	98	1,900	52	0	22	3,890	--	--	--	--	7,520	10.23	8,550	1,420	1,380	74	22,11,700	7.7
Dec. 21-24	66.5	--	--	284	78	1,310	65	0	23	2,700	--	--	--	--	5,180	7.04	930	1,030	976	73	18,8,280	7.7

ARKANSAS RIVER BASIN

Dec. 25-30, 1956	12.2	565	170	2,720	70	0	37	5,620	--	--	10,700	14.55	352	2,110	2,050	74	26	16,300	7.6
Dec. 31	6.90	814	206	3,720	72	0	45	7,700	--	--	17,500	19.72	270	3,860	3,820	74	33	21,000	7.6
Jan. 1-2, 1957	6.30	960	283	4,510	59	0	50	9,410	--	--	14,700	24.07	301	5,660	5,510	73	33	25,000	7.8
Jan. 3-6	8.60	1,760	518	8,400	31	0	80	17,500	--	--	32,900	44.74	764	6,520	6,490	74	45	43,700	7.1
Jan. 7-10	10.4	2,680	687	12,200	12	0	109	25,400	--	--	47,800	65.01	1,340	9,510	9,500	74	54	60,200	6.3
Jan. 11-20	5.04	2,740	750	13,600	10	0	121	27,500	--	--	52,500	71.40	714	9,920	9,910	75	59	64,600	6.4
Jan. 21-22	31.2	4,150	1,080	21,000	7	0	165	42,800	--	--	79,800	108.53	6,720	14,800	14,800	76	75	92,100	6.3
Jan. 23-24	124	981	249	4,320	69	0	57	9,040	--	--	17,100	23.26	5,730	3,470	3,410	73	32	24,700	7.8
Jan. 25-26	30.0	1,192	61	1,901	76	0	18	1,850	--	--	3,650	4.96	296	3,730	3,668	73	15	5,880	8.0
Jan. 27-28	22.3	320	83	1,480	74	0	26	3,050	--	--	6,110	8.31	368	1,180	1,120	73	19	9,370	7.8
Jan. 30-31	110	383	108	1,660	76	0	27	3,490	--	--	6,550	9.04	1,980	1,400	1,340	72	19	10,400	7.9
Feb. 1-4	45.8	486	140	2,190	78	0	30	4,580	--	--	8,750	11.90	1,080	1,790	1,780	73	23	13,300	7.9
Feb. 5-10	19.3	853	219	3,800	75	0	42	7,940	--	--	15,000	20.40	792	3,080	2,970	73	30	21,800	7.7
Feb. 11-18	8.42	1,230	346	5,900	55	0	38	12,200	--	--	22,800	30.74	544	4,490	4,440	74	38	31,600	7.7
Feb. 19-20	9.30	1,960	571	9,110	24	0	86	19,100	--	--	35,700	46.55	896	7,240	7,220	73	46	47,300	7.0
Feb. 21-27	11.5	2,520	759	12,200	4	0	104	23,400	--	--	47,300	64.53	1,470	9,410	9,410	74	55	60,200	5.8
Feb. 28	9.60	312	83	1,370	88	0	13	2,850	--	--	5,660	7.70	147	1,120	1,050	73	18	6,700	7.9
Mar. 1-6	183	474	111	2,070	88	0	29	4,280	--	--	8,410	11.44	3,700	1,640	1,570	73	22	13,600	8.1
Mar. 7-10	32.0	755	194	3,190	71	0	41	6,750	--	--	12,700	17.27	1,100	2,680	2,620	72	27	19,900	7.8
Mar. 11-14	28.2	833	217	3,690	63	0	48	7,730	--	--	14,300	19.72	1,100	2,970	2,920	73	29	21,700	7.7
Mar. 15-20	65.2	415	106	1,830	94	0	470	3,790	--	--	7,050	9.59	1,240	1,470	1,390	73	21	11,300	8.2
Mar. 21-25	106	597	114	2,670	101	0	42	5,470	--	--	9,490	12.91	2,720	2,040	1,960	74	26	15,600	7.8
Mar. 26	36.0	1,350	392	6,400	89	0	67	13,300	--	--	22,800	31.01	2,220	4,980	4,960	74	39	34,000	8.0
Mar. 27-28, 30	38.3	139	45	606	106	0	12	1,240	--	--	2,290	3.11	237	530	443	71	11	4,190	7.7
Mar. 29, 31	37.5	82	25	293	102	0	12	600	4.8	4.8	1,210	1.65	123	310	224	67	7.2	2,120	8.0
Apr. 1	1,050	152	56	558	116	0	17	1,220	--	--	2,570	3.50	7,290	610	515	67	9.8	4,150	8.0
Apr. 2	431	256	93	2,080	120	0	23	3,680	--	--	4,400	5.98	5,120	1,020	922	67	13	7,020	8.2
Apr. 3-4	4,565	408	122	1,700	129	0	23	3,600	--	--	6,870	9.34	84,680	1,520	1,410	71	19	10,600	8.1
Apr. 5-10	397	1,179	1,800	130	0	23	38	4,040	--	--	8,110	11.03	8,690	1,910	1,800	67	18	12,900	7.8
Apr. 11-15	71.2	734	255	2,920	120	0	29	6,450	--	--	12,600	17.14	2,420	2,880	2,780	68	24	19,500	8.0
Apr. 16-17	49.0	104	39	317	136	0	8.6	700	1.8	1.8	1,630	2.22	216	420	308	62	6.7	2,660	8.0

a Values above 200 ppm reported to the nearest 5 ppm.

ARKANSAS RIVER BASIN--Continued  
 LITTLE RIVER NEAR SASAKWA, OKLA.--Continued

Chemical analyses, in parts per million, water year October 1956 to September 1957.--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Percent adsorbed sodium	Specific conductance (micro-mhos at 25°C)	pH	
														Parts per million	Tons per acre-foot	Tons per day	Calcium mg/l	Non-carbonate				
Apr. 18-21, 1957	2,033	--	--	46	17	130	--	98	0	3.7	272	--	2.2	686	0.95	3,820	186	108	60	4.1	1,080	7.9
Apr. 22	5,990	--	--	58	19	185	100	0	0	4.5	380	--	4.0	886	1.20	14,330	225	142	64	5.4	1,430	8.2
Apr. 23-24	6,270	--	--	218	72	924	78	0	18	1,980	1,880	--	--	3,950	5.37	67,400	840	776	71	14	6,150	7.8
Apr. 25-30	2,160	--	--	198	76	723	146	2	14	1,580	1,580	--	--	3,450	4.69	20,120	800	877	66	11	4,500	8.3
May 1, 4	3,324	--	--	298	83	1,100	156	8	22	2,350	2,350	--	--	4,410	6.00	3,860	1,080	938	69	15	7,250	8.4
May 2	323	--	--	148	51	507	138	4	11	1,100	1,100	--	--	2,480	3.37	2,160	580	460	66	9.2	3,640	8.4
May 3, 5, 10	277	--	--	224	68	761	148	6	25	1,650	1,650	--	--	3,130	4.26	2,340	830	698	67	11	5,350	8.4
May 6	280	--	--	326	103	1,360	100	0	23	2,950	2,950	--	--	5,510	7.49	4,170	1,260	1,180	70	17	8,850	8.2
May 7-9	172	--	--	489	163	1,840	184	0	32	3,980	3,980	--	--	7,360	10.01	3,420	1,800	1,650	69	19	11,800	8.0
May 11-12	340	--	--	51	15	135	106	0	4.1	3,275	3,275	--	2.6	856	89	802	188	101	81	4.3	1,110	8.2
May 13	3,050	--	--	97	25	182	120	0	8.4	595	595	--	3.2	882	1.20	7,260	270	172	59	4.8	1,510	8.2
May 14	3,900	--	--	91	32	282	132	4	10	600	600	--	2.2	1,250	1.70	11,810	360	246	63	6.5	2,130	8.3
May 15-16	2,865	--	--	122	43	389	128	4	13	850	850	--	2.9	1,750	2.38	13,540	480	368	64	7.7	2,890	8.4
May 17-20	12,940	--	--	61	20	184	80	0	3.7	400	400	--	1.6	844	1.15	28,580	235	170	63	5.2	1,480	7.5
May 21-22	3,560	--	--	92	18	188	78	0	3.7	400	400	--	1.4	872	1.19	8,380	225	160	65	5.5	1,480	8.1
May 23	7,330	--	--	92	41	294	80	0	12	680	680	--	3.2	1,410	1.92	27,910	400	324	62	6.4	2,420	8.2
May 24	3,190	--	--	66	23	177	120	4	8.4	375	375	--	1.9	860	1.17	6,800	260	155	60	4.9	1,450	8.4
May 25-26	9,915	--	--	68	12	88	88	0	2.3	122	122	--	1.7	482	1.60	11,830	140	70	58	3.2	1,733	8.2
May 27	21,400	--	--	66	26	172	128	0	8.0	375	375	--	2.2	870	1.18	50,270	210	165	58	4.6	1,460	8.1
May 28-31	4,570	--	--	54	19	140	116	4	6.4	288	288	--	1.6	684	0.93	6,480	210	110	59	4.2	1,160	8.4
June 1	4,210	--	--	47	15	108	120	0	5.4	220	220	--	1.7	482	0.66	5,460	180	82	57	3.5	814	7.8
June 2-6	6,892	--	--	216	76	682	190	8	20	1,520	1,520	--	2.2	3,470	4.72	64,570	850	681	64	10	5,040	8.3
June 7-8	1,971	--	--	264	93	897	178	0	23	2,000	2,000	--	2.9	4,420	6.01	23,520	1,040	894	65	12	6,340	8.2
June 9-10	2,520	--	--	48	21	96	116	0	6.6	220	220	--	2.9	587	0.77	3,860	205	110	51	2.9	949	8.0
June 11	820	--	--	26	11	106	110	0	4.5	58	58	--	3.0	189	0.26	4,118	112	22	37	3.3	365	7.8
June 12-13	383	--	--	50	18	106	130	0	8.2	222	222	--	2.3	564	0.77	583	200	94	53	3.3	957	8.1
June 14	256	--	--	118	44	337	168	0	11	750	750	--	2.6	1,700	2.31	1,180	475	338	61	6.7	2,640	8.2
June 15-16	5,660	--	--	36	12	74	98	0	3.3	150	150	--	2.2	377	0.51	5,760	138	58	54	2.7	671	7.7
June 17-18	6,645	--	--	30	11	643	93	0	3.7	93	93	--	1.8	258	0.35	4,630	120	42	44	1.7	476	7.9
June 19	6,140	--	--	45	15	89	122	0	7.0	185	185	--	1.8	477	0.65	7,910	176	76	52	2.9	810	8.0
June 20	3,730	--	--	102	40	292	166	0	10	640	640	--	2.2	1,480	2.01	14,910	420	284	60	6.2	2,320	8.2
June 21-30	2,611	18	0.00	228	124	1,010	236	0	30	2,150	2,150	0.1	--	4,800	6.53	33,840	1,080	886	67	13	6,730	7.9

ARKANSAS RIVER BASIN

July 1-6, 1957.....	174	--	--	336	117	1,350	195	0	36	2,880	--	--	5,280	7.18	2,480	1,320	1,160	69	16	8,640	7.6
July 7-10.....	86.8	--	435	152	177	1,770	213	0	44	3,790	--	--	7,030	9.56	1,650	1,710	1,540	69	19	11,400	7.6
July 11-17.....	55.9	--	494	196	2,070	211	0	51	4,480	10,100	--	--	8,370	11.38	1,260	2,040	1,870	69	20	13,300	7.8
July 18-19.....	38.5	--	1,050	396	4,670	108	0	78	10,100	5,670	--	--	17,500	23.80	1,820	4,250	4,160	71	31	27,500	7.9
July 20-21.....	33.5	--	581	217	2,660	96	0	52	879	2,340	--	--	9,720	13.22	2,780	2,340	2,260	71	24	16,300	7.8
July 22-25.....	576	--	128	39	452	128	0	17	950	2,050	1.6	--	1,780	2.43	2,802	480	375	67	9.0	3,340	7.7
July 26-31.....	80.3	--	240	88	974	190	0	30	2,050	2,500	--	--	3,700	5.03	802	960	804	69	14	6,480	7.8
Aug. 1-5.....	37.8	--	288	112	1,170	190	0	33	2,500	1,580	--	--	4,480	6.09	457	1,180	1,020	68	15	7,750	7.8
Aug. 6-7.....	104	--	178	80	766	208	0	41	1,580	2,220	--	--	2,870	3.90	806	775	604	68	12	5,200	7.8
Aug. 8-10.....	37.0	--	244	93	1,030	196	0	35	2,150	3,300	--	--	3,810	5.18	381	980	830	69	14	6,760	7.7
Aug. 11-16.....	18.2	--	276	115	1,260	148	0	33	2,650	4,445	--	--	4,500	6.12	221	1,960	1,040	70	16	7,900	7.7
Aug. 17-18.....	164	--	403	162	1,890	134	0	31	3,990	8,6	1.0	--	6,830	9.29	3,020	1,670	1,560	71	20	11,600	7.9
Aug. 19-20.....	70.0	--	136	56	529	178	0	23	1,100	118	1.1	--	2,070	2.82	391	570	424	67	9.6	3,770	7.8
Aug. 21-23.....	28.3	--	152	39	531	172	0	30	1,080	720	1.4	--	2,000	2.84	160	540	399	68	9.9	3,560	7.9
Aug. 24-27.....	12.0	--	188	73	730	176	0	27	1,550	1,980	--	--	3,000	4.08	97	770	626	67	11	5,120	7.8
Aug. 28-31.....	6.95	--	240	88	964	168	0	26	2,050	2,220	--	--	3,820	5.20	72	960	822	69	14	6,480	7.8
Sept. 1-6.....	6.23	--	272	105	1,010	180	0	24	2,220	3,100	--	--	4,520	6.15	76	1,110	962	66	13	7,430	7.7
Sept. 7-10.....	6.40	--	348	129	1,450	200	0	24	3,100	4,445	--	--	5,830	7.93	101	1,400	1,240	69	17	9,370	7.8
Sept. 11-14.....	11.0	--	376	129	1,550	184	0	25	3,300	8,6	1.0	--	6,020	8.19	179	1,470	1,320	70	18	9,780	7.8
Sept. 15-17.....	4,560	--	66	22	2,171	112	0	8,6	445	118	1.1	--	1,060	1.44	13,050	255	164	65	5.9	1,650	7.5
Sept. 18.....	2,171	--	30	11	60	91	0	8,2	118	720	2.6	--	1,320	2.03	4,880	120	46	52	2.4	552	7.3
Sept. 18-20.....	2,360	--	98	37	333	108	0	13	720	298	1.4	--	1,490	2.03	9,490	395	306	65	7.3	2,490	7.6
Sept. 21.....	1,969	--	53	19	141	108	0	8,2	298	720	1.6	--	688	.94	3,640	210	124	59	4.2	1,150	7.6
Sept. 22-25.....	3,146	--	102	39	334	136	0	12	720	1,350	1.4	--	1,520	2.07	12,910	415	304	64	7.1	2,510	7.7
Sept. 26-27.....	232	--	188	61	618	172	0	18	1,350	1,980	--	--	2,680	3.64	1,680	720	579	65	10	4,450	7.9
Sept. 28-30.....	114	--	248	90	915	198	0	23	1,980	1,020	--	--	3,850	5.24	1,190	960	828	67	13	6,210	7.9
Weighted average.....	1,082	--	131	48	474	b127	--	12	1,020	594	--	--	2,150	2.92	5,990	524	420	66	9.0	3,310	--

a Values above 200 ppm reported to the nearest 5 ppm.  
 b Includes equivalent of individual carbonate values shown above.

## LOWER MISSISSIPPI RIVER BASIN

## ARKANSAS RIVER BASIN--Continued

## LITTLE RIVER NEAR SASAKWA, OKLA.--Continued

Temperature (°F) of water, water year October 1956 to September 1957

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	74	64	47	46	36	--	52	65	75	87	92	87
2	74	62	48	46	34	49	55	67	76	92	91	87
3	69	62	49	47	40	47	54	67	75	90	90	87
4	71	63	52	46	47	46	54	68	76	91	88	87
5	70	61	51	45	48	42	56	67	78	89	87	80
6	74	64	50	46	48	41	60	67	79	89	87	78
7	75	63	52	45	58	40	61	69	82	90	86	75
8	--	53	43	42	58	42	57	69	81	91	85	78
9	69	49	39	42	61	40	60	70	78	90	86	78
10	70	53	38	41	57	50	60	70	78	90	89	78
11	70	57	40	41	57	53	62	71	79	90	89	79
12	71	58	38	38	56	61	55	70	--	91	89	80
13	69	53	38	37	56	60	49	70	79	91	92	82
14	68	54	--	37	57	63	56	71	79	90	93	78
15	72	58	41	36	57	57	58	72	80	91	87	76
16	74	48	42	36	53	56	60	71	79	91	86	75
17	73	50	43	36	52	55	62	71	80	90	85	75
18	70	50	42	36	53	55	67	72	80	90	82	76
19	71	50	41	35	53	54	65	72	78	90	80	--
20	70	47	44	37	49	53	67	72	80	90	85	72
21	70	47	45	36	48	52	67	73	79	89	85	72
22	69	48	46	45	47	52	65	73	80	90	86	71
23	70	48	46	38	48	52	65	73	78	88	87	72
24	68	47	47	38	48	49	65	72	73	87	89	70
25	67	48	47	37	49	48	67	72	75	87	88	70
26	67	47	46	36	49	53	66	73	78	89	89	71
27	68	47	47	35	51	52	67	72	80	89	89	69
28	69	47	--	36	51	53	66	73	79	89	89	70
29	65	48	46	37	--	52	67	72	82	90	88	70
30	64	48	--	34	--	53	67	70	87	91	89	70
31	63	--	48	35	--	53	--	71	--	92	89	--
Average	70	53	45	39	51	51	61	70	79	90	88	76

ARKANSAS RIVER BASIN--Continued

NORTH CANADIAN RIVER AT CANTON RESERVOIR, NEAR CANTON, OKLA.

LOCATION.--Immediately below dam on North Canadian River, half a mile upstream from gaging station at Canton, 2 miles northwest of Canton, Blaine County, and 4 1/2 miles upstream from Minnehaha Creek.  
 DRAINAGE AREA.--12,483 square miles above dam, of which 4,883 square miles is probably noncontributing.  
 RECORDS AVAILABLE.--Chemical analyses: October 1951 to September 1954, October 1956 to September 1957.  
 Water temperatures: October 1951 to September 1954.  
 EXTREMES, 1951-54.--Dissolved solids: Maximum, 1,450 ppm July 17-19, 1953; minimum, 370 ppm May 25-31, 1954.  
 Hardness: Maximum, 417 ppm Mar. 1-31, 1953; minimum, 205 ppm May 25-31, 1954.  
 Specific conductance: Maximum daily, 1,790 micromhos July 17, 1953; minimum daily, 399 micromhos May 26, 1954.  
 Water temperatures: Maximum, 85° F July 31, Aug. 5, 7, 9, 1952; minimum, freezing point Dec. 20-21, 1951.  
 REMARKS.--Records of discharge for gaging station at Canton for water year October 1956 to September 1957 given in WSP 1511.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH		
													Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate					
																					So-dium adsorp-tion ratio	
Oct. 8, 1956	2.4	6.5	0.01	58	27	108	3.7	216	120	130	0.9	1.9	0.08	575	0.78	3.8	255	78	48	3.0	973	7.4
Nov. 1	2.5	8.1	.01	58	29	104	3.6	216	122	130	1.0	1.4	.08	575	.78	4.0	265	88	46	2.8	972	7.4
Dec. 7	3.2	5.5	.01	60	31	108	3.6	228	126	133	1.0	1.1	.10	593	.81	4.7	275	88	46	2.8	1,020	7.5
Jan. 4, 1937	3.5	7.5	.01	66	31	101	--	b288	124	132	1.3	1.6	.05	581	.79	4.7	280	95	43	2.6	1,010	8.5
Feb. 11	2.8	6.5	.00	68	28	101	--	236	125	134	1.1	1.6	.24	582	.79	4.7	285	92	44	2.6	1,020	8.2
Mar. 4	1,470	5.5	.01	66	27	101	--	234	123	132	1.2	1.7	.06	582	.79	695	275	83	44	2.6	1,010	7.2
Apr. 5	.9	5.0	.01	62	27	100	--	226	119	121	1.0	1.4	.17	559	.76	175	265	79	45	2.7	969	7.4
May 3	740	9.0	.01	57	16	84	--	172	99	101	.7	2.8	.16	471	.64	481	210	67	46	2.5	804	7.3
June 4	1,470	14	.00	46	18	53	--	148	76	73	.3	1.8	.17	366	.50	1,420	190	68	38	1.7	618	7.1
July 10	1,740	14	.00	48	13	41	--	148	62	56	.5	1.7	.16	314	.43	1,570	174	52	34	1.3	533	7.5
Aug. 3	1,820	16	.00	54	13	38	--	176	55	50	.6	1.9	.21	356	.48	977	188	44	30	1.2	580	7.6
Sept. 4	20	14	.01	54	15	38	--	184	59	52	.6	2.0	.13	373	.51	172	166	45	30	1.2	575	7.3

a Includes 10 parts per million of carbonate (CO<sub>3</sub>).  
 b Values above 200 ppm reported to the nearest 5 ppm.

ARKANSAS RIVER BASIN--Continued  
NORTH CANADIAN RIVER NEAR EL RENO, OKLA.

LOCATION: --At gaging station at bridge on U. S. Highway 81, 2 miles north of court house in El Reno, Canadian County, and 2½ miles downstream from Target Creek.

DRAINAGE AREA: --13, 042 square miles of which 4,899 is probably noncontributing.

RECORDS AVAILABLE: --Chemical analyses: October 1954 to September 1957.

Water temperatures: October 1954 to September 1957.

EXTREMES: 1956-57.--Dissolved solids: Maximum, 642 ppm May 11; minimum, 120 ppm Oct. 16-19.

Hardness: Maximum, 316 ppm May 11; minimum, 82 ppm Oct. 16-19.

Specific conductance: Maximum daily, 1,080 microhms Mar. 19, Apr. 2; minimum daily, 178 microhms Oct. 17.

Water temperatures: Maximum, 90° F Aug. 27; minimum, 38° F Apr. 13.

EXTREMES, 1954-57.--Dissolved solids: Maximum, 1,160 ppm May 1-10, 1956; minimum, 120 ppm Oct. 16-19, 1956.

Hardness: Maximum, 520 ppm May 1-10, 1956; minimum, 80 ppm May 20, Oct. 3-7, 1955.

Specific conductance: Maximum daily, 1,980 microhms May 8, 1956; minimum, 160 microhms Oct. 20, 1955.

Water temperatures: Maximum, 94° F June 12, 1956; minimum, freezing point on several days during November, December, and January 1956.

REMARKS: --Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of discharge for water year October 1956 to September 1957 given in WSP 1511. No flow Oct. 1-14, 22-31, Nov. 1-4, 7-30, Dec. 1 to Mar. 3.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids (residue at 180° C)		Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (microhms at 25°C)	pH	
														Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate				
Oct. 15, 20, 1956	255	--	--	28	8.3	12	110	0	20	12	107	104	14	20	0.5	257	7.6				
Oct. 16-19	63.5	--	--	22	6.6	8.7	92	0	13	0	18	182	6	19	1.4	196	7.4				
Oct. 21	4.60	--	--	34	6.6	29	116	0	35	31	208	112	17	36	1.2	416	8.0				
Nov. 5	19.0	--	--	54	15	51	164	4	87	51	382	55	36	36	1.6	590	8.4				
Nov. 6	4.00	--	--	30	5.1	11	82	0	30	13	153	96	25	20	.5	247	8.0				
Mar. 4-10, 1957	976	--	--	61	33	99	224	0	125	134	588	81	580	104	43	2.5	1,020	7.9			
Mar. 11-20	401	8.0	0.00	66	25	111	238	0	129	128	622	85	673	268	47	2.9	1,050	7.6			
Mar. 21-31	32.5	--	--	54	40	90	236	0	120	126	597	81	52	300	40	2.3	1,000	8.1			
Apr. 1-10	197	10	0.00	61	25	102	226	0	123	111	566	77	301	254	49	2.8	993	7.8			
Apr. 11-19	203	--	--	66	24	115	264	0	118	124	578	79	317	264	48	3.1	965	8.1			
Apr. 20	219	--	--	35	6.9	26	136	0	26	22	187	25	111	116	4	3.3	1,034	8.1			
Apr. 21-26	891	--	--	30	5.8	22	114	0	26	18	174	24	129	99	6	3.3	1,075	7.8			
Apr. 27-30	141	--	--	50	12	50	166	0	65	56	330	45	126	176	40	3.8	1,100	8.2			
May 1-2	324	--	--	51	15	52	156	8	73	57	371	50	325	188	46	3.7	1,095	8.5			
May 3-6	790	--	--	34	8.5	22	125	0	33	20	215	29	459	120	28	.9	529	7.6			
May 7-8	157	--	--	58	19	57	170	12	89	65	485	58	180	222	62	3.6	1,069	8.5			
May 9-10	130	--	--	71	30	94	204	22	139	110	630	86	221	300	96	4.0	2,333	8.8			
May 11	168	--	--	73	33	90	198	22	156	104	642	87	291	316	117	3.8	2,286	8.8			
May 12	151	--	--	50	17	50	184	12	47	58	414	56	169	196	25	3.6	1,659	8.7			
May 13-16	123	--	--	72	30	89	214	20	135	104	621	54	206	304	95	3.9	2,261	8.7			



## LOWER MISSISSIPPI RIVER BASIN

## ARKANSAS RIVER BASIN--Continued

## NORTH CANADIAN RIVER NEAR EL RENO, OKLA.--Continued

Temperature (°F) of water, water year October 1956 to September 1957

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	--					--	65	65	69	80	--	79
2	--					--	63	65	64		--	81
3	--					--	54	65	64		--	72
4	--					--	55	60	61		--	75
5	--					43	61	60	65		--	73
6	--					44	--	72	73		80	73
7	--					40	54	75	75		77	65
8	--					45	54	68	75		76	68
9	--					47	58	79	75		77	63
10	--					50	60	69	75		79	69
11	--					59	57	61	78		80	68
12	--					56	42	70	77		81	67
13	--					59	38	78	74		81	65
14	--					57	49	82	78		80	72
15	59					59	57	82	77		79	63
16	60					51	60	85	76		81	63
17	72					53	73	87	76		79	71
18	64					60	78	84	74		76	68
19	59					57	64	86	72		75	72
20	65					49	66	77	73		77	69
21	--					47	60	78	79		77	68
22	--					47	68	76	75		77	65
23	--					49	60	70	74		79	62
24	--					48	63	70	69		80	66
25	--					40	65	68	72		79	69
26	--					58	68	73	73		86	64
27	--					59	63	80	75		90	65
28	--					--	63	77	78		75	74
29	--					67	63	78	82		77	69
30	--					56	62	72	82		75	58
31	--					57	--	69	--		75	--
Average	--					52	60	72	74		79	69

ARKANSAS RIVER BASIN--Continued  
NORTH CANADIAN RIVER NEAR WETUMKA, OKLA.

LOCATION. --At gaging station at bridge on U.S. Highway 75, 2.3 miles upstream from Wewoka Creek, and 2½ miles northeast of Wetumka, Hughes County. DRAINAGE AREA. --14,290 square miles, of which 4,899 square miles is probably noncontributing.

RECORDS AVAILABLE. --Chemical analyses: October 1953 to September 1957.

Water temperatures: October 1953 to September 1957.

EXTREMES. 1956-57. --Dissolved solids: Maximum, 190 ppm May 26-27.

Hardness: Maximum, 1,400 ppm Dec. 11; minimum, 108 ppm May 26-27.

Specific conductance: Maximum daily, 12,200 microhms Dec. 11; minimum daily, 330 microhms May 27.

Water temperatures: Maximum, 86°F July 30, Aug. 2-3; minimum, freezing point Jan. 10, 14-18, 23, 26, 28, 30.

EXTREMES. 1953-57. --Dissolved solids: Maximum, 25,800 ppm Feb. 8, 1955; minimum, 190 ppm May 26-27, 1957.

Hardness: Maximum, 4,640 ppm Dec. 31, 1954; minimum, 108 ppm May 26-27, 1957.

Specific conductance: Maximum daily, 37,100 microhms Dec. 31, 1954; minimum daily, 330 microhms May 27, 1957.

Water temperatures: Maximum, 92°F Aug. 24-25, 1954; minimum, freezing point on many days during winter months.

REMARKS. --Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of discharge for water year October 1956 to September 1957 given in WSP 1311. No flow Oct. 1-21.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carb. (CO <sub>2</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>		Percent sodium	Specific conductance (microhms at 25°C)	pH	
														Parts per million	Tons per acre-foot	Tons per day	Calcium				Non-carbonate
Oct. 22-31, 1956	13.2	9.0	0.06	94	26	461	7.4	80	0	76	860	0.6	5.2	0.36	1,680	2.30	340	274	74	3,030	7.2
Nov. 1-7	44.6	--	--	112	39	610	--	92	0	79	1,140	--	--	--	2,170	2.95	261	364	13	3,910	7.6
Nov. 8	85.0	--	--	186	48	963	--	108	0	54	1,830	--	--	--	3,340	4.54	767	660	76	5,850	7.9
Nov. 9-10	93.5	--	--	84	27	344	--	128	0	81	630	--	13	--	1,310	1.78	331	320	215	2,410	8.0
Nov. 11	78.0	--	--	100	26	431	--	132	0	64	760	--	22	--	1,580	2.16	335	355	247	2,820	8.1
Nov. 12-17	41.5	--	--	84	20	287	--	124	0	69	520	--	9.9	--	1,150	1.56	129	290	188	2,070	7.9
Nov. 18-20	33.0	--	--	118	31	427	--	158	0	79	800	--	12	--	1,680	2.28	150	420	69	2,950	8.1
Nov. 21-24	27.8	--	--	158	43	647	--	200	0	90	1,220	--	--	--	2,460	3.35	185	570	71	4,320	8.0
Nov. 25-30	23.2	--	--	192	54	802	--	214	0	119	1,520	--	--	--	3,010	4.08	189	700	524	5,270	8.2
Dec. 1	22.0	--	--	212	56	889	--	220	4	132	1,680	--	--	--	3,300	4.48	196	760	573	5,700	8.3
Dec. 2-6	23.2	--	--	256	73	1,207	--	236	0	140	2,150	--	7.1	--	4,160	5.68	262	940	746	72	8.2
Dec. 7	158	--	--	88	20	347	--	122	0	45	640	--	--	--	1,350	1.84	300	200	72	2,860	7.9
Dec. 8	82.0	--	--	41	9.1	151	--	54	0	21	280	--	8.5	--	592	.81	131	140	96	1,100	7.5
Dec. 9-10	39	--	--	144	39	595	--	128	0	83	1,150	--	--	--	2,240	3.05	432	520	415	4,030	7.9
Dec. 11	40.0	--	--	149	86	860	--	120	0	23	4,090	--	--	--	7,480	10.17	808	1,400	1,300	76	24
Dec. 12-20	48.3	--	--	216	49	958	--	186	0	127	1,800	--	--	--	3,430	4.66	457	740	588	74	15
Dec. 21-22	116	--	--	128	32	530	--	112	0	69	1,020	--	--	--	2,060	2.80	645	450	358	72	11
Dec. 23	95.0	--	--	184	42	768	--	84	0	44	1,550	--	--	--	2,870	3.90	736	630	561	73	13

a Values above 200 ppm are reported to the nearest 5 ppm.

ARKANSAS RIVER BASIN--Continued  
NORTH CANADIAN RIVER NEAR WETUMKA, OKLA.--Continued

Chemical analyses, in parts per million, water year October 1956 to September 1957.--Continued

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal-cium (Ca)	Mag-ne-sium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Car-bonate (CO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> ) (B)	Bo-ron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>		Per-cent so-lidum ratio	Specific conduct-ance (micro-mhos at 25°C)	pH	
															Tons per acre-foot	Tons per day	Calcium-magne-sium <sup>a</sup>	Non-carbon-ate				
Dec. 24-26, 1956.....	64.7	--	--	136	37	569	132	0	66	1,100	--	--	--	--	2,180	381	480	382	11	3,610	7.9	
Dec. 27-28.....	68.0	--	--	208	46	826	160	0	115	1,600	--	--	--	--	3,150	578	710	579	13	5,520	8.1	
Dec. 29-31.....	50.0	--	--	130	28	515	134	0	60	975	--	--	15	--	1,940	262	440	330	11	3,420	7.9	
Jan. 1-2, 1957.....	45.5	--	--	151	59	498	166	2	108	1,030	--	--	--	--	2,800	296	620	480	64	3,680	8.3	
Jan. 3-4.....	47.5	--	--	180	63	680	184	4	122	1,350	--	--	--	--	2,100	359	710	552	68	4,670	8.3	
Jan. 5-10.....	59.2	--	--	212	80	816	182	0	112	1,680	--	--	--	--	3,430	466	860	711	67	5,630	8.1	
Jan. 11-20.....	47.9	14	0.02	184	43	748	174	0	101	1,440	0.6	--	--	0.39	3,060	418	396	635	492	72	4,930	7.3
Jan. 21-22.....	62.0	--	--	192	73	781	168	0	108	1,560	--	--	--	--	3,230	439	541	780	642	69	5,310	8.2
Jan. 23, 25.....	131	--	--	23	28	238	82	0	30	460	--	--	15	--	1,060	1.44	375	270	203	66	1,760	8.0
Jan. 24.....	124	--	--	124	51	495	84	0	45	1,050	--	--	--	--	2,020	2.75	676	520	451	67	3,560	7.8
Jan. 26, 29.....	136	--	--	188	63	794	138	0	83	1,600	--	--	--	--	3,280	4.46	1,200	730	617	70	5,290	8.2
Jan. 27-28.....	182	--	--	264	76	1,080	150	6	100	2,200	--	--	--	--	4,380	5.96	2,150	970	837	15	7,260	8.4
Jan. 30-31.....	197	--	--	108	46	425	92	0	70	860	--	--	27	--	1,820	2.48	460	384	67	3,000	8.0	
Feb. 6-10.....	88.8	--	--	112	37	408	92	0	41	1,520	--	--	17	--	1,820	2.48	436	354	67	2,930	8.1	
Feb. 11-20.....	59.6	--	--	196	76	754	168	0	105	1,520	--	--	--	--	3,220	4.38	518	750	612	69	5,200	8.2
Feb. 21-28.....	45.6	--	--	280	27	871	216	2	122	1,700	--	--	--	--	3,530	4.80	435	810	630	13	5,850	8.3
Mar. 1-2.....	48.4	--	--	272	37	902	236	4	118	1,750	--	--	--	--	3,660	4.98	478	830	630	14	6,030	8.3
Mar. 1-2.....	47.0	--	--	240	40	1,160	208	24	351	1,920	--	--	--	--	4,050	5.51	514	765	556	77	6,540	8.6
Mar. 3-6.....	51.2	--	--	224	56	873	222	12	113	1,660	--	--	--	--	3,740	5.09	517	780	588	17	5,740	8.4
Mar. 7-10.....	54.0	--	--	220	66	886	220	8	123	1,720	--	--	--	--	3,710	5.05	541	820	628	13	6,000	8.7
Mar. 11-12.....	50.5	--	--	218	60	923	225	8	125	1,750	--	--	--	--	3,760	5.11	513	790	582	14	6,000	8.4
Mar. 13.....	48.0	--	--	232	59	1,010	208	12	116	1,920	--	--	--	--	3,840	5.22	498	820	631	15	6,330	8.4
Mar. 14-15, 17-19.....	50.8	--	--	204	66	873	223	0	95	1,700	--	--	--	--	3,620	4.92	497	760	568	17	5,710	8.1
Mar. 16, 20.....	44.0	--	--	188	68	892	208	8	108	1,700	--	--	--	--	3,598	4.88	426	750	568	14	5,650	8.3
Mar. 21-29.....	75.1	--	--	212	61	934	203	0	101	1,800	--	--	--	--	3,540	4.81	718	780	614	15	5,950	8.2
Mar. 30-31.....	64.0	--	--	152	44	661	172	2	72	1,280	--	--	--	--	2,460	3.33	423	560	416	12	4,310	8.3
Apr. 1-2.....	44.0	--	--	156	38	601	168	4	68	1,180	--	--	--	--	2,400	3.26	2,850	545	401	71	4,030	8.3
Apr. 3-5.....	3.937	--	--	88	98	118	0	14	14	180	--	--	3.0	--	423	1.56	4,500	140	44	66	788	8.0
Apr. 6-7.....	453	--	--	62	12	178	108	0	23	335	--	--	7.8	--	1,146	1.51	612	265	116	66	1,310	7.9
Apr. 8-10.....	164	--	--	80	20	270	104	0	33	323	--	--	12	--	1,140	1.58	1,270	280	187	66	1,950	7.9
Apr. 11-12.....	164	--	--	160	46	942	118	0	34	1,160	--	--	--	--	2,540	3.45	1,120	380	484	67	4,180	7.7
Apr. 13-14.....	182	--	--	115	32	400	136	0	44	800	--	--	6.3	--	1,620	2.46	694	420	308	67	2,950	7.9



ARKANSAS RIVER BASIN--Continued  
NORTH CANADIAN RIVER NEAR WETUMKA, OKLA.--Continued

Chemical analyses, in parts per million, water year October 1956 to September 1957--Continued

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal-cium (Ca)	Mag-nesium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Car-bonate (CO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> )	Bo-ron (B)	Dis-solved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>		Per-cent so-dium	So-dium ab-sorp-tion ratio	Specific conduct-ance (micro-mhos at 25°C)	pH	
															Parts per million	Tons per acre-foot	Calcium magne-sium	Non-carbon-ate					
June 11, 1957	5,140	--	--	58	8.6	60	168	0	21	105	105	--	3.1	--	358	0.49	4,970	180	42	42	1.9	609	7.4
June 12-14	3,240	--	--	76	14	126	168	0	66	220	220	--	3.6	--	621	.84	5,430	245	108	53	3.5	1,110	8.0
June 15-20	8,448	--	--	48	7.8	57	130	0	27	99	99	--	2.4	--	320	.44	7,300	152	46	45	2.0	592	7.8
June 21-23	4,553	--	--	67	10	103	148	0	44	185	185	--	3.4	--	541	.74	6,650	210	86	52	3.1	941	7.9
June 24-27	6,048	--	--	68	7.8	58	132	0	23	102	102	--	2.5	--	321	.44	5,240	152	44	45	2.0	589	7.8
June 28-30	2,660	--	--	69	12	115	156	0	41	210	210	--	5.8	--	568	.77	4,080	220	94	53	3.4	1,010	8.0
July 1-10	1,960	16	0.07	63	27	122	181	0	73	215	215	0.5	3.0	0.31	656	.86	3,370	265	118	50	3.3	1,120	7.9
July 11-20	1,703	--	--	70	16	106	166	0	68	185	185	--	1.6	--	418	.84	2,840	240	104	49	3.0	1,020	8.0
July 21-31	1,828	--	--	58	17	89	188	0	72	138	138	--	2.8	--	480	.65	2,370	215	78	47	2.6	847	7.6
Aug. 1-5	1,892	--	--	48	21	80	164	0	60	130	130	--	2.2	--	450	.61	2,300	210	74	46	2.4	801	7.6
Aug. 6-7	1,620	--	--	65	28	157	158	0	59	300	300	--	4.0	--	745	1.01	3,260	275	146	55	4.1	1,350	7.7
Aug. 8-10	1,610	--	--	53	19	86	170	0	60	138	138	--	2.0	--	467	.64	2,030	210	72	47	2.6	832	7.6
Aug. 11-18	1,662	--	--	56	16	76	168	0	60	118	118	--	2.3	--	430	.58	1,830	205	66	45	2.3	764	7.7
Aug. 19-20	1,598	--	--	66	22	112	188	0	54	202	202	--	3.9	--	567	.80	948	255	100	49	3.1	1,040	7.8
Aug. 21-29	619	--	--	70	26	131	204	0	61	235	235	--	3.3	--	667	.91	1,110	280	113	50	3.4	1,170	7.8
Aug. 30-31	273	--	--	78	36	203	204	0	57	395	395	--	2.2	--	943	1.28	703	345	177	56	4.8	1,690	7.8
Sept. 1-10	196	--	--	92	60	373	188	0	60	760	760	--	1.4	--	1,560	2.12	826	480	324	63	7.4	2,780	7.5
Sept. 11-14	205	--	--	82	69	466	132	0	64	940	940	--	2.2	--	1,780	2.42	885	490	380	68	9.2	3,190	7.6
Sept. 15-20	2,145	--	--	46	14	101	132	0	36	171	171	--	5.5	--	478	.65	2,770	172	64	56	3.3	808	7.4
Sept. 21-30	1,076	--	--	51	22	95	156	0	41	175	175	--	6.0	--	494	.67	1,440	215	88	49	2.8	902	7.4
Weighted average	1,626	--	--	57	13	--	b143	--	32	179	179	--	--	--	503	0.68	2,210	196	78	51	3.0	863	--

a Values above 200 ppm are reported to the nearest 5 ppm.

b Includes equivalent of individual carbonate values shown above.

## ARKANSAS RIVER BASIN--Continued

## NORTH CANADIAN RIVER NEAR WETUMKA, OKLA.--Continued

Temperature (°F) of water, water year October 1956 to September 1957

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	--	53	38	47	34	45	56	67	72	82	83	81
2	--	57	52	37	37	51	56	68	68	82	86	83
3	--	50	51	39	45	50	--	69	66	85	86	80
4	--	51	53	44	43	47	50	62	67	83	82	80
5	--	51	54	42	45	45	50	62	69	75	80	75
6	--	49	59	--	45	45	55	64	71	78	79	70
7	--	50	45	47	49	40	59	64	70	81	--	70
8	--	41	40	50	53	36	51	68	70	82	79	69
9	--	42	38	50	52	41	54	67	--	82	79	72
10	--	58	34	32	55	51	55	70	68	82	81	75
11	--	61	39	40	51	60	--	65	71	83	83	72
12	--	51	39	35	50	56	40	70	74	84	83	72
13	--	55	55	38	50	54	37	67	78	83	83	72
14	--	60	36	32	--	53	55	68	78	85	84	72
15	--	52	40	32	56	50	55	70	74	85	79	64
16	--	45	48	32	46	50	55	72	75	83	81	69
17	--	41	42	32	42	52	59	71	75	85	82	70
18	--	51	34	32	45	52	60	63	75	85	77	71
19	--	49	42	33	46	48	63	65	72	85	75	69
20	--	56	42	44	45	49	64	67	72	85	77	76
21	--	41	42	54	41	48	62	70	78	84	78	72
22	57	41	43	47	41	48	58	72	74	83	79	67
23	58	41	44	32	40	48	60	62	74	85	79	67
24	60	40	37	33	45	45	65	62	69	83	79	67
25	65	42	34	37	45	45	64	62	70	82	79	76
26	50	38	38	32	45	--	65	67	76	82	79	67
27	51	36	39	--	42	47	66	68	75	84	77	68
28	51	39	39	32	45	50	65	70	77	84	78	65
29	59	34	40	34	--	52	65	71	80	84	78	65
30	60	36	44	32	--	55	66	72	80	86	77	66
31	53	--	41	34	--	61	--	72	--	84	79	--
Average	--	47	43	38	46	49	58	67	73	83	80	71

ARKANSAS RIVER BASIN--Continued  
DEEP FORK NEAR BEGGS, OKLA.

LOCATION --At gaging station at highway bridge, 3 miles upstream from Adams Creek, 4 miles south of Beggs, Okmulgee County, and 8 miles downstream from Flat Rock (Cedarboard) Creek.  
DRAINAGE AREA --2,018 square miles.  
RECORDS AVAILABLE --Chemical analyses: November 1951 to September 1957.

Water temperatures: November 1951 to September 1957.  
EXTREMES, 1956-57.--Dissolved solids: Maximum, 3,690 ppm Nov. 8-10; minimum, 126 ppm May 21-31.

Hardness: Maximum, 1,090 ppm Sept. 14; minimum, 45 ppm Apr. 3-6.  
Specific conductance: Maximum daily, 6,440 micromhos Nov. 9; minimum daily, 113 micromhos May 27.

Water temperatures: Maximum, 92° F July 30; minimum, 33° F Jan. 15-16, 26-27.  
EXTREMES, 1951-57.--Dissolved solids: Maximum, 92° F July 30; minimum, 33° F Jan. 15-16, 26-27.

Hardness: Maximum, 1,310 ppm July 21, 1955; minimum, 16 ppm Sept. 27, 1955.  
Specific conductance: Maximum daily, 10,500 micromhos Jan. 12, 1955; minimum daily, 113 micromhos May 27, 1957.

Water temperatures: Maximum, 97° F July 28, Aug. 6, 16, 18, 1956; minimum, freezing point on many days during winter months.  
REMARKS.--Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of discharge for water year October 1946 to September 1957 given in WSP 1511. No flow Oct. 1 to Nov. 5, Nov. 27-30.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Percent adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	
															Parts per million	Tons per acre-foot	Tons per day	Calcium	Non-magnesium				
Nov. 6, 1956	55.0	--	--	50	24	129	142	0	27	255	--	--	0.7	--	596	0.81	89	225	108	56	3.7	1,120	7.9
Nov. 7	49.0	--	--	72	20	185	182	0	30	370	--	--	1.0	--	851	1.16	113	300	151	57	4.6	1,580	8.1
Nov. 8-10	8.67	--	--	272	42	660	13	0	34	2,050	--	--	1.0	--	3,690	5.07	86	850	840	71	14	6,380	6.8
Nov. 11-20	.65	--	--	208	39	755	32	0	11	1,620	--	--	.9	--	2,920	3.97	5.1	680	654	71	13	5,260	7.0
Nov. 21-26	.12	6.4	0.00	196	45	813	40	0	10	1,700	0.0	0.0	.8	0.24	3,060	4.16	1.0	680	647	72	14	5,180	6.9
Dec. 1-4	5.12	--	--	208	49	742	46	0	12	1,620	--	--	.7	--	2,930	3.98	4.1	720	682	69	12	5,170	7.1
Dec. 5-6	8.00	--	--	40	26	353	84	0	13	720	--	--	.6	--	1,380	1.89	30	330	261	70	6.5	2,520	7.6
Dec. 7-11	12.6	--	--	99	21	137	170	0	34	235	--	--	.7	--	609	8.3	21	210	70	59	4.1	1,110	7.9
Dec. 12, 14	14.0	--	--	42	21	101	150	0	31	175	--	--	.2	--	495	6.7	19	192	69	33	3.2	888	8.1
Dec. 13, 15	9.75	--	--	58	22	172	138	0	39	330	--	--	.2	--	747	1.02	20	235	123	61	4.9	1,360	8.0
Dec. 16-17	8.75	--	--	80	32	221	162	0	41	450	--	--	.1	--	1,020	1.39	24	330	197	59	5.3	1,830	8.0
Dec. 18	12.0	--	--	64	39	292	166	0	55	610	--	--	1.9	--	1,320	1.80	43	420	284	60	6.2	2,300	8.1
Dec. 19	16.0	--	--	81	22	145	104	0	47	300	--	--	1.9	--	876	1.19	38	245	159	56	4.0	1,560	7.9
Dec. 21-22	33.0	--	--	54	24	114	146	0	102	180	--	--	2.2	--	623	8.5	56	235	114	51	3.2	1,030	7.9
Dec. 23	32.0	--	--	88	29	277	126	0	72	540	--	--	2.2	--	1,290	1.75	111	340	236	64	6.5	2,040	8.0
Dec. 24	24.0	--	--	152	40	494	124	0	77	1,020	--	--	2.1	--	2,270	3.09	147	545	444	66	9.2	3,490	8.0
Dec. 25-26	22.5	--	--	58	27	139	102	0	52	390	--	--	2.0	--	976	1.33	59	255	172	63	5.4	1,560	7.7
Dec. 27-31	20.0	--	--	55	23	130	132	0	83	225	--	--	2.2	--	676	0.92	37	230	122	55	3.7	1,100	7.7
Jan. 1-10, 1957	20.1	5.0	.03	52	22	113	174	0	87	170	.5	.5	2.9	.43	594	.81	32	220	78	53	3.3	994	7.4
Jan. 11-20	14.8	--	--	51	24	118	198	0	83	162	--	--	5.0	--	565	.80	23	225	64	53	3.4	1,010	8.1



ARKANSAS RIVER BASIN--Continued  
DEEP FORK NEAR BEGGS, OKLA.--Continued

Chemical analyses, in parts per million, water year October 1956 to September 1957--Continued

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal-cium (Ca)	Mag-nesium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Car-bonate (CO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> ) (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Per-centage so-lidum	So-lidum sorp-tion ratio	Specific conduct-ance (micro-mhos at 25°C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
July 9-12, 1957.....	257	--	--	58	36	123		212	0	23	255	--	2.6	645	0.88	448	290	118	48	3.1	1,170	7.8
July 13-20.....	148	--	--	70	49	173		254	0	30	360	--	5.8	875	1.19	350	275	166	50	3.9	1,570	7.7
July 21-24.....	100	--	--	90	45	202		240	0	35	435	--	2.8	1,010	1.37	273	410	214	52	4.3	1,850	7.7
July 25-31.....	96.4	--	--	61	43	147		232	0	32	300	--	2.6	771	1.05	201	330	140	49	3.5	1,420	7.7
Aug. 1-10.....	59.8	--	--	88	49	207		286	0	40	420	--	2.8	990	1.35	160	420	186	52	4.4	1,820	7.8
Aug. 11-18.....	87.8	--	--	56	48	156		272	0	41	290	--	1.3	783	1.08	188	335	113	50	3.7	1,470	8.1
Aug. 19-20.....	66.0	--	--	132	62	423		210	0	32	920	--	3.6	1,860	2.53	331	585	413	61	7.6	3,240	8.0
Aug. 21-31.....	33.3	9.4	0.01	90	43	238		470	0	39	470	0.5	2.0	1,190	1.62	107	400	187	56	5.2	1,960	7.7
Sept. 1-10.....	16.5	--	--	96	40	231		286	0	35	450	--	1.0	1,090	1.48	49	405	170	55	5.0	1,950	7.9
Sept. 11-13.....	24.3	--	--	90	44	227		282	0	38	445	--	1.0	1,090	1.48	72	405	174	55	4.9	1,940	8.2
Sept. 14.....	54.0	--	--	274	99	818		202	0	22	1,900	--	1.0	3,210	4.37	468	1,090	924	62	11	6,120	8.2
Sept. 15.....	930	--	--	72	22	223		62	0	9.1	490	--	5.1	1,020	1.39	2,560	270	219	64	5.9	1,760	7.5
Sept. 16-26.....	1,477	--	--	23	6.4	34		84	0	15	50	--	2.3	181	.25	722	64	15	46	1.6	325	7.2
Sept. 27-30.....	380	--	--	37	12	51		134	0	20	84	--	1.8	292	.40	300	140	30	44	1.9	519	7.8
Weighted average...	1,914	--	--	20	7.0	30		b 78	--	11	47	--	2.5	183	0.25	946	79	15	45	1.5	301	--

a Values above 200 ppm are reported to the nearest 5 ppm.

b Includes equivalent of individual carbonate values shown above.

ARKANSAS RIVER BASIN

ARKANSAS RIVER BASIN--Continued

DEEP FORK NEAR BEGGS, OKLA.--Continued

Temperature (°F) of water, water year October 1956 to September 1957

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	75	65	52	52	42	57	64	71	73	84	88	83
2	84	62	61	46	39	--	64	70	64	88	90	83
3	81	63	67	47	43	51	56	68	69	87	92	84
4	79	57	69	43	46	53	52	65	72	87	86	86
5	80	56	68	44	51	50	54	67	77	84	82	82
6	81	54	52	47	51	48	67	69	78	87	83	82
7	79	52	45	50	52	42	55	71	80	88	83	80
8	76	51	41	57	52	49	54	69	82	88	83	74
9	77	52	41	44	61	56	55	73	78	--	84	73
10	74	59	42	45	60	63	60	69	86	88	86	76
11	77	59	46	44	57	63	61	73	85	89	86	74
12	76	59	44	46	62	55	48	78	81	89	89	74
13	74	62	63	40	62	57	51	74	79	90	90	75
14	--	63	64	35	64	51	54	76	80	91	87	76
15	74	54	47	33	58	56	55	78	84	88	85	67
16	77	51	54	33	51	57	65	77	83	89	87	69
17	76	52	42	35	57	51	63	69	82	89	78	74
18	64	62	41	37	51	52	70	66	76	87	80	75
19	67	61	45	39	50	53	71	71	78	89	81	77
20	70	50	44	42	--	51	71	77	80	90	86	79
21	70	49	42	52	56	52	70	79	82	88	82	71
22	69	50	45	39	53	51	73	69	79	88	85	72
23	72	55	43	40	51	51	67	69	74	89	82	70
24	71	55	42	39	54	50	67	73	74	86	82	71
25	68	51	45	34	55	49	75	78	78	82	84	71
26	65	45	46	33	51	56	68	74	77	85	85	71
27	66	47	52	33	51	51	69	79	80	89	86	72
28	64	46	54	35	55	58	70	74	81	91	83	72
29	71	43	54	35	--	61	68	72	85	91	84	69
30	62	52	57	36	--	63	70	74	84	92	83	69
31	64	--	54	39	--	63	--	73	--	89	82	--
Average	73	55	50	41	53	54	63	72	79	88	85	75

ARKANSAS RIVER BASIN--Continued  
CANADIAN RIVER NEAR WHITEFIELD, OKLA.

LOCATION.--At gaging station at bridge on State Highway 2, three-quarters of a mile north of Whitefield, Haskell County, and 5 1/2 miles upstream from Snake Creek.  
DRAINAGE AREA.--47,576 square miles, of which 9,700 square miles is probably noncontributing.  
RECORDS AVAILABLE.--Chemical analyses: September 1944 to February 1945; September 1946 to September 1957.  
Water temperatures: September 1944 to February 1945; September 1946 to September 1957.  
EXTREMES, 1956-57.--Dissolved solids: Maximum, 15,000 ppm Nov. 10-11; minimum, 181 ppm May 28.  
Hardness: Maximum, 3,080 ppm Nov. 10; minimum, 88 ppm Feb. 9-11.  
Specific conductance: Maximum daily, 22,900 microhms Nov. 11; minimum daily, 335 microhms May 28.  
Water temperatures: Maximum, 86°F July 29; minimum, freezing point Jan. 17.  
EXTREMES, 1944-57.--Dissolved solids: Maximum, 15,000 ppm Nov. 10-11, 1957; minimum 89 ppm Jan. 2, 5-7, 1948.  
Hardness: Maximum, 3,080 ppm Nov. 10, 1956; minimum 18 ppm Feb. 17, 1948.  
Specific conductance: Maximum daily, 22,900 microhms Nov. 11, 1956; minimum daily, 71.7 microhms Jan. 2, 1948.  
Water temperatures: Maximum, 88°F Sept. 4, 1944; minimum, freezing point on many days during winter months.  
REMARKS.--Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of discharge for water year October 1956 to September 1957 given in WSP 1511.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Percentage sodium	Specific conductance (microhms at 25°C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium	Non-magnesium			
Oct. 1-10, 1956.....	1.01	16	0.01	196	71	603	6.9	168	0	23	1,340	0.1	0.25	7.2	780	642	62	9.4	4,400	7.8	
Oct. 11-20.....	2.98	--	--	204	66	573	--	176	0	20	1,320	--	--	21	780	636	62	8.9	4,420	7.6	
Oct. 21-31.....	2.63	--	--	204	61	562	--	176	0	20	1,320	--	--	18	760	616	62	9.2	4,380	7.9	
Nov. 1-3.....	8.00	--	--	204	63	583	--	174	0	19	1,330	--	--	59	770	628	62	9.1	4,370	8.0	
Nov. 4-7.....	40.2	--	--	152	42	437	--	166	0	22	950	--	2.6	221	550	414	63	8.1	3,320	7.9	
Nov. 8-9.....	212	--	--	226	66	978	--	116	0	71	1,880	--	--	2,120	835	740	72	15	6,140	7.9	
Nov. 10.....	270	--	--	833	244	4,030	--	123	0	64	8,280	--	--	10,940	3,080	2,980	74	32	22,400	7.8	
Nov. 11.....	260	--	--	806	226	4,150	--	79	0	69	8,380	--	--	15,530	2,940	2,880	75	33	22,900	7.6	
Nov. 12.....	229	--	--	486	126	2,440	--	88	0	86	4,880	--	--	5,520	1,730	1,650	75	25	14,100	7.8	
Nov. 13-15.....	178	--	--	335	93	1,700	--	92	0	80	3,390	--	--	3,020	1,220	1,140	75	21	10,200	7.6	
Nov. 16-20.....	97.2	--	--	204	56	973	--	112	0	54	1,920	--	--	932	740	648	74	16	6,080	7.7	
Nov. 21.....	402	--	--	182	53	806	--	140	0	49	1,600	--	--	3,330	670	556	72	14	3,070	7.9	
Nov. 22-23.....	507	--	--	80	29	306	--	108	0	21	1,250	--	1.4	1,710	320	232	68	7.4	2,200	7.8	
Nov. 24-25.....	260	--	--	108	29	429	--	100	0	26	890	--	2.3	1,230	390	308	71	9.9	3,050	7.6	
Nov. 26-30.....	113	--	--	162	43	680	--	120	0	40	1,360	--	--	809	580	482	72	12	4,600	7.8	
Dec. 1-10.....	64.6	10	.00	194	55	731	9.9	170	0	49	1,500	.1	.30	3,020	710	576	69	12	5,240	7.1	
Dec. 11.....	242	--	--	188	59	815	--	156	4	60	1,620	--	--	2,030	710	576	71	13	5,140	8.3	
Dec. 12.....	310	--	--	350	58	1,200	--	128	0	53	2,400	--	--	3,770	940	835	73	17	7,370	8.1	
Dec. 13-14.....	284	--	--	355	86	1,680	--	94	0	48	3,390	--	--	6,290	855	4,820	75	21	10,300	7.9	
Dec. 15-16.....	172	--	--	439	115	2,150	--	102	0	47	4,340	--	--	8,050	10,95	3,740	75	24	12,900	7.9	

ARKANSAS RIVER BASIN

Dec. 17-18, 1956	114	--	--	324	90	1,540	122	0	44	3,100	--	--	5,810	7.90	1,790	1,180	1,080	74	19	9,570	8.1
Dec. 19-20	108	--	296	73	1,350	1,350	138	0	44	2,700	--	--	5,080	6.88	1,460	1,040	927	74	18	8,460	8.1
Dec. 21	678	--	304	71	1,380	1,380	144	4	44	2,720	--	--	5,060	6.91	9,260	1,050	826	74	18	8,140	8.3
Dec. 22-23	1,320	--	204	59	1,978	1,978	112	0	38	1,950	--	--	3,710	5.05	13,220	750	658	74	16	6,130	8.1
Dec. 24-31	342	--	160	49	694	694	116	0	38	1,400	--	--	2,740	3.73	2,530	600	505	72	12	4,630	7.9
Jan. 1-10, 1957	138	--	174	48	685	685	164	0	63	1,330	--	--	2,830	3.85	1,050	630	496	70	12	4,440	7.9
Jan. 11-20	102	--	196	59	792	792	168	0	80	1,520	--	--	3,240	4.41	892	730	592	69	12	5,080	8.1
Jan. 21-22	118	--	186	54	718	718	156	8	71	1,440	--	--	3,100	4.22	988	685	544	70	12	4,820	8.5
Jan. 23	1,570	--	124	24	421	421	110	2	37	840	12	--	1,680	2.28	7,120	410	316	69	9.0	2,870	8.3
Jan. 24	1,730	--	66	17	198	198	98	0	17	400	4.8	--	897	1.22	4,190	235	154	65	5.6	1,550	8.2
Jan. 25-27	1,254	--	106	23	402	402	76	0	25	810	5.4	--	1,640	2.23	5,550	360	298	71	9.2	2,770	8.0
Jan. 28	652	--	304	66	1,300	1,300	60	0	35	2,680	--	--	5,140	6.99	9,050	1,030	981	73	18	8,090	7.9
Jan. 29	556	--	558	138	2,600	2,600	66	0	45	5,330	--	--	10,100	13.74	15,160	1,960	1,910	74	26	15,200	8.0
Jan. 30	1,150	--	351	108	1,700	1,700	74	0	37	3,490	--	--	6,570	8.94	20,400	1,320	1,260	74	20	10,300	8.1
Jan. 31	2,510	--	80	21	278	278	82	0	21	565	5.5	--	1,250	1.70	8,470	285	218	68	7.2	2,010	8.1
Feb. 1	2,940	--	60	16	190	190	64	0	19	390	5.5	--	860	1.17	6,590	215	162	66	5.6	1,470	7.9
Feb. 2	2,480	--	80	20	290	290	60	0	22	590	7.1	--	1,240	1.69	8,300	280	231	69	7.5	2,070	7.8
Feb. 3	1,950	--	66	13	219	219	50	0	21	445	5.9	--	1,000	1.36	5,260	220	179	68	6.4	1,620	7.6
Feb. 4	1,500	--	94	28	348	348	56	0	26	730	5.9	--	1,540	2.09	6,240	350	304	68	8.1	2,580	7.8
Feb. 5-6	6,205	--	46	9.0	97	97	98	0	10	190	5.2	--	502	.68	8,410	152	72	58	3.4	819	8.1
Feb. 7-8	7,040	--	31	6.4	64	64	60	0	9.5	129	3.3	--	364	.50	6,920	104	55	57	2.7	572	7.8
Feb. 9-11	3,700	--	28	4.4	53	53	52	0	14	102	4.0	--	307	.42	3,070	88	46	57	2.5	474	7.8
Feb. 12-13	1,290	--	42	11	116	116	56	0	19	238	4.6	--	615	.84	2,140	152	106	62	4.1	959	7.9
Feb. 14-16	585	--	62	15	190	190	72	0	23	385	5.2	--	934	1.27	1,480	215	157	66	5.6	1,480	7.8
Feb. 17-20	388	--	82	11	394	394	86	0	32	570	4.6	--	1,350	1.84	1,400	250	180	73	8.4	2,120	7.9
Feb. 21-28	340	13	114	28	400	400	120	0	41	810	3.5	66	1,760	2.39	1,620	400	302	69	8.7	2,880	7.9
Mar. 1-4	327	--	132	32	479	479	118	0	47	920	3.2	--	1,340	2.94	1,910	460	364	69	9.7	3,310	8.0
Mar. 5-9-10	1,900	--	80	23	309	309	80	0	25	600	4.0	--	1,260	1.82	6,870	295	230	69	7.8	2,100	7.1
Mar. 6-8	6,827	--	47	12	133	133	76	0	22	262	2.2	--	643	.87	11,850	168	106	83	4.5	1,090	7.9
Mar. 11-16	686	--	95	27	381	381	88	0	31	760	3.6	--	1,520	2.07	2,820	350	278	70	8.9	2,690	7.9

a Values above 200 ppm are reported to the nearest 5 ppm.

ARKANSAS RIVER BASIN--Continued  
 CANADIAN RIVER NEAR WHITEFIELD, OKLA.--Continued

Chemical analyses, in parts per million, water year October 1956 to September 1957.--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonylate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>		Percent adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH		
															Parts per million	Tons per acre-foot	Calcium	Non-carbonate					
Mar. 17, 1957	634	--	--	123	42	531	94	2	57	1,060	--	--	--	--	2,110	2.87	3,610	480	400	71	11	3,570	8.3
Mar. 18	2,860	--	--	74	24	229	108	4	62	440	--	--	4.2	--	1,030	1.40	7,950	285	190	64	5.9	1,760	8.4
Mar. 19-20	4,495	--	--	29	7.7	74	64	0	26	130	--	1.9	--	--	328	1.45	3,980	104	52	61	3.1	562	8.0
Mar. 21-23	6,390	--	--	51	11	152	64	0	18	305	--	2.2	--	--	749	1.02	12,920	173	120	66	5.0	1,200	7.8
Mar. 24-26	6,577	--	--	31	9.8	91	56	0	14	180	--	1.6	--	--	456	.62	8,100	118	72	63	3.6	756	7.8
Mar. 27-29	2,763	--	--	50	11	160	62	0	19	315	--	2.4	--	--	727	.99	5,420	170	119	67	5.3	1,050	7.9
Mar. 30-31	3,440	--	--	34	9.7	100	58	0	14	188	--	1.8	--	--	504	.69	4,680	125	78	64	3.9	821	7.9
Apr. 1-2	2,625	--	--	67	15	195	94	0	37	380	--	3.3	--	--	922	1.25	6,530	230	153	65	5.6	1,540	8.0
Apr. 3-10	32,770	--	--	37	7.7	59	100	0	12	107	--	2.4	--	--	334	.45	29,550	124	42	51	2.3	576	8.0
Apr. 11-15	3,672	--	--	54	16	145	116	0	42	265	--	4.4	--	--	671	.91	6,650	200	105	61	4.5	1,130	8.1
Apr. 16-17	8,825	--	--	31	9.4	55	51	0	19	122	--	3.3	--	--	379	.52	9,030	116	74	51	2.2	566	8.0
Apr. 18-19	6,885	--	--	44	13	116	76	0	23	232	--	2.4	--	--	609	.83	11,320	164	102	61	3.9	971	7.8
Apr. 20	17,600	--	--	29	6.7	88	81	0	12	88	--	3.3	--	--	302	.41	14,350	100	34	51	2.1	448	8.2
Apr. 21	41,600	--	--	59	18	182	94	0	13	370	--	4.4	--	--	914	1.24	102,700	220	143	64	5.3	1,400	8.2
Apr. 22	59,100	--	--	46	10	104	118	4	15	186	--	4.4	--	--	537	.73	85,690	158	55	59	3.6	629	8.3
Apr. 23-30	57,450	--	--	32	6.8	44	98	0	15	74	--	2.8	--	--	286	.39	44,360	108	28	47	1.8	437	7.9
May 1-5	25,320	--	--	43	11	75	108	0	35	135	--	2.3	--	--	430	.58	29,400	154	66	51	2.6	623	7.7
May 6-7	13,900	--	--	62	17	133	134	0	72	235	--	3.8	--	--	673	.92	25,260	225	114	56	3.9	1,130	7.8
May 8-10	9,053	--	--	54	17	102	134	0	66	168	--	3.9	--	--	566	.77	13,830	205	94	52	3.1	940	8.0
May 11-12	4,905	--	--	60	18	137	136	6	67	232	--	4.3	--	--	685	.93	9,070	225	102	57	4.0	1,120	8.4
May 13	6,760	--	--	107	34	309	144	6	81	610	--	6.3	--	--	1,520	2.07	27,740	405	277	62	6.7	2,330	8.3
May 14	39,300	--	--	59	14	134	128	0	57	232	--	6.9	--	--	687	.91	70,780	205	101	59	4.1	1,090	8.2
May 15-17	20,870	--	--	42	9.5	78	111	0	20	142	--	2.8	--	--	432	.59	24,340	144	53	54	2.8	698	8.1
May 18-20	99,300	--	--	36	7.3	52	108	0	17	88	--	2.9	--	--	239	.41	80,160	120	32	48	2.1	50	7.8
May 21-22	38,900	--	--	46	9.0	60	122	4	27	104	--	1.9	--	--	351	.48	36,870	152	46	46	2.1	613	8.4
May 23	128,000	--	--	39	6.7	45	110	4	16	75	--	4.4	--	--	256	.35	88,470	125	28	44	1.7	474	8.5
May 24	84,800	--	--	39	6.7	57	94	8	12	102	--	3.1	--	--	269	.41	69,460	125	34	50	2.2	533	8.4
May 25-27	105,600	--	--	34	7.1	41	100	8	9	98	--	1.0	--	--	261	.35	74,420	114	18	44	1.7	429	8.5
May 28	91,200	--	--	34	3.6	32	102	8	3.8	95	--	2.2	--	--	181	.25	44,570	100	3	41	1.4	335	8.5
May 29-31	51,070	--	--	41	10	39	116	8	38	86	--	2.0	--	--	343	.47	47,300	145	36	47	2.1	573	8.4

ARKANSAS RIVER BASIN

June 1-4, 1957.....	68,950	--	--	40	7.8	54	112	0	25	92	--	1.8	--	299	0.41	55,660	132	40	47	2.0	537	8.0
June 5-6.....	75,200	--	--	37	8.6	44	113	0	21	96	--	1.6	--	232	.34	51,170	128	36	43	1.7	567	7.8
June 7-8.....	38,960	--	--	38	10	37	114	0	36	97	--	1.9	--	504	.41	31,930	136	42	47	2.1	557	7.8
June 9-10.....	24,050	--	--	46	11	74	121	0	37	128	--	2.4	--	377	.51	24,460	160	61	50	2.5	702	7.9
June 11.....	43,300	--	--	63	20	139	115	0	64	270	--	2.6	--	618	.84	72,250	240	146	56	3.9	1,150	7.9
June 12-14.....	25,270	--	--	41	9.1	67	110	0	22	120	--	3.6	--	356	.48	24,290	140	50	51	2.5	635	7.8
June 15-16.....	83,600	--	--	39	8.4	45	114	0	24	178	--	2.2	--	262	.36	59,140	132	38	43	1.7	488	7.9
June 17-20.....	38,620	--	--	40	7.8	64	108	0	16	116	--	2.3	--	331	.45	34,510	132	44	51	2.4	590	7.8
June 21-30.....	26,940	14	.01	37	12	61	116	0	26	113	.5	2.4	.32	372	.51	27,060	142	47	48	2.2	600	7.8
July 1-8.....	8,794	--	--	56	15	86	132	0	31	175	--	3.1	--	509	.69	12,090	200	94	48	2.6	902	7.7
July 9-10.....	3,920	--	--	75	28	135	172	0	53	280	--	6.2	--	776	1.06	8,210	300	161	49	3.4	1,320	8.0
July 11-20.....	2,532	--	--	85	26	183	172	2	60	360	--	1.0	--	943	1.28	6,450	315	174	56	4.4	1,570	8.3
July 21-25, 28, 30-31	2,375	--	--	80	25	158	164	0	56	320	--	4.2	--	871	1.18	5,590	305	170	53	3.9	1,490	7.5
July 26-27, 29	4,933	--	--	94	33	254	144	0	51	530	--	3.6	--	1,120	1.52	14,920	370	232	60	5.7	2,070	7.9
Aug. 1-6.....	2,605	--	--	69	20	123	172	0	60	225	--	3.6	--	620	1.08	4,360	255	115	51	3.4	1,120	7.6
Aug. 7-8.....	2,443	--	--	73	22	184	146	0	42	360	--	3.0	--	818	1.11	5,400	270	152	60	4.9	1,470	7.5
Aug. 10-14.....	4,156	--	--	88	34	210	206	0	144	348	--	8.3	--	972	1.32	10,910	360	191	56	4.8	1,690	7.3
Aug. 15-19.....	2,848	--	--	69	24	137	184	0	103	218	--	6.4	--	672	.91	5,350	270	121	52	3.6	1,200	7.1
Aug. 20.....	2,800	--	--	78	25	187	176	0	64	315	--	5.5	--	795	1.08	5,580	295	152	55	4.2	1,410	7.4
Aug. 21-25.....	2,410	--	--	92	32	217	200	0	90	405	--	3.8	--	1,000	1.36	6,510	360	196	57	5.0	1,740	7.7
Aug. 26-31.....	1,842	--	--	83	29	184	216	0	136	285	--	6.6	--	859	1.17	4,270	325	148	55	4.4	1,500	7.6
Sept. 1-3.....	679	--	--	79	29	194	206	0	96	330	--	3.0	--	912	1.24	1,670	315	147	57	4.7	1,460	8.1
Sept. 4-7.....	491	--	--	99	38	242	241	0	87	455	--	3.1	--	1,160	1.58	1,540	405	208	57	5.2	1,970	8.2
Sept. 8-10.....	417	--	--	111	43	287	233	0	79	585	--	3.2	--	1,460	1.99	1,640	455	264	59	6.1	2,270	8.1
Sept. 11-14.....	452	--	--	109	43	315	216	0	63	630	--	4.9	--	1,530	2.08	1,870	450	273	60	6.5	2,470	7.9
Sept. 15.....	5,140	--	--	76	24	191	148	0	37	385	--	3.2	--	953	1.30	13,230	290	168	59	4.9	1,540	8.0
Sept. 16-21.....	13,620	--	--	38	17	80	117	0	17	158	--	2.4	--	434	.59	15,960	164	68	52	2.7	778	7.8
Sept. 22-24.....	24,100	--	--	37	3.3	74	114	0	23	104	--	2.8	--	319	.43	20,760	106	12	60	3.1	579	7.5
Sept. 25-26.....	14,750	--	--	42	8.5	37	148	0	17	56	--	2.2	--	236	.32	9,400	140	18	36	1.4	421	7.6
Sept. 27-30.....	3,595	--	--	41	14	76	121	0	28	138	--	2.4	--	386	.52	3,750	160	61	51	2.6	694	7.4
Weighted average..	11,560	--	--	42	10	74	b 113	--	24	134	--	--	--	397	0.54	12,390	146	54	52	2.7	872	--

a Values above 200 ppm are reported to the nearest 5 ppm.

b Includes equivalent of individual carbonate values shown above.

## LOWER MISSISSIPPI RIVER BASIN

## ARKANSAS RIVER BASIN--Continued

## CANADIAN RIVER NEAR WHITEFIELD, OKLA.--Continued

Temperature (°F) of water, water year October 1956 to September 1957

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	68	54	40	45	41	42	60	68	70	79	84	77
2	70	58	40	40	38	52	57	67	70	81	84	77
3	69	53	47	40	43	51	61	69	68	83	85	78
4	69	54	--	47	48	50	57	65	69	83	83	78
5	68	55	58	45	47	50	53	62	69	81	78	75
6	67	54	62	46	48	47	54	62	72	78	77	75
7	64	55	54	42	48	43	58	65	74	78	74	72
8	62	50	43	48	52	38	53	65	77	80	76	66
9	62	43	35	45	57	44	52	67	79	82	78	67
10	64	46	35	35	55	48	55	70	73	84	80	68
11	62	52	39	37	54	59	58	--	77	82	81	71
12	65	54	38	37	52	55	57	68	78	84	81	70
13	69	52	34	40	50	53	54	70	76	85	82	71
14	69	50	40	38	52	59	48	67	79	84	82	72
15	65	48	42	35	54	49	53	68	78	83	80	67
16	66	45	36	34	48	50	55	72	76	84	79	--
17	65	42	42	32	45	52	58	70	79	84	79	--
18	64	44	40	33	50	53	61	67	78	85	77	69
19	65	48	46	33	48	52	65	63	77	83	--	72
20	63	47	49	38	48	51	65	66	77	82	77	74
21	60	42	49	54	44	50	64	70	78	82	78	72
22	60	41	46	52	48	50	64	73	75	82	76	68
23	60	43	48	38	47	49	64	68	74	83	75	64
24	62	42	39	38	49	49	64	67	72	82	79	65
25	65	45	38	43	51	49	64	67	72	80	72	65
26	57	40	40	34	50	45	65	67	75	78	77	67
27	55	38	41	34	44	48	65	68	70	82	79	68
28	54	41	43	34	40	47	66	72	73	85	71	67
29	58	--	40	38	--	52	66	72	80	86	76	65
30	63	--	43	36	--	50	66	72	78	85	76	65
31	57	--	44	38	--	55	--	72	--	83	77	--
Average	63	48	43	39	48	50	59	68	75	82	78	70

ARKANSAS RIVER BASIN--Continued

POTEAU RIVER AT WISTER RESERVOIR, NEAR WISTER, OKLA.  
(Formerly Published as Poteau River near Wister, Okla.)

LOCATION (revised).--At release gate at Wister Dam, 700 feet upstream from gaging station, 2 miles south of Wister, Le Flore County. DRAINAGE AREA (revised).--993 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1948, October 1956 to September 1957. Water temperatures: October 1947 to September 1948.

EXTRIMES, 1947-48.--Dissolved solids: Maximum, 108 ppm July 1-10, 1948; minimum, 56 ppm May 1-10, 1948.

Hardness: Maximum, 39 ppm Aug. 1-10, 1948; minimum, 14 ppm May 11-14, 1948; minimum daily, 44.2 micromhos Feb. 27-29, Mar. 2-3, 6-7, 1948.

Specific conductance: Maximum daily, 229 micromhos Apr. 18, 1948; minimum daily, 44.2 micromhos Feb. 27-29, Mar. 2-3, 6-7, 1948.

Water temperatures: Maximum, 86 F June 18, July 22, 27, 31, 1948; minimum, 34 F Jan. 25, 29, 30, 1948.

REMARKS.--Records of discharge for gaging station near Wister for water year October 1956 to September 1957 given in WSP 1511.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>		Percent sodium	Sulfate adsorption ratio	Specific conductance (micromhos at 25°C)	pH	
													Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate					
Oct. 1, 1956	0.4	2.6	0.09	4.5	2.9	7.3	2.5	24	11	5.8	0.3	2.0	0.00	58	0.08	23	4	38	0.7	86.5	6.8
Nov. 1	.7	1.3	.03	5.0	3.0	6.9	2.7	26	9.7	5.4	.0	1.6	.10	49	.07	25	4	34	.6	92.0	6.4
Dec. 5	.3	1.3	.03	5.2	2.7	6.9	2.7	24	9.9	5.5	.1	1.8	.11	48	.07	24	4	35	.6	90.8	6.2
Jan. 4, 1957	.98	2.5	.06	4.8	2.2	3.6	--	18	9.7	4.7	1.1	2.0	.14	49	.07	21	6	28	.3	74.3	5.9
Feb. 14	5,700	6.5	.08	4.0	1.0	3.7	--	11	6.8	3.0	.2	2.5	.04	58	.08	14	5	36	.4	50.5	6.5
Mar. 8	3,570	7.5	.07	4.0	1.9	4.6	--	14	8.2	4.5	.1	2.4	.04	58	.08	18	6	36	.5	63.4	6.6
Apr. 1	1,910	7.2	.10	3.2	1.2	5.4	--	12	12	4.0	.1	1.3	.06	51	.07	13	3	47	.6	50.4	5.8
May 2	4,240	7.4	.12	2.8	1.2	4.9	--	14	11	3.5	.1	1.3	.09	46	.06	12	0	47	.6	44.6	5.9
June 6	8,100	6.4	.04	4.8	1.5	3.9	--	19	6.3	3.8	.6	3.0	.30	50	.07	17	2	32	.4	63.7	6.0
July 3	1,110	6.3	.01	4.0	1.7	3.6	--	18	5.4	3.0	.1	2.2	.16	46	.06	18	2	32	.4	56.9	5.8
Aug. 8	143	6.8	.01	8.0	3.6	4.1	--	32	11	2.8	.1	3.2	.15	68	.09	35	9	20	.3	95.8	5.9
Sept. 2	14	5.6	.05	9.2	3.6	5.9	--	2	43	3.0	.2	2.8	.12	87	.12	38	36	25	.4	121	4.7

## ARKANSAS RIVER BASIN--Continued

## POTEAU RIVER AT CAUTHRON, ARK.

LOCATION.--At gaging station at bridge on county road at Cauthron, Scott County, 8 miles downstream from Jones Creek.  
 DRAINAGE AREA.--200 square miles.  
 RECORDS AVAILABLE.--Chemical analyses: October 1955 to September 1957.  
 REMARKS.--Records of discharge for water year October 1956 to September 1957 given in WSP 1511.

Chemical analyses, in parts per million, December 1956 to September 1957

Date of collection	Discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal- cium (Ca)	Mag- nesium (Mg)	Sodium (Na)	Potas- sium (K)	Bicar- bonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue on evap- oration at 180°C)	Hardness as CaCO <sub>3</sub>		Specific conduct- ance (micro- mhos at 25°C)	pH	Color
														Calcium, mag- nesium	Non- carbon- ate			
Dec. 12, 1956	56			3.5	1.7	3.9	2.0	14	7.6	4.0		3.2	50	16	4	68.8	6.4	35
Jan. 2, 1957	23			3.5	1.7	4.1	1.5	15	7.2	4.5		2.3	52	16	3	67.7	6.5	25
Jan. 24	416			2.8	1.0	3.2	1.0	9	6.4	2.8		2.6	44	11	4	50.6	6.3	15
Feb. 14	124			3.7	1.6	4.1	1.2	10	11	3.8		1.7	46	16	8	70.5	6.4	30
Mar. 25	483			2.6	1.6	3.7	1.0	12	9.2	1.2		2.0	49	13	3	50.4	6.4	--
Apr. 18	220			2.5	1.7	3.5	.8	14	4.8	2.5		.8	42	13	2	47.1	7.0	--
May 6	218			2.0	1.9	2.9	1.0	16	4.0	2.0		.7	41	13	0	44.8	6.9	3
June 24	21			3.8	2.4	3.9	1.2	24	4.4	2.5		1.2	50	19	0	56.6	7.2	--
Aug. 15	275			2.3	1.1	2.2	2.2	10	4.0	2.0		1.7	78	10	2	36.2	6.6	--
Sept. 9	3.6			3.4	2.6	3.5	1.8	26	3.0	2.7		1.4	52	19	0	56.7	6.6	24

ARKANSAS RIVER BASIN--Continued

LEE CREEK NEAR VAN BUREN, ARK.

LOCATION.--At gaging station, 300 feet west of Arkansas-Oklahoma State line, 3.2 miles downstream from Webbbers Creek, 6 1/2 miles northwest of Van Buren, Crawford County, and 7.9 miles upstream from mouth.

DRAINAGE AREA.--427 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1953 to September 1957.

REMARKS.--Records of discharge for water year October 1956 to September 1957 given in WSP 1511.

Chemical analyses, in parts per million, December 1956 to September 1957

Date of collection	Discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue on evaporation at 180°C)	Hardness as CaCO <sub>3</sub>		Specific conductance (micro-mhos at 25°C)	pH	Color
														Calcium	Non-carbonate			
Dec. 20, 1956	36			11	2.5	4.5	1.0	39	6.8	6.0		1.7	58	38	6	105	7.1	13
Jan. 9, 1957	26			14	2.9	5.4	.8	34	6.8	16		1.2	76	47	19	131	7.3	5
Feb. 12	672			8.2	1.5	3.2	.3	25	6.2	3.8		3.9	46	27	6	75.9	7.4	5
Mar. 13	702			8.3	1.6	2.5	.9	32	2.6	3.5		1.4	55	27	1	75.5	7.0	1
Mar. 13	268			8.4	1.7	2.8	.9	30	5.0	4.0		1.1	49	28	3	77.0	7.5	1
May 1	2,580			7.1	1.1	1.7	1.0	23	4.0	2.2		1.4	48	22	3	59.5	7.4	5
May 14	2,810			7.2	1.3	1.9	1.1	28	4.4	2.0		1.0	54	23	0	58.9	7.4	2
July 3	215			10	1.8	3.0	1.4	41	1.2	3.5		1.6	58	32	0	82.9	7.2	-
Aug. 13	3,010			5.4	1.7	1.1	2.3	18	3.8	2.0		2.1	43	16	2	44.0	6.7	45
Sept. 4	31			11	2.0	3.1	1.5	43	2.0	4.0		1.3	58	36	0	87.4	7.1	2

ARKANSAS RIVER BASIN--Continued  
 ARKANSAS RIVER AT VAN BUREN, ARK.

LOCATION.--At gaging station at bridge on U. S. Highways 64 and 71, at Van Buren, Crawford County, 1.3 miles downstream from Lee Creek, 8.6 miles downstream from Poteau River, and at mile 353.4.  
 DRAINAGE AREA.--150,483 square miles, of which 22,241 square miles is probably noncontributing.  
 RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1957.  
 Water temperatures: October 1945 to September 1957.

EXTREMES: 1956-57.--Dissolved solids: Maximum, 3,970 ppm Nov. 17; minimum, 110 ppm Mar. 22.  
 Hardness: Maximum, 725 ppm Nov. 17; minimum, 46 ppm Feb. 11-18.  
 Specific conductance: Maximum daily, 6,060 micromhos Nov. 17; minimum daily, 156 micromhos Feb. 14.  
 Water temperatures: Maximum, 86°F July 31; minimum, freezing point Jan. 16.  
 EXTREMES: 1945-57.--Dissolved solids: Maximum, 3,830 ppm Apr. 19, 1954; minimum, 110 ppm Mar. 22, 1957.  
 Hardness: Maximum, 1,100 ppm Apr. 1, 1954; minimum, 40 ppm Mar. 20, 1955.  
 Specific conductance: Maximum daily, 8,986 micromhos Apr. 1, 1954; minimum daily, 132 micromhos May 11, 1948.

Water temperatures: Maximum, 92°F Aug. 6, 1956; minimum, freezing point on many days during winter months.  
 REMARKS.--Records of specific conductance of daily samples available in district office at Fayetteville, Ark. Records of discharge for water year October 1956 to September 1957 given in WSP 1311.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Bo-ron (B)	Dissolved solids (residue of 180°C)		Hardness as CaCO <sub>3</sub>	Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	Color		
														Parts per million	Tons per acre-foot							Tons per day	
Oct. 1-6, 1956	422	5.8	0.00	89	19	264	13	190	78	450	0.1	5.1	0.00	1,180	1,410	300	144	6.6	1,940	7.4	5		
Oct. 7-10	401	--	--	83	19	182	--	220	48	315	--	3.3	.05	1,847	1,917	285	104	58	4.7	1,450	8.1	7	
Oct. 11-19	426	--	--	67	19	161	--	190	49	265	--	3.7	.00	730	.98	840	245	90	59	4.5	1,270	8.1	7
Oct. 20-22	598	--	--	79	21	230	--	180	66	390	--	3.7	.05	962	1.31	1,550	284	136	64	5.9	1,670	8.2	5
Oct. 23-24	582	--	--	93	23	353	--	170	91	605	--	3.4	--	1,370	1.86	2,150	326	187	70	8.5	2,390	8.0	5
Oct. 25-28	600	--	--	81	19	266	--	166	76	460	--	4.3	.10	1,080	1.47	1,750	280	144	67	6.9	1,900	8.1	10
Oct. 29-31	599	--	--	71	19	200	--	161	62	340	--	5.8	.00	857	1.17	1,390	255	123	63	5.4	1,500	8.0	10
Nov. 1, 4-6	1,133	--	--	70	19	211	--	137	59	380	--	4.1	.10	911	1.24	2,790	252	140	64	5.8	1,570	7.9	7
Nov. 7-8	1,177	--	--	85	20	312	--	153	77	540	--	3.3	.10	1,200	1.63	2,680	294	168	70	7.9	2,110	8.0	10
Nov. 8, 10	1,174	--	--	105	27	449	--	126	80	810	--	3.8	--	1,710	2.33	5,420	373	270	72	10	2,950	7.9	7
Nov. 9	1,240	--	--	--	--	--	--	117	114	1,040	--	2.0	--	2,320	3.02	7,430	450	354	--	--	3,700	8.1	--
Nov. 11-14	1,998	--	--	79	18	292	--	136	67	510	--	3.9	.10	1,150	1.56	4,030	271	160	70	7.7	2,000	8.0	10
Nov. 15	1,967	--	--	--	--	--	--	120	54	600	--	2.1	--	1,480	2.01	3,660	350	252	--	--	2,460	8.2	--
Nov. 16, 18	1,104	--	--	148	38	618	--	106	65	1,220	--	3.5	--	2,310	3.14	6,890	526	439	72	12	4,130	7.6	5
Nov. 17	1,220	--	--	200	55	950	--	94	70	1,860	--	4.4	--	3,970	5.40	13,060	725	648	74	15	6,060	7.6	5
Nov. 19, 22	1,265	--	--	103	30	452	--	120	62	830	--	3.7	.10	1,770	2.41	6,140	380	262	72	10	2,940	7.8	5
Nov. 20-21, 23	1,467	--	--	90	22	351	--	120	59	640	--	5.1	.10	1,350	1.84	5,350	315	216	71	8.6	2,390	7.7	5
Nov. 24-30	1,529	4.6	0.00	64	17	200	11	120	49	368	.1	5.1	.15	873	1.19	3,600	230	191	64	5.7	1,510	7.6	5
Dec. 1-9	1,319	4.6	0.00	67	15	177	8.9	140	43	318	.1	3.9	.10	797	1.08	2,840	228	184	62	5.1	1,370	7.5	5
Dec. 10-13	1,990	--	--	58	12	142	--	125	54	235	--	2.5	.05	595	.81	3,200	194	92	61	4.4	1,060	7.1	5

ARKANSAS RIVER BASIN

Dec. 14-15, 1986..	2,960	--	--	45	11	118	--	97	42	205	513	.70	4,100	158	78	62	4.1	921	8.0	10	
Dec. 16 a.....	2,520	--	--	--	--	--	--	115	54	265	840	1.14	5,720	234	140	--	--	1,400	8.2	--	
Dec. 17-18.....	1,837	--	--	90	16	303	--	116	47	570	1,250	1.70	6,200	291	196	69	7.7	2,110	7.9	10	
Dec. 20-21, 25-27.	2,442	--	--	104	30	392	--	110	49	760	1,630	2.22	10,750	383	293	69	8.7	2,690	7.6	10	
Dec. 22, 24.....	3,710	--	--	48	10	130	--	86	34	235	623	.85	6,240	161	90	64	4.5	1,040	7.7	10	
Dec. 23 a.....	3,820	--	--	--	--	--	--	66	46	46	386	.52	3,880	112	58	--	--	644	7.7	--	
Dec. 28-31.....	2,180	--	--	89	20	319	--	110	52	580	1,280	1.74	7,530	304	214	70	7.9	2,200	7.6	10	
Jan. 1-7, 1987....	1,730	5.1	--	73	16	208	11	126	60	385	950	1.29	4,440	248	144	63	5.7	1,590	8.0	5	
Jan. 8-13.....	1,673	--	--	62	17	169	--	119	54	310	772	1.05	3,490	224	127	62	4.9	1,330	7.8	10	
Jan. 14-19.....	1,283	--	--	71	22	207	--	137	60	380	921	1.25	3,190	268	156	63	5.5	1,570	8.0	10	
Jan. 20-21.....	1,275	--	--	65	15	163	9.8	137	53	302	828	1.13	2,850	224	112	60	4.7	1,280	7.7	6	
Jan. 22-23.....	3,215	--	--	58	5.0	106	7.6	108	41	188	474	.64	4,110	165	76	57	3.6	890	7.7	7	
Jan. 24-28, 30....	7,192	--	--	20	5.7	44	4.3	44	25	80	228	.31	4,430	73	37	55	2.2	396	6.8	8	
Jan. 29, 31, Feb. 3-6, 8-10...	14,880	--	--	17	2.8	27	3.8	38	20	47	184	.25	7,390	54	23	50	1.6	270	6.6	9	
Feb. 1-2, 7.....	14,870	--	--	24	5.9	64	4.9	40	18	126	341	.46	13,690	84	51	61	3.0	535	7.2	7	
Feb. 11-18.....	11,520	--	--	12	3.9	20	3.0	34	21	30	134	.18	4,170	46	18	47	1.3	197	6.6	8	
Feb. 19-26.....	6,753	2.5	--	41	7.7	65	3.1	90	48	112	359	.49	6,550	134	60	54	2.8	610	7.1	15	
Feb. 27-28, Mar. 1-2, 6-7...	9,508	--	--	20	6.6	29	3.7	52	30	50	192	.26	4,930	77	34	44	1.4	304	7.1	8	
Mar. 3-5, 8-11...	10,820	2.0	--	30	6.9	55	3.0	62	28	100	299	.41	8,730	103	52	53	2.4	491	7.0	17	
Mar. 12, 16-18, 20	7,106	--	--	39	8.8	77	6.8	83	37	139	432	.59	8,290	134	66	54	2.9	677	7.2	3	
Mar. 13-15.....	6,660	--	--	43	9.1	111	7.7	76	40	212	551	.75	9,910	145	82	61	4.0	886	7.2	5	
Mar. 19 a.....	8,070	--	--	--	--	--	--	51	36	60	217	.30	4,730	81	39	--	--	362	8.2	--	
Mar. 21, 23-24, 26, 30-31.....	18,230	--	--	20	6.2	42	2.8	51	28	72	230	.31	11,320	75	34	54	2.1	362	7.7	40	
Mar. 22 a.....	15,600	--	--	--	--	--	--	43	16	22	110	.15	4,630	79	44	--	--	183	8.0	--	
Mar. 25, 27-29	19,100	--	--	14	4.5	27	2.5	41	18	46	160	.22	8,250	53	20	51	1.6	258	7.7	10	
Apr. 1.....	97,560	--	--	33	5.5	52	4.4	90	24	82	271	.37	71,380	105	31	51	2.2	462	8.0	25	
Apr. 2-6.....		--	--																		

a Not included in weighted average. Dissolved solids and loads estimated from specific conductance.

ARKANSAS RIVER BASIN--Continued  
 ARKANSAS RIVER AT VAN BUREN, ARK.--Continued

Chemical analyses, in parts per million, water year October 1956 to September 1957--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Percent adsorption	Sodium ratio	Specific conductance (microhmhos at 25°C)	pH	Color
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate					
Apr. 7, 1957 a.....	97,800	--	--	--	--	--	--	b78	12	54	--	0.9	--	203	0.28	53,600	65	1	--	--	338	8.3	--
Apr. 8 a.....	89,400	--	--	38	7.8	75	5.0	c93	17	55	--	4.1	--	223	.30	53,830	112	36	--	--	371	8.3	--
Apr. 9-15, 17.....	54,840	--	--	38	7.8	75	5.0	100	37	124	--	1.1	0.10	374	.51	55,380	127	45	55	2.9	641	8.0	20
Apr. 16, 18-20, 24, 27-30.....	117,900	3.4	0.08	35	5.4	49	3.0	91	30	80	0.3	2.2	.05	282	.38	89,310	110	35	48	2.0	466	8.0	25
Apr. 21 a.....	96,600	--	--	--	--	--	--	77	17	99	--	1.3	--	217	.30	56,600	97	34	--	--	362	8.2	--
Apr. 22-23, 25-26.....	162,000	--	--	40	7.2	69	4.8	108	28	112	--	3.9	.05	363	.49	158,600	130	41	53	2.6	641	7.9	20
May 1-4.....	136,200	--	--	33	6.8	55	4.4	90	33	84	--	3.2	.05	286	.39	105,200	110	37	51	2.3	490	8.0	20
May 5, 10-11.....	85,970	--	--	43	7.2	67	5.4	112	47	106	--	3.6	.00	372	.51	86,350	137	45	50	2.5	600	7.5	10
May 6-9.....	97,680	--	--	49	9.6	129	7.4	104	66	205	--	6.1	.00	570	.78	150,300	162	77	62	4.4	977	7.8	15
May 12, 14, 16-20.....	128,700	3.7	.18	46	8.6	99	4.8	107	54	163	0	4.2	1.0	486	.66	168,900	150	63	58	3.5	816	8.2	20
May 13, 15.....	72,900	--	--	53	10	168	10	106	72	275	--	4.3	--	697	.95	137,200	173	86	66	5.6	1,100	7.8	25
May 21-23.....	273,300	--	--	49	7.4	100	5.8	116	57	153	--	2.9	.00	480	.65	354,200	152	58	58	3.5	774	7.8	7
May 24-26, 30-31.....	323,200	--	--	39	5.0	48	4.2	104	33	73	--	2.9	.05	288	.39	251,300	118	33	46	1.9	476	7.9	8
May 27-29.....	460,300	--	--	38	3.1	29	3.6	100	27	42	--	4.0	.00	238	.32	285,800	108	26	36	1.2	358	7.3	8
June 1-2, 4, 9-11.....	234,000	--	--	38	6.8	45	4.2	102	37	70	--	2.7	.02	293	.40	185,100	123	39	43	1.8	458	7.4	10
June 3, 5-8.....	256,200	--	--	41	7.7	58	4.4	110	38	90	--	3.4	.10	344	.47	238,000	134	44	47	2.2	548	7.5	10
June 12-16.....	222,800	--	--	44	7.1	58	4.7	102	45	84	--	3.0	1.15	344	.47	206,900	139	56	46	2.1	541	7.5	9
June 17-20.....	223,200	--	--	36	6.3	32	4.4	102	29	52	--	1.8	.05	260	.35	156,700	116	32	36	1.3	393	7.4	12
June 21-23, 26-28.....	194,000	3.9	.07	46	8.6	67	5.6	110	44	112	4	2.9	.00	384	.52	201,100	150	60	48	2.4	627	7.4	12
June 24-25, 28-30.....	176,800	--	--	41	7.5	47	5.2	109	43	70	--	2.3	.02	307	.42	146,500	133	44	42	1.8	483	7.9	8
July 1-5.....	159,000	--	--	41	7.4	49	6.0	110	40	76	--	2.6	.01	315	.43	135,200	133	43	43	1.8	505	7.6	8
July 6 a.....	140,000	--	--	41	7.4	49	6.0	110	40	76	--	2.6	.01	315	.43	135,200	133	43	43	1.8	505	7.6	8
July 7 a.....	141,000	--	--	41	7.4	49	6.0	110	40	76	--	2.6	.01	315	.43	135,200	133	43	43	1.8	505	7.6	8
July 8-16.....	107,900	7.4	.00	39	6.8	42	4.7	101	39	64	4	1.8	.00	283	.38	82,450	135	42	41	1.6	460	7.5	14
July 17-27.....	37,430	--	--	46	8.7	78	5.4	104	56	123	--	2.0	.00	411	.56	41,540	151	66	52	2.8	673	7.7	10
July 28-30.....	24,670	--	--	57	13	134	7.4	114	76	225	--	2.2	.00	630	.86	41,960	196	102	59	4.2	1,050	7.7	8
July 31, Aug. 1.....	20,800	--	--	66	18	194	8.8	123	104	320	--	1.6	.05	862	1.17	48,410	238	138	63	5.4	1,430	7.9	10
Aug. 2-4.....	16,630	--	--	52	12	110	6.6	117	66	182	--	2.0	.05	545	.74	24,470	179	84	56	3.6	826	7.5	12
Aug. 5-7.....	12,330	--	--	65	17	149	8.3	146	90	242	--	2.0	.05	691	.94	23,000	232	112	57	4.3	1,170	8.0	10
Aug. 8-12, 15.....	12,120	--	--	81	18	238	11	148	113	300	--	1.8	.05	971	1.32	31,780	276	154	64	6.2	1,670	8.0	8



## LOWER MISSISSIPPI RIVER BASIN

## ARKANSAS RIVER BASIN--Continued

## ARKANSAS RIVER AT VAN BUREN, ARK.--Continued

Temperature (°F) of water, water year October 1956 to September 1957

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	72	55	45	48	41	47	55	69	72	77	85	80
2	72	58	44	38	40	49	57	67	71	83	86	81
3	72	57	44	38	42	49	59	69	71	80	86	80
4	73	61	49	44	--	48	52	64	73	85	85	80
5	70	58	55	44	44	48	53	65	71	84	83	79
6	71	56	49	45	46	49	52	67	71	83	81	76
7	70	55	55	42	48	46	53	66	74	82	80	74
8	65	49	49	44	50	46	50	67	78	80	83	75
9	64	46	43	50	51	46	51	68	74	81	82	74
10	64	52	38	48	58	48	54	72	74	82	84	73
11	64	57	41	42	52	52	57	68	76	82	84	75
12	62	54	43	43	52	50	50	70	73	83	83	74
13	63	52	41	47	51	58	51	70	74	84	84	74
14	70	60	44	38	51	58	54	70	77	85	83	74
15	68	58	44	37	51	55	50	71	79	84	84	73
16	62	46	42	32	51	55	54	75	72	83	80	75
17	65	48	44	34	51	52	58	71	79	84	79	70
18	66	51	42	34	50	52	60	73	78	85	80	75
19	65	48	44	35	48	50	62	69	71	83	79	74
20	70	54	46	38	--	50	64	69	78	82	80	75
21	65	44	46	44	43	49	63	70	78	82	80	73
22	64	47	44	50	48	51	64	72	79	83	80	73
23	65	42	45	38	47	49	64	73	77	82	79	70
24	65	47	41	41	50	50	66	68	75	81	79	--
25	65	43	45	41	51	50	65	69	75	82	79	68
26	57	40	41	39	49	46	66	71	75	80	81	70
27	65	39	41	40	46	47	66	74	76	82	81	69
28	61	46	39	39	47	47	72	73	78	84	81	69
29	60	37	45	40	--	49	67	74	80	85	80	69
30	62	38	45	39	--	51	69	73	81	85	81	68
31	58	--	44	40	--	54	--	73	--	86	81	--
Average	66	50	44	41	48	50	59	70	75	83	82	74

ARKANSAS RIVER BASIN--Continued  
MULBERRY RIVER NEAR MULBERRY, ARK.

LOCATION --At gaging station a quarter of a mile upstream from Mill Creek, 5 miles northeast of Mulberry, Crawford County, and 11.3 miles upstream from mouth. DRAINAGE AREA --372 square miles.

RECORDS AVAILABLE --Chemical analyses: October 1953 to September 1957.

Water temperatures: October 1955 to September 1956.

EXTREMES, 1955-56 --Dissolved solids: Maximum, 126 ppm July 6; minimum, 25 ppm Dec. 1-10, Jan. 23.

Hardness: Maximum, 44 ppm July 6; minimum, 10 ppm Jan. 11-20, Jan. 23, Feb. 1-10, Mar. 1-10, May 1-10.

Specific conductance: Maximum daily, 146 micromhos July 6; minimum daily, 24.3 micromhos Feb. 18.

Water temperatures: Maximum, 88° F July 15, 16; minimum, 34° F Dec. 16-19, Jan. 20, 21.

REMARKS --Records of specific conductance of daily samples available in district office at Fayetteville, Ark. Records of discharge for water year October 1956 to September 1957 given in WSP 1511.

Chemical analyses, in parts per million, November 1956 to September 1957

Date of collection	Discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue on evaporation at 180°C)	Hardness as CaCO <sub>3</sub>		Specific conductance (micro-mhos at 25°C)	pH	Color
														Calcium	Non-carbonate			
Nov. 8, 1956	36			4.9	1.5	3.6	0.7	26	1.6	3.5		1.3	28	18	0	62.9	7.3	5
Dec. 20	67			2.8	1.2	2.4	.4	14	2.8	2.8		.8	26	12	1	41.8	7.3	15
Jan. 9, 1957	61			2.5	1.0	2.4	.4	12	3.2	2.8		.4	25	10	1	41.8	6.9	10
Feb. 21	825			2.1	1.1	2.0	.4	7	4.4	2.0		.8	26	10	4	35.3	7.1	15
Mar. 14	258			1.8	1.2	1.4	.6	11	.8	2.0		.5	28	9	0	29.2	7.1	2
Apr. 5	4,330			1.8	1.2	.9	.7	9	.8	1.5		.9	34	9	2	28.5	6.8	1
May 16	1,830			1.6	1.1	1.0	.7	12	2.0	1.5		.5	32	8	0	27.1	7.0	2
June 12	1,130			2.1	.9	1.3	.6	13	1.6	1.0		1.1	29	9	0	27.7	7.3	--
July 10	45			3.0	1.6	1.4	.9	18	1.0	2.0		.5	37	14	0	36.2	7.2	1
Aug. 7	4.3			4.1	1.8	1.9	1.0	24	1.2	2.5		.8	34	18	0	47.5	7.5	7
Sept. 5	15			3.6	2.0	2.0	1.2	20	1.8	2.5		.7	29	17	0	43.2	6.6	1

ARKANSAS RIVER BASIN--Continued  
PINEY CREEK NEAR DOVER, ARK.

LOCATION.--At gaging station, 7 1/2 miles downstream from Indian Creek, and 10 miles north of Dover, Pope County.  
DRAINAGE AREA.--274 square miles.  
RECORDS AVAILABLE.--Chemical analyses: October 1953 to September 1957.

Water temperatures: October 1955 to September 1956.  
EXTREMES, 1945-56.--Dissolved solids: Maximum, 72 ppm Aug. 16; minimum, 34 ppm June 21-30.  
Hardness: Maximum, 44 ppm Sept. 21-30; minimum, 14 ppm Feb. 1-10.

Specific conductance: Maximum daily, 152 micromhos Sept. 23; minimum daily, 27.0 micromhos Feb. 17.  
Water temperatures: Maximum, 92°F July 15, Aug. 16; minimum, 36°F Jan. 18.

REMARKS.--Records of specific conductance of daily samples available in district office at Fayetteville, Ark. Records of discharge for water year October 1956 to September 1957 given in WSP 1511.

Chemical analyses, in parts per million, November 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue on evaporation at 180°C)	Hardness as CaCO <sub>3</sub>		Specific conductance (micro-mhos at 25°C)	pH	Color
														Calcium magnesium	Non-carbonate			
Nov. 8, 1956	0.5			12	2.6	3.1	1.0	50	2.4	2.0		3.1	52	41	0	102	7.8	5
Dec. 19	33			6.5	1.8	2.3	.3	28	3.4	2.5		.8	38	24	1	63.5	7.4	5
Jan. 8, 1957	36			7.0	1.8	3.0	.4	26	6.0	2.0		.4	33	25	4	66.8	7.2	10
Feb. 20	653			4.4	1.2	1.5	.2	16	3.2	2.0		.9	26	16	3	45.9	6.9	7
Mar. 15	148			4.8	1.7	1.1	.7	21	3.0	1.5		.5	30	19	2	39.7	7.4	1
Apr. 4	7,810			2.6	1.5	.8	.9	14	.4	3.0		.7	34	13	1	31.1	6.9	1
May 16	1,440			3.7	1.6	.9	.8	18	2.4	3.0		.3	30	16	1	35.0	7.2	1
June 12	1,010			3.9	1.1	.8	.7	16	2.4	1.2		.6	30	14	1	36.3	7.6	7
July 10	66			6.0	1.5	1.2	.9	28	1.0	1.0		.6	37	21	0	50.1	7.5	2
Aug. 6	13			9.8	2.3	1.6	.9	43	1.4	1.2		.6	48	34	0	71.8	7.4	5
Sept. 4	92			8.2	1.4	1.7	1.2	34	2.2	1.5		.5	39	26	0	60.5	7.5	4

ARKANSAS RIVER BASIN--Continued  
ILLINOIS BAYOU NEAR SCOTTSVILLE, ARK.

LOCATION --At gaging station at bridge on county road, 1 1/4 miles north of Scottsville, Pope County, and 3 miles downstream from North Fork Illinois Bayou.

RECORDS AVAILABLE--242 square miles  
--Chemical analyses: October 1953 to September 1957.

Water temperatures: October 1955 to September 1956.  
EXTREMES, 1955-56.--Dissolved solids: Maximum, 86 ppm Oct. 22; minimum, 25 ppm Nov. 21-30; Jan. 11-20.

Hardness: Maximum, 22 ppm Oct. 22, Aug. 29; minimum, 8 ppm Jan. 1-10.  
Specific conductance: Maximum daily, 87.9 micromhos Oct. 22; minimum daily, 22.1 micromhos Feb. 18.

Water temperatures: Maximum, 88 F July 4, Aug. 7; minimum, 54 F Jan. 19-21.  
REMARKS.--Records of specific conductance of daily samples available in district office at Fayetteville, Ark. Records of discharge for water year October 1956 to September 1957 given in WSP 1511.

Chemical analyses, in parts per million, November 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue on evaporation at 180° C)	Hardness as CaCO <sub>3</sub>		Specific conductance (micro-mhos at 25° C)	pH	Color
														Calcium-magnesium	Non-carbonate			
Nov. 8, 1956	0.4			3.8	2.3	2.9	0.5	22	4.2	3.5		0.6	30	19	1	57.2	7.0	5
Dec. 18	58			3.1	1.1	2.2	.5	14	3.6	2.0		1.1	18	12	1	39.2	7.2	10
Jan. 9, 1957	51			2.9	.9	2.2	.3	13	2.2	2.5		1.0	22	11	0	37.5	7.0	30
Feb. 8	3,970			2.3	.6	1.6	.4	11	2.0	1.0		.8	25	8	0	30.6	7.0	5
Mar. 14	156			1.8	1.1	1.0	.6	10	2.8	2.0		.7	26	9	1	27.6	7.3	2
Apr. 3	21,900			2.3	1.0	.5	1.1	8	3.2	1.0		2.2	39	10	3	29.2	6.1	2
May 15	1,170			1.8	1.2	1.2	.8	12	1.8	1.5		.8	32	9	0	24.6	7.2	2
June 11	1,390			2.4	1.2	1.2	.9	12	3.0	1.2		.7	28	11	1	28.4	6.9	5
Aug. 5	8.2			3.0	1.7	1.5	.8	20	1.2	1.2		.6	33	14	0	40.5	7.1	8
Sept. 4	74			3.5	1.2	1.5	1.1	18	1.0	1.9		.8	32	14	0	34.9	7.2	7
Sept. 10	40			2.5	1.7	1.1	.8	16	2.0	1.5		.7	30	17	0	31.7	6.7	2

ARKANSAS RIVER BASIN--Continued  
 ARKANSAS RIVER AT DARDANELLE, ARK.

LOCATION.--At gaging station at bridge on State Highway 7, at Dardanelle, Yell County, 1 mile upstream from Whig Creek, 4.7 miles downstream from Illinois Bayou, and at mile 255.8.

DRAINAGE AREA.--153,707 square miles, of which 22,241 square miles is probably noncontributing.

RECORDS AVAILABLE.--Chemical analyses: October 1948 to September 1957.

Water temperatures: October 1948 to September 1957.

EXTREMES, 1956-57.--Dissolved solids: Maximum, not determined; minimum, 119 ppm Apr. 3-4.

Hardness: Maximum, 510 ppm Nov. 24; minimum, 44 ppm Apr. 3-4.

Specific conductance: Maximum daily, 4,100 microhos Nov. 24; minimum daily, 130 microhos Apr. 3.

Water temperatures: Maximum, 90°F Aug. 2, 3; minimum, 35°F Jan. 17.

EXTREMES, 1948-57.--Dissolved solids: Maximum, 3,140 ppm Apr. 4-6, 1954; minimum, 65 ppm Feb. 18, 1956.

Hardness: Maximum, 583 ppm Apr. 4-6, 1954; minimum, 52 ppm Feb. 18, 1956.

Specific conductance: Maximum daily, 5,310 microhos Apr. 4, 1954; minimum daily, 107 microhos Mar. 21, 1955.

Water temperatures: Maximum, 94°F Aug. 17, 1952; minimum, freezing point Jan. 30, 1949, Feb. 1-3, 1951.

REMARKS.--Records of specific conductance of daily samples available in district office at Fayetteville, Ark. Records of discharge for water year October 1956 to September 1957 given in WSP 1511.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (microhos at 25°C)	pH	Color	
														Parts per million	Tons per acre-foot 3	Calcium, magnesium	Non-carbonate					
Oct. 1-3, 1956 ..	644	--	--	66	19	139	--	182	45	240	--	3.2	--	680	0.92	242	94	56	3.9	1,160	7.9	10
Oct. 4-5 .....	632	--	--	72	19	230	--	159	60	390	--	4.1	--	1,390	1.31	258	127	66	6.2	1,630	7.8	5
Oct. 6-7 .....	532	--	--	82	30	346	--	142	82	610	--	4.0	--	1,740	1.89	328	212	70	8.3	2,380	7.7	10
Oct. 8-12 .....	493	--	--	101	30	483	--	138	100	845	--	5.0	--	1,240	2.37	376	262	74	11	3,130	7.4	5
Oct. 13-17 .....	441	--	--	81	23	302	--	176	80	510	--	4.5	--	1,240	1.69	296	152	69	7.7	2,100	7.9	7
Oct. 18-20 .....	541	--	--	81	20	240	--	194	69	395	--	3.4	--	983	1.35	284	125	65	6.2	1,730	7.9	10
Oct. 21-31 .....	668	6.5	0.00	69	18	147	8.4	197	47	255	0.1	4.4	--	718	.98	246	84	55	4.1	1,240	7.9	5
Nov. 1-2, 7-9 ..	1,133	--	--	73	15	197	--	174	62	325	--	2.8	--	840	1.14	244	101	64	5.5	1,460	8.0	10
Nov. 3-6, 10 ..	980	--	--	79	18	242	--	174	71	410	--	2.9	--	999	1.36	271	128	66	6.4	1,730	8.0	5
Nov. 11-13 .....	1,367	--	--	71	19	225	--	146	57	390	--	1.3	--	938	1.28	340	255	66	6.1	1,580	7.9	13
Nov. 14, 18-22 ..	1,505	--	--	79	22	274	--	136	56	500	--	1.2	--	1,140	1.55	430	288	67	7.0	1,940	7.7	8
Nov. 15-17 .....	1,440	--	--	99	29	431	--	138	63	780	--	1.0	--	1,690	2.30	366	253	72	9.8	2,830	7.8	13
Nov. 23, 25 .....	1,880	--	--	109	38	489	--	112	94	920	--	1.2	--	1,920	2.81	428	336	71	10	4,100	7.7	13
Nov. 24 a .....	1,880	--	--	--	--	--	--	104	44	1,180	--	1.8	--	62,450	3.33	510	425	--	--	4,100	7.7	13
Nov. 26-29 .....	2,062	--	--	80	22	300	--	115	35	1,570	--	1.2	--	1,270	1.73	290	196	69	7.7	2,130	7.6	15
Nov. 30, Dec. 1-6	1,607	--	--	63	15	186	--	124	33	340	--	1.9	--	849	1.15	218	117	65	5.5	1,400	7.9	15
Dec. 7-9 .....	3,393	--	--	32	7.1	78	--	70	20	140	--	1.9	--	398	.54	350	109	52	3.2	648	7.6	22
Dec. 10-21 .....	2,898	--	--	44	11	108	--	96	37	196	--	1.0	--	514	0.70	420	155	76	60	884	7.7	13
Dec. 22-24, 26, 28	3,676	--	--	53	16	154	--	88	28	298	--	1.0	--	698	.95	630	198	126	63	1,190	7.8	10
Dec. 25, 29-31 ..	3,598	--	--	74	22	270	--	86	32	555	--	1.3	--	1,190	1.62	11,560	275	204	69	2,010	7.5	17
Dec. 27 a .....	4,780	--	--	--	--	--	--	80	24	195	--	2.2	--	5,505	.69	66,520	142	76	--	845	8.1	--

ARKANSAS RIVER BASIN

Jan. 1-3, 1957...	2,803	--	78	20	273	--	88	26	540	--	1.5	1,160	1.58	8,760	276	204	68	7.2	1,970	7.4	10	
Jan. 4-6 .....	2,327	--	67	17	222	--	96	37	415	--	1.7	948	1.28	5,960	257	156	67	6.3	1,620	7.5	12	
Jan. 7-13 .....	2,325	7.4	58	15	169	8.4	114	46	305	1.1	3.5	898	1.22	5,640	206	112	63	5.1	1,300	8.2	5	
Jan. 14-20 .....	1,824	--	56	13	145	--	114	36	285	--	1.7	642	.87	3,160	183	100	62	4.5	1,140	7.6	15	
Jan. 21 a .....	1,680	--	--	--	--	--	c118	18	280	--	2.4	b712	.97	65,610	209	112	--	--	1,190	8.4	--	
Jan. 22-23, 25,	12,700	--	17	4.6	38	3.1	46	20	56	--	2.6	173	.24	5,830	61	24	56	2.1	296	7.2	30	
Jan. 24 a .....	9,640	--	--	--	--	--	82	12	156	--	1.1	b426	.58	611,090	131	64	--	--	713	8.2	--	
Jan. 25-28, 31...	11,760	--	22	6.1	53	3.6	54	23	88	--	3.0	239	.33	7,560	80	36	58	2.6	419	7.7	33	
Feb. 1-2, 6, 9 ..	23,700	--	19	5.0	43	3.0	42	16	78	--	2.6	227	.31	14,530	68	34	57	2.3	359	7.4	40	
Feb. 3, 5 .....	13,900	--	26	6.1	70	3.7	46	22	131	--	3.1	348	.47	13,060	90	52	62	3.2	552	7.5	15	
Feb. 4 a .....	14,000	--	--	--	--	--	52	8.0	300	--	1.0	b676	.92	625,550	171	128	--	--	1,130	7.9	--	
Feb. 7-8, 10-16 ..	25,410	--	17	3.6	22	2.9	44	13	41	--	3.3	154	.21	10,570	57	21	44	1.3	247	7.2	10	
Feb. 17, 22-23, 25	13,180	--	21	6.8	43	2.7	54	32	72	--	2.8	201	.27	7,150	80	36	53	2.1	375	7.5	15	
Feb. 18-21, 26-28	16,230	--	14	5.0	25	2.2	40	19	40	--	1.7	220	.18	5,780	56	23	48	1.5	228	7.3	30	
Feb. 24 a .....	11,300	--	--	--	--	--	65	16	103	--	.7	b316	.43	6,640	113	60	--	--	528	8.0	--	
Mar. 1 a .....	18,800	--	--	--	--	--	39	6.0	31	--	1.0	b125	.17	6,340	56	24	--	--	209	7.9	--	
Mar. 2-8 .....	13,270	--	21	5.6	34	3.0	54	24	56	--	2.2	186	.25	6,660	75	31	48	1.7	332	7.4	10	
Mar. 9, 13-14, 19-23	11,780	--	29	7.5	58	4.4	68	33	100	--	2.5	297	.40	9,450	103	47	54	2.5	511	7.5	15	
Mar. 10-12, 15-18	12,070	--	37	9.6	89	4.9	68	35	170	--	3.6	470	.64	15,320	132	76	58	3.4	740	7.2	23	
Mar. 24 a .....	23,600	--	--	--	--	--	51	11	39	--	.8	b180	.22	210,200	72	30	--	--	268	7.9	--	
Mar. 25-31 .....	27,260	--	20	5.5	43	3.2	50	19	72	--	2.1	226	.31	16,630	72	32	55	2.2	366	7.5	40	
Apr. 1-2, 5-8 .....	104,600	--	29	4.4	39	3.2	78	18	67	--	2.6	240	.33	67,780	90	27	47	1.8	405	6.8	7	
Apr. 3-4 .....	129,100	--	15	1.5	10	2.1	41	7.6	18	--	2.4	119	.16	41,480	44	10	32	.7	154	6.9	7	
Apr. 10-18, 23-24,	83,690	3.1	36	6.6	57	3.9	90	33	94	.2	2.3	309	.42	69,820	117	43	50	2.3	548	6.9	9	
Apr. 20-22, 25,	168,900	--	30	4.9	40	3.6	80	23	66	--	2.3	228	.31	104,000	95	29	47	1.8	373	7.7	7	
Apr. 27-30 .....	144,800	--	32	6.4	51	3.8	89	31	78	--	1.9	267	.38	143,100	106	33	50	2.2	459	7.0	8	
May 1-6 .....	118,000	--	46	8.0	95	5.3	105	45	155	--	3.9	449	.61	143,100	148	62	57	3.4	760	6.9	7	
May 7-8, 11, 17-20	91,400	--	50	10	138	6.8	100	73	215	--	2.5	596	.81	147,100	166	84	63	4.7	1,020	7.5	7	
May 9-10, 16 .....	81,400	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

c Includes equivalent of 4 parts per million of carbonate (CO<sub>3</sub>).

a Not included in weighted average.

b Dissolved solids and loads estimated from specific conductance.

## LOWER MISSISSIPPI RIVER BASIN

 ARKANSAS RIVER BASIN--Continued  
 ARKANSAS RIVER AT DARDANELLE ARK.--Continued

Chemical analyses, in parts per million, water year October 1956 to September 1957--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> ) (Fe)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Boron (B)	Dissolved solids (residue at 180°C)		Parts per million	Tons per acre-foot	Tons per day	Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	Color
														Calcium	Non-carbonate										
May 12-15, 1957...	74,920	--	--	33	6.3	69	4.1	80	41	105	--	1.7	332	0.45	67,160	43	57	2.9	557	7.7	12				
May 21-23, 1957...	300,200	--	--	39	6.2	64	3.8	106	29	104	--	1.5	335	.46	271,500	123	36	2.5	563	7.9	6				
May 22-25, 1957...	270,000	--	--	--	--	--	--	134	90	180	--	2.2	b 538	.73	b 392,200	179	69	--	900	7.9	--				
May 26-31, June 1-2	387,100	--	--	36	4.8	34	3.3	110	25	50	--	1.6	238	.32	248,800	110	19	3.9	394	7.5	3				
June 3-17, 1957.....	251,700	--	--	40	6.8	49	3.7	98	34	78	--	1.3	287	.39	185,000	128	39	4.5	452	7.7	7				
June 18-21, 1957.....	226,800	--	--	34	5.4	30	3.8	99	24	46	--	1.6	223	.30	136,800	107	28	3.7	369	7.5	7				
June 22-26, 1957.....	190,200	--	--	39	6.4	41	4.2	108	30	70	--	1.5	285	.39	146,400	124	35	4.1	444	7.5	8				
June 27-29, 1957.....	187,300	--	--	47	7.5	75	5.2	110	51	120	--	1.6	402	.55	203,300	148	51	2.7	478	7.4	7				
June 30, July 1-6	166,000	--	--	40	6.4	47	5.0	108	38	72	--	1.8	297	.40	133,100	128	38	4.4	478	7.4	7				
July 7-8, 1957.....	143,500	--	--	52	8.4	85	6.3	116	60	136	--	1.8	453	.62	175,500	164	70	5.2	708	7.7	7				
July 9-15, 1957.....	126,600	--	--	40	6.3	41	4.4	100	39	64	--	2.3	281	.38	96,050	126	44	4.0	457	7.4	7				
July 16-18, 1957.....	58,930	--	--	44	7.5	52	4.7	106	48	82	--	1.5	321	.44	51,970	141	54	4.3	540	7.8	8				
July 19-25, 1957.....	39,640	6.7	0.03	50	7.8	80	5.9	114	64	126	0.2	2.1	437	.59	45,770	157	64	5.1	752	7.4	10				
July 26-29, 1957.....	29,100	--	--	54	10	100	5.8	116	65	162	--	1.0	507	.69	39,830	176	80	5.4	809	7.8	8				
July 30-31, Aug. 1	24,330	--	--	66	11	140	6.8	124	69	242	--	1.2	642	.87	42,170	210	108	5.8	1,100	7.6	5				
Aug. 2-4, 1957.....	21,330	--	--	67	18	182	7.5	130	95	305	--	8	807	1.10	46,480	241	134	6.1	1,380	7.9	8				
Aug. 5-10, 1957.....	14,650	--	--	56	13	121	6.0	134	69	195	--	8	572	.78	22,630	193	83	5.7	3.8	959	7.8	7			
Aug. 11-12, 1957.....	13,050	--	--	73	17	182	7.8	156	86	305	--	8	799	1.09	26,150	252	124	6.0	1,350	7.7	7				
Aug. 13-17, 1957.....	41,100	--	--	--	--	--	--	80	96	150	--	1.6	b 985	.54	b 43,830	134	60	5.0	863	7.9	--				
Aug. 14-17, 1957.....	30,420	--	--	41	11	104	5.2	89	52	175	--	0.9	481	.65	39,510	148	64	5.9	3.7	854	7.9	7			
Aug. 18-20, 1957.....	31,530	--	--	33	7.3	61	3.6	88	36	91	--	1.0	413	.48	26,650	112	40	5.3	2.5	753	7.5	10			
Aug. 21-23, 1957.....	19,330	--	--	41	9.8	98	4.6	103	54	152	--	1.1	437	.59	22,810	144	58	5.9	4.6	756	7.1	8			
Aug. 24-26, 1957.....	15,230	--	--	48	11	134	5.9	110	57	218	--	1.1	573	.78	23,390	165	75	6.3	965	7.9	8				
Aug. 29-31, 1957.....	11,800	--	--	60	14	165	7.4	128	74	272	--	0.8	717	.98	22,940	102	62	4.5	1,100	7.6	8				
Sept. 1-3, 9-10, 1957.....	8,768	--	--	65	18	185	8.6	122	92	305	--	1.8	684	1.13	19,740	236	112	6.2	1,370	7.7	8				
Sept. 4-8, 11, 1957.....	7,167	--	--	55	15	130	7.3	142	64	215	--	1.6	655	.89	12,670	196	82	5.8	1,060	7.7	5				
Sept. 12-16, 21, 1957.....	13,500	--	--	64	17	192	8.2	140	72	330	--	1.6	892	1.21	32,510	230	115	6.3	5.5	1,410	7.8	10			
Sept. 19-20, 22-23, 1957.....	39,380	--	--	56	13	143	6.8	125	47	285	--	3.7	650	.88	69,110	193	90	6.1	4.5	1,100	7.8	10			
Sept. 24, 27-30, 1957.....	40,100	--	--	45	9.0	100	5.7	103	56	138	--	3.0	458	.62	49,890	150	65	5.8	3.6	810	7.9	13			
Sept. 25-26, 1957.....	51,200	--	--	41	8.4	59	4.7	121	33	97	--	2.2	391	.53	54,050	137	38	4.7	2.2	570	8.1	10			
Weighted average	d 61,050	--	--	38	6.6	56	--	100	34	88	--	1.9	312	0.42	51,430	122	40	5.0	513	--	14				

a Not included in weighted average.

b Dissolved solids and loads estimated from specific conductance.

c Mean discharge for water year October 1956 to September 1957 was 60,460 cfs.

## ARKANSAS RIVER BASIN--Continued

## ARKANSAS RIVER AT DARDANELLE, ARK.--Continued

Temperature (°F) of water, water year October 1956 to September 1957

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	75	65	44	47	42	53	58	69	74	79	88	84
2	74	61	45	43	42	51	61	69	72	80	90	81
3	77	60	47	43	41	51	59	68	72	82	90	83
4	79	64	49	44	41	50	58	67	72	83	85	83
5	79	63	50	46	41	50	56	66	72	84	85	83
6	80	62	57	47	42	49	57	66	74	85	83	80
7	77	62	54	46	47	48	57	67	75	85	83	76
8	74	54	53	47	53	47	55	67	77	85	84	76
9	73	52	44	48	55	49	57	68	76	84	85	77
10	72	53	--	45	55	49	56	70	76	84	86	78
11	73	58	46	44	55	51	59	70	78	84	84	79
12	74	55	45	44	55	49	54	74	77	85	80	77
13	73	57	45	44	54	52	54	70	77	84	79	79
14	74	60	43	40	54	52	54	70	77	85	83	79
15	73	60	48	39	51	56	53	71	78	86	84	74
16	74	52	47	36	50	55	54	73	77	86	84	77
17	74	52	48	35	50	49	58	74	77	87	81	76
18	74	51	46	37	49	55	60	73	78	87	81	76
19	72	49	46	36	49	56	62	73	79	87	81	75
20	71	50	48	38	50	53	57	70	79	86	82	76
21	71	49	48	45	49	51	63	71	79	84	82	74
22	73	45	47	49	50	51	64	72	77	83	82	73
23	74	46	47	45	52	50	63	72	76	85	82	73
24	73	48	45	42	53	52	66	70	77	85	81	72
25	69	47	44	41	53	51	65	69	76	84	83	72
26	68	44	45	39	51	50	65	72	76	85	84	72
27	64	44	46	39	52	50	65	71	76	85	84	73
28	65	44	45	40	52	51	65	72	76	87	84	72
29	65	42	44	41	--	54	68	73	78	88	84	72
30	62	42	46	41	--	55	69	73	79	87	84	72
31	64	--	46	41	--	55	--	74	--	88	85	--
Average	72	53	47	42	50	51	60	70	76	85	84	76

ARKANSAS RIVER BASIN--Continued  
 ARKANSAS RIVER AT LITTLE ROCK, ARK.

LOCATION.--At gaging station at Missouri Pacific Railroad bridge at Little Rock, Pulaski County, at mile 165.5.  
 DRAINAGE AREA.--158,201 square miles, of which 22,241 square miles is probably noncontributing.  
 RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1957.

Water temperatures: October 1945 to September 1957.  
 EXTREMES, 1956-57.--Dissolved solids: Maximum, 1,830 ppm Nov. 29; minimum, 105 ppm Mar. 3.

Hardness: Maximum, 410 ppm Nov. 29; minimum, 46 ppm Feb. 2-4, 9, 12-18.  
 Specific conductance: Maximum, 88°F Aug. 3; minimum, 35°F Jan. 16, 17.

Water temperatures: Maximum, 88°F Aug. 3; minimum, 35°F Jan. 16, 17.  
 EXTREMES, 1945-57.--Dissolved solids: Maximum, 2,400 ppm Nov. 28-29, 1953; minimum, 105 ppm Mar. 3, 1957.

Hardness: Maximum, 556 ppm Nov. 28-29, 1953; minimum, 46 ppm Feb. 2-4, 9, 12-18, 1957.  
 Specific conductance: Maximum, 5,050 microhos Apr. 8, 1954; minimum daily, 173 microhos Feb. 4, 1957.

Water temperatures: Maximum, 98°F Aug. 16, 1954, July 5, 1956; minimum, freezing point Dec. 19, 1945, Feb. 10, 11, 1947, Jan. 28, 29, 1948.

REMARKS.--Records of specific conductance of daily samples available in district office at Fayetteville, Ark. Records of discharge for water year October 1956 to September 1957 given in WSP 1511.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>		Per cent sodium	Sodium adsorption ratio	Specific conductance (microhos at 25°C)	pH	Color	
														Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate						
														per million	per acre-foot	Calcium, magnesium	Non-carbonate						
Oct. 1-4, 1956	1,288	--	--	54	15	85	--	180	32	138	--	1.6	--	445	0.61	1,510	196	48	49	2.6	779	8.0	8
Oct. 5-11	1,363	6.9	0.00	43	11	70	5.0	138	23	116	0.1	3.2	--	374	.51	1,380	132	40	49	2.5	658	8.2	5
Oct. 12-14	1,153	--	--	44	13	103	--	120	38	178	--	1.7	--	471	.64	1,470	164	65	58	3.5	850	8.0	8
Oct. 15-16	940	--	--	62	15	175	--	137	48	300	--	4.2	--	710	.97	1,800	216	104	64	5.2	1,300	7.9	7
Oct. 17-21	970	--	--	58	21	252	--	147	58	430	--	4.4	--	982	1.34	2,570	256	136	68	6.9	1,760	7.6	7
Oct. 22-27	1,133	--	--	58	17	157	--	160	46	265	--	3.0	--	652	.89	1,990	214	84	61	4.7	1,230	7.6	8
Oct. 28-31	1,162	--	--	58	15	118	--	171	32	195	--	4.1	--	527	.72	1,650	201	61	56	3.6	984	8.0	7
Nov. 1-8	1,285	--	--	54	14	100	--	165	36	168	--	3.3	--	449	.61	1,680	192	57	53	3.1	882	8.0	10
Nov. 9-19	1,661	--	--	65	18	174	--	160	57	300	--	3.6	--	733	1.00	3,330	236	105	62	4.9	1,350	7.9	7
Nov. 20, 24-28	2,173	--	--	71	22	236	--	145	62	415	--	2.7	--	963	1.31	5,650	268	148	66	6.3	1,690	7.7	7
Nov. 21-25, 30	1,920	--	--	83	25	314	--	136	69	580	--	3.7	--	1,240	1.69	6,430	310	198	89	7.8	2,250	7.7	8
Nov. 29 a	2,510	--	--	--	--	--	--	111	68	860	--	1.7	--	1,830	2.49	12,400	410	319	--	--	3,110	8.0	--
Dec. 1-4	1,952	--	--	70	23	263	--	120	54	480	--	4.0	--	1,020	1.39	5,390	269	170	68	7.0	1,880	7.5	13
Dec. 5-8	2,464	--	--	56	16	154	--	119	44	280	--	4.7	--	637	.87	4,240	206	108	82	4.7	1,220	7.7	7
Dec. 10-16	4,717	--	--	26	7.5	60	--	66	29	103	--	2.7	--	279	.38	3,550	96	42	58	2.7	518	7.6	23
Dec. 17-20, 24, 30	4,198	--	--	34	8.6	83	--	79	32	146	--	2.0	--	345	.47	3,910	120	56	60	3.3	876	7.3	10
Dec. 21-25, 25-27	4,511	--	--	41	9.1	110	--	79	38	196	--	4.9	--	434	.59	5,290	140	76	63	4.0	841	7.2	10
Dec. 28 a	6,200	--	--	--	--	--	--	87	24	365	--	1.4	--	823	1.12	13,780	204	133	--	--	1,400	8.0	--

ARKANSAS RIVER BASIN

Jan. 1-7, 1957...	3,706	--	--	59	17	206	8.6	81	31	405	--	4.3	950	1.29	9,510	217	150	66	6.1	1,530	7.6	5
Jan. 8-10.....	3,383	--	--	47	15	153	6.9	88	40	285	--	5.8	592	.94	6,320	170	107	64	5.0	1,120	7.8	12
Jan. 11-21.....	2,758	3.0	14	48	12	130	4.6	105	43	225	.1	3.5	682	.81	4,410	170	84	62	4.3	985	7.6	12
Jan. 22 a.....	4,100	--	--	--	--	--	--	101	20	131	--	3.1	363	.52	4,240	139	56	--	--	652	8.2	--
Jan. 23 a.....	10,900	--	--	--	--	--	--	67	40	76	--	2.5	232	.32	6,830	92	37	--	--	395	7.9	--
Jan. 24-25, 27-31	29,700	--	--	13	4.0	21	1.8	36	11	36	--	3.0	140	.19	11,230	49	19	47	1.3	202	7.0	45
Jan. 26 a.....	22,400	--	--	--	--	--	--	46	34	91	--	3.8	244	.33	14,760	84	46	--	--	415	7.8	--
Feb. 1, 5, 7-8, 10-11	45,130	--	--	15	4.5	32	2.6	39	14	60	--	1.5	205	.28	24,980	56	24	54	1.9	268	7.5	38
Feb. 2-4, 9, 12-18	34,280	--	--	13	3.4	21	2.2	39	11	34	--	2.8	138	.19	12,770	46	14	48	1.3	209	7.1	5
Feb. 6 a.....	34,100	--	--	--	--	--	--	42	6.0	140	--	2.9	329	.45	30,280	90	56	--	--	560	7.7	--
Feb. 19, 24-27.....	21,260	--	--	17	4.9	35	2.4	45	18	56	--	2.4	188	.26	10,780	53	26	54	1.9	301	7.9	20
Feb. 20-23, 28.....	23,460	--	--	14	4.5	21	1.9	40	17	36	--	2.2	136	.18	8,250	53	21	45	1.2	223	7.6	30
Mar. 1, 4-10.....	32,400	--	--	17	4.1	26	2.4	42	20	44	--	2.6	142	.19	8,580	59	25	48	1.5	256	7.8	15
Mar. 2 a.....	30,400	--	--	--	--	--	--	36	12	32	--	3.0	114	.16	9,360	50	40	--	--	194	7.8	--
Mar. 3 a.....	28,200	--	--	--	--	--	--	40	36	27	--	2.6	105	.14	8,280	50	7	--	--	179	7.8	--
Mar. 11, 14-19.....	15,970	--	--	23	6.5	55	2.8	52	22	98	--	1.5	276	.38	11,800	85	42	58	2.6	464	7.5	20
Mar. 12-13.....	22,400	--	--	33	8.4	72	5.2	60	20	148	--	1.8	410	.56	24,800	117	68	56	2.9	679	7.4	18
Mar. 20-25, 27-30	32,240	--	--	17	4.8	39	2.8	42	28	62	--	2.9	190	.26	18,540	62	28	56	2.2	320	7.7	30
Mar. 26 a.....	43,200	--	--	--	--	--	--	44	6.0	29	--	2.8	114	.16	13,900	52	16	--	--	194	7.8	--
Mar. 31 a.....	35,400	--	--	--	--	--	--	38	10	48	--	3.8	146	.20	13,950	58	27	--	--	248	7.7	--
Apr. 1-5.....	83,860	--	--	17	4.0	25	2.4	50	14	40	--	2.0	161	.22	40,800	59	18	47	1.4	248	6.9	25
Apr. 6-11.....	163,200	--	--	28	4.9	27	3.1	77	20	60	--	2.3	215	.29	95,000	90	26	46	1.7	329	7.3	20
Apr. 12-16, 20.....	74,900	5.1	.03	27	6.1	50	3.4	74	26	80	.2	1.3	261	.35	54,800	92	53	59	2.3	440	7.7	10
Apr. 19, 21-23.....	95,200	--	--	27	5.2	36	3.2	72	26	56	--	2.5	217	.30	55,760	86	30	47	1.8	338	7.3	18
Apr. 24-26.....	215,000	--	--	32	4.7	52	3.5	86	25	54	--	3.2	277	.38	161,200	98	29	52	2.3	460	7.6	16
Apr. 29-30, May 1-5.....	217,700	--	--	27	5.1	41	3.6	74	27	64	--	2.2	226	.31	132,800	88	28	49	1.9	388	7.0	15
May 6-8.....	173,300	--	--	37	7.0	56	4.0	98	28	92	--	2.6	306	.42	143,200	121	41	49	2.2	518	7.9	15
May 9-12, 17-24	166,900	--	--	--	43	7.3	100	5.3	107	46	--	2.1	453	.62	205,000	138	50	60	3.7	769	7.4	15
May 13-16, 25-26	183,000	--	--	33	5.7	60	4.0	86	39	90	--	2.3	303	.41	149,700	106	35	54	2.5	512	7.1	15
May 27-31, June 1-4	395,200	--	--	37	4.2	36	3.9	96	30	54	--	2.7	232	.32	250,100	100	31	41	1.5	379	7.5	12

a Not included in weighted averages. Dissolved solids and loads estimated from specific conductance.

ARKANSAS RIVER BASIN--Continued  
 ARKANSAS RIVER AT LITTLE ROCK, ARK.--Continued

Chemical analyses, in parts per million, water year October 1956 to September 1957--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Per cent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	Color
														Parts per million	Tons per acre-foot	Tons per day	Calcium	Non-carbonate					
June 5-10, 16-17, 1957	288,100	--	--	38	6.4	54	4.8	102	34	86	--	3.5		316	0.43	245,800	121	38	48	2.1	497	8.0	12
June 11-15, 18-19, 25-27	235,800	--	--	35	5.8	42	4.1	99	29	66	--	2.7		259	.35	164,800	111	30	44	1.7	424	8.0	15
June 20-22	230,300	--	--	32	6.4	28	4.3	92	23	48	--	2.2		216	.29	134,900	106	31	35	1.2	343	7.1	15
June 23-24, 28-30	202,600	--	--	43	7.9	62	5.2	102	44	102	--	2.5		370	.50	202,400	140	56	51	2.5	582	7.5	15
July 1-7, 10	168,200	--	--	44	7.2	46	5.0	122	44	74	--	.9		314	.43	142,600	139	39	41	1.7	544	7.3	7
July 8-9	148,000	--	--	54	7.0	73	6.1	132	56	120	--	1.9		434	.59	173,400	164	56	48	2.5	707	7.4	8
July 11-19	107,500	6.8	0.00	43	6.6	40	4.9	116	39	62	0.2	2.0		286	.39	83,010	134	39	38	1.5	478	7.4	5
July 20-28	47,500	--	--	46	7.0	64	4.8	106	49	106	--	.9		367	.50	47,070	144	57	48	2.3	620	7.6	7
July 29-31, Aug. 1	39,370	--	--	44	10	88	5.0	107	56	140	--	.6		441	.60	46,880	151	64	55	3.1	728	7.7	7
Aug. 2-6, 7	27,200	--	--	50	13	124	5.6	110	62	205	--	1.2		78	.74	42,010	178	88	59	4.0	928	7.8	7
Aug. 3-5, 8-10	22,100	--	--	54	12	121	5.3	118	66	205	--	1.0		547	.74	32,640	184	88	58	3.9	966	8.0	7
Aug. 11-15	42,340	--	--	40	9.3	81	4.2	97	44	135	--	1.4		374	.51	43,750	138	58	55	3.0	689	8.0	7
Aug. 16-20	69,580	--	--	25	4.1	53	3.6	64	29	95	--	1.4		267	.36	50,160	179	27	58	2.6	464	7.8	7
Aug. 21, 29-31	30,020	--	--	30	7.3	67	4.1	79	31	112	--	1.5		314	.43	25,450	105	40	57	2.8	563	7.6	10
Aug. 22-25	41,950	--	--	25	6.2	49	3.6	76	26	75	--	2.0		243	.33	27,460	88	26	54	2.3	428	7.6	7
Aug. 26-28	28,330	--	--	34	7.4	73	2.2	88	27	124	--	.6		374	.51	28,610	116	44	57	3.0	647	7.6	8
Sept. 1-5, 7-8	15,840	--	--	44	11	106	2.1	111	55	166	--	.8		472	.64	20,160	155	64	59	3.7	954	7.6	7
Sept. 4-5	113,230	--	--	44	13	116	2.1	110	69	166	--	.8		472	.64	21,470	164	73	60	3.9	961	7.5	8
Sept. 9-13	10,680	--	--	46	12	106	2.0	124	54	170	--	.8		466	.60	14,300	164	83	57	3.6	864	7.5	10
Sept. 14-15, 17-19	12,180	--	--	57	14	148	6.2	136	68	245	--	.8		660	.80	21,700	200	86	61	4.6	1,140	7.6	7
Sept. 19, 20-24	36,830	--	--	42	13	142	5.8	127	53	285	--	.8		421	.57	64,810	168	64	60	4.4	1,070	7.6	7
Sept. 25-30	50,700	--	--	42	8.9	86	4.3	110	46	136	--	2.0		421	.57	57,630	142	52	56	3.1	684	7.4	7
Weighted average	b72,510	--	--	35	6.1	53	--	93	33	85	--	2.3		295	0.40	57,750	112	36	51	2.2	488	--	12

a Not included in weighted averages. Dissolved solids and loads estimated from specific conductance.

b Mean discharge for water year October 1956 to September 1957 was 71,120 cfs.

## ARKANSAS RIVER BASIN--Continued

## ARKANSAS RIVER AT LITTLE ROCK, ARK.--Continued

Temperature (°F) of water, water year October 1956 to September 1957

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	74	63	46	46	42	54	57	69	74	79	87	81
2	73	61	47	42	43	51	60	70	73	79	87	80
3	74	61	52	43	45	50	59	69	74	81	88	80
4	75	63	55	43	54	50	60	66	74	83	86	81
5	76	64	59	46	51	49	55	67	74	83	85	81
6	77	64	62	45	53	49	56	69	75	83	83	80
7	73	63	61	45	52	47	58	68	76	84	84	77
8	70	55	49	47	53	48	56	68	76	85	84	76
9	70	53	49	54	55	49	57	68	76	85	84	75
10	69	55	48	45	55	49	58	70	78	84	84	76
11	70	65	48	45	54	54	59	70	79	84	84	75
12	70	65	48	47	55	54	52	72	79	84	82	76
13	70	65	46	46	54	51	55	70	80	85	81	77
14	71	65	41	39	56	56	56	73	80	85	82	78
15	70	65	48	40	55	56	55	74	80	86	79	75
16	71	55	48	35	50	56	55	74	81	84	81	75
17	71	55	50	35	50	54	57	75	80	86	80	76
18	70	52	50	36	49	57	59	75	81	84	81	76
19	70	51	47	38	48	56	63	74	81	86	80	76
20	69	56	49	39	48	53	65	75	81	85	81	78
21	68	51	49	46	48	51	65	74	81	84	81	75
22	70	48	49	50	49	51	65	73	78	84	81	73
23	70	48	48	46	52	52	64	73	79	84	81	74
24	70	49	46	44	53	54	66	73	72	83	78	73
25	70	47	45	45	53	--	67	71	79	84	81	74
26	66	44	46	41	51	51	66	71	78	84	81	73
27	63	44	47	39	50	51	66	71	78	84	--	73
28	60	--	46	40	53	53	67	72	79	84	83	73
29	64	42	46	41	--	55	68	72	80	86	83	71
30	63	44	47	40	--	56	70	74	80	84	83	73
31	63	--	47	40	--	55	--	74	--	85	83	--
Average	70	56	49	43	51	52	61	71	78	84	83	76

ARKANSAS RIVER BASIN--Continued  
 MISCELLANEOUS ANALYSES OF STREAMS IN ARKANSAS RIVER BASIN IN KANSAS

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Discharge (cfs)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Chloride (Cl)	Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH
								Calcium magnesium	Non-carbonate				
Jan. 6, 1957.....	26.6	90	17	40	208	12	56	a 295	106	23	1.0	767	8.5
Feb. 12.....	46.0	50	18	58	126	0	60	a 200	96	39	1.8	749	7.5
Mar. 18.....	62.2	51	21	54	108	0	62	a 210	124	36	1.6	728	7.4
July '9.....	105	144	32	86	148	0	98	a 490	368	28	1.7	1,290	8.0
Sept. 24.....	201	152	31	67	232	0	84	a 505	313	22	1.3	1,130	8.2

MEDICINE LODGE RIVER NEAR KIOWA, BARBER COUNTY

a Values above 200 ppm reported to the nearest 5 ppm.

Periodic determinations of suspended-sediment discharge, water year October 1956 to September 1957

Date	Water discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Discharge (tons per day)
July 11, 1957.....	202	148	81
Sept. 16.....	43	58	6.7
Sept. 27.....	36	89	8.7
Sept. 27.....	36	150	15
Sept. 28.....	34	87	8.0
Sept. 29.....	33	59	5.3
Sept. 30.....	31	44	3.7

LITTLE ARKANSAS RIVER AT VALLEY CENTER

ARKANSAS RIVER BASIN--Continued  
 MISCELLANEOUS ANALYSES OF STREAMS IN ARKANSAS RIVER BASIN IN OKLAHOMA AND MISSOURI --Continued

Chemical analyses, in parts per million, water year October 1956 to September 1957--Continued

Date of collection	Discharge (cfs)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Chloride (Cl)	Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
								Calcium magnesium	Non-carbonate				
SALT FORK ARKANSAS RIVER AT TONKAWA, KAY COUNTY, OKLA.													
Nov. 14, 1956	6.52	126	38	--	196	0	1,800	470	310	--	--	6,280	8.2
Nov. 27	4.21	191	59	21	249	8	3,240	718	500	--	--	10,600	8.3
Dec. 11	7.45	191	64	--	275	8	3,490	738	499	--	--	11,400	8.4
Jan. 3, 1957	7.97	187	64	--	217	0	3,990	728	550	--	--	12,800	8.2
Feb. 5	12.6	199	59	--	275	0	3,790	738	512	--	--	12,200	8.2
Mar. 6	32.1	151	76	2,910	103	0	4,630	687	602	90	48	14,400	8.2
Apr. 11	52.6	41	17	583	38	16	820	174	116	88	19	3,500	8.9
July 24	2,020	57	16	155	130	0	225	208	102	62	4.7	1,190	7.3
Aug. 9	226	100	58	1,070	176	0	1,500	490	346	83	21	5,870	8.1
Sept. 10	90.8	124	52	1,440	170	0	2,080	525	386	86	27	7,850	8.0

RED ROCK CREEK NEAR RED ROCK, NOBEL COUNTY, OKLA.

Nov. 14, 1956	0.10	23	6.4	21	124	0	17	84	0	35	1.0	263	8.0
Jan. 3, 1957	1.10	32	12	28	154	0	41	130	4	32	1.1	372	8.2
Apr. 11	1.38	27	6.4	24	92	20	29	102	0	34	1.0	102	8.5
May 1	32.1	33	11	26	126	0	43	126	22	31	1.0	372	7.9
May 17	20.5	8.4	3.2	6.1	38	0	6.2	34	3	28	1.5	93.0	6.9
July 25	31.4	62	21	87	202	0	108	240	74	44	2.4	680	7.9
Aug. 8	3.60	29	34	101	304	0	82	214	0	51	3.0	853	8.0

POLECAT CREEK NEAR HEYBURN, CREEK COUNTY, OKLA.

Feb. 25, 1957	2.03	22	10	31	48	0	65	98	58	41	1.4	371	7.0
Mar. 27	1.03	25	8.1	30	83	0	66	96	28	40	1.3	367	6.9
Apr. 18	568	19	8.1	28	9	0	64	81	74	43	1.4	350	6.1

DOUBLE CREEK NEAR RAMONA, WASHINGTON COUNTY, OKLA.

Apr. 18, 1957	58	58	4.7	26	128	0	67	164	60	26	0.9	479	7.7
Apr. 19	35	35	3.0	--	94	0	32	100	23	--	--	283	7.5
Apr. 21	44	44	4.4	18	108	0	45	128	40	23	.7	362	7.5
Apr. 23	44	44	4.4	--	112	0	40	128	36	--	--	346	7.5
Apr. 23	42	42	4.6	--	108	0	40	124	35	--	--	341	7.4

ARKANSAS RIVER BASIN--Continued  
MISCELLANEOUS ANALYSES OF STREAMS IN ARKANSAS RIVER BASIN IN OKLAHOMA AND MISSOURI--Continued

Date of collection	Discharge (cfs)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Chloride (Cl)	Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH
								Calcium	Non-carbonate				
Chemical analyses, in parts per million, water year October 1956 to September 1957--Continued													
DOUBLE CREEK NEAR RAMONA, WASHINGTON COUNTY, OKLA.--Continued													
May 15, 1957	3.10	53	4.9	9.5	147	0	35	152	32	12	0.3	371	7.8
May 16	.....	39	4.0	--	116	0	26	114	19	--	--	291	7.5
May 18	.....	37	3.6	--	108	0	20	108	20	--	--	274	7.4
May 21	.....	34	3.2	9.6	110	0	14	98	6	16	.4	247	7.5
June 12	.....	26	2.2	--	82	0	7.2	74	7	--	--	176	7.3
June 23	.....	26	3.2	4.5	92	0	7.1	78	2	11	.2	166	7.3
CANEY RIVER NEAR RAMONA, WASHINGTON COUNTY, OKLA.													
Mar. 26, 1957	152	132	24	240	0	0	490	430	430	53	5.0	2,310	3.3
May 2	9,490	24	3.4	16	0	0	30	74	74	22	.8	606	3.0
June 25	--	20	3.4	8.2	26	0	18	64	42	22	.4	180	7.0
SPRING RIVER NEAR QUAPAN, OTTAWA COUNTY, OKLA.													
Oct. 2, 1958	43.0	70	8.6	13	138	0	14	a210	97	12	0.4	456	7.5
Dec. 10	102	66	8.6	16	121	0	16	a200	101	15	.5	449	7.7
Jan. 8, 1957	84.7	69	19	13	92	0	21	a250	172	10	.4	522	7.0
Feb. 6	177	68	6.8	14	102	0	11	a200	116	13	.4	471	7.3
July 15	329	64	3.8	3.8	154	0	3.5	175	49	5	.1	366	7.3
ELK RIVER NEAR TIFF, McDONALD COUNTY, MO.													
May 7, 1957	995	42	1.9	1.9	130	0	4.2	113	6	3	0.1	237	8.2
Aug. 21	199	46	4.4	3.4	138	0	3.8	133	20	5	.1	263	7.8
BIG CABIN CREEK NEAR BIG CABIN, CRAIG COUNTY, OKLA.													
Oct. 2, 1956	221	46	6.1	14	158	0	21	140	10	18	0.5	334	6.9
Dec. 8	84	62	16	190	98	0	325	220	140	65	5.6	1,410	7.4
Jan. 7, 1957	4.17	27	6.0	4.2	50	0	18	92	51	9	.2	314	6.3
Jan. 23	2.98	35	13	14	88	0	16	142	70	18	.5	331	7.6
Mar. 12	301	47	11	11	6	0	16	164	159	13	.4	406	6.3
Apr. 10	203	34	8.9	5.9	44	0	8.0	124	88	9	.2	299	6.6
July 9	30.9	41	9.1	5.7	96	0	9.0	140	62	8	.2	319	6.9
Sept. 17	6.80	50	11	14	112	0	18	172	80	15	.5	403	7.6

a Values above 200 ppm are reported to the nearest 5 ppm.

PRYOR CREEK NEAR PRYOR, MAYES COUNTY, OKLA.

Jan. 22, 1957	0.16	34	17	36	0	0	50	156	32	1.3	578	3.6
Feb. 4	2.04	70	36	526	64	0	980	270	78	13	3,350	7.0
Mar. 28	39.6	17	8.4	23	0	0	14	102	23	1.0	423	3.3
May 6	1.51	26	8.3	11	30	0	9.9	74	50	2.4	213	6.6
July 9	12.3	23	11	30	51	0	36	101	59	1.3	360	6.5
July 23	9.12	42	15	68	57	0	70	105	118	2.3	1,510	6.5
July 23	1.99	30	22	53	80	0	105	184	98	4.1	654	7.3
Aug. 13	9.32	58	15	80	30	0	86	206	182	4.6	899	5.7
Aug. 13	.36	40	25	95	96	0	170	202	124	2.9	1,120	6.9
Sept. 20	12.4	23	10	72	88	0	109	100	28	6.1	587	7.4

ARKANSAS RIVER NEAR MUSKOGEE, MUSKOGEE COUNTY, OKLA.

Nov. 9, 1956	84	21	298	142	0	550	295	178	69	7.5	2,120	7.8
Nov. 9	126	37	600	146	0	1,100	470	350	74	12	3,860	7.9

ILLINOIS RIVER NEAR WATTS, ADAIR COUNTY, OKLA.

Nov. 19, 1956	49.8	46	2.2	5.4	93	0	7.8	124	48	0.2	290	7.2
Jan. 24, 1957	1.14	24	3.6	2.5	2.0	0	3.4	75	74	7	177	4.7
Mar. 27	110	28	2.9	3.0	56	0	6.8	82	36	7	168	6.8
June 24	1.08	27	5.0	3.5	96	0	6.8	88	10	8	195	7.2

FLINT CREEK NEAR KANSAS, DELAWARE COUNTY, OKLA.

Nov. 19, 1956	6.60	42	1.2	4.2	130	0	5.2	110	4	0.2	238	7.7
Dec. 17	20.9	39	2.6	4.3	120	0	7.6	108	10	8	232	7.1
Jan. 31, 1957	113	36	1.2	3.2	46	0	7.6	95	58	7	333	6.8
June 24	224	27	2.3	2.6	7	0	4.4	77	72	7	174	5.8

DEER CREEK NEAR HYDRO, CADDO COUNTY, OKLA.

May 6, 1957	35.4	120	12	26	120	0	13	360	952	14	955	7.9
May 19	48.6	100	17	13	160	0	11	320	172	8	643	9.1
July 29	20.4	116	24	31	112	0	19	390	298	15	992	7.8
July 29	9.69	88	26	30	128	0	16	325	220	17	772	8.0
Aug. 16	7.78	72	20	23	170	0	13	260	120	16	622	8.1
Sept. 5	6.60	98	16	18	266	0	12	310	92	11	672	8.0

ARKANSAS RIVER BASIN--Continued  
MISCELLANEOUS ANALYSES OF STREAMS IN ARKANSAS RIVER BASIN IN OKLAHOMA AND MISSOURI--Continued

Date of collection	Discharge (cfs)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Chloride (Cl)	Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
								Calcium	Non-carbonate				
Chemical analyses, in parts per million, water year October 1956 to September 1957--Continued													
LITTLE RIVER NEAR NORMAN, CLEVELAND COUNTY, OKLA.													
Dec. 31, 1956	0.20	21	42	16	286	12	12	226	0	13	0.5	471	8.5
Mar. 26, 1957	1.64	12	42	13	236	18	13	204	0	12	.4	430	8.7
LITTLE RIVER NEAR TECUMSEH, POTTAWATOMIE COUNTY, OKLA.													
Dec. 31, 1956	1.37	41	38	232	246	6	370	260	48	66	6.3	1,790	8.4
Feb. 5, 1957	2.53	50	30	186	200	12	300	248	64	62	5.2	1,450	8.6
Mar. 6	3.43	23	40	288	198	0	340	220	58	69	6.7	1,860	7.8
Mar. 26	3.28	21	43	206	210	0	325	228	56	66	5.9	1,310	7.7
SALT CREEK NEAR DEWRIGHT, SEMINOLE COUNTY, OKLA.													
Nov. 13, 1956	1.78	1,730	371	--	4	0	17,900	5,840	5,840	--	--	43,600	6.0
Feb. 5, 1957	4.44	2,150	571	10,400	66	0	17,100	7,710	7,660	75	52	51,400	7.9
July 10	15.2	791	476	5,070	76	0	9,760	3,930	3,870	74	35	27,200	7.7
NORTH CANADIAN RIVER NEAR GUYMON, TEXAS COUNTY, OKLA.													
Oct. 30, 1956	1.25	28	15	17	148	0	7.3	130	8	22	0.6	327	7.9
Dec. 5	6.46	44	21	21	236	0	10	198	4	19	.6	455	7.6
Feb. 4, 1957	7.70	51	30	31	256	0	12	252	42	21	.9	559	7.6
June 28	10.4	72	34	26	112	0	16	320	228	15	.6	677	7.0
COLDWATER CREEK NEAR HARDESTY, TEXAS COUNTY, OKLA.													
Dec. 5, 1956	1.87	64	38	46	256	0	30	315	105	24	1.1	799	7.8
Feb. 4, 1957	4.66	54	58	44	248	0	29	375	171	20	1.0	837	8.2
June 28	27.0	60	49	41	254	0	31	350	142	20	1.0	819	7.4
PALO DURO CREEK NEAR RANGE, TEXAS COUNTY, OKLA.													
Dec. 5, 1956	2.29	69	34	144	254	0	205	310	102	50	3.6	1,330	7.9
May 15, 1957	8.27	75	49	198	230	0	255	388	200	53	4.4	1,560	7.7
KIOWA CREEK NEAR SLAPOUT, BEAVER COUNTY, OKLA.													
Dec. 20, 1956	7.10	70	18	67	268	0	90	250	30	37	1.8	801	7.6
Feb. 11, 1957	7.63	19	19	67	162	0	92	192	59	43	2.1	712	7.6

a Values above 200 ppm are reported to the nearest 5 ppm.

CLEAR CREEK NEAR MAY, HARPER COUNTY, OKLA.

Dec. 20, 1956.....	7.75	68	9.2	40	226	0	52	210	25	29	1.2	603	8.0
Sept. 26, 1957.....	6.53	59	11.1	42	224	0	56	192	8	32	1.3	565	8.0

WOLF CREEK NEAR FORT SUPPLY, WOODWARD COUNTY, OKLA.

Apr. 1, 1957.....	605	60	35	143	226	0	165	292	107	52	3.7	1,100	8.0
Apr. 23.....	1,140	53	14	67	132	0	95	190	82	43	2.1	720	7.3
June 27.....	4.03	33	4.3	14	106	0	17	100	13	23	.6	269	7.1
Sept. 17.....	546	63	13	47	128	0	66	212	107	32	1.4	650	7.5

NORTH CANADIAN RIVER NEAR SEILING, DEWEY COUNTY, OKLA.

Apr. 1, 1957.....	3.44	82	18	12	112	0	14	280	188	8	.3	560	8.2
Apr. 1.....	3.44	63	24	99	156	16	137	254	100	46	2.7	568	8.5
Apr. 3.....	1,710	69	14	34	190	0	46	228	72	25	1.0	573	8.2
Apr. 8.....	201	74	24	115	188	6	162	282	118	47	3.0	1,090	8.3
Apr. 15.....	30.7	96	39	143	206	0	210	400	231	44	3.1	1,450	8.2
Apr. 21.....	696	66	16	55	208	0	66	232	62	34	1.6	666	8.1
Apr. 22.....	508	74	20	70	192	0	88	268	110	36	1.9	800	7.5
Apr. 29.....	228	72	19	73	188	0	104	358	104	38	2.0	844	8.2
May 1.....	179	111	34	91	192	0	120	415	258	32	1.9	1,170	8.2
May 3.....	1.11	73	17	57	168	0	76	252	114	33	1.6	744	8.1
May 6.....	1.96	62	16	67	212	0	86	220	46	40	2.0	716	8.1
May 17.....	7,230	61	12	23	160	0	28	200	69	19	.7	200	433
May 31.....	1,690	58	13	51	176	0	66	196	52	36	1.6	613	8.1
June 24.....	9,290	44	8.3	16	136	0	20	144	32	20	.6	337	7.8
June 25.....	12,900	43	8.4	23	148	0	21	142	8	25	.8	359	8.0
July 2.....	7,920	46	12	32	156	0	36	164	36	30	1.1	449	8.0
July 16.....	966	50	11	36	160	0	44	172	41	31	1.2	490	8.0
Aug. 7.....	297	62	19	58	212	0	72	298	58	35	1.7	728	8.2
Aug. 13.....	491	56	15	48	218	0	63	208	30	33	1.4	640	8.1
Sept. 16.....	505	56	12	32	164	0	48	218	56	27	1.0	549	7.9
Sept. 24.....	84.2	61	17	45	220	0	68	222	42	31	1.3	651	8.1

ARKANSAS RIVER BASIN--Continued  
 MISCELLANEOUS ANALYSES OF STREAMS IN ARKANSAS RIVER BASIN IN OKLAHOMA AND MISSOURI--Continued

Date of collection	Discharge (cfs)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Chloride (Cl)	Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH
								Calcium	Non-carbonate				
WENOKA CREEK NEAR WETUMKA, HUGHES COUNTY, OKLA.													
Nov. 14, 1956	0.88	316	76	--	42	0	3,300	1,100	1,070	--	--	9,800	7.5
Dec. 31	2.89	160	42	--	46	0	1,600	570	532	--	--	5,070	7.5
Feb. 5, 1957	541	30	10	135	22	0	278	118	100	71	5.4	991	7.3
Mar. 25	41.2	124	14	573	86	0	1,060	360	290	78	13	3,710	7.6
July 9	19.4	596	351	3,060	103	0	5,720	2,930	2,850	69	25	17,700	7.8
Sept. 5	3.29	604	229	2,910	95	0	5,470	2,440	2,360	72	26	17,000	7.8
CAPTAIN CREEK NEAR WELLSTON, LINCOLN COUNTY, OKLA.													
Mar. 25, 1957	15	16	40	28	230	5	50	204	7	23	0.9	540	8.4
June 25	24.9	42	39	23	326	0	23	264	0	16	.6	559	8.1
DEEP FORK NEAR WELTY, CREEK COUNTY, OKLA.													
Jan. 8, 1957	19.9	48	23	97	120	44	155	214	42	50	2.9	968	--
July 9	230	58	24	61	240	0	117	244	48	35	1.7	783	8.0
Sept. 5	9.60	42	45	146	280	12	225	292	42	52	3.7	1,260	8.4
LITTLE DEEP FORK CREEK NEAR EDNA, CREEK COUNTY, OKLA.													
Feb. 7, 1957	1.16	208	54	869	52	0	1,750	a740	698	72	14	5,670	7.9
Mar. 25	7.42	174	45	636	108	0	1,340	a620	532	69	11	4,410	7.7
July 9	33.9	206	38	615	202	0	1,200	a720	554	65	10	4,360	8.2
Sept. 5	1.51	416	122	1,470	158	0	2,900	a1,940	1,410	67	16	9,490	8.1
MONTEZUMA CREEK NEAR SCHULTER, OKMULGEE COUNTY, OKLA.													
Feb. 6, 1957	0.40	216	59	42	24	0	1,900	a780	760	72	12	5,840	7.4
Mar. 25	1.72	157	42	674	88	0	1,400	a565	493			4,440	7.6
SALLISAW CREEK NEAR SALLISAW, SEQUOYAH COUNTY, OKLA.													
Oct. 1, 1956	0.09	37	3.3	2.9	124	0	3.1	106	4	6	0.1	219	6.7
Jan. 8, 1957	8.44	28	1.9	4.4	82	0	7.8	78	11	11	.2	169	7.6
Feb. 5	2.54	7	2.2	35	14	0	38	10	12	12	.5	38	94.4
Mar. 6	111	24	1.9	69	0	0	2.5	68	12	8	.1	150	6.7
Mar. 25	602	20	4.9	2.4	44	0	3.0	34	7	7	.1	121	7.2
June 3	1,670	17	2.3	2.8	6	0	2.0	52	47	10	.2	115	6.5
July 29	25.9	32	1.5	3.2	56	0	3.8	86	40	8	.2	189	7.2

a Values above 200 ppm are reported to the nearest 5 ppm.

FOURCHE MALINE NEAR RED OAK, LATIMER COUNTY, OKLA.

Dec. 26, 1956.....	3.39	25	6.2	32	44	0	18	88	52	44	1.5	356	6.9
Jan. 22, 1957.....	69.9	9.6	2.2	2.7	0	0	2.7	33	33	13	.2	159	3.9
Feb. 6 .....	924	2.6	2.8	3.8	5	0	3.0	18	14	32	.4	56.8	6.1
Mar. 4 .....	121	3.5	2.6	3.5	12	0	4.1	19	9	28	.3	74.4	6.5
Mar. 18 .....	809	3.4	1.6	3.2	5	0	2.7	15	19	32	.4	62.4	5.7
Apr. 3 .....	7,520	4.6	6.4	3.1	0	0	2.1	38	38	6	.1	651	3.0
June 5 .....	1,430	3.4	2.8	2.5	0	0	3.5	20	20	18	.2	70.5	4.0
July 3 .....	4.00	14	9.0	18	37	0	8.0	72	42	35	.9	280	6.6

ARKANSAS RIVER BASIN--Continued  
MISCELLANEOUS ANALYSES OF STREAMS IN ARKANSAS RIVER BASIN IN TEXAS  
Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (calculated)		Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	
														Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate				
Oct. 3, 1956	1.94	84		47	34	133		a 289	92	112	3.2	79		716	0.97	256	38	53	3.6	1,170	8.4
Nov. 1	36.1	--		--	--	--		300	90	118	--	--		--	--	288	42	--	--	1,190	8.2
Dec. 6	10.0	80		56	35	125		314	96	100	2.6	62		b 745	97	284	26	49	3.2	1,140	7.8
Jan. 17, 1957	22.2	74		62	40	183		522	102	90	2.6	60		871	1.18	318	0	56	4.5	1,280	7.6
Feb. 20	13.3	74		--	--	122		88	100	2.8	72			--	--	--	--	--	--	1,310	8.2
Mar. 21	15.1	74		54	33	124		246	85	110	--	117		718	.98	270	68	50	3.3	--	--
Apr. 23	22.5	70		61	34	114		245	78	108	--	131		716	.97	282	91	46	2.9	1,260	--
May 20	9.29	90		57	38	129		c 321	106	95	2.8	80		786	1.03	288	65	49	3.3	1,100	8.6
June 20	10.2	90		32	39	135		d 254	123	100	1.6	65		711	.97	240	46	55	3.8	1,070	8.4
July 16	14.9	63		58	38	109		364	83	80	4.0	37		651	.89	301	2	44	2.7	1,040	8.0
Aug. 26	20.8	35		45	20	73		201	63	65	2.0	32		434	.59	194	30	45	2.3	707	8.2
Sept. 16	14.8	56		58	35	135		404	92	88	3.6	26		693	.94	288	0	50	3.4	1,140	7.5

EAST AMARILLO CREEK NEAR AMARILLO

a Includes equivalent of 10 parts per million of carbonate (CO<sub>3</sub>).

b Residue on evaporation at 180°C.

c Includes equivalent of 18 parts per million of carbonate (CO<sub>3</sub>).

d Includes equivalent of 8 parts per million of carbonate (CO<sub>3</sub>).

## RED RIVER BASIN

## SALT FORK RED RIVER NEAR HEDLEY, TEX.

LOCATION. --Half a mile downstream from Whitefish Creek, 2½ miles upstream from Jesse Arroyo and about 9 miles northeast of Hedley, Donley County.  
DRAINAGE AREA -- 868 square miles of which 209 square miles is probably noncontributing.  
RECORDS AVAILABLE. --Chemical analyses: March 1956 to August 1957.

EXTREMES. 1956-57. --Dissolved solids: Maximum, 2,520 ppm Jan. 18; minimum, 231 ppm Aug. 29.  
Hardness: Maximum, 1,440 ppm Jan. 10-17, 18, 25; minimum, 26 ppm Aug. 29.

Water temperatures: Maximum daily, 3,530 microhms Jan. 25; minimum daily, 382 microhms Aug. 29.  
Specific conductance: Maximum daily, 3,530 microhms Jan. 16-18; freezing point Jan. 16-18.

Water temperatures: Maximum, 95° F June 30; minimum, freezing point Jan. 16-18.  
EXTREMES, March 1956 to August 1957. --Dissolved solids: Maximum, 2,600 ppm Apr. 30, 1956; minimum, 231 ppm Aug. 29, 1957.

Hardness: Maximum, 1,640 ppm Apr. 30, 1956; minimum, 126 ppm Aug. 29, 1957.  
Specific conductance: Maximum daily, 3,530 microhms Jan. 25, 1957; minimum daily, 382 microhms Aug. 29, 1957.

Water temperatures: Maximum, 95° F June 30, 1957; minimum, freezing point Jan. 16-18, 1957.

REMARKS. --Values reported for dissolved solids concentrations less than 1,000 ppm are residues on evaporation. Concentrations more than 1,000 ppm are calculated from sums of determined constituents unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. (No discharge records available). No flow Oct. 1 to Dec. 19, July 2-21, Aug. 1-4, 10-28, Sept. 15-30.

Chemical analyses, in parts per million, December 1956 to August 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>	Percent sodium	Sodium adsorption ratio	Specific conductance (microhms at 25° C)		
													Parts per million	Tons per acre-foot	Tons per day						
Dec. 20-23, 25-26		34		166	53	122		217	510	128	0.7	7.0		1,130	1.54		30	2.1	1,600	7.4	
28-31, 1956		42	330	119	119	259		233	1,170	328	1.0	7.2		2,370	3.22		30	3.1	3,030	7.9	
Dec. 24, 27		32	126	40	90	90		195	366	90	0.7	7.0		848	1.15		29	1.8	1,230	7.8	
Jan. 1-9, 1957		26	370	125	286	216		216	1,280	340	1.0	1.7		2,510	3.41		28	2.3	3,190	8.0	
Jan. 10-12, 25		38	242	80	165	238		238	774	188	1.0	8.2		1,620	2.20		28	2.3	2,180	7.9	
Jan. 13-17		34	371	125	371	125		276	1,260	328	1.0	5.6		2,520	3.43		28	3.0	3,260	7.8	
Jan. 18		27	128	33	75	75		166	331	77	0.7	7.5		871	1.06		26	1.5	1,130	8.0	
Jan. 19, 20		34	179	55	143	143		251	529	155	1.0	6.9		1,250	1.67		32	2.4	1,730	8.0	
Jan. 21-24, 26-31		30	124	40	132	201		363	150	150	1.0	4.3		943	1.28		38	2.6	1,430	7.9	
Feb. 1-14, 16-18		26	110	33	146	210		284	181	181	0.8	2.2		935	1.27		44	3.1	1,430	8.0	
Feb. 19-28		30	100	34	144	202		293	162	162	0.8	2.8		886	1.18		34	3.2	1,350	8.2	
Mar. 1-11, 13		30	157	52	153	159		490	160	160	1.0	4.2		1,100	1.50		41	2.2	1,620	7.9	
Mar. 14-20		30	102	33	122	209		258	149	149	1.0	3.2		876	1.19		40	2.7	1,250	8.0	
Mar. 21-23, 25-31		27	106	39	142	142		314	170	170	0.8	3.2		252	0.82		42	3.0	1,380	8.2	
Apr. 1-10		28	102	38	143	143		188	310	170	0.8	3.2		411	0.82		43	3.1	1,360	8.0	
Apr. 11-19		30	81	20	103	20		166	198	113	1.0	5.0		651	0.89		44	2.7	973	7.8	
Apr. 19-23		32	101	31	111	111		162	294	126	0.8	3.0		814	1.11		39	2.5	1,180	7.8	
Apr. 24-27, 29-30		19	71	12	39	163		120	34	144	0.8	2.0		226	0.53		27	1.1	574	7.6	
Apr. 28		37	108	34	124	179		312	144	144	0.8	2.0		888	1.21		40	2.7	1,290	7.9	
May 1-14		22	76	16	54	167		152	53	53	0.8	2.2		468	0.64		32	1.5	702	7.7	
May 15-16																					

a Calculated from determined constituents.

## RED RIVER BASIN--Continued

## SALT FORK RED RIVER NEAR HEDLEY, TEX.--Continued

Chemical analyses, in parts per million, December 1956 to August 1957.--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids		Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH		
													Parts per million	Tons per acre-foot	Calcium magnesium	Non-carbonate					
May 17-27, 1957.		31		112	28	115		191	272	143	0.7	2.5		856	1.16	394	238	39	2.5	1,250	7.8
May 28-31, June 1		22		71	15	60		155	140	66	.7	2.8		476	.65	238	112	36	1.7	711	7.6
June 2-5		41		86	23	107		164	225	120	.8	2.0		709	.96	309	174	43	2.6	1,060	8.2
June 6-16		41		94	35	154		126	336	182	1.0	2.0		a 907	1.23	378	275	47	3.4	1,370	8.1
June 17-25		44		102	39	158		110	366	185	1.0	3.0		a 972	1.32	415	325	45	3.4	1,460	8.0
June 26-30, July 1		49		98	42	168		94	417	180	1.0	1.8		1,010	1.37	417	340	47	3.6	1,510	8.2
July 22-23		38		153	42	181		143	510	208	1.2	2.2		1,210	1.65	554	442	41	3.3	1,770	8.2
Aug. 5-8		32		112	31	135		156	317	168	1.2	1.8		a 820	1.25	407	279	42	2.9	1,380	8.2
Aug. 9		44		110	41	160		125	366	200	1.0	1.5		a 1,000	1.36	443	340	44	3.3	1,540	8.1
Aug. 29		15		38	7.5	30		111	57	25	.8	3.0		a 231	.31	128	35	34	1.1	382	8.0

a Calculated from determined constituents.

## RED RIVER BASIN--Continued

## SALT FORK RED RIVER NEAR HEDLEY, TEX.--Continued

Temperature (°F) of water, December 1956 to August 1957

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1			--	58	49	59	52	60	62	92	--	
2			--	46	46	50	75	60	66	--	--	
3			--	42	45	49	59	60	66	--	--	
4			--	51	44	47	60	60	70	--	--	
5			--	50	46	40	62	68	79	--	75	
6			--	51	48	40	66	64	83	--	74	
7			--	48	49	54	60	64	88	--	74	
8			--	47	55	66	68	63	87	--	77	
9			--	50	48	63	60	62	72	--	78	
10			--	47	50	65	48	70	69	--	--	
11			--	47	49	65	45	64	70	--	--	
12			--	48	51	--	43	63	75	--	--	
13			--	48	69	64	58	66	80	--	--	
14			--	35	68	62	60	67	87	--	--	
15			--	33	--	54	61	69	86	--	--	
16			--	32	55	65	73	80	84	--	--	
17			--	32	59	67	75	72	84	--	--	
18			--	32	46	64	72	72	83	--	--	
19			--	38	49	52	70	--	88	--	--	
20			38	40	45	48	54	77	85	--	--	
21			36	37	47	58	66	80	84	--	--	
22			52	34	42	59	62	78	86	84	--	
23			48	43	44	51	70	80	70	85	--	
24			35	44	45	--	68	73	71	--	--	
25			35	34	41	40	70	73	74	--	--	
26			34	34	46	41	70	78	75	--	--	
27			36	34	45	59	73	78	93	--	--	
28			38	34	49	58	60	79	94	--	--	
29			54	34	--	68	60	80	94	--	77	
30			41	35	--	65	58	74	95	--	--	
31			42	36	--	55	--	75	--	--	--	
Average			--	41	49	56	63	70	80	--	--	

RED RIVER BASIN--Continued  
 BEAVER CREEK NEAR WAURIKA, OKLA.  
 LOCATION.--At gaging station at bridge on State Highway 5, 4.5 miles northwest of Waurika, Jefferson County, 6.2 miles upstream from Cow Creek.  
 DRAINAGE AREA.--563 square miles.  
 RECORDS AVAILABLE.--Chemical analyses: October 1955 to September 1957.  
 Water temperatures: October 1955 to September 1957.  
 Sediment records: May to September 1957.  
 EXTREMES, 1956-57.--Dissolved solids: Maximum, 1,200 ppm July 1-10; minimum, 142 ppm May 18.  
 Hardness: Maximum, 585 ppm July 1-10; minimum, 58 ppm Apr. 21-30.  
 Specific conductance: Maximum daily, 1,910 microhms Dec. 30; minimum daily, 185 microhms Apr. 22.  
 Water temperatures: Maximum, 88°F Aug. 1; minimum, freezing point Dec. 10, Jan. 16-18, 22, 27-28, 31.  
 Sediment concentrations: Maximum daily, 2,600 ppm June 18; minimum, 49 ppm Sept. 20-21.  
 Sediment loads: Maximum daily, 75,000 tons May 26; minimum daily, 0.2 ton on several days.  
 EXTREMES, 1955-57.--Dissolved solids: Maximum, 1,210 ppm May 16, 18, 20, 1956; minimum, 125 ppm July 4-8, 1956.  
 Hardness: Maximum, 640 ppm Dec. 11-20, 1955; minimum, 58 ppm Apr. 21-30, 1957.  
 Specific conductance: Maximum daily, 2,000 microhms May 16, 1956; minimum on several days during December and January.  
 Water temperatures: Maximum, 88°F Aug. 1, 1957; minimum, freezing point on several days during December and January.  
 REMARKS.--Records of specific conductance of daily samples are available in district office at Oklahoma City, Okla. Records of discharge for water year October 1956 to September 1957 are given in WSP 1511. No flow Oct. 1-14, 29, Nov. 21-30, Dec. 1-18, 29-31, Jan. 1-30.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>		Percent sodium	Sulfate-adsorption ratio	Specific conductance (microhms at 25°C)	pH	
															Parts per million	Tons per acre-foot	Calcium	Magnesium					Tons per day
Oct. 15-20, 1956	161	--	--	32	7.3	8.9		110	0	29	8.5		1.3	--	146	0.20	63	110	20	15	0.4	259	7.4
Oct. 21-28, 30-31	43.7	8.0	0.04	34	8.0	8.8	4.0	122	0	24	11	0.5	1.8	0.28	160	0.22	19	118	18	13	0.3	274	7.5
Nov. 1-10	85.1	--	--	29	7.7	17		130	0	18	11	--	1.4	--	148	0.20	34	104	0	27	0.7	252	8.0
Nov. 11-20	30	--	--	27	6.9	19		110	0	28	12	--	1.7	--	149	0.20	34	96	6	30	0.8	248	7.7
Dec. 19-20	5.65	--	--	42	15	45		190	0	71	29	--	1.8	--	314	4.3	4.8	188	12	37	1.5	518	8.2
Dec. 21-24	10.3	--	--	40	15	55		178	0	90	34	--	2.4	--	338	4.6	9.4	180	14	43	1.9	561	8.0
Dec. 25-26	70	--	--	66	24	59		232	4	69	103	--	1.2	--	474	6.4	9.9	284	68	33	1.6	815	8.3
Dec. 27-28	120	--	--	116	39	206		270	0	57	425	--	1.1	--	1,100	1.50	5.9	450	228	50	4.2	1,870	8.2
Jan. 31, 1957	29.0	--	--	82	31		97	196	8	71	205	--	4.4	--	684	.93	54	330	156	39	2.3	1,100	8.6
Feb. 1-11	4.60	14	.03	90	21	108		212	0	73	205	.3	4.0	.36	678	.92	8.4	310	136	43	2.7	1,130	8.1
Feb. 12-20	2.31	--	--	112	17	32		254	0	148	40	--	1.8	--	509	.69	3.2	350	142	16	.8	778	7.8
Feb. 21-28	3.59	--	--	120	22	34		250	8	190	34	--	1.4	--	573	.78	5.6	380	172	16	.8	835	8.4
Mar. 1-10	6.96	--	--	85	27	34		220	0	168	31	--	1.4	--	519	.71	9.8	325	144	19	.8	726	8.0
Mar. 11-20	3.67	--	--	96	28	28		220	0	192	24	--	1.2	--	553	.75	5.5	355	174	15	.6	753	8.2
Mar. 21-22	85.0	--	--	110	35	18		246	2	214	22	--	1.2	--	586	.80	134	420	215	9	.4	806	8.3
Mar. 23-31	15.0	--	--	55	15	26		140	0	92	31	--	2.3	--	345	.47	14	200	85	22	.8	505	8.0

RED RIVER BASIN

Apr. 1-10, 1957.....	5.42	--	--	144	39	238	0	345	36	--	0.5	--	755	1.03	11	520	325	14	.7	1,040	8.2
Apr. 11-20.....	7.76	10	45	141	38	240	0	339	36	.3	1.2	.15	753	1.02	16	510	314	16	.9	1,050	8.1
Apr. 21-30.....	2,166	--	--	16	4.4	68	0	27	23	--	2.5	--	148	.20	866	58	2	51	1.6	199	7.8
May 1-10.....	1,994	--	--	37	11	124	0	33	38	--	2.5	--	230	.31	1,240	136	34	29	1.0	388	7.9
May 11-12.....	334	--	--	115	35	244	10	74	228	--	6.4	--	819	1.11	739	370	154	40	2.6	1,280	8.3
May 13.....	505	--	--	59	20	192	0	40	108	--	2.0	--	459	.62	626	225	70	35	1.6	714	7.3
May 14-15.....	1,164	--	--	50	11	160	0	42	51	--	1.6	--	320	.44	1,010	172	41	31	1.2	493	7.5
May 16.....	180	--	--	78	25	200	16	34	134	--	2.5	--	601	.82	292	300	108	29	1.4	930	8.4
May 17.....	477	--	--	42	12	132	0	76	69	--	3.0	--	332	.45	428	156	48	46	2.1	506	8.0
May 18.....	9,260	--	--	18	3.6	60	0	7.8	25	--	1.9	--	142	.19	3,550	60	11	36	.9	197	7.1
May 19-20.....	7,935	--	--	43	8.9	136	0	35	33	--	1.8	--	249	.34	5,330	144	32	27	.9	393	7.5
May 21.....	819	--	--	70	23	192	14	65	100	--	3.2	--	492	.67	1,090	275	95	30	1.4	767	8.5
May 22.....	345	--	--	96	44	276	8	119	152	--	2.8	--	761	1.03	709	420	180	28	1.6	1,200	8.3
May 23.....	1,450	--	--	66	21	172	4	70	64	--	4.0	--	451	.61	1,770	250	102	27	1.2	700	8.3
May 24-27.....	6,448	--	--	38	9.0	116	0	37	14	--	1.8	--	193	.26	3,360	132	37	15	.4	311	8.1
May 28.....	1,050	--	--	80	25	202	16	91	73	--	3.0	--	492	.67	1,390	305	112	22	1.0	788	8.5
May 29.....	347	--	--	59	37	146	4	154	102	--	3.1	--	678	.82	635	300	174	31	1.5	1,050	8.3
May 30.....	422	--	--	61	21	160	8	77	53	--	3.3	--	393	.53	448	240	96	20	.8	587	8.4
May 31.....	2,050	--	--	38	10	124	0	37	10	--	2.3	--	197	.27	1,090	138	36	12	.3	301	8.0
June 1-2.....	3,160	--	--	45	11	138	0	40	21	--	2.2	--	215	.29	1,830	156	43	16	.5	364	7.9
June 3-6.....	1,447	--	--	61	20	196	0	68	45	--	2.5	--	347	.47	1,360	235	76	21	.8	567	7.8
June 7-8.....	308	--	--	86	33	276	0	151	111	--	4.3	--	646	.88	537	350	124	36	2.1	1,030	7.6
June 9-10.....	210	--	--	112	17	236	0	227	170	--	4.8	--	837	1.14	475	430	236	36	2.3	1,300	7.6
June 11-15.....	190	--	--	96	67	310	0	230	175	--	5.0	--	895	1.22	459	515	261	31	2.0	1,420	7.7
June 16-20.....	467	--	--	81	28	220	0	115	86	--	2.6	--	493	.67	622	320	138	25	1.2	810	7.9
June 21.....	151	--	--	109	46	332	0	163	109	--	3.2	--	704	.96	287	460	188	23	1.3	1,120	7.5
June 22-30.....	96.3	--	--	83	74	256	0	245	205	--	3.3	--	947	1.29	246	510	300	33	2.2	1,460	7.8

a Values above 200 ppm are reported to the nearest 5 ppm.

RED RIVER BASIN--Continued  
 BEAVER CREEK NEAR WAURIKA, OKLA.--Continued

Chemical analyses, in parts per million, water year October 1956 to September 1957--Continued

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal-cium (Ca)	Mag-nesium (Mg)	So-dium (Na)	Potas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Car-bonate (CO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> ) (B)	Bo-ron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>		Per-cent so-dium	So-dium adsorp-tion ratio	Specific conductance (micro-mhos at 25°C)	pH	
															Parts per million	Tons per acre-day	Tons per foot	Calcium, magnesium					Non-carbonate
July 1-10, 1957.....	46.3	24	0.00	88	89	131		318	0	277	230	0.3	2.9	0.40	1,200	1.63	150	585	324	33	2.4	1,640	8.0
July 11-20 .....	25.3	--	--	80	76	125		276	0	269	195	--	2.6	--	917	1.25	63	510	286	35	2.4	1,470	7.7
July 21-23 .....	20.0	--	--	77	73	81		296	0	212	145	--	1.6	--	855	1.16	46	490	250	26	1.6	1,370	7.8
July 23-25 .....	18.6	--	--	78	28	56		168	0	103	124	--	2.6	--	520	.71	26	300	162	29	1.4	900	7.9
July 26-28 .....	156	--	--	45	12	26		150	0	40	37	--	3.0	--	244	.33	103	160	39	26	.9	452	7.6
July 29-31 .....	21.0	--	--	74	31	50		258	0	107	68	--	2.9	--	466	.63	26	310	100	26	1.2	809	8.0
Aug. 1-10 .....	11.9	--	--	88	54	76		308	0	226	82	--	1.8	--	713	.97	23	440	188	27	1.6	1,130	8.1
Aug. 11-20 .....	10.3	--	--	104	51	89		364	0	217	98	--	1.4	--	757	1.03	21	470	172	29	1.8	1,220	8.0
Aug. 21-31 .....	3.96	--	--	86	57	65		366	0	193	63	--	1.0	--	664	.90	7.1	450	150	24	1.3	1,080	7.9
Sept. 1-10 .....	1.47	--	--	77	57	94		400	0	197	68	--	.8	--	695	.95	2.8	425	97	32	2.0	1,120	7.3
Sept. 11-20 .....	1.71	--	--	66	65	105		386	0	235	68	--	.8	--	738	1.00	3.4	430	114	35	2.2	1,170	8.1
Sept. 21 .....	1.40	--	--	34	64	108		298	0	232	66	--	3.6	--	669	.91	2.3	350	106	40	2.5	1,110	8.2
Sept. 22 .....	683	--	--	86	20	154		154	0	156	28	--	3.6	--	442	.56	704	300	170	11	.4	665	7.9
Sept. 23-30 .....	71.0	--	--	61	19	20		172	0	85	15	--	3.1	--	302	.41	58	215	73	17	.6	482	7.3
Weighted average..	442	--	--	40	12	25		b127	--	45	36	--	2.3	--	253	0.34	302	150	46	26	0.9	398	--

a Values above 200 ppm are reported to the nearest 5 ppm.

b Includes equivalent of individual carbonate values shown above.

## RED RIVER BASIN--Continued

## BEAVER CREEK NEAR WAURIKA, OKLA.--Continued

Temperature (° F) water, water year October 1956 to September 1957

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	--	61	44	45	39	49	57	67	76	83	88	82
2	--	59	45	44	40	51	59	68	69	83	86	81
3	--	59	45	45	42	49	58	71	67	84	85	81
4	--	56	44	44	42	48	57	61	67	84	83	81
5	--	54	44	45	42	49	--	67	74	83	82	80
6	--	55	45	45	43	48	58	62	74	84	81	77
7	--	54	43	45	44	46	58	68	76	84	80	75
8	--	51	40	45	44	--	59	66	78	82	79	70
9	--	45	34	40	45	45	--	72	80	83	81	70
10	--	43	32	41	45	46	61	66	84	83	82	73
11	--	43	36	42	46	47	61	67	83	82	82	75
12	--	42	39	41	50	45	55	68	--	84	83	75
13	--	42	41	41	50	45	54	68	80	84	82	75
14	--	41	40	40	51	47	55	69	81	--	83	75
15	70	41	41	40	50	47	55	75	83	84	83	73
16	71	41	41	32	51	--	56	76	79	84	83	74
17	69	43	42	32	50	51	56	70	76	84	80	73
18	69	45	42	32	51	55	59	68	76	82	78	73
19	70	45	43	35	52	59	60	72	73	84	78	72
20	68	45	44	34	51	57	60	77	79	84	84	73
21	65	45	45	33	50	56	62	74	79	83	81	70
22	64	46	44	32	50	55	62	75	74	83	81	67
23	67	46	45	35	48	51	64	71	77	77	79	67
24	62	45	45	35	50	52	70	68	77	83	79	61
25	62	44	44	36	49	50	69	73	79	79	78	67
26	60	40	45	33	50	49	69	74	77	--	80	67
27	64	36	45	32	51	47	70	73	80	83	81	68
28	64	37	44	32	50	50	71	74	77	84	82	67
29	63	37	43	34	--	50	70	--	77	86	80	68
30	62	39	44	34	--	57	72	72	82	84	80	67
31	61	--	44	32	--	51	--	72	--	84	81	--
Average	--	46	42	38	47	50	61	70	77	83	81	73





RED RIVER BASIN--Continued  
RED RIVER NEAR GAINESVILLE, TEX.

LOCATION--At gaging station at bridge on U. S. Highway 77, a quarter of a mile downstream from Gulf, Colorado, and Santa Fe Railway bridge, 5 miles downstream from Fish Creek and 7 miles north of Gainesville, Cooke County, DRAINFAGE AREA--30,782 square miles of which 5,936 square miles is probably noncontributing. RECORDS AVAILABLE--Chemical analyses: May 1944 to April 1946, October 1952 to September 1957. Water temperatures: October 1952 to September 1957. EXTREMES, 1956-57.--Dissolved solids: Maximum, 4,260 ppm Sept. 11-12; minimum, 335 ppm Apr. 26-30. Hardness: Maximum, 1,250 ppm Aug. 11-12; minimum, 138 ppm Apr. 26-30.

Specific conductance: Maximum daily, 7,130 micromhos Sept. 10; minimum point Jan. 16-17. Water temperatures: Maximum, 91° F July 13; minimum, freezing point Jan. 16-17. EXTREMES, 1944-46, 1952-57.--Dissolved solids: Maximum, 6,480 ppm Apr. 11, 1953; minimum, 250 ppm Sept. 30, Oct. 1-3, 1945.

Hardness: Maximum, 1,510 ppm Apr. 11, 1953; minimum, 120 ppm Sept. 30, Oct. 1-3, 1945. Specific conductance: Maximum daily, 9,890 micromhos Apr. 11, 1953; minimum daily, 325 micromhos Oct. 1, 1945.

Water temperatures (1952-57): Maximum, 95° F July 13, 1954; minimum, freezing point on Dec. 23, 1953, Jan. 21, 1954, Jan. 16-17, 1957. REMARKS.--Records of specific conductance of daily samples for period May 1944 to April 1946 available in district office at Austin, Tex. Records of specific conductance of daily samples for period October 1952 to September 1957 available in district office at Oklahoma City, Okla. Records of discharge for water year October 1956 to September 1957 given in WSP 1511.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonylate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Boiron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH		
															Parts per million	Tons per acre-foot	Tons per day	Calcium	Non-carbonate					
Oct. 1-10, 1955	103	16	0.02	264	95	779	7.4	134	0	726	1,340	0.5	--	0.70	--	3,440	4.68	957	1,050	940	62	10	5,440	7.8
Oct. 11-13, 16-17	415	--	--	264	95	699	140	140	0	879	1,240	--	--	--	--	3,270	4.45	3,660	1,050	936	59	9.4	5,120	7.8
Oct. 14-15, 18, 20	1,586	--	--	108	21	198	128	128	0	212	335	--	3.3	--	--	1,000	1.36	4,280	335	265	55	4.6	1,670	7.5
Oct. 19	3,090	--	--	69	19	128	128	128	0	125	205	--	4.8	--	--	659	90	5,500	250	145	53	3.5	1,070	7.6
Oct. 21	3,320	--	--	120	27	238	116	116	0	260	395	--	4.8	--	--	1,170	1.59	10,490	410	315	56	3.1	1,940	7.5
Oct. 22-23	4,455	--	--	76	18	192	132	126	0	139	245	--	3.8	--	--	741	1.01	8,870	270	163	55	4.0	1,860	7.8
Oct. 24-25	2,690	--	--	176	34	370	126	126	0	386	620	--	6.0	--	--	1,720	2.34	12,490	580	476	56	6.7	2,800	7.8
Oct. 26-30	1,164	--	--	134	26	251	112	112	0	314	400	--	3.5	--	--	1,250	1.70	3,950	440	348	55	5.2	2,040	7.6
Oct. 31	628	--	--	156	33	418	118	118	0	347	690	--	3.8	--	--	1,760	2.39	2,980	525	428	53	7.9	2,870	7.9
Nov. 1	548	--	--	168	32	485	122	122	0	350	760	--	3.3	--	--	1,910	2.60	2,830	550	450	64	8.4	3,160	7.6
Nov. 2-10	2,076	--	--	68	18	143	108	108	0	118	248	--	2.2	--	--	705	.96	3,950	245	163	56	4.0	1,220	7.4
Nov. 11-13	669	--	--	92	22	221	104	104	0	168	382	--	2.2	--	--	986	1.34	1,780	320	235	60	5.4	1,750	8.0
Nov. 14-15	370	--	--	124	27	293	134	134	0	230	500	--	2.4	--	--	1,300	1.77	1,300	420	310	60	6.2	2,260	7.9
Nov. 16-18	271	--	--	160	29	368	152	152	0	286	635	--	2.2	--	--	1,640	2.23	1,200	520	396	61	7.0	2,780	8.1
Nov. 19-20	228	--	--	198	45	511	180	180	4	365	890	--	1.9	--	--	2,200	2.99	1,350	680	526	62	8.5	3,680	8.4
Nov. 21-24	198	--	--	216	49	576	180	180	0	431	990	--	1.4	--	--	2,460	3.35	1,320	740	592	63	9.2	4,070	8.1
Nov. 25-30	162	--	--	244	71	692	180	180	0	515	1,220	--	--	--	--	2,950	4.01	1,290	900	752	63	10	4,860	8.1
Dec. 1-7	140	--	--	260	81	732	184	184	0	550	1,310	--	--	--	--	3,200	4.35	1,210	980	829	62	10	5,160	7.9

RED RIVER BASIN

Dec. 8-10, 1957	313	--	--	178	57	471	132	8	353	860	--	1.9	--	2,130	2.90	1,800	660	558	60	7.8	3,510	8.3
Dec. 11-19	171	--	--	240	68	603	212	0	461	1,090	--	--	--	2,700	3.67	1,250	880	706	60	8.8	4,400	8.0
Dec. 20	2,040	--	--	154	43	349	136	8	285	655	--	1.2	--	1,670	2.27	9,200	560	435	58	6.4	2,760	8.6
Dec. 21-22	4,150	--	--	66	21	152	98	4	107	270	--	2.8	--	730	.99	8,180	250	163	57	4.2	1,270	8.6
Dec. 23-27	984	--	--	124	34	302	136	6	204	545	--	6.5	--	1,420	1.93	3,770	450	328	59	6.2	2,850	8.5
Dec. 28-31	401	--	--	180	56	479	178	2	354	850	--	6.2	--	2,170	2.95	2,350	680	530	60	8.0	3,550	8.3
Jan. 1-10, 1957	215	11	.01	224	53	532	--	0	380	940	1.3	2.6	.30	2,400	3.26	1,390	720	540	62	8.6	3,830	7.5
Jan. 11-13	155	--	--	202	83	620	180	0	458	1,150	--	1.3	--	2,910	3.96	1,220	900	752	60	9.0	4,500	8.2
Jan. 14-20	126	--	--	264	98	701	218	0	523	1,320	--	--	--	3,350	4.56	1,140	1,060	882	59	9.4	5,080	7.2
Jan. 21-25	180	--	--	264	85	721	206	4	520	1,320	--	--	--	3,240	4.41	1,570	1,010	834	61	9.9	5,090	8.3
Jan. 26, 28-29	171	--	--	168	56	412	184	6	319	745	--	2.0	--	2,160	2.94	997	650	489	58	7.0	3,210	8.4
Jan. 27, 30-31	161	--	--	236	76	604	206	12	428	1,120	--	--	--	2,890	3.93	1,260	900	711	59	8.8	4,380	8.6
Feb. 1-5	224	--	--	264	85	702	176	6	501	1,320	--	--	--	3,360	4.57	2,030	1,010	856	60	9.6	5,050	8.4
Feb. 6	192	--	--	156	66	516	164	12	385	936	--	6.0	--	2,480	3.37	4,690	750	596	60	8.2	3,690	8.6
Feb. 7	1,090	--	--	156	46	394	142	10	275	715	--	12	--	1,980	2.69	5,770	580	447	60	7.1	2,980	8.6
Feb. 8, 10	1,470	--	--	106	34	264	120	4	170	469	--	5.0	--	1,280	1.74	5,080	405	300	57	5.3	2,040	8.3
Feb. 9	1,410	--	--	78	22	165	110	4	119	328	--	4.5	--	830	1.06	3,540	285	188	58	4.8	1,480	8.4
Feb. 11-15	752	--	--	80	24	200	112	0	133	335	--	3.7	--	961	1.33	1,990	300	208	59	5.0	1,620	8.2
Feb. 16	306	--	--	124	34	300	136	8	205	540	--	3.8	--	1,490	2.03	1,230	450	325	59	6.2	2,320	8.6
Feb. 17-18	286	--	--	154	43	421	154	6	282	740	--	3.8	--	1,930	2.62	1,390	560	424	62	7.7	3,040	8.4
Feb. 19-20	213	--	--	188	61	533	178	6	353	960	--	2.8	.00	2,540	3.45	1,460	720	564	62	8.6	3,860	8.4
Feb. 21-28	201	--	--	248	76	710	188	6	466	1,280	--	--	--	3,270	4.45	1,770	910	746	63	10	4,940	8.4
Mar. 1	216	--	--	248	102	821	234	0	588	1,470	--	--	--	3,400	4.62	1,980	1,040	848	63	11	5,530	7.9
Mar. 2-3	390	--	--	204	71	663	160	0	443	1,170	--	--	--	2,780	3.78	2,930	800	669	64	10	4,500	7.7
Mar. 4	1,300	--	--	115	40	336	108	0	208	620	--	2.4	--	1,550	2.11	5,440	450	362	62	6.9	2,590	7.6
Mar. 5-6	1,390	--	--	75	25	206	96	0	128	370	--	3.0	--	987	1.34	3,700	290	210	61	5.3	1,660	7.5
Mar. 7-10	907	--	--	101	32	333	118	0	170	590	--	3.2	--	1,400	1.90	3,430	385	288	65	7.4	2,400	7.5
Mar. 11	790	--	--	120	35	411	136	0	226	700	--	5.2	--	1,670	2.27	3,560	445	334	67	8.5	2,810	7.7
Mar. 12-16	524	--	--	152	54	561	136	0	310	980	--	3.5	--	2,260	3.07	3,200	600	488	67	10	3,770	7.3
Mar. 17	300	--	--	200	68	706	136	0	456	1,240	--	--	--	2,930	3.98	2,370	780	680	68	11	4,700	7.8
Mar. 18-19	284	--	--	224	88	823	134	0	519	1,460	--	--	--	3,400	4.62	2,610	920	810	66	12	5,450	7.5
Mar. 20	254	--	--	144	49	494	110	0	316	860	--	4.4	--	2,080	2.83	1,430	560	470	66	9.1	3,490	7.6

a Values above 200 ppm are reported to the nearest 5 ppm.

## RED RIVER BASIN--Continued

## RED RIVER NEAR GAINESVILLE, TEX.--Continued

Chemical analyses, in parts per million, water year October 1956 to September 1957--Continued

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal-cium (Ca)	Mag-ne-sium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Car-bonate (CO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> )	Bo-ron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Per-centage so-dium	So-dium adsorp-tion ratio	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-day	Tons per day	Calcium	Non-carbonate				
Mar. 21, 1957.....	270	--	--	200	68	723	168	0	447	1,240	--	--	--	--	2,860	3.89	2,080	780	642	67	11	4,720	7.7
Mar. 22-25.....	1,930	--	--	122	43	388	124	0	223	700	--	--	2.3	--	1,730	2.35	9,020	480	378	64	7.7	2,850	7.5
Mar. 26-29.....	1,368	--	--	82	30	239	120	0	124	435	--	--	6.6	--	1,130	1.54	4,170	330	230	61	5.7	1,840	7.5
Mar. 30-31.....	554	--	--	120	43	379	138	0	255	650	--	--	3.5	--	1,710	2.33	2,560	475	362	63	7.6	2,780	7.6
Apr. 1.....	781	--	--	94	37	233	122	8	178	420	--	--	3.0	--	1,170	1.59	2,470	390	274	57	5.1	1,920	8.3
Apr. 2.....	572	--	--	130	48	411	128	10	291	700	--	--	2.4	--	1,770	2.41	2,730	520	398	63	7.8	2,930	8.4
Apr. 3.....	1,540	--	--	83	10	85	128	0	64	140	--	--	1.4	--	482	.66	2,000	186	81	50	2.7	827	8.2
Apr. 4.....	1,760	--	--	58	27	224	112	0	143	400	--	--	3.0	--	1,060	1.44	5,040	320	228	60	5.5	1,780	8.2
Apr. 5-6.....	809	--	--	136	49	472	126	0	278	830	--	--	2.2	--	2,000	2.72	4,370	540	436	66	8.8	3,300	7.9
Apr. 7.....	740	--	--	232	61	701	156	0	553	1,170	--	--	--	--	3,100	4.22	6,190	830	702	65	11	4,790	7.8
Apr. 8-9.....	2,270	--	--	160	49	392	116	8	421	640	--	--	2.3	--	2,210	3.01	13,550	600	492	59	7.0	3,530	8.3
Apr. 10-13.....	968	--	--	138	32	343	146	0	296	580	--	--	4.8	--	1,580	2.15	4,130	475	356	61	6.8	2,620	8.1
Apr. 14-15.....	724	--	--	115	29	263	130	2	221	450	--	--	3.9	--	1,250	1.70	2,440	405	295	59	5.7	2,120	8.3
Apr. 16-20.....	434	--	--	174	45	402	164	4	330	715	--	--	3.2	--	1,900	2.58	2,320	620	479	59	7.0	3,130	8.4
Apr. 21.....	1,580	--	--	91	20	171	132	4	124	310	--	--	2.3	--	804	1.09	3,450	310	196	55	4.2	1,540	8.4
Apr. 22-25.....	31,380	--	--	75	16	118	130	0	131	185	--	--	2.4	--	660	.90	55,920	280	142	51	3.3	1,100	8.2
Apr. 26-30.....	49,580	--	--	51	7.5	49	130	0	58	67	--	--	2.4	--	333	.86	44,850	138	52	40	1.7	553	8.2
May 1-2.....	58,700	--	--	120	20	185	122	0	248	300	--	--	2.2	--	976	1.33	134,700	380	280	51	4.1	1,640	8.0
May 3-10.....	44,140	--	--	86	13	110	140	0	131	182	--	--	1.9	--	614	.84	73,180	270	156	47	2.9	1,080	8.0
May 11-15.....	44,880	--	--	116	26	162	128	0	242	275	--	--	2.4	--	937	1.27	113,500	395	290	47	3.5	1,570	7.9
May 16-17.....	29,900	--	--	98	13	111	148	0	164	175	--	--	2.2	--	670	.91	54,090	300	178	45	2.8	1,130	8.2
May 18.....	60,000	--	--	68	11	63	140	6	80	99	--	--	5.0	--	444	.60	71,930	215	90	39	1.9	704	8.4
May 19-20.....	91,500	--	--	100	20	112	116	0	209	185	--	--	1.4	--	722	.98	178,400	330	235	43	2.7	1,200	7.9
May 21-24.....	53,600	--	--	85	14	95	130	4	144	150	--	--	2.0	--	584	.79	84,520	270	157	43	2.5	992	8.4
May 25-27.....	40,500	--	--	74	13	75	144	4	103	120	--	--	1.6	--	486	.66	53,140	240	116	40	2.1	837	8.3
May 28-31.....	36,900	--	--	98	17	132	144	0	173	125	--	--	1.9	--	745	1.01	74,220	315	197	48	3.2	1,270	8.2
June 1-2.....	40,750	--	--	86	16	63	144	0	83	110	--	--	2.9	--	429	.58	47,200	225	106	38	1.8	756	7.9
June 3.....	70,000	--	--	86	20	130	116	0	130	245	--	--	2.9	--	774	1.05	146,300	300	201	49	3.3	1,330	7.9
June 4-10.....	45,660	--	--	160	32	253	136	0	372	410	--	--	2.2	--	1,370	1.86	168,900	530	418	51	4.8	2,220	7.9
June 11-12.....	12,900	--	--	116	62	148	148	0	347	510	--	--	2.4	--	1,510	2.05	52,590	545	424	55	5.6	2,470	8.0

RED RIVER BASIN

June 13-14, 1957 ..	9,085	--	--	208	51	437	168	0	478	740	--	2.8	--	2,060	2.80	50,250	750	582	57	7.0	3,340	8.0
June 15-20 .....	7,508	--	232	528	54	528	172	0	515	900	2.6	2,410	3.28	2,410	3.28	48,650	800	659	59	8.1	3,910	7.9
June 21 .....	17,400	--	166	357	40	357	136	0	380	600	3.2	1,700	2.31	1,700	2.31	79,870	560	488	57	6.4	2,810	7.9
June 22-27 .....	6,842	--	140	240	32	240	148	0	260	430	3.6	1,270	1.73	1,270	1.73	23,460	460	358	52	4.8	2,100	7.9
June 28 .....	3,180	--	176	456	67	456	130	0	437	810	4.2	2,090	2.84	2,090	2.84	17,940	715	608	58	7.4	3,480	7.9
June 29 .....	2,760	--	256	563	54	563	236	0	514	960	2.5	2,810	3.55	2,810	3.55	19,590	860	666	59	8.3	4,180	7.9
June 30 .....	2,700	--	264	714	81	714	176	0	625	1,240	--	3,160	4.30	3,160	4.30	23,040	990	846	61	9.9	5,050	7.8
July 1-10 .....	1,605	24	.03	264	88	792	184	0	672	1,300	.3	.47	3,320	4.52	14,390	1,020	869	63	11	5.280	7.9	
July 11-20 .....	823	--	224	836	124	836	144	0	696	1,450	--	3,620	4.98	8,130	1,070	952	65	11	5,780	7.6		
July 21-25 .....	854	--	232	854	88	722	162	0	590	1,250	--	3,170	4.31	7,140	940	807	63	10	5,050	7.9		
July 26-30 .....	3,552	--	162	448	59	448	148	0	408	760	1.7	2,050	2.79	19,660	645	524	60	7.7	3,290	7.8		
July 31 .....	3,580	--	108	301	41	301	144	0	272	490	3.0	1,390	1.89	13,440	440	322	60	6.2	2,180	7.8		
Aug. 1-4 .....	1,725	--	133	283	34	283	136	0	317	455	3.2	1,500	2.04	6,990	470	358	57	5.7	2,430	7.5		
Aug. 5-8 .....	760	--	172	452	51	452	160	0	403	760	1.7	2,070	2.82	4,360	640	509	61	7.8	3,260	7.5		
Aug. 9-10 .....	665	--	248	759	93	759	168	0	652	1,300	--	3,310	4.50	5,940	1,000	862	62	10	5,200	7.7		
Aug. 11-12 .....	1,975	--	368	81	726	162	0	964	1,200	1,200	--	3,590	4.88	19,140	1,250	1,120	56	8.9	5,330	8.0		
Aug. 13-16 .....	1,332	--	272	479	59	479	150	0	652	820	3.9	2,470	3.38	8,680	920	797	53	6.9	3,820	7.9		
Aug. 17-20 .....	1,763	--	512	822	71	822	136	0	741	1,400	--	3,550	4.83	7,310	1,070	958	63	11	5,600	7.8		
Aug. 21-31 .....	499	--	288	814	88	814	154	0	719	1,400	--	3,580	4.94	4,800	1,080	954	62	11	5,590	7.5		
Sept. 1-10 .....	481	--	512	891	93	891	156	0	794	1,520	--	3,680	5.25	5,010	1,160	1,050	63	11	6,050	7.7		
Sept. 11-12 .....	445	--	384	1,020	69	1,020	118	0	917	1,700	--	4,280	5.79	5,120	1,240	1,140	64	13	6,530	7.6		
Sept. 13-20 .....	402	--	292	699	66	699	142	0	637	1,220	--	3,180	4.32	3,450	1,000	884	60	9.6	5,000	7.8		
Sept. 21-25 .....	565	--	210	555	72	555	158	0	469	1,000	--	2,530	3.44	3,660	820	680	60	8.4	4,070	7.8		
Sept. 26-30 .....	1,962	--	142	272	33	272	136	0	324	445	5.2	1,390	1.88	7,310	490	378	55	5.3	2,260	7.6		
Weighted average	7,484	--	107	169	23	169	b 136	--	209	283	--	917	1.25	18,530	360	250	50	3.9	1,520	--		

a Values above 200 ppm are reported to the nearest 5 ppm.

b Includes equivalent of individual carbonate values shown above.

## LOWER MISSISSIPPI RIVER BASIN

## RED RIVER BASIN--Continued

## RED RIVER NEAR GAINESVILLE, TEX.--Continued

Temperature (°F) of water, water year October 1956 to September 1957

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	72	64	50	46	42	60	65	66	71	85	89	88
2	72	62	52	--	45	53	66	67	70	87	88	88
3	74	63	52	--	45	57	63	65	69	87	89	89
4	75	64	58	50	50	52	56	62	69	88	89	85
5	74	62	60	49	50	51	58	--	71	86	--	82
6	73	62	58	51	50	48	64	63	75	88	86	83
7	76	58	52	50	51	45	69	68	78	87	85	80
8	75	53	46	56	59	50	59	67	80	89	86	79
9	74	55	40	52	62	54	58	68	78	88	85	78
10	72	54	42	48	59	61	63	70	--	88	87	77
11	72	55	44	45	56	65	68	70	80	89	88	78
12	73	57	46	46	58	62	42	70	80	90	89	76
13	72	58	45	48	57	66	47	68	82	91	86	75
14	72	64	48	39	56	61	55	72	82	89	86	79
15	70	60	48	36	62	60	57	72	82	88	87	78
16	71	52	49	32	56	59	58	75	82	89	85	79
17	70	50	46	32	56	56	70	75	83	88	84	80
18	70	54	40	40	52	61	72	70	81	90	86	80
19	69	--	44	47	50	60	72	70	83	88	87	82
20	68	52	44	53	54	52	73	74	80	90	89	82
21	69	50	42	56	54	53	67	74	82	88	85	78
22	68	52	43	43	53	56	67	78	--	86	84	75
23	67	50	42	39	46	59	66	74	80	87	90	72
24	67	52	43	38	50	50	68	74	80	89	87	75
25	68	50	45	39	54	46	69	72	82	88	88	74
26	65	48	44	35	53	51	65	72	81	87	87	72
27	66	48	45	34	55	56	67	74	83	87	87	72
28	65	46	44	37	55	47	65	75	85	89	85	73
29	65	42	42	40	--	59	65	75	84	89	86	70
30	63	44	45	40	--	59	64	75	86	90	85	72
31	64	--	41	42	--	64	--	74	--	88	85	--
Average	70	55	46	44	53	56	63	71	79	88	87	78

## RED RIVER BASIN--Continued

## WASHITA RIVER NEAR FOSS, OKLA.

LOCATION.--At gaging station at county highway bridge, 0.4 mile downstream from Oak Creek, 2½ miles west of Stratford, and 6 miles north of Foss, Washita County.

DRAINAGE AREA.--1,551 square miles.

RECORDS AVAILABLE.--Water temperatures: March 1956 to April 1957.

Sediment records: March 1956 to April 1957.

EXTREMES, October 1956 to April 1957.--Water temperatures: Maximum, 65°F Apr. 20, 22-24; minimum, freezing point Dec. 11, 13, Jan. 15, 16, 24.

Sediment concentrations: Maximum daily, 24,900 ppm Apr. 4, minimum daily, no flow on many days.

Sediment loads: Maximum daily, 228,000 tons Apr. 19; minimum daily, less than 0.05 ton on many days.

EXTREMES, March 1956 to April 1957.--Water temperatures: Maximum, 79°F July 4, 5, 1956; minimum, freezing point Dec. 11, 13, 1956. Jan. 15, 16, 24, 1957.

Sediment concentrations: Maximum daily, 24,900 ppm Apr. 4, 1957; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 228,000 tons Apr. 19, 1957; minimum daily, 0 tons on many days.

REMARKS.--Records of chemical analyses and water temperatures available June 1946 to September 1948 at site 2 miles upstream published as Washita River at Foss Dam site near Foss. Records of discharge for water years 1956 and 1957 given in WSP 1441 and 1511 respectively. No flow May 20-24, July 3-5, 7-9, Aug. 5-20, 22-31, Sept. 1-21, 24-30, Oct. 1-13, 1956.

Temperature (°F) of water, March to September 1956  
[Once-daily measurement between 7 a.m. and 9:30 a.m.]

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1						--	50	61	68	74	71	51
2						--	62	64	72	76	69	56
3						--	--	61	72	77	68	57
4						--	50	62	71	79	65	--
5						--	50	67	74	79	68	--
6						--	53	70	73	75	70	--
7						--	48	67	73	77	69	--
8						--	49	65	74	77	70	--
9						--	45	72	73	75	70	--
10						--	48	--	75	74	69	--
11						--	48	65	74	70	68	--
12						--	50	72	74	71	66	--
13						--	56	72	--	75	66	--
14						--	62	59	73	76	68	--
15						--	55	59	72	73	70	--
16						--	55	60	--	73	69	--
17						--	53	63	76	74	67	--
18						--	52	65	76	69	66	--
19						--	57	65	74	63	--	--
20						--	55	70	75	72	55	--
21						--	57	68	77	72	55	--
22						41	58	69	77	72	58	--
23						47	56	74	75	68	63	55
24						49	52	68	75	70	68	--
25						55	56	68	75	69	65	--
26						58	64	68	73	71	60	--
27						50	65	65	77	72	61	--
28						47	68	68	74	71	62	--
29						48	55	74	77	69	60	--
30						50	57	77	78	69	60	--
31						59	--	74	--	69	56	--
Average						--	55	67	74	73	--	--

LOWER MISSISSIPPI RIVER BASIN  
 RED RIVER BASIN--Continued  
 WASHITA RIVER NEAR FOSS, OKLA.--Continued

Temperature (°F) of water, October 1956 to April 1957  
 /Once-daily measurement between 8 a. m. and 9 a. m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	--	34	39	40	35	47	53					
2	--	34	38	38	37	50	53					
3	--	47	39	46	42	45	50					
4	--	48	46	45	41	49	48					
5	--	48	44	42	42	51	45					
6	--	48	47	44	38	35	50					
7	--	51	35	39	46	46	53					
8	--	43	34	39	52	35	45					
9	--	41	34	45	55	42	50					
10	--	46	34	34	49	53	51					
11	--	48	32	34	50	53	54					
12	--	51	34	35	47	48	40					
13	--	47	32	37	46	49	39					
14	--	56	34	33	48	46	45					
15	42	43	34	32	55	44	52					
16	40	38	36	32	46	45	52					
17	42	38	40	34	44	55	64					
18	42	43	34	35	49	55	60					
19	44	44	39	35	45	47	60					
20	43	44	40	35	42	50	65					
21	35	38	39	40	44	49	64					
22	36	--	40	39	38	48	65					
23	36	40	39	35	--	49	a 65					
24	36	38	38	32	40	40	65					
25	37	41	35	35	45	41	--					
26	33	37	36	34	44	40	--					
27	34	36	39	34	40	46	--					
28	38	38	39	35	44	44	--					
29	43	36	39	36	--	49	--					
30	42	37	40	33	--	54	--					
31	34	--	41	35	--	55	--					
Average	--	43	38	37	45	47	54					

a Reading obtained at 4 p. m.

## RED RIVER BASIN--Continued

## WASHITA RIVER NEAR FOSS, OKLA.--Continued

Suspended sediment, March to September 1956

Day	March			April			May			
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day	
1.....	2.5			0.9	136	0.3	0.5	192	0.3	
2.....				.9	152	.4	1.2	182	.5	
3.....				.8	150	.3		950	s 123	
4.....				.8	138	.3		1,100	s 522	
5.....				.8	144	.3	175	14,000	s 6,960	
6.....				.8	136	.3		7,000	s 1,530	
7.....				.6	117	.2		48	s 464	
8.....	2.2			.6	164	.3		1,900	164	
9.....	2.4			.7	113	.2		1,160	76	
10.....	2.4			.7	132	.2		709	40	
11.....	2.0			.7	107	.2		17	456	21
12.....	2.0			.6	113	.2		13	326	11
13.....	1.9			.5	122	.2		10	253	6.8
14.....	2.0			.2	113	.1		6.0	220	3.6
15.....	2.5			.1	140	(t)		3.5	149	1.4
16.....	2.4			.1	120	(t)		2.0	142	.8
17.....	1.9			.2	136	.1		1.0	150	.4
18.....	1.6			.2	134	.1		.5	157	.2
19.....	1.2			.1	141	(t)		.2	153	.1
20.....	1.3			.1	120	(t)		0	--	0
21.....	2.4			.4	130	.1		0	--	0
22.....	2.4	146		.4	133	.1		0	--	0
23.....	8.9	139	2.6	.2	146	.1		0	--	0
24.....	13	127	4.5	.3	157	.1		0	--	0
25.....	8.9	110	2.6	.4	163	.2		52	6,060	s 1,680
26.....	8.1	136	2.2	.2	160	.1		271	12,200	s 9,070
27.....	4.5	156	1.9	.1	143	(t)		557	17,800	s 33,400
28.....	3.9	148	1.6	.1	180	(t)		757	19,100	s 39,700
29.....	3.3	137	1.2	.1	180	(t)		180	11,600	s 5,870
30.....	2.4	138	.9	.1	170	(t)		122	6,300	2,080
31.....	1.6	142	.6	--	--	--		88	3,300	784
Total.	98.7	--	35.8	12.7	--	4.7	2,551.9	--	102,511.1	
Day	June			July			August			
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day	
1.....	31	2,220	188	0.4	66	0.1	18	2,740	s 163	
2.....	19	873	45	.2	67	(t)	2.9	588	s 4.9	
3.....	14	378	14	0	--	0	.8	77	.2	
4.....	11	236	7.0	0	--	0	.2	42	(t)	
5.....	9.1	506	12	0	--	0	0	--	0	
6.....	5.8	158	2.5	.5	88	.1	0	--	0	
7.....	4.5	115	1.4	0	--	0	0	--	0	
8.....	4.5	104	1.3	0	--	0	0	--	0	
9.....	5.8	152	2.3	0	--	0	0	--	0	
10.....	3.9	89	.9	16	5,350	s 1,080	0	--	0	
11.....	3.1	82	.7	518	19,600	s 31,100	0	--	0	
12.....	2.5	84	.6	188	12,400	s 5,750	0	--	0	
13.....	2.2	84	.5	80	7,700	s 1,740	0	--	0	
14.....	2.0	67	.4	19	1,800	92	0	--	0	
15.....	1.6	62	.3	7.1	259	4.9	0	--	0	
16.....	1.2	68	.2	3.9	480	4.8	0	--	0	
17.....	.9	96	.2	2.5	230	1.6	0	--	0	
18.....	204	4,920	s 8,490	1.8	66	.3	0	--	0	
19.....	218	9,460	s 7,050	142	12,500	s 6,340	0	--	0	
20.....	20	1,270	89	59	7,720	s 1,400	0	--	0	
21.....	7.6	182	3.7	18	1,330	s 91	3.0	80	.6	
22.....	3.7	76	.8	8.3	475	s 17	0	--	0	
23.....	2.5	44	.3	26	5,120	s 421	0	--	0	
24.....	2.0	24	.1	5.3	1,280	18	0	--	0	
25.....	1.8	24	.1	3.3	236	2.1	0	--	0	
26.....	1.6	38	.2	2.0	103	.6	0	--	0	
27.....	1.2	43	.1	1.3	103	.4	0	--	0	
28.....	1.0	54	.1	.9	28	.1	0	--	0	
29.....	.8	37	.1	.7	45	.1	0	--	0	
30.....	.5	47	.1	a 1.0	79	.2	0	--	0	
31.....	--	--	--	17	4,700	s 239	0	--	0	
Total.	586.6	--	15,889.9	a 1,102.2	--	48,303.3	24.9	--	168.7	

e Estimated.

s Computed by subdividing day.

t Less than 0.05 ton.

a Revised.

## LOWER MISSISSIPPI RIVER BASIN

## RED RIVER BASIN--Continued

## WASHITA RIVER NEAR FOSS, OKLA.--Continued

## Suspended sediment, March to September 1956--Continued

Date	Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day
Sept. 22, 1956.....	0.4	327	0.4
Sept. 23.....	.2	319	.2
Total for September.....	.6	--	.6
Total discharge for period March to September 1956 (cfs-days)..... 4,377.6			
Total load for period March to September 1956 (tons) .....166,914.1			

## Suspended sediment, October 1956 to April 1957

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	0	--	0	18	3,500	170	0.8	25	0.1
2.....	0	--	0	7.1	516	9.9	.8	41	.1
3.....	0	--	0	4.3	221	2.6	.8	31	.1
4.....	0	--	0	10	376	11	.8	45	.1
5.....	0	--	0	3.7	144	1.5	.8	46	.1
6.....	0	--	0	2.7	50	.4	.8	69	.1
7.....	0	--	0	2.5	37	.3	.9	86	.2
8.....	0	--	0	2.2	28	.2	1.0	32	.1
9.....	0	--	0	1.9	20	.1	1.0	95	.3
10.....	0	--	0	1.8	27	.1	1.2	92	.3
11.....	0	--	0	1.6	18	.1	1.2	49	.2
12.....	0	--	0	1.4	22	.1	1.2	52	.2
13.....	0	--	0	1.3	15	.1	.9	103	.3
14.....	103	2,370	s 2,480	1.0	39	.1	.9	87	.2
15.....	1,830	15,400	s 70,700	1.0	37	.1	.8	51	.1
16.....	273	10,500	s 8,480	.9	21	.1	.8	47	.1
17.....	40	4,700	531	.9	22	.1	.8	80	.2
18.....	16	902	41	.9	16	(t)	.7	52	.1
19.....	9.7	227	6.0	1.2	18	.1	.7	34	.1
20.....	7.8	124	2.6	1.0	36	.1	.8	22	.1
21.....	6.3	69	1.2	1.0	15	(t)	.8	24	.1
22.....	5.0	47	.6	.8	22	(t)	.7	22	(t)
23.....	3.9	40	.4	.9	18	(t)	.6	23	(t)
24.....	2.9	67	.5	.8	17	(t)	.5	29	(t)
25.....	2.2	34	.2	.9	20	(t)	.5	18	(t)
26.....	1.8	30	.1	.8	24	.1	.4	38	(t)
27.....	1.3	30	.1	.8	20	(t)	.5	13	(t)
28.....	1.2	22	.1	.8	41	.1	.5	24	(t)
29.....	1.1	34	s .1	.8	28	.1	.4	22	(t)
30.....	12	574	s 3,040	.8	26	.1	.5	37	(t)
31.....	192	17,100	s 11,200	--	--	--	.5	34	(t)
Total.	2,509.2	--	96,483.9	73.8	--	197.3	23.6	--	3.5

s Computed by subdividing day.

t Less than 0.05 ton.

## RED RIVER BASIN--Continued

## WASHITA RIVER NEAR FOSS, OKLA.--Continued

Suspended sediment, October 1956 to April 1957--Continued

Day	January			February			March		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	3.0	42	s 0.4	2.0	15	0.1	1.0	51	0.1
2.....	1.3	25	.1	1.8	7	(t)	6.9	279	s 6.4
3.....	1.2	26	.1	1.6	10	(t)	4.3	160	s 2.3
4.....	1.4	40	.2	1.4	9	(t)	2.4	62	.4
5.....	1.6	53	.2	1.4	11	(t)	2.2	35	.2
6.....	1.4	61	.2	1.4	15	.1	2.9	44	.3
7.....	1.4	62	.2	1.6	11	(t)	2.7	33	.2
8.....	1.4	45	.2	1.3	11	(t)	2.2	44	.3
9.....	1.4	56	.2	1.3	10	(t)	1.9	27	.1
10.....	1.4	75	.3	1.2	11	(t)	1.9	21	.1
11.....	1.4	86	.3	1.0	9	(t)	1.8	32	.2
12.....	1.3	77	.3	1.0	10	(t)	1.3	24	.1
13.....	1.3	41	.1	.9	21	.1	1.2	46	.1
14.....	1.3	75	.3	.8	26	.1	1.0	27	.1
15.....	1.2	67	.2	.8	36	.1	1.0	17	.1
16.....	1.3	94	.3	.7	30	.1	1.0	24	.1
17.....	.9	86	.2	.6	31	.1	1.2	21	.1
18.....	1.3	67	.2	1.3	14	.1	1.2	20	.1
19.....	1.3	66	.2	2.4	35	.2	.9	57	.1
20.....	1.3	44	.2	1.9	16	.1	1.9	33	.2
21.....	1.2	52	.2	1.9	29	.1	4.1	53	.6
22.....	1.0	34	.1	1.9	42	.2	2.4	9	.1
23.....	.9	61	.1	1.6	42	.2	65	3,020	s 852
24.....	1.0	56	.2	1.8	37	.2	31	2,390	s 209
25.....	.9	48	.2	1.8	35	.2	13	1,030	46
26.....	.8	57	.1	1.6	20	.1	6.6	167	3.0
27.....	.7	103	.2	1.2	35	.1	4.8	55	.7
28.....	.8	97	.2	1.2	65	.2	4.3	41	.5
29.....	.9	82	.2	--	--	--	3.7	31	.3
30.....	1.0	128	.3	--	--	--	3.5	38	.4
31.....	2.7	68	.5	--	--	--	3.7	68	.7
<b>Total.</b>	<b>40.0</b>	<b>--</b>	<b>6.7</b>	<b>39.4</b>	<b>--</b>	<b>2.8</b>	<b>183</b>	<b>--</b>	<b>1, 124.9</b>
<b>April</b>									
1.....	3.1	46	0.4						
2.....	2.7	91	.7						
3.....	1,020	17,100	s 82,700						
4.....	790	24,900	s 56,400						
5.....	109	11,100	s 3,472						
6.....	49	4,600	677						
7.....	30	1,480	124						
8.....	23	576	38						
9.....	18	276	14						
10.....	16	151	7.0						
11.....	14	91	3.4						
12.....	13	107	3.2						
13.....	11	73	2.2						
14.....	10	92	2.5						
15.....	10	87	2.3						
16.....	11	89	2.6						
17.....	11	57	1.7						
18.....	275	2,900	sa 20,200						
19.....	4,900	14,800	sa 228,000						
20.....	2,140	16,000	sa 112,000						
21.....	1,030	20,000	sa 56,400						
22.....	780	14,500	sa 44,100						
23.....	3,210	18,600	sa 165,000						
24.....	793	12,600	sa 31,900						
25.....	--	--	--						
26.....	--	--	--						
27.....	--	--	--						
28.....	--	--	--						
29.....	--	--	--						
30.....	--	--	--						
31.....	--	--	--						
<b>Total.</b>	<b>15,268.8</b>	<b>--</b>	<b>801,051.0</b>						

Total discharge for period (cfs-days) ..... 18,137.8  
 Total load for period (tons) ..... 898,870.1

s Computed by subdividing day.

t Less than 0.05 ton.

a Computed from partly estimated concentration graph.

## RED RIVER BASIN--Continued

## WASHITA RIVER NEAR FOSS, OKLA.--Continued

Particle-size analyses of suspended sediment, May 1956 to April 1957  
 (Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipet; S, sieve; N, in native water;  
 W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date of Collection	Time	Discharge (cfs)	Water temperature (°F)	Suspended sediment										Methods of analysis			
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters											
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250		0.350	0.500	1.000
May 11, 1956.....	12:35 p.m.	17	65	394	633	79	85	92	98	100	--	--	--	--	--	100	BCW
May 26.....	11:00 a.m.	353	70	14,600	2,720	43	54	69	77	81	83	85	85	97	100	100	SPCW
July 11.....	11:15 a.m.	1,230	71	23,900	3,180	47	61	75	85	91	93	96	96	100	100	100	SPCW
July 13.....	6:00 p.m.	60	75	8,330	1,960	86	92	98	99	100	--	--	--	--	--	--	SPCW
July 19.....	3:30 p.m.	210	72	18,200	3,680	50	64	84	93	98	99	100	100	--	--	--	SPCW
Oct. 16.....	11:00 a.m.	255	40	11,500	3,990	67	82	94	98	100	--	--	--	--	--	--	SPCW
Apr. 5, 1957.....	5:00 p.m.	90	51	9,200	2,770	78	89	94	97	98	99	100	100	--	--	--	SPCW
Apr. 18.....	1:00 p.m.	3,550	52	14,300	9,400	42	53	67	81	86	92	96	100	100	100	100	SPCW

RED RIVER BASIN--Continued  
 WASHITA RIVER NEAR FOSS, OKLA.--Continued  
 Particle-size analyses of bed material, May to October 1956  
 (Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipet; S, sieve; N, in native water;  
 W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date of Collection	Time	Discharge (cfs)	Water temperature (°F)	Depth	Station	Bed material										Methods of analysis
						Percent finer than indicated size, in millimeters										
						0.031	0.062	0.125	0.250	0.500	1.000	2.000	3.32	6.68 <sup>a</sup>	16.0	
May 11, 1956.....	12:45 p.m.	17		1.15	26	1.8	3.7	8.4	75	91	93	94	96	100	S	
May 11.....	12:45 p.m.	17		1.15	33	1.7	3.3	6.2	43	77	76	81	86	100	S	
May 11.....	12:45 p.m.	17		1.45	40	1.6	3.9	10	81	95	98	99	100	--	S	
May 26.....	11:25 a.m.	353		4.0	48	.7	1.6	7.4	72	33	97	98	99	100	S	
May 26.....	11:25 a.m.	353		4.9	60	1.2	2.6	8.1	60	81	88	92	95	100	S	
May 26.....	11:25 a.m.	355		4.2	74	.6	1.5	5.1	67	91	96	97	99	100	S	
June 5.....	3:15 p.m.	8.5		.45	14	.9	2.5	6.0	62	83	87	91	93	100	S	
June 5.....	3:15 p.m.	8.5		.70	22	.7	1.8	6.2	60	78	84	89	95	100	S	
June 5.....	3:15 p.m.	8.5		.60	26	1.1	2.6	4.0	48	84	93	96	97	100	S	
July 11.....	12:10 p.m.	1,230		--	18	1.0	3.2	23	97	100	--	--	--	--	S	
July 11.....	12:10 p.m.	1,230		--	29	4.3	12	52	94	98	99	100	--	--	S	
July 11.....	12:10 p.m.	1,230		--	54	.8	1.8	8.1	52	80	87	90	93	100	S	
July 13.....	6:00 p.m.	60		1.55	11	.3	1.9	8.9	63	82	88	93	96	100	S	
July 13.....	6:00 p.m.	60		1.50	20	.6	1.2	4.7	50	82	91	95	97	100	S	
July 13.....	6:00 p.m.	60		.85	30	.5	1.2	4.8	56	90	96	98	99	100	S	
July 19.....	4:00 p.m.	210		3.0	11	3.1	6.8	18	71	90	94	97	98	100	S	
July 19.....	4:00 p.m.	210		2.2	21	2.3	4.8	13	66	89	94	97	98	100	S	
July 19.....	4:00 p.m.	210		1.4	39	2.6	5.5	14	61	87	93	98	99	100	S	
Oct. 17.....	11:30 a.m.	--		1.5	40	59	71	75	94	100	--	--	--	--	S	
Oct. 17.....	11:30 a.m.	--		3.0	58	.2	.5	4.6	48	73	78	81	86	100	S	
Oct. 17.....	11:30 a.m.	--		.3	70	.3	1.2	18	99	100	--	--	--	--	S	

<sup>a</sup> Pebbles of various sizes.

## RED RIVER BASIN--Continued

## WASHITA RIVER AT CARNEGIE, OKLA.

LOCATION.--At gaging station at bridge on State Highway 9, 1,300 feet upstream from Running Creek, and 2.7 miles east of Carnegie, Caddo County. DRAINAGE AREA.--3,129 square miles including that of Running Creek.

RECORDS AVAILABLE.--Chemical analyses: October 1953 to September 1957.

Water temperatures: October 1953 to September 1957.

EXTREMES, 1956-57.--Dissolved solids: Maximum, 1,870 ppm Sept. 21.

Hardness: Maximum, 1,150 ppm Feb. 11-20; minimum, 120 ppm Sept. 21.

Specific conductance: Maximum daily, 2,450 microhms Feb. 9; minimum daily, 222 microhms Sept. 21.

Water temperatures: Maximum, 89°F July 28, 31, Aug. 1-2; minimum, 33°F Jan. 27.

EXTREMES, 1953-57.--Dissolved solids: Maximum, 2,460 ppm May 9-10, 1956; minimum, 163 ppm Sept. 21, 1957.

Hardness: Maximum, 1,480 ppm May 9-10, 1956; minimum, 120 ppm Sept. 21, 1957.

Specific conductance: Maximum daily, 3,530 microhms Aug. 26, 1954; minimum daily, 222 microhms Sept. 21, 1957.

Water temperatures: Maximum, 90°F July 14, 30-31, 1955, July 5, 1956; minimum, freezing point on several days during January, February and March 1954, February 11, 1955.

REMARKS.--Records of specific conductance of daily samples are available in district office at Oklahoma City, Okla. Records of discharge for water year October 1956 to September 1957 are given in WSP 1511.

## Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonyl (CO <sub>2</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (microhms at 25°C)	pH		
															Parts per million	Tons per acre-foot	Calcium	Non-carbonate					
Oct. 1-10, 1956.....	0.92	18	0.02	188	37	56	3.9	306	0	404	58	0.4	2.0	0.18	847	2.4	620	369	16	1.0	1,280	8.0	
Oct. 11-15.....	43.7	--	--	174	40	38	--	280	0	375	43	--	1.8	--	840	99	600	370	12	.7	1,150	7.9	
Oct. 16-20.....	831	--	--	80	20	9.4	--	140	0	163	10	--	2.9	--	369	553	280	166	7	.2	562	7.6	
Oct. 21-25.....	43.7	--	--	80	22	8.0	--	128	0	169	18	--	3.0	--	393	46	280	186	6	.2	578	7.7	
Oct. 24-31.....	42.1	--	--	118	27	29	--	168	0	265	38	--	2.6	--	599	.81	405	268	14	.6	888	7.7	
Nov. 1-2.....	95.5	--	--	154	37	59	--	176	0	379	88	--	1.9	--	884	1.20	535	391	19	1.1	1,280	7.7	
Nov. 3.....	86.0	--	--	88	26	15	--	124	0	208	26	--	3.5	--	461	.63	325	234	9	.4	672	7.5	
Nov. 4-10.....	36.1	--	--	154	38	23	--	180	0	382	31	--	2.8	--	765	1.04	540	382	9	.4	1,040	7.6	
Nov. 11-14.....	20.5	--	--	158	33	48	--	200	4	358	62	--	3.6	--	842	1.15	47	530	360	16	.9	1,140	8.3
Nov. 15-20.....	18.0	--	--	184	39	79	--	250	0	417	106	--	3.7	--	1,060	1.44	620	415	22	1.4	1,410	8.1	
Nov. 21-30.....	18.0	--	--	240	49	117	--	286	10	542	168	--	2.4	--	1,400	1.90	800	549	24	1.8	1,850	8.3	
Dec. 1-10.....	18.2	--	--	276	56	140	--	342	0	647	222	--	2.9	--	1,670	2.27	920	640	28	2.3	2,210	8.2	
Dec. 11-20.....	19.3	--	--	284	71	147	--	330	12	697	220	--	2.2	--	1,740	2.37	91	900	718	24	2.0	2,280	8.3
Dec. 21-31.....	19.5	--	--	288	64	162	--	336	0	729	210	--	2.4	--	1,750	2.38	92	920	704	26	2.3	2,280	8.0
Jan. 1-10, 1957.....	17.0	--	--	290	82	110	--	326	8	730	182	--	2.4	--	1,740	2.37	80	1,060	780	18	1.5	2,220	8.3
Jan. 11-20.....	14.3	--	--	292	88	120	--	310	14	751	205	--	3.0	--	1,790	2.43	69	1,090	812	19	1.6	2,310	8.5
Jan. 21-31.....	15.2	--	--	298	82	118	--	326	12	749	190	--	3.1	--	1,730	2.35	71	1,080	793	19	1.6	2,280	8.4
Feb. 1-10.....	20.2	--	--	268	103	134	--	336	0	779	208	--	1.1	--	1,870	2.54	102	1,090	814	21	1.8	2,360	8.2
Feb. 11-20.....	21.4	--	--	280	110	100	--	328	8	789	185	--	2.0	--	1,840	2.50	106	1,150	868	16	1.3	2,310	8.3
Feb. 21-28.....	25.2	--	--	282	120	101	--	292	22	781	175	--	3.0	--	1,720	2.34	117	1,120	844	16	1.3	2,240	8.5

RED RIVER BASIN

Mar. 1-10, 1957.....	29.8	107	90	322	0	765	165	--	2.8	--	1,760	2.39	142	1,100	836	15	1.2	2,220	8.1
Mar. 11-20.....	21.4	232	110	308	0	719	132	--	1.7	--	1,560	2.16	92	1,080	778	13	1.0	2,020	8.2
Mar. 21-31.....	32.8	248	102	244	16	766	160	--	2.0	--	1,660	2.26	147	1,080	814	17	1.3	2,130	8.4
Apr. 1-2.....	28.0	234	74	208	28	739	62	--	1.2	--	1,450	1.94	108	890	673	17	1.2	1,700	9.0
Apr. 3-4.....	9, 015	45	9.1	109	6	64	12	--	1.9	--	237	.32	1,930	150	50	19	.6	358	8.7
Apr. 5-10.....	639	90	29	144	10	238	20	--	2.8	--	511	.69	882	345	210	17	.7	733	8.6
Apr. 11-18.....	64.4	146	37	196	6	356	43	--	4.0	--	796	1.08	138	515	344	15	.8	1,090	8.3
Apr. 19-20.....	1,548	79	20	168	0	146	18	--	1.1	--	409	.58	1,710	280	142	11	.4	610	8.1
Apr. 21-25.....	7,448	49	6.2	114	0	159	6, 8	--	2.4	--	196	.27	3,940	148	54	11	.3	334	7.7
Apr. 26-30.....	1,661	85	19	162	0	172	16	--	2.3	--	434	.59	1,950	290	159	13	.5	640	8.1
May 1.....	2,020	56	28	132	4	144	22	--	7.5	--	393	.53	2,140	255	142	15	.6	585	8.3
May 2-5.....	8,872	43	9.8	108	0	158	8, 8	--	2.8	--	218	.30	5,220	148	60	19	.2	321	7.4
May 6-7.....	4,805	65	18	188	0	112	15	--	4.5	--	342	.47	4,530	235	82	20	.8	510	8.0
May 8-9.....	1,315	98	33	156	6	210	30	--	6.5	--	579	.79	2,060	390	252	5	.2	812	8.3
May 10-12.....	2,827	72	23	144	0	149	23	--	6.0	--	424	.58	3,240	295	156	11	.4	607	8.1
May 13.....	3,800	46	16	120	0	104	12	--	7.1	--	286	.36	2,730	182	84	21	.7	384	8.2
May 14-16.....	2,243	73	28	160	0	168	20	--	5.8	--	480	.61	2,730	295	165	13	.5	644	8.2
May 17.....	789	108	46	186	8	276	35	--	3.3	--	695	.95	1,480	460	284	9	.4	994	8.4
May 18-20.....	2,760	59	21	154	0	111	20	--	4.8	--	354	.48	2,640	230	106	15	.5	552	8.2
May 21-23.....	1,640	88	33	176	0	208	30	--	6.5	--	579	.72	2,330	355	212	13	.6	787	8.2
May 24-27.....	2,915	67	23	144	0	142	19	--	5.4	--	390	.53	3,070	260	144	12	.4	586	8.2
May 28-29.....	1,325	95	40	176	4	250	26	--	7.2	--	597	.81	2,140	400	250	12	.5	827	8.3
May 30-31.....	3,430	82	20	144	4	158	22	--	8.2	--	459	.58	3,970	285	162	12	.5	633	8.3
June 1-2.....	4,950	66	14	136	0	113	24	--	5.4	--	332	.45	4,440	225	112	16	.6	500	7.6
June 3-4.....	5,470	51	11	128	0	72	15	--	3.9	--	248	.34	3,660	172	87	16	.5	388	7.5
June 5.....	4,040	61	22	154	0	112	24	--	5.1	--	348	.47	3,800	245	118	13	.5	511	7.6
June 6-8.....	1,543	122	38	224	0	282	46	--	9.6	--	693	.94	2,890	460	276	16	.8	975	7.8
June 9-10.....	700	147	62	210	0	452	78	--	10	--	951	1.29	1,800	620	448	18	1.1	1,330	7.7
June 11-20.....	626	.07	168	234	0	472	76	5	8.7	.53	1,030	1.40	1,740	650	458	19	1.2	1,370	8.2
June 21-30.....	576	--	149	208	0	377	51	--	6.4	--	1,879	1.20	1,370	540	370	16	.9	1,140	8.1

a Values above 200 ppm are reported to the nearest 5 ppm.

## RED RIVER BASIN--Continued

## WASHITA RIVER AT CARNEGIE, OKLA.--Continued

Chemical analyses, in parts per million, water year October 1956 to September 1957.--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (residue at 180° C)			Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium magnesium	Non-carbonate				
July 1-10, 1957.....	172	--	--	228	83	109		232	0	747	125	--	3.3	--	1,590	2.16	738	910	720	21	1.6	1,920	8.0
July 11-20.....	98.5	26	0.07	248	107	130		240	0	836	144	0.3	3.5	0.77	1,710	2.33	459	1,060	864	21	1.7	2,110	8.0
July 21-22.....	136	--	--	256	80	139		134	0	862	175	--	3.7	--	1,690	2.30	621	970	844	24	1.9	2,110	7.9
July 23-26.....	289	--	--	164	37	45		166	0	434	45	--	3.7	--	888	1.21	645	580	424	14	.8	1,160	7.9
July 27-31.....	101	--	--	216	55	92		214	0	622	98	--	3.7	--	1,290	1.75	352	765	590	21	1.4	1,580	8.0
Aug. 1-10.....	61.0	--	--	266	87	115		240	0	814	158	--	2.8	--	1,720	2.34	283	1,020	824	20	1.6	2,110	8.1
Aug. 11-20.....	50.2	--	--	262	84	141		230	0	831	178	--	2.9	--	1,780	2.42	241	1,000	812	23	1.9	2,170	8.0
Aug. 21-31.....	33.8	--	--	260	83	133		244	0	808	168	--	1.6	--	1,750	2.38	160	990	790	23	1.8	2,160	7.9
Sept. 1-7.....	44.4	--	--	262	75	148		232	0	796	185	--	2.4	--	1,730	2.35	207	960	770	25	2.1	2,180	8.0
Sept. 8-9.....	57.5	--	--	188	42	59		176	0	488	72	--	4.5	--	1,060	1.44	165	640	496	17	1.0	1,320	7.9
Sept. 10-12.....	47.7	--	--	324	76	89		206	0	952	108	--	2.4	--	1,800	2.45	232	1,120	951	15	1.2	1,910	8.0
Sept. 13-15.....	35.3	--	--	200	59	62		234	0	569	63	--	2.0	--	1,150	1.56	110	740	548	15	1.0	1,400	8.1
Sept. 16.....	180	--	--	252	76	139		178	0	800	185	--	2.8	--	1,700	2.31	826	940	794	24	2.0	2,110	7.9
Sept. 17-20.....	58.2	--	--	131	25	21		136	0	315	22	--	5.7	--	644	.88	101	430	318	9	.4	862	7.8
Sept. 21.....	658	--	--	38	6.1	5.3		120	0	26	1.5	--	5.2	--	163	.22	290	120	22	9	.2	248	7.7
Sept. 22-25.....	578	--	--	78	17	27		124	0	177	42	--	6.2	--	435	.59	679	265	162	18	.7	610	7.8
Sept. 26.....	67.0	--	--	144	23	32		152	0	339	30	--	4.9	--	742	1.01	134	455	330	13	.6	938	7.9
Sept. 27-30.....	50.8	--	--	204	51	47		230	0	514	67	--	4.5	--	1,090	1.48	150	720	532	12	.8	1,340	8.0
Weighted average.....	616	--	--	76	21	23		b148	--	160	24	--	4.3	--	423	0.58	704	275	154	15	0.6	604	--

a Values above 200 ppm are reported to the nearest 5 ppm.

b Includes equivalent of individual carbonate values shown above.

## RED RIVER BASIN--Continued

## WASHITA RIVER AT CARNEGIE, OKLA.--Continued

Temperature (°F) of water, water year October 1956 to September 1957

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	75	60	48	47	44	52	63	65	--	86	89	82
2	70	59	49	44	44	54	61	65	65	--	89	83
3	75	55	50	45	46	53	53	67	64	88	86	83
4	77	53	51	45	45	51	53	63	67	85	85	81
5	76	55	54	44	44	53	54	63	--	84	85	81
6	74	57	55	46	46	47	55	65	75	85	83	80
7	70	55	48	47	47	46	55	65	78	85	83	75
8	73	55	39	52	58	49	56	64	79	86	83	72
9	70	53	39	47	59	53	58	67	80	86	84	76
10	70	51	40	39	55	59	59	66	82	85	85	75
11	69	56	44	41	56	58	58	66	82	87	85	72
12	70	56	45	44	57	60	48	66	80	85	87	77
13	70	56	41	--	57	63	49	68	80	87	86	76
14	72	60	43	38	58	59	54	69	81	87	83	75
15	70	53	45	36	59	59	55	72	81	87	85	74
16	59	49	46	34	54	57	59	74	80	85	84	74
17	63	49	43	36	53	58	66	73	80	85	80	74
18	57	50	39	37	51	60	66	67	78	86	79	73
19	60	53	41	39	50	58	67	68	75	85	82	77
20	63	49	45	44	48	54	67	70	77	82	87	75
21	60	48	46	49	47	52	64	73	79	86	80	63
22	63	43	47	44	45	55	64	72	80	86	82	68
23	63	48	47	36	41	55	68	71	73	83	83	69
24	64	48	42	42	46	51	67	70	76	83	82	68
25	62	47	44	39	52	47	70	70	73	84	81	68
26	61	46	45	34	53	51	67	73	75	83	82	71
27	60	47	47	33	52	50	67	71	79	85	83	71
28	60	45	46	37	49	54	66	72	83	89	81	71
29	63	44	48	38	--	58	64	75	79	88	82	72
30	61	46	48	37	--	57	65	70	86	--	81	72
31	61	--	48	40	--	63	--	70	--	89	82	--
Average	66	52	46	41	51	55	61	69	77	86	84	75

RED RIVER BASIN--Continued  
 WASHITA RIVER NEAR PAULS VALLEY, OKLA.

LOCATION.--At gaging station at bridge on U.S. Highway 77, 2 miles northwest of Pauls Valley, Garvin County, 6 miles downstream from Owl Creek, and 7 miles upstream from Washington Creek.  
 DRAINAGE AREA.--5,330 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1953 to August 1957.

REMARKS.--Records of discharge for water year October 1956 to September 1957 given in WSP 1511.

Chemical analyses, in parts per million, water year October 1956 to August 1957

Date of collection	Discharge (cfs)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Chloride (Cl)	Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
								Calcium, magnesium	Non-carbonate				
Oct. 15, 1956	0.69	45	63	80	372		67	420	115	29	1.7	1,120	7.5
Oct. 31	100	77	21	18	134		18	280	170	12	.5	636	7.2
Nov. 5	1,140	40	10	8.4	140		8.6	142	28	12	.3	328	7.8
Nov. 14	66.5	58	18	22	110		21	220	130	18	.6	524	6.8
Dec. 3	39.3	188	38	49	272		68	550	327	16	.9	1,240	8.2
Jan. 9, 1957	62.5	172	56	102	268		128	660	440	25	1.7	1,520	7.8
Jan. 22	80.1	178	72	97	308		72	740	488	22	1.6	1,590	7.7
Feb. 11	69.6	144	56	69	184		73	590	439	20	1.2	1,390	7.6
Feb. 28	127	162	65	254	254		86	670	462	20	1.3	1,570	7.7
Mar. 13	64.4	140	61	71	200		76	600	436	20	1.3	1,410	7.8
Mar. 29	187	152	59	78	260		70	620	407	21	1.4	1,400	7.6
Apr. 8	2,330	69	15	9.4	160		12	230	101	8	.3	485	7.3
Apr. 17	237	112	34	41	200		32	420	256	17	.9	889	7.4
Apr. 22	3,520	86	26	12	188		14	320	166	8	.3	638	8.0
May 2	3,580	96	31	16	234		14	368	173	9	.4	674	7.8
May 7	5,950	75	19	8.4	226		8.8	265	79	7	.2	473	7.7
May 13	7,200	122	34	11	298		16	443	201	5	.2	748	7.3
May 16	4,220	107	31	14	232		13	395	205	7	.3	748	7.4
June 18	3,470	115	45	21	266		24	470	252	9	.4	906	7.5
July 1	1,160	114	46	26	252		23	475	268	11	.5	924	7.4
Aug. 1	309	118	65	45	222		48	580	378	15	.8	1,230	7.4
Aug. 14	157	136	76	49	302		54	650	402	14	.8	1,360	7.7

a Values above 200 ppm are reported to the nearest 5 ppm.

RED RIVER BASIN--Continued  
ROCK CREEK NEAR DOUGHERTY, OKLA.

LOCATION.--At gaging station at bridge on State Highway 7-C, 1 mile east of Dougherty, Murray County, and 1 mile upstream from mouth.  
DRAINAGE AREA.--138 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1956 to September 1957.

Water temperatures: October 1956 to September 1957.

EXTREMES: 1956-57.--Dissolved solids: Maximum, 1,760 ppm Oct. 1-10; minimum, 145 ppm May 17-18.

Hardness: Maximum, 470 ppm Dec. 1-7; minimum, 110 ppm Sept. 23-24.

Specific conductance: Maximum daily, 3,250 microhms Oct. 2; minimum daily, 171 microhms Sept. 21.

Water temperatures: Maximum 98 F July 27, 29, 31, Aug. 1, 2; minimum, freezing point on several days during November, December, and January.

REMARKS.--Records of specific conductance of daily samples are available in district office at Oklahoma City, Okla. Records of discharge for water year October 1956 to September 1957 are given in WSP 1511.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Sodium adsorption ratio	Specific conductance (microhms at 25°C)	pH	
															Parts per million	Tons per acre-foot	Tons per day	Calcium	Non-magnesium				
Oct. 1-10, 1956.....	0.90	12	0.02	84	51	467	9.4	254	0	135	790	0.6	2.3	0.79	1,760	2.39	4.3	420	212	70	9.9	3,060	7.9
Oct. 11-20.....	2.88	--	--	93	55	425	--	274	0	129	740	--	1.6	--	1,650	2.24	13	480	238	67	8.6	2,920	7.8
Oct. 21-29.....	4.23	--	--	102	43	394	--	276	0	138	680	--	1.0	--	1,580	2.15	18	430	204	67	8.3	2,800	8.0
Oct. 30-31.....	10.5	--	--	85	37	314	--	244	0	106	550	--	1.7	--	1,280	1.74	36	385	165	65	7.1	2,300	7.7
Nov. 1-3.....	4.97	--	--	100	37	306	--	246	0	124	530	--	3.7	--	1,300	1.77	17	400	198	62	6.7	2,270	7.9
Nov. 4-5.....	70.0	--	--	66	28	103	--	180	0	77	285	--	7.2	--	625	.85	118	280	132	44	2.7	1,070	7.9
Nov. 6-9.....	9.25	--	--	81	38	146	--	192	0	103	285	--	5.7	--	808	1.10	20	360	202	47	3.3	1,480	7.8
Nov. 10.....	4.80	--	--	92	29	251	--	150	0	127	450	--	3.2	--	1,080	1.47	14	350	227	61	5.8	2,010	7.9
Nov. 11-12.....	6.85	--	--	96	38	236	--	250	0	107	400	--	3.6	--	1,040	1.41	19	395	190	57	5.2	1,940	8.2
Nov. 13-19.....	18.9	--	--	116	40	309	--	282	0	118	590	--	1.9	--	1,340	1.82	68	485	216	60	6.3	2,350	8.0
Nov. 20.....	246	--	--	62	21	115	--	180	0	44	205	--	1.8	--	577	.78	383	240	92	51	3.2	1,030	7.9
Nov. 21.....	28.0	--	--	54	8.6	81	57	186	0	25	98	--	3.3	--	345	.47	26	170	300	42	1.9	612	8.1
Nov. 22-25.....	3.12	--	--	76	27	131	--	200	0	79	245	--	3.6	--	686	.95	5.9	300	136	49	3.3	1,240	7.9
Nov. 26-30.....	3.60	--	--	106	33	226	--	280	0	107	398	--	4.2	--	1,070	1.46	10	400	170	55	4.9	1,870	8.0
Dec. 1-7.....	9.00	--	--	132	40	296	--	306	10	125	530	--	3.0	--	1,360	1.85	33	470	202	58	5.9	2,360	8.5
Dec. 8.....	6.20	--	--	76	22	141	--	208	6	61	275	--	5.2	--	760	1.03	17	280	100	62	3.7	1,310	8.4
Dec. 9-10.....	6.55	--	--	104	32	226	--	256	10	95	390	--	4.6	--	1,070	1.46	19	390	184	56	5.0	1,840	8.5
Dec. 11-18.....	7.68	--	--	118	35	246	--	304	0	119	470	--	4.2	--	1,230	1.67	28	485	186	55	5.1	2,130	8.1
Dec. 19-20.....	332	--	--	42	9.7	24	--	138	0	23	42	--	3.2	--	234	.32	210	145	32	26	.9	389	8.0
Dec. 21.....	41.0	--	--	69	14	70	--	196	0	53	117	--	7.5	--	465	.63	51	230	70	40	2.0	782	8.2

<sup>a</sup> Values above 200 ppm are reported to the nearest 5 ppm.

RED RIVER BASIN--Continued  
ROCK CREEK NEAR DOUGHERTY, OKLA.--Continued

Chemical analyses, in parts per million, water year October 1956 to September 1957.--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos/cm at 25°C)	pH	
														Parts per million	Tons per acre-foot	Tons per day	Calcium	Non-carbonate				
Dec. 22-25, 1956	23.8	--	--	90	23	122		254	0	77	202	--	28	709	0.86	46	320	112	45	3.0	1,190	8.2
Dec. 26-31	20.2	--	--	104	35	181		312	0	87	315	--	6.0	982	1.34	54	405	190	49	3.9	1,600	8.2
Jan. 1-10, 1957	9.72	7.5	0.01	84	49	234		314	0	101	390	0.3	2.9	1,080	1.48	29	410	154	55	5.0	1,800	8.1
Jan. 11-17	4.60	--	--	107	45	269		310	8	108	480	--	6.8	1,260	1.71	16	450	182	56	5.5	2,100	8.4
Jan. 18	4.20	--	--	68	17	120		160	4	52	215	--	6.6	614	.84	7.0	400	102	52	3.4	1,070	8.4
Jan. 19-20	4.20	--	--	98	35	222		242	8	103	380	--	5.1	1,100	1.50	12	390	178	55	4.9	1,820	8.4
Jan. 21-22	14.8	--	--	101	38	235		264	12	113	400	--	4.0	1,170	1.59	47	410	174	55	5.0	1,910	8.4
Jan. 23-31	14.2	--	--	83	32	138		244	0	81	250	--	3.8	817	1.11	31	340	140	47	3.3	1,310	8.2
Feb. 1-4	20.5	--	--	78	23	83		236	4	62	145	--	3.0	566	.77	31	290	90	38	2.1	852	8.3
Feb. 5	718	--	--	42	5.6		9.7	135	2	11	13	--	6.5	180	.24	349	128	14	14	.4	269	8.3
Feb. 6-7	93.5	--	--	65	17	31		195	0	39	66	--	5.7	366	.50	92	230	70	23	.9	582	8.2
Feb. 8-10	36.7	--	--	86	23	57		256	0	55	115	--	4.5	529	.72	52	310	100	28	1.4	867	8.1
Feb. 11-14	18.0	--	--	90	28	98		262	8	70	178	--	2.6	674	.92	33	340	112	39	2.3	1,090	8.4
Feb. 15-20	14.7	--	--	90	34	121		276	0	77	228	--	1.4	761	1.03	30	355	139	42	2.8	1,260	8.2
Feb. 21-28	14.0	6.5	.00	83	35	156		296	0	84	255	.4	1.7	813	1.11	31	350	108	49	3.9	1,400	8.1
Mar. 1-4	23.0	--	--	86	27	130		266	8	70	212	--	4.3	734	1.00	46	325	94	46	3.1	1,240	8.4
Mar. 5	451	--	--	48	7.3		12	162	2	8.6	17	--	8.5	215	.29	262	150	14	15	.4	357	8.3
Mar. 6-7	65.0	--	--	69	12	43		214	4	36	63	--	5.9	344	.47	60	220	38	30	1.3	614	8.4
Mar. 8-10	30.7	--	--	85	21	67		264	10	56	108	--	2.4	540	.73	45	300	67	33	1.7	852	8.5
Mar. 11-20	25.2	7.5	.01	74	25	110		260	0	67	170	.3	2.0	629	.86	43	290	75	45	2.8	1,060	8.0
Mar. 21	169	--	--	44	9.7		13	166	0	9.1	21	--	3.2	197	.27	90	150	14	15	.4	371	8.2
Mar. 22-31	48.5	--	--	74	14	59		250	0	44	92	--	2.5	438	.60	55	255	49	34	1.6	761	8.2
Apr. 1-2	866	--	--	51	17	22		186	6	25	26	--	3.5	260	.95	608	184	22	20	.7	438	8.5
Apr. 3-4	561	--	--	53	7.8		12	180	2	12	17	--	3.2	218	.30	342	164	13	14	.4	371	8.3
Apr. 5-10	75.8	--	--	82	16	46		270	4	42	70	--	2.9	432	.89	88	270	44	27	1.2	710	8.3
Apr. 11-19	37.0	8.0	.00	69	21	69		252	0	50	116	.1	1.6	503	.68	50	260	54	37	1.9	836	8.1
Apr. 20-30	1,022	--	--	64	11	16		220	0	24	22	--	3.5	270	.37	745	205	24	15	.5	448	8.2
May 1-4	776	--	--	66	8.6	17		184	18	34	20	--	2.3	285	.36	555	200	19	15	.5	419	8.7
May 5-10	148	--	--	69	19	29		216	10	42	51	--	4.0	368	.80	147	250	56	20	.8	618	8.4
May 11-12	49.0	--	--	46	15	40		164	8	42	51	--	1.3	296	.40	39	178	30	33	1.3	545	8.4



## LOWER MISSISSIPPI RIVER BASIN

## RED RIVER BASIN--Continued

## ROCK CREEK NEAR DOUGHERTY, OKLA.--Continued

Temperature (°F) of water, water year October 1956 to September 1957

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	--	52	34	51	--	60	56	62	75	90	96	88
2	75	51	55	41	39	50	58	66	68	94	96	89
3	70	43	43	49	45	52	52	64	69	94	93	95
4	69	51	51	43	43	45	47	66	68	--	86	--
5	67	51	53	47	40	44	55	64	76	90	92	89
6	--	51	65	50	39	41	58	67	79	--	94	92
7	62	49	53	50	40	43	61	66	85	90	91	--
8	70	41	41	58	58	39	50	63	88	95	90	--
9	63	39	32	--	62	50	56	70	86	--	93	80
10	65	49	--	36	59	62	57	67	85	91	94	--
11	63	--	--	39	50	61	57	62	87	94	95	78
12	62	48	33	47	58	60	46	69	81	89	92	79
13	72	52	32	40	58	60	46	64	86	91	91	78
14	68	--	37	34	53	57	57	--	88	90	--	73
15	65	50	40	34	58	57	52	85	--	90	90	67
16	64	39	47	32	52	53	55	79	85	93	91	65
17	65	34	39	32	55	50	67	64	85	92	94	83
18	64	41	39	35	40	60	61	61	84	94	92	69
19	63	44	44	32	45	55	--	68	85	94	93	79
20	61	42	45	35	50	47	61	71	85	--	90	75
21	59	43	45	40	43	64	59	85	85	90	88	69
22	58	55	53	39	44	53	62	67	87	--	90	71
23	60	51	47	36	49	51	61	63	78	95	75	61
24	61	50	48	41	50	41	61	69	84	--	79	61
25	64	44	52	32	55	38	68	69	80	--	70	70
26	55	32	52	32	49	49	61	71	85	--	75	71
27	55	32	52	32	50	43	61	70	86	96	88	67
28	62	40	--	32	50	59	60	--	87	94	88	72
29	60	32	43	32	--	60	60	--	87	96	90	64
30	62	41	35	32	--	58	65	--	91	94	92	63
31	59	--	52	35	--	58	--	--	--	96	86	--
Average	64	45	45	39	49	52	58	68	83	--	89	75

RED RIVER BASIN--Continued  
 WASHITA RIVER NEAR DURWOOD, OKLA.  
 LOCATION:--At gaging station at bridge on State Highway 18, 1.3 miles downstream from Caddo Creek, and 4 miles north of Durwood, Carter County.  
 DRAINAGE AREA.--7,202 square miles.  
 RECORDS AVAILABLE.--Chemical analyses: May 1944 to September 1957.  
 Water temperatures: April 1947 to September 1957.  
 EXTREMES 1956-57.--Dissolved solids: Maximum, 1,170 ppm Jan. 23; minimum, 169 ppm May 17-20.  
 Hardness: Maximum, 540 ppm July 11-20; minimum, 98 ppm Oct. 15.  
 Specific conductance: Maximum daily, 1,830 microhos Jan. 23; minimum daily, 234 microhos Oct. 15.  
 Water temperatures: Maximum, 85°F July 28-31, Aug. 2-3; minimum, freezing point on Jan. 15-17, 26.  
 EXTREMES 1944-57.--Dissolved solids: Maximum, 1,170 ppm Jan. 23, 1957; minimum, 70 ppm Nov. 2, 1951.  
 Hardness: Maximum, 715 ppm Dec. 11-20, 1955; minimum, 41 ppm Nov. 2, 1951.  
 Specific conductance: Maximum daily, 1,830 microhos Jan. 23, 1957; minimum daily, 94.9 microhos Nov. 2, 1951.  
 Water temperatures (1947-57): Maximum, 87°F Aug. 6, 1950; minimum, freezing point, on many days during winter months.

REMARKS--Records of specific conductance of daily samples are available in district office at Oklahoma City, Okla. Records of discharge for water year October 1956 to September 1957 given in WSP 1511. No flow on Oct. 1, 7-12.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal-cium (Ca)	Mag-ne-sium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Car-bonate (CO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> )	Bo-ron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>		Per-cent so-dium	So-dium ad-sorp-tion ratio	Specific conduct-ance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium				
Oct. 2-3, 1956.....	16.2	--	--	34	55	64	382	0	23	78	428	0.80	19	310	0	31	1.6	811	8.1			
Oct. 4-6.....	67	--	--	48	18	28	190	0	55	30	284	.89	284	196	0	24	1.9	487	7.8			
Oct. 13-14.....	10.6	--	--	62	29	38	286	0	60	44	377	.91	377	275	40	24	1.0	651	7.9			
Oct. 18.....	11.0	--	--	30	5.6	8.0	100	0	15	10	145	.20	145	98	16	15	.4	234	7.1			
Oct. 18-17.....	2.20	--	--	16	18	25	186	0	42	25	236	.35	236	180	28	23	.8	444	7.6			
Oct. 18-20.....	3.60	--	--	69	33	42	318	0	72	43	422	.57	422	310	48	23	1.0	717	7.9			
Oct. 21.....	7.20	--	--	58	29	45	278	0	76	38	384	.52	384	285	37	27	1.2	644	8.0			
Oct. 22.....	672	--	--	82	39	142	198	0	175	230	811	1.10	811	365	202	46	3.1	1,340	7.8			
Oct. 23-24.....	876	--	--	112	34	50	140	0	322	52	678	.92	678	420	308	21	1.1	969	7.8			
Oct. 25-31.....	181	--	--	80	23	32	132	0	192	36	456	.62	456	295	187	19	.8	683	7.7			
Nov. 1-3.....	107	--	--	74	21	36	152	0	143	50	419	.57	419	270	146	22	.9	681	8.0			
Nov. 4.....	305	--	--	86	28	66	156	0	144	135	580	.80	580	486	330	30	1.6	946	8.1			
Nov. 5-10.....	893	--	--	44	11	26	122	0	67	28	244	.53	244	156	56	26	.9	415	7.6			
Nov. 11-20.....	109	12	0.00	62	22	34	4.1	0	136	42	390	.12	390	124	23	12	633	7.0				
Nov. 21.....	294	--	--	80	21	99	188	0	88	178	590	.80	590	468	131	43	2.5	1,030	8.1			
Nov. 22-24.....	80.7	--	--	72	15	43	170	0	96	65	636	.83	636	84	100	28	1.2	654	7.9			
Nov. 25-30.....	58.2	--	--	108	34	62	218	0	234	85	656	.89	656	103	410	232	25	1.3	1,020	8.1		
Dec. 1-6.....	51.2	--	--	104	39	62	242	0	242	84	711	.97	711	98	420	24	1.3	1,060	8.2			
Dec. 7-9.....	246	--	--	50	10	26	142	0	55	34	270	.37	270	179	170	52	.9	449	8.1			
Dec. 10.....	114	--	--	102	26	50	204	10	187	61	587	.80	587	181	176	23	1.1	878	8.5			

a Values above 200 ppm are reported to the nearest 5 ppm.

RED RIVER BASIN--Continued  
WASHITA RIVER NEAR DURWOOD, OKLA.--Continued

Chemical analyses, in parts per million, water year October, 1956 to September, 1957--Continued

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Mag-nesium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Car-bonate (CO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> )	Bo-ron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>		Per-cent so-dium	So-dium ad-sorp-tion ratio	Specific conduct-ance (micro-mhos at 25°C)	pH	
															Parts per million	Tons per acre-foot	Calcium	Non-carbon-ate					
Dec. 11-18, 1956.....	90.6	--	--	124	35	79		252	0	246	114	--	3.7	--	762	1.06	455	248	27	1.6	1,190	8.0	
Dec. 19-20.....	3,075	--	--	42	5.6			136	0	21	14	--	5.6	--	190	.26	1,580	16	19	5	278	8.2	
Dec. 21-22.....	1,127	--	--	63	13	27		190	0	52	39	--	6.4	--	330	.45	1,000	210	22	8	526	8.2	
Dec. 23-31.....	232	--	--	100	27	54		254	0	148	80	--	4.0	--	606	.82	380	360	25	1.2	915	8.2	
Jan. 1-10, 1957.....	101	--	--	115	40	80		264	0	231	117	--	2.7	--	722	.98	197	450	28	1.6	1,150	7.7	
Jan. 11-20.....	74.1	2.5	0.07	144	39	99		300	0	291	135	0.3	3.0	0.13	915	1.24	183	520	29	1.9	1,360	7.7	
Jan. 21-22.....	116	--	--	128	46	86		244	8	298	122	--	1.7	--	947	1.29	297	510	296	27	1.7	1,290	8.3
Jan. 23.....	188	--	--	100	49	182		164	4	269	300	--	2.3	--	1,170	1.59	594	450	309	47	3.7	1,830	8.4
Jan. 24-25.....	298	--	--	82	32	83		204	4	205	88	--	7	--	698	.95	562	375	202	27	1.4	975	8.3
Jan. 26-27.....	144	--	--	62	18	29		172	2	83	44	--	1.4	--	385	.52	150	230	86	22	1.8	571	8.3
Jan. 28-31.....	136	--	--	97	29	42		190	6	151	90	--	1.4	--	655	.89	223	360	194	20	1.0	930	8.4
Feb. 1-4.....	342	--	--	64	48	40		214	18	128	72	--	3.2	--	503	.68	464	355	150	20	1.9	837	8.5
Feb. 5-7.....	1,723	--	--	42	28	14		164	8	49	34	--	3.6	--	274	.37	270	220	72	12	4	489	8.5
Feb. 8-10.....	551	--	--	54	43	22		212	16	85	48	--	5.1	--	413	.56	614	310	112	13	5	690	8.5
Feb. 11-20.....	209	--	--	96	31	39		214	8	149	76	--	2.6	--	525	.71	296	370	179	19	9	889	8.4
Feb. 21-28.....	168	--	--	107	43	52		206	10	206	108	--	1.9	--	670	.91	304	440	256	20	1.1	1,090	8.4
Mar. 1-4.....	198	--	--	107	40	41		182	0	209	108	--	1.4	--	671	.91	359	430	281	17	9	1,070	7.7
Mar. 5-8.....	922	--	--	75	17	30		192	2	66	64	--	3.0	--	385	.82	958	255	95	20	8	640	8.5
Mar. 9-10.....	363	--	--	98	40	363		238	12	151	76	--	3.3	--	608	.83	596	410	195	15	7	901	8.5
Mar. 11-20.....	251	--	--	119	36	36		208	0	166	80	--	2.3	--	588	.30	398	380	210	17	8	887	8.1
Mar. 21.....	1,790	--	--	44	8.8	28		128	4	49	29	--	3.7	--	1,110	1.10	146	34	29	1.0	362	8.4	
Mar. 22-25.....	783	--	--	61	18	45		172	6	73	69	--	2.0	--	401	.55	848	225	75	30	1.3	643	8.5
Mar. 26-31.....	288	--	--	97	37	62		168	2	190	82	--	2.0	--	697	.87	495	380	195	26	1.4	988	8.5
Apr. 1-2.....	2,605	--	--	52	12	24		216	4	55	31	--	1.4	--	280	.38	1,970	190	50	21	7	474	8.3
Apr. 3-5.....	7,840	--	--	48	9.7	16		168	0	26	20	--	2.9	--	209	.28	4,420	160	22	18	6	376	8.2
Apr. 6-10.....	2,488	--	--	71	18	23		174	0	111	29	--	3.6	--	356	.48	2,390	250	110	17	6	586	8.1
Apr. 11-12.....	1,060	--	--	85	15	20		152	0	83	24	--	4.2	--	294	.40	841	205	82	17	6	488	8.2
Apr. 13-20.....	535	--	--	92	23	31		192	0	161	45	--	4.8	--	486	.66	702	325	168	17	7	756	8.1
Apr. 21-30.....	18,160	13	.02	32	19	13		152	0	38	17	0.3	3.6	.06	224	.30	10,980	160	36	15	5	360	7.9
May 1-10.....	11,080	--	--	55	13	19		160	0	59	26	--	3.2	--	282	.38	8,440	190	59	18	6	442	8.0

May 11-16, 1957.....	11,510	--	--	58	14	21	160	0	72	29	3.3	--	300	.41	9,320	205	73	18	0.6	479	7.6
May 17-20.....	64,580	--	--	56	7.5	8.5	130	0	18	8.8	2.3	--	169	.23	29,430	121	14	13	.3	268	8.1
May 21-25.....	16,240	--	--	62	14	15	174	0	61	26	3.6	--	307	.42	13,460	210	70	14	.3	476	8.2
May 26-27.....	36,200	--	--	49	13	7.8	154	0	46	13	3.2	--	250	.34	24,440	178	52	9	.4	377	8.2
May 28-29.....	10,050	--	--	62	18	15	164	6	123	26	3.8	--	426	.58	11,960	260	136	10	.4	593	8.3
May 30.....	8,690	--	--	91	20	42	190	2	142	63	5.7	--	536	.73	12,380	310	151	23	1.0	788	8.3
May 31.....	28,200	--	--	61	16	15	160	0	78	24	5.2	--	323	.44	24,590	220	87	13	.4	491	8.2
June 1-6.....	18,880	--	--	54	13	21	160	0	59	27	3.1	--	302	.41	15,390	188	57	19	.7	446	8.1
June 7-10.....	7,770	--	--	71	19	27	186	0	106	35	3.6	--	435	.59	9,130	255	104	19	.7	595	8.1
June 11-14.....	3,348	--	--	89	29	44	210	0	170	61	3.7	--	556	.76	5,030	340	170	22	1.0	822	8.1
June 15-20.....	8,013	--	--	60	17	25	166	0	85	33	4.3	--	330	.45	7,140	220	84	20	.7	521	8.0
June 21-30.....	3,221	--	--	89	30	39	208	0	175	52	3.5	--	581	.79	5,050	345	174	20	.9	799	8.1
July 1-10.....	1,180	--	--	--	98	41	214	0	245	72	1.9	--	708	.96	2,260	415	238	22	1.2	988	8.1
July 11-20.....	1,760	22	.01	96	73	79	304	0	324	96	1.1	68	849	1.15	1,740	540	291	24	1.5	1,240	7.9
July 21-22.....	700	--	--	104	58	60	200	0	320	93	1.6	--	829	1.13	1,570	500	336	21	1.2	1,160	8.0
July 23-29.....	1,514	--	--	66	31	38	196	0	138	47	3.7	--	490	.67	2,000	290	130	22	1.0	689	8.0
July 30-31.....	1,735	--	--	116	51	57	210	0	324	80	2.4	--	810	1.10	1,610	500	328	20	1.1	1,030	8.0
Aug 1-10.....	409	--	--	108	61	62	242	0	318	9.0	8	--	833	1.13	920	520	322	21	1.2	1,200	8.0
Aug 11-20.....	297	--	--	85	69	71	266	0	281	99	5	--	778	1.06	624	485	277	24	1.4	1,180	8.1
Aug 21-31.....	210	--	--	152	33	76	284	0	297	109	.8	--	684	1.20	501	515	298	24	1.4	1,240	8.0
Sept. 1-10.....	163	--	--	104	58	87	276	0	297	108	1.2	--	825	1.12	363	500	274	27	1.7	1,260	8.1
Sept. 11-17.....	715	--	--	96	58	79	290	0	251	108	1.2	--	770	1.03	1,490	480	242	26	1.6	1,500	8.0
Sept. 18-20.....	434	--	--	47	16	31	148	0	64	42	2.8	--	283	.38	332	182	60	27	1.0	500	7.7
Sept. 21.....	10,800	--	--	78	43	53	198	0	212	71	3.3	--	565	.80	17,060	370	208	24	1.2	821	7.9
Sept. 22-30.....	4,755	--	--	77	21	19	170	0	140	24	3.2	--	379	.52	4,870	280	140	13	.5	598	7.6
Weighted average...	3,555	--	--	54	16	20	b162	--	70	26	3.2	--	303	0.41	2,850	200	68	18	0.6	465	--

a Values above 200 ppm are reported to the nearest 5 ppm.  
b Includes equivalent of individual carbonate values shown above.

## LOWER MISSISSIPPI RIVER BASIN

## RED RIVER BASIN--Continued

## WASHITA RIVER NEAR DURWOOD, OKLA.--Continued

Temperature (°F) of water, water year October 1956 to September 1957

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	69	56	42	45	39	48	60	67	69	82	84	78
2	69	58	42	43	--	52	60	69	69	83	85	79
3	--	52	46	43	50	52	60	65	62	84	85	78
4	70	53	52	46	45	50	56	61	68	84	83	78
5	69	50	55	45	46	48	52	61	69	81	80	77
6	68	50	59	47	47	48	53	65	72	79	79	78
7	66	50	52	44	50	48	59	65	75	83	75	--
8	65	49	46	51	54	42	54	65	76	80	76	--
9	63	45	37	38	58	45	52	--	79	82	77	--
10	65	47	37	40	57	53	55	68	80	83	79	72
11	66	50	43	38	55	59	55	67	79	84	80	66
12	63	52	39	40	52	52	51	62	80	84	83	68
13	69	53	37	37	52	56	54	66	78	84	81	70
14	69	61	40	35	50	57	57	67	80	84	82	73
15	65	55	41	32	58	51	54	69	79	84	80	72
16	66	42	39	32	52	54	56	72	75	82	78	72
17	68	43	43	32	48	55	59	68	77	--	78	75
18	67	45	42	46	51	54	65	65	76	82	76	67
19	65	49	39	39	49	53	65	65	75	83	75	70
20	64	--	45	50	48	53	66	62	77	82	76	70
21	60	46	46	52	45	50	62	71	79	82	77	70
22	59	45	48	37	50	50	63	74	79	81	76	67
23	63	43	45	38	45	55	62	68	79	79	71	67
24	64	43	43	37	45	52	64	67	73	81	80	68
25	65	46	40	34	50	48	65	69	73	81	83	68
26	57	42	42	32	50	49	64	68	74	81	83	68
27	50	40	42	33	46	48	63	69	74	83	82	67
28	57	42	44	36	49	45	65	72	79	85	78	65
29	60	38	43	35	--	42	65	72	83	83	76	65
30	62	39	43	38	--	55	65	73	83	85	78	65
31	56	--	43	40	--	59	--	70	--	85	78	--
Average	64	48	44	40	50	51	59	67	76	83	79	71

RED RIVER BASIN--Continued  
RED RIVER AT DENISON DAM, NEAR DENISON, TEX.

LOCATION.--Immediately below dam on Red River, 1.7 miles upstream from Sand Creek, 4 miles northwest of Denison, Grayson County, and 3 miles upstream from gaging station near Colbert, Bryan County, Okla.  
DRAINAGE AREA.--39,719 square miles above dam, 39,777 square miles above gaging station, of which 5,936 square miles is probably noncontributing.  
RECORDS AVAILABLE.--Chemical analyses: May 1944 to September 1957.  
Water temperatures: October 1945 to September 1957.  
EXTREMES, 1956-57.-- Dissolved solids: Maximum, 1,380 ppm Dec. 1-31; minimum, 696 ppm June 1-30.  
Hardness: Maximum, 465 ppm Dec. 1-31; minimum, 256 ppm June 1-30.  
Specific conductance: Maximum daily, 1,040 micromhos June 19 July 5.  
EXTREMES, 1944-57.--Dissolved solids: Maximum, 1,430 ppm Aug. 11-20, Sept. 1-10, 1944; minimum, 464 ppm Oct. 21-31, 1945.  
Hardness: Maximum, 522 ppm Aug. 11-20, Sept. 1-10, 1944; minimum, 233 ppm Dec. 21-31, 1945; Jan. 11-20, 1946.  
Specific conductance: Maximum daily, 3,520 micromhos Aug. 14, 1944; minimum daily, 656 micromhos Oct. 16, 1945.

REMARKS --Values reported for dissolved solids concentrations less than 1,000 ppm are residues of evaporation concentrations more than 1,000 ppm are calculated from determined constituents. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for gaging station near Colbert, Okla., for water year October 1956 to September 1957 given in WSP 1511. No appreciable inflow between dam and gaging station except during periods of heavy local rains.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)
													Parts per million	Tons per acre-foot	Tons per day	Calcium, mg./liter	Non-carbonate		
Oct. 1-31, 1956	66.7	12	132	32	299	124	333	470	0.8	1,340	1.82	241	461	360	59	6.1	2,200	8.0	
Nov. 1-30	79.6	10	131	32	306	122	340	475	8	1,350	1.84	290	458	358	59	6.2	2,240	7.7	
Dec. 1-31	677	12	134	32	311	123	342	485	7	1,380	1.88	2,520	465	364	58	6.3	2,290	7.8	
Jan. 1-31, 1957	2,115	9.8	130	32	311	126	330	485	8	1,360	1.85	7,770	455	352	60	6.3	2,260	7.9	
Feb. 1-28	1,513	8.6	135	30	310	124	330	488	5	1,360	1.85	5,560	460	359	59	6.3	2,320	8.2	
Mar. 1-31	1,481	9.2	133	32	289	124	323	478	5	1,350	1.81	5,320	464	362	58	6.0	2,260	7.8	
Apr. 1-30	3,201	11	130	31	284	123	324	445	3.0	1,290	1.75	11,130	351	280	58	5.8	2,170	8.0	
May 1-31	34,840	11	97	22	200	113	218	315	3.5	986	1.34	92,750	332	240	57	4.8	1,600	7.5	
June 1-30	66,910	11	78	15	133	107	165	202	1.8	696	.95	125,700	256	168	53	3.6	1,130	7.6	
July 1-31	12,610	14	92	17	155	117	195	238	1.5	822	1.12	27,990	300	204	53	3.9	1,310	7.7	
Aug. 1-31	2,453	12	95	18	176	126	207	265	1.2	882	1.20	5,840	311	208	55	4.3	1,420	7.7	
Sept. 1-30	4,872	10	90	18	167	130	188	250	1.2	849	1.15	11,170	298	192	54	4.1	1,350	8.0	
Weighted average	10,890	11	89	18	167	112	195	258	2.2	840	1.14	24,700	296	204	55	4.2	1,370	--	



RED RIVER BASIN--Continued  
 CLEAR BOGGY CREEK NEAR CANEY, OKLA.  
 LOCATION.--At gaging station at bridge on U.S. Highways 69 and 75, half a mile downstream from Caney Creek, and 1.5 miles north of Caney, Atoka County.  
 DRAINAGE AREA.--720 square miles.  
 RECORDS AVAILABLE.--Chemical analyses: October 1955 to September 1957.  
 Water temperatures: October 1955 to September 1957.  
 EXTREMES, 1956-57.--Dissolved solids: Maximum, 1,120 ppm July 21-24; minimum, 105 ppm July 25.  
 Hardness: Maximum, 444 ppm July 9-20; minimum, 62 ppm July 25.  
 Specific conductance: Maximum, 2,030 micromhos July 21-24; minimum daily, 70.1 micromhos Sept. 22.  
 Water temperatures: Maximum, 87°F Aug. 3, 6; minimum, 35°F Jan. 28.  
 EXTREMES, 1955-57.--Dissolved solids: Maximum, 1,690 ppm Nov. 11-20, 1955; minimum, 105 ppm July 25, 1957.  
 Hardness: Maximum, 675 ppm Nov. 11-20, 1955; minimum, 52 ppm June 1-2, 1956.  
 Specific conductance: Maximum, 3,010 micromhos Nov. 12, 1955, minimum daily, 70.1 micromhos Sept. 22, 1957.  
 Water temperatures: Maximum, 87°F Aug. 3, 6, 1957; minimum, freezing point on several days during December 1955 and February 1956.  
 REMARKS.--Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of discharge for water year October 1956 to September 1957 given in WSP 1511. No flow on Oct. 1-31, Nov. 1-5, 22-30, Dec. 1-18.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal-cium (Ca)	Mag-ne-sium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Car-bonate (CO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> ) (B)	Bo-ron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>		Per-cent so-lidum ratio	So-lidum ad-sorp-tion	Specific conduct-ance (micro-mhos at 25°C)	pH	
															Parts per mil-lion	Tons per acre-foot	Calcium, mag-nesium	Non-carbon-ate					
Nov. 6, 1956	43.0	--	--	39	14	65		104	0	69	110	--	1.9	--	372	0.51	43	156	71	48	2.3	687	7.9
Nov. 7-10	41.0	--	--	32	7.8	43		78	0	19	84	--	4.3	--	255	.35	28	112	48	45	1.8	451	7.8
Nov. 11-20	1.58	6.5	0.07	45	8.1	47	3.9	102	0	28	98	0.4	2.4	0.10	313	.43	1.3	146	62	40	1.7	546	7.4
Nov. 21	--	--	--	48	11	49		124	0	29	97	--	.6	--	312	.42	.1	164	62	39	1.7	377	7.9
Dec. 19	--	--	--	51	15	51		144	0	31	99	--	.4	--	329	.45	.1	190	72	37	1.6	612	7.7
Dec. 20-21	484	--	--	22	5.1	19		76	0	10	26	--	2.6	--	139	.19	182	76	14	35	1.0	236	7.8
Dec. 22	172	--	--	43	8.9	51		110	0	14	103	--	3.7	--	312	.42	145	144	54	44	1.8	553	7.9
Dec. 23-25	47.3	--	--	72	18	118		148	0	22	260	--	3.9	--	632	.86	81	255	134	50	3.2	1,140	8.0
Dec. 26-31	12.4	--	--	58	15	46		178	0	28	79	--	4.0	--	324	.44	11	198	52	34	1.4	600	7.9
Jan. 1-10, 1957	4.80	--	--	66	15		34	200	0	32	72	--	3.1	--	379	.52	4.9	228	64	24	1.0	609	7.2
Jan. 11-20	2.03	--	--	72	18	31		218	0	36	72	--	2.5	--	400	.54	2.2	252	74	21	.9	642	7.9
Jan. 21-25	22.7	--	--	63	15	40		190	2	39	76	--	1.5	--	383	.52	23	220	61	28	1.2	617	8.3
Jan. 26-29	26.0	--	--	109	29	166		200	8	63	360	--	1.0	--	952	1.29	67	390	212	48	3.7	1,610	8.4
Jan. 30	37.0	--	--	70	21	84		154	2	54	182	--	1.7	--	563	.77	56	260	130	41	2.3	928	8.0
Jan. 31	50.0	--	--	50	11	39		126	0	41	77	--	2.5	--	334	.45	45	172	68	33	1.3	525	8.2
Feb. 1-4	162	--	--	55	12	47		144	0	37	94	--	1.7	--	384	.52	168	188	70	35	1.5	605	8.2
Feb. 5-8	1,702	--	--	39	1.1		3.0	100	0	5.8	13	--	2.6	--	142	.19	653	102	20	6	.1	232	8.1
Feb. 9-10	1,402	--	--	46	7.5	14		146	0	20	24	--	2.4	--	212	.29	230	146	26	17	.5	341	8.2
Feb. 11-20	85.0	10	.04	78	11	31		220	8	39	55	.3	3.9	.09	376	.51	86	240	46	22	.9	603	8.5
Feb. 21-28	41.4	--	--	77	20		31	232	0	46	72	--	1.6	--	396	.54	44	274	84	20	.8	687	8.1

## RED RIVER BASIN--Continued

CLEAR BOGGY CREEK NEAR CANEY, OKLA.--Continued  
 Chemical analyses, in parts per million, water year October 1956 to September 1957--Continued

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal-cium (Ca)	Mag-nesium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Car-bonate (CO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> )	Bo-ron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>		Per-centage ad-sorp-tion	So-dium con-duct-ance (micro-mhos at 25°C)	pH		
															Parts per million	Tons per acre-foot	Tons per day	Calcium				Non-carbon-ate	
Mar. 1-5, 1957.....	145	--	--	70	14	45		186	0	45	86	--	1.0	--	425	0.58	166	232	72	30	660	7.9	
Mar. 6-10.....	621	--	--	48	8.1	18		160	0	22	28	--	2.8	--	244	.33	409	156	25	20	375	7.7	
Mar. 11-17.....	100	--	--	78	6.6	15		226	8	40	47	--	1.8	--	355	.48	96	248	50	19	580	8.5	
Mar. 18-20.....	926	--	--	38	6	15		114	4	18	25	--	2.4	--	194	.26	485	132	22	22	308	8.3	
Mar. 21-25.....	1,420	--	--	36	4.9	12		122	0	14	14	--	2.2	--	166	.23	636	110	10	19	261	8.2	
Mar. 26-27.....	308	--	--	58	10	12		174	8	16	27	--	2.0	--	282	.38	235	186	30	12	416	8.6	
Mar. 28-31.....	612	--	--	44	7.3	18		134	4	21	28	--	2.0	--	221	.30	365	140	24	22	348	8.5	
Apr. 1-2.....	1,365	--	--	40	6.8	16		128	2	24	20	--	1.4	--	190	.26	700	128	20	21	331	8.3	
Apr. 3-6.....	5,665	--	--	26	2.7	6.9		86	0	9.9	6.4	--	1.3	--	113	.15	1,730	76	6	16	3	179	8.0
Apr. 7-10.....	387	--	--	67	10	19		196	12	30	25	--	2.3	--	287	.39	300	208	28	16	463	8.7	
Apr. 11-18.....	170	--	--	70	15	27		222	4	39	47	--	1.3	--	346	.47	159	238	50	20	589	8.4	
Apr. 19-30.....	8,618	12	0.06	35	4.5	42		106	0	13	71	0.1	2.0	0.04	243	.33	5,650	106	19	46	439	7.5	
May 1-5.....	5,902	--	--	34	5.6	9.9		120	2	8.2	12	--	2.3	--	164	.22	2,610	108	6	17	4	251	8.3
May 6-11.....	788	--	--	82	12	27		232	14	26	49	--	1.8	--	356	.48	757	252	38	19	7	589	8.6
May 12-16.....	1,661	--	--	53	6.3	21		152	8	19	31	--	1.7	--	232	.32	1,040	158	20	22	7	393	8.6
May 17-20.....	3,568	--	--	34	5.6	12		120	2	10	15	--	1.6	--	152	.21	1,460	108	6	20	5	256	8.4
May 21.....	5,720	--	--	41	5.2	10		138	2	9.1	13	--	1.7	--	158	.21	2,440	124	8	15	4	266	8.3
May 22-23.....	1,305	--	--	69	11	29		216	0	21	55	--	2.5	--	296	.40	1,040	216	39	22	9	532	7.9
May 24.....	5,920	--	--	50	7.1	14		160	0	15	25	--	3.8	--	206	.28	3,290	154	23	17	5	348	8.2
May 25-26.....	13,700	--	--	39	4.5	5.1		76	0	44.1	6.0	--	1.7	--	110	.15	4,070	66	4	14	3	151	7.3
May 27-28.....	6,900	--	--	34	4.1	20		114	0	66.0	8.9	--	1.4	--	141	.18	2,660	102	8	10	2	212	7.8
May 29.....	2,840	--	--	66	9.6	5.1		196	10	17	37	--	2.4	--	290	.39	1,750	204	27	18	6	472	8.0
May 30-31.....	644	--	--	86	18	31		260	2	30	76	--	2.0	--	415	.56	1,060	288	72	19	8	685	8.3
June 1.....	6,260	--	--	43	4.7	18		136	0	7.8	36	--	2.8	--	185	.27	3,300	132	20	24	7	324	7.6
June 2-6.....	9,158	--	--	30	5.1	6.4		110	0	6.2	8.8	--	1.3	--	136	.16	3,360	96	6	13	3	214	7.9
June 7.....	4,370	--	--	50	7.5	13		176	0	9.5	20	--	1.6	--	216	.29	2,550	156	12	15	4	338	8.2
June 8.....	1,320	--	--	61	11	325		184	8	20	46	--	2.0	--	304	.41	1,080	188	34	21	8	547	8.4
June 9-10.....	664	--	--	102	9.6	36		284	0	28	78	--	1.7	--	425	.58	7,762	294	63	21	9	715	8.2
June 11-13.....	351	--	--	90	18	58		256	0	35	126	--	1.7	--	487	.66	462	300	90	29	1.4	849	8.1
June 14.....	2,670	--	--	43	4.9	12		144	0	8.2	26	--	2.6	--	187	.25	1,350	140	22	15	4	313	7.7
June 17.....	3,940	--	--	26	3.6	9.0		90	0	3.3	13	--	4.4	--	128	.17	1,360	80	6	20	4	198	7.8
June 18.....	4,960	--	--	37	3.3	11		118	0	4.9	18	--	3.3	--	162	.22	2,170	106	10	18	5	253	8.0
June 19.....	830	--	--	75	11	39		210	10	19	76	--	3.3	--	378	.59	847	234	46	26	1.1	623	8.4
June 20.....	418	--	--	88	19	67		266	0	31	135	--	2.2	--	510	.61	576	298	80	33	1.7	954	8.2

June 21-22, 1957 ...	300	--	70	20	81	188	0	34	172	--	3.1	--	556	.76	450	258	104	41	2.2	920	8.2
June 23-27 .....	727	--	64	11	38	194	0	19	75	--	1.6	--	345	.47	677	204	45	29	1.2	576	8.2
June 28-30 .....	168	--	85	19	72	252	0	28	150	--	1.7	--	520	.71	236	282	86	35	1.8	922	8.2
July 1-8 .....	99.1	--	69	35	132	234	0	37	282	--	1.4	--	681	.93	182	314	122	48	3.2	1,260	7.7
July 9-20 .....	56.0	14	.07	90	53	274	0	34	445	1.1	.7	.26	1,090	1.48	220	444	220	50	4.1	1,780	7.9
July 21-24 .....	75.2	--	--	87	49	254	0	27	495	--	1.7	--	1,120	1.52	227	420	212	55	5.0	2,030	7.7
July 25 .....	318	--	20	2.9	13	73	0	5.8	14	--	5.0	--	105	.14	90	62	2	31	.7	178	7.0
July 26-27 .....	182	--	56	22	66	204	0	19	132	--	2.3	--	427	.58	210	232	65	38	1.9	799	7.6
July 28-29 .....	73.0	--	35	10	32	118	0	12	64	--	1.7	--	225	.31	44	130	34	35	1.2	432	7.3
July 30-31 .....	42.0	--	48	25	53	194	0	17	113	--	1.4	--	373	.51	42	222	63	34	1.6	702	7.4
Aug. 1-10 .....	32.0	--	60	42	104	298	0	20	200	--	.4	--	609	.83	53	322	78	41	2.5	1,100	7.3
Aug. 11-19 .....	38.7	--	69	43	101	276	0	15	230	--	.4	--	674	.92	70	348	122	39	2.3	1,200	7.8
Aug. 20-31 .....	28.4	--	46	40	90	246	0	12	185	--	.6	--	538	.73	41	280	78	41	2.3	979	8.0
Sept. 1-14 .....	25.4	--	68	34	81	256	0	12	187	--	.8	--	552	.75	38	310	100	36	2.0	1,030	7.6
Sept. 15-20 .....	1,338	--	32	7.3	25	110	0	11	20	--	1.9	--	147	-.20	591	110	20	16	.4	276	7.1
Sept. 21 .....	5,060	--	55	10	7.3	180	0	22	42	--	2.2	--	230	-.31	3,140	178	30	23	.8	439	7.9
Sept. 22-26 .....	12,040	--	28	3.6	6.0	88	0	6.8	8.9	--	1.6	--	109	-.15	3,540	80	8	14	.3	132	7.4
Sept. 27-28 .....	345	--	82	13	30	260	0	25	60	--	1.7	--	348	.47	324	260	47	20	.8	619	7.7
Sept. 29-30 .....	184	--	99	23	41	322	0	31	94	--	1.4	--	465	.63	231	340	76	21	1.0	818	7.7
Weighted average...	1,437	--	36	5.6	20	all 19	--	11	33	--	1.9	--	188	.26	729	113	16	28	0.8	317	--

a Includes equivalent of individual carbonate values as shown above.

## LOWER MISSISSIPPI RIVER BASIN

## RED RIVER BASIN--Continued

## CLEAR BOGGY CREEK NEAR CANEY, OKLA.--Continued

Temperature (<sup>o</sup>F) of water, water year October 1956 to September 1957

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	68	55	45	44	40	50	58	67	70	83	85	79
2	69	55	46	43	40	53	62	68	70	83	85	81
3	71	54	48	43	43	53	64	68	70	85	87	80
4	69	53	50	45	48	53	59	66	70	85	86	81
5	69	54	50	46	47	51	55	63	71	84	83	80
6	69	52	60	47	48	48	55	62	72	81	87	81
7	67	52	55	45	49	46	60	--	72	83	80	77
8	61	52	47	49	52	46	58	68	73	83	78	72
9	62	49	42	52	56	45	56	68	78	83	81	71
10	64	49	40	45	58	51	58	71	79	85	82	71
11	64	50	40	43	56	57	60	71	80	85	84	74
12	65	50	40	42	53	57	57	70	81	85	84	72
13	66	53	41	42	53	57	48	70	78	85	85	75
14	67	60	42	40	53	59	47	68	80	86	84	77
15	67	58	42	39	59	55	55	70	80	85	85	68
16	66	48	41	39	53	55	56	72	75	85	83	68
17	67	47	41	38	50	56	60	70	78	85	83	69
18	64	46	41	38	52	55	63	70	76	85	80	70
19	67	46	43	38	50	54	66	67	77	85	79	72
20	63	46	46	38	49	55	68	68	78	83	79	75
21	63	45	46	45	47	50	66	72	80	85	80	75
22	64	44	47	50	49	51	65	76	79	86	81	69
23	64	44	47	43	48	53	65	72	77	83	81	67
24	64	44	42	42	50	53	66	69	72	83	82	68
25	64	44	41	42	55	51	65	70	73	79	82	67
26	59	45	41	38	53	46	67	69	74	83	81	68
27	56	43	42	37	49	50	64	71	76	83	82	69
28	57	42	43	35	49	46	68	73	78	84	82	69
29	60	41	42	36	--	51	68	74	81	85	82	67
30	64	44	43	38	--	55	67	75	83	86	81	67
31	65	--	43	39	--	57	--	73	--	86	80	--
Average	64	49	44	42	50	52	61	69	76	84	82	73

RED RIVER BASIN--Continued  
LITTLE RIVER NEAR HORATIO, ARK.

LOCATION.--At gaging station at bridge on State Highway 41, 0.9 mile downstream from Rolling Fork, 2 miles southwest of Horatio, Sevier County, and 28.5 miles upstream from Cossatot River.

DRAINAGE AREA.--2,674 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1953 to September 1957.

Water temperatures: October 1953 to September 1957.

EXTREMES, 1956-57.--Dissolved solids: Maximum, 399 ppm Oct. 21-31; minimum, 40 ppm Mar. 1-10.

Hardness: Maximum, 70 ppm Oct. 21-31; minimum, 11 ppm Feb. 1-10.

Specific conductance: Maximum daily, 685 micromhos Nov. 1; minimum daily, 26.1 micromhos Sept. 25.

Water temperatures: Maximum, 88°F July 18, 19; minimum, 35°F Jan. 17.

EXTREMES, 1953-57.--Dissolved solids: Maximum, 399 ppm Oct. 21-31, 1956; minimum, 40 ppm Mar. 1-10, 1957.

Hardness: Maximum, 70 ppm Oct. 21-31, 1956; minimum, 10 ppm Jan. 1-8, 1955.

Specific conductance: Maximum daily, 685 micromhos Nov. 1, 1956; minimum daily, 26.1 micromhos Sept. 25, 1957.

Water temperatures: Maximum, 89°F July 14-18, 1954; minimum, 35°F Dec. 25, 1953 Jan. 17, 1957.

REMARKS.--Records of specific conductance of daily samples available in district office at Fayetteville, Ark. Records of discharge for water year October 1956 to September 1957 given in WSP 1511.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue on evaporation at 180° C)	Hardness as CaCO <sub>3</sub>		Specific conductance (micro-mhos at 25° C)	pH	Color
														Calcium-magnesium	Non-carbonate			
Oct. 1-10, 1956	2.84	5.0	0.00	17	5.2	88	4.4	26	6.4	165	0.0	1.7	389	64	42	658	6.4	7
Oct. 11-20	2.32	--	--	19	4.9	97	--	25	6.0	180	--	1.5	380	68	5	659	6.5	8
Oct. 21-31	3.46	--	--	19	5.3	99	--	25	6.0	180	--	2.0	399	70	5	674	7.2	8
Nov. 1-5	1.68	--	--	19	5.2	98	--	26	5.6	178	--	1.9	392	69	5	663	7.2	8
Nov. 6-11-20	3.67	--	--	7.2	1.3	11	2.2	20	8.4	18	--	1.6	80	23	7	115	7.2	25
Nov. 7-8	1.295	--	--	14	4.1	74	--	50	15	109	--	1.2	274	52	11	491	7.0	17
Nov. 9	1.795	--	--	--	--	--	--	5	9.0	32	--	12	a119	39	55	188	6.2	--
Nov. 10	5.83	--	--	--	--	--	--	27	11	42	--	1.6	a123	34	12	209	7.2	--
Nov. 21-30	6.52	--	--	5.6	1.3	9.2	2.0	20	3.2	14	--	1.9	68	19	3	92.9	6.7	25
Dec. 1-7	316	--	--	5.1	1.4	8.6	1.9	18	4.8	12	--	1.6	64	18	4	83.9	6.9	25
Dec. 8-19	1,748	--	--	4.5	1.1	4.2	1.5	16	5.2	6.5	--	1.5	46	16	3	58.9	6.4	23
Dec. 20-31	1,537	--	--	3.9	.6	4.2	1.2	12	4.6	5.5	--	1.7	43	12	2	53.0	6.7	23
Jan. 1-10, 1957	1,762	2.9	.08	3.7	1.1	5.0	.6	14	4.0	6.0	.2	1.3	45	14	2	54.3	6.6	27
Jan. 11-20	900	--	--	4.2	.7	4.2	.9	12	3.6	7.0	--	1.2	52	13	4	56.4	6.7	23
Jan. 21-31	8,936	--	--	3.6	.9	2.8	.9	12	4.0	3.5	--	.7	49	13	3	44.8	6.5	15
Feb. 1-10	11,900	--	--	3.6	.4	2.0	.9	12	2.0	3.0	--	1.3	41	11	1	39.4	6.4	33
Feb. 11-20	3,928	--	--	4.0	.9	2.8	.9	14	3.6	3.5	--	2.0	42	14	2	47.9	6.6	23
Feb. 21-28	1,936	--	--	5.9	4.4	4.2	.9	16	4.8	6.5	--	1.3	44	16	3	59.5	6.8	23
Mar. 1-10	2,588	--	--	4.6	1.0	3.6	.7	16	5.0	5.0	--	.8	40	16	2	53.7	7.0	22
Mar. 11-20	8,104	--	--	3.8	1.0	3.1	.9	14	4.8	4.5	--	.8	43	14	2	48.8	6.6	33
Mar. 21-31	13,320	--	--	3.7	.7	2.1	.9	14	3.6	2.5	--	1.0	44	12	1	40.6	6.6	55

a Estimated from specific conductance.

## RED RIVER BASIN--Continued

## LITTLE RIVER NEAR HORATIO, ARK.--Continued

Chemical analyses, in parts per million, water year October 1956 to September 1957.--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue on evaporation at 180°C)	Hardness as CaCO <sub>3</sub>		Specific conductance (micro-mhos at 25°C)	pH	Color
														Calcium, magnesium	Non-carbonate			
Apr. 1-10, 1957	19,940	1.8	0.05	3.8	0.7	3.1	0.7	15	2.8	2.0	0.3	1.9	42	12	0	40.0	6.5	30
Apr. 11-20	4,987	--	--	4.1	.6	3.6	1.0	12	5.0	3.8	--	1.2	46	13	3	50.3	6.4	8
Apr. 21-30	44,050	--	--	3.1	1.0	2.1	1.2	14	3.2	2.0	--	1.2	41	12	0	37.1	6.9	10
May 1-10	18,520	--	--	5.0	.7	2.7	1.2	18	3.4	3.5	--	1.6	54	15	1	49.3	6.6	10
May 11-20	14,330	--	--	4.3	.9	2.9	1.0	16	3.0	3.2	--	2.0	53	14	1	48.7	6.9	20
May 21-31	24,980	--	--	3.6	1.1	2.6	1.1	14	2.8	3.5	--	1.3	52	14	2	45.1	6.5	12
June 1-10	17,620	--	--	4.0	1.0	2.7	1.0	17	2.6	3.0	--	1.3	51	14	0	46.9	6.6	15
June 11-20	2,856	--	--	4.1	1.8	4.8	1.0	20	3.2	7.0	--	1.3	56	18	1	64.0	6.8	15
June 21-30	911	--	--	6.6	1.9	8.8	1.0	26	13	13	--	1.7	126	24	3	95.1	6.7	12
July 1-10	333	4.4	.00	7.3	2.2	14	1.2	31	4.4	2.0	--	1.4	86	27	2	130	6.8	13
July 11-20	147	--	--	8.4	2.5	22	1.3	32	6.0	3.1	--	2.4	116	31	5	163	7.2	15
July 21-31	271	--	--	9.7	2.0	19	1.8	35	5.4	28	--	1.2	100	32	4	164	7.4	10
Aug. 1-10	128	--	--	18	4.2	22	1.9	39	6.2	52	--	1.5	172	62	30	239	6.6	10
Aug. 11-20	300	--	--	11	2.6	28	2.1	38	6.8	45	--	.8	134	38	7	232	6.8	8
Aug. 21-30	147	--	--	9.3	1.9	21	1.7	35	5.4	31	--	1.7	104	31	2	177	7.0	8
Sept. 1-10	70.3	--	--	9.2	2.5	24	1.8	33	4.6	38	--	.9	122	33	6	198	7.0	10
Sept. 11-16, 19	293	--	--	10	2.0	24	1.3	34	5.6	39	--	1.6	119	33	5	204	6.7	10
Sept. 17-18, 20-30	6,643	--	--	3.8	1.1	3.5	1.3	15	5.2	4.5	--	1.0	49	14	2	48.2	6.7	9
Average	6,080	--	--	7.5	1.8	20	1.4	21	5.2	33	--	1.7	110	26	9	165	--	18

## RED RIVER BASIN--Continued

## LITTLE RIVER NEAR HORATIO, ARK.--Continued

Temperature (°F) of water, water year October 1956 to September 1957

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	73	61	43	45	45	51	56	66	72	84	87	84
2	73	63	43	44	46	52	58	66	72	84	87	82
3	72	62	44	43	47	51	62	66	72	84	87	82
4	72	72	47	48	49	53	59	65	71	86	87	82
5	72	64	51	45	50	52	57	63	70	87	86	82
6	72	62	58	45	51	51	57	64	70	84	84	83
7	71	60	60	44	52	53	57	63	71	84	82	81
8	71	60	57	46	53	47	58	65	72	84	83	77
9	69	54	53	50	59	48	56	66	74	85	83	76
10	69	53	49	47	55	50	55	67	75	86	84	74
11	68	54	50	46	56	53	56	69	77	87	85	76
12	68	54	49	44	55	52	59	71	77	87	83	77
13	70	55	49	45	53	52	55	70	72	87	83	76
14	70	57	48	46	54	55	54	68	80	87	84	76
15	70	60	49	44	55	54	55	68	80	87	86	77
16	70	57	46	41	54	53	56	67	80	86	85	75
17	68	52	48	35	52	55	57	70	81	85	85	75
18	68	50	49	37	53	54	60	71	81	88	83	74
19	68	51	48	37	52	52	61	71	80	88	82	73
20	68	55	50	43	51	53	64	72	81	84	82	74
21	67	52	49	42	49	54	63	75	81	84	82	77
22	66	51	48	47	50	51	63	74	81	84	82	74
23	66	49	42	47	51	53	63	70	80	84	81	70
24	66	48	40	47	53	--	64	70	77	83	82	68
25	67	46	42	46	53	--	63	70	77	82	83	68
26	68	46	42	46	54	50	65	69	78	80	83	68
27	63	44	43	44	52	49	64	69	78	80	84	68
28	64	44	43	43	51	50	64	70	80	85	83	68
29	64	44	43	45	--	50	64	70	82	85	83	67
30	65	43	43	44	--	51	65	70	83	86	83	67
31	62	--	43	44	--	55	--	71	--	86	84	--
Average	68	54	47	44	52	52	60	69	77	85	84	73

RED RIVER BASIN--Continued  
RED RIVER AT FULTON, ARK.

LOCATION --At gaging station at bridge on U. S. Highway 67 at Fulton, Miller County, 0.3 mile downstream from Missouri Pacific Railroad bridge, 2 1/2 miles downstream from Little River, and at mile 463.0  
DRAINAGE AREA --52,380 square miles of which 5,936 square miles is probably noncontributing.  
RECORDS AVAILABLE --Chemical analyses: October 1946 to September 1947, October 1952 to September 1957.  
Water temperatures: October 1946 to September 1947, October 1952 to September 1957  
EXTREMES, 1956-57 --Dissolved solids: Maximum, 1,260 ppm Oct. 1-10; minimum, 54 ppm Dec. 11-16.  
Hardness: Maximum, 445 ppm Oct. 4-10; minimum, 17 ppm Dec. 11-16.  
Specific conductance: Maximum daily, 2,210 microhms Oct. 5; minimum daily, 50.5 microhms Dec. 12.  
Water temperatures: Maximum, 86 F on several days during July and August; minimum, 41 F Jan. 18-20.  
EXTREMES, 1952-57 --Dissolved solids: Maximum, 1,380 ppm Sept. 21-30, 1956; minimum, 54 ppm Nov. 1-3, 1954, Dec. 11-16, 1956.  
Hardness: Maximum, 468 ppm Sept. 21-30, 1956; minimum, 17 ppm Dec. 11-16, 1956.  
Specific conductance: Maximum daily, 2,210 microhms Oct. 5, 1956; minimum daily, 48.8 microhms Mar. 8, 1953.  
Water temperatures: Maximum, 88 F July 30, 1955; minimum, 35 F Dec. 23, 24, 26, 1953, Dec. 16, 1955.  
REMARKS --Records of specific conductance of daily samples available in district office at Fayetteville, Ark. Records of discharge for water year October 1956 to September 1957 given in WSP 1511.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue on evaporation at 180°C)	Hardness as CaCO <sub>3</sub>		Specific conductance (microhms at 25°C)	pH	Color
														Calcium	Non-carbonate			
Oct. 1-10, 1956	1,392	6.9	0.00	124	33	241	13	146	284	400	0.1	3.5	1,260	445	326	1,900	7.4	8
Oct. 11-18	1,598	--	--	91	31	190	--	168	190	292	--	2.9	997	354	217	1,570	7.4	8
Oct. 19-31	452	--	--	65	34	132	--	204	125	210	--	3.0	955	302	135	1,220	7.8	8
Nov. 1	505	--	--	805	27	107	--	170	148	160	--	7	820	270	131	1,280	8.2	--
Nov. 2-7	820	--	--	62	27	107	--	203	91	160	--	2.1	615	266	101	1,000	7.5	7
Nov. 8-10	2,317	--	--	18	5.2	26	--	68	15	36	--	.9	161	86	11	271	7.3	18
Nov. 11-13	1,767	--	--	24	6.9	53	--	68	21	92	--	.9	273	88	32	457	7.2	13
Nov. 14-24	1,388	--	--	54	4	77	--	174	56	116	--	1.3	437	192	50	736	8.0	10
Nov. 25-29	1,288	--	--	21	3.8	29	--	76	13	44	--	1.6	162	76	14	304	7.2	10
Nov. 30	1,240	--	--	--	13	45	--	b160	24	60	--	1.2	a312	156	25	480	8.3	--
Dec. 1-8	1,019	--	--	51	13	--	--	182	29	72	--	3.7	345	180	32	560	8.0	15
Dec. 9	2,320	--	--	--	--	--	--	33	17	30	--	.9	a135	54	27	207	7.8	--
Dec. 10	4,410	--	--	--	--	--	--	23	12	12	--	1.0	a60	23	4	92.8	7.3	--
Dec. 11-16	2,692	--	--	4.8	1.2	5.7	--	17	7.4	7.0	--	1.0	54	17	3	66.9	6.6	15
Dec. 17-18, 22-25, 29-30	2,815	--	--	11	3.1	17	--	33	17	21	--	1.1	110	40	13	174	6.7	23
Dec. 19-21, 26-28, 31	3,716	--	--	21	3.9	27	--	46	28	43	--	1.5	188	68	31	283	6.9	10
Jan. 1-9, 10-11, 13-14, 1957	4,120	--	--	14	3.6	26	--	27	29	37	--	1.5	149	50	28	247	7.4	20

RED RIVER BASIN

Jan. 3-4, 16, 1957	3,450	--	--	32	8.2	60	--	52	67	90	--	1.3	318	114	71	541	7.0	10
Jan. 5	2,980	--	--	--	--	--	--	64	153	160	--	.8	a570	182	130	876	7.8	--
Jan. 6-9, 12, 17, 25-26, 31	9,164	--	--	11	2.6	20	--	22	21	28	--	1.5	117	38	20	177	6.9	10
Jan. 15	4,070	--	--	--	--	--	--	34	36	142	--	.9	a232	79	51	357	7.5	--
Jan. 18-23	3,853	5.6	.00	66	17	123	7.0	70	154	205	--	3.9	680	234	177	1,130	7.7	5
Jan. 24, 27-30	16,540	--	--	10	1.4	13	--	22	14	18	--	1.9	86	31	13	1,145	6.9	23
Feb. 1-7	22,140	--	--	--	7.7	8.8	--	19	8.6	13	--	1.7	79	25	9	113	6.8	15
Feb. 8-10	33,970	--	--	15	2.6	18	--	38	38	23	--	1.4	136	48	17	191	7.4	30
Feb. 11-17	22,280	--	--	--	8.7	9.0	--	24	12	12	--	1.5	82	28	9	119	7.0	23
Feb. 18-19	6,823	--	--	16	3.8	28	--	43	29	36	--	1.7	160	56	20	262	7.4	35
Feb. 20-25, 27-28	5,308	--	--	49	9.7	92	--	64	111	138	--	1.2	478	162	110	769	7.4	23
Feb. 26	5,300	--	--	--	--	--	--	56	125	93	--	1.9	a355	122	76	945	7.9	--
Mar. 1-7	6,236	--	--	47	11	84	--	67	109	128	--	1.3	462	162	108	730	7.2	10
Mar. 8	9,650	--	--	--	6.0	42	--	59	105	94	--	1.9	a350	123	75	538	7.9	--
Mar. 9, 15-16	6,817	--	--	23	--	--	--	42	51	58	--	4.6	244	82	48	384	7.4	35
Mar. 10-14, 17-18	8,714	--	--	19	3.2	27	--	41	29	36	--	1.5	187	61	27	263	7.3	25
Mar. 19-20, 22, 28-31	34,420	--	--	15	2.8	17	--	37	21	22	--	1.2	184	49	19	191	7.1	25
Mar. 21, 23-28	40,730	--	--	12	1.7	10	--	32	11	14	--	1.3	97	37	11	141	7.2	37
Apr. 1-3, 8-9, 15	55,550	--	--	16	2.2	12	--	44	17	14	--	1.3	117	49	13	164	7.4	35
Apr. 4-7, 16, 20	64,080	--	--	25	3.2	19	--	66	26	24	--	1.9	166	76	21	249	7.6	30
Apr. 10-14	52,520	--	--	11	1.5	6.6	--	36	8.2	7.0	--	1.7	90	34	4	102	7.3	35
Apr. 17-19	17,700	--	--	34	6.6	47	--	62	64	72	--	1.8	296	112	61	461	7.6	30
Apr. 21-22, 24-30	116,200	2.8	.27	24	3.1	12	1.8	73	16	14	.4	2.6	148	73	13	196	7.2	25
Apr. 23	63,600	--	--	--	--	--	--	83	125	115	--	1.7	a436	169	101	670	8.0	--
May 1-4	195,200	--	--	23	3.0	10	2.2	68	16	13	--	1.0	138	70	14	195	7.0	10
May 5	165,000	--	--	--	--	--	--	77	55	39	--	2.2	a187	94	31	287	8.1	--
May 6-9	146,500	--	--	42	9.6	56	4.0	87	73	86	--	1.6	353	144	73	557	7.6	15
May 10-15	90,630	--	--	58	15	92	5.5	93	120	150	--	3.0	562	206	130	880	7.9	20
May 16, 21-25	99,420	--	--	53	13	80	5.0	98	101	124	--	1.2	478	186	105	773	7.4	15
May 17-19, 26-27	111,200	--	--	32	9.0	27	3.6	85	40	48	--	1.3	225	117	47	310	7.5	45
May 20, 28-31	146,400	--	--	24	5.8	16	2.4	84	22	23	--	1.3	168	84	15	241	7.2	25

a Estimated from specific conductance.

b Includes equivalent of 2 parts per million of carbonate (CO<sub>3</sub>).

## RED RIVER BASIN--Continued

RED RIVER AT FULTON, ARK.--Continued  
 Chemical analyses, in parts per million, water year October 1956 to September 1957--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue on evaporation at 180°C)	Hardness as CaCO <sub>3</sub>		Specific conductance (micro-mhos at 25°C)	pH	Color
														Calcium, mg-nesium	Non-carbonate			
June 1-12, 1957	182,600	--	--	46	8.4	44	3.8	106	62	69	--	1.1	308	149	62	503	7.4	20
June 13-23	103,100	--	--	65	11	75	5.1	124	99	119	--	.8	474	207	106	781	7.4	12
June 24-30	73,330	--	--	77	14	102	6.2	125	150	156	--	1.0	605	250	147	976	7.5	10
July 1-10	58,300	--	--	79	15	105	6.6	124	156	162	--	1.5	638	258	157	1,020	7.5	10
July 11-20	9,751	3.9	0.01	83	16	104	6.6	154	152	155	0.4	1.9	652	273	147	1,010	7.4	3
July 21-31	6,759	--	--	80	18	96	6.2	172	135	148	--	.8	598	274	132	887	7.7	10
Aug. 1-13	6,904	--	--	91	19	115	7.4	182	157	185	--	1.8	710	305	156	1,110	7.4	10
Aug. 14-17	5,175	--	--	66	15	78	4.8	150	100	122	--	.3	511	226	103	829	8.0	8
Aug. 18-31	3,864	--	--	91	18	108	6.6	190	135	170	--	1.8	676	301	146	1,080	7.8	8
Sept. 1-12	3,149	--	--	96	21	123	7.0	194	158	195	--	2.2	746	326	167	1,180	8.2	8
Sept. 13-19	5,371	--	--	84	18	95	5.3	192	131	145	--	1.1	616	284	126	997	8.1	10
Sept. 20-28	32,180	--	--	33	6.4	29	2.8	89	39	46	--	2.4	221	109	36	356	7.2	15
Sept. 26-30	74,340	--	--	26	2.6	10	2.4	81	16	13	--	1.6	150	76	9	204	7.2	10
Average	35,500	--	--	42	10	59	--	89	72	91	--	1.7	359	146	73	565	--	17

## RED RIVER BASIN--Continued

## RED RIVER AT FULTON, ARK.--Continued

Temperature (°F) of water, water year October 1956 to September 1957

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	--	60	43	46	45	53	56	66	--	79	86	82
2	73	61	--	46	45	53	55	67	72	80	86	82
3	73	62	45	44	47	53	55	66	73	80	86	82
4	72	63	56	44	50	53	60	66	73	--	86	82
5	72	63	--	46	50	50	60	66	75	80	84	82
6	71	62	58	45	50	50	60	67	75	79	82	82
7	71	62	--	45	50	50	60	67	75	80	80	80
8	67	62	61	45	53	48	59	68	75	80	82	79
9	67	53	49	53	55	49	58	69	75	82	82	78
10	67	51	50	47	56	55	58	70	77	82	82	76
11	67	53	52	47	55	53	59	70	78	83	81	74
12	67	53	53	47	55	54	60	70	78	82	81	74
13	70	53	50	47	55	55	56	70	78	83	81	76
14	69	53	50	47	55	56	58	70	78	83	82	76
15	69	52	56	43	55	55	57	70	78	85	83	76
16	69	52	--	42	54	55	58	70	78	85	82	74
17	68	52	50	42	54	55	59	70	78	85	82	74
18	68	52	50	41	54	55	62	72	78	85	82	74
19	68	53	50	41	52	54	63	72	78	85	81	76
20	66	54	45	41	50	52	64	72	78	85	80	76
21	66	--	50	42	50	53	60	72	79	85	80	76
22	64	49	--	42	50	53	65	72	78	85	80	76
23	64	48	50	44	50	53	63	--	77	86	80	75
24	64	50	--	44	50	54	65	72	76	86	80	73
25	66	52	--	47	55	54	65	72	75	86	82	70
26	64	50	45	47	53	53	65	72	76	86	82	68
27	60	47	45	45	50	54	65	72	77	86	82	68
28	60	46	--	45	52	54	65	72	78	86	82	67
29	63	45	45	45	--	54	66	72	79	86	82	67
30	63	43	45	44	--	55	66	73	79	86	80	67
31	60	--	46	44	--	55	--	--	--	86	82	--
Average	67	54	--	45	52	53	61	70	77	84	82	75

RED RIVER BASIN--Continued  
RED RIVER NEAR HOSSTON, LA.

LOCATION--At aging station at bridge on State Highway 2, at Millers Bluff, 3½ miles east of Hoston, and 4 miles downstream from Dry Bayou.

DRAINAGE AREA--57,041 square miles.  
RECORDS AVAILABLE--Chemical analyses: March to September 1957.

Water temperatures: March to September 1957.  
EXTREMES, March to September 1957.--Dissolved solids: Maximum 700 ppm Sept. 11-21; minimum, 133 ppm Sept. 27-30.

Hardness: Maximum, 292 ppm Sept. 11-21; minimum, 69 ppm Mar. 28-31.

Specific conductance: Maximum daily, 1,130 micromhos Sept. 20; minimum daily, 187 micromhos Apr. 13.

Water temperatures: Maximum, 90 F Sept. 3, 4.

REMARKS.--Records of specific conductance of daily samples available in subdistrict office at Baton Rouge, La. Records of discharge for this station not available.

Chemical analyses, in parts per million, March to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Boron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
														Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate			
Mar. 28-31, 1957.		11	0.30	22	3.4	23		59	22	33	0.5	1.0		0.20	69	21	43	1.2	261	7.4
Apr. 1-10.....		9.0	.42	25	3.9	19		73	21	26	.6	1.2		.19	76	19	35	1.0	250	7.7
Apr. 11-16.....		9.0	.09	25	3.4	19		75	17	27	.4	.2		.19	76	19	35	1.0	243	7.6
Apr. 19-24.....		9.0	.04	37	5.5	42		83	47	63	.4	.2		.33	115	47	44	1.7	433	7.6
Apr. 25-30, May 1-5.....		11	.08	29	4.1	14		90	16	19	.5	.2		.19	89	15	25	.6	235	7.7
May 6-10.....		9.2	.03	40	6.9	44		94	49	67	.5	.5		.39	128	51	43	1.7	473	7.7
May 11-18.....		9.6	.03	53	11	76		101	85	120	.5	.5		.59	177	94	48	2.5	726	7.7
May 19-21, 25, 28-31.....		14	.01	31	4.7	27		85	29	39	.4	.5		.26	97	27	38	1.2	331	7.5
May 22-24, 26, 27, June 2-9.....		13	.02	46	10	79		74	85	126	.4	.2		.54	156	96	52	2.7	711	7.3
June 10-20.....		12	.02	35	6.1	49		75	49	68	.6	.5		.260	112	51	47	1.8	446	7.3
June 21-30.....		12	.02	50	8.4	61		100	73	94	.6	1.0		.368	160	68	46	2.1	622	7.5
July 1-10.....		12	.01	60	11	109		109	100	122	.6	1.0		.469	194	106	47	2.5	771	7.6
July 11-20.....		13	.01	59	12	89		98	116	132	.4	.8		.470	196	116	49	2.7	821	7.6
July 21-30.....		14	.01	50	8.5	83		120	64	75	.2	.5		.340	160	62	41	1.8	571	7.9
Aug. 1-10.....		13	.01	49	8.3	46		132	52	66	.2	.5		.287	156	48	39	1.6	535	7.7
Aug. 11-10.....		14	.02	53	8.8	54		144	56	76	.4	.5		.342	168	50	41	1.8	575	8.1



## LOWER MISSISSIPPI RIVER BASIN

## RED RIVER BASIN--Continued

## RED RIVER NEAR HOSSTON, LA.--Continued

Temperature (°F) of water, March to September 1957

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1						--	60	67	--	85	89	88
2						--	63	70	76	85	89	88
3						--	64	70	75	--	87	90
4						--	64	69	75	--	--	90
5						--	60	66	76	--	84	88
6						--	60	67	76	85	84	88
7						--	63	68	77	86	84	84
8						--	62	70	78	86	87	81
9						--	63	--	78	88	87	81
10						--	63	70	78	88	84	81
11						--	63	70	79	--	84	81
12						--	62	75	78	85	--	81
13						--	61	76	81	85	--	81
14						--	--	76	82	87	87	81
15						--	62	77	81	87	88	81
16						--	63	77	--	87	88	81
17						--	62	--	82	87	86	81
18						--	66	75	83	88	--	81
19						--	66	77	81	88	84	81
20						--	67	77	87	86	84	81
21						--	68	77	82	88	85	80
22						--	69	77	81	87	85	80
23						--	69	78	82	--	84	80
24						--	69	78	83	--	83	78
25						--	69	78	--	84	87	78
26						--	70	76	--	84	87	--
27						--	68	76	85	84	87	74
28						53	68	77	86	86	85	72
29						55	67	75	83	85	86	72
30						58	68	76	87	85	86	72
31						58	--	76	--	89	84	--
Average						--	65	74	80	86	86	81

## RED RIVER BASIN--Continued

## BLACK BAYOU NEAR GILLIAM, LA.

LOCATION:--At gaging station near left bank on downstream side of bridge on State Highway 170, 0.2 mile downstream from Red Bayou and 2 miles southwest of Gilliam, Caddo Parish.

DRAINAGE AREA.--364 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1954 to September 1957.

REMARKS.--Records of discharge for water year October 1956 to September 1957 given in WSP 1511.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids (calculated)		Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	
													Parts per million	Tons per acre-foot	Calcium, mg./liter	Non-carbonate				
Oct. 11, 1956 ...	3.8	11	0.02	232	133	5,290		343	30	8,740			14,800	19.9	1,130	845	91	69	23,100	7.1
Oct. 24 .....	5.1	--	--	233	142	5,140		353	--	8,450			--	--	1,170	876	91	65	23,000	7.4
Nov. 15 .....	8.1	12	.02	184	97	3,180		162	26	5,400			8,980	12.2	858	725	89	47	15,100	7.2
Nov. 20 .....	82	6.5	--	42	20	437		115	19	720		5.0	1,310	1.78	186	92	84	14	2,450	7.2
Dec. 5 .....	5.8	18	.02	239	114	4,490		391	37	7,430			12,500	17.0	1,070	745	90	60	20,300	7.4
Jan. 7, 1957 .....	9.4	11	.06	120	55	1,390		329	39	2,300			4,080	5.55	525	256	85	26	7,410	7.0
Feb. 2 .....	792	11	.34	30	8.8	179		46	8.2	322		2.2	585	.80	112	74	78	7.4	1,130	6.8
Apr. 12 .....	815	9.2	.20	32	6.8	155		12	5.4	305		.5	520	.71	108	98	76	6.5	1,030	6.3
May 16 .....	156	7.4	.71	15	4.4	83		28	3.8	147		1.8	277	.38	56	33	76	4.8	546	6.3
June 12 .....	1,080	8.2	.72	19	3.8	82		18	2.6	158		1.2	285	.39	63	48	74	4.5	573	5.9
July 9 .....	36	10	.03	55	22	588		134	11	980		2.2	1,730	2.85	228	118	85	17	3,300	7.0
Sept. 4 .....	5.2	12	.00	171	103	3,240		390	64	5,330		--	9,110	12.4	850	530	89	48	15,300	7.6

RED RIVER BASIN--Continued  
RED RIVER AT SHREVEPORT, LA.

LOCATION.--At gaging station at Illinois Central Railroad bridge at Shreveport, half a mile downstream from Cross Bayou.  
DRAINAGE AREA.--60,613 square miles, of which 5,936 square miles above Denison Dam is noncontributing.  
RECORDS AVAILABLE.--Chemical analyses: October 1955 to September 1957.

Water temperatures: October 1955 to September 1957.  
EXTREMES, 1956-57.--Dissolved solids: Maximum, 1,220 ppm Oct. 1-10; minimum, 122 ppm Apr. 11-18.

Hardness: Maximum, 451 ppm Oct. 1-10; minimum, 70 ppm Feb. 5-7, 11-16.  
Specific conductance: Maximum daily, 2,190 micromhos Nov. 4; minimum daily, 186 micromhos Apr. 14.

Water temperatures: Maximum, 89°F July 29, Aug. 2, 4; minimum, 41°F Jan. 17.  
EXTREMES, 1955-57.--Dissolved solids: Maximum, 1,220 ppm Sept. 21-30 Oct. 1-10, 1956; minimum, 122 ppm Apr. 11-18, 1957.

Hardness: Maximum, 451 ppm Oct. 1-10, 1956; minimum, 70 ppm Feb. 5-7, 11-16, 1957.  
Specific conductance: Maximum daily, 2,190 micromhos Nov. 4, 1956; minimum daily, 186 micromhos Apr. 14, 1957.

Water temperatures: Maximum, 91°F Aug. 9, 16, 17, 1956; minimum, 40°F Jan. 19, 1956.  
REMARKS.--Records of specific conductance of daily samples available in subdistrict office at Baton Rouge, La. Records of discharge for water year October 1956 to September 1957 given in WSP 1511.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate		
Oct. 1-10, 1956.....	1,650	8.4	0.02	128	32	264	185	283	410	0.3	1.2	1.220	1.66	5,440	451	300	56	5.4	2,010	
Oct. 11-20.....	969	14	.02	119	33	238	208	248	368	.3	1.2	1,120	1.52	2,930	432	262	54	5.0	1,850	
Oct. 21-31.....	759	15	.01	87	34	166	260	144	250	.2	1.5	825	1.12	1,690	357	144	50	3.8	1,430	
Nov. 1-12.....	1,120	16	.00	72	32	179	244	96	282	.3	1.5	799	1.09	2,420	310	110	56	4.4	1,430	
Nov. 13-20.....	1,760	11	.01	51	14	69	170	47	103	.2	.5	380	.52	1,830	184	44	45	2.2	675	
Nov. 21-30.....	1,200	10	.01	69	18	98	234	53	149	.3	.5	513	.70	1,790	246	54	46	2.7	911	
Dec. 1-12.....	1,320	9.8	.00	54	15	56	213	25	82	.3	.2	347	.47	1,240	196	22	38	1.7	628	
Dec. 13-20.....	3,320	10	.07	26	8.1	23	195	17	30	.5	1.0	161	.22	1,440	91	13	35	1.0	283	
Dec. 21-28.....	2,400	12	.03	39	9.6	38	134	31	55	.4	.5	252	.54	1,630	158	28	38	1.4	438	
Dec. 29-31.....	6,000	11	.02	51	12	86	104	91	130	.4	1.5	434	.59	7,030	177	92	52	2.3	748	
Jan. 1-10, 1957.....	3,370	9.0	.05	49	12	94	84	101	143	.4	.5	450	.61	4,090	172	103	54	3.1	783	
Jan. 11-19.....	4,900	9.6	.04	49	12	102	74	107	156	.3	.8	473	.64	6,260	172	112	56	3.4	841	
Jan. 20-26.....	5,170	9.8	.02	85	22	192	99	213	295	.3	.8	867	1.18	12,100	302	221	58	4.8	1,470	
Jan. 27-31, Feb. 2-4, 8-10.....	23,800	8.2	.58	29	5.8	41	60	44	63	.4	1.2	223	.30	14,300	96	47	48	1.8	405	
Feb. 5-7, 11-16.....	30,600	10	.88	22	3.8	18	57	21	27	.4	1.5	133	.18	11,100	70	23	36	.9	231	
Feb. 17-22.....	14,200	9.8	.12	22	4.3	39	61	31	53	.4	.8	190	.26	7,280	73	23	54	2.0	337	
Feb. 23-28.....	9,280	11	.08	38	9.0	79	67	79	118	.4	.8	a366	.52	9,870	132	77	57	3.0	660	
Mar. 1-11.....	8,640	11	.07	38	10	79	67	81	119	.4	.5	a389	.53	9,070	137	82	56	2.9	687	
Mar. 12-21.....	12,000	11	.12	30	5.9	43	62	46	65	.5	1.0	a254	.35	8,230	98	47	49	1.9	417	

Mar. 22-31, 1957.....	43,800	9.6	.35	25	3.4	22	66	23	32	7	0.5	149	.20	17,600	77	23	39	1.1	262	7.3
Apr. 1-10.....	82,100	8.8	.47	26	3.9	17	74	21	24	.5	1.0	139	.19	30,800	81	20	32	.8	247	7.8
Apr. 11-18.....	68,400	11	.36	24	3.1	14	76	14	17	.6	1.0	122	.17	21,500	73	10	30	.7	204	7.8
Apr. 19-22, 24-25.....	50,800	11	.13	31	4.6	30	81	32	42	.6	1.0	182	.26	26,200	96	30	40	1.3	337	7.9
Apr. 25, 26-30.....	165,000	10	.44	28	4.1	14	92	16	16	.7	1.2	a 135	.18	60,100	87	11	26	.7	229	7.9
May 1-5.....	200,000	11	.16	41	6.5	39	95	46	61	.6	1.2	253	.34	137,000	129	51	40	1.5	451	7.7
May 6-10.....	128,000	9.8	.04	55	11	85	99	93	132	.5	1.0	436	.59	151,000	182	101	50	2.7	780	7.8
May 12-17.....	129,000	12	.07	38	5.9	40	90	42	60	.5	1.5	a 245	.33	80,700	118	44	42	1.6	422	7.5
May 18-25, 28-29.....	118,000	12	.02	55	9.8	80	101	87	125	.5	1.5	a 433	.59	138,000	177	44	50	2.6	742	7.7
May 23-27.....	161,000	10	.16	29	5.6	19	95	20	25	.5	1.5	a 163	.22	70,900	96	18	30	.8	270	7.5
May 30-31, June 1-2.....	162,000	11	.04	43	5.4	46	97	50	68	.6	1.5	274	.37	120,000	130	50	44	1.8	474	7.5
June 3-9.....	162,000	10	.03	51	8.8	60	102	72	95	.6	1.5	a 364	.50	159,000	164	80	44	2.0	631	7.5
June 11-20.....	92,500	9.6	.02	59	11	80	107	100	121	.6	1.5	a 448	.61	112,000	191	104	48	2.5	759	7.8
June 21-30.....	73,600	11	.01	64	11	88	113	113	130	.4	1.5	a 481	.75	95,600	204	112	48	2.7	825	7.7
July 1-12.....	23,600	11	.05	50	8.0	56	123	67	76	.4	1.2	a 333	.45	21,200	158	57	43	1.9	578	7.8
July 13-21.....	16,800	11	.04	48	7.8	46	131	52	63	.4	.8	293	.40	13,300	152	44	40	1.6	515	7.8
July 22-31.....	14,000	14	.02	52	8.8	53	144	58	71	.3	.8	a 342	.47	12,900	166	48	41	1.8	568	8.1
Aug. 1-10.....	10,900	15	.02	55	9.3	57	152	59	79	.3	.5	a 360	.49	10,600	175	50	41	1.9	605	8.1
Aug. 11-20.....	7,780	13	.02	63	11	69	167	71	99	.4	.8	a 428	.58	8,980	202	65	43	2.1	713	8.0
Aug. 21-31.....	5,390	11	.01	80	16	105	203	105	153	.3	1.7	a 624	.85	9,080	266	99	46	2.8	971	8.3
Sept. 1-12.....	3,770	13	.01	83	19	114	209	121	166	.3	1.0	a 666	.91	6,780	285	114	47	2.9	1,060	8.1
Sept. 13-20.....	43,800	7.2	.05	41	7.5	47	108	51	65	.4	1.6	a 301	.41	35,400	133	45	43	1.8	477	8.0
Sept. 21-30.....	40,700	11	0.12	53	12	78	128	77	117	0.4	1.0	420	0.57	46,200	186	82	48	2.3	716	--
Weighted average.....																				

a Residue on evaporation at 180° C.

b Includes equivalent of 4 parts per million of carbonate (CO<sub>3</sub>).

## LOWER MISSISSIPPI RIVER BASIN

## RED RIVER BASIN--Continued

## RED RIVER AT SHREVEPORT, LA.--Continued

Temperature (°F) of water, water year October 1956 to September 1957  
Once daily measurement, usually between 4 and 6 p. m.

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	77	67	51	52	--	59	82	70	--	83	87	86
2	--	--	55	48	47	56	87	70	--	85	89	84
3	77	65	56	47	53	56	65	71	--	85	88	81
4	76	69	58	53	58	55	65	68	--	86	89	85
5	77	67	64	53	56	54	66	67	--	86	85	85
6	77	--	66	52	56	54	64	69	--	84	84	80
7	74	68	70	52	55	51	67	69	--	85	--	78
8	74	50	66	50	58	51	61	71	--	86	86	78
9	73	--	51	62	61	54	62	71	--	86	86	78
10	73	57	52	52	59	58	65	73	--	87	82	79
11	73	59	55	52	56	60	65	--	81	87	84	80
12	74	62	60	52	60	62	63	71	83	87	85	78
13	74	63	54	54	58	63	57	72	--	88	86	80
14	74	66	53	48	60	62	62	73	82	87	86	80
15	74	65	54	47	61	61	59	72	81	87	87	80
16	74	63	53	42	56	61	63	77	82	87	87	79
17	73	65	55	41	56	59	62	71	82	--	86	79
18	73	55	55	43	54	62	65	75	82	88	85	80
19	73	69	55	43	53	63	70	78	81	88	85	81
20	70	63	54	53	51	59	--	79	81	86	85	82
21	69	58	54	53	53	58	69	81	81	87	85	81
22	70	53	57	56	54	61	68	81	--	86	85	77
23	72	54	53	46	57	59	67	81	81	84	85	76
24	72	53	54	45	58	57	69	80	79	82	84	75
25	72	53	--	47	60	52	70	75	79	85	84	73
26	68	49	51	45	55	54	70	76	80	86	86	72
27	68	49	52	45	55	53	67	72	77	87	87	72
28	69	48	51	48	58	55	68	77	81	88	86	71
29	70	45	50	49	--	56	72	77	82	89	86	71
30	68	49	52	45	--	57	69	78	83	86	83	70
31	65	--	55	50	--	60	--	76	--	86	84	--
Average	72	59	56	49	56	57	65	74	81	86	86	78

RED RIVER BASIN--Continued

BAYOU DORCHEAT NEAR MINDEN, LA.

LOCATION.--At gaging station on left bank, 500 feet upstream from bridge on U. S. Highway 80, three-quarters of a mile upstream from Louisiana and Arkansas Railway bridge, 3 miles west of Minden, and 28 miles upstream from Bisteneau Dam.  
DRAINAGE AREA.--1,097 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1955 to August 1957.

REMARKS:--Records of discharge for water year October 1956 to September 1957 given in WSP 1511.

Chemical analyses, in parts per million, November 1956 to August 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium magnesium	Non-carbonate				
Nov. 14, 1956	3.5	6.0	0.01	28	6.7	132		24	5.0	255				446	0.61	4.2	98	78	75	5.8	900	6.3
Dec. 12	20	8.8	.02	57	14	329		16	11	632		0.8		1,060	1.44	57	200	187	78	10	2,030	6.9
Jan. 7, 1957	57	7.6	.05	52	12	312		15	12	590		.2		993	1.35	153	178	166	79	10	1,950	6.6
Feb. 5	1,230	10	.18	27	7.3	150		5	7.6	292		.5		497	.68	1,650	98	94	77	6.6	966	5.6
Mar. 11	1,090	13	.06	21	5.0	103		6	6.8	202		.6		354	.48	1,050	74	69	75	5.2	701	5.9
Apr. 11	10,800	8.8	.18	7.9	2.5	39		9	4.8	72		.8		140	.19	4,080	30	23	74	3.1	288	5.9
May 15	3,400	5.8	.20	4.8	1.4	12		9	1.0	24		.8		54	.07	496	18	10	59	1.2	106	5.7
June 5	2,290	9.6	.32	34	2.8	15		8	3.2	84		.5		153	.21	946	96	89	25	0.7	322	5.5
July 12	94	13	.38	20	4.4	87		14	2.2	172		.5		306	.42	78	68	56	74	4.6	606	6.1
Aug. 6	32	7.6	.02	19	4.8	85		24	3.0	163		.2		295	.40	25	67	48	73	4.5	582	6.3
Aug. 27	2.2	8.8	.02	19	5.0	88		22	4.8	168		.2		305	.41	1.8	68	50	74	4.7	595	6.4

RED RIVER BASIN--Continued  
 CYPRESS BAYOU NEAR BENTON, LA.

LOCATION.--At gaging station at bridge on State Highway 162, 2 miles upstream from Little Caney Bayou and 3 miles east of Benton, Bossier Parish, DRAINAGE AREA.--91 square miles.  
 RECORDS AVAILABLE.--Chemical analyses: October 1955 to August 1957.  
 REMARKS.--Records of discharge for water year October 1956 to September 1957 given in WSP 1631.

Chemical analyses, in parts per million, November 1956 to August 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (calculated)		Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium				Non-carbonate
Nov. 16, 1956 ...	0.6	7.8	0.15	5.1	1.8	5.8	3.5	10	16	7.0	0.2	0.2	52	0.07	0.08	20	12	33	0.5	84.0	5.9
Dec. 12 ...	.5	15	.48	5.1	1.8	6.8	3.7	16	11	9.8	.3	.2	62	.08	.09	20	7	37	.7	88.6	6.1
Jan. 8, 1957 ...	21	14	.62	2.2	1.1	9.7	2.5	16	6.0	9.0	.6	.5	54	.07	3.1	10	0	62	1.3	76.4	6.1
Feb. 4 ...	344	7.4	.39	2.9	1.4	10	5	4.6	5	18	--	.8	47	.06	44	13	9	63	1.2	84.2	5.3
Mar. 12 ...	101	12	.53	8.4	2.5	30	10	6.0	6.0	58	--	1.2	124	.17	34	31	23	68	2.4	228	5.8
Apr. 4 ...	588	8.2	.35	3.9	1.7	7.5	1.3	11	3.6	14	.5	.8	47	.06	75	17	8	47	.8	80.6	5.8
Apr. 29 ...	5,400	4.0	.22	1.7	.7	1.5	2.0	7	1.9	2.2	.4	1.0	19	.03	277	7	1	25	.2	31.4	5.4
June 5 ...	.572	9.2	.52	2.3	1.3	6.2	1.9	8	1.2	13	--	1.0	41	.06	63	11	4	50	.8	69.9	5.5
July 15 ...	.1	10	1.1	12	3.2	33	33	26	2.6	63	--	1.2	139	.19	.04	43	22	62	22	271	6.1
Aug. 5 ...	.1	6.0	.31	6.3	1.8	11	11	26	4.2	14	--	1.0	58	.08	.02	23	2	50	1.0	109	6.1

RED RIVER BASIN--Continued  
 LOGGY BAYOU NEAR NINOCK, LA.

LOCATION--At gaging station at bridge on U. S. Highway 71, a quarter of a mile downstream from Flat River, 2 miles southeast of Ninock, and 6 miles down-stream from Loggy Bayou, Bisteanu Dam  
 DRAINAGE AREA--2,628 square miles  
 RECORDS AVAILABLE--Chemical analyses: November 1954 to September 1957.  
 REMARKS--Records of discharge for water year October 1956 to September 1957 given in WSP 1511.

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO <sub>3</sub>	Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25 C)	pH
														Parts per million	Tons per acre-foot	Tons per day					
														Calcium, magnesium	Carbonate						
Oct. 15, 1956	7.74	6.6	0.00	61	44	242	288	91	375	692	1.31	14	344	100	61	5.7	1,700	7.5			
Nov. 19	.19	7.0	0.03	51	28	92	245	60	126	485	.66	25	241	40	45	2.6	867	7.8			
Dec. 13	200	9.6	.94	32	9.0	136	135	30	192	476	.65	257	116	6	73	5.5	864	7.4			
Jan. 9, 1957	447	8.8	.88	35	6.7	153	149	37	202	517	.70	624	114	0	74	6.2	929	7.3			
Feb. 6	2,050	9.8	.33	16	4.9	67	30	9.2	122	245	.33	1,360	60	35	71	3.8	474	6.5			
Mar. 13	2,320	6.0	.25	21	5.5	102	26	13	185	348	.47	2,170	75	54	75	5.1	682	6.7			
Apr. 9	6,150	6.0	.08	16	4.5	60	14	6.6	151	272	.37	4,520	58	47	75	4.5	544	6.3			
May 3	6,800	6.8	.14	7.6	2.4	23	18	3.4	42	95	.13	1,740	29	14	63	1.8	181	6.2			
June 6	7,300	5.0	.37	6.5	2.4	8.8	13.0	2.4	16	61	.06	1,200	26	6	39	.8	115	6.1			
July 16	1,140	6.2	1.1	11	2.9	13	40	3.0	122	81	.11	249	39	6	43	.9	153	6.3			
Aug. 29	48.4	9.2	.02	60	22	63	256	54	109	464	.63	62	240	30	43	2.3	825	7.4			
Sept. 12	52.2	14	.06	64	27	92	271	65	128	524	.71	74	270	48	43	2.4	916	7.8			

RED RIVER BASIN--Continued  
 SALINE BAYOU NEAR LUCKY, LA.

LOCATION.--At gaging station at bridge on State Highway 4, 0.7 mile downstream from Sixmile Creek and 1.0 mile east of Lucky, Bienville Parish.  
 DRAINAGE AREA.--154 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1955 to September 1957.

REMARKS.--Records of discharge for water year October 1956 to September 1957 given in WSP 1511.

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO <sub>3</sub>		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH		
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				Percent sodium	
																							per million
Oct. 23, 1956	13	13	0.22	1.9	0.3	2.8	1.2	7	1.8	4.0	--	0.2		28	0.04	1.0	6	0	45	0.5	31.4	6.0	
Nov. 28	18	15	.23	1.2	.7	3.5	1.3	8	1.2	4.8	--	.2		32	.04	1.6	6	0	51	.6	34.9	6.2	
Dec. 18	46	15	.46	2.0	.7	3.2	1.2	7	1.4	5.5	0.3	.2		33	.04	4.1	8	2	42	.5	38.0	6.0	
Jan. 17, 1957	32	15	.88	1.9	.8	15		8	3.4	22	--	.2		63	.09	5.4	8	1	81	2.4	89.6	6.2	
Jan. 31	515	9.4	.46	2.0	.7	4.8	1.5	4	4.4	7.0	.7	.8		34	.05	47	8	5	51	.7	42.6	5.4	
Feb. 19	259	9.6	.60	1.4	.9	4.7	.9	6	1.2	7.0	.7	.8		31	.04	22	7	2	55	.8	40.7	5.4	
Mar. 20	106	--	--	--	--	--	--	10	--	17	--	--		--	--	--	5	0	--	--	--	80.2	6.2
Apr. 11	183	14	.52	2.7	1.3	--	13	10	5.2	18	--	.8		61	.08	30	12	4	69	1.6	95.5	5.9	
May 29	793	11	.42	1.6	.8	2.8	1.2	8	2.0	3.8	.3	.5		28	.04	60	7	1	41	.4	34.8	5.8	
June 5	430	7.6	.40	.9	.9	1.6	1.1	4	1.4	2.0	.6	2.0		20	.03	23	6	3	32	.3	32.8	5.1	
July 19	16	15	.99	2.5	.7	1.6	1.6	9	1.4	24	--	.8		65	.09	2.8	9	2	79	2.3	97.6	5.8	
Aug. 29	9.0	13	.32	1.6	.4	11		11	.4	14	--	.8		47	.06	1.1	6	0	81	2.1	68.6	6.3	
Sept. 25	47	16	.35	1.7	.9	4.1	1.0	6	1.2	6.8	.6	.5		36	.05	4.6	8	3	49	.6	42.2	6.0	

Chemical analyses, in parts per million, water year October 1956 to September 1957

## RED RIVER BASIN--Continued

BLACK LAKE BAYOU NEAR CASTOR, LA.

LOCATION.--At gaging station at bridge on State Highway 4, 2.8 miles downstream from Four Mile Bayou, 2.8 miles northeast of Castor, Bienville Parish, and 6.0 miles southeast of Ringold.

DRAINAGE AREA.--423 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1955 to September 1957.

REMARKS.--Records of discharge for water year October 1956 to September 1957 given in WSP 1511.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Boiron (B)	Dissolved solids (calculated)			Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate			
Oct. 15, 1956	7.9	15	0.23	1.8	0.6	3.6	1.5	9	2.2	4.5	--	0.2		34	0.05	0.7	7	0	47	35.2	6.3
Nov. 19	28	16	.25	2.4	1.0	4.6	1.9	9	4.0	6.5	0.3	.5		41	.06	3.1	10	3	45	52.1	6.0
Dec. 13	45	15	.28	2.5	1.3	4	20	12	3.4	30	--	.2		79	.11	9.6	12	2	79	122	6.3
Jan. 9, 1957	190	14	.27	5.7	1.5	66	8	8	8.8	137	--	.2		258	.35	132	22	15	89	467	6.0
Feb. 6	1,000	12	.29	3.6	1.7	16	4	4	9.0	27	--	.5		72	.10	184	16	13	59	126	5.4
Mar. 13	555	12	.44	3.6	1.6	20	8	8	8.8	30	--	1.0		81	.11	121	16	9	73	141	6.0
Apr. 11	1,520	10	.29	2.7	1.4	14	14	10	6.0	20	--	.2		60	.08	246	12	4	71	100	6.2
June 4	1,010	12	.48	3.2	1.6	14	14	14	2.8	21	--	.2		62	.08	169	15	3	67	104	6.2
June 24	295	15	.62	3.5	2.0	55	55	7	6.4	87	--	1.0		174	.24	139	17	11	87	336	5.5
July 18	35	17	1.1	5.7	2.0	84	10	4.4	136	--	--	1.2		256	.35	24	22	14	89	7.7	491
Aug. 7	43	14	.46	2.8	.7	29	13	5.6	40	--	--	.8		99	.13	11	10	0	87	165	6.1
Sept. 16	52	14	.28	2.0	1.0	5.1	1.8	9	3.2	7.0	.6	.8		40	.05	5.6	9	0	50	50	6.2

RED RIVER BASIN--Continued  
RED RIVER AT ALEXANDRIA, LA.

LOCATION--At gaging station at old bridge on U. S. Highway 165 between Alexandria, Rapides Parish, and Pineville, 1.7 miles downstream from Bayou Rigolette. DRAINAGE AREA 667,500 square miles of which 5,936 square miles above Denison Dam is noncontributing.

RECORDS AVAILABLE--Chemical analyses: October 1952 to September 1957.

Water temperatures: October 1954 to September 1957.

EXTREMES, 1956-57.--Dissolved solids: Maximum, 1,130 ppm Oct. 1, 3-9, 11-20; minimum, 144 ppm Apr. 11-20.

Hardness: Maximum, 464 ppm Oct. 11-20; minimum, 65 ppm Feb. 17-21.

Specific conductance: Maximum daily, 2,020 micromhos Oct. 8; minimum daily, 231 micromhos Apr. 17.

Water temperatures: Maximum, 89° F Aug. 12, 17; minimum, 46° F Jan. 19, 1953.

EXTREMES, 1952-57.--Dissolved solids: Maximum, 1,130 ppm Oct. 1, 3-9, 11-20, 1956; minimum, 91 ppm June 1-9, 1953.

Hardness: Maximum, 464 ppm Oct. 11-20, 1956; minimum, 57 ppm June 1-9, 1953.

Specific conductance: Maximum daily, 2,020 micromhos Oct. 8, 1956; minimum daily, 133 micromhos June 24, 1953.

Water temperatures: Maximum, 93° F Aug. 2, 8, 10, 1956; minimum, 45° F Dec. 25, 1953.

REMARKS--Records of specific conductance of daily samples available in subdistrict office at Baton Rouge, La. Records of discharge for water year October 1956 to September 1957 given in WSP 1511.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids (calculated)			Hardness as CaCO <sub>3</sub>	Percent sodium	Specific conductance (micro-mhos at 25°C)			
													Parts per million	Tons per acre-foot	Tons per day				Calcium, magnesium	Non-carbonate	
																					Calcium, magnesium
Oct. 1, 3-9, 1956.	2,140	16	0.00	121	35	234	210	237	380		--	1.2	1,130	1.54	6,530	446	274	53	4.8	1,870	8.2
Oct. 11-20.....	1,660	18	.01	123	38	227	220	250	365		--	1.2	1,130	1.54	5,060	464	293	52	4.6	1,930	8.3
Oct. 21-31.....	1,090	15	.01	122	37	206	288	194	330		0.2	1.0	1,050	1.43	3,090	456	220	50	4.2	1,790	8.2
Nov. 1-10.....	1,210	17	.00	86	33	161	b 269	131	242		0.2	1.5	804	1.09	2,630	350	129	50	3.7	1,390	8.3
Nov. 11-20.....	1,820	14	.00	88	32	166	b 316	81	260		.2	1.0	797	1.08	3,920	352	92	51	3.8	1,400	8.3
Nov. 21-23, 25-30.	1,840	12	.01	65	19	101	228	55	151		.2	.5	516	.70	2,560	240	53	48	2.8	909	7.9
Dec. 1-12.....	1,640	11	.00	74	22	134	270	51	208		--	1.2	633	.86	2,800	276	54	51	3.5	1,150	7.7
Dec. 13-20.....	3,580	9.8	.11	43	13	60	170	25	90		--	1.0	326	.44	3,150	162	22	45	2.1	584	7.8
Dec. 21-31.....	4,860	11	.38	27	7.3	45	98	19	66		--	1.2	225	.31	2,950	97	17	50	2.0	401	7.4
Jan. 1-10, 1957...	5,030	9.0	.13	39	12	76	110	59	114		--	1.2	c 386	.52	5,240	148	58	53	2.7	653	7.4
Jan. 11-12, 14-20.	4,720	8.8	.13	45	13	101	94	85	155		--	.8	c 480	.65	6,120	165	88	57	3.4	819	7.7
Jan. 21-30.....	8,000	8.8	.09	55	15	125	101	116	194		--	.8	c 577	.78	12,500	198	124	58	3.9	989	7.7
Jan. 31, Feb. 1-6.	29,200	8.0	.09	30	6.8	52	73	40	81		--	1.2	265	.35	20,100	104	44	52	2.2	466	7.6
Feb. 7-16.....	36,800	8.6	.15	23	4.6	29	63	24	43		--	1.0	164	.22	16,200	76	24	45	1.4	293	7.6
Feb. 17-21.....	28,700	10	.21	19	4.2	29	59	18	43		--	.8	153	.21	11,900	65	17	49	1.6	276	7.5
Feb. 22-27.....	22,700	9.4	.19	21	4.9	59	54	21	95		--	.8	238	.32	14,600	73	29	64	3.0	444	7.3
Feb. 28, Mar. 1-7.	16,000	9.4	.19	27	7.0	84	50	42	137		--	.5	332	.45	14,300	96	55	65	3.7	625	7.2
Mar. 8-15.....	17,100	9.4	.14	26	7.3	76	54	47	118		--	.2	311	.42	14,900	95	50	63	3.4	568	7.4
Mar. 16-23.....	21,000	11	.20	25	5.2	70	53	31	93		--	.5	249	.34	14,200	83	60	60	2.7	464	7.2
Mar. 24-31.....	53,600	9.6	.35	25	4.0	31	66	20	50		--	.8	173	.24	25,000	79	25	46	1.5	320	7.5

Apr. 1-10, 1957...	77,400	9.6	.38	25	4.5	28	69	21	44	--	.8	167	.23	34,900	81	24	43	1.3	307	7.3
Apr. 11-20.....	83,700	11	.35	24	3.9	21	75	14	32	--	.8	144	.20	32,500	76	14	38	1.1	259	7.8
Apr. 21-30.....	82,300	11	.27	29	4.5	25	86	23	35	--	1.0	171	.23	38,000	91	20	37	1.1	304	7.9
May 1-10.....	177,000	9.8	.31	32	4.9	14	101	17	21	--	1.0	150	.20	71,700	100	17	24	.6	265	7.8
May 11-17.....	177,000	10	.17	42	7.4	46	96	51	73	--	1.0	278	.38	133,000	135	57	43	1.7	502	7.7
May 18-20, 25-29,	145,000	12	.03	49	8.8	67	98	70	106	--	1.2	c383	.52	150,000	159	78	48	2.3	644	7.6
May 21-24, 30-31..	145,000	13	.09	37	6.2	40	91	40	62	--	1.2	c254	.33	99,400	117	42	43	1.6	426	7.6
June 1-5.....	147,000	11	.10	32	5.0	27	97	29	34	--	1.5	c188	.26	74,600	101	22	36	1.2	308	7.6
June 6-15.....	162,000	11	.04	38	6.7	45	98	45	66	--	1.2	c269	.37	118,000	123	43	44	1.8	464	7.5
June 16-21.....	165,000	10	.04	47	8.1	54	100	62	85	--	1.5	c326	.44	145,000	151	69	44	1.9	563	7.7
June 22-30.....	134,000	9.8	.11	49	8.5	60	101	72	92	--	1.5	c361	.49	131,000	158	75	45	2.1	601	7.7
July 1-10.....	102,000	15	.02	57	9.6	73	102	96	111	--	1.2	c424	.58	117,000	182	96	47	2.4	721	7.6
July 11-16.....	56,600	13	.06	51	8.8	59	108	75	86	--	1.2	c354	.48	53,500	163	74	44	2.0	614	7.5
July 19-31.....	23,800	11	.06	46	7.9	45	122	52	64	--	1.2	c290	.39	18,600	147	47	40	1.6	508	7.5
Aug. 1-10.....	18,600	15	.03	51	8.6	46	142	50	67	--	.5	c322	.44	16,200	162	46	38	1.6	533	8.2
Aug. 11-13, 15-20.	13,400	13	.03	53	9.7	55	158	54	74	--	.5	c352	.48	12,700	172	42	41	1.8	584	8.1
Aug. 21-31.....	10,200	15	.02	51	9.9	60	175	58	81	--	.2	c384	.52	10,600	188	44	41	1.9	640	8.1
Sept. 1-10.....	8,600	15	.03	69	14	67	d189	69	99	--	1.0	c462	.63	10,700	230	66	39	1.9	752	8.3
Sept. 11-20.....	5,820	15	.02	82	18	86	235	86	130	--	.5	c572	.78	8,990	278	86	40	2.2	924	8.2
Sept. 21-28.....	19,200	13	.03	80	17	94	e221	94	137	--	1.2	c584	.79	30,300	270	88	43	2.5	945	8.3
Sept. 29-30.....	77,700	8.4	.27	31	5.7	20	105	24	24	--	2.0	167	.23	35,000	102	16	30	.9	297	8.0
Weighted average.	46,800	12	0.11	53	13	79	136	67	121	--	0.9	422	0.57	54,000	186	74	48	2.4	726	--

c Residue on evaporation at 180°C.

d Includes equivalent of 4 parts per million of carbonate (CO<sub>3</sub>).

e Includes equivalent of 3 parts per million of carbonate (CO<sub>3</sub>).

## LOWER MISSISSIPPI RIVER BASIN

## RED RIVER BASIN--Continued

## RED RIVER AT ALEXANDRIA, LA.--Continued

Temperature (°F) of water, water year October 1956 to September 1957  
 Once-daily measurement, usually between 3 and 4 p. m.

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	79	70	56	--	54	59	63	71	77	85	87	85
2	--	70	--	53	52	60	69	73	76	85	87	87
3	80	72	56	50	54	62	65	71	78	84	88	83
4	82	72	55	55	55	59	66	70	76	85	87	85
5	86	73	59	54	57	59	65	69	78	87	86	85
6	81	74	65	51	59	59	64	69	78	87	86	85
7	81	72	67	53	60	57	63	70	76	--	87	85
8	77	69	65	60	61	55	60	71	80	85	88	83
9	78	64	56	62	62	57	64	72	81	85	86	85
10	--	64	57	61	64	58	62	73	79	84	85	84
11	79	64	60	58	61	60	65	74	81	87	86	84
12	78	65	62	57	60	58	65	76	81	87	89	84
13	77	65	62	--	58	62	64	75	82	88	86	87
14	76	69	60	51	--	64	61	76	82	85	--	86
15	78	66	60	52	63	68	62	76	83	87	88	85
16	75	62	61	50	59	60	61	77	84	87	86	78
17	71	60	60	47	58	64	64	73	82	86	89	79
18	75	59	60	49	57	65	66	78	83	87	88	74
19	78	63	58	46	56	63	68	79	84	87	85	83
20	78	62	60	56	54	64	68	77	83	86	85	88
21	77	62	61	58	55	64	68	80	83	87	86	80
22	74	60	61	56	56	64	70	81	82	86	84	83
23	74	60	60	52	58	65	72	80	84	85	83	79
24	75	--	59	50	58	60	73	80	83	86	86	80
25	74	57	56	53	58	58	74	81	82	86	85	86
26	72	55	54	50	56	55	72	80	83	85	85	76
27	73	54	53	50	57	56	72	79	82	86	85	74
28	74	56	55	51	59	57	73	77	80	84	86	72
29	73	54	52	59	--	55	70	78	81	82	85	72
30	72	54	55	53	--	56	70	79	82	87	--	70
31	70	--	54	55	--	62	--	77	--	85	86	--
Average	76	64	59	54	58	60	67	76	81	86	86	82

## RED RIVER BASIN--Continued

## OUACHITA RIVER AT ARKADDELPHIA, ARK.

LOCATION --At gaging station at bridge on State Highway 8 at Arkadelphia, Clark County, 800 feet upstream from Missouri Pacific Railroad bridge. DRAINAGE AREA --2,311 square miles.

RECORDS AVAILABLE --Chemical analyses: October 1948 to September 1957.

Water temperatures: October 1948 to September 1957.  
 EXTREMES, 1956-57 --Dissolved solids: Maximum, not determined; minimum, 41 ppm Apr. 2-10.  
 Hardness: Maximum, 77 ppm June 20; minimum, 18 ppm Apr. 2-10.

Specific conductance: Maximum daily, 240 micromhos June 24; minimum daily, 45.6 micromhos May 28.

Water temperatures: Maximum, 85° F July 19, 20; minimum, 44° F on several days during January.

EXTREMES, 1948-57 --Dissolved solids: Maximum, 266 ppm Jan. 16, 1956; minimum, 30 ppm Mar. 17-21, 23, 25-28, 1955.

Hardness: Maximum, 77 ppm June 20, 1957; minimum, 11 ppm Jan. 25-31, 1949.

Specific conductance: Maximum daily, 390 micromhos Jan. 16, 1956; minimum daily, 26.7 micromhos Jan. 27, 1949.

Water temperatures: Maximum, 99° F July 7, 1955; minimum, 36° F Jan. 30, 31, Feb. 1, 2, 1951.

REMARKS --Records of specific conductance of daily samples available in district office at Fayetteville, Ark. Records of discharge for water year October 1956 to September 1957 furnished by district office, Corps of Engineers, Vicksburg, Miss.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue on evaporation at 180° C)	Hardness as CaCO <sub>3</sub>		Specific conductance (micro-mhos at 25° C)	pH	Color
														Calcium, magnesium	Non-carbonate			
Oct. 1, 3-10, 1956	1,648	--	--	9.5	2.5	3.4	--	38	2.6	3.5	--	6.3	60	34	3	84.2	7.3	7
Oct. 2	1,540	--	--	--	--	--	--	38	5.0	14	--	3.8	82	40	9	117	7.6	--
Oct. 11-13, 15-20	2,221	--	--	10	2.5	3.6	--	41	3.6	4.2	--	3.8	62	35	2	187.9	7.1	7
Oct. 14	2,110	--	--	--	--	--	--	42	4.0	16	--	1.3	80	41	7	129	7.4	--
Oct. 21-26, 28-31	1,534	--	--	9.9	2.7	4.3	--	40	4.8	4.8	--	2.4	60	36	3	94.6	6.5	8
Oct. 27	2,080	--	--	--	--	--	--	40	7.0	24	--	.3	112	50	17	180	7.4	--
Nov. 1-10	1,565	2.4	0.0	9.8	2.7	3.2	1.1	36	7.2	4.0	0.1	1.9	60	36	6	91.4	7.3	8
Nov. 11-20	1,351	--	--	10	2.5	4.0	--	36	7.2	4.5	--	4.3	73	35	6	96.6	6.8	5
Nov. 21-30	2,068	--	--	9.8	2.6	4.1	--	37	7.2	5.0	--	2.4	70	35	5	96.0	7.0	7
Dec. 1-10	615	--	--	11	2.3	4.5	--	40	5.6	2.5	--	1.7	72	34	2	97.1	7.0	7
Dec. 11-20	631	--	--	11	3.0	5.2	--	38	8.8	6.5	--	3.6	74	40	9	103	7.1	7
Dec. 21-31	321	--	--	12	2.7	6.3	--	36	13	6.5	--	5.7	79	41	12	117	6.5	8
Jan. 1-10, 1957	649	2.8	0.0	11	2.4	5.8	1.0	38	6.0	7.0	.1	1.5	64	37	6	110	7.0	10
Jan. 11-16, 18-20	881	--	--	10	2.5	4.5	--	39	5.6	5.0	--	4.2	69	35	3	96.1	7.0	6
Jan. 17	1,630	--	--	--	--	--	--	37	9.0	18	--	.3	94	42	12	134	7.4	--
Jan. 21-31	5,508	--	--	9.4	2.8	4.0	--	31	7.2	5.0	--	2.3	64	35	10	85.2	7.3	13
Feb. 1-10	8,744	--	--	7.4	1.5	3.1	--	22	7.6	3.5	--	2.3	58	25	7	69.4	7.2	23
Feb. 11-17, 19-20	3,224	--	--	7.9	2.1	3.0	--	28	6.8	3.0	--	2.0	58	28	5	71.0	6.7	23
Feb. 18	1,810	--	--	--	--	--	--	26	8.0	9.5	--	.3	65	30	9	92.6	7.2	--
Feb. 21-22, 24-28	2,191	--	--	9.4	1.4	3.4	1.1	26	7.2	6.0	--	1.5	54	29	8	79.2	7.2	15

a Estimated from specific conductance.

RED RIVER BASIN--Continued  
 OUACHITA RIVER AT ARKADDELPHIA, ARK.--Continued

Chemical analyses, in parts per million, water year October 1956 to September 1957--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue on evaporation at 180°C)	Hardness as CaCO <sub>3</sub>		Specific conductance (micro-mhos at 25°C)	pH	Color
														Calcium-magnesium	Non-carbonate			
Feb. 23, 1957	1,940	--	--	--	--	--	--	28	8.0	26	--	0.3	a106	40	17	151	7.2	--
Mar. 1-14	1,546	--	--	8.4	1.6	2.8	0.8	28	8.0	3.5	--	2.1	2.1	28	5	72.8	7.0	5
Mar. 15-31	5,854	--	--	7.0	1.0	2.1	1.1	22	6.2	3.0	--	1.3	4.4	22	4	56.4	7.0	30
Apr. 1	9,370	--	--	--	--	--	--	22	3.0	9.8	--	2.4	a64	26	8	91.8	7.7	--
Apr. 2-10	18,730	3.0	0.00	5.2	1.3	3.3	.8	20	3.2	2.5	0.3	1.9	4.1	18	2	54.8	6.7	17
Apr. 11-18, 20	9,274	--	--	7.7	1.2	2.0	1.2	26	4.0	3.0	--	1.1	4.3	24	3	62.3	7.4	15
Apr. 19	8,720	--	--	--	--	--	--	32	7.0	16	--	2.2	a85	37	11	122	7.7	--
Apr. 21-30	19,330	--	--	5.7	1.6	2.3	.9	24	4.4	2.0	--	1.1	4.4	21	1	67.7	6.8	25
May 1-10	12,000	--	--	6.4	2.4	2.9	1.0	26	5.2	3.8	--	1.3	5.8	26	4	68.0	6.6	7
May 11-20	10,220	--	--	7.9	1.8	3.8	1.4	30	4.6	6.0	--	.8	6.2	27	2	81.9	6.2	5
May 21-31	17,860	--	--	6.5	1.9	3.1	1.3	24	4.8	4.5	--	.7	5.5	24	4	66.9	7.1	10
June 1-10	10,380	--	--	7.8	1.5	2.4	1.0	31	3.6	2.8	--	.6	4.9	26	0	70.4	7.1	7
June 11-19	8,022	--	--	7.3	1.9	2.5	1.0	32	3.6	2.5	--	1.0	4.4	26	0	67.2	7.2	7
June 20	5,600	--	--	--	--	--	--	14	2.0	47	--	2.6	a141	77	66	201	6.4	--
June 21-23, 25-30	5,529	--	--	7.9	1.8	2.2	1.0	32	2.8	2.8	--	.8	4.2	27	1	68.6	7.1	5
June 24	6,640	--	--	--	--	--	--	16	2.0	55	--	3.2	a168	66	53	240	6.2	--
July 1-7	2,230	--	--	7.9	2.2	3.1	1.0	34	4.8	3.8	--	.8	4.5	29	1	75.6	6.8	10
July 8-18	725	3.1	.00	9.0	2.4	5.3	1.1	35	4.8	6.5	.3	1.8	6.2	32	4	95.3	6.8	9
July 19-23, 25-31	1,189	--	--	8.4	2.5	3.9	1.3	35	5.2	5.2	--	.9	5.0	31	3	85.6	7.2	8
July 24	770	--	--	--	--	--	--	36	2.0	17	--	1.0	a85	37	7	121	7.2	--
Aug. 1-10	1,563	--	--	8.6	2.1	3.8	1.3	32	6.2	5.5	--	1.4	5.0	30	4	84.2	7.0	8
Aug. 11-20	2,164	--	--	8.4	1.9	3.0	1.1	31	5.6	3.5	--	1.2	4.5	29	3	75.3	7.1	7
Aug. 21-31	1,946	--	--	8.2	2.2	3.0	1.2	32	6.0	4.2	--	1.2	4.4	30	3	76.5	7.3	7
Sept. 1-10	1,994	--	--	8.2	2.0	2.8	1.3	30	6.6	3.0	--	.6	5.8	29	4	73.4	7.2	5
Sept. 11-20	1,943	--	--	8.3	2.2	2.6	1.3	30	6.4	3.0	--	.5	5.5	30	5	73.9	7.0	6
Sept. 21-30	2,414	--	--	8.2	1.8	2.9	1.2	29	5.0	4.0	--	.6	5.6	28	4	72.2	7.2	6
Average	4,763	--	--	8.6	2.1	3.5	--	31	5.7	8.7	--	1.8	67	30	4	95.4	--	10

a Estimated from specific conductance.

## RED RIVER BASIN--Continued

## OUACHITA RIVER AT ARKADELPHIA, ARK.--Continued

Temperature (°F) of water, water year October 1956 to September 1957

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	68	62	51	45	46	52	59	68	68	73	81	75
2	68	61	52	44	45	51	--	--	67	73	82	76
3	68	60	53	46	46	52	60	68	68	73	83	76
4	67	60	51	45	53	52	60	64	66	73	83	76
5	68	60	51	45	52	52	59	62	68	76	78	73
6	68	61	52	50	53	53	60	62	69	77	79	73
7	68	60	62	50	52	53	56	63	69	77	78	74
8	68	60	62	51	52	53	57	63	70	83	76	74
9	67	55	54	50	52	52	58	64	70	83	76	72
10	68	55	54	55	53	55	58	64	71	84	78	71
11	68	56	55	54	52	48	59	68	73	84	78	70
12	68	57	55	55	52	54	59	68	74	80	76	73
13	69	57	52	45	53	55	55	68	74	80	76	72
14	69	60	52	46	53	55	54	64	73	82	77	73
15	70	58	51	45	50	53	56	63	73	83	77	73
16	70	58	52	44	49	54	56	65	73	80	76	70
17	70	58	52	44	48	54	60	68	71	82	76	70
18	69	57	51	45	51	54	60	69	72	84	77	71
19	66	57	51	47	52	--	63	69	74	85	78	71
20	65	56	50	56	49	52	64	68	73	85	78	72
21	65	55	49	56	50	53	64	68	74	84	78	72
22	65	56	52	56	52	55	62	69	70	84	72	68
23	65	55	51	55	51	56	62	70	70	83	72	68
24	64	54	50	47	51	56	62	72	72	84	72	67
25	64	53	48	46	55	54	62	72	73	--	74	66
26	66	51	49	44	56	55	63	72	73	84	76	66
27	67	50	50	44	56	55	63	72	72	84	76	67
28	67	53	51	45	56	--	63	73	72	83	77	68
29	68	52	51	44	--	53	63	69	72	84	77	66
30	67	55	54	46	--	54	64	70	73	80	76	66
31	68	--	55	45	--	54	--	70	--	80	78	--
Average	67	57	52	48	51	53	60	68	71	81	77	71

RED RIVER BASIN--Continued  
OUACHITA RIVER NEAR FELSENTHAL, ARK.

LOCATION.--At U. S. Engineers Lock No. 6, 3 miles south of Felsenthal, Union County.

DRAINAGE AREA.--10,787 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1949 to September 1957.

Water temperatures: October 1949 to September 1957.

EXTREMES, 1956-57.--Dissolved solids: Maximum, not determined; minimum, 76 ppm Apr. 16-24.

Hardness: Maximum, 522 ppm Jan. 27; minimum, 21 ppm Apr. 10-15, 16-24.

Specific conductance: Maximum daily, 4,390 microhos Jan. 27; minimum daily, 76.9 microhos May 11.

Water temperatures: Maximum, 90°F Aug. 1; minimum, 45°F Feb. 2, 1957; minimum, 44 ppm Jan. 23-31, Mar. 1-9, 1950.

EXTREMES, 1949-57.--Dissolved solids: Maximum, 2,730 ppm Jan. 27, 1957; minimum, 5 ppm May 8, 1956.

Hardness: Maximum, 522 ppm Jan. 27, 1957; minimum, 5 ppm May 8, 1956.

Specific conductance: Maximum daily, 7,610 microhos Oct. 7, 1954; minimum daily, 55.7 microhos Mar. 4, 1950.

Water temperatures: Maximum, 96°F June 9, 1953, Aug. 29, 1954; minimum, 35°F Feb. 3, 1951.

REMARKS.--Records of specific conductance of daily samples available in district office at Fayetteville, Ark. No discharge records available for this station.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue on evaporation at 180°C)	Hardness as CaCO <sub>3</sub>		Specific conductance (microhos at 25°C)	pH	Color	
														Calcium	Non-carbonate				
Oct. 1-6, 1956				58	16	271	19	15	15	540		8.4	1,060	210	195	1,880	6.6	8	
Oct. 7-14, 1956	5.6		0.00	51	14	225	9.6	24	12	455	0.1	7.7	1,988	184	165	1,610	7.4	5	
Oct. 15								30	12	345		3.7	1,778	156	131	1,250	7.2	--	
Oct. 16-19				62	17	282	--	21	17	565		10	1,130	224	208	1,980	6.8	8	
Oct. 20-21, 28-31				41	17	220	--	27	10	425		9.6	872	172	150	1,490	6.5	25	
Oct. 22-27																			
Nov. 1-3, 5-6				56	15	254	--	23	12	510		9.6	1,030	201	182	1,770	6.4	8	
Nov. 4				51	14	226	--	26	11	445		8.1	912	184	163	1,580	7.0	10	
Nov. 7-11								33	12	265		1.5	1,611	126	99	1,862	7.4	--	
Nov. 12-20				62	17	277	--	28	9.4	560		6.5	1,120	224	202	1,900	6.7	9	
Nov. 21-22, 24-27				79	20	376	--	22	13	740		8.1	1,450	279	261	2,490	6.6	7	
Nov. 13-14				98	27	508	--	20	12	1,000		9.7	1,940	356	339	3,210	6.8	8	
Nov. 23				55	15	252	--	34	12	495		6.6	993	198	179	1,730	6.6	10	
Nov. 28								20	12	310		2.0	1,409	138	110	1,140	7.0	--	
Nov. 29-30								5	12	800		3.9	1,620	300	284	2,600	7.2	--	
Dec. 1				106	31	534	--			1,090		11	2,140	392	388	3,490	6.1	8	
Dec. 2								6	12	830		4.7	1,770	324	319	2,840	6.6	--	
Dec. 3-7				48	13	220	--	19	17	640		3.8	1,370	252	200	2,200	7.1	--	
Dec. 8-13, 19-20				37	12	150	--	22	11	430		5.6	898	174	156	1,520	7.0	10	
Dec. 14-18				44	14	203	--	30	14	302		2.7	686	142	118	1,120	7.0	10	
								31	20	388		3.2	871	168	142	1,400	7.6	15	

RED RIVER BASIN

Dec. 21-28, 1956 .....	10	134	--	33	19	265	--	3.5	562	128	102	987	7.0	10
Dec. 29-31 .....	13	216	--	34	18	415	--	4.3	176	148	148	1,480	7.0	10
Jan. 1-5, 1957 .....	20	292	--	32	21	590	--	4.5	1,190	245	219	2,000	6.6	12
Jan. 6, 8-15 .....	82	352	13	13	10	750	.2	8.5	1,560	286	276	2,530	6.9	25
Jan. 16-19 .....	26	507	--	10	18	1,020	--	12	2,060	374	366	3,350	7.6	20
Jan. 20-22 .....	21	379	--	12	17	780	--	12	1,590	291	281	2,640	6.4	20
Jan. 23-26 .....	20	314	--	18	17	620	--	8.6	1,300	242	226	2,120	6.7	20
Jan. 27 .....	--	--	--	2	13	1,360	--	5.5	a,2,730	522	520	4,390	5.1	--
Jan. 28 .....	--	--	--	24	17	285	--	2.6	a,659	123	103	1,060	7.2	--
Jan. 29-31, Feb. 1....	7.5	107	5.3	18	11	225	--	1.0	549	98	84	839	6.6	45
Feb. 2-3 .....	16	63	3.5	18	11	130	--	1.3	320	62	48	531	6.6	50
Feb. 4-6, 19-20 .....	9.2	35	2.6	12	9.6	72	--	1.3	184	41	31	312	6.2	45
Feb. 7-18 .....	6.2	19	2.0	10	7.8	38	--	1.2	117	27	19	182	7.2	30
Feb. 21-28 .....	12	40	2.6	14	10	86	--	1.3	222	56	44	350	6.9	35
Mar. 1, 3-9 .....	12	48	2.8	14	10	96	--	1.9	284	53	41	403	6.4	45
Mar. 2 .....	--	--	--	9	20	132	--	4.5	a,322	71	64	517	7.1	--
Mar. 10-18 .....	15	57	2.9	14	8.8	116	--	2.1	306	61	49	475	6.6	45
Mar. 16-20 .....	21	74	3.2	13	12	148	--	4.0	348	64	54	577	6.9	40
Mar. 21 .....	--	--	--	16	10	262	--	1.8	a,600	114	101	964	7.2	--
Mar. 22-26 .....	11	38	2.4	15	9.8	74	--	1.6	203	44	32	335	7.0	30
Mar. 27-31 .....	8.4	27	2.1	16	6.2	52	--	1.8	150	33	20	235	7.1	25
Apr. 1-9 .....	2.2	29	1.9	15	12	50	.4	1.7	163	35	22	224	7.0	40
Apr. 10-15 .....	5.1	16	2.0	13	6.0	27	--	2.1	100	21	11	140	6.6	25
Apr. 16-24 .....	5.6	11	1.8	17	4.6	17	--	2.4	76	21	7	108	6.6	45
Apr. 25-30 .....	9.6	21	2.2	20	5.2	42	--	2.2	142	32	16	204	6.7	40
May 1-6 .....	11	31	2.5	20	7.0	59	--	1.4	169	41	24	244	6.7	40
May 7 .....	--	--	--	16	3.0	70	--	.8	a,84	26	13	151	6.0	--
May 8-21 .....	8.1	8.4	1.6	18	4.0	17	--	1.6	86	25	10	116	6.8	45
May 22-31 .....	10	19	2.1	26	4.4	35	--	1.4	116	33	11	173	7.1	40
June 1-10 .....	11	24	2.2	24	2.6	47	--	1.6	136	38	18	195	7.1	40

a Estimated from specific conductance.

RED RIVER BASIN--Continued  
 OUCHITA RIVER NEAR FELSENTHAL, ARK.--Continued  
 Chemical analyses, in parts per million, water year October 1956 to September 1957--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue on evaporation at 180°C)	Hardness as CaCO <sub>3</sub>		Specific conductance (micro-mhos at 25°C)	pH	Color
														Calcium, magnesium	Non-carbonate			
June 11-20, 1957.....		--	--	11	1.8	20	2.1	24	4.0	38	--	1.1	121	35	15	182	7.1	40
June 21-29.....		--	--	12	3.1	23	2.2	28	4.0	47	--	1.4	151	43	20	216	7.0	40
June 30.....		--	--	--	--	--	--	23	7.0	83	--	1.1	a 202	58	39	324	6.5	--
July 1-4, 6-10.....		--	--	17	5.2	51	3.0	22	4.0	108	--	1.8	263	64	46	412	6.7	25
July 5.....		--	--	--	--	--	--	10	6.0	165	--	2.9	a 368	120	112	591	6.3	--
July 11-18.....	3.9	--	0.01	15	5.0	49	3.0	27	5.6	98	0.2	2.0	255	58	36	385	6.8	22
July 19-22.....	--	--	--	19	4.6	61	3.2	31	5.2	120	--	.8	281	66	41	464	7.1	12
July 23-28.....	--	--	--	24	5.6	90	3.8	28	6.8	175	--	2.4	402	83	60	663	7.2	8
July 29-31.....	--	--	--	40	11	178	5.8	19	9.2	362	--	3.4	763	145	130	1,230	7.1	10
Aug. 1-2.....	--	--	--	67	18	324	11	5	13	660	--	5.4	1,380	241	237	2,150	5.3	8
Aug. 3.....	--	--	--	--	--	--	--	10	3.0	362	--	4.7	a 1,000	179	171	1,610	6.7	--
Aug. 4-6.....	--	--	--	36	8.7	159	5.8	16	9.0	315	--	4.2	677	126	113	1,150	6.5	8
Aug. 7-8, 15-16.....	--	--	--	31	7.7	122	5.0	22	7.2	250	--	5.1	537	109	91	896	7.1	8
Aug. 9-14.....	--	--	--	22	5.1	81	3.4	26	6.8	158	--	3.7	365	76	54	612	7.0	10
Aug. 17-21.....	--	--	--	38	11	161	5.4	18	3.2	328	--	7.9	692	140	125	1,140	6.9	7
Aug. 22-31.....	--	--	--	21	4.6	71	3.3	26	12	140	--	3.6	337	71	50	561	7.3	8
Sept. 1-8.....	--	--	--	25	6.1	92	3.4	26	8.0	180	--	4.2	418	88	66	668	7.1	10
Sept. 9-12.....	--	--	--	31	7.1	127	4.3	24	9.4	245	--	5.8	513	106	87	887	7.0	8
Sept. 13-15, 19-20, 25, 28	--	--	--	37	9.5	156	5.2	19	11	310	--	8.0	653	132	116	1,100	6.6	8
Sept. 16-18, 21-22, 24.....	--	--	--	50	9.7	208	6.1	19	10	412	--	8.1	831	165	150	1,410	7.1	8
Sept. 23, 27.....	--	--	--	64	15	292	8.0	15	14	580	--	12	1,170	221	208	1,960	6.9	7
Sept. 26, 29-30.....	--	--	--	24	6.0	95	3.6	25	6.2	185	--	5.0	427	84	64	734	7.1	7
Average.....	--	--	--	37	10	159	--	20	10	338	--	4.5	721	134	117	1,190	--	21

<sup>a</sup> Estimated from specific conductance.

## RED RIVER BASIN--Continued

## OUACHITA RIVER NEAR FELSENTAL, ARK.--Continued

Temperature (°F) of water, water year October 1956 to September 1957

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	75	65	52	52	48	55	59	75	76	80	90	85
2	75	65	50	50	45	56	62	72	78	80	88	82
3	75	67	50	50	--	55	64	71	75	80	87	83
4	75	65	50	50	50	55	55	--	75	80	87	82
5	75	67	50	50	51	55	54	68	75	80	87	--
6	75	67	52	53	52	55	65	69	78	80	87	82
7	75	68	50	50	54	55	65	69	78	84	87	82
8	74	65	57	50	55	58	65	69	78	81	86	80
9	72	--	55	55	55	50	56	69	75	84	85	79
10	75	60	53	50	58	55	65	60	75	82	85	80
11	72	62	55	54	55	57	--	60	58	84	86	80
12	70	61	58	53	55	55	62	70	--	80	85	80
13	70	60	55	55	56	57	60	71	58	85	86	80
14	72	60	--	50	55	58	--	72	--	81	85	75
15	72	60	54	52	57	56	--	75	59	--	85	80
16	72	58	54	50	55	57	60	74	59	85	86	77
17	70	58	55	46	55	58	63	75	59	85	76	75
18	70	58	55	48	55	57	63	--	60	87	85	80
19	70	60	54	48	55	60	64	75	60	85	85	78
20	72	60	55	50	55	58	65	--	60	85	--	77
21	72	60	55	52	55	60	68	74	62	85	85	--
22	73	55	56	50	51	60	65	--	60	85	--	79
23	73	55	55	50	54	60	68	75	60	85	85	76
24	70	55	55	50	--	60	68	75	58	85	85	75
25	70	55	54	48	--	55	70	76	58	85	85	75
26	69	53	55	48	52	55	70	76	60	85	82	75
27	70	52	55	48	--	55	71	--	69	85	82	--
28	65	52	55	50	55	55	--	75	69	85	83	75
29	70	52	55	50	--	55	70	75	69	85	85	70
30	68	50	55	46	--	55	71	76	80	89	84	73
31	65	--	52	46	--	55	--	76	--	88	83	--
Average	72	59	54	50	--	56	64	72	67	84	85	78

## LOWER MISSISSIPPI RIVER BASIN

## RED RIVER BASIN--Continued

## CORNIE BAYOU NEAR THREE CREEKS, ARK.

LOCATION.--At gaging station at bridge on State Highway 15, 4½ miles downstream from Pidgeon Roost Creek and 6 miles southwest of town of Three Creeks, Union County.

DRAINAGE AREA.--180 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1952 to September 1955. (Specific conductance, chloride, and pH: May 1950 to September 1952, February 1956 to September 1957.)

Water temperatures: May 1950 to September 1955, February 1956 to September 1957.

EXTREMES, 1956-57.--Specific conductance: Maximum, 20,100 micromhos Nov. 6; minimum 316 micromhos May 1.

Water temperatures: Maximum, 88°F July 10, 12, 16; minimum, freezing point on several days during winter months.

EXTREMES, 1950-57.--Dissolved solids (1952-55): Maximum, 20,600 ppm July 15-21, 1954; minimum, 287 ppm Apr. 28-30, 1953.

Hardness (1952-55): Maximum, 6,270 ppm July 15-21, 1954; minimum, 62 ppm Apr. 28-30, 1953.

Specific conductance: Maximum daily, 33,200 micromhos Dec. 9, 1954; minimum daily, 316 micromhos May 1, 1957.

Water temperatures: Maximum, 95°F July 8, 1953; minimum, freezing point on several days during winter months.

REMARKS.--Records of discharge for water year October 1956 to September 1957 given in WSP 1511.

Specific conductance, chloride, and pH, water year October 1956 to September 1957

Day	October				November				December			
	Mean discharge (cfs)	Specific conductance (micro-mhos at 25°C)	Chloride (Cl)	pH	Mean discharge (cfs)	Specific conductance (micro-mhos at 25°C)	Chloride (Cl)	pH	Mean discharge (cfs)	Specific conductance (micro-mhos at 25°C)	Chloride (Cl)	pH
1	0	14,600	5,050	3.50	1.6	13,500	4,700	3.80	9.1	--	--	--
2	0	14,400	4,950	3.65	1.9	14,200	5,000	3.75	8.2	6,700	2,100	4.35
3	0	14,300	5,000	3.65	4.6	12,900	4,400	3.90	7.4	7,100	2,300	4.35
4	0	--	--	--	7.8	14,200	4,900	3.90	7.1	7,520	2,400	4.35
5	0	14,100	4,950	3.55	15	17,500	6,200	3.70	7.1	7,560	2,450	4.35
6	0	14,000	4,950	3.50	44	20,100	7,300	4.15	7.2	7,860	2,600	4.30
7	0	13,900	4,800	3.50	54	12,100	4,100	4.55	7.4	8,150	2,700	4.30
8	0	13,600	4,600	3.55	70	16,000	5,600	4.35	7.4	8,470	2,800	4.25
9	0	13,600	4,750	3.55	66	8,800	2,900	4.45	8.6	9,660	3,200	4.20
10	.2	13,300	4,500	3.50	40	8,650	2,900	4.35	8.9	9,680	3,200	4.20
11	.1	13,200	4,550	3.55	20	7,340	2,500	4.40	8.0	9,740	3,200	4.05
12	.1	13,200	4,600	3.55	14	7,870	2,600	4.35	8.6	9,390	3,100	4.25
13	0	12,600	4,400	3.55	8.6	7,870	2,600	4.30	9.1	9,370	3,100	4.25
14	0	13,100	4,550	3.65	5.8	7,900	2,600	4.35	12	7,670	2,500	4.40
15	0	12,900	4,450	3.65	5.6	8,900	3,000	4.30	11	11,000	3,700	4.35
16	0	13,000	4,550	3.65	5.0	8,870	3,000	4.30	20	11,000	3,750	4.35
17	0	13,100	4,600	3.60	4.7	10,100	3,400	4.20	28	11,000	3,750	4.20
18	0	14,500	5,100	3.65	4.8	10,100	3,500	4.25	28	10,100	3,400	4.40
19	0	13,200	4,600	3.75	6.9	10,800	3,600	4.40	28	14,500	4,700	4.30
20	0	13,300	4,700	3.65	10	10,800	3,700	4.30	35	14,600	4,700	4.30
21	0	13,100	4,500	3.70	16	9,600	3,200	4.35	58	11,700	3,850	4.00
22	.1	13,000	4,500	3.65	44	9,100	3,000	4.35	50	11,500	3,900	3.95
23	0	13,000	4,600	3.60	108	9,250	3,000	4.35	35	11,500	3,900	3.90
24	.2	13,000	4,600	3.55	108	5,010	1,550	4.45	28	10,000	3,300	4.25
25	.5	13,100	4,600	3.55	62	5,830	1,850	4.45	26	10,000	3,300	4.30
26	.5	13,200	4,600	3.65	32	5,820	1,900	4.45	28	7,360	2,400	4.25
27	.6	13,100	4,100	3.70	14	5,960	1,950	4.50	26	7,300	2,350	4.30
28	.8	13,000	4,500	3.65	15	6,140	2,000	4.45	21	7,420	2,400	4.25
29	.7	13,100	4,600	3.75	12	6,300	2,050	4.45	18	7,420	2,320	4.30
30	.7	13,300	4,700	3.75	9.7	6,370	2,100	4.40	15	7,390	2,380	4.25
31	.8	13,400	4,600	3.80	--	--	--	--	14	7,360	2,350	4.25
Average	0.17	13,400	4,650	--	27.0	9,930	3,370	--	18.9	9,330	3,060	--



## LOWER MISSISSIPPI RIVER BASIN

## RED RIVER BASIN--Continued

## CORNIE BAYOU NEAR THREE CREEKS, ARK.--Continued

Specific conductance, chloride, and pH, water year October 1956 to September 1957--Continued

Day	July				August				September			
	Mean dis-charge (cfs)	Specific conduct-ance (micro-mhos at 25°C)	Chloride (Cl)	pH	Mean dis-charge (cfs)	Specific conduct-ance (micro-mhos at 25°C)	Chloride (Cl)	pH	Mean dis-charge (cfs)	Specific conduct-ance (micro-mhos at 25°C)	Chloride (Cl)	pH
1	120	3,220	960	3.85	6.7	4,500	1,450	4.10	0.1	3,910	1,310	4.00
2	66	3,280	990	3.75	5.7	4,470	1,390	4.05	.4	4,110	1,270	3.95
3	42	3,280	990	3.70	4.7	4,500	1,390	4.00	.5	4,080	1,290	4.05
4	30	3,470	1,030	3.90	4.7	4,470	1,430	4.05	.6	4,110	1,290	4.00
5	25	3,460	1,050	3.90	5.0	4,260	1,370	4.05	.7	4,160	1,310	3.95
6	19	3,160	950	4.00	5.0	4,300	1,330	3.90	.5	4,160	1,310	4.00
7	16	2,190	650	4.20	9.4	4,070	1,270	3.90	.4	4,220	1,310	3.95
8	13	1,720	510	4.6	13	4,110	1,290	3.95	.5	4,160	1,270	3.95
9	12	3,260	970	3.90	8.4	5,020	1,590	3.90	.6	4,210	1,310	4.00
10	10	3,310	1,010	3.80	6.2	5,080	1,670	3.95	1.6	4,800	1,550	4.00
11	9.3	3,310	1,010	3.85	5.1	6,020	1,920	3.80	7.1	4,840	1,510	4.00
12	8.4	3,430	1,050	3.90	4.2	5,880	1,940	3.90	9.7	4,850	1,520	4.00
13	6.9	3,500	1,070	3.80	4.1	6,000	1,950	3.85	8.6	4,220	1,330	4.00
14	6.3	3,600	1,090	3.85	3.7	5,010	1,730	3.80	10	3,820	1,190	4.30
15	6.0	3,770	1,150	3.75	3.4	5,270	1,730	3.85	21	2,670	800	4.10
16	5.7	3,820	1,170	3.80	3.3	4,890	1,510	3.85	24	5,170	1,660	4.15
17	5.2	3,770	1,150	3.80	3.4	4,140	1,260	3.80	15	3,660	1,130	4.20
18	5.0	3,850	1,170	3.75	3.0	3,970	1,200	3.80	9.1	3,940	1,210	4.10
19	4.7	3,840	1,170	3.85	2.4	3,970	1,210	3.90	6.3	5,070	1,590	4.00
20	4.6	3,860	1,190	3.80	2.1	4,020	1,270	3.90	5.0	4,900	1,430	4.10
21	4.4	3,920	1,190	3.80	1.5	4,090	1,250	3.85	3.8	3,980	1,250	4.30
22	4.4	3,910	1,190	3.85	1.5	4,010	1,250	3.85	3.4	3,610	1,190	4.15
23	5.1	3,890	1,170	3.85	1.4	4,020	1,270	4.00	9.5	3,810	1,210	4.10
24	6.9	3,890	1,190	3.85	1.3	4,120	1,290	4.05	32	5,800	1,870	4.00
25	32	2,810	830	4.10	1.1	4,160	1,290	3.90	33	2,830	870	4.30
26	38	2,790	850	4.20	1.1	4,160	1,290	3.80	25	2,650	790	4.35
27	42	2,490	730	4.6	.6	4,180	1,290	3.85	15	1,980	620	4.40
28	32	4,490	1,370	4.00	.4	3,880	1,290	3.85	9.3	1,950	570	4.6
29	19	2,820	830	4.10	.2	4,140	1,290	3.90	6.7	1,880	540	4.7
30	12	4,100	1,270	4.10	.1	4,220	1,290	3.80	5.1	1,980	570	4.6
31	8.2	4,490	1,390	4.05	.1	4,230	1,310	3.90	--	--	--	--
Average	20.0	3,440	1,040	--	3.64	4,490	1,420	--	8.82	3,850	1,200	--

## RED RIVER BASIN--Continued

## CORNIE BAYOU NEAR THREE CREEKS, ARK.--Continued

Temperature (°F) of water, water year October 1956 to September 1957

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	65	47	--	33	34	38	45	53	73	81	87	82
2	69	53	--	33	32	37	48	52	72	80	87	80
3	65	51	39	32	--	37	51	52	74	85	84	80
4	--	53	40	39	37	38	49	43	73	84	85	77
5	67	52	44	35	42	37	46	45	75	84	85	78
6	65	51	43	38	44	41	44	42	87	85	83	80
7	65	55	49	37	46	37	47	46	78	84	84	75
8	64	50	50	40	49	33	46	49	78	82	84	72
9	62	45	48	43	48	34	--	50	78	87	85	70
10	64	40	46	34	48	37	42	53	82	88	80	72
11	57	43	42	39	45	39	42	57	84	87	83	70
12	57	58	43	36	47	34	64	54	83	88	85	75
13	55	65	45	36	46	49	42	52	82	87	87	76
14	63	48	41	34	44	46	43	56	85	83	85	77
15	54	48	44	32	45	45	42	58	84	90	84	74
16	55	44	43	--	41	46	43	54	82	88	84	77
17	59	48	40	--	38	44	43	58	85	87	86	73
18	50	44	42	--	35	43	45	63	84	85	82	74
19	55	49	40	--	--	41	49	64	84	89	85	75
20	55	44	41	--	32	43	49	69	85	85	83	75
21	57	41	43	35	--	40	52	65	82	84	83	81
22	59	40	41	56	33	42	50	73	82	83	81	77
23	53	39	43	53	36	43	51	65	80	83	83	72
24	51	39	34	33	40	43	57	66	70	83	80	74
25	54	38	36	31	40	42	53	64	71	83	78	70
26	53	36	38	31	40	36	52	64	75	82	83	73
27	53	32	36	--	41	39	50	63	75	84	77	71
28	50	31	37	31	34	39	50	65	76	85	76	70
29	53	32	35	--	--	41	49	73	76	82	81	67
30	55	34	35	33	--	42	50	73	79	82	78	67
31	54	--	--	32	--	43	--	74	--	--	80	--
Average	58	45	41	--	41	40	48	59	79	85	83	74

## LOWER MISSISSIPPI RIVER BASIN

## RED RIVER BASIN--Continued

## THREE CREEK NEAR THREE CREEKS. ARK.

LOCATION.--At gaging station at bridge on State Highway 15, 2½ miles southwest of town of Three Creeks, Union County, and 2½ miles upstream from small tributary.

DRAINAGE AREA (revised).--46 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1952 to September 1955. (Specific conductance, chloride, and pH: May 1950 to September 1952, February 1956 to September 1957).

Water temperatures: May 1950 to September 1955, February 1956 to September 1958.

EXTREMES, 1956-57.--Specific conductance: Maximum daily, 4,930 micromhos Dec. 26; minimum daily, 83.1 micromhos Apr. 25.

Water temperatures: Maximum, 83°F July 4; minimum, freezing point Jan. 17-19.

EXTREMES, 1950-57.--Dissolved solids (1952-55): Maximum, 13,200 ppm July 29-31; 1953; minimum, 133 ppm Apr. 28-30, 1953.

Hardness (1952-55): Maximum, 4,390 ppm July 29-31, 1953; minimum, 30 ppm Apr. 28-30, May 12-15, 1953.

Specific conductance: Maximum daily, 20,300 micromhos Sept. 4, 1952; minimum daily, 45.7 micromhos Feb. 1, 1952.

Water temperatures: Maximum, 89°F Sept. 1, 1951, Aug. 4, 1953; minimum, freezing point Dec. 16, 1952, Jan. 17-19, 1957.

REMARKS.--Records of discharge for water year October 1956 to September 1957 given in WSP 1511.

Specific conductance, chloride and pH, water year October 1956 to September 1957

Day	October				November				December			
	Mean discharge (cfs)	Specific conductance (micromhos at 25°C)	Chloride (Cl)	pH	Mean discharge (cfs)	Specific conductance (micromhos at 25°C)	Chloride (Cl)	pH	Mean discharge (cfs)	Specific conductance (micromhos at 25°C)	Chloride (Cl)	pH
1	1.0	602	70	8.3	1.4	1,230	315	8.0	1.3	2,290	640	7.6
2	1.3	--	--	--	1.3	607	120	7.1	1.3	2,300	640	7.4
3	2.6	484	56	8.3	4.9	594	120	8.0	1.0	2,320	660	7.6
4	2.6	548	80	8.2	8.3	1,290	355	7.0	.8	2,160	620	7.6
5	1.8	756	146	8.2	8.5	1,290	352	6.8	.6	2,060	570	7.7
6	1.2	766	146	8.2	7.0	1,390	398	7.3	1.1	1,930	540	7.8
7	1.2	597	98	8.2	16	1,360	390	7.1	1.4	1,850	510	7.4
8	1.2	762	144	8.1	14	1,350	395	6.4	1.3	1,730	480	7.8
9	1.0	707	128	8.1	7.9	3,480	1,040	6.3	1.5	1,340	340	7.8
10	1.0	833	175	8.2	2.8	6,700	2,170	6.4	1.7	1,360	350	7.7
11	1.0	1,500	380	7.9	2.0	6,790	2,180	6.0	1.5	976	235	7.4
12	.9	1,460	375	8.0	2.2	4,370	1,360	6.1	1.5	1,060	260	7.7
13	.9	937	200	8.2	1.9	4,330	1,350	6.0	2.0	1,180	300	7.5
14	1.0	910	200	8.3	1.9	4,320	1,360	6.1	3.8	1,130	285	7.9
15	1.2	915	195	8.2	2.0	4,310	1,340	6.4	2.8	1,120	285	7.5
16	1.2	583	85	8.2	1.9	1,910	550	7.3	4.0	1,010	240	7.8
17	1.0	577	80	8.3	1.8	1,870	535	7.0	4.4	1,020	235	7.4
18	1.0	579	80	8.0	1.8	1,860	535	7.5	8.7	1,430	398	7.4
19	1.0	559	74	8.2	2.4	1,880	530	7.2	7.2	1,420	392	7.4
20	1.1	530	68	8.2	4.0	1,410	390	7.0	5.7	1,480	400	7.3
21	2.2	617	66	8.2	5.4	910	235	7.0	5.4	2,600	760	7.3
22	2.7	640	108	7.7	7.5	1,200	305	6.7	7.0	2,400	700	7.1
23	2.2	646	110	8.2	5.9	1,180	302	6.8	6.6	3,340	1,000	6.9
24	1.4	540	76	8.3	4.5	1,710	500	6.7	5.7	3,360	1,000	6.9
25	1.0	611	106	8.0	3.9	1,440	410	7.1	4.7	4,900	1,540	6.8
26	1.2	730	144	8.0	2.3	1,920	560	7.1	4.0	4,930	1,530	6.9
27	1.2	808	170	7.6	1.8	2,240	650	7.1	3.0	3,910	1,210	6.9
28	1.2	807	170	7.6	1.3	2,660	810	6.7	2.7	3,370	990	7.3
29	1.3	815	170	8.0	1.7	2,820	850	6.8	2.3	4,170	1,290	7.8
30	1.1	1,750	470	7.9	1.3	2,660	795	7.2	2.2	4,140	1,250	6.9
31	1.2	1,690	460	7.7	--	--	--	--	2.0	4,260	1,300	6.8
Average	1.35	809	161	--	4.32	2,370	707	--	3.20	2,340	676	--

## RED RIVER BASIN

## RED RIVER BASIN--Continued

## THREE CREEK NEAR THREE CREEKS, ARK.--Continued

Specific conductance, chloride, and pH, water year October 1956 to September 1957--Continued

Day	January				February				March			
	Mean dis-charge (cfs)	Specific conductance (micro-mhos at 25°C)	Chloride (Cl)	pH	Mean dis-charge (cfs)	Specific conductance (micro-mhos at 25°C)	Chloride (Cl)	pH	Mean dis-charge (cfs)	Specific conductance (micro-mhos at 25°C)	Chloride (Cl)	pH
1	1.9	--	--	--	345	728	205	5.5	12	2,030	600	5.9
2	1.8	4,250	1,290	7.6	468	433	120	5.7	12	2,290	680	6.2
3	1.9	4,310	1,330	7.6	485	357	92	6.3	31	1,310	370	6.1
4	6.8	3,200	950	7.7	342	327	86	6.2	55	1,320	380	6.2
5	34	1,390	380	7.8	83	720	198	5.8	45	1,850	540	5.6
6	84--	2,110	620	5.9	38	1,090	315	5.4	24	1,220	350	5.8
7	33	2,270	660	5.0	24	1,370	390	5.4	19	1,270	360	6.1
8	13	2,110	600	5.6	18	1,540	445	5.4	19	1,260	360	6.3
9	7.2	2,100	610	6.4	15	1,710	495	5.6	18	1,820	520	6.4
10	6.4	2,140	620	6.8	12	1,630	470	6.1	14	1,820	530	6.1
11	5.4	2,200	640	7.0	11	1,930	560	6.1	12	1,860	540	6.2
12	3.9	2,260	660	7.2	9.1	2,120	620	6.2	13	2,360	690	6.3
13	3.8	2,220	630	7.3	7.7	2,120	620	6.4	12	2,420	660	5.8
14	3.3	2,220	640	7.3	6.6	2,270	670	6.5	12	1,980	590	6.1
15	3.2	2,210	630	7.6	6.3	2,300	670	6.6	10	1,900	550	6.7
16	2.8	2,300	670	7.4	7.0	2,180	630	6.6	8.5	2,210	640	6.2
17	2.6	2,270	640	7.7	5.9	1,780	510	7.0	7.9	2,310	700	6.5
18	2.2	2,250	650	7.7	47	1,690	480	7.0	50	1,100	305	6.7
19	1.9	1,980	550	7.6	380	350	86	6.8	132	1,060	295	6.4
20	1.8	1,970	550	7.7	398	580	158	6.5	83	1,020	292	5.6
21	1.8	1,940	535	7.6	342	495	134	6.4	64	899	252	6.0
22	4.7	1,770	495	7.7	104	629	162	6.3	164	650	185	6.1
23	13	1,250	340	7.6	36	903	250	6.4	137	727	200	6.0
24	25	1,370	360	7.8	27	1,190	325	6.4	72	657	180	6.2
25	30	3,110	920	6.0	23	1,200	340	6.3	79	723	195	5.9
26	34	4,130	1,240	5.1	19	1,370	385	6.2	53	978	280	5.6
27	35	1,880	550	5.0	17	1,490	430	6.7	28	870	240	5.9
28	36	2,150	630	4.7	15	1,770	505	6.3	20	971	270	6.0
29	40	1,880	535	5.3	--	--	--	--	16	1,100	310	6.2
30	65	2,510	735	5.4	--	--	--	--	16	1,190	335	6.5
31	188	1,730	500	4.8	--	--	--	--	104	780	215	5.4
Average	22.4	2,320	672	--	118	1,300	370	--	43.3	1,420	407	--



## RED RIVER BASIN--Continued

## THREE CREEK NEAR THREE CREEKS, ARK.--Continued

Temperature (°F) of water, water year October 1956 to September 1957

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	71	54	33	--	46	47	59	70	73	80	--	78
2	--	58	41	46	47	49	61	69	60	81	80	78
3	69	60	45	41	51	51	67	69	--	80	81	78
4	69	60	48	48	54	50	64	65	73	83	80	78
5	61	60	50	50	56	51	64	62	72	80	80	76
6	63	64	60	--	58	53	57	60	72	71	75	75
7	67	63	63	49	57	51	60	61	73	79	73	72
8	59	57	62	52	59	44	63	60	75	80	77	73
9	58	48	56	56	63	46	56	62	73	81	78	72
10	59	44	46	54	64	50	54	70	76	81	79	67
11	59	46	56	45	--	57	59	71	77	81	79	69
12	62	49	--	46	56	55	58	73	78	78	79	78
13	59	54	55	--	55	54	54	75	76	80	80	71
14	60	60	49	47	55	60	53	71	79	80	81	70
15	61	63	50	43	55	56	53	73	79	80	81	70
16	60	48	45	39	54	53	57	73	80	80	81	72
17	60	48	48	32	48	58	58	75	80	81	82	72
18	59	46	51	31	49	56	66	75	82	80	80	73
19	60	45	53	31	47	54	65	78	82	80	77	74
20	63	53	54	41	46	56	67	72	77	79	76	74
21	62	54	53	49	43	54	68	76	72	79	75	75
22	59	53	56	55	46	53	68	73	80	79	74	70
23	59	41	--	48	50	57	71	78	72	79	74	69
24	59	41	46	45	53	57	68	75	74	79	75	65
25	61	43	44	44	55	55	67	75	72	77	75	65
26	59	44	39	45	57	50	66	73	70	80	76	64
27	56	38	40	43	50	47	--	72	74	80	74	62
28	56	36	44	43	48	58	--	70	72	81	74	63
29	56	39	46	49	--	52	--	67	78	80	74	63
30	59	38	48	46	--	54	68	69	77	80	76	65
31	58	--	42	46	--	58	--	70	--	--	77	--
Average	61	50	49	45	53	53	62	70	75	80	77	71

RED RIVER BASIN--Continued  
CORNEY BAYOU NEAR LILLIE, LA.

LOCATION--At gaging station near left bank on downstream side of bridge on U. S. Highway 167, 2 miles upstream from Little Corney Bayou and 3 miles south of Lillie, Union Parish.

DRAINAGE AREA--462 square miles.

RECORDS AVAILABLE--Chemical analyses: November 1954 to September 1957.

REMARKS--Records of discharge for water year October 1956 to September 1957 given in WSP 1511.

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate		
Nov. 21, 1956	4.3	2.1	0.00	112	17	259	2	8.0	640	1.0	1.0	1,040	1.41	12	350	348	62	6.0	2,040	5.2
Dec. 11	8.1	2.1	.02	174	23	409	0	6.0	1,000	1.0		1,820	2.20	35	528	528	63	7.7	3,120	4.5
Jan. 16, 1957	69	6.3	.03	239	23	476	1	1.6	1,230	.5		1,960	2.69	369	700	700	60	7.8	3,860	4.5
Feb. 13	678	9.5	.29	60	9.4	119	2	6.6	310	.5		516	.70	945	187	186	58	3.8	1,050	5.1
Mar. 18	266	14	.20	61	8.2	128	2	6.8	322	.6		542	.74	389	185	184	60	4.1	1,080	5.2
Apr. 8	2,850	7.4	.27	15	2.9	39	5	3.6	89	.5		160	.22	1,230	49	45	63	2.4	323	5.5
Apr. 30	11,200	7.4	.28	11	2.3	24	6	1.8	59	.2		109	.15	3,300	37	32	59	1.7	221	5.4
June 17	96	9.4	.17	25	4.2	60	4	3.0	145	.5		249	.34	65	80	77	62	2.9	521	5.2
July 24	37	6.0	.02	35	5.7	86	4	4.2	205	.5		344	.47	34	111	108	63	3.5	700	5.2
Aug. 15	9.8	2.7	.01	42	6.9	104	8	3.6	248	.2		411	.56	11	134	127	63	3.9	828	5.8
Sept. 23	9.3	2.6	.01	3	7.1	108	4	4.0	260	.5		428	.58	11	139	136	63	4.0	870	5.5

Chemical analyses, in parts per million, November 1956 to September 1957

RED RIVER BASIN--Continued  
OUACHITA RIVER AT MONROE, LA.

LOCATION--At gaging station at bridge on U. S. Highway 80 at Monroe, 0.4 mile upstream from Illinois Central Railroad bridge and 5½ miles upstream from lock and dam no. 4.

DRAINAGE AREA--15,298 square miles.

RECORDS AVAILABLE--Chemical analyses: August 1954 to September 1957.

Water temperatures: August 1954 to September 1957.

EXTREMES, 1956-57.--Dissolved solids: Maximum, 1,200 ppm Dec. 1-10; minimum, 22 ppm Apr. 20 to May 1.

Hardness: Maximum, 254 ppm Dec. 1-10; minimum, 22 ppm Apr. 20 to May 1.

Specific conductance: Maximum daily, 3,230 micromhos Dec. 8; minimum observed, 51°F Nov. 29.

Water temperatures: Maximum, 89°F Aug. 1, 3; minimum, 60 ppm Apr. 20 to May 1, 1957.

EXTREMES, 1954-57.--Dissolved solids: Maximum, 2,860 ppm Oct. 16-18, 1954; minimum, 60 ppm Apr. 20 to May 1, 1957.

Hardness: Maximum, 558 ppm Oct. 16-18, 1954; minimum, 22 ppm Apr. 20 to May 1, 1957.

Specific conductance: Maximum daily, 6,070 micromhos Oct. 17, 1954; minimum daily, 93.4 micromhos Apr. 24, 1957.

Water temperatures: Maximum, 95°F Aug. 11, 1956; minimum, 40°F Jan. 18, 1956.

REMARKS.--Records of specific conductance of daily samples available in subdistrict office at Baton Rouge, La. Records of discharge for water year October 1956 to September 1957 given in WSP 1511.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO <sub>3</sub>		Per cent sodium	So-dium adsorp-tion ratio	Specific conductance (micro-mhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, mg./mesium	Non-carbonate				
Oct. 1-10, 1956..	1,640	7.2	0.02	64	15	334	10	14	14	650	0.2	10	1,200	1.50	4,870	221	213	77	9.8	2,130	6.5	
Oct. 11-20.....	2,080	6.6	.01	54	14	256	18	11	11	505	3	11	1,020	1.18	4,870	192	177	74	8.0	1,700	6.7	
Oct. 21-31.....	2,270	6.0	.04	53	15	245	22	13	13	485	4	11	839	1.14	5,140	194	176	73	7.6	1,660	6.9	
Nov. 1-12.....	2,700	7.0	.06	50	12	237	30	13	13	455	4	11	800	1.09	5,830	175	150	75	7.8	1,540	7.2	
Nov. 13-24.....	2,200	5.8	.08	67	17	342	30	13	13	662	5	7.8	1,130	1.54	6,710	237	212	76	9.7	2,140	6.7	
Nov. 25-30.....	2,180	5.6	.02	54	13	263	28	13	13	508	5	5.2	1,876	1.19	5,160	187	164	75	8.4	1,670	7.1	
Dec. 1-10.....	1,770	6.6	.02	74	17	359	20	18	18	702	3	9.6	1,200	1.63	5,730	254	238	75	9.8	2,340	6.3	
Dec. 11-15.....	1,200	6.4	.02	63	15	304	12	16	16	595	4	16	1,020	1.39	3,300	219	209	75	8.9	1,970	6.6	
Dec. 16-31.....	2,080	7.0	.04	42	9.0	181	31	16	16	345	5	7.6	823	.85	3,500	143	118	73	6.6	1,220	7.2	
Jan. 1-3, 1957...	1,630	8.4	.04	34	8.2	139	28	16	16	400	6	13	581	.72	2,340	116	95	72	5.6	1,959	7.1	
Jan. 7-9.....	6,300	7.2	.03	51	12	244	27	19	19	268	5	8.8	889	1.21	15,100	177	155	75	8.0	1,880	6.7	
Jan. 11-26.....	4,050	6.6	.12	51	13	261	16	14	14	505	5	7.2	866	1.18	9,470	180	167	76	8.5	1,670	6.7	
Jan. 30-31, Feb. 1-2	17,400	6.5	.13	22	5.3	98	15	9.6	9.6	187	5	2.5	339	.46	15,900	76	64	74	4.9	660	6.6	
Feb. 4-16.....	27,100	5.2	.24	8.7	2.5	3.4	10	6.4	6.4	58	5	1.0	119	.16	8,710	32	24	68	2.4	234	6.7	
Feb. 18-23.....	34,400	6.2	.17	6.3	2.5	2.5	12	7.2	7.2	43	5	.8	98	.13	9,100	26	16	67	2.1	180	6.6	
Feb. 25-Mar. 5...	33,200	7.4	.15	9.2	2.7	37	12	7.2	7.2	68	4	.8	139	.19	12,500	34	24	70	2.8	271	6.5	
Mar. 6-15.....	29,700	7.8	.16	11	3.3	47	13	9.6	9.6	87	4	1.0	173	.24	13,900	42	31	71	3.2	336	6.6	
Mar. 16-23.....	25,600	8.0	.11	17	4.1	67	12	10	10	129	7	2.2	244	.33	16,900	60	50	71	3.8	477	6.6	
Mar. 25-30.....	25,900	7.6	.12	11	2.8	39	14	7.4	7.4	73	7	1.8	150	.20	10,500	40	29	68	2.7	289	6.5	

a Residue on evaporation at 180°C.

## RED RIVER BASIN--Continued

## OUACHITA RIVER AT MONROE, LA.--Continued

Chemical analyses, in parts per million, water year October 1956 to September 1957--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (calculated)		Hardness as CaCO <sub>3</sub>		Percent adsorption	Sedimentation ratio	Specific conductance (micro-mhos at 25°C)	pH	
														Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate					
Apr. 1-9, 1957 ..	30,300	6.4	0.20	9.6	2.6	31	14	7.8	56	0.6	1.2			122	0.17	9,980	35	23	66	2.3	235	6.8
Apr. 12-19 .....	42,900	5.6	0.19	7.0	2.1	25	14	5.6	43	0.5	0.8			97	0.13	11,200	26	15	67	2.1	180	6.7
Apr. 20-May 1 ..	48,000	4.2	0.20	5.7	1.8	13	16	4.0	22	0.5	0.5			60	0.08	7,780	22	8	57	1.2	114	6.4
May 2-10 .....	53,600	6.0	0.21	8.4	2.3	23	18	6.2	40	0.6	1.5			97	0.13	14,000	30	16	62	1.8	183	6.5
May 13-17 .....	58,900	6.0	0.31	7.6	2.2	23	18	4.6	40	0.7	0.8			94	0.3	14,900	28	13	64	1.9	174	6.3
May 18-21 .....	59,400	7.3	0.10	7.6	2.2	14	16	3.4	29	--	--			73	0.10	11,700	28	15	52	1.2	139	6.7
May 22-29 .....	56,900	8.9	0.19	6.8	2.0	12	20	4.2	20	0.5	1.0			66	0.09	10,100	25	9	51	1.0	113	6.3
June 1-10 .....	51,900	8.2	0.19	7.8	2.2	15	22	3.6	27	0.5	1.0			76	0.10	10,600	28	10	54	1.3	142	6.4
June 11-20 .....	47,900	8.2	0.21	9.3	2.5	21	22	4.2	39	0.5	1.0			97	0.13	12,500	34	15	58	1.6	182	6.4
June 22-29 .....	43,500	9.0	0.24	9.0	2.5	19	22	4.0	35	0.5	1.1			91	0.12	10,700	33	15	56	1.4	171	6.4
July 1-10 .....	37,900	13	0.15	10	2.6	28	24	4.6	41	0.4	1.8			109	0.15	11,200	36	18	58	1.6	195	6.8
July 11-20 .....	31,100	12	0.07	13	3.0	36	23	3.6	70	0.3	2.5			151	0.21	12,700	45	26	64	2.4	295	6.7
July 23-31 .....	18,600	12	0.09	17	4.2	58	24	4.4	112	0.3	2.5			222	0.30	11,100	60	40	68	3.2	441	6.7
Aug. 1-2, 9-14 ..	5,020	12	0.06	27	6.7	127	18	7.8	242	0.3	8.4			440	0.60	5,960	95	80	74	5.7	851	7.0
Aug. 3, 5-7, .....	6,080	13	0.05	43	10	225	11	8.6	435	0.3	5.7			746	1.01	12,200	146	140	77	8.0	1,430	6.0
Aug. 15-18, 27-29, 31 .....	4,510	9.4	0.09	20	5.2	77	22	9.4	145	0.4	7.6			265	0.39	3,470	71	53	70	4.0	568	6.9
Aug. 19-26 .....	4,480	10	0.04	30	8.0	135	18	8.8	262	0.4	8.3			472	0.64	5,710	108	93	73	5.6	945	6.8
Sept. 1-10 .....	4,020	8.8	0.07	19	5.0	78	19	9.0	146	0.4	6.6			282	0.38	3,060	68	52	71	4.1	554	7.3
Sept. 11-20 .....	5,560	7.8	0.08	28	6.7	123	17	7.8	238	0.4	7.1			427	0.58	6,410	98	84	73	5.4	841	6.9
Sept. 21-24, 28-29	6,220	6.4	0.39	30	7.3	141	18	10	270	0.4	6.8			481	0.85	8,080	105	90	75	6.0	942	6.8
Sept. 25-27, 30 ...	6,580	6.6	0.52	46	11	224	17	9.8	435	0.4	9.9			751	1.02	13,300	160	146	75	7.7	1,460	6.8
Time-weighted average .....	20,700	7.6	0.12	28	7.1	127	19	9.2	241	0.4	5.0			439	0.60	24,500	99	84	74	4.8	848	--

a Residue on evaporation at 180°C.

## RED RIVER BASIN--Continued

## OUACHITA RIVER AT MONROE, LA.--Continued

Temperature (°F) of water, water year October 1956 to September 1957

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	81	70	52		--	--	62	--	74	81	89	84
2	83	65	--		--	63	64	--	--	80	86	83
3	79	68	54		--	--	68	--	75	80	89	83
4	75	--	54		--	55	66	--	--	83	--	80
5	75	71	58		--	57	--	--	75	84	84	81
6	81	69	60		--	58	64	--	74	80	85	82
7	--	67	60		--	53	--	--	--	--	85	82
8	78	63	59		--	53	64	--	--	87	--	78
9	68	65	--		--	--	64	--	--	82	86	78
10	75	66	56		--	58	--	--	79	83	85	78
11	78	--	--		--	65	--	--	79	84	85	81
12	76	63	--		--	62	65	--	80	82	85	81
13	76	62	--		--	--	60	--	79	85	84	80
14	76	64	--		--	--	--	--	82	--	86	78
15	76	60	--		--	57	63	--	80	86	86	80
16	75	61	--		--	62	63	--	--	84	86	79
17	74	58	--		--	--	--	--	81	85	86	78
18	--	--	--		56	60	67	--	81	85	86	79
19	70	59	--		54	--	65	--	80	85	84	77
20	75	62	--		62	61	--	--	80	85	86	77
21	--	59	--		60	61	--	--	--	--	84	79
22	70	58	--		55	61	--	--	80	--	84	80
23	72	54	--		57	62	--	77	--	81	84	78
24	75	57	--		--	--	--	78	80	83	83	78
25	63	--	--		58	57	--	75	77	83	84	77
26	87	54	--		56	59	--	75	80	84	83	77
27	66	53	--		54	60	--	72	77	83	84	76
28	--	52	--		56	57	--	75	82	--	83	75
29	69	51	--		--	60	--	75	79	83	83	73
30	71	52	--		--	60	--	--	--	79	--	72
31	68	--	--		--	--	--	--	--	75	84	--
Average	74	61	--		--	59	--	--	79	83	85	79

RED RIVER BASIN--Continued  
BOEUF RIVER NEAR GIRARD, LA.

LOCATION.--At gaging station on upstream side of pier on Illinois Central Railroad bridge and 0.5 mile east of Girard, Richland Parish.  
DRAINAGE AREA.--1,226 square miles, arbitrarily determined.  
RECORDS AVAILABLE.--Chemical analyses: October 1954 to August 1957.  
REMARKS.--Records of discharge for water year October 1956 to September 1957 given in WSP 1511.

Chemical analyses, in parts per million, October 1956 to August 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate			
Oct. 15, 1956	55	14	0.00	71	30	74	263	72	113	--	--	0.2	509	0.69	76	300	74	35	1.8	868	8.3
Nov. 5	46	12	.01	73	37	84	280	88	139	--	--	.2	571	.78	71	334	104	35	2.0	994	8.0
Dec. 7	144	8.6	.03	47	19	53	171	40	92	--	--	.5	344	.47	134	196	56	37	1.7	824	7.5
Jan. 7, 1957	624	8.8	.27	15	4	7.4	4.9	15	11	0.7	1.2	1.2	95	.13	180	55	12	21	4	146	7.0
Feb. 6	1,180	3.8	.51	5.5	2.0	3.1	3.8	4.2	4.0	.5	.8	.8	43	.06	188	22	7	20	.3	66.1	6.3
Mar. 4	496	6.0	.42	7.6	2.5	3.0	3.6	3.6	2.8	.5	.5	.5	48	.07	65	28	0	16	.2	77.1	6.6
Apr. 6	1,290	4.6	.34	7.1	2.2	2.7	3.0	4.0	3.0	.5	.5	1.0	43	.06	150	27	1	16	.2	71.2	6.5
May 20	90	10	.75	24	7.6	5.1	104	10	12	--	--	1.5	127	.17	31	91	6	20	.5	228	7.3
June 10	271	6.6	.39	10	3.4	5.1	45	6.4	7.2	.5	.5	3.2	70	.10	51	40	3	19	.4	124	6.6
July 1	376	8.4	.26	15	4.2	8.0	58	7.8	12	.5	.5	3.2	93	.13	94	55	7	22	.5	159	6.6
Aug. 6	105	9.6	.02	38	14	27	158	24	40	--	--	.8	231	.31	65	152	23	28	1.0	413	7.5
Aug. 27	78	14	.01	45	16	28	185	13	53	--	--	.2	260	.35	55	178	26	26	.9	512	7.8

RED RIVER BASIN--Continued  
TENSAS RIVER AT TENDAL, LA.

LOCATION.--At gaging station near left bank on upstream side of bridge on U. S. Highway 80 at Tendal, 200 feet upstream from Illinois Central Railroad bridge and 3 miles east of Waverly.  
DRAINAGE AREA.--309 square miles, arbitrarily determined.  
RECORDS AVAILABLE.--Chemical analyses: October 1955 to August 1957.  
REMARKS.--Records of discharge for water year October 1956 to September 1957 given in WSP 1511.

Chemical analyses, in parts per million, October 1956 to August 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (calculated)		Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium					Non-carbonate
Oct. 16, 1956	4.0	14	0.01	57	22	34		341	5.1	16	--	0.8		317	0.43	233	0	24	1.0	553	8.0	
Nov. 6	6.8	12	.03	52	25	39		344	5.4	21	--	.8		324	.44	232	0	27	1.1	580	7.7	
Dec. 5	7.7	7.8	.02	46	19	25		263	9.8	15	--	.8		252	.34	194	0	22	.8	451	7.7	
Jan. 8, 1957	197	10	.26	27	8.2	6.4	4.9	122	12	4.8	--	1.2		135	.18	72	100	12	.3	233	7.3	
Feb. 6	1,170	11	.48	17	4.6	3.4	5	70	11	2.8	0.5	1.2		91	.12	287	61	10	.2	149	6.8	
Mar. 5	342	8.8	.36	11	2.9	1.6	3.4	48	3.7	1.5	.4	.2		58	.08	39	0	7	.1	94.8	--	
Apr. 6	1,840	10	.35	11	2.7	2.0	3.7	50	3.7	.6	.5	.2		60	.08	298	39	9	.1	90.7	6.7	
May 10	46	11	.01	55	19	17		275	13	8.5	--	1.2		260	.35	32	215	15	.5	460	7.6	
June 11	89	13	.04	35	11	12		163	12	6.2	--	3.0		172	.23	41	132	16	.4	312	6.9	
July 2	1,320	12	.41	17	3.9	3.4	6.6	74	4.2	3.0	.7	2.2		89	.12	317	58	10	.2	151	6.6	
Aug. 7	1,320	17	.01	54	17	27		294	7.0	10	--	1.2		278	.38	25	204	0	.22	481	7.6	
Aug. 20	23	21	.01	63	24	36		368	6.4	18	1.0	1.0		350	.48	22	256	0	24	1.0	588	8.0

RED RIVER BASIN--Continued  
MISCELLANEOUS ANALYSES OF STREAMS IN THE RED RIVER BASIN IN OKLAHOMA

Chemical analyses, in parts per million, water year October, 1956 to September, 1957

Date of collection	Discharge (cfs)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Chloride (Cl)	Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH
								Calcium, magnesium	Non-carbonate				
GYPSUM CREEK NEAR OLUSTEE, JACKSON COUNTY													
Oct. 1, 1956	1.99	710	141	--	132	0	1,300	a 2,350	2,240	--	--	7,180	8.1
Oct. 30	10.1	220	32	177	86	2	1,232	a 890	a 604	--	--	1,980	8.3
Dec. 4	3.16	660	147	--	120	0	1,230	a 2,250	2,150	--	--	6,900	8.0
Jan. 4, 1957	3.49	680	147	--	92	0	1,350	a 2,300	2,220	--	--	7,110	7.9
Mar. 19	2.25	750	116	926	54	0	1,370	a 2,350	2,310	46	8.3	7,180	7.9
Apr. 16	4.00	664	156	894	70	0	1,360	a 2,300	2,240	46	8.1	7,110	7.7
June 12	10.7	628	166	728	80	0	1,190	a 2,250	2,180	41	6.7	6,560	7.7
TURKEY CREEK NEAR OLUSTEE, JACKSON COUNTY													
Oct. 1, 1956	0.86	520	190	419	136	0	720	a 2,080	1,970	30	4.0	4,920	8.1
Oct. 30	15.5	92	12	29	110	0	46	a 280	190	18	.8	678	8.1
Dec. 4	2.97	384	107	175	190	0	315	a 1,400	1,240	21	2.0	2,970	8.2
Jan. 4, 1957	4.94	568	181	322	92	0	550	a 2,160	2,080	24	3.0	4,360	7.8
Feb. 20	3.81	620	149	352	72	0	620	a 2,160	2,100	26	3.3	4,520	7.6
Mar. 19	2.93	272	25	135	88	0	235	a 780	708	27	2.1	2,010	7.7
Apr. 16	2.69	280	163	262	84	0	450	a 1,370	1,300	29	3.1	3,320	7.7
June 12	8.26	440	195	310	80	0	395	a 1,900	1,830	26	3.1	4,200	7.8
ALTUS LUGERT RESERVOIR AT LUGERT, KIOWA COUNTY													
Oct. 1, 1956		166	48	128	116	0	195	a 610	515	31	2.3	1,680	7.8
Oct. 1		172	46	126	120	0	200	a 620	520	31	2.2	1,720	8.2
Dec. 18		170	48	138	142	2	205	a 620	500	33	2.4	1,700	8.3
Jan. 3, 1957		162	48	131	108	0	200	a 600	512	32	2.3	1,780	8.1
Feb. 19		172	59	154	160	0	208	a 670	539	34	2.7	1,770	8.2
Mar. 19		164	66	141	88	0	215	a 680	608	31	2.4	1,820	7.8
Apr. 16		164	85	112	162	0	104	a 760	627	34	1.8	1,740	7.9
May 15		108	27	72	112	0	104	a 380	288	29	1.6	1,991	7.8
June 11		124	32	87	138	0	120	a 440	327	30	1.8	1,400	7.8
ELK CREEK NEAR HOBART, KIOWA COUNTY													
Oct. 30, 1956	19.4	30	6.6	5.5	122	0	5.5	a 102	2	11	0.2	240	7.7
Feb. 19, 1957	1.17	78	48	162	280	0	176	a 380	160	47	3.6	1,440	8.1
June 11	64.4	61	79	101	190	0	100	a 475	320	32	2.0	1,550	8.0

SANDSTONE CREEK NEAR CHEYENNE, ROGER MILLS COUNTY

Feb. 6, 1957.....	0.80	304	171	100	260	0	32	a 1,460	1,250	13	1.1	2,420	7.9
Mar. 27.....	1.27	272	132	76	236	0	22	a 1,220	1,080	12	.9	2,110	7.3
May 4.....	--	126	29	15	172	0	6.6	a 485	284	7	.3	707	7.7
June 20.....	--	138	63	49	156	0	19	a 605	477	15	.9	1,270	7.8

POND CREEK NEAR FT. COBB, CADDO COUNTY

Oct. 18, 1956.....	5.81	132	27	27	184	6	20	a 440	279	12	0.6	920	8.4
Oct. 30.....	13.4	67	21	28	126	0	18	a 255	152	19	.8	626	8.0
Dec. 3.....	10.8	96	20	27	208	0	17	a 320	150	15	.7	718	8.0
Apr. 2, 1957.....	24.3	46	27	27	142	0	17	a 230	112	20	.8	613	8.1
Apr. 16.....	26.6	48	29	37	116	0	17	a 240	144	25	1.0	682	7.8
May 15.....	37.2	46	35	36	134	0	16	a 260	150	23	1.0	629	7.9
June 11.....	31.8	62	26	39	120	0	18	a 260	162	25	1.1	880	7.8

SUGAR CREEK NEAR GRACEMONT, CADDO COUNTY

Apr. 16, 1957.....	5.10	75	32	29	238	0	15	320	125	16	0.7	675	8.2
May 15.....	9.74	86	26	40	176	0	23	320	176	21	1.0	922	8.1
June 11.....	11.1	72	55	53	150	0	28	405	282	22	1.1	1,130	8.0

FINN CREEK NEAR STORY, McCLAIN COUNTY

Oct. 2, 1956.....	0.04	68	38	35	408	0	17	a 325	0	19	0.8	726	7.7
Nov. 14.....	.12	59	27	26	326	0	12	a 260	0	18	.7	558	8.0
Feb. 11, 1957.....	.39	38	47	29	392	0	13	a 280	0	18	.7	676	8.1
Mar. 14.....	.06	24	48	36	306	0	13	a 260	7	23	1.0	714	7.9
Aug. 1.....	2.28	52	79	43	550	0	21	a 455	4	17	.9	934	7.7

RUSH CREEK NEAR MAYSVILLE, GARVIN COUNTY

Oct. 31, 1956.....	17.8	66	28	105	52	0	208	280	238	45	2.7	1,100	7.3
Jan. 9, 1957.....	4.10	59	56	146	158	0	325	378	248	46	3.3	1,440	8.1
Mar. 14.....	4.35	90	74	206	186	0	445	530	378	46	3.9	2,080	7.8
May 16.....	46.9	80	52	108	196	0	225	414	254	38	2.3	1,480	7.6
June 21.....	83.6	119	77	154	252	0	280	615	326	35	2.7	1,800	7.4

\* Values above 200 ppm reported to the nearest 5 ppm.

RED RIVER BASIN--Continued  
MISCELLANEOUS ANALYSES OF STREAMS IN THE RED RIVER BASIN IN OKLAHOMA--Continued

Chemical analyses, in parts per million, water year October 1956 to September 1957--Continued

Date of collection	Discharge (cfs)	Calcium (Ca)	Magnesium (mg)	Sodium (Na)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Chloride (Cl)	Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance /micro-mhos at 25° C)	pH
								Calcium, magnesium	Non-carbonate				
WILDHORSE CREEK NEAR HOOVER, GARVIN COUNTY													
Nov. 28, 1956	0.15	56	13	19	208	0	28	195	24	48	0.6	458	7.8
Feb. 11, 1957	44.5	50	11	3.1	180	0	8.7	172	24	4	1.1	335	7.9
Mar. 14	22.8	46	8.0	7.9	174	0	12	148	6	10	3.3	403	7.8
July 31	4.96	58	23	4.4	248	0	69	240	37	28	1.2	663	7.6
ROCK CREEK NEAR DOUGHERTY, MURRAY COUNTY													
Nov. 28, 1956	4.82	100	32	209	272	0	385	380	157	54	4.7	1,840	7.7
Dec. 20	140	51	8.0	35	140	0	66	160	46	32	1.2	523	8.1
BLUE CREEK AT MILBUEN, JOHNSTON COUNTY													
Jan. 21, 1957	25.6	44	41	3.0	332	0	3.2	280	8	2	0.1	502	7.9
Mar. 13	46.7	19	32	4.9	210	0	4.2	178	6	6	1.2	388	8.2
July 31	92.0	26	48	3.2	308	0	3.5	282	10	3	1.1	486	7.8
BLUE RIVER NEAR BLUE, BRYAN COUNTY													
Oct. 29, 1956	5.68	45	39	6.6	322	0	8.0	274	84	5	0.2	513	7.2
Jan. 8, 1957	22.2	39	23	3.9	209	0	6.7	192	20	4	0.1	380	7.7
Feb. 20	42.2	46	36	10	240	6	8.8	240	14	8	3.3	452	8.3
Mar. 28	736	38	8.5	1.6	100	0	3.8	130	48	3	1.1	279	7.4
Apr. 3	3,160	39	7.9	1.5	128	0	1.3	130	25	3	1.1	262	7.3
Apr. 30	--	26	5.6	3.3	84	0	1.8	88	19	7	2.0	188	7.3
July 3	160	42	46	3.3	260	0	5.6	286	83	2	1.1	532	7.5
Aug. 5	83.3	24	51	3.4	276	0	10	270	44	3	5.4	485	7.8
Aug. 29	--	37	27	8.9	248	0	10	204	1	9	3.3	472	8.0
NORTH BOGGY CREEK NEAR STRINGTOWN, ATOKA COUNTY													
Dec. 18, 1956	0.16	11	3.8	4.3	33	0	4.0	43	16	18	0.3	128	6.8
Jan. 8, 1957	15.7	6.4	3.4	5.1	28	0	3.2	30	7	27	4.4	72.5	6.6
Mar. 12	54.4	10	2.4	3.0	30	0	5.6	34	10	26	1.2	102	6.2
June 17	54.4	10	3.2	5.1	23	0	4.6	38	19	22	1.4	104	6.1

CHICKASAW CREEK NEAR STRINGTOWN, ATOKA COUNTY

Dec. 18, 1956.....	13	4.5	4.6	64	0	1.5	51	0	16	0.3	134	7.2
Jan. 8, 1957.....	--	4.1	2.9	41	0	3.4	36	2	15	.2	97.0	7.3
Mar. 12.....	7.97	2.9	3.8	19	0	5.0	22	6	28	.4	66.2	6.7
June 17.....	9.13	2.8	3.7	26	0	3.8	23	2	26	.3	76.1	6.7

MCCEE CREEK NEAR STRINGTOWN, ATOKA COUNTY

Oct. 1, 1956.....	--	4.6	6.4	54	0	6.5	40	0	26	0.4	125	7.0
Dec. 18.....	--	7.0	3.5	4.0	0	2.0	32	0	21	.3	88.7	7.4
Jan. 8, 1957.....	2.50	5.2	2.4	1.9	0	4.8	23	10	15	.2	82.7	7.1
Mar. 12.....	18.5	4.4	1.9	5.9	0	6.8	19	4	41	.6	73.2	6.3
June 17.....	23.3	11	3.0	3.5	0	4.6	40	2	16	.2	106	6.6

MUDDY BOGGY CREEK NEAR FARRIS, ATOKA COUNTY

Oct. 17, 1956.....	19.2	21	7.7	20	41	0	20	84	50	0.9	294	7.2
Dec. 13.....	9.53	11	4.0	9.3	5	0	6.5	44	40	.6	164	6.2
Jan. 7, 1957.....	28.2	6.4	3.4	8.3	22	0	13	30	12	.7	124	7.3
Feb. 25.....	90.1	8.0	2.9	7.7	32	0	9.2	32	24	.6	119	6.4
Mar. 28.....	4,880	8.4	4.6	6.5	0	0	8.0	40	40	.4	236	3.2
Apr. 4.....	14.0	4.4	1.5	3.5	12	0	3.4	17	7	.4	54.6	6.2
Apr. 20.....	6.00	10	3.2	6.8	15	0	7.0	38	26	.5	121	6.3
July 5.....	--	37	14	33	86	0	68	82	32	1.2	463	6.6
Aug. 5.....	14.0	18	16.6	11	0	0	22	172	72	.6	219	3.2
Aug. 28.....	7.66	30	18	94	84	0	47	146	79	3.0	683	7.6

BUCK CREEK NEAR MOYERS, PUSHMATAHA COUNTY

Oct. 1, 1956.....	--	2.7	23	38	0	20	24	0	68	2.0	137	6.3
Dec. 4.....	0.83	7.2	1.0	9.9	24	0	14	22	2	.9	109	6.7
Jan. 21, 1957.....	5.56	4.0	1.5	4.6	14	0	6.7	16	4	.5	81.5	7.1
Mar. 12.....	34.3	3.2	1.7	6.0	22	0	4.2	15	0	.46	58.0	6.9
July 30.....	.84	7.6	3.2	9.4	39	0	9.0	32	0	.7	103	6.9

RED RIVER BASIN--Continued  
 MISCELLANEOUS ANALYSES OF STREAMS IN THE RED RIVER BASIN IN OKLAHOMA--Continued  
 Chemical analyses, in parts per million, water year October 1956 to September 1957--Continued

Date of collection	Discharge (cfs)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Chloride (Cl)	Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micro- mhos at 25°C)	pH
								Calcium, magnesium	Non- carbonate				
TENMILE CREEK NEAR MILLER, PUSHMATAHA COUNTY													
Dec. 18, 1956.....	--	8.8	7.8	5.1	55	0	3.4	54	9	17	0.3	125	6.9
Jan. 8, 1957.....	10.2	2.8	1.7	3.2	10	0	6.6	14	6	33	.4	52.8	6.4
Mar. 12.....	15.6	9.6	1.9	7.7	20	0	7.0	32	16	34	.6	73.1	6.6
Apr. 26.....	3,760	5.6	3.4	3.1	18	0	2.2	28	13	19	.2	46.3	6.8
June 17.....	10.2	10	8.0	5.9	40	0	3.9	58	25	18	.3	96.5	6.9

RED RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN RED RIVER BASIN IN LOUISIANA  
Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (calculated)		Hardness as CaCO <sub>3</sub>		Percent sodium	Specific conductance (micro-mhos at 25°C)	
													Parts per million	Tons per acre-foot day	Calcium, magnesium	Non-carbonate			So-adsorption ratio
Oct. 23, 1956		19		64	12	177		23	3	21	130		0.2	694	0.94	64	45	65	493
Nov. 20											400					210	208	5.3	1,340
Oct. 23, 1956		15		7,080	926	21,800		0		49,200						21,400	21,400	69	91,700
Nov. 20				1,310	186	4,060		3		9,090				14,700	19.99	4,030	4,030	69	22,900
Oct. 24, 1956		12		4,550	590	14,700		0		32,800						13,800	13,800	70	68,200
Nov. 20				1,120	154	3,310		0		7,460				12,100	16.46	3,430	3,430	68	19,500
Oct. 23, 1956		12		281	43	1,210		0		2,050				4,860	6.61	878	878	75	6,270
Nov. 20				424	58	1,350		0		3,000						1,300	1,300	69	8,600
Oct. 24, 1956		22		101	22	868		10	3.3	1,310		0.9		2,160	2.94	342	334	81	4,120
Nov. 20		20		100	23	718		6	2.3	1,370		2.0		2,240	3.05	344	339	82	4,080
Oct. 23, 1956		11		51	26	992		12	4.1	1,670		0.6		2,770	3.77	234	224	90	5,200
Nov. 20		10		66	33	1,230		12	25	2,080				3,450	4.69	300	280	90	6,170

STATE LINE CREEK ON STATE HIGHWAY 1, 1.6 MILES NORTH OF RODESSA

TYSON BRANCH ON STATE HIGHWAY 1, NEAR RODESSA

STATE LINE CREEK ON STATE HIGHWAY 168, NEAR RODESSA

BLACK BAYOU ON STATE HIGHWAY 1, SOUTH OF RODESSA

BLACK BAYOU LAKE AT DAM, NEAR HOSSTON

CADDO LAKE IN CADDO PARISH

RED RIVER BASIN--Continued  
 MISCELLANEOUS ANALYSES OF STREAMS IN RED RIVER BASIN IN LOUISIANA--Continued  
 Chemical analyses, in parts per million, water year October 1956 to September 1957--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (calculated)		Hardness as CaCO <sub>3</sub>	Percent sodium	Specific conductance (micro-mhos at 25° C)
														Parts per million	Tons per acre-foot per day			

CADDO LAKE AT BRIDGE ON STATE HIGHWAY 1, NEAR MOORINSPOUR

Oct. 23, 1956 ...		11		16	7.1	123	4.2	26	12	219	0.6	0.3		406	0.55	70	48	78	6.4	800	6.8
Nov. 20 .....		11		18	7.1	122	3.8	18	15	223		.2		409	.56	73	58	77	6.2	772	6.6

BAYOU DORCHEAT ON STATE HIGHWAY 2, NEAR SAREPTA

Oct. 24, 1956 ...		8.7		89	19	528	6.9	23	3.5	1,030		0.5		1,700	2.31	300	281	79	13	3,280	6.6
Nov. 21 .....		8.6		89	22	161	41	41	8.1	1,120		4.0		1,880	2.56	312	279	81	15	3,460	6.9

BAYOU DORCHEAT ON STATE HIGHWAY 160, NEAR COTTON VALLEY

Oct. 24, 1956 ...		8.6		39	8.7	172	4.6	20	2.1	352	0.3	0.3		588	0.81	134	118	73	6.5	1,210	6.4
Nov. 21 .....		7.1		35	8.4	161	14	14	4.0	322		.2		545	.74	121	110	74	6.4	1,080	6.4

BAYOU BODCAU NEAR SAREPTA

Oct. 4, 1956 ...	3.7	7.2		12	5.2	25	4.8	40	3.7	53		1.0		132	0.20	52	19	48	1.5	254	6.6
Nov. 21 .....	331	8.3		40	5.0	155	4.1	191	21	198		0.5		526	.72	120	0	73	6.2	934	7.3

BAYOU BODCAU AT STATE HIGHWAY 157, NEAR BELLEVUE

Oct. 24, 1956 .....		7.2		9.2	3.2	10	4.7	42	1.6	21		1.0		78		37	3	34	0.7	150	7.4
Oct. 24 .....								42		20						36	2			148	6.6

BAYOU BARTHOLOMEW NEAR BEEKMAN

Oct. 25, 1956 .....		15		26	8.3	23	3.0	148	3.9	20		1.2		173	0.24	100	0	32	1.0	159	7.7
Nov. 22 .....		10		21	5.5	15	3.1	106	4.2	15		.2		126	.17	75	0	29	.8	210	8.1

LITTLE BAYOU BOEUF ON STATE HIGHWAY 554, SOUTHWEST OF BASTROP

Oct. 26, 1956 ...	96	8.3	396	556	392			274	0	76	10	2,180	7.0
Nov. 22 .....	98	9.3	351	447	63	422		282	0	73	9.1	2,010	7.0
	20							1,180	1.60				

BAYOU L'OUTRE ON DIRT ROAD JUST SOUTH OF ARKANSAS

Oct. 25, 1956 .....	394	92	2,720	30	208	70	5,000	8,420	11.5	1,960	1,190	81	32	14,300	7.3
Nov. 22 .....	166	34	941	60	50	1,740		2,970	4.04	554	505	79	17	5,310	6.9

LION CREEK SOUTH OF ARKANSAS BORDER

Oct. 25, 1956 .....	5.4	2.3	5.3	3.9	26	4.8		67	0.09	11	0	62	6.6
Nov. 22 .....	18			9	19	7.2	1.9			23	16	29	0.5

BAYOU L'OUTRE NEAR LARAN

Oct. 25, 1956 .....	363	84	2,380	28	106	81	4,490	7,480	10.2	242	1,160	80	29	12,800	7.3
Nov. 22 .....	159	28	743	37	33	1,430	3.0	2,400	3.26	492	462	78	15	4,350	6.9

BAYOU L'OUTRE AT DE LOUTRE

Oct. 25, 1956 .....	356	86	2,200	81	--	4,220	--	1,240	--	1,180	79	27	12,200	7.7
Nov. 22 .....	85	17	448	24	26	870	0.2	282	2.00	262	78	12	2,760	7.2
Nov. 22 .....	79	18	423	22	22	820	.2	272	1.88	254	77	11	2,620	6.8

THREE CREEKS ON DIRT ROAD, JUST SOUTH OF ARKANSAS BORDER

Oct. 25, 1956 .....	31	4.6	148	4.0	126	11	223	488	0.67	97	0	76	6.5
Nov. 21 .....	176	22	341	11	8.6	900	.0	1,460	1.99	530	521	58	6.4

## RED RIVER BASIN--Continued

## MISCELLANEOUS ANALYSES OF STREAMS IN RED RIVER BASIN IN LOUISIANA--Continued

Chemical analyses, in parts per million, water year October 1956 to September 1957--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (calculated)		Hardness as CaCO <sub>3</sub>		Percent adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH		
														Parts per million	Tons per acre-foot	Calcium	Non-magnesium					
Oct. 25, 1956.....	17			3.3	1.4	5.2	12	10	6.6	16			0.8		52	0.07	13	3	39	0.6	82	6.1
Nov. 22.....										9.5							14	6			63	6.0
CORNEY LAKE ON STATE HIGHWAY 9, AT BRIDGE NEAR SUMMERFIELD																						
Oct. 25, 1956.....	8.0			368	46	822	25	0	7.4	2,100					3,350	4.56	1,110	1,110	61	11	6,410	3.7
Nov. 21.....	9.0			443	52	919			11	2,350					3,780	5.14	1,320	1,320	60	11	6,860	4.6
CORNEY LAKE AT SPILLWAY, NEAR LILLIE																						
Oct. 25, 1956....	0.2			161	20	353	9.8	1	4.3	910	0.1	0.2			1,460	1.99	484	482	61	7.0	2,960	4.8
Nov. 21.....	1.4			172	22	344		0	5.6	910	.0				1,460	1.99	520	520	59	6.6	2,800	4.6
BIG CORNEY BAYOU NEAR LILLIE																						
Oct. 25, 1956 ...	2.8			137	26	295	4	4	9.1	780			0.2		1,020	1.39	449	446	59	6.0	2,490	5.8
Nov. 22.....				120	16	243	2	2	825								366	364	59	5.5	1,960	5.1
LITTLE CORNEY BAYOU NEAR LILLIE																						
Oct. 25, 1956....	2.6			14	3.8	143	4.0	16	3.0	246	0.5	0.2			424	0.58	51	40	85	8.7	851	6.5
Nov. 22.....	14			20	4.7	88	4.6	6	6.4	181	.2				322	.44	70	65	72	4.6	608	5.9
MIDDLE FORK BAYOU D'ARBOIS ON STATE HIGHWAY 9, NEAR SUMMERFIELD																						
Nov. 21, 1956....	3.2			3.1	0.8	3.7	4.0	6	10	6.0		0.7			34	0.05	11	6	33	0.5	57	5.8
Nov. 21.....	8.0			10	3.2	39	5.4	11	13	77		.2			161	.22	38	29	65	2.8	301	6.6

OUACHITA RIVER NEAR STERLINGTON

Oct. 25, 1956 ...	11	50	13	37	460	4.5	1,320	1.80	178	150	76	10	1,590	6.8
Nov. 22 .....		79	19	27	14	780			276	254			2,500	6.7
		397												

BOEUF RIVER ON STATE HIGHWAY 2, NEAR GIRARD

Oct. 25, 1956 ...	6.4	70	38	101	4.3	249	99	117	0.4	0.3	618	0.84	331	127	39	2.4	1,110	7.7
Nov. 23 .....	14	48	18	56	4.8	167	41	99	.5		361	.49	188	51	39	1.8	638	8.0

BAYOU MACON ON STATE HIGHWAY 2, NEAR OAK GROVE

Oct. 25, 1956 ...	14	48	16	20	4.2	226	20	21		1.0	255		185	0	19	0.6	445	7.6
Nov. 23 .....	12	32	11	11	6.0	152	13	14		1.2	175	0.24	125	0	15	.4	297	8.2

MISSISSIPPI RIVER MAIN STEM  
MISSISSIPPI RIVER NEAR ST. FRANCISVILLE, LA.

LOCATION.--At ferry on State Highway 10 crossing, 2 miles southwest of St. Francisville, West Feliciana Parish.  
RECORDS AVAILABLE.--Chemical analyses: August 1954 to September 1957.

Water temperatures: August 1954 to September 1957.

EXTREMES 1956-57 --Dissolved solids: Maximum 280 ppm Nov. 1-10; minimum 111 ppm Feb. 11-19.

Hardness: Maximum 167 ppm Oct. 11-20; Nov. 1-10; minimum 75 ppm Feb. 11-19.

Specific conductance: Maximum daily, 489 micromhos May 22; minimum daily, 179 micromhos Feb. 19.

Water temperature: Maximum, 84°F on several days during July, August; minimum, 40°F Jan. 19.

EXTREMES, 1954-57.--Dissolved solids: Maximum, 320 ppm Oct. 11-20, 1953; minimum, 111 ppm Feb. 11-19, 1957.

Hardness: Maximum, 185 ppm Jan. 21-31, 1956; minimum, 75 ppm Feb. 11-19, 1957.

Specific conductance: Maximum daily, 683 micromhos Oct. 16, 1953; minimum daily, 173 micromhos Apr. 15, 1955.

Water temperatures: Maximum, 87°F July 12, Aug. 12, 1955; Aug. 8, 11-13, 1956; minimum, 40°F Jan. 19, 1957.

REMARKS.--Records of specific conductance of daily samples available in subdistrict office at Baton Rouge, La. No discharge records available.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>	Percent sodium	Specific conductance (micro-mhos at 25°C)	pH
														Parts per million	Tons per acre-foot				
Oct. 1-10, 1956		7.8	0.00	43	12	26	131	72	20	0.4	3.0	252	0.34	157	50	27	0.9	413	7.9
Oct. 11-20		5.8	0.00	46	13	32	141	81	25	4	1.8	274	37	167	51	30	1.1	444	7.8
Oct. 21-31		5.4	0.00	44	13	29	148	70	20	4	1.8	258	35	162	41	28	1.0	426	7.7
Nov. 1-10		6.0	0.01	44	14	33	152	76	22	5	2.2	280	38	167	42	30	1.1	459	7.8
Nov. 11-20		6.6	0.01	42	13	32	142	70	24	4	2.0	265	36	157	41	30	1.1	435	8.1
Nov. 21-30		5.8	0.01	41	14	27	140	62	26	5	2.2	266	36	160	45	27	.9	427	8.1
Dec. 1-10		7.0	0.01	41	12	27	136	57	26	5	1.8	249	34	152	41	28	.9	404	7.6
Dec. 11-20		6.0	0.03	40	12	29	128	55	32	5	2.2	248	38	148	43	30	1.0	401	7.7
Dec. 21-31		5.8	0.11	34	10	22	95	53	27	5	2.2	202	27	127	49	27	.8	345	7.6
Jan. 1-10, 1957		7.8	0.05	30	7.8	17	64	41	21	2	3.0	164	23	107	36	26	.7	300	7.7
Jan. 11-20		7.8	0.07	31	8.5	16	92	40	20	2	2.5	184	23	112	37	24	.7	300	7.5
Jan. 21-31		6.8	0.10	31	8.4	16	94	38	20	2	2.5	186	25	112	35	24	.7	305	7.5
Feb. 1-10		7.2	0.17	27	6.2	14	80	30	16	2	3.5	158	21	93	27	24	.6	258	7.7
Feb. 11-19		6.6	0.19	23	4.5	7.1	2.2	64	22	10	2	3.8	11	75	23	17	.4	197	7.7
Feb. 20-28		6.8	0.24	22	5.1	7.2	2.2	66	25	8.5	3	3.2	a113	77	23	16	.4	199	7.6
Mar. 1-10		8.6	0.13	25	5.9	7.2	11	72	28	9.2	4	3.2	a125	87	28	15	.3	212	7.6
Mar. 11-20		8.2	0.07	28	7.4	11	85	33	11	4	4.5	156	21	100	31	19	.5	249	7.7
Mar. 21-31		7.4	0.07	29	7.5	11	83	35	14	4	3.2	a149	20	103	35	19	.5	259	7.6
Apr. 1-10		8.4	0.10	30	8.4	19	95	36	22	5	3.2	188	26	109	32	27	.8	289	7.5
Apr. 11-20		8.2	0.20	29	7.3	15	89	32	18	5	3.2	176	24	102	29	24	.7	273	7.6
Apr. 21-30		7.4	0.15	29	7.4	15	87	35	16	5	4.5	175	24	103	32	24	.6	265	7.5

May 1-10, 1957..	12	.11	29	8.9	19	36	24	.3	3.2	165	.27	108	33	28	.8	319	7.3
May 11-20 .....	12	.06	31	9.9	21	105	34	.3	2.8	207	.28	118	32	28	.8	339	7.4
May 21 .....	11	.06	34	12	31	118	39	.3	3.5	250	.34	134	37	34	1.2	418	7.6
June 1-10 .....	12	.17	33	7.8	19	103	30	.6	3.8	a182	.25	114	30	26	.8	335	7.4
June 11-20 .....	9.8	.18	33	7.8	15	103	30	.6	2.2	a170	.23	114	30	22	.6	309	7.3
June 21-30 .....	7.8	.23	32	7.8	17	102	29	.7	2.8	a169	.23	112	28	25	.7	304	7.4
July 1-10 .....	12	.07	35	8.7	22	115	34	.4	2.8	206	.28	123	29	28	.9	338	7.8
July 11-20 .....	11	.06	35	8.7	20	116	33	.4	3.8	197	.27	133	28	26	.8	327	7.7
July 21-31 .....	11	.08	38	9.6	19	127	37	.5	3.8	206	.28	134	30	24	.7	339	7.5
Aug. 1-10 .....	12	.04	38	11	25	134	42	.5	6.3	240	.33	140	30	28	.9	380	7.8
Aug. 11-20 .....	12	.04	39	11	23	135	44	.4	3.8	231	.31	143	32	26	.8	371	8.0
Aug. 21-31 .....	9.4	.06	38	10	30	133	44	.4	2.8	240	.33	136	27	33	1.1	392	8.1
Sept. 1-10 .....	11	.04	39	12	28	144	51	.4	1.5	a238	.32	147	29	29	1.0	409	8.0
Sept. 11-20 .....	9.8	.04	42	12	29	151	57	.4	1.5	a249	.34	154	30	29	1.0	424	8.1
Sept. 21-30 .....	8.4	.09	39	13	35	148	61	.4	1.5	a259	.35	151	29	33	1.2	446	8.0
Average .....		8.6	0.08	35	9.7	21	44	22	0.4	2.9	0.28	127	35	26	0.8	342	--

a Calculated from determined constituents.

## LOWER MISSISSIPPI RIVER BASIN

## MISSISSIPPI RIVER MAINSTEM--Continued

## MISSISSIPPI RIVER AT ST. FRANCISVILLE, LA.--Continued

Temperature (°F) of water, water year October 1956 to September 1957

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	--	64	47	52	52	52	--	67	74	81	84	83
2	73	66	50	50	49	50	59	68	73	81	84	83
3	73	68	50	48	50	53	59	68	73	--	84	83
4	74	68	50	52	48	53	59	68	74	--	84	83
5	74	68	53	52	47	50	60	65	74	--	84	82
6	73	68	54	--	47	50	57	65	74	79	82	80
7	72	67	55	51	49	50	62	65	74	78	--	78
8	71	65	54	50	49	48	62	68	--	--	--	79
9	69	59	53	53	50	48	64	69	76	82	83	80
10	70	59	49	54	51	49	65	70	76	82	82	82
11	71	62	52	48	50	53	60	72	77	82	83	81
12	69	60	55	50	51	--	60	72	77	82	82	78
13	72	60	52	51	49	--	57	72	78	82	83	78
14	71	60	54	52	51	54	55	72	78	82	83	78
15	70	62	53	--	52	52	55	73	78	82	83	79
16	70	60	54	--	51	50	60	73	--	82	84	78
17	69	59	54	42	49	52	60	74	79	83	84	78
18	68	59	56	43	50	54	60	74	79	83	84	78
19	69	59	55	40	50	54	60	74	79	83	84	76
20	72	62	56	46	49	54	60	74	80	83	82	78
21	76	55	--	47	48	56	62	75	80	83	79	78
22	70	55	55	47	51	55	62	77	80	83	80	78
23	69	55	55	45	53	57	61	77	79	83	80	78
24	68	55	50	44	52	55	65	78	80	--	81	--
25	67	54	50	--	--	54	65	78	81	84	80	--
26	69	53	50	47	52	53	--	78	79	83	81	75
27	69	47	50	47	51	55	65	76	80	83	81	73
28	69	49	48	49	52	55	--	76	80	84	81	73
29	69	49	--	49	--	56	--	73	80	84	81	73
30	68	48	50	49	--	56	67	73	80	85	81	70
31	67	--	49	57	--	58	--	--	--	84	81	--
Average	70	59	52	49	50	53	61	72	78	82	82	78

## MISSISSIPPI RIVER DELTA--Continued

## VERMILION RIVER AT BANCKER FERRY NEAR ABBEVILLE, LA.

LOCATION.--At Bancker Ferry about 6 miles south of Abbeville, Vermilion Parish.

RECORDS AVAILABLE.--Chemical analyses: January 1949 to September 1957.

Water temperatures: January 1949 to September 1957.

EXTREMES, 1956-57.--Specific conductance: Maximum daily, 15,500 micromhos Nov. 5;

minimum daily, 49.4 micromhos May 3.

Water temperatures: Maximum, 88°F July 31; minimum, 49°F Jan. 23.

EXTREMES, 1949-57.--Specific conductance: Maximum daily, 21,200 micromhos Sept. 18, 1954;

minimum daily, 47.7 micromhos May 20, 1953.

Water temperatures: Maximum, 98°F Aug. 9, Sept. 3, 1951; minimum, 38°F Jan. 30, 1951.

Specific conductance (micromhos at 25°C) and chloride, in parts per million,  
water year October 1956 to September 1957

Day	October		November		December	
	Conductance	Chloride	Conductance	Chloride	Conductance	Chloride
1	10,500	3,390	8,760	2,720	3,030	--
2	5,110	--	12,000	--	2,610	--
3	--	--	12,800	--	3,450	--
4	5,370	--	14,300	--	3,350	--
5	6,410	--	15,500	--	4,130	1,240
6	6,260	1,900	14,100	--	3,640	--
7	5,420	--	12,400	4,070	3,390	990
8	5,390	--	2,170	580	2,720	--
9	7,290	--	929	215	509	112
10	7,320	--	4,070	1,250	506	--
11	7,560	--	4,720	--	2,010	560
12	10,000	--	3,410	--	2,140	--
13	10,100	3,250	3,310	960	1,870	515
14	8,380	--	5,250	1,620	513	118
15	8,280	--	6,020	--	344	65
16	6,210	--	880	220	466	--
17	5,780	1,740	1,480	425	472	--
18	5,960	--	1,550	--	796	210
19	8,480	--	1,070	--	110	20
20	9,480	--	1,050	288	110	--
21	7,660	--	491	119	93.5	--
22	7,020	--	2,480	728	88.7	16
23	10,200	--	2,230	--	132	--
24	10,700	--	2,240	--	141	--
25	12,300	--	1,740	490	177	--
26	10,700	--	771	196	190	39
27	7,720	2,400	1,090	--	187	--
28	8,450	--	2,010	--	188	--
29	10,200	--	2,620	755	180	--
30	11,500	--	644	161	182	--
31	13,200	4,390	--	--	157	--

## LOWER MISSISSIPPI RIVER BASIN

## MISSISSIPPI RIVER DELTA--Continued

## VERMILION RIVER AT BANCKER FERRY NEAR ABBEVILLE, LA.--Continued

Specific conductance (micromhos at 25°C) and chloride, in parts per million, water year October 1956 to September 1957--Continued

Day	January		February		March	
	Conductance	Chloride	Conductance	Chloride	Conductance	Chloride
1	160	22	250	--	176	--
2	199	--	240	--	180	--
3	204	--	140	--	175	--
4	171	--	140	26	180	--
5	162	--	315	73	159	--
6	173	--	298	--	149	20
7	164	--	188	--	173	--
8	217	42	194	--	192	32
9	180	--	192	--	334	78
10	164	--	192	--	271	55
11	195	--	199	--	250	50
12	209	--	212	38	184	--
13	218	--	204	--	216	--
14	218	--	180	--	194	--
15	242	50	179	--	193	--
16	177	32	201	--	177	--
17	164	--	211	--	194	--
18	320	--	213	--	151	--
19	253	--	266	47	51.6	9.0
20	338	77	214	--	80.3	13
21	159	28	327	60	157	36
22	187	--	243	--	138	--
23	196	--	318	--	141	--
24	262	--	188	31	161	--
25	281	--	210	--	126	22
26	288	66	162	32	223	48
27	196	--	186	--	162	--
28	256	--	185	--	142	--
29	369	--	--	--	138	--
30	381	92	--	--	125	--
31	381	--	--	--	129	--
	April		May		June	
1	141	21	105	18	364	59
2	157	26	138	--	195	34
3	156	--	49.4	7.2	151	--
4	137	--	85.0	--	142	21
5	221	47	203	47	159	--
6	174	--	127	--	149	--
7	168	30	114	--	201	--
8	145	--	115	--	226	--
9	173	--	170	--	174	--
10	180	--	131	--	239	38
11	163	27	138	23	276	--
12	170	--	140	--	263	--
13	146	--	146	--	287	46
14	195	--	156	--	285	--
15	221	--	183	--	215	--
16	143	21	195	--	207	--
17	256	62	229	45	224	--
18	66.4	11	164	21	219	--
19	84.2	--	171	--	210	27
20	98.3	--	215	31	204	--
21	152	--	223	--	227	--
22	186	--	205	29	213	--
23	154	--	217	--	232	--
24	132	--	255	--	174	--
25	192	36	259	--	132	--
26	172	--	273	--	188	--
27	152	--	350	60	151	17
28	135	--	311	--	468	102
29	133	20	303	--	229	45
30	141	--	313	--	162	26
31	--	--	331	--	--	--

## MISSISSIPPI RIVER DELTA

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## MISSISSIPPI RIVER DELTA--Continued

## VERMILION RIVER AT BANCKER FERRY NEAR ABBEVILLE, LA.--Continued

Specific conductance (micromhos at 25°C) and chloride, in parts per million,  
water year October 1956 to September 1957--Continued

Day	July		August		September	
	Conductance	Chloride	Conductance	Chloride	Conductance	Chloride
1	154	--	162	22	443	88
2	145	--	195	31	348	--
3	143	--	--	--	307	--
4	134	22	--	--	288	46
5	159	--	--	--	342	--
6	157	--	--	--	343	--
7	163	--	--	--	329	--
8	186	27	290	52	313	--
9	172	--	268	--	320	--
10	179	--	253	--	315	--
11	188	--	253	--	342	54
12	183	--	253	37	303	--
13	195	25	171	25	223	--
14	189	--	191	--	166	22
15	192	--	227	--	271	--
16	210	--	270	--	309	--
17	225	31	356	65	234	--
18	196	--	274	--	248	--
19	204	--	256	--	233	--
20	219	--	319	60	283	--
21	203	--	294	--	186	25
22	489	116	292	--	314	--
23	168	--	312	--	219	--
24	193	--	304	49	188	--
25	239	50	304	--	213	--
26	142	20	304	--	196	--
27	182	--	316	--	168	--
28	164	--	306	--	141	17
29	160	--	334	--	212	--
30	166	--	525	118	230	--
31	147	--	403	80	--	--

## LOWER MISSISSIPPI RIVER BASIN

## MISSISSIPPI RIVER DELTA--Continued

## VERMILION RIVER AT BANCKER FERRY, LA.--Continued

Temperature (°F) of water, water year October 1956 to September 1957  
 Once-daily measurement, usually between 6 and 10 a. m.

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	78	72	54	56	66	60	65	76	83	83	87	85
2	78	74	56	55	66	60	68	75	79	83	87	85
3	--	74	56	55	66	62	68	77	76	85	--	85
4	78	75	56	58	65	62	70	72	77	85	--	84
5	78	75	58	58	67	62	69	70	78	85	--	83
6	77	74	60	59	66	60	68	69	80	85	--	82
7	77	74	60	59	67	59	69	69	80	84	--	83
8	77	72	61	60	69	55	70	71	81	85	84	82
9	76	69	60	60	70	56	65	72	81	85	85	80
10	77	68	60	62	70	58	66	72	81	86	84	80
11	77	68	60	60	71	59	65	74	82	86	84	81
12	76	67	61	60	70	60	66	76	83	85	83	80
13	76	66	62	63	69	61	66	77	84	86	82	78
14	76	68	62	64	68	63	65	78	85	87	83	77
15	76	68	62	62	69	65	66	79	85	86	84	78
16	75	66	63	60	68	64	67	79	85	86	85	76
17	75	62	64	51	66	65	66	80	85	86	86	78
18	74	61	65	50	66	64	67	80	85	86	86	76
19	75	62	64	50	62	65	70	81	85	85	85	77
20	75	63	64	50	60	67	71	81	85	85	85	78
21	74	63	65	52	57	65	73	82	85	84	85	80
22	73	62	66	53	57	65	75	83	84	83	85	80
23	73	60	66	49	57	66	75	83	83	84	84	80
24	74	60	63	51	58	65	76	83	83	84	83	78
25	75	58	60	55	60	63	77	83	81	84	84	77
26	76	57	58	56	59	62	76	82	82	84	85	70
27	74	59	53	58	58	61	77	81	79	85	85	75
28	74	58	52	60	58	62	78	81	82	86	86	73
29	73	56	55	62	--	61	77	83	81	86	85	78
30	74	54	55	64	--	62	75	83	83	87	85	70
31	73	--	55	65	--	64	--	83	--	88	85	--
Average	75	66	60	57	64	62	70	78	82	85	85	79

## MISSISSIPPI RIVER DELTA.--Continued

## TICKFAW RIVER AT HOLDEN, LA.

LOCATION.--On U. S. Highway 190, half a mile west of Holden and 4½ miles upstream from Big Branch.  
DRAINAGE AREA.--242 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1955 to August 1956, December 1956 to September 1957.

REMARKS.--Records of discharge for water year October 1956 to September 1957 given in MSP 1511.

Chemical analyses, in parts per million, December 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids (calculated)			Hardness as CaCO <sub>3</sub>	Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH		
													Parts per million	Tons per acre-foot	Tons per day						
Dec. 31, 1956 ...	95	12	0.34	1.4	1.0	3.7	1.2	12	1.0	5.0	--	0.6	32	0.04	8.2	8	0	0	0.6	36.2	6.4
Jan. 23, 1957 ...	98	13	.60	1.9	.8	3.7	.9	12	.0	6.0	--	.2	33	.04	8.7	8	0	0	.6	42.3	6.7
Mar. 1 .....	142	9.4	.18	1.5	.8	3.7	1.1	11	.4	4.4	0.3	.5	27	.04	10	7	0	0	.6	39.3	6.2
Mar. 20 .....	436	8.2	.15	1.6	.9	3.2	1.6	8	2.0	4.5	--	1.2	28	.04	33	8	1	.5	.5	35.1	5.9
May 21 .....	106	11	.08	1.5	.4	3.5	1.4	10	.2	4.2	--	.5	28	.04	8.0	5	0	.6	.6	34.8	5.5
June 13 .....	95	12	.24	1.5	1.0	3.3	.9	10	.2	4.5	.3	.5	29	.04	7.4	8	0	.5	.5	35	6.0
July 11 .....	89	12	.28	1.5	.9	3.6	1.4	10	.2	5.2	.4	.8	31	.04	7.4	7	0	.6	.6	35.2	6.1
Sept. 3 .....	77	10	.08	0.9	.7	3.3	.8	9	.2	4.0	--	--	24	.03	5.0	5	0	.6	.6	32.2	6.5

## PART 8. WESTERN GULF OF MEXICO BASINS

## MERMENTAU RIVER BASIN

## MERMENTAU RIVER AT LAKE ARTHUR, LA.

LOCATION.--At bridge on State Highway 14, about half a mile east of Lake Arthur, Jefferson Davis Parish.

RECORDS AVAILABLE.--Chemical analyses: January 1949 to September 1957.

Water temperatures: January 1949 to September 1952.

EXTREMES, 1956-57.--Specific conductance: Maximum, 573 micromhos Nov. 25; minimum, 22.2 micromhos Sept. 12.

EXTREMES, 1949-57.--Specific conductance: Maximum, 6,330 micromhos June 30, 1952; minimum, 22.2 micromhos Sept. 12, 1956.

Specific conductance (micromhos at 25°C) and chloride, in parts per million, water year October 1956 to September 1957

Day	October		November		December	
	Conductance	Chloride	Conductance	Chloride	Conductance	Chloride
1	502	86	453	--	511	--
2	457	--	449	83	497	--
3	--	--	454	--	504	--
4	441	82	460	--	500	101
5	450	--	476	88	512	--
6	444	--	443	--	508	--
7	450	--	439	--	507	--
8	448	--	468	--	510	--
9	447	--	451	--	509	--
10	446	--	446	--	512	103
11	444	81	451	--	550	--
12	443	--	447	--	552	107
13	450	--	443	82	378	63
14	446	--	444	--	462	--
15	444	82	450	--	485	--
16	450	--	451	--	512	--
17	442	--	553	109	513	--
18	453	--	516	--	221	50
19	453	--	508	--	227	--
20	452	--	509	--	220	--
21	448	--	506	--	221	--
22	--	--	505	--	223	50
23	445	83	509	--	102	16
24	470	--	--	--	98.3	--
25	446	--	573	--	95.4	--
26	479	--	511	--	95.6	--
27	477	--	570	115	95.6	--
28	461	--	509	--	95.6	16
29	457	--	509	101	89.7	--
30	484	--	--	--	91.8	--
31	446	--	--	--	89.9	--
January		February		March		
1	961	--	140	--	245	--
2	97.5	--	140	--	245	47
3	98.0	--	270	--	171	--
4	93.1	16	276	--	170	--
5	92.6	--	276	63	170	--
6	108	--	279	--	184	--
7	108	--	--	--	179	--
8	108	--	--	--	181	--
9	99.4	17	--	--	181	--
10	158	25	--	--	173	32
11	96.3	--	--	--	182	36
12	94.3	15	--	--	157	--
13	99.4	--	--	--	160	--
14	99.7	--	217	--	163	--
15	101	16	224	--	148	--
16	98.6	--	244	--	149	30
17	98.3	--	219	--	133	--
18	98.0	--	226	39	135	--
19	98.3	--	223	--	135	--
20	102	--	246	--	133	26
21	103	16	250	--	111	18
22	104	--	252	51	104	--
23	105	--	--	--	105	--
24	105	--	210	--	106	--
25	106	--	207	--	87.7	--
26	105	--	210	--	87.7	--
27	138	--	205	--	86.8	15
28	140	--	237	46	89.9	--
29	141	23	--	--	82.8	--
30	140	--	--	--	84.3	--
31	140	--	--	--	102	--

## MERMENAU RIVER BASIN--Continued

## MERMENAU RIVER AT LAKE ARTHUR, LA.--Continued

Specific conductance (micromhos at 25°C) and chloride, in parts per million.  
water year October 1956 to September 1957--Continued

Day	April		May		June	
	Conductance	Chloride	Conductance	Chloride	Conductance	Chloride
1	104	--	86.5	--	483	130
2	105	--	81.8	--	101	16
3	103	14	79.7	--	105	--
4	103	--	81.0	--	99.7	--
5	103	--	79.3	13	124	--
6	104	--	112	--	123	--
7	104	--	88.3	--	135	--
8	107	--	120	24	122	--
9	110	--	93.2	--	155	24
10	96.7	22	85.6	--	131	--
11	94.7	--	85.6	15	125	--
12	97.4	--	96.3	--	127	--
13	101	20	102	--	165	27
14	87.2	--	109	--	133	17
15	87.2	--	90.9	--	126	--
16	87.2	--	168	32	126	--
17	93.9	--	89.7	--	128	--
18	87.6	--	--	--	124	--
19	88.8	--	--	--	140	--
20	68.0	10	99.1	--	140	--
21	67.3	--	99.1	--	134	--
22	96.9	19	96.8	15	135	21
23	58.6	8.0	97.1	--	128	--
24	77.1	--	103	--	118	--
25	60.2	--	104	--	--	--
26	59.3	--	103	--	--	--
27	78.2	--	105	--	--	--
28	64.3	--	102	--	--	--
29	69.0	--	113	18	107	16
30	75.8	--	102	--	111	--
31	--	--	99.1	--	--	--
	July		August		September	
1	103	--	181	--	181	24
2	98.5	18	180	26	222	--
3	133	20	--	--	273	--
4	127	--	201	27	277	--
5	123	--	--	--	276	--
6	115	--	--	--	278	--
7	115	--	185	--	278	--
8	120	--	198	--	278	48
9	--	--	187	--	279	--
10	--	--	193	--	311	54
11	143	--	169	--	25.8	2
12	150	19	176	--	22.2	2
13	144	--	172	--	--	--
14	145	--	--	--	--	--
15	136	--	166	23	--	--
16	128	--	172	--	188	28
17	123	--	175	--	195	--
18	125	--	185	24	190	--
19	121	--	174	--	192	--
20	120	16	170	--	196	--
21	174	--	170	23	193	--
22	183	--	175	--	193	--
23	177	--	182	--	206	32
24	176	--	196	26	198	--
25	182	--	179	--	180	24
26	173	25	186	--	213	31
27	175	--	176	--	189	--
28	208	32	176	--	189	--
29	181	--	178	--	183	--
30	183	--	174	--	184	--
31	179	--	176	--	--	--

## CALCASIEU RIVER BASIN

## WHISKEY CHITTO CREEK NEAR OBERLIN, LA.

LOCATION.--At gaging station near left bank on downstream side of bridge on State Highway 26, 1 mile downstream from Tenmile Creek, 8 miles upstream from Bundick Creek, and 10 miles northwest of Oberlin, Allen Parish.  
DRAINAGE AREA.--510 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1955 to July 1957.

REMARKS.--Records of discharge for water year October 1956 to September 1957 given in WSP 1512.

Chemical analyses, in parts per million, October 1956 to July 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO <sub>3</sub>	Percent sodium adsorption ratio	Specific conductance (microhmhos at 25°C)	pH		
														Parts per million	Tons per acre-foot	Tons per day						
Oct. 25, 1956	102	29	0.13	4.3	0.8	6.4	1.4	25	0.9	6.0	--	0.2		61	0.08	17	14	0	47	0.7	63.0	6.9
Nov. 29	160	23	.19	2.4	1.0	5.7	1.3	16	1.2	6.0	0.2	.2		49	.07	20	10	0	52	.8	51.3	6.5
Dec. 20	1,940	5.2	.45	1.0	.7	2.1	1.5	7	2.2	3.0	--	.8		20	.03	105	5	0	38	.4	26.4	5.8
Jan. 24, 1957	423	18	.28	2.0	1.0	4.1	1.0	11	1.8	6.0	--	.2		39	.05	45	9	0	46	.6	40.4	6.4
Feb. 18	345	22	.29	2.1	.9	4.8	.9	15	.4	5.5	--	.2		44	.06	41	9	0	51	.7	46.3	6.5
Mar. 21	2,300	6.8	.28	1.0	.6	2.4	.9	6	1.0	3.2	.1	.8		20	.03	124	5	0	46	.5	28.1	5.7
Apr. 17	1,280	8.0	.25	.9	.6	2.7	.8	7	.2	3.0	.3	.5		20	.03	69	5	0	51	.6	26.7	6.0
May 29	230	26	.14	2.7	1.0	6.1	1.2	21	.2	6.0	--	.2		54	.07	34	11	0	52	.8	56.2	6.6
July 16	210	28	.34	2.7	1.1	5.9	1.4	19	.2	6.5	.4	.2		56	.08	32	11	0	50	.8	55.4	6.2

CALCASIEU RIVER BASIN--Continued  
BUNDICK CREEK NEAR DRY CREEK, LA.

LOCATION.--At gaging station at bridge on State Highway 113, 1 mile northeast of town of Dry Creek, Beauregard Parish, and 8 miles upstream from mouth.  
DRAINAGE AREA.--238 square miles.  
RECORDS AVAILABLE.--Chemical analyses: October 1955 to July 1957.  
REMARKS.--Records of discharge for water year October 1956 to September 1957 given in WSP 1512.

Chemical analyses, in parts per million, October 1956 to July 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids (calculated)		Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH		
													Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium				Non-carbonate	
Oct. 24, 1956	59	38	0.34	4.0	1.0	13		36	1.3	8.0	--	0.2	84	0.11	13	14	0	67	1.5	97.8	6.6
Nov. 28	73	27	.26	4.3	1.3	12		30	3.4	9.0	--	.5	73	.10	14	16	0	61	1.3	88.2	6.7
Dec. 19	506	13	.45	2.4	1.0	5.1	1.6	10	4.6	6.8	--	.9	41	.06	56	10	2	48	.7	51.3	6.0
Jan. 20, 1957	114	24	.39	3.5	1.3	8.0	1.5	24	2.8	7.8	--	.2	61	.08	19	14	0	52	.9	69.8	6.4
Feb. 17	114	24	.39	3.4	1.0	11		27	1.8	7.8	--	.8	63	.09	19	13	0	65	1.3	76.5	6.4
Mar. 20	1,240	5.0	.33	1.2	.6	3.2	1.1	6	1.6	3.8	0.5	.8	21	.03	70	5	1	50	.6	32.5	5.7
Apr. 16	317	9.0	.23	1.2	.7	3.4	.8	10	.6	3.2	.2	.8	25	.03	21	6	0	52	.6	34.9	6.0
May 28	95	36	.23	3.4	1.3	11		32	1.2	7.5	--	.2	77	.10	18	14	0	64	1.3	79.8	6.5
July 16	85	37	.39	3.5	1.0	12		30	1.4	9.2	--	.5	80	.11	18	13	0	67	1.5	84.3	6.0

SABINE RIVER BASIN  
SABINE RIVER NEAR TATUM, TEX.

LOCATION. --At gaging station at bridge on State Highway 43, 5 miles upstream from Potter Creek, 5.2 miles northeast of Tatum, Rusk County, 7 miles downstream from Cherokee Bayou, and at mile 339.

DRAINAGE AREA. --3,586 square miles.

RECORDS AVAILABLE. --Chemical analyses: February 1952 to September 1957.

Water temperatures: February 1952 to September 1957.

EXTREMES. 1956-57. --Dissolved solids: Maximum, 805 ppm Oct. 21-31; minimum, 74 ppm Apr. 24-30.

Hardness: Maximum, 97 ppm Oct. 21-31; minimum, 22 ppm Apr. 24-30.

Specific conductance: Maximum, 90°F on several days during July; minimum, 43°F Jan. 18.

Water temperatures: Maximum, 90°F on several days during July; minimum, 43°F Jan. 18.

EXTREMES. 1952-57. --Dissolved solids: Maximum, 936 ppm Aug. 21-31, 1956; minimum, 74 ppm Apr. 24-30, 1957.

Hardness: Maximum, 106 ppm Sept. 1-10, 1954; minimum, 22 ppm Apr. 24-30, 1957.

Specific conductance: Maximum, 1,850 micromhos daily, 1,850 micromhos Oct. 29, 1954, Aug. 31, 1956; minimum daily, 98 micromhos Apr. 29, 1957.

Water temperatures: Maximum, 98°F Aug. 13, 1956; minimum, 42°F Feb. 10, 1956.

REMARKS. --Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1956 to September 1957 given in WSP 1312.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH		
													Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium				Non-carbonate	
Oct. 1-10, 1956 ..	10.2	5.6		20	7.3	246		145	18	340		0.8	730	0.99	20.1	82	0	87	1,320	8.0	
Oct. 11-20 .....	12.0	4.2		22	8.6	244		111	21	358		.2	723	.98	23.4	88	0	86	1,340	7.9	
Oct. 21-31 .....	32.5	4.4		24	9.0	273		148	26	385		.0	805	1.09	70.6	97	0	86	1,480	7.3	
Nov. 1-13, 15 .....	154	7.0		25	8.3	249		81	36	378		1.0	753	1.02	313	96	30	85	1,430	7.4	
Nov. 14, 25-30 .....	146	13		18	4.5	83		58	30	116		1.8	320	.44	126	64	16	74	4.5	550	6.9
Nov. 16-24 .....	238	9.2		13	3.1	38		42	24	48		1.2	a158	.21	102	45	12	64	2.4	280	6.8
Dec. 1-10 .....	61.6	14		20	6.0	143		70	31	212		1.8	494	.67	82.2	80	22	80	7.0	872	7.6
Dec. 11-20 .....	76.1	15		22	5.6	127		61	31	188		1.8	458	.60	90.0	73	22	79	6.5	775	7.3
Dec. 21-31 .....	118.1	14		21	6.0	147		57	33	222		1.0	490	.67	156.0	77	30	81	7.3	888	7.2
Jan. 1-11, 1957 .....	162	15		18	6.3	94		39	39	144		1.5	360	.49	157	71	39	74	4.9	639	7.2
Jan. 12-20 .....	139	11		19	6.9	143		47	46	220		1.2	504	.69	189	86	48	78	6.7	911	7.3
Jan. 21-31 .....	382	12		21	5.8	105		36	37	164		1.6	388	.53	369	72	42	76	5.4	700	7.0
Feb. 1-5, 7-9 .....	1,552	10		13	3.2	65		15	23	105		2.5	a229	.31	960	46	34	75	4.1	427	6.9
Feb. 6, 10-14 .....	1,920	11		11	3.7	32		28	21	47		2.0	3142	.19	736	43	20	62	2.1	251	7.1
Feb. 15-26 .....	625	14		17	5.2	71		29	32	115		1.5	a272	.37	459	64	41	71	3.9	497	7.0
Mar. 1-11 .....	584	17		23	8.6	105		18	46	180		1.2	a369	.53	561	76	62	72	4.7	741	6.6
Mar. 12-16 .....	893	11		23	4.9	89		36	28	79		1.2	a210	.29	506	63	34	63	4.2	361	7.2
Mar. 18-24 .....	1,369	13		16	6.1	80		21	55	134		1.5	a288	.41	1,090	70	53	71	4.2	573	7.1
Mar. 25-31 .....	3,524	9.6		11	3.2	26		27	19	38		1.0	a121	.10	1,150	41	18	56	4.1	222	7.2

Apr. 1-11, 1957 ..	4,752	13	14	3.9	32	32	24	50	1.0	a154	.21	1,980	51	26	58	2.0	285	6.1
Apr. 12-23 .....	5,842	13	11	3.4	24	36	15	35	.8	a120	.16	1,890	41	12	56	1.6	214	6.1
Apr. 24-30 .....	18,580	8.2	4.7	2.5	16	14	12	23	.8	a74	.10	3,710	22	11	61	1.5	133	5.8
May 1-10 .....	45,700	9.8	12	2.9	18	40	11	25	1.2	a100	.14	12,340	42	9	48	1.2	177	6.6
May 11-21 .....	14,210	14	17	3.4	32	58	13	46	2.8	a158	.21	6,060	59	11	54	1.8	282	6.9
May 22-31 .....	8,104	12	18	3.1	18	54	11	26	1.8	a116	.16	2,540	55	11	41	1.0	211	6.6
June 1-10 .....	18,960	11	12	2.8	19	42	12	25	1.2	a104	.14	5,320	41	7	50	1.3	181	6.7
June 11-20 .....	15,430	12	17	3.3	19	56	10	28	1.5	a119	.16	4,960	56	10	42	1.1	212	6.8
June 21-30 .....	4,045	14	16	4.4	40	42	15	67	1.5	a179	.24	1,950	58	24	60	2.3	333	6.7
July 1-10 .....	487	21	21	5.9	76	47	25	126	1.0	a299	.41	377	77	38	68	3.8	568	7.0
July 11-20 .....	180	21	23	6.7	98	60	23	160	.5	398	.54	193	85	36	72	4.6	675	7.1
July 21-31 .....	286	21	20	6.8	117	48	23	190	.5	439	.60	339	78	38	77	5.8	763	6.8
Aug. 1-10 .....	294	23	17	5.7	93	48	22	145	2.5	359	.49	285	66	26	75	5.0	598	7.2
Aug. 11-20 .....	228	18	13	4.4	72	38	22	107	1.5	282	.38	174	51	19	75	4.4	473	7.0
Aug. 21-31 .....	89.2	16	14	4.9	81	48	21	120	1.5	296	.40	71.3	55	16	76	4.7	511	7.1
Sept. 1-5 .....	134	19	16	5.2	96	63	18	142	.5	330	.45	119	62	10	77	5.3	586	7.5
Sept. 6-20 .....	131	17	18	6.3	143	41	19	232	1.0	497	.68	176	71	38	81	7.4	875	7.4
Sept. 21-27, 29-30 ..	521	14	15	5.4	118	42	19	185	1.0	412	.56	580	60	25	81	6.6	728	7.0
Sept. 28 .....	908	16	7.2	3.9	--	25	--	107	1.2	--	--	--	34	14	--	--	396	7.0
Weighted average	3,968	11	13	3.2	25	41	13	37	1.4	126	0.17	1,350	46	12	54	1.6	226	--

a Calculated from determined constituents.

## WESTERN GULF OF MEXICO BASINS

## SABINE RIVER BASIN--Continued

## SABINE RIVER NEAR TATUM, TEX.--Continued

Temperature (°F) of water, water year October 1956 to September 1957

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	77	70	54	55	--	66	57	70	79	--	--	89
2	84	70	--	53	50	64	65	--	77	83	89	89
3	78	70	--	50	50	64	63	--	76	84	89	87
4	80	70	--	52	52	60	64	--	77	90	89	85
5	80	66	57	53	56	60	62	68	76	90	87	87
6	85	65	--	54	54	57	65	--	76	87	84	86
7	78	65	60	54	55	53	66	--	78	85	82	86
8	79	65	--	56	57	54	63	--	80	85	87	85
9	76	64	52	60	56	55	60	71	82	90	87	75
10	78	63	54	52	57	57	60	75	80	90	87	76
11	77	62	55	52	57	68	65	75	82	90	87	75
12	79	--	--	53	56	63	64	77	80	90	87	76
13	77	62	55	54	57	63	61	76	80	90	88	78
14	77	63	--	53	60	66	--	77	80	90	88	78
15	76	62	55	49	56	63	62	77	81	86	88	78
16	78	62	55	47	55	64	62	80	81	86	88	82
17	78	60	56	44	55	67	62	78	83	86	86	81
18	78	63	57	43	55	67	68	77	84	87	86	81
19	77	66	54	46	54	70	64	77	83	85	86	--
20	76	65	53	47	52	67	--	80	84	90	86	--
21	76	60	54	50	54	57	68	80	84	87	--	80
22	76	56	54	50	54	67	--	79	84	87	86	78
23	--	59	54	46	55	64	70	80	84	87	86	76
24	75	58	--	45	55	57	67	80	80	85	86	76
25	74	56	53	47	60	53	66	79	79	85	87	74
26	74	54	52	50	57	53	69	79	79	86	87	71
27	74	52	53	45	53	56	70	78	79	86	89	75
28	74	53	53	47	56	55	70	79	82	86	89	72
29	74	--	53	50	--	55	70	79	81	85	88	70
30	--	53	54	50	--	55	69	79	83	86	88	68
31	74	--	57	--	--	58	--	79	--	86	88	--
Average	77	62	--	50	55	61	65	77	80	87	87	79

SABINE RIVER BASIN--Continued  
SABINE RIVER NEAR RULIFF, TEX.

LOCATION --At gaging station at bridge on State Highway 235, 2.4 miles north of Ruliff, Newton County, 4.2 miles upstream from Kansas City Southern Railway bridge, 4.5 miles downstream from Cypress Creek and at mile 40.

DRAINAGE AREA, 9,440 square miles.  
RECORDS AVAILABLE--Chemical analyses: October 1945 to September 1946, October 1947 to September 1957.

Water temperatures: October 1947 to September 1957.

EXTREMES, 1956-57.--Dissolved solids: Maximum, 250 ppm Dec. 1-12; minimum, 47 ppm Dec. 22-26, 28.

Hardness: Maximum, 52 ppm Aug. 1-10; minimum, 10 ppm Sept. 27-29.

Specific conductance: Maximum daily, 555 micromhos Dec. 5; minimum daily, 53.7 micromhos Dec. 23.

Water temperatures: Maximum, 90° F Aug. 4; minimum, 45° F Jan. 21.

EXTREMES, 1945-46, 1947-57.--Dissolved solids: Maximum, 411 ppm Dec. 26-27, 1948; minimum, 35 ppm June 5-11, 1950.

Hardness: Maximum, 65 ppm Dec. 21-22, 1954; minimum, 8 ppm May 20-24, 1953.

Specific conductance: Maximum daily, 774 micromhos Dec. 26, 1948; minimum daily, 32.9 micromhos May 22, 1953.

Water temperatures (1947-57): Maximum, 95° F Aug. 12, 1953; minimum, 34° F Jan. 28, 1948.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1956 to September 1957 given in WSP 1512.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids (calculated)		Hardness as CaCO <sub>3</sub>		Percentage sodium	Specific conductance (micro-mhos at 25° C)	pH
													Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate			
Oct. 1-10, 1956..	290	21	8.2	2.8	37	46	4.9	47	1.0	146	0.20	114	32	0	71	2.8	244	7.3	
Oct. 11-20 .....	277	21	8.0	2.4	36	46	4.7	46	.5	151	.21	113	30	0	72	2.8	240	7.2	
Oct. 21-31 .....	287	22	7.8	2.5	40	44	5.0	53	.8	162	.22	126	30	0	74	3.2	283	7.6	
Nov. 1-10 .....	463	20	7.4	2.3	38	41	5.8	50	.5	144	.20	180	28	0	75	3.1	251	7.4	
Nov. 11-16, 20-24	738	17	6.2	2.1	39	32	7.0	54	.2	142	.19	283	24	0	78	3.5	246	6.8	
Nov. 17-19, 25-30	991	15	8.6	3.1	76	50	9.6	105	.2	242	.33	648	34	0	83	5.7	450	7.1	
Dec. 1-12 .....	561	15	4.0	4.0	76	56	12	105	.5	250	.34	379	42	0	80	5.1	472	7.6	
Dec. 13-20 .....	2,720	12	6.0	1.7	32	20	8.5	46	.4	117	.16	859	22	6	76	2.9	207	6.6	
Dec. 21-26, 28 .....	10,520	7.8	3.2	1.0	11	11	6.8	13	.2	47	.06	1,330	12	3	65	1.3	71.6	6.3	
Dec. 27, 29-31 .....	4,602	12	4.8	1.5	17	14	11	22	.8	76	.10	944	18	6	67	1.7	125	6.3	
Jan. 1-10, 1957 .....	1,901	16	4.2	1.8	23	20	8.8	28	2.2	94	.13	482	18	2	73	2.3	146	6.8	
Jan. 11-20 .....	1,358	18	5.6	2.2	24	28	9.6	29	.8	103	.14	378	23	0	69	2.1	169	6.7	
Jan. 21-31 .....	1,651	18	6.4	2.4	33	28	10	45	.8	130	.18	580	26	3	73	2.8	219	6.8	
Feb. 1-10 .....	3,648	15	7.8	2.8	41	20	18	60	1.0	156	.21	1,540	31	14	74	3.2	276	6.7	
Feb. 11-20 .....	3,808	14	9.4	3.0	16	20	64	64	1.8	161	.22	1,660	36	23	71	3.0	285	6.6	
Feb. 21-28 .....	7,958	12	7.6	2.0	14	15	12	23	1.5	79	.11	1,700	27	14	54	1.2	133	6.5	
Mar. 1-13 .....	5,485	11	6.2	2.2	19	14	15	27	1.2	89	.12	1,320	24	13	63	1.7	183	6.3	
Mar. 14-27 .....	15,280	7.8	3.9	1.5	13	10	8.8	18	1.0	59	.08	2,430	16	8	64	1.4	102	6.1	
Mar. 28-31 .....	14,100	11	6.8	2.2	18	14	15	26	1.0	87	.12	3,310	26	14	60	1.5	154	6.5	

a Residue on evaporation at 180° C.

SABINE RIVER BASIN--Continued  
 SABINE RIVER NEAR RULIFF, TEX.--Continued

Date of collection	Chemical analyses, in parts per million, water year October 1956 to September 1957--Continued																				
	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids (calculated)			Hardness as CaCO <sub>3</sub>	Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH		
													Parts per million	Tons per acre-foot	Tons per day						
Apr. 1-10, 1957..	14,860	11		6.4	2.5	17	16	15	25			1.2	86	0.12	3,450	26	14	59	1.5	147	6.4
Apr. 11-20 .....	17,170	12		7.8	2.5	19	17	16	27			2.5	95	.13	4,400	30	16	57	1.5	172	5.7
Apr. 21-30 .....	13,020	12		8.6	2.6	21	29	16	26			1.5	102	.14	3,580	32	8	59	1.6	174	5.9
May 1-12 .....	32,580	9.8		4.6	1.6	8.6	3.0	8.2	13	0.4		1.0	57	.08	5,010	18	6	46	.9	91.1	6.1
May 13-23 .....	47,960	10		5.6	2.0	12	20	8.8	16			1.0	65	.09	8,420	22	6	55	1.2	112	6.1
May 24-31 .....	41,320	12		11	3.3	19	44	8.0	26			1.2	102	.14	11,380	40	4	51	1.3	171	7.5
June 1-10 .....	23,860	13		13	3.4	17	46	9.6	25			1.5	106	.14	6,830	46	9	44	1.1	186	6.9
June 11-20 .....	18,220	10		10	2.7	15	34	9.6	21			1.8	87	.12	4,280	36	8	48	1.1	157	6.7
June 21-30 .....	27,860	8.8		10	2.8	15	38	8.2	20			1.2	85	.12	6,390	36	6	47	1.1	153	6.6
July 1-9 .....	29,080	13		11	3.1	19	42	8.0	22			1.0	95	.13	7,460	40	6	47	1.1	164	6.4
July 10-20 .....	3,404	19		13	4.1	25	48	12	36			1.0	134	.18	1,230	50	10	52	1.5	238	7.1
July 21-31 .....	2,915	18		12	3.4	28	39	14	41			.5	136	.18	1,070	44	12	58	1.8	238	6.5
Aug. 1-10 .....	2,029	20		14	4.2	40	46	15	61			1.5	179	.24	981	52	15	62	2.4	317	7.3
Aug. 11-20 .....	1,523	20		12	4.4	37	48	14	53			1.0	165	.24	728	48	8	63	2.4	291	7.1
Aug. 21-31 .....	1,134	19		12	4.1	39	46	13	57			1.0	168	.25	560	47	10	65	2.5	299	7.1
Sept. 1-10 .....	1,109	19		11	3.5	41	44	12	58			.5	a177	.24	530	42	6	68	2.7	287	7.3
Sept. 11-25 .....	1,313	16		9.2	3.0	41	38	10	59			.5	a166	.23	588	36	4	72	3.0	276	7.1
Sept. 26-30 .....	4,900	11		5.6	1.5	24	22	7.6	32			.5	93	.13	1,210	20	2	72	2.3	156	7.1
Sept. 27-29 .....	6,757	6.4		2.6	.9	14	10	5.6	18			.5	53	.07	1,250	10	2	75	1.9	81.1	6.5
Weighted average	9,645	11		8.0	2.5	17	27	10	24			1.2	88	0.12	2,280	30	8	55	1.3	151	--

a Residue on evaporation at 180°C.

## SABINE RIVER BASIN

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## SABINE RIVER BASIN--Continued

## SABINE RIVER NEAR RULIFF, TEX.--Continued

Temperature (°F) of water, water year October 1956 to September 1957  
 Once-daily temperature measurement, usually between 7 and 8 a. m.

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	80	88	52	55	61	60	64	73	77	83	88	86
2	80	88	52	56	61	60	66	73	77	84	--	86
3	80	89	52	56	61	60	65	76	76	84	89	83
4	80	89	55	55	61	60	68	75	--	84	90	84
5	80	70	57	57	62	61	68	75	78	85	89	85
6	80	70	58	57	62	62	68	72	--	85	--	86
7	--	70	60	--	62	63	64	72	78	85	85	86
8	80	75	62	59	63	--	66	72	78	85	80	86
9	--	66	64	56	62	64	64	74	78	85	89	86
10	--	66	62	56	62	65	64	73	78	86	80	86
11	--	63	60	58	61	64	65	73	78	87	80	87
12	82	60	63	59	62	64	65	72	81	88	80	87
13	82	60	62	57	62	65	60	74	81	88	86	87
14	84	60	61	57	61	65	60	75	82	88	86	87
15	84	60	60	54	63	65	60	75	83	88	87	87
16	84	58	60	52	61	--	64	75	84	88	85	87
17	84	50	60	50	62	--	71	76	84	88	89	86
18	84	58	60	49	60	65	71	76	83	88	88	86
19	84	58	60	48	57	65	72	76	83	88	88	85
20	83	59	60	46	55	64	71	76	83	88	88	84
21	83	68	60	45	56	64	72	77	83	88	87	82
22	80	58	60	56	56	66	73	78	82	88	86	80
23	78	57	60	54	57	66	74	78	82	85	86	80
24	76	57	58	--	62	62	75	78	82	86	88	79
25	74	56	56	55	58	58	79	--	82	85	87	76
26	72	54	54	55	57	57	75	78	80	--	87	75
27	72	52	52	56	57	59	75	79	80	85	87	73
28	72	52	52	57	56	65	73	78	79	--	87	70
29	72	52	53	58	--	59	69	78	82	88	86	70
30	70	52	54	60	--	--	72	--	84	88	86	71
31	70	--	55	61	--	65	--	70	--	88	86	--
<b>Average</b>	<b>79</b>	<b>61</b>	<b>58</b>	<b>55</b>	<b>60</b>	<b>63</b>	<b>68</b>	<b>75</b>	<b>81</b>	<b>86</b>	<b>86</b>	<b>82</b>

SABINE RIVER BASIN--Continued  
 MISCELLANEOUS ANALYSES OF STREAMS IN SABINE RIVER BASIN IN TEXAS

Periodic determinations and particle-size analyses of suspended sediment, water year October 1956 to September 1957  
 (Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipet; S, sieve; N, in native water;  
 W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date of collection	Time	Discharge (cfs)	Water temperature (°F)	Suspended sediment							Methods of analysis					
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Discharge (tons per day)	Percent finer than indicated size, in millimeters									
							0.002	0.004	0.008	0.016		0.031	0.062	0.125	0.250	0.350
Apr. 4, 1957 . . . . .	2:30 p. m.	12,800	67	402	3,290	13,900	--	54	59	65	72	81	93	99	100	SPWCM
May 13, . . . . .	2:00 p. m.	38,700	75	631	2,350	65,900	16	19	21	22	27	32	58	71	89	SBWCM

SABINE RIVER NEAR BON WEIR

Particle-size analyses of bed material, water year October 1956 to September 1957  
 (Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; M, mechanically dispersed;  
 N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time	Discharge (cfs)	Number of sampling points	Bed material							Methods of analysis					
				Percent finer than indicated size, in millimeters												
				0.062	0.125	0.250	0.500	1.000	2.000	4.000						
Apr. 4, 1957 . . . . .	2:30 p. m.	12,800	0	2	11	68	96	99	100							S
May 13, . . . . .	2:00 p. m.	38,700	1	8	24	67	98	99	100							S

SABINE RIVER BASIN--Continued  
 MISCELLANEOUS ANALYSES OF STREAMS IN SABINE RIVER BASIN IN LOUISIANA  
 Chemical analyses, in parts per million, January to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (calculated)		Hardness as CaCO <sub>3</sub>	Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH
														Parts per million	Tons per acre-foot				
BAYOU SAN PATRICIO NEAR NOBLE																			
Apr. 19, 1957	66	15	0.87	6.0	3.2	21	19	18	28	0.14	102	0.14	1.8	28	13	62	1.8	172	6.5
May 15	62	16	.89	7.3	3.5	30	28	9.4	45	.17	128	.17	21	33	10	67	2.3	223	6.2
June 14	29	16	2.1	7.3	2.8	31	24	10	46	.18	129	.18	10	30	10	69	2.5	229	5.9
July 8	5.8	18	3.0	9.5	4.1	38	40	11	55	.22	161	.22	2.5	41	8	67	2.6	280	6.2
Sept. 3	.5	5.4	.20	13	6.4	29	77	.4	41	.18	134	.18	.2	59	0	52	1.6	295	7.2
BAYOU SAN MIGUEL NEAR ZWOLLE																			
Jan. 31, 1957	268	6.4	0.50	1.8	1.5	4.0	2.9	6	7.6	5.5	0.7	0.8	35	0.05	25	38	0.5	49.0	5.4
Mar. 1	24	15	.81	5.5	3.0	15	14	24	16	.12	87	.12	5.6	26	15	56	1.3	140	6.3

## NECHES RIVER BASIN

## ANGELINA RIVER NEAR LUFKIN, TEX.

LOCATION--At gaging station at bridge on U. S. Highway 59, 200 feet upstream from Procella Creek, 1½ miles downstream from Bayou Loco, 1.5 miles upstream from Southern Pacific Railroad bridge, and 8 miles north of Lufkin, Angelina County.

DRAINAGE AREA.--1,630 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1954 to September 1957.

Water temperatures: October 1954 to September 1957.

EXTREMES, 1956-57.--Dissolved solids: Maximum, 365 ppm Jan. 11-20; minimum, 42 ppm Apr. 25-28, 30, May 1-2.

Hardness: Maximum, 65 ppm Oct. 21-31; minimum, 15 ppm Apr. 25-28, 30, May 1-2.

Specific conductance: Maximum, 728 microhos Dec. 24; minimum daily, 39 microhos Apr. 25.

Water temperatures: Maximum, 89°F July 9; minimum, 41°F Jan. 18, 19.

EXTREMES, 1954-57.--Dissolved solids: Maximum, 412 ppm Nov. 4-18, 26-30, 1954; minimum, 42 ppm Apr. 25-28, 30, May 1-2, 1957.

Hardness: Maximum, 76 ppm Nov. 4-18, 26-30, 1954; minimum, 15 ppm Apr. 25-28, 30, May 1-2, 1957.

Specific conductance: Maximum daily, 895 microhos Nov. 10, 1954; minimum daily, 39 microhos Apr. 25, 1957.

Water temperatures: Maximum, 89°F July 9, 1957; minimum, 40°F Jan. 24, 1955, Jan. 19-20, 24, 1956.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1956 to September 1957 given in WSP 1512.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (microhos at 25°C)		
														Paris million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate					
Oct. 1-10, 1956	1.58	9.6	0.09	12	6.0	58	52	13	88	0.8	132	18	9.37	34	14	66	2.2	224	7.3	3.5	391	6.9	
Oct. 11-20	1.30	8.8	.02	12	6.4	62	56	13	93	.5	123	.17	8.77	30	4	67	2.2	203	7.3	7.0	3.6	423	6.7
Oct. 21-31	1.31	7.8	.02	14	7.2	64	51	13	105	.5	123	.33	.86	65	22	69	3.5	451	7.6	6.5	3.5	451	7.6
Nov. 1-14	15.2	7.8	.06	11	6.7	70	10	15	115	.2	245	.33	10.1	55	25	73	4.1	482	7.1	7.2	4.1	482	7.1
Nov. 15-20	21.3	9.8	.11	7.5	4.2	44	37	12	62	.2	171	.23	9.83	36	6	72	3.2	293	7.4	6.5	1.9	174	7.3
Nov. 21-30	17.4	8.8	.12	5.1	3.5	23	27	15	27	.8	96	.13	4.51	27	5	65	1.9	174	7.3	6.5	1.9	174	7.3
Dec. 1-10	26.3	13	.14	7.5	3.7	30	24	35	30	.5	132	.18	9.37	34	14	66	2.2	224	7.3	7.0	3.6	423	6.7
Dec. 11-19	26.4	15	.20	6.6	3.3	28	32	30	24	.2	123	.17	8.77	30	4	67	2.2	203	7.3	6.5	3.5	451	7.6
Dec. 20-31	59.6	17	.09	14	6.9	85	22	50	127	.2	339	.46	54.6	64	46	74	4.6	568	6.9	7.2	4.1	482	7.1
Jan. 1-10, 1957	49.6	21	.05	13	5.6	80	15	38	125	.2	310	.42	41.5	56	42	76	4.7	545	6.6	6.5	3.5	451	7.6
Jan. 11-20	46.3	17	.08	14	6.3	99	16	37	159	.2	365	.50	45.6	61	48	78	5.5	649	6.9	7.2	4.1	482	7.1
Jan. 21-31	112	15	.09	10	4.7	71	16	29	110	.0	260	.35	78.6	44	31	78	4.6	470	6.5	6.5	3.5	451	7.6
Feb. 1-10	255	16	.14	9.6	4.4	62	8	30	98	.5	243	.33	167	42	35	76	4.1	416	6.7	7.0	3.6	423	6.7
Feb. 11-19	182	15	.07	13	5.9	92	10	32	155	.2	230	.48	172	57	52	78	5.3	608	6.5	6.5	3.5	451	7.6
Feb. 20-28	283	11	.18	8.6	4.0	60	8	27	93	.2	231	.36	177	38	37	77	4.2	391	6.5	6.5	3.5	451	7.6
Feb. 1-11	341	13	.10	9.6	4.9	69	8	28	112	.2	263	.36	242	44	37	77	4.3	480	6.3	6.3	3.5	451	7.6
Mar. 12-20	277	13	.09	8.7	5.2	72	10	30	114	.2	271	.37	203	43	33	79	4.8	462	6.3	6.3	3.5	451	7.6
Mar. 21-31	615	12	.18	6.9	4.6	55	10	26	86	.2	196	.27	325	36	28	77	4.0	362	6.3	6.3	3.5	451	7.6

Apr. 1-10, 1957	1,124	13	.24	7.6	3.9	37	9	27	56	.5	149	.20	452	35	28	70	2.7	255	6.6
Apr. 11-23	546	16	.32	9.9	5.2	49	16	28	78	.8	207	.27	305	46	33	70	3.2	345	6.7
Apr. 24-29, May 3-9	13,040	13	.34	5.8	2.6	15	22	12	19	.5	79	.11	2,780	26	8	55	1.2	117	6.7
Apr. 25-28, 30,																			
May 1-2	12,450	11	.75	2.5	2.1	3.4	15	6.4	5.0	.5	42	.06	1,410	15	3	28	.4	55	6.6
May 10-20	3,740	15	.51	8.0	3.9	13	32	10	19	1.8	87	.12	879	36	10	44	1.0	144	6.8
May 21-31, June 1-3	832	14	.73	8.9	4.1	17	34	13	23	1.8	100	.14	225	39	11	48	1.2	184	6.9
June 4-10	3,149	13	.78	5.2	2.5	7.5	18	10	12	1.0	64	.09	544	23	8	38	.7	93	6.4
June 11-14, 16-20	4,376	14	.67	7.0	3.1	13	26	10	19	1.0	81	.11	957	30	9	49	1.1	128	6.5
June 15-21	3,140	15	.96	8.3	3.7	30	32	11	44	1.2	130	.18	1,100	36	10	64	2.2	233	7.0
June 22-30, July 1	1,403	16	1.0	7.5	3.7	12	35	9.4	15	1.5	83	.11	314	34	5	44	.9	137	6.7
July 2-10	435	18	1.1	9.9	4.3	21	42	14	27	1.5	118	.16	139	42	8	52	1.4	187	6.7
July 11-23	114	22	.64	10	4.7	28	42	16	38	1.8	142	.19	43.7	44	10	58	1.9	235	7.0
July 24-31	469	14	.52	5.4	2.5	13	16	18	14	1.2	77	.10	97.5	24	11	55	1.2	116	6.5
Aug. 1-10	249	16	.44	7.1	3.2	19	21	22	22	1.0	101	.14	67.9	31	14	57	1.5	161	7.0
Aug. 11-20	157	19	.37	7.2	3.0	26	31	17	30	1.0	119	.16	50.4	30	5	65	2.0	183	7.2
Aug. 21-31	63.7	18	.40	8.0	3.0	29	40	12	35	.5	126	.17	21.7	32	0	66	2.2	202	7.2
Sept. 1-10	57.0	17	.33	8.2	3.5	30	44	10	37	.5	129	.18	19.9	35	0	65	2.2	206	7.3
Sept. 11-20	89.2	14	.38	5.4	3.5	22	34	14	22	1.5	100	.14	24.1	28	0	63	1.8	159	7.4
Sept. 21-30	114	13	.45	5.0	3.0	17	28	14	17	1.0	84	.11	25.9	25	2	60	1.5	135	7.2
Weighted average	1,089	13	0.54	6.0	3.1	17	22	12	23	0.8	88	0.12	259	28	10	57	1.4	138	--

a Residue on evaporation at 180°C.

## WESTERN GULF OF MEXICO BASINS

## NECHES RIVER BASIN--Continued

## ANGELINA RIVER NEAR LUFKIN, TEX.--Continued

Temperature (°F) of water, water year October 1956 to September 1957  
Once-daily measurement, generally at 8:30 a. m.

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	72	59	45	50	52	55	60	67	76	80	84	83
2	72	61	45	49	51	56	65	71	75	81	85	82
3	72	59	47	48	53	56	69	72	73	82	85	82
4	73	61	51	54	52	57	65	71	72	82	85	80
5	73	63	58	51	59	59	64	68	74	82	84	80
6	73	63	59	51	60	56	61	67	74	84	82	80
7	73	64	63	52	59	52	64	67	75	83	80	79
8	66	61	61	51	60	49	65	69	78	83	81	76
9	66	54	54	59	52	50	60	70	79	89	82	76
10	64	56	51	55	63	55	61	--	80	84	81	75
11	64	53	52	--	63	58	64	73	80	85	81	74
12	66	55	54	52	62	58	66	75	82	85	82	75
13	66	55	55	54	59	58	56	76	81	86	82	76
14	66	63	63	55	58	61	59	75	80	86	83	76
15	68	65	58	50	62	58	60	76	81	85	83	78
16	68	55	51	48	61	57	62	76	81	85	84	76
17	67	53	54	44	58	61	--	77	81	85	84	76
18	66	53	57	41	57	62	68	--	80	86	--	77
19	67	54	56	41	55	59	68	74	80	85	83	77
20	69	61	56	46	53	61	69	75	78	85	81	78
21	68	57	54	52	52	60	69	--	72	84	81	81
22	64	51	56	56	52	59	70	78	79	83	80	77
23	68	51	54	47	55	64	73	78	79	82	82	74
24	64	50	52	48	52	59	69	77	76	80	80	78
25	64	50	49	48	58	56	70	79	76	78	81	70
26	65	56	--	48	55	57	71	77	78	80	82	71
27	61	47	--	--	53	55	72	76	76	80	82	71
28	60	45	48	49	54	56	70	75	76	82	83	70
29	61	45	48	54	--	55	68	76	79	82	83	70
30	66	45	46	50	--	59	68	75	80	83	82	69
31	--	--	47	50	--	61	--	76	--	83	83	--
Average	67	56	53	50	56	57	66	74	78	83	82	76

NECHES RIVER BASIN--Continued  
NECHES RIVER AT EVADALE, TEX.

LOCATION.--At gaging station at bridge on U. S. Highway 96, 200 feet upstream from Gulf, Colorado and Santa Fe Railway bridge at Evadale, Jasper County, 600 feet downstream from Mill Creek, 15 miles upstream from Village Creek and at mile 55.

DRAINAGE AREA.--7,908 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1957.

Water temperatures: October 1947 to September 1957.

EXTREMES 1956-57.--Dissolved solids: Maximum, 222 ppm Oct. 21-31; minimum, 50 ppm May 3-15.

Hardness: Maximum, 48 ppm Oct. 11-20, 21-31, Aug. 1-10, 11-20; minimum, 14 ppm May 3-15.

Specific conductance: Maximum daily, 422 micromhos Jan. 25; minimum, 40 micromhos Mar. 19.

Water temperatures: Maximum, 93°F July 29-31; minimum, 40°F Jan. 18.

EXTREMES 1947-57.--Dissolved solids: Maximum, 222 ppm Oct. 21-31, 1956; minimum, 36 ppm May 5-12, 26-27, 1953.

Hardness: Maximum, 70 ppm Nov. 1-10, 1947; minimum, 14 ppm May 3-15, 1957.

Specific conductance: Maximum daily, 422 micromhos Jan. 25, 1957; minimum daily, 49 micromhos May 9, 1953.

Water temperatures: Maximum, 94°F June 29, 1953; minimum, 37°F Jan. 30-31, 1948, Jan. 31, 1949.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1956 to September 1957 given in WSP 1512.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (calculated)		Hardness as CaCO <sub>3</sub>		Per cent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)		
														Parts per million	Tons per acre-foot	Calcium, mg./nestum	Non-carbonate					
Oct. 1-10	170	22		11	4.2	51	76	14	55	0.4	1.0			196	90.0	45	0	71	3.2	327	7.2	
Oct. 11-20	194	22		13	3.9	50	84	12	52	.5	1.5			196	103	48	0	70	3.2	325	7.3	
Oct. 21-31	169	22		13	3.6	61	99	10	61	.5	1.8			222	30	48	0	73	3.8	369	7.2	
Nov. 1-10	131	24		13	3.5	131	54	9.8	48	.4	1.8			196	27	69.3	47	69	3.1	328	7.9	
Nov. 11-20	125	24		13	3.2	37	79	8.6	36	.4	1.2			162	22	54.7	46	64	2.4	258	7.9	
Nov. 21-30	72.3	24		13	3.0	29	67	9.0	29	.4	1.0			141	19	27.5	45	59	1.9	224	7.7	
Dec. 1-10	90.7	22		13	3.1	25	56	10	28	1.2	1.2			130	17	31.8	45	55	1.6	206	7.5	
Dec. 11-20	91.6	21		13	3.0	24	58	11	26	.2	.5			128	17	31.7	45	54	1.6	201	7.2	
Dec. 21-31	239	18		8.8	2.4	24	33	17	28	.2	.5			115	16	74.2	8	62	1.9	181	6.7	
Jan. 1-12, 1957	115	20		11	2.7	21	37	14	27	.5	.8			119	16	35.7	38	54	1.5	180	7.0	
Jan. 13-20	131	21		12	3.3	47	62	15	55	.5	.8			185	25	65.4	44	70	3.1	317	7.2	
Jan. 21-31	228	19		12	2.9	216	62	18	62	.6	.5			229	133	42	40	76	4.1	374	7.3	
Feb. 1-11	189	18		12	2.6	181	45	17	67	.6	.8			191	26	97.5	40	74	3.5	332	7.2	
Feb. 12-22	140	22		13	2.5	170	44	14	55	.5	.8			170	23	64.3	43	68	2.7	280	6.9	
Feb. 23-28	1,237	15		10	2.5	47	44	25	52	.6	.5			175	24	584	36	74	3.4	294	7.2	
Mar. 1-9	1,833	38		8.7	2.5	39	31	26	31	.8	1.0			174	24	861	32	72	3.0	288	6.8	
Mar. 10-17	2,855	14		7.4	2.6	30	19	33	36	.8	1.8			174	24	956	28	13	70	2.5	207	6.9
Mar. 18-21	4,845	8.2		4.0	1.5	14	12	13	15	.8	.8			63	.09	824	16	66	1.6	99	6.4	
Mar. 22-31	5,943	12		7.4	2.4	26	19	19	34	.8	.5			111	15	1,780	28	13	67	2.2	183	6.5
Apr. 1-10	7,069	13		7.6	2.2	18	15	19	24	.4	.5			82	13	1,760	28	16	59	1.5	157	5.9

NECHES RIVER BASIN--Continued  
NECHES RIVER AT EVADALE, TEX.--Continued

Chemical analyses, in parts per million, water year October 1956 to September 1957--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (microhmhos at 25°C)	pH	
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
Apr. 11-20, 1957.	4,430	13	7.2	7.2	2.4	18		15	19	24	0.4	0.8		92	0.13	1,100	28	16	59	1.5	157	5.9
Apr. 21-30	5,544	14	8.6	8.6	2.8	24		16	24	32	.6	1.2		115	.16	1,720	33	20	61	1.8	186	5.7
May 1-2, 16-20	30,870	12	4.8	4.8	2.4	16		16	13	18	.7	3.8		79	.11	6,580	22	9	61	1.5	124	6.2
May 3-15	43,430	10	3.0	3.0	1.6	6.7	3.3	10	9.2	9.0	.7	1.2		50	.07	5,860	14	6	45	.8	76	6.1
May 21-31	15,340	14	8.6	8.6	3.3	13		34	10	16	.6	1.0		84	.11	3,480	35	7	45	1.0	140	6.9
June 1-10	6,217	14	11	11	4.0	15		42	11	20	.5	1.2		98	.13	1,650	44	10	42	1.0	168	6.7
June 11-22	8,133	14	9.0	9.0	3.4	15		31	13	19	.5	1.2		90	.12	1,980	36	11	47	1.1	151	6.5
June 23-30	14,550	9.6	6.6	6.6	2.6	10		22	9.6	14	.5	.8		65	.09	2,550	27	9	45	.9	113	6.5
July 1-10	6,182	16	9.2	9.2	3.3	13		38	8.4	16	.5	.8		86	.12	1,440	36	6	43	.9	136	6.6
July 11-22, 30-31	1,091	18	12	12	3.9	16		48	11	19	.5	.8		105	.14	309	46	6	42	1.0	187	7.0
July 23-29	1,060	14	8.8	8.8	3.1	12		33	11	14	.5	.5		80	.11	229	34	8	42	.9	132	6.7
Aug. 1-10	1,294	19	12	12	4.5	20		54	11	24	.4	1.0		119	.16	416	48	4	47	1.2	183	7.4
Aug. 11-20	7,44	18	12	12	4.4	20		54	13	23	.4	.5		118	.16	237	48	4	48	1.3	194	7.3
Aug. 21-31	1,032	14	10	10	4.7	25		52	14	28	.4	.5		123	.17	343	44	2	55	1.6	206	7.2
Sept. 1-10	662	16	11	11	4.0	25		53	13	28	.4	.5		124	.17	222	44	0	55	1.6	204	7.5
Sept. 11-25	540	17	11	11	3.9	25		54	12	28	.4	.2		124	.17	181	44	0	55	1.6	203	7.4
Sept. 26-30	1,464	11	6.8	6.8	2.7	19		30	11	22	.4	.5		88	.12	348	28	4	59	1.5	138	6.9
Weighted average	4,607	12	6.2	6.2	2.5	15		21	12	17	0.6	1.4		78	0.11	970	26	9	56	1.3	127	--

NECHES RIVER BASIN

NECHES RIVER BASIN--Continued  
NECHES RIVER AT EVADALE, TEX.--Continued

Temperature (°F) of water, water year October 1956 to September 1957  
(Recorder with temperature attachment, continuous thermograph)

Day	October		November		December		January		February		March		April		May		June		July		August		September	
	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min
1.....	80	74	69	60	--	--	63	55	65	60	58	62	60	70	70	81	80	82	81	90	89	87	84	
2.....	80	75	69	64	--	a 66	57	51	65	62	61	60	64	62	70	80	79	84	82	90	88	88	85	
3.....	81	74	71	64	--	a 62	56	50	63	61	60	65	64	70	79	78	85	84	90	88	88	88	84	
4.....	80	75	72	67	--	a 56	62	56	68	63	60	60	66	65	70	78	78	86	85	90	88	84	82	
5.....	80	72	--	a 70	--	a 54	59	54	70	65	60	60	66	65	70	69	78	78	87	86	90	89	85	
6.....	83	72	--	a 70	--	a 68	58	53	70	66	60	59	66	64	69	68	79	78	88	87	90	89	86	
7.....	83	71	--	a 64	--	a 71	61	57	68	65	59	58	65	64	68	80	79	88	87	89	87	86	83	
8.....	--	a 68	--	a 64	--	a 68	63	58	70	65	58	56	65	64	68	80	79	87	87	88	86	84	80	
9.....	--	a 68	--	a 60	--	a 56	66	62	74	65	58	55	65	63	70	68	81	80	88	87	88	86	82	
10.....	--	a 68	--	a 45	--	a 56	65	56	78	68	58	57	64	63	71	70	82	81	88	87	86	84	82	
11.....	--	a 68	--	a 55	--	a 55	56	53	71	66	60	58	64	63	72	71	82	82	89	88	84	83	82	
12.....	--	a 73	--	a 54	--	a 68	57	55	66	63	61	60	66	64	72	72	82	82	90	88	86	84	79	
13.....	--	a 71	--	a 72	--	a 69	62	57	70	61	61	60	66	64	73	72	83	82	90	89	87	85	81	
14.....	--	--	--	a 72	--	a 65	63	59	71	61	62	60	64	63	74	73	84	83	90	89	88	86	82	
15.....	78	70	--	a 72	--	a 65	59	52	71	63	62	61	64	63	75	74	84	83	90	88	89	86	83	
16.....	75	70	--	a 73	--	a 60	52	46	68	62	62	61	64	64	76	75	84	84	90	88	89	86	81	
17.....	75	69	--	--	--	a 60	48	42	62	57	62	62	66	64	76	76	84	84	92	89	90	86	82	
18.....	74	69	--	a 65	--	a 60	51	40	57	55	63	61	68	66	76	76	84	83	92	89	90	88	80	
19.....	73	70	--	a 68	--	a 54	48	43	56	56	63	62	70	68	76	76	84	83	90	87	89	87	83	
20.....	74	71	--	a 68	--	a 63	55	48	61	54	63	62	72	70	76	76	84	83	90	87	89	86	83	
21.....	71	69	--	a 65	--	61	58	54	60	52	64	62	72	71	77	76	83	82	89	87	89	86	85	
22.....	72	65	--	a 54	--	61	58	53	61	54	65	63	73	72	78	77	82	80	87	85	87	84	80	
23.....	74	65	--	a 56	61	60	58	53	59	58	65	64	75	73	79	78	80	80	85	84	87	84	80	
24.....	74	65	--	a 57	60	56	53	51	59	58	64	62	75	74	79	79	80	80	85	83	87	84	79	
25.....	76	67	--	a 57	56	53	53	51	59	59	62	61	76	74	80	79	80	79	86	84	86	85	78	
26.....	75	66	--	a 53	55	52	53	52	59	58	61	59	76	76	80	80	79	79	86	86	87	85	76	
27.....	73	62	--	a 53	55	51	56	53	58	57	60	59	76	76	80	79	80	79	87	87	86	82	71	
28.....	73	64	--	--	--	55	51	50	55	59	57	60	76	73	80	79	78	77	88	87	89	87	71	
29.....	73	66	--	a 54	58	48	65	59	--	--	60	59	73	72	80	79	80	78	93	89	89	87	71	
30.....	70	67	--	a 58	58	48	64	61	--	--	60	60	72	71	81	80	81	80	93	90	87	85	71	
31.....	70	63	--	61	49	66	61	--	--	61	60	60	--	--	81	81	--	--	93	90	86	85	--	
Average.....	--	69	--	62	--	59	58	53	65	61	61	60	69	67	75	74	81	80	88	87	88	86	81	

a No pen trace, daily measurements taken at 7:30 a.m., used as the minimum.

TRINITY RIVER BASIN  
CLEAR FORK TRINITY RIVER AT FORT WORTH, TEX.

LOCATION.--Temperature recorder at gaging station, at bridge on Vickery Boulevard, Fort Worth, Tarrant County, 100 feet upstream from East-West Expressway bridge, 310 feet downstream from Texas and Pacific Railway bridge, 3 miles upstream from mouth, 5 miles downstream from Marys Creek, and 10 miles downstream from Bendrook Dam.

DRAINAGE AREA.--326 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1948 to September 1952.

Water temperatures: October 1948 to September 1957.

EXTREMES, 1936-57.--Maximum, 94 F July 30, Aug. 1; minimum, 38 F Jan. 17.

EXTREMES, 1948-53, 1954-57.--Water temperatures: Maximum, 98 F Aug. 28, 1956; minimum, freezing point on several days in January 1949.

REMARKS.--No flow on many days. No temperature record, Sept. 17-30. Records of discharge for water year October 1956 to September 1957 given in WSP 1512.

Temperature (°F) of water, water year October 1956 to September 1957

Day	October		November		December		January		February		March		April		May		June		July		August		September	
	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min
1.	--	--	--	--	--	--	49	47	42	40	58	53	63	59	70	89	80	78	83	81	84	88	85	83
2.	--	--	62	60	--	--	43	42	42	57	55	55	65	61	71	70	80	75	84	82	83	89	86	84
3.	--	--	60	57	--	--	48	47	49	43	59	55	65	63	73	71	77	74	84	83	92	88	85	84
4.	--	--	57	52	51	49	52	48	51	49	60	56	63	60	71	68	74	72	86	83	93	88	88	83
5.	77	73	57	54	55	51	50	49	51	50	60	57	62	58	65	72	71	89	86	91	88	88	83	83
6.	--	--	57	55	--	--	52	49	50	47	57	54	64	59	66	65	74	72	91	85	90	85	86	83
7.	--	--	59	55	58	54	51	50	52	49	55	51	68	63	68	66	76	74	92	88	88	85	84	80
8.	--	--	--	--	--	--	54	50	57	52	54	50	67	60	70	67	81	76	92	88	87	85	80	77
9.	--	--	--	--	--	--	57	54	62	56	57	51	63	59	70	68	83	80	91	87	88	84	80	76
10.	--	--	--	--	--	--	62	60	58	55	65	61	73	70	85	82	92	88	88	88	88	85	80	76
11.	--	--	--	--	--	--	48	47	61	58	66	58	70	65	75	72	85	83	92	88	88	85	80	77
12.	--	--	--	--	--	--	50	47	62	58	64	60	69	58	74	70	84	83	92	88	88	85	80	76
13.	--	--	--	--	--	--	51	48	60	58	63	60	58	55	71	67	84	81	92	88	90	86	78	76
14.	--	--	--	--	--	--	49	46	61	60	63	61	60	55	72	69	84	80	92	88	89	86	78	76
15.	--	--	47	45	--	--	47	44	67	60	63	56	60	56	77	72	82	77	92	87	89	87	79	74
16.	--	--	46	44	--	--	44	39	62	56	61	58	61	59	78	77	83	77	93	88	88	85	78	74
17.	--	--	49	46	42	38	57	55	61	59	67	61	77	74	83	82	92	87	92	87	85	84	--	--
18.	--	--	46	43	42	39	56	54	64	61	68	67	73	68	84	82	92	87	92	87	84	82	--	--
19.	68	65	--	--	43	42	42	41	54	63	59	68	65	70	67	84	83	93	88	84	82	--	--	--
20.	68	65	--	--	45	43	44	42	57	53	62	58	70	68	71	68	84	82	92	88	85	80	--	--
21.	--	--	46	44	49	44	44	44	55	53	60	57	68	66	70	68	83	77	92	88	85	81	--	--
22.	--	--	48	46	52	48	56	54	62	57	68	65	70	68	70	69	78	72	91	88	87	82	--	--
23.	--	--	47	45	47	42	53	52	63	61	68	66	70	64	72	70	64	72	90	88	86	88	83	--
24.	--	--	47	44	43	42	53	50	61	58	68	67	68	65	72	71	85	82	90	85	85	85	--	--
25.	--	--	47	44	43	41	57	53	67	54	69	66	70	65	72	71	87	82	90	86	86	86	--	--
26.	--	--	47	44	41	39	56	53	58	52	58	52	71	66	70	65	76	74	88	84	88	85	--	--
27.	--	--	48	45	40	37	56	52	57	52	54	50	65	63	73	70	76	74	90	85	88	85	--	--
28.	--	--	46	46	40	37	56	52	54	50	58	65	72	71	77	75	82	77	92	87	89	85	--	--
29.	--	--	49	46	40	39	--	--	57	58	68	66	76	72	80	78	83	80	93	88	86	84	--	--
30.	64	63	--	--	49	47	40	39	--	--	58	56	70	68	77	75	82	80	94	88	84	83	--	--
31.	--	--	50	47	41	39	--	--	--	--	78	77	--	--	78	77	--	--	93	89	85	82	--	--
Average	--	--	--	--	46	44	44	44	56	53	60	56	66	62	72	64	80	77	90	86	88	85	--	--

## TRINITY RIVER BASIN

## TRINITY RIVER BASIN--Continued

## ELM FORK TRINITY RIVER NEAR MUENSTER, TEX.

LOCATION.--At gaging station at bridge on Farm Road 373, 2.5 miles south of Muenster, Cooke County, 2.5 miles downstream from Long Branch, and 6.5 miles upstream from Brushy Elm Creek.

DRAINAGE AREA.--46.0 square miles, of which 30.97 square miles are above flood-detention structures.

RECORDS AVAILABLE.--Water temperatures: October 1956 to September 1957.

Sediment records: October 1956 to September 1957.

EXTREMES, 1956-57.--Water temperatures: Maximum, 83°F July 7.

Sediment concentrations: Maximum daily, 3,000 ppm Apr. 26; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 14,000 tons Apr. 26; minimum daily, no flow on many days.

REMARKS.--No flow October, November, January, February and March; tabulation omitted for these months. Records of discharge for water year October 1956 to September 1957 given in WSP 1512.

Temperature (°F) of water, April to July 1957

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1							--	68	70	77		
2							--	66	70	78		
3							65	64	67	78		
4							--	64	69	77		
5							--	60	69	78		
6							--	60	69	79		
7							--	59	70	83		
8							--	68	72	79		
9							--	69	73	78		
10							--	65	74	79		
11							--	65	75	77		
12							--	71	75	77		
13							--	65	74	78		
14							--	64	76	--		
15							--	66	76	--		
16							--	69	75	--		
17							--	70	76	--		
18							--	65	75	--		
19							--	65	70	--		
20							--	67	--	--		
21							--	71	76	--		
22							--	79	76	--		
23							61	70	77	--		
24							65	67	69	--		
25							--	68	69	--		
26							63	67	73	--		
27							--	68	73	--		
28							64	68	74	--		
29							63	69	75	--		
30							--	69	78	--		
31							--	69	--	--		
Average							--	67	73	--		

Suspended sediment, water year October 1956 to September 1957

Month	Mean discharge (cfs)	Tons per day
Dec. 19 .....	14	a 2.0
20 .....	32	a 6.5
21 .....	8.9	a 1.2
22 .....	2.4	a .3
23 .....	1.2	a .2
24 .....	.5	a .1
Total .....	59	10.3

Computed from water-sediment discharge curve.

## TRINITY RIVER BASIN--Continued

## ELM FORK TRINITY RIVER NEAR MÜNSTER, TEX.--Continued

Suspended sediment, water year October 1956 to September 1957--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	0	--	0	270	544	sb 507	d 384	1,280	s 2,530
2.....	0	--	0	275	410	304	d 381	1,710	sb 7,820
3.....	2.5	--	a .3	266	800	s 697	253	714	488
4.....	8.0	--	a 1.0	217	452	265	258	885	703
5.....	15	--	a 2.2	185	242	121	201	526	285
6.....	8.9	--	a 1.2	177	209	100	185	448	224
7.....	5.8	--	a .7	166	244	109	169	310	141
8.....	3.4	--	.4	154	190	79	158	335	143
9.....	2.2	--	a .3	167	334	s 156	150	329	133
10.....	1.4	--	a .1	146	267	105	146	255	101
11.....	.9	--	a .1	210	892	s 716	132	287	102
12.....	.6	--	a .1	148	262	105	114	315	97
13.....	.3	--	a .1	263	871	s 806	100		
14.....	.2	--	(at)	160	618	267	88		
15.....	.2	--	(at)	142	388	149	79	160	35
16.....	.2	--	(at)	136	240	88	72		
17.....	.1	--	(at)	156	497	sb 448	62		
18.....	.1	--	(at)	566	1,340	sb 3,470	64		
19.....	.5	--	a .1	198	483	258	61		
20.....	1.1	--	a .1	175	380	180	54	114	15
21.....	61	--	a 19	160	386	167	37		
22.....	65	--	a 21	147	395	157	34		
23.....	469	2,290	sb 4,010	213	725	sb 555	73	--	a 28
24.....	156	350	147	285	712	sb 675	32		
25.....	290	954	sc 3,420	878	2,080	sb 6,340	28	127	9.1
26.....	1,520	3,000	sb 14,000	d 270	582	424	25		
27.....	432	--	a 2,500	204	464	256	24		
28.....	399	1,040	s 1,920	191	388	200	23		
29.....	407	1,170	sb 1,630	174	279	131	22		
30.....	278	--	a 700	221	581	sb 698	19	80	4.4
31.....	--	--	--	243	866	sb 711	--	--	--
Total.	4,128.4	--	28,373.9	d 7,163	--	19,244	3,428	--	7,099.3
July			August			September			
1.....	16			0.3			0.1		
2.....	18	80	3.5	.2			.1		
3.....	16			0			.1		
4.....	15			0			.1		
5.....	15			0.1			.1		
6.....	15			0			.1		
7.....	15	88	2.5	.1			.2		
8.....	9.6			0			.1		
9.....	4.4			0			.1		
10.....	3.7			0			.1		
11.....	3.2	150	1.3	.1			.6		
12.....	2.6	165	1.2	.1			.5		
13.....	2.2	103	.6	.2			.1		
14.....	1.8	--	a .2	1.0			3.9		
15.....	1.5	--	a .2	.3			2.3		
16.....	1.2	--	a .2	.2			.7		
17.....	1.0	--	a .1	.2			.3		
18.....	.8	--	a .1	.2			.2		
19.....	.6	--	a .1	.2			.2		
20.....	.6	--	a .1	.2			.2		
21.....	.8	--	a .1	.2			.2		
22.....	.9	--	a .1	.2			1.2		
23.....	1.0	--	a .1	.2			.4		
24.....	1.4	--	a .2	.2			.2		
25.....	1.2	--	a .2	.1			.3		
26.....	.9	--	a .1	.1			.3		
27.....	.6	--	a .1	.1			.3		
28.....	.5	--	a .1	.1			.2		
29.....	.4	--	a .1	.1			.2		
30.....	.4	--	a .1	.1			.2		
31.....	.3	--	a .1	.1			--		
Total.	151.6	--	34.4	4.8	--	a 1.0	13.6	--	a 2.5
Total discharge for year (cfs-days).....									d 14,948.4
Total load for year (tons).....									54,765.4

s Computed by subdividing day.

t Less than 0.05 ton.

a Computed from water-sediment discharge curve.

b Computed from partly estimated concentration graph.

c Computed from estimated concentration graph.

d Revised.

TRINITY RIVER BASIN--Continued  
ELM FORK TRINITY RIVER NEAR MUENSTER, TEX.--Continued

Particle-size analyses of suspended sediment, water year October 1956 to September 1957  
(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipet, S, sieve, N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date of collection	Time	Discharge (cfs)	Water temperature (°F)	Suspended sediment										Methods of analysis			
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters											
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250		0.350	0.500	1.000
Apr. 23, 1957 ...	7:00 a. m.	510	61	2,100	1,490	52	57	62	72	84	94	98	99	100	100	1.000	SBWCM
Apr. 26 .....	9:00 a. m.	560	63	2,060	1,050	44	48	54	56	64	82	82	86	99	100	--	SBWCM
May 1 .....	9:30 p. m.	469	67	1,640	1,190	33	34	50	52	63	76	69	87	100	--	--	SBWCM
May 11 .....	8:20 a. m.	345	76	2,020	1,640	40	43	49	52	55	67	78	91	99	100	--	SBWCM
May 13 .....	10:45 a. m.	535	66	1,420	520	38	42	44	47	51	65	82	97	100	--	--	SBWCM
May 18 .....	5:30 a. m.	733	65	1,660	659	43	47	50	56	64	77	92	98	99	100	--	SBWCM
May 24 .....	6:10 a. m.	485	67	2,330	1,420	42	47	51	57	64	76	90	98	100	--	--	SBWCM
June 1 .....	6:10 p. m.	1,270	72	4,810	3,090	46	51	54	65	76	88	96	99	100	--	--	SBWCM

## TRINITY RIVER BASIN

## TRINITY RIVER NEAR ROSSER, TEX.

LOCATION--At gaging station at bridge on State Highway 34, 2.5 miles south of Rosser, Kaufman County, 8.5 miles downstream from East Fork and at mile 451.

DRAINAGE AREA --8 162 square miles.

RECORDS AVAILABLE--Chemical analyses: October 1954 to September 1957.

Water temperatures: October 1954 to September 1957.

EXTREMES 1954-57--Dissolved solids: Maximum 1,730 ppm Oct. 1-10; minimum, 190 ppm June 21-30.

Hardness: Maximum, 310 ppm Oct. 11-20; minimum, 119 ppm June 21-30.

Specific conductance: Maximum daily, 2,960 micromhos Oct. 13; minimum daily, 279 micromhos Apr. 27.

Water temperatures: Maximum 84°F July 27; minimum, 41°F Jan. 18.

EXTREMES 1954-57--Dissolved solids: Maximum 1,800 ppm Aug. 21-31, 1956; minimum, 190 ppm June 21-30, 1957.

Hardness: Maximum, 310 ppm Oct. 11-20, 1956; minimum, 199 ppm June 21-30, 1957.

Water temperatures: Maximum daily, 2,980 micromhos Oct. 13, 1956; minimum daily, 279 micromhos Apr. 27, 1957.

Water temperatures: Maximum, 97°F July 1, 1955; minimum, 34°F Jan. 20, 1956.

REMARKS.--Values reported for dissolved solids concentrations less than 1,000 ppm are residues on evaporation and for concentrations more than 1,000 ppm are calculated from determined constituents unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1956 to September 1957 given in WSP 1512.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent adsorbium	Specific conductance (micro-mhos at 25°C)	pH		
													Parts per million	Tons per acre-foot	Tons per day	Calcium	Non-carbonate					
Oct. 1-10, 1956	118	28		94	18	496		213	353	555		78		1,730	2.35	551	308	134	78	12	2,740	8.0
Oct. 11-20	181	24		93	19	485		223	329	548		84		1,690	2.30	826	310	128	77	12	2,770	7.8
Oct. 21-31	127	18		82	15	362		174	332	362		87		1,320	1.80	453	266	124	75	9.7	2,150	7.1
Nov. 1-3, 5	380	21		82	16	396		206	279	490		80		1,400	1.90	1,440	270	101	76	10	2,340	7.4
Nov. 4, 6	637	9.6		52	4.6	86		163	78	81		8.7		1,400	.54	688	148	14	56	3.1	688	7.6
Nov. 7-17	207	15		75	10	262		150	251	262		52		1,000	1.36	559	227	104	71	7.6	1,650	7.8
Nov. 18-30	131	22		73	13	390		272	328	328		71		1,360	1.85	481	236	13	78	11	2,190	7.1
Dec. 1-10	134	27		67	13	375		206	324	318		100		1,320	1.80	478	220	51	79	11	2,120	7.2
Dec. 11-20	176	28		69	13	391		191	344	338		104		1,380	1.88	656	226	70	79	11	2,230	7.7
Dec. 21-31	273	14		64	7.9	209		140	226	175		62		849	1.15	626	193	78	70	6.5	1,350	7.2
Jan. 1-10, 1957	157	22		69	12	297	18	192	266	282		81		1,140	1.55	483	222	64	73	8.7	1,880	7.0
Jan. 11-20	148	20		66	12	315	18	192	280	280		94		1,190	1.62	476	214	56	74	9.3	1,990	7.2
Jan. 21-31	170	20		66	12	322	19	184	299	285		99		1,210	1.65	555	214	63	75	9.6	2,030	7.1
Feb. 1-10	348	16		69	7.5	218		152	224	185		74		925	1.26	869	204	80	70	6.6	1,430	7.1
Feb. 11-19	176	16		65	8.0	214		183	204	175		64		863	1.17	410	195	45	70	6.7	1,390	6.9
Feb. 20-28	199	18		67	8.0	294		289	241	200		84		1,050	1.43	564	198	0	76	9.1	1,660	7.1
Mar. 1-10	186	24		68	8.2	258		179	242	212		82		992	1.35	498	202	56	74	7.9	1,560	7.3
Mar. 11-19, 21	375	18		68	8.0	252		194	215	214		87		973	1.32	985	190	31	74	8.0	1,540	7.5
Mar. 20, 22-24	860	14		53	4.0	112		146	114	90		33		506	.69	1,170	148	28	62	4.0	1,821	7.3
Mar. 25-31	338	15		68	6.1	162		163	160	146		49		711	.97	649	194	60	64	5.0	1,160	7.1

Apr. 1-11, 21, 1957	2,363	12	65	3.9	50	153	77	49	16	366	.50	2,340	178	52	38	1.6	587	7.5
Apr. 12-20	342	17	89	5.9	152	196	176	139	46	745	1.01	668	246	66	57	4.2	1,170	7.1
Apr. 22-30	26,870	11	46	2.6	19	125	37	14	7.1	210	.29	15,240	126	23	24	.7	334	7.3
May 1-10	20,920	11	51	3.2	25	140	35	27	6.3	241	.33	13,610	141	26	27	.9	390	7.7
May 11-20	22,380	9.8	49	3.2	24	137	33	27	3.8	222	.30	13,410	135	23	28	.9	368	7.3
May 21-31	34,950	8.4	46	3.0	20	133	25	22	3.2	203	.28	19,160	126	17	25	.8	336	7.3
June 1-10	35,510	13	46	3.3	15	136	24	16	3.0	196	.27	18,780	128	17	21	.6	319	7.8
June 11-20	14,640	12	45	3.7	21	135	24	24	3.5	216	.29	8,540	128	17	26	.8	348	7.5
June 21-30	10,020	11	42	3.4	21	130	21	24	3.5	a190	.26	5,140	119	12	28	.8	333	7.7
July 1-10	8,808	16	46	3.6	20	140	22	24	2.5	214	.29	5,090	130	15	25	.8	350	7.8
July 11-20	6,132	14	43	3.3	21	130	22	25	2.5	209	.28	3,460	121	14	28	.8	344	7.7
July 21-31	6,218	14	43	3.5	21	132	22	24	3.0	202	.27	3,390	122	14	27	.8	344	7.6
Aug. 1-10	5,916	14	45	3.7	21	139	23	23	3.5	218	.30	3,480	128	14	26	.8	351	8.1
Aug. 11-20	6,157	13	45	3.5	24	142	23	25	3.5	218	.30	3,620	127	10	29	.9	353	8.1
Aug. 21-31	2,455	9.2	46	4.0	25	155	25	21	4.0	220	.30	1,460	131	4	29	1.0	367	7.8
Sept. 1-10	922	14	52	4.3	61	170	57	49	15	368	.50	916	147	8	48	2.2	582	8.2
Sept. 11-20	508	14	51	4.4	81	172	65	69	20	a389	.53	531	145	4	55	2.9	670	8.1
Sept. 21-30	583	12	51	4.4	89	159	89	70	20	452	.61	724	145	14	57	3.2	701	7.8
Weighted average	5,805	12	47	3.4	26	136	33	27	5.6	231	0.31	3,620	131	20	30	1.0	378	--

a Calculated from determined constituents.

## WESTERN GULF OF MEXICO BASINS

## TRINITY RIVER BASIN--Continued

## TRINITY RIVER NEAR ROSSER, TEX.--Continued

Temperature (°F) of water, water year October 1956 to September 1957  
 Once-daily temperature measurement usually between 7 and 8 a. m.

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	74	65	48	50	47	55	--	68	--	80	82	81
2	74	64	47	50	49	56	--	68	75	80	81	82
3	75	62	56	50	52	56	63	71	75	81	82	80
4	77	66	54	53	56	57	62	70	75	81	81	--
5	76	60	57	52	54	57	60	67	74	81	80	82
6	76	55	59	53	54	55	60	67	76	81	79	83
7	74	56	62	52	56	52	63	66	78	80	79	80
8	72	57	57	57	59	51	62	67	79	81	78	77
9	72	56	51	59	62	52	--	67	80	79	80	77
10	72	55	49	54	62	58	--	69	81	80	81	76
11	71	57	53	52	62	59	64	72	81	81	79	77
12	71	56	51	50	61	59	61	73	79	80	80	78
13	72	59	51	52	61	61	57	71	79	81	82	79
14	72	61	49	52	62	62	55	70	80	80	82	80
15	73	62	49	49	64	59	60	73	80	80	82	80
16	70	57	48	44	62	59	61	74	80	79	81	77
17	70	54	52	44	59	61	--	75	80	80	81	78
18	71	53	49	41	57	62	66	74	79	80	81	77
19	72	57	50	43	56	59	67	72	78	80	80	--
20	72	60	51	45	54	59	68	74	79	80	79	80
21	70	57	--	52	53	56	66	76	79	80	82	81
22	69	54	--	55	55	57	66	77	79	81	81	78
23	69	54	--	50	53	59	65	75	79	79	80	75
24	70	52	--	47	54	58	66	73	77	79	82	72
25	70	53	--	48	55	53	65	74	76	80	82	71
26	66	53	--	47	56	51	66	73	80	80	82	--
27	65	49	--	45	54	49	67	74	78	84	83	73
28	64	50	--	44	54	50	67	74	79	82	81	72
29	66	46	--	46	--	56	66	74	80	81	81	72
30	67	47	--	45	--	60	68	76	81	81	81	71
31	64	--	--	46	--	62	--	77	--	82	81	--
Average	71	56	--	49	57	57	64	72	78	80	81	77

TRINITY RIVER BASIN--Continued  
CEDAR CREEK NEAR MABANK, TEX.

LOCATION.--At gaging station at bridge on State Farm Highway 85, 2 miles downstream from Lacy's Fork and 5 1/4 miles southwest of Mabank, Kaufman County.  
DRAINAGE AREA.--734 square miles.

RECORDS AVAILABLE.--Chemical analyses: April 1956 to September 1957 (discontinued).

Water temperatures: April 1956 to September 1957 (discontinued).

EXTRMES, 1956-57.--Dissolved solids: Maximum, 471 ppm Jan. 14-21; minimum, 51 ppm Feb. 24-25, Apr. 20, 23-28.

Hardness: Maximum, 172 ppm June 28-30, July 1, 23-25; minimum, 17 ppm Feb. 24-25.

Specific conductance: Maximum daily, 894 micromhos Jan. 17; minimum daily, 50.7 micromhos Apr. 20.

Water temperatures: Maximum, 79°F June 27, Aug. 19, 21-22; minimum, 44°F Jan. 27-28.

EXTRMES, April 1956-September 1957.--Dissolved solids: Maximum, 471 ppm Jan. 14-21, 1957; minimum, 51 ppm Feb. 24-25, Apr. 20, 23-28, 1957.

Hardness: Maximum, 172 ppm June 28-30, July 1, 23-25, 1957; minimum, 17 ppm Feb. 24-25, 1957.

Specific conductance: Maximum daily, 894 micromhos Jan. 17, 1957; minimum daily, 50.7 micromhos Apr. 20, 1957.

Water temperatures: Maximum, 83°F on several days during May and June 1956; minimum, 44°F Jan. 27-28, 1957.  
REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1956 to September 1957 given in WSP 1512.

Chemical analyses, in parts per million, November 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (calculated)		Hardness as CaCO <sub>3</sub>		Percent adsorption	Specific conductance (micro-mhos at 25°C)	pH			
														Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate						
Nov. 18-30, 1956	a 551	8.4	--	13	2.6	15	43	19	11	0.6	2.9			94	0.13	140	42	7	44	1.0	150	7.4	
Nov. 18-30, 1956	.22	10	--	18	3.4	20	63	26	16	7	1.5			127	.17	.08	60	8	42	1.1	207	7.5	
Dec. 1-15, 1956	65.9	6.0	--	6.6	3.3	8.2	25	15	7.8	--	1.0			60	.08	10.7	30	10	37	7.7	103	7.2	
Dec. 19-21, 1956	23.8	10	--	22	4.4	56	83	44	55	5	2.2			235	.32	15.1	73	5	62	2.8	405	7.4	
Jan. 1-5, 1957	10.9	9.6	--	18	3.7	31	72	27	27	7	1.0			153	.21	4.50	61	2	52	1.7	268	7.3	
Jan. 6-13, 1957	50.7	7.4	--	20	4.6	108	55	29	160	7	1.8			358	.49	49.0	69	24	77	5.7	675	6.9	
Jan. 14-21, 1957	1.30	9.6	--	26	7.1	142	65	23	230	5	1.2			471	.64	1.65	95	42	77	6.4	891	7.2	
Jan. 22-24, 30-31, 1957	1,295	8.2	--	8.7	1.6	7.2	34	11	5.2	5	2.0			66	.09	231	28	0	32	.6	101	6.8	
Feb. 1-4, 1957	72.4	8.4	--	18	2.8	18	56	30	10	6	3.8			120	.16	23.5	56	10	42	1.1	198	7.1	
Jan. 25-29, 1957			--																				
Feb. 5-9, 1957	66.8	10	--	17	3.6	22	63	23	19	5	2.2			127	.17	22.9	57	5	45	1.3	214	7.4	
Feb. 10-18, 1957	6.90	12	--	23	5.5	30	79	33	31	5	1.2			175	.24	3.26	80	15	45	1.5	304	7.2	
Feb. 19-23, 1957	8.90	14	--	23	8.1	43	66	37	63	6	1.2			222	.30	5.33	91	37	51	1.9	406	7.7	
Feb. 24-25, 1957	72.1	5.8	--	3.3	2.1	8.4	18	7.8	8.2	8	2.0			51	.07	0.93	17	2	46	.9	79	6.7	
Feb. 26-28, 1957	110	7.8	--	11	2.8	18	45	14	15	6	2.5			94	.13	27.9	38	1	50	1.2	161	7.4	
Mar. 1-2, 1957	7.72	13	--	20	5.6	39	66	30	49	6	2.8			192	.26	4.00	74	20	53	2.0	350	7.5	
Mar. 3-7, 1957	3.92	8.8	--	32	9.4	52	87	64	65	5	1.0			276	.38	2.92	118	47	49	2.1	494	7.6	
Mar. 8-16, 1957			--																				
Mar. 17, 21-22, 24, 1957	1,713	8.8	--	9.1	3.0	11	35	13	10	6	1.5			74	.10	342	35	6	41	.8	125	6.9	
Mar. 18-20, 23, 1957	2,340	9.6	--	11	3.4	22	41	19	22	6	2.2			110	.15	695	41	7	53	1.5	188	7.4	
Mar. 25-31, 1957			--																				
Apr. 1-2, 1957	356	12	0.44	20	3.3	20	66	22	16	8	3.5			132	.18	127	64	10	40	1.1	221	7.5	

a No flow Oct. 1-31, Nov. 1-3, Dec. 16-18, July 2-22, 26-31, Aug. 1-9, 14-31, Sept. 1-21, 30.

TRINITY RIVER BASIN--Continued  
CEDAR CREEK NEAR MABANK, TEX.--Continued  
Chemical analyses, in parts per million, November 1956 to September 1957---Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (calculated)		Hardness as CaCO <sub>3</sub>		Percent sodium ratio	Specific conductance (micro-mhos at 25°C)	pH	
														Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate				
Apr. 3-7, 1957 ...	4,100	9.0	0.58	9.1	2.5	11	34	8.6	11	0.7	2.5	72	0.10	797	33	5	41	0.8	117	7.2	
Apr. 8-19 .....	64.1	17	.18	26	6.9	35	78	43	41	.4	2.5	210	.29	36.3	94	30	45	1.6	362	7.2	
Apr. 20, 23-28 ...	17,590	8.2	.22	6.5	1.9	3.8	29	4.0	5.0	.5	2.2	51	.07	2,420	24	0	21	.3	84	6.4	
Apr. 21-22, 29-30	12,920	11	.18	11	3.0	6.0	50	5.2	7.5	5	3.2	78	.13	2,720	41	0	22	.4	130	6.7	
May 1-5, .....	4,364	12	.23	17	3.0	11	67	8.2	8.5	.5	3.0	96	.13	1,130	55	0	31	.7	162	7.0	
May 6-12, .....	4,455	13	.40	23	4.6	31	79	24	36	.5	2.5	174	.24	214	76	11	47	1.6	300	7.1	
May 13-20, .....	2,392	11	.36	16	3.5	19	58	17	18	.5	3.2	116	.16	762	54	6	43	1.1	196	6.6	
May 21-24, 26-29	3,344	6.4	.57	10	2.3	7.4	35	10	9.8	.5	3.2	72	.10	650	35	6	28	.5	119	6.6	
May 25, 30-31 ...	2,383	11	.56	26	3.7	16	86	21	16	.4	3.5	142	.19	914	80	10	33	.9	240	6.9	
June 1-3, .....	1,019	7.8	.47	24	2.9	13	81	14	11	7	2.5	116	.16	319	71	5	29	.7	202	7.4	
June 4-7, .....	2,500	8.6	.36	11	3.2	13	40	12	14	8	1.5	84	.11	567	41	8	41	.9	143	7.1	
June 8-10, 12-13	2,120	15	.28	28	5.1	25	88	28	28	7	2.0	175	.24	56.7	91	19	37	1.1	300	7.5	
June 11, 14-16 ...	26.2	16	.18	36	8.7	42	42	97	54	56	6	1.2	263	36	18.6	126	48	42	1.6	462	7.6
June 17-24, .....	3.45	17	.08	46	13	58	112	79	84	.5	1.5	354	.48	3.30	168	78	43	1.9	617	7.8	
June 25-27, .....	8.33	12	.02	18	3.9	24	67	21	24	.5	2.0	138	.19	3.10	61	6	46	1.3	258	7.2	
June 28-30, July 1, 23-25, .....	3.63	20	.04	49	12	61	143	69	79	.5	2.2	b386	.52	3.78	172	55	43	2.0	622	7.9	
Aug. 9-13, .....	40.0	14	.38	19	4.5	26	70	25	26	.6	2.0	151	.21	16.3	66	9	47	1.4	251	7.7	
Aug. 15-22, .....	c0	16	.10	30	6.4	32	95	46	29	.7	1.8	b223	.39	---	101	23	40	1.4	346	7.8	
Sept. 22-26, .....	612	9.2	.61	11	2.5	18	43	17	14	.0	2.5	96	.13	159	3	2	51	1.3	134	7.2	
Sept. 27-30, .....	5.65	9.6	.57	16	2.8	24	56	23	22	.6	1.8	128	.17	1.95	51	6	51	1.5	211	7.1	
Weighted average	911	9.2	---	11	2.5	12	42	8.7	9.4	.5	2.6	76	0.10	187	38	3	41	0.8	127	---	

b. Residue at 180°C.

c. Includes days of less than 0.05 cubic feet per second.

## TRINITY RIVER BASIN--Continued

## CEDAR CREEK NEAR MABANK, TEX.--Continued

Temperature (°F) of water, November 1956 to September 1957  
 Once-daily measurement, usually at about 4 p. m.

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1		--	--	59	52	58	57	56	--	77	--	--
2		--	--	59	53	57	57	57	--	77	--	--
3		--	--	58	53	57	57	57	--	78	--	--
4		--	--	59	55	56	56	--	71	78	--	--
5		--	--	60	56	56	56	57	70	78	--	--
6		--	--	58	56	55	56	57	69	--	--	--
7		57	--	58	58	56	56	57	69	--	--	--
8		60	--	59	58	56	56	57	71	--	--	--
9		60	--	59	59	56	51	57	76	--	76	--
10		58	--	58	60	56	--	58	78	--	77	--
11		58	--	--	60	58	--	57	70	--	--	--
12		58	--	--	60	58	56	57	71	--	76	--
13		61	--	--	60	58	55	57	76	--	78	--
14		60	--	--	59	59	56	58	78	--	77	--
15		60	--	--	59	58	55	58	73	--	78	--
16		61	--	--	57	57	57	57	76	--	77	--
17		60	--	--	58	57	57	58	72	--	78	--
18		61	--	--	56	58	56	57	76	--	78	--
19		61	--	--	60	57	56	57	74	--	79	--
20		60	--	--	58	57	55	--	71	--	78	--
21		59	60	--	60	57	55	58	74	--	79	--
22		59	59	--	59	58	56	58	73	--	79	--
23		59	59	--	55	57	56	58	73	--	--	70
24		60	58	49	56	55	56	59	76	--	--	69
25		58	58	45	57	53	56	59	76	--	--	69
26		57	58	45	56	56	56	58	77	--	--	69
27		57	59	44	57	57	57	58	79	--	--	69
28		56	58	44	58	58	56	58	70	--	--	68
29		55	60	45	--	58	56	--	--	--	--	69
30		--	60	48	--	58	56	58	76	--	--	68
31		--	60	50	--	57	--	59	--	--	--	--
Average		--	--	--	57	57	56	58	73	--	--	--

## WESTERN GULF OF MEXICO BASINS

## TRINITY RIVER BASIN--Continued

## PIN OAK CREEK NEAR HUBBARD, TEX.

LOCATION.--At gaging station at bridge on State Highway 171, 5.8 miles southeast of Hubbard, Hill County, and 9 miles upstream from Elm Creek.

DRAINAGE AREA.--17.6 square miles.

RECORDS AVAILABLE.--Water temperatures: January to September 1957.

Sediment records: October 1956 to September 1957.

EXTREMES, 1956-57.--Water temperatures: (January to September 1957), Maximum, 77°F June 12. Sediment concentrations: Maximum daily, 5,160 ppm June 4, minimum daily, no flow on many days.

Sediment loads: Maximum daily, 12,200 tons Apr. 20; minimum daily, no flow on many days.

REMARKS.--No flow October 1956, July to August 1957; tabulation omitted for these periods. Maximum observed sediment concentration during water year, 114,000 ppm Apr. 19. Records of discharge for water year October 1956 to September 1957 given in WSP 1512.

Temperature (°F) of water, January to September 1957

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1				--	49	--	58	69	72			--
2				--	47	--	65	67	71			--
3				--	50	--	68	68	70			--
4				--	60	--	59	68	70			--
5				--	55	--	52	60	72			--
6				--	54	--	47	58	73			--
7				--	55	--	62	60	73			--
8				--	62	--	53	63	73			--
9				--	62	--	53	66	76			--
10				--	61	--	55	67	76			--
11				--	62	--	--	69	76			--
12				--	62	58	--	69	77			--
13				--	59	58	--	71	--			--
14				--	62	58	--	68	--			--
15				--	--	--	--	71	--			--
16				--	--	--	--	73	--			--
17				--	--	63	--	73	--			--
18				--	50	59	--	70	--			--
19				--	49	55	68	66	--			--
20				--	48	56	64	68	--			--
21				--	--	59	64	73	--			--
22				--	56	55	68	75	--			71
23				--	51	61	63	75	--			66
24				--	47	50	66	74	--			64
25				--	53	46	65	75	--			--
26				--	51	--	67	74	--			--
27				34	48	51	62	72	--			--
28				37	--	49	67	69	--			--
29				49	--	55	66	69	--			--
30				--	--	60	67	70	--			--
31				43	--	61	--	71	--			--
Average				--	--	--	--	69	--			--

TRINITY RIVER BASIN--Continued

PIN OAK CREEK NEAR HUBBARD, TEX.--Continued

Suspended sediment, water year October 1956 to September 1957

Day	November			December			January		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	0	--	0	0	--	0	0	--	0
2.....	0	--	0	0	--	0	0	--	0
3.....	1.5	--	a .7	0	--	0	0	--	0
4.....	847	4,150	sb7,900	0	--	0	0	--	0
5.....	27	1,100	80	0	--	0	0	--	0
6.....	1.3	250	.9	0	--	0	0	--	0
7.....	0	--	0	0	--	0	0	--	0
8.....	0	--	0	0	--	0	0	--	0
9.....	0	--	0	0	--	0	0	--	0
10.....	0	--	0	0	--	0	0	--	0
11.....	0	--	0	0	--	0	0	--	0
12.....	0	--	0	0	--	0	0	--	0
13.....	0	--	0	0	--	0	0	--	0
14.....	0	--	0	0	--	0	0	--	0
15.....	0	--	0	0	--	0	0	--	0
16.....	0	--	0	0	--	0	0	--	0
17.....	0	--	0	0	--	0	0	--	0
18.....	0	--	0	0	--	0	0	--	0
19.....	0	--	0	.4	--	a .1	0	--	0
20.....	0	--	0	5.6	517	s7.2	0	--	0
21.....	0	--	0	.5	410	.6	0	--	0
22.....	0	--	0	.1	200	.1	0	--	0
23.....	0	--	0	0	--	0	0	--	0
24.....	0	--	0	0	--	0	0	--	0
25.....	0	--	0	0	--	0	0	--	0
26.....	0	--	0	0	--	0	0	--	0
27.....	0	--	0	0	--	0	7.1	1,150	s36
28.....	0	--	0	0	--	0	5.3	635	9.1
29.....	0	--	0	0	--	0	3.8	220	2.3
30.....	0	--	0	0	--	0	2.7	135	1.0
31.....	--	--	0	0	--	0	4.1	1,000	11
Total..	876.8	--	7,981.6	6.6	--	8.0	23.0	--	59.4
	February			March			April		
1.....	180	2,760	sb1,890	0	--	0	24	900	58
2.....	9.0	350	8.5	0	--	0	2.3	195	1.2
3.....	3.2	178	1.5	0	--	0	3.4	353	s3.5
4.....	1.6	125	.5	0	--	0	1.7	195	.9
5.....	.7	86	.2	0	--	0	.3	129	.1
6.....	.3	78	.1	0	--	0	.1	118	(t)
7.....	.1	20	(t)	0	--	0	0	--	0
8.....	0	--	0	0	--	0	0	--	0
9.....	0	--	0	0	--	0	0	--	0
10.....	0	--	0	0	--	0	0	--	0
11.....	0	--	0	1.3	--	a .5	0	--	0
12.....	0	--	0	.5	198	.3	0	--	0
13.....	0	--	0	0	--	0	0	--	0
14.....	0	--	0	0	--	0	0	--	0
15.....	0	--	0	0	--	0	0	--	0
16.....	0	--	0	0	--	0	0	--	0
17.....	0	--	0	45	1,210	s590	0	--	0
18.....	0	--	0	54	1,000	146	0	--	0
19.....	0	--	0	5.7	196	3.0	205	3,270	s4,800
20.....	0	--	0	40	896	s664	1,970	1,940	s12,200
21.....	.1	18	(t)	195	1,240	s1,130	428	4,100	sb3,940
22.....	.2	10	(t)	4.6	246	3.1	84	1,480	s468
23.....	1.9	100	.5	2.1	135	.8	1,080	2,550	8,360
24.....	1.3	220	.8	1.0	84	.2	449	2,580	s5,410
25.....	.6	110	.2	.7	70	.1	86	1,350	s710
26.....	.1	100	(t)	.6	66	.1	151	1,190	s1,960
27.....	0	--	0	22	3,290	s814	372	1,000	1,000
28.....	0	--	0	8.6	1,200	28	51	2,070	s445
29.....	--	--	--	2.4	325	2.1	53	850	122
30.....	--	--	--	1.0	195	.5	7.2	150	2.9
31.....	--	--	--	8.0	1,240	s74	--	--	--
Total..	199.1	--	1,902.3	392.5	--	3,456.7	4,968.0	--	39,281.6

s Computed by subdividing day.  
t Less than 0.05 tons.

a Computed from water-sediment discharge curve.  
b Computed from partly estimated concentration graph.

## TRINITY RIVER BASIN--Continued

## PIN OAK CREEK NEAR HUBBARD, TEX.--Continued

Suspended sediment, water year October 1956 to September 1957--Continued

Day	May			June			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	53	2,060	sb495	5.2	400	5.6	0	0	0
2.....	53	520	74	19	1,440	sc172	0	0	0
3.....	110	1,920	s1,430	238	2,620	s3,030	0	0	0
4.....	19	700	36	348	5,160	s5,510	0	0	0
5.....	3.2	144	1.2	83	1,000	224	0	0	0
6.....	.2	137	.1	1.7	258	1.2	0	0	0
7.....	.1	134	(t)	.4	225	.2	0	0	0
8.....	0	--	0	.1	270	.1	0	0	0
9.....	13	2,190	s143	0	--	0	0	0	0
10.....	1.6	290	1.3	0	--	0	0	0	0
11.....	218	2,350	s3,300	0	--	0	0	0	0
12.....	304	900	739	0	--	0	0	0	0
13.....	919	2,680	s8,000	0	--	0	0	0	0
14.....	13	460	16	0	--	0	0	0	0
15.....	3.0	146	1.2	0	--	0	0	0	0
16.....	1.3	182	.6	0	--	0	0	0	0
17.....	.6	195	.3	0	--	0	0	0	0
18.....	.3	205	.2	0	--	0	0	0	0
19.....	.3	222	.2	0	--	0	0	0	0
20.....	.1	197	.1	0	--	0	0	0	0
21.....	.1	172	(t)	0	--	0	0	0	0
22.....	0	--	0	0	--	0	5.6	1,060	sb51
23.....	.4	232	.3	0	--	0	0	0	0
24.....	3.5	331	3.2	0	--	0	0	0	0
25.....	11	1,850	s244	0	--	0	0	0	0
26.....	7.6	1,250	26	0	--	0	0	0	0
27.....	2.8	300	2.3	0	--	0	0	0	0
28.....	.7	220	.4	0	--	0	0	0	0
29.....	.2	224	.1	0	--	0	0	0	0
30.....	.1	252	.1	0	--	0	0	0	0
31.....	57	5,130	s1,830	--	--	--	--	--	--
<b>Total.</b>	<b>1,796.1</b>	<b>--</b>	<b>16,344.7</b>	<b>695.4</b>	<b>--</b>	<b>8,943.1</b>	<b>5.4</b>	<b>--</b>	<b>51</b>

Total discharge for year (cfs-days)..... 8,963.1

Total load for year (tons)..... 78,028.4

s Computed by subdividing day.

b Computed from partly estimated concentration graph.

t Less than 0.05 tons.

c Computed from estimated concentration graph.

TRINITY RIVER BASIN--Continued  
PIN OAK CREEK NEAR HUBBARD, TEX.--Continued

Particle-size analyses of suspended sediment, water year October 1956 to September 1957  
(Methods of analysis: B, bottom withdrawal tube; D, decantation; F, pipet; S, sieve; N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date of collection	Time	Discharge (cfs)	Water temperature (°F)	Suspended sediment										Methods of analysis			
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters											
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250		0.350	0.500	1.000
Nov. 4, 1956	7:45 a. m.	1,030	--	3,740	2,870	--	77	84	90	94	97	99	100	--	--	100	SPWCM
Nov. 4	1:00 p. m.	1,870	--	3,040	73	81	86	92	96	96	97	99	100	--	--	100	SBWCM
Nov. 4	3:00 p. m.	1,470	--	1,840	1,330	79	86	89	93	96	97	98	99	100	100	100	SBWCM
Dec. 20	4.1	22	--	1,780	609	97	98	99	99	99	99	99	99	100	100	100	SBWCM
Jan. 27, 1957	1:30 p. m.	484	36	4,140	3,210	--	85	91	94	98	99	99	100	--	--	100	SPWCM
Feb. 1	6:00 a. m.		49	5,630	4,390	--	66	71	80	85	96	99	100	--	--	100	SPWCM
Mar. 17	6:30 p. m.	48	62	1,290	810	76	82	84	86	86	90	91	93	98	100	100	SBWCM
Mar. 17	10:30 p. m.	258	62	4,670	3,070	68	73	80	87	89	95	98	99	100	100	100	SBWCM
Mar. 18	10:40 p. m.	33	61	1,773	482	83	90	91	96	98	98	99	99	100	100	100	SBWCM
Mar. 21	7:00 a. m.	252	57	1,560	1,000	70	76	81	87	84	96	99	100	--	--	100	SBWCM
Mar. 27	7:00 p. m.	124	52	26,200	4,050	--	33	62	73	83	96	99	100	--	--	100	SPN
Mar. 27	7:00 p. m.	124	52	26,200	4,210	--	72	76	84	83	97	99	100	--	--	100	SPWCM
Mar. 27	9:00 p. m.	96	51	8,110	2,760	--	75	81	--	86	99	100	--	--	100	SPWCM	
Mar. 31	6:50 p. m.	8.5	60	3,920	2,500	79	87	89	94	96	98	99	99	100	100	100	SBWCM
Apr. 20	8:00 a. m.	3,310	64	2,100	1,350	75	81	86	94	97	98	99	99	100	100	100	SBWCM
Apr. 20	7:00 p. m.	81	71	1,980	1,420	66	74	81	85	88	96	99	99	100	100	100	SBWCM
Apr. 23	6:00 a. m.	215	63	6,280	4,160	--	70	73	77	88	95	99	100	--	--	100	SPWCM
Apr. 23	7:00 a. m.	988	62	9,070	2,340	--	70	73	82	82	98	100	--	--	100	SPWCM	
Apr. 24	5:00 p. m.	926	66	14,200	4,800	--	72	79	88	86	96	98	100	--	--	100	SPWCM
Apr. 24	7:00 p. m.	1,260	66	4,870	3,360	--	73	80	88	85	97	99	100	--	--	100	SPWCM
May 3	7:00 p. m.	425	70	2,810	1,550	58	64	72	77	86	93	99	99	100	100	100	SBWCM
May 25	7:00 p. m.	96	75	13,500	4,840	--	62	66	72	79	99	99	99	100	100	100	SPWCM
May 25	7:00 p. m.	96	75	13,500	4,840	--	62	66	72	79	99	99	99	100	100	100	SPN
May 31	6:00 a. m.	168	71	8,700	5,860	--	13	57	70	81	98	98	100	--	--	100	SPWCM
June 3	3:30 p. m.	252	73	15,000	5,280	--	12	69	81	91	96	99	100	--	--	100	SPN
June 3	3:30 p. m.	252	73	15,000	5,510	--	74	82	87	94	99	99	100	--	--	100	SPWCM
Sept. 22	4:00 p. m.	27	71	2,360	1,650	45	65	80	92	96	98	100	100	--	--	100	SBN
Sept. 22	4:00 p. m.	27	71	2,360	1,920	17	77	82	87	93	95	97	99	100	100	100	SBWCM

TRINITY RIVER BASIN--Continued  
 RICHLAND CREEK NEAR FAIRFIELD, TEX.

LOCATION.--At bridge on State Farm Highway 488, 4 miles upstream from mouth, 4 miles downstream from Chambers Creek and 16 miles north of Fairfield, Freestone County.

RECORDS AVAILABLE.--Chemical analyses: April 1956 to September 1957.

Water temperatures: April 1956 to September 1957.

EXTREMES, 1956-57.--Dissolved solids: Maximum, 12,200 ppm Oct. 11-17; minimum, 131 ppm Apr. 21-30.

Hardness: Maximum, 460 ppm Oct. 18; minimum, 79 ppm Nov. 5-8.

Specific conductance: Maximum daily, 20,000 micromhos Oct. 10-11; minimum daily, 157 micromhos Apr. 25.

Water temperatures: Maximum, 98°F Aug. 3; minimum, 40°F Jan. 19.

EXTREMES, April 1956 to September 1957.--Dissolved solids: Maximum, 13,500 ppm Aug. 11-31, 1956; minimum, 131 ppm Apr. 21-30, 1957.

Hardness: Maximum, 460 ppm Oct. 18, 1956; minimum, 79 ppm Nov. 5-8, 1956.

Specific conductance: Maximum daily, 22,000 micromhos Aug. 22, 1956; minimum daily, 157 micromhos Apr. 25, 1957.

Water temperatures: Maximum, 98°F Aug. 3, 1957; minimum, 40°F Jan. 19, 1957.

REMARKS.--Values reported for dissolved solids concentrations less than 1,000 ppm are residues on evaporation and for concentrations more than 1,000 ppm are calculated from determined constituents unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. No discharge records available.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Mag-nesium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Car-bonate (CO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> )	Bo-ron (B)	Dissolved-solids			Hardness as CaCO <sub>3</sub>		Per-cent so-lid-ad-sorp-tion ratio	So-dium adsorp-tion	Specific conduct-ance (micro-mhos at 25 C)	pH	
															Parts per mil-lion	Tons per acre-foot	Tons per day	Calcium	Non-carbon-ate					
Oct. 1-10, 1956	---	---	---	---	---	---	---	502	40	---	6,730	---	---	---	---	292	286	0	---	---	18,800	8.5	---	
Oct. 11-17	---	---	---	---	---	---	---	533	41	---	7,110	---	---	---	---	12,200	296	0	---	---	19,500	8.6	---	
Oct. 18	---	---	---	---	---	---	---	424	29	---	3,700	---	---	---	---	460	460	64	---	---	11,100	8.6	---	
Oct. 19-20	8.4	---	---	40	4.1	393	393	135	0	63	560	0.8	3.0	---	---	1,140	116	116	6	88	2,080	7.8	16	
Oct. 21-26	---	9.6	---	44	6.6	831	831	159	0	58	1,240	1.8	1.5	---	---	2,270	306	136	6	93	4,160	8.2	31	
Oct. 27-31, Nov. 1-4	---	6.0	---	52	17	2,420	320	15	39	3,640	6	---	---	---	---	6,350	8,64	200	0	96	10,900	8.5	75	
Nov. 5-8	---	7.8	---	27	3.0	43	103	0	24	43	6	1.5	---	---	---	222	30	79	0	54	358	7.9	2.1	
Nov. 9-12	---	9.4	---	55	4.4	167	142	0	31	260	5	1.5	---	---	---	635	154	154	38	70	1,120	8.0	5.9	
Nov. 13-20	---	9.6	---	76	8.6	480	172	0	38	770	5	1.5	---	---	---	1,470	2,00	225	84	82	14	8.0	14	
Nov. 21-25	---	13	---	116	19	1,390	322	0	41	2,180	8	---	---	---	---	3,920	5,33	368	104	89	6,890	8.2	31	
Nov. 26-30, Dec. 1-10	---	6.6	---	91	27	2,530	395	0	45	3,870	8	---	---	---	---	6,780	9,19	338	14	94	11,500	7.8	60	
Dec. 11-18	---	---	---	---	---	---	---	313	10	---	3,130	---	---	---	---	419	419	---	---	---	14,900	8.3	---	
Dec. 20-21	---	---	---	---	---	---	---	191	0	---	800	---	---	---	---	---	---	---	---	---	2,770	7.7	---	
Dec. 22	---	---	---	---	---	---	---	151	0	---	64	---	---	---	---	---	---	---	---	---	---	545	7.9	---
Dec. 23-31	---	9.4	---	54	5.3	229	138	0	83	318	8	3.8	---	---	---	787	1,06	196	43	76	1,420	7.7	8.0	
Jan. 1-5, 1957	---	8.0	---	70	9.9	761	339	0	59	1,150	7	4.1	---	---	---	2,170	2,95	215	34	88	3,910	8.1	23	
Jan. 6-12	---	4.3	---	75	18	1,740	230	10	51	2,620	7	---	---	---	---	4,680	6,38	281	0	94	8,230	8.4	47	
Jan. 13-22	---	2.9	---	110	22	2,760	472	17	58	4,170	9	---	---	---	---	7,370	10,0	385	0	94	12,600	8.4	63	
Jan. 23	---	9.6	---	30	2.8	165	122	0	28	222	8	2.5	---	---	---	a521	7.1	87	0	80	988	7.9	7.7	
Jan. 24-25	---	12	---	44	5.7	439	162	0	38	660	8	6.7	---	---	---	1,300	1,77	156	23	86	2,430	7.8	15	

TRINITY RIVER BASIN

Jan. 26-31, 1957.....	12	--	66	11	1,070	246	0	32	1,630	.8	4.0	2,950	4.01	210	8	92	32	5,370	8.1
Feb. 1, 10-13.....	14	--	70	7.6	389	208	0	54	580	.6	6.0	1,220	1.66	206	36	40	12	2,200	8.2
Feb. 2-5.....	12	--	35	2.7	118	0	23	7	23	1.4	4.4	208	.28	99	27	40	80	523	7.8
Feb. 6-9.....	15	--	54	4.9	126	172	0	43	168	.7	3.7	511	.69	154	13	64	4.4	511	8.0
Feb. 14-20.....	6.2	--	76	14	1,040	221	0	66	1,600	.6	1.4	2,910	3.96	248	67	90	29	5,180	7.7
Feb. 21-22.....	2.4	--	70	21	1,850	314	0	52	2,820	.5	--	4,970	6.76	261	4	94	50	8,880	7.6
Feb. 23-28, Mar. 1-3.....	15	--	94	22	1,890	344	9	68	2,880	.6	--	5,150	7.00	324	27	93	46	8,990	8.3
Mar. 4-11.....	9.0	--	48	5.7	282	152	0	44	412	.5	3.8	882	1.20	143	18	81	10	1,640	7.9
Mar. 12-19.....	8.6	--	57	9.0	733	227	0	31	1,100	.5	2.7	2,050	2.79	180	0	90	24	3,750	8.0
Mar. 20, 26, 30-31.....	10	.06	40	3.4	83	140	0	27	1,06	.6	1.8	362	.49	114	0	61	3.4	634	7.6
Mar. 21-25, 27-29.....	11	.11	38	2.6	24	119	0	27	20	.6	3.2	200	.27	106	8	33	1.0	324	7.5
Apr. 1-7.....	13	.06	42	3.0	269	131	0	33	51	.8	4.0	289	.37	117	10	46	1.9	435	7.8
Apr. 8-10, 20.....	14	.05	57	4.2	92	173	0	42	120	.8	2.5	430	.58	160	18	56	3.2	731	7.8
Apr. 11-15.....	15	.03	81	9.0	348	221	7	63	518	.8	4.7	1,160	1.58	239	58	76	9.8	2,050	8.5
Apr. 16-19.....	14	.02	98	11	691	289	0	66	1,050	.8	5.5	2,060	2.83	290	52	84	18	3,730	8.1
Apr. 21-30.....	9.6	.27	29	2.5	14	99	0	14	10	.8	2.0	a131	.18	83	2	27	.7	217	7.9
May 1-7.....	14	.04	44	3.7	138	0	25	12	5	3.2	202	.27	125	12	22	22	.6	313	7.2
May 8-12.....	14	.01	76	4.5	46	200	0	50	58	.5	9.9	376	.51	208	44	32	1.4	608	7.7
May 13-15.....	12	.03	45	3.4	130	0	33	5	3.8	.8	2.8	226	.31	127	20	29	.9	365	7.8
May 16-17, 24-27.....	12	.02	42	2.4	17	119	0	29	13	.5	3.8	188	.26	114	16	24	.7	299	7.6
May 18-23.....	15	.02	86	5.0	55	210	0	70	70	.4	12	444	.60	235	63	34	1.6	705	7.8
May 28-31.....	14	.02	60	3.0	28	160	0	39	32	.4	6.2	281	.38	162	31	27	1.0	446	7.6
June 1-6.....	11	.06	46	3.2	22	126	0	36	32	.7	3.8	225	.31	128	25	28	.9	354	7.3
June 9-13.....	15	.02	72	4.9	63	186	0	56	84	.7	7.2	403	.55	200	47	41	2.0	681	7.8
June 14-28.....	16	.02	78	6.0	170	201	0	67	245	.7	9.7	704	.96	219	54	63	5.0	1,230	7.7
June 29-30, July 1-9.....	16	.00	73	7.6	325	182	0	90	468	.5	7.8	1,060	1.47	214	56	77	9.6	1,940	8.0
July 10-20.....	12	.04	85	11	715	247	0	79	1,060	.7	2.5	2,110	2.87	257	54	86	19	3,600	7.9
July 21-29.....	15	.01	72	15	1,190	259	0	72	1,800	.6	2.0	3,290	4.47	241	28	91	33	5,930	8.2
July 30-31, Aug. 1-6, 12-13.....	11	.01	54	8.3	610	266	0	70	850	.7	2.5	1,740	2.37	168	0	89	20	3,130	8.2

a Calculated from determined constituents.

TRINITY RIVER BASIN--Continued  
 RICHLAND CREEK NEAR FAIRFIELD, TEX.--Continued

Chemical analyses, in parts per million, water year October 1956 to September 1957.--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbomate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Boron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	
															Parts per million	Tons per acre-foot	Tons per day	Calcium magnesium	Non-carbonate				
Aug. 7-11, 1957.....		10	0.02	60	11	1,120	291	0	53	1,860	0.8	2.0	2.0			3,060	4.16	194	0	93	5,530	8.1	
Aug. 14-19, 25.....		7.4	.05	43	7.6	574	173	2	34	852	.7	2.0	2.0			1,610	2.19	139	0	90	2,960	8.3	
Aug. 20-24, 26-31,		5.6	.03	81	14	1,120	282	7	46	1,700	.8	1.5	1.5			3,100	4.22	260	17	90	5,630	8.4	
Sept. 1-2.....		5.6	.02	96	22	2,160	379	13	46	3,300	.7	--	--			5,830	7.93	330	0	93	10,000	8.4	
Sept. 3-10.....																							
Sept. 11-22.....		5.2	.02	74	27	2,990	415	14	29	4,540	--	--	--			7,860	10.7	296	0	96	13,100	8.4	
Sept. 23.....		11	.14	38	4.0	538	172	2	35	470	.8	2.0	2.0			986	1.34	112	0	87	1,840	8.3	
Sept. 24-28.....		10	.14	30	2.5	118	128	0	24	148	.5	3.5	3.5			440	.60	86	0	75	739	8.2	
Sept. 29-30.....		13	.11	41	4.3	322	188	0	39	440	.7	2.5	2.5			975	1.33	119	0	85	1,770	8.1	

a Calculated from determined constituents.

## TRINITY RIVER BASIN--Continued

## RICHLAND CREEK NEAR FAIRFIELD, TEX.--Continued

Temperature (°F) of water, water year October 1956 to September 1957

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	--	64	--	51	52	62	63	67	77	86	92	92
2	78	--	49	53	51	56	60	72	74	89	94	90
3	86	64	46	59	53	61	62	74	80	87	98	93
4	82	62	--	58	58	60	66	69	75	90	89	91
5	71	56	62	51	59	59	61	69	77	89	91	93
6	--	56	--	55	60	58	65	69	77	86	93	89
7	75	56	66	--	58	55	67	65	80	89	90	90
8	76	58	62	60	61	56	60	66	80	87	89	89
9	--	54	60	60	62	50	65	70	84	90	94	87
10	75	--	63	50	64	54	69	76	86	89	93	88
11	75	56	59	--	66	58	72	72	85	--	94	87
12	76	56	52	--	65	60	64	71	84	88	95	89
13	72	--	53	52	67	59	66	71	--	90	90	88
14	78	58	--	50	66	58	69	76	87	90	--	88
15	76	62	--	46	70	61	63	77	88	93	--	85
16	68	53	--	44	64	57	66	78	87	89	--	87
17	75	59	56	48	57	57	58	80	84	94	--	84
18	73	--	52	43	53	62	62	76	89	90	90	88
19	66	60	53	40	56	60	67	75	83	89	95	84
20	69	--	--	46	57	56	65	77	86	91	94	89
21	75	60	--	58	58	58	69	79	89	91	91	82
22	--	56	--	57	58	60	66	80	86	90	96	89
23	70	51	--	58	56	64	64	79	82	91	94	87
24	73	54	--	52	53	60	63	75	89	95	92	81
25	68	--	--	52	60	59	60	77	84	90	91	82
26	68	55	--	47	55	62	68	79	83	90	95	85
27	67	56	--	48	60	58	67	80	85	91	92	90
28	73	52	--	46	61	63	67	79	86	90	88	82
29	--	57	--	49	--	59	68	80	87	92	90	80
30	--	--	--	48	--	60	74	80	84	91	93	74
31	65	--	--	50	--	64	--	81	--	89	90	--
Average	--	--	--	51	59	60	65	75	83	80	92	87

TRINITY RIVER BASIN--Continued  
TRINITY RIVER AT ROMAYOR, TEX.

LOCATION --At gaging station at bridge on State Highway 105, 1.9 miles south of Romayor, Liberty County, 2.0 miles downstream from Gulf, Colorado and Santa Fe Railway bridge and at mile 94.  
DRAINAGE AREA --17,192 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1945 to November 1949, February 1950 to September 1951, April 1953 to September 1957.

Water temperatures: February 1950 to September 1957: Maximum, 1,730 ppm Oct. 21-31; minimum, 105 ppm Apr. 18-19, 26-27, 29-30.

EXTREMES, 1956-57.--Dissolved solids: Maximum, 1,730 ppm Oct. 21-31; minimum, 105 ppm Apr. 18-19, 26-27, 29-30.

Hardness: Maximum, 258 ppm Oct. 21-31; minimum, 49 ppm Apr. 18-19, 26-27, 29-30.

Specific conductance: Maximum daily, 3,800 micromhos Oct. 30; minimum daily, 125 micromhos Apr. 27.

Water temperatures: Maximum, 90°F July 12, 17, 20-21; minimum, 48°F Nov. 28, Jan. 18.

EXTREMES, 1945-50, 1953-57.--Dissolved solids: Maximum, 1,900 ppm Nov. 7, 1953; minimum, 82 ppm July 31, 1954.

Hardness: Maximum, 258 ppm Oct. 21-31, 1956; minimum, 32 ppm Nov. 1-3, 1953.

Specific conductance: Maximum daily, 3,800 micromhos Oct. 30, 1956; minimum daily, 103 micromhos Nov. 9, 1946.

Water temperatures (1953-57): Maximum, 98°F July 18, 27, 1953; minimum, 38°F Jan. 18, 1956.

REMARKS.--Values reported for dissolved solids concentrations less than 1,000 ppm are residues on evaporation and for concentrations more than 1,000 ppm are calculated from determined constituents unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1956 to September 1957 given in WSP 1512.

Chemical analyses, in parts per million, October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH	
														Parts per million	Tons per acre-foot	Tons per day	Calcium-magnesium	Non-carbonate				So-dium-sulphate ratio
Oct. 1-10, 1956	158 17			65	9.7	374		195	104	528		1.0		1,190	1.62	508	202	42	80	11	2,080	8.1
Oct. 11-20	155 18			83	12	493		246	167	675		1.2		1,570	2.14	657	256	55	81	13	2,680	8.1
Oct. 21-31	224 18			82	13	554		245	165	770		1.2		1,730	2.35	1,050	258	59	82	15	2,930	8.0
Nov. 1-8	371 13			70	13	519		205	192	700		8		1,610	2.19	1,810	228	59	83	15	2,850	8.2
Nov. 9-19	2,911 8.8			36	3.4	88		118	46	106		2.8		356	.48	2,800	105	8	65	3.7	641	7.8
Nov. 20-30	372 12			40	3.5	86		113	50	109		2.5		360	.49	362	114	22	62	3.5	645	7.6
Dec. 1-13	270 12			36	4.1	93		92	50	129		5		390	.53	284	107	32	65	3.9	671	7.5
Dec. 14-17, 22-26	606 12			54	6.0	193		145	63	278		1.2		733	1.00	1,200	159	40	72	6.6	1,250	7.8
Dec. 18-21, 28-31	652 13			79	11	453		189	194	610		12		1,460	2.00	2,570	241	86	37	13	2,590	8.2
Jan. 1, 1957	677 24			--	--	134		50	51	202		.2		--	--	--	88	47	77	6.2	864	7.5
Jan. 2, 6, 8-10, 12-17	384 22			62	7.7	322		169	148	412		14		1,070	1.46	1,110	186	48	79	10	1,900	7.9
Jan. 3-5, 7, 11	424 18			74	12	538		220	172	730		18		1,670	2.27	1,910	234	54	83	13	2,960	8.1
Jan. 18-31	602 18			62	10	252		173	146	308		19		941	1.28	1,530	196	54	74	7.8	1,600	7.8
Feb. 1-2, 6-7	3,168 20			67	10	322		151	119	458		18		1,090	1.48	9,320	209	86	77	9.6	1,940	7.7
Feb. 3-5, 8-9	3,404 15			40	4.1	115		131	58	136		10		484	.66	4,450	118	10	68	4.6	781	7.8
Feb. 10-19	1,901 15			37	3.8	66		106	42	82		5.6		a303	.41	1,560	107	20	57	2.8	529	7.8
Feb. 20-28	1,348 14			38	4.4	83		97	50	111		5.5		a354	.48	1,290	112	32	62	3.4	622	7.6
Mar. 1-12	1,301 17			40	4.9	123		94	63	169		7.1		496	.67	1,740	119	42	69	4.9	834	7.7

Mar. 13-19, 22-23, 27-28, 1857, . . . .	4,190	16	27	2.6	59	79	35	72	4.7	a255	.35	2,880	79	14	62	2.9	438	7.7
Mar. 20-21, 24-26	5,660	16	31	3.6	114	81	51	153	6.6	a415	.56	6,340	93	36	73	5.1	739	7.3
Mar. 29-31, . . . . .	10,750	13	26	2.0	34	87	29	31	2.2	a180	.24	5,220	74	3	50	1.7	294	7.6
Apr. 1-6, . . . . .	7,462	25	30	2.5	39	82	25	52	4.5	a208	.28	4,190	86	19	49	1.8	353	7.4
Apr. 7-17, . . . . .	8,125	22	41	3.7	42	118	38	49	5.0	260	.35	5,700	117	20	44	1.7	432	7.6
Apr. 18-19, 26-27, 29-30, . . . . .	3,357	11	17	1.6	16	54	13	18	1.5	a105	.14	952	49	4	42	1.0	164	7.3
Apr. 20-23, 25, 28	13,640	14	32	2.2	29	79	24	42	2.0	a184	.25	6,780	88	24	41	1.3	312	7.4
Apr. 24, . . . . .	8,340	14	51	4.9	78	106	49	124	4.0	a377	.51	8,490	146	59	54	2.8	671	8.0
May 1-10, . . . . .	73,890	15	29	2.6	17	98	18	15	1.0	a146	.20	29,130	84	4	31	.8	247	7.3
May 11-20, . . . . .	73,950	15	41	3.2	19	126	24	18	1.8	a184	.25	36,740	115	12	26	.8	312	7.5
May 21-31, . . . . .	40,330	16	47	3.7	25	144	27	27	1.2	234	.32	25,480	132	14	29	.9	371	7.4
June 1-9, . . . . .	40,970	29	26	1.7	19	77	21	19	1.2	164	.22	18,140	72	9	36	1.0	240	7.4
June 10-20, . . . . .	54,970	20	33	2.5	20	96	23	23	1.5	178	.24	26,420	93	14	32	.9	279	7.4
June 21-30, . . . . .	38,010	19	29	2.3	27	87	23	31	1.0	180	.24	18,470	82	10	41	1.3	284	7.6
July 1-10, . . . . .	13,050	45	27	.7	36	b90	22	36	1.5	234	.32	8,240	70	0	53	1.9	304	8.9
July 11-20, . . . . .	9,376	30	34	1.7	40	c105	25	39	1.0	237	.32	6,000	92	6	45	1.6	343	8.7
July 21-31, . . . . .	7,111	33	27	.5	35	b85	25	42	1.0	233	.32	4,470	70	0	55	2.1	330	9.1
Aug. 1-10, . . . . .	7,210	43	29	1.4	42	d97	23	46	1.2	234	.32	4,560	78	0	54	2.1	353	8.9
Aug. 11-20, . . . . .	18,650	26	25	1.4	27	82	15	31	1.0	180	.24	9,060	68	1	46	1.4	287	8.2
Aug. 21-31, . . . . .	5,061	16	42	4.3	39	138	27	46	2.0	a244	.33	3,330	122	10	41	1.3	424	7.9
Sept. 1-10, . . . . .	2,513	15	39	4.1	43	134	26	50	1.2	250	.34	1,700	114	4	45	1.4	417	8.0
Sept. 11-18, 21-22	1,286	13	36	3.9	59	121	27	76	.2	282	.38	979	106	7	55	2.5	484	7.8
Sept. 19-20, 23-30	1,741	5.4	47	5.1	91	150	41	121	.2	390	.53	1,830	138	16	59	3.4	693	7.8
Weighted average	12,690	19	33	2.6	30	103	24	33	1.7	201	0.27	6,890	93	8	41	1.3	325	--

a Calculated from determined constituents.  
 b Includes equivalent of 16 parts per million of carbonate (CO<sub>3</sub>).  
 c Includes equivalent of 9 parts per million of carbonate (CO<sub>3</sub>).  
 d Includes equivalent of 10 parts per million of carbonate (CO<sub>3</sub>).

## WESTERN GULF OF MEXICO BASINS

## TRINITY RIVER BASIN--Continued

## TRINITY RIVER AT ROMAYOR, TEX.--Continued

Temperature (°F) of water, water year October 1956 to September 1957

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	84	70	58	60	52	60	62	--	82	86	88	85
2	84	70	60	58	54	60	62	--	--	86	88	80
3	80	70	60	58	60	60	62	--	82	86	88	85
4	82	70	60	55	60	65	62	--	82	89	88	85
5	80	70	60	55	62	62	62	--	82	89	88	85
6	80	70	60	55	65	60	65	--	80	89	88	--
7	80	70	60	55	62	60	65	--	82	89	88	82
8	78	68	60	60	60	60	65	--	84	88	88	82
9	80	68	58	62	62	--	65	--	82	88	88	83
10	78	64	58	60	--	60	65	--	83	88	78	82
11	80	60	60	60	64	62	65	--	82	88	79	82
12	80	60	60	60	64	--	65	--	82	90	83	81
13	78	60	60	60	64	68	62	--	85	89	83	81
14	78	60	62	60	66	68	62	78	85	89	83	81
15	80	60	60	60	66	66	62	78	85	89	83	81
16	80	58	60	60	64	64	65	78	85	89	85	--
17	78	60	60	50	60	84	68	78	85	90	84	82
18	75	60	60	48	58	68	68	78	85	89	85	82
19	75	62	60	58	58	68	70	78	85	89	85	84
20	75	62	60	60	58	65	70	79	85	90	87	84
21	72	56	60	60	58	66	70	79	85	90	87	82
22	72	58	--	60	58	68	70	80	85	85	87	82
23	75	60	--	56	58	66	70	80	85	85	87	80
24	75	58	--	52	60	66	70	82	85	89	87	82
25	75	58	--	55	60	62	72	82	85	86	82	79
26	75	55	--	--	60	62	72	82	85	88	80	76
27	72	50	55	52	60	--	70	82	85	88	82	74
28	68	48	60	54	60	62	70	82	85	88	85	73
29	70	50	69	62	--	62	70	82	85	88	85	75
30	72	54	60	58	--	62	72	82	85	88	82	74
31	72	--	54	60	--	62	--	82	--	88	83	--
Average	77	62	60	57	60	63	67	--	84	88	85	81



TRINITY RIVER BASIN--Continued  
 TRINITY RIVER NEAR MOSS BLUFF, TEX.--Continued

Chemical analyses, in parts per million, water year October 1956 to September 1957--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids		Hardness as CaCO <sub>3</sub>		Percent adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH		
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium				Non-carbonate	
May 3-9, 11-12, 1957		11		29	2.9		17	97	15	19					143	0.19	85	6	31	0.8	255	6.7
May 10, 13-20		12		34	3.8		24	111	19	30		1.2			200	.27	101	10	34	1.1	319	6.7
May 21-31		12		45	3.4		26	138	24	30		1.8			231	.31	126	13	31	1.0	371	7.1
June 1-14		12		45	3.7		23	138	22	28		2.8			221	.30	128	14	28	.9	372	7.2
June 15-24, 27-31		11		47	4.2		30	141	22	41		3.0			240	.33	134	19	32	1.1	408	7.1
July 1-4, 8		11		51	4.2		35	151	29	46		3.5			234	.35	144	21	35	1.3	459	7.6
July 11-20		12		48	3.9		34	143	26	44		3.5			241	.33	136	19	35	1.3	435	7.9
July 21-22, 24-31		10		47	4.0		32	136	28	43		3.5			234	.32	134	22	34	1.2	429	7.4
Aug. 1-8		13		46	3.7		37	144	26	44		3.0			244	.33	130	12	38	1.4	425	7.9
Aug. 9-15		9.2		26	2.0		22	83	15	25		1.8			142	.19	73	5	39	1.1	250	7.7
Aug. 16-31		13		46	3.8		88	144	24	48		2.2			248	.34	130	12	39	1.4	432	7.6
Sept. 2-10		13		51	4.2		49	170	28	57		2.8			300	.41	144	5	43	1.8	510	7.9
Sept. 11-20		7.0		49	4.4		53	160	26	68		1.0			298	.41	140	10	45	1.9	522	7.7
Sept. 21-27		6.0		46	4.2		54	145	28	72		.8			298	.41	132	14	47	2.0	520	8.0
Sept. 28-30		5.8		19	1.5		30	62	14	37		2.0			139	.19	54	3	55	1.8	254	7.3

<sup>a</sup> Calculated from determined constituents.

TRINITY RIVER BASIN

TRINITY RIVER BASIN--Continued  
OLD RIVER NEAR COVE, TEX.

LOCATION.--At Barber Hill Pumping Plant, 5 miles northwest of Cove, Chambers County.  
 RECORDS AVAILABLE.--Chemical analyses: Short periods during summers of 1946 to 1949.  
 EXTREMES, 1956-57.--Dissolved solids: Maximum 11,300 ppm Oct. 14-29; minimum, 77 ppm Apr. 29, May 1-2.  
 Hardness: Maximum, 2,460 ppm Oct. 14-29; minimum, 34 ppm Apr. 29, May 1-2.  
 Specific conductance: Maximum daily, 18,000 microhos Oct. 15-17; minimum daily, 101 microhos Apr. 29.  
 EXTREMES, 1949-57.--Dissolved solids: Maximum 11,300 ppm Oct. 14-29, 1956; minimum, 77 ppm Apr. 29, May 1-2, 1957.  
 Hardness: Maximum, 2,460 ppm Oct. 14-29, 1956; minimum, 34 ppm Apr. 29, May 1-2, 1957.  
 Specific conductance: Maximum daily, 18,000 microhos Oct. 15, 17, 1956; minimum daily, 101 microhos Apr. 29, 1957.  
 REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. No discharge records available for this station.

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids (calculated)		Hardness as CaCO <sub>3</sub>	Percent sodium	Sodium adsorption ratio	Specific conductance (microhos at 25° C)	pH		
													Parts per million	Tons per acre-foot day							
Oct. 1-13, 1956		15		218	251	2,490		191	619	4,390		--		8,080	10.99	1,580	1,420	77	27	13,200	8.0
Oct. 14-29		14		354	394	3,400		174	868	6,240		--		11,300	15.37	2,460	2,320	75	30	17,900	7.8
Oct. 30		--		--	--	--		355	--	1,150		--		--	--	110	--	--	--	17,973	8.1
Oct. 31		--		--	--	--		378	--	1,180		--		--	--	575	--	--	--	4,110	8.2
Nov. 1-13		12		270	226	2,160		206	554	3,940		--		7,260	9.87	1,600	1,430	75	23	11,900	7.9
Nov. 14-20		12		104	61	794		183	239	1,300		6.5		2,610	3.55	510	360	77	13	4,490	7.7
Nov. 21-30		13		82	49	540		148	166	910		4.2		1,840	2.50	406	284	74	12	3,350	8.1
Dec. 1-3		10		155	191	1,820		164	470	3,200		--		5,930	8.06	1,170	1,040	77	23	10,000	8.0
Dec. 4-25		20		69	51	527		107	151	910		.5		1,780	2.42	382	294	75	12	3,220	7.9
Dec. 26-27, 30-31		26		44	19	186		95	71	312		1.5		706	.96	188	110	68	5.9	1,300	7.8
Dec. 28-29																					
Jan. 1-12, 1957		12		64	23	330		128	405	585		1.8		1,130	1.54	254	149	74	9.0	2,090	7.9
Jan. 13-19, 21		11		88	31	463		151	149	760		3.0		1,580	2.15	348	222	74	11	2,870	7.9
Jan. 22-31																					
Feb. 1-4		12		105	65	732		168	208	1,250		5.5		2,460	3.35	580	392	75	14	4,360	8.2
Feb. 5-18		9.2		83	37	505		163	166	810		11		1,700	2.31	359	226	75	12	3,120	8.1
Feb. 19-27		8.2			5.8	81		54	31	119		3.0		794	.40	111	27	71	4.2	561	7.5
Feb. 28, Mar. 1-8		12		42	11	147		106	51	232		4.2		551	.75	150	63	68	5.2	1,020	8.0
Mar. 9-17		14		43	8.8	138		93	58	215		6.0		529	.72	144	68	68	5.0	963	7.8
Mar. 18-28		12		19	3.4	35		57	19	49		1.2		167	.23	61	15	55	1.9	296	7.4
Mar. 29-31																					
Apr. 1-3, 6-12		17		19	3.3	32		67	14	43		2.8		164	.22	62	7	53	1.8	292	7.1
Apr. 4-5, 13		14		16	2.5	19		53	10	25		2.2		115	.16	49	6	46	1.2	204	7.0
Apr. 14-22, 28		16		21	3.4	35		72	17	45		2.0		174	.24	66	7	53	1.9	308	7.1

Chemical analyses, in parts per million, water year October 1956 to September 1957

## TRINITY RIVER BASIN--Continued

## OLD RIVER NEAR COVE, TEX.--Continued

Chemical analyses, in parts per million, water year October 1956 to September 1957--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids (calculated)		Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH	
													Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate				
Apr. 23-27, 1957.		16		24	4.5	45		85	17	61		3.0		0.29	70	9	55	2.2	383	7.3
Apr. 28, May 1-2		11		11	1.7	12		44	5.4	12		1.5		.10	34	0	43	.9	131	6.8
Apr. 30								120		177					149	50	--	--	833	7.6
May 3-10		16		17	2.6	20		74	6.4	20		2.5		.16	53	0	46	1.2	208	7.0
May 11-20		13		18	2.9	21		80	6.6	19		2.8		.17	56	0	45	1.2	209	7.2
May 21-31		16		24	3.3	21		97	9.6	20		2.0		.20	73	0	39	1.1	250	7.3
June 1-9		10		33	4.7	39		125	19	45		2.0		.32	102	0	46	1.7	396	7.8
June 10								289		101					134	0	--	--	614	8.2
June 11-25		16		36	5.0	41		140	19	45		1.2		.33	110	0	45	1.7	405	7.9
June 26-30		15		22	2.9	21		79	11	25		2.0		.19	67	2	41	1.1	235	7.4
Sept. 9-23		14		46	5.0	55		158	24	71		1.0		.42	136	6	47	2.1	525	8.2
Sept. 24-30		15		28	4.0	29		100	17	35		.8		.27	86	4	42	1.4	309	8.0

a Residue on evaporation at 180°C

TRINITY RIVER BASIN--Continued  
TRINITY RIVER AT ANAHUAC, TEX.

LOCATION.--At Lone Star Pumping Plant in Anahuac, Chambers County.  
RECORDS AVAILABLE.--Chemical analyses: Short periods during summers of 1946 to 1949, December 1949 to September 1957.  
EXTREMES, 1956-57.--Hardness: Maximum, 4,140 ppm Oct. 1, 8, 15; minimum, 61 ppm Sept. 30.  
Specific conductance: Maximum daily, 36,300 microhmhos Oct. 1; minimum daily, 236 microhmhos May 1.  
EXTREMES, 1949-57.--Dissolved solids (1949-56): Maximum, 18,400 ppm Aug. 1-31, 1956; minimum, 140 ppm Apr. 12-19, 1955.  
Hardness: Maximum, 4,140 ppm Oct. 1, 8, 15, 1956; minimum, 45 ppm Apr. 12-19, 1955.  
Specific conductance: Maximum daily, 36,300 microhmhos Oct. 1, 1956; minimum daily, 199 microhmhos Apr. 15, 1955.  
REMARKS.--Values reported for dissolved solids concentrations less than 1,000 ppm are residues on evaporation and for concentrations more than 1,000 ppm are calculated from determined constituents unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. No discharge records available for this station.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids		Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (microhmhos at 25°C)	pH
														Parts per million	Tons per acre-foot	Calcium magnesium	Non-carbonate			
Oct. 1, 8, 15, 1956..	--	--	--	--	--	--	--	124	--	12,100	--	--	--	--	--	4,140	--	--	32,600	8.1
Oct. 22, 29 .....	--	--	--	--	--	--	--	158	--	8,860	--	--	--	--	--	3,100	--	--	24,800	7.7
Nov. 6, 12, 19, 26 .....	--	--	--	--	--	--	--	153	--	4,710	--	--	--	--	--	1,670	--	--	14,500	7.6
Dec. 3, 17 .....	--	--	--	--	--	--	--	133	--	8,630	--	--	--	--	--	2,960	--	--	24,300	7.9
Dec. 10 .....	--	--	--	--	--	--	--	144	--	3,820	--	--	--	--	--	1,410	--	--	11,900	8.0
Dec. 24 .....	--	--	--	--	--	--	--	144	--	1,970	--	--	--	--	--	745	--	--	6,670	8.0
Dec. 31 .....	--	--	--	--	--	--	--	117	--	840	--	--	--	--	--	348	--	--	3,060	7.9
Jan. 7, 14, 1957 .....	--	--	--	--	--	--	--	122	--	8,180	--	--	--	--	--	2,710	2,610	--	22,800	8.1
Jan. 9 .....	8.6	--	--	98	129	1,280	--	112	352	2,200	3.7	4,130	5.62	--	775	2,710	2,580	20	7,210	7.5
Jan. 21, 28 .....	--	--	--	--	--	--	--	151	--	8,180	--	--	--	--	--	2,710	--	--	22,700	8.0
Feb. 4 .....	--	--	--	--	--	--	--	143	--	1,050	--	--	--	--	--	400	283	--	3,970	8.2
Feb. 11 .....	--	--	--	--	--	--	--	156	--	540	--	--	--	--	--	210	98	--	2,140	8.0
Feb. 18 .....	--	--	--	--	--	--	--	106	--	4,280	--	--	--	--	--	1,440	1,350	--	13,000	8.0
Feb. 25 .....	--	--	--	--	--	--	--	104	--	3,280	--	--	--	--	--	1,200	1,020	--	10,300	7.8
Mar. 4 .....	--	--	--	--	--	--	--	105	--	2,820	--	--	--	--	--	1,000	914	--	8,950	7.9
Mar. 11 .....	--	--	--	--	--	--	--	91	--	830	--	--	--	--	--	318	244	--	2,930	8.0
Mar. 18 .....	--	--	--	--	--	--	--	80	--	275	--	--	--	--	--	114	48	--	1,150	7.7
Mar. 25 .....	--	--	--	--	--	--	--	72	--	208	--	--	--	--	--	108	49	--	873	7.8
Apr. 1, 3, 8, 10, 12, 15 .....	13	--	--	34	3.6	51	--	88	31	66	4.8	a 251	.34	--	100	19	52	2.2	455	7.0
Apr. 17, 19, 22, 24, 26, 29 .....	11	--	--	28	2.2	47	--	74	27	63	3.3	a 218	.30	--	79	18	56	2.3	405	6.9
May 1, 3, 6, 8, 10, 13, 15 .....	14	--	--	27	2.9	31	--	85	19	40	1.5	a 177	.24	--	79	10	46	1.5	315	7.2

a Calculated from determined constituents.

TRINITY RIVER BASIN--Continued  
TRINITY RIVER AT ANAHUAC, TEX.--Continued

Chemical analyses, in parts per million, water year October, 1956 to September, 1957--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids		Hardness as CaCO <sub>3</sub>	Percent sodium	Sorption ratio	Specific conductance (micro-mhos at 25 C)	pH	
														Parts per million	Tons per acre-foot						Calcium, magnesium
May 17, 20, 22, 24, 27, 28, 31, 1957	16			40	3.5	26	125	24	29	1.5				201	0.27	114	11	33	1.1	345	7.6
June 3, 5, 7, 10, 12, 14	15			47	3.8	29	140	24	39	2.0				240	.33	133	18	32	1.1	391	7.3
June 17, 19, 21, 24, 26, 28	13			47	3.7	28	142	24	36	2.5				236	.32	132	16	32	1.1	386	7.3
July 1, 3, 5, 8, 10, 12, 15	18			48	4.4	39	148	25	53	2.0				270	.37	138	17	38	1.5	468	7.8
July 17, 19, 22, 26, 29, 31	17			49	3.8	50	140	31	69	2.0				308	.42	138	23	44	1.8	524	7.8
Aug. 12, 14, 16, 19, 21, 23	11			34	2.8	41	100	30	51	2.0				221	.30	96	15	48	1.8	376	7.8
Aug. 2, 5, 7, 9, 26, 28, 30	14			47	4.0	61	141	29	85	2.5				341	.46	134	18	50	2.3	566	8.0
Sept. 2	--			--	--	156	180	46	228	--				--	--	178	30	66	5.1	1,110	8.1
Sept. 4, 6, 9, 11, 13, 16	14			56	4.6	91	167	35	129	1.5				424	.58	158	22	56	3.1	742	8.2
Sept. 18	--			--	--	488	172	120	780	--				--	--	370	229	13	10	2,830	8.1
Sept. 20	--			--	--	40	164	25	46	--				--	--	138	4	39	1.5	468	8.2
Sept. 23	--			--	--	181	181	50	272	--				--	--	191	42	67	5.7	1,220	8.2
Sept. 25	--			--	--	127	166	43	185	--				--	--	165	29	63	4.3	960	8.1
Sept. 27	--			--	--	69	137	33	93	--				--	--	127	14	54	2.7	601	8.0
Sept. 30	--			--	--	42	64	18	58	--				--	--	61	9	60	2.4	334	7.7

a - Calculated from determined constituents.

TRINITY RIVER BASIN--Continued  
TRINITY BAY AT MOUTH OF TRINITY RIVER, NEAR ANAHUAC, TEX.

LOCATION.--At four sampling stations in Trinity Bay opposite mouth of Trinity River, near Anahuac, Chambers County. Station 2: In Anahuac Channel immediately below delta. Station 3: In Anahuac Channel about 1 1/4 miles southwest of Station 2. Station 6: In Anahuac Channel at south end. Station 7: In Trinity Bay about 1 1/4 miles west of Station 6.  
RECORDS AVAILABLE.--Chemical analyses: October 1950 to September 1957.

Specific conductance (micromhos at 25°C) and chloride, in parts per million, water year October 1956 to September 1957

Date of collection	Station 2		Station 3		Station 6		Station 7	
	Conductance	Chloride	Conductance	Chloride	Conductance	Chloride	Conductance	Chloride
Oct. 1, 1956	29,100	11,000	29,400	11,100	32,200	12,400	32,200	12,400
Oct. 8	32,800	12,300	32,600	11,900	32,700	12,100	36,200	13,900
Oct. 15	35,300	13,500	35,200	13,400	37,100	14,300	36,400	13,900
Oct. 22	24,600	8,870	24,800	8,970	35,200	13,400	26,200	9,510
Oct. 29	36,300	13,900	36,200	13,900	36,300	14,000	36,300	14,000
Nov. 6	33,200	12,500	33,200	12,500	39,900	15,500	39,800	15,600
Nov. 12	10,300	3,200	10,300	3,170	10,500	3,370	17,400	5,850
Nov. 19	10,200	3,220	12,500	4,040	25,000	8,870	31,200	11,600
Nov. 26	10,500	3,320	10,600	3,370	20,400	7,060	25,600	9,170
Dec. 3	25,300	9,170	28,900	10,600	30,400	11,300	32,300	12,300
Dec. 10	22,100	7,800	21,800	7,800	28,000	10,200	29,400	10,800
Dec. 17	31,500	11,700	31,100	11,600	32,100	12,100	32,300	12,100
Dec. 24	6,610	1,980	6,580	1,980	7,380	2,250	10,400	3,300
Dec. 31	2,980	800	2,980	820	3,190	890	3,610	1,030
Jan. 7, 1957	27,400	10,200	26,500	9,900	28,200	10,500	30,600	11,500
Jan. 14	17,900	6,240	28,600	10,800	30,700	11,700	29,700	11,200
Jan. 21	29,800	11,300	29,900	11,300	30,100	11,400	30,700	11,700
Jan. 28	19,900	7,060	15,900	5,400	21,900	7,940	29,400	11,100
Feb. 4	3,010	800	4,320	1,230	17,200	5,870	17,300	5,900
Feb. 11	2,100	542	2,160	2,150	2,130	550	2,190	572
Feb. 18	21,300	7,600	10,700	3,420	19,600	6,980	23,500	8,580
Feb. 25	12,000	3,940	4,430	1,320	12,500	4,140	24,600	9,070
Mar. 4	1,420	350	1,420	348	14,400	4,810	18,700	6,480
Mar. 11	4,960	1,480	2,790	770	1,350	323	4,620	1,350
Mar. 18	906	193	916	199	764	203	890	185
Mar. 25	705	164	691	166	764	178	855	201

TRINITY RIVER BASIN--Continued  
 TRINITY BAY AT MOUTH OF TRINITY RIVER NEAR ANAHUAC, TEX.--Continued

Specific conductance (micromhos at 25°C) and chloride, in parts per million, water year October 1956 to September 1957--Continued

Date of collection	Station 2		Station 3		Station 6		Station 7	
	Conductance	Chloride	Conductance	Chloride	Conductance	Chloride	Conductance	Chloride
Apr. 1, 1957	512	61	580	91	446	59	454	60
Apr. 3	503	71	476	60	580	94	1,030	224
Apr. 5	535	77	531	73	476	61	626	96
Apr. 8	370	62	411	71	417	76	439	84
Apr. 10	363	60	362	60	413	72	470	81
Apr. 12	396	67	600	126	415	72	472	79
Apr. 15	469	65	647	110	546	76	608	95
Apr. 17	696	128	491	66	550	80	518	72
Apr. 19	492	65	473	65	512	71	530	75
Apr. 22	410	81	372	70	367	69	473	96
Apr. 24	529	105	432	83	386	69	389	69
Apr. 26	403	77	395	72	379	68	402	71
Apr. 29	332	59	281	45	--	--	255	39
May 1	367	74	261	41	289	36	251	39
May 3	317	45	259	28	236	38	287	31
May 6	290	37	276	32	336	62	266	34
May 8	272	34	387	65	270	31	260	30
May 10	263	30	279	32	266	30	279	32
May 12	420	67	332	36	291	28	334	41
May 15	348	29	315	29	328	35	215	30
May 20	345	30	465	67	372	36	414	49
May 22	374	34	353	32	502	70	375	34
May 24	365	34	373	36	444	56	372	35
May 27	318	31	328	39	310	32	279	30
May 29	386	36	391	39	614	96	450	52
May 31	432	47	405	39	390	37	391	38
June 3	423	39	419	40	419	40	--	--
June 5	411	40	438	51	485	63	412	42
June 7	488	67	389	39	409	44	397	44
June 10	398	42	427	50	397	43	387	40
June 12	514	75	506	58	404	42	390	40
June 14	388	36	382	36	385	36	385	35
June 17	545	63	484	42	415	41	405	37
June 19	462	40	443	40	391	36	381	35

TRINITY RIVER BASIN

June 21, 1957	414	38	397	407	43
June 24	--	--	391	408	44
June 26	49	46	434	405	40
June 28	490	90	490	494	91
July 1	436	45	445	464	52
July 3	484	44	441	456	45
July 5	561	51	453	503	58
July 8	471	50	462	484	53
July 10	544	73	523	470	53
July 12	496	60	512	572	76
July 15	480	57	614	487	54
July 17	508	59	491	503	57
July 19	614	92	577	513	82
July 22	521	69	566	526	67
July 23	578	82	544	544	73
July 26	607	85	558	528	72
July 29	535	71	517	526	69
July 31	556	82	560	646	94
Aug. 2	539	77	544	585	86
Aug. 5	549	82	578	553	82
Aug. 7	628	99	628	642	101
Aug. 9	568	87	568	578	88
Aug. 12	400	49	389	487	70
Aug. 14	344	46	337	337	44
Aug. 16	397	56	386	411	62
Aug. 19	323	44	332	336	45
Aug. 21	453	67	387	383	53
Aug. 23	516	74	516	478	69
Aug. 26	545	82	518	502	70
Aug. 28	605	99	513	560	82
Aug. 30	629	101	622	635	101

TRINITY RIVER BASIN--Continued  
 TRINITY BAY AT MOUTH OF TRINITY RIVER NEAR ANAHUAC, TEX.--Continued

Specific conductance (micromhos at 25°C) and chloride, in parts per million, water year October 1956 to September 1957--Continued

Date of collection	Station 2		Station 3		Station 6		Station 7	
	Conductance	Chloride	Conductance	Chloride	Conductance	Chloride	Conductance	Chloride
Sept. 2, 1957.....	615	96	628	98	621	97	639	101
Sept. 4, .....	443	45	443	46	--	--	480	58
Sept. 6, .....	757	128	690	110	680	112	787	141
Sept. 9, .....	666	102	677	105	666	102	658	102
Sept. 11, .....	930	182	912	166	862	160	796	139
Sept. 13, .....	776	134	764	132	777	136	734	121
Sept. 16, .....	763	127	752	127	764	131	773	131
Sept. 18, .....	4,160	1,220	4,330	1,240	4,330	1,240	4,440	1,270
Sept. 20, .....	1,030	202	1,000	202	971	190	1,150	245
Sept. 23, .....	1,320	290	1,300	288	1,350	302	1,430	322
Sept. 25, .....	849	156	843	155	818	147	806	143
Sept. 27, .....	581	96	581	96	583	95	589	95
Sept. 30, .....	337	59	340	58	333	56	342	59

TRINITY RIVER BASIN--Continued  
MISCELLANEOUS ANALYSES OF STREAMS IN TRINITY RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (calculated)		Hardness as CaCO <sub>3</sub>	Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	
														Parts per million	Tons per acre-foot						Calcium, magnesium
NORTH CHANNEL TEHUACANA CREEK AT FM ROAD 488 NEAR FAIRFIELD																					
Nov. 5, 1956		5.4		33	11	450		44	24	738	0.5	2.8		1,290	1.75	128	92	88	17	2,430	6.8
Jan. 10, 1957		.9		194	71	1,800		77	84	3,220	--	--		5,410	7.36	775	712	83	28	9,520	7.3
Feb. 22		4.0		22	9.8	356		87	20	550	.6	.8		1,010	1.37	96	24	89	16	1,910	7.2
Mar. 19		.9		41	16	576		90	58	910	.5	.8		1,650	2.24	168	94	88	19	3,090	7.8
Mar. 27		9.6		18	5.8	192		60	15	298	.6	1.2		570	.78	69	20	86	10	1,090	7.2
June 4		8.0		69	23	254		69	50	500	--	5.7		944	1.28	266	210	67	6.8	1,780	6.6
SOUTH CHANNEL TEHUACANA CREEK AT FM ROAD 488 NEAR FAIRFIELD																					
Nov. 5, 1956		6.4		19	7.7	298		59	26	460	0.4	3.0		850	1.16	79	30	89	15	1,590	6.9
Feb. 22, 1957		9.2		14	3.6	71		50	24	95	.8	2.9		945	.33	50	9	76	4.4	453	6.7
Mar. 19		9.0		19	5.5	97		64	34	133	.6	2.9		232	.45	69	16	75	5.1	611	7.5
Mar. 27		13		13	4.5	66		59	18	86	.6	5.7		236	.82	51	3	74	4.0	431	6.6
June 4		7.2		49	17	166		70	47	315	--	2.5		638	.87	192	133	65	5.2	1,220	7.5

## BRAZOS RIVER BASIN

## DOUBLE MOUNTAIN FORK BRAZOS RIVER NEAR ASPERMONT, TEX.

LOCATION:--At gaging station at bridge on U. S. Highway 83, 8 miles downstream from Mountain Creek, and 10 miles south of Aspermont, Stonewall County. DRAINAGE AREA.--7,980 square miles, approximately, of which 6,470 square miles is probably noncontributing.

RECORDS AVAILABLE.--Chemical analyses: October 1948 to November 1951, October 1956 to September 1957.

Water temperatures: November 1949 to November 1951, October 1956 to September 1957.

Sediment records: November 1949 to September 1951.

EXTREMES, 1956-57.--Dissolved solids: Maximum, 4,420 ppm July 9-16; minimum, 689 ppm June 1-7, 13-14, 19-20.

Hardness: Maximum, 2,150 ppm Oct. 1-15; minimum, 220 ppm Aug. 20-21.

Specific conductance: Maximum daily, 6,580 microhms July 10; minimum daily, 798 microhms Apr. 30.

Water temperatures: Maximum, 86°F June 8; minimum, freezing point Jan. 16.

EXTREMES, 1948-51: 1956-57.--Dissolved solids: Maximum, 4,740 ppm Aug. 5, 8, 1951; minimum, 646 ppm May 11, 12-13, 1950.

Hardness: Maximum, 2,510 ppm Aug. 5, 8, 1951; minimum, 220 ppm Sept. 9-10, 1948, Aug. 20-21, 1957.

Specific conductance: Maximum daily, 7,200 microhms Feb. 18, 1949; minimum daily, 798 microhms Apr. 30, 1957.

Water temperatures (1949-51, 1956-57): Minimum, freezing point Jan. 4, 1950, Jan. 29, 1951, Jan. 16, 1957.

Sediment concentrations (1949-51): Maximum daily, 77,700 ppm May 19, 1951; minimum daily, no flow on many days.

Sediment loads (1949-51): Maximum daily, 565,000 tons May 11, 1950; minimum daily, 0 tons on many days.

REMARKS.--Values reported for dissolved solids concentrations less than 1,000 ppm are residues on evaporation and for concentrations more than 1,000 ppm are calculated from determined constituents unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1956 to September 1957 given in WSP 1512.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium-sulfate ratio	Specific conductance (microhms at 25°C)	pH
													Parts per million	Tons per acre-foot	Tons per day	Calcium	Non-carbonate				
Oct. 1-15, 1956..	a.0.31	17	698	99	563	98	2,010	850	1.5	4,290	5.83	3.59	2,070	2,150	36	5.3	5,340	7.6			
Oct. 16-19, 29-31	59.9	12	324	30	134	83	861	192	2.8	1,590	2.16	257	864	932	24	1.9	2,050	7.5			
Oct. 20-28 .....	0	12	888	93	525	132	1,910	810	1.2	4,100	5.58	--	1,960	2,100	35	5.0	5,210	7.5			
Nov. 1-2 .....	20.7	14	288	27	154	74	770	212	4.0	1,500	2.04	83.8	769	830	29	2.3	2,060	7.4			
Nov. 3-15 .....	a.13	12	624	70	448	135	1,660	660	1.8	3,560	4.87	1.26	1,940	1,940	35	4.5	4,450	7.7			
Nov. 16-30 .....	0	9.0	712	85	464	145	1,920	720	1.8	3,960	5.41	--	2,010	2,130	32	4.4	4,820	7.8			
Dec. 1-10 .....	0	12	676	80	530	134	1,860	780	2.0	4,030	5.48	--	1,910	2,020	36	5.1	4,940	7.8			
Dec. 11-18 .....	7.53	10	708	82	476	142	1,940	710	5.0	4,000	5.44	--	1,960	2,100	33	4.5	4,840	7.7			
Dec. 19-21 .....	a.11	6.4	270	19	99	56	724	118	1.8	1,270	1.73	25.8	706	752	22	1.6	1,620	7.4			
Dec. 22-31 .....	0	11	516	57	339	129	1,390	500	2.8	2,860	3.92	.86	1,520	1,420	33	3.8	3,610	7.7			
Jan. 1-10, 1957..	0	10	571	67	394	137	1,500	610	2.5	3,240	4.41	--	1,700	1,420	34	4.2	4,120	7.8			
Jan. 11-20 .....	0	7.8	597	69	392	148	1,590	600	4.0	3,320	4.53	--	1,770	1,650	32	4.0	4,140	7.5			
Jan. 21-31 .....	0	6.4	595	81	366	150	1,680	560	3.5	3,320	4.52	--	1,690	1,690	30	3.7	4,140	7.5			
Feb. 1-5 .....	0	8.6	575	70	404	135	1,470	680	8	3,270	4.44	--	1,610	1,720	34	4.2	4,140	8.2			
Feb. 6-8, 10-11	1,070	13	174	17	142	123	1,467	156	4.2	1,040	1.41	3,000	403	504	36	2.3	1,540	7.9			

Feb. 9, 15-28, 1957	70.5	13	64	752	133	1,270	1,180	1.5	3,830	5.18	729	1,460	1,350	53	8.6	5,650	7.9
Feb. 12-14	52.7	11	474	309	118	490	420	3.2	1,490	2.03	212	528	432	56	5.8	2,430	8.0
Mar. 1-19	a. 59	15	655	674	131	1,780	1,060	1.0	4,340	5.90	6.91	1,980	1,880	42	6.6	5,800	7.9
Mar. 20-22	35.1	9.2	290	104	67	783	150	1.8	1,350	1.84	128	810	755	22	1.6	1,810	7.6
Mar. 23-31	56	13	580	386	152	1,480	660	5	3,270	4.45	4.94	1,740	1,610	33	4.1	4,400	7.9
Apr. 1-2, 5-18	13.1	14	560	523	102	1,510	830	1.5	3,560	4.45	126	1,690	1,610	40	5.5	4,820	7.4
Apr. 3-4	86.5	20	308	288	85	854	385	4.5	1,930	2.62	451	1,880	810	42	4.2	2,580	7.7
Apr. 19-24	407	15	238	203	119	618	272	1.8	1,430	1.94	1,570	685	588	39	3.4	2,070	7.8
Apr. 25-30	2,948	15	168	74	115	418	78	1.5	889	1.21	7,070	480	386	25	1.5	1,180	7.4
May 1-4, 9-10	962	13	175	87	99	439	98	4.0	9,878	1.19	2,280	480	409	28	1.7	1,280	7.7
May 5-8	100	16	196	222	117	536	268	2.5	1,340	1.62	362	580	484	45	4.0	2,060	7.9
May 11-21	2,928	13	133	85	108	358	75	2.5	780	1.06	6,160	385	296	32	1.9	1,090	7.7
May 22-24, 26-29	548	12	190	143	109	504	180	2.5	1,110	1.51	1,630	560	470	36	2.6	1,690	7.8
May 25, 30-31	3,055	9.8	194	20	72	450	24	2.5	787	1.07	6,490	520	461	8	4	982	7.4
June 1-7, 13-14,																	
19-20	2,849	16	104	89	122	273	87	4.2	688	.94	5,300	317	217	38	2.2	1,020	7.8
June 8-12	390	20	129	166	119	350	210	3.5	c 1,030	1.40	1,080	400	302	47	3.6	1,550	7.8
June 15-18, 23-25,																	
28-29	582	17	171	237	117	486	302	1.8	1,310	1.78	2,060	525	429	50	4.5	2,020	7.8
June 21-22, 26-27,	248	15	105	165	114	320	179	3.2	810	1.24	609	324	230	53	4.0	1,360	7.9
June 30, July 1-8	23.0	22	384	688	88	1,120	1,040	1.5	3,360	4.57	209	1,210	1,140	55	8.6	5,050	7.7
July 9-16	4.62	26	588	787	59	1,720	1,190	1.6	4,420	6.01	55.1	1,810	1,600	49	8.0	6,020	7.5
July 17-23	1.27	22	588	506	61	1,770	720	2.2	3,720	5.06	12.8	1,810	1,760	38	5.2	4,760	7.4
July 24, 27-31	172	15	178	231	101	538	275	2.0	1,310	1.78	608	530	448	49	4.4	1,990	7.6
July 25-26	1,730	14	160	95	88	440	97	4.2	907	1.23	4,240	465	393	31	1.9	1,270	7.6

a Includes days of less than 0.05 cfs flow.

b Calculated from determined constituents.

c Residue on evaporation at 180°C.

## BRAZOS RIVER BASIN--Continued

## DOUBLE MOUNTAIN FORK BRAZOS RIVER NEAR ASPERMONT, TEX.--Continued

Chemical analyses, in parts per million, water year October 1956 to September 1957.--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Boron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25 C)	pH		
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate					
Aug. 1-10, 1957..	23.4	18		333	44	504		111	973	710		3.9		2,640	3.59	187	1,010	921	52	6.9	3,880	7.7	
Aug. 11-14, 22-26	42.4	16		223	24	283		115	656	348		2.5		1,610	2.19	184	1,655	561	48	4.8	2,400	7.9	
Aug. 15-19, 27-28	87.5	19		360	50	520		98	1,140	720		1.2		2,880	3.92	680	1,150	1,070	49	6.6	4,110	8.0	
Aug. 20-21.....	402	20		70	11	162		140	230	152		3.5		720	.98	781	220	105	62	4.7	1,170	8.2	
Aug. 29-31.....																							
Sept. 1-7.....	a. 18	20		576	77	493		109	1,680	700		.2		3,600	4.90	1.75	1,750	1,660	38	5.1	4,650	7.9	
Sept. 8-9, 11-12,																							
13-19.....	270	13		179	20	157		107	454	218		2.5		1,100	1.50	802	528	441	39	3.0	1,720	7.7	
Sept. 0, 13-14..	271	14		107	13	103		117	290	98		9.7		742	1.01	543	320	224	41	2.5	1,070	7.6	
Sept. 20-30.....	1.85	15		456	59	460		107	1,280	680		.5		3,000	4.08	15.0	1,360	1,290	42	5.4	5,130	7.7	
Weighted average	352	14		152	16	110		110	400	123		3.0		910	1.24	865	445	355	35	2.3	1,300	--	

a Includes days of less than 0.05 cfs flow.

## BRAZOS RIVER BASIN--Continued

## DOUBLE MOUNTAIN FORK BRAZOS RIVER NEAR ASPERMONT, TEX.--Continued

Temperature (°F) of water, water year October 1956 to September 1957

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	79	62	--	41	--	53	69	66	71	82	75	60
2	71	59	53	43	50	64	70	72	85	82	83	72
3	78	55	--	55	53	66	65	71	84	81	79	63
4	77	51	53	56	--	58	60	60	69	82	79	60
5	78	59	56	53	--	58	63	66	76	78	73	62
6	76	60	59	53	51	48	65	70	81	81	73	60
7	71	52	45	58	58	57	67	70	84	80	75	59
8	--	54	39	60	63	60	60	74	86	79	74	54
9	72	56	42	--	66	63	62	71	84	78	76	74
10	74	60	49	41	62	68	66	70	84	81	--	61
11	76	60	53	51	63	68	64	66	84	81	75	--
12	78	--	47	54	62	65	41	67	78	80	61	--
13	76	61	--	58	64	61	42	69	78	82	70	--
14	78	68	47	41	67	62	52	74	84	82	71	--
15	74	--	49	39	62	61	58	76	83	76	68	--
16	71	50	52	32	56	63	67	82	82	73	79	--
17	69	52	49	38	54	63	69	73	79	79	80	--
18	70	61	--	41	53	62	71	68	72	76	66	--
19	73	62	41	47	50	61	68	74	75	--	71	--
20	71	--	53	53	52	57	69	78	70	78	70	74
21	68	49	55	55	58	62	70	80	79	74	69	70
22	69	51	51	50	46	66	73	78	80	75	68	64
23	68	49	49	--	47	50	69	71	78	77	68	68
24	68	51	41	52	62	51	75	76	79	66	69	69
25	62	52	48	39	62	52	65	76	79	69	70	69
26	61	--	51	38	57	53	61	76	80	73	70	76
27	68	55	51	--	52	51	65	79	77	60	67	75
28	68	44	52	39	51	57	62	79	79	73	61	74
29	72	47	54	41	--	60	61	80	82	79	62	74
30	65	--	54	40	--	62	63	81	82	80	62	75
31	64	--	51	47	--	65	--	73	--	75	61	--
Average	72	55	50	47	57	60	64	73	78	77	71	--

BRAZOS RIVER BASIN--Continued  
SALT FLAT CREEK AT WEIR B, NEAR ASPERMONT, TEX.

LOCATION.--At mouth, about 20 miles northwest of Aspermont, Stonewall County.  
RECORDS AVAILABLE.--Chemical analyses: October 1956 to September 1957.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal- cium (Ca)	Mag- ne- sium (Mg)	Sodium (Na)	Potas- sium (K)	Bicar- bonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chlo- ride (Cl)	Fluo- ride (F)	Ni- trate (NO <sub>3</sub> )	Bo- ron (B)	Dissolved solids		Hardness as CaCO <sub>3</sub>	Per- cent so- dium	Specific conduct- ance (micro- mhos at 25°C)	pH	Den- sity <sup>b</sup> (gm/ml 20°C)
														Parts per mil- lion	Tons per acre- foot per day					
Oct. 9, 1956	a 0.22					91,400	--	--	3,040	145,000						9,820	--	95	--	1.185
Oct. 18	.24					88,900	--	--	3,210	138,000						8,830	--	96	--	1.178
Oct. 20	.40					80,400	--	--	3,370	126,000						9,940	--	95	--	1.162
Oct. 25	.23					93,500	--	--	3,230	146,000						10,100	--	95	--	1.189
Nov. 9	.27					89,500	364	36	3,180	142,000						9,860	9,830	95	7.5	1.182
Nov. 22	.50					90,700	363	32	3,170	144,000						9,970	9,940	95	7.3	1.183
Dec. 7	.30					90,100	--	--	3,010	146,000						10,000	--	95	--	1.181
Dec. 20	.72					66,300	--	--	3,970	105,000						8,790	--	94	--	1.132
Jan. 11, 1957	.43					88,100	--	--	3,190	142,000						9,830	--	95	--	1.180
Jan. 24	a .44					86,400	--	--	3,060	139,000						10,100	--	95	--	1.179
Feb. 20	.60					68,300	--	--	3,540	108,000						9,400	--	95	--	1.137
Mar. 7	.41					88,300	--	--	3,250	143,000						9,480	--	95	--	1.176
May 15	.47					70,300	--	--	3,300	113,000						8,800	--	95	--	1.142
June 25	.60					77,000	--	--	3,460	121,000						9,350	--	95	--	1.155
July 11	.43					91,700	--	--	3,080	146,000						10,200	--	95	--	1.187
July 23	.73					79,300	--	--	3,620	124,000						8,620	--	95	--	1.160
Aug. 21	.62					91,100	--	--	3,050	143,000						9,530	--	95	--	1.186
Sept. 11	1.01					86,400	--	--	2,980	138,000						9,080	--	95	--	1.178
Sept. 27	.36					89,300	--	--	3,110	143,000						8,950	--	96	--	1.184

a. Field estimate.  
b. Values expressed in parts per million should be multiplied by the density when computing loads.

BRAZOS RIVER BASIN--Continued

SALT CROTON (DOVE) CREEK, AT WEIR C, NEAR ASPERMONT, TEX.  
 LOCATION --Half a mile downstream from Salt Flat Creek, about 20 miles northwest of Aspermont, Stonewall County.  
 RECORDS AVAILABLE.--Chemical analyses: October 1956 to September 1957.

Chemical analyses, in parts per million, water year October 1956 to September, 1957

Date of collection	Discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub> Calcium, magnesium	Non-carbonate	Percent sodium	Specific conductance (micro-mhos at 25°C)	pH	Density (gm/ml at 20°C)
														Parts per million	Tons per acre-foot	Tons per day						
Oct. 9, 1956	a.0.47					86,400	--	--	3,100	153,000					9,430	--	96		--	1.198		
Oct. 18	a.1.20					84,600	--	--	3,150	148,000					9,640	--	96		--	1.193		
Oct. 20	a.1.65					26,200	--	--	2,440	40,500					4,100	--	92		--	1.049		
Oct. 25	.82					86,100	--	--	3,400	134,000					9,040	--	95		--	1.173		
Nov. 9	a.69					84,300	312	42	3,230	137,000					8,880	8,850	95		7.4	1.171		
Nov. 22	.66					83,400	337	35	3,150	147,000					9,180	9,150	95		7.5	1.188		
Dec. 7	.70					83,400	--	--	3,330	146,000					9,470	--	98		--	1.188		
Dec. 20	2.25					31,600	--	--	2,770	50,200					5,210	--	93		--	1.066		
Jan. 11, 1957	.64					83,300	--	--	3,300	147,000					9,320	--	96		--	1.185		
Jan. 24	.71					81,900	--	--	3,320	147,000					9,240	--	98		--	1.185		
Feb. 20	1.50					68,500	--	--	3,480	112,000					6,060	--	93		--	1.141		
Mar. 7	.74					72,600	--	--	3,100	117,000					7,820	--	95		--	1.144		
Mar. 22	.96					46,400	--	--	3,010	73,000					6,060	--	94		--	1.089		
Apr. 9	.68					82,800	--	--	3,430	147,000					9,650	--	95		--	1.186		
May 15	.70					56,300	--	--	2,860	88,800					7,370	--	94		--	1.112		
June 25	.88					55,600	--	--	2,860	87,400					7,120	--	94		--	1.110		
July 11	.86					95,500	--	--	3,410	150,000					9,740	--	96		--	1.191		
July 23	1.01					73,400	--	--	3,770	115,000					8,100	--	95		--	1.148		
Aug. 21	.62					94,000	--	--	2,820	150,000					8,800	--	96		--	1.193		
Sept. 11	.86					87,500	--	--	2,970	140,000					8,470	--	96		--	1.180		
Sept. 27	.56					92,400	--	--	3,150	146,000					8,580	--	96		--	1.187		

a. Field estimate.

b. Values expressed in parts per million should be multiplied by the density when computing loads.

## BRAZOS RIVER BASIN--Continued

## SALT CROTON (DOVE) CREEK, AT WEIR D, NEAR ASPERMONT, TEX.

LOCATION.--About 500 feet upstream from Haystack (Hayrick) Creek, 1,000 feet upstream from gaging station, and about 20 miles northwest of Aspermont, Stonehall County.

RECORDS AVAILABLE.--Chemical analyses: October 1956 to September 1957.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH	Density (gm/ml at 20°C)
													Parts per million	Tons per acre-foot	Tons per day	Calcium magnesium	Non-carbonate				
Oct. 9, 1956 ...	a.0.33					97,200	--	--	2,800	157,000							10,100	96	--	--	1.203
Oct. 18 .....	.84					98,400	--	--	2,900	158,000							9,890	96	--	--	1.203
Oct. 19 .....	a.2.20					28,700	--	--	2,490	45,900							4,170	93	--	--	1.056
Oct. 24 .....	.69					58,500	--	--	3,500	91,600							7,270	95	--	--	1.114
Nov. 9 .....	.78					73,700	96	48	3,340	118,000							8,120	95	--	7.8	1.145
Nov. 23 .....	.60					96,200	348	38	2,890	152,000							9,210	96	--	7.5	1.195
Dec. 7 .....	.57					96,600	--	--	3,050	154,000							9,480	95	--	--	1.195
Dec. 20 .....	2.36					42,500	--	--	2,598	87,000							5,220	95	--	--	1.082
Jan. 11, 1957 ..	.53					95,400	--	--	3,420	150,000							9,660	96	--	--	1.190
Jan. 24 .....	.71					94,700	--	--	3,250	148,000							9,420	96	--	--	1.189
Feb. 20 .....	1.62					68,800	--	--	3,120	111,000							7,680	95	--	--	1.136
Mar. 7 .....	.86					61,400	--	--	3,140	95,400							7,050	95	--	--	1.120
May 15 .....	.8					21,800	--	--	2,270	34,500							4,180	92	--	--	1.048
May 27 .....	a.19.5					24,400	--	--	2,380	38,900							4,130	93	--	--	1.048
June 12 .....	a.2.40					4,270	--	--	1,600	6,750							1,470	86	--	--	1.007
June 24 .....						9,640	--	--	1,470	15,400							2,360	90	--	--	1.018
July 11 .....	a.40					99,800	--	--	2,780	186,000							10,600	95	--	--	1.205
July 24 .....	a.3.90					39,600	--	--	3,900	62,200							5,600	94	--	--	1.078
Aug. 21 .....	a.40					99,100	--	--	2,650	137,000							8,720	96	--	--	1.204
Sept. 10 .....	.60					100,000	--	--	2,960	137,000							8,150	96	--	--	1.202
Sept. 27 .....	.51					99,500	--	--	2,720	136,000							8,550	96	--	--	1.204

a Field estimate.

b Values expressed in parts per million should be multiplied by the density when computing loads.

BRAZOS RIVER BASIN--Continued  
 HAYSTACK (HAYRICK) CREEK AT WEIR E, NEAR ASPERMONT, TEX.

LOCATION.--About 400 feet upstream from mouth, about 20 miles northwest of Aspermont, Stonewall County.  
 RECORDS AVAILABLE.--Chemical analyses: October 1956 to September 1957.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Per cent sodium chloride	Specific conductance (micro-mhos at 25°C)	pH	Density (gm/ml at 20°C)			
													Parts per million	Tons per acre-foot	Tons per day	Calcium	Non-carbonate							
Oct. 9, 1956	a0.12					45,300			4,910	73,200													1.093	
Oct. 18	1.04					41,600			3,920	65,100														1.083
Oct. 19	a.46					3,850			2,180	6,880														1.012
Oct. 24	.10					39,600			4,780	61,800														1.080
Nov. 9	.18					32,900	109	79	4,240	52,600														1.065
Nov. 22	.18					35,500	118	89	4,370	56,000														1.071
Dec. 7	.21					34,600			4,400	55,100														1.070
Dec. 20	.51					18,600			3,120	30,100														1.038
Jan. 10, 1957	.14					37,400			4,530	59,500														1.076
Jan. 24	.19					33,800			4,300	54,300														1.068
Feb. 20	.43					28,400			3,840	45,500														1.054
Mar. 7	.17					35,300			4,370	56,100														1.070
Mar. 20	.90					25,000			3,200	39,100														1.048
Mar. 20	6.97					8,950			1,510	14,100														1.016
May 15	.46					13,800			3,300	21,700														1.029
May 27	.20					15,500			3,520	24,500														1.032
June 12	1.18					4,170			2,570	6,760														1.009
June 24	1.01					5,210			2,550	8,510														1.010
July 11	.16					26,300			4,650	42,200														1.054
July 24	.52					11,100			3,000	17,900														1.032
Aug. 21	.16					30,300			4,850	48,400														1.063
Sept. 10	.40					31,500			4,420	49,300														1.064
Sept. 27	.30					29,200			4,360	45,300														1.060

a. Field estimate.

b. Values expressed in parts per million should be multiplied by the density when computing loads.

BRAZOS RIVER BASIN--Continued  
SALT CROTON (DOVE) CREEK, NEAR ASPERMONT, TEX.

LOCATION.--At gaging station just below the mouth of Haystack (Hayrick) Creek and about 20 miles northwest of Aspermont, Stonewall County DRAINAGE AREA 69 square miles, approximately. 1956 to September 1957.  
RECORDS AVAILABLE.--Chemical analyses: October 1956 to September 1957 given in WSP 1512 as "Dove Creek near Aspermont".  
REMARKS.--Records of discharge for water year October 1956 to September 1957

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids		Hardness as CaCO <sub>3</sub>		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH at 20°C	Density (gm/ml at 20°C)	
														Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate					
Oct. 9, 1956	..					89,700	--	--	3,370	146,000					9,860	--	95	95	--	1.187	--	1.187
Oct. 18	1.79					72,700	--	--	3,530	114,000					8,390	--	95	95	--	1.144	--	1.144
Oct. 19	5.20					34,300	--	--	2,650	53,400					4,730	--	94	94	--	1.067	--	1.067
Oct. 24	.64					59,000	--	--	4,080	92,300					7,530	--	94	94	--	1.116	--	1.116
Nov. 8	1.08					56,700	211	53	3,830	91,700					7,420	7,380	94	94	--	1.112	7.6	1.112
Nov. 22	.72					87,100	303	48	3,460	138,000					9,230	9,190	95	95	--	1.175	7.6	1.175
Dec. 6	1.00					79,200	--	--	3,440	126,000					8,950	--	95	95	--	1.156	--	1.156
Dec. 20	3.08					38,900	--	--	2,650	61,900					5,210	--	94	94	--	1.075	--	1.075
Jan. 10, 1957	.73					66,000	--	--	4,000	106,000					8,160	--	95	95	--	1.133	--	1.133
Jan. 24	.90					65,300	--	--	3,890	104,000					7,960	--	95	95	--	1.131	--	1.131
Feb. 20	1.96					54,200	--	--	3,420	87,000					6,790	--	95	95	--	1.104	--	1.104
Mar. 7	.51					39,300	--	--	4,250	63,100					6,400	--	93	93	--	1.078	--	1.078
Apr. 3	2.96					36,300	--	--	3,360	57,000					5,510	---	93	93	--	1.070	--	1.070
Apr. 9	.74					67,400	--	--	4,120	107,000					8,280	---	95	95	--	1.135	--	1.135
Apr. 20	50					11,700	--	--	1,840	17,900					2,740	---	84	84	---	1.021	---	1.021
Apr. 28	760					3,060	--	--	992	4,980					1,270	---	84	84	---	1.004	---	1.004
Apr. 28	2,800					1,100	11	259	1,230	1,730					1,400	1,190	62	62	---	7.130	7.2	---
Apr. 28	5,500					868	10	169	988	1,340					1,140	1,000	62	62	---	5.760	7.0	---
May 15	1.27					16,700	--	--	2,680	26,100					4,070	---	90	90	---	62,200	---	1.033
May 17	50					2,480	--	--	1,260	4,080					1,630	---	77	77	---	18,000	---	1.004
May 22	760					17,900	--	--	2,100	28,100					3,540	---	91	91	---	60,600	---	1.033
May 27	1.07					20,000	--	--	2,840	31,800					4,340	---	91	91	---	67,700	---	1.038
May 31	50					1,110	11	132	1,360	1,700					1,470	1,310	62	62	---	7,700	8.1	---
May 31	760					517	12	167	1,450	800					1,580	1,440	41	41	---	4,810	6.9	---



BRAZOS RIVER BASIN--Continued  
SALT FORK BRAZOS RIVER, NEAR ASPERMONT, TEX.

LOCATION.--At gaging station at bridge on U. S. Highway 83, 5½ miles downstream from Salt Croton (Dove) Creek, and 13.2 miles northwest of Aspermont, Stonewall County.

DRAINAGE AREA.--4,830 square miles, approximately, of which 2,770 square miles is probably noncontributing.

RECORDS AVAILABLE.--Chemical analyses: October 1948 to September 1951, October 1956 to September 1957.

Water temperatures: October 1948 to September 1951, October 1956 to September 1957.

EXTREMES. 1956-57.--Dissolved solids: Maximum, 76,900 ppm Feb. 1-6; minimum, 1,280 ppm June 2-4.

Hardness: Maximum, 5,590 ppm Feb. 1-6; minimum, 392 ppm June 2-4.

Specific conductance: Maximum daily, 103,000 micromhos Mar. 22; minimum daily, 1,820 micromhos June 3.

Water temperatures: Maximum, 91°F Sept. 6; minimum freezing point on Jan. 16, 17.

EXTREMES. 1948-51. 1956-57.--Dissolved solids: Maximum, 78,500 ppm Mar. 21, 24-28, 1949; minimum, 1,280 ppm June 2-4, 1957.

Hardness: Maximum, 5,590 ppm Feb. 1-6, 1957; minimum, 372 ppm Mar. 19-23, '24 (12 m.-10 p.m.) 1951.

Specific conductance: Maximum daily, 111,300 micromhos Mar. 24, 25, 1949; minimum daily, 1,820 micromhos June 3, 1957.

Water temperatures (1948-51, 1956-57): Maximum, 91°F Sept. 6, 1957; minimum, freezing point on many days during winter months.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1956 to September 1957 given in WSP 1312.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids (calculated)			Hardness as CaCO <sub>3</sub>		Percent sodium	Sorption ratio	Specific conductance (micromhos at 25°C)	pH	Density (gm/ml at 20°C)	
													Parts per million	Tons per acre-foot	Tons per day	Calcium	Non-carbonate						
																							foot
Oct. 1-15, 1956	0.30	19	1,540	356	340	18,100	153	153	3,610	28,700				52,400	73.9	29.3	5,310	5,180	88	108	63,300	7.91	1.036
Oct. 16-31	12.2	15	1,340	302	302	17,400	136	136	3,050	27,600				49,800	70.0	1,700	4,590	4,470	89	112	61,200	7.61	1.034
Nov. 1-15	1.42	12	1,210	298	298	16,400	133	133	2,870	26,000				46,900	65.8	186	4,240	4,140	89	110	60,600	7.71	1.032
Nov. 16-30	.35	12	1,410	339	339	15,800	172	172	3,370	25,500				46,500	65.2	45.3	4,910	4,770	87	98	59,800	7.81	1.032
Dec. 1-10	.33	13	1,440	340	340	15,900	156	156	3,450	25,400				46,600	65.4	42.8	4,990	4,860	87	98	59,300	7.71	1.032
Dec. 11-20	3.35	9.7	1,330	358	358	17,100	147	147	3,190	27,300				49,300	69.3	461	4,710	4,580	89	106	61,700	7.61	1.034
Dec. 21-31	.67	10	1,410	380	380	23,200	149	149	3,300	36,800				65,200	82.7	123	5,060	4,970	91	141	77,400	7.61	1.045
Jan. 1-15, 1957	.29	12	1,450	345	345	15,600	173	173	1,630	26,400				45,500	64.0	36.8	5,040	4,960	81	95	60,000	7.71	1.034
Jan. 16-31	.36	12	1,420	349	349	15,500	172	172	1,620	26,100				45,100	63.3	43.3	4,960	4,840	87	95	59,300	7.81	1.033
Feb. 1-6	.68	12	1,490	455	455	27,600	149	149	3,190	44,100				76,900	111	149	5,580	5,470	91	160	86,600	7.91	1.054
Feb. 7-9	91.0	17	283	46	46	2,100	125	125	2,750	3,200				6,540	8.91	1,610	920	818	83	30	10,600	8.11	1.002
Feb. 10	158	17	337	56	56	2,850	102	102	876	4,480				8,690	11.9	3,720	1,120	1,040	85	37	13,900	8.01	1.004
Feb. 11-12	9.55	16	1,115	958	958	15,920	95	95	1,140	9,410				17,100	23.5	445	1,660	1,580	89	63	25,600	8.01	1.010
Feb. 13-18	3.00	9.3	1,320	958	958	23,000	12,000	12,000	3,240	19,100				34,600	48.2	303	3,340	3,250	89	90	46,700	7.91	1.021
Feb. 19-28	3.00	9.1	1,320	375	375	21,800	135	135	2,880	34,800				61,300	87.0	518	4,840	4,720	91	136	73,400	7.91	1.043
Mar. 1-5	46.3	12	544	115	115	6,900	89	89	1,200	11,000				19,800	27.2	2,500	1,850	1,760	89	70	28,300	7.81	1.011
Mar. 6-20	.73	9.7	1,300	327	327	16,900	147	147	1,320	26,900				48,600	68.3	99.0	4,590	4,470	89	108	59,400	7.81	1.033
Mar. 21-31	2.17	9.2	1,470	394	394	22,700	145	145	3,230	36,300				64,200	91.3	393	5,290	5,170	90	136	73,800	7.81	1.046

Apr. 3-5, 1957	30.2	7.2	447	85	3,940	80	1,030	6,310	--	11,900	16.3	976	1,460	1,400	85	45	18,500	7.7	1,006
Apr. 6-10	7.2	8.6	1,130	264	13,200	127	2,770	21,000	--	38,400	53.5	76.4	3,900	3,800	88	92	48,600	7.4	1,024
Apr. 11-20	12.6	12	1,340	322	15,600	129	3,080	25,000	--	45,400	63.6	1,590	4,670	4,560	88	99	61,200	7.6	1,031
Apr. 21-22, 28	1,259	17	586	63	2,760	141	1,440	4,330	--	9,260	12.7	31,600	1,720	1,610	78	23	14,600	7.2	1,004
Apr. 23-27, 29	1,339	19	334	32	771	129	822	1,190	3.0	3,230	4.39	11,680	985	860	63	11	5,140	7.5	--
Apr. 30	2,650	18	173	18	283	127	436	412	5.0	1,420	1.93	10,180	505	401	56	5.7	2,250	7.6	--
May 1-8	285	16	332	50	1,700	111	805	2,700	--	5,600	7.70	4,310	1,030	943	78	23	9,360	7.8	--
May 9-10	1,085	20	384	25	465	87	970	700	3.5	2,610	3.55	7,720	1,060	990	48	6.2	3,750	7.8	--
May 11, 17, 23-27, 31	1,325	16	323	42	1,350	114	805	2,120	--	4,710	6.41	16,850	978	885	75	19	7,620	7.9	--
May 12-14, 19-20	4,012	16	156	19	384	114	407	552	7.5	1,600	2.18	17,350	467	374	64	7.7	2,600	7.8	--
May 15-16, 18, 21-24	2,723	16	250	31	669	106	636	1,030	6.0	2,690	3.66	19,780	752	664	66	11	4,370	7.7	--
May 28-30	157	16	359	81	2,400	158	1,010	3,790	--	7,760	10.6	3,300	1,300	1,170	80	29	12,300	7.9	1,002
June 1, 5-10	1,512	15	236	35	854	118	603	1,320	5.0	3,130	4.26	12,780	733	636	72	14	5,110	7.8	--
June 2-4	4,590	15	126	19	300	127	319	428	6.1	1,280	1.74	15,860	392	288	62	6.6	2,080	7.8	--
June 11, 13, 16-17	248	18	346	63	1,740	122	850	2,780	--	5,860	7.97	3,920	1,120	1,020	77	23	9,420	7.9	--
June 12, 14-15, 23-26	520	18	336	41	882	103	898	1,350	2.5	3,580	4.87	5,030	1,010	922	66	12	5,570	7.8	--
June 18-22	1,842	19	129	23	364	122	350	525	4.2	1,470	2.00	7,310	416	316	66	7.8	2,450	7.9	--
June 27-30, July 1-3	56.1	19	411	94	2,080	120	1,100	3,320	--	7,080	9.65	1,070	1,410	1,310	76	24	11,300	7.9	1,002
July 4-10	15.6	19	675	149	4,420	113	1,710	7,110	--	14,100	19.6	606	2,300	2,200	81	40	21,400	7.8	1,020
July 11-23, 25	29.1	17	1,040	232	9,310	105	2,580	14,900	--	18,100	38.9	2,250	3,550	3,460	85	68	38,600	7.7	1,019
July 24, 26, 30-31	140	17	280	48	1,500	120	762	2,320	--	4,990	6.79	1,890	896	798	78	22	8,330	8.0	--
July 27-29	156	18	168	31	567	116	465	850	2.1	2,160	2.94	910	546	452	69	11	3,610	7.8	--

a Values expressed in parts per million should be multiplied by density when computing loads.

## BRAZOS RIVER BASIN--Continued

## SALT FORK BRAZOS RIVER, NEAR ASPERMONT, TEX.--Continued

Chemical analyses, in parts per million, water year October 1956 to September 1957.--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids (calculated)			Hardness as CaCO <sub>3</sub>		Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	Density at 20°C	
													Parts per million	Tons per acre-foot	Tons per day	Calcium magnesium	Non-carbonate					
Aug. 1, 6-10, 1957	20.3	15		447	87	2,150	124	1,210	3,390					7,360	10.0	404	1,470	1,370	76	11,500	7.7	1.002
Aug. 2-5 .....	52.0	14		183	37	784	109	494	1,210			2.8		2,780	3.78	390	608	519	74	4,660	7.5	--
Aug. 11, 15-16, 20, 23-25 .....	19.0	16		428	72	1,970	115	1,100	3,120					6,760	9.19	347	1,360	1,270	76	10,600	7.9	--
Aug. 12, 17-19, 26-27 .....	4.75	13		760	158	5,750	102	1,910	9,200					17,800	24.5	231	2,550	2,460	83	25,600	7.8	1.011
Aug. 13-14, 21-22	70.5	15		288	37	789	96	808	1,180			3.0		3,170	4.31	603	870	792	66	5,020	7.8	--
Aug. 28-31, Sept. 1-11 .....	1.13	15		1,410	326	14,300	161	3,320	22,900					42,400	59.3	133	4,860	4,730	86	53,700	7.7	1.028
Sept. 12-13 .....	188	18		354	43	886	152	953	1,340			2.3		3,680	5.00	1,870	1,060	836	65	5,690	8.0	--
Sept. 14-15 .....	21.0	14		510	71	3,310	83	1,230	5,250					10,400	14.2	592	1,560	1,500	82	16,100	7.8	1.004
Sept. 16-18 .....	3.83	12		872	184	7,800	108	2,090	12,500					23,500	32.4	246	2,830	2,840	85	33,900	7.8	1.014
Sept. 19-30 .....	.53	9.6		1,480	328	16,100	156	3,490	25,700					47,200	66.3	69.8	5,040	4,810	87	60,600	7.8	1.033
Weighted average	299	17		247	33	882	117	625	1,360					3,220	4.38	2,600	752	656	72	5,080	--	--

a Values expressed in parts per million should be multiplied by density when computing loads.

## BRAZOS RIVER BASIN--Continued

## SALT FORK BRAZOS RIVER, NEAR ASPERMONT, TEX.--Continued

Temperature (°F) of water, water year October 1956 to September 1957  
Once-daily measurement, usually between 7 and 9 a. m.

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	62	54	44	43	43	49	--	62	65	76	76	73
2	68	--	43	45	42	54	--	64	64	78	--	74
3	61	45	46	40	45	55	--	62	61	75	79	--
4	69	49	50	48	48	53	--	50	65	85	75	75
5	63	44	52	47	49	--	52	51	68	71	76	--
6	66	50	56	45	50	46	53	65	71	--	74	91
7	58	55	40	41	58	--	57	58	71	88	71	66
8	58	46	41	52	59	38	--	--	75	71	72	63
9	--	62	44	55	59	45	70	64	75	71	74	65
10	62	48	46	35	54	57	62	65	76	--	72	65
11	60	51	--	40	51	--	51	61	70	72	72	--
12	62	59	46	44	51	--	64	60	71	71	74	63
13	59	66	36	44	55	--	46	61	69	71	74	--
14	69	61	41	37	56	--	48	63	75	72	75	70
15	74	50	--	34	56	55	54	67	78	72	74	62
16	65	48	50	32	--	55	60	71	80	70	73	64
17	65	39	41	32	53	59	--	72	73	71	73	65
18	64	40	34	35	49	55	68	64	68	71	74	64
19	62	49	--	44	47	55	62	63	69	74	71	73
20	61	41	46	39	56	51	65	69	74	76	70	64
21	59	39	44	41	49	46	61	70	71	--	71	70
22	58	40	47	44	39	53	64	72	75	77	70	74
23	59	40	38	44	46	52	62	69	69	--	77	--
24	60	40	39	40	52	--	60	69	69	78	70	64
25	55	50	44	35	54	39	61	66	72	75	--	59
26	53	41	54	34	65	--	62	70	74	76	89	--
27	53	39	43	--	46	45	58	70	70	77	72	--
28	56	41	--	39	69	54	58	66	75	78	71	64
29	65	35	55	41	--	55	59	69	77	76	70	82
30	55	44	46	39	--	57	60	81	79	77	70	65
31	51	--	50	42	--	54	--	67	--	78	70	--
Average	61	47	45	41	52	--	59	65	72	75	73	--

## BRAZOS RIVER BASIN--Continued

## HUBBARD CREEK NEAR BRECKENRIDGE, TEX.

LOCATION.--At gaging station at bridge on U. S. Highway 183, 2.3 miles downstream from Big Sandy Creek, 6.8 miles northwest of Breckenridge, Stephens County, 7 miles upstream from Gonzales Creek, and 8 miles upstream from Clear Fork Brazos River.

DRAINAGE AREA--1,087 square miles

RECORDS AVAILABLE.--Chemical analyses: April 1955 to September 1957

RECORDS AVAILABLE.--Dissolved solids: Maximum, 1,810 ppm Aug. 8-31; minimum, 118 ppm Feb. 6-8.

EXTREMES, 1956-57.--Dissolved solids: Maximum, 1,810 ppm Aug. 8-31; minimum, 118 ppm Feb. 6-8.

Hardness: Maximum, 766 ppm Sept. 1-11; minimum, 72 ppm Feb. 6-8.

Specific conductance: Maximum daily, 3,920 micromhos July 24; minimum daily, 121 micromhos Apr. 27.

EXTREMES, 1955-57.--Dissolved solids: Maximum, 2,200 ppm Apr. 17-28, 1956; minimum, 118 ppm Feb. 6-8, 1957.

Hardness: Maximum, 866 ppm Apr. 17-28, 1956; minimum, 72 ppm Feb. 6-8, 1957.

Specific conductance: Maximum daily, 5,350 micromhos Apr. 18, 1956; minimum daily, 121 micromhos Apr. 27, 1957.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1956 to September 1957 given in WSP 1512.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids (calculated)		Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)			
													Parts per million	Tons per acre-foot	Calcium	Non-carbonate					
Oct. 1-15, 1956.....	3.0, 09	6.8		82	14	193	107	14	410	410	0.4	1.2	774	1.05	0.19	174	62	5.2	1,500	8.0	
Oct. 16-31.....	418.8	8.6		52	6.5	62	129	20	114	114	.5	1.5	328	4.5	16.6	155	50	2.2	618	7.8	
Nov. 1-15.....	198.7	7.0		37	4.3	29	102	14	50	50	.6	4.5	196	27	105	110	26	37	347	7.7	
Nov. 15-30.....	a.41	7.6		34	3.6	15	106	12	21	21	.5	2.0	148	20	.16	99	12	25	258	7.3	
Dec. 1-14.....	a.0	7.0		39	4.4	17	128	12	22	22	.7	1.0	166	.23	0	115	10	24	.7	289	7.3
Dec. 15-19, 22-31.	a.49, 2.	6.2		32	3.5	18	100	10	27	27	.3	1.5	148	.20	19.7	94	12	29	.8	269	7.9
Dec. 20-21.....	370	6.0		38	4.7	54	95	16	93	93	.4	2.0	263	.56	263	113	35	51	2.2	472	7.7
Jan. 1-13, 1957.....	a.04	6.2		32	3.8	23	95	11	38	38	.4	1.2	163	.22	.02	95	17	34	1.0	301	7.7
Jan. 14-31.....	a.0	5.2		33	4.0	25	101	10	42	42	.4	.2	170	.23	0	99	16	36	1.1	316	7.6
Feb. 1-5.....	a.5, 08	5.2		36	4.3	31	95	10	60	60	.3	.5	194	.26	2.66	107	29	39	1.3	369	7.9
Feb. 6-8.....	7, 473	6.2		25	2.3	15	79	7.0	21	21	.2	2.0	118	.16	2, 380	72	7	31	.7	213	7.8
Feb. 9-28.....	22.4	8.8		46	5.4	33	126	14	62	62	.2	2.8	234	.32	14.2	137	34	34	1.2	435	7.8
Mar. 1-19.....	a.14	10		62	8.6	46	169	26	86	86	.5	1.8	324	.44	11.2	190	52	34	1.5	569	8.1
Mar. 20-31, Apr. 1-3	14.1	7.4		41	4.5	25	111	18	45	45	.5	.8	197	.27	7.50	121	30	31	1.0	362	7.7
Apr. 4-22.....	13.2	6.4		59	8.0	75	121	15	160	160	.5	1.2	385	.52	13.7	180	81	47	2.4	742	7.7
Apr. 23.....	1, 140	7.6		64	9.8	103	103	11	230	230	.7	2.2	479	.65	1, 470	200	116	53	3.2	937	7.5
Apr. 24-25.....	382	7.6		42	5.2	46	112	13	82	82	.7	3.5	255	.35	263	126	34	44	1.8	484	7.8
Apr. 26-30, May 1.	10, 510	7.0		29	2.7	16	86	7.6	26	26	.7	2.5	134	.18	3, 800	83	13	30	1.8	241	7.8
May 2-7.....	2, 734	8.6		38	4.4	30	100	10	58	58	.7	2.5	201	.27	1, 480	113	31	37	1.2	375	7.7
May 8-9, 16-17.....	903	10		47	5.9	34	115	16	72	72	.3	3.5	246	.33	600	142	47	34	1.3	457	7.4

May 10-15, 18-20, 1957.....	5,799	9.2	36	4.0	18	103	9.0	35	.3	2.8	165	.22	2,580	106	22	27	.8	301	7.9
May 21-27.....	6,361	9.6	38	3.9	20	106	9.8	38	.4	3.2	175	.24	3,010	111	24	28	.8	321	7.8
May 28-31, June 1-5	1,098	11	62	9.0	61	129	23	134	.4	5.9	369	.50	1,000	192	86	41	1.9	692	7.7
June 6-8, 13-15....	1,032	9.6	40	6.4	40	114	14	88	.4	3.5	267	.36	744	149	55	36	1.4	511	7.6
June 9-12.....	122	12	88	14	94	156	40	215	.3	8.6	549	.75	181	277	149	42	2.5	1,030	7.9
June 16-21.....	332	13	61	8.7	59	121	31	128	.5	4.2	365	.50	327	188	89	41	1.9	684	8.0
June 22-30.....	30.7	13	102	18	135	153	45	312	.5	11	712	.97	59.0	328	203	47	3.2	1,340	8.1
July 1-12.....	4.70	11	160	32	235	186	93	550	.4	19	1,190	1.62	15.1	530	378	49	4.4	2,170	8.1
July 13-24, 27-31, Aug. 1-4.....	16.6	11	211	43	313	208	150	740	.4	17	1,590	2.16	71.3	704	533	49	5.1	2,870	7.7
July 25-26, Aug. 5-7.....	237	17	40	6.0	36	94	17	73	--	6.3	241	.33	154	125	48	38	1.4	436	8.1
Aug. 8-31.....	50	14	204	51	384	149	259	820	.4	5.9	1,810	2.46	2.44	718	596	54	6.2	3,160	7.8
Sept. 1-11.....	44	14	218	54	327	176	315	710	.4	4.5	1,730	2.35	2.06	766	622	48	5.1	2,980	7.9
Sept. 14-21.....	7.12	10	129	34	291	110	108	630	.5	2.5	1,260	1.71	24.2	462	372	58	5.9	2,240	7.9
Sept. 22-23.....	652	7.4	70	14	125	108	31	268	.5	2.8	572	.76	1,010	232	144	54	3.6	1,090	7.8
Sept. 12-13, 24-30, Weighted average	44.7	9.6	48	7.2	52	109	23	104	.6	2.2	301	.41	36.3	150	60	43	1.9	563	8.0
Weighted average	633	8.4	36	4.1	24	98	10	46	0.5	2.9	180	0.25	308	107	26	33	1.0	331	--

a Includes days of less than 0.05 cfs.

## WESTERN GULF OF MEXICO BASINS

## BRAZOS RIVER BASIN--Continued

## HUBBARD CREEK NEAR BRECKENRIDGE, TEX.--Continued

Temperature (°F) of water, water year October 1956 to September 1957  
 Once-daily measurement, usually before 10 a. m.

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	78	60	43	44	--	--	56	68	71	87	85	80
2	--	--	--	--	41	55	--	87	--	--	--	--
3	67	66	46	40	--	--	57	68	69	83	85	80
4	--	57	--	--	48	57	57	66	69	--	--	--
5	65	52	49	48	--	--	--	64	70	83	83	80
6	--	--	--	47	45	58	56	63	69	--	80	--
7	--	54	53	--	50	--	--	65	73	82	--	--
8	--	--	--	52	56	45	55	66	78	--	82	73
9	65	49	40	--	57	--	--	65	79	82	--	--
10	--	--	--	45	53	57	59	66	82	--	82	73
11	62	51	45	--	57	--	--	68	83	83	--	--
12	--	--	--	44	--	55	57	70	79	82	83	73
13	69	55	40	--	58	--	--	67	78	--	--	--
14	--	--	--	42	--	58	49	67	89	82	82	78
15	67	53	44	--	50	--	--	71	81	--	--	--
16	68	--	--	34	--	55	61	67	80	82	83	73
17	--	45	45	--	--	--	--	76	81	--	--	--
18	68	--	--	35	53	57	70	68	74	82	81	75
19	--	51	43	--	--	--	--	69	75	--	--	--
20	65	--	45	43	50	55	69	71	75	84	79	75
21	--	46	43	--	--	--	--	75	79	--	--	--
22	62	--	46	48	50	56	--	--	--	82	80	72
23	--	45	--	--	--	--	68	70	--	--	--	--
24	62	--	45	47	47	47	67	69	81	80	81	70
25	--	45	--	--	--	--	78	69	79	78	--	--
26	57	--	42	--	54	48	64	70	--	81	81	68
27	--	42	--	35	--	--	63	72	81	--	--	68
28	60	--	42	--	51	48	65	--	--	84	82	68
29	--	40	--	38	--	--	66	72	83	--	--	--
30	63	--	44	--	--	48	70	70	--	85	81	69
31	--	--	--	39	--	--	--	75	--	--	--	--
Average	--	--	--	--	--	--	--	69	77	--	--	--

## BRAZOS RIVER BASIN--Continued

## BRAZOS RIVER AT POSSUM KINGDOM DAM, NEAR GRAFORD, TEX.

LOCATION--Immediately below dam on Brazos River, 2.6 miles upstream from Loving Creek, 11.3 miles southwest of Graford, Palo Pinto County, and 20 miles upstream from gaging station near Palo Pinto.  
 DRAINAGE AREA--22,550 square miles, approximately, of which 9,240 square miles is probably noncontributing.  
 RECORDS AVAILABLE--Chemical analyses: January 1942 to September 1957.

Water temperatures: October 1949 to September 1955.

Hardness: 1956-57.--Dissolved solids: Maximum, 2,130 ppm Oct. 1-31; minimum, 331 ppm Apr. 26-30, May 1-10.

Specific conductance: Maximum, 670 ppm Oct. 1-31; minimum, 135 ppm Apr. 26-30, May 1-10.

Hardness: Maximum, 670 ppm Oct. 1-31; minimum, 135 ppm Apr. 26-30, May 1-10.

EXTREMES, 1942-57.--Dissolved solids: Maximum, 2,640 ppm Jan. 1-31, 1956; minimum, 331 ppm Apr. 26-30, May 1-10, 1957.

Hardness: Maximum, 828 ppm Jan. 1-31, 1956; minimum, 135 ppm Apr. 26-30, May 1-10, 1957.

Specific conductance: Maximum daily, 5,720 microhos Jan. 7, 1956; minimum daily, 494 microhos May 4, 1957.

Water temperatures (1949-55): Maximum, 76° Sept. 27-30, 1950; minimum, 45° F on several days in February 1951.

REMARKS.--Values reported for dissolved solids concentrations less than 1,000 ppm are residues on evaporation and for concentrations more than 1,000 ppm are calculated from determined constituents. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for gaging station near Palo Pinto for water year October 1956 to September 1957 given in WSP 1512. No appreciable inflow between dam and gaging station except during periods of heavy local rains.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium	Specific conductance (microhos at 25°C)	pH		
													Parts per million	Tons per acre-foot	Tons per day	Calcium	Non-carbonate					
Oct. 1-31, 1956 ..	87.3	12		219	30	501		128	518	790		0.8		2,130	2.90	387	670	565	62	3,430	7.6	
Nov. 1-30 ..	111	12		200	29	430		118	504	660		1.0		1,890	2.57	566	618	522	60	3,090	7.4	
Dec. 1-31 ..	263	9.8		195	28	410		114	505	620		.8		1,820	2.48	1,290	602	508	60	2,820	7.9	
Jan. 1-31, 1957 ..	289	9.6		195	27	402		114	498	610		.5		1,800	2.45	1,450	598	504	59	2,910	7.9	
Feb. 1-28 ..	349	9.6		191	26	376		115	466	582		.7		1,710	2.33	1,610	584	490	58	2,770	7.7	
Mar. 1-31 ..	144	9.4		176	25	349		111	427	542		1.0		1,580	2.15	614	542	451	58	2,590	7.5	
Apr. 1-25 ..	188	9.8		182	26	367		113	446	568		1.5		1,660	2.26	887	561	468	59	2,690	7.4	
Apr. 26-30, May 1-10 ..	38,920	7.4		45	5.4	60		74	73	91		1.8		331	.45	34,780	135	74	49	573	7.1	
May 11-20 ..	30,840	7.0		53	5.8	60		84	84	92		1.8		359	.49	29,890	157	88	45	611	7.0	
May 21-31 ..	27,800	8.4		64	7.8	76		94	112	115		1.8		451	.61	33,850	191	114	46	2,4	759	7.4
June 1-9 ..	17,730	8.2		55	6.4	69		94	87	102		1.8		399	.54	19,100	164	68	48	2.3	671	7.3
June 10-30 ..	3,200	12		113	12	125		100	240	192		1.8		786	1.07	6,700	332	250	45	3.0	1,240	7.4
July 1-31 ..	603	13		114	13	118		104	238	185		2.0		769	1.07	1,280	338	253	43	2.8	1,220	7.8
Aug. 1-31 ..	531	12		114	14	136		111	252	200		2.5		840	1.14	1,200	342	251	46	3.2	1,290	7.6
Sept. 1-30 ..	367	9.6		112	14	144		119	232	220		1.5		831	1.13	823	337	240	48	3.4	1,310	7.5
Weighted average	4,145	8.0		61	7.2	79		85	108	119		1.8		443	0.60	4,960	182	112	49	2.6	743	--

## BRAZOS RIVER BASIN--Continued

BRAZOS RIVER AT WHITNEY DAM, NEAR WHITNEY, TEX.  
(Formerly published as Brazos River near Whitney, Tex.)

LOCATION (revised).--On State Highway 22, 2.4 miles upstream from Coon Creek, 4.0 miles upstream from Iron Creek, 3.4 miles upstream from gaging station and 7.4 miles southwest of Whitney, Hill County, and at mile 442.

DRAINAGE AREA (revised).--26,170 square miles, approximately, of which 9,240 square miles is probably noncontributing.

RECORDS AVAILABLE.--Chemical analyses: October 1947 to May 1948, October 1948, to September 1957.

Water temperatures: October 1947 to May 1948, October 1948 to September 1957.

EXTREMES, 1956-57.--Dissolved solids: Maximum, 1,380 ppm Oct. 1-31; minimum, 337 ppm June 11-20.

Hardness: Maximum, 474 ppm Oct. 1-31; minimum, 148 ppm May 4.

Specific conductance: Maximum daily, 2,350 micromhos Dec. 6, 8-9; minimum daily, 538 micromhos June 12.

Water temperatures: Maximum, 92°F July 21, 28, 29; minimum, 42°F Jan. 27, 28.

EXTREMES, 1947-57.--Dissolved solids: Maximum, 1,360 ppm Oct. 1-10, 1948; minimum, 183 ppm June 11-20, 1952.

Hardness: Maximum, 542 ppm Oct. 1-10, 1948; minimum, 96 ppm June 11-20, 1952.

Specific conductance: Maximum daily, 2,660 micromhos Oct. 1, 1948; minimum, freezing point Jan. 28-29, 1948.

Water temperatures: Maximum, 98°F July 8, 1954; minimum, 44 micromhos Oct. 1, 1948.

REMARKS.--Values reported for dissolved solids concentrations less than 1,000 ppm are residues on evaporation and for concentrations more than 1,000 ppm are calculated from determined constituents. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for gaging station near Whitney for water year October 1956 to September 1957 given in WSP 1512. No appreciable inflow between dam and gaging station except during periods of heavy local rains.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Per-sulfate ratio	Specific conductance (micro-mhos at 25°C)
													Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate		
Oct. 1-31, 1956	639	13	147	26	303	115	361	470	1.0	1,380	1.88	2,380	380	58	6.1	2,230	7.9		
Nov. 1-30	41.3	9.8	149	23	292	114	356	452	.8	1,340	1.82	1,449	466	373	5.9	2,260	8.0		
Dec. 1-31	31.8	11	150	23	302	117	365	462	.8	1,370	1.86	1,118	468	372	5.8	2,300	8.0		
Jan. 1-31, 1957	612	8.8	145	21	297	118	351	446	.2	1,330	1.81	2,200	446	352	5.9	2,230	7.9		
Feb. 1-28	661	9.6	128	23	282	118	312	430	1.0	1,240	1.89	2,210	415	318	6.0	2,130	7.9		
Mar. 1-31	645	9.2	131	20	253	116	295	395	.8	1,160	1.58	2,020	409	314	5.4	1,960	7.8		
Apr. 1-30	1,472	8.6	124	19	233	114	266	370	1.6	1,080	1.47	4,290	388	294	5.7	1,830	7.6		
May 1-3, 5-17	18,790	9.6	68	9	115	98	125	176	1.8	575	.78	29,170	210	130	5.4	3.5	976	7.5	
May 4	8,350	--	--	--	--	101	87	87	--	--	--	--	148	85	--	584	7.6		
May 18-31	43,610	9.8	55	7.0	76	99	82	116	1.5	416	.57	48,980	166	85	5.0	2.6	713	7.6	
June 1-10	38,530	13	58	5.8	53	101	69	86	1.8	354	.48	36,830	156	73	4.4	2.0	579	7.4	
June 11-20	34,260	12	51	5.6	53	104	67	78	1.5	337	.46	31,170	150	65	4.4	1.9	548	7.7	
June 21-30	34,130	10	58	6.6	57	113	71	91	1.2	380	.52	35,020	172	79	4.2	1.9	617	7.4	
July 1-31	3,510	15	72	10	79	141	103	120	2.0	488	.66	4,620	220	105	4.4	2.3	802	7.9	
Aug. 1-31	723	15	77	9.9	86	155	110	125	1.5	539	.73	1,050	232	106	4.4	2.5	863	7.9	
Sept. 1-30	798	11	84	12	101	147	134	155	1.0	652	.86	1,360	259	138	4.6	2.7	997	7.9	
Weighted average	6,213	11	62	7.9	82	106	96	126	1.5	459	0.62	7,700	187	100	4.9	2.6	766	--	

BRAZOS RIVER BASIN

BRAZOS RIVER AT WHITNEY DAM, NEAR WHITNEY, TEX.--Continued

Temperature (° F) of water, year October 1956 to September 1957

Day	October		November		December		January		February		March		April		May		June		July		August		September	
	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min
	1.....	79	77	70	67	52	49	51	47	46	57	54	58	54	66	65	74	80	80	80	80	90	84	88
2.....	81	76	66	66	51	51	51	46	47	56	55	56	54	66	66	76	75	81	80	89	83	88	83	83
3.....	79	77	66	60	53	52	50	51	47	56	56	58	53	66	66	76	76	83	81	89	82	83	82	82
4.....	80	76	60	58	56	54	50	52	48	59	56	58	57	66	66	76	76	82	82	90	83	86	81	81
5.....	80	76	61	58	62	59	54	49	48	57	55	59	55	66	66	76	84	82	82	91	84	85	81	81
6.....	79	75	63	61	65	62	52	51	50	48	56	55	62	66	66	76	84	82	87	83	87	83	88	82
7.....	78	74	66	63	66	63	52	51	50	48	56	51	69	61	66	66	75	83	82	86	80	84	79	79
8.....	78	73	65	60	63	63	52	50	48	46	56	53	68	56	66	75	83	81	87	81	87	81	77	75
9.....	78	74	60	56	53	45	51	50	47	46	59	54	58	66	66	75	85	82	86	82	86	81	81	75
10.....	77	74	59	56	46	44	51	40	53	49	65	55	57	66	66	76	85	82	83	82	82	82	79	79
11.....	78	73	61	59	50	46	50	48	58	50	56	55	58	66	66	76	86	82	87	81	83	83	79	79
12.....	76	74	65	60	53	50	52	49	56	50	58	57	55	66	66	76	87	82	85	83	82	82	79	79
13.....	77	75	64	62	53	49	53	50	56	51	57	56	56	66	66	76	89	82	87	81	83	80	80	80
14.....	76	74	67	64	49	48	51	48	51	49	57	56	58	66	66	76	90	84	84	81	85	80	84	81
15.....	76	74	67	60	50	49	50	47	53	49	58	55	57	66	67	77	85	82	86	81	83	81	83	81
16.....	76	74	60	55	50	49	48	45	52	50	59	56	57	66	67	78	86	82	85	82	85	82	81	78
17.....	76	74	56	53	52	50	49	44	53	52	59	57	62	67	67	79	88	82	89	82	82	82	78	78
18.....	75	74	55	53	52	48	46	46	53	52	59	57	62	66	68	81	79	86	82	89	86	84	79	79
19.....	77	74	61	55	48	46	47	47	52	50	58	56	61	68	68	82	81	89	82	87	83	81	79	79
20.....	75	74	65	60	48	46	53	47	51	51	68	57	68	68	68	82	81	88	83	85	82	81	79	79
21.....	74	71	60	55	50	48	57	49	52	49	62	57	66	60	69	81	80	92	84	85	82	83	79	79
22.....	74	70	55	52	54	50	53	49	52	50	61	57	66	60	69	80	89	85	87	82	82	82	76	76
23.....	74	71	53	52	54	52	49	45	50	48	62	61	63	60	70	81	78	85	82	85	82	79	74	74
24.....	74	72	53	52	48	48	47	50	50	42	57	64	62	70	70	82	81	85	82	88	82	80	76	76
25.....	75	72	53	52	49	47	47	55	53	57	50	65	62	71	70	82	79	88	84	88	82	79	76	76
26.....	72	69	53	50	48	47	47	44	58	55	57	52	66	63	72	80	79	87	83	88	84	79	77	77
27.....	71	68	50	48	50	48	44	42	56	54	56	54	65	64	72	81	80	90	83	87	82	79	77	77
28.....	72	70	50	49	50	50	46	42	58	53	56	54	65	65	73	81	80	92	83	87	82	79	76	76
29.....	70	50	48	51	50	47	46	--	--	--	54	65	65	72	73	80	80	92	84	86	81	80	76	76
30.....	72	70	49	48	52	50	47	46	--	--	56	55	65	65	74	80	80	84	82	86	81	80	74	74
31.....	71	68	--	--	52	51	47	46	--	--	56	56	--	--	74	74	--	--	85	82	87	81	--	--
Average.....	76	73	60	56	53	50	50	48	53	50	58	55	62	58	68	78	86	82	87	82	87	82	82	78



BRAZOS RIVER BASIN--Continued  
BRAZOS RIVER AT RICHMOND, TEX.

LOCATION.--At gaging station at bridge on U. S. Highway 59 in Richmond, Fort Bend County, 925 feet downstream from Texas and New Orleans Railroad bridge, and at mile 93.

DRAINAGE AREA.--44,020 square miles, approximately, of which 9,240 square miles is probably noncontributing.

RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1957.

Water temperatures: November 1950 to September 1957.

EXTREMES, 1956-57.--Dissolved solids: Maximum, 1,230 ppm Oct. 1-10; minimum, 104 ppm Apr. 24-30.

Hardness: Maximum, 415 ppm Oct. 1-10; minimum, 104 ppm Apr. 24-30.

Specific conductance: Maximum daily, 2,230 micromhos Mat. 1; minimum, 104 ppm Sept. 29.

Water temperatures: Maximum 87° F Aug. 18-19; minimum, 43° F Jan. 18.

EXTREMES, 1945-57.--Dissolved solids: Maximum, 1,400 ppm Sept. 1-10, 1951; minimum, 133 ppm Aug. 27-31, 1947.

Hardness: Maximum, 446 ppm Sept. 1-10, 1948; minimum, 74 ppm Jan. 13-14, 18-20, 1950.

Specific conductance: Maximum daily, 2,540 micromhos Sept. 4, 1951; minimum daily, 187 micromhos Aug. 31, 1947.

Water temperatures: Maximum daily, 2,540 micromhos Sept. 4, 1951; minimum, 40° F Dec. 24, 1953.

REMARKS.--Values reported for dissolved solids concentrations less than 1,000 ppm are residues on evaporation and for concentrations more than 1,000 ppm are calculated from determined constituents unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1956 to September 1957 given in WSP 1512.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Per cent sodium	Specific conductance (micro-mhos at 25° C)	pH
														Paris per million	Tons per acre-foot	Tons per day	Calcium	Non-carbonate			
														So-adsorp-tion ratio							
Oct. 1-10, 1956..	593	12	130	22	275	136	307	412	1.0	1.67	1,970	415	304	59	2,020	7.9					
Oct. 11-20.....	584	12	121	24	271	146	301	395	1.0	1,200	1,890	400	281	60	1,970	8.1					
Oct. 21-31.....	742	8.8	128	23	274	136	319	402	1.0	1,200	1,890	414	302	59	2,010	8.1					
Nov. 1-9.....	1,237	9.0	118	20	285	132	273	380	1.0	1,070	1,466	3,570	268	58	1,780	7.7					
Nov. 12-20.....	1,058	8.4	81	8.1	64	135	67	89	2.3	367	.50	1,640	168	58	43	634	8.0				
Nov. 21-30.....	1,998	6.4	35	8.0	59	171	42	81	1.0	347	.47	985	170	30	43	608	7.7				
Dec. 1-10.....	989	8.8	55	9.0	51	176	37	72	1.0	328	.45	876	174	30	39	587	8.1				
Dec. 11-20.....	947	9.0	56	8.8	54	190	43	74	1.0	344	.47	860	189	34	38	619	8.1				
Dec. 21-31.....	1,118	8.6	56	8.9	57	177	43	78	1.0	346	.47	1,040	176	31	41	613	8.0				
Jan. 1-9, 1957..	489	11	62	9.8	66	199	63	78	1.5	398	.54	525	195	32	43	674	7.8				
Jan. 10-23.....	680	8.8	90	16	128	233	125	175	1.5	672	.91	1,230	290	100	49	3.3	1,130	8.0			
Jan. 24-31.....	906	6.2	126	21	241	147	285	360	1.0	1,110	1.51	2,720	401	280	57	5.2	1,900	8.1			
Feb. 1-10.....	830	15	126	21	229	164	250	338	1.0	1,080	1.47	2,420	402	268	55	5.0	1,850	7.7			
Feb. 11-20.....	894	6.6	108	17	205	154	186	312	1.0	a 898	1.22	2,170	308	198	59	5.1	1,500	7.5			
Feb. 21-28.....	1,046	11	108	18	238	146	209	372	1.0	1,030	1.40	2,910	344	224	60	5.6	1,780	7.5			
Mar. 1-10.....	1,222	10	108	17	225	135	193	350	1.0	a 964	1.31	3,180	320	209	60	5.5	1,700	7.6			
Mar. 11-17.....	1,086	7.8	108	18	216	144	220	330	1.0	a 971	1.32	2,850	344	226	58	5.1	1,680	7.8			
Mar. 18-31.....	6,523	8.6	46	6.0	55	108	57	77	2.2	325	.44	5,810	140	51	46	2.0	548	7.5			

a Calculated from determined constituents.

## BRAZOS RIVER BASIN--Continued

## BRAZOS RIVER AT RICHMOND, TEX.--Continued

Chemical analyses, in parts per million, water year October 1956 to September 1957.--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
Apr. 1-11, 1957.	6,491	12		46	5.0	44	4.6	124	39	67	0.6	2.8		305	0.41	5,350	136	34	40	499	7.7	
Apr. 12-23	3,481	9.4		56	7.3	84	3.2	118	81	119	.6	1.5		440	.60	4,140	170	73	52	729	7.6	
Apr. 24-30	61,290	8.2		35	4.1	14	4.0	123	23	16	.5	3.0		3,161	.22	26,640	104	14	22	280	7.9	
May 1-5, 9	99,820	14		40	4.4	14	58	120	70	20		1.5		1,900	.26	51,210	118	16	20	303	7.3	
May 6-8, 10-15	78,540	14		56	7.1	31	3.6	123	33	85		3.5		386	.52	81,850	169	70	43	612	7.3	
May 16-20	81,540	14		43	5.3	24		123	33	34		2.8		244	.33	53,720	129	28	28	379	7.3	
May 21-31	61,780	13		54	7.7	61		116	68	92		2.8		390	.53	65,030	166	71	44	624	7.4	
June 1-10	67,500	13		48	7.0	41	3.7	116	56	63		3.0		300	.41	54,680	149	54	37	507	7.7	
June 11-20	94,840	12		46	6.7	36	3.8	117	52	55		2.5		287	.39	42,500	149	52	34	477	7.7	
June 21-30	32,170	12		51	7.7	42	3.9	121	60	65		2.2		324	.44	46,110	158	60	36	532	7.6	
July 1-10	32,170	14		56	8.3	47	4.2	140	61	73		1.8		361	.49	51,360	178	64	36	594	7.7	
July 11-20	9,518	14		59	7.9	33	4.1	139	46	56		2.2		322	.44	8,270	180	49	28	530	7.8	
July 21-31	6,973	12		54	7.4	28	4.5	163	32	43		1.8		286	.39	5,380	165	32	26	480	7.7	
Aug. 1-10	6,679	22		54	8.1	39	4.9	168	42	57		1.5		318	.43	5,730	168	30	33	527	8.1	
Aug. 11-20	1,999	18		62	8.9	44	4.5	194	47	63		1.0		356	.48	1,920	191	32	33	593	8.2	
Aug. 21-31	1,361	16		72	15	80	8.0	200	91	110				518	.70	1,900	241	77	42	839	7.8	
Sept. 1-10	1,034	12		75	16	80	8.0	191	99	118				538	.73	1,500	253	96	41	2.2	866	8.0
Sept. 11-20	2,962	12		74	17	87	10.1	194	101	128				568	.77	1,480	254	96	43	2.4	896	7.9
Sept. 21-30	2,972	11		65	14	70	7.0	168	85	103				475	.65	3,810	220	82	41	2.0	758	7.8
Weighted average	15,290	13		50	6.9	46		124	54	65		2.5		317	0.43	13,090	154	52	39	519	--	

a Calculated from determined constituents.

## BRAZOS RIVER BASIN--Continued

## BRAZOS RIVER AT RICHMOND, TEX.--Continued

Temperature (°F) of water, water year October 1956 to September 1957

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	76	--	50	57	64	59	62	71	75	--	86	83
2	78	72	52	57	61	62	67	71	75	--	85	84
3	80	71	55	55	60	65	68	72	76	83	85	85
4	78	72	58	60	65	61	67	73	76	83	85	85
5	76	72	64	--	69	--	67	72	75	83	85	83
6	78	72	66	64	69	61	65	71	75	84	86	83
7	77	72	66	66	70	61	--	70	76	85	84	84
8	78	70	69	65	70	58	--	70	79	85	83	--
9	76	68	59	67	71	--	64	70	79	85	83	78
10	74	57	51	66	71	61	64	71	79	85	--	78
11	74	52	57	64	72	61	65	72	80	85	84	78
12	76	58	58	65	69	66	65	73	80	86	85	80
13	76	60	60	64	70	68	64	73	80	86	84	80
14	76	65	54	64	66	69	62	73	80	86	85	82
15	75	68	56	54	68	65	63	74	80	86	85	82
16	75	61	55	--	70	65	--	75	79	86	85	--
17	75	61	58	50	68	67	67	75	80	--	85	80
18	75	54	60	43	66	65	68	75	80	85	87	80
19	74	60	62	45	57	66	73	75	81	86	87	82
20	75	62	61	52	55	67	75	75	80	86	85	83
21	73	62	58	57	53	66	76	76	80	86	84	83
22	73	57	58	64	56	67	75	76	80	86	84	84
23	72	57	58	55	61	68	76	76	80	85	85	80
24	71	--	52	52	59	67	72	76	81	85	84	75
25	72	55	52	52	60	60	73	--	81	--	84	--
26	71	55	52	53	61	59	73	75	81	--	85	72
27	--	57	51	51	58	60	69	76	81	85	85	72
28	70	50	52	51	58	61	69	75	80	85	--	70
29	72	52	52	52	--	59	74	75	82	86	85	70
30	72	50	53	59	--	60	71	76	82	86	83	71
31	71	--	56	60	--	62	--	76	--	--	83	--
Average	75	62	57	57	64	63	69	74	79	85	85	80



BRAZOS RIVER BASIN--Continued  
MISCELLANEOUS ANALYSES OF STREAMS IN BRAZOS RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids (calculated)		Hardness as CaCO <sub>3</sub>		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH	
													Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate				
DOVE CREEK AT WEIR A, 21 MILES NORTHWEST OF ASPERMONT																				
Oct. 20, 1956	0.10	9.0		293	46	789		56	1,190	940		5.9	3,290	4.47	920	874	65	11	4,750	7.2
Oct. 25	.01	2.7		559	60	940	85	1,440	1,500	1,500		5	4,540	6.17	1,640	1,570	55	10	6,600	7.2
Mar. 7, 1957	.02	--		409	34	987	63	947	1,640	1,640		--	--	--	1,160	1,110	65	--	6,480	7.7
May 15	.01	--		--	--	--	--	--	1,480	1,360		--	--	--	1,660	--	53	--	6,270	--
June 25	.01	--		--	--	155	8.4	65	1,140	250		--	--	--	1,210	1,160	22	--	2,600	7.8
MILLERS CREEK AT COUNTY ROAD CROSSING 12 MILES SOUTHWEST OF SEYMOUR																				
Feb. 21, 1957	0.00	12		34	5.5	15	128	16	13	13		2.1	161	0.22	108	3	24	0.6	258	8.2
Mar. 22	12.3	11		29	5.9	14	113	15	9.0	9.0		6.1	146	.20	96	3	24	.6	239	8.1
May 28	--	--		--	--	19	136	31	14	14		--	--	--	123	12	25	--	232	7.8
Aug. 22	.00	--		--	--	--	176	--	24	24		--	--	--	170	26	--	--	444	8.2

COLORADO RIVER BASIN  
COLORADO RIVER AT COLORADO CITY, TEX.

LOCATION. --At gaging station at Colorado City, Mitchell County, 3.517 feet upstream from bridge on U. S. Highway 80, 4,100 feet upstream from Texas and Pacific Railway bridge, 1.6 miles upstream from Lone Wolf Creek, and at mile 796.  
DRAINAGE AREA. --4,082 square miles, approximately, of which 2,590 square miles is probably noncontributing.  
RECORDS AVAILABLE. --Chemical analyses: May 1946 to September 1954; November 1956 to September 1957.  
Water temperatures: November 1952 to September 1954; November 1956 to September 1957.

EXTREMES. 1956-57. --Dissolved solids: Maximum, 19,800 ppm Jan. 24-31, Feb. 1-6; minimum, 208 ppm May 12-14, 17-18.  
Hardness: Maximum, 2,390 ppm Jan. 24-31, Feb. 1-6; minimum, 85 ppm May 25-26, 31, June 1-2.

Specific conductance: Maximum, 36,500 micromhos Dec. 19; minimum daily, 245 micromhos May 14.

Water temperatures: Maximum, 93°F July 30; minimum, freezing point on several days during December and January.

EXTREMES. 1946-54; 1956-57. --Dissolved solids: Maximum, 32,800 ppm Apr. 10, 1952; minimum, 176 ppm Oct. 26, 1947.  
Hardness: Maximum, 4,500 ppm Aug. 9-12, 1946; minimum, 65 ppm Sept. 15-20, 1949.

Specific conductance: Maximum daily, 45,800 micromhos Apr. 1-10, 1952; minimum daily, 245 micromhos May 14, 1957.

Water temperatures: Maximum, 93°F July 30, 1951; minimum, freezing point on several days during December 1956 and January 1957.

REMARKS. --Values reported for dissolved solids concentrations less than 1,000 ppm are residues on evaporation and for concentrations more than 1,000 ppm are calculated from determined constituents unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1956 to September 1957 given in WSP 1512.

Chemical analyses, in parts per million, November 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH		
													Parts per million	Tons per acre-foot	Tons per day	Calcium	Non-carbonate					
																mesium	ate					
Nov. 15-21, 1956	a. 09	4.0		283	115	3,050		68	644	4,930				9.040	12.3	2.24	1,130	1,070	85	39	14,600	7.4
Nov. 22-30	a. 09	3.5		385	173	4,720		78	1,090	7,530				13,900	18.9	3.38	1,870	1,610	86	50	21,300	7.6
Dec. 1-10	a. 05	2.8		454	188	5,320		82	1,290	8,520				15,800	21.5	--	1,860	1,790	86	54	23,800	7.5
Dec. 11-20	a. 04	4.4		489	237	6,360		69	1,360	10,300				15,800	25.6	206	2,190	2,120	86	59	27,700	7.4
Dec. 21-31	5.30	4.5		376	173	4,310		103	821	7,080				12,900	17.5	185	1,650	1,560	85	46	20,200	7.6
Jan. 1-10, 1957	.78	3.9		428	183	5,050		91	1,180	8,150				15,000	20.4	31.6	1,820	1,750	86	51	23,200	7.8
Jan. 11-23	.37	5.8		530	222	6,530		105	1,480	10,500				19,300	26.2	19.3	2,240	2,150	86	60	28,100	7.7
Jan. 24-31, Feb. 1-6	2.85	4.5		569	235	6,670		122	1,500	10,800				19,800	26.9	152	2,390	2,280	86	59	28,000	7.6
Feb. 7	676	13		283	102	2,750		80	319	4,760				8,270	11.2	15,090	1,130	1,080	84	36	14,300	7.5
Feb. 8	1,800	11		36	5.3	101	5.6	109	35	148				1,400	.54	1,940	111	22	65	4.2	721	7.8
Feb. 9-10	74	8.2		74	18	477		92	114	760		2.8		1,520	2.07	3,04	258	183	80	13	2,800	7.5
Feb. 11-18	10.1	8.4		163	52	1,430		92	328	2,350				4,380	5.96	119	620	545	83	25	7,520	7.8
Feb. 19-28	3.37	6.5		260	90	2,460		102	553	4,040				7,460	10.1	67.9	1,020	935	84	33	12,300	7.8
Mar. 1-10	.94	4.6		354	122	3,520		111	809	5,750				10,600	14.4	26.9	1,380	1,290	85	41	16,800	7.8
Mar. 11-18	a. 25	1.7		410	124	4,100		91	966	6,640				12,300	16.7	8.30	1,530	1,460	85	45	18,100	7.6
Mar. 19-31	3.88	5.6		372	146	3,810		94	891	6,240				11,500	15.6	120	1,530	1,450	84	42	18,000	7.5

COLORADO RIVER BASIN

Apr. 1-10, 1957.....	a. 33	394	157	4,020	80	941	6,610	--	12,200	16.6	10.9	1,650	1,560	84	43	18,900	7.3
Apr. 11-18.....	a.0	425	172	4,420	75	1,090	7,220	--	13,400	18.2	--	1,770	1,710	84	46	20,500	7.3
Apr. 19-24.....	a.1.46	400	155	3,870	67	1,010	6,340	--	11,800	16.0	48.5	1,640	1,580	84	42	18,700	7.7
Apr. 25-27.....	1.775	45	6.7	163	84	49	258	2.2	615	.84	2,950	1,40	63	72	6.0	1,090	7.4
Apr. 28-30.....	1.541	32	4.3	61	99	27	180	2.2	284	.39	1,180	98	77	58	2.7	494	7.0
May 1, 9-10.....	376	44	6.6	151	84	51	242	1.0	585	.81	604	136	67	71	5.6	1,010	7.2
May 2-8.....	22.5	140	39	904	123	246	1,500	4.0	2,910	3.96	177	510	409	79	17	5,110	7.3
May 11, 19, 27.....	776	45	6.3	131	114	46	198	3.0	532	.72	1,110	138	44	67	4.9	906	7.5
May 12-14, 17-18.....	1,919	30	3.3	35	99	16	46	3.0	208	2.8	1,080	88	7	47	1.6	346	7.4
May 15-16, 20-21.....	59.1	57	23	303	124	94	492	2.0	1,040	1.41	166	236	134	74	8.6	1,900	7.6
May 22-23, 30.....	20.6	100	23	535	140	158	870	2.0	1,770	2.41	98.4	344	230	77	13	3,200	7.6
May 25-26, 31.....	4,784	28	3.5	46	104	19	56	2.0	232	32	3,000	85	0	54	2.2	391	7.3
June 3.....	289	51	7.8	127	114	28	220	2.0	b504	69	393	158	64	64	4.4	967	7.8
June 4-6.....	54.3	90	18	374	156	130	600	3.5	1,310	1.78	192	298	170	73	9.4	2,370	8.0
June 7-12, 17, 20.....	19.0	157	47	957	142	334	1,560	2.0	3,140	4.27	161	585	468	78	17	5,490	8.0
June 13-16, 18-19.....	47.7	114	29	647	138	247	1,020	2.0	2,140	2.91	276	404	290	78	14	3,780	8.0
June 21-30.....	13.6	160	54	1,090	151	349	1,780	1.5	3,520	4.78	129	621	498	79	19	6,180	8.1
July 1-8.....	a. 74	192	68	1,470	119	433	2,400	--	4,620	6.28	9.23	734	638	81	24	7,900	7.8
July 9-22.....	a.0	275	109	2,380	104	737	3,770	--	4,270	9.89	243	1,130	1,050	82	30	11,800	7.7
July 23-30.....	29.7	109	36	986	87	275	1,560	2.0	3,080	4.12	243	420	340	84	21	5,330	7.8
July 31, Aug. 2-4.....	27.8	36	7.0	146	94	47	218	3.8	324	.71	39.3	119	42	73	3.8	944	7.7
Aug. 1, 5-8.....	18.9	102	35	900	91	239	1,440	2.5	2,770	3.77	141	398	324	83	20	5,000	7.4
Aug. 9-18.....	a.08	110	42	1,140	69	312	1,800	4.0	3,450	4.69	.75	447	390	85	23	6,010	7.8
Aug. 19-25.....	3.57	180	74	1,930	48	444	3,150	--	5,810	7.90	56.0	754	714	85	30	9,770	7.5
Aug. 26-31, Sept. 1-6.....	a.02	232	91	2,320	93	564	3,780	--	7,040	9.57	.48	953	877	84	33	11,700	7.7
Sept. 7-8.....	21.7	169	50	1,410	112	350	2,300	--	4,340	5.90	254	627	535	83	25	7,510	7.9
Sept. 9-11.....	11.2	61	16	483	98	136	740	1.8	1,480	2.03	45.1	218	138	83	14	2,730	7.9
Sept. 12-20.....	a.1.48	101	31	909	77	224	1,480	1.3	2,770	3.77	11.1	380	316	84	20	4,980	7.7
Sept. 21-22.....	8.80	36	4.8	91	103	32	183	2.1	b356	1.28	8.46	109	24	64	3.8	667	8.0
Sept. 23-30.....	a.0	54	10	285	70	90	425	1.0	946	1.29	--	176	118	77	8.7	1,870	7.7
Weighted average.....	c.163	40	7.4	151	102	42	235	--	555	0.75	244	130	47	72	5.8	946	--

a. Includes days of less than 0.05 cfs.  
 b. Calculated from determined constituents.  
 c. Represents more than 99 percent of discharge for the year.

## WESTERN GULF OF MEXICO BASINS

## COLORADO RIVER BASIN--Continued

## COLORADO RIVER AT COLORADO CITY, TEX.--Continued

Temperature (°F) of water, November 1956 to September 1957  
Once-daily measurement, usually at 5:30 p. m.

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1		--	53	55	40	64	69	62	70	90	91	89
2		--	54	52	52	69	76	70	67	89	90	90
3		--	56	51	51	64	65	60	68	90	88	--
4		--	43	56	50	60	60	61	72	89	90	--
5		--	56	58	58	60	51	73	69	86	91	--
6		--	57	59	53	68	68	70	84	89	89	--
7		--	42	63	55	56	74	73	83	90	90	--
8		--	36	65	55	67	72	--	92	91	90	--
9		--	35	65	68	55	73	71	89	88	91	--
10		--	36	58	67	65	76	70	87	90	92	--
11		--	34	48	67	68	80	69	85	90	91	--
12		--	32	60	65	--	72	65	80	91	91	--
13		--	32	60	65	--	69	67	86	91	91	82
14		--	36	52	65	--	62	69	91	90	91	82
15		49	36	36	66	--	70	72	89	91	91	60
16		56	38	32	60	--	71	83	82	91	91	78
17		39	40	34	58	73	75	62	82	92	91	82
18		60	38	36	52	65	80	64	75	89	90	78
19		65	32	48	50	64	62	86	80	90	89	80
20		52	44	55	50	56	65	87	82	89	83	73
21		55	54	48	51	70	69	90	82	88	85	73
22		53	56	34	51	60	72	84	85	89	85	71
23		55	50	33	--	55	65	75	80	89	88	74
24		41	49	32	50	50	68	80	89	89	89	75
25		52	49	31	60	58	60	70	89	87	92	73
26		54	48	30	61	59	55	79	90	88	91	76
27		52	50	30	63	68	60	75	90	90	90	76
28		47	51	28	65	62	58	--	91	91	91	74
29		49	54	30	--	64	62	70	91	92	89	76
30		47	55	40	--	65	69	75	90	93	92	76
31		55	55	48	--	66	--	72	--	90	92	--
<b>Average</b>		--	45	46	57	63	67	73	83	90	90	--

COLORADO RIVER BASIN--Continued  
 COLORADO RIVER NEAR SILVER, TEX.

LOCATION.--At gaging station at bridge on county road, 5.4 miles southwest of Silver, Coke County, 11 miles upstream from Pecan Creek, 18.5 miles downstream from Big Silver Creek, and at mile 743.  
 DRAINAGE AREA.--15,480 square miles, approximately, of which 11,600 square miles is probably noncontributing.  
 RECORDS AVAILABLE.--Chemical analyses: October 1956 to September 1957.  
 Water temperatures: October 1956 to September 1957.

EXTREMES, 1956-57.--Dissolved solids: Maximum, 6,190 ppm Nov. 3-10; minimum, 180 ppm June 1-4.  
 Hardness: Maximum, 1,050 ppm Mar. 14-16; minimum, 93 ppm Apr. 29-30.  
 Specific conductance: Maximum daily, 12,000 micromhos at 25°C, minimum daily, 202 micromhos June 2.  
 Water temperatures: Maximum, 85°F, June 21; minimum, 38°F, Dec. 9.

REMARKS.--Values reported for dissolved solids concentrations less than 1,000 ppm are residues on evaporation and for concentrations more than 1,000 ppm are calculated from determined constituents unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1956 to September 1957 given in WSP 1512.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)		
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate					
Oct. 15-16, 1956.	613	11	41	4.7	4.7	22	117	139	42	19	0.5	2.2		204	0.28	338	122	26	28	0.9	326	7.5	
Oct. 17-19.....	576	11	42	5.3	5.3	17	139	27	27	13	7.7	2.5		191	.26	297	127	13	23	0.7	312	7.6	
Oct. 20-24.....	40.5	10	36	5.1	5.1	35	115	96	37	37	5	2.8		222	.80	24.3	111	17	41	1.5	374	7.9	
Oct. 25-29.....	4.86	10	44	7.0	7.0	77	117	94	100	6	2.0	4.8		556	.99	4.50	140	44	54	2.8	634	7.5	
Oct. 30-31.....	212	13	48	4.9	4.9	19	133	30	30	26	.5	4.8		211	.29	121	233	31	23	.7	349	7.7	
Nov. 1.....	112	18	70	14	14	150	127	143	214	--	--	4.5		678	.82	205	233	129	58	4.2	1,160	8.1	
Nov. 2.....	37	15	117	29	29	631	118	314	960	6	5.0	5.0		2,130	2.90	213	314	77	14	3,640	7.9		
Nov. 3-10.....	5.69	7.8	201	98	98	2,030	79	348	3,470	3	--	--		6,190	8.42	95.1	904	840	83	29	10,500	7.2	
Nov. 11-20.....	a.05	8.2	231	90	90	1,740	94	462	2,950	3	--	--		5,530	7.52	.75	946	870	80	25	9,240	7.8	
Nov. 21-30.....	a.0	5.8	259	88	88	1,770	100	547	2,980	3	--	--		5,700	7.75	--	1,010	926	79	24	9,420	7.6	
Dec. 1-9.....	a.0	3.8	251	89	89	1,840	109	511	3,100	3	--	--		5,850	7.96	--	992	902	80	25	9,660	7.7	
Dec. 10-17.....	a.0	5.0	214	88	88	1,840	111	381	3,120	--	--	--		5,700	7.75	--	896	805	82	27	9,610	7.7	
Dec. 18.....	a.0	5.6	20	22	22	483	72	169	800	--	--	1.8		1,610	2.19	--	315	256	77	12	2,840	7.8	
Dec. 19-20.....	440	8.6	39	20	20	125	27	21	28	228	118	16	2.2	1,810	2.28	--	118	18	27	.8	325	8.0	
Dec. 21, 23-25.....	32.7	6.4	80	27	27	128	218	400	149	--	7.5	7.5		1,070	1.48	--	310	208	66	6.7	1,880	7.4	
Dec. 22.....	33	7.0	41	9.4	9.4	110	95	89	149	--	1.2	1.2		462	41.2	--	142	64	63	4.0	805	7.6	
Dec. 26-31.....	2.80	7.0	92	30	30	402	129	296	575	--	2.0	2.0		1,470	2.00	--	353	248	71	9.3	2,540	7.7	
Jan. 1-10, 1957..	.18	5.8	133	37	37	572	148	405	840	--	--	--		2,070	2.82	--	1.01	484	362	11	3,500	7.9	
Jan. 11-20.....	a.0	6.3	239	52	52	917	164	670	1,380	6	5	5		3,340	4.54	--	786	651	72	14	5,460	8.0	
Jan. 21-28.....	a.0	4.4	217	53	53	927	174	630	1,400	6	6	6		5,320	4.52	--	760	617	73	15	5,390	7.8	
Jan. 29-31.....																							
Feb. 1-2, 4-5..	a.03	4.0	284	66	66	1,350	188	741	2,120	4	--	--		4,660	6.34	--	980	826	75	19	7,530	7.8	

a Includes days of less than 0.05 cfs.

COLORADO RIVER BASIN--Continued  
 COLORADO RIVER NEAR SILVER, TEX.--Continued

Chemical analyses, in parts per million, water year October 1956 to September 1957.--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
													Parts per million	Tons per acre-foot	Tons per day	Calcium	Non-carbonate				
													Boiron (B)	Boiron (B)	Boiron (B)	Boiron (B)	Boiron (B)				
Feb. 3, 1957.....	0.10	--		111	35	452		156	328	660	0.7	0.5	1,660	2.26	0.45	420	292	70	9.6	2,860	8.0
Feb. 6-7.....	128	8.2		399	69	80		90	38	129	.3	2.2	3,373	.51	1.29	125	51	58	3.1	659	7.6
Feb. 8-13.....	432	8.2		54	12	284		98	106	430	.5	2.8	9,946	1.29	1.10	184	104	77	9.1	1,710	7.9
Feb. 14-20.....	11.0	7.8		86	21	471		93	180	750	.5	1.0	1,560	2.12	46.3	300	224	77	12	2,770	7.9
Feb. 21-28.....	4.25	6.4		124	32	652		97	272	1,060	.5	.5	2,200	2.99	25.2	441	362	76	14	3,840	7.8
Mar. 1-13.....	69	6.4			42	770		105	368	1,260	.3	1.5	5,660	3.62	4.96	574	488	74	10	4,800	7.7
Mar. 14-16.....	.13	7.4		306	69	1,450		136	749	2,350	.3	--	2,000	6.80	1.76	1,050	936	75	20	6,180	7.8
Mar. 17.....	90	8.8		111	20	320		106	233	510	.5	5.0	1,280	1.71	306	1,358	271	66	7.3	2,180	7.9
Mar. 18-19.....	8.60	20		47	4.5	48		104	52	70	.5	2.5	5,296	.40	6.87	136	51	44	1.8	496	7.9
Mar. 20-23.....	356	12		60	12	134		114	102	203	.5	3.0	616	.84	592	199	106	59	4.1	1,040	7.7
Mar. 24-31, Apr. 1-2, 6.....	7.35	11		100	26	444		86	230	715	.7	2.2	1,570	2.14	31.2	356	286	73	10	2,740	8.0
Apr. 3-4.....	101	17		49	7.4	48		136	41	67	.7	6.0	5,303	.41	82.6	152	40	41	1.7	523	8.3
Apr. 5.....	23	7.8		54	9.4	151		94	81	238	.7	2.8	620	.84	38.5	173	96	66	3.0	1,080	7.6
Apr. 7-16.....	1.48	7.2		169	44	637		108	369	1,380	.6	2.5	2,860	3.89	11.4	602	514	75	15	4,950	7.8
Apr. 17-18.....	1.50	13		228	57	1,100		131	534	1,800	.6	2.0	3,800	5.17	15.4	804	696	75	17	6,400	8.1
Apr. 19.....	4.120	13		50	6.9	50		156	35	67	.7	2.5	3,111	.42	3,460	154	26	42	1.8	566	8.0
Apr. 20-25.....	141	13		46	6.7	105		105	60	126	.7	3.5	398	.54	152	146	60	55	2.9	662	8.0
Apr. 26.....	4,700	11		65	11	216		142	79	336	.7	2.5	10,320	1.11	10,320	207	90	69	6.6	420	7.9
Apr. 27.....	5,970	9.8		37	5.2	114		114	26	74	.7	3.5	2,751	.37	4,430	114	20	50	2.2	487	7.8
Apr. 28.....	5,480	8.6		43	6.4	71		127	32	104	1.0	3.0	3,344	.47	5,090	134	30	54	2.7	606	7.8
Apr. 29-30.....	4,555	7.8		30	4.5	39		101	22	49	.7	2.0	2,061	.28	2,530	93	11	48	1.8	365	7.8
May 1-4.....	329	10		44	6.4	78		106	54	112	.6	3.8	380	.52	338	136	49	55	2.9	645	6.8
May 5-8.....	17.0	12		72	14	226		120	127	352	.6	1.8	1,231	.23	41.4	238	140	67	6.4	1,520	7.7
May 9-10.....	2,445	12		50	8.1	135		135	52	133	.6	3.2	2,880	.59	8,500	159	48	55	3.1	741	7.4
May 11.....	17,400	11		34	4.0	20		112	23	20	.5	3.2	1,181	.25	8,500	104	12	30	.9	291	7.3
May 12-15.....	6,902	11		36	6.3	43		121	42	45	.6	3.0	263	.36	4,901	116	17	45	1.8	431	7.2
May 16-17.....	967	11		39	8.5	71		138	65	73	.8	1.8	356	.48	929	132	22	44	2.7	585	7.9
May 18-19.....	6,990	11		35	5.4	40		108	31	52	.5	3.2	246	.33	4,640	110	19	22	4.4	416	7.4
May 20-22.....	2,907	10		39	7.6	67		119	58	80	.7	2.0	338	.46	828	128	30	53	2.6	573	7.4
May 23-30.....	2,770	11		45	7.2	59		128	51	77	.5	3.2	331	.45	2,480	143	38	47	2.1	560	7.4
May 31.....	4,760	12		39	6.2	52		108	40	73	.5	3.0	296	.40	3,900	123	34	48	2.1	497	7.8

June 1-4, 1957 ...	7,362	9.4	32	4.9	25	97	26	32	.4	2.5	b180	3,580	100	20	35	1.1	322	7.3
June 5-6 .....	902	27	51	9.1	71	131	68	96	.6	4.8	396	.54	164	57	49	2.4	667	7.9
June 7-9 .....	282	24	71	14	155	150	120	225	.5	4.8	1,710	.97	541	112	59	4.4	1,200	8.0
June 10-20 .....	231	20	89	21	279	130	190	430	.4	4.0	1,100	1.50	308	202	66	6.9	1,940	7.9
June 21-30 .....	34.8	14	137	33	487	125	331	740	.4	2.2	1,790	2.43	478	375	68	9.3	3,080	7.8
July 1-6, 15, 19-20	13.2	15	214	53	738	106	565	1,190	.4	2.0	2,880	3.85	101	665	68	12	4,730	7.7
July 7-14, 16-18 .	10.2	15	103	69	1,260	105	778	1,980	.3	2.5	4,420	6.01	122	964	74	18	7,080	7.8
July 21-25, 26-31	18.3	15	248	70	1,150	119	608	1,900	.4	3.0	4,050	5.51	200	907	73	17	6,790	7.9
July 24-25 .....	262	12	54	6.7	52	115	64	78	.5	5.0	b329	.45	233	68	41	1.8	582	7.8
July 26 .....	158	17	65	13	127	113	120	192	.5	3.0	b594	.81	253	216	56	3.8	1,040	8.0
July 27 .....	68	14	122	26	345	130	264	550	.5	4.0	1,390	1.89	255	305	65	7.4	2,400	8.1
Aug. 1-10 .....	28	8.0	178	48	954	117	440	1,530	.5	3.0	3,220	4.38	243	546	76	16	5,570	7.8
Aug. 11-17 .....	8.10	9.8	222	55	1,020	141	572	1,620	.5	3.0	3,570	4.86	78.1	780	74	16	6,050	7.8
Aug. 18-19, 22-23	369	13	62	15	195	127	131	280	.6	3.0	791	1.08	788	216	112	5.8	1,400	8.1
Aug. 20-21 .....	118	12	38	8.8	86	106	63	114	.7	3.2	b378	.51	120	43	59	3.3	681	8.1
Aug. 24-28 .....	6.30	14	117	28	485	122	290	750	.6	1.5	1,750	2.38	29.8	407	72	10	3,020	8.1
Aug. 29-31	3.92	15	195	47	965	147	534	1,520	.5	1.5	3,370	4.58	35.7	560	75	16	5,580	7.9
Sept. 1-2	38.2	10	136	29	327	116	326	520	.5	1.5	1,410	1.92	145	384	61	6.6	2,350	7.7
Sept. 3-5, 11-13 .																		
Sept. 6-10 .....	3.76	10	158	35	636	127	402	990	.5	.5	2,290	3.11	23.2	538	72	12	3,830	7.8
Sept. 14-19 .....	5.78	8.6	170	43	813	117	460	1,270	.5	.5	2,820	3.84	43.0	601	79	14	4,800	7.7
Sept. 20 .....	3.00	12	218	56	1,190	128	624	1,650	.6	3.0	4,010	5.45	32.3	774	610	19	6,560	7.9
Sept. 21-24 .....	1,361	10	45	6.0	42	137	38	32	.6	3.0	--	1,030	137	23	40	1.6	499	7.8
Sept. 25-26 .....	36	16	58	8.6	137	107	100	200	.6	2.5	b378	.78	50.0	82	62	4.4	1,040	7.9
Sept. 27-30 .....	9.42	12	82	13	254	122	164	380	.8	2.0	b968	1.32	23.6	238	68	6.8	1,700	7.5
Weighted average	496	11	41	6.9	64	117	46	66	0.6	2.9	326	0.45	441	131	35	2.4	565	--

b Calculated from determined constituents.

## WESTERN GULF OF MEXICO BASINS

## COLORADO RIVER BASIN--Continued

## COLORADO RIVER NEAR SILVER, TEX.--Continued

Temperature (°F) of water, water year October 1956 to September 1957  
Once-daily measurement, generally between 6 and 8 a. m.

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	--	57	63	51	49	57	61	64	67	82	82	78
2	--	56	47	47	44	67	66	53	65	83	82	80
3	--	53	55	47	48	68	59	68	64	81	83	75
4	--	50	63	50	57	70	58	65	66	76	81	79
5	--	49	68	47	57	57	56	58	70	81	82	80
6	--	53	64	50	56	50	57	64	70	80	80	80
7	--	59	62	51	55	66	60	64	75	80	78	74
8	--	53	43	54	59	45	68	63	82	82	79	68
9	--	49	38	50	60	56	56	65	82	81	77	79
10	--	41	52	46	59	58	76	69	83	82	78	72
11	--	51	50	43	59	60	63	65	81	81	80	84
12	--	51	54	54	62	58	52	70	77	82	79	76
13	--	50	52	50	62	60	43	68	79	82	78	79
14	--	61	51	48	62	53	46	67	69	81	80	83
15	--	51	57	44	59	51	54	64	77	82	79	84
16	--	53	60	42	56	58	75	73	79	81	80	73
17	69	57	53	40	53	71	74	75	81	82	82	79
18	64	48	41	42	52	60	72	64	75	81	80	78
19	63	58	42	42	51	57	64	64	75	82	75	72
20	64	58	44	43	50	56	65	71	80	81	76	84
21	60	53	50	45	51	50	70	73	85	80	75	78
22	61	58	50	43	55	57	68	76	81	79	78	68
23	61	49	45	51	52	53	68	65	79	78	77	66
24	61	51	42	48	52	48	67	70	80	79	75	62
25	60	58	41	44	56	45	71	72	79	76	--	68
26	58	54	40	40	62	53	65	70	80	80	--	70
27	53	59	41	50	61	54	62	70	80	79	77	78
28	53	50	44	56	54	50	65	70	78	80	79	69
29	73	54	44	50	--	54	61	68	80	84	80	65
30	57	58	48	50	--	58	62	74	81	80	79	68
31	51	--	45	45	--	59	--	74	--	82	80	--
Average	--	53	50	47	55	57	63	68	77	81	79	75

COLORADO RIVER BASIN--Continued  
 COLORADO RIVER NEAR SAN SABA, TEX.

LOCATION--At gaging station at bridge on U. S. Highway 190, 5.2 miles downstream from San Saba, 9.2 miles east of San Saba, San Saba County, and at mile 474  
 DRAINAGE AREA--30, 600 square miles, approximately, of which 11,900 square miles is probably noncontributing.  
 RECORDS AVAILABLE--Chemical analyses: September 1947 to September 1957.  
 Water temperatures: September 1947 to September 1957.

Sediment records: December 1950 to September 1957.  
 EXTREMES, 1936-57.--Dissolved solids: Maximum, 1,100 ppm Aug. 28-31, Sept. 1-5; minimum, 149 ppm Apr. 20-23, 25-29.  
 Hardness: Maximum, 436 ppm Aug. 28-31, Sept. 1-5; minimum, 89 ppm May 11-20.  
 Specific conductance: Maximum daily, 2,150 micromhos Aug. 31; minimum daily, 196 micromhos Apr. 23.  
 Water temperatures: Maximum, 90°F July 28; minimum, 39°F Jan. 17.  
 Sediment concentrations: Maximum daily, 10,500 ppm Oct. 20; minimum daily, 24 ppm Nov. 19.  
 SEDIMENTS, 1947-57.--Dissolved solids: Maximum, 1,530 ppm Oct. 15-19, 1947; minimum, 102 ppm Sept. 23-25, 1955.  
 Hardness: Maximum, 522 ppm Oct. 15-19, 1947; minimum, 71 ppm June 25-30, 1949.  
 Specific conductance: Maximum daily, 3,420 micromhos Sept. 20, 1947; minimum daily, 161 micromhos Sept. 11, 1952.  
 Water temperatures: Maximum, 98°F Aug. 3, 1956; minimum, freezing point Jan. 29, 1948, Jan. 30, 1951.  
 Sediment concentrations (1950-57): Maximum daily, 10,500 ppm Oct. 20, 1956; minimum, no flow Aug. 27-31, 1954.  
 Sediment loads (1950-57): Maximum daily, 535,000 tons May 19, 1955; minimum 0 tons Aug. 27-31, 1954.  
 REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1956 to September 1957 given in WSP 1512.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (residue at 180° C)		Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)
														Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate		
Oct. 1-10, 1956..	11.2	12	47	22	52	239	19	74	0.8	345	0.47	10.4	209	13	35	1.5	635	7.8	
Oct. 11-19 .....	752	11	53	18	56	216	31	83	2.2	365	.50	741	206	29	37	1.7	651	7.8	
Oct. 20-31 .....	2,143	10	43	7.7	33	140	26	46	3.8	249	.34	1,440	138	23	34	1.2	434	8.1	
Nov. 1-10 .....	628	10	42	7.5	27	133	29	38	2.5	234	.32	397	136	27	30	1.0	391	7.8	
Nov. 11-20 .....	77.7	10	42	9.0	27	150	16	42	2.5	a222	.30	46.6	142	19	29	1.0	392	8.0	
Nov. 21-30 .....	31.6	12	49	14	34	196	19	50	2.5	a276	.38	23.5	180	20	29	1.1	489	8.2	
Dec. 1-10 .....	20.6	12	54	18	41	229	21	62	1.0	344	.47	19.2	208	21	30	1.2	575	8.2	
Dec. 11-18, 20 .....	124	10	58	20	47	123	24	72	1.2	367	.50	13.2	226	25	31	1.4	644	8.2	
Dec. 19 .....	928	9.6	26	10	19	123	9.6	26	2.2	a162	.22	406	107	6	28	.8	277	8.3	
Dec. 21-24 .....	454	6.0	45	7.5	83	149	26	123	3.2	a367	.50	450	143	22	56	3.0	692	7.9	
Dec. 25-31 .....	176	8.0	45	9.3	29	161	25	39	1.5	280	.34	119	151	19	29	1.0	430	8.1	
Jan. 1-10, 1957..	69.9	8.2	59	14	40	200	41	61	.8	346	.47	65.3	205	41	30	1.2	582	8.1	
Jan. 11-20 .....	47.6	7.6	78	22	54	243	83	83	.2	484	.66	62.2	285	86	29	1.4	774	8.1	
Jan. 21-31 .....	44.5	8.2	79	24	60	265	75	89	.5	513	.70	61.6	296	78	31	1.5	822	8.1	

a Calculated from determined constituents.

COLORADO RIVER BASIN--Continued  
 COLORADO RIVER NEAR SAN SABA, TEX.--Continued

Chemical analyses, in parts per million, water year October 1956 to September 1957.--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boiron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH		
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium				Non-carbonate	
Feb. 1-10, 1957..	48.8	9.4		71	24	61	244	74	83			0.8		472	0.64	62.2	276	76	32	1.6	805	8.0
Feb. 11-19.....	284	7.0		70	18	86	196	80	135			1.2		520	.91	329	248	88	43	2.4	895	7.9
Feb. 20-28.....	127	7.8		75	18	85	201	94	130			.2		530	.72	182	262	98	41	2.3	897	7.9
Mar. 1-10.....	60.1	7.0		71	21	67	229	80	99			.2		482	.66	78.2	264	76	36	1.8	811	8.1
Mar. 11, 21-31..	1,163	10		42	5.2	33	124	27	46			3.5		235	.32	738	126	24	36	1.3	404	7.7
Mar. 12-21.....	737	8.8		83	21	182	182	124	206			1.5		722	.98	1,440	294	145	48	3.2	1,160	7.9
Apr. 1-6.....	550	9.2		42	8.6	24	148	21	34			2.8		228	.31	339	140	19	28	.9	381	7.8
Apr. 7-18.....	206	7.8		62	14	91	156	77	143			1.5		502	.68	279	212	84	48	2.7	845	8.1
Apr. 19, 24, 30	19,090	11		43	5.6	35	134	22	51			2.0		238	.82	12,270	131	21	36	1.3	417	7.5
Apr. 20-23, 25-29	16,020	11		36	3.7	149	120	9.4	16			2.0		149	.20	6,440	104	6	21	.6	253	7.3
May 1-10.....	8,052	9.8		38	5.0	22	128	16	27			4.0		204	.28	4,440	116	11	29	.9	334	7.6
May 11-20.....	42,310	10		30	3.5	16	110	11	14			3.0		155	.21	17,710	89	0	28	.7	247	7.6
May 21-31.....	20,770	10		39	4.0	18	123	16	23			4.0		194	.26	10,880	115	14	25	.7	313	7.4
June 1-9.....	14,590	10		42	6.0	19	134	20	26			4.0		213	.29	8,390	129	20	24	.7	338	7.5
June 10-20.....	2,962	13		54	10	33	160	35	53			6.9		315	.43	2,520	176	45	29	1.1	506	7.4
June 21-30.....	1,134	18		68	15	70	186	69	108			7.6		473	.64	1,450	231	78	40	2.0	780	8.2
July 1-10.....	1,377	19		68	20	75	210	71	115			8.6		516	.70	525	262	80	39	2.1	843	8.1
July 11-20.....	169	22		70	24	74	232	74	112			12		543	.74	248	273	83	37	1.9	878	8.2
July 21-31.....	411	16		82	24	100	228	100	157			10		630	.86	689	303	116	42	2.5	1,060	8.0
Aug. 1-12.....	207	15		88	31	120	191	169	180			9.7		774	1.05	433	347	180	43	2.8	1,230	8.1
Aug. 13-27.....	114	17		81	33	129	195	170	186			2.5		785	1.08	245	338	178	45	3.0	1,220	7.9
Aug. 28-31.....	92.1	16		102	44	226	191	261	352			3.5		1,100	1.50	274	436	279	53	4.7	1,840	7.9
Sept. 1-5.....	103	16		74	32	144	208	142	218			2.5		a 730	.99	203	316	146	50	3.5	1,270	8.0
Sept. 6-12.....	1,265	11		48	9.1	98	138	48	98			3.2		588	.41	1,020	157	44	36	1.4	501	8.0
Sept. 13-24.....	1,194	10		64	18	98	158	90	156			3.8		541	.74	1,740	234	104	48	2.8	918	8.0
Sept. 25-30.....	3,354	10		38	5.3	23	125	19	29			3.4		204	0.28	1,850	117	14	30	0.9	333	--

a Calculated from determined constituents.

COLORADO RIVER BASIN--Continued

COLORADO RIVER NEAR SAN SABA, TEX.--Continued

Temperature (°F) of water, water year October 1956 to September 1957  
Once-daily measurement, generally between 7 and 11 a. m.

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	76	62	47	47	51	55	58	66	73	81	84	86
2	72	63	58	49	55	65	59	67	72	83	84	82
3	73	59	50	49	57	58	62	66	70	82	84	80
4	75	58	55	54	59	57	65	67	70	88	88	80
5	72	61	55	51	57	57	62	65	70	83	84	80
6	73	59	60	57	58	55	61	63	70	83	82	78
7	76	59	62	57	60	56	66	65	73	89	78	--
8	69	57	58	57	69	52	60	65	75	81	84	--
9	71	52	49	58	65	53	60	66	--	83	--	80
10	70	--	45	52	69	66	62	69	78	82	--	82
11	67	--	48	48	62	61	65	--	80	83	--	82
12	74	58	50	49	61	61	61	--	78	84	--	--
13	72	62	47	51	55	61	55	--	78	83	81	--
14	78	62	46	51	55	65	56	--	78	86	84	78
15	70	62	48	47	54	58	56	--	79	87	83	76
16	70	53	54	42	60	60	61	--	78	84	82	78
17	70	52	51	39	60	65	65	--	80	83	83	79
18	70	59	49	40	57	62	69	--	80	83	88	78
19	69	59	45	40	56	60	68	--	78	84	83	81
20	67	60	48	58	55	61	65	--	78	83	80	81
21	--	52	--	57	53	59	68	73	79	85	80	81
22	60	50	--	57	55	58	66	73	79	83	80	74
23	70	53	--	48	53	60	65	72	80	82	81	--
24	--	52	47	46	55	56	68	74	76	81	81	71
25	66	55	47	48	55	52	69	73	82	82	83	70
26	60	50	45	42	56	54	69	73	82	83	81	71
27	60	49	45	43	54	56	64	72	80	89	82	71
28	--	50	46	43	54	54	69	72	83	90	81	73
29	--	46	46	51	--	55	65	71	80	84	81	70
30	65	47	55	46	--	59	65	73	85	84	80	67
31	65	--	48	48	--	59	--	72	--	85	80	--
Average	70	56	50	49	58	58	63	--	77	84	82	77

WESTERN GULF OF MEXICO BASINS  
 COLORADO RIVER BASIN--Continued

COLORADO RIVER NEAR SAN SABA, TEX.--Continued

Suspended sediment, water year October 1956 to September 1957

Day	October			November			December			
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day	
1.....	8.4			118	145	46	26			
2.....	7.7			192	182	94	26			
3.....	8.1			213	162	93	25			
4.....	13	34	1.0	950	818	sa2,430	23			
5.....	14			1,380	1,230	4,580	20			
6.....	13			1,380	1,500	5,590	18	28	1.6	
7.....	12	924	1,120	2,790	18					
8.....	11	562	890	1,350	18					
9.....	12			344	720	669	16			
10.....	13			221	--	e 340	16			
11.....	14	39	1.3	152	438	180	20			
12.....	12			117	320	101	20			
13.....	11			94	255	65	16			
14.....	11			84	214	49	15			
15.....	20	44	2.4	69	151	28	14	32	1.6	
16.....	178	--	e 70	62	140	23	16			
17.....	3,170	5,410	sa63,900	56	100	15	18			
18.....	2,150	5,200	30,200	51	50	6.9	30			
19.....	1,200	4,300	13,900	48	24	3.1	928	1,670	sa5,580	
20.....	8,440	10,500	sa251,000	44	54	6.4	964	2,400	6,250	
21.....	1,500	5,000	155,000	40	56	6.0	520	2,050	2,880	
22.....	2,660	5,400	38,800	37	50	5.0	188	650	330	
23.....	1,120	4,550	13,800	36			512	625	sa1,190	
24.....	692	1,850	3,460	35			597	500	806	
25.....	450	689	837	31			356	600	577	
26.....	270	383	279	30	40	3.2	234	402	254	
27.....	177	265	127	28			170	250	115	
28.....	132	215	77	27			136	140	51	
29.....	112	160	48	26	126	120	41			
30.....	91	185	45	26	112	110	33			
31.....	67	140	25	--	--	--	99	84	22	
Total.	32,589.2	--	571,586.5	7,377	--	18,496	5,297	--	18,137.8	
	January			February			March			
1.....	89	77	19	58	76	10	82	98	16	
2.....	80			51			76			
3.....	76			60			69			
4.....	76			56			65			
5.....	71			48			58			
6.....	69	50	9.0	45	63	6.5	55	385	--	b 370
7.....	65			43			50			
8.....	60			43			48			
9.....	58			43			47			
10.....	55			41			51			
11.....	53	57	7.2	38	61	35	80	--	30	
12.....	50			38			173			
13.....	50			607			188			
14.....	50			450	--	b 800	152			
15.....	50			305	--	b 150	109			
16.....	47	57	7.2	213	54	25	67	--	472	
17.....	44			170			80			
18.....	44			148			48			19
19.....	44			136	56	21	420	--	b 450	
20.....	44			159	50	21	583	300		
21.....	43	44	5.3	145	106	35	5,540	5,550	s 86,800	
22.....	44			123			6,170	5,760	96,000	
23.....	43			142			1,650	3,920	17,500	
24.....	47			145			1,300	2,990	10,500	
25.....	47			126			948	2,380	6,090	
26.....	44	44	5.3	112	--	--	611	850	1,400	
27.....	45			101			429	595	686	
28.....	44			91			315	444	378	
29.....	44		--	--	248	345	231			
30.....	44			--	--	--	177	310	148	
31.....	44			--	--	--	561	1,230	s 2,950	
Total.	1,664	--	234	3,737	--	1,764	20,765	--	224,348	

e Estimated.  
 s Computed by subdividing day.

a Computed from partly estimated graph.  
 b Computed from water-sediment discharge curve.

COLORADO RIVER BASIN--Continued

COLORADO RIVER NEAR SAN SABA, TEX.--Continued

Suspended sediment, water year October 1956 to September 1957--Continued

Day	April			May			June		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	1,190	1,220	3,920	28,000	2,500	189,000	5,000	5,180	s 72,900
2.....	562	850	1,290	15,800	2,800	119,000	10,900	6,300	185,000
3.....	282	300	228	8,780	3,020	71,600	17,900	3,400	164,000
4.....	184	250	124	4,560	4,060	50,000	25,000	2,600	176,000
5.....	442	496	sa 954	5,900	4,000	63,700	30,000	1,800	146,000
6.....	640	600	1,040	3,680	2,400	23,800	25,400	1,450	99,400
7.....	358	116	54	2,160	1,800	10,500	8,820	3,800	s 80,000
8.....	261			1,310	1,200	4,240	4,690	2,400	30,400
9.....	210			2,150	3,520	sa 22,700	3,620	1,750	17,100
10.....	154			8,180	3,100	68,500	2,820	1,320	10,100
11.....	124			18,300	3,690	s 181,000	2,290	1,050	6,490
12.....	104	31,300	2,600	220,000	2,010	750	4,070		
13.....	88	54,600	1,920	283,000	3,020	2,080	sa 24,200		
14.....	77	64,600	1,670	291,000	7,810	3,050	64,300		
15.....	383	58,900	1,420	226,000	4,760	1,620	20,800		
16.....	328	200	177	59,500	1,230	198,000	2,670	1,450	10,500
17.....	218	200	103	55,600	863	130,000	2,200	850	5,050
18.....	164			24,900	5,000	s 266,000	1,850	600	3,000
19.....	2,470	4,290	sa 37,700	23,300	3,700	233,000	1,680	800	3,630
20.....	5,630	5,120	sa 84,500	32,100	2,000	173,000	1,470	450	1,790
21.....	11,100	3,800	114,000	34,300	1,550	144,000	1,700	400	1,840
22.....	4,080	2,770	sa 59,500	31,100	1,500	126,000	1,420	400	a 1,530
23.....	10,800	4,090	s 107,000	9,230	5,680	s 122,000	1,530	450	a 1,860
24.....	19,500	5,260	s 275,000	12,400	5,450	s 184,000	1,250	200	a 675
25.....	14,100	4,300	164,000	20,900	3,500	198,000	1,120	170	514
26.....	4,770	2,500	32,200	22,500	1,800	109,000	989	162	433
27.....	22,700	3,470	s 213,000	17,100	2,200	102,000	916	170	420
28.....	36,600	2,850	282,000	24,200	2,200	144,000	868	170	398
29.....	34,400	2,300	214,000	30,600	2,100	174,000	828	186	416
30.....	35,300	2,500	238,000	19,900	1,710	s 77,000	716	140	271
31.....	--	--	--	6,270	4,640	s 81,500	--	--	--
Total.	207,219	--	1,829,664	732,120	--	4,285,540	175,247	--	1,133,087

Day	July			August			September				
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment			
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		
1.....	534	150	216	338	46	28	84	73	15		
2.....	513			290			73				
3.....	450			252			76				
4.....	415			221			71				
5.....	368			209			71				
6.....	350	96	90	243	107	22	80	58	12		
7.....	315			217			84				
8.....	295			170			94				
9.....	275			148			78				
10.....	252			145			64				
11.....	238	82	35	132	94	31	62	73	15		
12.....	204			123			257			187	s 585
13.....	188			114			5,470			3,740	s 55,100
14.....	200			107			3,600			1,950	19,000
15.....	170			96			1,300			950	3,330
16.....	160	77	92	89	84	33	748	58	12		
17.....	148			82			464			196	808
18.....	146			73			300			156	246
19.....	129			69			234			189	126
20.....	112			69			200			126	68
21.....	107	77	92	62	94	31	170	58	12		
22.....	312			55			892			400	963
23.....	452			53			544			334	491
24.....	261			96			1,260			1,150	s 10,800
25.....	704			338			3,660			4,950	48,900
26.....	338	77	92	234	84	33	1,340	58	12		
27.....	285			180			876			800	1,890
28.....	660			142			597			300	484
29.....	527			129			401			155	168
30.....	485			96			290			156	122
31.....	394	87	--	--	--						
Total.	9,983	--	2,386	4,659	--	918	23,440	--	152,811		

Total discharge for year (cfs-days) ..... 1,224,097.2  
 Total load for year (tons) ..... 8,238,972.3

s Computed by subdividing day.

a Computed from partly estimated graph.

COLORADO RIVER BASIN--Continued  
COLORADO RIVER NEAR SAN SABA, TEX.--Continued

Particle-size analyses of suspended sediment, water year October 1956 to September 1957  
(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipet; S, sieve; N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date of collection	Time	Discharge (cfs)	Water temperature (°F)	Suspended sediment										Methods of analysis		
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters									Methods of analysis	
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250			0.350
Oct. 18, 1956	8:00 a. m.	2,420	70	5,200	2,970	--	57	86	95	97	100	--	--	--	--	SPWCM
Oct. 20	8:00 a. m.	6,920	67	11,600	4,120	--	71	88	93	98	100	--	--	--	--	SPWCM
Oct. 24	8:00 a. m.	804	65	1,980	1,240	--	87	94	98	99	100	--	--	--	--	SBWCM
Oct. 25	8:00 a. m.	485	66	732	360	82	87	88	95	96	99	100	--	--	--	SBWCM
Nov. 5	6:00 p. m.	1,340	61	1,170	808	70	81	87	96	98	99	100	--	--	--	SBWCM
Nov. 9	8:00 a. m.	1,37	52	752	448	83	89	92	94	94	97	100	--	--	--	SBWCM
Dec. 20	8:00 a. m.	1,010	48	1,320	810	74	81	84	89	96	99	100	--	--	--	SBWCM
Dec. 22	9:00 a. m.	200	50	628	395	91	94	95	97	99	100	--	--	--	--	SBWCM
Mar. 22, 1957	8:00 a. m.	8,300	58	6,340	4,120	--	67	81	92	98	99	100	--	--	--	SPWCM
Apr. 23	8:00 a. m.	12,100	65	4,300	2,190	--	62	76	87	94	98	99	100	--	--	SPWCM
Apr. 24	8:00 a. m.	15,800	68	6,050	3,470	--	71	76	94	98	99	100	--	--	--	SPWCM
Apr. 24	8:00 a. m.	13,800	68	6,050	2,360	--	46	77	84	98	99	100	--	--	--	SPWCM
Apr. 25	6:20 a. m.	17,600	67	4,890	3,620	--	75	86	95	97	99	100	--	--	--	SPWCM
Apr. 27	9:30 p. m.	32,200	65	2,670	2,140	--	64	85	93	98	99	100	--	--	--	SPWCM
Apr. 28	8:30 a. m.	38,200	69	2,800	2,150	--	77	88	93	98	99	100	--	--	--	SPWCM
May 2	6:00 p. m.	14,100	69	3,100	2,920	--	79	87	96	99	100	--	--	--	--	SPWCM
May 9	7:30 a. m.	1,660	66	2,420	1,350	57	72	81	93	98	100	--	--	--	--	SBWCM
May 11	10:25 a. m.	16,800	68	5,250	2,590	43	56	64	76	82	99	100	--	--	--	SBWCM
May 13	4:10 a. m.	48,900	67	1,760	69	78	86	94	95	98	99	100	--	--	--	SBWCM
May 14	12:00 m.	66,100	71	1,600	1,300	72	84	94	98	99	99	100	--	--	--	SBWCM
May 15	11:45 p. m.	57,500	70	1,400	942	71	83	92	94	96	98	99	100	--	--	SBWCM
May 16	11:55 p. m.	61,000	71	990	563	81	87	91	95	98	99	100	--	--	--	SBWCM
May 17	10:30 p. m.	46,200	73	922	731	75	88	92	96	98	99	100	--	--	--	SBWCM
May 18	8:00 a. m.	28,800	70	1,770	1,380	65	78	85	91	92	98	99	100	--	--	SBWCM

May 23, 1957	7:30 a. m.	8,460	72	7,020	4,760	--	57	69	82	96	99	100	--	SPWCM
June 1	6:00 p. m.	6,500	73	7,060	4,930	--	58	63	81	94	98	100	--	SPWCM
June 4	6:30 p. m.	26,800	72	2,250	1,810	60	68	78	84	92	97	99	100	SPWCM
June 7	7:30 a. m.	9,260	73	3,470	2,750	--	62	71	78	92	98	99	--	SPWCM
June 15	8:00 a. m.	5,130	79	1,660	1,190	51	62	71	88	95	98	99	--	SPWCM
Sept. 13	6:00 p. m.	6,920	82	3,810	3,340	43	55	63	81	94	98	99	100	SPWCM
Sept. 13	6:00 p. m.	6,920	82	3,810	2,720	5	9	11	49	96	98	99	100	SENM
Sept. 23	6:00 p. m.	2,420	70	4,240	2,710	56	74	86	97	99	100	--	--	SPWCM

COLORADO RIVER BASIN--Continued  
WALLER CREEK AT 23rd STREET, AT AUSTIN, TEX.

LOCATION.--Temperature recorder at gaging station, on San Jacinto Boulevard, 50 feet upstream from bridge on East 23rd Street at Austin, Travis County, and 2.1 miles upstream from Colorado River.

DRAINAGE AREA.--4.13 square miles.

RECORDS AVAILABLE.--Water temperatures: March 1955 to September 1957.

EXTREMES, 1956-57.--Water temperatures: Maximum, 92°F July 30, Aug. 1; minimum, 47°F Jan. 17.

EXTREMES, 1955-57.--Water temperatures: Maximum, 93°F June 28, 1955; minimum, 43°F Jan. 18, 1956.

REMARKS.--No temperature record Jan. 24 to Feb. 3, June 21 to July 10, recorder not functioning. Records of discharge for water year October 1956 to September 1957 given in WSP 1512.

Temperature (°F) of water, water year October 1956 to September 1957

Day	October		November		December		January		February		March		April		May		June		July		August		September	
	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min
1.....	80	78	76	70	64	58	64	58	64	64	69	64	72	64	75	74	81	78	--	92	82	87	80	
2.....	82	79	76	58	63	58	60	57	--	--	68	66	75	72	75	74	78	75	--	90	82	86	80	
3.....	82	79	62	56	64	60	64	59	--	--	68	65	76	74	77	75	77	76	--	90	82	85	79	
4.....	81	78	60	56	67	64	70	64	72	65	71	64	75	71	77	75	79	75	--	89	81	85	79	
5.....	81	79	65	60	71	68	67	62	72	69	71	67	73	68	73	72	78	76	--	86	81	85	78	
6.....	81	78	72	65	72	71	67	63	71	68	70	66	72	69	74	72	80	75	--	87	82	85	78	
7.....	80	76	76	71	73	72	67	62	73	68	67	62	74	71	74	73	83	77	--	87	79	82	75	
8.....	80	76	72	67	75	67	70	66	76	71	65	60	74	71	76	73	83	79	--	88	81	77	73	
9.....	80	78	67	62	67	58	71	68	76	71	67	62	74	68	76	75	85	80	--	88	80	80	71	
10.....	80	78	66	61	62	57	71	59	77	72	70	67	76	71	79	76	85	81	--	86	81	81	73	
11.....	79	76	67	62	69	61	59	56	78	72	78	51	76	74	79	78	89	82	79	89	81	82	75	
12.....	80	78	69	64	73	87	63	58	78	73	70	60	76	72	80	79	84	74	88	80	90	82	81	
13.....	80	78	70	65	73	63	67	61	76	64	72	66	72	64	80	77	82	76	87	80	82	84	76	
14.....	79	78	72	69	65	61	66	61	72	67	72	68	64	62	82	76	83	78	87	80	89	81	84	
15.....	79	78	72	65	66	62	60	56	76	70	70	62	68	64	83	80	86	79	85	79	88	81	84	
16.....	79	78	65	62	64	61	56	50	75	64	68	65	71	68	83	81	86	79	87	88	81	81	76	
17.....	79	78	64	60	69	63	55	47	64	60	70	67	75	71	83	81	86	80	87	80	89	82	81	
18.....	79	78	64	59	67	49	57	49	62	57	73	67	77	75	83	75	86	79	88	80	88	82	75	
19.....	79	77	59	62	54	49	55	52	62	58	73	67	77	75	79	75	86	79	88	80	86	82	83	
20.....	79	75	73	68	61	54	61	55	62	59	70	65	80	75	80	78	86	79	89	82	87	80	84	
21.....	76	74	68	62	61	58	66	61	64	58	70	65	80	77	83	80	--	--	89	81	85	78	85	
22.....	75	72	66	61	66	61	70	62	64	61	71	65	79	75	83	82	--	--	86	82	85	78	82	
23.....	76	73	64	60	64	58	62	55	62	59	71	67	77	75	83	82	--	--	88	81	86	78	82	
24.....	76	74	65	60	61	55	--	--	62	60	67	61	75	74	85	83	--	--	89	81	86	79	75	
25.....	77	75	65	60	61	55	--	--	68	61	63	59	75	74	85	83	--	--	89	80	85	79	72	
26.....	77	74	65	59	61	55	--	--	68	64	66	61	77	72	85	78	--	--	89	80	88	80	74	
27.....	74	72	63	59	62	55	--	--	66	62	70	65	72	70	79	76	--	--	88	81	88	82	76	
28.....	74	72	63	58	62	55	--	--	66	61	70	62	73	72	78	76	--	--	89	80	87	82	74	
29.....	76	74	62	58	63	56	--	--	--	--	68	62	74	73	82	77	--	--	91	80	85	80	74	
30.....	76	75	61	56	64	57	--	--	--	--	68	67	75	73	83	78	--	--	92	81	86	79	74	
31.....	75	72	--	--	85	57	--	--	--	--	67	66	--	82	76	--	--	88	81	85	78	--	--	
Average.....	78	76	67	62	65	60	--	--	--	--	70	64	74	71	80	77	--	--	--	88	81	81	75	

COLORADO RIVER BASIN--Continued  
 COLORADO RIVER AT AUSTIN, TEX.

LOCATION (revised) --At raw-water intake at Austin City Water Plant, just downstream from bridge on U. S. Highway 290 in Austin, Travis County, half a mile downstream from Barton Creek and 4.5 miles upstream from gaging station at Montopolis Bridge on U. S. Highway 183.  
 DRAINAGE AREA 38,400 square miles, approximately, above gaging station, of which 11,900 square miles is probably noncontributing.  
 RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1957.  
 WATER TEMPERATURES: October 1947 to September 1957.

EXHIBITS, 1956-57.--Dissolved solids: Maximum, 259 ppm June 2-3, minimum, 184 ppm July 1-31.  
 Hardness: Maximum, 171 ppm Jan. 1-31; minimum, 122 ppm June 1, 4-30.

Specific conductance: Maximum daily, 552 micromhos Dec. 1; minimum daily, 288 micromhos Sept. 23.  
 Water temperatures: Maximum, 82°F Aug. 19, 20; minimum, 49°F Jan. 13, 19, Feb. 19.

EXHIBITS, 1947-57.--Dissolved solids: Maximum, 340 ppm Nov. 1-30, 1951; minimum, 184 ppm July 1-31, 1957.  
 Hardness: Maximum, 214 ppm Jan. 1-31, 1954; minimum, 122 ppm June 1, 4-30, 1957.

Specific conductance: Maximum daily, 591 micromhos July 1, 1948; minimum daily, 243 micromhos Dec. 2, 1953.  
 Water temperatures: Maximum, 87°F on several days during summer months; minimum, 43°F Jan. 28, 1948, Feb. 4, 1949.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1956 to September 1957 given in WSP 1512. No appreciable inflow between sampling point and gaging station except during periods of heavy local rains.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boiron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>		Percent sodium	Specific conductance (micro-mhos at 25°C)		
														Parts per million	Tons per acre-foot	Calcium-magnesium	Non-carbonate			Tons per day	Soil adsorption ratio
Oct. 1-31, 1956..	310	8.0		41	11	29		162	22	39	0.2	0.8		237	0.32	198	148	15	30	412	7.7
Nov. 1-30 .....	182	9.2		45	11	31		167	25	42	4	8		246	0.33	121	157	20	30	440	8.0
Dec. 1-31.....	175	9.2		42	12	31		168	20	44	3	5		242	0.33	114	154	16	31	432	8.0
Jan. 1-31, 1957..	172	6.4		49	12	23		167	23	41	3	5		245	0.33	114	171	34	22	437	8.1
Feb. 1-28 .....	189	7.8		42	11	31		164	22	42	3	8		242	0.33	123	150	16	31	428	8.0
Mar. 1-31 .....	229	8.2		40	11	32		158	23	41	5	1.2		237	0.32	147	145	16	32	423	8.2
Apr. 1-30 .....	2,166	8.0		37	11	28		149	21	37	3	2.2		226	0.31	1,320	138	16	31	397	7.5
May 1-31 .....	27,270	8.4		38	7	26		137	18	34	3	1.8		207	0.28	15,240	126	14	31	383	7.4
June 1-30 .....	18,180	9.6		38	6.7	21		132	16	27	6	4.0		188	0.26	9,230	122	14	27	329	7.5
June 2-3 .....	12,360	14		49	9.2	31		168	29	39	6	4.5		259	0.35	8,640	161	24	29	433	8.1
July 1-31 .....	12,889	11		38	6.4	13		131	13	13	5	3.2		184	0.25	4,430	124	16	18	304	7.7
Aug. 1-31 .....	2,665	9.6		40	6.6	17		143	14	20	3	3.0		197	0.27	1,430	127	10	22	337	8.0
Sept. 1-30 .....	2,388	9.6		40	6.6	18		143	12	23	3	1.5		180	0.26	1,230	127	8	23	321	7.8
Weighted average	4,900	9.1		38	7.1	23		137	17	30	0.4	2.6		201	0.27	2,660	124	12	28	349	--

a. Calculated from determined constituents.

WESTERN GULF OF MEXICO BASINS  
 COLORADO RIVER BASIN--Continued

COLORADO RIVER AT AUSTIN, TEX.--Continued

Temperature (°F) of water, water year October 1956 to September 1957  
 Once-daily temperature measurement, generally at 8 a. m.

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	76	68	59	57	54	61	63	65	76	78	79	80
2	76	70	58	57	55	61	66	64	72	--	79	79
3	76	68	59	58	57	62	67	70	72	--	79	78
4	76	66	59	56	57	62	66	64	72	--	79	79
5	75	64	60	59	59	66	--	68	72	--	80	79
6	74	--	62	--	59	62	72	62	72	--	80	78
7	--	66	58	60	59	62	66	65	72	77	79	79
8	--	66	--	60	60	58	67	64	74	78	79	78
9	75	66	62	--	60	--	52	66	74	--	80	77
10	75	66	61	--	62	60	65	66	74	--	80	76
11	75	64	58	60	62	63	67	--	76	--	80	78
12	74	66	58	59	63	63	66	69	76	--	79	76
13	74	65	59	49	63	--	65	67	76	--	80	78
14	74	67	57	59	63	65	--	67	76	--	80	78
15	74	65	57	59	63	64	--	68	76	77	81	78
16	75	65	57	54	64	62	63	69	76	--	80	78
17	76	--	56	54	63	64	65	69	75	--	81	78
18	76	65	58	52	63	64	66	69	76	--	80	78
19	75	64	58	49	49	64	66	69	76	--	82	78
20	74	71	57	54	--	65	68	70	76	--	82	78
21	73	64	57	56	61	64	68	70	76	78	80	79
22	73	64	58	58	60	66	69	71	77	78	81	80
23	71	64	58	58	60	66	70	72	78	80	--	78
24	71	62	59	57	60	63	70	72	77	79	80	76
25	71	63	58	54	--	64	70	72	76	79	79	76
26	71	61	58	54	61	60	70	73	76	79	78	75
27	68	61	57	54	60	61	70	73	77	80	81	75
28	67	--	57	53	60	--	70	71	--	80	80	75
29	70	61	56	53	--	61	71	71	--	80	78	75
30	71	60	56	53	--	62	66	73	78	80	79	74
31	70	--	57	53	--	63	--	74	--	80	79	--
Average	73	65	58	56	60	63	67	69	75	--	80	77

COLORADO RIVER BASIN--Continued

COLORADO RIVER AT COLUMBUS, TEX.

LOCATION.--At gaging station at bridge on U. S. Highway 90, at eastern edge of Columbus, Colorado County, 340 feet downstream from Texas and New Orleans Railroad bridge, 2.6 miles downstream from Cummins Creek, and at mile 135.

DRAINAGE AREA.--41,070 square miles, approximately, of which 11,900 square miles are noncontributing.

RECORDS AVAILABLE.--Water temperatures: March to September 1957.

Sediment records: March to September 1957.

EXTREMES, March to September 1957.--Water temperatures: Maximum, 89°F July 27, 28, Aug. 11.

Sediment concentrations: Maximum daily, 5,650 ppm Mar. 25; minimum, 33 ppm composite period Aug. 13-17.

Sediment loads: Maximum daily, 410,000 tons Apr. 29; minimum, 44 tons, composite period Aug. 16-19.

REMARKS.--Records of discharge for water year October 1956 to September 1957 given in WSP 1512.

Temperature (°F) of water, March to September 1957

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1						--	60	67	73	85	88	82
2						--	66	69	72	87	88	83
3						--	69	67	73	88	86	--
4						--	68	64	73	88	85	--
5						--	65	65	73	87	88	--
6						--	63	60	72	86	83	--
7						--	68	65	75	85	85	82
8						--	62	64	75	87	86	77
9						--	69	67	78	86	85	76
10						--	63	68	79	87	87	77
11						--	64	70	77	86	89	78
12						--	65	73	77	85	88	72
13						--	57	73	78	87	87	80
14						--	55	70	78	86	85	82
15						--	59	71	78	87	88	82
16						--	68	72	80	86	--	81
17						--	66	72	78	87	88	79
18						--	72	72	77	87	87	81
19						--	73	70	77	87	--	81
20						--	75	70	78	86	--	81
21						66	73	72	79	88	--	82
22						64	73	72	82	87	88	80
23						66	73	74	82	85	84	75
24						60	73	75	80	86	86	72
25						65	75	78	84	87	85	70
26						67	73	76	81	85	84	66
27						72	69	73	81	89	84	67
28						77	67	71	85	89	88	67
29						73	64	72	83	87	86	70
30						62	67	74	83	87	83	69
31						63	--	75	--	86	82	--
Average						--	67	70	78	87	86	77

Suspended sediment, March to September 1957

Date	Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day
Mar. 21, 1957	5,330	3,170	52,000
Mar. 22	5,700	2,700	41,600
Mar. 23	6,260	4,550	76,300
Mar. 24	3,020	5,010	40,900
Mar. 25	1,360	5,650	20,300
Mar. 26	952	2,300	5,910
Mar. 27	752	882	1,790
Mar. 28	1,330	998	3,580
Mar. 29	1,440	846	3,290
Mar. 30	1,780	966	4,640
Mar. 31	1,860	1,240	6,230
Total	29,784	--	256,540

s Computed by subdividing day.

## WESTERN GULF OF MEXICO BASINS

## COLORADO RIVER BASIN--Continued

## COLORADO RIVER AT COLUMBUS, TEX.--Continued

## Suspended sediment, March to September 1957--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	4,390	2,930	s35,000	22,800	2,400	148,000	37,500	682	69,100
2.....	2,440	1,560	10,300	12,100	1,030	33,700	42,000	682	77,300
3.....	1,100	808	2,400	23,400	1,210	76,400	44,100	1,070	127,000
4.....	832	490	1,100	30,100	978	79,500	25,400	1,670	115,000
5.....	645	294	512	30,500	876	72,100	29,900	2,210	178,000
6.....	548	196	290	30,800	670	55,700	42,200	1,390	158,000
7.....	495	174	233	30,900	618	51,600	31,400	824	69,900
8.....	446	160	193	27,000	505	36,800	35,900	682	66,100
9.....	441	118	131	16,200	432	18,900	39,000	735	77,400
10.....	383	100	103	9,340	752	19,000	38,900	788	82,800
11.....	362	84	82	8,560	720	16,600	39,700	502	53,800
12.....	348	82	77	8,140	612	13,500	40,100	517	56,000
13.....	329	90	80	15,100	912	37,200	39,800	543	58,400
14.....	316	77	66	23,900	909	58,700	44,400	1,600	192,000
15.....	316	58	49	23,500	606	38,500	23,500	2,020	128,000
16.....	342			23,800	596	38,300	18,100	1,780	87,000
17.....	390			30,400	721	59,200	30,300	1,240	101,000
18.....	446	40	44	31,800	670	57,500	28,800	721	56,100
19.....	470			32,500	650	57,000	13,300	582	20,900
20.....	1,000	285	770	35,900	630	61,100	10,800	846	24,700
21.....	1,480	1,870	s 10,200	37,200	578	58,100	10,200	658	18,100
22.....	2,660	1,380	9,910	36,900	504	50,200	8,110	450	9,850
23.....	2,340	1,070	6,760	37,000	472	47,200	7,620	450	9,260
24.....	4,370	1,590	18,800	37,000	525	52,400	7,480	396	8,000
25.....	4,990	2,370	31,900	37,200	514	51,600	7,180	376	7,290
26.....	6,950	2,850	s64,600	37,600	483	49,000	6,850	254	4,700
27.....	24,700	4,440	296,000	41,300	578	64,500	6,810	225	4,140
28.....	39,800	2,990	321,000	46,100	1,340	167,000	6,710	261	4,730
29.....	59,800	2,540	410,000	32,400	1,180	102,000	6,620	246	4,400
30.....	44,100	1,710	204,000	18,900	1,880	95,900	6,540	241	4,260
31.....	--	--	--	29,600	1,030	82,300	--	--	--
Total.	207,199	--	1,424,732	857,940	--	1,849,500	729,220	--	1,873,230
	July			August			September		
1.....	6,400	160	2,760	3,850			2,200		
2.....	6,400	212	3,660	3,740			2,350	127	780
3.....	6,260	252	4,260	3,630			2,450		
4.....	6,120	163	2,690	3,630			2,450		
5.....	6,120	185	3,060	3,520	104	1,030	2,450	--	e 650
6.....	5,840	153	2,410	3,740			2,250		
7.....	5,700	118	1,820	3,630			2,600		
8.....	5,980	212	3,420	2,970			2,550		
9.....	5,840	110	1,730	2,750			2,300		
10.....	5,840	191	3,010	2,650	70	470	2,150	81	508
11.....	5,840	238	3,750	2,100			2,150		
12.....	5,700	111	1,710	1,960			2,200		
13.....	5,570	177	2,660	1,920			2,600		
14.....	5,570	178	2,680	2,300			2,550		
15.....	5,570	174	2,620	2,300	54	323	2,650	103	688
16.....	5,570	156	2,350	2,150			2,600		
17.....	5,440	173	2,540	2,400			2,200		
18.....	5,180	192	2,690	2,250			2,250		
19.....	5,440	126	1,850	2,150			2,150		
20.....	5,310	225	3,230	1,820	33	179	2,150		
21.....	5,310	208	2,980	1,690			2,000	80	473
22.....	4,690	118	1,490	2,150			2,100		
23.....	4,210	191	2,170	2,450			2,550		
24.....	4,210	158	1,800	2,550			5,070	690	9,450
25.....	4,090	157	1,730	2,450	79	552	13,000	2,770	s113,000
26.....	3,970	157	1,680	2,750			49,800	2,890	389,000
27.....	3,850	123	1,280	2,750			32,700	1,180	104,000
28.....	3,970	117	1,250	2,750			9,090	810	19,900
29.....	4,090	60	663	2,860	127	958	4,690	519	6,570
30.....	3,970	142	1,520	2,970			3,630	280	2,740
31.....	4,090	131	1,450	2,600			--	--	--
Total.	162,140	--	72,913	83,430	--	18,662	171,880	--	658,361

Total discharge for March to September (cfs-days) ..... 2,241,593

Total load for March to September (tons) ..... 6,153,938

e Estimated.

s Computed by subdividing day.

COLORADO RIVER BASIN--Continued  
 COLORADO RIVER NEAR COLUMBIUS, TEX.--Continued

Particle-size analyses of suspended sediment, March to September 1957

(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipet; S, sieve; N, in native water; W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date of collection	Time	Discharge (cfs)	Water temperature (°F)	Concentration of suspended sediment (ppm)		Percent finer than indicated size, in millimeters										Methods of analysis	
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.350	0.500		1.000
Mar. 21, 1957 ..	7:15 p. m.	7,520	66	3,610	4,840	--	70	80	88	93	95	96	99	100	--	--	SPWCM
Mar. 21 .....	2:30 p. m.	7,520	66	2,980	68	68	73	80	87	93	95	92	94	99	100	--	SBWCM
Mar. 22 .....	9:20 a. m.	5,840	65	2,600	2,660	--	75	82	89	90	93	93	99	100	--	--	SBWCM
Mar. 23 .....	10:27 a. m.	6,680	67	4,000	3,140	--	65	66	71	74	76	76	95	--	--	--	SPWCM
Mar. 24 .....	8:27 a. m.	3,410	60	5,600	3,140	--	88	94	95	96	100	--	--	--	--	--	SPWCM
Mar. 30 .....	8:27 a. m.	1,520	62	746	473	77	81	85	90	92	94	95	100	--	--	--	SBWCM
Apr. 1 .....	11:28 a. m.	4,330	63	5,760	1,650	40	48	52	56	57	61	61	76	99	100	--	SBWCM
Apr. 2 .....	11:10 a. m.	2,250	68	1,570	--	--	88	93	96	97	99	99	100	--	--	--	SPWCM
Apr. 4 .....	8:16 a. m.	864	68	581	451	94	95	95	97	97	100	--	--	--	--	--	SPWCM
Apr. 24 .....	7:30 a. m.	3,630	73	1,390	1,040	76	78	83	87	88	90	90	97	100	--	--	SBWCM
Apr. 25 .....	7:40 a. m.	5,570	73	2,580	1,980	--	82	85	90	93	94	95	98	100	--	--	SPWCM
Apr. 25 .....	1:55 p. m.	4,600	76	1,970	--	--	87	91	94	96	97	97	99	100	--	--	SPWCM
Apr. 26 .....	4:24 p. m.	8,100	75	3,520	2,290	--	85	89	90	92	94	95	99	100	--	--	SPWCM
Apr. 27 .....	1:40 p. m.	31,600	73	4,380	--	--	56	67	71	74	76	77	88	98	100	--	SPWCM
Apr. 27 .....	5:30 p. m.	29,500	70	4,200	2,450	63	79	84	90	95	97	98	100	--	--	--	SBWCM
Apr. 28 .....	10:00 p. m.	54,000	67	2,820	2,070	60	67	75	81	84	88	88	98	100	--	--	SBWCM
Apr. 29 .....	5:30 p. m.	60,200	68	1,820	67	73	73	78	84	86	87	89	98	100	--	--	SBWCM
May 1 .....	7:50 a. m.	26,100	67	2,740	1,830	74	82	87	93	95	97	98	99	100	--	--	SBWCM
May 5 .....	4:00 p. m.	30,400	68	780	442	45	49	54	61	65	71	78	97	100	--	--	SBWCM
May 6 .....	6:30 p. m.	31,800	64	687	--	--	53	63	75	66	74	80	85	100	--	--	S
May 9 .....	4:45 p. m.	13,000	69	448	3,020	--	55	63	75	66	91	96	100	--	--	--	SPWCM
May 14 .....	6:30 p. m.	23,600	73	828	491	52	60	65	60	66	92	100	--	--	--	--	SBWCM
May 21 .....	12:30 p. m.	36,800	74	562	241	45	49	55	65	72	78	84	100	--	--	--	SBWCM
May 30 .....	11:00 a. m.	16,400	78	2,140	1,180	52	62	64	78	85	95	98	100	--	--	--	SBWCM
June 1 .....	8:00 a. m.	36,000	73	647	400	31	37	42	52	57	75	84	100	--	--	--	SBWCM
June 5 .....	2:45 p. m.	32,100	73	2,080	3,140	--	51	58	68	77	82	97	99	100	--	--	SPWCM
June 14 .....	5:30 p. m.	46,100	81	2,090	1,580	65	74	78	83	93	95	99	100	--	--	--	SBWCM
June 20 .....	5:30 p. m.	11,200	80	1,100	641	39	44	47	59	76	88	96	100	--	--	--	SBN
June 30 .....	5:30 p. m.	11,200	80	1,100	716	62	65	68	72	81	90	97	100	--	--	--	SBWCM
Sept. 25 .....	7:30 a. m.	9,460	70	2,000	1,270	59	67	70	77	82	86	91	99	100	--	--	SBWCM
Sept. 26 .....	10:30 a. m.	52,500	66	2,780	1,520	49	55	59	64	68	73	73	95	100	--	--	SBWCM
Sept. 26 .....	4:30 p. m.	61,000	69	1,940	4,380	46	51	57	62	69	73	81	99	100	--	--	SPWCM

COLORADO RIVER BASIN--Continued  
 COLORADO RIVER AT WHARTON, TEX.

LOCATION--At gaging station at bridge on U. S. Highway 59, in Wharton, Wharton County, 1,000 feet downstream from Texas and New Orleans Railroad bridge, 12 miles upstream from Jones Creek and at mile 67.  
 DRAINAGE AREA--41,380 square miles, approximately, of which 11,900 square miles is probably noncontributing.  
 RECORDS AVAILABLE.--Chemical analyses: April 1944 to September 1957.

Water temperatures: October 1945 to September 1948, March 1950 to September 1957.

EXTREMES, 1944-57.--Dissolved solids: Maximum, 312 ppm Dec. 1-25; minimum, 108 ppm Sept. 27-29.

Hardness: Maximum, 199 ppm Dec. 1-25; minimum, 66 ppm Sept. 27-29.

Specific conductance: Maximum daily, 765 micromhos Feb. 5; minimum daily, 146 micromhos Sept. 27.

Water temperatures: Maximum, 88°F July 29; minimum, 38°F Jan. 17.

EXTREMES, 1944-57.--Dissolved solids: Maximum, 386 ppm Apr. 1-10, 1948; minimum, 108 ppm Sept. 27-29, 1957.

Hardness: Maximum, 231 ppm Feb. 1-10, 1947; minimum, 66 ppm Sept. 27-29, 1957.

Specific conductance: Maximum daily, 765 micromhos Feb. 5, 1957; minimum, daily, 146 micromhos Sept. 27, 1957.

Water temperatures (1945-48, 1950-57): Maximum, 95°F July 26, 1954; minimum, 38°F Jan. 17, 1957.

REMARKS.--Records of specific conductance of daily samples available in a district office at Austin, Tex. Records of discharge for water year October 1956 to September 1957 given in WSP 1512.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>		Percent sodium ratio	Specific conductance (micro-mhos at 25°C)	pH		
													Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate					
Oct. 1-31, 1956 ..	296	14		50	12	32	5.2	200	24	43	0.3	0.5	a279	0.38	223	174	10	28	1.1	478	7.9
Nov. 1-30 .....	220	10		56	13	34	5.0	224	26	47	--	.6	304	.41	181	192	8	27	1.1	529	8.2
Dec. 1-25 .....	279	8.8		57	14	34	4.9	229	26	47	.4	.5	312	.42	235	199	12	26	1.0	544	8.2
Dec. 26-31 .....	469	8.6		39	5.4	18	4.2	129	22	24	.5	1.8	194	.26	246	119	14	24	.7	331	7.9
Jan. 1-31, 1957 ..	251	6.2		12	31	4.7	4.7	216	29	43	--	.5	292	.40	198	191	14	26	1.0	519	8.2
Feb. 1-28 .....	361	5.8		49	13	39	4.8	199	27	55	.3	1.2	296	.40	289	176	13	32	1.3	534	7.9
Mar. 1-10 .....	423	11		1-43	8.0	25	4.4	154	25	34	--	2.5	246	.33	281	140	14	27	.9	406	8.2
Mar. 11-17 .....	497	8.2		48	10	30	4.6	183	26	41	--	1.0	272	.37	365	162	10	28	1.0	466	8.2
Mar. 18-31 .....	3,246	9.2		34	3.8	11	4.1	115	14	14	--	3.8	168	.23	1,470	100	6	19	.5	280	8.0
Apr. 1-23 .....	1,245	11		43	6.3	18	4.5	147	20	26	.5	2.2	222	.30	746	134	13	22	.7	359	7.8
Apr. 24-28 .....	9,528	9.0		36	4.5	11	4.3	120	17	14	.5	3.2	a158	.21	4,060	108	10	17	.5	279	7.7
Apr. 29-30, May 1-3	35,240	12		34	3.4	7.5	4.0	105	17	9.5	--	4.2	153	.21	14,560	98	12	14	.3	237	7.2
May 4-31 .....	27,230	9.6		40	7.4	23	4.9	140	20	34	--	3.5	219	.30	16,100	131	16	27	.9	374	7.6
June 1-10 .....	34,730	11		38	5.9	16	4.3	123	18	25	--	2.5	195	.27	18,290	120	18	22	.6	325	7.6
June 11-20 .....	28,600	12		38	5.6	13	4.3	125	16	21	--	4.2	186	.25	14,360	118	16	19	.5	307	7.5
June 21-30 .....	7,050	13		43	7.2	15	4.3	146	17	23	--	4.7	214	.29	4,070	137	18	19	.6	349	7.6
July 1-31 .....	4,277	13		43	6.9	13	4.0	144	15	23	--	3.2	a192	.26	2,220	136	18	17	.5	342	7.8
Aug. 1-31 .....	2,151	12		38	7.8	15	4.2	140	17	20	.3	2.0	200	.27	1,160	127	12	20	9.6	331	7.8
Sept. 1-26, 30 .....	2,836	11		38	7.5	17	4.5	142	15	24	.2	1.0	194	.26	1,540	126	10	22	.7	323	7.8
Sept. 27-29 .....	24,360	10		24	1.2	7.0	5.2	77	11	9.5	1.4	1.0	a108	.15	7,100	66	3	17	.4	169	7.7
Weighted average	5,937	11		39	6.3	17	4.5	131	18	25	--	3.0	198	0.27	3,170	124	16	22	0.7	331	--

a Calculated from determined constituents.

COLORADO RIVER BASIN--Continued

COLORADO RIVER AT WHARTON, TEX.--Continued

Temperature (°F) of water, water year October 1956 to September 1957

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	75	64	48	60	65	59	64	70	75	85	85	84
2	76	65	52	55	61	62	69	70	74	85	85	85
3	78	61	50	60	64	66	70	72	74	86	85	85
4	77	59	60	62	68	60	69	71	75	85	84	84
5	75	59	62	62	70	63	68	70	75	85	85	84
6	75	60	68	65	68	60	65	66	74	86	86	84
7	76	67	70	66	70	54	68	66	76	85	83	84
8	75	62	67	66	70	51	67	68	76	87	84	79
9	74	53	50	66	69	55	62	69	77	86	84	78
10	71	51	46	59	69	62	65	71	78	--	85	79
11	70	55	52	51	71	67	70	71	--	86	85	80
12	74	59	62	54	69	66	67	74	79	86	85	80
13	73	64	59	60	67	65	61	75	79	87	85	80
14	73	66	52	62	63	66	60	76	80	85	85	82
15	73	70	54	57	68	61	63	73	79	85	85	81
16	74	55	52	46	70	62	65	75	80	86	85	82
17	70	53	60	38	57	67	68	74	80	86	85	82
18	70	53	64	39	53	67	74	73	79	86	87	82
19	72	64	60	45	55	66	75	71	79	86	87	83
20	74	68	59	54	54	68	75	73	80	86	85	83
21	70	58	58	63	51	66	73	73	80	87	83	83
22	66	52	58	68	56	67	75	75	81	86	83	83
23	67	53	58	51	61	67	75	74	82	85	83	79
24	69	54	52	48	58	62	75	76	83	85	84	76
25	71	50	52	50	60	59	75	76	83	85	84	75
26	68	50	51	52	61	57	75	75	84	87	84	73
27	64	46	50	50	58	60	75	75	83	86	84	69
28	67	47	50	49	58	62	75	73	83	87	85	69
29	70	48	51	63	--	59	69	74	84	88	84	70
30	72	45	51	59	--	63	70	75	85	87	84	70
31	64	--	55	59	--	63	--	77	--	87	82	--
Average	72	57	56	56	63	62	69	73	79	86	85	80

COLORADO RIVER BASIN--Continued  
MISCELLANEOUS ANALYSES OF STREAMS IN COLORADO RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids (calculated)		Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	
													Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate			
Oct. 17, 1956 .....		3.6	0.00	32	6.1	53	3.6	173	45	22	0.9	0.4	253	0.34	105	0	51	2.3	429
Feb. 1957 .....		3.4	.21	32	6.3	60	60	168	56	27	.8	.0	269	.37	105	0	56	2.6	468
Apr. 25, 1957 .....		19		39	3.8	17		132	18	14		4.5	a192	.26	113	5	25	0.7	298
May 11 .....		18		30	2.3	11		96	9.4	10		4.5	133	.18	84	4	22	5	226
May 18 .....		14		58	22	119		83	111	218		3.0	a429	.66	285	167	52	3.4	1,060
May 25 .....		12		61	30	150		91	131	275		2.5	a765	1.04	276	201	54	3.9	1,280

a Residue on evaporation at 180°C.

LAKE J. B. THOMAS NEAR VINCENT

BEALS CREEK AT BIG SPRING

GUADALUPE RIVER BASIN  
GUADALUPE RIVER AT VICTORIA, TEX.

LOCATION.--At gaging station at bridge on U. S. Highway 59, in Victoria, Victoria County, 1,300 feet upstream from Texas and New Orleans Railroad bridge, 10 miles upstream from Coleta Creek, and at mile 51.  
DRAINAGE AREA.--5,161 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1946, October 1948 to September 1957.

Water temperatures: November 1950 to September 1957.

EXTREMES, 1956-57.--Dissolved solids: Maximum, 404 ppm July 1-10; minimum, 142 ppm Oct. 23-31.

Hardness: Maximum, 267 ppm June 16-30; minimum, 86 ppm Oct. 23-31.

Specific conductance: Maximum, 87°F June 1; minimum, 44°F Jan. 17.

Water temperatures: Maximum daily, 77°F June 1; minimum, 44°F Jan. 17.

EXTREMES, 1945-46, 1948-57.--Dissolved solids: Maximum, 1,040 ppm Jan. 11-17, 1946; minimum, 142 ppm Oct. 23-31, 1956.

Hardness: Maximum, 428 ppm Jan. 11-17, 1946; minimum, 86 ppm Oct. 23-31, 1956.

Specific conductance: Maximum daily, 1,950 microhmhos Jan. 17, 1946; minimum daily, 184 microhmhos Oct. 24, 1956.

Water temperatures (1950-57): Maximum, 90°F Aug. 4, 27, 1952; minimum, 40°F Feb. 1-2, 1951.  
REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1956 to September 1957 given in WSP 1512.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Percentage adsorption ratio	Specific conductance (microhmhos at 25°C)	
													Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate			
Oct. 1-18, 1956.	32.2	21	43	30	13	74	214	26	84	0.5	0.5	366	0.50	31.8	161	0	50	2.5	631	8.3
Oct. 19-22	879	12	30	6.0	28	4.3	130	13	32	2.2	2.2	192	.26	456	96	0	37	1.2	336	7.8
Oct. 23-31	109	12	29	3.0	13	4.9	110	9.2	14	2.7	2.7	142	.19	41.8	86	0	24	1.6	233	8.0
Nov. 1-10	84.8	17	41	5.1	22	5.2	152	16	26	2.0	2.0	219	.30	50.1	123	0	27	.9	351	8.1
Nov. 11-20	51.3	15	41	5.6	20	4.3	184	16	33	2.0	2.0	228	.31	51.7	125	0	30	1.0	375	7.9
Nov. 21-30	42.7	15	50	7.7	40	4.4	195	22	31	.9	.9	289	.39	33.3	137	0	35	1.4	494	7.7
Dec. 1-10	50.3	17	57	11	55	4.8	236	27	66	0.5	0.5	368	.50	50.0	187	0	38	1.7	622	7.8
Dec. 11-21	571	16	58	13	64	5.0	252	29	78	.5	.5	400	.54	617	199	0	40	2.0	684	8.2
Dec. 22-31	828	9.0	35	4.5	22	4.5	124	19	28	1.8	1.8	198	.27	443	106	4	30	.9	328	7.8
Jan. 1-10, 1957.	121	11	40	5.6	26	4.7	142	21	29	4.2	4.2	223	.30	72.9	124	8	30	1.0	373	7.4
Jan. 11-20	112	14	48	7.8	29	4.5	179	24	35	2.8	2.8	262	.36	76.2	153	6	28	1.0	442	7.6
Jan. 21-31	121	13	55	10	35	4.5	208	28	44	2.5	2.5	304	.41	98.3	179	8	29	1.1	515	8.1
Feb. 1-12	139	14	60	15	62	249	38	72	72	.4	2.0	395	.54	148	212	8	39	1.9	670	8.0
Feb. 13-24	254	14	63	16	63	260	34	77	77	1.0	1.0	402	.55	276	222	9	38	1.8	697	8.1
Feb. 25-28	1,691	11	46	10	41	4.3	177	29	54	2.5	2.5	301	.41	1,370	156	11	36	1.4	499	7.9
Mar. 1-10	488	13	44	8.4	32	4.3	150	29	44	3.8	3.8	276	.38	326	144	22	32	1.2	444	8.1
Mar. 11-20	859	12	44	7.5	29	4.0	160	27	34	2.5	2.5	257	.35	596	141	10	30	1.1	413	8.2
Mar. 21-31	2,106	10	39	6.4	21	4.0	140	20	27	2.8	2.8	218	.30	1,240	124	10	26	.8	351	8.1

<sup>a</sup> Calculated from determined constituents.

## GUADALUPE RIVER BASIN--Continued

## GUADALUPE RIVER AT VICTORIA, TEX.--Continued

Chemical analyses, in parts per million, water year October 1956 to September 1957--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Boron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium					Non-carbonate
Apr. 1-10, 1957.	1,659	11		39	6.0	22	4.2	133	21	30	0.5	3.2		0.30	972	122	13	27	0.9	350	7.9	
Apr. 11-20	974	14		52	8.7	30	4.2	178	27	44	.5	3.0		217	288	166	20	28	1.0	467	7.9	
Apr. 21-30	9,809	10		34	4.6	12	4.6	118	15	16	.4	2.8		a157	.21	4,160	8	19	.5	272	7.9	
May 1-6	20,130	15		42	4.8	10	5.0	140	16	14	--	4.2		194	.26	10,540	10	14	.4	305	7.6	
May 7-18	3,418	17		60	9.8	23	4.1	197	28	34	--	8.2		313	.43	2,890	190	20	.7	478	7.8	
May 19-20, 30-31	7,538	13		36	6.1	15	4.6	122	17	22	--	4.2		195	.27	3,970	114	21	.6	305	7.6	
May 21-29	2,627	17		67	14	25	3.6	230	32	38	--	8.6		351	.48	2,490	225	36	.7	542	8.1	
June 1-9	13,020	12		47	5.6	13	4.6	150	18	21	--	4.0		210	.29	7,380	140	16	.5	345	7.4	
June 10-15	3,025	14		62	11	21	4.0	202	26	35	--	6.5		304	.41	2,480	200	34	.6	491	7.6	
June 16-30	1,803	16		79	17	30	3.1	265	37	51	--	7.3		393	.53	1,700	267	43	.8	652	7.8	
July 1-10	687	21		65	18	40	3.0	229	41	63	--	8.1		404	.55	968	256	48	27	1.1	636	8.0
July 11-20	660	23		62	19	42	3.1	221	42	66	--	6.6		396	.54	706	232	52	28	1.2	638	8.0
July 21-31	499	19		58	18	43	3.0	219	41	67	--	2.3		362	.52	515	218	39	30	1.3	631	8.0
Aug. 1-10	392	20		46	19	44	3.1	191	41	69	--	2.0		370	.50	392	193	36	33	1.4	596	7.9
Aug. 11-20	357	20		54	19	45	3.0	217	40	69	--	2.0		366	.52	372	212	34	31	1.4	625	7.9
Aug. 21-31	321	20		54	15	41	3.9	212	35	59	--	1.5		346	.47	300	196	22	31	1.3	570	7.9
Sept. 1-10	246	21		53	18	53	2.1	40	53	75	--	1.0		a365	.90	242	206	33	36	1.6	637	8.2
Sept. 11-23	360	18		51	18	52	2.1	37	69	69	--	.5		386	.52	375	201	24	36	1.6	621	8.2
Sept. 24-30	15,520	11		32	4.9	13	5.1	114	16	18	--	2.5		a158	.21	6,620	100	6	21	.6	274	8.0
Weighted average	1,873	13		45	7.3	18	4.5	153	21	26	--	4.0		227	0.31	1,210	142	17	21	0.7	370	--

a Calculated from determined constituents.

GUADALUPE RIVER BASIN--Continued

GUADALUPE RIVER AT VICTORIA, TEX.--Continued

Temperature (°F) of water, water year October 1956 to September 1957  
Once-daily measurement between 6 and 9 a. m.

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	75	68	--	62	57	60	65	71	87	84	85	83
2	--	70	54	60	61	64	69	70	74	85	85	84
3	78	--	--	60	63	65	70	72	74	84	84	84
4	78	68	64	63	66	62	67	71	75	84	84	82
5	75	--	65	65	68	63	66	70	76	86	85	82
6	76	66	67	66	67	60	66	68	75	86	85	82
7	77	68	70	64	70	58	70	69	74	86	84	82
8	77	65	70	66	70	56	68	70	77	86	83	80
9	76	60	56	67	69	60	64	72	82	85	84	70
10	75	58	56	60	70	65	64	71	80	84	84	78
11	75	60	56	58	73	68	67	73	82	85	86	78
12	76	64	64	58	73	67	67	75	80	85	85	78
13	77	64	61	62	--	65	61	76	82	85	85	79
14	74	69	58	64	68	65	60	76	82	86	85	79
15	76	70	59	60	69	62	63	76	80	84	84	82
16	74	60	58	50	70	63	66	77	84	83	84	83
17	75	60	61	44	64	67	67	77	80	85	85	79
18	74	58	63	47	58	68	70	77	80	85	86	80
19	73	63	59	49	60	66	72	76	82	86	84	81
20	72	69	58	58	58	67	71	76	80	85	85	80
21	70	64	--	62	56	66	72	--	80	84	84	82
22	68	57	59	67	60	67	73	80	81	86	82	81
23	68	58	56	56	62	70	73	80	80	84	83	76
24	70	59	54	53	60	62	73	81	82	85	83	73
25	70	58	53	57	62	60	74	81	83	84	83	70
26	72	57	54	55	60	59	74	80	83	85	84	70
27	70	53	54	53	59	62	72	80	82	84	84	79
28	72	53	56	52	--	62	70	76	82	85	86	68
29	71	54	--	62	--	61	70	82	84	85	83	68
30	73	52	55	59	--	62	70	75	84	85	82	67
31	68	--	57	59	--	64	--	--	--	84	82	--
Average	74	62	59	59	64	63	68	75	80	85	84	78

GUADALUPE RIVER BASIN--Continued  
 MISCELLANEOUS ANALYSES OF STREAMS IN GUADALUPE RIVER BASIN IN TEXAS  
 Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids (calculated)		Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
													Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate			
Dec. 17, 1956		--		21	1.7	--	12	156	--	4.0	--	--		0.22	117	0	--	279	7.5
Feb. 25, 1957	5.0			22	1.3	10	83	87	7.2	4.5	0.5	3.5		96	59	0	31	143	7.5
Mar. 12	11			30	1.6	4.9	111	111	3.4	3.2	5.5	3.0		97	61	0	27	164	7.8
Apr. 17	12			42	2.3	14	143	143	2.8	2.5	5.5	3.2		119	81	0	11	166	6.9
Apr. 22	18			19	1.8	4.9	71	71	5.4	10.0	8.5	5.0		183	113	0	21	285	7.5
Apr. 27	7.8			19	1.8	4.9	71	71	5.6	0.0	5.5	2.0		10	51	0	17	197	7.9
Sept. 30	6.0			23	1.8	6.8	8.0	96	3.8	4.5	2.2	1.0		102	64	0	17	114	7.4

ESCONDIDO RESERVOIR NO. 1 NEAR KENEDY

a Residue on evaporation at 180°C.

NUECES RIVER BASIN  
 NUECES RIVER NEAR MATHIS, TEX.

LOCATION.--At intake tower at Lake Corpus Christi, 0.8 mile upstream from gaging station at bridge on State Highway 359, 200 feet downstream from Texas and New Orleans Railroad bridge and 4 miles southwest of Mathis, San Patricio County.

DRAINAGE AREA--16,660 square miles  
 RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1957.

TEMPERATURES.--Dissolved solids: October 1947 to September 1957.  
 EXTREMES, 1956-57.--Dissolved solids: Maximum, 322 ppm Sept. 1-30; minimum, 177 ppm May 1-31.

Hardness: Maximum, 174 ppm July 1-31; minimum, 90 ppm Apr. 24-30.  
 Specific conductance: Maximum daily, 677 micromhos Apr. 9; minimum daily, 246 micromhos May 31.

Water temperatures: Maximum, 90 F July 31; minimum, 50 F Jan. 18, 19.  
 EXTREMES, 1947-57.--Dissolved solids: Maximum, 348 ppm June 1-30, 1948; minimum, 175 ppm Apr. 27-30, 1949.

Hardness: Maximum, 201 ppm May 1-24, 1951; minimum, 85 ppm Apr. 27-30, 1949.  
 Specific conductance: Maximum daily, 1,040 micromhos July 1, 1948; minimum daily, 233 micromhos July 30, 1949.

Water temperatures: Maximum, 94 F July 27, 1948; minimum, 38 F Jan. 31, 1948.  
 REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1956 to September 1957 given in WSP 1512.

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (residue at 180°C)				Hardness as CaCO <sub>3</sub>	Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)		
														Parts per million	Tons per acre-foot	Tons per day	Calcium					Magnesium	Non-carbonate
Oct. 1-31, 1956	635	18	37	3.2	38	6.5	141	33	31	3.8	240	0.33	411	105	0	42	1.6	385	7.8				
Nov. 1-30	108	17	36	2.6	39	6.2	137	39	29	3.2	246	.33	71.7	101	0	44	1.7	391	7.6				
Dec. 1-31	93.3	17	40	3.2	45	5.6	156	39	30	0.7	269	.37	67.6	113	0	45	1.8	417	7.5				
Jan. 1-31, 1957	60.4	15	40	3.4	39	6.8	159	30	31	2.0	257	.35	41.9	114	0	41	1.6	415	7.7				
Feb. 1-28	63.6	17	42	3.4	44	6.8	169	30	36	2.5	282	.38	48.4	118	0	43	1.8	431	7.9				
Mar. 1-31	321	10	41	3.1	54	6.2	178	32	42	2.5	309	.42	286	115	0	49	2.2	480	8.2				
Apr. 1-23	648	14	36	2.8	67	159	37	53	5	2.8	316	.43	553	102	0	59	2.9	491	8.0				
Apr. 24-30	9,284	12	32	2.6	24	7.3	119	20	22	5	4.8	184	.25	4,610	90	0	34	1.1	309	7.5			
May 1-31	9,462	14	20	10	18	6.9	117	20	13	3.0	177	.24	4,550	92	0	28	.8	283	7.2				
June 1-30	6,142	14	43	3.6	17	7.4	154	13	16	3.6	208	.28	4,570	122	0	22	.7	334	7.4				
July 1-31	109	17	61	5.4	21	8.3	216	23	25	4	3.5	280	.39	85.3	174	0	24	.9	458	8.0			
Aug. 1-31	106	17	57	6.7	36	9.0	218	28	35	4	3.0	312	.42	89.3	170	0	30	1.2	499	8.0			
Sept. 1-30	1,735	17	53	6.1	48	48	200	31	44	4	2.5	322	.44	1,510	157	0	40	1.7	509	8.0			
Weighted average	1,962	14	33	6.3	22	7.2	140	20	20	--	3.4	208	0.28	1,100	108	0	29	0.9	333	--			

a Calculated from determined constituents.

## WESTERN GULF OF MEXICO BASINS

## NUECES RIVER BASIN--Continued

## NUECES RIVER NEAR MATHIS, TEX.--Continued

Temperature (°F) of water, water year October 1956 to September 1957  
Once-daily measurement, usually at 9 a. m.

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	78	74	56	60	58	64	67	73	79	86	86	83
2	78	74	57	58	60	63	69	74	79	87	85	84
3	79	69	57	59	62	63	71	74	78	86	85	88
4	79	68	58	60	63	64	71	74	78	85	86	87
5	78	66	61	61	65	64	71	73	78	85	85	--
6	78	65	63	62	65	64	72	73	80	85	86	85
7	78	65	63	64	66	62	72	73	82	85	85	--
8	78	64	63	63	67	63	67	72	82	87	85	--
9	78	64	61	64	67	63	65	73	82	86	85	83
10	78	63	58	62	68	63	66	74	82	85	85	83
11	78	63	58	59	68	65	66	74	84	84		84
12	78	64	60	58	68	66	68	74	84	85	85	83
13	78	63	61	58	68	68	67	74	85	85	85	81
14	78	66	61	60	69	67	66	75	85	84	85	81
15	78	70	59	61	68	68	64	77	85	84	84	--
16	78	67	59	60	68	68	64	77	--	86	86	--
17	79	64	59	56	67	68	66	77	84	84	86	83
18	80	63	58	50	63	69	68	77	84	84	86	83
19	82	64	60	50	61	69	70	77	84	85	86	84
20	80	66	59	53	61	68	70	79	84	86	85	83
21	80	64	59	54	61	68	72	78	83	87	85	83
22	78	63	59	53	62	68	73	80	83	88	85	83
23	77	61	60	53	62	68	75	81	83	86	88	79
24	77	63	60	54	63	66	75	81	84	87	--	--
25	74	63	60	55	66	63	75	81	84	86	86	75
26	72	60	59	55	65	62	75	81	85	85	85	70
27	70	60	60	53	66	64	75	80	85	85	85	70
28	70	60	59	54	65	64	75	79	86	86	85	70
29	72	58	60	55	--	62	73	79	86	85	84	69
30	72	56	60	57	--	63	72	79	86	88	--	71
31	74	--	61	56	--	63	--	79	--	90	84	--
Average	77	64	60	57	65	65	70	77	83	86	85	80

RIO GRANDE BASIN  
RIO GRANDE ABOVE CULEBRA CREEK, NEAR LOBATOS, COLO.

LOCATION. --Half a mile southeast of Lasausas, 7 miles upstream from Culebra Creek, and 15 miles upstream from gaging station near Lobatos, Conejos County. DRAINAGE AREA. --7,700 square miles, approximately, above gaging station (includes 2,940 square miles in closed basin in northern part of San Luis Valley, Colo.)

RECORDS AVAILABLE. --Chemical analyses: October 1946 to September 1957.

EXTREMES, 1956-57. --Dissolved solids: Maximum, 518 ppm Oct. 11-19; minimum, 136 ppm Sept. 3.

Hardness: Maximum, 206 ppm Oct. 11-19; minimum, 68 ppm Sept. 3.

Specific conductance: Maximum daily, 873 micromhos Oct. 15; minimum daily, 196 micromhos June 23.

EXTREMES, 1946-57. --Dissolved solids: Maximum, 691 ppm July 21-31, 1948; minimum, 104 ppm May 2-10, 1947.

Hardness: Maximum, 346 ppm June 9-14, 1953; minimum, 52 ppm May 1-10, 1952.

Specific conductance: Maximum daily, 1,070 micromhos July 26, 1948; minimum daily, 122 micromhos June 1, 1949.

REMARKS. --Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of discharge for gaging station near Lobatos for water year October 1956 to September 1957 given in WSP 1512. Culebra Creek which enters the Rio Grande between the sampling point and the gaging station is usually dry at its mouth. Inflow from this and other sources between sampling point and gaging station occurs only after heavy local rainfall.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonyl sulfate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>		Percent sodium	Sulfate adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH		
														Parts per million	Tons per acre-foot	Tons per day	Calcium, mg./l.					Non-carbonate	
Oct. 1-10, 1956	7.60	41	0.02	39	10	67	8.2	197	0	98	22	1.2	0.4	0.32	387	0.53	7.94	138	0	49	2.5	568	7.8
Oct. 11-19	12.3	--	--	58	15	81	--	213	0	--	--	--	--	--	518	70	17.2	206	32	46	2.5	749	7.9
Oct. 20-31	17.7	--	--	46	11	50	--	232	0	--	--	--	--	--	351	49	17.3	160	0	41	1.7	524	7.6
Nov. 1-19	54.9	--	--	46	9.7	44	--	187	0	--	--	--	--	--	338	46	50.1	155	2	38	1.5	490	7.5
Nov. 20-30	76.3	--	--	42	9.0	34	--	169	0	--	--	--	--	--	239	41	61.6	142	4	34	1.2	426	7.4
Dec. 1-31	63.0	--	--	40	7.8	31	--	168	0	--	--	--	--	--	276	38	46.9	132	0	34	1.2	392	7.7
Jan. 1-18, 1957	78.9	33	.11	35	5.2	26	5.5	138	0	40	8.2	.5	.2	.08	235	32	50.1	109	0	33	1.1	327	7.0
Jan. 19-31	71.4	--	--	35	7.6	30	--	168	0	--	--	--	--	--	250	34	48.2	119	0	35	1.2	362	7.6
Feb. 1-28	102	--	--	34	7.4	28	--	143	0	--	--	--	--	--	242	33	66.6	116	0	35	1.1	354	7.7
Mar. 1-31	66.0	--	--	41	9.3	36	--	167	0	--	--	--	--	--	296	40	52.7	140	4	36	1.3	436	7.9
Apr. 1-13	60.8	--	--	48	11	57	--	172	0	--	--	--	--	--	396	54	65.0	165	24	43	1.9	573	7.7
Apr. 14-18	37.4	--	--	44	10	48	--	178	0	--	--	--	--	--	342	47	34.5	151	5	41	1.7	504	7.7
Apr. 19-29	85.2	33	.08	30	7.6	30	6.2	157	0	36	6.2	.7	.9	.19	237	32	54.5	106	0	36	1.3	338	7.5
Apr. 30	60	--	--	41	8.8	45	--	143	0	--	--	--	--	--	318	43	51.5	138	22	41	1.7	465	7.3
May 1-2	46.5	--	--	47	12	58	--	162	0	--	--	--	--	--	402	55	50.5	167	34	43	1.9	568	8.0
May 3	39	--	--	35	7.8	36	--	147	0	--	--	--	--	--	298	41	31.4	120	0	40	1.4	390	7.4
May 4-10	516	--	--	21	5.0	27	--	108	0	--	--	--	--	--	182	25	254	73	0	37	1.0	230	7.6
May 11-14	896	--	--	23	5.7	90	--	204	0	--	--	--	--	--	404	55	977	81	0	72	4.7	570	7.9
May 15-20	744	--	--	25	6.9	68	--	162	0	--	--	--	--	--	336	46	675	91	0	62	3.1	471	7.8
May 21-28	750	--	--	35	8.6	33	--	108	0	--	--	--	--	--	272	37	551	123	34	37	1.3	386	7.5

RIO GRANDE BASIN--Continued  
RIO GRANDE ABOVE CULEBRA CREEK, NEAR LOBATOS, COLO.--Continued

Chemical analyses, in parts per million, water year October 1956 to September 1957--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonylate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Boiron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>		Percent adsorption	Specific conductance (micro-mhos at 25°C)	pH		
															Parts per million	Tons per acre-foot	Calcium	Non-carbonate					
May 29-31, 1957	1,025	--	--	25	7.1	18	--	78	0	--	--	--	--	--	198	0.27	548	92	28	30	0.8	270	7.7
June 1-30	2,000	--	--	20	5.9	19	--	80	0	--	--	--	--	--	172	.23	929	74	9	36	1.0	234	7.7
July 1-16	2,086	--	--	22	5.2	19	--	88	0	--	--	--	--	--	178	.24	993	76	4	35	.9	241	7.5
July 17-27	1,520	--	--	30	10	27	--	99	0	--	--	--	--	--	236	.32	968	110	35	34	1.1	333	7.4
July 28-31	3,052	--	--	27	6.2	21	--	73	0	--	--	--	--	--	192	.26	1,370	80	20	36	1.0	265	7.2
Aug. 1-3	2,737	--	--	29	4.9	30	--	92	0	--	--	--	--	--	210	.29	1,550	92	16	41	1.4	312	8.1
Aug. 4-8	1,370	--	--	37	6.6	33	--	98	16	--	--	--	--	--	232	.32	858	120	12	38	1.3	379	9.0
Aug. 9-13	1,791	--	--	45	8.5	36	--	140	0	--	--	--	--	--	315	.43	673	148	33	35	1.3	462	7.8
Aug. 14	625	--	--	52	10	47	--	149	6	--	--	--	--	--	342	.47	577	170	38	37	1.6	520	8.5
Aug. 15-22	417	--	--	56	9.5	57	--	184	0	--	--	--	--	--	395	.54	445	178	25	41	1.9	599	8.1
Aug. 23	322	--	--	58	10	67	--	160	9	--	--	--	--	--	430	.58	374	186	40	44	2.1	657	8.6
Aug. 24-25	287	--	--	56	11	57	--	192	0	--	--	--	--	--	407	.55	315	184	27	40	1.8	602	8.0
Aug. 26-30	366	--	--	43	10	42	--	154	6	--	--	--	--	--	302	.41	298	148	12	38	1.5	456	8.5
Aug. 31	406	--	--	35	7.6	35	--	111	11	--	--	--	--	--	236	.32	259	119	10	39	1.4	360	8.8
Sept. 1	586	--	--	32	1.9	20	--	85	0	--	--	--	--	--	164	.22	259	88	18	33	.9	245	8.2
Sept. 2	1,020	--	--	21	10	26	--	101	3	--	--	--	--	--	198	.27	545	94	6	38	1.2	295	8.4
Sept. 3	1,270	--	--	23	2.4	20	--	78	0	--	--	--	--	--	136	.18	466	68	4	39	1.1	218	7.9
Sept. 4-6	883	--	--	28	4.3	26	--	76	12	--	--	--	--	--	189	.26	451	88	5	39	1.2	287	9.1
Sept. 7-11	472	--	--	40	7.6	38	--	142	0	--	--	--	--	--	268	.36	342	131	15	39	1.4	413	6.7
Sept. 12-14	250	--	--	51	10	46	--	160	0	--	--	--	--	--	367	.50	248	168	37	37	1.5	536	7.5
Sept. 15-20	153	--	--	63	11	53	--	176	0	--	--	--	--	--	426	.58	176	202	58	36	1.6	622	7.9
Sept. 21	117	--	--	59	10	47	--	142	13	--	--	--	--	--	392	.53	124	188	50	35	1.5	567	8.8
Sept. 22	111	--	--	46	8.6	36	--	148	0	--	--	--	--	--	290	.39	86.9	150	29	34	1.3	452	7.2
Sept. 23-25	114	--	--	39	8.1	32	--	134	6	--	--	--	--	--	289	.39	89.0	131	11	35	1.2	396	8.5
Sept. 26-28	113	--	--	40	10	38	--	142	0	--	--	--	--	--	290	.38	85.4	141	24	37	1.4	447	8.0
Sept. 29-30	105	--	--	52	11	45	--	126	14	--	--	--	--	--	369	.50	105	174	48	36	1.5	544	8.8
Weighted average	529	--	--	27	6.6	27	--	a103	0	--	--	--	--	--	217	0.30	310	94	10	38	1.2	307	--

a Includes carbonate as bicarbonate.

RIO GRANDE BASIN--Continued

RIO CHAMA NEAR CHAMITA, N. MEX.

LOCATION.--At gaging station on left bank, 200 feet downstream from bridge on U. S. Highway 285, half a mile west of Chamita, Rio Arriba County, 2½ miles northwest of San Juan Pueblo, and 3 miles upstream from mouth.

DRAINAGE AREA.--3,200 square miles, approximately.

RECORDS AVAILABLE.--Water temperatures: October 1950 to September 1957.

Sediment records: October 1947 to September 1957.

EXTREMES, 1956-57.--Water temperatures: Maximum, 78°F Aug. 23; minimum, freezing point on many days during winter months.

Sediment concentrations: Maximum daily, 38,800 ppm Aug. 7; minimum daily, 10 ppm Oct. 10.

Sediment loads: Maximum daily, 209,000 tons Aug. 7; minimum daily, less than 0.50 ton on many days in October.

EXTREMES, 1947-57.--Water temperatures (1950-57) Maximum, 89°F July 19, 1951, Aug. 8, 1956; minimum, freezing point on many days during winter months.

Sediment concentrations: Maximum daily, 55,500 ppm Aug. 21, 1955; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 209,000 tons Aug. 7, 1957; minimum daily, 0 ton on many days.

REMARKS.--Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of discharge for water year October 1956 to September 1957 given in WSP 1512. Flow affected by ice Nov. 16, 17, 20-23, Nov. 29 to Dec. 5, Dec. 9 to Jan. 4, Jan. 17-24, Jan. 30 to Feb. 2.

Chemical analyses, in parts per million, August 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Sodium (Na)	Bicarbonate (HCO <sub>3</sub> )	Chloride (Cl)	Hardness as CaCO <sub>3</sub>		Per cent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
						Calcium, magnesium	Non-carbonate				
Aug. 17, 1957 ...	1,640	16	25	224	3.0	184	1	23	0.8	456	7.6
Aug. 18 .....	1,610	16	35	190	6.0	740	584	9	.6	1,330	7.3
Aug. 19 .....	1,440	17	8.8	106	2.0	111	24	15	.4	260	7.6
Aug. 20 .....	1,440	18	7.7	129	1.0	111	6	13	.3	249	8.0
Aug. 22 .....	1,490	18	12	134	1.0	154	44	14	.4	344	7.7
Aug. 24 .....	1,540	18	19	170	1.0	170	30	20	.6	395	7.6
Aug. 26 .....	1,780	17	14	144	2.0	154	36	17	.5	351	7.9

Temperature (°F) of water, water year October 1956 to September 1957  
Once-daily measurement, generally between 8 a. m. and 5 p. m.

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	58	40	37	32	32	46	55	59	a57	62	72	b68
2	64	41	32	32	32	47	48	55	53	63	67	70
3	54	35	33	32	42	42	45	52	67	72	72	70
4	53	38	36	38	35	34	48	53	66	63	74	70
5	55	32	35	40	45	36	53	59	68	62	69	71
6	60	37	34	36	41	36	51	58	65	62	69	71
7	65	51	37	32	45	52	53	58	70	62	74	62
8	55	50	36	41	47	55	a52	52	b58	61	68	--
9	55	36	33	38	44	48	51	58	62	68	76	71
10	57	52	32	34	44	49	60	48	b59	b67	67	62
11	55	50	32	41	44	54	54	55	b57	62	61	71
12	53	38	32	41	52	45	58	53	69	b62	66	67
13	--	43	33	38	49	44	60	58	71	b61	70	70
14	67	45	32	44	47	45	52	59	b61	61	68	71
15	46	35	32	46	46	34	59	55	62	61	61	66
16	61	35	32	44	44	43	58	59	56	59	b61	60
17	50	46	34	32	45	45	60	58	b54	64	71	60
18	53	41	34	36	43	53	56	54	56	65	--	60
19	57	44	33	33	39	54	57	53	64	58	72	58
20	55	32	33	34	39	46	49	52	65	b59	72	65
21	50	32	32	32	45	44	57	48	62	59	62	56
22	53	32	32	35	45	46	49	56	--	61	70	61
23	44	32	32	34	48	44	49	57	b56	60	78	69
24	55	36	32	32	46	48	54	58	60	67	67	66
25	40	38	32	32	46	55	57	52	60	58	65	71
26	46	44	32	40	52	54	52	55	61	67	70	65
27	43	44	32	43	42	60	52	51	60	60	--	71
28	55	41	32	35	53	59	50	62	61	61	63	76
29	45	32	32	39	--	53	56	62	63	66	65	64
30	49	32	32	36	--	56	61	a59	62	67	66	70
31	39	--	32	32	--	50	--	54	--	73	63	--
Average	53	39	34	37	44	48	54	55	62	63	66	67

a Measurement obtained after 5 p. m.  
b Measurement obtained before 8 a. m.

## WESTERN GULF OF MEXICO BASINS

## RIO GRANDE BASIN--Continued

## RIO CHAMA NEAR CHAMITA, N. MEX.--Continued

Suspended sediment, water year October 1956 to September 1957

Day	October			November			December		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	0.7	13	(t)	14	35	1	30	60	5
2.....	.8	18	(t)	20	49	3	30	85	7
3.....	.7	28	(t)	23	36	2	30	165	13
4.....	.6	26	(t)	23	48	3	45	780	95
5.....	.7	14	(t)	24	41	3	65	450	79
6.....	.8	28	(t)	26	59	4	72	130	25
7.....	.8	17	(t)	25	44	3	74	90	18
8.....	.8	13	(t)	24	32	2	68	75	14
9.....	.8	14	(t)	26	44	3	50	78	11
10.....	.5	10	(t)	28	110	8	35	105	10
11.....	.6	20	(t)	33	51	5	35	112	11
12.....	.4	22	(t)	31	38	3	40	90	10
13.....	.4	32	(t)	30	37	3	45	92	11
14.....	.5	19	(t)	40	60	6	45	43	5
15.....	1.5	26	(t)	37	88	9	40	52	6
16.....	1.0	22	(t)	25	90	6	35	110	10
17.....	.8	25	(t)	30	72	6	30	103	8
18.....	.8	27	(t)	37	65	6	30	108	9
19.....	.8	20	(t)	34	40	4	30	108	9
20.....	.8	21	(t)	20	43	2	30	70	6
21.....	.8	16	(t)	25	60	4	30	41	3
22.....	.8	18	(t)	30	55	4	30	60	5
23.....	1.0	28	(t)	30	53	4	30	130	11
24.....	1.7	24	(t)	41	75	8	30	100	8
25.....	3.2	32	(t)	37	68	7	30	90	7
26.....	2.4	27	(t)	35	62	6	35	65	6
27.....	2.9	40	(t)	37	50	5	35	67	6
28.....	2.2	34	(t)	37	38	4	35	95	9
29.....	3.4	35	(t)	25	46	3	35	109	10
30.....	7.5	31	1	30	38	3	40	122	13
31.....	10	30	1	--	--	--	40	144	16
<b>Total.</b>	<b>50.7</b>	<b>--</b>	<b>4</b>	<b>877</b>	<b>--</b>	<b>130</b>	<b>1,229</b>	<b>--</b>	<b>456</b>
	<b>January</b>			<b>February</b>			<b>March</b>		
1.....	45	92	11	74	200	40	174	600	282
2.....	50	107	14	80	230	50	170	720	330
3.....	50	102	14	100	280	76	191	1,600	825
4.....	60	160	26	90	310	75	212	2,250	1,290
5.....	54	100	15	80	280	60	221	3,180	1,900
6.....	54	80	12	80	450	97	216	1,920	1,120
7.....	59	52	8	69	320	60	187	1,500	757
8.....	73	76	15	83	250	56	159	840	361
9.....	104	240	67	80	270	58	155	740	310
10.....	125	570	192	97	300	79	159	1,000	429
11.....	83	610	137	129	880	307	174	1,590	747
12.....	100	2,400	648	195	7,280	84,700	208	2,050	1,150
13.....	118	1,250	398	212	11,500	6,580	226	1,060	647
14.....	107	500	144	231	6,700	4,180	221	920	549
15.....	136	830	305	246	5,100	3,390	216	740	432
16.....	136	2,700	991	272	4,200	3,080	191	400	206
17.....	100	3,800	1,030	266	3,400	2,440	159	500	215
18.....	90	1,100	267	266	3,100	2,230	151	390	159
19.....	80	980	212	261	1,900	1,340	155	440	184
20.....	70	820	155	251	1,000	678	166	370	166
21.....	70	400	76	256	1,000	691	174	550	258
22.....	90	420	102	261	1,500	1,060	182	390	192
23.....	80	300	65	251	1,500	1,020	199	660	355
24.....	80	230	50	246	2,500	1,660	221	1,050	627
25.....	104	250	70	241	3,000	1,950	208	780	438
26.....	104	270	76	236	5,700	3,630	159	350	150
27.....	90	230	56	212	2,250	1,290	147	300	119
28.....	90	370	90	203	1,000	548	129	260	91
29.....	64	200	35	--	--	--	122	220	72
30.....	70	180	34	--	--	--	144	480	187
31.....	70	200	38	--	--	--	178	560	269
<b>Total.</b>	<b>2,606</b>	<b>--</b>	<b>5,353</b>	<b>5,068</b>	<b>--</b>	<b>41,425</b>	<b>5,574</b>	<b>--</b>	<b>14,817</b>

s Computed by subdividing day.

t Less than 0.50 ton.



## RIO GRANDE BASIN--Continued

## RIO CHAMA NEAR CHAMITA, N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1956 to September 1957  
 (Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipet; S, sieve; N, in native water;  
 W, in distilled water; C, chemically dispersed; M, mechanically dispersed; V, visual accumulation tube)

Date of collection	Time	Discharge (cfs)	Water temperature (°F)	Suspended sediment										Methods of analysis		
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters										
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250		0.350	0.500
Jan. 11, 1957	3:45 p. m.	60	41	522	4,350	--	90	--	93	--	96	98	100	--	--	SPWCM
Feb. 12	3:30 p. m.	158	52	2,030	4,060	--	72	--	80	--	83	90	99	100	--	VPWCM
Feb. 26	3:15 p. m.	210	52	13,000	3,660	67	83	92	97	98	98	98	100	--	--	VPWCM
Feb. 26	3:15 p. m.	210	52	13,000	3,800	2	3	16	97	98	98	98	100	--	--	VPN
Apr. 13	2:35 p. m.	540	60	5,120	3,830	--	32	--	68	--	80	89	97	100	--	VPWCM
May 4	9:55 a. m.	1,800	53	4,430	3,580	--	16	--	23	--	39	61	86	99	100	VPWCM
May 11	3:50 p. m.	3,080	55	5,310	3,820	--	23	--	54	--	48	68	90	98	100	VPWCM
June 2	7:50 a. m.	2,070	53	2,390	4,460	--	16	--	25	--	41	53	88	99	100	VPWCM
June 12	8:30 a. m.	4,220	56	7,640	3,820	--	25	--	41	--	56	63	73	90	100	VPWCM
June 20	8:30 a. m.	4,360	59	3,120	3,460	--	16	--	26	--	54	71	90	97	99	VPWCM
June 21	8:35 a. m.	3,600	59	3,890	3,460	--	14	--	20	--	39	58	80	91	96	VPWCM
July 24	8:15 a. m.	1,430	59	11,700	4,730	--	48	--	72	--	85	87	95	99	100	VPWCM
Aug. 7	4:10 p. m.	1,050	74	25,300	3,960	--	58	--	80	--	90	98	100	--	--	VPWCM
Aug. 10	10:20 a. m.	716	67	13,300	3,490	--	48	--	70	--	94	97	100	--	--	VPWCM
Aug. 30	8:20 a. m.	1,370	62	6,350	3,130	--	24	--	28	--	38	70	93	99	100	VPWCM

RIO GRANDE BASIN--Continued  
 RIO GRANDE AT OTOWI BRIDGE, NEAR SAN ILDEFONSO, N. MEX.

LOCATION.--At gaging station on downstream side of pier of former railway bridge, 400 feet downstream from bridge on State Highway 4, 1 1/4 miles southwest of San Ildefonso Pueblo, 2 1/2 miles downstream from Pojoaque River, and 7 miles west of Pojoaque, Santa Fe County.

DRAINAGE AREA.--14,300 square miles, approximately (includes 2,940 square miles in closed basin in San Luis Valley, Colo.).

RECORDS AVAILABLE.--Chemical analyses: October 1946 to September 1957.

Water temperatures: October 1948 to September 1957.

Sediment records: October 1947 to September 1957.

EXTREMES, 1956-57.--Dissolved solids: Maximum, 397 ppm June 10-12.

Hardness: Maximum, 233 ppm Feb. 13-16; minimum, 92 ppm June 10-12, July 3-8.

Specific conductance: Maximum daily, 636 micromhos Feb. 14-15; minimum daily, 205 micromhos June 12.

Water temperatures: Maximum, 77° F July 31, Aug. 1; minimum, freezing point on many days during winter months.

Sediment concentrations: Maximum daily, 17,100 ppm Aug. 10; minimum daily, 40 ppm Oct. 2.

Sediment loads: Maximum daily, 158,000 tons Aug. 10; minimum daily, 16 tons Oct. 2.

EXTREMES, 1946-57.--Dissolved solids: Maximum, 884 ppm Aug. 26, 1951; minimum, 137 ppm June 11-20, 1952.

Hardness: Maximum, 572 ppm Aug. 26, 1951; minimum, 85 ppm June 21-30, 1949.

Specific conductance: Maximum daily, 1,230 micromhos Aug. 26, 1951; minimum daily, 165 micromhos June 13, 1952.

Water temperatures: Maximum, 88° F Aug. 4, 5, 1954; minimum, freezing point on many days during winter months.

Sediment concentrations (1946-57): Maximum, 88 F Aug. 21, 1955; minimum daily, 18 ppm Sept. 24, 26, 1953.

Sediment loads (1947-57): Maximum daily, 239,000 tons Aug. 21, 1955; minimum daily, 9 tons Sept. 22, 24, 26, 1953.

REMARKS.--Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of discharge for water year October 1956 to September 1957 given in WSP 1512.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Mag-nesium (Mg)	So-dium (Na)	Potas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Car-bonate (CO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> )	Bo-ron (B)	Dissolved solids (calculated)		Hardness as CaCO <sub>3</sub>		Per-cent so-dium ad-sorp-tion ratio	Specific conduct-ance (micro-mhos at 25° C)	pH
															Parts per million	Tons per acre-foot	Calcium	Non-carbon-ate			
															per ml.	per acre-foot	mag-nesium	ate			
Oct. 1-31, 1956	168	36		37	9.0	28		171	0	39	8.5	0.5	242	0.33	110	130	0	32	1.1	369	7.8
Nov. 1-30	281	33		45	11	36		174	0	77	12	.5	300	.41	228	156	15	33	1.3	463	7.8
Dec. 1-31	361	32		44	10	33		173	0	68	12	.7	285	.39	278	151	9	32	1.2	440	7.7
Jan. 1-31, 1957	402	31		45	11	31		166	0	68	12	.9	281	.38	305	158	22	30	1.1	433	7.9
Feb. 1-12	416	28		44	11	30		163	0	68	11	.8	273	.37	307	155	22	30	1.0	425	7.7
Feb. 13-16	664	23		67	16	38		159	0	164	9.0	1.7	397	.54	712	233	102	26	1.1	599	7.9
Feb. 17-28	648	23		52	12	31		153	0	103	9.2	1.3	306	.42	535	179	54	27	1.0	476	7.8
Mar. 1-31	490	29		52	11	34		163	0	93	9.8	1.9	310	.42	410	174	41	30	1.1	483	7.7
Apr. 1-15	653	26		53	11	29		159	0	90	8.8	1.9	298	.41	525	177	46	26	.9	454	7.9
Apr. 16-May 3	1,675	20		46	6.9	14		146	0	40	5.2	3.0	207	.28	836	144	24	18	.5	332	7.9
May 4-31	3,740	23		42	5.0	12		128	0	35	4.2	1.7	186	.25	1,880	126	20	17	.5	292	7.9
June 1-3	4,633	20		37	4.5	10		114	0	31	4.2	1.4	164	.22	2,050	111	18	17	.4	261	7.9
June 4-9	5,663	18		38	4.3	11		117	0	31	4.2	1.7	166	.23	2,490	112	16	18	.5	270	7.7
June 10-12	5,687	20		30	4.0	11		97	0	29	3.8	1.2	147	.20	2,260	102	12	21	.5	228	7.9
June 13-24	4,842	17		36	3.8	12		107	0	33	4.0	.9	160	.22	2,090	106	18	20	.5	257	7.7
June 25-30	4,860	18		32	3.8	11		97	0	33	3.8	.9	150	.20	1,970	96	16	20	.5	238	7.7

RIO GRANDE BASIN--Continued  
RIO GRANDE AT OTOWI BRIDGE, NEAR SAN ILDEFONSO, N. MEX.--Continued

Chemical analyses, in parts per million, water year October 1956 to September 1957--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids (calculated)		Hardness as CaCO <sub>3</sub>		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH		
														Parts per million	Tons per acre-foot	Calcium magnesium	Non-carbonate					
July 1-2, 1957.....	5,160	12		31	6.6	20		114	0	43	5.0		1.1	175	0.24	2,440	104	11	29	0.8	265	8.2
July 3-6.....	4,910	9.7		30	4.3	20		102	0	42	4.0		1.1	161	.22	2,130	92	9	32	.9	239	8.2
July 8-16.....	4,578	12		31	5.7	18		82	6	47	6.5		1.1	166	.24	2,050	101	24	28	.8	251	8.2
July 17-23.....	3,626	12		33	7.7	20		94	10	43	5.5		1.1	176	.24	1,720	106	12	29	.8	304	8.2
July 24-26.....	3,883	12		34	6.4	24		114	8	49	6.0		2.6	186	.27	1,900	112	4	32	.9	337	8.7
July 27-29.....	3,893	17		36	6.2	25		122	0	54	8.0		1.1	207	.28	2,160	116	16	32	1.0	427	7.9
July 30-Aug. 3.....	5,240	12		31	4.7	20		90	8	41	6.0		1.1	168	.23	2,380	97	10	31	.9	297	8.8
Aug. 4-14.....	3,268	15		44	10	24		156	0	67	6.5		1.1	245	.33	2,160	151	22	26	.8	446	8.0
Aug. 15-18.....	2,990	11		38	6.6	23		124	0	50	9.0		1.0	200	.27	1,610	122	20	29	.9	366	7.9
Aug. 19.....	2,660	--		--	--	22		--	--	72	6.5		--	--	--	--	--	--	--	--	420	--
Aug. 20-23.....	2,558	12		36	6.2	22		128	0	51	9.0		1.0	200	.27	1,380	116	10	29	1.0	378	7.9
Aug. 24.....	3,120	--		--	--	28		--	--	123	8.0		--	--	--	--	--	--	--	--	505	--
Aug. 25.....	3,050	--		--	--	18		--	--	79	5.0		--	--	--	--	--	--	--	--	382	--
Aug. 26.....	3,070	--		--	--	20		--	--	79	5.5		--	--	--	--	--	--	--	--	487	--
Aug. 27-31.....	3,292	12		34	5.7	20		92	8	52	9.0		1.0	187	.25	1,660	108	20	29	.8	334	8.8
Sept. 1.....	3,500	10		--	--	30		82	15	98	6.0		.1	--	--	--	--	--	--	--	395	9.2
Sept. 2-6.....	3,248	17		46	5.0	15		145	2	42	6.0		.1	204	.28	1,790	136	14	19	.6	328	8.3
Sept. 7-11.....	2,386	17		44	4.5	13		135	0	42	6.0		.1	193	.26	1,240	128	18	18	.5	312	7.6
Sept. 12-20.....	1,702	20		42	4.7	14		129	0	46	5.5		.1	195	.27	896	124	19	20	.5	307	7.9
Sept. 21-30.....	615	21		48	6.6	25		153	0	67	10		.1	253	.34	420	147	22	27	.9	396	8.2
Weighted average	1,792	18		39	6.0	18		a125	0	47	5.9		1.2	196	0.27	948	122	20	24	0.7	321	--

a Includes carbonate as bicarbonate.

RIO GRANDE BASIN--Continued  
 RIO GRANDE AT OTOWI BRIDGE, NEAR SAN ILDEFONSO, N. MEX.--Continued

Temperature (°F) of water, water year October 1956 to September 1957  
 Seven-day mercury actuated thermograph

Day	October		November		December		January		February		March		April		May		June		July		August		September	
	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min
1.....	71	56	48	42	41	31	40	32	40	32	46	44	56	50	53	61	53	74	64	77	70	68	60	
2.....	68	54	50	39	40	31	42	36	40	32	50	44	51	46	65	64	64	75	65	76	69	70	60	
3.....	68	56	a 48	38	40	31	39	34	42	36	48	44	51	46	62	56	67	75	67	74	69	70	60	
4.....	68	54	47	37	42	37	41	36	47	40	49	45	61	53	68	57	72	66	76	70	70	61	60	
5.....	68	55	47	35	44	36	44	37	44	33	45	40	51	40	58	50	60	70	65	74	68	69	61	
6.....	71	56	48	38	45	38	43	34	44	34	48	40	53	44	60	62	72	63	73	68	71	61	61	
7.....	67	55	52	40	41	40	38	34	44	34	51	40	54	46	58	68	61	72	63	74	67	70	62	
8.....	65	55	51	42	43	39	43	39	42	36	53	43	51	41	55	66	60	72	63	76	68	72	62	
9.....	66	54	50	40	36	31	46	41	49	40	54	44	56	44	58	68	60	70	62	76	68	69	62	
10.....	65	53	52	40	38	31	38	36	48	39	56	47	58	47	57	66	60	71	64	75	66	67	61	
11.....	65	53	52	41	a 38	32	40	33	49	42	54	44	59	48	56	51	64	59	71	63	72	65	69	
12.....	63	53	51	40	a 33	42	34	50	41	52	43	56	47	55	48	66	57	72	63	70	64	68	58	
13.....	66	52	50	39	a 42	a 38	a 40	38	48	41	53	46	60	48	58	66	58	72	64	72	64	67	60	
14.....	65	50	48	41	38	33	46	39	48	40	50	40	58	52	60	66	60	73	64	73	64	68	60	
15.....	66	49	44	35	38	31	47	40	47	42	50	40	59	50	57	66	60	71	65	72	65	66	58	
16.....	63	48	42	32	38	31	44	37	48	42	52	43	60	50	59	66	58	73	63	73	65	66	58	
17.....	62	53	44	33	38	32	41	34	47	43	54	44	61	51	58	65	56	71	64	73	66	67	58	
18.....	64	a 53	44	34	38	32	38	a 32	46	44	50	43	58	50	61	51	66	56	73	62	71	65	67	60
19.....	64	50	44	35	38	32	39	31	44	41	52	44	58	50	61	53	65	59	72	64	73	64	67	60
20.....	61	46	40	34	41	34	37	31	48	41	50	47	58	49	59	69	69	71	66	74	64	67	56	
21.....	60	44	38	32	38	32	35	32	48	42	54	45	57	48	56	50	67	70	65	72	66	66	56	
22.....	59	45	41	32	33	32	38	31	50	45	50	46	54	51	58	49	66	58	66	70	65	a 54	54	
23.....	59	46	43	31	48	33	35	31	48	42	45	39	49	44	58	50	67	58	67	70	65	66	56	
24.....	56	50	44	34	36	32	38	31	51	44	48	36	56	45	59	52	60	73	66	68	63	67	56	
25.....	54	41	44	34	36	32	40	33	50	43	50	38	56	48	61	50	72	61	69	65	68	63	67	56
26.....	54	41	44	33	38	32	43	36	50	42	55	44	56	47	62	54	70	62	70	64	70	62	65	58
27.....	55	42	42	32	39	33	40	35	48	44	56	45	57	46	58	52	71	60	73	65	70	62	67	56
28.....	55	42	42	33	38	32	39	37	51	42	56	45	55	49	60	50	72	63	76	66	70	63	69	56
29.....	50	a 45	42	32	38	31	38	31	47	43	53	47	58	47	63	54	74	65	74	67	68	61	70	59
30.....	53	40	42	32	39	32	40	32	48	41	57	50	61	50	64	56	72	64	75	67	67	61	70	60
31.....	53	40	42	32	38	32	40	32	47	41	59	48	58	48	58	54	73	65	68	67	62	65	68	59
Average.....	62	49	46	36	39	33	40	35	47	40	52	43	56	47	59	68	59	73	65	72	65	68	59	59

a Thermograph record doubtful.

## WESTERN GULF OF MEXICO BASINS

## RIO GRANDE BASIN--Continued

## RIO GRANDE AT OTOWI BRIDGE, NEAR SAN ILDEFONSO, N. MEX.--Continued

Suspended sediment, water year October 1956 to September 1957

Day	October			November			December		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	152	43	18	213	72	41	344	210	195
2.....	152	40	16	229	80	49	361	220	214
3.....	152	44	18	235	85	54	332	210	188
4.....	150	45	18	245	83	55	332	250	224
5.....	145	44	17	254	140	96	357	260	251
6.....	150	42	17	265	170	122	365	240	237
7.....	150	48	19	254	100	69	369	260	259
8.....	150	48	19	258	100	70	378	220	225
9.....	150	50	20	279	190	143	369	230	229
10.....	159	53	23	276	140	104	328	250	221
11.....	169	61	28	279	160	121	349	290	273
12.....	172	83	39	290	200	157	378	260	260
13.....	164	42	19	272	140	103	405	270	295
14.....	164	48	21	290	200	157	378	200	204
15.....	177	48	23	279	175	132	365	150	148
16.....	167	50	23	272	160	118	344	205	190
17.....	164	81	36	254	130	89	332	260	233
18.....	164	56	25	262	130	92	357	270	260
19.....	162	47	21	268	150	109	357	230	214
20.....	162	44	19	272	150	110	378	210	214
21.....	172	43	20	268	220	159	387	240	251
22.....	169	44	20	279	225	169	361	140	136
23.....	164	57	25	290	220	172	369	170	169
24.....	174	95	45	324	230	201	378	160	163
25.....	182	86	43	324	240	210	344	240	223
26.....	185	63	31	332	280	251	336	280	254
27.....	182	51	25	340	250	230	353	230	219
28.....	187	48	24	340	230	211	374	230	232
29.....	193	64	33	344	220	204	369	180	179
30.....	202	69	36	344	210	195	365	210	207
31.....	210	66	37	--	--	--	365	230	227
Total.	5,195	--	779	8,431	--	3,993	11,179	--	6,807
	January			February			March		
1.....	369	270	269	353	210	200	538	550	799
2.....	383	280	290	374	250	252	540	500	729
3.....	349	320	302	437	275	324	580	750	1,170
4.....	369	320	319	437	330	389	615	1,300	2,160
5.....	365	250	246	383	230	238	598	2,600	4,200
6.....	353	190	181	396	275	294	517	1,720	2,400
7.....	344	200	186	383	240	248	486	790	1,040
8.....	361	220	214	391	240	253	447	500	603
9.....	491	690	915	400	220	238	471	400	509
10.....	447	500	603	447	290	350	466	400	503
11.....	400	530	572	481	320	416	486	650	853
12.....	387	520	543	511	850	1,170	559	750	1,130
13.....	418	830	937	633	2,500	4,270	543	700	1,030
14.....	442	520	621	645	4,000	6,970	491	400	530
15.....	461	510	635	669	4,250	7,680	486	430	584
16.....	491	560	742	708	3,700	7,070	442	275	328
17.....	491	1,020	1,350	688	3,000	5,570	418	270	305
18.....	432	730	851	714	1,900	3,660	423	300	343
19.....	405	460	503	701	1,400	2,650	447	290	350
20.....	374	430	434	663	1,100	1,970	476	300	386
21.....	378	330	337	639	650	1,120	491	310	411
22.....	396	350	374	627	550	931	491	320	424
23.....	387	270	282	645	700	1,220	511	380	524
24.....	344	200	186	639	1,080	1,860	517	410	572
25.....	418	290	327	662	2,100	3,870	476	370	476
26.....	414	230	257	627	3,950	6,690	414	330	369
27.....	418	300	339	587	2,100	3,330	423	300	343
28.....	442	280	334	565	850	1,300	423	260	297
29.....	405	230	252	--	--	--	437	320	378
30.....	365	170	168	--	--	--	481	270	351
31.....	361	240	234	--	--	--	511	330	455
Total.	12,460	---	13,803	15,425	--	64,533	15,204	--	24,532

RIO GRANDE BASIN--Continued

RIO GRANDE AT OTOWI BRIDGE, NEAR SAN ILDEFONSO, N. MEX.--Continued

Suspended sediment, water year October 1956 to September 1957--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	548	400	592	1,410	1,220	4,640	5,020	3,140	42,600
2.....	598	480	775	1,580	1,700	7,250	4,460	2,650	31,900
3.....	651	570	1,000	1,960	2,180	11,500	4,200	2,500	29,800
4.....	639	790	1,360	2,310	3,240	20,200	5,140	2,890	40,100
5.....	609	940	1,550	2,630	3,550	25,200	5,500	2,480	36,800
6.....	543	800	1,170	2,970	4,000	32,100	5,480	2,310	34,200
7.....	501	530	717	3,390	4,550	41,600	5,660	2,520	38,500
8.....	517	420	586	4,000	3,800	41,000	5,760	1,900	29,500
9.....	532	400	575	4,200	3,560	40,400	5,840	1,900	30,000
10.....	466	320	403	4,450	3,800	45,700	5,800	2,040	31,900
11.....	442	410	489	5,160	4,400	61,300	5,520	1,900	28,300
12.....	576	700	1,090	4,750	4,070	52,200	5,740	1,720	26,700
13.....	852	2,570	4,950	4,500	4,080	49,600	5,290	1,500	21,400
14.....	1,070	3,100	8,960	4,100	3,200	35,400	4,670	2,040	25,700
15.....	1,250	3,180	10,700	3,680	2,300	22,900	4,660	1,530	19,300
16.....	1,420	3,400	13,000	3,370	2,100	19,100	5,040	1,700	23,100
17.....	1,540	3,420	14,200	3,320	2,260	20,300	5,040	2,000	27,200
18.....	1,680	3,280	14,900	3,370	2,130	19,400	4,640	1,320	16,500
19.....	1,770	3,100	14,800	3,510	2,210	20,900	4,510	1,520	18,500
20.....	1,760	3,050	14,500	3,770	2,800	28,500	4,530	1,840	22,500
21.....	1,830	2,340	11,600	3,900	2,620	27,600	4,930	1,870	24,900
22.....	2,060	2,590	14,400	3,940	2,600	27,700	5,020	1,680	22,800
23.....	2,060	2,200	12,200	3,810	2,420	24,900	4,930	2,000	26,600
24.....	1,880	1,900	9,640	3,550	2,360	22,600	4,840	1,550	20,300
25.....	1,720	1,750	8,130	3,260	2,230	19,600	4,510	1,380	16,800
26.....	1,700	1,650	7,570	3,380	2,220	20,300	4,600	1,150	14,300
27.....	1,560	1,800	7,580	3,420	2,060	19,000	4,690	1,400	17,700
28.....	1,460	1,200	4,730	3,440	1,860	17,300	5,060	1,590	21,700
29.....	1,390	1,150	4,320	3,760	1,930	19,600	5,120	1,250	17,300
30.....	1,370	1,210	4,480	4,150	2,630	29,500	5,180	1,140	15,900
31.....	---	---	---	4,640	2,790	35,000	---	---	---
<b>Total.</b>	<b>34,994</b>	<b>--</b>	<b>190,967</b>	<b>109,680</b>	<b>--</b>	<b>862,290</b>	<b>151,600</b>	<b>--</b>	<b>772,800</b>
Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	5,140	1,200	16,700	5,360	2,100	30,400	3,500	9,200	86,900
2.....	5,180	1,140	15,900	6,640	5,200	84,800	3,180	4,000	34,300
3.....	5,140	1,300	18,000	4,640	2,550	31,900	3,320	2,750	24,700
4.....	5,190	1,150	16,100	3,550	3,150	30,200	3,520	2,800	26,600
5.....	5,040	1,150	15,600	3,520	5,200	49,400	3,280	2,100	18,600
6.....	4,980	1,000	13,400	3,420	6,200	57,300	2,940	2,000	15,900
7.....	4,710	1,000	12,700	4,100	14,200	157,000	2,700	2,300	16,800
8.....	4,400	820	9,740	2,760	3,400	25,300	2,590	2,000	14,000
9.....	4,640	1,550	19,400	2,700	6,850	61,700	2,390	1,500	9,680
10.....	5,160	1,800	25,100	3,110	17,100	158,000	2,180	1,270	7,480
11.....	5,210	1,540	21,700	3,180	5,800	49,800	2,070	1,240	6,930
12.....	5,000	1,200	16,200	3,110	4,200	35,300	1,960	1,220	6,460
13.....	4,870	1,470	18,500	3,220	5,200	45,200	1,900	1,140	5,850
14.....	4,250	1,480	17,000	3,280	5,600	49,600	1,830	900	4,450
15.....	3,870	1,010	10,600	2,860	2,800	21,600	1,740	1,180	5,540
16.....	3,820	1,100	11,300	2,970	3,000	24,100	1,740	1,070	5,030
17.....	3,790	3,100	31,700	2,980	4,900	39,400	1,700	1,180	5,420
18.....	3,780	5,800	59,200	3,150	5,600	47,600	1,160	1,160	5,010
19.....	3,710	1,990	19,900	2,660	3,000	21,500	1,550	1,030	4,310
20.....	3,810	1,370	14,100	2,510	2,750	18,600	1,300	1,140	4,000
21.....	3,600	1,220	11,900	2,490	2,600	17,500	770	880	1,830
22.....	3,430	1,100	10,200	2,720	5,700	41,900	695	510	957
23.....	3,260	830	7,310	2,510	3,150	21,300	653	250	441
24.....	3,490	2,680	25,300	3,120	8,800	74,100	613	150	248
25.....	3,570	1,910	18,400	3,050	6,300	51,900	613	230	381
26.....	3,630	2,270	22,200	3,070	7,200	59,700	608	200	328
27.....	3,780	3,100	31,600	2,630	2,450	17,400	613	250	414
28.....	3,650	2,950	29,100	2,630	4,750	33,700	586	150	237
29.....	4,250	4,100	a47,000	3,460	8,920	s111,000	526	120	168
30.....	5,040	3,900	53,100	4,030	10,300	s131,000	482	100	130
31.....	5,120	1,700	23,500	3,710	4,300	43,100	---	---	---
<b>Total.</b>	<b>134,310</b>	<b>--</b>	<b>662,450</b>	<b>102,540</b>	<b>--</b>	<b>1,641,300</b>	<b>53,143</b>	<b>--</b>	<b>313,094</b>

Total discharge for year (cfs-days) ..... 654,161  
 Total load for year (tons) ..... 4,557,348

s Computed by subdividing day.

a Computed from estimated concentration graph.

RIO GRANDE AT OTOWI BRIDGE, NEAR SAN ILDEFONSO, N. MEX.--Continued

Particle-size analyses, of suspended sediment, water year October 1956 to September 1957

(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipet; S, sieve; N, in native water; W, in distilled water; C, chemically dispersed; M, mechanically dispersed; V, visual accumulation tube).

Date of collection	Time	Discharge (cfs)	Water temperature (°F)	Suspended sediment										Methods of analysis		
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters										
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250		0.350	0.500
Jan. 17, 1957.....	11:10 a. m.	496	35	1,110	2,880	64	68	75	97	100	100	100	100	100	100	V P W C M
Feb. 13 .....	9:45 a. m.	645	42	2,500	7,600	57	82	88	98	100	100	100	100	100	100	V P W C M
Apr. 13 .....	9:30 a. m.	873	55	2,310	3,840	32	55	77	86	92	96	99	100	100	100	V P W C M
May 6 .....	10:10 a. m.	3,520	54	3,330	3,440	18	27	49	74	93	99	100	100	100	100	V P W C M
May 12 .....	9:15 a. m.	5,140	50	3,930	5,320	25	35	64	88	98	100	100	100	100	100	V P W C M
June 4 .....	9:30 a. m.	5,420	58	2,680	2,900	18	24	42	58	86	98	99	100	100	100	V P W C M
June 21 .....	10:00 a. m.	5,000	61	2,190	4,780	15	22	42	57	80	97	100	100	100	100	V P W C M
Aug. 10 .....	9:15 a. m.	2,840	67	23,200	3,140	56	78	95	97	98	100	100	100	100	100	V P W C M
Aug. 29 .....	9:30 p. m.	5,230	68	13,000	4,630	21	45	78	93	96	99	100	100	100	100	V P W C M

RIO GRANDE BASIN--Continued  
GALISTEO CREEK AT DOMINGO, N. MEX.

LOCATION --At gaging station in Santo Domingo Pueblo Grant, 160 feet downstream from highway bridge, 0.3 mile northeast of Domingo, Sandoval County, 2 1/2 miles east of Santo Domingo Pueblo, and 4 miles upstream from mouth.

DRAINAGE AREA 640 square miles, approximately.

RECORDS AVAILABLE --Sediment records: January 1948 to September 1957.

EXTREMES, 1956-57. --Sediment concentrations: Maximum daily, 74,000 ppm Aug. 5; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 690,000 tons Aug. 5; minimum daily, 0 tons on many days.

EXTREMES, 1948-57. --Sediment concentrations: Maximum daily, 88,800 ppm July 4, 1952; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 1,600,000 tons Sept. 25, 1955; minimum daily, 0 tons on many days.

REMARKS --No flow October to February, April to June; tabulation omitted for these periods. Records of discharge for water year October 1956 to September 1957 given in WSP 1512.

Chemical analyses, in parts per million, July to August 1957

Date of collection	Discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
July 25, 1957, 2:10 p. m. ....	32.0			64	13	28		133		7.5				350	0.48	30.2	213	104	22	0.8	511	7.4
July 25, 3:25 p. m.	5,780		210	46	75	162		162		14				1,170	1.59	18,260	713	580	19	1.2	1,400	7.1
Aug. 5, 2:15 a. m.	3,000		80	16	58	74		74		10				550	.75	4,460	266	205	32	1.5	744	7.7
Aug. 5, 9:50 a. m.	2,500		111	21	65	69		69		11				714	.97	4,820	364	307	28	1.5	526	7.8
Aug. 29	a 212		141	18	28	127		127		6.0				--	--	--	426	322	13	.6	881	7.7
Aug. 30, 2:00 a. m.	652		100	15	33	121		121		6.5				--	--	--	311	212	19	.8	699	7.8
Aug. 30, 6:30 a. m.	272		91	16	56	122		122		7.5				--	--	--	293	193	29	1.4	759	7.8
Aug. 31	a 596	15	--	--	--	55		140		6.5				--	--	--	346	232	26	1.3	859	7.6

a Daily mean discharge.

## WESTERN GULF OF MEXICO BASINS

## RIO GRANDE BASIN--Continued

## GALISTEO CREEK AT DOMINGO, N. MEX.--Continued

Suspended sediment, water year October 1956 to September 1957

Day	March			July			August		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	1	700	sa 2	0	--	0	78	32,000	sa 12,000
2.....	1	338	s 1	0	--	0	1	5,000	a 14
3.....	0	--	0	0	--	0	49	17,000	sa 4,600
4.....	0	--	0	12	--	b 2,000	815	42,000	sa 370,000
5.....	0	--	0	0	--	0	2,570	74,000	sc 690,000
6.....	0	--	0	4	--	b 800	440	--	b 80,000
7.....	0	--	0	0	--	0	624	--	b 200,000
8.....	0	--	0	0	--	0	10	--	b 1,500
9.....	0	--	0	0	--	0	37	--	b 8,000
10.....	0	--	0	0	--	0	41	--	b 8,500
11.....	0	--	0	0	--	0	24	--	b 5,000
12.....	0	--	0	0	--	0	7	--	b 1,000
13.....	0	--	0	0	--	0	4	--	b 600
14.....	0	--	0	0	--	0	24	--	b 6,000
15.....	0	--	0	160	18,300	s 42,100	384	--	b 150,000
16.....	0	--	0	46	37,100	s 5,830	7	--	b 800
17.....	0	--	0	4	4,790	s 631	35	--	b 7,500
18.....	0	--	0	10	30,000	sa 970	137	--	b 40,000
19.....	0	--	0	1	8,000	a 22	8	--	b 1,000
20.....	0	--	0	0	--	0	0	--	0
21.....	0	--	0	0	--	0	42	--	b 8,000
22.....	0	--	0	0	--	0	14	--	b 2,500
23.....	0	--	0	44	52,000	sc 8,600	0	--	0
24.....	0	--	0	10	54,000	sa 2,200	544	--	b 170,000
25.....	0	--	0	693	38,300	s 199,000	100	--	b 20,000
26.....	0	--	0	182	48,700	s 31,100	6	--	b 800
27.....	0	--	0	11	29,000	a 860	0	--	0
28.....	0	--	0	0	--	0	0	--	0
29.....	0	--	0	27	12,000	sa 7,600	212	21,000	sc 44,000
30.....	0	--	0	6	28,000	sa 1,200	381	52,000	sc 75,000
31.....	0	--	0	0	--	0	596	53,000	sc 150,000
Total.	2	--	3	1,210	--	302,913	7,190	--	2,056,814
September									
1.....				122	37,000	a 13,000			
2.....				6	7,000	a 110			
3.....				0	--	0			
4.....				0	--	0			
5.....				0	--	0			
6.....				0	--	0			
7.....				0	--	0			
8.....				0	--	0			
9.....				0	--	0			
10.....				0	--	0			
11.....				0	--	0			
12.....				0	--	0			
13.....				0	--	0			
14.....				0	--	0			
15.....				0	--	0			
16.....				0	--	0			
17.....				0	--	0			
18.....				0	--	0			
19.....				0	--	0			
20.....				0	--	0			
21.....				0	--	0			
22.....				0	--	0			
23.....				0	--	0			
24.....				0	--	0			
25.....				0	--	0			
26.....				0	--	0			
27.....				0	--	0			
28.....				0	--	0			
29.....				0	--	0			
30.....				0	--	0			
31.....				--	--	--			
Total.				128	--	13,110			

Total discharge for year (cfs-days) ..... 8,530  
 Total load for year (tons) ..... 2,372,840

s Computed by subdividing day.

a Computed from estimated concentration graph.

b Computed from water-sediment discharge relationship.

c Computed from partly-estimated concentration graph.



## WESTERN GULF OF MEXICO BASINS

## RIO GRANDE BASIN--Continued

## JAMEZ RIVER BELOW JAMEZ CANYON DAM, N. MEX.

LOCATION.--At gaging station, three-quarters of a mile downstream from Jamez Canyon Dam, 1 1/4 miles upstream from mouth, and 6 miles north of Bernalillo, Sandoval County.

DRAINAGE AREA.--1,040 square miles, approximately.

RECORDS AVAILABLE.--Water temperatures: October 1950 to September 1957.

Sediment records: April 1948 to September 1957.

EXTREMES, 1956-57. Water temperatures: Maximum, 94°F Aug. 16; minimum, freezing point Dec. 6, 22, 28-29, Jan. 10.

Sediment concentrations: Maximum daily, 65,500 ppm Aug. 30; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 46,600 tons Aug. 30; minimum daily, 0 tons on many days.

EXTREMES, (1948-57).--Water temperatures (1950-57): Maximum 94°F Aug. 16, 1957; minimum, freezing point on many days during winter months.

Sediment concentrations: Maximum daily, 118,000 ppm Aug. 1, 1955; minimum daily, no flow on many days each year.

Sediment loads: Maximum daily, 167,000 tons July 25, 1951; minimum daily, 0 tons on many days each year.

REMARKS.--Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of discharge for water year October 1956 to September 1957 given in WSP 1512. Flow affected by ice Dec. 8-10, 19, 23-24, Jan. 18-20, 29 to Feb. 2.

REVISIONS.--Revised figures of mean discharge, mean concentration, and tons per day for water year 1950, superseding figures published in WSP 1188 are given herewith.

WSP 1188 - 1950 water year			
Date	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
Sept. 19, 1950 .....	197	65,300	s58,300
Sept. 20 .....	289	66,700	s91,700
Total for September	694	--	162,000
Total discharge for year (cfs-days).....			5,144
Total load for year (tons).....			214,400
s Computed by subdividing day.			

EXTREMES, 1948-50.--Sediment loads: Maximum daily, 91,700 tons Sept. 20, 1950.

## Chemical analyses, in parts per million, July and August 1957

Constituent	July 26, 1957		Constituent	Aug. 8, 1957	
	July 26, 1957	Aug. 8, 1957		July 26, 1957	Aug. 8, 1957
Discharge (cfs) .....	15	262	Dissolved solids--cont.		
Silica (SiO <sub>2</sub> ) .....	--	23	Tons per day .....	77.0	--
Calcium (Ca) .....	256	--	Hardness as CaCO <sub>3</sub> ) .....		
Magnesium (Mg) .....	28	--	Calcium, magnesium ....	754	614
Sodium (Na) .....	281	216	Noncarbonate .....	639	491
Bicarbonate (HCO <sub>3</sub> ) .....	140	150	Percent sodium .....	45	43
Chloride (Cl) .....	194	135	Sodium adsorption ratio ...	4.4	3.8
Dissolved solids			Specific conductance		
Parts per million .....	1,900	--	(micromhos at 25°C) .....	2,440	1,910
Tons per acre foot .....	2.58	--	pH .....	7.9	--

## RIO GRANDE BASIN--Continued

## JAMEZ RIVER BELOW JAMEZ CANYON DAM, N. MEX.--Continued

Temperature (\*F) of water, water year October 1956 to September 1957  
Once daily measurement, generally between 11 a. m. and 4 p. m.

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1		--	a38	--	42	56	62	62	--	--	86	--
2		--	--	44	--	54	53	69	--	--	91	--
3		--	b34	34	--	--	58	63	--	--	--	83
4		--	40	40	--	53	54	--	b68	--	--	84
5		--	34	50	58	57	62	--	--	--	70	89
6		--	b32	--	54	56	63	62	--	--	82	87
7		--	44	44	55	59	--	65	--	--	82	--
8		--	37	--	58	63	63	58	--	--	75	--
9		--	--	48	--	--	67	62	--	--	76	79
10		a46	--	32	--	--	70	60	--	--	--	73
11		--	--	47	67	61	71	58	69	--	--	72
12		--	47	49	66	64	75	--	--	--	79	75
13		48	41	--	64	57	--	58	--	--	93	75
14		43	34	56	61	62	--	65	--	--	84	--
15		b36	33	52	63	64	71	64	--	--	83	--
16		--	--	46	--	--	76	58	--	--	94	--
17		--	45	--	57	--	66	62	70	--	--	--
18		--	41	--	46	62	65	--	--	--	--	--
19		43	36	--	52	60	69	--	--	--	74	79
20		--	37	--	62	61	59	61	73	--	90	--
21		--	35	34	59	65	--	61	70	--	83	--
22		--	a32	41	62	52	55	69	b64	--	86	--
23		--	--	--	51	--	49	70	--	--	75	--
24		a38	--	--	51	--	52	67	70	--	--	--
25		--	--	--	52	62	59	--	b71	--	--	--
26		43	--	a49	60	60	56	--	b69	b81	73	--
27		42	--	--	64	67	--	64	--	--	72	--
28		39	32	39	63	65	--	72	--	--	81	--
29		42	a32	37	--	68	53	78	--	--	91	85
30		43	--	42	--	63	60	--	--	--	86	64
31		--	35	42	--	--	--	57	--	--	87	--
Average		--	--	--	--	--	--	--	--	--	--	--

a Measurement obtained after 4 p. m.

b Measurement obtained before 11 a. m.

## WESTERN GULF OF MEXICO BASINS

## RIO GRANDE BASIN--Continued

## JAMEZ RIVER BELOW JAMEZ CANYON DAM, N. MEX.--Continued

Suspended sediment, water year October 1956 to September 1957

Day	October			November			December			
	Suspended sediment			Suspended sediment			Suspended sediment			
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	
1.....				0	--	0	6	3,200	52	
2.....				0	--	0	3	3,800	a31	
3.....				0	--	0	2	2,100	11	
4.....				0	--	0	15	6,380	a2,300	
5.....				0	--	0	9	3,750	91	
6.....				0	--	0	11	6,700	199	
7.....				0	--	0	13	5,800	204	
8.....				0	--	0	16	5,700	246	
9.....				0	--	0	5	3,200	a43	
10.....				.1	2,000	1	0	--	0	
11.....				.6	2,500	a4	0	--	0	
12.....				2	2,100	a11	37	8,850	a972	
13.....				4	950	10	14	7,150	270	
14.....				4	3,250	35	12	6,100	198	
15.....				.3	2,100	2	9	5,100	124	
16.....				0	--	0	4	4,900	a53	
17.....				2	1,900	sa37	10	5,000	135	
18.....				9	3,300	a80	15	7,200	292	
19.....				6	3,400	55	5	4,100	55	
20.....				7	3,600	a68	15	3,300	134	
21.....				0	--	0	6	3,000	49	
22.....				0	--	0	12	4,750	a296	
23.....				5	1,800	sa140	15	12,000	a490	
24.....				34	6,800	624	1	2,800	a8	
25.....				14	5,200	a200	0	--	0	
26.....				9	5,000	122	0	--	0	
27.....				4	2,600	28	0	--	0	
28.....				9	7,420	sa1,480	5	2,250	a116	
29.....				5	3,400	46	11	3,900	116	
30.....				6	3,000	49	15	5,600	a230	
31.....				--	--	--	17	5,750	264	
Total.	0		0	121.0	--	2,992	283	--	6,979	
		January			February			March		
1.....	18	5,700	a280	6	5,400	87	34	2,500	230	
2.....	19	7,500	385	16	5,800	a250	57	4,800	739	
3.....	18	7,000	340	24	5,700	a370	36	2,800	a270	
4.....	30	11,200	907	21	3,400	a190	31	3,400	285	
5.....	16	6,800	294	22	4,200	249	30	1,900	164	
6.....	13	7,200	a250	17	3,500	161	20	1,600	86	
7.....	15	5,700	231	14	3,200	121	11	2,200	65	
8.....	19	2,900	a150	16	3,500	151	16	3,800	164	
9.....	30	7,100	575	21	3,400	a190	30	3,900	a320	
10.....	43	10,600	1,230	20	3,700	a200	47	1,900	a240	
11.....	26	7,900	555	19	6,100	313	57	7,000	1,080	
12.....	26	4,900	344	22	6,250	371	49	6,600	873	
13.....	22	4,700	a280	32	8,100	700	53	5,500	787	
14.....	21	4,750	269	51	8,000	1,100	47	4,200	533	
15.....	22	5,500	327	62	8,300	1,390	32	4,100	354	
16.....	28	4,500	340	65	6,600	a1,200	30	4,000	a320	
17.....	13	4,700	a160	57	9,700	1,490	31	5,600	a470	
18.....	10	6,600	a180	68	6,100	1,120	41	5,500	609	
19.....	12	6,500	a210	88	1,750	416	36	2,100	204	
20.....	15	6,800	a280	70	4,100	775	45	3,000	364	
21.....	21	5,500	312	41	3,700	410	47	7,250	920	
22.....	13	5,600	197	31	3,600	301	43	6,100	708	
23.....	8	6,400	a140	30	3,300	267	39	6,900	a730	
24.....	8	5,600	a120	30	2,750	223	30	3,500	a280	
25.....	18	7,200	a350	24	2,300	149	21	1,800	102	
26.....	14	5,000	189	20	1,800	97	11	1,700	50	
27.....	13	4,600	a160	18	1,900	92	13	1,700	60	
28.....	18	5,000	243	21	1,700	96	19	2,500	128	
29.....	10	5,100	138	--	--	--	25	4,500	304	
30.....	15	5,400	219	--	--	--	32	4,600	389	
31.....	13	4,750	167	--	--	--	41	4,100	a450	
Total.	567	--	9,822	926.0	--	12,479	1,054	--	12,268	

s Computed by subdividing day.

a Computed from estimated concentration graph.

RIO GRANDE BASIN--Continued

JAMEZ RIVER BELOW JAMEZ CANYON DAM, N. MEX.--Continued

Suspended sediment, water year October 1956 to September 1957--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	57	3,300	508	73	100	20	82	100	a22
2.....	60	3,000	486	70	150	28	88	100	a24
3.....	55	4,200	624	62	210	35	267	220	159
4.....	45	3,850	468	62	210	a35	152	1,120	460
5.....	41	3,000	332	57	210	a32	36	1,100	a110
6.....	37	2,800	280	202	1,000	s995	23	830	a52
7.....	37	2,500	a250	261	670	472	15	600	a24
8.....	47	4,000	508	270	470	343	15	400	a16
9.....	41	3,700	410	288	650	s410	15	230	a9
10.....	47	4,400	558	288	1,360	1,060	36	120	a12
11.....	53	5,300	758	258	2,970	2,070	50	50	7
12.....	65	5,900	1,040	252	2,600	a1,800	50	40	a5
13.....	91	6,200	a1,500	232	480	301	50	40	a5
14.....	102	6,300	a1,700	193	370	193	50	40	a5
15.....	84	4,900	1,110	153	550	227	50	40	a5
16.....	84	3,500	794	129	300	104	49	35	a5
17.....	76	3,200	657	123	280	93	46	30	4
18.....	70	3,500	662	125	210	a71	44	30	a4
19.....	41	2,900	321	123	450	a150	44	30	a4
20.....	45	3,000	364	123	2,070	687	175	238	s196
21.....	53	3,800	a540	155	830	347	285	150	115
22.....	62	2,500	418	109	1,320	388	152	150	62
23.....	148	4,750	1,900	91	630	155	32	150	a13
24.....	108	2,750	802	85	650	149	29	90	7
25.....	98	500	132	77	840	a170	125	103	s60
26.....	116	280	88	79	510	a110	143	100	39
27.....	109	810	a240	103	280	78	.7	--	(et)
28.....	165	1,000	a450	163	350	154	.3	--	(et)
29.....	98	460	122	121	340	111	.3	--	(et)
30.....	84	180	41	125	560	a190	.3	--	(et)
31.....	--	--	--	129	390	136	--	--	--
Total.	2,219	--	18,063	4,561	--	11,114	2,104.6	--	1,424

Day	July			August			September		
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1.....	0.2	--	(et)	20	9,000	486	312	1,300	a1,100
2.....	.1	--	(et)	52	18,400	s2,780	235	13,000	sa2,600
3.....	.1	--	(et)	66	20,000	a3,600	53	23,500	3,360
4.....	.1	--	(et)	137	20,000	a7,400	43	13,500	1,530
5.....	.3	--	(et)	138	35,500	s14,400	35	12,000	1,130
6.....	0	--	0	2	3,000	16	28	18,000	1,360
7.....	0	--	0	2	210	1	13	21,000	a740
8.....	0	--	0	262	5,600	s8,460	7	13,000	a250
9.....	0	--	0	404	600	654	3	2,500	20
10.....	0	--	0	202	400	a220	5	5,500	74
11.....	0	--	0	190	1,700	a870	8	5,000	108
12.....	0	--	0	157	6,500	2,760	2	400	2
13.....	0	--	0	64	12,100	s893	.7	210	(t)
14.....	0	--	0	52	13,500	s1,710	.2	200	(at)
15.....	0	--	0	107	7,500	s2,490	.2	200	(at)
16.....	0	--	0	123	9,070	s3,240	.4	200	(at)
17.....	.3	130	sa1	135	16,000	a5,800	.3	150	(at)
18.....	.5	130	(at)	141	8,000	a3,000	.2	100	(at)
19.....	0	--	0	337	4,000	3,640	.1	58	(t)
20.....	0	--	0	92	23,400	s4,560	.1	50	(at)
21.....	0	--	0	34	14,000	1,290	0	--	0
22.....	0	--	0	72	17,000	3,300	0	--	0
23.....	0	--	0	105	9,000	2,550	0	--	0
24.....	0	--	0	139	18,000	a6,800	0	--	0
25.....	.5	6,500	sa26	141	31,000	a12,000	0	--	0
26.....	15	35,100	s1,560	359	9,500	9,210	0	--	0
27.....	57	27,000	sa4,300	510	540	744	0	--	0
28.....	30	23,000	a1,900	167	27,000	s30,600	0	--	0
29.....	7	6,400	121	95	24,500	6,280	0	--	0
30.....	47	26,900	s3,730	254	65,500	46,600	0	--	0
31.....	32	12,500	1,080	340	26,000	a24,000	--	--	--
Total.	190.1	--	12,718	4,899	--	219,354	745.2	--	12,275

Total discharge for year (cfs-days) ..... 17,669.9

Total load for year (tons) ..... 319,489

e Estimated.

t Less than 0.50 ton.

s Computed by subdividing day.

a Computed from estimated concentration graph.

RIO GRANDE BASIN--Continued  
JAMEZ RIVER BELOW JAMEZ CANYON DAM, N. MEX.--Continued

Particle-size analysis of suspended sediment, water year October 1956 to September 1957  
(Methods of analysis: B, bottom withdrawal tube, D, decantation; P, pipet; S, sieve; N, an native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed; V, visual accumulation tube)

Date of Collection	Time	Discharge (cfs)	Water temperature (°F)	Suspended sediment										Methods of analysis		
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters										
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250		0.350	0.500
Nov. 13, 1956 ...	4:25 p.m.	3.6	67	1,170	1,990	--	97	--	99	--	99	100	--	--	--	SPWCM
Dec. 28 ...	2:00 p.m.	71	32	11,000	4,780	--	39	--	59	--	93	100	--	--	--	VPWCM
Jan. 22, 1957 ...	2:45 p.m.	19	32	6,830	3,540	--	36	--	49	--	75	98	--	--	--	VPWCM
Feb. 11 ...	12:00 m.	16	57	3,740	4,100	36	40	44	51	62	79	98	100	100	100	VPWCM
Feb. 11 ...	12:00 m.	16	57	3,740	4,170	2	7	35	--	60	79	98	100	100	100	VPN
Feb. 17 ...	2:45 p.m.	65	57	5,820	4,160	--	37	--	50	--	74	96	--	--	--	VPWCM
Feb. 17 ...	5:00 p.m.	113	55	9,700	4,230	--	30	--	44	--	73	96	100	100	100	VPWCM
Mar. 11 ...	12:00 m.	53	56	6,480	4,530	--	28	--	38	--	66	96	100	100	100	VPWCM
Mar. 21 ...	1:15 p.m.	62	61	5,970	2,970	--	30	--	39	--	64	95	100	100	100	VPWCM
Apr. 8 ...	11:30 a.m.	57	55	3,750	3,580	--	36	--	51	--	68	84	99	100	100	VPWCM
May 6 ...	2:55 p.m.	432	62	2,320	2,420	--	18	--	23	--	40	78	98	100	100	VPWCM
May 13 ...	12:00 m.	235	53	438	1,950	--	73	--	78	--	80	82	89	99	100	VPWCM
May 28 ...	3:15 p.m.	220	72	387	--	--	--	--	--	--	83	86	93	100	100	V
June 11 ...	11:15 a.m.	82	69	43	--	--	--	--	--	--	87	92	100	100	100	S
June 24 ...	10:35 a.m.	28	77	131	--	--	--	--	--	--	100	--	--	--	--	S
Aug. 2 ...	10:50 a.m.	31	77	9,480	3,940	--	84	--	94	--	100	--	--	--	--	VPWCM
Aug. 8 ...	1:50 p.m.	542	73	47,600	3,840	--	73	--	93	--	97	98	100	100	100	VPWCM
Sept. 3 ...	3:20 p.m.	52	83	21,500	3,360	--	53	--	68	--	97	100	100	100	100	VPWCM

RIO GRANDE BASIN--Continued

RIO GRANDE NEAR BERNALILLO, N. MEX.

LOCATION.--At gaging station, 2 miles northwest of Sandia Pueblo, 3 miles southwest of Bernalillo, Sandoval County, 3.5 miles downstream from State Highway 44, and 8.5 miles downstream from Jemez River.

DRAINAGE AREA.--17,300 square miles, approximately (includes 2,940 square miles in closed basin in San Luis Valley, Colo.).

RECORDS AVAILABLE.--Water temperatures: October 1948 to September 1957.

Sediment records: November 1947 to September 1957.

EXTREMES, 1956-57.--Water temperatures: Maximum, 80°F June 28; minimum, freezing point on several days during winter months.

Sediment concentrations: Maximum daily, 34,500 ppm Aug. 5; minimum daily, 64 ppm Oct. 14.

Sediment loads: Maximum daily, 861,000 tons Aug. 5; minimum daily, 1 ton Oct. 1, 2, 4, 13, 14.

EXTREMES, 1947-57.--Water temperatures (1948-57) Maximum, 93°F Aug. 18, 1951; minimum, freezing point on many days during winter months.

Sediment concentrations: Maximum daily, 75,000 ppm Sept. 25, 1955; minimum daily, no flow on several days during July 1956.

Sediment loads: Maximum daily, 1,680,000 tons Sept. 25, 1955; minimum daily, 0 tons on several days during July 1956.

REMARKS.--Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of discharge for water year October 1956 to September 1957 given in WSP 1512. Flow affected by ice Dec. 25 to Jan. 2.

Temperature (°F) of water, water year October 1956 to September 1957  
Once-daily measurement, generally before 12 m.

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	55	40	a43	33	33	47	49	51	b60	66	68	62
2	49	33	37	36	b54	b50	44	59	51	65	68	63
3	a75	a45	34	a37	37	42	42	55	62	73	69	68
4	53	34	34	35	36	48	42	b70	59	64	68	58
5	53	a48	35	b45	35	39	39	56	64	70	65	60
6	b70	34	35	35	34	40	b58	52	65	b74	68	60
7	53	35	36	40	35	39	48	56	60	68	67	b69
8	51	38	38	44	36	42	34	55	b66	65	67	58
9	b65	38	33	47	a52	b55	42	50	60	62	67	60
10	49	--	38	36	42	48	45	51	65	b70	b73	62
11	50	40	36	34	44	49	47	b60	57	65	67	60
12	40	37	39	a46	44	41	48	58	58	62	66	55
13	b50	37	39	45	42	43	--	47	59	b70	68	59
14	47	34	41	48	45	36	53	49	60	67	65	b65
15	43	39	34	40	42	38	48	52	b65	66	65	58
16	50	a42	33	42	44	b55	53	48	58	66	65	58
17	56	a45	36	36	a52	44	50	50	55	66	b70	58
18	a68	33	35	33	45	42	50	b60	72	65	68	58
19	49	a51	35	33	42	42	48	52	74	66	66	56
20	b55	a32	37	a41	44	45	b65	52	68	b67	65	54
21	45	35	33	35	43	48	54	50	70	64	68	b65
22	a64	34	a38	37	47	40	47	60	63	65	75	50
23	43	34	32	35	b48	b48	58	52	--	63	67	55
24	50	a44	34	36	45	35	45	62	62	67	b68	55
25	34	38	31	35	44	34	47	b60	61	65	65	54
26	34	34	32	b45	42	40	46	51	60	66	65	54
27	b57	35	32	35	45	62	b61	52	70	65	66	55
28	48	34	32	38	43	43	51	53	80	67	67	b70
29	47	34	a34	35	--	45	47	56	b72	68	64	59
30	35	34	33	34	--	b55	46	63	70	67	64	53
31	34	--	32	33	--	47	--	52	--	67	b66	--
Average	51	38	35	38	43	45	49	55	64	66	67	59

a Measurement between 12 m. and 6 p. m.  
b Measurement after 6 p. m.



RIO GRANDE BASIN--Continued

RIO GRANDE NEAR BERNALILLO, N. MEX.--Continued

Suspended sediment, water year October 1956 to September 1957--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	224	690	417	1,240	3,250	10,900	4,940	3,730	49,800
2.....	386	1,460	1,520	1,290	2,900	10,100	4,580	4,180	51,700
3.....	342	1,200	1,110	1,540	4,550	18,900	3,080	3,040	25,300
4.....	352	1,120	1,060	2,010	4,950	26,900	4,640	3,280	41,100
5.....	347	1,250	1,170	2,390	6,200	40,000	5,000	3,950	53,300
6.....	347	1,250	1,170	2,270	5,470	33,500	5,240	5,220	73,900
7.....	440	1,660	1,970	2,550	5,200	35,800	5,000	4,330	58,500
8.....	369	1,850	1,840	3,180	6,950	59,700	5,600	4,670	70,600
9.....	263	1,000	710	3,850	7,320	76,100	5,000	2,750	41,600
10.....	263	1,140	810	3,400	6,570	60,300	5,600	3,050	46,100
11.....	247	950	634	4,300	6,320	73,400	5,300	3,750	53,700
12.....	214	1,200	693	4,700	5,430	68,900	5,360	3,750	54,700
13.....	305	1,690	51,500	4,100	6,500	72,000	4,580	3,700	45,800
14.....	680	5,500	10,900	4,300	6,700	77,800	3,850	2,300	27,000
15.....	792	5,100	10,900	3,750	5,340	54,100	3,900	2,750	29,000
16.....	852	5,600	12,900	3,220	4,370	38,000	4,400	2,500	29,700
17.....	1,040	6,150	17,300	2,910	4,480	35,200	4,760	3,100	39,800
18.....	1,300	7,500	26,300	2,910	4,490	35,300	4,400	4,200	49,900
19.....	1,370	5,450	20,200	3,180	4,210	36,100	4,250	3,800	43,600
20.....	1,200	5,800	18,800	2,980	4,170	33,600	4,080	2,900	31,900
21.....	1,480	5,650	22,600	3,360	4,290	38,900	4,200	5,650	64,100
22.....	1,390	5,400	26,300	3,310	4,310	38,500	4,950	3,700	49,500
23.....	1,610	6,000	26,100	3,260	4,110	36,200	4,600	2,200	a 27,000
24.....	1,390	5,200	19,500	3,400	3,820	35,100	4,320	2,400	28,000
25.....	1,280	2,380	8,230	3,130	4,100	34,600	4,000	2,450	26,500
26.....	1,330	2,970	10,700	2,950	3,380	26,900	4,320	5,400	63,000
27.....	1,310	3,150	11,100	3,130	3,480	29,400	4,650	5,800	72,800
28.....	1,500	4,150	16,800	3,080	3,230	26,900	4,900	3,750	49,600
29.....	1,480	3,270	13,100	3,220	2,520	21,900	4,820	3,250	42,300
30.....	1,330	3,050	11,000	3,220	3,030	26,300	4,880	2,600	34,300
31.....	--	--	--	3,750	3,120	31,600	--	--	--
Total.	25,433	--	290,534	95,880	--	1,242,900	139,800	--	1,370,600
Day	July			August			September		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	4,820	2,350	30,600	5,120	4,500	62,200	4,350	13,700	s183,000
2.....	5,000	2,200	29,700	6,230	7,000	118,000	3,180	9,000	77,300
3.....	4,700	2,250	28,600	4,460	5,400	65,000	2,590	5,600	39,200
4.....	6,020	4,260	80,700	3,400	5,800	53,200	3,360	6,200	56,200
5.....	5,880	3,950	62,700	8,160	34,500	s861,000	3,180	4,900	42,100
6.....	5,180	3,050	42,700	6,170	17,200	s176,000	2,830	5,300	40,500
7.....	5,000	2,150	29,000	6,570	26,700	s481,000	2,630	3,800	27,000
8.....	4,520	2,700	33,000	2,430	14,400	94,500	2,830	3,100	23,700
9.....	4,460	2,400	28,900	2,590	5,500	38,500	2,350	2,920	18,500
10.....	4,640	2,700	33,800	4,150	18,000	b200,000	1,840	3,220	16,000
11.....	4,760	2,750	35,300	3,400	12,500	115,000	1,680	2,530	11,500
12.....	5,120	2,600	35,900	2,590	6,200	43,400	1,630	2,670	11,800
13.....	5,120	2,150	29,700	2,830	5,200	39,700	1,600	2,150	9,290
14.....	4,640	2,100	26,300	2,950	6,600	52,600	1,510	2,000	8,150
15.....	3,850	2,000	20,800	3,180	9,390	s84,200	1,800	2,350	11,400
16.....	3,700	5,700	56,900	2,910	9,700	76,200	1,740	2,270	10,700
17.....	4,000	3,200	34,600	2,950	9,400	74,900	1,340	1,770	6,400
18.....	3,900	3,700	39,000	3,310	10,500	93,800	1,270	2,150	7,370
19.....	3,600	3,650	35,500	2,950	10,400	82,800	1,070	1,920	5,550
20.....	3,800	3,800	39,000	2,350	8,700	55,200	1,170	1,860	5,880
21.....	4,100	2,050	22,700	2,040	4,000	22,000	920	1,330	3,200
22.....	3,850	2,100	21,800	2,950	5,700	45,400	630	1,150	1,960
23.....	3,850	2,450	25,500	2,350	6,900	43,800	387	760	794
24.....	3,400	2,500	23,000	3,470	10,900	s135,000	374	510	515
25.....	4,130	6,220	s88,700	3,700	20,800	208,000	344	410	381
26.....	5,050	16,300	s246,000	2,950	10,600	84,400	326	400	352
27.....	3,800	10,800	111,000	2,870	12,600	97,600	309	300	250
28.....	4,400	5,200	61,800	2,500	10,800	75,500	287	180	139
29.....	3,900	4,700	49,500	4,010	10,500	s193,000	436	500	589
30.....	5,000	7,300	98,600	4,350	20,400	240,000	235	130	82
31.....	5,240	5,200	73,600	4,630	9,800	s154,000	--	--	--
Total.	139,450	--	1,574,900	111,570	--	4,165,900	48,198	--	619,902
Total discharge for year (cfs-days) .....									610,664
Total load for year (tons) .....									9,594,163

a Computed from estimated concentration graph.

b Computed from partly estimated concentration graph.

s Computed by subdividing day.

RIO GRANDE NEAR BERNALILLO, N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1956 to September 1957  
(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipet; S, sieve; N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed; V, visual accumulation tube)

Date of collection.	Time	Discharge (cfs)	Water temperature (°F)	Suspended sediment										Methods of analysis			
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters											
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250		0.350	0.500	1.000
Oct. 2, 1956 . . . . .	12:55 p. m.	6	75	109	400	61			65	73	80	84					SPWCM
Oct. 15 . . . . .	1:35 p. m.	7	69	69	--	--			--	--	85	100					S
Oct. 15 . . . . .	2:00 p. m.	12	51	121	580	71			91	98	99	100					SPWCM
Oct. 29 . . . . .	2:00 p. m.	295	38	1,360	4,650	23			40	77	92	98					VPWCM
Nov. 26 . . . . .	3:45 p. m.	250	34	2,900	6,110	8			19	55	81	87					VPWCM
Dec. 11 . . . . .	3:45 p. m.	275	45	1,890	4,050	15			24	56	87	100					VPWCM
Jan. 8, 1957 . . . . .	4:30 p. m.	342	34	2,280	3,030	15			23	49	85	87					VPWCM
Jan. 21 . . . . .	11:30 a. m.																VPWCM
Feb. 5 . . . . .	2:45 p. m.	404	48	1,960	5,360	12			18	59	84	95					VPWCM
Feb. 19 . . . . .	4:20 p. m.	662	50	1,720	3,940	36			53	63	83	97					VPWCM
Mar. 4 . . . . .	3:10 p. m.	434	52	1,830	3,590	20			27	53	95	97					VPWCM
Mar. 18 . . . . .	1:20 p. m.	207	53	1,140	3,540	17			24	43	72	88					VPWCM
Mar. 18 . . . . .	1:50 p. m.	434	54	1,250	3,790	24			34	65	84	100					VPWCM
Apr. 2 . . . . .	1:50 p. m.	760	65	4,940	4,640	35			50	74	95	98					VPWCM
Apr. 15 . . . . .	2:45 p. m.	1,320	59	3,680	3,460	12			16	39	79	93					VPWCM
Apr. 29 . . . . .	3:00 p. m.																VPWCM
May 13 . . . . .	6:00 p. m.	4,460	58	6,320	3,830	16			21	36	79	97					VPWCM
May 16 . . . . .	6:00 p. m.	3,080	60	4,460	3,840	9			13	30	73	97					VPWCM
May 27 . . . . .	3:55 p. m.	3,040	64	2,540	4,020	9			13	32	80	98					VPWCM
June 11 . . . . .	4:00 p. m.	4,860	65	3,570	4,020	10			15	27	64	94					VPWCM
June 24 . . . . .	4:30 p. m.	4,450	73	1,900	4,140	10			12	32	63	95					VPWCM
July 5 . . . . .	1:05 p. m.	4,940	74	3,560	3,580	12			19	44	64	95					VPWCM
Aug. 9 . . . . .	4:15 p. m.	2,560	81	4,520	3,530	38			50	74	90	100					VPWCM
Aug. 30 . . . . .	2:25 p. m.	5,000	69	20,400	3,540	42			59	86	94	99					VPWCM

RIO GRANDE BASIN--Continued  
RIO GRANDE NEAR BERNALILLO, N. MEX.--Continued

Particle-size analyses of bed material, water year October 1956 to September 1957  
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; M, mechanically dispersed;  
N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time	Discharge (cfs)	Number of sampling points	Bed material										Methods of analysis		
				Percent finer than indicated size, in millimeters												
				0.0625	0.125	0.250	0.500	1.000	2.000	4.000	8.000	16.000	32.000			
Apr. 25, 1952	.....	2,820	--	2	11	56	93	98	99	99	99	99	99	100	100	S
May 12	.....	6,490	--	0	2	15	71	94	98	99	99	99	99	100	100	S
June 10	.....	6,120	--	0	3	37	93	99	99	100	100	100	100	100	100	S
June 20	.....	4,780	--	0	3	27	86	95	97	98	98	98	98	100	100	S
June 26	.....	2,800	--	0	3	33	87	98	99	100	100	100	100	100	100	S
July 24	.....	2,080	--	1	6	46	87	98	100	100	100	100	100	100	100	S
Apr. 29, 1953	.....	1,540	15	0	3	29	87	98	99	99	99	99	100	100	100	S
May 5	.....	550	15	1	5	41	82	96	98	99	99	100	100	100	100	S
June 1	.....	2,570	3	1	4	26	87	98	99	100	100	100	100	100	100	S
June 2	.....	2,150	15	1	4	28	87	98	99	99	99	100	100	100	100	S
June 4	.....	2,090	3	0	4	34	74	91	94	94	96	96	97	98	97	S
June 17	.....	1,340	3	0	3	31	88	96	97	97	98	98	99	100	100	S

RIO GRANDE BASIN--Continued  
RIO GRANDE NEAR BERNARDO, N. MEX.

LOCATION.--At gaging station at bridge on U. S. Highway 60, 2 miles east of Bernardo, Socorro County, and 3½ miles upstream from Rio Puerco.  
DRAINAGE AREA.--19,230 square miles, approximately (includes 2,940 square miles in closed basin in San Luis Valley, Colo.).  
RECORDS AVAILABLE.--Chemical analyses: October 1956 to September 1957.

Sediment records: October 1947 to September 1957.

EXTREMES 1956-57.--Dissolved solids: Maximum 787 ppm Nov. 1-27; minimum, 221 ppm July 1-4.

Hardness: Maximum 348 ppm Nov. 1-27; minimum, 120 ppm July 1-4.  
Specific conductance: Maximum daily, 325 micromhos Nov. 16; minimum daily, 325 micromhos July 3.

Sediment loads: Maximum daily, 237,000 tons Aug. 31; minimum daily, 0 tons on many days in October.

EXTREMES 1947-57.--Sediment loads: Maximum daily, 348,000 tons Sept. 26, 1955; minimum daily, 0 tons on many days.

REMARKS.--Chemical records computed from summation of water discharges from all channels. Records of specific conductance of daily samples and daily mean sediment concentrations available in district office at Albuquerque, N. Mex. Records are summation of water and sediment discharges in main channel, conveyance channel, and Bernardo Interior drain. Table for particle-size analyses for conveyance channel is published separately and shows water discharge and concentrations in that channel at the time of sampling. Daily sediment concentrations not listed because a composite concentration of more than one channel is meaningless. Records of discharge for water year October 1956 to September 1957 given in WSP 1512.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (calculated)		Hardness as CaCO <sub>3</sub>		Percent sodium	Sedimentation ratio	Specific conductance (micro-mhos at 25°C)	pH	
														Parts per million	Tons per acre-foot	Calcium	Non-carbonate					
Oct. 25-31, 1956..	a 1.9	37	--	102	19	120	--	263	279	66	--	1.0	--	753	1.02	332	117	44	2.9	1,110	7.8	
Nov. 1-27.....	10.1	50	--	106	20	123	--	284	281	65	--	2.2	--	787	1.07	346	114	44	2.9	1,140	8.1	
Nov. 28-30.....	21.7	51	--	94	17	105	--	263	233	53	--	5.1	--	687	.93	304	89	43	2.6	1,000	8.2	
Dec. 1-3.....	23.0	42	--	103	18	110	--	277	256	57	--	3.1	--	725	.99	331	104	42	2.6	1,070	7.6	
Dec. 4-10.....	61.4	39	--	98	17	91	--	269	223	46	--	3.2	--	649	.88	108	94	39	2.2	963	7.7	
Dec. 11-18.....	165	35	--	89	15	72	--	257	175	35	--	3.4	--	552	.75	246	73	36	1.9	832	7.4	
Dec. 19-31.....	218	34	--	84	13	66	--	244	160	32	--	4.6	--	512	.70	301	263	63	1.8	771	7.7	
Jan. 1-11, 1957..	312	33	--	81	13	60	--	236	143	30	--	3.4	--	479	.65	404	256	34	1.6	727	7.5	
Jan. 12-31.....	397	32	--	74	12	56	--	221	133	28	--	3.0	--	447	.61	479	234	53	34	680	7.7	
Feb. 1-28.....	504	36	0.01	71	13	55	4.1	217	129	28	0.6	1.9	0.16	446	.61	607	230	52	34	664	8.1	
Mar. 1-31.....	231	34	.01	73	15	63	6.1	223	150	32	.2	2.4	.18	484	.66	302	244	61	36	728	8.0	
Apr. 1-17.....	97.5	37	.00	83	18	82	4.7	249	194	43	.6	2.4	.25	589	.80	155	281	77	38	881	7.8	
Apr. 18.....	187	39	.00	83	19	78	5.9	240	--	--	--	--	--	b 562	.76	284	285	88	37	2.0	854	7.8
Apr. 19-20.....	492	29	.04	69	15	49	5.4	217	125	26	.8	2.4	.09	629	.58	732	234	56	31	1.4	652	7.7
Apr. 21-30.....	1,057	27	.04	61	11	37	4.7	188	92	19	.6	1.9	.12	346	.47	987	197	43	26	1.1	533	7.8
May 1-4.....	503	29	.01	62	11	49	5.1	191	114	26	.4	2.3	.12	393	.53	534	200	43	34	1.5	600	7.8
May 5-10.....	2,025	24	.04	55	10	33	4.2	174	60	16	.6	1.1	.10	312	.42	1,710	176	36	28	1.1	483	7.8
May 11-16.....	3,965	23	.03	54	9.0	28	4.5	107	69	15	.6	2.2	.13	287	.39	3,070	172	34	26	.9	443	7.9
May 17-23.....	2,900	22	.04	47	8.5	25	3.9	148	65	11	.6	1.2	.09	237	.35	2,010	152	31	26	.9	402	7.9
May 24-26.....	2,940	20	.06	49	8.8	24	3.2	148	67	15	.4	1.2	.07	252	.36	2,060	156	37	24	.8	412	8.0

May 27-31, 1957 ..	2,478	21	.02	46	8.8	26	4.2	145	66	16	.6	1.2	.07	261	.35	1,750	151	32	27	.9	403	8.0
June 1-30.....	3,829	27	--	48	5.4	23	--	149	55	9.0	--	.6	--	241	.33	2,490	142	20	26	.8	376	8.0
July 1-4.....	3,902	29	--	40	5.0	22	--	120	57	8.0	--	1.1	--	221	.30	2,330	120	22	28	.9	330	8.2
July 5.....	4,980	22	--	72	9.7	25	--	129	156	9	--	.7	--	357	.49	4,800	220	114	20	.7	526	7.6
July 6-19.....	4,274	27	--	46	4.7	23	--	139	60	10	--	.3	--	239	.33	2,760	134	20	27	.9	366	7.9
July 20.....	3,300	24	--	68	8.1	25	--	172	100	9	--	.6	--	320	.44	2,850	203	62	21	.8	483	7.8
July 21-Aug. 5.....	3,942	27	--	54	6.4	28	--	150	82	12	--	.5	--	284	.39	3,020	161	38	27	1.0	433	7.8
Aug. 6.....	6,020	23	--	91	12	19	57	177	219	19	--	1.1	--	509	.69	8,270	276	132	31	1.5	739	8.0
Aug. 7-10.....	3,538	26	--	75	11	39	--	161	164	16	--	.2	--	410	.56	3,920	232	100	27	1.1	610	7.6
Aug. 11-19.....	2,934	28	--	60	7.4	34	--	160	102	15	--	.8	--	326	.44	2,560	180	49	29	1.1	500	7.7
Aug. 20.....	2,140	23	--	91	12	40	--	163	203	18	--	.6	--	468	.64	2,700	276	143	24	1.0	680	7.4
Aug. 21-26.....	2,133	26	--	64	7.8	33	--	170	100	15	--	1.0	--	331	.45	1,910	192	52	27	1.0	507	7.6
Aug. 27-30.....	2,620	24	--	85	11	42	--	160	166	22	--	.8	--	450	.61	3,180	257	126	26	1.1	667	7.6
Aug. 31.....	6,220	25	--	67	7.8	32	--	175	107	15	--	.7	--	340	.46	5,710	199	56	26	1.0	510	7.4
Sept. 1-6.....	3,682	27	--	71	9.0	35	--	196	102	18	1.0	1.2	--	360	.30	3,580	214	54	26	1.0	540	7.8
Sept. 7-22.....	1,282	31	--	62	6.1	34	--	191	64	15	--	1.1	--	329	.45	1,140	168	32	28	1.1	499	7.7
Sept. 23-30.....	1,359	38	--	75	11	60	--	223	139	27	--	1.6	--	462	.64	448	232	50	36	1.7	698	7.7
Weighted average	c 1,514	27	--	57	7.7	31	--	162	86	14	--	1.0	--	304	0.41	1,240	174	40	28	1.0	464	--

a No flow Oct. 1-24.

b Residue on evaporation at 180° C.

c Average for 341 days of flow.

## WESTERN GULF OF MEXICO BASINS

## RIO GRANDE BASIN--Continued

## RIO GRANDE NEAR BERNARDO, N. MEX.--Continued

Suspended sediment, water year October 1956 to September 1957

Day	October			November			December		
	Suspended sediment			Suspended sediment			Suspended sediment		
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1.....	0		0	3		(t)	18		4
2.....	0		0	5		1	20		6
3.....	0		0	5		1	31		14
4.....	0		0	7		1	47		48
5.....	0		0	8		1	49		51
6.....	0		0	6		1	54		42
7.....	0		0	7		(t)	57		45
8.....	0		0	8		1	67		79
9.....	0		0	8		1	65		67
10.....	0		0	7		(t)	91		290
11.....	0		0	8		(t)	120		641
12.....	0		0	8		1	142		756
13.....	0		0	9		1	140		566
14.....	0		0	9		2	156		740
15.....	0		0	10		1	174		924
16.....	0		0	12		s 3	192		1,110
17.....	0		0	13		3	198		1,020
18.....	0		0	13		2	198		916
19.....	0		0	12		1	203		939
20.....	0		0	10		1	207		913
21.....	0		0	12		s 4	216		1,020
22.....	0		0	15		s 5	221		1,020
23.....	0		0	15		2	227		984
24.....	0		0	15		2	232		1,190
25.....	1		(t)	18		3	228		1,200
26.....	1		(t)	16		4	234		1,060
27.....	1		(t)	15		2	220		978
28.....	2		(t)	24		s 18	197		660
29.....	2		(t)	22		22	197		602
30.....	3		(t)	19		8	220		867
31.....	3		(t)	--		--	232		971
Total.	13		1	339		94	4,653		19,723
	January			February			March		
1.....	240		979	366		1,540	524		3,730
2.....	261		1,300	344		1,370	479		4,360
3.....	305		1,960	342		1,260	539		3,600
4.....	353		2,480	339		1,270	373		1,800
5.....	348		2,190	334		1,190	317		1,380
6.....	321		1,800	359		1,130	305		1,330
7.....	315		1,560	404		1,520	308		1,340
8.....	321		1,610	389		1,460	283		1,190
9.....	321		1,530	374		1,310	253		1,210
10.....	313		1,410	366		1,300	232		824
11.....	335		1,630	356		1,280	191		586
12.....	478		4,390	349		1,270	187		554
13.....	448		3,400	359		1,360	202		534
14.....	403		2,340	389		1,510	198		432
15.....	388		2,000	494		2,580	182		328
16.....	403		2,160	614		4,550	187		416
17.....	403		2,240	679		7,760	149		262
18.....	419		2,420	732		8,710	181		365
19.....	463		3,100	836		10,300	179		s 522
20.....	464		3,060	732		8,280	169		253
21.....	419		2,380	662		6,320	212		393
22.....	389		2,080	629		5,300	190		251
23.....	374		1,870	614		4,660	190		269
24.....	363		1,820	614		4,610	176		218
25.....	373		1,800	599		3,980	134		146
26.....	359		1,530	599		3,780	189		416
27.....	329		1,300	614		3,990	152		215
28.....	352		1,620	629		4,780	157		278
29.....	363		1,560	--		--	136		188
30.....	365		1,610	--		--	106		100
31.....	388		1,910	--		--	79		53
Total.	11,376		63,039	14,117		98,370	7,161		27,743

s Computed by subdividing day.

t Less than 0.50 ton.

RIO GRANDE BASIN--Continued

RIO GRANDE NEAR BERNARDO, N. MEX.--Continued

Suspended sediment, water year October 1956 to September 1957--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	91		73	572		2,750	3,220		29,200
2.....	97		s 83	502		2,120	3,960		32,500
3.....	112		113	410		2,160	3,910		30,100
4.....	141		176	527		3,780	3,570		28,600
5.....	146		206	1,000		10,700	4,310		36,300
6.....	151		198	1,610		s 23,800	4,010		28,000
7.....	131		167	1,390		16,700	4,470		30,700
8.....	130		156	2,050		23,200	4,230		26,400
9.....	111		132	2,810		42,200	4,460		30,400
10.....	116		135	3,290		40,800	4,780		31,900
11.....	85		76	3,450		39,900	4,760		32,000
12.....	70		37	3,750		44,400	4,480		30,600
13.....	58		18	5,080		62,100	4,510		29,200
14.....	45		9	4,280		47,300	4,190		26,200
15.....	46		9	3,880		36,800	3,740		20,600
16.....	56		45	3,350		a 31,000	3,740		21,400
17.....	72		130	2,950		28,700	4,340		26,900
18.....	187		s 1,700	2,450		17,300	3,860		24,100
19.....	459		s 6,950	2,690		21,900	3,280		18,800
20.....	806		12,500	3,000		22,600	2,960		15,600
21.....	912		13,000	3,060		22,400	3,130		18,000
22.....	1,040		14,900	3,180		24,200	3,490		23,400
23.....	953		s 11,800	2,970		23,700	3,650		23,300
24.....	1,110		s 15,800	3,070		29,000	3,790		21,300
25.....	1,130		s 13,400	2,810		27,300	3,150		15,800
26.....	1,040		11,200	2,940		27,700	2,970		15,200
27.....	1,110		10,100	2,760		23,700	3,170		14,400
28.....	1,090		10,800	2,420		19,000	3,440		20,400
29.....	1,750		s 13,200	2,350		18,000	3,500		20,900
30.....	932		6,580	2,230		18,600	3,800		19,100
31.....	--		--	2,630		24,800	--		--
Total.	13,677		143,693	79,461		778,610	114,870		741,300
		July		August			September		
1.....	4,140		19,700	4,290		39,100	5,870		164,000
2.....	3,780		20,200	4,480		41,400	4,660		108,000
3.....	3,830		19,900	4,900		56,800	2,850		58,300
4.....	3,860		20,200	5,080		56,200	2,660		39,800
5.....	4,980		60,300	3,320		37,400	3,170		35,200
6.....	5,470		50,800	6,020		174,000	2,880		a 26,000
7.....	4,550		32,100	3,760		89,400	2,480		22,400
8.....	4,850		31,900	4,930		162,000	2,150		20,800
9.....	3,870		21,100	2,540		65,700	2,120		17,800
10.....	3,430		16,700	2,920		56,400	1,580		12,500
11.....	4,620		26,400	4,040		83,100	1,520		13,300
12.....	5,050		23,300	2,920		60,700	1,330		8,790
13.....	4,920		21,600	2,630		39,000	1,160		7,040
14.....	4,950		27,000	2,770		45,300	1,090		7,380
15.....	4,380		18,300	3,060		s 49,200	1,040		6,000
16.....	3,700		15,300	3,090		s 101,000	1,140		sb 6,600
17.....	3,300		13,900	2,470		53,400	1,010		b 5,800
18.....	3,340		14,400	2,750		59,100	824		4,310
19.....	3,410		18,200	2,680		74,500	789		3,800
20.....	3,300		58,100	2,140		54,500	827		4,090
21.....	3,900		34,800	1,640		s 32,600	756		3,230
22.....	3,070		20,500	1,530		b 19,000	701		2,910
23.....	2,660		20,200	1,730		sb 27,000	616		1,810
24.....	2,730		20,500	1,800		b 32,000	510		1,020
25.....	3,420		26,400	3,430		s 95,500	398		439
26.....	4,900		55,200	2,670		90,600	327		242
27.....	4,760		108,000	2,510		67,900	274		278
28.....	3,560		54,400	2,210		41,700	269		464
29.....	3,600		31,500	1,890		38,600	260		302
30.....	3,670		32,400	3,870		s 160,000	219		256
31.....	4,730		43,000	6,220		232,000	--		--
Total.	124,730		976,300	100,290		2,235,100	45,480		582,861

Total discharge for year (cfs-days)..... 516,167  
 Total load for year (tons)..... 5,666,834

s Computed by subdividing day.  
 a Computed from partly estimated concentration graph.  
 b Computed from estimated concentration graph.

RIO GRANDE BASIN--Continued  
RIO GRANDE NEAR BERNARDO, N. MEX.--Continued  
CONVEYANCE CHANNEL

Particle-size analyses of suspended sediment, water year October 1956 to September 1957  
(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipet; S, sieve; N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed; V, visual accumulation tube)

Date of collection	Time	Discharge (cfs)	Water temperature (°F)	Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Suspended sediment										Methods of analysis	
						Percent finer than indicated size, in millimeters											
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.350	0.500		1.000
Dec. 13, 1956	1:30 p.m.	130	44	1,380	3,650	64	82				95	97	100				SPWCM
Jan. 14, 1957	10:30 a.m.	412	45	1,990	3,915	40	51				77	93	100				VPWCM
Feb. 1	12:30 p.m.	360	40	1,560	2,420	34	45				63	76	98				VPWCM
Feb. 16	6:00 p.m.	628	57	2,780	3,340	45	58				81	92	100				VPWCM
Feb. 19	6:00 p.m.	818	51	4,430	4,525	54	65				82	92	99				VPWCM
Mar. 9	2:00 p.m.	272	57	2,000	3,810	52	62				67	71	77				VPWCM
Mar. 20	1:30 p.m.	154	50	580	--	--	--				75	83	99				V
Apr. 6	2:00 p.m.	154	60	562	--	--	--				91	95	100				S
Apr. 16	7:00 a.m.	44	52	86	--	--	--				91	96	100				S
Apr. 24	12:05 p.m.	1,000	53	5,400	4,820	40	63				78	87	98				VPWCM
May 1	2:45 p.m.	550	88	1,850	4,270	41	55				79	88	97				VPWCM
May 8	7:00 a.m.	1,900	59	4,370	4,340	38	51				81	91	99				VPWCM
May 10	3:00 p.m.	1,680	83	4,830	4,380	40	58				85	90	98				VPWCM
June 5	6:00 p.m.	1,490	80	3,470	3,730	26	34				73	92	98				VPWCM
June 11	5:00 p.m.	1,690	67	3,100	4,880	19	28				57	83	96				VPWCM
June 14	11:50 a.m.	1,630	67	4,290	3,790	16	22				44	62	72				VPWCM
June 26	5:00 p.m.	1,140	82	2,540	4,500	15	27				58	87	97				VPWCM
Sept. 5	5:30 p.m.	1,570	75	4,520	3,800	26	41				72	91	98				VPWCM
Sept. 20	5:00 p.m.	856	69	1,950	2,850	16	24				48	87	100				VPWCM

Particle-size analyses of bed material, water year October 1956 to September 1957

Date of collection	Time	Discharge (cfs)	Number of sampling points	Bed material										Methods of analysis			
				Percent finer than indicated size, in millimeters													
				0.0025	0.0125	0.025	0.05	0.1	0.2	0.4	0.8	1.6	3.2				
Apr. 24, 1957	12:05 a.m.	1,000	3	2	13	74	100	--	--	--	--	--	--	--	--	--	S
May 1	2:45 p.m.	550	3	1	4	45	97	99	99	99	99	100					S
May 10	3:00 p.m.	1,680	3	1	3	44	94	100	--	--	--	--					S
June 14	11:50 a.m.	1,630	3	0	2	20	82	89	100	100							S



RIO GRANDE BASIN--Continued  
 RIO PUERCO NEAR BERNARDO, N. MEX.

LOCATION.--At gaging station at bridge on U. S. Highway 85, 1.2 miles southwest of Bernardo, Socorro County, 3 miles upstream from mouth, and 18 (revised) miles south of Belen.

DRAINAGE AREA.--5,860 square miles, approximately.

RECORDS AVAILABLE.--Sediment records: October 1947 to September 1957.

EXTREMES, 1956-57.--Sediment concentrations: Maximum daily, 230,000 ppm July 26; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 2,240,000 tons Aug. 7; minimum daily, 0 tons on many days.

EXTREMES, 1947-57.--Sediment concentrations: Maximum daily, 230,000 ppm July 26, 1957; minimum daily, no flow on many days each year.

Sediment loads: Maximum daily, 2,240,000 tons Aug. 7, 1957; minimum daily, 0 tons on many days each year.

REMARKS.--Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. No flow October to April; tabulation omitted for this period. Records of discharge for water year October 1956 to September 1957 given in WSP 1512.

REVISIONS.--Revised figures of mean discharge, mean concentration, and tons per day for water year 1948, 1949, superseding figures published in WSP 1133 and WSP 1163 are given herewith:

WSP 1133 - 1948 water year			
Date	Mean discharge (cfs)	Mean concentration (percent)	Tons per day
Apr. 23, 1948 .....	12	9.35	3,250
Total for April..	321	--	85,980
Total discharge for year (cfs-days).....			5,283
Total load for year (tons).....			1,634,000

WSP 1163 - 1949 water year			
Date	Mean discharge (cfs)	Mean concentration (percent)	Tons per day
June 12, 1949 .....	15	8.08	5,470
June 19 .....	7	5.86	2,110
June 24 .....	23	8.55	87,150
Total for June..	53	--	16,850
Total discharge for year (cfs-days).....			14,246
Total load for year (tons).....			5,760,000

s Computed by subdividing day.

RIO GRANDE BASIN--Continued  
 RIO PIERCO NEAR BERNARDO, N. MEX.--Continued  
 Chemical analyses, in parts per million, June to August 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carb- onate (CO <sub>3</sub> )	Sul- fate (SO <sub>4</sub> )	Chlo- ride (Cl)	Fluo- ride (F)	Ni- trate (NO <sub>3</sub> ) (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Per- cent so- lution ratio	So- lution ratio	Specific conductance (micro- mhos at 25°C)	pH	
														Parts per million	Tons per acre-foot	Tons per day	Calcium	Non-carbonate					
June 4, 1957.....	146	--	--	232	46	301	--	219	--	--	52	--	--	--	1,970	2.68	777	768	588	46	4.7	2,420	7.3
July 27.....	3,450	--	--	138	28	188	--	119	--	71	--	--	--	--	1,190	1.62	11,080	460	362	47	3.6	1,600	7.7
Aug. 7.....	5,010	23	--	--	--	39	--	165	--	12	--	--	--	--	--	--	--	222	87	28	1.1	384	8.0
Aug. 22.....	30	11	--	--	--	246	--	139	--	56	--	--	--	--	--	--	--	538	444	49	4.5	1,900	7.6
Aug. 30.....	1,400	11	--	--	--	220	--	172	--	82	--	--	--	--	--	--	--	710	569	40	3.6	2,120	8.0

## RIO GRANDE BASIN--Continued

## RIO PUERCO NEAR BERNARDO, N. MEX.--Continued

Suspended sediment, water year October 1956 to September 1957

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....				0	--	0	2	6,400	sa 410
2.....				0	--	0	32	78,000	a 7,000
3.....				0	--	0	34	74,500	7,090
4.....				0	--	0	146	100,000	sa 72,000
5.....				0	--	0	95	120,000	a 33,000
6.....				0	--	0	39	110,000	a 12,000
7.....				0	--	0	31	95,000	8,540
8.....				0	--	0	21	77,600	4,560
9.....				0	--	0	15	52,000	2,180
10.....				0	--	0	14	73,000	2,860
11.....				0	--	0	15	74,000	3,110
12.....				0	--	0	24	75,000	5,040
13.....				13	87,000	sa 3,200	151	124,000	s 44,600
14.....				9	85,000	a 2,100	72	90,000	18,800
15.....				11	70,000	a 2,200	25	75,000	5,250
16.....				3	23,000	a 190	10	72,600	2,030
17.....				1	7,000	a 20	7	73,000	1,430
18.....				0	--	0	5	56,000	784
19.....				0	--	0	2	43,000	241
20.....				0	--	0	133	74,000	s 52,500
21.....				0	--	0	50	78,800	s 13,800
22.....				0	--	0	17	57,500	2,740
23.....				0	--	0	3	28,500	231
24.....				0	--	0	1	4,200	11
25.....				0	--	0	0	--	0
26.....				1	--	e 20	0	--	0
27.....				0	--	0	0	--	0
28.....				0	--	0	0	--	0
29.....				0	--	0	0	--	0
30.....				0	--	0	0	--	0
31.....				0	--	0	0	--	0
Total.	0	0	0	38	--	7,730	944	--	306,207
	July			August			September		
1.....	0	--	0	138	87,400	33,800	2,000	114,000	746,000
2.....	0	--	0	450	108,000	s 213,000	1,520	135,000	s 623,000
3.....	0	--	0	623	94,200	s 180,000	302	76,000	64,300
4.....	245	35,000	sa 220,000	253	104,000	s 88,200	107	56,000	16,800
5.....	913	160,000	sa 490,000	921	174,000	s 499,000	51	51,000	7,280
6.....	53	56,800	s 8,420	1,550	140,000	s 651,000	23	47,400	3,050
7.....	6	19,800	s 510	5,010	149,000	2,240,000	6	41,500	697
8.....	0	--	0	3,130	164,000	s 1,590,000	1	12,500	34
9.....	0	--	0	1,110	120,000	386,000	0	--	0
10.....	0	--	0	460	91,000	121,000	0	--	0
11.....	0	--	0	539	107,000	s 186,000	0	--	0
12.....	0	--	0	145	73,500	29,800	0	--	0
13.....	0	--	0	38	52,000	5,530	0	--	0
14.....	3	--	e 80	10	45,000	1,280	0	--	0
15.....	0	--	0	163	99,200	a 53,800	0	--	0
16.....	442	68,600	s 149,000	278	128,000	103,000	0	--	0
17.....	170	72,000	s 42,800	633	144,000	s 286,000	0	--	0
18.....	65	60,600	s 13,800	1,710	208,000	s 861,000	0	--	0
19.....	110	83,300	s 27,900	2,190	138,000	s 942,000	0	--	0
20.....	37	73,900	7,660	376	89,000	s 100,000	0	--	0
21.....	20	79,000	4,420	97	63,000	17,100	0	--	0
22.....	19	81,000	4,310	30	58,000	4,870	0	--	0
23.....	4	90,000	1,040	15	56,500	2,370	0	--	0
24.....	87	45,900	s 26,000	177	78,100	s 70,200	0	--	0
25.....	36	31,700	s 10,600	1,070	148,000	s 549,000	0	--	0
26.....	1,100	230,000	s 806,000	1,950	141,000	s 926,000	0	--	0
27.....	3,450	127,000	sl, 260,000	308	92,400	82,500	0	--	0
28.....	2,770	142,000	sl, 290,000	100	70,500	19,700	0	--	0
29.....	793	92,100	s 228,000	87	62,000	15,100	0	--	0
30.....	210	51,000	30,000	1,400	94,500	s 570,000	0	--	0
31.....	109	52,500	18,000	b 2,750	102,000	s 844,900	--	--	0
Total.	10,642	--	4,634,540	27,711	--	11,651,230	4,010	--	1,461,161
Total discharge for year (cfs-days).....	43,346								
Total load for year (tons).....	18,094,888								
e Estimated.	a Computed from estimated concentration graph.								
s Computed by subdividing day.	b Revised in WSP 1632								



## WESTERN GULF OF MEXICO BASINS

## RIO GRANDE BASIN--Continued

## RIO SALADO NEAR SAN ACACIA, N. MEX.

LOCATION.--At gaging station, 1 mile upstream from mouth, 2 miles northeast of San Acacia, Socorro County, 1.7 miles downstream from bridge on U. S. Highway 85, and 15 miles north of Socorro.

DRAINAGE AREA.--1,380 square miles, approximately.

RECORDS AVAILABLE.--Chemical analyses: July 1956 to September 1957 (intermittent).

Sediment records: July 1948 to June 1956 (daily). July 1956 to September 1957 (intermittent).

EXTREMES, 1948-56.--Sediment concentrations: Maximum daily, 182,000 ppm Aug. 13, 1953; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 793,000 tons Aug. 13, 1953; minimum daily, 0 tons on many days.

REMARKS.--Records of discharge for water year October 1956 to September 1957 given in WSP 1512.

REVISIONS.--Revised figures of mean discharge, mean concentration, and tons per day for water years 1948, 1949, superseding figures published in WSP 1133 and WSP 1163 are given herewith.

## WSP 1133 - 1948 water year

Date	Mean discharge (cfs)	Mean concentration (percent)	Tons per day
Aug. 1, 1948.....	15	9.22	4,010
Total for August.....	61.7	--	19,390
Total discharge for year (cfs-days) .....			832.4
Total load for year (tons).....			279,600

## WSP 1163 - 1949 water year

Date	Mean discharge (cfs)	Mean concentration (percent)	Tons per day
Oct. 14, 1948.....	143	2.41	s 53,300
Oct. 15.....	98	9.28	s 28,000
Oct. 20.....	14	4.35	s 4,780
Total for October.....	278	--	88,980
May 12, 1949.....	127	8.40	s 33,300
Total for May.....	158	--	41,940
July 13, 1949.....	451	13.6	s 258,000
July 14.....	94	7.67	s 27,900
July 23.....	492	11.2	s 247,000
July 24.....	30	7.2	6,050
Total for July.....	1,486	--	664,700
Aug. 3, 1949.....	181	8.58	s 71,900
Aug. 4.....	2	4.40	246
Aug. 6.....	0	--	0
Aug. 7.....	0	--	0
Aug. 8.....	160	10.7	s 111,000
Aug. 9.....	32	7.00	6,270
Aug. 18.....	36	8.46	s 14,000
Aug. 24.....	1	4.25	s 468
Aug. 25.....	4	10.2	1,180
Aug. 26.....	0	--	0
Aug. 27.....	0	--	0
Aug. 28.....	0	--	0
Total for August.....	437	--	208,600
Sept. 1, 1949.....	267	8.88	s 136,000
Sept. 6.....	21	2.19	s 7,770
Sept. 9.....	109	8.11	s 57,500
Sept. 10.....	72	8.62	s 17,600
Sept. 15.....	186	7.87	s 59,900
Sept. 30.....	223	7.14	s 55,900
Total for September.....	1,188	--	464,800
Total discharge for year (cfs-days).....			3,561
Total suspended sediment load for year (tons).....			1,469,000

s Computed by subdividing day.

RIO GRANDE BASIN--Continued  
 RIO SALADO NEAR SAN ACACIA, N. MEX.--Continued  
 Chemical analyses, in parts per million, March to August 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Boron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>	Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
														Parts per million	Tons per acre-foot				
Mar. 20, 1957	3	--	--	--	--	--	--	--	--	--	--	--	--	0.80	1,740	--	--	1,470	--
July 26	1,100	--	75	13	91	--	--	163	--	35	--	--	--	586	240	107	45	849	7.5
Aug. 5 (11:00 a.m.)	a 417	--	108	25	72	72	72	420	36	36	71	--	58,300	372	28	30	1.6	944	7.2
Aug. 5 (5:00 p.m.)	a 168	18	--	--	73	73	367	30	30	30	39	--	158,000	420	119	27	1.6	1,050	7.4
Aug. 22	160	21	--	--	67	67	288	32	32	32	952	--	103,000	385	149	27	1.5	922	7.2
Aug. 30	175	20	--	--	97	97	188	46	46	46	790	--	123,000	460	306	31	2.0	1,200	7.8

a Discharge at time of sampling.

Periodic determinations of suspended-sediment discharge, water year October 1956 to September 1957

Date of collection	Time	Discharge (cfs)	Mean concentration (ppm)	Discharge (tons per day)
Mar. 20, 1957	10:00 a.m.	8	67,700	1,520
Mar. 20	2:30 p.m.	6	35,700	600
July 11	--	71	58,300	11,600
July 16	--	232	158,000	110,000
July 18	--	39	103,000	11,600
July 24	8:30 a.m.	952	123,000	340,000
July 24	9:30 a.m.	790	124,000	284,000
July 26	7:30 a.m.	1,900	119,000	656,000
July 26	8:30 a.m.	1,800	120,000	626,000
Aug. 5	--	196	105,000	47,800
Aug. 8	--	335	103,000	100,000
Aug. 22	--	746	131,000	283,000
Aug. 30	11:30 a.m.	952	89,400	247,000
Aug. 30	12:30 p.m.	468	102,000	138,000



RIO GRANDE BASIN--Continued

RIO GRANDE CONVEYANCE CHANNEL BELOW HEADING, NEAR SAN MARCIAL, N. MEX.

LOCATION.--At heading structure, 1,250 feet upstream from gaging station, 6 miles upstream from former site of San Marcial, Socorro County, and 13.4 miles southwest of San Antonio.

RECORDS AVAILABLE.--Water temperatures: March 1954 to June 1957 (discontinued).

Sediment records: March 1954 to June 1957 (discontinued).

EXTREMES, 1956-57.--Water temperatures: Maximum, 83°F June 25, 26, 28, 30; minimum, not determined.

Sediment concentrations: Maximum daily, 12,800 ppm Apr. 22; minimum daily, not determined.

Sediment loads: Maximum daily, 20,800 tons Apr. 26; minimum daily, not determined.

EXTREMES, 1954-57.--Water temperatures: Maximum, 90°F June 12, 1955; minimum, freezing point on several days.

Sediment concentrations: Maximum daily, 138,000 ppm Aug. 4, 1956; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 294,000 tons July 28, 1955; minimum daily, 0 tons on many days.

REMARKS.--Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of discharge for period October 1956 to June 1957 given in WSP 1512.

Temperature (°F) of water, December 1956 to June 1957  
Once-daily measurement, generally between 11 a. m. and 6 p. m.

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1			--	38	52	58	66	68	70			
2			--	46	48	58	--	74	74			
3			--	38	58	54	50	78	73			
4			--	44	46	54	54	74	74			
5			--	45	54	55	a 61	68	78			
6			--	48	50	58	63	72	75			
7			--	47	46	61	85	70	75			
8			--	49	58	66	62	66	74			
9			--	51	55	56	--	73	75			
10			--	41	55	58	65	69	71			
11			--	55	65	a 61	--	62	68			
12			--	a 48	56	63	--	60	72			
13			--	50	62	64	--	65	75			
14			--	60	60	59	--	69	73			
15			38	58	59	58	--	64	73			
16			35	58	48	60	--	66	75			
17			43	52	52	60	--	68	69			
18			47	45	48	62	--	68	74			
19			41	48	54	54	--	68	74			
20			45	48	56	48	--	65	78			
21			45	a 50	--	62	65	67	74			
22			35	48	60	53	a 53	64	78			
23			48	48	--	48	56	68	78			
24			36	55	53	--	64	68	79			
25			38	52	54	56	64	68	83			
26			40	49	58	60	63	72	83			
27			45	50	60	58	64	70	80			
28			48	48	60	58	56	75	83			
29			39	a 42	--	58	54	75	b 75			
30			48	51	--	58	68	78	83			
31			41	44	--	71	--	69	--			
Average			--	49	55	58	--	69	76			

a Measurement before 11 a. m.

b Measurement after 6 p. m.

## RIO GRANDE BASIN--Continued

RIO GRANDE CONVEYANCE CHANNEL BELOW HEADING, NEAR SAN MARCIAL, N. MEX.--Continued

Suspended sediment, October 1956 to June 1957

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	2.9			4.8			9.5		
2.....	3.4			5.4			9.8		
3.....	3.2			8.9			9.8		
4.....	3.2			8.8			9.7		
5.....	3.8			7.1			9.9		
6.....	3.3			6.5			9.8		
7.....	3.4			6.2			9.8		e 8
8.....	3.2			6.6			11		
9.....	3.7			6.8			9.6		
10.....	4.4			6.8			9.6		
11.....	4.3			6.7			9.7		
12.....	4.1			6.8			11		
13.....	4.8			7.4			14	--	a 40
14.....	4.8			9.3			33	--	b 200
15.....	5.1			7.8			43	2,320	269
16.....	5.2			7.9			44	2,680	318
17.....	5.2			7.6			56	2,880	435
18.....	5.5			7.6			77	4,850	1,010
19.....	3.7			7.3			78	3,400	716
20.....	3.8			8.1			78	3,140	661
21.....	3.8			7.5			80	3,920	847
22.....	3.7			8.2			84	3,620	821
23.....	3.3			7.6			94	5,180	1,310
24.....	3.9			7.7			58	4,300	673
25.....	4.7			7.8			40	1,510	163
26.....	4.8			7.8			40	1,740	188
27.....	4.6			8.1			39	1,160	122
28.....	4.7			9.9			47	2,820	358
29.....	4.5			9.3			65	2,700	474
30.....	5.1			9.6			66	4,620	823
31.....	4.9			--			82	5,680	1,260
Total.	129.0		e 120	227.9		e 180	1,237.2	--	10,784
	January			February			March		
1.....	121	6,460	2,110	234	5,880	3,710	440	8,980	10,700
2.....	186	7,130	3,580	234	6,170	3,900	388	8,180	8,570
3.....	159	7,650	3,280	231	5,660	3,530	366	10,500	10,400
4.....	177	7,210	3,450	215	5,340	3,100	431	12,000	14,000
5.....	192	7,880	4,080	208	5,550	3,120	312	8,010	6,750
6.....	191	7,820	4,030	204	5,670	3,120	270	7,720	5,630
7.....	171	8,090	3,740	217	6,700	3,930	259	7,350	5,140
8.....	161	7,930	3,450	230	5,990	3,720	231	6,330	3,950
9.....	155	6,730	2,820	234	6,080	3,840	233	6,540	3,940
10.....	164	6,240	2,760	223	6,170	3,710	227	7,440	4,560
11.....	173	6,630	3,100	218	6,130	3,610	194	6,140	3,220
12.....	170	7,320	3,360	204	6,270	3,450	140	8,230	3,110
13.....	214	9,870	5,700	210	5,580	3,160	128	5,440	1,860
14.....	245	8,770	5,800	224	6,120	3,700	133	6,170	2,220
15.....	221	6,950	4,150	239	6,800	4,390	137	5,800	2,150
16.....	171	8,540	3,940	272	8,490	6,240	123	4,730	1,570
17.....	186	7,200	3,620	343	9,400	8,710	120	4,330	1,400
18.....	191	8,300	4,280	433	11,900	13,900	99	5,110	1,370
19.....	225	9,040	5,490	482	9,840	12,800	105	5,130	1,450
20.....	253	8,790	6,000	568	11,100	17,000	123	5,600	1,860
21.....	264	9,230	6,580	558	9,640	14,500	131	6,320	2,240
22.....	266	10,200	7,330	494	9,790	13,100	124	6,190	2,070
23.....	247	7,800	5,200	454	9,740	11,900	121	6,490	2,120
24.....	226	7,310	4,460	452	9,940	12,100	151	5,450	2,220
25.....	228	7,200	4,430	436	9,680	11,400	146	5,250	2,070
26.....	214	7,590	4,390	424	11,000	12,600	91	2,780	683
27.....	201	5,910	3,210	441	9,250	11,000	90	4,760	1,160
28.....	202	5,520	3,010	439	9,100	10,800	98	4,300	1,140
29.....	199	5,720	3,070	--	--	--	79	2,330	497
30.....	222	5,940	3,560	--	--	--	69	2,480	462
31.....	220	4,230	2,510	--	--	--	44	1,840	219
Total.	6,215	--	126,490	9,121	--	210,040	5,593	--	108,751

e Estimated.

a Computed from water-sediment discharge curve.

b Computed from estimated concentration graph.

## RIO GRANDE BASIN--Continued

## RIO GRANDE CONVEYANCE CHANNEL BELOW HEADING, NEAR SAN MARCIAL, N. MEX.--Continued

Suspended sediment, October 1956 to June 1957--Continued

Day	April			May			June		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day
1. ....	35	1,200	113	751	8,500	17,200	1,050	2,420	6,860
2. ....	23	960	b60	391	6,910	7,290	1,130	2,030	6,190
3. ....	25	728	49	298	4,880	3,930	1,240	1,780	5,960
4. ....	33	1,560	139	231	5,080	3,070	1,110	1,970	5,900
5. ....	68	4,430	813	289	6,700	5,230	990	3,080	8,250
6. ....	48	1,870	242	660	9,800	17,500	991	3,550	9,500
7. ....	35	1,210	114	929	6,820	17,100	1,100	2,810	8,350
8. ....	29	1,500	117	1,110	4,610	13,800	1,140	1,960	6,030
9. ....	27	1,100	b80	1,270	4,280	14,700	1,150	1,730	5,370
10. ....	24	650	42	1,270	4,400	15,100	1,150	1,740	5,400
11. ....	22	600	b38	1,090	2,730	8,030	1,280	1,760	6,080
12. ....	23			913	3,140	7,740	1,440	1,680	6,530
13. ....	26			1,060	4,180	12,000	1,430	1,660	6,410
14. ....	20			1,320	2,460	8,770	1,430	3,400	13,100
15. ....	23			1,420	2,920	11,200	1,400	2,430	9,190
16. ....	26			1,220	2,720	8,960	1,380	1,880	7,000
17. ....	24	1,220	2,380	7,840	1,310	1,660	5,870		
18. ....	24	1,140	2,060	6,340	1,320	1,460	5,200		
19. ....	24	1,090	1,840	5,420	1,340	1,330	4,810		
20. ....	21	1,020	1,800	4,960	1,320	1,360	4,850		
21. ....	177	8,450	s 6,030	1,060	1,910	5,470	1,270	4,100	14,100
22. ....	414	12,800	14,300	1,040	2,060	5,780	1,240	2,600	8,700
23. ....	606	11,400	18,700	1,110	1,980	5,930	1,270	1,800	6,170
24. ....	743	9,640	19,300	1,120	2,140	6,470	1,310	2,000	7,070
25. ....	931	8,200	20,600	1,130	2,020	6,160	1,350	1,400	5,100
26. ....	1,000	7,710	20,800	1,110	1,730	5,180	1,360	1,320	4,850
27. ....	766	8,800	18,200	1,110	1,780	5,330	1,410	1,330	5,060
28. ....	663	8,400	15,000	1,090	1,540	4,530	1,450	1,280	5,010
29. ....	724	8,700	17,000	1,050	2,050	5,810	1,430	1,240	4,790
30. ....	861	7,260	16,900	952	2,280	5,860	1,400	1,120	4,230
31. ....	--	--	--	948	2,480	6,350	--	--	--
Total ..	7,465	--	168,979	30,412	--	259,150	38,191	--	201,910

Total discharge for period (cfs-days) ..... 98,591.1

Total load for period (tons) ..... 1,086,404

s Computed by subdividing day.

b Computed from estimated concentration graph.

RIO GRANDE CONVEYANCE CHANNEL BELOW HEADING, NEAR SAN MARCIAL, N. MEX.--Continued

Particle-size analyses of suspended sediment, October 1956 to June 1957  
(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipet; S, sieve; N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed; V, visual accumulation tube)

Date of collection	Time	Discharge (cfs)	Water temperature (°F)	Suspended sediment										Methods of analysis			
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters											
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250		0.350	0.500	1.000
Dec. 15, 1956	10:25 a. m.	42	38	2,320	3,990	--	81	--	--	95	--	99	100	--	--	100	SPWCM
Dec. 19	4:00 p. m.	58	41	3,430	3,770	--	80	--	92	92	--	94	98	100	100	100	VPWCM
Dec. 30	4:45 p. m.	66	48	5,320	3,760	--	43	--	52	52	--	67	80	98	100	100	VPWCM
Jan. 10, 1957	4:15 p. m.	180	41	6,240	4,240	--	55	--	69	69	--	77	90	99	100	100	VPWCM
Jan. 20	2:10 p. m.	253	48	8,790	3,130	--	45	--	55	55	--	68	88	99	100	100	VPWCM
Jan. 27	11:45 a. m.	164	50	5,910	3,880	--	47	--	60	60	--	69	87	99	100	100	VPWCM
Feb. 4	10:00 a. m.	218	46	5,340	3,630	--	44	--	56	56	--	72	88	99	100	100	VPWCM
Feb. 9	11:30 a. m.	242	55	6,080	3,620	--	44	--	59	59	--	76	91	100	100	100	VPWCM
Feb. 17	3:00 p. m.	371	52	8,870	3,710	--	41	--	58	58	--	76	92	99	100	100	VPWCM
Feb. 23	1:55 p. m.	429	55	9,740	3,810	37	44	49	58	69	79	95	100	100	100	100	VPWCM
Feb. 23	1:55 p. m.	429	55	9,740	4,140	2	5	28	58	68	79	95	100	100	100	100	VPWCM
Mar. 2	2:40 p. m.	344	58	8,180	3,340	--	45	--	60	60	--	81	96	100	100	100	VPWCM
Mar. 11	6:05 p. m.	176	61	6,140	4,070	--	38	--	49	49	--	73	91	99	100	100	VPWCM
Mar. 22	3:00 p. m.	137	53	6,120	3,860	--	33	--	45	45	--	68	90	99	100	100	VPWCM
Apr. 4	12:25 p. m.	39	54	1,860	4,040	--	89	--	93	93	--	96	97	100	100	100	VPWCM
Apr. 10	3:10 p. m.	22	65	872	4,160	--	94	--	98	98	--	100	--	--	--	--	PWCM
May 3	3:00 p. m.	310	78	4,770	4,120	--	44	--	58	58	--	79	97	100	100	100	VPWCM
May 11	6:50 a. m.	1,860	63	3,250	3,360	--	82	--	92	92	--	99	100	100	100	100	SPWCM
May 22	11:20 a. m.	1,040	64	2,070	3,740	--	62	--	72	72	--	90	100	100	100	100	VPWCM
May 29	6:50 a. m.	1,660	65	2,060	3,660	--	60	--	71	71	--	90	98	100	100	100	VPWCM
June 2	3:25 p. m.	1,150	72	2,210	4,010	--	62	--	75	75	--	93	98	100	100	100	VPWCM
July 1	3:50 p. m.	1,440	83	948	3,740	--	79	--	96	96	--	98	99	100	100	100	SPWCM

RIO GRANDE BASIN--Continued  
RIO GRANDE CONVEYANCE CHANNEL AT SAN MARCIAL, N. MEX.

LOCATION.--At gaging station 440 feet downstream from grade control at outlet of San Marcial Lake, 150 feet downstream from mouth of drain entering from left side, 1,800 feet west of San Marcial gage on railway bridge, about 18½ miles southwest of San Antonio, and about 1 mile south of the site of former village of San Marcial, Socorro County.

RECORDS AVAILABLE.--Chemical analyses: March 1954 to September 1957.

Water temperatures: March 1954 to September 1957.

Sediment records: March 1954 to September 1957.

EXTREMES, 1956-57.--Dissolved solids: Maximum, 1,810 ppm Oct. 21-31; minimum, 390 ppm July 1-5.

Hardness: Maximum, 489 ppm Oct. 21-31; minimum, 189 ppm July 1-5.

Specific conductance: Maximum daily, 2,860 micromhos Oct. 25; minimum daily, 527 micromhos June 24, July 2.

Water temperatures: Maximum, 91°F July 3; minimum 35°F Nov. 15 Dec. 9, 24, 25.

Sediment concentrations: Maximum daily, 18,600 ppm July 29; minimum daily, 53 ppm Nov. 11.

Sediment loads: Maximum daily, 52,700 tons July 29; minimum daily, 1 ton on several days.

EXTREMES, 1954-57.--Dissolved solids: Maximum, 2,010 ppm Aug. 2-8, 1956; minimum, 390 ppm July 1-5, 1957.

Hardness: Maximum, 948 ppm Aug. 2-8, 1956; minimum, 189 ppm July 1-5, 1957.

Specific conductance: Maximum daily, 2,860 micromhos Oct. 25, 1956; minimum daily, 527 micromhos June 24, July 2, 1957.

Water temperatures: Maximum, 95°F June 21, 22, July 8, 15, 1955; minimum, 33°F Dec. 28, 30, 31, 1954, Dec. 10, 1955; Feb. 2, 1956.

Sediment concentrations: Maximum daily, 76,600 ppm Aug. 12, 1956; minimum daily, no flow on several days in 1956.

Sediment loads: Maximum daily, 234,000 tons July 29, 1955; minimum daily, 0 tons on several days in 1956.

REMARKS.--Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of discharge for water year October 1956 to September 1957 furnished by Santa Fe district office of Surface Water Branch. Records of composite discharge for Rio Grande conveyance channel at San Marcial, and Rio Grande floodway at San Marcial given under Rio Grande at San Marcial in WSP 1512. Quality of water records for Rio Grande floodway given on page 455.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH		
														Parts per million	Tons per acre-foot	Tons per day	Tons per day				Calcium magnesium	Non-carbonate
Oct. 1-20, 1956...	5.13	44	0.01	102	28	336	12	317	412	208	0.7	2.4	0.45	1,380	1.88	370	110	66	7.6	2,140	7.9	
Oct. 21-31 .....	3.52	--	--	130	40	410	--	372	--	--	--	--	--	1,810	2.46	489	184	65	8.1	2,680	7.9	
Nov. 1-21 .....	6.36	--	--	124	32	392	--	337	--	--	--	--	--	1,660	2.26	441	165	66	8.1	2,520	7.9	
Nov. 22-30 .....	6.77	--	--	116	29	342	--	308	--	--	--	--	--	1,460	1.99	408	156	65	7.3	2,250	7.9	
Dec. 1-13 .....	8.78	--	--	124	28	332	--	356	--	--	--	--	--	1,430	1.94	424	149	63	7.0	2,220	7.9	
Dec. 14-31 .....	60.3	--	--	98	18	128	--	252	--	--	--	--	--	769	1.05	318	112	47	3.1	1,150	7.8	
Jan. 1-31, 1957..	224	30	.03	87	14	100	6.5	231	204	73	.7	2.3	.19	641	.87	388	85	43	2.6	965	7.8	
Feb. 1-28 .....	375	--	--	87	15	90	--	234	--	--	--	--	--	618	1.03	278	86	41	3.3	919	7.9	
Mar. 1-31 .....	254	--	--	91	18	122	--	232	--	--	--	--	--	722	.98	495	111	47	3.1	1,100	7.7	
Apr. 1-21 .....	102	--	--	103	23	167	--	247	--	--	--	--	--	922	1.25	352	149	51	3.9	1,400	7.8	
Apr. 22-26 .....	748	--	--	68	15	66	--	195	--	--	--	--	--	480	.65	969	231	71	38	1.9	728	7.9
Apr. 27-30 .....	817	26	--	67	14	64	5.8	196	135	44	--	4.2	.25	462	.63	1,020	64	37	1.9	704	7.7	

RIO GRANDE BASIN--Continued  
 RIO GRANDE CONVEYANCE CHANNEL AT SAN MARCIAL, N. MEX.--Continued

Chemical analyses, in parts per million, water year October 1956 to September 1957.--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Boron (B)	Dissolved solids (residue at 180° C)		Hardness as CaCO <sub>3</sub>	Percent sodium chloride	Sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH	
														Parts per million	Tons per acre-foot						
May 1-7, 1957	573	--	--	74	15	82	--	201	--	--	--	--	--	550	0.75	246	82	42	2.3	831	7.9
May 8-14	1,247	--	--	62	11	55	--	181	--	--	--	--	--	408	.55	200	51	37	1.7	624	7.7
May 15-31	1,294	--	--	58	11	58	--	161	--	--	--	--	--	409	.56	190	58	40	1.8	628	7.7
June 1-30	1,409	--	--	62	9.5	54	--	186	--	--	--	--	--	408	.55	194	41	38	1.7	616	8.0
July 1-5	1,290	24	0.01	56	12	47	4.8	164	107	38	0.6	1.9	0.10	390	.53	1,360	189	54	3.4	567	7.9
July 6-8	1,213	--	--	77	12	62	--	178	--	--	--	--	--	500	.68	1,640	242	96	3.6	740	8.0
July 9-17	1,162	--	--	65	9.5	51	--	189	--	--	--	--	--	406	.55	1,270	201	48	3.6	802	7.8
July 18-27	879	--	--	77	12	65	--	208	--	--	--	--	--	500	.68	1,190	242	71	3.7	749	7.8
July 28-Aug. 1	959	--	--	109	15	98	--	236	--	--	--	--	--	720	.98	334	140	39	2.3	1,030	7.9
Aug. 2-29	263	--	--	80	14	116	--	a196	--	--	--	--	--	690	.94	257	96	50	3.2	1,060	8.5
Aug. 30-Sept. 4	547	--	--	75	16	100	--	b129	--	--	--	--	--	432	.86	933	253	46	2.7	1,050	8.4
Sept. 5-13	718	--	--	71	11	66	--	c198	--	--	--	--	--	481	.65	932	222	64	3.9	737	8.6
Sept. 14-30	254	--	--	90	14	110	--	221	--	--	--	--	--	696	.95	477	282	101	4.6	1,030	7.9
Weighted average	482	--	--	71	12	73	--	194	--	--	--	--	--	505	0.69	630	226	68	4.1	763	--

a Includes 10 parts per million of carbonate (CO<sub>3</sub>).

b Includes 5 parts per million of carbonate (CO<sub>3</sub>).

c Includes 12 parts per million of carbonate (CO<sub>3</sub>).

## RIO GRANDE BASIN--Continued

## RIO GRANDE CONVEYANCE CHANNEL AT SAN MARCIAL, N. MEX.--Continued

Temperature (°F) of water, water year October 1956 to September 1957  
Once-daily measurement, generally between 9 a. m. and 6 p. m.

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	68	48	50	a 43	65	63	66	75	74	88	83	79
2	75	45	38	50	45	60	52	86	78	89	85	77
3	78	47	48	36	53	58	b 53	82	74	91	81	a 66
4	76	45	40	--	49	58	61	77	82	86	76	78
5	76	55	43	44	64	60	b 60	73	85	87	82	74
6	65	56	44	48	51	57	67	76	80	89	80	80
7	62	56	49	a 47	48	67	64	73	84	87	80	a 64
8	74	55	40	48	56	73	66	74	81	80	79	79
9	75	56	35	50	60	54	66	75	80	85	79	75
10	72	59	38	40	58	55	72	72	78	85	b 75	68
11	74	44	50	55	68	60	b 65	64	75	75	80	75
12	65	57	53	52	58	66	b 64	61	80	83	82	76
13	60	52	45	56	65	63	76	72	80	80	79	75
14	63	55	50	59	65	63	67	74	79	88	82	73
15	74	35	36	52	55	63	b 67	68	78	86	82	76
16	72	47	36	58	52	59	b 69	74	82	87	81	75
17	55	48	45	54	55	67	b 66	77	75	87	79	75
18	67	48	48	43	48	67	b 63	71	82	80	73	a 61
19	68	54	43	56	55	56	79	69	78	85	79	74
20	67	38	46	55	62	51	70	71	82	78	80	74
21	60	40	45	b 43	60	67	68	72	83	84	80	72
22	55	44	37	54	66	56	b 55	74	82	86	79	70
23	65	45	46	56	62	48	60	74	86	84	82	74
24	62	39	35	62	55	58	54	74	86	83	73	72
25	47	47	35	63	61	57	74	b 71	89	87	77	75
26	62	47	38	51	65	63	70	83	90	83	80	75
27	50	44	37	52	67	62	72	72	88	84	73	75
28	58	45	40	52	68	61	61	b 80	89	86	77	73
29	55	45	38	51	--	58	57	78	a 75	87	75	75
30	56	46	46	58	--	64	74	84	88	86	78	76
31	55	--	42	48	--	73	--	72	--	78	72	--
Average	65	48	42	51	58	61	65	74	81	85	79	74

a Measurement before 9 a. m.

b Measurement after 6 p. m.

## WESTERN GULF OF MEXICO BASINS

## RIO GRANDE BASIN--Continued

## RIO GRANDE CONVEYANCE CHANNEL AT SAN MARCIAL, N. MEX.--Continued

Suspended sediment, water year October 1956 to September 1957

Day	October			November			December		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	4	350	4	4	700	8	8	171	4
2.....	5	293	4	5	300	4	8	156	3
3.....	6	216	3	6	1,470	24	8	136	3
4.....	5	225	3	10	670	18	7	111	2
5.....	6	259	4	8	160	3	8	128	3
6.....	5	337	5	6	125	2	8	84	2
7.....	5	258	3	6	85	1	7	78	1
8.....	6	250	4	6	95	2	9	152	4
9.....	6	227	4	6	77	1	8	120	3
10.....	4	250	3	6	54	1	9	90	2
11.....	5	262	4	6	53	1	14	251	s37
12.....	5	320	4	6	115	2	10	120	3
13.....	6	180	3	6	145	2	11	450	13
14.....	6	176	3	9	144	3	28	870	66
15.....	6	141	2	8	202	4	36	870	85
16.....	6	137	2	7	135	3	40	1,320	143
17.....	6	228	4	6	107	2	46	2,150	267
18.....	6	156	3	6	178	3	69	2,800	522
19.....	3	143	1	5	160	2	76	2,220	456
20.....	3	144	1	7	126	2	75	2,240	454
21.....	3	134	1	6	144	2	82	2,250	498
22.....	3	189	2	6	132	2	86	2,050	476
23.....	3	245	2	7	137	3	99	1,850	495
24.....	3	230	2	6	82	1	57	1,250	192
25.....	4	161	2	6	80	1	38	1,000	103
26.....	4	162	2	6	106	2	43	1,100	128
27.....	4	282	3	6	100	2	40	730	79
28.....	4	151	2	9	162	4	49	630	83
29.....	3	153	1	7	123	2	68	660	121
30.....	4	228	2	8	137	3	69	780	145
31.....	4	120	1	--	--	--	85	810	186
Total..	143	--	84	196	--	110	1,201	--	4,579
	January			February			March		
1.....	129	1,600	s626	290	1,750	1,370	473	3,140	4,010
2.....	178	2,570	1,240	289	1,700	1,290	454	2,910	3,570
3.....	176	4,080	1,940	280	1,600	1,210	434	2,880	3,370
4.....	181	2,760	1,350	268	1,610	1,160	517	3,690	5,150
5.....	197	2,890	1,540	266	1,550	1,110	473	2,400	3,040
6.....	197	2,810	1,490	256	1,570	1,090	386	2,010	2,090
7.....	182	2,820	1,390	265	1,570	1,120	327	1,640	1,450
8.....	172	2,790	1,300	280	1,650	1,250	296	1,890	1,510
9.....	176	3,560	1,690	294	2,400	1,910	276	1,930	1,440
10.....	190	2,750	1,410	276	1,850	1,380	280	2,400	1,810
11.....	176	2,550	1,210	274	1,560	1,150	247	2,030	1,350
12.....	174	2,380	1,120	266	1,780	1,280	202	1,540	840
13.....	200	2,470	1,330	256	1,750	1,210	176	1,960	831
14.....	252	3,020	2,050	268	1,690	1,220	184	1,990	989
15.....	224	2,730	1,650	286	1,800	1,390	202	2,160	1,180
16.....	184	2,150	1,070	292	2,110	1,660	200	1,750	945
17.....	195	2,450	1,290	367	2,320	2,300	220	2,200	1,310
18.....	221	2,220	1,320	482	3,130	4,070	198	1,730	925
19.....	261	2,120	1,490	551	3,000	4,460	176	1,200	570
20.....	290	2,060	1,610	604	3,720	6,070	181	900	440
21.....	294	2,810	2,230	615	3,450	5,730	184	1,040	517
22.....	302	3,000	2,450	558	3,070	4,630	172	1,340	622
23.....	272	2,200	1,620	511	2,990	4,130	175	1,370	647
24.....	256	2,480	1,710	502	3,400	4,610	210	1,280	726
25.....	263	2,220	1,580	493	3,000	3,990	217	1,350	791
26.....	265	2,060	1,470	489	2,860	3,780	166	750	336
27.....	252	2,550	1,740	487	2,460	3,230	181	930	454
28.....	241	2,550	1,660	454	2,380	2,920	189	1,220	623
29.....	252	1,960	1,330	--	--	--	170	550	252
30.....	290	1,800	1,410	--	--	--	168	510	231
31.....	302	1,870	1,520	--	--	--	153	300	124
Total..	6,944	--	46,836	10,510	--	70,720	7,887	--	42,273

s Computed by subdividing day.

RIO GRANDE BASIN--Continued

RIO GRANDE CONVEYANCE CHANNEL AT SAN MARCIAL, N. MEX.--Continued

Suspended sediment, water year October 1956 to September 1957.--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	134	680	246	912	3,160	7,780	1,150	1,020	3,170
2.....	134	730	264	534	2,010	2,900	1,250	872	3,280
3.....	134	310	112	331	1,550	1,390	1,350	1,010	3,680
4.....	133	380	136	286	1,460	1,130	1,380	1,400	5,220
5.....	146	610	240	335	1,270	1,150	1,150	1,500	4,660
6.....	127	570	195	650	2,260	3,970	1,130	2,980	9,090
7.....	103	880	245	965	2,710	7,060	1,240	1,960	6,560
8.....	109	800	235	1,190	2,920	9,380	1,260	1,490	5,070
9.....	116	400	125	1,310	3,060	10,800	1,280	1,400	4,840
10.....	108	510	149	1,380	2,000	7,450	1,290	1,590	5,540
11.....	105	320	91	1,300	1,480	5,190	1,370	1,740	6,440
12.....	102	460	127	1,030	2,290	6,370	1,540	1,400	5,820
13.....	86	270	63	1,140	2,690	8,280	1,560	1,270	5,350
14.....	70	250	47	1,380	2,370	8,830	1,560	2,240	9,430
15.....	78	320	67	1,500	2,830	11,500	1,540	2,470	10,300
16.....	69	200	37	1,400	2,600	9,830	1,530	1,400	5,780
17.....	65	280	49	1,430	1,870	7,220	1,490	1,180	4,750
18.....	59	300	48	1,400	1,410	5,330	1,490	1,030	4,140
19.....	61	250	41	1,320	1,280	4,560	1,500	940	3,810
20.....	60	240	39	1,220	1,300	4,280	1,480	1,030	4,120
21.....	138	1,910	s 977	1,220	1,390	4,580	1,420	1,630	6,250
22.....	405	4,420	4,830	1,280	1,100	3,800	1,390	1,870	7,020
23.....	629	4,400	7,470	1,310	1,200	4,240	1,410	1,490	5,670
24.....	756	3,450	7,040	1,310	1,300	4,600	1,460	1,100	4,340
25.....	900	3,190	7,750	1,310	1,100	3,890	1,490	950	3,820
26.....	1,050	3,410	9,670	1,310	1,070	3,780	1,490	870	3,500
27.....	871	3,090	7,270	1,310	1,130	4,000	1,510	900	3,400
28.....	751	3,040	6,160	1,250	876	2,960	1,550	810	3,390
29.....	746	2,930	5,900	1,200	1,280	4,150	1,520	750	3,080
30.....	900	2,910	7,070	1,120	1,040	3,140	1,480	810	3,240
31.....	--	--	--	1,100	1,020	3,030	--	--	--
<b>Total.</b>	<b>9,156</b>	<b>--</b>	<b>66,693</b>	<b>34,733</b>	<b>--</b>	<b>166,570</b>	<b>42,260</b>	<b>--</b>	<b>155,030</b>
	July			August			September		
1.....	1,500	820	3,320	841	4,000	9,080	615	11,200	s 19,000
2.....	1,500	760	3,080	286	1,400	1,080	526	8,600	12,200
3.....	1,150	810	2,520	294	1,100	873	468	8,800	11,100
4.....	1,120	940	2,840	300	1,500	1,220	520	6,000	8,420
5.....	1,180	1,670	5,320	300	1,300	1,050	713	5,000	9,630
6.....	1,240	4,980	16,700	286	1,200	927	896	3,250	7,860
7.....	1,230	2,300	7,640	313	2,750	2,320	898	2,600	6,300
8.....	1,170	1,500	4,740	338	2,900	2,650	858	2,100	4,860
9.....	1,140	1,330	4,090	342	3,880	s 4,760	823	2,000	4,440
10.....	1,120	1,280	3,870	260	2,300	1,610	707	1,800	3,440
11.....	1,100	1,350	4,010	238	1,050	675	614	1,600	2,650
12.....	1,120	1,350	4,080	242	980	640	524	1,280	1,810
13.....	1,170	1,120	3,540	228	840	517	432	1,130	1,320
14.....	1,170	1,040	3,290	223	580	349	331	830	742
15.....	1,240	1,250	4,180	231	500	312	313	680	575
16.....	1,240	1,770	5,930	262	760	538	298	530	426
17.....	1,160	4,160	13,000	300	1,300	1,050	302	600	489
18.....	1,110	5,680	s 17,300	258	1,620	1,130	276	500	373
19.....	810	2,820	6,170	270	2,550	1,860	236	350	223
20.....	834	5,120	11,500	252	2,530	1,720	226	260	159
21.....	830	2,730	6,120	231	860	536	230	250	155
22.....	845	2,870	6,550	230	720	447	222	230	138
23.....	845	1,800	4,110	230	770	478	225	240	146
24.....	825	2,700	6,010	226	710	433	225	240	146
25.....	830	8,300	18,600	239	950	613	225	210	128
26.....	858	4,000	9,270	254	780	535	284	250	192
27.....	1,000	12,500	33,800	234	350	221	239	240	155
28.....	1,040	14,700	41,300	236	1,310	835	226	200	122
29.....	1,050	18,600	52,700	260	1,900	1,330	236	170	108
30.....	960	9,900	25,700	607	6,160	s 14,000	230	230	143
31.....	905	6,800	16,600	544	8,460	s 12,600	--	--	--
<b>Total.</b>	<b>33,292</b>	<b>--</b>	<b>347,880</b>	<b>9,355</b>	<b>--</b>	<b>66,389</b>	<b>12,918</b>	<b>--</b>	<b>97,450</b>
<b>Total discharge for year (cfs-days)</b> .....									<b>168,584</b>
<b>Total load for year (tons)</b> .....									<b>1,064,614</b>

s Computed by subdividing day.

## RIO GRANDE BASIN--Continued

## RIO GRANDE CONVEYANCE CHANNEL AT SAN MARCIAL, N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1956 to September 1957

(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipet; S, sieve; N, in native water; W, in distilled water; C, chemically dispersed; M, mechanically dispersed; V, visual accumulation tube)

Date of Collection	Time	Discharge (cfs)	Water temperature (°F)	Suspended sediment										Methods of analysis		
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters										
						0.002	0.004	0.008	0.016	0.062	0.125	0.250	0.500		1.000	2.000
Oct. 17, 1956	10:20 a. m.	6	55	228	--	--	--	--	95	97	100	--	--	--	S	
Dec. 17	2:40 p. m.	56	44	2,590	4,760	85	99	100	100	--	--	--	--	--	PWCM	
Dec. 30	3:15 p. m.	103	44	806	--	--	--	100	--	--	--	--	--	--	S	
Jan. 7, 1957	8:10 p. m.	181	47	2,700	4,170	89	100	--	--	--	--	--	--	--	PWCM	
Jan. 20	1:45 p. m.	298	55	2,150	3,600	90	99	100	--	--	--	--	--	--	PWCM	
Jan. 29	6:05 p. m.	284	51	1,650	2,410	90	99	100	--	--	--	--	--	--	PWCM	
Feb. 9	11:45 a. m.	284	60	2,560	2,640	51	66	68	70	81	93	100	--	--	VPWCM	
Feb. 20	4:30 p. m.	624	62	3,700	3,210	86	97	100	--	--	--	--	--	--	PWCM	
Mar. 3	12:55 p. m.	423	58	2,890	4,430	83	96	98	98	98	100	--	--	--	SPWCM	
Apr. 7	2:45 p. m.	89	64	867	--	--	--	94	95	96	98	100	--	--	S	
Apr. 19	2:00 p. m.	62	79	197	--	--	--	99	100	--	--	--	--	--	S	
May 1	2:10 p. m.	866	75	3,030	4,760	84	97	100	--	--	--	--	--	--	PWCM	
May 15	7:30 a. m.	1,490	60	2,110	3,630	88	97	99	100	100	--	--	--	--	SPWCM	
June 2	4:30 p. m.	1,300	78	866	--	--	--	100	--	--	--	--	--	--	S	
June 28	6:50 a. m.	1,550	72	823	--	--	--	99	100	100	--	--	--	--	S	
July 6	6:40 a. m.	1,210	72	4,180	3,460	89	98	100	--	--	--	--	--	--	PWCM	
July 11	7:10 a. m.	1,090	71	948	--	--	--	100	100	100	--	--	--	--	S	
July 30	6:40 a. m.	982	74	11,300	4,210	84	95	97	98	98	99	99	100	--	SPWCM	
Aug. 14	7:10 a. m.	217	68	543	--	--	--	99	100	100	--	--	--	--	S	
Aug. 26	3:30 p. m.	258	80	448	--	--	--	97	98	99	100	--	--	--	SPWCM	
Sept. 1	11:30 a. m.	590	73	7,360	3,330	82	96	100	100	100	--	--	--	--	SPWCM	
Sept. 6	2:05 p. m.	922	80	2,970	2,360	78	94	99	100	100	--	--	--	--	SPWCM	
Sept. 10	3:23 p. m.	678	68	1,750	3,060	68	88	96	99	99	100	--	--	--	SPWCM	

RIO GRANDE BASIN--Continued  
RIO GRANDE FLOODWAY AT SAN MARCIAL, N. MEX.

LOCATION.--At gaging station at Atchison, Topeka, and Santa Fe Railway bridge, 1.1 miles downstream from former site of San Marcial, Socorro County, and 18 1/2 miles southwest of San Antonio.  
DRAINAGE AREA.--27,700 square miles, approximately (Includes 2,940 square miles in closed basin in San Luis Valley, Colorado).  
RECORDS AVAILABLE.--Chemical analyses: July 1946 to September 1957.  
Water temperatures: January 1949 to September 1957.  
Sediment records: July 1946 to September 1957.

EXTREMES, 1956-57.--Dissolved solids: Maximum, 990 ppm Aug. 18; minimum, 263 ppm July 14.  
Hardness: Maximum, 494 ppm Aug. 18; minimum, 132 ppm June 20.  
Specific conductance: Maximum daily, 1,350 micromhos Aug. 18; minimum daily, 378 micromhos June 20.  
Water temperatures: Maximum, 89°F June 28; minimum, not determined.  
Sediment concentrations: Maximum daily, 41,400 ppm Aug. 19; minimum daily, no flow on many days.  
Sediment loads: Maximum daily, 754,000 tons Aug. 8; minimum daily, 0 tons on many days.

EXTREMES, 1956-57.--Dissolved solids: Maximum, 1,950 ppm Aug. 3-10, 1954; minimum, 233 ppm June 11-20, 1952.  
Hardness: Maximum, 1,010 ppm Aug. 3-10, 1954; minimum, 132 ppm June 20, 1957.  
Specific conductance: Maximum daily, 2,730 micromhos Apr. 8, 1953; minimum daily, 311 micromhos June 14, 1952.  
Water temperatures (1949-57): Maximum, 97°F Aug. 11, 1951; minimum, freezing point on many days.  
Sediment concentrations: Maximum daily, 98,300 ppm Aug. 8, 1957; minimum daily, 0 tons on many days each year.  
Sediment loads: Maximum daily, 754,000 tons Aug. 8, 1957; minimum daily, 0 tons on many days each year.

REMARKS.--No flow during October to April; tabulation omitted for this period. Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of chemical analyses and sediment loads for years prior to 1946 have been published in Water Bulletins of International Boundary and Water Commission. Records of discharge for water year October 1956 to September 1957 furnished by Santa Fe district office of Surface Water Branch. Records of composite discharge for Rio Grande conveyance channel at San Marcial and Rio Grande floodway at San Marcial given under Rio Grande at San Marcial in WSP 1512. Quality of Water records for Rio Grande conveyance channel at San Marcial on page 429.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (Residue at 180°C)			Hardness as CaCO <sub>3</sub>	Percent sodium adsorption ratio	Specific conductance (micromhos at 25°C)		
														Parts per million	Tons per acre-foot	Tons per day					
May 11-31, 1957	1,376			63	8.1	37		196						350	0.48	1,300	190	30	30	1.2	527
June 1-5	1,620			48	12	34		171						321	.44	1,400	170	30	30	1.1	477
June 6	2,330			64	8.1	50		173						402	.55	2,530	193	50	36	1.6	580
June 7-19	2,482			58	6.2	33		180						318	.43	2,110	170	22	30	1.1	471
June 20	1,940			42	6.6	31		129						279	.38	1,460	132	26	34	1.2	378
June 21-30	1,767			48	6.2	33		149						292	.40	1,390	146	24	33	1.2	434
July 1-5	2,112	37	0.00	48	9.5	31	4.1	152	80	12	0.5	1.8	0.02	330	.45	1,880	159	34	29	1.1	408
July 6-7	3,070			50	11	51		163						462	.63	3,830	220	86	34	1.5	686
July 8-13	2,728			59	6.4	30		177						313	.43	2,310	174	28	27	1.0	485
July 14	2,720			47	4.7	27		140						263	.36	1,930	137	22	30	1.0	380
July 15-17	2,687			58	6.2	29		181						300	.41	2,180	170	22	27	1.0	464

a includes 17 parts per million of carbonate (CO<sub>3</sub>).

## RIO GRANDE BASIN--Continued

## RIO GRANDE FLOODWAY AT SAN MARCIAL, N. MEX.--Continued

Chemical analyses, in parts per million, water year October 1956 to September 1957--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (residue at 180° C)		Hardness as CaCO <sub>3</sub>		Percent sodium	So-adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	
														Parts per million	Tons per acre-foot	Calcium, mg./nesium	Non-carbonate					
July 18, 1957	2,180			75	11	58		b166						489	0.68	2,940	232	96	35	1.7	692	8.5
July 19	2,040			58	8.1	37		c172						330	.45	1,820	178	37	31	1.2	486	8.5
July 20-26	2,236			39	8.8	39		199						384	.52	2,320	208	45	29	1.2	571	7.7
July 27	3,410			94	19	63		247						557	.76	5,130	312	110	30	1.6	822	7.5
July 28-29	5,715			121	15	108		231						835	1.14	12,880	364	174	39	2.5	1,160	8.1
July 30-31	3,000			84	13	69		202						554	.75	4,490	263	98	36	1.8	795	7.8
Aug. 1-5	4,150			73	10	48		193						432	.59	4,840	223	65	32	1.4	635	7.6
Aug. 6-7	5,155			102	16	65		218						618	.84	8,570	320	142	31	1.6	865	7.3
Aug. 8-11	5,290			134	20	101		235						855	1.16	12,210	416	224	35	2.2	1,170	8.1
Aug. 12-13	2,850			89	14	68		222						567	.77	4,360	280	98	35	1.8	821	7.2
Aug. 14-16	2,430			49	6.2	48		d141						347	.47	2,280	148	32	41	1.7	605	8.9
Aug. 17	2,990			108	14	56		270						563	.77	4,550	322	100	27	1.4	799	7.3
Aug. 18	3,050			160	23	104		179						980	1.35	8,150	494	347	31	2.0	1,350	8.2
Aug. 19	4,210			107	14	66		e215						632	.86	7,180	324	148	31	1.6	904	8.3
Aug. 20	4,080			139	22	110		f160						949	1.29	10,450	438	306	35	2.3	1,260	8.3
Aug. 21-23	1,707			87	13	68		186						567	.77	2,610	270	118	35	1.8	814	8.0
Aug. 24	1,680			106	16	75		148						685	.93	3,110	330	209	33	1.8	948	8.2
Aug. 25	3,150			92	12	48		240						812	.84	4,010	279	82	27	1.2	704	8.1
Aug. 26-27	4,285			137	19	89		237						926	1.10	9,330	420	210	32	1.9	1,270	7.4
Aug. 28-31	2,580			117	14	67		214						581	.89	4,120	297	122	33	1.7	856	7.9
Sept. 1-3	5,740			117	17	77		214						713	.97	11,050	362	186	32	1.8	897	7.7
Sept. 4	2,200			77	10	63		g186						486	.68	2,960	233	80	37	1.8	790	8.1
Sept. 5-7	1,763			70	8.5	44		205						391	.53	1,860	210	42	31	1.3	587	8.1
Sept. 8-17	982			60	7.6	41		180						356	.48	944	181	34	33	1.3	530	8.1
Sept. 18-25	376			87	9.0	49		195						406	.55	412	204	44	34	1.5	612	8.2
Sept. 26-30	44.4			77	12	69		215						530	.72	63.5	242	66	38	1.9	765	--
Weighted average	h 2,249			80	11	54		194						485	0.68	2,950	244	86	32	1.5	696	--

b Includes 8 parts per million of carbonate (CO<sub>3</sub>).  
c Includes 6 parts per million of carbonate (CO<sub>3</sub>).  
d Includes 19 parts per million of carbonate (CO<sub>3</sub>).  
e Includes 3 parts per million of carbonate (CO<sub>3</sub>).  
f Includes 4 parts per million of carbonate (CO<sub>3</sub>).  
g Includes 15 parts per million of carbonate (CO<sub>3</sub>).  
h Average for 143 days of flow.

## RIO GRANDE BASIN--Continued

## RIO GRANDE FLOODWAY AT SAN MARCIAL, N. MEX.--Continued

Temperature (°F) of water, water year October 1956 to September 1957  
(Once-daily measurement, generally between 8 a. m. and 6 p. m.)

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1								--	72	85	81	74
2								--	75	87	83	75
3								--	76	88	83	76
4								--	78	81	78	76
5								--	80	83	80	73
6								--	76	85	78	76
7								--	78	82	81	75
8								--	78	80	80	74
9								--	77	82	80	74
10								--	73	82	a 78	69
11								a 61	72	77	79	73
12								58	75	82	80	72
13								65	78	83	80	72
14								66	74	84	82	74
15								64	75	83	80	72
16								66	78	83	80	73
17								70	73	84	80	71
18								72	78	81	74	75
19								69	76	81	77	71
20								68	77	a 79	78	70
21								68	78	83	80	71
22								65	81	84	79	65
23								68	82	82	83	70
24								68	84	80	72	69
25								a 71	86	84	75	69
26								73	86	82	78	72
27								72	88	82	75	72
28								78	89	84	79	74
29								75	b 75	86	76	79
30								84	87	85	74	79
31								69	--	80	73	--
Average								69	78	83	79	73

a Measurement after 6 p. m.

b Measurement before 8 a. m.



RIO GRANDE BASIN--Continued  
 RIO GRANDE FLOODWAY AT SAN MARCIAL, N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1956 to September 1957  
 (Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipet; S, sieve; N, in native water;  
 W, in distilled water; C, chemically dispersed; M, mechanically dispersed; V, visual accumulation tube)

Date of collection	Time	Discharge (cfs)	Water temperature (° F)	Suspended sediment										Methods of analysis		
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters										
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250		0.350	0.500
May 16, 1957	10:25 a. m.	2,260	60	2,940	3,000	74	83	89	89	93	97	100	VPWCM			
May 20	4:40 p. m.	1,240	68	2,040	4,420	71	86	91	95	100	100	100	VPWCM			
May 31	2:50 p. m.	986	69	2,050	3,450	52	64	75	80	100	100	100	VPWCM			
June 12	2:55 p. m.	2,900	75	1,800	4,220	76	91	93	96	100	100	100	VPWCM			
June 24	6:30 a. m.	1,840	71	2,050	4,250	65	79	81	84	100	100	100	VPWCM			
June 28	6:40 a. m.	1,590	72	1,360	2,680	63	78	80	86	100	100	100	VPWCM			
July 7	2:10 p. m.	3,020	82	2,960	3,370	67	80	87	94	100	100	100	VPWCM			
July 8	3:10 p. m.	2,930	80	2,720	3,060	67	72	87	84	100	100	100	VPWCM			
July 20	6:15 p. m.	2,240	79	3,960	3,770	79	94	95	97	100	100	100	VPWCM			
July 29	6:45 a. m.	6,990	72	30,000	4,260	75	87	91	93	100	100	100	VPWCM			
Aug. 8	8:00 a. m.	7,340	76	37,300	4,680	76	93	98	99	100	100	100	VPWCM			
Aug. 14	2:45 p. m.	2,110	82	7,450	3,510	66	85	94	97	100	100	100	VPWCM			
Aug. 22	3:15 p. m.	1,440	79	10,600	3,340	70	85	98	99	100	100	100	VPWCM			
Aug. 31	6:55 a. m.	3,200	67	40,000	4,910	47	63	94	100	--	--	--	VPWCM			
Sept. 10	3:15 p. m.	1,060	69	5,650	3,400	38	53	87	99	100	100	100	VPWCM			
Sept. 23	6:40 a. m.	298	60	2,550	2,310	47	60	82	99	100	100	100	VPWCM			
Sept. 26	3:10 p. m.	103	72	1,350	3,050	70	82	90	99	100	100	100	VPWCM			
Sept. 29	3:00 p. m.	9	79	421	--	--	--	87	97	100	100	100	S			

## RIO GRANDE BASIN --Continued

## PECOS RIVER AT PUERTO DE LUNA, N. MEX.

LOCATION.--At bridge at Puerto de Luna, Guadalupe County, 9 miles northwest of gaging station near Puerto de Luna which is 17½ miles upstream from Alamoordo Dam.

DRAINAGE AREA.--3,970 square miles, approximately (contributing area above gaging station).

RECORDS AVAILABLE.--Chemical analyses: July 1939 to September 1941, November 1946 to September 1957.

Water temperatures: June 1949 to September 1954.

Sediment records: January 1949 to September 1957.

EXTREMES, 1939-57.--Dissolved solids: Maximum 2,680 ppm Mar. 1-31, July 1-14; minimum, 220 ppm Aug. 7.

Hardness: Maximum, 1,850 ppm Feb. 1-28; minimum, 161 ppm Aug. 7.

Specific conductance: Maximum daily, 3,880 microhos June 27, 30; minimum daily, 352 microhos Aug. 7.

Sediment concentrations: Maximum daily, 48,000 ppm Aug. 31; minimum daily, 51 ppm Sept. 24.

Sediment loads: Maximum daily, 1,400,000 tons Aug. 31; minimum daily, 11 tons Sept. 24.

EXTREMES, 1939-41, 1946-57.--Dissolved solids: Maximum, 2,740 ppm May 1-10, 1955, July 1-9, 1956; minimum, 220 ppm Aug. 7, 1957.

Hardness: Maximum, 1,910 ppm Apr. 21-30, 1954; minimum, 161 ppm Aug. 7, 1957.

Specific conductance: Maximum daily, 3,880 microhos June 27, 30, 1957; minimum daily, 344 microhos Sept. 21, 1941.

Sediment concentrations (1949-57): Maximum daily, 59,200 ppm July 28, 1955; minimum daily, 20 ppm Apr. 21-30, 1955.

Sediment loads (1949-57): Maximum daily, 1,510,000 tons Oct. 7, 1954; minimum daily, 4 tons Apr. 21-30, 1955.

REMARKS.--Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of discharge for gaging station near Puerto de Luna for water year October 1956 to September 1957 given in WSP 1512. No appreciable inflow between sampling point and gaging station except during periods of heavy local runoff. Flow affected by ice Nov. 21-22, 28, Dec. 9-11, 23-27, Jan. 16-19, 24, 26-27.

## Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids (calculated)			Hardness as CaCO <sub>3</sub>	Percent adsorption ratio	Specific conductance (microhos at 25°C)	pH			
													Parts per million	Tons per acre-foot	Tons per day					Calcium, magnesium	Non-carbonate	
Oct. 1-31, 1956 ..	62.3	29		603	71	106		135	1,640	152		0.3		2,670	3.63	449	1,800	1,690	11	1.1	2,950	7.8
Nov. 1-30 .....	75.0	27		592	78	107		151	1,640	153		.5		2,670	3.63	526	1,800	1,670	11	1.1	2,950	7.6
Dec. 1-31 .....	75.2	19		596	78	109		174	1,610	155		.5		2,650	3.60	538	1,810	1,660	12	1.1	2,960	7.8
Jan. 1-31, 1957 ..	76.6	20		580	85	104		139	1,620	150		.3		2,650	3.58	544	1,800	1,680	11	1.1	2,900	7.9
Feb. 1-28 .....	79.6	20		596	88	104		169	1,630	151		.5		2,670	3.63	574	1,850	1,710	11	1.1	2,950	7.8
Mar. 1-31 .....	79.6	25		592	85	113		133	1,640	159		.4		2,680	3.64	576	1,830	1,720	12	1.2	2,950	7.9
Apr. 1-30 .....	83.3	20		560	57	96		126	1,520	137		.6		2,450	3.33	551	1,630	1,530	11	1.0	2,760	7.9
May 1-9 .....	80.3	20		564	64	96		170	1,510	136		.5		2,470	3.36	556	1,670	1,530	11	1.0	2,790	7.7
May 10 .....	232	17		361	47	59		169	938	80		3.1		1,580	2.16	996	1,090	956	11	.8	1,950	7.3
May 11 .....	458	17		246	39	48		174	629	65		1.0		1,130	1.54	1,400	774	632	12	.8	1,480	7.5
May 12 .....	267	16		258	30	40		172	622	52		1.8		1,100	1.50	793	787	626	10	.6	1,430	7.6
May 13-15 .....	185	15		298	32	49		154	746	67		1.9		1,280	1.74	639	875	749	11	.7	1,620	7.6
May 16-19 .....	122	16		421	52	69		156	1,110	96		.9		1,840	2.50	606	1,280	1,140	11	.8	2,180	7.7
May 20-27 .....	68.0	17		524	59	86		166	1,390	122		.6		2,280	3.10	542	1,550	1,410	11	.9	2,610	7.7
May 28 .....	197	18		230	31	48		184	555	51		1.8		1,020	1.39	543	702	550	13	.8	1,360	7.5
May 29-31 .....	348	17		409	52	59		176	1,070	77		1.9		1,770	2.41	1,660	1,230	1,090	9	.7	2,090	7.5

RIO GRANDE BASIN

June 1-18, 1957.....	258	20	238	158	536	45	2.2	974	1.32	678	676	546	10	.6	1,270	7.6
June 19.....	182	24	324	153	807	73	2.5	1,400	1.90	688	840	814	12	.8	1,700	8.1
June 20.....	597	25	254	252	545	25	5.6	2,040	3.11	1,650	762	555	6	.4	1,320	7.5
June 21-30.....	63.6	25	528	50	96	117	.9	2,290	3.11	517	1,400	1,400	12	1.1	2,540	8.0
July 1-14.....	50.2	26	615	134	1,650	145	4	2,660	3.24	363	1,780	1,670	12	1.2	2,910	7.8
July 15-16.....	224	19	220	169	478	40	2.5	982	1.21	539	623	484	10	.6	1,180	8.0
July 17-18.....	80.0	25	580	173	1,490	126	1.0	2,460	3.35	531	1,640	1,500	12	1.1	2,700	7.7
July 19-20.....	83.5	26	399	176	1,020	84	2.7	1,720	2.34	388	1,160	1,010	11	.9	2,020	7.5
July 21.....	70	25	552	163	1,460	123	1.3	2,400	3.26	454	1,580	1,460	12	1.1	2,610	8.2
July 22-25.....	283	22	226	22	37	203	4.4	943	1.28	721	654	488	11	.6	1,240	7.5
July 26.....	4,830	25	74	6.6	15	928	4.2	287	.89	3,740	212	24	13	.4	456	7.5
July 27-28.....	1,012	17	150	12	21	182	1.6	592	.81	1,620	424	274	10	.4	849	7.7
July 29-31.....	268	18	286	22	50	168	1.4	1,130	1.94	818	739	622	13	.8	1,430	7.4
Aug. 1.....	1,750	18	93	177	124	12	1.7	354	.46	1,670	264	118	8	.3	544	7.8
Aug. 2-3.....	512	20	164	154	353	30	4.5	951	.94	479	353	10	.5	.948	7.9	
Aug. 4-6.....	213	16	88	6.1	9.0	94	2.3	318	.43	183	244	88	7	.2	505	7.7
Aug. 7.....	4,200	21	56	5.2	8.8	7	2.3	220	.30	2,490	161	21	11	.3	352	7.5
Aug. 8-11.....	908	16	121	171	32	211	2.9	466	.63	1,140	334	212	9	.4	881	7.7
Aug. 12-14.....	326	17	210	146	454	38	1.9	836	1.14	736	582	462	10	.5	1,120	7.8
Aug. 15.....	1,010	17	170	165	328	17	1.8	640	.87	1,750	464	330	7	.3	877	7.7
Aug. 16.....	710	14	284	19	45	213	.5	1,170	1.59	2,240	812	637	11	.7	1,450	7.2
Aug. 17.....	1,960	14	76	a144	99	6	5.5	284	.39	1,500	205	87	11	.4	444	8.5
Aug. 18.....	2,170	14	326	21	10	178	1.2	1,200	1.63	7,030	900	754	2	.1	1,420	7.2
Aug. 19.....	815	13	117	133	216	18	6.5	461	.63	1,010	319	210	12	.5	671	8.2
Aug. 20-22.....	347	14	174	16	26	367	3.2	707	.96	862	500	374	10	.5	977	7.7
Aug. 23-24.....	525	16	157	174	300	26	1.8	621	.84	860	466	323	7	.3	879	7.4
Aug. 25.....	1,950	11	97	196	101	6	5.5	329	.45	1,730	262	101	6	.2	524	7.3
Aug. 26-29.....	746	14	157	151	329	28	.9	641	.67	1,290	453	330	10	.5	900	7.4
Aug. 30.....	2,610	15	78	174	76	6	1.6	273	.37	1,920	216	74	5	.2	439	8.0
Aug. 31.....	8,790	15	140	146	378	6	1.3	675	.92	16,020	469	370	6	.3	903	7.7
Sept. 1-4.....	959	14	148	11	148	295	1.8	581	.79	1,500	414	293	9	.4	814	7.7
Sept. 5-8.....	322	13	248	17	42	570	.9	1,010	1.37	878	689	571	12	.7	1,310	7.4
Sept. 9-13.....	169	17	393	43	69	160	.9	1,700	2.31	776	1,160	1,030	11	.9	2,000	7.9
Sept. 14-30.....	87.3	20	576	162	1,520	134	.5	2,490	3.39	587	1,670	1,540	12	1.1	2,740	7.6
Weighted average	240	18	281	165	618	51	1.9	1,100	1.50	713	762	627	10	0.6	1,340	--

a Includes 6 parts per million of carbonate (CO<sub>2</sub>).

## WESTERN GULF OF MEXICO BASINS

## RIO GRANDE BASIN --Continued

## PECOS RIVER AT PUERTO DE LUNA, N. MEX.--Continued

Suspended sediment, water year October 1956 to September 1957

Day	October			November			December		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	54	273	40	61	133	22	81	160	35
2.....	65	559	98	65	207	36	76	192	39
3.....	61	804	132	72	161	31	83	187	42
4.....	61	175	29	72	70	14	85	333	76
5.....	59	115	18	72	136	26	83	269	60
6.....	56	249	38	72	76	15	83	252	56
7.....	61	273	45	70	234	44	76	179	37
8.....	61	250	41	70	238	45	79	142	30
9.....	63	296	50	72	180	35	74	158	32
10.....	61	124	20	76	551	113	76	174	36
11.....	57	174	27	76	584	120	72	210	41
12.....	61	130	21	72	244	47	79	192	41
13.....	57	177	27	74	605	121	72	144	28
14.....	59	199	32	74	553	110	79	151	32
15.....	63	124	21	72	213	41	79	121	26
16.....	63	131	22	72	284	55	76	100	21
17.....	63	117	20	68	427	78	72	278	54
18.....	77	346	72	81	261	61	76	348	71
19.....	70	234	44	74	250	50	74	291	58
20.....	61	89	15	74	395	79	76	302	62
21.....	63	184	31	74	359	72	70	265	50
22.....	65	155	27	76	247	51	68	252	46
23.....	61	126	21	74	241	48	70	179	34
24.....	63	182	31	72	143	28	74	207	41
25.....	62	138	23	72	124	24	72	182	35
26.....	65	225	39	76	121	25	70	127	24
27.....	63	368	63	74	244	49	68	124	23
28.....	63	580	99	70	216	41	72	400	78
29.....	65	224	39	83	202	45	72	442	86
30.....	63	315	54	81	207	45	74	674	135
31.....	65	311	55	--	--	--	70	569	108
Total.	1,931	--	1,294	2,191	--	1,571	2,331	--	1,537
Day	January			February			March		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	72	451	88	79	217	46	83	129	29
2.....	76	589	121	76	118	24	97	213	56
3.....	68	420	77	76	161	33	95	112	29
4.....	79	650	139	76	136	28	88	128	30
5.....	76	221	45	76	161	33	81	122	27
6.....	70	290	55	76	153	31	83	166	37
7.....	79	255	54	74	173	35	83	241	54
8.....	83	282	63	76	118	24	81	251	55
9.....	81	288	63	79	149	32	76	134	27
10.....	74	245	49	81	198	43	76	117	24
11.....	79	330	70	81	120	26	79	226	48
12.....	74	200	40	79	119	25	76	92	19
13.....	74	210	42	79	186	40	70	102	19
14.....	76	189	39	81	198	43	72	223	43
15.....	79	392	84	79	113	24	79	204	44
16.....	76	243	50	81	118	26	83	169	38
17.....	79	301	64	81	80	17	76	109	22
18.....	76	293	60	93	106	27	70	124	23
19.....	79	291	62	90	82	20	72	142	28
20.....	79	340	73	79	147	31	90	223	54
21.....	76	117	24	79	153	33	102	437	120
22.....	81	134	29	81	147	32	81	290	63
23.....	79	136	29	83	143	32	76	328	67
24.....	81	160	35	81	156	34	76	205	42
25.....	76	143	29	76	181	37	79	225	48
26.....	74	121	24	79	406	87	74	413	83
27.....	76	237	49	79	102	22	74	92	18
28.....	74	114	23	79	110	23	74	92	18
29.....	76	430	88	--	--	--	74	84	17
30.....	76	117	24	--	--	--	74	103	21
31.....	76	145	30	--	--	--	74	118	24
Total.	2,374	--	1,722	2,229	--	908	2,468	--	1,227

RIO GRANDE BASIN--Continued

PECOS RIVER AT PUERTO DE LUNA, N. MEX.--Continued

Suspended sediment, water year October 1956 to September 1957--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	74	115	23	100	234	63	361	13,800	s 14,100
2.....	76	92	19	95	166	43	305	9,500	7,820
3.....	81	72	16	79	109	23	245	6,000	3,970
4.....	83	106	24	70	100	19	232	2,430	1,520
5.....	85	119	27	70	99	19	202	1,880	1,030
6.....	81	65	14	74	114	23	206	3,290	1,830
7.....	81	96	21	70	71	13	244	3,290	2,170
8.....	81	101	22	72	149	29	280	2,860	2,160
9.....	81	115	25	93	145	36	336	3,170	2,880
10.....	81	140	31	232	3,100	sa 2,200	330	4,740	4,220
11.....	81	135	30	458	7,000	sa 10,000	300	2,070	1,680
12.....	76	82	17	267	6,800	a 4,800	280	2,040	1,540
13.....	76	82	17	206	3,950	2,200	267	2,230	1,610
14.....	76	93	19	184	1,700	845	245	1,050	695
15.....	81	170	37	164	1,550	686	209	908	512
16.....	79	166	35	143	1,060	409	209	899	507
17.....	74	75	15	126	894	304	202	852	465
18.....	74	100	20	115	470	146	188	929	472
19.....	74	92	18	102	440	121	182	1,420	s 1,670
20.....	76	268	55	88	324	77	587	20,400	s 37,100
21.....	95	219	56	79	279	60	171	3,800	1,750
22.....	92	541	139	76	288	59	126	750	255
23.....	90	389	90	93	574	144	102	422	116
24.....	88	660	157	105	591	168	90	411	100
25.....	105	980	278	88	270	64	76	172	35
26.....	98	407	108	81	310	68	63	146	25
27.....	88	203	48	94	1,600	sa 740	56	134	20
28.....	83	172	39	197	8,600	sa 5,300	52	161	23
29.....	90	209	51	123	1,500	498	48	167	22
30.....	97	242	63	676	17,000	sa 43,000	52	154	22
31.....	--	--	--	246	14,800	s 9,310	--	--	--
Total.	2,500	--	1,514	4,666	--	81,467	6,246	--	90,319
July									
1.....	54	128	19	1,750	17,000	sa 150,000	1,950	15,500	s 96,900
2.....	54	133	19	653	10,400	s 20,300	806	5,600	12,200
3.....	52	136	19	370	8,020	s 8,430	617	2,380	3,960
4.....	47	141	18	967	19,000	sa 62,000	464	2,270	2,840
5.....	50	179	24	2,360	27,000	sa 210,000	403	2,020	2,200
6.....	52	182	26	3,050	31,200	s 290,000	336	2,820	2,560
7.....	52	171	24	4,200	36,000	sa 490,000	290	2,150	1,680
8.....	47	170	22	1,180	20,100	s 70,000	258	1,770	1,230
9.....	47	178	23	1,190	8,800	sa 29,000	213	820	472
10.....	52	190	27	696	8,710	s 16,500	184	820	407
11.....	47	187	24	567	4,690	7,180	171	406	187
12.....	47	148	19	374	3,440	3,470	146	319	126
13.....	48	144	19	330	2,250	2,000	131	333	118
14.....	54	118	17	275	2,640	1,960	123	486	161
15.....	264	4,700	s 6,040	1,010	20,100	s 67,600	112	282	85
16.....	183	4,400	s 2,110	710	13,000	sa 45,000	97	343	90
17.....	95	1,150	295	1,960	19,000	sa 110,000	93	211	53
18.....	65	--	e 50	2,170	19,000	sa 140,000	85	297	68
19.....	58	--	e 60	815	7,920	s 19,900	81	255	56
20.....	109	2,190	645	445	2,740	3,290	81	168	37
21.....	70	676	128	341	2,230	2,050	83	308	69
22.....	95	14,000	sa 3,700	254	1,820	1,250	79	169	36
23.....	464	19,000	sa 38,000	400	5,000	sa 6,200	79	126	27
24.....	269	17,000	sa 13,000	650	8,300	sa 19,000	83	51	11
25.....	304	8,670	s 13,000	1,950	12,000	sa 83,000	83	353	79
26.....	4,830	33,000	sa 580,000	1,690	7,100	sa 27,000	81	345	75
27.....	1,470	12,300	sa 64,300	548	6,400	9,470	81	192	42
28.....	554	7,010	10,500	415	3,230	3,620	81	79	17
29.....	280	5,540	4,190	330	2,870	2,560	83	152	34
30.....	209	4,420	2,450	2,610	26,000	sa 290,000	79	73	16
31.....	314	5,530	4,690	8,790	48,000	sa 140,000	--	--	--
Total.	10,336	--	743,498	43,050	--	3,590,780	7,453	--	125,836

Total discharge for year (cfs-days) ..... 87,775  
 Total load for year (tons) ..... 4,641,673

e Estimated.  
 s Computed by subdividing day.  
 a Computed from partly estimated concentration graph.

RIO GRANDE BASIN--Continued  
 PECOS RIVER AT PUERTO DE LUNA, N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1956 to September 1957  
 (Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipet; S, sieve; N, in native water;  
 W, in distilled water; C, chemically dispersed; M, mechanically dispersed; V, visual accumulation tube)

Date of collection	Time	Discharge <sup>a</sup> (cfs)	Water temperature (°F)	Suspended sediment										Methods of analysis		
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters										
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250		0.350	0.500
Dec. 1, 1956	9:35 a. m.		48	160	--	--	--	--	--	67	91	100	--	--	--	S
Jan. 20, 1957	2:10 p. m.		52	340	--	--	--	--	--	44	94	100	--	--	--	V
Feb.	10:05 a. m.		45	217	--	--	--	--	--	84	98	100	--	--	--	S
Apr. 24	11:00 a. m.		62	676	36	42	53	53	53	61	84	99	100	100	100	VPWCM
May 11	5:30 a. m.		55	7,100	38	38	--	--	--	77	95	100	--	--	--	VPWCM
May 27	10:45 a. m.		70	193	--	--	--	--	--	86	99	100	--	--	--	S
June 1	7:00 a. m.		60	17,600	48	48	78	78	78	98	100	--	--	--	--	VPWCM
June 19	7:45 p. m.		61	18,900	6	6	28	28	28	85	98	100	--	--	--	VPWCM
July 9	5:55 a. m.		65	178	--	--	--	--	--	97	100	--	--	--	--	S
July 17	11:45 a. m.		79	672	--	--	--	--	--	85	91	100	--	--	--	S
July 25	7:05 p. m.		72	21,400	37	37	61	61	61	88	96	99	100	100	100	VPWCM
Aug. 4	8:30 a. m.		74	13,900	35	35	51	51	51	81	97	100	--	--	--	VPWCM
Aug. 5	5:05 p. m.		73	28,000	29	29	46	46	46	71	80	92	198	198	100	SPWCM
Aug. 17	7:15 a. m.		68	24,400	31	31	39	39	39	81	97	99	100	100	100	VPWCM
Aug. 20	6:10 p. m.		76	2,740	56	56	77	77	77	97	100	--	--	--	--	VPWCM
Aug. 30	4:30 a. m.		85	24,700	32	32	46	46	46	85	97	99	100	100	100	VPWCM
Aug. 31	8:00 a. m.		65	28,100	28	28	44	44	44	74	90	98	100	100	100	VPWCM
Aug. 31	2:45 p. m.		70	49,500	19	19	27	27	27	62	81	97	100	100	100	SPWCM
Sept. 20	5:15 p. m.		70	168	--	--	--	--	--	18	77	100	--	--	--	V

<sup>a</sup> Discharges omitted because of lack of correlation of discharges at sampling point and at gaging station.

RIO GRANDE BASIN--Continued  
 PECOS RIVER BELOW ALAMOGORDO DAM, N. MEX.

LOCATION.--At gaging station, 1,200 feet downstream from Alamogordo Dam, 1½ miles downstream from Alamogordo Creek, and 4½ miles northeast of Guadalupe, De Baca County.  
 DRAINAGE AREA.--4,390 square miles, approximately (contributing area).  
 RECORDS AVAILABLE.--Chemical analyses: June 1937 to September 1957.  
 EXTREMES, 1956-57.--Dissolved solids: Maximum, 2,720 ppm Oct. 1-31, Nov. 5-7; minimum, 545 ppm Aug. 9-31.  
 Hardness: Maximum, 1,820 ppm Nov. 5-7; minimum, 373 ppm Aug. 9-31.  
 Specific conductance: Maximum daily, 3,070 microhos Nov. 5; minimum daily, 549 microhos Aug. 10.  
 EXTREMES, 1937-57.--Dissolved solids: Maximum, 2,730 ppm May 11-20, 1954; minimum, 435 ppm Oct. 1-8, 1941.  
 Hardness: Maximum, 1,910 ppm May 1-10, 1954; minimum, 294 ppm Oct. 1-8, 1941.  
 Specific conductance, 1,910 ppm May 1-10, 1954; minimum, 294 ppm Oct. 1-8, 1941.  
 REMARKS.--Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of discharge for water year October 1956 to September 1957 given in MSP 1512.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids (calculated)		Hardness as CaCO <sub>3</sub>		Percent sodium	Specific conductance (micro-mhos at 25°C)		
													Parts per million	Tons per acre-foot	Calcium magnesium	Non-carbonate				
Oct. 1-31, 1956..	56.1	19		607	73	110		129	1,700	151		0.7		2,720	3.70	412	1,810	1,710	12	2,990
Nov. 1-4 .....	6.10	19		572	76	107		152	1,590	144		.6		2,580	3.51	42.5	1,740	1,620	12	2,880
Nov. 5-7 .....	578	21		599	78	115		160	1,670	157		2.0		2,720	3.70	4,240	1,820	1,680	12	3,010
Nov. 8-12 .....	75.4	18		580	76	106		158	1,610	145		1.5		2,610	3.55	531	1,760	1,630	12	2,910
Nov. 13-14 .....	a.19.0	17		580	85	110		155	1,620	150		.9		2,650	3.60	136	1,800	1,670	12	2,940
Nov. 16, 21-30....	a.34	17		520	83	105		154	1,490	137		2.9		2,430	3.30	2.23	1,640	1,510	12	2,760
Dec. 1-31 .....	1.44	12		500	78	104		158	1,430	135		4.0		2,340	3.18	9.10	1,570	1,440	13	2,690
Jan. 1-16, 18-31, 1957	a.37.4	18		560	88	102		132	1,570	147		2.1		2,550	3.47	257	1,760	1,650	11	2,860
Feb. 1-28 .....	253	17		498	88	100		149	1,420	135		3.4		2,330	3.17	3.21	1,600	1,480	12	2,690
Mar. 1-31 .....	45.6	21		596	73	109		154	1,650	152		.7		2,660	3.62	1,820	1,790	1,660	12	2,940
Apr. 1-30 .....	67.0	19		568	83	111		137	1,650	137		.5		2,660	3.62	327	1,810	1,700	12	2,970
May 1-31 .....	84.1	20		556	59	102		122	1,500	134		.5		2,430	3.30	440	1,630	1,530	12	2,710
June 1-30 .....	364	19		393	43	71		127	1,040	90		1.4		1,720	2.34	391	1,160	1,050	12	2,040
July 1-26 .....	896	14		381	43	70		119	1,020	90		2.1		1,680	2.28	1,650	1,130	1,030	12	2,000
July 27-Aug. 8 .....	374	14		153	20	27		126	361	28		2.4		667	.91	1,610	464	360	11	5,932
Aug. 9-31 .....	409	14		133	10	20		109	296	16		1.8		546	.74	550	373	284	10	801
Sept. 1-24 .....	54.8	8.7		268	11	18		107	360	15		1.4		627	.85	692	444	356	8	857
Sept. 25-30 .....	b.164	16		320	37	56		137	643	48		1.1		1,100	1.50	183	746	634	11	1,390
Weighted average														1,400	1.90	608	950	848	11	0.8

a No flow Nov. 15, 17-20, Jan. 17.  
 b Average for 359 days of flow.

RIO GRANDE BASIN--Continued  
PECOS RIVER NEAR ACME, N. MEX.

LOCATION--At gaging station, 1 mile southeast of Melena railroad station, 3½ miles downstream from Salt Creek, 5 miles southwest of Acme, Chaves County and 13 miles northeast of Roswell.  
DRAINAGE AREA--41,380 square miles, approximately (contributing area).  
RECORDS AVAILABLE--Chemical analyses: July 1937 to September 1957.  
Water temperatures: May 1952 to September 1957.  
EXTREMES, 1956-57.--Dissolved solids: Maximum, 6,670 ppm May 1-3; minimum, 594 ppm Aug. 11-16.

Hardness: Maximum, 3,060 ppm May 1-3; minimum, 366 ppm July 26-27.  
Specific conductance: Maximum daily, 10,300 micromhos May 1; minimum daily, 859 micromhos Aug. 12.  
Water temperatures: Maximum, 90°F July 29; minimum, 38°F Dec. 9, Jan. 18, 26.  
EXTREMES, 1937-57.--Dissolved solids: Maximum, 19,870 ppm May 23 to June 2, 1938; minimum, 594 ppm Aug. 11-16, 1957.  
Hardness: Maximum, 5,320 ppm May 23 to June 2, 1938; minimum, 366 ppm July 26-27, 1957.

Specific conductance: Maximum daily, 39,300 micromhos Aug. 9, 1945; minimum daily, 859 micromhos Aug. 12, 1957.  
Water temperatures, 1952-57: Maximum, 95°F July 15, 1955; minimum, 33°F Jan. 4, 1953; Feb. 5-7, 1956.

REMARKS.--Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of discharge for water year October 1956 to September 1957 given in WSP 1512.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids (calculated)		Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	
													Parts per million	Tons per acre-foot	Tons per acre-foot	Non-carbonate				
Nov. 7-20, 1956	a 81.3	14		588	107	130	132	132	1,710	212		2.2		2,830	3.85	1,910	1,800	13	3,270	7.7
Nov. 21-30	10.8	17		570	121	252	143	143	1,770	376		2.4		3,190	4.34	1,940	1,830	22	3,830	7.7
Dec. 1-31	3.6	17		576	133	454	152	152	1,880	630		8		3,760	5.11	1,960	1,860	33	4,680	7.5
Jan. 1-31, 1957	5.5	19		572	143	464	125	125	1,890	675		1.4		3,830	5.21	2,020	1,910	33	4,770	7.7
Feb. 1-14	4.3	16		580	154	527	112	112	1,960	775		1.0		4,070	5.54	2,080	1,990	36	5,180	7.3
Feb. 15-18	2.0	15		631	171	713	116	116	2,120	1,080		1.9		4,790	6.51	2,280	2,160	40	6,220	7.5
Feb. 19-28	5.8	16		584	159	553	121	121	1,970	825		1.1		4,170	5.67	2,110	2,010	36	5,320	7.5
Mar. 1-2, 7-8	a 4.5	24		667	190	799	131	131	2,300	1,190		3.1		5,240	7.13	2,450	2,340	42	6,700	7.9
Mar. 9-12	6.5	21		647	169	391	116	116	2,150	585		1.3		4,020	5.47	2,310	2,210	27	5,820	7.9
Mar. 13-14	3.0	20		679	190	522	124	124	2,300	790		8		4,560	6.20	2,460	2,370	31	5,580	7.5
Mar. 15-31	332	23		603	119	360	132	132	1,800	255		1.5		3,030	4.12	1,990	1,860	15	3,450	7.6
Apr. 1-16	13.1	21		651	157	386	120	120	2,110	575		8		3,960	5.39	2,270	2,170	27	4,750	7.6
Apr. 17-21	a 2.0	21		766	204	627	131	131	2,520	980		1.1		5,160	7.04	2,750	2,640	33	6,310	7.4
May 1-10	4.7	16		778	271	1,090	135	135	2,610	1,840		2.8		6,670	9.07	3,060	2,940	44	8,770	7.9
May 4-10	1.1	22		683	204	549	98	98	2,660	850		1.1		4,720	6.42	2,540	2,460	32	5,810	7.2
May 11-12	130	10		262	55	276	122	122	875	478		4.4		1,820	2.48	880	780	41	2,760	7.3
May 13-15	43.0	17		500	128	440	123	123	1,500	745		23		3,410	4.64	1,770	1,670	35	4,550	7.6
May 16-17	a 1.5	6, 0		651	176	610	69	69	2,080	1,020		6, 9		4,590	6.24	2,350	2,260	36	5,970	7.3
May 26	23	16		619	142	398	97	97	1,930	640		2.2		3,860	5.17	2,130	2,050	29	4,710	7.1
May 27-31	366	14		234	50	98	107	107	697	134		.6		1,260	1.74	790	702	21	1,760	7.5

June 1-5, 1957	387	20	212	27	89	135	575	87	1.6	1,080	1.47	1,130	640	530	23	1.5	1,450	7.7
June 6-8	37.3	18	393	66	197	102	1,190	252	2.1	2,170	2.95	219	1,250	1,170	25	2.4	2,730	7.8
June 9-12	43.0	22	915	107	477	117	1,820	650	1.7	3,650	5.24	41.6	1,970	1,980	34	4.7	4,730	8.0
July 8-19	402	19	453	57	116	131	1,280	128	1.7	2,120	2.68	2,300	1,960	1,260	16	1.4	2,460	7.7
July 20	15	15	163	17	63	111	407	69	1.9	1,781	1.68	32.0	476	386	22	1.3	1,100	7.5
July 21-25	5.2	17	391	41	87	96	1,080	92	1.7	1,760	2.39	24.7	1,140	1,070	14	1.1	2,060	7.6
July 26-27	27.0	16	125	13	116	160	389	57	1.3	796	1.08	58.0	366	234	41	2.6	1,150	7.5
July 28-29	23.0	16	411	68	200	97	1,310	210	1.5	2,260	3.07	140	1,300	1,230	25	2.4	2,720	7.6
July 30-31	1,156	17	270	26	70	172	664	70	2.9	1,200	1.63	3,750	780	640	16	1.1	1,540	7.8
Aug. 1-9	820	13	145	36	58	150	428	48	1.1	802	1.09	1,780	510	387	20	1.1	1,120	7.2
Aug. 10	150	19	250	37	75	128	698	74	3.2	1,220	1.66	494	776	671	17	1.2	1,450	7.6
Aug. 11-16	966	7.3	125	28	24	136	311	31	1.1	594	.81	1,550	427	316	11	.5	874	7.8
Aug. 17-19	291	6.4	163	24	48	104	415	64	2.2	774	1.05	608	505	420	17	.9	967	8.2
Aug. 20-23	114	13	247	76	109	136	835	130	1.4	1,480	2.01	456	929	818	20	1.5	1,750	7.6
Aug. 24	30.2	16	397	71	104	86	1,150	170	1.0	1,950	2.65	159	1,280	1,210	15	1.3	2,360	7.7
Aug. 28	12	16	274	52	122	132	765	182	2.1	1,480	2.01	48.0	898	790	23	1.8	2,040	8.0
Aug. 29-31	8.3	15	349	81	180	132	1,050	280	-2	2,020	2.75	45.3	1,200	1,100	25	2.3	2,610	8.0
Sept. 1-5, 9-11	86.0	21	445	85	102	104	1,330	150	1.1	2,180	2.96	35.3	1,460	1,380	13	1.2	3,350	8.2
Sept. 19-25	73.3	7.5	206	36	35	131	636	54	.8	950	1.27	1,950	662	554	10	.6	1,130	8.2
Sept. 27-28	78.0	11	256	15	32	135	550	62	-2	992	1.35	204	700	590	9	.5	1,430	8.2
Sept. 29-30	49.0	11	318	38	96	118	840	132	1.5	1,490	2.03	197	950	854	16	1.3	1,889	7.7
Weighted average	b 149	14	296	54	89	136	641	117	1.3	1,480	2.01	595	960	849	17	1.2	1,950	--

a No flow Oct. 1 to Nov. 6, Mar. 3-6, Apr. 22-30, May 18-25, June 13 to July 7, Sept. 6-8, 12-18.

b Average for 272 days of flow.

## WESTERN GULF OF MEXICO BASINS

## RIO GRANDE BASIN--Continued

## PECOS RIVER NEAR ACME, N. MEX.--Continued

Temperature (°F) of water, water year October 1956 to September 1957  
Once-daily measurement, generally between 4 and 5 p. m.

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1		--	52	43	55	67	62	81	85	--	86	a 83
2		--	53	50	57	64	59	79	a 72	--	85	82
3		--	51	43	58	--	65	--	72	--	82	87
4		--	53	46	55	--	58	--	73	--	86	89
5		--	46	52	56	--	67	66	80	--	83	83
6		--	54	51	54	--	67	73	--	--	86	--
7		--	53	48	60	66	66	76	86	--	86	--
8		50	45	54	67	67	63	74	87	80	87	--
9		54	38	58	64	63	67	81	85	81	82	--
10		56	46	48	63	60	73	68	86	83	86	--
11		57	50	50	65	66	72	--	85	82	--	--
12		58	51	54	66	67	60	62	77	a 83	70	--
13		60	49	55	68	65	63	72	--	80	74	--
14		58	50	56	67	67	64	74	--	79	70	--
15		50	51	51	63	56	75	69	--	83	79	--
16		52	50	45	53	58	77	81	--	85	b 72	--
17		50	a 47	40	50	61	73	78	--	86	74	--
18		54	48	38	43	57	71	--	--	87	80	--
19		53	46	42	47	57	78	--	--	88	74	76
20		43	48	53	63	52	73	--	--	81	80	75
21		49	50	50	64	50	a 69	--	--	80	66	76
22		53	45	52	51	58	--	--	--	87	76	71
23		57	--	50	50	47	--	--	--	82	55	72
24		50	43	55	52	45	--	--	--	80	--	71
25		52	39	46	61	47	--	--	--	81	--	71
26		49	41	38	62	62	--	79	--	82	--	75
27		50	43	40	64	63	--	b 75	--	82	--	77
28		45	45	53	67	63	--	76	--	83	77	74
29		53	41	--	--	63	--	78	--	90	a 80	73
30		51	47	43	--	62	--	73	--	86	83	76
31		--	48	45	--	a 67	--	75	--	85	--	--
Average		--	47	48	59	60	--	--	--	--	--	--

a Measurement after 5 p. m.

b Measurement before 4 p. m.

RIO GRANDE BASIN--Continued

RIO HONDO AT DIAMOND A RANCH, NEAR ROSWELL, N. MEX.

LOCATION --At gaging station on downstream side of road bridge, at Diamond A. Ranch, 8 miles upstream from Rocky Arroyo, and 18 miles west of Roswell, Chaves County 947 square miles (contributing area).

DRAINAGE AREA

RECORDS AVAILABLE --Chemical analyses: August 1956 to September 1957 (intermittent).

Water temperatures: September 1951 to September 1955, May to September 1957.

EXTRMS, 1956-57 --Water temperatures: Maximum, 88°F Aug. 1; minimum, 51°F June 1.

Sediment concentrations: Maximum daily, 44,700 ppm July 27; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 127,000 tons Aug. 18; minimum daily, 0 tons on many days.

EXTRMS, 1951-57 --Water temperatures:(1951-55, 1956-57) --Maximum, 88°F Aug. 1, 1957; minimum, 51°F June 1, 1957.

Sediment concentrations: Maximum daily, 64,300 ppm July 19, 1956; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 630,000 tons Oct. 6, 1954; minimum daily, 0 tons on many days.

REMARKS --No flow during October, December, February and March; tabulation omitted for these months. Records of discharge for water year October 1956 to September 1957 given in WSP 1512.

Chemical analyses, in parts per million, August 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (calculated)		Hardness as CaCO <sub>3</sub>	Percent sodium	Specific conductance (micro-mhos at 25°C)	pH		
															Parts per million	Tons per acre-foot						
Aug. 21, 1956	191	17	0.01	108	20	--	11	171		200	18	0.6	1.2	0.08	460	0.63	352	212	7	0.3	692	7.3
June 3, 1957	8	--	--	220	56	34		104			45				1,190	1.62	760	694	9	0.5	1,400	7.9
July 20	a 87.5	--	--	243	61	35		350			45				1,260	1.71	858	570	8	0.5	1,500	7.4
July 21	51	--	--	81	12	8.0		149			11				382	.52	252	130	7	0.2	514	7.6
July 23	245	--	--	86	15	12		95			14				442	.60	276	198	9	0.4	571	7.7
July 24	506	--	--	191	43	26		378			32				900	1.22	654	344	8	0.4	1,170	7.2
July 27		--	--	292	46	23		213			19				1,330	1.61	918	743	5	0.3	1,500	7.2
Aug. 5, 1:40 p.m.	a 314	--	--	266	58	35		189			49				--	--	902	747	8	0.5	1,530	7.3
Aug. 5, 9:00 p.m.	a 22	12	--	--	--	6.8		106			7.5				--	--	199	112	7	0.2	414	7.7
Aug. 6, 9:40 a.m.	a 1,550	--	--	230	68	31		240			42				--	--	854	657	7	0.5	1,420	7.3
Aug. 6, 8:00 p.m.	a 146	--	--	101	17	9		189			10				--	--	322	167	6	0.2	638	7.3
Aug. 18	919	18	--	--	--	6.6		209			6.0				--	--	230	58	6	0.2	457	7.6
Aug. 20	42	12	--	--	--	23		142			18				--	--	530	414	9	0.4	1,080	7.7
Sept. 9	4	19	--	--	--	38		115			47				--	--	690	596	11	0.6	1,310	8.0

a Discharge at time of sampling.

## WESTERN GULF OF MEXICO BASINS

## RIO GRANDE BASIN--Continued

## RIO MONDO AT DIAMOND A RANCH, NEAR ROSWELL, N. MEX.--Continued

Temperature (°F) of water, May to September 1957  
Once daily measurement, generally between 11:00 a.m. and 6:00 p.m.

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1									51	--	88	75
2									a 58	--	84	a 68
3									74	--	86	a 68
4									--	--	79	a 70
5									--	--	77	a 70
6									--	--	75	a 70
7									--	--	78	75
8									--	--	78	a 64
9									--	--	80	a 68
10									--	--	83	a 68
11									--	--	--	75
12									--	--	--	75
13									--	--	--	75
14									--	--	--	a 66
15									--	--	78	--
16									--	--	75	--
17									a 58	--	74	--
18									--	--	86	--
19									--	--	75	--
20									--	80	77	--
21									--	76	80	--
22									--	--	a 72	--
23									--	75	80	--
24									--	75	78	--
25									--	80	a 75	--
26									--	82	82	--
27									--	77	a 71	--
28									--	81	a 70	--
29									--	85	a 67	--
30									--	82	b 65	--
31								57	--	81	a 65	--
Average								--	--	79	76	--

a Measurement before 11:00 a.m.

b Measurement after 6:00 p.m.

## Suspended sediment, water year October 1956 to September 1957

Date	Discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Discharge (tons per day)
Nov. 1-30, 1956.....	1	--	e 5
Jan. 1-31, 1957.....	12	--	e 24
Apr. 1-30.....	2	--	e 5
May 10.....	27	--	e 3,000
May 11.....	39	--	e 3,000
May 30.....	35	787	4,530
May 31.....	340	38,300	s 60,000
May 1-31.....	441	--	70,530
June 1.....	19	7,900	405
June 2.....	12	1,900	62
June 3.....	8	484	10
June 4.....	1	--	e 5
June 5.....	1	--	e 4
June 1-30.....	41	--	486

e Estimated.

s Computed by subdividing day.

RIO GRANDE BASIN--Continued

RIO HONDO AT DIAMOND A RANCH, NEAR ROSWELL, N. MEX.--Continued

Suspended sediment, water year October 1956 to September 1957--Continued

Day	July			August			September			
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day	
1.....	0	--	0	6	355	s 12	80	13,500	2,920	
2.....	0	--	0	10	600	16	67	2,600	470	
3.....	0	--	0	4	400	4	50	1,200	162	
4.....	0	--	0	2	141	1	31	485	41	
5.....	0	--	0	43	3,980	s 2,270	18	315	15	
6.....	0	--	0	255	26,900	s 46,900	14	262	10	
7.....	0	--	0	88	11,000	2,610	14	195	7	
8.....	0	--	0	194	31,400	s 24,600	11	80	2	
9.....	0	--	0	50	6,340	s 1,050	4	55	1	
10.....	0	--	0	5	1,250	17	11	62	2	
11.....	0	--	0	0	--	0	9	48	1	
12.....	0	--	0	0	--	0	1	6	(t)	
13.....	0	--	0	0	--	0	3	10	(t)	
14.....	0	--	0	0	--	0	5	8	(t)	
15.....	0	--	0	102	15,900	s 9,170	4	--	(et)	
16.....	0	--	0	117	32,400	s 8,720	3	--	(et)	
17.....	0	--	0	130	21,800	s 12,300	3	--	(et)	
18.....	0	--	0	919	40,200	s 127,000	2	--	(et)	
19.....	0	--	0	179	17,500	s 9,400	1	--	(et)	
20.....	53	13,400	s 3,100	42	4,300	488	0	--	0	
21.....	51	11,200	s 2,610	25	960	65	0	--	0	
22.....	1	--	e 3	27	625	s 53	2	--	e 1	
23.....	245	28,600	s 38,300	28	540	41	2	--	(et)	
24.....	39	16,700	s 1,850	36	1,390	s 160	1	--	(et)	
25.....	104	17,800	s 7,640	26	2,980	209	0	--	0	
26.....	277	7,380	s 50,500	21	1,300	74	0	--	0	
27.....	506	44,700	s 84,400	10	400	11	0	--	0	
28.....	142	34,900	s 14,100	2	420	2	0	--	0	
29.....	13	13,200	463	2	100	1	0	--	0	
30.....	2	760	4	2	687	s 106	0	--	0	
31.....	1	136	s 1	23	4,170	s 705	--	--	--	
Total.	1,434	--	202,971	2,348	--	245,985	336	--	3,633	
Total discharge for year (cfs-days).....										4,615
Total load for year (tons).....										523,639

e Estimated.

s Computed by subdividing day.

t Less than 0.50 ton.

RIO GRANDE BASIN--Continued  
RIO HONDO AT DIAMOND A RANCH, NEAR ROSWELL, N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1956 to September 1957  
(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipet; S, sieve; N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed; V, visual accumulation tube)

Date of collection	Time	Discharge (cfs)	Water temperature (°F)	Suspended sediment										Methods of analysis		
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters										
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250		0.350	0.500
May 31, 1957	12:05 a. m.	3,000	52	90,500	4,320	--	41	--	66	--	94	98	100	--	--	SPWCM
June 2	7:30 p. m.	9	68	1,700	1,700	--	95	--	99	--	99	100	--	--	--	SPWCM
July 20	8:10 a. m.	152	75	24,600	3,830	--	58	--	88	--	98	99	100	--	--	VPWCM
July 21	10:50 p. m.	7	77	2,440	5,050	--	92	--	100	--	--	--	--	--	--	PWCM
July 23	8:50 a. m.	1,030	73	78,100	4,780	--	27	--	55	--	94	99	100	--	--	VPWCM
July 26	11:30 p. m.	3,680	73	92,700	3,940	--	32	--	50	--	93	98	100	--	--	VPWCM
July 26	11:30 p. m.	4,920	68	73,300	4,130	--	44	--	64	--	95	99	100	--	--	VPWCM
July 27	1:40 a. m.	2,110	66	62,500	4,350	--	43	--	62	--	90	97	100	--	--	SPWCM
July 27	2:50 a. m.	1,300	66	65,400	3,780	--	44	--	61	--	90	96	99	100	--	VPWCM
Aug. 5	1:50 p. m.	402	81	33,800	3,840	--	47	--	68	--	93	97	99	100	--	VPWCM
Aug. 6	9:15 a. m.	724	74	38,900	3,840	14	17	19	27	44	81	92	99	100	100	VPWCM
Aug. 6	9:15 a. m.	724	74	38,900	4,680	2	4	11	24	36	81	92	99	100	100	VPN
Aug. 6	9:55 a. m.	1,620	74	85,700	5,030	--	32	--	52	--	91	98	100	--	--	VPWCM
Aug. 8	2:35 a. m.	571	71	48,000	3,670	--	40	--	61	--	87	97	100	--	--	VPWCM
Aug. 8	10:45 a. m.	151	73	28,600	4,520	46	58	71	83	92	97	99	100	--	--	VPWCM
Aug. 8	10:45 a. m.	151	73	28,600	4,740	2	5	12	82	92	97	99	100	--	--	VPN
Aug. 18	4:35 p. m.	3,400	66	43,900	4,140	--	26	--	46	--	81	96	100	--	--	VPWCM
Aug. 18	5:25 p. m.	2,400	66	41,500	3,760	19	29	36	46	57	81	96	99	100	100	VPWCM
Aug. 18	5:25 p. m.	2,400	66	41,500	4,740	3	6	18	37	56	81	96	99	100	100	VPN

RIO GRANDE BASIN--Continued  
 PECOS RIVER NEAR ARTESIA, N. MEX.

LOCATION--At gaging station at bridge on State Highway 83, 4.3 miles east of Artesia, Eddy County, 7.0 miles north of mouth of Rio Penasco, and 17 miles north of McHittan Dam.  
 DRAINAGE AREA--15,500 square miles, approximately (contributing area).  
 RECORDS AVAILABLE--Chemical analyses: July 1937 to September 1957.  
 Water temperatures: April 1949 to September 1957.  
 Sediment records: January 1949 to September 1957.

EXTREMES, 1956-57.--Dissolved solids: Maximum, 572 ppm July 11; minimum, 332 ppm July 26-27.  
 Specific conductance: Maximum daily, 19,700 microhms July 11; minimum daily, 792 microhms July 26.  
 Water temperatures: Maximum, 90°F June 28; minimum, 38°F Jan. 18.  
 Sediment concentrations: Maximum daily, 12,700 ppm June 3; minimum daily, no flow on several days in July.  
 Specific conductance: Maximum daily, 81,300 tons May 31; minimum daily, 0 tons on several days in July.  
 EXTREMES, 1937-57.--Dissolved solids: Maximum, 14,800 ppm July 11, 1957; minimum, 270 ppm Oct. 7-8, 1954.  
 Specific conductance: Maximum daily, 20,700 microhms Sept. 10, 1955; minimum daily, 745 microhms Oct. 8, 1954.  
 Water temperatures (1949-57): Maximum, 92°F June 30, 1953; minimum, freezing point, Feb. 2, 1956.  
 Sediment concentrations (1949-57): Maximum daily, 20,800 ppm July 22, 1955; minimum daily, no flow on many days.  
 Sediment loads (1949-57): Maximum daily, 183,000 tons Sept. 26, 1955; minimum daily, 0 tons on many days.  
 REMARKS.--Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of discharge for water year October 1956 to September 1957 given in WSP 1512.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO <sub>3</sub>		Per-sodium	So-dium absorp-tion ratio	Specific conductance (microhms at 25°C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium	Non-carbonate				
Oct. 1-4, 1956.....	13.8	23	145	724	320	2,190	145	2,480	2,890	3,330	--	--	--	9,270	12.6	345	3,120	3,000	60	17	12,700	7.5
Oct. 5-16.....	12.8	20	653	653	266	1,680	148	2,480	2,580	2,580	--	--	--	7,970	10.5	266	2,950	2,730	55	13	10,600	7.4
Oct. 19-21.....	24.0	19	594	588	280	1,850	148	2,220	2,890	2,130	--	--	--	6,370	10.8	463	2,630	2,510	60	16	11,300	7.6
Oct. 22-31.....	26.1	19	576	559	259	1,350	150	2,150	2,080	2,080	--	--	3.7	6,320	8.60	528	2,500	2,360	52	12	9,150	7.5
Nov. 1-6.....	30.8	17	576	576	259	1,250	168	2,110	2,020	2,020	2.6	2.6	3.7	3,510	4.77	1,270	1,990	1,870	29	3.7	8,820	7.7
Nov. 9-15.....	134	21	580	145	375	151	1,800	535	1,800	535	2.5	2.5	2.5	4,360	5.93	622	2,180	2,020	39	5.9	5,700	7.6
Nov. 16-24.....	69.8	20	584	171	632	171	1,690	975	1,690	975	3.9	3.9	3.9	5,240	7.13	754	2,330	2,180	46	8.2	7,080	7.8
Nov. 25-30.....	53.3	20	580	214	912	175	1,980	1,440	1,980	1,440	--	--	--	5,670	7.71	900	2,340	2,220	50	9.6	7,920	7.9
Dec. 1-31.....	58.8	17	564	228	1,070	152	1,930	1,780	1,930	1,780	3.3	3.3	3.3	5,860	7.97	990	2,340	2,210	51	10	8,280	7.9
Jan. 1-31, 1957.....	62.6	17	556	233	1,140	165	1,940	1,890	1,940	1,890	--	--	--	6,260	8.54	899	2,460	2,340	52	11	8,620	7.6
Feb. 1-28.....	53.0	16	584	245	1,250	156	2,070	2,040	2,070	2,040	--	--	--	6,760	9.18	756	2,560	2,440	54	12	9,410	7.8
Mar. 1-16.....	41.5	23	615	250	1,360	154	2,230	2,200	2,230	2,200	1.3	1.3	1.3	4,360	5.93	5,190	2,180	2,010	37	5.5	5,900	7.4
Mar. 17.....	443	26	599	166	587	205	2,060	815	2,060	815	3.2	3.2	3.2	3,070	4.18	5,160	1,970	1,750	21	2.3	3,590	7.7
Mar. 18-23.....	691	20	592	95	235	149	1,750	310	1,750	310	3.0	3.0	3.0	3,440	4.68	1,510	1,920	1,800	29	3.5	4,800	8.3
Mar. 24-25.....	163	19	568	109	356	137	1,770	530	1,770	530	3.0	3.0	3.0	3,440	4.68	1,510	1,920	1,800	29	3.5	4,800	8.3
Mar. 26-31.....	62.0	17	611	152	462	148	1,960	920	1,960	920	2.6	2.6	2.6	4,340	5.90	737	2,150	2,030	38	5.6	5,600	7.6

RIO GRANDE BASIN--Continued  
 PECOS RIVER NEAR ARTESIA, N. MEX.--Continued

Chemical analyses, in parts per million, water year October 1956 to September 1957.--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium magnesium	Non-carbonate			
Apr. 1-5, 1957	39.6	18		643	207	924		138	2,220	1,470		3.6		5,550	7.55	593	2,460	2,340	45	7,360	7.5
Apr. 6-30	31.2	18		667	264	1,400		156	2,410	2,260		--		7,100	9.66	598	2,750	2,620	53	9,790	7.5
May 1-15	39.1	13		637	273	1,500		159	2,440	2,440		--		7,320	9.96	773	2,710	2,560	55	10,200	7.4
May 16-19	36.2	14		588	178	1,980		119	1,980	1,580		3.4		5,390	7.33	527	2,200	2,100	50	7,470	7.1
May 20-27	12.4	14		651	273	1,420		114	2,370	2,340		--		7,120	9.68	238	2,650	2,650	53	9,880	7.2
May 28	424	26		592	128	590		204	1,850	860		9		4,150	5.64	4,750	2,000	1,840	39	5,400	7.4
May 29-30	240	14		498	81	274		139	1,470	378		3.1		2,780	3.78	1,800	1,570	1,460	28	3,480	7.6
May 31	1,630	20		153	21	137		a241	281	204		1.3		936	1.27	4,120	1,468	270	39	1,480	8.3
June 1-2	686	--		223	40	141		213	--	190		--		b1,340	1.82	2,480	718	544	30	1,830	7.8
June 3-7	211	21		310	50	174		135	885	232		4.1		1,740	2.37	991	979	868	28	2,320	7.8
June 8-10	51.3	25		222	157	351		134	1,030	525		6.7		2,380	3.24	330	1,200	1,080	39	3,440	7.9
June 11-15	19.3	28		449	114	590		126	1,340	975		3.9		3,580	4.84	188	1,490	1,490	45	5,180	7.6
June 16-22	5.73	26		580	164	980		147	1,830	1,510		3.1		5,150	7.09	79.7	2,070	1,950	51	7,120	7.5
June 23-July 3	2.07	26		715	223	1,430		130	2,920	2,240		--		7,120	9.68	39.8	2,700	2,580	54	9,720	7.5
July 11	227	24		963	362	3,540		178	5,900	5,900		--		b14,600	20.1	9,070	3,950	3,800	66	19,700	7.3
July 12-22	302	24		482	71	180		128	1,400	238		3.3		2,480	3.39	2,030	1,520	1,410	20	3,000	7.5
July 23-25	283	21		373	52	166		128	1,940	230		4.0		1,940	2.64	1,600	1,140	1,040	24	2,480	7.4
July 26-27	283	15		113	12	50		107	--	77		--		b572	.78	437	332	184	25	860	8.2
July 28-30	37.7	15		153	28	133		101	402	206		4.9		1,35	1.01	496	409	37	2.6	1,520	7.7
July 31	217	--		516	140	664		133	--	1,080		--		b4,470	6.08	2,620	1,860	1,750	44	5,540	7.7
Aug. 1-2	1,315	--		365	45	122		171	--	150		--		b1,870	2.54	6,640	1,100	956	20	2,200	7.5
Aug. 3-11	580	23		274	30	77		145	682	98		3.0		1,260	1.71	1,970	807	688	17	1,660	7.4
Aug. 12	498	--		266	36	129		129	--	182		--		b1,460	1.99	1,960	812	688	26	1,900	7.5
Aug. 13-17	838	20		212	20	49		142	509	52		2.0		934	1.27	2,110	611	494	15	1,250	7.6
Aug. 18-23	187	21		263	32	126		135	663	188		4.0		1,360	1.85	687	790	680	26	1,190	7.5
Aug. 24-31	27.8	15		453	100	590		112	1,380	905		1.8		3,510	4.77	263	1,540	1,450	45	4,880	7.4
Sept. 1-15	6.09	19		576	169	945		116	1,860	1,510		2.1		5,140	6.99	84.5	2,130	2,040	49	7,090	7.4
Sept. 16-20	9.36	21		790	246	2,100		104	2,550	3,480		--		9,240	12.6	234	2,980	2,890	60	13,100	7.4
Sept. 21	626	--		318	50	170		125	--	222		--		b1,840	2.50	3,110	999	881	27	2,340	7.5
Sept. 22-30	451	17		266	28	93		125	677	130		1.8		1,270	1.73	1,550	778	676	21	1,700	7.5
Weighted average	d 125	20		405	94	401		152	1,220	624		--		2,840	3.86	958	1,400	1,270	38	3,790	--

a Includes 4 parts per million of carbonate (CO<sub>3</sub>).

b Residues on evaporation at 180°C.

c No flow July 4-10.

d Average for 356 days of flow.

## RIO GRANDE BASIN--Continued

## PECOS RIVER NEAR ARTESIA, N. MEX.--Continued

Temperature (°F) of water, water year October 1956 to September 1957  
 Once-daily measurement, generally between 11 p. m. and 6 p. m.

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	--	57	50	44	49	a 54	64	b 72	62	87	87	76
2	74	51	50	50	47	a 55	a 56	75	65	88	85	a 74
3	72	50	52	48	51	49	58	75	63	a 75	86	a 70
4	76	50	52	52	50	a 53	a 58	65	b 70	84	b 80	76
5	74	48	49	47	52	a 49	59	58	a 70	80	80	80
6	74	50	50	49	52	a 52	65	65	a 75	a 77	a 75	78
7	a 67	55	55	55	61	49	a 61	55	a 75	82	80	78
8	a 67	a 54	50	55	61	52	57	a 70	a 79	a 77	80	74
9	a 64	a 51	43	--	a 55	a 53	a 55	70	80	80	80	79
10	a 65	53	43	49	62	65	63	68	77	a 76	78	a 70
11	67	--	56	50	57	58	62	70	80	82	80	80
12	67	a 51	58	55	a 55	58	a 52	a 68	77	82	78	78
13	73	--	50	53	a 57	a 57	45	75	80	85	79	a 70
14	70	--	a 45	50	59	54	a 54	a 67	85	81	78	79
15	71	--	51	45	62	53	67	75	84	83	79	a 68
16	73	49	50	--	53	55	67	72	a 82	83	79	70
17	65	48	47	45	50	58	71	73	a 70	81	80	a 70
18	67	46	47	a 38	50	57	70	a 68	a 72	85	78	75
19	69	--	48	46	47	58	70	74	80	85	78	78
20	65	a 45	47	47	52	50	73	70	82	a 80	a 74	78
21	a 58	45	49	51	55	61	70	a 67	83	a 82	80	70
22	68	44	50	47	50	58	65	a 65	80	85	a 75	70
23	64	47	43	43	52	48	b 62	--	84	78	a 74	68
24	65	a 42	42	47	54	45	63	75	82	a 78	78	61
25	a 55	--	39	48	a 49	48	65	75	87	a 76	80	68
26	58	49	42	40	49	56	63	75	88	a 75	a 78	69
27	58	--	40	40	55	a 55	72	a 74	a 85	a 81	a 76	70
28	67	48	47	--	a 54	55	60	76	90	85	a 80	a 66
29	59	48	a 40	45	--	57	57	b 67	a 88	88	81	a 64
30	56	46	43	46	--	64	70	72	88	86	78	70
31	57	--	47	46	--	64	--	60	--	85	a 74	--
Average	66	--	48	48	54	55	62	70	79	82	79	73

a Measurement before 11 a. m.

b Measurement after 6 p. m.

## RIO GRANDE BASIN--Continued

## PECOS RIVER NEAR ARTESIA, N. MEX.--Continued

Suspended sediment, water year October 1956 to September 1957

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	8.4	31	1	28	28	2	46	19	2
2.....	15	63	3	26	102	7	42	134	15
3.....	16	57	2	29	76	6	42	29	3
4.....	16	160	7	29	85	7	41	29	3
5.....	17	22	1	31	69	6	42	47	5
6.....	14	5	(at)	34	141	13	42	31	4
7.....	14	6	(t)	35	137	13	50	46	6
8.....	14	46	2	34	84	8	46	31	4
9.....	16	79	3	125	612	s 385	46	55	7
10.....	16	60	3	256	2,350	1,620	49	26	3
11.....	16	55	2	171	1,220	563	52	12	2
12.....	16	55	2	126	455	155	57	11	2
13.....	12	42	1	95	143	37	55	50	7
14.....	8.8	26	1	87	70	16	56	27	4
15.....	6.4	30	a1	75	51	10	65	18	3
16.....	6.7	40	1	69	24	4	71	44	8
17.....	8.4	57	1	67	16	3	71	13	2
18.....	14	39	1	72	25	5	70	50	9
19.....	29	99	8	75	41	8	71	19	4
20.....	21	20	1	70	36	7	71	91	17
21.....	22	120	7	77	24	5	68	44	8
22.....	21	20	1	72	40	8	67	72	13
23.....	24	38	2	67	27	5	65	69	12
24.....	24	50	a3	59	30	5	62	70	12
25.....	25	78	5	56	27	4	67	80	14
26.....	28	16	1	57	26	4	67	57	10
27.....	25	51	3	56	6	1	70	26	5
28.....	26	56	4	55	5	a1	68	75	14
29.....	28	41	3	52	12	2	68	46	8
30.....	31	30	3	44	33	4	69	50	9
31.....	29	77	6	--	--	--	66	44	8
Total.	567.7	--	79	2,129	--	2,914	1,822	--	223
	January			February			March		
1.....	67	71	13	56	63	10	52	73	10
2.....	69	36	7	55	84	12	43	110	13
3.....	72	22	4	51	89	12	44	57	7
4.....	77	31	6	49	74	10	42	80	9
5.....	76	74	15	52	87	12	42	62	7
6.....	75	51	10	49	85	11	42	32	4
7.....	73	10	2	47	80	a10	46	56	8
8.....	73	39	8	46	82	10	40	80	9
9.....	72	43	8	45	121	15	42	57	6
10.....	72	38	7	45	84	10	36	51	5
11.....	70	53	10	42	197	22	39	51	5
12.....	68	20	a4	45	100	12	41	42	5
13.....	67	20	a4	47	57	7	38	40	4
14.....	68	25	5	40	88	10	33	42	4
15.....	68	44	8	43	196	25	33	66	6
16.....	61	30	a5	51	210	29	46	50	a6
17.....	56	26	4	55	99	15	441	798	s 1,070
18.....	51	29	4	56	217	33	595	1,400	2,250
19.....	53	13	2	60	109	18	642	1,400	2,430
20.....	54	19	3	62	229	38	744	1,520	3,050
21.....	54	46	7	64	97	17	796	1,420	3,050
22.....	55	30	a4	67	146	26	644	1,280	2,230
23.....	54	30	a4	65	120	21	315	1,500	1,280
24.....	54	20	a3	65	126	22	177	1,380	660
25.....	52	20	a3	65	60	11	149	482	194
26.....	51	15	2	58	112	18	107	247	71
27.....	50	14	2	52	56	8	83	174	39
28.....	50	4	1	52	122	17	64	111	19
29.....	57	17	3	--	--	--	48	89	12
30.....	60	9	1	--	--	--	38	79	8
31.....	60	42	7	--	--	--	32	76	7
Total.	1,941	--	166	1,484	--	459	5,539	--	16,478

s Computed by subdividing day.

t Less than 0.50 ton.

a Computed from estimated concentration graph.

RIO GRANDE BASIN--Continued

PECOS RIVER NEAR ARTESIA, N. MEX.--Continued

Suspended sediment, water year October 1956 to September 1957--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	56	97	15	35	109	10	674	8,780	s 19,600
2.....	47	112	14	32	83	7	698	9,460	s 19,800
3.....	34	120	a 11	23	84	5	490	12,700	16,800
4.....	28	130	10	19	76	4	213	9,000	5,610
5.....	33	21	2	30	94	8	148	3,600	1,440
6.....	37	130	12	32	181	16	106	700	200
7.....	34	72	7	37	242	24	81	275	60
8.....	32	78	7	40	231	25	58	105	16
9.....	40	68	7	39	116	12	54	58	8
10.....	35	65	6	38	97	10	42	105	12
11.....	30	50	a 4	36	144	14	30	62	5
12.....	29	45	4	37	108	11	28	68	5
13.....	28	24	2	40	107	12	17	51	2
14.....	30	29	2	79	151	32	13	50	a 2
15.....	41	52	6	70	176	33	8.7	50	a 1
16.....	40	39	4	46	74	9	5.1	40	a 1
17.....	27	143	10	41	50	6	6.1	67	1
18.....	25	59	4	32	63	5	6.1	33	1
19.....	32	213	18	26	60	4	7.5	96	2
20.....	31	76	6	21	36	2	4.4	50	a 1
21.....	29	50	a 4	23	94	6	3.3	50	(at)
22.....	29	35	3	14	90	a 3	7.6	71	1
23.....	29	50	a 4	11	77	2	9.2	106	3
24.....	25	70	5	9.2	94	2	5.1	85	1
25.....	26	65	a 5	7.7	81	2	2.6	74	1
26.....	23	60	a 4	7.0	83	2	1.8	126	1
27.....	20	61	3	6.1	80	a 1	1.4	102	(t)
28.....	26	86	6	424	8,450	s 14,300	1.1	65	(t)
29.....	42	109	12	322	9,500	8,260	.7	33	(t)
30.....	40	102	11	159	3,200	1,370	.5	90	(t)
31.....	--	--	--	1,630	11,500	s 81,300	--	--	--
Total.	978	--	208	3,366.0	--	105,497	2,741.2	--	63,575
	July			August			September		
1.....	0.2	70	(t)	1,380	9,830	s 37,800	28	94	7
2.....	.1	93	(t)	1,250	10,200	s 36,200	16	101	4
3.....	.1	178	(t)	799	7,900	17,000	9.2	106	3
4.....	0	--	0	920	5,800	14,400	6.4	136	2
5.....	0	--	0	842	6,400	14,500	2.9	121	1
6.....	0	--	0	804	6,300	13,700	1.9	129	1
7.....	0	--	0	1,060	5,200	14,900	1.2	80	(t)
8.....	0	--	0	436	4,400	5,180	1.9	156	1
9.....	0	--	0	178	2,600	1,250	1.9	65	(t)
10.....	0	--	0	112	1,000	302	2.4	58	(t)
11.....	227	1,130	s 785	66	600	107	3.1	78	1
12.....	340	2,270	2,080	498	4,180	s 7,290	2.4	116	1
13.....	461	3,000	3,730	828	5,900	13,200	1.9	70	(t)
14.....	555	3,300	4,950	966	4,300	11,200	2.1	73	(t)
15.....	592	3,200	5,110	966	3,800	9,910	10	76	2
16.....	605	3,330	5,440	990	3,700	9,890	4.7	16	(t)
17.....	290	2,400	1,880	438	2,600	3,070	1.6	17	(t)
18.....	154	870	362	193	1,700	886	.7	30	(at)
19.....	94	250	63	278	1,300	976	.8	53	(t)
20.....	65	80	14	268	3,020	s 2,120	39	100	a 11
21.....	45	50	6	154	3,600	1,500	626	6,150	s 10,700
22.....	116	200	63	130	1,800	632	842	4,800	10,900
23.....	227	2,660	s 1,580	100	1,000	270	946	4,700	12,000
24.....	115	3,700	s 1,160	54	376	55	958	4,000	10,300
25.....	574	2,460	s 6,600	34	160	15	677	3,400	6,210
26.....	466	3,900	s 5,910	28	63	5	251	2,000	1,360
27.....	100	572	s 187	25	68	5	151	1,200	489
28.....	43	116	13	20	47	3	98	800	212
29.....	36	67	7	25	89	6	70	450	85
30.....	34	44	4	20	74	4	62	200	33
31.....	217	1,250	s 1,700	16	73	3	--	--	--
Total.	5,356.4	--	41,644	13,878	--	216,379	4,819.1	--	52,325

Total discharge for year (cfs-days)..... 44,621.4  
 Total load for year (tons)..... 499,947

s Computed by subdividing day.  
 t Less than 0.50 ton.  
 a Computed from estimated concentration graph.

## RIO GRANDE BASIN--Continued

## PECOS RIVER NEAR ARTESIA, N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1956 to September 1957

(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipe; S, sieve; N, in native water;

W, in distilled water; C, chemically dispersed; M, mechanically dispersed; V, visual accumulation tube)

Date of collection	Time	Discharge (cfs)	Water temperature (° F)	Suspended sediment										Methods of analysis		
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters										
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250		0.350	0.500
Jan. 14, 1957 . . .	12:00 m.	55	55	25	--	--	--	--	--	--	62	70	98	100	100	S
Mar. 20 . . . . .	6:15 p. m.	759	52	2,170	2,940	60	84	84	84	96	96	99	100	100	100	SPWCM
Apr. 26 . . . . .	9:30 a. m.	21	60	31	--	--	--	--	--	68	76	98	100	100	100	S
Aug. 16 . . . . .	9:45 a. m.	1,020	79	3,600	3,380	53	71	71	71	94	94	100	100	100	100	VPWCM
Aug. 25 . . . . .	12:15 p. m.	30	80	160	--	--	--	--	--	86	94	99	100	100	100	S
Aug. 29 . . . . .	11:15 a. m.	16	81	312	--	--	--	--	--	20	34	99	100	100	100	V
Sept. 7 . . . . .	11:00 a. m.	1.6	78	80	--	--	--	--	--	88	93	99	100	100	100	S
Sept. 21 . . . . .	9:45 a. m.	631	64	7,930	3,090	65	90	90	90	97	99	100	100	100	100	VPWCM
Sept. 26 . . . . .	5:00 p. m.	216	69	1,680	4,410	68	88	88	88	92	95	100	100	100	100	VPWCM

## RIO GRANDE BASIN--Continued

## PECOS RIVER SEEPAGE INVESTIGATION

Several series of water samples were collected during the months of October 1956, January, March, and June 1957 on the Pecos River and its tributaries beginning at the gaging station near Acme, N. Mex., and ending at the gaging station near Artesia, N. Mex. Samples were collected for chemical analysis at the time of discharge measurement. Discharge data are given in WSP 1512.

Chemical analyses, in parts per million, of Pecos River and tributaries, N. Mex., water year October 1956 to September 1957

Date	Streams or diversion	Location	Discharge (cfs)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Hardness as CaCO <sub>3</sub> calcium, magnesium	Specific conductance (micro-mhos at 25°C)	pH
Oct. 17, 1956	Bitter Creek	Near mouth, 6½ miles east of Roswell.	2.07	58	7,660	6,090	--	21,400	--
17	Pecos River	Just upstream from Rio Hondo, 7 miles east of Roswell.	5.84	238	--	2,230	--	8,810	6.8
17	Hagerman, Inc. well "a".	NE¼NE¼NE¼ sec. 35, T. 10 S., R. 24 E. (empties into Rio Hondo above Hagerman Canal), 3 miles east of Roswell.	5.47	145	--	3,490	--	11,900	8.0
17	Hagerman, Inc. well "b".	NE¼NE¼NE¼ sec. 35, T. 10 S., R. 24 E. (empties into Rio Hondo above Hagerman Canal), 3 miles east of Roswell.	6.34	57	--	3,570	--	11,800	8.0
17	Hagerman Canal.	At head, 5 miles east of Roswell (diverts from Rio Hondo).	24.4	237	1,180	2,610	--	9,440	7.5
17	South Spring Creek.	At entrance to Hagerman Canal, SE¼SE¼SE¼ sec. 8, T. 11 S., R. 25 E., 2½ miles northeast of East Grand Plains.	2.81	218	--	526	--	3,590	7.8
17	Pamona main drain	At entrance to Hagerman Canal, NW¼NW¼SE¼ sec. 22, T. 11 S., R. 25 E., 2½ miles east of East Grand Plains.	4.28	227	1,500	94	--	2,770	7.7
17	Rio Hondo.	At mouth, 7 miles east of Roswell.	5.00	239	1,080	1,350	--	5,750	7.2
17	East Grand Plains Drainage District "D" line.	At mouth, 3.1 miles northeast of East Grand Plains.	.90	324	--	226	--	2,430	7.1
17	East Grand Plains Drainage District "A-B-C" lines.	At mouth, 3.4 miles northeast of East Grand Plains.	.40	273	1,080	238	--	2,710	7.4
17	Gravel Pit drain.	At mouth, 3½ miles east of East Grand Plains.	.49	312	--	186	--	2,410	8.0
17	Pecos River	Below Bottomless Lakes, 4½ miles east of East Grand Plains.	15.2	204	1,240	1,240	--	5,680	8.2
17	Oasis-Miller drain.	At mouth, 4½ miles east of East Grand Plains.	.54	307	--	155	--	3,360	7.4
17	Nine Mile Draw.	At mouth, 3 miles north of Dexter.	.09	185	--	545	--	4,010	7.8
17	Pecos River	At Dexter Bridge, 2¼ miles northeast of Dexter.	12.6	169	--	1,310	--	6,230	7.8
17	Berry ditch	At mouth, 3 miles east of Dexter.	.39	291	--	150	--	3,860	7.7
17	Dexter-Greenfield drain, "E" line.	At mouth, 4 miles northeast of Dexter.	.12	215	--	1,470	--	8,430	8.0
17	Dexter-Greenfield drain, "D" line.	At mouth, 4 miles southeast of Dexter.	.38	237	--	915	--	5,580	7.2
17	Pecos River	0.8 mile upstream from Rio Felix and 2½ miles north of Hagerman.	16.6	164	--	1,110	--	5,790	7.4
17	Rio Felix	0.7 mile upstream from mouth and 2 miles north of Hagerman.	.08	142	2,190	1,860	--	8,150	8.0

## WESTERN GULF OF MEXICO BASINS

## RIO GRANDE BASIN--Continued

## PECOS RIVER SEEPAGE INVESTIGATION--Continued

Chemical analyses, in parts per million, of Pecos River and tributaries,  
N. Mex., water year October 1956 to September 1957--Continued

Date	Streams or diversions	Location	Dis-charge (cfs)	Bicar-bonate (HCO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Hardness as CaCO <sub>3</sub> calcium, magne-sium	Specific conduct-ance (micro-mhos at 25°C)	pH
Oct. 17, 1956	Hagerman Drainage District, "D" line.	At mouth, 1½ miles northeast of Hagerman.	0.10	361	--	76	--	1,650	7.2
17	Pecos River	Near Lake Arthur (gaging station).	6.99	169	--	4,520	--	15,700	7.9
17	Walnut Creek	Near mouth, ¼ mile south of Lake Arthur.	.10	166	--	255	--	3,360	8.2
17	Lake Arthur Drainage District, "B" line.	At mouth, 3½ miles southeast of Lake Arthur.	.03	343	--	590	--	7,270	7.6
17	Lawrence Ranch drain	At mouth, 6¼ miles south of Lake Arthur.	.39	239	--	58	--	2,380	7.6
17	Cottonwood Creek.	Near Lake Arthur (gaging station).	.28	228	--	250	--	3,870	8.2
17	Pecos River	Near Artesia (gaging station).	8.86	137	--	2,310	--	9,830	8.3
Jan. 2, 1957	do. . . . .	Near Acme (gaging station).	4.98	144	1,830	635	--	4,700	7.5
2	Bitter Creek	Near mouth, 6½ miles east of Roswell.	5.99	102	2,630	4,180	--	15,300	7.4
2	Pecos River	Just upstream from Rio Hondo, 7 miles east of Roswell.	17.1	175	1,870	2,030	--	9,160	6.8
2	Hagerman Canal.	At head, 5 miles east of Roswell (diverts from Rio Hondo).	1.56	241	1,560	1,810	--	7,770	7.1
2	South Spring Creek.	At entrance to Hagerman Canal, SE¼SE¼SE¼ sec. 8, T. 11 S., R. 25 E., 2¼ miles northeast of East Grand Plains.	3.94	257	1,230	510	--	3,820	7.1
2	Pamona drain.	At entrance to Hagerman Canal, NW¼NW¼SE¼ sec. 22, T. 11 S., R. 25 E., 2¼ miles east of East Grand Plains.	2.73	255	1,340	88	--	2,590	7.5
2	Rio Hondo. . .	At mouth, 7 miles east of Roswell.	24.9	256	1,260	1,260	--	5,910	7.3
2	East Grand Plains Drainage District "D" line.	At mouth, 3.1 miles northeast of East Grand Plains.	.70	266	994	265	--	2,690	6.9
2	East Grand Plains Drainage District "A-B-C" lines.	At mouth, 3.4 miles northeast of East Grand Plains.	1.05	292	1,600	318	--	3,620	7.6
2	Gravel Pit drain.	At mouth, 3½ miles east of East Grand Plains.	.84	287	1,080	218	--	2,710	7.7
2	Pecos River.	Below Bottomless Lakes, 4¼ miles east of East Grand Plains.	51.7	226	1,520	1,450	--	6,720	7.1
2	Oasis-Miller drain.	At mouth, 4¼ miles east of East Grand Plains.	.15	169	2,170	350	--	4,360	7.8
2	Nine Mile draw.	At mouth, 3 miles north of Dexter.	.86	193	1,560	410	--	3,740	7.4
2	Pecos River.	At Dexter Bridge, 2¼ miles northeast of Dexter.	54.4	221	1,580	1,470	--	6,860	7.1
2	Berry ditch.	At mouth, 3 miles east of Dexter.	.63	--	2,160	320	--	4,040	8.1
2	Zuber Hollow ditch.	1 mile upstream from mouth and 3 miles east of Dexter.	.45	209	1,920	505	--	4,400	7.6
2	Dexter-Greenfield drain, "A" line.	At mouth, 4 miles southeast of Dexter.	.22	178	1,660	1,000	--	5,420	7.7
2	Dexter-Greenfield drain, "E" line.	At mouth, 4 miles northeast of Dexter.	.09	169	1,870	326	--	3,840	8.1
2	Dexter-Greenfield drain, "D" line.	At mouth, 4 miles southeast of Dexter.	.28	253	2,380	1,520	--	7,790	7.4

a Includes equivalent of 5 parts per million of carbonate (CO<sub>3</sub>).

## RIO GRANDE BASIN--Continued

## PECOS RIVER SEEPAGE INVESTIGATION--Continued

Chemical analyses, in parts per million, of Pecos River and tributaries,  
N. Mex., water year October 1956 to September 1957--Continued

Date	Streams or diversion	Location	Dis-charge (cfs)	Bicar-bonate (HCO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Hardness as CaCO <sub>3</sub> , calcium, magne-sium	Specific conductance (micro-mhos at 25°C)	pH
Jan. 2, 1957	Pecos River	0.8 mile upstream from Rio Felix and 2½ miles north of Hagerman.	61.3	222	1,660	1,510	--	6,810	8.1
2	Rio Felix...	0.7 mile upstream from mouth and 2 miles north of Hagerman.	2.63	265	1,830	1,350	--	6,720	7.3
2	Hagerman Drainage District, "D" line.	At mouth, 1½ miles northeast of Hagerman.	.09	392	556	64	--	1,600	7.3
2	Pecos River	Near Lake Arthur (gaging station).	63.2	206	1,780	1,750	--	7,750	7.2
2	Lake Arthur Drainage District, "B" line.	At mouth, 3½ miles southeast of Lake Arthur.	.01	253	2,480	270	--	4,500	8.0
2	Lawrence Ranch drain.	At mouth, 6¼ miles south of Lake Arthur.	.05	233	1,360	142	--	2,780	7.6
2	Cottonwood Creek.	Near Lake Arthur (gaging station).	.84	261	2,120	240	--	3,990	7.4
2	Artesia sewage line.	At mouth, 2½ miles east of Artesia.	.11	297	2,020	440	--	4,570	7.6
2	Pecos River	Near Artesia (gaging station).	68.9	181	1,820	1,710	--	7,730	7.9
Mar. 4	.... do .....	Near Acme (gaging station).	.47	147	--	1,440	--	7,520	7.4
4	Bitter Creek	Near mouth, 6½ miles east of Roswell.	4.88	132	2,540	3,490	2,870	13,300	8.8
4	Pecos River	Just upstream from Rio Hondo, 7 miles east of Roswell.	9.94	182	--	3,360	--	12,800	7.5
4	Hagerman, Inc. well "a".	NE¼NE¼ sec. 35, T. 10S., R. 24 E. (empties into Rio Hondo above Hagerman Canal), 3 miles east of Roswell.	4.86	200	940	3,020	1,320	10,800	7.3
4	Hagerman, Inc. well "b".	..... do.....	5.24	202	836	2,520	1,240	8,990	7.2
4	Hagerman Canal.	At head, 5 miles east of Roswell (diverts from Rio Hondo).	26.5	230	--	1,930	--	7,990	7.1
4	South Spring Creek.	At entrance to Hagerman Canal, SE¼SE¼ sec. 8, T. 11 S., R. 25 E., 2¼ miles northeast of East Grand Plains.	4.07	255	1,230	515	1,760	3,690	7.5
4	Pamona drain.	At entrance to Hagerman Canal, NW¼NW¼SE¼ sec. 22, T. 11 S., R. 25 E., 2¼ miles east of East Grand Plains.	3.45	261	1,470	96	1,820	2,770	7.4
4	Rio Hondo ..	At mouth, 7 miles east of Roswell.	6.47	238	--	1,410	--	6,070	7.4
4	East Grand Plains Drainage District "D" line.	At mouth, 3.1 miles northeast of East Grand Plains.	.67	272	965	266	1,430	2,640	7.2
4	East Grand Plains Drainage District "A-B-C" lines.	At mouth, 3.4 miles northeast of East Grand Plains.	1.57	308	1,660	350	2,060	3,780	7.4
4	Gravel Pit drain.	At mouth, 3¼ miles east of East Grand Plains.	.88	258	1,160	218	1,560	2,730	7.6
4	Pecos River	Below Bottomless Lake, 4¼ miles east of East Grand Plains.	24.5	202	--	1,820	--	7,840	7.7
4	Oasis-Miller drain.	At mouth, 4¼ miles east of East Grand Plains.	.41	249	2,170	255	2,530	4,010	7.6
4	Nine Mile draw.	At mouth, 3 miles north of Dexter.	.52	243	1,580	670	2,160	4,490	7.5
4	Zuber Hollow wasteway.	At mouth, 2 miles northeast of Dexter.	.04	166	2,140	605	2,610	4,830	6.9

## WESTERN GULF OF MEXICO BASINS

## RIO GRANDE BASIN--Continued

## PECOS RIVER SEEPAGE INVESTIGATION--Continued

Chemical analyses, in parts per million, of Pecos River and tributaries,  
N. Mex., water year October 1956 to September 1957--Continued

Date	Streams or diversion	Location	Dis-charge (cfs)	Bicar-bonate (HCO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Hardness as CaCO <sub>3</sub> calcium, magne-sium	Specific conductance (micro-mhos at 25°C)	pH
Mar. 4, 1957	Pecos River.	At Dexter Bridge, 2 $\frac{1}{2}$ miles northeast of Dexter.	30.0	201	2,370	1,670	--	7,570	7.8
4	Berry ditch.	At mouth, 3 miles east of Dexter.	.42	219	2,330	160	2,740	3,890	8.0
4	Dexter-Greenfield drain, "A" line.	At mouth, 4 miles southeast of Dexter.	.21	245	1,690	910	2,650	5,190	8.1
4	Dexter-Greenfield drain, "E" line.	At mouth, 4 miles northeast of Dexter.	.32	272	2,850	1,150	3,320	7,340	7.6
4	Dexter-Greenfield drain, "D" line.	At mouth, 4 miles southeast of Dexter.	.49	263	2,350	1,430	3,280	7,480	7.7
4	Pecos River.	0.8 mile upstream from Rio Felix and 2 $\frac{1}{2}$ miles north of Hagerman.	37.4	198	--	1,550	--	7,320	7.6
4	Rio Felix...	0.7 mile upstream from mouth and 2 miles north of Hagerman.	.49	260	1,910	1,480	--	7,060	7.5
4	Hagerman Drainage District, "D" line.	At mouth, 1 $\frac{1}{2}$ miles northeast of Hagerman.	.02	270	673	124	1,080	1,850	7.0
4	Hagerman Drainage District, "A" line.	At mouth, 2 $\frac{1}{2}$ miles southeast of Hagerman.	.40	193	2,080	1,310	3,320	6,670	7.3
4	Pecos River.	Near Lake Arthur (gaging station).	48.6	162	--	2,180	--	9,320	7.0
4	Lake Arthur Drainage District, "B" line.	At mouth, 3 $\frac{1}{2}$ miles southeast of Lake Arthur.	.01	351	4,450	795	5,960	10,500	7.4
4	Lawrence Ranch drain.	At mouth, 6 $\frac{1}{2}$ miles south of Lake Arthur.	.10	190	4,140	1,490	3,200	10,000	7.8
4	Cottonwood Creek.	Near Lake Arthur (gaging station).	1.01	259	1,930	295	--	4,440	7.3
4	Artesia sewage line.	At mouth, 2 $\frac{1}{2}$ miles east of Artesia.	.57	317	1,940	330	2,260	4,210	7.4
4	Pecos River.	Near Artesia (gaging station)...	42.7	160	--	2,090	--	9,100	7.2
June 19	Bitter Creek	Near mouth, 6 $\frac{1}{2}$ miles east of Roswell.	.59	54	--	5,480	--	19,800	7.0
19	Pecos River.	Just upstream from Rio Hondo, 7 miles east of Roswell.	2.74	147	2,040	2,850	--	10,800	8.0
19	Hagerman, Inc. well "a".	NE $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 35, T. 11 S., R. 24 E. (empties into Rio Hondo above Hagerman Canal), 3 miles east of Roswell.	3.42	203	--	3,190	--	10,900	7.6
19	Hagerman, Inc. well "b".	....do.....	3.70	202	--	3,120	--	10,700	7.1
19	Hagerman Canal.	At head, 5 miles east of Roswell (diverts from Rio Hondo).	20.0	b122	--	2,080	--	7,840	8.5
19	South Spring Creek.	At entrance to Hagerman Canal, SE $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 8, T. 11 S., R. 25 E., 2 $\frac{1}{2}$ miles northeast of East Grand Plains.	2.16	243	--	475	--	3,430	8.0
19	Pamona drain.	At entrance to Hagerman Canal, NW $\frac{1}{4}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$ sec. 22, T. 11 S., R. 25 E., 2 $\frac{1}{2}$ miles east of East Grand Plains.	4.84	255	--	100	--	2,920	7.2
19	Flowing well (tributary to Rio Hondo).	$\frac{1}{4}$ mile upstream from mouth and 6 $\frac{1}{4}$ miles east of Roswell.	1.24	206	1,130	2,200	--	8,370	7.1

b Includes equivalent of 8 parts per million of carbonate (CO<sub>3</sub>).

RIO GRANDE BASIN--Continued

PECOS RIVER SEEPAGE INVESTIGATION--Continued

Chemical analyses, in parts per million, of Pecos River and tributaries,  
N. Mex., water year October 1956 to September 1957--Continued

Date	Streams or diversion	Location	Dis-charge (cfs)	Bicar-bonate (HCO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Hardness as CaCO <sub>3</sub> calcium, magne-sium	Specific conduct-ance (micro-mhos at 25°C)	pH
June 19, 1957	Rio Hondo	At mouth, 7 miles east of Roswell.	5.03	211	1,090	1,530	--	6,250	7.8
19	East Grand Plains Drainage District "D" line.	At mouth, 3.1 miles northeast of East Grand Plains.	.39	96	820	280	--	2,280	6.3
19	East Grand Plains Drainage District "A-B-C" lines.	At mouth, 3.4 miles northeast of East Grand Plains.	.37	280	1,210	260	--	2,970	7.3
19	Gravel Pit drain.	At mouth, 3½ miles east of East Grand Plains.	.23	236	--	184	--	2,310	8.1
19	Pecos River.	Below Bottomless Lake, 4¼ miles east of East Grand Plains.	12.3	132	1,450	1,550	--	6,640	8.0
19	Oasis-Miller drain.	At mouth, 4¼ miles east of East Grand Plains.	.26	245	--	160	--	3,210	8.0
19	Nine Mile draw	At mouth, 3 miles north of Dexter.	.10	170	--	725	--	4,490	7.4
19	Pecos River.	At Dexter Bridge, 2¼ miles northeast of Dexter.	14.1	147	1,570	1,220	--	5,870	8.0
19	Berry ditch.	At mouth, 3 miles east of Dexter.	.84	275	--	155	--	3,950	7.9
19	Dexter-Greenfield drain, "E" line.	At mouth, 4 miles northeast of Dexter.	.12	282	2,910	1,320	--	7,870	7.8
19	Dexter-Greenfield drain, "D" line.	At mouth, 4 miles southeast of Dexter.	.35	279	2,720	1,540	--	8,180	8.1
19	Pecos River.	0.8 mile upstream from Rio Felix and 2½ miles north of Hagerman.	17.3	175	1,830	1,240	--	6,250	8.1
19	Templeton pump diversion.	On left bank of Rio Felix, 1 mile upstream from mouth.	5.07	285	1,800	1,430	--	6,660	7.8
19	Bogle pump diversion from Rio Felix.	On right bank ¼ mile upstream from mouth.	-4.35	c 58	1,930	1,510	--	6,860	8.6
19	Rio Felix...	0.7 mile upstream from mouth and 2 miles north of Hagerman.	.17	265	--	1,780	--	7,980	7.0
19	Lankford pump diversion.	1¼ miles northeast of Hagerman.	-5.28	175	--	1,210	--	6,320	7.6
19	Ball pump diversion.	1½ miles northeast of Hagerman.	-2.48	176	1,890	1,200	--	6,360	8.1
19	Michelet pump diversion.	2 miles northeast of Hagerman.	d-8.12 to -6.68	177	--	1,230	--	6,440	7.2
19	Charles Green pump diversion.	2 miles east of Hagerman.	d-3.17 to -3.31	176	--	1,310	--	6,850	7.5
19	Buffalo Valley pump diversion.	6.3 miles northeast of Lake Arthur.	d-6.26 to -7.97	189	2,270	1,680	--	8,130	8.0
19	Parker upper pump diversion.	6.1 miles northeast of Lake Arthur.	d6.92 to 9.80 to 10.1	200	2,540	2,340	--	10,200	7.6
19	Pecos River.	Near Lake Arthur (gaging station)	4.31	128	2,430	3,420	--	12,800	8.0

c Includes equivalent of 7 parts per million of carbonate (CO<sub>3</sub>).  
d Pump ran at varying rate.

## WESTERN GULF OF MEXICO BASINS

## RIO GRANDE BASIN--Continued

## PECOS RIVER SEEPAGE INVESTIGATION--Continued

Chemical analyses, in parts per million, of Pecos River and tributaries,  
N. Mex., water year October 1956 to September 1957--Continued

Date	Streams or diversion	Location	Dis-charge (cfs)	Bicar-bonate (HCO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Hardness as CaCO <sub>3</sub> calcium, magne-sium	Specific conduct-ance (micro-mhos at 25°C)	pH
June 19, 1957	Lawrence Ranch drain.	At mouth, 6½ miles south of Lake Arthur.	0.60	238	1,630	150	--	3,140	8.0
19	Cottonwood Creek.	Near Lake Arthur (gaging station).	.25	72	1,860	260	--	3,580	8.2
19	Artesia sewage line	At mouth, 2½ miles east of Artesia.	.16	415	--	335	--	3,940	7.6
19	Pecos River.	Near Artesia (gaging station)...	8.15	161	--	1,580	--	7,270	7.9

RIO GRANDE BASIN--Continued

RIO PENASCO AT DAYTON, N. MEX.

LOCATION.--At gaging station 3 feet upstream from crest of abandoned diversion dam, 1 mile northeast of old Dayton railway station, 3 1/4 miles upstream from mouth, and 7 miles southeast of Artesia, Eddy County.

DRAINAGE AREA.--1,070 square miles, approximately.

RECORDS AVAILABLE.--Sediment records: September 1951 to September 1957.

EXTREMES, 1956-57.--Sediment concentrations: Maximum daily, 17,700 ppm Aug. 31; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 48,600 tons Aug. 18; minimum daily, 0 tons on many days.

EXTREMES, 1951-57.--Sediment concentrations: Maximum daily, 30,000 ppm Oct. 7, 1954; minimum daily, no flow on many days each year.

Sediment loads: Maximum daily, 600,000 tons Oct. 7, 1954; minimum daily, 0 tons on many days each year.

REMARKS.--Records of discharge for water year October 1956 to September 1957 given in WSP 1512.

Suspended sediment, water year October 1956 to September 1957

Flow occurred only on days indicated

Date	Water discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Discharge (tons per day)
Apr. 28, 1957.....	21	--	a 250
April Total.....	21	--	250
Aug. 18.....	669	5,120	s 48,600
Aug. 19.....	253	5,980	s 4,980
Aug. 20.....	5	3,000	40
Aug. 31.....	177	17,700	s 14,200
August Total.....	1,104	--	67,820
Sept. 1.....	31	12,000	sb 1,500
September Total.....	31	--	1,500
Total discharge for year (cfs-days).....			1,156
Total annual load (tons).....			69,570

a Computed by subdividing day.

a Computed from water-sediment discharge curve.

b Computed from estimated concentration graph.

Particle-size analyses of suspended sediment, water year October 1956 to September 1957  
 (Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipet; S, sieve; N, in native water;  
 W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date of Collection	Time	Discharge (cfs)	Water temperature (*F)	Suspended sediment							Methods of analysis	
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters						
						0.002	0.004	0.008	0.016	0.031		0.062
Aug. 19, 1957....	10:00 a. m.	184	70	5,360	4,240	66	84	97	99	99	100	PWCM
Aug. 19 ..	10:00 a. m.	184	70	5,360	4,580	5	18	73	98	99	100	PN
Aug. 19 ..	12:00 m.	169	70	5,350	3,900	--	88	--	98	--	100	PWCM
Aug. 19 ..	2:00 p. m.	158	70	5,250	3,720	--	88	--	99	--	100	PWCM
Aug. 19 ..	7:00 p. m.	81	70	4,720	3,600	--	93	--	99	--	100	PWCM
Aug. 19 ..	8:00 p. m.	68	70	4,590	3,380	--	89	--	98	--	100	PWCM
Aug. 31 ..	9:00 a. m.	627	68	31,900	3,430	--	55	--	93	--	100	PWCM

## WESTERN GULF OF MEXICO BASINS

## RIO GRANDE BASIN--Continued

## PECOS RIVER AT DAM SITE 3, NEAR CARLSBAD, N. MEX.

LOCATION.--At gaging station at dam site 3 of Carlsbad project of Bureau of Reclamation, about 1 mile upstream from flow line of Lake Avalon, 1.3 miles downstream from Rocky Arroyo, and 8 miles northwest of Carlsbad, Eddy County.

DRAINAGE AREA.--17,620 square miles, approximately (contributing area).

RECORDS AVAILABLE.--Chemical analyses: July 1951 to September 1957.

REMARKS.--Samples collected at approximately weekly intervals. Records of discharge for water year October 1956 to September 1957 given in WSP 1512.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Bicarbonate (HCO <sub>3</sub> )	Chloride (Cl)	Specific conductance (micromhos at 25°C)	pH
Oct 1, 1956	48	109	380	3,820	--
Oct. 8	37	153	810	5,090	7.2
Oct. 15	32	153	830	5,070	7.3
Oct. 23	37	156	810	5,080	7.4
Nov. 1	32	159	810	5,120	7.4
Nov. 15	30	129	830	5,090	7.9
Nov. 26	28	54	820	5,050	8.1
Dec. 2	30	152	820	5,110	7.8
Dec. 10	30	48	830	5,120	8.1
Dec. 18	31	113	820	5,080	7.8
Dec. 27	32	156	820	5,120	7.7
Jan. 2, 1957	30	140	820	5,110	7.9
Jan. 12	31	155	820	5,150	7.7
Jan. 17	30	153	830	5,140	7.4
Jan. 25	30	153	820	5,140	7.5
Feb. 1	29	154	810	5,130	7.2
Feb. 8	29	150	820	5,110	7.1
Feb. 15	31	147	820	5,110	7.2
Feb. 21	31	150	810	5,110	7.1
Mar. 1	34	113	820	5,110	7.9
Mar. 7	34	150	820	5,160	7.6
Mar. 19	32	154	840	5,160	7.4
Mar. 26	34	146	830	5,180	7.5
Apr. 1	35	158	830	5,150	7.5
Apr. 11	474	114	1,260	6,870	7.1
Apr. 16	295	129	1,310	6,980	7.6
May 1	120	133	1,420	7,420	7.9
May 9	175	113	1,740	8,580	8.0
May 20	29	163	835	5,210	8.1
June 4	24	130	213	1,830	7.2
June 12	22	172	830	5,240	7.4
June 17	21	167	845	5,300	7.7
July 1	258	114	965	5,510	7.0
July 10	18	147	875	5,360	7.1
July 17	314	89	288	3,280	7.1
Aug. 1	48	88	790	4,990	8.0
Aug. 8	329	111	195	2,430	6.5
Aug. 14	234	a127	225	2,390	8.5
Aug. 20	40	b151	230	1,940	8.5
Aug. 27	244	121	215	2,200	7.2
Sept. 3	284	c80	215	2,180	8.3
Sept. 13	192	80	255	2,440	8.2
Sept. 23	181	d71	335	2,820	8.6

a Includes 11 parts per million of carbonate (CO<sub>3</sub>).

b Includes 13 parts per million of carbonate (CO<sub>3</sub>).

c Includes 2 parts per million of carbonate (CO<sub>3</sub>).

d Includes 6 parts per million of carbonate (CO<sub>3</sub>).

## RIO GRANDE BASIN

RIO GRANDE BASIN--Continued  
CARLSBAD MAIN CANAL AT HEAD, NEAR CARLSBAD, N. MEX.

LOCATION --At gaging station 220 feet downstream from headgates in Avalon Dam and 5.0 miles north of Carlsbad, Eddy County.

RECORDS AVAILABLE --Chemical analyses: February 1939 to September 1957.  
EXTREMES: 1956-57 --Dissolved solids: Maximum 6,030 ppm May 1-10, 1957; minimum, 800 ppm Aug. 19-24.

Hardness: Maximum 2,730 ppm May 1-10, 1957; minimum, 474 ppm Aug. 19-24.  
Specific conductance: Maximum daily, 6,360 micromhos May 10, 1957; minimum daily, 1,060 micromhos Aug. 20.

EXTREMES, 1939-57 --Dissolved solids: Maximum 7,430 ppm June 21-28, 1955; minimum, 552 ppm Aug. 24-31, 1954.  
Hardness: Maximum, 3,100 ppm June 11-20, 1955; minimum, 338 ppm Aug. 24-31, 1954.

Specific conductance: Maximum daily, 11,400 micromhos June 24, 1955; minimum daily, 401 micromhos June 3, 1948.

REMARKS --Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of discharge furnished by Surface Water Branch, Santa Fe district for water year October 1956 to September 1957. Monthly diversions to canal below Lake Avalon for water year October 1956 to September 1957 given in WSP 1512.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carb. (CO <sub>2</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boiron (B)	Dissolved solids (calculated)			Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	
															Parts per million	Tons per acre-foot	Tons per day	Calcium	Non-carbonate					
Oct. 1-4, 1956.....	a2.0	17		488	95	226		108		1,450	355		2.0			2,690	3.66	14.5	1,610	1,520	23	2.5	3,340	7.6
Mar. 31-Apr. 30, 1957	216	14		715	164	792		129		2,260	1,220		2.1			5,230	7.11	3,050	2,460	2,350	41	6.9	6,460	7.8
May 1-10, 29 .....	a101	13		766	200	970		137		2,510	1,500		2.3			6,030	8.20	1,640	2,730	2,620	44	8.1	7,740	7.6
June 16-24 .....	166	10		335	70	339		136		1,983	514		2.0			2,320	3.16	1,040	1,120	1,010	40	4.4	3,230	7.6
June 25-27 .....	294	14		464	97	483		140		1,410	725		1.8			3,260	4.43	2,590	1,560	1,440	40	5.3	4,260	7.4
June 28-July 7 .....	a215	11		576	131	703		111		1,840	1,060		3.3			4,380	5.96	2,540	1,980	1,880	44	6.9	5,790	7.5
July 14-16 .....	207	14		655	138	666		131		2,050	995		5.1			4,590	6.24	2,570	2,200	2,090	40	6.2	5,840	7.8
July 17-23 .....	195	13		526	79	266		87		1,610	330		2.6			2,870	3.90	1,510	1,640	1,570	26	2.9	3,430	7.4
July 24-27 .....	a70.8	11		298	39	141		87		1,858	172		3.7			1,570	2.14	300	904	832	25	2.0	2,050	7.7
July 31-Aug. 18 .....	241	15		385	53	192		98		1,010	240		1.1			1,990	2.57	1,230	1,050	974	28	2.6	2,430	7.8
Aug. 19-24 .....	215	5.9		154	22	71		64		421	80		4			1,900	1.09	464	474	398	25	1.4	1,130	7.8
Aug. 25-Sept. 8 .....	289	18		286	45	164		106		853	200		1.6			1,920	2.20	1,310	904	815	28	2.4	2,130	7.3
Sept. 9-30 .....	177	17		351	62	244		103		1,080	320		1.6			2,130	2.90	903	1,130	1,050	32	3.2	2,760	7.5
Weighted average...	b197	14		466	95	430		113		1,440	629		1.9			3,130	4.26	1,660	1,550	1,460	38	4.7	4,000	--

a No flow Oct. 5 to Mar. 30, May 11-28, May 30 to June 15, July 8-13, 28-30.

b Average for 144 days of flow.

RIO GRANDE BASIN--Continued  
PECOS RIVER AT CARLSBAD, N. MEX.

LOCATION. --At gaging station at Greene Street bridge in Carlsbad, Eddy County, half a mile upstream from Dark Canyon. DRAINAGE AREA. --18,100 square miles, approximately, (contributing area).

RECORDS AVAILABLE. --Chemical analyses: May 1937 to September 1946, July 1951 to September 1957.

Water temperatures: July 1951 to September 1957.

EXTREMES, 1956-57. --Dissolved solids: Maximum, 2,770 ppm July 1-31; minimum, 2,340 ppm Mar. 1-31.

Hardness: Maximum, 1,440 ppm Oct. 1-31; minimum, 1,270 ppm Mar. 1-31.

Specific conductance: Maximum daily, 3,980 micromhos July 14; minimum daily, 3,130 micromhos Nov. 30.

Water temperatures: Maximum, 98°F July 3; minimum, 40°F Jan. 25.

EXTREMES, 1937-46, 51-57. --Dissolved solids: Maximum, 3,590 ppm May 1, 1941; minimum, 360 ppm May 22, 1941.

Hardness: Maximum, 1,970 ppm May 1, 1941; minimum, 290 ppm May 22, 1951.

Specific conductance: Maximum daily, 5,870 micromhos Apr. 25, 1942; minimum daily, 649 micromhos May 22, 1941.

Water temperatures (1951-57): Maximum, 98°F July 3, 1957; minimum, 40°F Jan. 25, 1957.

REMARKS. --Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of discharge for water year October 1956 to September 1957 given in WSP 1512.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> ) (Fe)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids (calculated)		Hardness as CaCO <sub>3</sub>		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH	
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium				Non-carbonate
Oct. 1-31, 1956	27.8	20		371	125	320		183		1,160	580		3.5	2,640	3.59	198	1,440	1,290	83	3,630	7.7
Nov. 1-30	27.9	21		343	121	286		192		1,100	485		3.0	2,480	3.37	187	1,360	1,200	32	3,440	7.6
Dec. 1-31	27.1	19		330	116	282		186		1,060	460		2.8	2,390	3.25	175	1,300	1,180	33	3,320	7.7
Jan. 1-31, 1957	30.0	19		351	110	281		200		1,050	482		3.7	2,390	3.25	194	1,330	1,160	32	3,290	7.7
Feb. 1-28	28.6	23		351	110	284		196		1,060	482		3.4	2,410	3.28	173	1,330	1,170	32	3,310	7.7
Mar. 1-31	29.9	12		318	116	284		a118		1,070	480		1.0	2,340	3.18	189	1,270	1,170	33	3,330	8.3
Apr. 1-30	26.0	15		341	126	303		b139		1,140	515		1.1	2,510	3.41	176	1,370	1,260	32	3,520	8.3
May 1-31	25.2	18		361	131	319		c161		1,190	540		.8	2,640	3.59	178	1,440	1,310	33	3,640	8.4
June 1-30	23.0	25		337	109	322		d152		1,100	510		1.4	2,480	3.37	155	1,280	1,160	35	3,410	7.6
July 1-31	16.7	18		373	112	379		d138		1,240	575		.2	2,770	3.77	125	1,390	1,280	37	3,730	8.3
Aug. 1-31	20.1	26		363	106	358		173		1,160	530		1.4	2,650	3.60	144	1,340	1,200	37	3,560	7.7
Sept. 1-30	27.4	23		359	108	343		191		1,160	510		2.4	2,600	3.54	192	1,340	1,180	36	3,490	7.6
Weighted average...	25.6	20		349	116	312		169		1,120	510		2.2	2,510	3.41	173	1,350	1,210	33	3,460	--

a Includes 2 parts per million of carbonate (CO<sub>3</sub>).

b Includes 1 part per million of carbonate (CO<sub>3</sub>).

c Includes 5 parts per million of carbonate (CO<sub>3</sub>).

d Includes 4 parts per million of carbonate (CO<sub>3</sub>).

## RIO GRANDE BASIN--Continued

## PECOS RIVER AT CARLSBAD, N. MEX.--Continued

Temperature (°F) of water, water year October 1956 to September 1957  
Once-daily measurement, generally in the p. m.

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	85	67	66	46	52	63	75	72	77	93	86	84
2	78	65	65	48	54	64	68	80	76	91	87	84
3	83	63	56	47	45	65	70	70	75	98	87	84
4	80	62	64	58	55	65	70	72	a75	a90	84	85
5	83	65	68	60	68	63	72	a70	80	81	85	84
6	83	67	64	55	55	65	75	75	a80	82	a85	85
7	75	65	64	56	66	63	74	78	81	a88	86	82
8	80	63	58	58	72	73	70	76	80	82	87	77
9	80	--	52	56	70	65	70	78	82	84	a85	80
10	78	65	56	54	72	67	80	76	82	82	a85	80
11	78	70	56	50	70	73	75	78	80	84	a83	80
12	78	68	52	68	70	72	58	72	85	87	81	83
13	76	65	54	65	72	70	52	a77	84	82	85	83
14	78	65	59	56	70	71	54	95	85	87	86	84
15	78	63	60	58	70	65	70	82	82	87	88	82
16	--	63	58	50	67	70	70	75	80	87	85	79
17	74	62	45	50	50	73	76	80	85	84	87	78
18	73	65	48	50	57	70	75	78	81	85	82	84
19	74	63	48	50	65	70	76	78	83	a83	85	80
20	73	65	50	52	61	68	78	80	83	82	84	84
21	73	--	57	50	61	69	78	79	84	a85	84	83
22	73	65	56	48	65	68	75	80	87	85	84	83
23	75	63	55	45	58	63	a69	80	80	82	84	75
24	73	60	55	42	66	62	--	82	82	85	82	74
25	70	64	57	40	65	65	71	80	88	84	84	78
26	68	65	58	42	68	62	70	76	87	83	86	80
27	73	63	54	45	65	63	76	80	82	85	85	80
28	73	62	56	--	68	66	70	80	91	84	85	76
29	68	62	64	--	--	66	73	75	90	85	85	82
30	72	65	64	53	--	70	71	75	90	85	84	80
31	70	--	60	60	--	75	--	78	--	84	80	--
Average	76	64	57	52	63	67	71	78	83	85	85	81

a Measurement obtained after 6 p. m.

## WESTERN GULF OF MEXICO BASINS

## RIO GRANDE BASIN--Continued

## REFINERY INTAKE CANAL NEAR LOVING, N. MEX.

(Weekly samples taken from canal in sec. 13, T. 23 S., R. 28 E., representing water in Harroun Canal diverted from Pecos River at dam in sec. 11, T. 23 S., R. 28 E.)

Date of collection	Chloride (Cl)	Specific conductance (micromhos at 25°C)
Oct. 4, 1956	855	5, 030
Oct. 11	885	5, 160
Oct. 18	890	5, 170
Oct. 25	940	5, 340
Nov. 1	855	5, 010
Nov. 8	865	5, 070
Nov. 15	885	5, 190
Nov. 22	860	5, 060
Nov. 29	830	4, 960
Dec. 6	887	5, 050
Dec. 13	833	4, 970
Dec. 20	767	4, 680
Dec. 27	773	4, 760
Jan. 3, 1957	780	4, 570
Jan. 10	753	4, 600
Jan. 17	760	4, 580
Jan. 24	747	4, 540
Jan. 31	747	4, 570
Feb. 7	740	4, 370
Feb. 14	733	4, 450
Feb. 21	737	4, 480
Feb. 28	713	4, 400
Mar. 7	683	4, 100
Mar. 15	707	4, 300
Mar. 21	720	4, 370
Mar. 28	863	5, 030
Apr. 4	757	4, 590
Apr. 11	717	4, 340
Apr. 18	720	4, 420
Apr. 25	733	4, 400
May 2	740	4, 450
May 9	823	4, 840
May 16	837	4, 910
May 23	810	4, 750
May 29	727	4, 240
June 6	610	3, 810
June 14	647	3, 980
June 20	737	4, 350
June 27	750	4, 480
July 4	753	4, 520
July 11	723	4, 440
July 18	757	4, 550
July 25	820	4, 680
Aug. 1	635	3, 830
Aug. 8	610	3, 610
Aug. 18	22	410
Aug. 22	86	680
Aug. 29	222	1, 360
Sept. 5	615	3, 570
Sept. 12	680	4, 020
Sept. 19	740	4, 360
Sept. 26	815	4, 700

RIO GRANDE BASIN--Continued  
 PECOS RIVER EAST OF MALAGA, N. MEX.  
 LOCATION.--One and one-half miles upstream from gaging station near Malaga, Eddy County, and 3 miles downstream from Black River.  
 DRAINAGE AREA.--190 square miles, approximately, above gaging station (contributing area).  
 RECORDS AVAILABLE.--Chemical analyses: July 1937 to September 1957.  
 EXTREMES 1956-57.--Dissolved solids: Maximum, 9,100 ppm June 22 to July 21; minimum, 530 ppm Aug. 18-19.  
 Hardness: Maximum, 2,700 ppm May 1-8; minimum, 278 ppm Aug. 18-19.  
 Specific conductance: Maximum daily, 14,600 micromhos July 21; minimum daily, 864 micromhos Aug. 19.  
 EXTREMES 1937-57.--Dissolved solids: Maximum, 9,100 ppm June 22 to July 21, 1957; minimum, 364 ppm Sept. 21-22, 1941.  
 Hardness: Maximum, 2,750 ppm June 1-10, 1955; minimum, 254 ppm Sept. 21-22, 1941.  
 Specific conductance: Maximum daily, 14,600 micromhos July 21, 1957; minimum daily, 450 micromhos Sept. 21, 1941.  
 REMARKS.--Records of specific conductance of daily samples available at district office at Albuquerque, N. Mex. Records of discharge for gaging station near Malaga for water year October 1956 to September 1957 given in WSP 1512. No appreciable inflow between sampling point and gaging station.  
 Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal-cium (Ca)	Mag-ne-sium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Car-bonate (CO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> ) (B)	Dissolved solids (calculated)		Hardness as CaCO <sub>3</sub>		Per-centage of so-lidum	So-lidum ratio	Specific conductance (micro-mhos at 25°C)	pH	
														Parts per million	Tons per acre-foot	Calcium	Non-carbonate					
Oct. 1-31, 1956	42.0	23		595	242	1,370	181	0	2,000	2,290				750	2,480	2,330	55	12	9,340	7.6		
Nov. 1-30	31.7	28		584	238	1,450	180	0	2,050	2,340				6,780	2,440	2,290	56	13	9,850	7.7		
Dec. 1-31, 1957	57.7	21		528	209	1,902	194	0	1,770	1,510			8.4	5,040	2,190	2,020	47	8.4	7,130	7.7		
Jan. 1-31, 1957	62.6	18		528	181	806	202	0	1,670	1,350			8.9	4,660	2,060	1,900	46	7.7	6,500	7.7		
Feb. 1-16, 1957	45.4	18		508	173	814	179	0	1,640	1,340			7.7	4,590	1,830	1,830	47	8.0	6,390	7.6		
Feb. 17-28	23.9	21		548	188	1,150	181	0	1,790	1,860			8.9	5,650	2,140	1,990	54	11	8,060	7.7		
Mar. 1-31	20.4	27		598	254	1,540	175	0	2,080	2,540				7,120	2,540	2,360	57	13	10,300	7.7		
Apr. 1-7	13.9	16		610	244	1,610	179	0	2,090	2,620				7,260	2,550	2,380	58	14	10,500	7.9		
Apr. 8-30	16.5	21		617	265	1,930	183	0	2,190	3,110				8,220	2,560	2,460	61	16	12,400	8.1		
May 1-8	22.0	23		609	287	2,000	175	2	2,220	3,260				8,400	2,700	2,550	62	17	12,600	8.3		
May 9-20	23.2	22		590	273	1,510	103	5	2,180	2,490				7,120	2,660	2,500	56	13	10,300	8.4		
May 21-29	15.4	18		601	284	2,030	133	6	2,250	3,290				4,350	2,670	2,550	62	17	12,600	8.4		
May 30-June 3	242	16		389	119	646	135	0	1,280	1,020			4.1	3,520	4,79	2,300	49	7.3	5,070	8.2		
June 4-9	20.0	20		449	143	1,190	165	0	1,480	1,850			3.4	5,220	7,10	2,570	60	12	7,700	7.5		
June 10-20	15.3	31		546	192	1,950	199	0	1,860	3,040				7,720	10.5	319	2,150	1,990	86	18	11,300	7.9
June 21	16.5	32		601	194	2,170	220	0	2,170	3,660				8,480	11.5	343	2,300	2,120	87	20	12,300	7.8
June 22-July 21	16.5	32		617	218	2,350	206	0	2,010	3,680				9,100	12.4	405	2,440	2,270	68	21	13,300	7.9
July 22-31	30.4	21		560	185	1,420	188	0	1,880	2,240				6,380	8.68	524	2,160	2,030	59	13	9,170	7.4
Aug. 1-17	17.9	26		608	215	2,180	188	0	2,070	3,430				8,620	11.7	471	2,400	2,250	66	19	12,400	8.2
Aug. 18-19	1.480	7.0		87	15	77	114	17	154	118			1.4	530	7.2	2,090	278	136	37	2.0	864	9.0
Aug. 20	180	16		127	30	268	103	7	334	444			5.0	1,250	1.70	2,040	440	440	57	5.6	2,040	8.5
Aug. 21	52.0	19		195	57	484	147	0	558	760			4.5	2,150	2.92	302	721	603	59	7.8	3,440	7.7
Aug. 22-23	27.0	20		248	76	664	154	0	774	1,020			4.7	2,880	3.92	210	932	803	61	9.5	4,480	8.1
Aug. 24	22	16		318	98	888	129	14	1,000	1,390			4.4	3,780	5.14	225	1,190	1,060	62	11	5,780	8.6
Aug. 25	361	17		361	116	1,060	143	7	1,190	1,640			5.6	4,480	6.09	242	1,390	1,250	63	12	6,750	8.3
Aug. 26-28	18.0	24		409	145	1,480	161	0	1,380	2,320				5,860	7.97	265	1,620	1,480	67	16	8,110	7.9
Aug. 29-Sept. 30	23.0	24		514	205	2,050	181	0	1,830	3,210				7,920	10.8	482	2,130	1,980	68	19	11,500	8.1
Weighted average	42.1	19		447	168	1,020	173	--	1,480	1,660			--	4,880	6.64	555	1,800	1,660	55	10	7,020	--

a Includes carbonate as bicarbonate.

## RIO GRANDE BASIN--Continued

## PECOS RIVER AT PIERCE CANYON CROSSING, NEAR MALAGA, N. MEX.

LOCATION --At Pierce Canyon Crossing, a quarter of a mile downstream from gaging station which is 6 miles southeast of Malaga, Eddy County.

DRAINAGE AREA --19,260 square miles, approximately (contributing area).

RECORDS AVAILABLE --Chemical analyses: March 1938 to September 1941, October 1951 to September 1957.

Water temperatures: October 1952 to September 1957.

EXTREMES, 1956-57.--Dissolved solids: Maximum, 16,800 ppm July 1-21; minimum, 410 ppm Aug. 18-19.

Hardness: Maximum, 2,760 ppm July 1-21; minimum, 204 ppm Aug. 18-19.

Specific conductance: Maximum daily, 26,500 microhos July 21; minimum daily, 686 microhos Aug. 19.

Water temperatures: Maximum, 90° F July 1; minimum, 42° F Dec. 28-29, Jan. 18.

EXTREMES, 1938-41, 1951-57.--Dissolved solids: Maximum, 23,700 ppm Aug. 11-21, 1954; minimum, 280 ppm Sept. 21, 1941.

Hardness: Maximum, 3,420 ppm Aug. 11-21, 1954; minimum, 202 ppm Sept. 21, 1941.

Specific conductance: Maximum daily, 34,400 microhos Aug. 2, 1954; minimum daily, 433 microhos Sept. 21, 1941.

Water temperatures (1952-57): Maximum, 90° F Aug. 3, 1953, July 1, 1957; minimum, 37° F Dec. 24, 1953, Feb. 5, 1956.

REMARKS --Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of discharge for water year October 1956 to September 1957 given in WSP 1512. No appreciable inflow between sampling and gaging station except during periods of heavy local rains.

Chemical analyses, in parts per million, water year: October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (calculated)			Hardness as CaCO <sub>3</sub>		Percent sodium	Specific conductance (microhos at 25°C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium magnesium	Non-carbonate			
Oct. 1-31, 1956	47.7	25	612	289	2,850	182	2,230	4,570	10,700	14.6	1,380	2,570	70	24	2,720	2,500	15,600	7.5			
Nov. 1-30	37.5	27	616	270	2,920	181	2,230	4,630	10,800	14.7	1,080	2,500	71	25	2,650	2,500	15,600	7.9			
Dec. 1-31	66.2	18	554	225	1,840	179	1,930	2,940	7,590	10.3	1,360	2,160	63	17	2,310	2,160	11,000	7.8			
Jan. 1-31, 1957	70.3	17	528	207	1,640	192	1,810	2,620	6,920	9.41	1,310	2,010	62	15	2,170	2,010	9,970	7.6			
Feb. 1-14	54.4	15	507	206	1,640	168	1,770	2,650	6,840	9.30	1,000	2,110	63	16	2,110	1,970	10,000	7.4			
Feb. 15-28	28.9	18	534	230	2,600	169	1,950	4,080	9,500	12.9	742	2,280	71	24	2,280	2,140	14,000	7.5			
Mar. 1-31	23.3	24	615	269	3,600	147	2,350	5,610	12,500	17.0	886	2,640	75	30	2,640	2,520	18,500	7.8			
Apr. 1-30	18.2	19	646	278	3,970	150	2,480	6,150	13,600	18.5	668	2,760	76	33	2,760	2,630	20,000	7.8			
May 1-30	25.7	19	677	278	3,800	170	2,540	5,900	13,300	18.1	923	2,830	74	31	2,830	2,690	20,500	7.6			
May 31	1,602	5.0	212	28	166	84	438	340	1,230	1.67	1,980	575	36	2.8	644	575	2,150	7.4			
June 1-3	102	14	425	135	897	138	1,390	1,420	4,350	5.92	1,200	1,620	55	9.7	1,620	1,500	6,400	7.4			
June 4-6	30.7	13	429	180	1,580	142	1,440	2,600	6,320	8.60	1,524	1,250	55	16	1,250	1,740	9,780	7.3			
June 7-30	18.9	23	536	260	3,880	190	2,120	6,010	12,900	17.5	658	2,410	2,250	73	34	2,410	19,400	7.4			
July 1-21	18.0	21	652	306	3,140	164	2,560	7,970	16,800	22.8	816	2,680	2,750	79	42	2,680	24,600	7.4			
July 22-31	37.3	19	576	281	2,910	154	2,100	4,570	10,500	14.3	1,060	2,430	2,300	72	26	2,430	15,700	7.4			
Aug. 1-17	23.0	16	591	282	4,310	157	2,380	6,700	14,400	19.6	894	2,680	2,550	76	36	2,680	21,100	7.6			
Aug. 18-19	1,300	13	64	11	65	145	83	83	110	.56	1,440	304	88	41	2.0	304	21,686	8.1			
Aug. 20	251	10	21	22	211	115	217	318	1,950	1.26	630	515	221	59	5.2	515	1,970	7.3			
Aug. 21	119	8.7	42	526	122	111	339	820	1,920	2.61	363	470	367	11	5.2	470	3,520	8.5			
Aug. 22-25	32.5	13	191	86	1,370	136	645	2,150	4,520	6.15	397	680	716	78	21	680	7,500	7.6			
Aug. 26-31	166	317	166	317	1,250	133	1,250	4,370	8,960	12.2	975	1,470	1,360	81	32	1,470	13,900	7.6			
Sept. 1-30	26.7	16	536	250	4,800	158	2,100	6,500	13,700	18.6	968	2,410	2,260	79	37	2,410	20,000	7.4			
Weighted average	45.5	18	465	195	2,170	164	1,660	3,410	8,000	10.9	983	1,960	1,830	71	21	1,960	11,700	--			

a includes 4 parts per million of carbonate (CO<sub>3</sub>).

## RIO GRANDE BASIN--Continued

PECOS RIVER AT PIERCE CANYON CROSSING, NEAR MALAGA, N. MEX.--Continued

Temperature (°F) of water, water year October 1956 to September 1957  
Once-daily measurement during daylight hours

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	71	60	46	46	45	56	--	66	67	90	80	80
2	71	55	47	--	47	59	67	69	67	87	87	81
3	70	53	48	47	50	59	59	71	70	82	--	84
4	70	54	48	46	52	55	57	69	72	82	82	82
5	74	52	49	45	52	53	57	65	75	86	80	82
6	75	51	50	44	54	53	58	69	79	85	82	83
7	73	52	53	46	55	52	63	63	--	80	82	75
8	74	53	54	58	55	52	58	65	80	84	83	75
9	73	55	50	56	64	58	58	68	79	79	84	75
10	71	58	48	56	59	60	61	68	79	79	84	77
11	68	54	53	--	60	57	62	68	83	80	78	76
12	68	54	52	54	62	59	59	69	81	83	82	80
13	71	53	51	--	59	59	--	66	83	81	82	78
14	66	58	54	--	60	59	--	67	79	--	82	82
15	73	53	51	54	60	60	56	68	81	80	86	76
16	69	51	48	44	58	61	60	67	79	83	84	77
17	72	48	47	44	58	59	62	74	81	82	82	76
18	68	51	49	42	54	58	63	70	75	78	80	77
19	65	54	49	43	52	59	67	70	80	84	73	80
20	65	--	47	44	52	62	68	72	79	80	74	80
21	63	46	50	50	53	57	69	72	80	84	80	73
22	61	--	51	49	55	57	72	72	77	85	80	70
23	62	46	51	46	55	56	63	75	80	82	82	72
24	62	48	46	45	56	51	63	77	80	85	80	71
25	61	47	--	45	54	49	65	75	82	85	80	70
26	62	47	43	46	54	50	65	73	80	84	80	74
27	59	46	--	43	55	55	66	72	83	82	83	74
28	63	47	42	45	62	55	66	77	80	80	82	73
29	63	46	42	47	--	56	63	76	80	84	83	74
30	58	46	--	--	--	69	70	75	89	83	81	76
31	55	--	44	46	--	63	--	64	--	83	82	--
Average	67	51	49	47	55	57	63	70	79	83	81	77

## RIO GRANDE BASIN--Continued

## PECOS RIVER NEAR RED BLUFF, N. MEX.

LOCATION.--At pipeline bridge, 2½ miles downstream from gaging station at Red Bluff, Eddy County, which is 0.2 mile downstream from Red Bluff Creek, and 5.5 miles upstream from Delaware River.

DRAINAGE AREA.--19,540 square miles, approximately, above gaging station (contributing area).

RECORDS AVAILABLE.--Chemical analyses: July 1937 to September 1957.

Water temperatures: October 1952 to September 1957.

Hardness: Maximum, 3,100 ppm May 1-16; minimum, 282 ppm Aug. 18-19.

Specific conductance: Maximum daily, 28,300 microhmhos July 21; minimum daily, 978 microhmhos Aug. 19.

Water temperatures: Maximum, 89°F July 21; minimum, 43°F Jan. 27.

Hardness: Maximum, 3,860 ppm Sept. 1-10, 1953; minimum, 256 ppm June 3, 1948.

Specific conductance: Maximum daily, 33,200 microhmhos Sept. 18, 1953; minimum daily, 268 microhmhos Sept. 19, 1946.

Water temperatures (1952-57): Maximum, 91°F Aug 7, 1955; minimum, 35°F Dec. 28, 1954.

REMARKS.--Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of discharge for gaging station at Red Bluff for water year October 1956 to September 1957 given in WSP 1512. No appreciable inflow between sampling point and gaging station except during periods of heavy local rains.

## Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Percent sodium ratio	Specific conductance (microhmhos at 25°C)			
													Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate					
Oct. 1-31, 1956...	52.7			600	293	3,090		74		4,670				11,800	16.0	1,680	2,700	2,640	71	25	16,600	6.8
Nov. 1-30 .....	44.1			577	284	2,890		129		4,430				11,100	15.1	1,320	2,610	2,500	71	25	15,500	7.3
Dec. 1-31 .....	64.7			542	249	2,000		168		3,090				8,450	11.5	1,480	2,380	2,240	65	18	11,600	7.5
Jan. 1-31, 1957 .....	66.9			523	216	1,660		166		2,720				7,260	9.90	1,310	2,190	2,060	62	15	10,300	7.8
Feb. 1-16 .....	50.6			503	209	1,580		155		2,620				7,030	9.56	960	2,110	1,990	62	15	10,000	7.9
Feb. 17-28 .....	26.8			522	225	2,230		190		3,690				8,890	12.1	643	2,230	2,100	66	21	12,800	7.3
Mar. 1-31 .....	22.8			556	303	3,380		160		5,340				12,500	17.0	770	2,630	2,500	74	29	17,900	7.7
Apr. 1-30 .....	19.1			658	349	3,750		123		5,900				14,100	19.2	727	3,080	2,680	73	29	19,700	7.3
May 1-16 .....	27.0			630	372	4,860		94		7,080				16,100	21.8	1,170	3,100	3,020	76	36	22,800	7.0
May 17-20 .....	25.5			447	294	2,690		95		5,860				9,280	12.6	640	2,060	2,060	69	20	13,600	7.2
May 21-30 .....	21.3			681	340	3,380		74		5,310				12,900	19.3	742	2,910	2,910	71	27	18,000	7.1
May 31-June 1 .....	515			244	99	505		123		1,980				2,490	3.39	3,870	852	750	96	7.5	3,790	6.0
June 2-14 .....	21.2			421	176	1,200		102		1,980				5,570	7.58	319	1,770	1,690	60	12	8,000	7.7

June 15-25.....	16.3	459	208	2,700	79	4,320	9,720	13.2	426	2,000	1,940	75	26	14,400	7.3
June 26-July 25.....	17.9	645	306	5,070	53	8,060	17,400	23.7	841	2,870	2,820	79	41	24,600	7.1
July 26-Aug. 17.....	19.7	582	250	3,200	46	5,170	12,000	16.3	638	2,450	2,410	74	26	17,000	7.0
Aug. 18-19.....	1,263	80	14	90	167	143	588	1.80	2,010	282	145	41	2.3	1,970	7.5
Aug. 20.....	480	95	23	167	130	302	920	1.25	1,190	352	225	55	4.5	1,560	7.5
Aug. 21.....	136	111	33	549	123	572	1,500	2.04	547	412	312	65	7.5	2,480	7.4
Aug. 22-25.....	38.5	163	53	715	146	1,220	2,840	3.86	295	748	628	68	12	4,630	7.6
Aug. 26-29.....	26.5	210	69	1,370	152	2,190	4,920	6.69	345	806	663	79	21	7,850	7.5
Aug. 30-Sept. 5.....	27.4	273	154	2,390	109	3,610	8,030	10.9	594	1,310	1,220	80	29	12,400	7.3
Sept. 6-30.....	28.6	489	260	4,210	71	6,550	13,900	18.9	1,070	2,290	2,230	80	38	20,300	7.2
Weighted average	46.8	440	201	2,070	131	3,260	8,050	10.9	1,020	1,920	1,800	70	21	11,400	--

## RIO GRANDE BASIN

## RIO GRANDE BASIN--Continued

## PECOS RIVER NEAR RED BLUFF, N. MEX.--Continued

Temperature (°F of water, water year October 1956 to September 1957  
Once-daily measurement, generally in the p. m.

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	77	62	50	46	51	63	a65	--	a66	88	86	84
2	77	59	50	48	52	63	66	78	72	b87	b86	85
3	77	54	48	47	54	61	64	79	71	b88	b84	84
4	78	58	50	52	57	60	60	70	75	b85	83	84
5	--	55	51	52	57	58	64	--	--	87	83	83
6	--	--	54	31	56	51	65	--	--	87	85	83
7	b75	58	a54	53	59	56	66	b70	84	b85	83	76
8	75	a54	53	54	63	59	63	74	--	82	84	80
9	74	55	48	55	--	--	64	75	82	84	83	79
10	73	60	48	51	a63	--	70	74	81	84	b83	78
11	72	59	50	53	a63	--	69	75	82	84	85	82
12	72	58	52	a48	65	65	60	75	80	--	81	80
13	73	--	51	--	65	--	62	b73	81	85	85	81
14	73	--	a49	--	66	--	60	75	b83	b85	84	81
15	73	54	50	49	64	61	69	b77	84	b83	85	79
16	73	51	--	47	58	62	70	75	85	83	87	78
17	72	52	--	45	--	65	70	70	85	82	84	78
18	70	51	48	44	56	64	71	79	80	84	b76	78
19	70	55	49	46	54	63	71	76	83	84	75	78
20	68	50	47	48	56	61	75	73	83	85	80	78
21	70	49	a49	51	58	65	77	75	87	89	82	78
22	72	--	50	--	55	61	71	75	85	85	82	73
23	66	a45	48	46	54	a56	a68	--	80	83	85	72
24	67	a48	47	48	62	55	--	b80	--	84	85	70
25	65	50	46	49	60	57	a62	80	88	84	86	73
26	--	50	45	46	60	--	--	75	83	--	86	75
27	67	49	45	43	61	61	72	79	86	b84	88	75
28	a64	48	47	47	62	62	65	80	--	--	85	76
29	63	50	48	--	--	62	64	75	b87	b84	84	76
30	63	a50	46	a47	--	64	72	--	87	84	82	76
31	62	--	--	47	--	68	--	69	--	82	82	--
Average	71	53	49	48	59	61	67	75	82	85	84	78

a Measurement obtained in a. m.

b Measurement obtained after 6 p. m.

## RIO GRANDE BASIN--Continued

PECOS RIVER BELOW RED BLUFF DAM NEAR ORLA, TEX.

LOCATION.--Just below dam, 3 miles upstream from Salt (Screwbean) Draw, 5 miles northwest of Orla, Reeves County, and 14 miles upstream from gaging station near Orla.

DRAINAGE AREA.--20,720 square miles, approximately (contributing area).

RECORDS AVAILABLE.--Chemical analyses: July 1937 to September 1957.

Water temperatures: March 1953 to September 1957.

EXTREMES 1956-57.--Dissolved solids: Maximum, 12,800 ppm Aug. 1-13; minimum, 4,010 ppm Sept. 12-23.

Hardness: Maximum, 3,010 ppm May 1-31; minimum, 1,440 ppm Sept. 12-23.

Specific conductance: Maximum daily, 22,600 micromhos July 26; minimum daily, 4,870 micromhos Aug. 19.

Water temperatures: Maximum, 80°F on several days during July and August; minimum, 43°F, Dec. 28, 29.

EXTREMES 1947-57.--Dissolved solids: Maximum, 15,600 ppm Sept. 17-30, 1953; minimum, 1,090 ppm June 1-2, 1948.

Hardness: Maximum, 3,430 ppm July 1-31, Oct. 1-16, 1953; minimum, 602 ppm June 1-2, 1948.

Specific conductance: Maximum daily, 24,200 micromhos Sept. 28, 30, 1953; minimum daily, 1,610 micromhos June 2, 1948.

Water temperatures (1953-57): Maximum, 80°F on many days during July and August; minimum, 40°F on several days during winter months.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for gaging station near Orla for water year October 1956 to September 1957 given in WSP 1512. Mean discharge values reported below have been adjusted to reflect inflow from Salt (Screwbean) Draw which enters Pecos River between sampling point and gaging station.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (calculated)		Hardness as CaCO <sub>3</sub>		Percent adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
														Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate			
Oct. 1-31, 1956 ..	25.0	14	681	681	227	2,460	103	2,360	3,860	651	13.1	9,850	2,830	2,550	67	21	13,700	7.7		
Nov. 1-30 ..	21.2	--	--	--	--	2,010	108	2,360	3,240	--	--	--	2,830	2,540	62	17	12,200	7.2		
Dec. 1-31 ..	22.4	14	687	687	245	2,480	129	2,340	3,980	589	13.2	9,740	2,690	2,560	67	21	14,100	7.6		
Jan. 1-31, 1957 ..	47.7	6.2	687	687	234	2,180	125	2,340	3,480	1,160	12.2	8,970	2,680	2,570	64	18	12,900	7.8		
Feb. 1-28 ..	265	5.0	649	649	219	2,090	127	2,220	3,290	6,110	11.6	8,540	2,520	2,420	64	18	12,300	7.6		
Mar. 1-31 ..	8.30	5.4	637	637	231	1,950	145	2,140	3,140	1,183	11.1	8,170	2,540	2,420	63	17	11,900	7.7		
Apr. 1-30 ..	7.96	8.2	689	689	249	2,330	132	2,270	3,780	202	12.8	9,390	2,740	2,640	65	13	13,900	7.5		
May 1-31 ..	39.1	3.8	704	704	305	2,990	120	2,530	4,800	1,200	15.5	11,400	3,010	2,910	68	24	16,300	7.8		
June 1-30 ..	20.3	9.6	617	617	234	2,460	99	2,160	3,910	517	12.8	9,440	2,500	2,420	68	21	13,800	7.8		
July 1-31 ..	16.9	8.8	617	617	249	2,880	80	2,250	4,550	484	14.4	10,600	2,560	2,500	71	25	15,500	7.2		
Aug. 1-13 ..	11.8	15	651	651	283	3,650	87	2,420	5,760	408	17.4	12,800	2,790	2,720	74	30	18,200	7.6		
Aug. 14-16, 20-22 ..	108	12	669	669	211	2,510	80	2,290	3,930	2,820	13.1	9,660	2,540	2,470	68	22	13,900	7.5		
Aug. 19 ..	13.0	--	--	--	--	410	650	--	--	--	--	--	1,450	1,110	--	--	4,870	7.5		
Aug. 23-31 ..	284	14	598	598	161	1,880	83	1,990	2,910	5,820	10.3	7,590	2,150	2,060	65	18	11,100	7.5		
Sept. 1-11, 24-30 ..	175	11	480	480	110	1,210	86	1,470	1,900	7,111	7.1	5,230	1,650	1,580	61	13	7,700	7.7		
Sept. 12-23 ..	131	6.4	442	442	81	836	68	1,310	1,300	4,010	6.45	4,010	1,440	1,380	56	9.6	5,980	7.6		
Weighted average	60.6	8.5	610	610	196	1,990	107	2,060	3,130	8,050	10.9	1,320	2,330	2,240	65	18	11,600	--		

## WESTERN GULF OF MEXICO BASINS

## RIO GRANDE BASIN--Continued

## PECOS RIVER BELOW RED BLUFF DAM NEAR ORLA, TEX.--Continued

Temperature (F°) of water, water year October 1956 to September 1957  
Once-daily measurement, generally at 8 a. m.

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	72	59	48	44	45	56	55	65	71	77	80	79
2	72	58	48	44	--	55	57	63	68	77	80	78
3	72	56	48	44	45	56	56	--	69	77	80	78
4	72	55	49	44	48	56	57	62	70	77	79	78
5	72	55	49	45	49	55	58	61	70	78	79	78
6	73	55	49	45	51	55	56	61	70	78	79	77
7	73	55	49	46	52	54	58	62	70	77	78	76
8	73	56	49	46	51	52	57	62	71	77	78	76
9	73	55	49	48	52	53	55	63	70	76	78	75
10	72	54	49	48	54	53	57	66	70	76	78	75
11	72	54	48	48	54	55	58	67	70	77	78	75
12	72	53	49	48	54	55	58	67	70	76	78	76
13	73	54	48	49	55	55	57	67	71	76	77	76
14	72	55	49	49	55	56	57	67	71	77	78	75
15	72	53	49	50	55	55	57	66	71	76	77	74
16	72	53	48	--	56	55	58	66	71	76	78	74
17	71	51	48	47	55	56	58	67	72	76	80	73
18	70	51	47	46	55	55	59	67	73	76	79	73
19	70	51	48	45	54	56	59	68	73	76	74	73
20	65	49	47	45	54	57	60	69	74	76	77	74
21	67	48	47	46	54	58	60	69	74	77	78	73
22	67	48	47	46	54	59	59	69	74	77	78	72
23	67	48	46	46	54	55	59	69	76	77	77	72
24	68	48	45	45	55	51	60	69	76	77	77	72
25	64	47	45	47	55	51	60	68	76	78	78	71
26	62	48	44	46	--	51	61	70	76	80	78	71
27	62	47	44	45	--	52	62	70	76	80	79	70
28	62	46	43	44	55	52	62	69	76	80	79	70
29	63	46	43	45	--	54	61	70	76	80	78	70
30	60	--	44	46	--	55	62	71	77	80	78	70
31	59	--	44	45	--	55	--	71	--	80	78	--
Average	69	52	47	46	53	55	58	67	72	77	78	74

RIO GRANDE BASIN--Continued

PECOS RIVER NEAR GIRVIN, TEX.

LOCATION.--At supplementary gage at bridge on U. S. Highway 67, about half a mile downstream from Panhandle and Santa Fe Railway bridge, 2.1 miles east of Girvin, Pecos County, 6½ miles downstream from Comanche Creek and 7.8 miles downstream from regular gaging station.

DRAINAGE AREA.--29,560 square miles, approximately (contributing area at supplementary gage).

RECORDS AVAILABLE.--Chemical analyses: October 1939 to June 1941, October 1946 to September 1947, October 1953 to September 1957.

Water temperatures: October 1953 to September 1957.

EXTREMES, 1956-57.--Hardness: Maximum, 4,820 ppm Sept. 1-20; minimum, 330 ppm May 18. Specific conductance: Maximum daily, 24,300 micromhos July 13-15; minimum daily, 790 micromhos Apr. 26.

Water temperatures: Maximum, 92°F June 24; minimum, 40°F Nov. 29, Dec. 29-31.

EXTREMES, 1939-41, 1946-47, 1953-57.--Hardness: Maximum, 5,040 ppm June 1-30, 1956; minimum, 330 ppm May 18, 1957.

Specific conductance: Maximum daily, 25,600 micromhos July 1, 1956; minimum daily, 790 micromhos Apr. 26, 1957.

Water temperatures (1953-57): Maximum, 93°F June 1, 1954; minimum, 38°F Feb. 3, 4, 1956.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1956 to September 1957 given in WSP 1512.

Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Sodium (Na)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
						Calcium, magnesium	Non-carbonate				
Oct. 1-15, 20-31, 1956.....	17.8	3,920	61	3,930	6,140	4,280	4,230	67	26	19,800	7.4
Oct. 16-19.....	47.5	2,210	61	2,350	3,560	2,630	2,580	65	19	12,500	7.5
Nov. 1-30.....	23.6	3,860	104	3,880	6,050	4,160	4,080	67	26	20,700	7.6
Dec. 1-31.....	24.1	3,690	159	3,670	5,900	4,020	3,890	67	25	19,900	7.6
Jan. 1-31, 1957..	22.2	3,670	187	3,610	5,800	3,920	3,770	67	25	19,800	8.0
Feb. 1-28.....	54.7	3,240	169	3,150	5,090	3,540	3,400	67	24	17,500	7.8
Mar. 1-31.....	43.2	2,970	112	3,150	4,720	3,380	3,290	66	22	16,800	7.6
Apr. 1-18.....	30.4	3,740	88	3,630	5,800	4,120	4,050	66	25	19,300	7.4
Apr. 19-22.....	163	734	96	960	1,160	1,120	1,040	59	9.5	5,130	7.5
Apr. 23-24, 27, 29-30.....	36.4	1,980	139	2,220	3,060	2,480	2,370	63	17	11,500	7.5
Apr. 25-26, 28...	964	36	82	332	51	411	344	16	.8	924	7.5
May 1-17, 25-27..	24.9	3,570	139	3,530	5,570	3,830	3,720	67	25	19,000	7.5
May 18.....	390	192	107	240	300	330	242	56	4.6	1,570	7.9
May 19, 28.....	71.5	925	101	1,380	1,350	1,480	1,400	58	10	6,340	7.9
May 20-24, 29-31	52.9	1,930	75	2,170	3,040	2,370	2,310	64	17	11,400	7.2
June 1-9.....	45.3	2,260	96	2,370	3,610	2,690	2,610	65	19	13,200	7.5
June 10-30.....	19.1	3,080	72	3,140	4,720	3,340	3,280	67	23	16,700	7.4
July 1-22.....	15.8	4,530	63	4,260	6,970	4,680	4,630	68	29	23,100	7.5
July 23-31.....	23.2	3,040	75	3,290	4,570	3,440	3,380	66	23	16,500	7.1
Aug. 1-31.....	14.8	4,380	68	4,440	6,920	4,750	4,690	67	28	22,900	7.5
Sept. 1-20.....	13.9	4,570	69	4,610	7,070	4,820	4,760	67	29	23,400	7.5
Sept. 21-30.....	31.4	2,280	39	2,440	3,540	2,610	2,540	66	19	13,100	7.6
Weighted average	37.9	2,420	107	2,510	3,790	2,760	2,670	66	20	13,270	--

## WESTERN GULF OF MEXICO BASINS

## RIO GRANDE BASIN--Continued

## PECOS RIVER NEAR GIRVIN, TEX.--Continued

Temperature (°F) of water, water year October 1956 to September 1957

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	76	55	52	42	58	62	66	78	75	90	--	72
2	78	54	46	52	58	64	57	78	70	90	--	76
3	80	54	45	54	63	67	58	78	76	88	--	76
4	78	52	49	60	63	62	68	74	73	86	--	73
5	70	50	48	58	64	60	66	--	78	88	--	75
6	68	53	59	60	64	62	65	67	--	88	--	69
7	69	52	57	61	62	62	66	--	78	86	--	72
8	68	56	60	--	62	--	67	--	--	85	--	75
9	68	58	54	62	62	64	--	--	--	85	--	79
10	68	65	56	56	69	62	72	--	73	88	--	72
11	67	63	58	58	69	64	73	--	75	88	--	82
12	70	62	54	58	69	68	60	--	78	82	--	79
13	73	61	58	59	68	70	63	--	88	88	--	80
14	70	61	56	56	68	64	57	--	88	87	--	80
15	76	--	56	50	68	64	65	--	87	86	--	75
16	75	--	53	56	61	--	--	--	88	--	--	76
17	72	57	52	48	51	64	65	--	81	--	87	76
18	68	55	49	44	55	64	65	--	81	--	87	78
19	80	52	--	46	55	65	69	--	89	--	86	79
20	69	53	54	52	60	66	72	--	85	--	89	78
21	68	55	56	51	61	69	72	--	90	--	86	71
22	64	49	54	52	61	69	77	--	80	--	72	71
23	70	51	54	45	58	68	77	--	84	--	73	74
24	68	52	56	52	58	--	77	--	92	--	73	68
25	67	51	46	46	64	51	65	--	81	--	70	75
26	69	56	46	46	64	61	65	--	81	--	81	78
27	72	48	46	48	62	64	68	--	87	--	81	80
28	70	46	51	48	62	66	61	--	85	--	86	--
29	71	40	40	54	--	67	65	--	83	--	82	80
30	64	43	40	50	--	70	69	81	87	--	83	65
31	60	--	40	50	--	67	--	79	--	--	84	--
Average	71	54	52	53	62	64	67	--	82	--	--	75

RIO GRANDE BASIN--Continued  
 MISCELLANEOUS ANALYSES OF STREAMS IN RIO GRANDE BASIN IN NEW MEXICO  
 Chemical analyses, in parts per million, water year October 1956 to September 1957

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids (calculated)		Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)
														Parts per million	Tons per acre-foot	Calcium-magnesium	Non-carbonate		

RIO HONDO AT ARROYO HONDO

Aug. 13, 1957		8.9				3.0		70								63	6	9	0.2	138
Aug. 25		7.6				2.9		69			0.5	1.5				65	8	9	.2	145

EMBUDO CREEK AT DIXON

Aug. 24, 1957		14				5.6		145			0.5					129	10	9	0.2	269
Aug. 26		8.0				3.5		122			1.0					118	18	6	.1	232

RIO GRANDE AT ALBUQUERQUE

Feb. 18, 1957	732	21	0.08	55	8.8	37	4.3	158		101	18	0.6	0.8	0.10	325	0.44	642	44	31	1.2	498	
Mar. 19	165	--	--	55	10	38		172			17				330	.45	165	178	37	1.2	506	
Apr. 16	732	--	--	42	8.8	31		128			13				270	.87	534	141	36	1.1	411	
June 3	3,920	--	--	19	2.6	16		45			7.5				140	.19	1,480	58	16	38	.9	195
June 24	4,690	--	--	32	3.6	14		96			5.0				2,130	.23	2,130	95	16	24	.6	248
July 22	3,220	--	--	31	4.7	17		102			6.2				187	.25	1,630	97	14	28	.8	265
Aug. 12	2,940	--	--	54	8.3	30		138			14				--	--	--	168	56	28	1.0	444
Sept. 16	1,310	19	--	--	--	18		120			8.0				--	--	--	126	28	24	.7	328

TIJERAS CREEK AT TIJERAS

July 26, 1957				36	2.8	2.2		122							175	0.24		102	2	5	0.1	202
Aug. 10				44	4.0	4.2		123			1.8	1.5						126	26	7	.2	254

SAN JOSE RIVER AT U. S. HIGHWAY 66, NEAR LAGUNA PUEBLO

July 26, 1957				33	8.1	80		109			17				400	0.54		116	26	60	3.2	557
Aug. 19				67	15	75		142			40							228	112	42	2.1	760

RIO PUERCO AT U. S. HIGHWAY 66, NEAR CORREO

July 16, 1957				187	31	166		201			22				1,290	1.75	2,010	594	430	38	3.0	1,820
July 26				306	74	170		156			15				1,960	2.87		1,070	940	26	2.3	2,160
Aug. 7				143	24	192		192			19				--	--		456	298	48	3.9	1,550

a Includes 6 parts per million of carbonate (CO<sub>3</sub>)

## RIO GRANDE BASIN--Continued

## MISCELLANEOUS ANALYSES OF STREAMS IN RIO GRANDE BASIN IN NEW MEXICO--Continued

Chemical analyses, in parts per million, water year October 1956 to September 1957--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Boron (B)	Dissolved solids (Calculated)		Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH		
															Parts per million	Tons per acre-foot	Calcium	Non-magnesium						
July 16, 1957	590	12		194	33	140		189			38				1,260	1.71	620	464	33	2.4	1,590	7.3		
Aug. 25	2,360					226		165			26						682	547	42	3.8	1,950	7.5		
Feb. 1, 1957	370	--		42	5.4	--		--			--				234	0.32	127	26	28	0.9	583	--		
July 8	4,250					142		121			8.8						475	316	39	2.8	331	7.7		
Aug. 7	7,600	16				32		194			14						158	39	31	1.1	440	7.8		
Sept. 11	1,250	22						145																
RIO PUERCO AT RIO PUERCO																								
RIO GRANDE AT SAN ACACIA																								
LAKE McMILLAN AT McMILLAN DAM, NEAR LAKEWOOD																								
Oct. 1, 1956								83			254											3,100	7.0	
Oct. 19								80			360												3,590	6.8
Oct. 25								84			418												3,840	7.9
Nov. 2								95			733												4,970	6.8
Nov. 8								98			583												4,550	6.7
Dec. 17								106			970												5,870	7.5
Jan. 2, 1957								99			1,160												6,430	7.2
Jan. 15								117			1,330												6,860	7.0
Jan. 22								113			1,350												6,990	7.1
Feb. 5								108			1,510												7,450	6.8
Feb. 19								97			1,610												7,790	6.8
Mar. 4								94			1,700												8,080	6.8
Mar. 18								79			1,850												8,620	--
Apr. 2								93			1,280												6,830	7.3
Apr. 19								114			1,360												7,270	7.4
May 3								130			1,680												8,520	7.2
May 17								127			2,240												10,400	6.9
May 27								118			2,790												12,300	6.9
June 15								98			810												4,720	6.8
June 28								98			950												5,380	6.9
Aug. 9								85			131												1,830	7.1
Aug. 23								81			133												1,790	6.9
Sept. 13								98			164												1,980	7.2

## RIO GRANDE BASIN--Continued

## MISCELLANEOUS ANALYSES OF STREAMS IN RIO GRANDE BASIN IN NEW MEXICO--Continued

Chemical analyses, in parts per million, water year October 1956 to September 1957--Continued

Date of collection	Mean discharge (cfs)	Bicarbonate (HCO <sub>3</sub> )	Chloride (Cl)	Specific conductance (micromhos at 25° C)	pH
PECOS RIVER BELOW LAKE McMILLAN DAM, NEAR LAKEWOOD					
Oct. 11, 1956	0.2	82	278	3,270	6.9
Sept. 27, 1957	132	86	148	1,770	7.2

## PECOS RIVER AT FORD CROSSING IN MAJOR JOHNSON SPRING AREA, NEAR LAKEWOOD

Oct. 1, 1956		129	623	4,430	8.0
Oct. 25		172	787	5,020	6.8
Nov. 8		175	793	5,020	7.9
Dec. 17		171	785	5,050	7.3
Jan. 2, 1957		170	795	5,030	7.2
Jan. 15		191	780	4,920	7.2
Jan. 22		169	780	5,040	7.4
Feb. 5		166	785	5,040	7.8
Feb. 19		168	770	5,070	7.3
Mar. 4		167	785	5,080	7.3
Mar. 18		172	780	5,070	7.3
Apr. 2		173	770	5,080	7.2
May 3		131	1,650	8,420	7.5
May 17		177	785	5,160	7.7
May 27		181	780	5,110	7.6
June 15		138	760	4,970	8.0
July 12		184	805	5,170	6.8
Aug. 9		100	147	1,980	7.2
Aug. 23		172	735	4,370	7.1
Sept. 13		98	172	2,020	7.1
Sept. 27		82	206	2,090	7.2

## PECOS RIVER BELOW MAJOR JOHNSON SPRING, NEAR CARLSBAD

Oct. 1, 1956		156	747	4,840	7.6
Dec. 17		160	815	5,090	7.7
Jan. 2, 1957		161	820	5,110	7.6
Jan. 15		161	815	5,100	7.7
Jan. 22		157	815	5,100	7.4
Feb. 5		157	805	5,090	7.5
Feb. 19		151	820	5,090	7.9
Mar. 4		161	825	5,120	7.4
Mar. 18		161	820	5,120	7.2
Apr. 2		163	820	5,140	7.2
Apr. 19		135	1,150	6,410	7.1
May 3		136	1,440	7,530	7.1
May 17		170	810	5,120	7.1
May 27		154	785	5,030	7.4
June 15		164	785	5,020	7.1
June 28		120	945	5,390	6.8
July 12		170	770	4,970	7.0
July 26		104	590	4,170	7.2
Aug. 9		102	172	2,100	7.0
Aug. 23		165	770	4,790	7.4
Sept. 13		101	282	2,530	7.2
Sept. 27		95	374	2,880	7.4

## BLACK RIVER BELOW MAYES RANCH, NEAR WHITE CITY

Oct. 31, 1956	b 0.84	170	11	2,180	7.7
Nov. 21	b 1.11	225	9.0	2,240	7.5
Dec. 20	b .93	225	12	2,230	7.3
Jan. 21, 1957	b 1.29	224	--	2,250	7.4
Feb. 27	b 1.39	227	12	2,370	7.3
Mar. 26	b 1.25	208	10	2,220	7.3
Apr. 18	b .99	224	12	2,230	7.2
May 27	b 1.20	209	9.5	2,200	7.9
June 17	b .70	219	9.5	2,200	7.9
July 29	b .77	--	9.0	2,080	7.9
Aug. 27	b .96	228	11	2,210	7.4
Sept. 26	b 1.01	127	9.0	2,130	7.8

b Discharge at time of sampling.

## WESTERN GULF OF MEXICO BASINS

## RIO GRANDE BASIN--Continued

## MISCELLANEOUS ANALYSES OF STREAMS IN RIO GRANDE BASIN IN NEW MEXICO--Continued

Chemical analyses, in parts per million, water year October 1956 to September 1957--Continued

Date of collection	Mean discharge (cfs)	Bicarbonate (HCO <sub>3</sub> )	Chloride (Cl)	Specific conductance (micromhos at 25°C)	pH
BLACK RIVER AT HARKEY CROSSING SEC. 9, T. 24 S., R. 27 E., NEAR MALAGA					
Nov. 9, 1956.....		198	30	1,940	7.8
Dec. 18.....		205	26	1,930	7.4
Jan. 30, 1957.....		178	28	1,920	7.8
Mar. 12.....		186	23	1,880	7.7
Apr. 25.....		197	22	1,760	7.5
June 7.....		214	18	1,650	7.8
July 18.....		169	20	1,650	7.5
Aug. 28.....		c 138	14	1,270	8.4

c Includes 4 parts per million of carbonate (CO<sub>3</sub>).

RIO GRANDE BASIN--Continued  
MISCELLANEOUS ANALYSES OF STREAMS IN RIO GRANDE BASIN IN NEW MEXICO--Continued

Particle-size analyses of suspended sediment, water year October 1956 to September 1957  
(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipet; S, sieve; N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed; V, visual accumulation tube)

Date of collection	Time	Discharge (cfs)	Water temperature (°F)	Suspended sediment						Methods of analysis			
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters							
						0.002	0.004	0.008	0.016		0.031	0.062	0.125
RIO GRANDE AT EMBUDO													
May 11, 1957	2:30 p.m.	2,300	52	1,010	3,460	12	22	38	50	68	91	100	VPWCM
June 13	8:15 p.m.	4,380	60	2,610	2,610	17	26	42	47	61	91	100	VPWCM
Aug. 1	9:30 p.m.	4,530	71	745	2,180	28	45	76	84	91	100	100	VPWCM
Aug. 13	5:20 p.m.	1,390	68	1,010	3,480	46	68	91	94	98	100	100	VPWCM
Aug. 30	2:30 p.m.	1,730	63	3,720	4,050	22	30	41	51	75	92	100	VPWCM
COCHITI EAST SIDE MAIN CANAL NEAR COCHITI													
Mar. 18, 1957	11:30 a.m.	53	48	114	--	--	--	90	100	--	--	100	S
Apr. 1	11:15 a.m.	64	54	143	1,000	72	84	94	95	96	98	100	SPWCM
Apr. 15	11:30 a.m.	68	54	2,750	3,870	51	78	96	100	--	--	--	VPWCM
May 2	10:40 a.m.	74	62	1,090	2,580	25	36	61	94	100	--	--	VPWCM
May 16	2:00 p.m.	78	53	956	3,550	33	42	66	92	100	--	--	VPWCM
May 29	11:15 a.m.	104	63	803	2,140	22	29	48	65	99	100	100	VPWCM
June 12	11:25 a.m.	84	60	1,190	4,280	30	48	69	81	100	--	--	VPWCM
June 26	12:20 p.m.	98	66	611	--	--	--	57	78	100	--	--	V
SILI MAIN CANAL NEAR COCHITI													
Oct. 3, 1956	11:10 a.m.	35	62	19	--	--	--	98	100	--	--	100	S
Oct. 16	10:20 a.m.	38	51	24	--	--	--	98	99	100	--	100	S
Oct. 30	12:20 p.m.	34	49	64	--	--	--	98	100	--	--	100	S
Mar. 18, 1957	1:00 p.m.	29	47	113	--	--	--	97	100	--	--	100	S
Apr. 1	12:45 p.m.	43	54	147	1,020	68	86	99	100	--	--	100	SPWCM
Apr. 15	1:40 p.m.	44	56	2,650	3,980	60	85	100	100	--	--	100	VPWCM
May 2	3:55 p.m.	42	62	709	2,400	58	53	94	100	--	--	100	VPWCM
May 16	4:45 p.m.	47	55	559	1,700	56	67	96	100	--	--	100	SPWCM
May 29	10:55 a.m.	47	61	334	--	--	--	89	100	--	--	100	S
June 12	12:35 p.m.	44	61	989	3,130	44	67	90	99	100	--	100	SPWCM
June 26	2:40 p.m.	44	67	470	--	--	--	80	98	100	--	100	S

RIO GRANDE BASIN--Continued  
MISCELLANEOUS ANALYSES OF STREAMS IN RIO GRANDE BASIN IN NEW MEXICO--Continued

Particle-size analyses of suspended sediment, water year October 1956 to September 1957--Continued  
(Methods of analysis: B, bottom withdraw tube; D, decantation; P, pipet; S, sieve; N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed; V, visual accumulation tube)

Date of collection	Time	Discharge (cfs)	Water temperature (°F)	Suspended sediment										Methods of analysis		
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters										
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250		0.350	0.500
RIO GRANDE AT COCHITI																
Oct. 3, 1956	1:45 p. m.	24	71	20	--	--	--	--	--	--	77	89	100	--	--	S
Oct. 16	1:00 p. m.	53	62	26	--	--	--	--	--	--	94	96	100	--	--	S
Oct. 30	1:30 p. m.	95	52	49	--	--	--	--	--	--	87	90	98	100	--	S
Nov. 14	12:40 p. m.	280	48	847	1,400	--	15	15	15	15	36	64	83	99	100	VPWCM
Nov. 27	12:30 p. m.	331	39	710	--	--	--	--	--	--	27	78	100	--	--	V
Dec. 11	1:00 p. m.	435	33	953	1,410	5	9	9	9	9	28	63	98	100	--	VPWCM
Dec. 26	2:15 p. m.	345	32	724	--	--	--	--	--	--	8	19	55	94	100	V
Jan. 8, 1957	11:50 a. m.	352	39	384	--	--	--	--	--	--	16	45	87	100	--	V
Jan. 21	11:40 a. m.	366	35	684	--	--	--	--	--	--	22	37	80	100	--	V
Feb. 5	2:15 p. m.	396	44	426	--	--	--	--	--	--	13	33	84	100	--	V
Feb. 19	11:00 a. m.	676	44	2,870	4,140	22	23	23	23	23	32	40	49	62	96	VPWCM
Mar. 18	2:30 p. m.	304	52	195	--	--	--	--	--	--	51	54	91	100	--	V
Apr. 1	2:20 p. m.	380	54	1,330	1,010	9	11	11	11	11	13	13	40	90	100	VPWCM
Apr. 15	4:00 p. m.	985	58	4,710	3,870	37	52	52	52	52	62	68	73	81	98	VPWCM
May 2	1:00 p. m.	1,220	62	1,760	4,480	16	22	22	22	22	43	65	86	98	100	VPWCM
May 16	4:00 p. m.	3,370	54	2,550	3,880	12	16	16	16	16	26	49	85	96	100	VPWCM
May 29	3:00 p. m.	3,470	62	2,770	3,410	7	9	9	9	9	19	32	63	87	100	VPWCM
June 12	5:00 p. m.	5,580	62	5,410	4,360	8	13	13	13	13	20	25	36	58	90	VPWCM
June 26	5:40 p. m.	4,500	67	3,940	1,680	5	6	6	6	6	14	22	51	80	96	VPWCM

## RIO GRANDE AT SAN FELIPE

Oct. 4, 1955	3:45 p. m.	82	73	108	--	--	--	66	91	99	100	--	S
Oct. 17	2:15 p. m.	119	56	196	--	--	--	37	76	98	100	--	S
Oct. 31	3:15 p. m.	693	54	1,160	12	17	17	34	78	99	100	--	VPWCM
Nov. 14	3:20 p. m.	255	47	995	9	15	15	47	92	100	100	--	VPWCM
Nov. 27	3:30 p. m.	325	43	1,440	4	8	8	28	85	100	100	--	VPWCM
Dec. 13	3:15 p. m.	376	39	1,300	4	6	6	22	77	100	100	--	VPWCM
Dec. 26	1:05 p. m.	320	35	1,190	--	--	--	9	60	89	100	--	V
Jan. 6, 1957	2:40 p. m.	358	43	1,140	--	--	--	24	72	97	100	--	V
Jan. 21	2:30 p. m.	358	37	794	--	--	--	46	82	89	100	--	V
Feb. 5	10:45 a. m.	394	41	756	--	--	--	21	60	89	100	--	V
Feb. 19	2:00 p. m.	680	45	6,060	24	28	28	69	96	100	100	--	VPWCM
Mar. 4	3:30 p. m.	428	49	1,060	28	38	38	50	77	98	99	100	VPWCM
Mar. 19	10:45 a. m.	407	48	1,450	--	--	--	15	26	59	78	98	V
Apr. 2	10:50 a. m.	470	52	1,080	13	15	15	23	33	50	72	100	VPWCM
Apr. 16	1:40 p. m.	1,080	59	3,920	31	50	50	69	90	98	100	--	VPWCM
May 1	11:15 a. m.	1,160	61	1,710	13	19	19	40	74	95	100	--	VPWCM
May 15	2:30 p. m.	3,520	57	3,360	14	19	19	35	54	76	83	100	VPWCM
May 28	1:20 p. m.	3,170	61	2,250	11	11	11	21	40	83	97	100	VPWCM
June 13	11:00 a. m.	5,200	64	2,670	11	17	17	28	47	77	94	100	VPWCM
June 28	2:00 p. m.	4,400	73	2,160	7	11	11	25	43	78	98	100	VPWCM

## RIO GRANDE BASIN--Continued

## MISCELLANEOUS ANALYSES OF STREAMS IN RIO GRANDE BASIN IN NEW MEXICO--Continued

Particle-size analyses of suspended sediment, water year October 1956 to September 1957--Continued  
 (Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipet; S, sieve; N, in native water;  
 W, in distilled water; C, chemically dispersed; M, mechanically dispersed; V, visual accumulation tube)

Date of collection	Time	Discharge (cfs)	Water temperature (°F)	Suspended sediment										Methods of analysis		
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters									1.000	2.000
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250			
RIO GRANDE AT ALBUQUERQUE																
Nov. 15, 1956	4:30 p. m.	64	42	1,170	3,050	66	89	90	92	95	100	100	100	SPWCM		
Nov. 26	3:30 p. m.	138	41	1,440	2,960	55	83	89	94	99	100	100	100	SPWCM		
Dec. 11	12:05 p. m.	290	38	1,020	1,690	17	26	44	72	69	100	100	100	VPWCM		
Dec. 24	12:15 p. m.	246	44	756	-	-	-	48	61	82	100	100	100	VPWCM		
Jan. 7, 1957	3:30 p. m.	376	43	936	2,450	27	40	51	59	82	99	100	100	VPWCM		
Jan. 21	2:30 p. m.	428	44	1,880	3,170	35	55	66	78	98	100	100	100	VPWCM		
Feb. 4	3:10 p. m.	346	46	827	2,540	35	49	68	80	96	100	100	100	VPWCM		
Feb. 18	3:40 p. m.	794	48	4,450	4,440	43	56	86	95	98	100	100	100	VPWCM		
Mar. 8	12:20 p. m.	364	50	2,640	3,770	56	67	86	94	98	100	100	100	VPWCM		
Mar. 19	2:30 p. m.	188	51	585	2,170	38	49	79	87	99	100	100	100	VPWCM		
Apr. 1	3:50 p. m.	102	53	618	3,750	52	69	91	99	100	100	100	100	VPWCM		
Apr. 16	3:45 p. m.	920	66	8,170	4,270	31	45	78	96	99	100	100	100	VPWCM		
Apr. 30	4:00 p. m.	971	68	4,470	3,980	13	19	34	76	89	98	100	100	VPWCM		
May 14	3:15 p. m.	4,020	62	9,490	5,100	10	14	35	54	69	90	98	100	SPWCM		
May 27	12:10 p. m.	3,040	65	3,910	3,970	9	14	30	73	94	99	100	100	VPWCM		
June 10	12:45 p. m.	5,500	67	5,540	2,860	10	15	29	65	86	97	100	100	VPWCM		
June 24	3:45 p. m.	4,880	75	8,490	3,630	3	5	12	26	51	94	100	100	VPWCM		
RIO GRANDE NEAR BELEN																
Dec. 27, 1956	2:20 p. m.	215	44	882	--	--	--	87	90	98	100	100	100	S		
Jan. 7, 1957	3:00 p. m.	290	48	3,520	--	--	--	29	29	37	70	99	99	V		
Jan. 21	2:00 p. m.	378	45	1,890	3,300	59	78	86	89	99	100	100	100	VPWCM		
Feb. 4	1:30 p. m.	315	45	991	4,300	43	65	77	84	95	100	100	100	VPWCM		
Feb. 18	2:00 p. m.	780	51	3,470	3,960	64	80	86	90	99	100	100	100	VPWCM		
Mar. 4	3:10 p. m.	262	53	1,220	3,970	56	78	94	97	100	100	100	100	SPWCM		
Mar. 19	12:00 m.	192	52	494	2,150	58	78	90	95	100	100	100	100	SPWCM		

RIO GRANDE NEAR BELEN--Continued

Apr. 1, 1957	4:00 p. m.	128	58	354	1,430	46	62	89	84	99	100	--	SPWCM
Apr. 15	12:15 p. m.	116	64	799	5,480	66	89	96	97	99	100	--	SPWCM
Apr. 29	2:45 p. m.	986	60	3,440	4,170	33	52	84	95	100	--	--	VPWCM
May 15	3:00 p. m.	3,640	61	7,960	3,960	18	27	55	73	90	98	100	VPWCM
May 27	12:30 p. m.	2,930	64	5,210	3,960	14	25	57	84	97	100	--	VPWCM
June 24	2:10 p. m.	4,100	85	3,200	3,590	14	22	46	81	98	100	--	VPWCM

RIO GRANDE AT SAN ACACIA

Jan. 14, 1957	10:00 a. m.	425	48	9,050	3,410	23	30	56	84	100	--	--	VPWCM
June 4	1:05 p. m.	3,260	70	5,400	3,400	30	37	60	84	98	100	--	VPWCM
July 8	9:00 a. m.	4,650	75	4,950	4,040	22	27	55	80	98	100	--	VPWCM

## WESTERN GULF OF MEXICO BASINS

## RIO GRANDE BASIN--Continued

## MISCELLANEOUS ANALYSES OF STREAMS IN RIO GRANDE BASIN IN NEW MEXICO--Continued

Periodic determinations of suspended-sediment discharge, water year October 1956 to September 1957

Date	Discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Discharge (tons per day)
RIO GRANDE AT EMBUDO			
Oct. 26, 1956 .....	183	32	16
Nov. 23 .....	239	252	163
Dec. 27 .....	246	24	16
Feb. 14, 1957 .....	343	64	59
Mar. 25 .....	282	29	22
Apr. 17 .....	565	469	715
May 5 .....	802	410	888
May 11 .....	2,300	1,010	1,840
June 13 (3:15 p. m.) .....	4,380	516	6,100
June 13 (3:30 p. m.) .....	4,380	524	6,200
June 19 .....	2,680	203	1,470
June 24 .....	3,280	236	2,090
July 3 .....	3,700	259	2,590
July 10 .....	2,600	160	1,120
July 18 .....	1,960	381	2,020
July 26 .....	2,100	387	2,190
July 29 .....	3,280	674	5,970
Aug. 1 .....	4,530	745	9,110
Aug. 13 .....	1,390	1,010	3,870
Aug. 30 (1:45 p. m.) .....	1,730	2,880	13,500
Aug. 30 (2:00 p. m.) .....	1,730	3,720	17,400
Sept. 12 .....	766	78	161

## COCHITI EAST SIDE MAIN CANAL NEAR COCHITI

Oct. 3, 1956 .....	91	36	9
Oct. 16 .....	91	42	10
Oct. 30 .....	68	73	13
Mar. 12, 1957 .....	61	609	100
Mar. 18 .....	53	114	16
Mar. 25 .....	67	362	65
Apr. 1 .....	64	143	25
Apr. 8 .....	64	182	31
Apr. 15 .....	68	2,750	505
Apr. 23 .....	68	1,580	290
May 2 .....	74	1,090	218
May 7 .....	82	2,470	547
May 16 .....	78	956	201
May 21 .....	73	841	166
May 29 .....	104	803	225
June 4 .....	91	1,130	278
June 12 .....	84	1,190	270
June 20 .....	80	711	154
June 26 .....	98	611	162

## RIO PUERCO BELOW CABEZON

Mar. 6, 1957 .....	1.9	59,200	315
May 3 .....	9.0	53,800	1,360
May 9 .....	60	58,100	9,930
May 16 .....	29	32,300	2,620
May 24 .....	12	29,300	949
May 29 .....	94	77,800	20,500
June 4 .....	71	49,900	9,920
June 13 .....	44	27,400	3,260
July 30 .....	4.6	34,300	442
July 31 .....	17	76,800	3,680
Aug. 8 .....	27	42,400	3,210
Aug. 21 .....	11	18,800	558

## RIO GRANDE BASIN--Continued

## MISCELLANEOUS ANALYSES OF STREAMS IN RIO GRANDE BASIN IN NEW MEXICO--Continued

Periodic determinations of suspended-sediment discharge, water year October 1956 to September 1957--Continued

Date	Discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Discharge (tons per day)
<b>CHICO ARROYO NEAR GUADALUPE</b>			
Mar. 6, 1957 .....	0.5	26,300	36
May 9 .....	8.4	44,200	1,040
June 4 .....	8.2	20,200	447
June 13 .....	6.1	34,600	591
July 30 .....	152	68,700	29,200
July 31 .....	16	28,700	1,240
Aug. 8 .....	428	76,900	92,200
Aug. 21 .....	146	42,100	17,200
Sept. 5 .....	2.8	1,640	12
<b>RIO PUERCO AT RIO PUERCO</b>			
Aug. 25, 1957 (2:50 p. m.) .	6,960	216,000	4,660,000
Aug. 25 (3:40 p. m.) .....	7,440	173,000	3,860,000
<b>SILI MAIN CANAL NEAR COCHITI</b>			
Oct. 3, 1956 .....	35	19	2
Oct. 16 .....	38	24	2
Oct. 30 .....	34	64	6
Mar. 12, 1957 .....	31	637	53
Mar. 18 .....	29	113	9
Mar. 25 .....	36	191	19
Apr. 1 .....	43	147	17
Apr. 8 .....	35	231	22
Apr. 15 .....	44	2,650	315
Apr. 23 .....	31	1,610	135
May 2 .....	42	709	80
May 7 .....	53	1,450	207
May 16 .....	47	559	71
May 21 .....	49	650	86
May 29 .....	47	334	42
June 4 .....	46	1,140	142
June 12 .....	44	989	117
June 20 .....	43	686	80
June 26 .....	44	470	56
<b>RIO GRANDE AT COCHITI</b>			
Oct. 3, 1956 .....	24	20	1
Oct. 8 .....	30	27	2
Oct. 16 .....	53	26	4
Oct. 22 .....	73	33	7
Oct. 30 .....	95	49	13
Nov. 5 .....	250	856	578
Nov. 14 .....	280	847	640
Nov. 19 .....	268	487	352
Nov. 27 .....	331	710	635
Dec. 3 .....	345	504	469
Dec. 11 .....	435	953	1,120
Dec. 17 .....	370	576	575
Dec. 26 .....	345	724	674
Dec. 31 .....	353	667	636
Jan. 8, 1957 .....	352	384	365
Jan. 14 .....	428	764	883
Jan. 21 .....	386	684	676
Jan. 30 .....	352	508	483
Feb. 5 .....	396	426	455
Feb. 11 .....	428	528	610
Feb. 19 .....	676	2,870	5,240
Feb. 28 .....	649	2,200	3,860

## WESTERN GULF OF MEXICO BASINS

## RIO GRANDE BASIN--Continued

## MISCELLANEOUS ANALYSES OF STREAMS IN RIO GRANDE BASIN IN NEW MEXICO--Continued

Periodic determinations of suspended-sediment discharge, water year October 1956 to September 1957--Continued

Date	Discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Discharge (tons per day)
RIO GRANDE AT COCHITI--Continued			
Mar. 12, 1957.....	412	851	947
Mar. 18 .....	304	195	160
Mar. 25 .....	373	346	348
Apr. 1 .....	380	1,330	1,360
Apr. 8 .....	380	290	298
Apr. 15 .....	985	4,710	12,500
Apr. 23 .....	1,910	2,530	13,000
May 2 .....	1,220	1,760	5,800
May 7 .....	3,090	6,010	50,100
May 16 .....	3,370	2,550	23,200
May 21 .....	3,840	907	9,400
May 29 .....	3,470	2,770	26,000
June 4 .....	4,850	1,150	15,100
June 12 .....	5,580	5,410	81,500
June 20 .....	3,910	5,020	53,000
June 26 .....	4,500	3,940	47,900
RIO GRANDE AT SAN FELIPE			
Oct. 4, 1956 .....	82	108	24
Oct. 9 .....	88	115	27
Oct. 17 .....	119	196	63
Oct. 22 .....	129	337	117
Oct. 31 .....	160	693	299
Nov. 7 .....	290	1,780	1,390
Nov. 14 .....	255	995	685
Nov. 20 .....	259	1,490	1,040
Nov. 27 .....	325	1,210	1,060
Dec. 3 .....	352	1,380	1,310
Dec. 13 .....	376	1,300	1,320
Dec. 17 .....	364	1,460	1,430
Dec. 26 .....	320	1,190	1,030
Dec. 31 .....	320	1,100	950
Jan. 8, 1957 .....	358	1,140	1,100
Jan. 14 .....	449	1,570	1,900
Jan. 21 .....	358	794	767
Jan. 30 .....	358	712	688
Feb. 5 .....	394	736	783
Feb. 11 .....	435	736	864
Feb. 19 .....	680	6,060	11,100
Feb. 25 .....	613	1,370	2,270
Mar. 4 .....	428	1,060	1,220
Mar. 12 .....	449	2,240	2,720
Mar. 19 .....	407	1,450	1,590
Mar. 26 .....	394	423	450
Apr. 2 .....	470	1,090	1,380
Apr. 9 .....	478	747	964
Apr. 16 .....	1,080	3,920	11,400
Apr. 24 .....	1,760	1,010	4,800
May 1 .....	1,160	1,710	5,360
May 7 .....	2,590	3,890	27,200
May 15 .....	3,520	3,360	31,900
May 23 .....	3,980	2,400	25,800
May 28 .....	3,170	2,250	19,300
June 3 .....	4,150	2,310	25,900
June 13 .....	5,200	2,670	37,500
June 20 .....	4,540	1,270	15,600
June 28 .....	4,400	2,160	25,700

## RIO GRANDE BASIN--Continued

## MISCELLANEOUS ANALYSES OF STREAMS IN RIO GRANDE BASIN IN NEW MEXICO--Continued

Periodic determinations of suspended-sediment discharge, water year October 1956 to September 1957--Continued

Date	Discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Discharge (tons per day)
RIO GRANDE AT ALBUQUERQUE			
Nov. 5, 1956	16	261	11
Nov. 15	64	1,170	202
Nov. 20	33	974	87
Nov. 26	138	1,440	537
Dec. 3	160	1,390	600
Dec. 11	290	1,020	799
Dec. 17	329	839	745
Dec. 24	346	756	706
Jan. 2, 1957	400	1,320	1,430
Jan. 7	376	936	950
Jan. 14	428	1,530	1,770
Jan. 21	428	1,880	2,170
Jan. 28	421	1,190	1,350
Feb. 4	346	827	773
Feb. 11	358	815	788
Feb. 18	794	4,450	9,540
Feb. 26	684	4,180	7,720
Mar. 8	364	2,640	2,590
Mar. 12	290	1,400	1,100
Mar. 19	188	585	297
Mar. 25	250	1,070	722
Apr. 1	102	618	170
Apr. 9	159	828	355
Apr. 16	920	8,170	20,300
Apr. 22	1,690	9,920	45,300
Apr. 30	971	4,470	11,700
May 3	1,640	6,950	30,800
May 6	2,010	11,900	64,600
May 14	4,020	9,490	103,000
May 21	3,430	4,690	43,400
May 27	3,040	3,910	32,100
June 3	3,880	7,010	73,400
June 10	5,500	5,540	82,300
June 17	4,940	12,000	160,000
June 24	4,860	8,490	111,000
RIO GRANDE NEAR BELEN			
Oct. 18, 1956	18	58	3
Oct. 24	16	59	3
Nov. 6	18	105	5
Nov. 12	25	164	11
Nov. 26	34	223	20
Dec. 4	54	189	28
Dec. 18	203	2,120	1,160
Dec. 27	215	882	512
Dec. 31	218	875	515
Jan. 7, 1957	290	3,520	2,760
Jan. 14	325	1,640	1,440
Jan. 21	378	1,890	1,930
Jan. 28	315	1,310	1,110
Feb. 4	315	991	843
Feb. 11	320	878	759
Feb. 18	790	3,470	7,400
Feb. 25	676	3,280	5,990
Mar. 4	262	1,220	863
Mar. 11	254	1,110	761
Mar. 19	192	494	256
Mar. 25	246	845	561

## WESTERN GULF OF MEXICO BASINS

## RIO GRANDE BASIN--Continued

## MISCELLANEOUS ANALYSES OF STREAMS IN RIO GRANDE BASIN IN NEW MEXICO--Continued

Periodic determinations of suspended-sediment discharge, water year October 1956 to September 1957--Continued

Date	Discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Discharge (tons per day)

## RIO GRANDE NEAR BELEN--Continued

Apr. 1, 1957 .....	128	354	122
Apr. 9 .....	172	793	368
Apr. 15 .....	116	799	250
Apr. 23 .....	1,250	4,010	13,500
Apr. 29 .....	986	3,440	9,160
May 6 .....	2,240	4,940	29,900
May 15 .....	3,640	7,980	78,200
May 20 .....	3,350	7,000	63,300
May 27 .....	2,930	5,210	41,200
June 3 .....	4,140	7,890	88,200
June 17 .....	4,860	4,360	57,200
June 24 .....	4,100	3,200	35,400

## RIO GRANDE AT SAN ACACIA

Jan. 14, 1957 .....	425	9,050	10,400
Feb. 1 .....	414	5,320	5,950
Feb. 8 .....	438	2,840	3,360
Apr. 11 .....	15	475	19
May 6 .....	1,260	7,850	26,700
June 4 .....	3,260	5,400	47,500
June 13 .....	4,440	10,900	131,000
July 8 .....	4,650	4,950	62,100
Aug. 7 .....	6,410	82,100	1,470,000
Sept. 11 .....	1,580	2,450	10,300



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