

# Quality of Surface Waters of the United States 1952

## Parts 7-8. 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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*Prepared in cooperation with the States  
of Arkansas, Louisiana, New Mexico,  
Oklahoma, and Texas, and with other  
agencies*



**UNITED STATES DEPARTMENT OF THE INTERIOR**

**Fred A. Seaton, *Secretary***

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Figure 1. Map of the United States showing basins covered by the four water-supply papers on quality of surface waters in 1952. ....

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# QUALITY OF SURFACE WATERS OF THE UNITED STATES, 1952

PARTS 7-8

## 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.

The regular yearly publication of records of chemical analyses, suspended sediment, and water temperature was begun by the Geological Survey in 1941. The annual records prior to 1948 were published 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 were collected from October 1, 1951, to September 30, 1952. Descriptive statements are given for each sampling station for which regular series of chemical analyses 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 dissolved solids, hardness, sediment loads, water temperature, and other pertinent data. Records of water discharge of the streams at, or near, the sampling point for the sampling period are included in most tables of analyses. The records are arranged by drainage basins, according to Geological Survey practice in reporting records of stream flow.

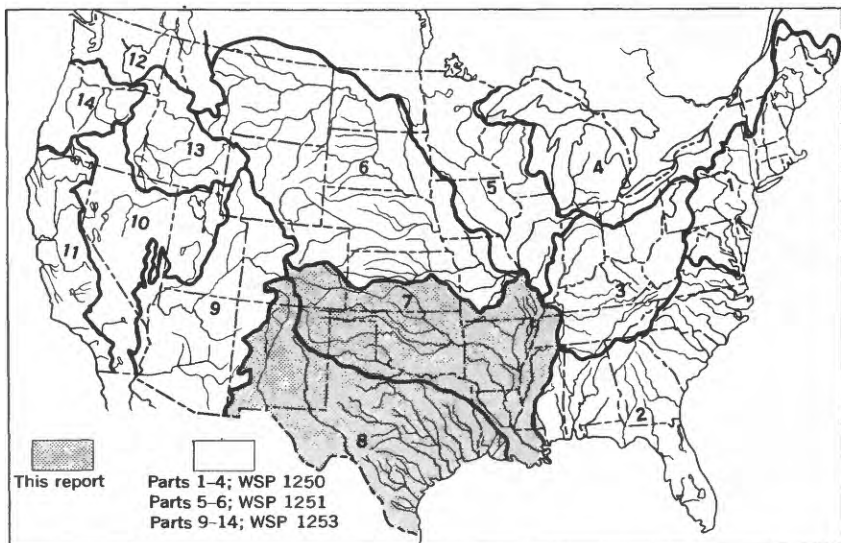


Figure 1. Map of the United States showing basins covered by the four water-supply papers on quality of surface waters in 1952. The shaded portion represents the section of the country covered by this volume; the unshaded portion represents the section of the country covered by other water-supply papers.

Beginning with the series of reports for the water year ending September 30, 1951, the order of listing station records has been changed. In this report, stations on tributary streams are listed between stations on the main stream in the order in which those tributaries enter the main stem. Stations on tributaries to tributaries are inserted in a similar manner.

During the year ended September 30, 1952, 170 regular sampling stations on 86 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 87 of the regular sampling 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, determinations made on the daily samples before compositing have not been reported. Specific conductance was usually determined on each daily sample, and pH, chloride, or other determinations were also made on many of the daily samples. As noted in the table headings these data are available for reference at the district offices listed under Division of Work, on page 17.

Quantities of suspended sediment are reported for 29 stations during the year ended September 30, 1952. 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 31 of the stations. As noted under "Remarks" in the table headings, suspended-sediment concentrations also were determined from the samples collected for chemical analysis in some parts of the country. The data do not provide a reliable basis for computing the loads of suspended sediment carried by the stream but may be of value for design and operation of filtration plants utilizing these stream waters. Records of these infrequent determinations are available for reference in the district offices listed.

Material which is transported essentially in continuous contact with the stream bed is termed bed load. All other undissolved material in transport is termed suspended sediment and generally constitutes the major part of the total sediment load. At the present time no reliable method has been developed for determining bed load on a routine basis.

## COLLECTION AND EXAMINATION OF SAMPLES

### CHEMICAL QUALITY

Samples for chemical analysis were usually collected daily at, or near, points on streams where gaging stations are maintained for measurement of water discharge. Most of the analyses were made on 10-day composites of daily samples collected for a period of a year at each sampling point. 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 during the remainder of the month. For some streams that are subject to sudden and large changes in chemical composition or concentration, samples were composited for shorter periods on the basis of the concentration of dissolved solids indicated by measurements of specific conductance of the daily samples.

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., 1946).

For those waters containing moderately large quantities of soluble salts, the value reported for dissolved solids is the sum of the quantities of the various determined constituents using the carbonate equivalent of the reported bicarbonate. In other analyses the value reported as dissolved solids is the residue on evaporation after drying at 180°C for 1 hour. Specific conductance is given for most analyses and was determined by means of a conductance bridge using a standard potassium chloride solution as reference.

## SUSPENDED SEDIMENT

In general, samples were collected daily with the US D-43 depth-integrating sampler (U. S. Inter-agency, 1948, p.70-76) 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. Suspended-sediment samples, consisting of depth-integrated samples at three or more verticals in the cross section were made periodically to determine the cross-sectional distribution of the suspended concentration with respect to that at the daily sampling vertical. In streams where comparatively rapid fluctuations in transverse distribution of water discharge or sediment concentration are encountered at the sampling point, 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 mean daily 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 anytime and, for most periods, mean daily 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 sediment 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 sediment loads were estimated on the basis of water discharge, sediment concentrations observed immediately preceding and following the periods, and 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 sediment loads for individual days are not estimated, as numerous factors influencing the quantities of transported sediment made it very difficult to make accurate estimates of sediment loads for individual days. However, estimated sedi-

ment loads for missing days in an otherwise continuous period of sampling have been included in monthly and annual totals for most streams to provide a complete record.

In addition to the records of total quantities of sediment, records of the particle sizes of sediment are included also. The particle sizes of the suspended sediments were determined periodically for many of the stations. As much of the material carried in suspension can pass through the finest sieves, the bottom-withdrawal tube method (U. S. Inter-agency, 1943, p. 82-90) was used in most of the analyses. Generally, sieves were used in the determination of particle sizes for sediments which were predominantly coarser than 0.062 mm. Size distribution for some sediments was determined by a combination of sieves and pipette methods in which the size fraction 0.062 mm and larger was analyzed by sieves and that smaller than 0.062 mm was analyzed by the pipette method (Kilmer and Alexander, 1949). Native or distilled water, as noted in the tables of analyses, was used as the settling medium. In some instances, chemical dispersing agents were added to the settling medium. As settling diameters of the clay and colloidal fractions are often affected by the chemical character of the settling medium, analyses made using native water may more nearly simulate particle sizes existing in the stream. Results of analyses using distilled water or using a settling medium containing dispersing agents 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 pipette method. The concentration of suspended sediment used in the bottom-withdrawal tube or pipette cylinder was often different from the concentration in the original suspension. The concentration at which analyses were made is indicated in the appropriate tables.

### TEMPERATURE

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

Records of thermograph observations consist of maximum and minimum temperatures for each day, and the monthly averages of the maximum daily and minimum daily temperatures.

## 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 and is calculated by dividing the concentration in parts per million by the chemical combining weight of the constituent. 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 (Fe <sup>++</sup> ) .....	0.0358	Carbonate (CO <sub>3</sub> <sup>--</sup> ) ..	0.0333
Iron (Fe <sup>+++</sup> ) .....	.0537	Bicarbonate (HCO <sub>3</sub> <sup>-</sup> ) ..	.0164
Calcium (Ca <sup>++</sup> ) .....	.0499	Sulfate (SO <sub>4</sub> <sup>--</sup> ) .....	.0208
Magnesium (Mg <sup>++</sup> ) ...	.0822	Chloride (Cl <sup>-</sup> ) .....	.0282
Sodium (Na <sup>+</sup> ) .....	.0435	Fluoride (F <sup>-</sup> ) .....	.0526
Potassium (K <sup>+</sup> ) .....	.0256	Nitrate (NO <sub>3</sub> <sup>-</sup> ) .....	.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, as calcium carbonate (CaCO<sub>3</sub>), is calculated from the equivalents of calcium and magnesium except for a few samples for which the reported values also include equivalents of free mineral acid, aluminum, iron, and manganese when present in significant quantities. 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.

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 has been 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 moder-

ate to high concentration, the proportion of potassium is much smaller than that of sodium.

Specific conductance values are expressed in reciprocal ohms times  $10^6$  (micromhos at  $25^{\circ}\text{C}$ ). The discharge of the streams is reported in cubic feet per second (see Stream Flow, p. 20) 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 (pH) is given as the negative logarithm of the number of moles of ionized hydrogen per liter of water.

An average of analyses (arithmetical or weighted) for the water year is given for most daily sampling stations. An arithmetical 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 weighted average represents approximately 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. The weighted average of the analyses is computed by multiplying the discharge for the sampling period by the quantities of the individual constituents for the corresponding period and dividing the sum of the products by the sum of the discharges. Water as represented by the weighted average is less concentrated than that represented by the average of the individual analyses for most streams because at times of high discharge the rivers generally have lower concentrations of dissolved solids.

Mean daily sediment concentrations are expressed in parts per million by weight. A part per million of sediment 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 finer than indicated sizes in millimeters. The size classification used in this report is that recommended by the American Geophysical Union Subcommittee on sediment terminology (Lane, et al., 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 through which the water has passed and the length

of time it has been in contact with the rocks or soils. Some streams are fed by both surface runoff and underground 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. Underground water is usually more highly concentrated than surface runoff as 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 return drain waters.

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, and dissolved solids. Aluminum, manganese, color, pH, acidity, oxygen consumed, and other dissolved constituents and physical properties are reported for certain streams. 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 few contain more than 50 parts, but the more common range is from 10 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 steam turbines.

### Aluminum (Al)

Aluminum is usually 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 practically 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 practically 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--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, 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 in-



creasing the corrosiveness of waters that contain large quantities of calcium and magnesium.

#### Fluoride (F)

Fluoride has been reported as being present in some rocks to about the same extent 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 in some instances may indicate previous contamination by sewage or other organic matter. The quantities of nitrate present in surface waters usually amount to 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 be the cause of methemoglobinemia in infants (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 boron is detrimental to citrus and other boron-sensitive crops. Boron is reported in Survey analyses of surface waters in arid and semiarid regions of the Southwest and West 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. Waters 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.

## PROPERTIES AND CHARACTERISTICS OF WATER

### Oxygen consumed

The value for 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. Naturally highly colored waters may have relatively high oxygen consumed, although 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 usually passes unnoticed. Some swamp waters have natural color of 200 to 300 or more.

### Hydrogen-ion concentration (pH)

The degree of acidity or alkalinity of water, as indicated by the hydrogen-ion concentration, expressed as pH, 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 value of 7.0 indicates that the water is neither acid nor alkaline. Waters having pH values progressively lower than 7.0 denote increasing acidity, whereas values progressively higher than 7.0 denote increasing alkalinity.

(See p. 7 ). 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 at 25 C)

The specific conductance of a water is a measure of its capacity to conduct a current of electricity. 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. (See p. 7 .)

Hardness

Hardness is the characteristic of water that receives the most attention in industrial and domestic use. It is usually 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 usually requires some softening before being used for most purposes.

Total acidity

The total acidity of a natural water represents the content of free carbon dioxide, mineral acids, and salts--especially sulfates of iron and aluminum--that hydrolyze to give hydrogen ions. Acid waters are very corrosive and generally contain excessive amounts of objectionable constituents, such as iron, aluminum, and manganese.

### 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

Percent sodium 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 basic constituents in the water has a bearing on the suitability of a water for irrigation. (See p. 6.) 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; Wilcox, 1948, p. 6).

### Sodium-adsorption-ratio

Sodium-adsorption-ratio (SAR) is the relative proportion of sodium to the other cations in an irrigation water.

$$SAR = \frac{Na^+}{\sqrt{(Ca^{++} + Mg^{++})/2}}$$

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

The term is used for soil extracts and irrigation waters to express the relative activity of sodium ions in exchange reactions with soil. SAR provides an estimate of the sodium or alkali hazard and reportedly is more significant for interpreting water quality than percent sodium because it relates more directly to the exchangeable sodium percentage the soil will attain when it and the water are in equilibrium.

The U. S. Salinity Laboratory diagram for classifying waters for irrigation divides water into four classes with respect to sodium hazard, the dividing points being at SAR values of 10, 18, and 26. They range from low-sodium water that can be used for irrigation on almost all soils to very high-sodium water which is 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 sediment 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, vegetal 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.

## PUBLICATIONS

Reports giving chemical analyses, suspended-sediment loads, and water temperatures of samples of surface water made by the Geological Survey have been published yearly since 1941. Records for the years ended September 30, 1941, 1942, 1943, 1944, 1945, 1946, 1947, 1948, 1949, 1950, and 1951, for many of the stations listed in this report are given in Water-Supply Papers 942, 950, 970, 1022, 1030, 1050, 1102, 1133, 1163, 1188, and 1199.

Geological Survey reports containing analyses of surface-water samples collected prior to 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 southeastern 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. 18-19 lists State and local agencies that cooperated in quality-of-water investigations in the drainage basins included in this volume. The locations of quality-of-water district or regional offices responsible for the data collected in the drainage basins are given in the table, also.

Financial assistance was furnished by the Bureau of Reclamation of the United States Department of the Interior, in the operation of some stations in Oklahoma, New Mexico, and Texas.

Financial assistance was also furnished by the Corps of Engineers, Department of Army, in the operation of some stations in Texas. The Corps also provided financial assistance and made determinations of particle-size analyses of bed material and of sediment concentrations in their laboratory in connection with the sedimentation investigations of the Mississippi River at St. Louis. Assistance in collecting records was given by many municipal, State, and Federal agencies.

In addition to these cooperative programs, many of the stations were operated from funds appropriated directly to the Geological Survey for quality-of-water investigations. Studies of suspended-sediment loads in the middle Rio Grande in New Mexico were initiated as a Federal project in 1948.

## DIVISION OF WORK

The quality-of-water program was conducted by the Water Resources Division of the Geological Survey, Carl G. Paulsen, Chief Hydraulic Engineer and S. K. Love, Chief of the Quality of Water Branch. The records were collected and prepared for publication under supervision of district or regional chemists and engineers as follows: In Arkansas--G. A. Billingsley; in Mis-

State	Cooperating agency	Drainage basin	District or regional office
Arkansas	Institute of Science and Technology, University of Arkansas, Dr. W. W. Grigorieff, director.	Lower Mississippi River.	c/o Institute of Science and Technology, University of Arkansas, Fayetteville, Ark.
Louisiana	Louisiana Department of Public Works, J. Lester White, Director.	Lower Mississippi River, Western Gulf of Mexico.	302 W. 15th St., Austin, Tex.
Missouri	--	Lower Mississippi River (sedimentation investi- gations at St. Louis).	510 Rudge-Guenzel Bldg., Lincoln, Nebr.
New Mexico	New Mexico Interstate Stream Commission, John H. Bliss, sec- retary.	Lower Mississippi River, Western Gulf of Mexico.	P. O. Box 293, University Station, Albuquerque, N. Mex.
Oklahoma	Oklahoma Planning and Resources Board, Division of Water Resources, Ira C. Husky, director, and Okla- homa A. & M. College, Division of Engineering Research, C. A. Dunn, executive director.	Lower Mississippi River.	P. O. Box 4355, Oklahoma City, Okla.



## COOPERATION

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State	Cooperating agency	Drainage basin	District or regional office
Texas	<p>Texas State Board of Water Engineers, consisting of H. A. Beckwith, chairman, A. P. Rollins, and J. S. Guleke; Red Bluff Water Power Control District, Lower Colorado River Authority, Brazos River Conservation and Reclamation District, Lower Neches Valley Authority, San Jacinto Conservation and Reclamation District, Sabine River Authority, Upper Red River Flood Control and Irrigation District, and the Texas Electric Company. Cities of Abilene, Amarillo, Fort Worth, and Midland. Chambers-Liberty Counties Navigation District.</p>	Lower Mississippi River, Western Gulf of Mexico.	302 W. 15th St., Austin, Tex.

souri--P. C. Benedict; in Oklahoma--T. B. Dover; in New Mexico and the Rio Grande and Arkansas River basins in Colorado--J. D. Hem; in Colorado (except that part in Colorado River basin), C. S. Howard; in Texas and Louisiana--Burdge Irelan. Any additional information on file can be obtained by writing the responsible Survey district office.

## STREAM FLOW

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 the mean daily discharges for the normal composite period. For analyses in which the composite periods differ from the normal 10- or 11-day period, the discharges reported are the averages of the mean daily discharges for the days indicated. The discharges reported in the tables of single analyses either are daily mean discharges or are discharges for the time at which samples were collected, computed from a stage-discharge relation or from a discharge measurement.

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## CHEMICAL ANALYSES, WATER TEMPERATURES, AND SUSPENDED SEDIMENT

## PART 7. LOWER MISSISSIPPI RIVER BASIN

## MISSISSIPPI RIVER MAIN STEM

## MISSISSIPPI RIVER AT ST. LOUIS, MO.

LOCATION.--At MacArthur bridge, 1.1 miles below gaging station which is 15 miles downstream from Missouri River and 180 miles upstream from Ohio River.

DRAINAGE AREA.--701,000 square miles, approximately.

RECORDS AVAILABLE.--Water temperatures: October 1951 to September 1952.

Sediment records: April 1948 to September 1952.

EXTREMES, 1951-52.--Water temperatures: Maximum, 85°F July 1, 28; minimum, freezing point Dec. 27, Jan. 5, 7.

Sediment loads: Maximum daily, 3,770,000 tons Apr. 13; minimum daily, 46,100 tons Dec. 27.

EXTREMES, 1948-52.--Sediment loads: Maximum daily, 7,010,000 tons May 5, 1951; minimum daily, 4,340 tons Feb. 3, 1951.

REMARKS.--Suspended sediment data were computed from a continuous graph of concentration defined by one or more daily measurements and by the relative discharge of the Mississippi and Missouri Rivers above their junction. Records of discharge for water year October 1951 to September 1952 given in Water-Supply Paper 1241.

Temperature (°F) of water, water year October 1951 to September 1952  
/Once-daily temperature measurement, generally between 9:00 a.m. and 2:00 p.m./

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

## MISSISSIPPI RIVER MAIN STEM--Continued

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

Suspended sediment, water year October 1951 to September 1952

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-----	211,000	657	374,000	213,000	603	347,000	199,000	461	a 248,000
2-----	202,000	728	397,000	202,000	632	345,000	196,000	446	236,000
3-----	191,000	663	342,000	195,000	729	a 384,000	190,000	391	201,000
4-----	186,000	621	312,000	190,000	650	333,000	202,000	473	258,000
5-----	181,000	594	290,000	176,000	570	271,000	203,000	378	207,000
6-----	173,000	669	312,000	176,000	520	247,000	204,000	312	172,000
7-----	180,000	786	a 382,000	181,000	544	266,000	192,000	356	185,000
8-----	208,000	827	464,000	175,000	608	287,000	186,000	449	a 225,000
9-----	225,000	837	508,000	170,000	644	296,000	184,000	361	179,000
10-----	233,000	859	540,000	172,000	610	283,000	180,000	295	143,000
11-----	233,000	880	554,000	175,000	608	286,000	173,000	357	167,000
12-----	220,000	1,050	624,000	187,000	577	291,000	174,000	487	229,000
13-----	204,000	872	a 480,000	220,000	640	380,000	186,000	436	219,000
14-----	192,000	754	a 391,000	280,000	1,010	764,000	186,000	458	a 230,000
15-----	191,000	686	354,000	319,000	1,570	1,350,000	189,000	519	a 265,000
16-----	181,000	633	309,000	359,000	1,430	1,390,000	140,000	494	a 183,000
17-----	170,000	597	274,000	352,000	1,340	a 1,270,000	114,000	510	a 157,000
18-----	170,000	589	270,000	331,000	1,290	1,150,000	103,000	581	b 162,000
19-----	164,000	520	230,000	306,000	1,050	868,000	84,400	574	b 131,000
20-----	163,000	505	a 222,000	284,000	957	734,000	87,600	445	b 105,000
21-----	163,000	584	a 257,000	266,000	748	537,000	96,200	310	b 80,500
22-----	172,000	881	409,000	247,000	708	a 472,000	93,500	243	b 61,300
23-----	182,000	755	371,000	238,000	691	444,000	94,400	212	b 54,000
24-----	190,000	703	361,000	230,000	679	a 422,000	89,300	209	b 50,400
25-----	223,000	885	533,000	228,000	832	512,000	86,000	209	a 48,500
26-----	238,000	805	517,000	234,000	543	343,000	82,100	209	46,300
27-----	244,000	793	a 522,000	236,000	505	322,000	80,600	212	b 46,100
28-----	242,000	785	513,000	235,000	556	353,000	83,700	221	a 49,900
29-----	236,000	729	465,000	230,000	530	329,000	86,000	228	52,900
30-----	218,000	684	393,000	217,000	485	284,000	93,500	232	58,600
31-----	212,000	623	357,000	--	--	--	97,100	240	a 62,900
Total-	6,199,000	--	12,327,000	7,024,000	--	15,560,000	4,355,400	--	4,513,400
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-----	112,000	274	82,900	168,000	475	215,000	158,000	439	187,000
2-----	124,000	443	148,000	176,000	486	a 231,000	156,000	374	a 158,000
3-----	135,000	649	237,000	180,000	508	247,000	163,000	525	231,000
4-----	133,000	444	159,000	213,000	1,010	581,000	169,000	571	261,000
5-----	130,000	447	157,000	234,000	1,020	644,000	185,000	505	252,000
6-----	128,000	519	a 179,000	240,000	890	577,000	192,000	561	291,000
7-----	129,000	492	171,000	228,000	704	433,000	182,000	653	321,000
8-----	129,000	417	145,000	213,000	546	314,000	180,000	525	255,000
9-----	128,000	364	126,000	213,000	530	305,000	181,000	469	a 229,000
10-----	133,000	449	161,000	210,000	461	a 261,000	196,000	525	276,000
11-----	141,000	482	183,000	206,000	418	232,000	250,000	783	529,000
12-----	142,000	509	a 195,000	200,000	423	228,000	306,000	1,370	1,130,000
13-----	138,000	598	223,000	197,000	451	240,000	366,000	2,160	2,130,000
14-----	142,000	525	201,000	196,000	381	202,000	389,000	2,580	2,710,000
15-----	149,000	668	269,000	199,000	444	239,000	400,000	2,500	2,700,000
16-----	148,000	629	251,000	203,000	400	a 219,000	402,000	2,350	a 2,550,000
17-----	159,000	520	223,000	203,000	432	237,000	411,000	2,250	2,500,000
18-----	173,000	489	228,000	196,000	527	332,000	416,000	2,220	a 2,490,000
19-----	181,000	469	a 239,000	200,000	695	375,000	422,000	2,210	2,520,000
20-----	190,000	546	280,000	217,000	603	353,000	425,000	2,120	2,430,000
21-----	196,000	551	292,000	217,000	715	419,000	418,000	1,740	1,960,000
22-----	197,000	483	257,000	203,000	611	335,000	420,000	1,590	1,800,000
23-----	182,000	569	275,000	202,000	634	346,000	432,000	1,870	a 2,180,000
24-----	163,000	651	287,000	204,000	670	a 369,000	425,000	1,730	1,990,000
25-----	161,000	625	272,000	202,000	677	369,000	416,000	1,640	1,840,000
26-----	178,000	567	a 273,000	194,000	662	347,000	404,000	1,560	1,700,000
27-----	199,000	541	291,000	184,000	262	311,000	385,000	1,360	1,410,000
28-----	192,000	594	308,000	169,000	591	270,000	360,000	1,080	1,050,000
29-----	161,000	567	246,000	160,000	550	238,000	338,000	924	843,000
30-----	137,000	412	152,000	--	--	--	318,000	798	a 685,000
31-----	144,000	439	171,000	--	--	--	299,000	697	563,000
Total-	4,754,000	--	6,681,900	5,827,000	--	9,469,000	9,764,000	--	40,173,000

a Computed from estimated concentration graph.

b Computed from partly-estimated concentration graph.

## LOWER MISSISSIPPI RIVER BASIN

## MISSISSIPPI RIVER MAIN STEM--Continued

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

Suspended sediment, water year October 1951 to September 1952--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-----	296,000	738	590,000	674,000	885	1,610,000	219,000	1,700	a1,010,000
2-----	292,000	731	576,000	656,000	742	1,310,000	205,000	1,440	797,000
3-----	299,000	884	714,000	632,000	700	1,190,000	201,000	1,010	548,000
4-----	340,000	1,320	1,210,000	598,000	688	a1,110,000	209,000	782	448,000
5-----	395,000	1,850	1,970,000	558,000	727	1,060,000	212,000	724	418,000
6-----	422,000	2,410	a2,750,000	529,000	740	1,060,000	214,000	724	418,000
7-----	425,000	2,510	2,880,000	498,000	687	924,000	217,000	677	a397,000
8-----	418,000	2,160	2,440,000	474,000	732	937,000	193,000	640	a334,000
9-----	411,000	1,880	2,090,000	456,000	674	830,000	179,000	727	a351,000
10-----	411,000	1,900	2,110,000	436,000	651	766,000	198,000	2,200	1,180,000
11-----	416,000	2,270	2,550,000	421,000	663	a754,000	213,000	2,350	a1,350,000
12-----	432,000	2,820	a3,290,000	405,000	732	a800,000	207,000	1,630	911,000
13-----	469,000	2,980	a3,770,000	388,000	683	718,000	189,000	1,500	765,000
14-----	495,000	2,460	3,290,000	372,000	627	630,000	173,000	1,320	617,000
15-----	503,000	2,080	2,820,000	349,000	615	580,000	176,000	1,160	a551,000
16-----	508,000	2,000	2,740,000	326,000	613	540,000	197,000	678	361,000
17-----	514,000	1,970	2,730,000	308,000	585	486,000	196,000	530	280,000
18-----	514,000	1,860	2,580,000	297,000	598	a480,000	194,000	525	275,000
19-----	514,000	1,850	2,570,000	294,000	624	495,000	197,000	530	282,000
20-----	511,000	1,760	a2,430,000	292,000	660	520,000	192,000	551	286,000
21-----	514,000	1,870	2,320,000	288,000	766	598,000	183,000	484	a239,000
22-----	525,000	1,870	2,370,000	272,000	872	640,000	201,000	505	274,000
23-----	542,000	1,650	2,410,000	261,000	829	584,000	236,000	742	473,000
24-----	567,000	1,870	2,560,000	252,000	766	a521,000	266,000	1,350	970,000
25-----	592,000	1,590	2,540,000	248,000	728	a487,000	318,000	3,310	2,640,000
26-----	619,000	1,630	2,720,000	267,000	759	547,000	328,000	3,300	2,920,000
27-----	649,000	1,530	a2,680,000	301,000	1,210	983,000	299,000	3,030	2,450,000
28-----	671,000	1,340	2,430,000	308,000	1,520	1,600,000	261,000	2,800	a1,970,000
29-----	681,000	1,100	2,020,000	295,000	2,260	1,800,000	238,000	2,640	1,700,000
30-----	682,000	945	1,740,000	271,000	2,220	a1,620,000	227,000	1,900	a1,160,000
31-----	--	--	--	243,000	1,990	a1,310,000	--	--	--
Total-	14,627,000	--	89,890,000	11,969,000	--	27,526,000	6,538,000	--	26,625,000
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-----	234,000	1,250	790,000	148,000	373	149,000	122,000	395	130,000
2-----	254,000	1,390	a953,000	148,000	334	133,000	122,000	376	124,000
3-----	260,000	1,820	1,280,000	150,000	328	a133,000	125,000	441	149,000
4-----	240,000	2,390	1,550,000	157,000	326	138,000	135,000	717	261,000
5-----	227,000	2,440	1,500,000	156,000	306	129,000	145,000	936	366,000
6-----	216,000	2,330	1,360,000	158,000	268	114,000	141,000	1,120	426,000
7-----	203,000	1,770	970,000	159,000	255	109,000	129,000	1,210	a421,000
8-----	201,000	1,520	825,000	161,000	255	a111,000	119,000	998	321,000
9-----	209,000	1,180	666,000	163,000	258	114,000	112,000	666	201,000
10-----	206,000	894	497,000	164,000	260	a115,000	108,000	540	157,000
11-----	193,000	824	429,000	167,000	266	120,000	107,000	449	130,000
12-----	198,000	834	a441,000	164,000	330	146,000	106,000	422	121,000
13-----	213,000	903	a519,000	161,000	310	135,000	104,000	376	a106,000
14-----	217,000	1,260	738,000	161,000	331	144,000	105,000	333	94,400
15-----	209,000	2,750	1,550,000	162,000	257	112,000	102,000	302	83,200
16-----	205,000	3,630	2,010,000	162,000	255	112,000	94,200	307	78,100
17-----	203,000	2,960	1,620,000	167,000	333	a150,000	96,600	338	88,200
18-----	198,000	2,010	1,070,000	170,000	384	176,000	99,900	359	96,800
19-----	196,000	1,750	926,000	167,000	418	188,000	99,900	281	75,800
20-----	197,000	1,800	a957,000	163,000	467	206,000	90,200	322	78,400
21-----	196,000	1,970	1,040,000	160,000	510	220,000	90,200	333	a81,100
22-----	192,000	1,660	861,000	179,000	822	397,000	87,800	343	81,300
23-----	185,000	1,090	544,000	210,000	1,400	794,000	85,400	374	86,200
24-----	179,000	990	478,000	219,000	1,340	a792,200	81,400	380	83,500
25-----	174,000	1,070	503,000	210,000	1,220	692,000	83,000	333	74,600
26-----	173,000	796	372,000	181,000	1,010	494,000	83,000	359	80,500
27-----	174,000	649	a305,000	154,000	764	318,000	79,800	343	a73,900
28-----	169,000	588	268,000	139,000	634	238,000	76,600	268	55,400
29-----	161,000	572	249,000	132,000	861	307,000	76,600	276	57,100
30-----	156,000	564	238,000	126,000	788	268,000	78,200	313	66,100
31-----	150,000	484	196,000	120,000	679	a220,000	--	--	--
Total-	6,186,000	--	25,705,000	5,088,000	--	7,474,000	3,084,800	--	4,247,600
Total discharge for year (cfs-days) .....									85,370,000
Total load for year (tons) .....									250,191,900

a Computed from estimated concentration graph.

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

Particle-size analyses of suspended sediment, water year October 1951 to September 1952  
(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date of collection	Time	Water discharge (cfs)	Water tem- per- ature (° 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. 10, 1951 ...	11:42 a.m.	234,000	--	857		10	17	40	60	76	85	95	99		100		BN
Oct. 10, 1951 ...	11:42 a.m.	234,000	--	857		39	46	52	63	78	86	94	99		100		BN
Oct. 10, 1951 ...	10:50 a.m.	170,000	63	597		50	56	63	71	79	86	96	100		--		BN
Oct. 13, 1951 ...	11:45 a.m.	218,000	47	620		39	44	52	59	68	75	85	98		100		BN
Nov. 13, 1951 ...	11:40 a.m.	202,000	43	492		27	32	41	47	54	63	82	99		100		BN
Dec. 4, 1951 ...	11:40 a.m.	202,000	43	492		9	28	43	51	62	66	79	97		100		BN
Dec. 4, 1951 ...	11:40 a.m.	202,000	43	492		9	28	43	51	62	66	79	97		100		BN
Feb. 20, 1952 ...	1:55 p.m.	220,000	39	596		14	23	37	55	64	75	97	99		99		BN
Feb. 20, 1952 ...	1:55 p.m.	220,000	39	596		25	30	36	46	58	63	71	92		98		BN
Mar. 17, 1952 ...	1:35 p.m.	411,000	40	2,250		32	38	46	57	72	81	90	98		100		BN
Apr. 25, 1952 ...	1:35 p.m.	592,000	57	1,530		21	27	32	38	46	80	88	93		99		BN
May 1, 1952 ...	1:35 p.m.	674,000	65	895		30	34	40	45	53	66	73	88		93		BN
June 19, 1952 ...	10:55 a.m.	198,000	--	526		46	59	71	80	90	93	98	100		--		BN
July 9, 1952 ...	12:45 p.m.	210,000	80	1,130		50	62	72	82	93	96	98	100		--		BN
July 24, 1952 ...	12:50 p.m.	178,000	83	941		47	60	72	84	96	98	99	100		--		BN
Aug. 8, 1952 ...	10:50 a.m.	161,000	--	298		44	56	67	78	88	92	96	99		100		BN
Aug. 19, 1952 ...	11:25 a.m.	167,000	79	412		48	60	70	82	90	94	97	100		--		BN
Sept. 11, 1952 ...	10:50 a.m.	107,000	76	442		46	59	69	79	91	96	98	99		99		BN
Sept. 29, 1952 ...	12:10 p.m.	77,400	70	268		52	64	76	86	95	98	99	100		--		BN

## LOWER MISSISSIPPI RIVER BASIN

## LOWER MISSISSIPPI RIVER BASIN--Continued

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

Particle-size analyses of bed material, May to September 1951  
(Methods of analysis: B, bottom withdrawal tube; P, pipette; D, decantation; S, sieve; N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date	Sampling station	Water discharge (cfs)	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	6.35	9.53	
May 23, 1951	475	359,000	--	0	2	24	80	95	99	100	--	S
May 23	900		--	--	0	20	60	81	91	94	96	S
May 23	1,275		0	1	9	71	96	99	100	--	--	S
May 23	1,600		--	0	3	22	52	72	80	84	87	S
June 19	475	321,000	--	0	1	26	83	95	97	98	98	S
June 19	900		--	0	2	23	48	63	76	82	88	S
June 19	1,275		--	0	2	29	74	90	97	98	98	S
June 19	1,600		--	0	9	96	99	100	--	--	--	S
July 16	475	705,000	--	0	2	32	83	89	91	94	96	S
July 16	900		--	--	0	10	28	42	64	78	86	S
July 16	1,275		--	0	4	31	81	94	98	100	--	S
July 16	1,600		--	0	7	33	85	98	100	--	--	S
July 22	450	761,000	--	0	1	19	62	79	87	90	93	S
July 22	1,600		--	0	8	41	85	97	100	--	--	S
Sept. 19	450	378,000	--	0	6	19	66	86	94	96	99	S
Sept. 19	875		0	1	5	23	65	78	86	88	92	S
Sept. 19	1,250		0	2	5	16	73	91	97	98	99	S
Sept. 19	1,600		0	1	4	23	55	73	86	93	97	S
Sept. 26	475	238,000	--	0	4	24	79	90	95	98	100	S
Sept. 26	900		--	0	2	18	57	73	86	92	97	S
Sept. 26	1,275		--	2	5	15	77	94	98	99	100	S
Sept. 26	1,600		--	1	6	30	67	83	91	93	97	S

## Particle-size analyses of bed material, water year October 1951 to September 1952

Date	Sampling station	Water discharge (cfs)	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	7.93	12.7	
Oct. 17, 1951 .....	475	107,000	0	2	4	20	72	87	94	98	100	S
Oct. 17 .....	900		--	0	1	11	44	65	82	96	100	S
Oct. 17 .....	1,275		0	5	16	30	73	92	99	100	--	S
Oct. 17 .....	1,600		0	1	40	52	75	88	93	98	98	S
Oct. 30 .....	475	218,000	--	0	1	9	61	84	96	100	--	S
Oct. 30 .....	1,275		--	0	22	45	93	99	100	--	--	S
Oct. 30 .....	1,600		--	0	21	45	92	99	99	100	--	S
Nov. 13 .....	475	225,000	0	1	44	54	87	95	99	100	--	S
Nov. 13 .....	900		--	0	4	17	70	88	94	96	99	S
Nov. 13 .....	1,275		C	40	46	81	96	100	--	--	--	S
Nov. 13 .....	1,600		--	0	77	82	92	97	100	--	--	S
Nov. 28 .....	475	234,000	0	14	92	93	98	99	99	99	99	S
Nov. 28 .....	900		0	24	100	--	--	--	--	--	--	S
Nov. 28 .....	1,275		0	8	57	71	97	100	--	--	--	S
Nov. 28 .....	1,600		0	11	99	100	--	--	--	--	--	S
Feb. 20, 1952 .....	525	222,000	0	3	25	34	63	69	74	81	90	S
Feb. 20 .....	950		0	9	100	--	--	--	--	--	--	S
Feb. 20 .....	1,275		0	7	90	93	99	100	--	--	--	S
Feb. 20 .....	1,600		0	9	100	--	--	--	--	--	--	S
Mar. 17 .....	500	411,000	0	4	83	85	91	95	98	100	--	S
Mar. 17 .....	900		0	1	99	100	--	--	--	--	--	S
Mar. 17 .....	1,275		0	1	49	97	100	--	--	--	--	S
Mar. 16 .....	1,600		0	7	100	--	--	--	--	--	--	S
Apr. 26 .....	450	619,000	--	0	9	18	41	59	73	84	94	S
Apr. 26 .....	850		--	--	0	12	58	84	95	100	--	S
Apr. 26 .....	1,275		0	1	25	88	97	100	--	--	--	S
Apr. 26 .....	1,600		--	0	23	66	94	99	100	--	--	S



## LOWER MISSISSIPPI RIVER BASIN--Continued

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

Particle-size analyses of bed material, water year October 1951 to September 1952--Continued  
(Methods of analysis: B, bottom withdrawal tube; P, pipette; D, decantation; S, sieve; N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date	Sampling station	Water discharge (cfs)	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	7.93	12.7	
May 2, 1952.....	450	659,000	--	0	1	23	62	78	85	90	98	S
May 2.....	850		--	0	1	18	66	93	99	100	--	S
May 2.....	1,275		--	0	13	75	96	99	100	--	--	S
May 2.....	1,575		--	0	29	93	100	--	--	--	--	S
May 9.....	450	456,000	--	0	1	36	88	95	97	98	100	S
May 9.....	850		--	--	0	16	63	87	96	99	100	S
May 9.....	1,275		0	1	5	60	90	98	100	--	--	S
May 9.....	1,575		--	0	11	46	81	92	96	100	--	S
May 23.....	500	261,000	--	0	2	29	86	95	98	100	--	S
May 23.....	900		--	--	0	2	23	58	84	98	100	S
May 23.....	1,275		--	0	1	40	92	97	98	99	100	S
May 23.....	1,550		--	0	39	54	87	95	98	100	--	S
June 16.....	525	197,000	0	1	4	21	66	80	86	89	89	S
June 16.....	925		0	1	3	38	72	81	89	96	100	S
June 16.....	1,300		0	1	3	23	73	88	95	98	100	S
June 16.....	1,550		0	1	13	60	88	94	97	99	99	S
June 19.....	525	198,000	--	0	1	18	76	92	96	98	100	S
June 19.....	925		--	0	2	30	74	90	96	99	100	S
June 19.....	1,300		--	0	1	17	72	92	97	99	100	S
June 19.....	1,550		0	1	9	40	67	80	89	94	98	S
July 9.....	525	210,000	--	0	4	32	88	96	98	98	98	S
July 9.....	925		0	1	7	31	57	71	86	97	100	S
July 9.....	1,300		--	0	2	14	37	54	70	91	96	S
July 9.....	1,550		--	0	6	49	84	92	93	95	96	S
July 24.....	525	178,000	--	0	1	28	84	94	98	99	100	S
July 24.....	925		--	0	4	16	27	31	36	63	74	S
July 24.....	1,300		0	1	6	33	69	80	87	93	96	S
July 24.....	1,550		--	0	7	58	93	98	100	--	--	S
Aug. 8, 1952.....	525	161,000	0	1	6	48	95	98	99	99	100	S
Aug. 8.....	925		0	3	16	42	74	85	91	97	99	S
Aug. 8.....	1,300		0	1	3	18	55	69	80	92	96	S
Aug. 8.....	1,550		0	1	16	79	96	97	97	99	100	S
Aug. 19.....	525	168,000	--	0	4	23	86	96	99	100	--	S
Aug. 19.....	925		--	0	2	20	70	89	96	98	100	S
Aug. 19.....	1,300		0	1	2	34	82	97	99	99	100	S
Aug. 19.....	1,550		0	1	15	61	87	94	97	98	99	S
Sept. 11.....	525	108,000	1	6	22	40	71	80	85	91	97	S
Sept. 11.....	925		1	3	11	57	80	85	87	92	99	S
Sept. 11.....	1,300		--	0	1	12	57	77	90	99	100	S
Sept. 11.....	1,550		0	1	9	55	88	96	98	100	--	S
Sept. 29.....	525	77,400	1	8	31	44	84	96	99	100	--	S
Sept. 29.....	925		0	16	20	48	64	72	79	87	99	S
Sept. 29.....	1,275		0	3	8	16	37	53	69	90	99	S
Sept. 29.....	1,550		1	6	16	45	68	79	89	97	100	S

## ST. FRANCIS RIVER BASIN

## ST. FRANCIS RIVER AT MARKED TREE, ARK.

LOCATION.--At gaging station at bridge on U. S. Highway 63, at Marked Tree, Poinsett County, 4.8 miles downstream from Little River, and 7 miles downstream from dam of Poinsett County Drainage District 7.

RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1946, November 1949 to September 1952.

Water temperatures: October 1945 to September 1946, November 1949 to September 1952.

EXTREMES, 1951-52.--Dissolved solids: Maximum, 309 ppm Aug. 1-10; minimum, 148 ppm Mar. 11-20.

Hardness: Maximum, 262 ppm Aug. 1-10; minimum, 115 ppm Mar. 11-31.

Specific conductance: Maximum, 514 micromhos Nov. 20; minimum, 150 micromhos Mar. 24.

Water temperatures: Maximum, 89° F June 29, July 1; minimum, 38° F Dec. 17, 21.

EXTREMES, 1945-46, 1949-52.--Dissolved solids: Maximum, 329 ppm Nov. 21-30, 1949; minimum, 87 ppm Jan. 15-18, 1951.

Hardness: Maximum, 262 ppm Aug. 1-10, 1952; minimum, 94 ppm Feb. 14-19, 1950.

Specific conductance: Maximum, 536 micromhos Nov. 20, 1949; minimum, 99.3 micromhos Jan. 27, 1951.

Water temperatures: Maximum, 89° F June 29, July 1, 1952; minimum, freezing point 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 1951 to September 1952 given in Water-Supply Paper 1441.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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, 1951.....	1,987	16	0.07	37	13	7.4	2.2	163	13	7.5	0.2	1.0	182	146	12	294	7.7	15
Oct. 11-20.....	1,389	21	.12	51	15	10	2.1	216	13	10	.2	2.2	236	189	12	375	7.9	10
Oct. 21-31.....	1,208	20	.08	51	16	10	2.0	226	15	11	.1	2.4	232	193	8	393	8.1	10
Nov. 1-10.....	1,633	19	.11	47	15	9.8	2.7	199	18	10	.2	1.4	218	179	16	354	8.2	15
Nov. 11-18.....	1,674	20	.07	43	13	8.6	3.6	179	19	9.8	.2	.7	206	161	14	332	8.2	23
Nov. 19-24.....	612	29	.04	63	18	11	2.4	a 265	25	7.2	.1	1.4	287	231	14	427	8.4	7
Nov. 25-30.....	1,922	21	.07	45	13	7.5	3.8	181	22	5.5	.2	2.9	238	166	17	327	8.1	15
Dec. 1-10.....	2,763	16	.28	32	10	5.6	3.7	127	16	6.8	.2	1.4	163	121	17	238	7.6	45
Dec. 11-20.....	2,992	18	.23	36	12	6.8	3.2	148	18	6.0	.3	1.7	181	139	18	273	7.8	37
Dec. 21-31.....	3,002	18	.31	41	12	6.8	3.4	166	20	5.8	.1	1.6	196	152	16	293	8.1	25
Jan. 1-10, 1952.....	3,404	16	.05	35	9.7	5.7	2.8	139	18	3.8	.1	2.1	172	137	13	262	7.6	20
Jan. 11-20.....	3,137	15	.06	38	11	6.2	2.6	151	19	3.5	.2	2.3	182	140	16	279	7.3	20
Jan. 21-31.....	2,787	18	.04	45	13	6.7	2.3	185	19	5.5	.2	1.6	211	166	14	323	7.7	15
Feb. 1-9.....	2,496	21	.03	53	14	8.7	2.9	b 214	20	7.5	.1	1.9	244	190	14	365	8.3	7
Feb. 10-20.....	3,517	14	.28	37	11	6.2	2.7	146	16	6.2	.2	2.0	177	138	18	279	7.4	30
Feb. 21-31.....	3,827	13	.12	39	10	6.7	2.4	151	16	6.8	.2	1.6	173	138	15	278	7.4	18
Mar. 1-10.....	2,824	15	.06	48	12	7.9	2.2	196	21	7.0	.2	1.5	220	169	8	341	7.9	12
Mar. 11-20.....	3,538	11	.11	31	9.1	4.8	2.3	127	15	4.0	.1	1.6	148	115	11	240	7.7	25
Mar. 21-31.....	3,430	13	.24	33	7.9	4.8	2.3	131	15	3.5	.2	1.8	158	115	8	241	7.8	30
Apr. 1-10.....	2,832	14	.08	43	10	6.2	2.5	172	16	5.2	.2	1.3	193	148	7	301	8.1	30
Apr. 11-20.....	2,615	22	.06	51	12	8.3	2.1	208	17	7.0	.1	1.6	234	177	6	347	8.1	10
Apr. 21-30.....	2,353	23	.10	52	13	8.3	2.2	216	16	7.2	.1	1.2	253	183	6	374	7.9	10

a Includes equivalent of 5 parts per million of carbonate (CO<sub>3</sub>).

b Includes equivalent of 2 parts per million of carbonate (CO<sub>3</sub>).

May 1-10, 1952.....	2,086	22	.03	62	15	9.7	2.1	245	17	8.8	.2	1.1	283	216	16	420	8.1	7
May 11-20.....	1,880	25	.04	63	17	11	1.8	258	19	10	.1	1.3	274	227	16	441	7.7	10
May 21-31.....	1,758	24	.04	60	16	11	1.1	241	20	10	.1	1.4	260	216	18	424	7.6	7
June 1-10.....	1,678	25	.04	59	16	12	2.5	242	15	10	.2	1.3	284	213	15	419	7.8	4
June 11-20.....	1,444	28	.07	62	16	13	2.3	c259	17	10	.2	1.6	283	220	8	433	8.5	7
June 21-30.....	1,273	27	.04	63	16	12	2.5	262	17	12	.1	1.0	281	223	8	435	7.9	4
July 1-10.....	1,080	28	.06	63	16	12	2.3	262	16	12	.1	1.3	282	228	13	447	8.1	4
July 11-20.....	930	27	.06	64	18	12	2.1	236	18	12	.1	1.3	278	229	19	450	8.0	5
July 21-31.....	486	28	.06	64	18	12	2.2	289	19	7.5	.1	1.4	279	234	13	454	8.0	5
Aug. 1-10.....	227	28	*.00	72	20	11	2.3	301	20	5.5	.1	1.3	309	262	15	495	7.9	5
Aug. 11-18.....	790	25	.04	59	16	11	2.3	236	21	9.0	.1	1.2	280	213	20	418	8.0	5
Aug. 19-31.....	1,284	21	.06	36	19.4	7.2	2.3	138	16	5.8	.1	1.5	174	128	15	270	7.5	8
Sept. 1-10.....	256	24	.03	63	18	9.8	2.6	270	20	5.8	.1	1.2	282	231	10	445	8.2	5
Sept. 11-20.....	352	20	.03	66	16	10	2.6	d272	20	7.0	.1	.8	284	230	7	448	8.4	5
Sept. 21-30.....	183	21	.03	74	17	11	2.6	306	21	5.8	.1	.8	307	254	4	501	7.9	5
Average.....	1,949	21	0.09	51	14	8.9	2.5	209	18	7.5	0.1	1.5	231	184	13	364	--	14

c Includes equivalent of 9 parts per million of carbonate (CO<sub>3</sub>).d Includes equivalent of 8 parts per million of carbonate (CO<sub>3</sub>).

## LOWER MISSISSIPPI RIVER BASIN

## ST. FRANCIS RIVER BASIN--Continued

## ST. FRANCIS RIVER AT MARKED TREE, ARK.--Continued

Temperature (°F) of water, water year October 1951 to September 1952

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

## ST. FRANCIS RIVER BASIN--Continued

## MISCELLANEOUS ANALYSES OF STREAMS IN ST. FRANCIS RIVER BASIN IN ARKANSAS

Chemical analyses, in parts per million, water year October 1951 to September 1952

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			
ST. FRANCIS RIVER AT ST. FRANCIS																		
Oct. 4, 1951 .....	585							97	7.0	3.0		1.1		90	10	170	7.2	
Mar. 20, 1952 .....	9,750							50	8.0	1.8		2.8		47	6	104	7.7	
ST. FRANCIS RIVER AT LAKE CITY																		
Oct. 4, 1951 .....	1,900							102	12	2.5		1.0		91	7	196	8.2	
Mar. 20, 1952 .....	9,010							71	10	2.5		1.0		63	5	128	7.2	
RIGHT HAND CHUTE OF LITTLE RIVER AT RIVERVALE																		
Oct. 5, 1951 .....	705							a 198	14	12		1.1		179	17	354	8.5	
Mar. 21, 1952 .....	11,600							56	9.0	2.0		2.0		52	6	107	8.0	
ST. FRANCIS RIVER FLOODWAY NEAR MARKED TREE																		
Mar. 4, 1952 .....	8,020							b 132	12	7.0		1.2		124	16	239	8.3	
Sept. 17 .....	560							a 192	15	6.8		1.5		159	2	323	8.4	
ST. FRANCIS BAY NEAR RIVERFRONT																		
Oct. 3, 1951 .....	1,630							112	11	3.0		1.2		99	7	196	8.2	
Mar. 20, 1952 .....	17,200							73	10	3.0		1.5		77	17	140	7.9	
Sept. 30 .....	600							c 234	10	9.0		1.2		192	0	375	8.6	
ST. FRANCIS RIVER AT PARKIN																		
Oct. 3, 1951 .....	2,610							172	12	6.8		0.8		157	16	300	8.3	
Mar. 20, 1952 .....	4,730							d 127	12	3.8		2.4		122	18	223	8.3	

a Includes equivalent of 7 parts per million of carbonate (CO<sub>3</sub>).b Includes equivalent of 3 parts per million of carbonate (CO<sub>3</sub>).c Includes equivalent of 10 parts per million of carbonate (CO<sub>3</sub>).d Includes equivalent of 9 parts per million of carbonate (CO<sub>3</sub>).

## WHITE RIVER BASIN

## WHITE RIVER AT BEAVER, ARK.

LOCATION --At gaging station at Missouri and North Arkansas Railway bridge, a quarter of a mile east of Beaver, Carroll County, and 2½ miles upstream from Leathwood, Ark.

DRAINAGE AREA --1,238 square miles.

RECORDS AVAILABLE --Chemical analyses: October 1945 to September 1946, October 1949 to September 1952.

Water temperatures: October 1945 to September 1952.

EXTREMES 1951-52 --Dissolved solids: Maximum, 162 ppm July 11-20; minimum, 77 ppm Nov. 25-30.

Hardness: Maximum, 122 ppm Oct. 1-10; minimum, 49 ppm Nov. 25-30. Apr. 13-17.

Specific conductance: Maximum, 254 micromhos Oct. 24; minimum, 64.8 micromhos Mar. 12.

Water temperatures: Maximum, 92°F July 27; minimum, 33°F Dec. 21.

EXTREMES 1945-46, 1949-52 --Dissolved solids: Maximum, 162 ppm July 11-20, 1952; minimum, 41 ppm Feb. 13-15, 1950.

Hardness: Maximum, 133 ppm Dec. 1-10, 1950; minimum, 33 ppm Feb. 13-15, 1950.

Specific conductance: Maximum, 263 micromhos Jan. 15, 1951; minimum, 57.1 micromhos Feb. 21, 1951.

Water temperatures: Maximum, 92°F July 27, 1952; minimum, freezing point on several 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 1951 to September 1952 given in Water-Supply Paper 1241.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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./l.	Non-carbonate			
Oct. 1-10, 1951.....	257	8.3	0.12	41	4.8	2.8	1.4	138	5.7	4.2	0.0	2.0	138	122	9	225	8.0	5
Oct. 11-20.....	183	--	--	40	4.7	3.3	--	141	4.8	4.0	--	--	123	119	4	233	8.1	5
Oct. 21-28.....	643	--	--	40	4.6	3.2	--	132	5.8	4.0	--	--	133	119	11	223	7.7	6
Oct. 29-31.....	2,490	--	--	21	2.7	2.4	--	71	6.0	3.0	--	--	93	64	5	134	7.1	18
Nov. 1-10.....	2,920	--	--	22	2.1	1.7	--	70	5.2	2.2	--	--	84	64	6	130	7.9	22
Nov. 11-20.....	2,145	--	--	22	2.2	1.9	--	72	4.8	1.0	--	--	84	64	5	134	7.6	17
Nov. 21-24.....	1,545	--	--	28	4.1	3.7	--	96	4.9	3.8	--	--	108	87	8	170	7.9	6
Nov. 25-30.....	8,487	--	--	15	2.7	3.4	--	50	4.4	3.5	--	--	77	49	8	102	7.6	35
Dec. 1-10.....	2,440	--	--	21	2.8	2.6	--	70	5.1	3.0	--	--	90	64	7	131	8.0	11
Dec. 11-20.....	1,970	--	--	21	2.8	2.3	--	70	5.2	2.8	--	--	88	64	7	129	7.8	18
Dec. 21-31.....	614	--	--	27	3.3	2.7	--	87	5.4	3.2	--	--	100	81	10	159	7.9	5
Jan. 1-5, 1952.....	2,800	--	--	31	4.5	3.3	--	101	7.6	3.0	--	--	113	96	13	175	8.2	5
Jan. 6-10.....	2,234	--	--	22	4.4	.9	--	72	8.1	3.8	--	--	86	73	14	146	8.0	18
Jan. 11-20.....	970	--	--	26	3.9	.8	--	82	7.3	3.2	--	--	96	81	14	152	7.7	6
Jan. 21-31.....	1,179	--	--	24	3.7	.8	--	78	8.2	3.8	--	--	88	75	11	146	7.8	8
Feb. 1-10.....	2,444	--	--	22	2.7	4.0	--	70	6.7	3.2	--	--	92	66	9	130	8.0	6
Feb. 11-20.....	1,698	7.2	.04	23	3.5	1.6	.5	81	7.0	3.2	.1	--	93	72	5	142	7.9	8
Feb. 21-28.....	1,620	--	--	24	3.0	2.1	--	76	7.7	2.8	--	--	87	72	10	139	7.5	5

Mar. 1-4, 10, 1952...	2,752	--	--	25	3.7	2.2	--	--	89	6.0	2.2	--	1.2	110	78	5	159	8.0	7
Mar. 5-9.....	4,996	--	--	17	2.4	2.1	--	--	59	6.0	2.5	--	1.6	84	52	4	116	7.9	22
Mar. 11, 18-20.....	3,458	--	--	24	3.5	2.1	--	--	84	7.0	2.5	--	1.6	103	74	5	154	8.0	8
Mar. 12-17.....	7,670	--	--	18	2.5	2.1	--	--	60	6.0	2.2	--	2.2	88	55	6	115	7.9	13
Mar. 21-31.....	1,457	--	--	25	2.4	2.4	--	--	65	5.2	2.5	--	1.4	103	72	3	155	7.9	5
Apr. 1-12.....	2,123	6.8	.02	28	3.4	2.5	--	.9	90	6.1	3.5	.1	1.2	97	84	10	161	8.0	7
Apr. 13-17.....	10,700	--	--	15	2.7	2.5	--	--	49	5.0	2.5	--	1.5	82	49	18	95.9	7.6	60
Apr. 18-30.....	2,568	--	--	21	3.7	2.0	--	--	65	5.2	3.5	--	1.4	88	66	12	123	7.9	7
May 1-10.....	1,005	--	--	27	2.7	2.0	--	2.3	85	5.2	2.8	--	1.2	101	78	9	152	8.1	4
May 11-23.....	1,490	--	--	32	3.2	2.3	--	2.3	103	4.9	3.8	--	1.4	115	93	9	179	8.1	4
May 24-31.....	4,628	--	--	18	2.6	2.0	--	2.0	63	4.4	2.2	--	2.2	87	56	4	123	7.5	18
June 1-10.....	588	--	--	25	2.8	2.2	--	2.2	84	4.2	3.0	--	2.3	94	74	5	153	7.5	6
June 11-20.....	241	--	--	30	3.5	2.6	--	2.6	101	4.9	3.0	--	1.8	109	89	6	178	8.1	4
June 21-30.....	138	--	--	32	3.8	2.8	--	2.8	109	4.7	3.5	--	1.0	117	95	6	190	7.9	4
July 1-10.....	109	--	--	28	4.4	4.5	--	--	112	4.9	3.5	--	1.2	120	88	0	197	7.6	3
July 11-20.....	121	--	--	31	6.3	4.6	--	--	a121	4.3	3.8	--	.7	162	103	4	203	8.4	4
July 21-31.....	93.4	--	--	34	5.1	4.2	--	--	128	4.0	3.8	--	.9	129	106	10	213	8.2	4
Aug. 1-10.....	100	--	--	36	5.6	1.7	--	--	127	4.9	5.8	--	.8	125	113	9	231	7.5	8
Aug. 11-22.....	512	15	.08	38	6.4	3.7	--	1.3	140	3.5	3.2	.1	1.4	144	121	6	239	7.6	5
Aug. 23-31.....	1,444	--	--	32	3.0	3.7	--	--	108	5.8	3.5	--	4.3	121	92	4	191	7.6	13
Sept. 1-10.....	191	--	--	36	4.6	4.2	--	--	b129	5.8	4.0	--	2.4	135	109	3	217	8.6	9
Sept. 11-20.....	105	--	--	37	3.8	4.2	--	--	133	5.0	5.5	--	1.3	134	108	0	224	8.2	6
Sept. 21-30.....	70.2	--	--	38	4.9	3.4	--	--	134	4.7	4.2	--	.8	128	115	5	222	8.2	5
Average.....	1,574	--	--	27	3.6	2.7	--	--	93	5.6	3.3	--	1.6	106	83	7	166	--	11

a Includes equivalent of 2 parts per million of carbonate (CO<sub>3</sub>).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 BEAVER, ARK.--Continued

Temperature (°F) of water, water year October 1951 to September 1952  
 [Once-daily temperature measurement at approximately 5:30 p.m.]

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	73	50	54	46	48	47	62	66	71	86	87	75
2	75	45	56	42	48	48	61	69	75	86	88	76
3	75	48	52	37	49	48	55	71	77	86	88	76
4	76	45	--	38	47	46	52	73	79	85	85	73
5	77	44	52	45	48	46	53	74	67	85	87	76
6	69	43	55	39	45	47	54	75	80	88	85	77
7	67	43	52	42	49	48	58	75	82	87	84	77
8	63	45	46	45	48	49	60	74	79	84	84	78
9	65	48	45	43	49	50	55	72	84	84	83	77
10	65	52	45	40	--	49	56	67	83	85	86	79
11	64	53	43	42	48	53	55	65	84	85	85	78
12	64	57	46	46	49	50	50	65	84	85	83	80
13	65	57	44	52	52	51	49	68	--	85	80	78
14	64	58	40	52	51	49	--	70	86	80	85	78
15	66	54	38	51	45	48	52	71	85	80	86	78
16	68	45	38	55	42	48	55	74	80	80	83	78
17	67	45	38	52	47	48	56	70	80	81	87	88
18	65	45	38	52	49	50	58	65	85	82	82	86
19	63	45	39	55	50	54	57	65	86	84	85	74
20	65	48	38	51	48	56	58	70	85	86	84	70
21	64	49	33	50	49	55	62	70	85	86	83	70
22	63	53	38	39	46	50	61	69	85	--	78	72
23	58	48	39	42	46	49	62	72	85	87	75	72
24	60	48	38	44	45	50	60	68	85	88	75	71
25	60	50	41	50	45	51	60	64	86	88	77	72
26	64	49	38	50	47	52	60	--	88	89	76	72
27	62	50	39	48	50	54	63	68	87	92	77	73
28	60	50	41	47	52	55	65	67	89	91	78	73
29	59	51	43	45	47	57	67	70	85	91	78	73
30	63	50	50	45	--	59	68	70	89	90	80	74
31	55	--	51	47	--	62	--	69	--	88	81	--
Average	65	49	44	46	48	51	58	70	83	86	82	76



## 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 1952.

Water temperatures: October 1947 to September 1952.

EXTREMES, 1951-52.--Dissolved solids: Maximum, 200 ppm Feb. 1-10; minimum, 149 ppm June 11-20, July 1-10.

Hardness: Maximum, 191 ppm Feb. 11-29, Mar. 11-19; minimum, 128 ppm June 11-20.

Specific conductance: Maximum daily, 397 micromhos Feb. 14; minimum daily, 212 micromhos Mar. 11.

Water temperatures: Maximum, 73°F on several days during July and August; minimum, 40°F Dec. 15.

EXTREMES, 1947-52.--Dissolved solids: Maximum, 200 ppm Feb. 1-10, 1952; minimum, 110 ppm Aug. 11-12, 1950.

Hardness: Maximum, 191 ppm Feb. 11-29, Mar. 11-19, 1952; minimum, 66 ppm Aug. 16-20, 1949.

Specific conductance: Maximum daily, 397 micromhos Feb. 14, 1952; minimum daily, 133 micromhos, Aug. 19, 1948.

Water temperatures: Maximum, 84°F on several days during summer months; minimum, 33°F Feb. 1-2, 1951.

REMARKS.--Records of specific conductance of daily samples available in district office at Fayetteville, Ark. Records of discharge for gaging station near Flippin, Ark., for water year October 1951 to September 1952 given in Water-Supply Paper 1241. No appreciable inflow between sampling point and gaging station.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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./l.	Non-carbonate			
Oct. 1-10, 1951.....	141	--	--	48	15	3.1	--	205	5.2	4.0	--	2.6	180	181	13	321	8.1	6
Oct. 11-20.....	140	--	--	49	13	2.8	--	207	4.9	3.2	--	1.9	180	176	8	319	8.1	5
Oct. 21-31.....	169	9.6	0.03	50	14	2.6	1.3	205	4.4	4.2	0.0	3.5	179	182	13	324	8.0	7
Nov. 1-10.....	190	--	--	50	13	2.1	--	205	4.3	3.2	--	4.2	180	178	10	328	7.9	6
Nov. 11-20.....	2,030	--	--	48	12	2.0	--	201	5.1	3.8	--	3.1	181	169	4	320	7.9	6
Nov. 21-30.....	8,010	--	--	40	11	2.1	--	175	4.9	3.5	--	2.4	170	145	2	281	7.7	8
Dec. 1-10.....	14,260	--	--	41	13	2.7	--	175	4.5	3.5	--	2.8	169	156	12	277	8.3	6
Dec. 11-20.....	14,480	--	--	41	14	2.6	--	183	4.4	3.0	--	2.5	173	160	10	290	8.2	7
Dec. 21-31.....	11,870	--	--	40	13	2.3	--	175	4.4	3.0	--	2.7	166	153	10	278	8.2	6
Jan. 1-10, 1952.....	6,875	--	--	38	13	2.6	--	168	5.5	3.5	--	3.2	161	148	16	259	8.3	8
Jan. 11-20.....	5,245	--	--	38	13	8	--	167	6.0	3.5	--	3.1	157	148	11	260	8.1	7
Jan. 21-31.....	3,016	7.0	.04	41	14	2.2	1.1	183	6.5	3.0	.1	5.6	173	160	10	285	7.5	5
Feb. 1-10.....	235	--	--	53	14	3.2	--	215	5.8	6.2	--	3.2	200	190	14	339	8.2	5
Feb. 11-20.....	247	--	--	52	15	4.1	--	213	6.0	6.0	--	3.9	197	191	17	338	8.0	6
Feb. 21-29.....	273	--	--	52	15	2.9	--	218	6.5	3.8	--	2.8	195	191	13	336	8.0	5
Mar. 1-10.....	380	--	--	48	15	2.6	--	202	5.7	3.5	--	3.2	193	181	16	320	8.2	5
Mar. 11-19.....	611	--	--	50	16	1.4	--	211	5.5	3.0	--	4.2	188	191	18	334	8.0	4
Mar. 20-31.....	15,940	--	--	40	12	1.5	--	165	5.1	3.2	--	3.4	160	149	14	273	8.1	5
Apr. 1-10.....	10,780	--	--	42	12	1.9	--	176	5.1	3.8	--	4.0	166	154	10	287	8.0	6
Apr. 11-20.....	17,190	7.3	.02	38	12	2.5	1.0	163	6.0	3.0	.1	2.6	154	144	11	259	8.2	8
Apr. 21-30.....	18,010	--	--	38	11	1.5	--	161	5.7	3.5	--	2.6	150	140	8	265	8.1	6

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

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

## WHITE RIVER BASIN--Continued

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

Chemical analyses, in parts per million, water year October 1951 to September 1952--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			
May 1-10, 1952.....	9,369	--	--	40	12	1.9	--	163	5.3	3.2	--	3.9	170	149	16	271	7.6	5
May 11-20.....	2,144	--	--	41	13	1.5	--	178	5.6	3.2	--	3.1	170	156	10	291	7.6	6
May 21-31.....	689	--	--	44	15	1.6	--	192	5.4	3.0	--	2.8	180	172	14	308	7.8	5
June 1-10.....	518	--	--	32	14	2.0	--	c155	4.4	3.2	--	2.8	150	137	10	248	8.4	3
June 11-20.....	383	--	--	30	13	1.9	--	152	4.2	3.0	--	3.1	149	128	4	251	7.8	3
June 21-30.....	350	--	--	36	13	2.0	--	171	4.3	3.0	--	2.7	163	143	3	271	8.2	4
July 1-10.....	314	--	--	32	12	3.9	--	154	4.6	3.8	--	2.8	149	129	3	265	7.4	7
July 11-20.....	220	18	0.12	41	13	2.7	1.3	179	4.2	2.5	0.1	3.2	168	156	9	291	7.8	5
July 21-31.....	441	--	--	42	14	2.6	--	187	6.1	3.2	--	2.3	173	162	9	302	7.8	6
Aug. 1-10.....	197	--	--	34	14	2.9	--	185	4.7	3.0	--	2.8	154	142	7	274	7.8	7
Aug. 11-20.....	208	--	--	41	14	3.4	--	184	4.4	3.2	--	2.9	164	130	9	293	8.0	6
Aug. 21-31.....	234	--	--	46	13	1.4	--	d195	4.1	3.2	--	2.9	171	169	8	324	8.4	4
Sept. 1-10.....	248	--	--	46	11	3.0	--	b193	4.7	4.0	--	2.2	185	168	2	308	8.4	3
Sept. 11-20.....	227	--	--	51	12	3.8	--	c208	4.4	5.2	--	2.8	197	177	6	339	7.9	4
Sept. 21-30.....	388	--	--	50	13	2.9	--	211	4.4	4.0	--	1.8	195	178	5	334	8.0	3
Average.....	4,109	--	--	43	13	2.4	--	185	5.1	3.6	--	3.0	173	161	10	296	--	6

b Includes equivalent of 3 parts per million of carbonate (CO<sub>3</sub>).c Includes equivalent of 4 parts per million of carbonate (CO<sub>3</sub>).d Includes equivalent of 5 parts per million of carbonate (CO<sub>3</sub>).

## WHITE RIVER BASIN--Continued

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

Temperature (°F) of water, water year October 1951 to September 1952

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

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

LOCATION --At gaging station at bridge on U. S. Highway 67 at Newport, Jackson County, 7½ miles downstream from Black River.

DRAINAGE AREA --19,812 square miles.

RECORDS AVAILABLE --Chemical analyses: October 1945 to September 1952.

Water temperatures: October 1945 to September 1952.

EXTREMES, 1951-52.--Dissolved solids: Maximum, 189 ppm June 21-30; minimum, 117 ppm Mar. 11-20.

Hardness: Maximum, 186 ppm Sept. 21-30; minimum, 96 ppm Mar. 11-20.

Specific conductance: Maximum daily, 362 microhmhos Sept. 24; minimum daily, 155 microhmhos Jan. 5.

Water temperatures: Maximum, 87°F Aug. 1; minimum, 40°F Dec. 24, 26-27, Jan. 3, 7.

EXTREMES, 1945-52.--Dissolved solids: Maximum, 194 ppm Oct. 1-20, 1948; minimum, 98 ppm Feb. 1-3, 1949.

Hardness: Maximum, 186 ppm Sept. 21-30, 1952; minimum, 51 ppm Jan. 25-31, 1949.

Specific conductance: Maximum daily, 400 microhmhos Sept. 22, 1947; minimum daily, 103 microhmhos 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 1951 to September 1952 given in Water-Supply Paper 1241.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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 (microhmhos at 25°C)	pH	Color
														Calcium, mg-nestum	Non-carbonate			
Oct. 1-10, 1951 .....	9,601	9.2	0.04	38	19	2.4	1.4	198	4.6	3.5	0.0	2.5	160	173	11	303	7.9	7
Oct. 11-20 .....	8,930	13	.00	39	19	2.4	1.3	204	2.6	3.5	.0	1.4	172	175	8	310	8.0	5
Oct. 21-31 .....	12,280	9.4	.07	37	18	2.6	1.4	192	4.4	3.2	.0	1.9	159	166	9	294	7.9	10
Nov. 1-10 .....	22,830	8.8	.08	29	14	1.9	1.6	146	5.6	2.5	.1	2.0	136	130	10	237	7.5	20
Nov. 11-21 .....	22,310	11	.03	34	16	2.6	1.1	178	4.4	2.2	.1	1.8	153	151	5	278	7.9	7
Nov. 22-30 .....	56,730	11	.14	27	12	2.0	1.6	129	4.8	3.5	.2	1.5	127	117	11	204	7.7	27
Dec. 1-3, 9-10 .....	6,358	10	.10	28	12	2.0	1.3	135	4.4	2.5	.3	2.2	127	119	9	217	7.4	18
Dec. 4-8 .....	61,020	12	.03	35	16	3.3	1.1	178	4.3	4.2	.1	1.8	158	153	7	284	7.7	8
Dec. 9-20 .....	48,700	11	.07	31	12	3.8	1.8	157	4.6	3.8	.1	2.8	143	127	0	250	7.7	10
Dec. 21-31 .....	34,530	11	.09	32	15	3.3	1.5	162	4.6	4.5	.0	1.7	148	142	9	254	7.6	9
Jan. 1-10, 1952 .....	51,360	10	.09	31	12	2.8	1.7	152	4.6	3.0	.1	1.3	141	137	2	241	7.9	12
Jan. 11-20 .....	41,630	9.9	.06	27	14	1.4	.9	145	5.1	2.5	.1	1.6	137	135	6	214	8.0	10
Jan. 21-31 .....	24,000	9.8	.04	33	16	1.4	.8	168	4.8	3.0	.2	2.0	150	148	10	264	7.7	15
Feb. 1-10 .....	28,090	9.6	.04	33	15	1.0	.8	182	5.8	2.5	.1	2.8	150	144	11	286	8.0	10
Feb. 11-20 .....	23,450	7.7	.05	30	16	1.6	.7	185	9.0	2.8	.1	1.2	144	141	12	250	7.6	10
Feb. 21-29 .....	23,920	9.3	.11	30	18	1.8	.7	165	6.8	2.0	.1	1.4	153	148	13	248	7.9	8
Mar. 1-10 .....	57,560	8.0	.11	34	15	1.9	.8	169	5.8	2.0	.1	1.4	153	147	5	266	7.9	8
Mar. 11-20 .....	57,840	8.0	.20	25	8.1	1.3	1.1	111	4.1	1.8	.1	1.6	117	98	5	192	8.1	40
Mar. 21-31 .....	59,020	8.8	.06	30	13	1.4	1.0	149	5.3	2.8	.2	2.0	139	128	6	238	8.0	10

Apr. 1-10, 1952.....	47,980	8.1	.05	30	12	1.4	1.0	148	5.3	2.2	.1	1.3	135	124	3	239	7.6	10
Apr. 11-20.....	62,600	8.2	.07	29	10	1.6	1.1	134	4.8	2.2	.2	1.8	131	113	4	223	7.6	14
Apr. 21-30.....	60,250	11	.08	32	11	2.4	1.0	140	4.4	3.8	.1	2.3	137	125	10	236	8.0	15
May 1-10.....	38,650	14	.05	36	14	1.8	1.0	172	4.7	3.8	.1	2.4	154	147	6	272	8.0	10
May 11-20.....	22,510	9.7	.02	36	15	2.7	1.1	174	5.1	3.0	.1	1.6	161	152	9	278	7.6	8
May 21-31.....	22,640	9.2	.02	35	14	2.7	1.2	166	4.7	2.5	.1	1.6	155	145	9	266	7.5	7
June 1-10.....	13,420	11	.02	42	17	3.0	1.2	200	4.6	3.2	.1	1.7	181	175	11	312	7.6	5
June 11-20.....	10,640	15	.05	39	19	3.5	1.4	206	3.8	3.8	.1	1.9	186	175	7	328	7.7	3
June 21-30.....	8,996	14	.06	39	20	3.5	1.3	a208	3.9	3.5	.1	2.8	189	180	9	326	8.3	4
July 1-10.....	8,311	14	.08	39	20	3.8	1.2	211	3.3	3.6	.1	2.1	184	180	7	329	8.0	5
July 11-20.....	7,344	14	.04	39	20	3.1	1.2	210	3.0	3.2	.1	1.6	183	180	7	325	8.2	6
July 21-31.....	7,856	14	.06	39	21	3.1	1.3	209	2.9	3.5	.1	1.3	179	184	12	322	7.9	5
Aug. 1-10.....	7,310	14	.04	39	20	3.4	1.2	209	2.9	3.8	.1	1.8	180	180	8	329	8.0	4
Aug. 11-20.....	7,008	14	.04	39	20	3.1	1.2	211	4.0	3.0	.1	1.7	178	180	7	327	7.7	3
Aug. 21-31.....	6,748	12	.06	39	20	3.4	1.1	a207	2.7	4.5	.1	1.5	178	180	10	318	8.3	4
Sept. 1-10.....	6,842	11	.04	37	20	3.0	1.2	199	2.9	3.2	.1	1.4	167	175	12	308	8.1	5
Sept. 11-20.....	6,130	17	.04	40	20	3.2	1.3	b213	3.0	4.0	.1	1.3	184	182	7	333	8.6	5
Sept. 21-30.....	5,654	14	.04	40	21	4.3	1.3	230	3.1	5.0	.1	1.2	183	186	6	337	7.9	5
Average.....	26,800	11	0.06	34	16	2.5	1.2	176	4.3	3.2	0.1	1.8	157	152	8	275	--	10

a Includes equivalent of 2 parts per million of carbonate (CO<sub>3</sub>).b Includes equivalent of 10 parts per million of carbonate (CO<sub>3</sub>).

## LOWER MISSISSIPPI RIVER BASIN

## WHITE RIVER BASIN--Continued

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

Temperature (°F) of water, water year October 1951 to September 1952

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

## WHITE RIVER BASIN--Continued

LITTLE RED RIVER NEAR HEBER SPRINGS, ARK.

LOCATION --At gaging station at bridge on State Highway 25, 2½ miles downstream from Peter Creek, and 3 miles northeast of Heber Springs, Cleburne County.  
 DRAINAGE AREA--144 square miles.  
 RECORDS AVAILABLE--144. Chemical analyses: November 1949 to September 1952.

REMARKS--Records available from 1949 to September 1952.

EXTREMES 1951-52--Dissolved solids: Maximum, 53 ppm; July 11-20; minimum, 24 ppm Jan. 1, 7-10.

Hardness: Maximum, 31 ppm Aug. 21-31; minimum, 10 ppm Jan. 2-6.

Specific conductance: Maximum daily, 109 micromhos Aug. 17; minimum daily, 25.2 micromhos Jan. 3.

Water temperatures: 92°F July 25-28; minimum, 36°F Dec. 23.

EXTREMES 1949-52--Dissolved solids: Maximum, 58 ppm Aug. 21-24, 1950; minimum, 21 ppm Mar. 17-20, 1951.

Hardness: Maximum, 31 ppm Nov. 11-16, 1950, Aug. 21-31, 1952; minimum, 10 ppm Jan. 2-6, 1952.

Specific conductance: Maximum daily, 126 micromhos Jan. 21, 1951; minimum daily, 25.2 micromhos Jan. 3, 1952.

Water temperatures: Maximum 92°F 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 1951 to September 1952 given in Water-Supply Paper 1241.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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, 1951	175	5.7	0.10	7.2	1.9	2.1	0.9	26	4.1	2.5	0.1	2.3	41	26	4	60.0	7.2	12
Oct. 11-20	146	5.0	.11	8.0	2.0	1.9	1.1	30	4.4	2.2	.1	1.2	41	28	4	61.9	7.2	7
Oct. 21-31	967	5.1	.14	8.1	1.6	2.1	1.5	27	3.5	3.0	.2	.8	44	27	5	60.0	6.9	27
Nov. 1-10	7,986	8.3	.13	5.1	1.8	2.1	1.2	16	2.5	2.2	.1	1.0	38	16	2	41.9	6.7	32
Nov. 11-20	2,985	8.5	.10	5.5	1.5	2.1	.8	22	3.8	2.0	.1	1.3	41	20	2	45.9	7.3	22
Nov. 21-30	11,980	6.8	.17	4.2	1.2	1.9	.8	15	3.8	2.0	.2	.6	39	15	3	36.2	7.4	40
Dec. 1-10	3,409	6.8	.20	5.0	1.6	2.0	.7	19	4.0	2.5	.1	.6	36	19	4	41.1	7.0	28
Dec. 11-20	1,980	5.6	.13	5.3	1.4	2.1	.6	20	4.3	2.5	.1	.6	38	19	3	43.5	7.8	26
Dec. 21-31	1,944	5.2	.28	4.6	1.2	2.3	.6	18	4.2	2.5	.1	.9	35	16	2	43.5	7.5	25
Jan. 1, 7-10, 1952	4,034	--	--	4.8	1.0	2.3	--	17	4.6	2.2	--	.6	24	16	2	43.4	7.2	17
Jan. 2-6	18,750	--	--	3.2	.5	2.0	--	11	3.7	1.2	--	1.0	26	10	1	30.4	6.5	33
Jan. 11-20	1,724	6.6	.38	5.0	1.7	2.0	.9	20	3.8	2.0	.1	.6	33	20	3	44.4	7.1	20
Jan. 21-31	805	6.4	.06	5.4	1.4	2.3	1.6	20	4.1	2.5	.1	.6	37	19	3	48.1	7.5	15
Feb. 1-10	4,151	5.6	.11	4.8	1.4	2.1	1.3	18	4.0	2.2	.1	.9	38	18	3	44.6	6.7	25
Feb. 11-20	1,518	5.6	.08	5.0	1.2	1.7	.9	19	4.0	2.0	.1	.6	34	17	2	44.0	7.1	15
Feb. 21-29	2,827	6.0	.02	4.8	1.4	1.8	.9	17	4.2	2.0	.1	.4	36	18	4	43.1	7.0	18
Mar. 1-10	4,309	5.3	.10	4.0	1.2	1.7	.9	15	4.2	2.5	.2	.6	36	15	3	39.2	6.7	27
Mar. 11-20	7,899	7.2	.37	4.8	1.4	1.3	1.0	17	3.7	1.8	.1	.8	38	18	4	38.4	7.4	30
Mar. 21-31	3,518	5.8	.34	5.7	1.3	1.5	.9	19	3.7	2.0	.1	.6	40	20	4	41.7	6.8	40
Apr. 1-10	2,938	6.3	.10	4.9	1.3	1.2	.6	17	4.2	2.0	.2	1.0	35	18	4	42.7	6.9	30
Apr. 11-20	7,511	6.2	.09	4.7	1.6	1.2	.7	16	3.9	1.8	.2	.7	34	18	5	39.0	6.9	30
Apr. 21-30	7,084	6.3	.34	4.8	.9	1.3	.7	19	1.6	1.8	.1	.5	34	16	0	37.9	7.0	35

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

Chemical analyses, in parts per million, water year October 1951 to September 1952--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-nestum	Non-carbonate			
May 1-10, 1952	930	5.4	0.08	6.5	1.2	1.7	0.9	22	4.4	2.0	0.1	0.6	35	21	3	48.5	6.9	6
May 11-20	641	5.0	.03	7.3	1.3	1.9	.9	26	3.8	2.2	.1	.6	37	24	2	54.7	6.7	4
May 21-31	2,059	12	.29	7.0	1.4	1.9	.2	26	4.0	1.8	.1	1.1	48	23	2	54.1	7.3	7
June 1-10	374	6.6	.03	7.2	1.4	1.8	.1	26	3.6	2.5	.1	.7	36	24	2	53.0	7.3	10
June 11-20	126	7.4	.01	8.2	1.5	2.0	.2	29	3.7	2.8	.1	.8	41	27	1	60.9	7.0	5
June 21-30	188	7.0	.01	8.4	1.7	2.0	.2	32	3.8	2.9	.1	.9	43	28	2	62.4	7.4	7
July 1-10	23.0	8.4	.06	8.4	1.5	2.0	1.5	36	3.8	3.5	.1	.8	50	30	1	70.3	7.5	5
July 11-20	13.0	10	.06	8.4	2.2	2.9	1.3	36	2.9	3.0	.1	.8	50	30	0	70.0	6.9	6
July 21-31	10.7	7.9	.06	8.4	1.9	3.0	1.3	34	3.1	3.0	.1	1.1	47	29	1	69.9	6.5	7
Aug. 1-10	4.27	6.0	.06	7.6	2.4	3.0	1.1	35	2.9	3.0	.1	1.4	47	29	0	70.5	6.8	5
Aug. 11-20	7.06	8.2	.08	9.6	1.5	3.0	1.1	38	2.9	2.8	.1	.7	48	30	0	70.4	7.4	5
Aug. 21-31	14.0	5.8	.06	9.4	1.8	3.4	1.2	37	2.7	3.0	.1	.8	48	31	1	74.5	7.2	6
Sept. 1-10	9.39	2.6	.06	8.4	1.7	3.5	1.2	36	2.0	3.8	.1	1.5	45	28	0	72.3	7.2	8
Sept. 11-20	8.71	3.4	.04	8.0	1.9	3.6	1.2	36	2.8	3.5	.1	1.0	44	28	0	71.0	7.0	4
Sept. 21-30	3.72	3.0	.06	8.7	1.7	3.3	1.1	34	2.9	3.2	.1	1.0	45	29	1	70.1	7.1	12
Average	2,475	6.3	0.13	6.4	1.5	2.2	0.9	34	3.6	2.4	0.1	0.9	39	22	2	52.5	--	17



## WHITE RIVER BASIN--Continued

## LITTLE RED RIVER NEAR HEBER SPRINGS, ARK.--Continued

Temperature (°F) of water, water year October 1951 to September 1952

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	74	53	--	48	49	49	59	66	73	88	85	84
2	74	52	--	45	51	49	58	66	74	88	86	78
3	73	50	52	44	51	47	58	70	76	88	86	78
4	71	48	54	45	50	48	57	72	78	87	87	79
5	71	46	53	45	49	47	56	72	77	87	87	79
6	69	45	53	44	47	46	55	72	79	86	88	80
7	73	46	54	44	46	47	56	73	81	86	87	85
8	74	47	53	45	47	48	58	74	83	86	86	84
9	78	46	52	44	48	50	59	74	83	86	87	82
10	71	47	45	43	48	52	54	71	84	86	86	82
11	75	49	45	43	48	53	56	70	84	86	85	82
12	68	53	45	46	48	54	55	69	84	87	84	81
13	68	54	45	48	49	54	52	68	85	86	81	80
14	67	56	44	49	50	53	50	67	85	86	83	80
15	67	55	42	51	50	52	52	69	86	86	85	79
16	68	54	40	53	49	51	54	71	86	86	85	78
17	68	48	40	52	49	50	56	72	87	86	86	78
18	68	45	41	52	49	50	59	70	88	85	86	77
19	66	45	41	53	48	50	61	70	88	86	85	76
20	67	44	40	54	47	52	62	68	89	86	85	76
21	67	44	39	52	48	54	60	89	89	85	84	74
22	69	48	37	49	47	53	60	70	88	85	84	75
23	67	50	36	49	48	52	59	--	89	86	83	75
24	65	52	38	50	48	52	59	65	89	90	83	75
25	62	49	42	52	48	53	59	66	90	92	82	75
26	64	50	43	53	48	52	58	67	89	92	81	74
27	62	51	43	53	48	53	60	67	89	92	80	74
28	62	51	43	52	49	54	63	68	89	92	80	75
29	60	50	44	48	49	56	64	69	88	91	82	75
30	60	50	45	46	--	58	65	70	88	91	82	75
31	56	--	37	46	--	58	--	72	--	89	84	--
Average	68	49	44	48	48	52	58	70	85	88	84	78

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

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

DRAINAGE AREA --55,497 square miles.

RECORDS AVAILABLE --Chemical analyses: October 1947 to September 1952.

Water temperatures: October 1948 to September 1952.

EXTREMES, 1951-52. --Dissolved solids: Maximum, 199 ppm Aug. 21-31; minimum, 87 ppm Jan. 21-31.

Hardness: Maximum, 180 ppm Aug. 11-20; minimum, 55 ppm Jan. 8-20.

Specific conductance: Maximum daily, 341 micromhos July 26; minimum daily, 103 micromhos Jan. 28.

Water temperatures: Maximum, 88°F on several days during June and July; minimum, 40°F Dec. 21.

EXTREMES, 1947-52. --Dissolved solids: Maximum, 199 ppm Aug. 21-31, 1952; minimum, 38 ppm Feb. 1-9, 1950.

Hardness: Maximum, 180 ppm Aug. 11-20, 1952; minimum, 29 ppm Mar. 1-10, 1948.

Specific conductance: Maximum daily, 366 micromhos Oct. 10, 1947; minimum daily, 60.7 micromhos Feb. 3, 1950.

Water temperatures (1948-52): Maximum, 88°F on several days during summer months; minimum, 35°F Jan. 31, Feb. 1, 1951.

REMARKS --Records of specific conductance of daily samples available in district office at Fayetteville, Ark. Records of discharge for water year October 1951 to September 1952 obtained from Corps of Engineers, Memphis District.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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	Non-carbonate			
Oct. 1-10, 1951	12,180	--	--	34	15	4.5	--	175	0	4.5	5.0	--	2.9	158	147	3	279	7.9	7
Oct. 11-20	10,610	--	--	38	17	4.8	--	196	0	4.2	5.8	--	2.8	172	165	4	309	8.0	7
Oct. 21-30	10,730	12	0.06	38	17	3.9	1.1	200	0	3.8	5.5	0.1	1.3	182	165	1	316	7.8	5
Oct. 31-Nov. 1-8	22,840	--	--	25	11	1.9	--	131	0	2.5	3.0	--	1.6	122	108	0	209	8.1	12
Nov. 9-20	31,780	--	--	25	8.8	2.1	--	112	0	4.7	3.5	--	1.8	112	99	7	190	7.5	23
Nov. 21-25	29,400	--	--	24	11	3.4	--	121	0	7.0	3.8	--	1.2	125	105	6	202	8.2	22
Nov. 26-30	39,100	--	--	18	8.2	2.6	--	81	0	6.0	2.8	--	1.2	102	79	12	148	7.7	45
Dec. 1-10	70,570	--	--	19	6.9	2.6	--	86	0	4.9	3.5	--	1.3	112	76	5	152	7.7	40
Dec. 11-20	83,190	--	--	16	7.2	3.6	--	72	0	5.8	4.8	--	1.6	100	70	12	132	7.8	45
Dec. 21-31	94,300	--	--	17	6.9	3.4	--	76	0	5.5	3.5	--	1.4	105	71	12	133	7.7	35
Jan. 1-10, 1952	93,700	10	.35	17	6.5	2.2	1.7	80	0	5.8	3.2	2.2	1.9	104	55	6	147	7.9	65
Jan. 11-20	78,000	--	--	12	6.2	1.6	--	58	0	5.8	2.9	--	1.9	93	56	9	112	7.5	70
Jan. 21-31	58,040	--	--	12	6.4	1.7	--	58	0	5.0	2.5	--	1.9	87	--	--	111	7.5	70
Feb. 1-10	36,720	--	--	17	7.0	3.3	--	80	0	3.6	2.5	--	1.3	109	71	6	144	7.9	35
Feb. 11-20	38,550	--	--	18	7.9	3.3	--	89	0	3.2	3.5	--	1.9	101	77	4	161	7.8	28
Feb. 21-29	39,790	--	--	14	6.9	3.5	--	73	0	3.0	3.0	--	1.4	101	63	4	131	7.7	38
Mar. 1-10	38,380	--	--	16	6.7	3.8	--	73	0	3.7	3.5	--	1.3	114	87	8	134	7.8	45
Mar. 11-20	55,520	--	--	15	6.4	3.3	--	69	0	3.1	3.0	--	2.2	105	64	7	125	7.8	45
Mar. 21-31	74,170	--	--	16	6.7	2.8	--	77	0	3.0	2.0	--	2.9	108	87	4	134	7.9	40
Apr. 1-10	74,390	--	--	18	7.6	3.2	--	84	0	3.8	2.2	--	1.8	95	76	7	148	7.6	45
Apr. 11-20	70,060	7.6	.27	21	7.5	3.0	1.5	94	0	4.9	2.5	1.1	1.6	107	83	6	164	7.9	35
Apr. 21-30	78,020	--	--	23	7.8	3.2	--	106	0	4.4	2.2	--	1.6	106	89	3	180	7.6	21

May 1-10, 1952.....	67,510	--	--	27	10	2.6	--	122	0	3.4	3.5	--	2.1	126	108	8	200	7.6	10
May 11-20.....	45,220	--	--	27	11	3.3	--	129	0	3.9	3.2	--	2.7	134	113	7	214	7.8	11
May 21-31.....	29,310	--	--	30	12	2.8	--	141	0	4.0	3.8	--	1.9	146	124	9	231	8.0	8
June 1-10.....	21,390	--	--	33	15	4.6	--	163	0	3.6	4.5	--	2.5	164	144	10	274	7.1	11
June 11-20.....	13,000	--	--	37	18	4.6	--	188	0	3.5	4.8	--	2.1	185	166	12	304	8.0	8
June 21-30.....	10,260	--	--	38	20	4.9	--	203	0	3.3	4.8	--	2.1	192	177	11	309	8.1	10
July 1-10.....	90,020	17	04	35	20	4.2	1.3	183	5	3.8	6.5	.0	1.7	186	170	11	311	8.5	4
July 11-20.....	81,970	--	--	38	20	4.8	--	199	2	3.7	5.2	--	1.8	180	177	11	311	8.3	8
July 21-31.....	85,390	--	--	37	21	5.5	--	189	8	3.7	5.2	--	1.6	180	179	10	321	8.5	4
Aug. 1-10.....	78,630	20	.04	35	20	5.1	1.4	192	4	3.1	5.0	.1	2.0	190	170	6	312	8.4	5
Aug. 11-20.....	72,590	17	.00	39	20	5.1	1.6	206	0	4.1	5.0	.1	1.6	196	180	11	328	7.9	5
Aug. 21-31.....	70,980	17	.04	37	19	7.1	1.6	180	13	3.9	6.0	.1	1.7	199	175	6	317	8.7	6
Sept. 1-10.....	70,610	--	--	37	19	5.4	--	188	10	3.5	5.5	--	1.4	183	170	0	315	8.8	9
Sept. 11-20.....	88,450	--	--	38	18	4.6	--	182	8	4.3	5.8	--	1.1	188	164	1	306	8.7	6
Sept. 21-30.....	84,680	--	--	38	19	5.2	--	205	0	3.8	5.5	--	1.1	185	173	5	322	8.2	3
Average.....	53,320	--	--	26	12	3.7	--	131	1	4.2	4.0	--	1.7	139	117	7	220	--	24

## LOWER MISSISSIPPI RIVER BASIN

## WHITE RIVER BASIN--Continued

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

Temperature (°F) of water, water year October 1951 to September 1952

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

WHITE RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN WHITE RIVER BASIN IN ARKANSAS

Chemical analyses, in parts per million, water year October 1951 to September 1952

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			
KINGS RIVER NEAR BERRYVILLE																			
Feb. 11, 1952.....	635							114	1	7.0	3.0			3.5	110	17	195	8.3	
Aug. 25.....	331							128	6	7.0	2.0			2.9	132	17	228	8.6	
BUFFALO RIVER NEAR ST. JOE																			
Feb. 12, 1952.....	850							108	0	4.0	2.2			1.0	105	16	180	8.2	
Aug. 26.....	136							125	6	6.0	3.0			.6	123	11	225	8.6	
BUFFALO RIVER NEAR RUSH																			
Feb. 12, 1952.....	1,140							121	2	4.0	2.2			1.0	110	8	200	8.3	
Aug. 26.....	253							124	4	7.0	2.2			.4	126	18	216	8.6	
NORTH FORK RIVER AT NORFORK DAM NEAR NORFORK																			
Oct. 1, 1951.....	a 2,220	7.2	0.00	36	22	1.6	1.6	212	0	3.4	2.8	0.0		163	180	7	288	7.5	4
Nov. 7.....	1,470	5.9	.08	33	18	1.1	1.4	188	0	3.7	1.5	.0		152	156	2	281	7.6	7
Jan. 2, 1952.....	2,510	7.0	.03	31	20	1.0	1.2	185	0	3.8	2.2	.0	.9	158	160	8	275	7.6	5
Jan. 28.....	2,490	6.2	.08	34	19	1.2	1.2	190	0	4.1	1.5	.1	1.0	165	163	7	285	8.0	7
May 14.....	2,140	7.3	.01	31	20	.3	1.0	191	0	4.5	2.0	.1	1.5	165	160	3	289	7.8	8
May 19.....	2,410	7.0	.01	35	20	1.6	1.2	193	0	4.2	2.0	.0	1.6	162	170	11	293	8.0	12
June 5.....	2,440	6.0	.04	35	20	1.0	1.0	192	0	3.9	2.5	.1	2.2	166	170	12	302	7.9	5
June 25.....	2,430	5.6	.02	35	20	1.8	1.7	192	0	3.7	2.8	.1	2.1	162	170	12	306	7.6	7
July 6.....	--	7.9	.04	36	19	.9	1.2	193	0	3.6	2.0	.1	2.0	163	168	10	300	7.5	7
Sept. 2.....	1,350	7.9	.02	34	19	4.0	1.4	198	0	4.5	2.8	.1	1.5	163	163	1	302	7.5	5
Sept. 30.....	980	8.8	.02	34	19	4.0	1.4	197	0	3.4	2.2	.1	1.4	163	163	2	307	7.5	4
WHITE RIVER AT CALICO ROCK																			
Oct. 31, 1951.....	2,960							176	0	5.0	2.8		2.3		161	17	278	7.6	
Feb. 27, 1952.....	5,110							181	0	4.0	2.5		1.4		165	17	274	8.2	
Aug. 27.....	1,280							179	1	6.0	2.2		1.8		174	26	293	8.7	

a Values for discharge shown for North Fork River at Norfork Dam near Norfork are mean discharge (cfs).

b Day of month not recorded on sample.

## WHITE RIVER BASIN--Continued

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

Chemical analyses, in parts per million, water year October 1951 to September 1952--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> )	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			
WHITE RIVER AT BATESVILLE																			
Oct. 15, 1951 .....	1,800							214	0	6.0	2.5		0.3		189	14	312	8.4	
Feb. 13, 1952 .....	10,400							156	7	4.0	2.5		1.7		160	22	258	8.5	
Sept. 10 .....	1,660							171	7	5.0	2.0		.9		168	16	282	8.5	
BLACK RIVER NEAR CORNING																			
Feb. 14, 1952 .....	2,970							100	0	5.0	2.0		1.5		95	13	164	8.1	
Sept. 11 .....	502							159	9	4.0	2.0		.3		156	11	264	8.6	
BLACK RIVER AT POCAHONTAS																			
Feb. 14, 1952 .....	9,480							118	0	5.0	2.0		1.0		108	11	182	8.2	
Sept. 11 .....	2,140							182	10	3.0	2.2		.8		184	18	302	8.6	
SPRING RIVER AT IMBODEN																			
Feb. 13, 1952 .....	1,750							181	6	3.0	2.2		3.1		180	22	284	8.4	
Sept. 10 .....	505							172	9	3.0	2.0		3.4		174	18	287	8.6	
ELEVEN POINT RIVER NEAR RAVENDEN SPRINGS																			
Feb. 13, 1952 .....	1,530							200	10	2.0	2.2		3.2		202	22	314	8.6	
Sept. 11 .....	647							178	7	1.0	1.8		1.8		179	22	284	8.6	
BLACK RIVER AT BLACK ROCK																			
May 22, 1952 .....	10,200							184	0	4.0	1.8		0.5		160	9	286	7.4	
Sept. 10 .....	3,290							177	8	3.0	2.0		1.0		181	23	288	8.6	
Sept. 24 .....	3,040	11	0.00	40	22	2.8	1.2	211	8	2.3	3.0	0.1	.9	190	190	4	337	8.5	5
STRAWBERRY RIVER NEAR EVENING SHADE																			
Mar. 11, 1952 .....	7,720							38	0	4.0	0.5		2.1		35	4	68.3	6.6	
Sept. 24 .....	15							173	9	6.0	2.2		1.8		170	13	287	8.7	



## ARKANSAS RIVER BASIN

## ARKANSAS RIVER BELOW JOHN MARTIN RESERVOIR, COLO.

LOCATION --At gaging station 1 mile upstream from Caddo Creek, 1½ miles downstream from John Martin Dam, Bent County, and 3 miles southeast of Hasty.  
 NAME AREA 18,953 square miles.  
 DATA AVAILABLE: August 1942 to August 1943, October 1945 to July 1949 (intermittent and weekly samples) January 1951 to September 1952 (daily samples).

Water temperatures: January 1951 to September 1952.  
 EXTREMES: 1951-52 --Dissolved solids: Maximum, 3,470 ppm Mar. 1-10; minimum, 763 ppm June 21-30.

Hardness: Maximum, 1,710 ppm Feb. 1-10; minimum, 405 ppm June 21-30.  
 Specific conductance: Maximum observed, 4,620 microhmhos Jan. 29; minimum observed, 830 microhmhos December 19.

Water temperatures: Maximum observed, 77°F Aug. 26; minimum observed, 35°F on several days during December and January.  
 EXTREMES: January 1951-52 --Dissolved solids: Maximum, 3,470 ppm Mar. 1-10, 1952; minimum, 763 ppm June 21-30, 1952.

Hardness: Maximum, 1,710 ppm Feb. 1-10, 1952; minimum, 405 ppm June 21-30, 1952.  
 Specific conductance: Maximum observed, 4,620 microhmhos Jan. 29, 1952; minimum observed, 830 microhmhos June 19, 1952.

Water temperatures: Maximum observed, 85°F Aug. 6, 1951; minimum observed, 35°F on several days during months of December 1951 and January 1952.  
 REMARKS --Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Values reported for dissolved solids are sums of determined constituents. Records of discharge for water year October 1951 to September 1952 given in Water-Supply Paper 1241.

## Chemical analyses, in parts per million, water year October 1951 to September 1952

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 (sum)			Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (microhmhos at 25°C)	pH	Color	
															Parts per million	Tons per acre-foot	Tons per day	Calcium, mg./l.	Non-carbonate, mg./l.					
Oct. 1-10, 1951	486	3.3	0.02	195	66	162	8.2	161	0	889	39	0.5	3.4	0.27	1,450	1.97	1,900	758	626	31	2.6	1,870	7.7	5
Oct. 11-20	420	2.2	.01	211	75	165	7.8	169	0	953	43	.5	3.3	.21	1,540	2.09	1,750	835	696	30	2.5	1,980	7.7	6
Oct. 21-31	335	3.2	.01	223	80	170	8.0	172	0	1,010	46	.7	3.1	.26	1,630	2.22	1,470	886	744	29	2.5	2,070	7.8	5
Nov. 1-10	11.5	25	.01	344	146	373	7.8	272	0	1,800	106	.6	4.7	.67	2,940	4.00	91.3	1,460	1,240	36	4.2	3,470	7.8	3
Nov. 11-20	5.2	17	.02	336	164	415	9.6	300	0	1,930	113	.6	3.1	.66	3,140	4.27	44.1	1,510	1,270	37	4.6	3,710	7.6	5
Nov. 21-30	4.0	17	.02	344	171	439	8.8	327	0	1,990	116	.7	3.9	.60	3,250	4.42	35.0	1,560	1,260	38	4.8	3,800	7.7	3
Dec. 1-10	4.1	17	.02	372	177	436	10	349	0	2,050	121	.6	4.4	.63	3,360	4.57	37.2	1,660	1,370	36	4.7	3,920	7.8	2
Dec. 11-20	3.9	18	.02	370	184	464	9.4	376	0	2,080	124	.6	4.7	.67	3,450	4.69	36.3	1,680	1,370	37	4.9	4,010	7.9	2
Dec. 21-31	4.2	17	.02	372	177	412	7.4	358	0	2,010	117	.6	5.0	.56	3,290	4.47	37.3	1,660	1,360	35	4.4	3,880	7.7	--
Jan. 1-10, 1952	4.9	13	.02	356	176	413	7.6	369	0	2,010	115	.6	3.4	.55	3,280	4.46	43.4	1,610	1,310	36	4.5	3,840	7.8	--
Jan. 11-20	4.2	18	.02	360	175	459	7.2	362	0	2,030	118	.8	6.1	.57	3,350	4.56	38.0	1,620	1,320	38	5.0	3,930	7.7	5
Jan. 21-31	4.4	24	.13	380	170	444	13	390	0	2,070	130	.6	2.8	.70	3,410	4.64	40.5	1,650	1,350	37	4.8	4,080	7.7	10
Feb. 1-10	4.0	23	.02	390	180	429	13	349	0	2,080	129	.8	4.8	.85	3,430	4.66	37.0	1,710	1,430	35	4.5	4,110	7.6	10
Feb. 11-20	4.0	20	.01	366	176	467	7.3	369	0	2,060	120	1.0	5.8	.75	3,410	4.64	36.8	1,640	1,330	38	5.0	3,940	7.6	5
Feb. 21-29	3.9	19	.01	336	176	413	7.2	382	0	1,980	114	.8	3.7	.64	3,190	4.34	33.6	1,560	1,250	36	4.5	3,770	7.7	7
Mar. 1-10	4.3	20	.01	352	175	500	7.5	344	0	2,120	126	.7	4.3	.72	3,470	4.72	40.3	1,600	1,320	40	5.4	4,040	7.8	7
Mar. 11-20	4.0	21	.03	340	178	500	7.6	383	0	2,070	124	.8	4.6	.69	3,440	4.68	37.2	1,580	1,270	41	5.5	4,030	7.8	7
Mar. 21-31	6.4	22	.01	344	175	485	7.5	379	0	2,030	121	.8	4.3	.79	3,400	4.60	58.4	1,560	1,270	40	5.3	3,990	7.8	7
Apr. 1-6	4.8	15	.01	340	156	445	7.5	321	0	1,930	112	.8	4.6	.84	3,170	4.31	41.1	1,490	1,230	39	5.0	3,750	7.8	7
Apr. 7-20	486	9.7	.00	286	119	328	7.1	200	6	1,540	79	1.0	3.4	.40	2,480	3.37	250	1,200	1,030	37	4.1	3,040	--	2
Apr. 21-30	485	10	.00	280	121	336	7.2	206	0	1,560	78	1.0	3.0	.36	2,500	3.40	3,270	1,200	1,030	38	4.2	3,040	7.8	2



May 1-10, 1952	441	11	.01	279	121	326	7.3	202	0	1,540	78	1.0	3.0	.40	2,470	3.36	2,940	1,190	1,030	37	4.1	3,010	7.8	2
May 11-20	66.2	9.5	.00	282	123	336	7.4	204	0	1,610	80	1.1	2.6	.40	2,550	3.47	4,456	1,210	1,040	37	4.2	3,070	7.8	2
May 21-31	650	10	.01	261	115	313	7.1	182	0	1,510	76	1.0	3.3	.40	2,390	3.25	4,190	1,120	1,040	38	4.1	2,910	7.8	2
June 1-2	568	11	.00	211	98	252	6.4	150	0	1,200	60	1.0	2.6	--	1,920	2.61	2,940	930	806	37	3.6	2,420	8.1	5
June 3-10	486	14	.00	127	51	124	5.0	147	0	597	31	1.0	4.2	.28	1,030	1.40	1,350	528	406	34	2.4	1,410	7.7	5
June 11-20	804	16	.08	103	39	90	4.6	140	0	445	20	.7	4.4	.21	792	1.06	1,220	418	303	32	1.9	1,110	8.0	7
June 21-30	613	14	.06	103	36	95	4.4	125	6	524	22	.6	4.4	.18	763	1.04	1,460	403	282	32	1.9	1,080	--	7
July 1-10	468	13	.01	122	43	112	4.6	143	0	536	29	.6	4.3	.13	853	1.27	1,190	582	364	35	2.2	1,280	7.8	6
July 11-20	501	13	.00	134	45	120	5.6	153	0	567	30	.7	4.6	.27	1,120	1.39	1,657	582	406	35	2.3	1,360	7.8	5
July 21-31	238	13	.01	192	73	162	5.3	182	0	916	45	.7	5.6	.34	1,520	2.07	977	779	630	33	2.8	1,960	7.6	5
Aug 1-10	443	15	.08	150	51	122	5.7	162	0	632	31	.8	5.0	.22	1,090	1.48	1,300	584	452	31	2.2	1,480	8.0	7
Aug 11-20	175	15	.02	180	65	166	5.3	178	0	824	43	.7	5.8	.31	1,390	1.89	657	716	570	33	2.7	1,810	7.7	5
Aug 21-31	346	14	.01	193	70	168	6.2	184	0	883	40	.7	5.2	.29	1,470	2.00	1,370	770	618	32	2.6	1,890	7.7	10
Sept 1-5	211	15	.01	223	75	184	6.5	206	0	976	46	.8	9.8	.29	1,640	2.23	934	865	696	31	2.7	2,060	7.7	10
Sept 6-10	64.0	20	.01	323	118	334	7.1	278	0	1,560	86	.9	9.3	.60	2,620	3.56	453	1,290	1,060	36	4.0	3,130	7.9	10
Sept 11-13																								
Sept 17-20	111	17	.02	308	118	324	7.3	248	0	1,550	80	.8	8.5	.53	2,540	3.45	761	1,250	1,050	36	4.0	2,990	7.8	15
Sept 14-16	685	15	.01	194	67	137	7.3	212	0	802	28	.5	1.2	.26	1,360	1.85	2,520	760	586	28	2.2	1,720	7.7	10
Sept 21-30	115	16	.01	266	102	272	6.2	257	0	1,310	68	.8	8.0	.45	2,130	2.96	677	1,080	872	35	3.6	2,650	7.8	7
Weighted average	244	11	0.02	208	80	206	6.3	177	0	1,010	50	0.8	4.0	0.30	1,660	2.26	1,080	833	688	35	3.1	2,100	--	--

## LOWER MISSISSIPPI RIVER BASIN

## ARKANSAS RIVER BASIN--Continued

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

Temperature (°F) of water, water year October 1951 to September 1952  
 [Once-daily temperature measurement generally between 7 a.m. and 10 a.m.]

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

a Temperature measurement obtained at 3:00 p.m.

b Temperature measurement obtained at 12:30 p.m.

# ARKANSAS RIVER BASIN

## ARKANSAS RIVER AT ARKANSAS CITY, KANS.

LOCATION.--At gaging station at Chestnut Avenue highway bridge, half a mile west of Arkansas City, Cowley County, and 5 miles upstream from Walnut River.

DRAINAGE AREA.--43,475 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1951 to September 1952.

Water temperatures: October 1951 to September 1952.

EXTREMES, 1951-52.--Dissolved solids: Maximum, 1,600 ppm Dec. 22-23; minimum, 501 ppm Oct. 1-10.

Hardness: Maximum, 561 ppm Dec. 22-23; minimum, 180 ppm Oct. 1-10.

Specific conductance: Maximum daily, 2,960 micromhos Aug. 3; minimum daily, 736 micromhos Oct. 8.

Freezing temperatures: Maximum 80° F July 1, Aug. 1, 17-18; minimum, freezing point on several days during December and January.

REMARKS.--Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of discharge for water year October 1951 to September 1952 given in Water-Supply Paper 1241.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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)
															Parts per million	Tons per acre-foot	Calcium, mg./nestum	Non-carbonate		
Oct. 1-10, 1951	3,756	--	--	52	12	112	152	100	135	100	135	--	3.6	--	501	0.68	5,080	180	55	882
Oct. 11-12	3,780	--	--	68	21	161	174	145	220	145	220	--	4.6	--	734	1.00	7,490	256	114	1,230
Oct. 13-20	2,419	--	--	100	26	212	250	198	285	198	285	--	4.4	--	984	1.34	6,430	356	152	1,630
Oct. 21-31	2,324	21	0.00	110	28	225	270	216	302	216	302	0.5	4.9	0.09	1,050	1.43	6,580	390	168	1,720
Nov. 1-3, 10	3,238	--	--	98	27	203	251	199	270	199	270	--	4.4	--	958	1.30	8,380	356	150	1,560
Nov. 4-8	2,942	--	--	108	31	227	259	221	315	221	315	--	6.1	--	1,070	1.46	8,500	397	185	1,790
Nov. 9-11	2,823	21	0.00	114	31	235	287	282	288	282	288	3	4.9	0.06	1,150	1.56	8,770	412	193	1,840
Nov. 11-20	2,523	22	0.00	124	35	253	275	313	310	313	310	3	7.8	0.07	1,260	1.71	8,580	454	225	1,960
Dec. 1-10	2,209	19	0.00	126	35	269	278	328	330	328	330	5	5.7	0.07	1,300	1.77	7,750	458	230	2,050
Dec. 11-20	1,709	--	--	130	38	319	297	325	415	325	415	--	9.2	--	1,380	1.88	6,370	480	237	2,220
Dec. 21-24-31	1,702	--	--	125	34	301	306	266	405	266	405	--	7.8	0.05	1,280	1.75	5,930	452	201	2,160
Dec. 22-23	1,255	--	--	154	43	373	323	313	550	313	550	--	7.6	0.07	1,600	2.18	5,420	561	296	2,680
Jan. 1-10, 1952	1,780	17	0.00	124	34	271	279	277	348	277	348	5	7.8	0.08	1,280	1.75	6,200	450	221	2,040
Jan. 11-20	2,275	--	--	120	35	274	262	337	332	337	332	--	6.6	0.06	1,230	1.67	7,560	444	229	2,030
Jan. 21-31	1,868	18	0.00	139	42	301	274	432	358	432	358	5	6.9	0.08	1,450	2.03	8,000	520	295	2,250
Feb. 1-10	1,865	16	0.00	134	40	300	270	405	358	405	358	5	6.8	0.07	1,440	1.96	7,250	499	278	2,230
Feb. 11-20	1,897	19	0.00	132	40	298	269	389	380	389	380	5	6.3	0.22	1,450	1.97	7,430	494	274	2,260
Feb. 21-29	1,748	17	0.00	122	35	296	270	312	372	312	372	3	6.4	0.25	1,340	1.82	6,320	448	228	2,160
Mar. 1-10	2,161	15	0.00	112	32	270	253	250	352	250	352	3	5.7	0.24	1,180	1.60	6,880	411	203	2,030
Mar. 11-12	6,880	--	--	58	16	111	154	108	145	108	145	--	9.7	--	561	0.76	10,420	210	84	945
Mar. 13-14	2,960	--	--	72	24	165	184	164	220	164	220	--	5.5	--	1,400	1.09	8,350	278	127	1,310
Mar. 15-20	3,610	--	--	100	32	240	240	243	318	243	318	--	7.1	--	1,840	1.55	8,530	361	184	1,840
Mar. 21-31	2,272	20	0.00	114	33	269	271	286	342	286	342	5	6.5	0.21	1,240	1.69	7,610	420	193	2,010

a Includes equivalent of 5 parts per million of carbonate (CO<sub>3</sub>).

## LOWER MISSISSIPPI RIVER BASIN

## ARKANSAS RIVER BASIN--Continued

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

Chemical analyses, in parts per million, water year October 1951 to September 1952--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> )	Carbonyl (CO <sub>2</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	Non-carbonate			
Apr. 1-10, 1952	1,958	16	0.00	121	36	285	6.2	265		341	358	0.5	5.1	0.21	1,320	1.80	6,980	450	233	57	2,120	7.5
Apr. 11-12, 14, 18, 20	2,320	--	--	102	30	256		244		236	345	--	3.6	--	1,170	1.59	7,330	378	178	60	1,920	7.6
Apr. 13, 15-17, 19	2,728	--	--	94	28	228		241		202	302	--	3.8	--	1,020	1.39	7,510	342	144	59	1,700	7.8
Apr. 21, 23, 25, 27	3,070	--	--	100	27	245		248		200	338	--	5.6	--	1,120	1.52	9,280	360	157	60	1,830	8.4
Apr. 22-24, 29-30	5,562	--	--	74	20	169		202		149	220	--	3.3	--	780	1.06	11,710	266	101	58	1,300	7.7
Apr. 25-28	5,728	--	--	61	14	132		181		97	172	--	4.3	--	605	.82	9,360	210	61	58	1,030	8.2
May 1-10	2,774	--	--	95	26	210		233		211	275	--	4.0	--	988	1.36	7,470	344	153	57	1,620	7.8
May 11-20	2,061	--	--	100	27	246	6.6	218		250	338	.5	2.3	.18	1,130	1.54	6,290	348	170	60	1,850	7.5
May 21, 24-28, 31	2,393	--	--	73	21	189		175		168	252	--	3.6	--	830	1.13	5,360	268	122	61	1,410	7.6
May 22-23, 29-30	2,550	--	--	77	25	243		195		210	312	--	3.2	--	1,020	1.39	7,020	295	132	64	1,710	7.6
June 1, 6, 9-10	2,668	--	--	74	20	206		177		186	265	--	2.3	--	840	1.14	6,050	266	122	63	1,440	7.7
June 2-4	2,053	--	--	94	24	261		215		212	355	--	3.7	--	1,070	1.46	5,930	333	157	63	1,830	8.2
June 5, 7-8	4,273	--	--	54	13	138		138		116	180	--	1.8	--	573	.78	6,610	188	76	61	1,020	7.5
June 11-15	1,300	--	--	92	29	289		208		235	395	--	4.9	--	1,180	1.60	4,140	348	178	64	1,950	7.9
June 16-20	951	--	--	104	34	351		213		269	500	--	4.2	--	1,400	1.90	3,580	400	225	66	2,350	7.8
June 21-22	1,145	--	--	83	29	285		196		225	388	--	5.6	--	1,140	1.55	3,520	326	166	66	1,840	8.0
June 23-30	1,705	--	--	98	35	398		194		268	575	--	5.7	--	1,500	2.04	2,860	388	230	69	2,540	7.9
July 1-4, 6-10	589	--	--	88	31	377		176		237	550	--	4.4	--	1,400	1.90	2,230	350	208	70	2,460	7.5
July 5	664	--	--	80	24	280		185		205	380	--	5.6	--	1,080	1.47	1,940	268	146	67	1,860	8.4
July 11-20	566	10	.00	85	31	368	8.2	171		228	590	.5	1.7	.33	1,390	1.89	2,120	340	200	70	2,480	7.1
July 21-31	490	11	.00	76	30	414	8.6	150		225	610	.5	3.3	.34	1,490	2.03	1,970	313	190	74	2,620	7.0

a Includes equivalent of 5 parts per million of carbonate (CO<sub>3</sub>).b Includes equivalent of 5 parts per million of carbonate (CO<sub>3</sub>).

Aug. 1, 10, 1952 ..	496	--	--	69	28	334	151	200	480	--	5.9	--	1,210	1.65	1,620	287	164	72	2,130	7.4
Aug. 2-8 .....	420	--	--	76	33	457	151	216	685	--	6.4	--	1,580	2.15	1,790	325	202	75	2,770	7.4
Aug. 9 .....	707	--	--	64	21	236	156	156	330	--	4.8	--	900	1.22	1,720	246	118	68	1,900	8.0
Aug. 11-12 .....	1,415	--	--	50	15	168	160	84	235	--	2.6	--	657	.89	2,510	186	56	66	1,180	8.0
Aug. 13, 15-16 .....	923	--	--	62	17	211	171	116	288	--	3.6	--	827	1.12	2,060	224	84	67	1,450	8.0
Aug. 14, 17-20 .....	727	--	--	78	21	310	184	165	445	--	4.3	--	1,150	1.56	2,260	281	130	71	2,010	7.9
Aug. 21-28, 30-31 ..	474	--	--	84	27	348	193	181	515	--	4.8	--	1,300	1.77	1,660	320	162	70	2,240	7.6
Avg. 29 .....	520	--	--	82	22	175	c 202	147	240	--	.22	--	842	1.15	1,180	265	130	56	1,390	8.4
Sept. 1-10 .....	318	14	.00	92	31	386	8.2	184	590	.5	3.7	.40	1,410	1.92	1,210	357	190	70	2,470	7.8
Sept. 11-20 .....	253	10	.00	106	31	391	8.4	177	585	.5	5.6	.39	1,490	2.03	1,020	392	196	68	2,570	7.9
Sept. 21-30 .....	237	8.4	.00	108	30	395	7.6	174	595	.3	7.3	.27	1,500	2.04	960	593	194	68	2,560	7.7
Weighted average ..	1,907	--	--	100	28	243	234	242	316	--	5.3	--	1,060	1.48	5,610	364	173	59	1,790	--

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

## LOWER MISSISSIPPI RIVER BASIN

## ARKANSAS RIVER BASIN--Continued

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

Temperature (° F) of water, water year October 1951 to September 1952

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

## 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 Grayhorse Creek.

Drainage Area, 34,227 square miles.

RECORDS AVAILABLE.--Chemical analyses: January 1950 to September 1952.

Water temperatures: January 1950 to September 1952.

EXTREMES: 1951-52 Dissolved solids: Maximum, 2,000 ppm Aug. 11; minimum, 309 ppm June 7.

Hardness: Maximum, 505 ppm Jan. 21-31; minimum, 141 ppm June 7.

Specific conductance: Maximum daily, 3,420 microhms Aug. 11; minimum daily, 492 microhms June 7.

Water temperatures: Maximum, 92°F July 24, 26-28, 31, Aug. 1, 6, 16-17; minimum, freezing point on several days during December and January.

EXTREMES: January 1950 to September 1952.--Dissolved solids: Maximum, 2,530 ppm Jan. 5, 1951; minimum, 208 ppm July 15-17, 1951.

Hardness: Maximum, 582 ppm Jan. 5, 1951; minimum, 90 ppm July 15-17, 1951.

Specific conductance: Maximum daily, 4,070 microhms Jan. 5, 1951; minimum daily, 319 microhms July 16, 1951.

Water temperatures: Maximum, 93°F Sept. 12, 1951; 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 1951 to September 1952 given in Water-Supply Paper 1241.

Chemical analyses, in parts per million, water year October 1951 to September 1952

Date of collection	Mean discharge (cfs)	Temperature (°F)	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 (microhms at 25°C)	pH
															Parts per million	Tons per foot	Tons per day	Calcium, magnesium	Non-carbonate			
Oct. 1-3, 10, 1951...	7,338	--	--	--	79	20	142		191	131	208	--	2.2	--	712	0.97	14,110	279	122	53	1,190	8.0
Oct. 4-9.....	5,562	--	--	--	96	26	201		223	179	292	--	1.4	--	922	1.25	13,950	346	164	58	1,580	7.7
Oct. 11-13.....	7,127	--	--	--	67	17	163		176	122	225	--	2.9	--	699	.95	13,450	237	93	60	1,190	7.5
Oct. 14-20.....	5,127	--	--	--	84	23	224		234	161	305	--	3.3	--	984	1.30	13,210	304	112	62	1,620	7.9
Oct. 21-31.....	4,359	16	0.00	109	109	27	233	5.6	250	177	350	0.1	2.5	0.07	1,070	1.46	12,590	383	178	56	1,790	7.9
Nov. 1-5.....	6,220	--	--	--	98	26	187		228	157	288	--	2.9	--	900	1.22	15,110	352	164	54	1,540	7.9
Nov. 6-10.....	5,284	--	--	--	111	31	230		251	187	355	--	4.1	--	1,050	1.43	14,980	404	199	55	1,820	7.3
Nov. 11-20.....	7,490	16	--	00	99	25	191	5.2	232	174	278	.3	3.5	.06	915	1.24	18,500	350	180	54	1,530	8.1
Nov. 21-25.....	5,196	--	--	--	115	28	244		272	229	332	--	3.8	--	1,100	1.50	15,430	402	178	57	1,830	8.2
Nov. 26-30.....	7,336	--	--	--	92	23	186		224	176	255	--	4.0	--	855	1.16	16,950	324	140	73	1,470	7.8
Dec. 1-10.....	4,813	18	--	00	124	33	248	4.4	284	241	342	.3	3.3	.11	1,190	1.62	15,460	445	212	54	1,920	8.2
Dec. 11-20.....	3,950	17	--	00	131	36	268	6.0	298	257	375	.3	3.8	.04	1,260	1.71	13,440	475	231	55	2,070	8.1
Dec. 21-31.....	3,076	--	--	--	133	34	306		319	236	445	--	4.2	--	1,310	1.80	10,960	472	210	99	2,110	8.0
Jan. 1-10, 1952.....	3,676	19	--	00	129	34	279	5.0	290	230	405	.3	6.0	.22	1,300	1.77	12,900	462	224	56	2,110	8.0
Jan. 11-20.....	4,431	--	--	--	126	35	296		270	253	435	--	5.9	--	1,280	1.74	15,310	458	238	58	2,180	8.1
Jan. 21-31.....	3,794	18	--	00	138	39	306	5.3	279	319	410	.3	4.3	.34	1,440	1.96	14,710	505	276	57	2,270	7.9
Feb. 1-10.....	3,432	18	--	00	132	38	291	5.2	274	303	390	.3	4.4	.18	1,370	1.86	12,690	486	261	56	2,180	8.1
Feb. 11-20.....	3,002	--	--	--	123	43	300		268	309	420	--	4.4	--	1,400	1.90	11,350	494	264	57	2,260	7.8
Feb. 21-29.....	2,926	14	--	00	132	38	322	5.3	268	273	460	.3	2.3	.22	1,440	1.96	11,380	486	266	59	2,340	7.9

## ARKANSAS RIVER BASIN--Continued

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

Chemical analyses, in parts per million, water year October 1951 to September 1952--Continued

Date of collection	Mean discharge (cfs)	Temperature (°F)	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 carbonate	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium magnesium	Non-carbonate			
Mar. 1-9, 1952.....	4,333	--	--	--	111	35	273		241	200	430	--	4.4	--	1,240	1.69	14,510	421	224	58	2,080	7.7
Mar. 10.....	16,000	--	--	--	72	22	148		171	120	228	--	5.9	--	732	1.00	31,620	270	130	54	1,240	7.5
Mar. 11-14.....	19,920	--	--	--	58	16	88		140	79	158	--	5.2	--	547	1.01	29,420	210	98	50	1,919	7.5
Mar. 15.....	9,700	--	--	--	70	24	143		162	128	222	--	5.9	--	742	1.01	19,430	273	140	53	1,240	7.5
Mar. 16-20.....	7,636	--	--	--	92	28	210		212	173	315	--	5.2	--	1,000	1.36	20,620	344	171	57	1,670	7.5
Mar. 21-31.....	5,500	16	--	0.00	109	29	253	5.0	263	215	362	0.3	5.4	0.23	1,150	1.56	17,080	391	176	58	1,920	8.2
Apr. 1-10.....	4,387	14	--	--	110	32	275	5.2	240	237	395	.3	1.9	.00	1,220	1.66	14,450	406	210	59	2,040	8.1
Apr. 11-20.....	4,683	--	--	--	98	29	259		227	202	375	--	3.2	--	1,160	1.58	14,670	364	178	61	1,930	8.2
Apr. 21-23, 28-30.....	10,320	--	--	--	100	29	281		196	212	422	--	2.8	--	1,210	1.65	33,720	368	208	62	2,030	7.6
Apr. 24-27.....	17,050	--	--	--	78	24	219		155	175	325	--	2.9	--	968	1.32	44,560	293	166	62	1,620	7.5
May 1-10.....	6,770	16	--	--	118	32	272	6.0	218	281	395	.5	1.9	.17	1,290	1.75	23,580	426	248	58	2,070	8.1
May 11-20.....	4,235	15	--	--	116	33	287	6.0	215	287	390	.5	1.0	.20	1,280	1.74	14,640	435	249	57	6,050	8.1
May 21-22, 24, 29-31.....	4,270	--	--	--	104	33	188		188	274	378	--	3.5	--	1,180	1.60	13,600	395	241	59	1,960	8.0
May 23, 25-28.....	5,974	--	--	--	80	25	164		157	168	280	--	5.0	--	863	1.17	13,920	302	174	57	1,460	8.0
June 1-4.....	4,052	--	--	--	108	30	257		178	263	375	--	3.0	--	1,160	1.58	12,690	393	247	56	1,940	8.1
June 5-6.....	13,960	--	--	--	72	18	158		138	132	238	--	1.2	--	716	.97	26,990	294	140	57	1,240	7.8
June 7.....	20,100	--	--	--	40	10	44		94	47	76	--	3.6	--	309	.42	16,770	141	64	40	482	7.8
June 8-10.....	10,430	--	--	--	54	14	110		127	114	146	--	2.8	--	512	.70	14,420	182	68	55	897	7.7
June 11-12.....	4,970	--	--	--	80	22	182		162	168	285	--	4.2	--	948	1.13	10,460	280	157	58	1,420	7.9
June 13-20.....	2,652	--	--	--	104	31	285		216	231	413	--	4.2	--	1,260	1.70	6,950	367	208	62	2,040	8.1
June 21-30.....	1,690	15	--	.05	108	35	320	7.4	219	225	495	.4	.5	.31	1,350	1.84	6,160	405	235	63	2,330	8.1
July 1-10.....	1,482	11	--	.00	92	31	329	7.3	179	212	500	.4	.5	.27	1,320	1.80	5,290	367	210	66	2,290	7.8
July 11-20.....	1,305	13	--	.00	98	31	348	6.8	182	221	595	.5	1.1	.33	1,410	1.92	4,970	372	223	67	2,400	7.6
July 21-31.....	935	--	--	--	79	36	398		115	221	695	--	4.8	--	1,530	2.08	3,860	345	251	71	2,610	7.2
Aug. 1-7, 8-10.....	904	--	--	--	78	33	414		114	220	640	--	5.1	--	1,480	2.01	3,610	330	238	73	2,590	7.2
Aug. 8.....	1,120	--	--	--	75	28	301		121	161	485	--	5.7	--	1,200	1.63	3,830	302	202	68	2,110	8.3
Aug. 9.....	1,300	--	--	--	120	38	536		134	212	912	--	5.0	--	2,000	2.72	7,020	456	346	72	3,420	8.2
Aug. 10.....	1,610	--	--	--	107	37	473		146	253	750	--	7.8	--	8,000	2.45	7,320	419	300	71	2,980	8.2
Aug. 11.....	1,560	--	--	--	94	35	394		133	223	630	--	5.4	--	1,520	2.07	6,400	378	270	69	2,550	8.2
Aug. 12-20.....	1,393	--	--	--	68	22	263		161	156	378	--	4.5	--	993	1.35	3,730	260	128	69	1,750	7.8

a Includes equivalent of 2 parts per million of carbonate (CO<sub>3</sub>).



Aug. 21-22, 29-31, 1952.....	1,083	--	--	80	31	347	146	176	550	--	4.0	--	1,340	1.82	3,930	327	208	70	2,280	7.8
Aug. 23-26 .....	986	--	--	82	31	417	144	186	555	--	3.8	--	1,320	2.07	4,050	332	214	73	2,510	7.7
Aug. 27-28 .....	1,045	--	--	90	37	528	136	243	520	--	3.8	--	1,640	2.50	5,190	376	265	75	3,160	8.0
Sept. 1-4 .....	847	--	--	76	30	330	156	167	515	--	2.5	--	1,270	1.73	2,800	313	185	70	2,180	7.5
Sept. 5-10 .....	696	--	--	87	35	426	139	207	665	--	2.2	--	1,560	2.12	2,830	341	230	72	2,660	7.5
Sept. 11-20 .....	594	--	--	92	36	440	167	207	685	0.5	0.41	--	1,560	2.13	2,830	341	230	72	2,660	7.5
Sept. 21-30 .....	497	8.8	.05	100	36	454	166	198	700	.3	1.8	.33	1,680	2.28	2,250	398	245	71	2,470	7.6
Weighted average .	4,267	--	--	101	229	240	219	204	350	--	3.5	--	1,080	1.47	12,440	371	192	58	1,800	--

## LOWER MISSISSIPPI RIVER BASIN

## ARKANSAS RIVER BASIN--Continued

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

Temperature (°F) of water, water year October 1951 to September 1952

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	74	42	53	35	50	43	65	70	74	83	92	72
2	71	42	58	33	47	48	64	74	78	89	84	77
3	77	45	54	32	38	40	55	78	82	90	85	79
4	78	41	58	34	41	42	53	79	80	88	84	80
5	70	35	50	33	48	45	58	79	75	91	89	81
6	63	38	50	33	48	44	60	80	75	89	92	83
7	68	40	49	33	51	50	65	77	77	80	90	81
8	65	40	43	42	50	52	68	79	84	82	90	84
9	68	49	41	39	51	42	53	71	85	85	91	81
10	65	51	40	39	50	45	55	67	81	80	88	81
11	65	56	42	39	50	49	55	67	86	85	88	80
12	61	57	44	48	53	49	52	68	86	85	80	81
13	65	55	42	50	52	48	46	67	83	80	87	82
14	65	53	36	53	49	46	56	74	82	80	88	82
15	69	42	33	53	43	49	60	75	86	80	85	81
16	68	45	33	55	45	50	62	71	85	84	92	83
17	64	42	33	53	48	47	62	65	86	77	92	73
18	61	48	32	50	54	47	63	65	89	82	90	80
19	58	49	32	55	53	55	65	66	88	87	88	71
20	64	43	32	42	51	57	61	73	88	87	90	68
21	66	49	32	50	45	48	68	75	82	87	89	69
22	58	45	35	42	47	43	63	79	85	87	82	71
23	58	45	32	39	44	49	60	70	81	90	78	73
24	59	43	32	41	40	47	59	74	86	92	82	75
25	60	45	34	50	43	51	62	74	87	90	81	78
26	62	43	33	45	47	49	65	78	88	92	84	80
27	54	45	35	46	53	58	63	75	88	92	80	79
28	54	48	38	45	55	58	70	74	90	92	83	81
29	57	50	39	42	56	51	70	75	90	90	86	78
30	58	50	45	43	--	60	73	77	90	85	83	78
31	42	--	52	48	--	68	--	77	--	92	83	--
Average	63	46	41	43	48	49	61	73	84	86	86	78

ARKANSAS RIVER BASIN--Continued  
SKELETON CREEK NEAR LOVELL, OKLA.

LOCATION.--At gaging station at bridge on State Highway 74, 2 miles upstream from Otter Creek, and 2 3/4 miles east of Lovell, Logan County.  
DRAINAGE AREA, 410 square miles.  
RECORDS AVAILABLE.--Chemical analyses: October 1950 to September 1952.  
EXTREMES: Maximum, 1740 ppm Aug. 1-6; minimum, 202 ppm Aug. 9.  
SPECIFIC CONDUCTANCE: Maximum, 84 ppm Aug. 31; minimum, 16 ppm Aug. 31.  
WATER TEMPERATURES: Maximum, 91°F. July 25, minimum, 62°F. Aug. 2-4; minimum, 229 micromhos Aug. 9.  
EXTREMES: 1950-52.--Dissolved solids: Maximum, 2100 ppm Dec. 7-8, 1950; minimum, 122 ppm Sept. 13, 1951.  
HARDNESS: Maximum, 670 ppm Dec. 7-8, 1950; minimum, 48 ppm July 21, 1951.  
SPECIFIC CONDUCTANCE: Maximum daily, 3,610 micromhos Dec. 7, 1950; minimum daily, 178 micromhos July 2, 1951.  
WATER TEMPERATURES: Maximum, 91°F. July 25, 1952; minimum, freezing point on several 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 1951 to September 1952 given in Water-Supply Paper 1241.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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)	Ni- trate (NO <sub>3</sub> )	Phos- phate (PO <sub>4</sub> )	Bo- ron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Per- cent ad- sorp- tion	Specific conduct- ance (micro- mhos at 25°C)	
															Parts per mil- lion	Tons per acre- foot	Tons per day	Calcium, mag- nesium	Non-carbon- ate			
Oct. 1-5,7-10,1951...	7.51	--	--	88	33	206	354	354	0	111	280	2.7	--	--	935	1.27	19	355	65	56	1,610	8.0
Oct. 6, 1951.....	42.0	--	--	36	13	70	330	0	0	44	198	6.5	--	--	342	.47	39	144	37	51	622	7.4
Oct. 11,13.....	4.00	--	--	91	24	161	283	0	0	91	180	7.3	--	--	702	.95	7.6	250	18	58	1,190	8.2
Oct. 12, 14-15.....	4.37	--	--	64	36	248	436	3	164	275	2.7	5.7	--	--	1,060	1.44	13	382	20	59	1,740	8.3
Oct. 16-18, 20.....	10.4	--	--	68	25	178	315	0	109	198	5.7	15	--	--	766	1.04	22	272	11	59	1,300	7.9
Oct. 19.....	6.10	--	--	45	19	129	235	0	95	119	15	15	--	--	558	.76	9.2	180	0	60	932	8.0
Oct. 21-22.....	3.75	--	--	46	17	131	177	0	71	177	4.1	--	--	--	942	1.28	26	334	44	53	1,610	7.9
Oct. 23-27, 30.....	10.9	--	--	83	31	186	354	0	142	262	4.4	--	--	--	774	1.05	52	280	34	59	1,330	7.6
Oct. 28-29, 31.....	25.1	--	--	68	27	182	300	0	112	220	5.3	--	--	--	798	1.09	58	264	37	61	1,330	8.1
Nov. 1-2, 8-9.....	26.7	--	--	68	23	187	277	0	112	228	6.7	--	--	--	708	1.09	52	264	37	61	1,330	8.1
Nov. 3-7, 10.....	14.7	--	--	44	18	150	219	0	92	162	6.3	--	--	--	615	.84	24	184	4	64	1,030	8.0
Nov. 11, 17-20.....	9.60	--	--	84	28	244	388	0	154	262	8.2	--	--	--	1,020	1.39	26	324	6	62	1,670	7.9
Nov. 12-16.....	12.8	--	--	72	24	193	314	0	112	225	7.5	--	--	--	788	1.07	27	278	20	60	1,430	8.0
Nov. 21-23.....	7.07	--	--	69	22	186	327	0	110	198	6.4	--	--	--	768	1.04	15	262	0	61	1,320	8.2
Nov. 24-25.....	18.4	--	--	79	26	217	345	0	130	252	3.6	--	--	--	878	1.19	44	304	22	61	1,520	8.0
Nov. 26-30.....	78.4	--	--	32	11	74	142	0	52	79	4.4	--	--	--	339	.46	72	135	8	56	617	7.8
Dec. 1.....	13.0	--	--	40	18	92	176	0	69	106	11	--	--	--	480	.65	17	174	30	54	738	8.0
Dec. 2, 7.....	10.3	--	--	76	30	178	323	0	123	215	5.5	--	--	--	823	1.12	23	313	48	55	1,390	7.7
Dec. 3-6, 8.....	10.2	--	--	64	25	148	276	0	103	175	5.4	--	--	--	862	.93	19	282	36	58	1,180	7.6
Dec. 9-10.....	8.80	--	--	95	37	243	414	0	173	275	13	--	--	--	1,070	1.46	25	389	50	58	1,660	7.5
Dec. 11-20.....	8.87	--	--	100	39	254	423	0	189	280	12	--	--	--	1,220	1.52	27	410	64	57	1,680	8.0
Dec. 21-31.....	10.3	21	0.00	105	41	299	467	0	207	325	18	7.5	--	0.13	1,280	1.74	36	430	48	59	2,070	7.7

## LOWER MISSISSIPPI RIVER BASIN

## ARKANSAS RIVER BASIN--Continued

## SKELETON CREEK NEAR LOVELL, OKLA.--Continued

Chemical analyses, in parts per million, water year October 1951 to September 1952--Continued

Date of collection	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)	Ni- trate (NO <sub>3</sub> )	Phos- phate (PO <sub>4</sub> )	Bo- ron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Per- cent so- lids	So- lids ad- sorp- tion ratio	Specific conduc- tance (micro- mhos at 25°C)
														Parts per mil- lion	Tons per acre- foot	Tons per acre- day	Calcium	Non- mag- nesium			
Jan. 1-10, 1952.....	13.9	0.05	100	38	282	8.9	419	0	194	322	19	6.5	0.44	1,220	1.66	46	406	62	60	2,010	7.5
Jan. 11-20.....	13.9	0.05	88	37	248	8.4	365	0	164	290	17	5.5	0.43	1,080	1.47	41	374	75	59	1,800	7.6
Jan. 21-31.....	9.58	0.05	102	40	279	8.4	451	0	184	315	8.7	5.5	0.43	1,200	1.63	31	419	50	59	1,980	7.8
Feb. 1-10.....	9.38	0.05	104	40	284	8.9	434	0	197	350	11	6.5	0.53	1,220	1.66	31	424	68	60	2,100	7.6
Feb. 11-20.....	9.05	0.05	106	41	297	8.9	449	0	189	340	12	6.5	0.53	1,220	1.63	31	433	65	59	2,070	7.9
Feb. 21-23, 26.....	10.0	0.05	104	43	305	8.4	451	0	189	372	11	6.5	0.53	1,310	1.78	35	436	67	60	2,180	7.8
Feb. 24-25, 27-29...	18.2	0.05	98	36	222	8.4	392	0	176	255	14	6.5	0.53	1,050	1.43	52	392	72	55	1,720	7.7
Mar. 1-8.....	19.4	0.05	78	34	225	8.4	366	0	172	235	17	6.5	0.53	964	1.31	50	334	34	59	1,620	7.7
Mar. 9.....	13.0	0.05	62	26	141	8.4	242	14	130	146	6.2	6.2	0.44	644	.88	23	202	40	54	1,100	8.5
Mar. 10.....	142	0.05	33	13	98	8.4	172	0	89	78	6.2	6.2	0.44	402	.58	24	136	10	61	687	8.0
Mar. 11.....	276	0.05	28	11	46	8.4	108	0	46	70	7.7	7.7	0.44	282	.40	218	136	10	53	592	7.2
Mar. 13-14.....	46.5	0.05	33	13	69	8.4	147	0	58	70	5.7	5.7	0.44	592	.81	35	240	30	53	1,030	7.6
Mar. 15-16.....	22.2	0.05	77	24	125	8.4	230	0	130	183	7.8	7.8	0.44	750	1.02	42	298	40	55	1,300	7.8
Mar. 19-20.....	21.7	0.05	66	28	155	8.4	235	0	130	183	7.8	7.8	0.44	713	.97	34	280	36	54	1,260	7.7
Mar. 21-22, 24.....	13.7	0.05	66	28	155	8.4	235	0	130	183	7.8	7.8	0.44	713	.97	34	280	36	54	1,260	7.7
Mar. 23, 25-31.....	13.9	0.05	91	39	238	8.4	422	0	176	260	11	6.5	0.53	1,030	1.40	39	338	42	57	1,620	8.0
Apr. 1-10.....	11.6	0.05	100	43	298	8.2	461	0	207	332	5.2	3.5	.23	1,270	1.73	40	426	48	60	2,080	8.0
Apr. 11-20.....	13.4	0.05	99	42	303	8.6	452	0	265	345	4.5	3.5	.23	1,280	1.74	46	420	49	60	2,120	8.0
Apr. 21-23.....	32.0	0.05	83	42	269	8.6	231	0	199	300	7.8	7.8	0.44	1,150	1.56	99	404	52	51	1,920	8.1
Apr. 23-25.....	119	0.05	35	14	87	8.6	152	0	83	85	6.5	6.5	0.44	406	.55	130	148	23	56	699	7.5
Apr. 26-28.....	19.7	0.05	47	19	116	8.6	203	0	86	132	6.3	6.3	0.44	530	.72	23	195	28	56	927	7.6
Apr. 29-30.....	13.5	0.05	56	23	140	8.6	253	0	98	158	7.8	7.8	0.44	630	.86	23	234	26	57	1,100	8.1
May 1.....	14.0	0.05	65	28	164	8.6	278	10	112	190	5.7	5.7	0.44	742	1.01	28	277	32	56	1,220	8.5
May 2-10.....	12.9	0.05	88	36	256	8.6	408	0	163	295	3.7	3.7	0.44	1,090	1.48	38	368	33	60	1,830	8.1
May 11-16.....	7.32	0.05	90	37	288	8.6	419	0	154	350	5.7	5.7	0.44	1,170	1.59	22	376	33	62	1,990	8.2
May 17-19.....	108	0.05	32	12	89	8.6	148	0	67	92	3.1	3.1	0.44	388	.53	113	130	8	60	686	7.8
May 20.....	26.0	0.05	46	18	135	8.6	211	0	95	144	8.4	8.4	0.44	576	.78	40	189	16	61	564	8.1
May 21-25.....	18.2	0.05	48	19	120	8.6	185	0	77	154	7.3	7.3	0.44	563	.77	28	198	43	57	575	7.8
May 26-29.....	9.02	0.05	64	26	175	8.6	283	0	94	220	6.3	6.3	0.44	764	1.04	18	266	34	59	1,330	8.1
May 30-31.....	5.70	0.05	79	30	230	8.6	346	0	125	285	7.1	7.1	0.44	968	1.32	15	320	37	61	1,960	8.1
June 1-3.....	34.0	0.05	54	21	166	8.6	252	0	103	188	5.0	5.0	0.44	678	.82	62	222	15	62	1,190	7.5
June 4-6.....	119	0.05	27	12	61	8.6	140	0	60	50	1.9	1.9	0.44	300	.41	96	117	2	53	514	7.3
June 7-8.....	16.0	0.05	37	15	89	8.6	183	0	73	85	2.4	2.4	0.44	412	.56	18	154	4	56	719	7.6

## ARKANSAS RIVER BASIN

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	4.95	--	63	28	214	335	0	123	235	3.6	--	--	989	1.18	12	272	0	63	1,490
June 9-10, 1952 .....	2.82	21	.00	78	27	240	348	7	117	288	3.0	5.5	982	1.34	7.5	304	8	62	1,850
June 11-20 .....	1.96	--	--	74	31	330	346	11	82	305	5.7	--	946	1.29	5.0	312	10	62	1,830
June 21-25 .....	1.38	--	--	90	40	330	415	12	114	442	4.3	--	1,280	1.74	4.7	389	29	65	2,210
June 26-30 .....																			8.4
July 1-10 .....	1.02	19	.00	106	38	335	441	10	121	460	2.5	3.0	1,330	1.81	3.7	420	42	63	2,310
July 11, 14 .....	1.50	--	--	67	26	218	285	4	86	295	3.5	--	1,868	1.18	3.5	274	34	63	1,520
July 12-13, 15-20 .....	1.72	--	--	109	44	412	473	16	151	550	3.6	--	1,540	2.09	7.2	453	39	66	2,640
July 21-31 .....	.84	12	.05	90	44	468	453	17	145	605	2.8	1.8	1,660	2.26	3.8	406	6	71	2,910
Aug. 1-6 .....	.22	--	--	112	47	493	507	29	156	650	2.4	--	1,740	2.37	1.0	473	9	69	3,020
Aug. 7, 10 .....	148	--	--	27	9.5	48	118	0	26	60	4.5	--	244	.33	98	106	10	50	423
Aug. 8 .....	151	--	--	72	21	297	104	0	45	550	6.5	--	1,160	1.58	473	286	181	71	2,010
Aug. 9 .....	511	--	--	22	7.2	20	104	0	20	14	3.3	--	202	.27	279	94	0	34	280
Aug. 11 .....	28.0	--	--	22	8.2	39	104	1	29	35	7.8	--	233	.32	16	88	2	49	339
Aug. 12-20 .....	5.24	--	--	32	12	56	150	0	33	64	4.0	--	309	.42	4.4	130	6	48	517
Aug. 21-23, 25, 28 .....	18.8	--	--	30	11	56	138	0	32	64	5.2	--	318	.43	16	120	7	50	505
Aug. 24, 27 .....	47.9	--	--	25	7.7	36	118	0	29	30	4.9	--	226	.31	29	94	0	46	343
Aug. 28, 29-31 .....	14.3	--	--	53	19	137	223	10	91	150	3.9	--	604	.82	23	210	11	59	992
Sept. 1-2 .....	3.00	--	--	23	10	30	113	0	25	29	4.3	--	236	.32	1.9	98	6	40	318
Sept. 3-10 .....	1.14	--	--	57	21	159	278	0	94	175	2.6	--	672	.91	2.1	226	0	60	1,120
Sept. 11-15, 18 .....	.87	--	--	64	23	163	282	5	97	188	2.3	--	714	.97	1.7	254	14	58	1,210
Sept. 16-17, 19 .....	2.10	--	--	76	31	210	320	0	126	268	1.6	--	908	1.23	5.1	317	55	59	1,550
Sept. 20 .....	6.60	--	--	81	32	289	248	5	95	460	2.3	--	1,180	1.96	2.0	334	122	65	1,890
Sept. 21-24, 26-27 .....	1.10	--	--	79	31	231	352	8	126	278	1.3	--	1,36	1.52	2.9	344	52	61	1,940
Sept. 25, 29-30 .....	1.10	--	--	85	32	295	337	0	135	380	1.1	--	1,761	1.03	3.4	344	51	57	1,940
Sept. 25 .....	.30	--	--	69	25	157	281	9	107	193	2.2	--	761	1.03	.6	275	30	57	1,260
Weighted average ..	13.2	--	--	54	21	143	a236	--	97	164	6.5	--	639	0.87	31	221	28	58	1,070

a Includes equivalent of individual carbonate values shown above.

## ARKANSAS RIVER BASIN--Continued

## SKELETON CREEK NEAR LOVELL, OKLA.--Continued

Temperature (°F) of water, water year October 1951 to September 1952

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	68	43	46	35	48	41	63	70	68	82	89	86
2	69	38	42	34	48	38	62	70	81	82	89	83
3	70	41	47	33	48	45	62	70	79	83	89	77
4	68	37	--	33	45	46	65	72	72	84	89	74
5	63	40	48	32	45	44	52	73	75	85	85	78
6	50	38	48	32	44	46	65	73	78	85	85	78
7	54	40	46	34	46	46	65	75	80	--	78	72
8	58	42	41	38	46	46	65	75	80	80	78	72
9	58	45	36	38	47	46	50	74	79	79	78	81
10	51	48	38	35	51	46	54	72	85	80	80	72
11	54	49	40	40	50	48	54	70	80	76	82	72
12	57	55	--	40	48	50	54	68	86	78	82	72
13	59	55	41	43	50	49	53	67	86	82	82	76
14	65	48	40	47	--	47	56	74	82	76	88	72
15	--	48	37	48	46	48	54	--	83	78	83	78
16	--	39	35	50	46	48	62	71	82	80	83	72
17	62	38	35	50	45	48	62	62	85	87	--	73
18	56	39	32	47	46	50	58	62	82	87	85	76
19	61	42	--	54	48	48	64	62	83	86	81	68
20	62	44	32	53	46	52	61	64	88	87	81	71
21	62	42	32	50	46	50	62	65	82	87	81	72
22	57	--	32	52	46	49	64	72	83	87	81	62
23	56	39	32	44	46	42	59	68	83	87	81	60
24	56	42	32	42	45	42	57	71	86	88	75	71
25	57	44	32	44	46	42	58	74	82	91	75	71
26	57	42	34	47	42	41	66	72	82	89	75	71
27	57	42	41	39	46	42	62	72	82	84	80	69
28	55	42	--	42	46	61	70	71	82	85	76	70
29	--	48	--	40	44	62	70	74	82	--	76	70
30	56	48	41	35	--	60	70	75	82	89	80	68
31	50	--	42	42	--	63	--	81	--	89	86	--
Average	59	43	39	42	46	48	61	71	81	84	82	73

# ARKANSAS RIVER BASIN--Continued

## CIMARRON RIVER AT MANNFORD, OKLA.

LOCATION.-- At county highway bridge  $\frac{1}{4}$  miles downstream from House Creek, and half a mile north of Mannford, Creek County, 18 miles upstream from mouth, DRAINAGE AREA.-- 18,822 square miles.

RECORDS AVAILABLE.-- Chemical analyses: October 1949 to September 1952.

Water temperatures: October 1949 to September 1952

EXTREMES, 1951-52.-- Dissolved solids: Maximum, 22,400 ppm Sept. 20; minimum, 858 ppm May 24.

Hardness: Maximum, 4,030 ppm Sept. 20; minimum, 206 ppm May 24.

Specific conductance: Maximum daily, 34,230 microhms Sept. 20; minimum daily, 1,480 microhms Mar. 12.

Water temperatures: Maximum, 90°F. July 23; minimum, freezing point on several days during November, December, and January.

EXTREMES 1949-52: Maximum, 90°F. July 23; minimum, 32°F. Sept. 20, 1951; 30°F. Sept. 20, 1952; minimum, 568 ppm Sept. 10, 1951.

Hardness: Maximum, 4,030 ppm Sept. 20, 1952; minimum, 206 ppm May 24, 1951.

Specific conductance: Maximum daily, 34,200 microhms Sept. 20, 1952; minimum daily, 964 microhms Sept. 10, 1951.

Water temperatures: Maximum, 90°F. July 23, 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 1951 to September 1952 given in Water-Supply Paper 1241.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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. bicarbonate (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 adsorption ratio	Specific conductance (microhms at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate		
Oct. 1-5, 1951.....	--	--	--	257	71	2,210	137	164	0	307	3,750	--	4.2	--	6,980	9.08	933	755	84	10,300	7.5
Oct. 6-10.....	--	--	--	129	36	988	134	167	0	169	1,650	--	5.1	--	3,080	4.19	470	360	82	5,310	7.5
Oct. 11-13.....	--	--	--	196	62	1,960	177	0	229	2,620	2,820	--	4.2	--	5,150	7.00	744	599	83	8,300	7.5
Oct. 14-15, 19-20.....	--	--	--	263	70	2,170	164	0	312	3,670	3,670	--	3.6	--	6,560	8.95	944	793	83	10,700	7.4
Oct. 16, 18.....	--	--	--	174	45	1,180	156	0	244	1,980	1,980	--	3.3	--	3,860	5.25	619	491	81	6,640	7.3
Oct. 17.....	--	--	--	92	24	525	106	0	121	890	--	--	2.7	--	1,820	2.48	338	241	78	3,180	7.5
Oct. 21-26.....	--	--	--	311	89	2,330	188	0	309	4,060	--	--	3.2	--	7,200	9.75	1,140	988	82	11,400	7.5
Oct. 27.....	--	--	--	70	19	270	119	0	54	485	--	--	2.3	--	1,260	1.71	252	155	70	1,860	7.7
Oct. 28-29.....	--	--	--	191	60	1,370	154	0	230	2,360	--	--	5.0	--	4,480	6.09	723	597	80	7,440	7.9
Oct. 30-31.....	--	--	--	138	44	943	137	0	142	1,640	--	--	4.1	--	3,040	4.13	526	414	80	5,210	7.8
Nov. 1-2.....	--	--	--	108	26	619	142	0	103	1,060	--	--	3.7	--	1,990	2.71	376	280	78	3,650	7.7
Nov. 3-4.....	--	--	--	130	34	940	154	0	184	2,550	--	--	5.0	--	2,920	3.97	464	338	81	7,990	7.8
Nov. 5-10.....	--	--	--	196	51	1,450	178	0	283	2,420	--	--	6.1	--	4,560	6.19	686	352	82	7,500	7.6
Nov. 11, 18-20.....	--	--	--	232	66	2,190	233	0	327	3,610	--	--	4.5	--	6,560	8.91	951	703	82	10,500	7.6
Nov. 12.....	--	--	--	65	14	311	113	0	66	520	--	--	3.2	--	2,620	3.53	423	307	75	2,000	7.7
Nov. 13-15.....	--	--	--	114	35	1,620	148	0	133	1,320	--	--	4.9	--	2,820	6.66	718	558	83	5,030	7.6
Nov. 16-17.....	--	--	--	298	84	1,910	183	0	244	2,460	--	--	5.0	--	6,620	9.00	926	708	84	8,960	7.7
Nov. 21-23, 29.....	--	--	--	229	66	2,140	266	0	224	2,440	--	--	5.0	--	6,620	9.00	926	708	84	10,700	8.1
Nov. 25-28, 30.....	--	--	--	180	50	1,310	210	0	230	2,190	--	--	4.5	--	4,210	5.73	654	482	81	7,060	7.5
Dec. 1-5.....	--	--	--	200	56	1,450	218	0	276	2,460	--	--	4.5	--	4,510	6.13	729	550	81	7,100	7.5
Dec. 6-10.....	--	--	--	278	86	2,180	269	0	381	3,620	--	--	4.8	--	6,720	9.14	1,050	826	82	10,900	7.8
Dec. 11-20.....	15	0.00	0.00	312	86	2,250	16	282	0	383	3,840	0.3	3.2	0.11	7,400	10.06	1,130	853	81	12,100	8.0
Dec. 21-31.....	15	.00	.00	338	94	2,350	18	394	0	368	3,930	.3	4.5	.13	7,730	10.51	1,230	581	80	12,300	8.1

## LOWER MISSISSIPPI RIVER BASIN

ARKANSAS RIVER BASIN--Continued  
 CUMMINS RIVER AT MANNFORD, OKLA.

Chemical analyses, in parts per million, water year October 1951 to September 1952--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)	Pot- as- 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 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- mag- nesium				
Jan. 1-10, 1952	17	0.00	304	88	2,370	17	291	0	387	3,860	0.1	3.8	0.44	7,250	9.86	1,120	882	82	82	12,200	8.2		
			247	70	2,200	17	276	0	348	3,610	--	4.5	--	6,620	9.00	904	678	84	84	10,200	8.0		
			269	80	2,940	17	271	0	454	4,740	--	5.1	--	8,620	11.72	1,000	778	86	86	13,000	7.7		
			.00	83	2,160	17	283	0	351	3,540	1	3.0	.42	6,530	9.29	1,060	823	81	81	11,200	8.1		
Feb. 1-10	12	.00	287	87	2,280	17	243	0	377	3,770	1	2.0	.44	7,360	10.01	1,070	875	82	82	11,900	8.0		
			283	89	2,220	17	233	0	360	3,640	1	1.7	.46	7,210	9.81	1,070	861	82	82	11,700	7.5		
			283	92	2,430	17	237	0	389	4,090	--	2.8	--	7,400	10.06	1,080	890	83	83	12,000	8.0		
			--	164	58	1,300	199	0	218	2,180	--	2.8	--	4,110	5.59	1,648	484	81	81	7,040	7.5		
Mar. 1-7	--	--	185	70	1,440	238	0	268	2,420	--	2.3	--	4,590	6.24	750	554	81	81	7,730	8.0			
			134	49	984	185	0	187	1,650	0	187	1,650	--	3.1	--	3,200	4.35	536	384	90	90	5,330	7.8
			--	34	599	165	0	120	1,010	0	120	1,010	--	2.0	--	1,990	2.71	384	250	77	77	3,500	7.6
			207	79	2,210	244	0	349	3,610	0	61	400	--	2.0	--	6,580	8.95	842	642	85	85	11,000	7.6
Mar. 8-12	--	--	56	17	251	155	0	61	400	--	2.0	--	910	1.24	210	82	72	72	1,630	7.9			
			75	22	335	185	3	82	540	--	3.5	--	1,190	1.62	278	121	72	72	2,150	8.3			
			Mar. 14, 18-19	97	33	707	161	0	151	1,150	--	4.5	--	2,220	3.02	378	246	80	80	3,940	7.9		
			Mar. 15, 20	106	36	933	172	0	173	1,500	--	4.8	--	2,860	3.92	412	272	83	83	5,150	7.5		
Mar. 16-17	--	--	144	53	1,430	204	0	264	2,300	--	4.6	--	4,300	5.85	978	410	84	84	7,350	8.0			
			121	45	978	191	0	190	1,600	--	4.0	--	3,040	4.13	487	330	81	81	5,370	8.0			
			178	62	1,410	256	0	291	2,300	--	3.8	--	4,420	6.01	669	469	81	81	7,950	7.9			
			--	226	76	1,900	263	0	340	3,150	--	3.6	--	5,830	7.93	876	661	83	83	9,570	8.0		
Apr. 1-10	12	.00	215	75	1,740	16	231	0	325	3,000	1	1.4	.72	5,760	7.86	845	656	81	81	9,640	7.8		
			238	89	1,850	254	0	340	3,140	--	2.2	--	6,120	8.32	960	752	81	81	10,100	7.9			
			172	64	1,410	249	0	249	2,380	--	4.9	--	4,600	6.26	692	548	82	82	7,670	7.7			
			106	38	866	177	0	161	1,410	--	3.6	--	2,780	3.78	420	276	82	82	4,850	7.8			
Apr. 21-22, 24	--	--	96	32	560	156	0	97	962	--	3.2	--	1,860	2.53	371	243	77	77	3,250	8.2			
			191	58	1,750	175	0	435	2,780	--	4.8	--	5,530	7.52	715	572	84	84	9,240	7.8			
			138	42	1,200	159	0	345	1,860	--	5.4	--	3,770	5.13	517	396	83	83	6,390	7.7			
			May 1, 6-7	156	49	1,440	179	0	379	2,250	--	4.6	--	4,460	6.07	590	444	84	84	7,420	7.9		
May 2-4, 8-10	--	--	146	44	1,090	190	0	343	1,700	--	5.1	--	3,610	4.91	545	390	81	81	5,920	8.0			
			65	21	535	149	3	163	788	--	6.3	--	1,770	2.41	248	172	82	82	3,050	8.3			
			191	64	1,410	222	0	394	2,280	--	4.3	--	1,590	6.24	740	558	81	81	7,620	8.2			
			May 11-15, 19-20	229	71	1,660	221	0	444	2,720	--	3.9	--	5,660	7.70	864	682	81	81	9,310	8.2		
May 16-18	--	--	161	57	1,260	185	0	367	2,010	--	4.2	--	4,140	5.63	636	484	81	81	6,830	8.2			
			May 21-22, 30-31	96	28	1,525	135	0	149	870	--	5.0	--	1,860	2.53	354	244	76	76	3,220	8.2		
			May 23, 29	86	18	201	129	0	20	365	--	3.8	--	858	1.17	206	100	68	68	1,500	8.1		
			May 24	74	24	414	143	0	118	665	--	5.7	--	1,420	1.93	283	166	76	76	2,550	7.5		



# ARKANSAS RIVER BASIN

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	190	52	1,040	152	0	400	1,700	4.5	3,550	4.83	688	564	77	5,950	8.1
June 1-4, 1952	52	28	1,040	152	0	400	1,700	--	--	4.83	688	564	77	5,950	8.1
June 5-6	97	28	681	140	0	164	1,100	3.3	2,170	2.95	357	242	81	3,900	7.9
June 7-8	58	17	261	133	0	87	425	3.2	1,950	2.27	214	106	73	1,720	8.1
June 9-10	76	23	512	126	0	128	820	4.9	6,970	2.27	284	181	78	3,010	8.1
June 11	98	29	552	140	0	95	1,000	5.6	2,010	2.73	364	249	78	3,370	8.2
June 12-13	146	40	845	168	0	136	1,480	--	3,080	4.19	528	391	78	4,990	8.0
June 14	180	54	1,150	160	6	194	2,000	--	4,440	5.49	671	530	79	6,500	8.4
June 15-17	225	69	1,560	169	0	272	2,700	--	5,400	7.40	845	706	80	8,770	8.2
June 18-20	266	89	2,140	128	0	355	3,690	--	7,290	8.91	1,030	924	82	11,400	8.0
June 21-24, 26	324	107	2,860	101	0	390	4,670	--	8,860	12.08	1,250	1,170	82	13,600	8.1
June 25, 27-30	464	138	3,130	125	0	387	5,690	--	11,400	15.50	1,720	1,520	80	17,200	8.1
July 1, 7-10	559	153	3,540	121	0	321	6,580	--	13,000	17.66	2,020	1,920	78	18,800	7.9
July 2-6	393	109	2,530	117	0	264	4,800	--	9,270	12.61	1,480	1,340	69	11,000	8.1
July 11-14	465	134	3,130	121	0	321	3,770	--	11,800	13.10	1,600	1,500	78	16,300	8.0
July 15-16	303	84	1,890	120	0	163	3,510	--	9,130	2.10	1,100	1,060	78	10,200	8.0
July 19	98	28	566	136	0	82	1,700	8.3	2,930	2.89	364	252	78	3,610	8.1
July 20	166	23	434	136	0	21	1,700	4.8	3,720	2.34	309	226	75	2,790	8.2
July 21	154	42	1,785	189	2	21	1,540	--	3,130	4.26	582	497	75	4,940	8.3
July 22-24	353	84	1,930	111	0	81	3,360	--	4,750	6.46	862	770	78	7,720	8.2
July 25-28	533	140	3,070	97	0	123	3,740	--	7,230	9.83	1,280	1,200	77	11,000	8.1
July 29-31	678	175	3,830	113	0	201	5,870	--	11,200	15.23	1,910	1,810	78	16,500	8.2
Aug. 1, 6	268	72	1,580	94	0	88	3,000	--	14,300	19.45	2,410	2,310	78	20,500	8.1
Aug. 2, 7-8	215	60	1,280	90	0	113	2,400	--	5,430	7.38	964	888	78	8,780	8.0
Aug. 3, 5, 9	360	91	2,030	80	0	102	3,900	--	4,680	6.36	763	710	78	7,310	8.1
Aug. 4	567	145	3,300	86	5	206	6,310	--	7,040	9.57	1,270	1,200	78	11,200	8.2
Aug. 10	169	51	1,020	113	4	133	1,850	--	11,300	15.37	2,010	1,930	78	18,000	8.3
Aug. 11, 13-14	143	39	762	133	0	102	1,390	--	3,570	4.86	631	532	78	5,950	8.4
Aug. 12, 15	172	54	1,080	131	0	123	1,960	--	3,720	3.70	518	408	76	4,680	8.1
Aug. 16	257	64	1,440	132	2	108	2,700	--	3,870	5.25	651	544	78	6,460	8.2
Aug. 17	299	80	1,900	65	0	121	3,570	--	5,240	7.13	504	752	78	8,530	8.3
Aug. 18-19	395	101	2,450	72	0	184	4,610	--	6,710	9.13	1,080	1,020	79	10,800	8.0
Aug. 20	487	131	2,930	85	0	184	5,580	--	8,600	11.70	1,400	1,340	79	13,500	7.7
Aug. 21-22, 28	563	147	3,250	103	0	178	6,250	--	10,600	14.42	1,750	1,680	78	16,200	8.0
Aug. 23-24, 29-31	640	162	3,560	98	0	183	6,900	--	11,400	15.50	2,010	1,920	78	17,400	7.8
Aug. 25-26	309	84	1,810	110	0	149	3,410	--	12,700	17.27	2,260	2,180	77	19,400	7.5
Aug. 27	399	106	2,320	93	0	153	4,430	--	6,390	11.08	1,120	1,030	78	10,300	7.8
								--	8,150		1,430	1,360	78	12,700	8.2

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

Chemical analyses, in parts per million, water year October 1951 to September 1952--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				
Sept. 1-10, 1952.....		11	0.00	536	134	3,960	41	103	0	501	6,800	0.1	--	0.86	12,800	17.41		1,890	1,800	82		19,600	8.0
Sept. 11-12.....		--	--	659	174	4,150		71	9	333	7,790	--	--	--	--	14,000	19.04	2,360	2,300	79		21,800	7.8
Sept. 13-15.....		--	--	828	212	4,820		58	0	280	9,260	--	--	--	--	16,600	22.58	2,940	2,850	78		24,900	7.7
Sept. 16-18.....		--	--	938	236	5,460		73	0	302	10,500	--	--	--	--	18,700	25.43	3,310	3,250	78		27,700	7.5
Sept. 19.....		--	--	1,020	260	5,970		79	0	296	11,500	--	--	--	--	20,400	27.74	3,610	3,550	78		30,000	7.2
Sept. 20.....		--	--	1,150	282	6,490		84	0	284	12,600	--	--	--	--	22,400	30.46	4,030	3,960	78		34,200	7.8
Sept. 21-30.....	10		.00	1,030	254	5,860	84	92	0	246	11,400	.0	--	1.3	20,000	27.20		3,610	3,540	77		35,400	7.5

## ARKANSAS RIVER BASIN--Continued

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

Temperature (°F) of water, water year October 1951 to September 1952

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	69	44	50	41	50	40	60	69	72	83	81	77
2	70	41	55	33	50	42	56	67	72	75	82	66
3	71	37	60	32	51	47	57	69	75	78	79	85
4	74	39	46	32	43	41	50	73	76	80	80	68
5	73	38	40	32	44	39	48	74	71	77	74	70
6	65	32	50	32	42	41	50	73	74	84	78	67
7	59	38	46	32	40	43	54	73	75	82	81	68
8	57	38	41	38	45	46	62	72	79	71	78	69
9	59	43	44	39	44	50	63	72	80	72	83	70
10	62	48	38	34	45	48	45	63	81	73	83	72
11	62	51	40	37	43	44	50	58	82	79	82	70
12	63	58	45	39	50	48	51	59	80	78	77	68
13	61	58	43	52	49	46	49	60	80	82	79	74
14	65	51	38	53	47	45	46	66	80	78	81	75
15	64	50	33	45	44	44	50	69	80	76	85	70
16	66	43	32	53	38	44	55	70	78	76	74	68
17	64	38	33	57	39	49	59	70	78	77	84	73
18	62	34	33	52	43	47	62	60	78	77	74	65
19	55	36	33	55	57	45	59	61	81	78	83	65
20	56	44	35	48	43	50	59	64	80	79	81	66
21	63	45	32	47	42	53	61	68	80	80	80	63
22	60	55	33	43	45	34	68	70	79	82	76	60
23	56	48	33	34	45	38	59	70	78	90	75	59
24	50	43	32	35	43	43	58	65	79	84	74	57
25	53	44	37	47	40	43	56	68	81	89	75	60
26	60	45	32	53	37	47	57	69	78	83	78	68
27	61	42	32	47	41	45	61	72	80	84	77	64
28	54	40	33	42	45	49	63	69	81	82	72	65
29	57	45	34	48	48	53	66	66	82	82	75	62
30	58	45	43	40	--	56	68	69	83	80	74	63
31	57	--	52	43	--	60	--	72	--	80	78	--
Average	61	44	40	42	45	46	57	68	78	80	78	67

## 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.--74,350 square miles at gaging station.

RECORDS AVAILABLE.--Chemical analyses: October 1946 to September 1952.

Water temperatures: October 1946 to September 1952.

EXTREMES, 1951-52.--Dissolved solids: Maximum, 3,460 ppm Sept. 4; minimum, 696 ppm June 5-8.

Hardness: Maximum, 726 ppm Sept. 19-20; minimum, 192 ppm June 5-8.

Specific conductance: Maximum daily, 5,880 micromhos Sept. 4; minimum daily, 1,060 micromhos June 8.

Water temperatures: Maximum, 92°F. June 29-30; July 24; minimum, freezing point Dec. 16, 20-21, Jan. 1, 4.

EXTREMES, 1946-52.--Dissolved solids: Maximum, 5,360 ppm Oct. 12-17, 1946; minimum, 232 ppm July 18-20, 1950.

Hardness: Maximum, 1,280 ppm Oct. 11, 1946; minimum, 106 ppm July 2, 1947.

Specific conductance: Maximum daily, 15,300 micromhos Oct. 11, 1946; minimum daily, 379 micromhos July 19, 1950.

Water temperatures: Maximum, 96°F. Aug. 7, 1947; minimum, freezing point on several 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 1951 to September 1952 given in WSP 1241. 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 1951 to September 1952

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 chloride ratio	Specific conductance (micro-mhos at 25°C)	Color or pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, mg./l.	Non-carbonate, mg./l.			
Oct. 1-2, 1951.....	9,210	--	--	68	17	236	143	188	143	372	--	2.4	--	922	1.25	22,930	240	132	68	1,610	8.0
Oct. 3-10.....	7,194	--	--	88	24	293	188	143	143	460	--	2.8	--	1,150	1.56	22,340	318	164	67	1,990	7.9
Oct. 11, 15, 17, 19-20.....	7,118	--	--	97	28	318	201	168	168	500	--	3.6	--	1,260	1.71	24,220	357	192	66	2,130	8.0
Oct. 12-14, 18.....	8,040	--	--	88	24	246	181	132	132	400	--	4.5	--	1,040	1.41	22,580	318	170	63	1,770	7.9
Oct. 15.....	7,100	--	--	106	36	516	188	171	185	850	--	4.2	--	1,880	2.56	36,040	412	258	73	3,230	8.0
Oct. 21-31.....	5,177	14	0.00	108	28	354	210	163	163	560	0.3	1.9	0.10	1,420	1.93	19,850	384	212	66	2,480	7.8
Nov. 1-5.....	8,292	--	--	96	30	334	183	134	134	565	--	2.7	--	1,270	1.73	28,430	363	213	67	2,290	7.7
Nov. 6-10.....	6,568	--	--	120	36	458	219	195	195	750	--	5.0	--	1,970	2.27	29,620	448	268	69	2,990	7.7
Nov. 11-12, 17-20.....	8,272	--	--	105	27	445	218	167	167	895	--	9.0	--	1,620	2.20	36,180	373	194	72	2,780	7.5
Nov. 13-16.....	10,120	--	--	106	26	561	190	147	147	905	--	7.8	--	1,940	2.64	53,010	372	216	77	3,380	8.1
Nov. 21-30.....	7,808	17	0.00	124	32	462	243	196	196	730	3	3.1	0.08	1,770	2.41	37,310	441	242	69	3,020	7.9
Dec. 1-10.....	5,686	--	--	124	31	405	252	204	204	635	--	5.0	--	1,560	2.12	23,960	437	230	67	2,710	7.9
Dec. 11-20.....	4,668	--	--	148	38	478	296	240	240	745	--	5.3	--	1,940	2.50	23,280	523	254	68	3,200	8.1
Dec. 21-31.....	3,505	16	0.00	182	42	543	309	240	240	865	3	4.5	0.08	2,110	2.87	19,940	576	334	67	3,860	8.0
Jan. 1-8, 1952.....	3,966	--	--	150	41	590	287	235	235	950	--	7.3	--	2,120	2.87	22,590	542	308	70	3,520	7.9
Jan. 9-10.....	3,940	--	--	152	47	733	290	275	275	1,180	--	7.7	--	2,120	3.43	26,810	572	334	74	4,280	7.9
Jan. 11-20.....	4,976	14	0.00	180	39	593	6.1	273	249	920	3	4.2	0.07	2,100	2.98	29,420	534	311	70	3,720	7.9
Jan. 21-31.....	4,352	16	0.00	183	42	539	6.4	278	308	820	3	3.5	0.07	2,100	2.86	24,680	554	326	68	3,510	7.9
Feb. 1-10.....	3,854	13	0.00	154	44	567	6.6	266	305	900	3	3.0	0.07	2,240	3.05	23,310	565	347	69	3,720	8.1
Feb. 11-20.....	3,495	--	--	136	49	558	254	254	305	870	--	2.9	--	2,220	3.02	20,950	541	333	69	3,610	7.8
Feb. 21-28.....	4,213	13	0.00	144	43	563	6.8	244	266	920	1	2.4	0.24	2,170	2.95	24,680	535	336	70	3,710	8.0

Mar. 1-2, 4, 8-9, 1952	5,748	--	--	138	46	577	235	198	955	--	4.2	--	2,140	2,91	33,210	508	316	71	3,660	7.8
Mar. 3, 5-7, 10	7,324	--	--	102	34	432	191	145	125	--	4.4	--	1,510	2.19	31,840	394	236	70	2,800	7.7
Mar. 11, 15	21,180	--	--	70	22	294	157	91	480	--	3.5	--	1,120	1.82	53,960	265	186	71	1,970	7.5
Mar. 12-14	27,400	--	--	61	16	187	146	175	306	--	4.3	--	1,761	1.03	26,300	214	197	70	1,760	7.6
Mar. 16, 19-20	12,600	--	--	33	26	446	159	103	302	--	4.5	--	2,140	2.91	83,270	380	236	78	2,720	7.5
Mar. 17-18	10,980	--	--	98	33	624	173	176	825	--	3.1	--	1,500	2.40	38,440	451	247	72	3,340	8.0
Mar. 21-31	7,191	14	.00	123	35	534	249	217	825	3	4.4	.25	1,960	2.66	38,440	451	247	72	3,340	8.0
Apr. 1-10	5,540	11	.00	122	39	536	227	237	825	3	4	.29	1,900	2.71	29,770	460	274	71	3,360	8.0
Apr. 11-15, 18-19	5,417	--	--	120	42	521	222	228	843	--	1.2	--	1,970	2.68	28,810	472	280	71	3,320	7.8
Apr. 16-17, 23	5,963	--	--	98	36	469	183	181	760	--	1.0	--	1,670	2.27	27,030	392	242	72	3,020	7.9
Apr. 21-24	13,210	--	--	83	26	377	168	101	630	--	1.9	--	1,400	1.90	49,930	314	176	72	2,470	7.9
Apr. 25-30	19,450	--	--	122	38	773	174	258	1,220	--	3.6	--	2,600	3.54	136,500	460	318	78	4,330	7.6
Apr. 26-29	18,350	--	--	107	31	627	164	255	960	--	4.0	--	2,180	2.96	108,000	394	260	78	3,710	7.7
May 1, 5-7	10,240	--	--	130	41	764	201	309	1,180	--	4.9	--	2,640	3.59	72,990	493	338	77	4,480	7.8
May 2-4, 8-10	8,905	--	--	118	34	556	201	279	840	--	5.0	--	2,000	2.72	48,090	434	270	74	3,430	8.0
May 11-20	5,742	18	.00	131	36	511	216	323	780	3	2.0	.23	1,980	2.69	30,700	475	306	70	3,300	8.1
May 21-22	4,860	--	--	123	39	531	215	269	825	--	3.0	--	1,980	2.69	25,980	468	282	71	3,330	8.1
May 23, 30-31	6,850	--	--	104	30	436	159	228	680	--	4.0	--	1,640	2.23	30,330	383	252	71	2,770	7.8
May 24-29	9,155	--	--	74	19	269	157	132	410	--	3.7	--	1,020	1.39	25,210	262	134	69	1,800	7.7
June 1-4	5,668	--	--	124	34	460	173	299	705	--	3.5	--	1,780	2.42	27,240	450	308	69	2,870	7.8
June 5-8	18,820	--	--	54	14	172	133	74	268	--	2.9	--	696	.95	35,370	192	84	66	1,240	7.7
June 9	18,500	--	--	60	18	357	134	128	535	--	3.8	--	1,770	1.59	56,440	224	114	78	2,030	7.7
June 10	12,600	--	--	55	16	218	125	99	332	--	5.5	--	794	1.08	27,010	203	100	70	1,450	7.4
June 11	8,960	--	--	56	16	218	129	190	330	--	5.0	--	806	1.10	19,500	206	100	70	1,470	7.4
June 12-13	6,355	--	--	86	24	282	161	138	460	--	3.3	--	1,190	1.62	20,420	313	181	68	1,950	7.7
June 14-20	3,837	--	--	120	35	422	297	212	697	--	4.6	--	1,680	2.28	17,400	444	280	67	2,830	7.4
June 21-30	2,146	18	.00	128	39	519	195	234	865	3	1.7	.33	2,060	2.80	11,940	480	320	70	3,460	8.1
July 1-10	1,681	16	.00	124	39	557	160	219	930	5	1.8	.40	2,060	2.80	9,350	470	339	71	3,570	7.6
July 11-19	1,529	--	--	133	44	691	170	209	1,180	--	4.6	--	2,390	3.25	9,870	513	374	73	4,030	7.9
July 20	2,227	--	--	88	28	417	146	165	670	--	6.4	--	1,480	2.01	8,870	534	374	73	2,600	8.1
July 21-23	1,430	--	--	130	35	440	177	174	745	--	3.9	--	1,660	2.28	6,410	384	274	71	2,900	8.1
July 24-26	1,297	--	--	117	39	537	199	292	923	--	6.2	--	2,510	2.73	6,810	425	346	75	3,990	8.1
July 27-31	1,718	--	--	116	43	645	192	213	1,110	--	4.4	--	2,320	3.16	6,360	472	388	75	3,980	7.4

## ARKANSAS RIVER BASIN--Continued

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

Chemical analyses, in parts per million, water year October 1951 to September 1952--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	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	Color
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate					
Aug. 1, 9-10, 1952	1,329	--	--	120	44	667		94	179	1,180	--	2.2	--	2,400	3.26	8,610	480	404	75		4,063	8.0	
Aug. 2, 8.....	1,145	--	--	146	51	776		96	197	1,400	--	4.0	--	2,940	4.00	9,950	574	498	75		4,880	8.1	
Aug. 3-6.....	1,085	--	--	105	38	579		109	250	975	--	4.2	--	2,070	2.82	6,060	418	328	75		3,500	7.5	
Aug. 7.....	1,260	--	--	173	57	981		92	292	1,780	--	4.6	--	3,440	4.68	11,700	666	580	76		5,870	8.1	
Aug. 11, 13-15.....	1,928	--	--	114	39	584		113	200	1,000	--	5.1	--	2,090	2.84	10,880	445	352	74		3,640	8.6	
Aug. 12, 16, 20.....	1,737	--	--	90	32	475		114	165	783	--	3.3	--	1,680	2.30	7,880	356	282	74		2,860	7.9	
Aug. 17-19.....	1,687	--	--	74	28	394		98	137	660	--	2.9	--	1,400	1.90	6,360	320	238	75		2,860	7.9	
Aug. 21-22.....	1,310	--	--	89	37	472		104	135	800	--	2.1	--	1,530	2.53	7,110	303	238	76		2,860	7.8	
Aug. 23-26.....	1,260	--	--	103	49	873		126	187	1,580	--	1.5	--	3,580	4.83	11,350	603	505	76		5,230	7.9	
Aug. 27-29.....	1,209	--	--	121	35	932		111	166	1,038	--	5	--	2,040	2.80	8,670	396	297	75		3,430	7.2	
Aug. 30-31.....	1,223	--	--	128	45	730		127	230	1,240	--	.7	--	2,650	3.60	8,730	504	400	76		4,300	7.5	
Sept. 1-2, 5-17.....	887	--	--	153	49	856		153	219	1,480	--	2.9	--	2,930	3.98	7,020	583	458	76		4,970	7.5	
Sept. 3.....	1,740	--	--	124	43	669		145	175	1,180	--	5.0	--	2,370	3.22	8,650	486	368	75		3,990	8.3	
Sept. 4.....	1,890	--	--	151	52	1,020		168	279	1,690	--	2.3	--	3,460	4.71	8,030	500	452	79		5,880	8.3	
Sept. 11-18.....	652	--	--	146	56	735		165	201	1,310	--	1.6	--	2,660	3.62	1,680	595	400	73		4,570	7.8	
Sept. 19-20.....	596	--	--	187	63	857		172	197	1,590	--	.5	--	3,190	4.34	5,130	726	584	72		5,520	7.6	
Sept. 21-23.....	582	--	--	181	62	881		171	202	1,610	--	1.0	--	3,190	4.34	5,010	706	568	73		5,500	8.1	
Sept. 24-30.....	512	--	--	158	57	748		163	194	1,360	--	.7	--	2,720	3.70	3,760	628	495	72		4,680	7.6	
Weighted average	5,444	--	--	111	32	463		203	196	734	--	3.8	--	1,720	2.34	25,280	408	242	71		2,940	--	--

a Includes equivalent of 3 parts per million of carbonate (CO<sub>3</sub>).b Includes equivalent of 5 parts per million of carbonate (CO<sub>3</sub>).

## ARKANSAS RIVER BASIN--Continued

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

Temperature (°F) of water, water year October 1951 to September 1952

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	75	43	52	32	44	44	66	72	73	83	86	80
2	76	42	54	33	49	49	68	74	74	89	87	70
3	79	44	54	33	49	45	56	77	82	81	70	76
4	79	41	53	31	48	45	53	78	82	82	85	74
5	77	37	51	34	49	46	57	75	82	83	81	76
6	69	37	54	35	50	48	58	76	81	88	89	76
7	68	41	51	37	50	46	64	77	80	90	86	76
8	67	44	45	43	51	51	68	76	81	84	84	76
9	68	45	44	41	50	49	59	74	84	87	87	78
10	65	51	43	41	51	45	56	68	83	87	88	78
11	68	52	42	39	50	50	53	67	84	89	85	77
12	67	59	45	44	55	51	55	69	85	84	82	81
13	67	59	43	49	54	50	49	70	87	81	85	81
14	66	56	36	55	50	49	54	74	86	80	85	84
15	69	52	33	57	45	49	60	71	87	78	81	75
16	68	46	34	57	45	50	62	76	87	81	81	79
17	68	42	34	56	48	48	62	69	88	77	89	78
18	64	43	33	57	50	46	61	66	89	87	82	72
19	62	44	36	58	54	54	62	69	87	87	85	69
20	65	44	32	50	54	57	61	72	88	85	87	70
21	65	47	32	49	47	56	63	74	86	87	85	65
22	60	48	33	40	46	49	62	77	86	87	83	67
23	58	44	34	41	46	46	61	71	85	86	80	68
24	60	44	33	43	44	48	60	71	86	92	83	70
25	60	48	34	52	43	51	63	75	85	83	79	71
26	60	45	34	51	46	51	65	77	87	87	75	72
27	60	48	33	47	50	54	68	77	87	86	79	78
28	60	48	38	48	53	54	70	74	89	84	80	77
29	61	51	44	44	48	57	71	76	92	87	80	76
30	61	52	46	44	--	58	72	76	92	81	83	78
31	49	--	52	42	--	67	--	77	--	86	84	--
Average	66	47	41	45	49	51	61	73	85	84	84	75

## ARKANSAS RIVER BASIN--Continued

## VERDIGRIS RIVER NEAR LENAPAH, OKLA.

LOCATION --At gaging station at highway bridge on county road, 2 1/2 miles east of Lenapah, Nowata County, and 4 1/2 miles upstream from Cedar Creek.

DRAINAGE AREA --3,639 square miles.

RECORDS AVAILABLE --Chemical analyses: October 1951 to September 1952.

Water temperatures: October 1951 to September 1952.

EXTREMES, 1951-52 --Dissolved solids: Maximum, 509 ppm Nov. 12, 14, 16.

Hardness: Maximum, 304 ppm Oct. 4-5, 9-10, Jan. 1-10; minimum, 122 ppm Nov. 12, 14, 16.

Specific conductance: Maximum daily, 899 microhos Feb. 28; minimum daily, 300 microhos Mar. 12.

Water temperatures: Maximum daily, 92°F, July 28; minimum daily, freezing point Dec. 21-22, Jan. 3.

REMARKS --Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of discharge for water year October 1951 to September 1952 given in Water-Supply Paper 1241.

## Chemical analyses, in parts per million, water year October 1951 to September 1952

Date of collection	Mean discharge (cfs)	Tem- perature (°F)	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 (residue at 100°C)		Hardness as CaCO <sub>3</sub>		Per- cent so- dium	Specific conduct- ance (micro- mhos at 25°C)	pH	
															Parts per mil- lion	Tons per acre- foot	Calcium, mag- nesium	Non-carbon- ate				
Oct. 1-3, 6-8, 1951...	630		--	--	86	14	35		290	33	52	--	2.4	--	370	0.50	629	272	34	22	664	8.0
Oct. 4-5, 9-10, 1951...	1,245		--	--	94	17	41		319	36	65	--	2.8	--	413	.56	1,390	304	43	23	737	8.1
Oct. 11-12, 1951...	905		--	--	83	17	63		268	36	110	--	2.0	--	459	.62	1,120	277	58	33	820	8.2
Oct. 13-14, 18-20, 1951...	470		--	--	71	13	40		233	33	64	--	3.0	--	342	.47	434	230	40	28	626	7.7
Oct. 15-17, 1951...	1,132		--	--	54	9	36		183	26	52	--	2.5	--	292	.40	892	174	24	31	512	7.8
Oct. 21-31, 1951...	1,393		--	0.02	58	11	37	3.0	181	31	62	0.1	2.3	0.06	329	.45	1,240	190	41	29	546	7.6
Nov. 1-2, 9-10, 1951...	2,955		--	--	57	9	40		179	34	59	--	1.7	--	304	.41	2,460	180	34	32	543	7.7
Nov. 3-8, 1951...	833		--	--	74	13	45		236	35	74	--	2.2	--	379	.52	852	238	44	29	669	7.5
Nov. 11, 15, 1951...	6,405		--	--	59	11	42		176	42	66	--	3.3	--	312	.42	5,400	192	48	32	569	8.1
Nov. 12, 14, 16, 1951...	11,390		--	--	38	6	23		122	27	29	--	2.5	--	207	.28	6,370	122	22	29	348	7.6
Nov. 13, 17-20, 1951...	5,044		--	--	52	8	28		164	34	36	--	2.4	--	265	.38	3,610	163	28	27	447	7.9
Nov. 21-30, 1951...	2,702		--	--	61	9	32		198	38	41	--	1.6	--	302	.41	2,200	190	28	27	513	7.8
Dec. 1-6, 1951...	1,187		--	--	70	11	38		223	43	52	--	1.9	--	345	.47	1,110	220	36	28	588	8.1
Dec. 7-10, 1951...	880		--	--	82	12	46		256	48	66	--	1.7	--	405	.55	962	254	44	28	691	8.0
Dec. 11-14, 1951...	936		--	--	90	14	44		278	50	68	--	2.3	--	423	.58	1,070	282	54	25	728	8.1
Dec. 15-20, 1951...	1,607		--	--	70	12	41		213	50	60	--	1.9	--	338	.49	1,560	224	50	28	613	7.7
Dec. 21-31, 1951...	626		10	--	88	15	44	1.9	270	53	72	1	2.2	.03	437	.58	739	281	60	25	722	8.0
Jan. 1-10, 1952...	1,312		10	--	94	17	53	2.2	278	56	85	0	2.4	.07	474	.64	1,680	304	76	27	786	8.1
Jan. 11-20, 1952...	1,836		7.6	--	68	13	42	2.3	199	49	66	0	2.8	.16	368	.50	1,820	223	60	29	613	7.8
Jan. 21-26, 1952...	740		--	--	66	10	49		216	50	58	--	2.4	--	370	.50	739	206	28	34	513	8.0
Jan. 27-31, 1952...	604		--	--	81	13	48		247	54	71	--	2.2	--	421	.57	687	236	53	29	708	8.0
Feb. 1-10, 1952...	1,502		9.4	0.0	74	13	45	2.4	211	60	69	0	2.5	.58	404	.55	1,640	238	65	29	661	8.1
Feb. 11-20, 1952...	641		7.7	0.0	90	17	70	1.9	250	63	119	0	1.2	.09	509	.69	881	294	90	34	871	7.9
Mar. 1-4, 7-8, 1952...	3,044		--	--	70	14	49		191	61	83	--	3.1	--	414	.56	3,400	232	76	32	689	7.7
Mar. 5-6, 9-10, 1952...	6,732		--	--	53	11	37		148	50	58	--	3.2	--	325	.44	5,910	177	56	31	532	7.5



Mar. 11-14, 1952..	14,560	--	40	7.8	16	124	30	22	--	3.6	--	228	.31	8,960	132	30	21	335	7.6	
Mar. 15-20 .....	4,808	--	62	15	37	196	48	59	--	2.8	--	357	.49	4,530	216	56	27	589	7.8	
Mar. 21-24 .....	5,472	--	56	10	32	174	38	47	--	2.8	--	305	.41	4,510	180	38	28	502	8.0	
Mar. 25-31 .....	1,721	--	78	14	40	243	49	61	--	2.4	--	397	.54	1,840	252	53	25	655	8.1	
Apr. 1-3 .....	1,270	--	84	16	49	260	51	80	--	2.3	--	450	.61	1,540	276	62	28	735	7.9	
Apr. 4-10 .....	4,051	--	61	12	33	183	45	52	--	2.3	--	329	.45	3,600	202	52	26	533	7.4	
Apr. 11-20 .....	2,707	9.7	72	13	36	2.2	220	51	62	1.1	1.6	.06	.54	2,890	233	53	26	625	7.8	
Apr. 21-22, 28-30.	2,830	--	67	13	34	209	46	52	--	1.7	--	.47	.22	2,620	220	50	25	565	7.6	
Apr. 23-27 .....	7,988	--	51	11	31	170	37	42	--	1.9	--	.282	.40	6,310	172	32	28	463	7.6	
May 1-10 .....	896	5.8	77	15	38	245	48	60	1.1	.7	.08	.54	.65	965	254	52	24	644	7.9	
May 11-20 .....	551	6.1	83	17	43	2.3	264	49	70	1.1	.7	.10	.456	949	277	60	25	700	8.1	
May 21-31 .....	816	9.0	78	16	47	2.5	253	49	76	1.3	1.9	.11	.423	.58	932	260	53	28	704	8.2
June 1, 6 .....	588	--	73	18	40	a 234	48	69	--	3.2	--	.32	.53	591	256	64	25	672	8.3	
June 2-5, 7-10 .....	566	--	60	14	36	206	38	52	--	2.9	--	.329	.43	503	271	38	27	571	8.0	
June 11-20 .....	165	11	64	13	40	a 207	41	54	1.3	2.3	.17	.32	.49	161	43	29	37	391	8.3	
June 21-30 .....	37.0	--	56	12	47	194	41	72	--	1.4	--	.37	.51	191	44	34	34	352	7.8	
July 1-10 .....	45.2	6.5	56	15	48	183	39	76	1.1	.7	.25	.37	.40	201	46	34	34	354	8.0	
July 11-20 .....	45.2	7.8	56	15	54	183	43	90	1.1	.7	.33	.32	.47	201	51	36	36	680	7.7	
July 21-31 .....	25.8	--	55	16	60	a 186	43	95	--	1.2	--	.408	.55	28	203	50	39	683	8.3	
Aug. 1-10 .....	16.1	7.4	50	15	66	3.4	167	42	106	.3	1.1	.44	.398	.54	17	186	50	43	695	8.2
Aug. 11-20 .....	24.6	7.4	50	16	70	3.4	173	39	110	1.1	1.0	.30	.394	.54	26	191	49	44	696	8.2
Aug. 21-31 .....	24.5	8.0	53	17	29	3.6	175	44	129	1.1	1.0	.35	.431	.59	29	202	58	45	774	8.2
Sept. 1-10 .....	13.7	7.4	53	17	84	3.9	176	48	133	1.1	.5	.36	.448	.61	17	202	58	47	798	8.0
Sept. 11-20 .....	12.4	5.2	54	17	90	3.9	176	50	142	.3	.5	.40	.456	.62	15	204	60	48	829	7.9
Sept. 21-30 .....	10.8	5.2	56	17	98	4.0	182	52	151	.3	.7	.38	.497	.68	14	210	60	50	859	8.0
Weighted average.	1,525	--	61	12	36	190	42	54	--	2.4	--	333	0.45	1,370	202	46	28	549	--	

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

## LOWER MISSISSIPPI RIVER BASIN

## ARKANSAS RIVER BASIN--Continued

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

Temperature (°F.) of water, water year October 1951 to September 1952

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

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

LOCATION.--At gaging station at bridge on State Highway 20, 2.3 miles downstream from Caney River, 4½ miles west of Claremore, Rogers County, and 12 miles upstream from Bird Creek.

DRAINAGE AREA.--6,534 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1952.

Water temperatures: October 1947 to September 1952.

EXTREMES, 1951-52.--Dissolved solids: Maximum, 594 ppm Aug. 11-31; minimum, 199 ppm Nov. 11-17.

Hardness: Maximum, 307 ppm Jan. 1-10; minimum, 96 ppm Nov. 11-31; minimum daily, 274 microhms Nov. 12.

Specific conductance: Maximum, 317, 1,930 microhms Aug. 31-F. 21-22; minimum, 33-F. 21-22; minimum daily, 274 microhms Nov. 12.

Temperature: Maximum, 81-F. 3-4, 76-F. 21-22; minimum, 33-F. 21-22; minimum daily, 274 microhms Nov. 12.

EXTREMES, 1945-52.--Dissolved solids: Maximum, 500 ppm June 22-30, 1948.

Hardness: Maximum, 406 ppm June 22-30, 1948.

Specific conductance: Maximum, 500 ppm June 22-30, 1948.

Records: Maximum, 406 ppm June 22-30, 1948.

Water temperatures: Maximum daily, 1,310 microhms, Jan. 31, 1951; minimum daily, 130 microhms June 24, 1948.

Water temperatures: Maximum 93-F. July 22, 1949; 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 1951 to September 1952 given in Water-Supply Paper 1241.

Chemical analyses, in parts per million, water year October 1951 to September 1952

Date of collection	Mean discharge (cfs)	Tem-perature (°F)	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 (residue at 180°C)		Hardness as CaCO <sub>3</sub>		Per-cent so-dium	Specific conduct-ance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Calcium magnesium	Non-carbonate			
Oct. 1-10, 1951.....	1,903	11	0.08	71	11	33	3.0	224	26	56	0.0	2.4	0.14	340	0.46	1,470	222	38	34	568	8.1
Oct. 11-12, 17-18.....	2,220	--	--	70	13	42	4.2	215	27	80	--	2.5	--	386	.32	2,310	228	52	29	643	8.0
Oct. 13-16.....	1,544	--	--	83	7.0	53	3.6	263	34	103	--	4.3	--	276	.63	1,890	202	56	29	731	8.3
Oct. 19-20.....	1,475	--	--	46	7.0	52	3.6	136	25	53	--	1.6	--	269	.37	1,940	144	36	32	426	7.6
Oct. 21-31.....	4,282	8.5	.02	46	7.6	31	7.9	146	35	53	1.1	1.6	0.03	268	.37	4,110	180	34	31	437	7.7
Nov. 1-3.....	5,800	--	--	47	7.9	29	29	190	35	70	--	1.3	--	355	.48	3,740	207	32	29	569	7.9
Nov. 4-9.....	3,808	--	--	65	11	39	19	189	24	26	--	3.5	--	203	.28	5,340	106	24	30	278	7.6
Nov. 10.....	9,740	--	--	30	5.2	5.0	23	108	22	30	--	2.0	--	199	.27	6,590	106	17	33	317	7.4
Nov. 11-17.....	17,960	--	--	51	7.6	26	26	159	30	37	--	1.4	--	250	.34	6,260	158	28	28	428	8.0
Nov. 18-20.....	9,267	--	--	63	9.8	26	2.8	197	32	40	1.1	1.3	2.3	302	.41	4,950	198	35	22	497	7.8
Nov. 21-30.....	6,076	12	.02	63	9.8	26	2.8	197	32	40	1.1	1.3	2.3	302	.41	4,950	198	35	22	497	7.8
Dec. 1-10.....	2,331	13	.02	74	12	38	2.6	221	39	64	1.1	1.0	.09	374	.51	2,350	234	53	26	612	8.2
Dec. 11-20.....	2,294	--	--	77	15	38	3.8	224	42	76	--	1.8	--	405	.55	2,510	254	70	24	691	7.9
Dec. 21-31.....	1,109	11	.02	87	14	48	2.3	259	47	86	1.1	1.6	.28	457	.62	1,370	274	62	27	741	8.1
Jan. 1-10, 1952.....	1,738	14	.00	95	17	62	2.1	265	56	108	0.1	1.6	.16	496	.67	2,330	270	50	30	838	8.1
Jan. 11-12.....	5,700	--	--	78	13	82	8.2	214	55	136	--	2.3	--	508	.69	7,820	248	72	42	865	8.0
Jan. 13-20.....	2,940	--	--	70	10	55	5.5	208	48	80	--	2.0	--	400	.54	3,180	216	45	36	668	8.2
Jan. 21-31.....	1,276	9.4	.00	82	15	51	2.1	231	51	88	0.1	1.4	.13	420	.57	1,450	266	76	29	718	7.9
Feb. 1-10.....	2,966	9.0	.00	81	15	54	2.1	223	55	92	0.1	1.2	.22	439	.60	3,320	264	80	31	741	7.8
Feb. 11-20.....	1,189	--	--	82	14	54	5.4	224	59	95	--	1.4	--	461	.63	1,480	262	78	31	744	7.8
Feb. 21-29.....	2,351	11	.00	82	15	67	2.2	211	57	118	0.1	.8	.16	481	.65	3,050	266	93	35	812	7.9
Mar. 1-2.....	2,055	--	--	80	17	49	4.9	221	55	97	--	1.1	--	421	.57	2,340	270	88	28	750	8.0
Mar. 3-9.....	8,680	--	--	56	12	30	164	43	52	52	--	1.9	--	303	.41	7,100	169	54	28	507	7.8
Mar. 10-13.....	22,150	--	--	35	5.6	15	15	102	26	22	--	2.9	--	208	.38	12,440	110	27	23	295	7.8

a. Includes equivalent of 2 parts per million of carbonate (CO<sub>3</sub>).

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

Chemical analyses, in parts per million, water year October 1951 to September 1952 --Continued

Date of collection	Mean discharge (cfs)	Temperature (°F)	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	Calcium magnesium	Non-carbonate			
Mar. 14-17, 1952...	14,040	--	--	--	49	8.0	23	154	32	29	--	--	4.2	--	241	0.33	155	29	24	401	7.9
Mar. 18-20.....	10,140	--	--	--	58	10	35	170	43	54	--	--	2.3	--	321	.44	186	46	29	334	8.0
Mar. 23-31.....	5,073	10	10	0.02	71	13	38	209	45	67	0.1	1.9	0.14	0.14	373	.51	230	60	26	617	7.9
Apr. 1-10.....	4,968	10	10	.05	74	14	42	214	51	70	1	1.8	1.8	1.8	397	.54	242	66	27	648	7.8
Apr. 11-20.....	4,138	11	10	.08	68	13	44	222	51	67	1	1.3	1.3	1.0	383	.52	233	59	30	632	8.0
Apr. 21-30.....	10,010	10	10	--	54	10	40	174	40	42	1	1.7	1.7	1.0	289	.35	176	33	29	470	8.4
May 1-10.....	1,804	10	10	.00	74	14	42	221	46	72	3	1.7	1.7	1.5	407	.55	241	61	27	636	8.2
May 11-20.....	1,848	12	12	.00	72	15	52	226	52	86	3	1.1	1.1	1.3	426	.58	241	56	31	711	8.1
May 21-30.....	2,804	--	--	--	46	9.8	41	128	36	71	--	--	2.4	--	305	.41	186	50	36	511	8.0
May 25-31.....	1,927	--	--	--	65	17	66	199	45	116	--	--	1.7	--	460	.63	232	69	38	771	8.1
June 1-10.....	1,253	7.7	7.7	.00	70	14	57	214	45	99	3	1.1	1.1	1.2	436	.59	232	56	34	725	8.3
June 11-20.....	1,417	6.0	6.0	.02	66	13	50	205	42	88	3	1.2	1.2	1.7	395	.54	218	50	33	666	8.0
June 21-30.....	114	--	--	--	58	14	57	188	36	95	--	--	1.2	--	396	.54	202	48	37	671	8.1
July 1-10.....	89.2	10	10	.00	60	13	55	3.0	186	34	98	1.1	1.0	.29	402	.55	203	50	37	672	8.1
July 11-20.....	119	10	10	.00	69	14	63	210	33	115	1.1	1.7	1.7	.30	457	.62	230	58	37	764	8.0
July 21-28.....	64.6	--	--	--	53	17	70	153	34	137	--	--	1.0	--	437	.59	202	76	43	768	8.0
July 29-31.....	47.0	--	--	--	78	18	86	189	61	168	--	--	1.0	--	551	.75	268	114	41	963	8.0
Aug. 1-10.....	55.1	--	--	--	82	18	88	201	51	178	--	--	1.2	--	570	.78	278	114	41	994	7.8
Aug. 11-20.....	53.1	13	13	.00	77	16	99	177	55	190	3	1.0	1.0	.31	594	.81	258	113	45	1,010	8.1
Aug. 21-31.....	73.9	11	11	.00	78	18	103	200	39	198	1.1	1.6	1.6	.32	594	.81	268	104	45	1,030	8.0
Sept. 1-10.....	26.3	--	--	--	70	16	121	201	57	198	--	--	1.0	--	587	.80	240	76	52	1,000	8.0
Sept. 11-16.....	16.0	--	--	--	72	22	98	203	30	202	--	--	1.7	--	573	.78	25	104	44	1,020	8.0
Sept. 17-20.....	72.2	--	--	--	53	16	66	142	29	138	--	--	1.2	--	409	.56	198	82	42	726	7.9
Sept. 21-30.....	11.0	7.4	7.4	.00	70	16	91	182	32	174	3	1.1	1.1	.28	520	.71	240	92	43	911	8.1
Weighted averages...	2,993	--	--	--	58	10	36	174	38	57	--	--	1.9	--	320	.44	186	43	30	563	--

a Includes equivalent of 2 parts per million of carbonate (CO<sub>3</sub>).

b Includes equivalent of 5 parts per million of carbonate (CO<sub>3</sub>).

## ARKANSAS RIVER BASIN--Continued

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

Temperature (°F.) of water, water year October 1951 to September 1952

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

## ARKANSAS RIVER BASIN--Continued

## BIRD CREEK NEAR SPERRY, OKLA.

LOCATION.-- At gaging station at bridge on county highway, 1½ miles upstream from Delaware Creek 2.4 miles downstream from Hominay Creek, and 2½ miles southeast of Sperry, Tulsa County.

DRAINAGE AREA.-- 905 square miles.

RECORDS AVAILABLE.-- Chemical analyses: October 1951 to September 1952.

Water temperatures: October 1951 to September 1952.

EXTREMES, 1951-52.-- Dissolved solids: Maximum, 2,160 ppm Sept. 21-30; minimum, 208 ppm Apr. 23.

Hardness: Maximum, 558 ppm Sept. 21-30; minimum, 84 ppm Nov. 13.

Specific conductance: Maximum daily, 3,780 microhos Oct. 13.

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Chemical analyses, in parts per million, water year October 1951 to September 1952

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 non-carbonate	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, mg./l.	Non-carbonate, mg./l.			
Oct. 1, 1951	80.0	--	--	44	9.8	100	117	117	18	176	--	--	4.8	--	445	0.61	96	150	54	59	794	8.2
Oct. 2, 5	50.0	--	--	52	12	130	126	16	16	242	--	--	1.4	--	558	7.6	70	180	76	61	1,030	7.5
Oct. 6-7	1,780	--	--	20	5.1	39	58	9.7	9.7	70	--	--	2.5	--	224	30	1,080	71	25	55	339	7.0
Oct. 8-10	214	--	--	28	6.4	60	74	11	11	109	--	--	2.4	--	305	41	176	96	36	58	486	7.3
Oct. 11-12, 17-20	104	--	--	41	12	87	109	12	12	168	--	--	2.0	--	436	59	122	152	62	55	766	7.3
Oct. 13-16	43.5	--	--	50	15	130	109	11	11	260	--	--	2.4	--	614	84	72	186	97	60	1,070	7.2
Oct. 21-23	81.3	--	--	48	14	103	114	14	14	208	--	--	9	--	495	67	109	178	84	56	910	7.5
Oct. 24-26	142	--	--	48	11	67	137	18	18	127	--	--	1.1	--	374	51	143	165	53	47	671	7.5
Oct. 27-31	1,465	--	--	24	7.1	46	65	12	12	85	--	--	4.4	--	252	34	997	89	36	53	412	7.3
Nov. 1-2, 8	1,312	--	--	30	7.5	38	81	15	15	74	--	--	2.0	--	249	34	882	106	40	44	406	7.3
Nov. 3-7, 9-10	565	--	--	42	11	60	114	20	20	117	--	--	1.4	--	352	48	537	150	56	47	610	7.5
Nov. 11-12, 15, 19-20	1,141	--	--	41	9.5	57	119	119	22	102	--	--	1.3	--	345	47	1,060	142	44	47	577	7.7
Nov. 13	6,730	--	--	18	4.6	27	55	44	16	44	--	--	1.2	--	211	29	3,830	64	19	48	264	7.4
Nov. 14, 16-18	1,534	--	--	29	6.9	82	16	16	16	66	--	--	1.8	--	256	31	1,060	101	34	43	397	7.2
Nov. 21-24, 29-30	1,244	--	--	58	13	60	168	26	26	116	--	--	1.0	--	412	56	271	198	60	40	695	7.8
Nov. 25-28	1,211	--	--	40	8.4	48	115	23	23	85	--	--	1.6	--	311	42	1,020	134	40	44	510	7.7
Dec. 1-5, 7	190	--	--	64	14	83	185	29	29	152	--	--	1.6	--	478	65	245	217	66	45	811	7.9
Dec. 6, 8-10	122	--	--	70	15	97	4.8	31	31	185	--	--	1.7	--	551	75	181	236	84	47	944	7.6
Dec. 11-20	88.8	13	0.05	78	18	115	196	31	31	106	--	--	1.0	0.05	635	86	152	268	106	48	1,080	7.8
Dec. 21-31	64.4	13	.00	88	21	137	215	36	36	266	.3	1.0	1.0	.06	730	99	127	306	130	49	1,250	7.9
Jan. 1, 3-5, 7-10, 1952	151	--	--	94	22	203	222	39	39	385	--	--	1.7	--	930	126	379	325	143	58	1,660	7.8
Jan. 2, 6	89.0	--	--	110	27	255	224	40	40	505	--	--	2.2	--	1,160	158	279	386	202	59	2,000	7.6
Jan. 11-20	143	8.1	.05	88	22	119	238	37	37	240	.1	1.1	1.1	.08	684	93	264	310	115	45	1,210	7.6

REMARKS.--Records of specific conductance of daily samples available in district office at Oklahoma City, Okla.

Records of discharge for water year October 1951 to September 1952 given in Water Supply Paper 1241.

Jan. 21-31, 1952...	67.9	10	.05	94	24	143	3.0	241	40	282	.1	.7	.11	788	1.07	144	333	136	48	1,360	7.7
Feb. 1-10.....	140	6.1	.05	84	22	135	3.0	203	39	265	.1	1.2	.07	720	.96	272	300	134	49	1,240	7.8
Feb. 11-20.....	51.8	6.6	.05	84	22	135	2.9	208	39	268	.1	1.2	.13	734	1.00	162	304	134	49	1,270	7.7
Feb. 21-23.....	91.3	---	---	84	23	132	---	186	43	270	---	1.2	---	339	.45	163	310	130	49	1,260	7.6
Feb. 24-25.....	1,163	---	---	84	23	132	---	671	31	92	---	1.4	---	338	.45	1,640	190	163	46	1,260	7.0
Feb. 26-29.....	777	---	---	48	14	79	---	107	32	161	---	1.1	---	438	.60	919	178	90	49	765	7.4
Mar. 1-6.....	348	---	---	53	13	78	---	136	33	148	---	1.0	---	448	.61	421	186	74	48	779	7.3
Mar. 7-9.....	1,285	---	---	43	11	51	---	113	32	97	---	1.4	---	346	.47	1,200	152	60	42	567	7.2
Mar. 10.....	4,760	---	---	22	6.3	26	---	56	21	49	---	1.4	---	218	.30	2,800	81	35	41	299	7.4
Mar. 11-13, 19.....	3,930	---	---	26	8.3	23	---	71	16	52	---	1.4	---	239	.33	2,540	99	41	34	334	7.1
Mar. 14, 20.....	660	---	---	34	8.9	31	---	95	22	62	---	1.3	---	271	.37	463	123	44	36	403	7.2
Mar. 15-17.....	304	---	---	36	9.0	45	---	106	21	81	---	1.3	---	308	.42	253	127	40	43	483	7.0
Mar. 18.....	1,430	---	---	53	14	85	---	118	31	173	---	2.3	---	466	.63	1,800	190	93	49	819	7.9
Mar. 21-24.....	1,337	---	---	47	11	44	---	140	25	83	---	1.0	---	327	.44	296	162	46	37	555	7.5
Mar. 25-30.....	167	---	---	56	13	60	---	154	29	118	---	.8	---	395	.54	178	193	67	40	700	7.9
Mar. 31.....	139	---	---	68	18	143	---	166	34	270	---	2.4	---	678	.92	254	244	108	56	1,200	8.1
Apr. 1-3, 5-8.....	395	---	---	57	15	75	---	147	30	152	---	1.9	---	464	.63	495	204	83	45	780	7.3
Apr. 4, 9-10.....	317	9.0	.10	65	18	119	---	153	35	235	---	1.8	---	623	.85	533	236	110	52	1,050	7.2
Apr. 11-19.....	197	---	---	64	16	83	2.8	174	37	165	.1	.5	.13	552	.75	294	226	83	44	876	7.6
Apr. 20.....	465	---	---	88	26	217	---	177	42	432	---	1.6	---	993	1.35	1,250	326	162	59	1,730	7.6
Apr. 21, 27-30.....	1,129	---	---	48	12	49	---	136	28	95	---	1.0	---	356	.48	1,090	170	58	38	576	7.3
Apr. 22, 24-26.....	1,806	---	---	36	9.2	34	---	106	24	64	---	1.2	---	275	.37	1,340	128	41	37	439	7.2
Apr. 23.....	3,600	---	---	20	5.5	30	---	61	24	43	---	1.6	---	208	.28	2,020	72	22	47	279	7.2
May 1-5.....	189	---	---	57	14	69	---	165	29	131	---	.7	---	440	.60	225	200	64	43	723	7.8
May 6-10.....	107	---	---	63	16	87	---	177	30	167	---	.7	---	532	.72	154	223	78	46	867	7.6
May 11-18.....	61.9	---	---	72	21	119	---	205	30	230	---	2.3	---	566	.89	110	266	98	49	1,110	7.9
May 19-20.....	49.5	---	---	96	28	235	---	219	34	460	---	1.7	---	1,120	1.52	150	354	175	59	1,850	7.6
May 21-23.....	327	---	---	84	25	191	---	180	34	385	---	3.0	---	900	1.22	795	312	165	57	1,590	8.0
May 24, 26-27.....	2,174	---	---	24	7.3	41	---	65	11	86	---	1.8	---	259	.35	1,520	90	37	50	411	7.3
May 28, 28-29.....	618	---	---	30	9.2	53	---	77	13	106	---	2.3	---	313	.43	522	113	50	50	512	7.5
May 30-31.....	62.5	---	---	39	11	65	---	96	16	133	---	2.0	---	372	.41	63	142	64	50	633	7.8

ARKANSAS RIVER BASIN--Continued  
 BIRD CREEK NEAR SPERRY, OKLA.--Continued

Date of collection	Mean discharge (cfs)	Temperature (°F)	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> )	Boiling point (°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, mg./nesium	Non-carbonate			
June 1, 9-10, 1952 ..	82.0		--	--	45	12	61		138	17	116	--	1.7	--	365	0.50	81	162	49	45	646	7.7
June 2-5 .....	90.0		--	--	51	14	84		126	16	174	--	2.9	--	464	.63	113	164	52	50	826	7.7
June 6-8 .....	816		--	--	36	11	47		114	17	88	--	2.0	--	293	.40	646	135	42	43	512	7.6
June 11-17 .....	36.4		--	--	57	15	78		178	20	146	--	1.2	--	442	.60	43	204	58	46	798	8.0
June 18-20 .....	15.7		--	--	66	19	97		197	21	190	--	1.8	--	534	.73	23	242	81	46	997	8.0
June 21-24 .....	11.4		--	--	72	18	124		202	20	238	--	1.9	--	642	.87	20	254	88	52	1,120	8.0
June 25-30 .....	6.68		--	--	81	21	152		207	23	300	--	2.2	--	758	1.03	14	286	119	53	1,330	7.9
July 1-6, 9 .....	23.3		--	--	86	24	185		226	20	360	--	1.9	--	878	1.19	55	313	128	56	1,540	7.9
July 7-8 .....	34.4		--	--	102	30	248		218	24	505	--	3.2	--	1,150	1.56	107	378	200	59	1,960	8.0
July 10 .....	67.0		--	--	77	19	107		221	26	208	--	2.4	--	613	.83	111	270	89	46	1,030	8.3
July 11-15, 19-20 .....	26.9		--	--	76	20	107		232	23	205	--	2.3	--	856	1.16	44	272	82	46	1,060	8.0
July 16-18 .....	61.7		--	--	87	24	139		206	22	332	--	1.9	--	856	1.16	44	316	146	52	1,420	7.7
July 21-31 .....	9.77		12	0.05	70	16	125	3.8	176	18	236	0.1	1.0	0.25	640	.87	17	240	96	53	1,120	7.8
Aug. 1-10 .....	3.54		13	.05	74	21	155	4.2	185	16	300	.3	1.2	.30	731	.99	7.0	271	120	55	1,300	8.2
Aug. 11 .....	32.0		--	--	86	25	221		185	24	446	--	1.2	--	1,050	1.44	92	318	158	60	1,700	8.4
Aug. 12, 16 .....	14.0		--	--	114	30	343		190	17	695	--	1.0	--	1,640	2.32	62	408	232	66	2,560	8.0
Aug. 13-15 .....	11.6		--	--	134	39	442		194	13	916	--	1.0	--	1,850	2.52	58	495	336	62	2,460	7.8
Aug. 17-20 .....	5.05		--	--	102	32	294		210	13	595	--	1.4	--	1,290	.75	18	368	214	62	2,320	8.0
Aug. 21-31 .....	3.31		13	.05	112	32	337	5.3	190	12	680	.2	1.3	.32	1,480	2.01	13	411	256	64	2,500	7.6
Sept. 1-10 .....	.63		13	.00	124	37	391	5.6	177	13	890	.1	1.2	.28	1,650	2.24	2.8	462	316	64	2,840	7.7
Sept. 11-20 .....	1.07		10	.00	134	41	449	6.0	175	15	905	.1	1.0	.32	1,790	2.43	5.2	503	360	66	3,130	7.7
Sept. 21-30 .....	1.84		10	.00	148	46	523	6.2	165	18	1,090	.3	1.0	.35	2,150	2.92	11	558	424	67	3,770	8.0
Weighted average	370		--	--	39	10	55		105	22	105	--	1.6	--	345	0.47	345	138	52	46	557	--

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

b Includes equivalent of 7 parts per million of carbonate (CO<sub>3</sub>).

Chemical analyses, in parts per million, water year October 1951 to September 1952.--Continued



## ARKANSAS RIVER BASIN--Continued

## BIRD CREEK NEAR SPERRY, OKLA.--Continued

Temperature (°F.) of water, water year October 1951 to September 1952

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

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 1952.

Water temperatures: October 1950 to September 1952.

EXTREMES, 1951-52.-- Dissolved solids: Maximum, 1,010 ppm Sept. 11-17; minimum, 190 ppm Nov. 13-14.

Hardness: Maximum, 302 ppm Sept. 24-30; minimum, 94 ppm Nov. 13-14.

Specific conductance: Maximum daily, 2,010 micromhos Sept. 16-17; minimum daily, 291 micromhos Nov. 13-14.

Water temperatures: Maximum, 89° F. June 15-17, 23-30, July 1-2; minimum, freezing point on many days during November, December, and January.

EXTREMES, 1947-52.-- Dissolved solids: Maximum, 1,630 ppm Feb. 20-22, 1948; minimum, 91 ppm June 22-30, July 1-2, 1948.

Hardness: Maximum, 500 ppm Feb. 20-22, 1948; minimum, 60 ppm June 22-30, July 1-2, 1948.

Specific conductance: Maximum daily, 4,010 micromhos Nov. 1, 1947; minimum daily, 143 micromhos June 24, 1948.

Water temperatures, 1950-52: Maximum, 89° F. June 15-21, 23-30, July 1-2, Aug. 17-21, 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 1951 to September 1952 given in Water Supply Paper 1241.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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 in adsorption ratio	Sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH	Color
														Parts per million	Tons per acre-foot	Calcium	Non-magnesium					
Oct. 1-2, 6-8, 1951	3,332	--	--	41	7.6	34	127	18	58	--	--	2.5	--	242	0.33	134	30	36	438	7.6		
Oct. 3-5, 9-10	1,300	--	--	70	11	40	221	25	70	--	--	2.2	--	348	.47	1,220	36	29	614	8.0		
Oct. 11, 18-20	2,250	--	--	54	9.8	46	163	21	84	--	--	2.0	--	321	.44	1,950	176	42	576	7.7		
Oct. 12-17	1,844	--	--	80	14	57	235	33	86	--	--	2.5	--	404	.55	2,010	257	48	724	8.2		
Oct. 19-20	1,506	--	--	59	9.2	55	134	26	102	--	--	3.2	--	353	.48	1,440	163	53	601	7.9		
Oct. 21-23	6,905	--	--	34	7.8	32	100	22	56	--	--	2.4	--	252	.34	4,700	117	35	402	7.4		
Oct. 24-31		--	--																			
Nov. 1-2, 7-10	7,935	--	--	41	7.4	39	138	27	53	--	--	1.7	--	256	.55	1,460	135	20	39	445	8.0	
Nov. 3-6	4,253	--	--	56	9.2	46	164	34	75	--	--	2.0	--	322	.44	1,690	178	43	36	569	7.7	
Nov. 11-12, 15-18	17,930	--	--	41	6.7	30	127	27	44	--	--	1.6	--	248	.34	12,010	130	26	34	401	7.3	
Nov. 13-14	26,899	--	--	28	5.8	24	90	25	32	--	--	1.3	--	180	.26	13,750	94	20	36	291	7.3	
Nov. 19-20	9,650	--	--	61	9.6	39	187	36	60	--	--	1.7	--	316	.43	8,400	192	38	31	550	7.5	
Nov. 21-30	7,065	13	0.92	57	9.7	35	2.7	172	35	58	0.0	1.6	0.07	321	.44	6,120	182	41	29	527	7.6	
Dec. 1-10	2,780	16	.70	74	12	47	2.6	222	41	79	.1	1.3	.04	493	.55	2,020	234	52	30	666	7.8	
Dec. 11-20	2,562	--	--	78	15	55	218	42	108	--	--	1.8	--	455	.62	3,150	256	78	32	764	7.9	
Dec. 21-31	1,456	11	.70	84	15	60	2.5	240	47	196	.0	2.2	.06	470	.64	1,850	271	74	32	790	7.6	
Jan. 1-10, 1952	2,944	--	--	83	18	62	232	52	121	--	--	2.4	--	512	.70	2,830	281	91	33	856	7.5	
Jan. 11-20	3,973	11	.70	72	14	51	2.3	201	47	87	.0	2.0	.06	402	.55	4,310	237	72	32	681	7.6	
Jan. 21-31	1,507	--	--	80	13	62	223	49	108	--	--	1.4	--	466	.63	1,900	253	70	35	786	7.7	
Feb. 1-10	3,339	9.4	.00	82	15	55	2.3	222	55	96	.0	1.6	.42	446	.61	4,010	266	84	31	746	7.8	
Feb. 11-20	1,463	--	--	78	16	66	221	57	114	--	--	1.7	--	462	.67	1,970	260	80	35	805	7.6	

Feb. 21-23, 27-29, 1952.....	2,578	--	72	17	74	201	54	134	--	1.7	--	485	.67	3,450	250	85	39	854	7.4
Feb. 24-26.....	4,897	--	50	12	59	134	44	90	--	1.3	--	364	.50	4,720	174	64	39	594	7.3
Mar. 1-2.....	2,369	--	74	18	75	178	55	154	--	2.0	--	494	.67	3,150	258	112	39	874	7.4
Mar. 3-5.....	11,553	--	53	13	50	149	47	92	--	1.6	--	350	.48	10,910	186	71	37	620	7.5
Mar. 6-10.....	9,898	--	39	9.4	26	112	33	46	--	2.0	--	280	.35	6,950	136	44	30	401	7.4
Mar. 11-15.....	27,869	--	39	7.2	24	112	39	38	--	2.8	--	236	.32	17,430	127	35	29	372	7.4
Mar. 16-20.....	12,165	--	56	10	32	171	35	50	--	2.2	--	291	.40	9,550	160	40	28	495	7.8
Mar. 21-31.....	5,893	11	.02	71	41	276	44	68	.1	2.0	.23	376	.51	5,980	230	62	28	624	--
Apr. 1-6.....	3,678	--	76	15	58	229	52	97	--	2.0	--	469	.63	4,570	251	64	34	755	7.7
Apr. 7-10.....	8,318	--	56	11	40	167	42	63	--	2.2	--	335	.46	7,520	184	48	32	551	7.5
Apr. 11-20.....	4,786	9.0	58	12	55	186	47	83	.1	1.7	.12	401	.55	5,130	209	56	35	642	7.6
Apr. 21, 28-30.....	7,367	--	64	12	41	178	40	67	--	1.6	--	346	.37	7,060	191	43	32	562	7.6
Apr. 22-26.....	13,387	--	53	11	31	169	37	52	--	1.4	--	302	.41	12,560	177	46	27	483	7.4
May 1-10.....	2,148	9.0	72	14	48	218	42	82	3	1.0	.10	410	.56	2,580	227	58	20	872	7.8
May 11-20.....	4,988	7.4	.07	82	63	247	42	108	.3	1.6	.16	478	.85	1,880	270	58	33	913	8.1
May 21-22.....	631	--	76	17	70	211	45	128	--	1.8	--	518	.70	5,070	260	94	37	890	8.1
May 23-27.....	5,736	--	53	11	48	154	35	78	--	2.5	--	339	.45	5,100	170	44	58	584	7.6
May 28-31.....	1,585	--	63	16	57	232	47	98	--	2.3	--	423	.58	1,810	228	62	55	711	7.9
June 1-2.....	907	--	68	18	83	a 212	44	143	--	1.8	--	506	.69	1,230	213	70	43	872	8.4
June 3-6.....	2,128	--	32	8.8	37	194	31	54	--	2.8	--	244	.35	1,400	116	21	41	418	8.0
June 7-10.....	2,528	--	63	17	56	b 206	47	97	--	1.9	--	412	.56	2,810	227	58	35	704	8.4
June 11-20.....	580	5.5	.07	65	13	193	43	125	.3	1.4	.16	450	.61	705	216	58	41	769	7.9
June 21-27.....	194	--	68	15	101	232	38	175	--	2.5	--	559	.76	295	231	66	40	948	8.2
June 28-30.....	109	--	72	17	128	209	36	53	--	2.8	--	634	.86	187	250	78	53	1,100	8.2
July 1-10.....	137	6.8	.07	74	16	277	32	208	.1	1.9	.30	594	.81	208	250	81	49	1,070	8.0
July 11-14, 17-20.....	299	--	78	19	132	211	27	252	--	5.0	--	716	.97	403	272	100	51	1,183	7.9

a Includes equivalent of 8 parts per million of carbonate (CO<sub>3</sub>).  
b Includes equivalent of 7 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 1951 to September 1952--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 adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	Color
														Parts per million	Tons per acre-foot	Tons per day	Calcium, mg./l.	Non-carbonate, mg./l.				
July 15-16, 1952...	159	--	--	86	21	196		c200	28	375	--	5.9	--	934	1.27	401	301	137	59	1,560	8.5	
July 21-25.....	146	--	--	64	20	131		171	27	252	--	4.3	--	680	.92	268	242	102	54	1,150	8.1	
July 26-31.....	86.7	--	--	78	22	187		198	33	352	--	2.9	--	880	1.20	206	285	123	59	1,490	7.9	
Aug. 1-10.....	81.2	7.8	0.00	71	20	197	5.4	174	27	355	0.1	1.9	0.40	856	1.16	188	259	116	62	1,500	8.1	
Aug. 11-12, 19-20...	91.2	--	--	75	20	164		181	34	342	--	2.8	--	841	1.14	207	269	120	60	1,460	7.8	
Aug. 13-18.....	96.3	--	--	62	18	143		160	35	262	--	2.8	--	681	.93	177	228	98	58	1,200	7.9	
Aug. 21-31.....	98.2	12	.00	82	19	183	5.9	192	37	330	.1	2.6	.42	854	1.16	226	282	125	58	1,470	7.7	
Sept. 1-10.....	50.6	18	.05	82	22	215	6.3	185	30	400	.1	2.2	.94	956	1.30	131	295	144	61	1,650	7.7	
Sept. 11-17.....	39.3	--	--	77	25	250		186	27	465	--	3.8	--	1,010	1.37	107	295	142	65	1,800	7.6	
Sept. 18-20.....	104	--	--	73	22	173		185	25	332	--	5.0	--	787	1.07	221	272	121	58	1,410	7.5	
Sept. 21-23.....	60.0	--	--	68	21	153		181	23	292	--	6.5	--	726	.99	118	256	108	57	1,300	7.8	
Sept. 24-30.....	47.9	--	--	89	25	220		183	28	425	--	3.9	--	964	1.31	125	302	152	61	1,710	7.4	
Weighted average.	3,640	--	--	55	11	41		162	37	68	--	1.9	--	329	0.45	3,230	182	50	33	545	--	--

c Includes equivalent of 9 parts per million of carbonate (CO<sub>3</sub>).

## ARKANSAS RIVER BASIN--Continued

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

Temperature (°F) of water, water year October 1951 to September 1952

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

## ARKANSAS RIVER BASIN--Continued

## NEOSHO RIVER NEAR COMMERCE, OKLA.

LOCATION.--At gaging station at bridge on county highway, 1½ miles upstream from Mud Creek, 1½ miles downstream from Four Mile Creek, and 4½ miles west of Commerce, Ottawa County.

DRAINAGE AREA.--5,876 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1952.

Water temperatures: November 1947 to September 1952.

EXTREMES, 1951-52.--Dissolved solids: Maximum, 495 ppm Sept. 1-10; minimum, 176 ppm Nov. 12-13, 16.

Hardness: Maximum, 364 ppm Jan. 1-8; minimum, 102 ppm Nov. 12-13, 16.

Specific conductance: Maximum daily, 824 micromhos Jan. 1, 3; minimum daily, 214 micromhos Nov. 16.

Water temperatures: Maximum, 94°F June 30, July 26; minimum, 33°F Dec. 21, 26, Jan. 6.

EXTREMES, 1947-52.--Dissolved solids: Maximum, 623 ppm Jan. 21-31, 1951; minimum, 83 ppm July 8-10, 1949.

Hardness: Maximum, 462 ppm Jan. 21-31, 1951; minimum, 51 ppm Aug. 11-12, 1948.

Specific conductance: Maximum daily, 1,030 micromhos Feb. 14, 1951; minimum, freezing point on many days during winter months.

Water temperatures: Maximum, 94°F June 30, July 26, 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 1951 to September 1952 given in Water-Supply Paper 1241.

Chemical analyses, in parts per million, water year October, 1951, to September, 1952

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> )	Boiron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Percent sodium carbonate	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium	Noncalcium			
Oct. 1-8, 1951.....	2,746	-	-	98	22	21	25	36	0	53	20	-	4.1	-	.07	0.55	2,690	335	72	12	642	8.1
Oct. 9-10, 1951.....	6,680	-	-	51	10	16	27	166	0	4	16	-	3.2	-	219	30	3,940	68	32	7	389	7.7
Oct. 11-14, 1951, 8-20	2,773	-	-	67	16	17	17	200	0	73	20	-	3.5	-	309	42	1,820	233	69	14	507	8.0
Oct. 12-13, 16-17	2,665	-	-	44	10	14	12	12	0	4	42	-	3.0	-	2.1	29	520	5	35	47	350	7.9
Oct. 21, 25-27, 31	2,364	-	-	61	21	10	10	189	0	76	6	-	3.0	-	3.3	43	2,000	239	64	9	482	7.7
Oct. 22-24	5,883	-	-	31	6,3	15	15	80	0	54	8,2	-	2.6	-	.33	26	2,830	53	38	24	278	7.1
Oct. 28-30	3,157	-	-	45	11	16	16	32	0	62	12	-	2.6	-	.242	33	2,060	158	49	8	369	7.9
Nov. 1-8	3,18	-	-	80	17	25	25	245	0	89	20	-	2.6	-	.382	52	3,280	270	69	7	585	8.2
Nov. 9-10	8,570	-	-	46	5,7	27	27	124	0	73	12	-	3.5	-	.253	34	5,650	38	37	30	378	7.5
Nov. 11, 14-15, 17	2,650	-	-	40	8,8	17	12	122	0	54	11	-	2.3	-	.225	31	7,320	36	33	2	327	7.1
Nov. 12-13, 16	18,070	-	-	28	7,8	7,7	7,7	79	0	38	8,8	-	2.5	-	.176	24	6,590	102	37	1	439	7.0
Nov. 18-20	3,3-3	-	-	64	14	13	13	176	0	73	15	-	2.9	-	3.0	46	2,770	217	74	11	471	7.5
Nov. 21-24, 26	2,775	-	-	70	13	24	24	200	0	86	16	-	3.1	-	.335	46	2,490	226	64	19	523	8.1
Nov. 25, 27-30	3,770	-	-	58	10	23	23	164	0	74	16	-	2.4	-	.287	39	2,920	186	51	21	467	7.7
Dec. 1-5	4,638	-	-	66	14	24	24	194	0	64	18	-	5.4	-	.328	45	1,450	222	66	19	516	7.5
Dec. 6-10	1,382	-	-	90	21	23	23	255	0	114	23	-	3	-	.421	58	1,560	311	102	4	659	7.8
Dec. 11-14	1,280	-	-	100	24	22	22	284	0	117	28	-	2.8	-	.465	63	1,580	346	116	12	722	7.7
Dec. 15-20	2,442	-	-	67	16	21	21	166	0	95	18	-	3.5	-	.336	46	2,220	233	81	17	529	7.5
Dec. 21-31	866	14	0.70	99	22	29	29	283	0	118	29	-	3.1	0.05	.476	.65	1,110	338	106	18	735	8.0

Jan. 1-8, 1952	1,160	--	--	103	26	25	276	0	142	30	--	2.6	--	.481	.67	1,540	364	136	13	757	7.8
Jan. 9-10	5,330	--	--	56	14	21	145	0	95	16	--	3.9	--	308	.42	4,330	197	78	19	493	7.7
Jan. 11-20	2,624	10	10	71	16	25	191	0	95	24	.1	4.0	.04	356	.48	2,710	243	66	18	558	7.7
Jan. 21-31	1,023	9.4	9.4	81	19	29	216	0	114	28	.1	2.6	.13	407	.55	1,120	280	102	16	631	7.6
Feb. 1, 9-10	1,457	--	--	68	19	22	184	0	104	24	--	3.7	--	335	.46	1,320	248	97	16	562	7.7
Feb. 2, 5-8	4,420	--	--	49	11	18	134	0	80	13	--	3.8	--	265	.36	3,160	168	66	19	388	7.4
Feb. 9-10	10,550	--	--	28	8.1	9.6	65	0	94	8.0	--	4.5	--	194	.26	5,330	103	50	17	237	7.2
Feb. 11-20	9,983	9.0	9.0	82	18	27	216	0	119	24	.1	2.4	.04	407	.55	1,080	219	102	17	562	7.6
Feb. 21-29	1,172	7.7	7.7	86	22	32	226	0	136	28	.1	1.4	.17	456	.62	1,440	310	123	16	662	7.6
Mar. 1-3, 5	4,266	--	--	76	21	25	200	0	121	26	--	2.2	--	381	.52	4,390	276	112	17	620	7.8
Mar. 4-10	5,893	--	--	48	12	26	132	0	70	20	--	3.3	--	274	.37	4,290	169	69	20	416	7.4
Mar. 11-20	13,190	7.4	7.4	43	9.2	15	132	0	51	11	.1	4.3	.14	240	.33	6,550	143	42	16	346	7.4
Mar. 21-27	4,684	--	--	50	11	19	132	0	61	14	--	4.5	--	254	.35	3,200	170	45	20	437	7.3
Mar. 28-31	2,320	--	--	80	18	18	232	7	78	18	--	4.6	--	358	.49	2,240	277	72	12	561	8.4
Apr. 1-5	2,997	--	--	78	16	27	241	0	86	21	--	3.7	--	379	.52	3,070	260	63	19	578	8.0
Apr. 6-9	6,580	--	--	50	10	20	145	0	63	15	--	3.6	--	284	.36	4,690	166	47	20	394	7.7
Apr. 11-15	4,882	--	--	70	16	24	219	0	83	17	--	3.7	--	354	.48	4,670	240	61	18	539	8.0
Apr. 16-20	6,166	--	--	51	11	16	160	0	52	13	--	3.2	--	255	.35	4,250	172	41	16	392	7.5
Apr. 21, 24-28	9,323	--	--	47	11	13	153	0	46	10	--	4.3	--	248	.34	6,240	162	37	15	364	8.1
Apr. 22-23, 29-30	5,705	--	--	61	14	21	189	0	70	17	--	4.6	--	327	.44	5,040	210	55	18	489	8.1
May 1-5	2,334	--	--	59	15	20	203	0	61	14	--	3.8	--	317	.43	2,000	209	43	17	474	8.2
May 6-10	1,942	--	--	80	19	21	268	5	65	18	--	3.8	--	384	.52	2,010	278	49	14	587	8.3
May 11-20	1,411	13	13	82	22	23	261	0	97	26	.3	1.6	.09	413	.66	1,570	295	81	14	624	7.9
May 21-22, 24, 28	3,060	--	--	73	23	27	233	4	98	24	--	3.5	--	389	.53	3,210	277	79	18	616	8.3

## ARKANSAS RIVER BASIN--Continued

NEOSHO RIVER NEAR COMMERCE, OKLA.--Continued

Chemical analyses, in parts per million, water year October 1951 to September 1952--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-lidum	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium mag-nesium	Non-carbonate			
May 23, 26, 30-31, 1952	2,262	--	--	43	12	17	138	138	0	57	12	--	4.4	--	231	0.31	1,410	157	44	19	380	8.0
May 25, 27, 29	3,613	--	--	59	15	20	182	182	0	74	16	--	4.3	--	300	.41	2,930	209	60	17	488	8.0
June 1-6	1,106	--	--	46	11	19	157	157	0	51	12	--	3.8	--	243	.33	726	160	31	21	395	8.0
June 7-10	1,507	--	--	69	16	22	205	205	5	69	24	--	3.6	--	337	.46	1,370	238	62	16	537	8.3
June 11-20	758	16	0.00	66	18	21	210	210	2	71	21	0.3	2.9	0.18	339	.46	694	239	63	16	536	8.3
June 21-25	310	--	--	56	16	24	190	190	0	66	23	--	2.3	--	310	.42	259	206	50	21	499	8.1
June 26-30	252	--	--	69	20	30	202	202	0	100	34	--	1.7	--	395	.54	269	254	89	20	610	8.1
July 1-3, 9-10	242	--	--	71	19	28	204	204	0	97	34	--	1.2	--	399	.54	261	255	88	19	612	8.0
July 4-8	225	--	--	60	16	25	192	192	0	70	27	--	1.2	--	329	.45	200	216	58	20	522	8.0
July 11-20	244	12	.00	69	18	25	197	197	0	104	30	.3	1.4	.33	378	.51	249	246	85	18	598	8.0
July 21-31	173	12	.00	68	19	28	213	213	0	91	28	.3	1.2	.35	376	.51	176	248	73	19	605	7.8
Aug. 1-10	116	--	--	60	19	27	201	201	0	74	30	--	1.8	--	333	.45	104	228	63	20	548	7.8
Aug. 11-20	202	12	.00	64	20	36	214	214	0	75	43	.1	1.1	.30	377	.51	206	242	67	24	633	8.1
Aug. 21, 23-24, 26	405	--	--	64	24	32	178	178	7	105	43	--	1.4	--	397	.54	434	256	101	21	616	8.5
Aug. 22	313	--	--	28	10	19	79	79	0	56	16	--	9.3	--	186	.26	159	111	46	28	279	8.1
Aug. 25, 27-31	234	--	--	73	28	39	204	204	3	127	54	--	.8	--	461	.63	291	297	125	22	717	8.3
Sept. 1-10	122	--	--	72	29	53	219	219	0	140	62	--	.8	--	495	.67	163	289	119	28	775	8.1
Sept. 11-20	10.9	6.4	.00	76	28	45	224	224	0	126	59	.3	1.1	.46	407	.64	89	305	121	24	777	8.0
Sept. 21-30	34.8	6.4	.00	76	28	42	215	215	0	135	53	.3	1.7	.37	476	.65	45	305	129	23	737	8.0
Weighted average	2,633	--	--	56	13	19	a166	a166	--	70	16	--	3.5	--	292	0.40	2,080	193	57	18	448	--

a Includes equivalent of individual carbonate values shown above.



## ARKANSAS RIVER BASIN--Continued

## NEOSHO RIVER NEAR COMMERCE, OKLA.--Continued

Temperature (°F) of water, water year October 1951 to September 1952

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	70	46	44	38	44	44	58	70	74	90	90	80
2	71	42	54	36	48	45	59	--	78	96	90	75
3	73	45	52	34	45	43	57	74	80	88	88	78
4	75	42	50	35	42	42	54	75	81	88	89	80
5	74	37	50	35	44	42	54	75	78	92	88	83
6	61	38	50	33	44	40	53	76	82	89	88	83
7	65	39	50	34	45	45	55	76	84	87	88	83
8	65	39	42	49	43	45	59	77	85	83	90	84
9	64	45	44	36	46	43	54	74	85	85	88	83
10	69	45	49	35	47	44	55	70	85	88	89	83
11	63	49	44	35	51	45	54	68	85	86	87	84
12	62	35	44	49	48	46	54	68	85	87	84	82
13	62	55	42	44	51	45	51	70	86	84	83	83
14	62	55	39	47	48	44	55	72	87	83	87	80
15	64	51	35	45	45	45	53	73	87	81	87	82
16	64	44	34	55	42	46	54	74	89	82	92	84
17	65	37	34	50	45	45	54	69	88	80	89	80
18	63	44	34	48	41	44	54	67	89	82	90	78
19	60	42	35	51	50	48	56	67	90	84	91	77
20	62	42	34	47	45	48	56	70	89	85	90	70
21	64	46	33	43	46	48	60	70	85	86	88	70
22	59	46	35	44	41	42	62	--	85	87	80	70
23	56	45	34	40	45	45	62	68	85	88	83	73
24	55	44	38	48	43	47	60	71	86	90	82	74
25	59	45	34	46	43	47	60	72	86	90	82	75
26	59	44	33	45	45	46	62	74	88	94	81	75
27	56	44	35	44	43	47	64	74	88	93	84	77
28	57	44	36	45	49	50	66	73	91	93	84	75
29	57	45	44	41	45	54	67	72	90	93	85	78
30	58	45	40	43	--	54	70	72	94	90	85	79
31	51	--	46	45	--	58	--	73	--	92	85	--
Average	63	44	41	43	45	46	58	72	86	88	87	79

## ARKANSAS RIVER BASIN--Continued

NEOSHO RIVER AT PENSACOLA RESERVOIR AT LANGLEY, OKLA.  
(Lake O' The Cherokees)

LOCATION.--Immediately below dam on Neosho River at Langley, Mayes County, 10 miles upstream from Big Cabin Creek, and 3½ miles upstream from gaging station near Langley.

DRAINAGE AREA.--10,298 square miles

RECORDS AVAILABLE.--Chemical analyses: October 1951 to September 1952.

Water temperatures: October 1951 to September 1952.

EXTREMES, 1951-52.--Dissolved solids: Maximum, 237 ppm July 1-31; minimum, 155 ppm Oct. 1-31.

Hardness: Maximum, 166 ppm Sept. 1-30; minimum, 104 ppm Oct. 1-31.

Specific conductance: Maximum, 386 micromhos Mar. 10, July 9; minimum, 234 micromhos Oct. 18.

Water temperatures: Maximum, 76°F July 27-31; minimum 50°F Jan. 8-11.

REMARKS.--Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of discharge for gaging station near Langley for water year October 1951 to September 1952 given in Water-Supply Paper 1241. No appreciable inflow between sampling station and gaging station except during periods of heavy local rain.

Chemical analyses, in parts per million, water year October 1951 to September 1952

Date of collection	Mean discharge (cfs)	Temperature (°F)	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. 1-31, 1951 .....	5,951		10	0.10	33	5.3	7.5	3.0	97	30	6.0	0.1	2.8	0.06	155	0.21	2,490	104	25	13	238	7.6
Nov. 1-30 .....	16,120		10	.10	37	6.1	8.6	3.0	106	39	6.8	.1	3.1	.00	174	.24	7,570	117	28	13	279	7.8
Dec. 1-31 .....	5,740		8.9	.06	41	7.3	10	2.7	110	52	8.0	.1	3.0	.03	191	.26	2,960	132	42	14	302	7.8
Jan. 1-31, 1952 .....	5,000		8.7	.02	40	7.2	9.3	3.0	108	46	7.8	.1	3.5	.12	200	.27	2,700	129	41	13	301	7.7
Feb. 1-29 .....	8,549		8.8	.02	44	7.8	10	2.8	116	52	8.5	.1	3.9	.04	212	.29	4,890	142	47	13	327	7.6
Mar. 1-31 .....	11,640		8.2	.05	49	8.2	11	2.2	117	62	10	.1	5.0	.08	222	.30	6,960	156	60	13	353	7.6
Apr. 1-30 .....	9,458		6.9	.05	47	7.9	12	2.1	117	61	9.8	.1	4.6	.23	231	.31	5,900	150	54	15	352	7.8
May 1-31 .....	5,082		9.0	.00	49	7.6	13	2.1	127	61	10	.1	4.3	.27	230	.31	3,160	154	49	13	356	7.9
June 1-30 .....	3,920		9.7	.00	50	8.0	12	2.0	133	56	11	.1	3.7	.14	231	.31	2,450	158	49	14	372	7.8
July 1-31 .....	2,554		9.5	.00	52	8.5	13	2.1	140	56	10	.1	3.3	.30	237	.32	1,630	165	50	14	379	8.1
Aug. 1-31 .....	1,654		6.3	.00	51	9.1	14	2.1	144	57	11	.1	2.4	.28	234	.32	1,040	165	47	15	383	7.8
Sept. 1-30 .....	2,019		5.8	.00	52	8.7	13	2.2	148	56	10	.3	1.4	.31	233	.30	1,220	166	44	14	377	7.9
Weighted average ..	6,449		8.9	--	44	7.3	10	2.5	116	51	8.6	0.1	3.7	0.11	205	0.28	3,570	140	45	13	322	--

## ARKANSAS RIVER BASIN--Continued

NEOSHO RIVER AT PENSACOLA RESERVOIR AT LANGLEY, OKLA.--Continued  
(Lake O' The Cherokees)

Temperature (°F) of water, water year October 1951 to September 1952

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

## ARKANSAS RIVER BASIN--Continued

## NEOSHO RIVER AT FORT GIBSON RESERVOIR NEAR FORT GIBSON, OKLA.

LOCATION.--Immediately below dam on Neosho River, 7.7 miles upstream from mouth, 4 miles north of Fort Gibson, Wagoner County, and 1.1 miles upstream from gaging station.

DRAINAGE AREA.--12,492 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1951 to September 1952.

Water temperatures: October 1951 to September 1952.

EXTREMES, 1951-52.--Dissolved solids: Maximum, 229 ppm July 1-31; minimum, 158 ppm Oct. 1-31.

Hardness: Maximum, 160 ppm Aug. 1-31; Sept. 1-30; minimum, 101 ppm Oct. 1-31.

Specific conductance: Maximum, 387 microhmhos Aug. 17; minimum, 200 microhmhos Oct. 30.

Water temperatures: Maximum, 86° F Aug. 4; minimum, 34° F Dec. 21.

REMARKS.--Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of discharge for gaging station near Fort Gibson for water year October 1951 to September 1952 given in Water-Supply Paper 1241. 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 1951 to September 1952

Date of collection	Mean discharge (cfs)	Tem- perature (°F)	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 (residue at 180° C)			Hardness as CaCO <sub>3</sub>		Per- cent so- dium	Specific conduct- ance (micro- mhos at 25° C)	pH
															Parts per mil- lion	Tons per acre- foot	Tons per acre- foot	Calcium, mag- nesium	Non-carbon- ate			
Oct. 1-31, 1951...	6,608		10	0.10	32	5.2	8.3	2.8	98	30	7.8	0.1	2.5	0.04	158	0.21	2,820	101	21	15	242	7.5
Nov. 1-30, 1951...	15,510		10	0.10	34	5.4	8.4	2.7	99	34	7.5	0.1	2.6	0.00	186	.23	6,950	107	26	14	257	7.5
Dec. 1-31, 1951...	9,672		10	0.06	40	6.4	9.8	2.6	109	47	8.5	0.1	3.2	0.01	185	.25	4,830	128	37	14	285	7.8
Jan. 1-31, 1952...	5,662		9.0	0.02	40	7.4	9.7	2.8	106	47	10	0	3.7	0.10	196	.27	3,000	130	43	14	305	7.4
Feb. 1-28, 1952...	9,824		8.2	0.02	41	6.9	11	2.6	110	48	9.0	0	3.8	0.15	200	.27	5,360	131	40	13	307	7.6
Mar. 1-31, 1952...	13,000		8.1	0.02	44	7.2	10	2.4	111	52	9.0	0.1	3.8	0.11	202	.27	7,080	140	48	13	323	7.6
Apr. 1-30, 1952...	11,950		7.4	0.02	44	6.6	10	1.9	109	54	9.0	0.1	3.9	0.20	205	.28	6,560	137	48	13	319	7.9
May 1-31, 1952...	7,013		7.9	0.02	46	7.4	12	2.1	120	57	11	0.3	3.2	0.08	216	.29	4,090	145	47	15	337	7.8
June 1-30, 1952...	4,510		8.1	0.00	43	7.8	12	2.2	126	56	12	0.1	2.6	0.17	222	.30	2,700	152	49	15	365	8.0
July 1-31, 1952...	2,418		8.9	0.00	49	8.5	14	2.2	133	55	13	0.1	2.3	0.30	229	.31	1,500	155	46	16	375	7.8
Aug. 1-31, 1952...	2,037		8.8	0.02	49	9.1	15	2.4	136	55	14	0	1.6	0.32	226	.31	1,240	160	48	17	384	7.6
Sept. 1-30, 1952...	4,947		8.7	0.00	50	8.6	16	2.4	140	55	14	0.3	1.8	0.42	222	.30	1,170	160	45	18	360	7.8
Weighted average..	7,489		8.7	--	41	6.7	10	2.5	110	47	9.3	--	3.2	--	194	0.26	3,920	130	40	14	306	--

## ARKANSAS RIVER BASIN--Continued

## NEOSHO RIVER AT FORT GIBSON RESERVOIR NEAR FORT GIBSON, OKLA.--Continued

Temperature (°F) of water, water year October 1951 to September 1952

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

## LOWER MISSISSIPPI RIVER BASIN

## ARKANSAS RIVER BASIN--Continued

## MORA RIVER AT LOMA PARDA, N. MEX.

LOCATION.--At bridge on county road at Loma Parda, Mora County, about 5 miles below Coyote Creek.

DRAINAGE AREA.--530 square miles (above gaging stations, see REMARKS).

RECORDS AVAILABLE.--Water temperatures: April 1949 to September 1952. (Station discontinued Sept. 30, 1952.)

Sediment records: January 1949 to September 1952. (Station discontinued Sept. 30, 1952.)

EXTREMES, 1951-52.--Water temperatures: Maximum observed, 83°F July 27; minimum, freezing point on several days in December and January.

Sediment concentrations: Maximum daily, not determined; minimum daily, 4 ppm Oct. 11-20, April 1-10, June 24-30, composite periods.

Sediment loads: Maximum daily, 200,000 tons (estimated) Aug. 22; minimum daily, less than 0.50 ton on many days.

EXTREMES, 1949-52.--Water temperatures: Maximum observed, 88°F July 7, 1949; minimum, freezing point on many days during winter months.

Sediment concentrations: Maximum daily, not determined; minimum daily, 4 ppm Oct. 11-20, 1951, April 1-10, June 24-30, 1952, composite periods.

Sediment loads: Maximum daily, 200,000 (estimated) tons Aug. 22, 1952; minimum daily, less than 0.50 ton on many days.

REMARKS.--Records of discharge for water year October 1951 to September 1952 are summations of records for Mora River near Golondrinas and Coyote Creek near Golondrinas, which are given in Water-Supply Paper 1241. No appreciable inflow between stations and sampling point except during periods of heavy local rains.

Temperature (°F) of water, water year October 1951 to September 1952  
 (Once-daily temperature measurement taken between 11:00 a. m. and 6:00 p. m.)

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

a Observations made before 11:00 a. m.

b Observations made after 6:00 p. m.

## ARKANSAS RIVER BASIN

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## ARKANSAS RIVER BASIN--Continued

## MORA RIVER AT LOMA PARDA, N. MEX.--Continued

Suspended sediment, water year October 1951 to September 1952

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-----	4.7			4.0			4.6		
2-----	4.5			3.7			4.3		
3-----	4.2			4.0			4.8		
4-----	4.0			4.1			4.6		
5-----	3.8	44	(t)	3.8			5.5	20	(t)
6-----	3.6			4.2	20	(t)	5.0		
7-----	3.8			4.9			4.8		
8-----	3.8			5.1			4.6		
9-----	4.0	39	(t)	4.7			4.4	26	(t)
10-----	3.8	58	1	4.5			4.4		
11-----	3.9			4.4			4.6	30	a (t)
12-----	4.0			4.3			4.8		
13-----	3.7			4.2			5.0		
14-----	3.7			4.2			5.5		
15-----	3.9			4.5			4.9		
16-----	3.9	4	(t)	4.5	12	(t)	5.1	46	1
17-----	3.9			4.0			5.3		
18-----	3.8			4.0			5.5		
19-----	3.8			3.9			5.5		
20-----	3.8			3.7			5.5		
21-----	3.7			3.7			5.0		
22-----	3.0			3.9			5.3		
23-----	2.3			4.4	8	(t)	5.5		
24-----	2.6			4.5			5.5		
25-----	3.1			4.8			6.0		
26-----	3.5	32	(t)	4.8			5.5	26	(t)
27-----	3.4			4.6			5.5		
28-----	3.3			4.5	20	(t)	6.0		
29-----	3.0			4.5			6.3		
30-----	2.7			4.5			6.7		
31-----	3.0			--	--	--	7.2		
Total-	112.2	--	8	128.9	--	5	163.2	--	13
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-----	6.8			3.8			3.4		
2-----	6.5			3.6			3.8		
3-----	5.0			3.0			3.4		
4-----	3.6			3.0			3.0		
5-----	3.0	23	(t)	3.2			3.4		
6-----	3.0			3.7	11	(t)	4.0	13	(t)
7-----	3.0			3.7			4.6		
8-----	3.5			3.7			5.4		
9-----	3.5			3.6			5.4		
10-----	3.0			4.0			5.2		
11-----	3.0			3.4			4.5		
12-----	3.2			4.0			4.4		
13-----	3.8			3.7			4.0		
14-----	3.7			3.5			4.0		
15-----	3.3	15	(t)	3.3			4.4		
16-----	3.3			3.6	14	(t)	4.8	12	(t)
17-----	3.4			4.0			4.6		
18-----	3.8			3.9			6.0		
19-----	3.2			3.5			7.6		
20-----	3.4			2.6			7.6		
21-----	3.3			3.0			7.6		
22-----	2.3	32	(t)	3.0			5.6		
23-----	2.5			3.0			4.6		
24-----	2.9			2.8	15	(t)	5.1		
25-----	3.7			2.6			5.9		
26-----	3.5			2.8			6.0	33	(t)
27-----	4.0			3.0			6.6		
28-----	4.2	17	(t)	3.4			4.8		
29-----	3.7			3.3			2.4		
30-----	4.0			--	--	--	2.1		
31-----	4.2			--	--	--	1.9		
Total-	113.3	--	6	97.7	--	3	146.1	--	7

t Less than 0.50 ton.

a Computed from estimated concentration graph.

## LOWER MISSISSIPPI RIVER BASIN

## ARKANSAS RIVER BASIN--Continued

## MORA RIVER AT LOMA PARDA, N. MEX.--Continued

Suspended sediment, water year October 1951 to September 1952--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-----	1.6	4	(t)	103	455	127	73.6	154	31
2-----	1.5			96	432	112	76.0		
3-----	1.6			110	433	129	71.5		
4-----	2.2			122	714	235	79.6		
5-----	1.6			141	1,280	487	73.2		
6-----	2.2	44	1	134	916	331	63.8	230	44
7-----	2.9			148	924	369	66.5		
8-----	2.5			125	686	232	74.2		
9-----	5.0			107	499	144	83.0		
10-----	9.2			86.7	534	125	91.4		
11-----	7.8	44	1	83	419	94	87.3	408	92
12-----	5.4			54	300	a 44	73.0		
13-----	7.4			42.8	300	a 35	62.7		
14-----	9.8			26.0			53.7		
15-----	8.0			35.8			56.8		
16-----	8.4	176	s 28	46.8	159	24	52.2	86	9
17-----	10.6			65.2			32.3		
18-----	19.6			76			30.3		
19-----	15.8			74			35.4		
20-----	36.4			60			27.4		
21-----	74.3	620	124	61	190	22	26.2	4	(t)
22-----	76.5	580	120	53.9			23.2		
23-----	68.5	454	84	45.0			17.1		
24-----	65.4	180	32	32.0			12.1		
25-----	65	184	32	35.9			10.8		
26-----	65	180	32	28.0	421	54	10.2	4	(t)
27-----	67	225	41	19.4			8.3		
28-----	86	288	67	52			6.1		
29-----	115	1,100	342	52.9			5.1		
30-----	102	712	196	53.8			3.5		
31-----	--	--	--	58.6			--	--	--
Total-	944.2	--	1,107	2,228.8	--	3,034	1,386.5	--	781
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-----	3.0	68	1	9.4	66	2	82	256	57
2-----	2.4			7.5			74	171	34
3-----	3.2			58.2	2,150	741	63.3	144	25
4-----	7.2			17.3	1,200	56	42.6	113	13
5-----	3.7			15.5	356	15	34.5	103	10
6-----	4.0	54	1	15.2	301	12	29.7	84	7
7-----	4.8			11.7	220	7	25.0	63	4
8-----	16.2			11.8	193	6	20.0	52	3
9-----	8.9			14.2	150	6	14.4	53	2
10-----	4.4			14.2	180	7	13.2	30	1
11-----	3.2	45	1	14.2	136	5	11.7	35	1
12-----	4.9			14.2	122	5	49	2,880	s 403
13-----	4.9			29	1,300	s 215	181	5,710	s 2,910
14-----	4.7			18.2	900	44	72	900	175
15-----	8.5			14.6	430	17	56	536	81
16-----	5.9	66	1	10.7	271	8	61	924	152
17-----	7.5			9.9	200	5	46	501	62
18-----	9.1			17.7	250	12	43	351	41
19-----	5.7			26.6	1,500	108	35.3	286	27
20-----	5.0			17.2	600	28	34.7	203	19
21-----	3.9	59	1	25	3,820	s 398	33.0	121	11
22-----	4.0			1,240	--	b 200,000	46	127	16
23-----	5.3			264	--	b 8,000	71	438	84
24-----	10.8			117	--	b 1,000	60	272	44
25-----	5.4			152	--	b 3,000	51	162	22
26-----	5.2	68	1	131	--	b 1,500	43	110	13
27-----	4.5	96	1	80.3	1,750	379	38	83	9
28-----	3.3	79	1	88.8	1,790	s 449	35.0	58	5
29-----	4.1	66	1	270	7,080	s 5,390	34.4	47	4
30-----	6.6			139	1,500	563	34.2	49	5
31-----	8.2			97	420	110	--	--	--
Total-	178.5	--	34	2,951.4	--	222,090	1,434.0	--	4,240

Total discharge for year (cfs-days) ..... 9,884.8  
 Total load for year (tons) ..... 231,328

s Computed by subdividing day.

t Less than 0.50 ton.

a Computed from estimated concentration graph.

b Computed from water-sediment discharge curve.



## ARKANSAS RIVER BASIN--Continued

MORA RIVER AT LOMA PARDA, N. MEX.--Continued

Particle-size analyses of suspended sediment, August 1952

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

Date of collection	Time	Water 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
Aug. 3, 1952 . . .	6:30 p. m.	230		5,530	3,140	11	40		88	94			99	100	SPN
Aug. 22, . . . . .	5:30 p. m.	167		9,920	3,270	34	65		99	100	97				SPWCM

## ARKANSAS RIVER BASIN--Continued

UTE CREEK NEAR BUEYEROS, N. MEX.

LOCATION. --At gaging station at ford on New Mexico State Highway 57, 3½ miles northwest of Bueyeros, Harding County, and 19½ miles northeast of Mosquero. DRAINAGE AREA. --520 square miles, approximately.

RECORDS AVAILABLE. --Chemical analyses: February 1950 to September 1952.

Water temperatures: March 1949 to September 1952.

Sediment records: March 1949 to September 1952.

EXTREMES, 1951-52. --Dissolved solids: Maximum, 478 ppm June 1-30; minimum, 240 ppm Aug. 6, 21-31.

Hardness: Maximum, 266 ppm June 1-30; minimum, 162 ppm Aug. 6, 21-31.

Specific conductance: Maximum observed, 1,210 microhos May 16; minimum observed 320 microhos Aug. 24.

Water temperatures: Maximum observed, 93°F July 25; minimum, freezing point on several days during winter months.

Sediment concentrations: Maximum daily, 21,700 ppm Aug. 23; maximum observed, 51,200 ppm Aug. 19; minimum daily, no flow July 23-29.

Sediment loads: Maximum daily, 197,000 tons Aug. 22; minimum daily, 0 ton July 23-29.

EXTREMES, 1949-52. --Dissolved solids (1950-52): Maximum 674 ppm June 20, 1950; minimum, 142 ppm July 31, 1950.

Hardness (1950-52): Maximum, 266 ppm June 1-30, 1952; minimum, 89 ppm July 31, 1950.

Specific conductance (1950-52): Maximum observed, 1,400 microhos June 20, 1950; minimum observed, 175 microhos July 31, 1950.

Water temperatures: Maximum observed, 94°F June 16, 1950; minimum, freezing point on many days.

Sediment concentrations: Maximum daily, 21,700 ppm Aug. 23, 1952; minimum daily, 0 ton on several days.

Sediment loads: Maximum daily, 200,000 tons May 18, 1951; minimum daily, 0 ton on several days.

REMARKS. --Values reported for dissolved solids are sums of determined constituents. Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of discharge on water year October, 1951 to September 1952 given in Water-Supply Paper 1241. Stage-discharge relation affected by ice Dec. 7-28, Jan. 4-11, 13-31, Feb. 1-6, 12-14, 24-26.

## Chemical analyses, in parts per million, water year October 1951 to September 1952

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 (sum)			Hardness as CaCO <sub>3</sub>		Per-cent so-dium adsorp-tion ratio	Specific conduct-ance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, mag-nesium	Non-carbon-ate			
Oct. 1-31, 1951 ...	2.90	18		41	29	82		278	0	125	27	1.4	0.4		461	0.63	3.61	222	0	45	2.4	754
Nov. 1-30 ...	3.69	16		44	28	69		274	0	106	25	1.3	.5		425	.58	4.23	225	0	40	2.0	688
Dec. 1-31 ...	5.36	17		46	29	67		280	0	109	24	1.2	.6		432	.59	6.25	234	4	39	1.9	701
Jan. 1-31, 1952 ...	8.58	16		47	28	65		281	0	107	23	1.1	.5		427	.58	9.89	236	6	37	1.8	699
Feb. 1-29 ...	4.45	14		48	30	65		283	0	110	25	1.1	.5		433	.59	5.20	244	12	37	1.8	710
Mar. 1-31 ...	4.74	19		44	33	69		286	0	114	29	--	.7		450	.61	5.76	246	11	38	1.9	725
Apr. 1-30 ...	6.07	18		44	32	69		281	0	115	29	--	.9		446	.61	7.31	282	11	38	1.9	725
May 1-31 ...	7.22	20		44	34	70		294	0	129	31	--	.6		477	.65	9.30	250	9	40	2.1	770
June 1-30 ...	1.86	23		42	39	70		293	0	128	31	--	.6		478	.65	2.40	266	26	36	1.9	779
July 1-24, 1952, 19-24, 30, 31 a ...	5.88	21		42	32	79		283	0	126	29	1.6	.2		470	.64	7.46	236	4	42	2.2	743
July 3-4, 17-18 ...	80.5	16		46	15	18		170	0	59	6	.8	4.7		250	.34	5.43	176	37	18	.6	401
Aug. 1-5, 7-20 ...	10.5	19		42	28	71		273	0	107	26	1.4	2		429	.58	12.2	220	0	41	2.9	692
Aug. 6, 21-31 ...	430	20		45	12	23		205	0	28	8.0	1.2	1.8		240	.33	279	162	0	24	.3	387
Sept. 1-30 ...	3.34	19		47	24	70		265	0	112	22	1.2	.1		425	.58	3.83	216	0	41	2.1	678
Weighted average b	20.3	19		45	17	33		222	0	51	12	--	1.6		288	0.39	15.5	182	0	28	1.1	469

a No flow July 23-29.

b Average for 359 days of flow.

## ARKANSAS RIVER BASIN--Continued

## UTE CREEK NEAR BUEYEROS, N. MEX.--Continued

Temperature (°F) of water, water year October 1951 to September 1952

/Once-daily temperature 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	73	31	52	40	54	45	66	71	63	b 74	82	76
2	70	45	50	37	46	39	51	74	a 57	--	87	68
3	70	47	43	32	39	42	59	70	71	79	b 70	78
4	67	55	47	32	48	41	67	b 66	77	80	83	84
5	68	38	45	34	42	51	67	76	78	82	b 68	82
6	67	52	35	33	43	52	67	71	81	73	82	b 71
7	65	52	35	38	49	53	63	73	76	66	a 64	b 62
8	b 62	48	32	40	48	57	64	70	78	79	b 70	74
9	--	52	34	41	51	55	54	52	77	82	b 65	68
10	69	55	35	38	50	56	41	a 49	76	79	b 81	70
11	70	50	37	50	42	52	46	75	77	86	83	a 68
12	66	52	40	48	52	40	51	73	75	72	81	77
13	62	40	45	51	47	51	53	74	72	b 75	84	77
14	--	43	39	50	38	50	63	61	--	82	--	72
15	61	43	35	50	44	55	64	71	76	70	83	77
16	48	43	36	45	47	55	71	55	77	81	a 85	78
17	56	42	39	45	47	51	68	45	74	61	b 70	79
18	55	50	a 31	50	47	56	72	51	73	79	72	79
19	65	50	39	50	48	54	71	63	73	76	b 70	79
20	64	55	32	40	49	62	54	70	84	b 72	b 78	58
21	a 58	50	34	32	48	32	60	61	75	81	b 67	60
22	a 54	52	36	42	53	32	60	a 63	73	77	71	62
23	55	50	37	39	45	50	69	63	73	84	a 62	--
24	58	36	38	46	47	55	62	64	b 68	81	a 65	77
25	a 59	43	38	42	43	55	58	a 60	73	93	86	73
26	53	46	40	a 40	53	40	b 64	67	--	b 75	a 78	75
27	60	45	38	42	49	60	68	68	76	b 71	76	65
28	55	50	50	49	51	60	55	71	b 68	80	68	79
29	56	51	49	51	53	a 38	71	63	82	78	80	--
30	51	55	50	48	--	62	51	74	--	76	a 64	--
31	41	--	44	48	--	62	--	72	--	82	b 72	--
Average	61	47	50	43	47	50	61	66	74	78	75	73

a Reading obtained prior to 11:00 a. m.

b Reading obtained later than 6:00 p. m.

## LOWER MISSISSIPPI RIVER BASIN

## ARKANSAS RIVER BASIN--Continued

## UTE CREEK NEAR BUEYEROS, N. MEX.--Continued

Suspended sediment, water year October 1951 to September 1952

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-----	1.2	23	(t)	6.4	76	1	4.7	67	1
2-----	1.6			7.4			4.7		
3-----	1.2			6.4			5.5		
4-----	.9			4.7			5.5		
5-----	1.6			6.4			5.5		
6-----	2.0	20	(t)	2.9	116	1	7.4	226	3
7-----	2.0			2.0			6		
8-----	2.4			2.4			5		
9-----	2.4			2.4			3		
10-----	2.4			2.4			3		
11-----	2.4	87	1	2.9	124	1	4	142	2
12-----	2.0			2.9			5		
13-----	1.6			3.5			5		
14-----	2.0			3.5			5		
15-----	2.0			3.5			3		
16-----	1.6	87	1	2.9	124	1	3	142	2
17-----	2.4			2.9			4		
18-----	2.4			3			5		
19-----	2.9			3			6		
20-----	3.5			3			5		
21-----	2.9	87	1	2.9	124	1	3	142	2
22-----	3.5			3.5			3		
23-----	3.5			3.5			3		
24-----	2.9			4.1			3		
25-----	2.9			4.1			3		
26-----	3.5	87	1	4.1	124	1	3	142	2
27-----	7.4			4			3		
28-----	6.4			3			8		
29-----	5.5			3			13		
30-----	5.5			4			16		
31-----	5.5	87	1	--	--	--	14	99	4
Total--	90.0	--	13	110.7	--	30	186.3	--	62
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-----	14	132	3	5	189	2	5.5	103	1
2-----	14			4			7.4		
3-----	10			5			7.4		
4-----	4			4			7.4		
5-----	3			4			5.5		
6-----	4	132	3	4	141	1	4.1	84	1
7-----	5			3.5			4.1		
8-----	8			2.9			4.1		
9-----	10			2.4			4.1		
10-----	8			2.4			4.1		
11-----	10	145	5	3.5	176	2	3.5	97	1
12-----	17			3			4.1		
13-----	15			3			3.5		
14-----	12			3			2.9		
15-----	11			4.1			2.4		
16-----	10	106	2	4.1	131	2	2.9	97	1
17-----	11			4.1			2.9		
18-----	12			4.1			2.9		
19-----	13			5.5			3.5		
20-----	12			7.4			3.5		
21-----	8	106	2	5.5	131	2	4.7	97	1
22-----	5			5.5			6.4		
23-----	2			7.4			6.4		
24-----	5			6			4.7		
25-----	10			4			5.5		
26-----	9	100	1	5	--	--	6.4	--	--
27-----	8			6.4			7.4		
28-----	6			5.5			6.4		
29-----	4			4.7			5.5		
30-----	3			--			4.1		
31-----	3	100	1	--	--	--	3.5	--	--
Total--	266	--	86	129.0	--	53	146.8	--	31

## ARKANSAS RIVER BASIN--Continued

## UTE CREEK NEAR BUEYEROS, N. MEX.--Continued

Suspended sediment, water year October 1951 to September 1952--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-----	4.7			26	5,000	351	8.4		
2-----	4.7			4.7	562	8	3.5	141	2
3-----	4.1			9.4	211	5	2.9		
4-----	4.1			12			2.4		
5-----	4.1			9.4			1.6		
6-----	4.1	66	1	9.4			1.2		
7-----	3.5			8.4			1.2		
8-----	2.4			8.4	78	2	.9	62	(t)
9-----	4.1			13			.6		
10-----	4.1			16			.6		
11-----	4.7			12			.6		
12-----	4.7			10			.6		
13-----	5.5			9.4			.6		
14-----	4.7			7.4	809	13	.9	50	a (t)
15-----	3.5			4.7			.9	37	(t)
16-----	4.1	102	1	6.4	1,650	29	.6		
17-----	5.5			9.4	2,470	63	.6	399	1
18-----	6.4			8.4			4.1	1,790	s 80
19-----	7.4			6.4	115	2	2.4		
20-----	17	111	5	6.4			1.2		
21-----	22	589	35	4.7			1.2		
22-----	17	12	1	3.5			2.0		
23-----	7.4	337	7	2.0			1.6		
24-----	2.4	185	1	2.4			1.2		
25-----	2.0	208	1	2.9	68	1	1.6	48	(t)
26-----	.9	99	(t)	2.0			1.6		
27-----	.7	98	(t)	2.0			2.0		
28-----	.6	127	(t)	2.0			2.4		
29-----	.9	92	(t)	1.6			2.9		
30-----	25	4,260	s 952	1.6			3.5	30	a (t)
31-----	--	--	--	2.0	141	1	--	--	--
Total-	182.0	--	1,022	223.9	--	518	55.8	--	92
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-----	5.5	29	(t)	68	2,580	s 766	20		
2-----	4.1	30	a (t)	20	220	12	13		
3-----	105	2,940	s 6,210	12			9.4		
4-----	113	3,710	s 1,850	8.4	20	1	5.5		
5-----	19			13			4.7		
6-----	10			72	1,560	s 1,430	2.9	315	6
7-----	7.4			22	700	42	2.9		
8-----	3.5			5.5			2.4		
9-----	2.4			4.7			2.4		
10-----	.6	502	(t) 6	2.4			2.0		
11-----	1.2			1.6			2.4		
12-----	.9			.6			2.4	125	1
13-----	.9			1.2			2.0		
14-----	1.2			13	77	1	.9		
15-----	1.2			7.4			.9	60	(t)
16-----	.6	29	(t)	3.5			.9		
17-----	57	1,700	s 2,280	1.6			.9		
18-----	47	2,120	s 533	.9			.6		
19-----	4.7			8.7	2,000	s 248	.4		
20-----	4.7			5.5	2,000	30	.1		
21-----	3.5	--	a 4	429	5,450	s 36,800	.9		
22-----	.2			2,050	16,100	s 197,000	3.5		
23-----	0			1,680	21,700	s 120,000	4.7	36	(t)
24-----	0			422	13,800	s 20,200	4.7		
25-----	0			118			2.4		
26-----	0		0	80	1,030	215	1.6		
27-----	0			34			1.6		
28-----	0			37	4,460	s 882	1.6		
29-----	0			162	4,990	s 2,420	1.2	21	(t)
30-----	24	1,720	s 352	55	4,010	595	1.2	18	(t)
31-----	22	989	s 163	27	1,680	122	--	--	--
Total-	439.6	--	11,465	5,366.0	--	381,206	100.1	--	65
Total discharge for year (cfs-days) .....								7,276.2	
Total load for year (tons) .....								394,643	

s Computed by subdividing day.

t Less than 0.50 ton.

a Computed by estimated concentration graph.

## ARKANSAS RIVER BASIN--Continued

## UTE CREEK NEAR BUEYEROS, N. MEX.--Continued

Particle-size analyses of suspended sediment, June to August 1952

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

Date of collection	Time	Water discharge (cfs)	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
June 18, 1952	4:30 p.m.	22	16,000	3,780	69	88	95	97	100						SPWCM
July 4	8:00 a.m.	100	3,190	3,240	78	86	93	96	98					--	SPWCM
July 17	10:30 p.m.	404	12,600	3,560	51	68	84	93	99					99	SPWCM
July 30	5:00 p.m.	72	3,840	3,840	38	58	85	96	98					99	SPWCM
Aug. 6	7:15 p.m.	338	5,130	3,350	49	66	77	85	97					100	SPWCM

## ARKANSAS RIVER BASIN--Continued

## UTE CREEK NEAR LOGAN, N. MEX.

LOCATION.--At Logan-Trigg Ranch road crossing, a quarter of a mile upstream from gaging station which is 5½ miles upstream from mouth, and 6 miles northwest of Logan, Ariz.

DETAILED.--2,075 square miles (at gaging station).

RECORDS AVAILABLE.--Chemical analyses: October 1950 to September 1952.

EXTREMES 1951-52.--Dissolved solids: Maximum 514 ppm Aug. 3-7, 9-10; minimum, 382 ppm Aug. 21-31.

Hardness: Maximum 290 ppm Aug. 3-7, 9-10; minimum 175 ppm Aug. 21-31.

Specific conductance: Maximum observed 902 micromhos Aug. 9; minimum observed, 507 micromhos Aug. 26.

EXTREMES 1950-52.--Dissolved solids: Maximum 1,210 ppm Apr. 24, 1951; minimum, 201 ppm May 15, 1951.

Hardness: Maximum 426 ppm Apr. 24, 1951; minimum, 124 ppm May 15, 1951.

Specific conductance: Maximum observed 1,770 micromhos Apr. 24, 1951; minimum observed 332 micromhos May 15, 1951.

REMARKS.--Values reported for dissolved solids are sums of determined constituents. Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of discharge for water year October 1951 to September 1952 given in Water-Supply Paper 1241. No appreciable inflow between sampling point and gaging station except during periods of heavy local rains.

Chemical analyses, in parts per million, December 1951 to September 1952

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 (sum)		Hardness as CaCO <sub>3</sub>	Percent sodium in total hardness	Specific conductance (micro-mhos at 25° C)	pH			
														Parts per million	Tons per acre-foot					Calcium	Non-carbonate	
Dec. 22-23, 1951 <sup>a</sup>	1.0	30	0.03	57	18	70	4.2	326	0	72	17	1.1	3.3	0.20	434	0.59	216	0	41	2.1	680	7.7
Apr. 17-18, 20-21, 1952	3.2	26	47	19	19	75	314	0	68	18	1.4	1.4	2.5	13	412	.56	196	0	46	2.3	659	7.8
Aug. 3-7, 9-10	28.6	24	77	24	69	294	0	130	43	170	4.0	1.0	6.0	18	514	.70	290	50	34	1.8	820	--
Aug. 21-31	495	25	42	17	68	247	0	89	17	1.0	1.8	1.8	1.8	18	382	.52	175	0	46	2.2	806	--
Sept. 1-2	6.0	22	51	23	87	254	0	135	41	1.2	1.2	1.2	1.2	29	486	.66	222	14	46	2.5	764	--
Weighted average <sup>b</sup>	218	25	43	17	68	249	0	90	18	1.0	1.8	1.0	1.8	0.17	387	0.53	228	0	45	2.2	617	--

<sup>a</sup> No flow Oct. 1-Dec. 21, Dec. 24-Apr. 16, Apr. 19, Apr. 22-May 9, May 13-May 30, June 4-July 11, July 14-Aug. 2, Aug. 8, Aug. 11-20, Sept. 3-30.

<sup>b</sup> Average for 26 days of flow which includes 98 percent of runoff for water year.

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

LOCATION.--At Boy's Ranch near Tascosa. Oldham County, 20 miles upstream from gaging station near Amarillo, Potter County.  
DRAINAGE AREA, 287 square miles, at gaging station.  
RECORDS AVAILABLE.--Chemical analyses: June 1948 to September 1952.

EXTREMES, 1948-52.--Dissolved solids: Maximum, 514 ppm Mar. 18-19, 21-22, 26-27; minimum, 450 ppm July 16-21.  
Hardness: Maximum, 514 ppm Mar. 18-19, 21-22, 26-27; minimum, 46 ppm Mar. 9-10, 46 ppm Mar. 18-19, 21-22, 26-27.

Specific conductance: Maximum, 514 ppm Mar. 18-19, 21-22, 26-27; minimum, 46 ppm Mar. 9-10, 46 ppm Mar. 18-19, 21-22, 26-27.  
Specific conductance: Maximum, 514 ppm Mar. 18-19, 21-22, 26-27; minimum, 46 ppm Mar. 9-10, 46 ppm Mar. 18-19, 21-22, 26-27.

Specific conductance: Maximum, 514 ppm Mar. 18-19, 21-22, 26-27; minimum, 46 ppm Mar. 9-10, 46 ppm Mar. 18-19, 21-22, 26-27.  
Specific conductance: Maximum, 514 ppm Mar. 18-19, 21-22, 26-27; minimum, 46 ppm Mar. 9-10, 46 ppm Mar. 18-19, 21-22, 26-27.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Values reported for dissolved solids concentrations are sums of determined constituents unless otherwise noted. Records of discharge for gaging station near Amarillo for water year October 1951 to September 1952 given in Water-Supply Paper 1241. Mean discharge values reported are adjusted to reflect small discharge of sewage effluent entering Canadian River between sampling point and gaging station. No appreciable inflow between sampling point and gaging station except during periods of heavy local rains.

Chemical analyses, in parts per million, October 1951 to September 1952

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			Hardness as CaCO <sub>3</sub>		Per-cent ad-sorp-tion	So-specific conductance (micro-mhos at 25°C)	pH		
															Parts per mil-lion	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbon-ate					
Oct. 17-21, 26-31, 1951	13.5	13		85	41		280	203		412	792	0.6	2.0		1,240	1.69	45	380	214	62	6.4	1,970	7.8	
Nov. 1-10	57.3	11		76	38		251	209		384	225	.6	2.0		1,090	1.48	169	345	174	61	5.5	1,750	7.5	
Nov. 11-30, Dec. 1-5	13.1	14		84	45		282	238		393	272	.6	2.0		1,220	1.66	43	394	183	61	6.1	1,950	8.1	
Dec. 18, 19, 22-24, 26-31	4.5	20		56	32		177	317		193	136	.9	1.5		a 777	1.06	5.4	271	11	55	4.7	1,280	8.2	
Jan. 7-10, 1952	6.8	16		63	43		283	292		322	280	.6	.5		1,160	1.58	21	334	94	66	7.0	1,930	8.0	
Jan. 11-20	6.1	18		68	45		305	268		315	332	.7	1.0		1,220	1.66	20	354	135	65	7.0	2,030	8.0	
Jan. 22, 24, 27, 29-30	1.2	20		82	26		150	255		160	95	.7	2.2		611	.83	2.0	187	0	64	4.7	997	7.5	
Feb. 12-13	1.5	14		27	17		147	331		133	33	.4	.0		534	.73	2.2	138	0	70	5.4	845	7.8	
Feb. 17	2.0	16		40	29		146	270		164	106	.6	.2		698	.87	3.4	219	0	60	4.4	1,040	8.1	
Feb. 27-29	2.0	13		26	17		148	318		139	36	.6	.2		a 536	.73	2.5	135	0	70	5.3	863	8.2	
Mar. 1-8	2.9	13		38	24		150	282		159	86	.6	1.0		611	.83	4.8	194	0	63	4.7	586	8.0	
Mar. 9-10	6.0	14		48	5.2		148	244		87	52	.6	4.5		a 456	.62	7.4	46	0	87	9.4	857	8.1	
Mar. 11-14, 17	2.4	17		48	51		386	348		458	285	1.2	2.8		1,420	1.93	9.2	330	44	72	9.2	2,260	8.2	
Mar. 15-16, 24-25	1.8	16		24	21		198	336		195	69	.5	.8		689	.94	3.3	146	0	75	7.1	1,110	8.2	
Mar. 18-19, 21-22, 26-27																								
Apr. 2, 5, 6, 10-13, 15-17, May 4-7	1.7	18		79	77		532	306		740	458	1.0	1.8		2,060	2.80	9.5	514	263	68	10	3,140	8.2	
Apr. 15-23, 27																								
Apr. 18-30, May 1-3, 9-14, June 1-8	2.9	19		56	40		348	246		391	318	.8	3.0		a 1,290	1.75	10	304	102	71	8.7	2,140	8.0	
	86.7	17		34	19		201	158		207	179	.6	2.0		738	1.00	173	163	34	73	6.8	1,250	7.8	

a. Residue on evaporation.



July 2, 8-15, 27-29, 31, 1952.....	20	60	26	304	215	303	298	.9	4.7	1,120	1.52	31	256	80	72	8.3	1,850	8.1
July 16-21.....	20	23	9.3	123	177	103	76	.7	4.3	430	.61	190	159	1	74	5.5	786	8.2
July 22-28.....	19	38	15	189	190	163	163	.9	3.8	571	1.18	654	159	1	72	6.6	1,190	8.2
Aug. 21-24.....	30	58	26	229	371	139	210	.9	3.6	571	1.18	650	262	0	66	6.3	1,540	7.3
Aug. 25-31.....	19	39	16	137	192	166	120	.8	3.2	615	.84	1,780	164	6	68	5.3	1,030	7.8
Sept. 8-14, 16, 18- 23.....	18	77	43	326	214	399	342	.7	2.2	1,310	1.78	18	369	194	66	7.4	2,140	7.9
Sept. 26-30.....	16	88	43	340	207	431	365	.8	.8	1,390	1.89	15	396	227	65	7.4	2,230	8.0
18-month weighted average	21	45	20	178	232	169	152	0.9	2.9	705	0.96	156	194	4	67	5.5	1,210	--

## LOWER MISSISSIPPI RIVER BASIN

## ARKANSAS RIVER BASIN--Continued

## CANADIAN RIVER NEAR TASCOSA, TEX.--Continued

Temperature (°F) of water, water year October 1951 to September 1952												
Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	--	48		--	--	--	--	--		--	--	--
2	--	--		--	--	--	--	76		--	--	--
3	--	--		48	--	--	--	74		--	--	--
4	--	70		46	--	59	--	--		--	--	--
5	--	44		48	--	--	--	--		--	--	--
6	--	63		--	--	--	--	--		--	--	--
7	--	--		51	--	60	--	--		--	--	--
8	--	57		49	--	--	--	--		--	--	--
9	--	57		52	58	60	--	--		--	--	--
10	--	61		51	68	62	--	72		--	--	--
11	--	62		59	--	72	59	71		--	--	--
12	--	--		61	69	59	51	--		--	--	--
13	--	62		66	--	58	--	--		74	--	--
14	--	52		62	--	--	--	--		70	--	--
15	--	45		63	--	60	--	--		75	--	--
16	--	62		60	--	59	--	--		74	--	--
17	--	56		55	69	61	--	--		47	--	--
18	--	58		62	--	69	--	--		46	--	--
19	--	55		--	--	--	--	--		48	--	--
20	--	55		--	--	--	--	--		--	--	--
21	--	--		--	--	--	--	--		49	--	56
22	--	--		--	--	--	67	--		51	62	55
23	--	--		55	--	--	68	--		50	57	57
24	--	--		59	--	60	--	--		51	59	57
25	--	--		--	48	--	--	--		55	58	56
26	--	--		57	--	72	--	--		61	59	58
27	--	--		60	57	70	70	--		--	58	57
28	73	--		57	--	70	68	--		--	58	59
29	62	--		57	--	--	78	--		--	--	56
30	59	--		--	--	68	83	--		--	--	55
31	--	--		--	--	79	--	--		--	--	--
Average	--	--		--	--	--	--	--		--	--	--

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.--19,287 square miles.

RECORDS AVAILABLE.--Chemical analyses: July 1948 to October 1949, February 1950 to September 1952.

Water temperatures: August 1949 to September 1952.

Sediment records: August 1949 to September 1952.

EXTREMES, 1951-52.--Dissolved solids: Maximum, 1,950 ppm Jan. 5-8, 10; minimum, 285 ppm Sept. 3.

Hardness: Maximum, 735 ppm Jan. 5-8, 10; minimum, 188 ppm Sept. 3.

Specific conductance: Maximum daily, 3,590 microhos Jan. 5; minimum daily, 457 microhos Sept. 3.

Water temperatures: Maximum daily, 93°F June 12, 14; minimum observed, freezing point on many days during winter months.

Sediment concentrations: Maximum daily, 49,300 ppm Aug. 24; maximum observed, 92,600 ppm Aug. 29; minimum daily, 2 ppm Oct. 5.

Sediment concentrations: Maximum daily, 707,000 tons Aug. 24; minimum daily, less than 0.50 ton several days.

EXTREMES, 1949-52.--Dissolved solids (1950-52): Maximum, 1,950 ppm Jan. 5-8, 10, 1952; minimum, 285 ppm Sept. 3, 1952.

Hardness (1950-52): Maximum, 732 ppm Jan. 5-8, 10, 1952; minimum, 90 ppm Aug. 10-12, 1951.

Specific conductance (1950-52): Maximum daily, 3,630 microhos Jan. 30, 1951; minimum daily, 457 microhos Sept. 3, 1952.

Water temperatures: Maximum observed, 95°F June 29, 1951; minimum observed, freezing point on many days during winter months.

Sediment concentrations (1949-52): Maximum daily, 49,300 ppm Aug. 24, 1952; minimum daily, 0 ppm on many days in 1950.

Sediment loads (1949-52): Maximum daily, 3,700,000 tons July 7, 1950; minimum daily 0 tons on many days in 1950.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Values reported for dissolved solids concentrations less than 1,000 ppm are residues on evaporation and for concentrations more than 1,000 ppm are sums of determined constituents unless otherwise noted. Flow affected by ice Dec. 7, 8, 12-15, 17, 18, 20, 23, 24, 26-28, Jan. 1-3, 10, 23, Feb. 24-26, Mar. 4, 22, 23. Records of sediment discharge available from district office at Albuquerque N. Mex. Records of discharge for water year October 1951 to September 1952 given in Water-Supply Paper 1241.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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> )	Boiron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium	Specific conductance (microhos at 25°C)
															Parts per million	Tons per acre-foot	Tons per day	Calcium	Non-carbonate		
Oct. 1-15, 1951.....	8.6	68	70	42	141	141	285	332	135	116	116	4.0	84	ad33	1.11	18.9	347	58	47	3.3	1,280
Oct. 16-26, 28-29.....	14.2	52	60	36	138	138	285	285	135	112	112	2.4	64	1,792	1.08	30.4	298	36	50	3.5	1,160
Oct. 27, 30-31.....	41.3	24	19	16	86	86	285	285	135	112	112	8	13	1,360	1.85	132	466	332	36	3.5	2,130
Nov. 1, 6.....	34.2	49	18	36	222	222	285	285	135	112	112	1.8	48	1,430	2.06	209	370	187	61	5.9	1,870
Nov. 11-20.....	16.6	44	132	53	202	202	285	285	135	112	112	1.6	25	1,500	2.00	136	543	336	34	5.4	2,270
Nov. 21-30.....	10.5	53	147	53	285	285	285	285	135	112	112	1.6	25	1,500	2.00	67.2	593	360	51	5.1	2,400
Dec. 1-10.....	11.0	63	131	54	266	266	292	292	351	320	320	2.8	78	1,410	1.92	41.9	549	310	51	4.9	2,170
Dec. 11-20.....	9.8	65	138	56	270	270	280	280	351	320	320	2.4	79	1,460	1.99	38.6	575	346	51	4.9	2,260
Dec. 21-31.....	14.0	51	154	55	292	292	253	253	432	372	372	2.0	61	1,550	2.11	58.6	610	402	51	5.1	2,400
Jan. 1-4, 9, 1952.....	10.0	61	114	55	289	289	263	263	324	282	282	2.8	89	1,300	1.77	35.1	510	295	50	4.6	1,980
Jan. 5-8, 10.....	12.4	58	186	70	377	377	270	270	560	502	502	4.4	65	1,900	2.65	65.3	752	531	52	6.0	2,950
Jan. 11-20.....	16.1	58	114	52	264	264	287	287	326	308	308	4.0	67	1,330	1.81	57.8	498	264	54	5.1	2,100
Jan. 21-31.....	10.5	83	94	47	198	198	312	312	218	210	210	4.4	84	1,090	1.48	30.9	428	172	50	4.1	1,710

a Sum of determined constituents.

## LOWER MISSISSIPPI RIVER BASIN

## ARKANSAS RIVER BASIN--Continued

## CANADIAN RIVER NEAR AMARILLO, TEX.--Continued

Chemical analyses, in parts per million, water year October 1951 to September 1952.--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)	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			Hardness as CaCO <sub>3</sub>		Per-cent so-lu-sion	Specific conduct-ance (micro-mhos at 25°C)	
														Parts per mil-lion	Tons per acre-foot	Tons per day	Calcium	Non-carbon-ate			
Feb. 1-17, 1952.....	9.6	70		102	48	214		324		228	235	4.4	89	1,150	1.56	29.8	452	186	51	1,830	6.9
Feb. 18-23.....	8.9	70		72	42	140		322		116	127	4.4	99	836	1.14	20.1	352	88	46	1,370	6.8
Feb. 24-29.....	10.7	70		98	49	247		423		219	228	4.4	94	1,220	1.66	35.2	446	100	55	1,860	7.1
Mar. 1-2, 4-8.....	12.7	69		86	46	230		433		181	192	4.4	95	1,120	1.52	38.4	404	48	55	1,650	7.2
Mar. 3, 9-10.....	15.3	61		161	60	309		246		488	392	2.0	65	1,660	2.26	68.6	648	446	51	2,630	8.1
Mar. 11-20.....	11.9	84		80	46	158		330		155	160	3.6	82	a831	1.27	29.9	388	118	47	1,420	7.5
Mar. 21-31.....	11.0	88		64	44	135		341		109	118	3.6	82	827	1.12	24.6	340	61	46	1,300	7.7
Apr. 1-10.....	10.4	80		67	44	133		374		113	109	4.4	59	818	1.11	23.0	348	42	45	1,260	7.4
Apr. 11-17, 19-22.....	68.0	53		59	31	162		292		163	142	2.0	16	791	1.08	145	274	35	56	1,310	7.1
Apr. 18, 23-30, May 1.....	37.5	54		104	44	361		243		446	388	1.2	15	1,510	2.05	424	440	242	64	2,450	7.5
May 2-10.....	34.8	54		84	40	216		309		242	212	2.4	41	1,040	1.41	105	374	121	56	1,680	7.3
May 11-20.....	49.6	48		76	38	219		277		254	216	2.0	24	1,010	1.37	1.35	346	118	58	1,640	7.6
May 21-31.....	10.2	78		69	43	146		359		126	126	4.0	67	853	1.16	23.5	349	55	48	1,330	7.3
June 1, 5-8.....	34.8	45		113	57	401		247		506	451	2.0	21	1,720	2.34	162	516	314	63	2,750	7.3
June 2-4, 9-10.....	71.9	45		56	30	200		254		219	166	2.0	28	a891	1.21	173	263	55	62	1,410	7.8
June 11-20.....	8.22	91		57	43	135		338		113	102	3.6	72	a789	1.07	17.5	319	42	48	1,190	8.1
June 21-30.....	7.70	91		59	43	151		340		113	128	4.0	82	a838	1.14	17.4	324	46	50	1,300	8.1
July 1-10.....	13.8	63		54	34	169		351		159	128	2.8	5	a783	1.06	29.2	274	0	57	1,310	7.5
July 11-20.....	520	56		52	31	183		187		196	193	2.8	22	922	1.25	1,290	257	104	61	1,490	7.5
July 21-31.....	253	48		53	29	172		247		180	153	2.4	14	a772	1.05	527	251	48	60	1,290	8.2
Aug. 1-10.....	202	38		49	23	139		203		182	132	2.0	1.0	a648	.88	353	226	59	57	1,150	7.1
Aug. 11-20.....	113	45		68	36	181		248		239	182	1.0	5.0	a874	1.19	267	318	114	55	1,480	6.6
Aug. 21-27, 29-31.....	1,346	28		50	23	153		196		183	142	1.4	4.0	730	.99	2,650	220	59	61	1,150	6.4
Aug. 28.....	362	27		--	--	45		154		74	59	1.0	1.5	452	.61	442	192	66	34	1,677	7.9
Sept. 1-2, 4-10.....	156	39		86	36	193		282		258	196	2.0	.2	a949	1.29	400	362	132	54	1,580	7.5
Sept. 3.....	251	--		--	--	--		112		--	30	--	--	285	.39	193	188	96	--	457	7.6
Sept. 11.....	12.3	70		70	51	210		427		210	167	3.2	.0	1,010	1.37	33.5	384	34	54	1,650	7.1
Sept. 21-30.....	14.0	70		81	47	220		273		245	225	3.6	84	1,110	1.51	42.0	396	172	55	1,710	7.9
Weighted average	91.7	40		63	30	177		221		210	176	1.9	14	854	1.16	211	280	100	58	4.6	--

a Sum of determined constituents.

## ARKANSAS RIVER BASIN--Continued

## CANADIAN RIVER NEAR AMARILLO, TEXAS--Continued

Temperature (°F) of water, water year October 1951 to September 1952

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	--	--	37	--	40	38	45	--	61	73	89	78
2	41	--	37	32	35	38	43	58	52	66	88	86
3	40	--	42	33	38	36	48	56	64	68	89	82
4	40	--	38	32	33	--	42	60	74	69	70	84
5	44	--	33	32	50	32	39	58	76	78	86	84
6	--	--	36	32	32	35	45	61	80	71	78	87
7	32	--	32	34	32	43	48	60	84	72	82	85
8	--	--	32	34	32	42	50	58	84	62	72	84
9	32	--	32	34	33	--	39	60	--	70	68	75
10	--	--	32	32	38	47	34	49	86	74	69	79
11	--	--	32	35	44	37	41	48	91	78	89	74
12	--	--	--	38	42	37	45	55	93	74	68	81
13	--	--	33	42	43	35	37	--	89	81	90	74
14	--	--	35	39	40	38	47	55	93	69	89	80
15	--	45	32	35	38	36	46	58	71	80	78	84
16	--	38	32	36	32	38	49	66	73	69	71	84
17	--	--	32	38	34	44	53	50	92	85	67	84
18	--	32	32	44	36	39	55	49	90	79	--	85
19	--	32	35	44	34	42	56	45	83	82	89	60
20	--	35	32	38	32	40	58	55	76	86	84	75
21	--	40	32	40	37	48	52	52	72	64	89	75
22	--	42	32	32	35	32	47	55	91	69	--	65
23	--	35	33	32	38	32	47	55	81	72	72	74
24	--	38	33	35	40	33	50	55	89	79	83	76
25	--	35	34	38	32	37	47	54	74	82	88	74
26	--	38	32	38	32	38	50	59	72	66	64	68
27	--	35	32	36	36	35	53	60	85	66	72	75
28	--	35	33	33	37	38	50	51	73	70	59	--
29	--	36	37	34	39	42	53	53	73	72	88	--
30	--	35	45	35	--	49	52	56	74	86	59	--
31	--	--	47	33	--	47	--	60	--	74	81	--
Average	--	--	35	36	37	39	47	56	79	74	78	78

## LOWER MISSISSIPPI RIVER BASIN

## ARKANSAS RIVER BASIN--Continued

## CANADIAN RIVER NEAR AMARILLO, TEXAS--Continued

Suspended sediment, water year October 1951 to September 1952

Day	October			November			December		
	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-----	7.0	10	(t)	70	6,180	1,170	18		
2-----	7.0	15	(t)	64	4,700	812	16		
3-----	7.0	5	(t)	62	5,640	944	12	52	2
4-----	7.0	13	(t)	66	4,660	830	12		
5-----	7.0	2	(t)	70	3,910	739	12		
6-----	8.9	7	(t)	70	3,410	644	10		
7-----	8.3	9	(t)	77	3,360	699	10		
8-----	8.3	12	(t)	72	2,460	478	8	90	2
9-----	9.6	7	(t)	63	1,700	389	6		
10-----	9.6	7	a(t)	59	939	150	6		
11-----	9.6	7	a(t)	58	1,200	188	8	126	3
12-----	9.6	10	a(t)	55	1,090	162	10	63	2
13-----	9.6	10	a(t)	48	934	121	10	80	2
14-----	10	14	a(t)	38	598	61	8	75	2
15-----	10	14	a(t)	34	376	35	7	65	1
16-----	11	17	a1	30	215	17	7	46	1
17-----	12	18	a1	24			9	48	1
18-----	12	18	a1	21	107	6	12		
19-----	12			18			17		
20-----	11	18	1	16			10		
21-----	11			16			8		
22-----	9.6			14	60	2	12	52	2
23-----	10	21	1	12			16		
24-----	10			16			17		
25-----	10	67	2	18			16		
26-----	12			18	96	5	12		
27-----	32	3,510	s 431	18			12		
28-----	28	8,970	678	18			15	94	4
29-----	36	8,720	848	18	124	6	18		
30-----	36	4,810	468	18	97	5	16		
31-----	56	4,850	s 742	--	--	--	12		
Total-	437.1	--	3,183	1,181	--	7,402	362	--	72
Day	January			February			March		
	Mean dis-charge (cfs)	Mean concen-tration (ppm)	Tons per day	Mean dis-charge (cfs)	Mean concen-tration (ppm)	Tons per day	Mean dis-charge (cfs)	Mean concen-tration (ppm)	Tons per day
1-----	10			9.6			12		
2-----	9			10			14		
3-----	8	50	1	7.6			14		
4-----	6			7.0			12		
5-----	6			8.3	51	1	14	37	1
6-----	6			8.3			13		
7-----	14			8.9			12		
8-----	19	66	2	9.6			15	30	a1
9-----	17			9.6			17	25	1
10-----	17			9.6			17		
11-----	20	91	5	9.6			15	37	1
12-----	20			12			12		
13-----	19			11			12		
14-----	18			10			12		
15-----	16			9.6			12		
16-----	16			10	52	1	12	29	1
17-----	14	67	3	12			11		
18-----	14			8.3			12		
19-----	12			8.9			11		
20-----	12			8.9			10		
21-----	10			8.9			12		
22-----	11			8.9			11		
23-----	10			9.6			10		
24-----	12			9	37	1	11		
25-----	10			9			12		
26-----	10	55	2	10			12	24	1
27-----	11			12			12		
28-----	10			12			11		
29-----	11			12			10		
30-----	11			--	--	--	10		
31-----	10			--	--	--	10		
Total-	389	--	74	280.2	--	29	375	--	31

s Computed by subdividing day.

t Less than 0.50 ton.

a Computed from estimated concentration graph.

## ARKANSAS RIVER BASIN--Continued

## CANADIAN RIVER NEAR AMARILLO, TEXAS--Continued

Suspended sediment, water year October 1951 to September 1952--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-----	10			33	280	25	32	3,500	s 576
2-----	11			34	1,050	96	187	21,700	s 11,300
3-----	10			28	1,510	114	102	12,000	s 3,630
4-----	10			19			52	819	115
5-----	11	43	1	12			48	3,080	399
6-----	11			11	165	6	42	1,350	153
7-----	10			11			33	4,940	440
8-----	10			9.5			19	706	36
9-----	10			71	3,200	s 4,230	9.6	86	2
10-----	11			142	9,560	s 3,770	8.9		
11-----	14			253	19,800	s 14,100	8.9	79	2
12-----	13			95	6,200	1,590	8.9		
13-----	12	54	2	39	2,260	238	8.9		
14-----	10			24			8.9		
15-----	11			18			7.6	44	1
16-----	12			15			5.8		
17-----	22			14	131	6	8.3		
18-----	107	16,500	s 5,980	14			8.3		
19-----	81	13,000	2,840	12			8.3		
20-----	50	4,430	598	12			8.3	106	2
21-----	223	13,600	s 9,040	11			8.3		
22-----	300	14,000	11,300	11			7.0		
23-----	345	18,700	s 19,400	11			6.4	79	2
24-----	240	8,850	s 5,870	10	68	2	7.6		
25-----	95	4,800	1,230	10			7.6		
26-----	58	3,580	561	8.9			7.6		
27-----	55	1,790	266	11			8.3	62	1
28-----	40	832	90	10	76	2	8.9		
29-----	38	837	86	10	94	3	8.3		
30-----	34	620	57	9.8	57	1	7.0	101	2
31-----	--	--	--	9.6	41	1	--	--	--
Total--	1,864	--	57,344	978.7	--	24,256	682.7	--	16,687
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-----	7.6	90	2	11	30	1	642	14,600	25,700
2-----	43	10,500	s 1,430	12			326	9,040	7,960
3-----	9.6	187	5	88	11,900	s 7,200	251	8,000	5,420
4-----	9.6			415	24,600	s 28,800	148	5,730	2,290
5-----	8.9			611	19,400	s 33,000	95	3,460	887
6-----	6.4	25	1	347	15,100	s 14,900	72	1,770	344
7-----	7.0			144	13,400	s 5,440	54	853	124
8-----	14			191	25,100	s 14,500	32	546	47
9-----	16			70	16,000	3,020	17	200	9
10-----	16	45	2	135	12,400	s 8,270	18	192	9
11-----	16			212	23,000	s 13,600	17	92	4
12-----	16			72	21,000	4,080	14	81	3
13-----	16	12	1	62	1,700	285	12	121	4
14-----	51	21,700	s 3,350	223	13,300	s 14,600	11	46	1
15-----	24	5,300	343	274	24,300	18,000	10	33	1
16-----	642	23,700	s 59,500	120	18,500	5,990	11	265	8
17-----	1,290	23,800	s 86,100	70	13,100	2,480	10	145	4
18-----	1,120	31,300	s 101,000	46	7,500	a 930	12	88	3
19-----	1,060	43,400	s 126,000	30			14	71	3
20-----	963	26,400	s 69,400	17	289	16	12	53	2
21-----	864	27,700	s 64,600	16			12	148	5
22-----	736	21,000	41,700	11	300		18	250	a 12
23-----	833	27,500	s 60,500	1,120	18,700	s 138,000	14	254	10
24-----	175	33,000	s 16,400	5,100	49,300	s 707,000	13	43	2
25-----	76	26,600	5,460	2,860	42,200	s 348,000	13	102	4
26-----	34	3,150	289	710	27,000	51,800	14	86	3
27-----	18	387	19	443	23,500	28,100	14	70	3
28-----	11	97	3	362	18,000	17,600	14	70	a 3
29-----	11			1,280	33,400	s 155,000	14	70	a 3
30-----	9.6	33	1	699	16,300	s 42,800	14	70	a 3
31-----	11			1,220	25,000	a 82,400	--	--	--
Total--	8,114.7	--	636,118	16,971	--	1,745,854	1,918	--	42,871

Total discharge for year (cfs-days) .....

33,563.4

Total load for year (tons) .....

2,533,921

s Computed by subdividing day.

a Computed from estimated concentration graph.

ARKANSAS RIVER BASIN--Continued  
CANADIAN RIVER NEAR AMARILLO, TEXAS--Continued

Particle-size analyses of suspended sediment, water year October 1951 to September 1952

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

Date of collection	Time	Water discharge (cfs)	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. 29, 1951.....	4:10 p. m.	36	4,450	3,380		89		90		97	98	99		100		SPWCM
Oct. 30.....	7:30 a. m.	34	4,810	4,680		90		93		98	99	100		--		SPWCM
Nov. 1.....	12:30 p. m.	69	6,510	3,880		92		95		97	98	98		98	100	SPWCM
Apr. 19, 1952.....	1:23 p. m.	79	11,600	5,960		87		95		99	100	--		--		JPWCM
July 2.....	6:30 a. m.	54	13,800	4,260		75		99		99	99	100		--		SPWCM
July 2.....	6:30 a. m.	54	13,800	4,160		0		91		99	99	100		--		SPN
July 2.....	1:40 p. m.	40	10,500	5,060		87		99		100	--	--		--		SPWCM
July 14.....	8:05 a. m.	64	30,700	4,750		88		96		100	--	--		--		SPWCM
July 16.....	6:35 a. m.	76	26,800	4,620		80		93		98	99	100		--		SPWCM
July 16.....	1:15 p. m.	516	43,400	7,780		76		92		97	99	100		--		SPWCM
July 18.....	4:20 p. m.	900	39,700	3,560		77		89		94	95	98		100		SPWCM
July 18.....	4:20 p. m.	900	39,700	3,720		4		85		94	95	98		100		SPN
July 17.....	7:00 p. m.	738	18,600	2,960		85		93		97	99	100		--		SPWCM
July 22.....	6:00 p. m.	775	19,900	3,810		76		91		98	100	--		--		SPWCM
Aug. 4.....	2:00 p. m.	598	23,700	7,060		70		90		97	99	100		--		SPWCM
Aug. 4.....	2:00 p. m.	598	23,700	9,560		1		95		97	99	100		--		SPN
Aug. 5.....	4:05 a. m.	840	18,400	4,760		79		91		97	98	99		100		SPWCM
Aug. 10.....	11:40 p. m.	1,360	30,900	4,280		52		63		88	96	99		100		SPWCM
Aug. 15.....	7:30 a. m.	332	24,900	4,720		91		95		98	99	100		--		SPWCM
Aug. 15.....	7:30 a. m.	332	24,900	4,570		2		95		98	99	100		--		SPN
Aug. 24.....	7:05 a. m.	6,500	42,900	3,660		59		80		95	99	100		--		SPWCM



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

LOCATION --At gaging station at Chicago, Rock Island & Pacific Railway bridge, 2½ miles upstream from Lumpmouth Creek, and 1 mile north of Bridgeport, Caddo County, 25,071 square miles.

DRAINAGE AREA--25,071 square miles.

RECORDS AVAILABLE--Chemical analyses: October 1948 to September 1952.

Water temperatures: October 1948 to September 1952.

EXTREMES 1951-52--Dissolved solids: Maximum, 1,780 ppm Sept. 1-10; minimum, 192 ppm May 23.

Hardness: Maximum, 634 ppm Jan. 5-6; minimum, 138 ppm May 23.

Specific conductance: Maximum, 3,100 microhmhos Sept. 2; minimum, 226 microhmhos May 23.

Water temperatures: Maximum, 97°F July 11; minimum, freezing point on several days during November, December, and January.

EXTREMES, 1948-52--Dissolved solids: Maximum, 1,880 ppm June 20, 1950; minimum, 192 ppm May 23, 1952.

Hardness: Maximum, 778 ppm Jan. 30, 1951; minimum, 138 ppm May 23, 1952.

Specific conductance: Maximum, 3,100 microhmhos Sept. 2, 1952; minimum, 226 microhmhos 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 1951 to September 1952 given in Water-Supply Paper 1241.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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 80°C)		Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (microhmhos at 25°C)	pH	Color	
														Parts per million	Tons per acre-foot	Calcium	Non-carbonate magnesium					
Oct. 1-7, 9-10, 1951	9.36	--	--	106	19	32	220	205	12	--	--	2.4	--	504	0.69	342	162	17	737	8.2		
Oct. 8	12.0	--	--	173	30	26	131	462	13	--	--	4.4	--	782	1.06	25	555	448	9	1,050	7.7	
Oct. 11-20	9.93	18	0.00	114	21	27	4.6	261	200	12	0.0	2.2	0.11	535	.73	14	371	157	13	765	8.1	
Oct. 21-28, 30-31	21.5	--	--	118	24	34	247	232	16	--	--	1.8	--	569	.77	33	393	190	16	786	8.0	
Oct. 29	54.0	--	--	169	35	33	3.4	257	263	32	--	1.9	--	836	1.14	122	566	404	11	1,100	8.1	
Nov. 1-10	29.9	18	0.00	132	24	33	3.4	278	263	20	1.1	3.6	.06	628	.85	51	428	218	14	875	7.9	
Nov. 11-14	39.5	--	--	134	25	44	278	269	17	--	--	1.5	--	638	.87	68	438	210	18	899	8.1	
Nov. 15-20	47.7	--	--	152	31	101	286	354	98	--	--	1.9	--	883	1.20	114	506	288	30	1,270	8.1	
Nov. 21-30	80.6	18	0.00	130	29	89	3.4	223	314	93	3	2.2	.06	798	1.09	174	444	260	30	1,170	7.5	
Dec. 1-10	71.4	20	0.00	125	32	149	4.4	244	328	169	7	2.4	0.00	970	1.32	187	444	244	42	1,460	8.1	
Dec. 11-20	42.3	--	--	146	36	114	271	343	127	--	--	2.4	--	950	1.29	108	512	290	33	1,400	8.0	
Dec. 21-31	37.8	--	--	150	29	77	282	339	52	--	--	3.9	--	826	1.12	84	493	262	25	1,120	8.0	
Jan. 1-4, 1952	27.5	--	--	160	30	62	281	373	26	--	--	2.3	--	844	1.15	63	522	292	20	1,100	8.0	
Jan. 5-6	46.5	--	--	170	51	288	291	537	325	--	--	4.3	--	1,590	2.16	200	634	395	50	2,280	8.1	
Jan. 7-10	68.8	--	--	126	40	216	a	237	379	252	--	3.8	--	1,200	1.63	223	479	284	49	1,800	8.4	
Jan. 11-20	128	17	.05	116	38	209	5.3	225	319	260	1.1	2.0	.26	1,100	1.50	374	446	261	50	1,200	7.9	
Jan. 21-25	76.8	--	--	133	41	186	257	337	242	--	--	2.2	--	1,120	1.52	232	500	290	45	1,700	8.0	
Jan. 26-31	43.3	--	--	137	37	131	239	362	145	--	--	1.4	--	955	1.30	112	494	298	37	1,410	7.9	
Feb. 1-10	36.6	18	0.00	140	36	90	3.3	227	365	93	.5	.6	.17	890	1.20	87	498	312	28	1,250	7.9	
Feb. 11-20	42.5	--	--	137	37	81	295	367	73	--	--	1.0	--	866	1.18	99	494	310	26	1,200	7.9	
Feb. 21-29	60.0	18	0.00	142	41	120	4.2	222	397	133	.5	.8	.17	985	1.34	160	523	341	33	1,480	7.9	

a Includes equivalent of 9 parts per million of carbonate (CO<sub>3</sub>).

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

Chemical analyses, in parts per million, water year October 1951 to September 1952--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	Sodium sulfate ratio	Specific conductance (micro-mhos at 25°C)	Color or pH
														Parts per million	Tons per acre-foot	Tons per day					
Mar. 1-10, 1952..	131	18	0.00	137	45	181	4.9	221	410	218	0.7	1.1	0.08	1,140	1.55	403	527	346	42	1,730	7.9
Mar. 11-20.....	289	18	.00	124	43	192	5.4	218	375	232	.7	1.4	.26	1,110	1.51	886	486	308	46	1,710	8.0
Mar. 21-27.....	47.3	18	..	143	47	131	..	237	378	175	..	..	..	1,060	1.44	185	550	356	34	1,580	7.8
Mar. 28-31.....	28.0	..	..	135	41	76	..	220	363	78	..	3.0	..	1,852	1.16	64	506	328	25	1,210	8.2
Apr. 1-10.....	17.9	18	.05	138	29	36	2.6	230	332	19	.5	1.0	.00	716	.96	35	464	275	14	950	8.0
Apr. 11, 17-19.....	29.8	..	..	144	32	40	..	227	340	26	..	1.9	..	760	1.03	61	491	305	15	1,010	7.9
Apr. 12-16.....	43.0	..	..	157	40	74	..	206	433	68	..	1.8	..	946	1.29	110	556	387	23	1,280	7.7
Apr. 20-22.....	648	..	..	73	19	52	..	140	186	44	..	2.2	..	471	.64	894	280	146	30	734	7.4
Apr. 23-30.....	418	..	..	117	37	171	..	196	360	198	..	2.5	..	1,040	1.41	1,170	444	284	46	1,570	8.0
May 1, 3-4, 8.....	191	..	..	138	46	168	..	202	411	215	..	2.3	..	1,190	1.56	593	534	368	41	1,710	7.9
May 2, 8-7.....	167	..	..	147	50	216	..	255	459	280	..	2.0	..	1,340	1.82	604	572	404	45	1,980	7.8
May 9-10.....	24.0	..	..	142	33	68	..	235	352	56	..	1.2	..	817	1.11	53	490	299	23	1,150	8.1
May 11-20.....	24.3	19	.00	138	31	40	3.6	235	307	29	.5	1.3	.15	719	.98	47	472	280	15	985	8.0
May 21-22, 26, 28-31	10.9	..	..	114	26	36	..	207	264	16	..	2.6	..	608	.83	48	382	222	17	851	8.0
May 23-24.....	2,960	..	..	112	34	55	..	112	66	4.0	..	3.4	..	192	.26	1,570	136	46	19	226	7.9
May 24-25, 27.....	46.6	..	..	86	20	29	..	146	199	22	..	3.2	..	466	.63	59	296	177	18	663	8.1
June 1.....	23.0	..	..	58	17	29	..	180	119	14	..	4.3	..	390	.44	20	214	84	23	509	7.8
June 2-4, 8-10.....	14.0	..	..	99	24	41	..	194	142	14	..	2.2	..	561	.76	21	246	166	26	761	7.7
June 5-7.....	15.3	..	..	135	53	31	..	166	351	15	..	2.0	..	716	.97	30	372	320	13	944	7.8
June 11-20.....	5.25	22	.00	88	25	38	4.2	177	235	17	3	1.8	.24	528	.72	7.5	372	178	20	737	8.2
June 21-25.....	2.18	..	..	70	24	61	..	176	206	32	..	2.4	..	516	.70	3.0	273	129	33	762	8.2
June 26.....	..	..	..	60	27	69	..	138	231	38	..	3.5	..	522	.71	..	260	148	36	771	8.2
July 3.....	..	..	..	42	20	46	..	144	137	17	..	..	..	360	.49	..	187	69	35	564	7.5
July 4-10.....	..	..	..	61	16	37	..	150	101	14	..	2.2	..	307	.42	4.8	168	46	33	489	7.9
July 11-13, 15-16.....	5.80	..	..	61	17	41	..	184	134	14	..	2.2	..	382	.52	7.8	222	71	29	583	7.8
July 14, 17-20.....	7.52	..	..	61	17	41	..	184	134	14	..	1.1	..	382	.52	7.8	222	71	29	583	7.8
July 21-22.....	.65	21	.00	64	22	52	4.8	180	178	28	.5	1.1	.38	470	.64	.8	250	102	31	713	7.6
Sept. 1-10.....	27.5	20	.00	110	46	458	11	220	486	530	2.6	5.5	.60	1,760	2.42	132	464	283	68	2,860	8.0
Sept. 12.....	..	..	..	40	24	151	..	144	195	144	..	3.2	..	657	.89	..	198	80	62	1,100	8.1
Sept. 23-30.....	1.98	..	..	48	19	33	..	175	102	14	..	..	..	333	.45	..	198	54	27	1,525	8.1
Weighted average.	63.4	..	..	112	33	127	..	201	307	143	..	2.5	..	819	1.11	140	415	250	40	1,290	..

## ARKANSAS RIVER BASIN--Continued

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

Temperature (°F) of water, water year October 1951 to September 1952

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	68	37	50	32	50	38	53	61	67	83	82	--
2	66	36	54	32	42	41	51	65	72	79	81	68
3	62	--	46	32	47	34	54	66	72	79	80	--
4	64	32	42	--	48	32	60	69	74	79	--	--
5	65	--	36	32	35	34	44	68	68	81	80	--
6	54	32	45	36	36	42	50	69	79	83	81	68
7	58	36	40	44	36	43	56	68	76	81	81	73
8	54	38	36	35	42	44	60	70	75	73	--	69
9	54	44	32	36	32	50	--	70	75	69	--	71
10	57	42	43	32	40	44	39	58	74	85	87	73
11	58	50	32	35	42	41	46	53	77	97	86	84
12	60	56	34	54	47	47	50	60	77	77	76	70
13	60	55	--	50	46	43	45	62	76	83	81	72
14	60	42	32	56	45	42	50	65	77	74	80	--
15	62	49	32	41	39	39	52	68	74	72	80	--
16	63	36	35	45	40	35	55	70	74	75	81	--
17	52	--	36	52	38	49	57	60	74	75	83	--
18	54	--	32	47	44	45	57	53	80	76	--	--
19	46	--	--	54	45	48	56	59	78	77	79	--
20	56	--	32	42	38	51	60	65	76	77	80	--
21	65	47	--	47	38	50	64	66	75	75	84	--
22	50	56	32	35	45	45	58	69	86	79	78	--
23	51	39	34	38	40	34	65	58	76	77	81	--
24	47	38	33	32	40	38	55	75	78	82	79	57
25	56	37	34	46	--	41	54	68	78	81	78	62
26	59	43	32	47	41	46	55	70	81	81	81	63
27	49	42	32	40	39	41	61	68	80	86	79	62
28	52	47	--	34	44	47	66	62	81	88	--	60
29	55	42	34	32	43	52	64	64	81	83	--	62
30	55	49	50	35	--	56	66	69	83	81	--	65
31	40	--	54	45	--	63	--	71	--	82	--	--
Average	57	43	38	41	42	44	55	65	76	80	--	--

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

LOCATION.--At gaging station at bridge on State Highway 9, 1 mile upstream from Dave Blue Creek, 3½ miles downstream from Rock Creek, and 7.8 miles east of Norman, Cleveland County.

DRAINAGE AREA.--120 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1951 to September 1952.

Water temperatures: October 1951 to September 1952.

EXTREMES, 1951-52.--Dissolved solids: Maximum, 446 ppm Feb. 23, 27-29; minimum, 125 ppm May 23.

Hardness: Maximum, 386 ppm Feb. 23, 27-29; minimum, 76 ppm May 23.

Specific conductance: Maximum, 926 micromhos Feb. 28; minimum, 171 micromhos May 23.

Water temperatures: Maximum, 91°F June 22, 29; minimum, freezing point Dec. 15, 21, 25, Jan. 3.

REMARKS.--Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of discharge for water year October 1951 to September 1952 given in Water Supply Paper 1241.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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> )	Boiron (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. 11-20, 1951	1.71	10	0.00	50	52	16	2.5	425	0	7.5	11	0.1	0.6	0.07	366	0.50	1.7	339	0	9	641	8.1
Oct. 21-26, 28	2.31	--	--	53	48	9.4	4.8	397	0	9.1	9.8	--	1.1	--	354	.48	2.2	330	4	6	598	8.2
Oct. 27, 29-31	3.62	--	--	44	33	--	--	290	0	7.7	6.8	--	1.4	--	263	.36	2.6	246	8	4	464	8.0
Nov. 1	7.20	--	--	38	16	29	--	244	0	12	6.0	--	3.3	--	230	.31	4.5	161	0	28	398	7.9
Nov. 2-10	5.14	--	--	55	46	8.5	--	391	0	9.1	9.2	--	1.8	--	348	.47	4.8	326	6	5	592	8.2
Nov. 11-20	2.64	20	.00	50	52	14	3.0	412	5	7.6	11	.1	.8	.08	372	.51	2.7	339	2	8	622	8.3
Nov. 21-30	3.24	18	.00	62	51	14	2.9	454	1	7.9	11	.1	.7	.08	396	.54	3.5	364	0	8	666	8.3
Dec. 1-10	3.29	16	.00	41	51	14	2.4	391	0	7.7	11	.1	.7	.06	340	.46	3.0	312	0	9	586	8.2
Dec. 11-20	3.13	13	.00	57	54	14	1.8	452	0	7.3	10	.0	.8	.00	387	.53	3.3	364	0	8	662	8.1
Dec. 21-31	3.43	12	.00	56	54	14	1.8	444	0	7.3	10	.1	.7	.05	383	.52	3.5	362	0	8	658	8.1
Jan. 1-10, 1952	5.34	12	.00	46	49	14	1.6	382	0	7.7	9.8	--	.8	.13	334	.45	4.8	316	4	9	582	8.2
Jan. 11-20	3.98	10	.00	41	52	14	1.6	389	0	7.3	10	.1	.4	.12	333	.45	3.5	316	0	9	587	8.2
Jan. 21-31	4.05	10	.02	46	53	15	1.6	407	0	6.5	14	.0	.7	.17	355	.46	3.9	333	0	9	626	8.1
Feb. 1-10	3.50	12	.00	42	53	17	1.4	390	0	8.9	17	.1	1.0	.15	351	.48	3.3	323	4	10	613	8.2
Feb. 11-20	3.41	13	.02	46	54	19	1.6	385	0	8.8	17	.1	1.7	.18	372	.51	3.4	337	0	11	650	7.9
Feb. 21-29, 24-26	7.08	--	--	51	43	19	--	368	0	9.0	26	--	1.3	--	374	.51	7.1	312	10	12	672	7.9
Feb. 23, 27-29	4.55	--	--	66	54	18	--	463	0	9.0	25	--	1.0	--	446	.61	5.5	386	7	9	754	7.9
Mar. 1-6	10.3	--	--	38	28	44	--	323	0	15	17	--	3.1	--	322	.44	9.0	210	0	31	553	8.2
Mar. 7-10	25.3	--	--	38	24	21	--	218	0	8.5	34	--	3.7	--	266	.36	18	194	15	19	466	8.0
Mar. 11-15	14.1	--	--	15	42	--	--	244	10	8.9	12	--	2.6	--	235	.32	8.9	210	0	14	441	8.4

May 17, 1952	75.0	--	--	34	2.6	58	241	0	7.6	9.2	--	4.8	--	239	.33	48	96	0	57	410	7.9
May 18	584	--	--	21	8.0	13	114	0	8.8	6.2	--	3.0	--	141	.19	222	86	0	25	226	8.2
May 23	2100	--	--	18	7.5	2.1	87	0	2.5	3.8	--	1.2	--	125	.17	709	76	4	6	171	7.3
June 11-20	4.17	13	13	48	45	18	374	4	11	16	3	1.4	.24	353	.48	4.0	305	0	11	606	8.3
June 21-30	2.25	13	13	35	47	16	336	12	7.9	13	.1	1.1	.31	321	.44	2.0	280	0	11	562	8.4
July 1-10	1.60	11	11	38	49	16	359	7	6.1	12	.0	.6	.62	325	.44	1.4	296	0	10	580	8.3
July 11-20	2.34	11	11	40	44	16	350	0	8.6	11	.1	.7	.23	315	.43	2.0	231	0	11	557	8.1
July 21-31	1.01	11	11	36	48	16	363	0	13	10	.1	.5	.32	322	.44	.9	268	0	11	566	8.2
Aug. 1, 10	1.30	--	--	36	38	15	365	0	7.1	14	--	1.9	--	279	.38	1.0	246	0	12	500	8.1
Aug. 2-7	1.80	--	--	40	50	14	384	0	9.5	10	--	1.3	--	313	.46	.7	304	0	19	595	8.2
Aug. 8-9	17.1	--	--	31	21	12	293	7	7.1	11	--	2.2	--	198	.29	9.1	164	4	13	386	7.6
Aug. 10-14	1.14	--	--	13	35	11	278	0	6.8	11	--	1.6	--	259	.35	.8	226	0	12	481	8.4
Aug. 15-17-20	.72	--	--	14	41	13	347	0	6.2	9.5	--	1.6	--	310	.42	.6	278	0	9	543	8.2
Aug. 21-31	.49	11	11	40	46	19	383	4	5.1	9.5	.1	.6	.22	320	.44	.4	289	0	12	566	8.3
Sept. 1-10	.20	10	10	42	48	22	394	2	5.4	10	.1	.6	.24	343	.47	.2	302	0	14	601	8.3
Sept. 11-20	.21	9.7	9.7	44	49	21	403	0	6.4	9.8	.3	.8	.27	342	.47	.2	312	0	13	617	8.2
Sept. 21-30	.17	6.9	6.9	50	49	22	424	0	5.5	10	.3	.4	.27	359	.49	.2	326	0	13	630	8.1

## ARKANSAS RIVER BASIN--Continued

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

Temperature (°F) of water, water year October 1951 to September 1952

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	--	45	60	41	58	41	--	--	--	82	83	72
2	--	41	63	39	56	39	--	--	--	84	84	70
3	--	49	55	32	53	--	--	--	--	86	82	72
4	--	47	50	38	54	41	--	--	--	77	84	74
5	--	38	53	36	53	45	--	--	--	85	85	75
6	--	35	53	39	--	42	--	--	--	82	85	71
7	--	48	50	41	--	51	--	--	--	80	85	75
8	--	43	41	44	59	49	--	--	--	75	84	77
9	--	45	41	46	58	47	--	--	--	76	80	76
10	--	55	41	51	55	41	--	--	--	80	90	77
11	--	49	--	53	52	53	--	--	86	78	84	77
12	71	65	50	55	57	49	--	--	85	81	80	77
13	70	61	45	58	60	51	--	--	86	80	85	77
14	72	45	39	57	59	52	--	--	84	80	82	76
15	68	--	32	58	49	56	--	--	86	76	77	76
16	72	41	36	60	58	--	--	--	85	79	84	78
17	68	37	38	58	61	--	--	--	85	77	78	75
18	58	44	--	55	62	--	--	--	83	80	76	80
19	62	49	38	--	58	--	--	--	85	82	77	70
20	58	49	33	52	52	--	--	--	82	81	76	70
21	72	55	32	50	56	--	--	--	82	87	85	65
22	56	59	35	48	54	--	--	--	91	86	81	70
23	58	44	37	51	46	--	--	--	82	84	75	65
24	53	44	38	47	47	--	--	--	82	84	82	68
25	60	50	32	60	52	--	--	--	82	85	82	64
26	59	48	36	52	42	--	--	--	83	80	82	71
27	60	51	37	55	55	--	--	--	75	84	78	72
28	60	--	43	57	58	--	--	--	81	84	81	68
29	61	53	--	61	46	--	--	--	91	84	82	76
30	61	55	54	59	--	--	--	--	84	82	78	74
31	58	--	58	53	--	--	--	--	--	77	75	--
Average	--	48	44	50	54	--	--	--	--	81	81	73

## ARKANSAS RIVER BASIN--Continued

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

LOCATION.--Immediately below dam on North Canadian River, 4½ miles upstream from Minnehaha Creek, 2 miles upstream from gaging station at Canton, and 2 miles northwest of Canton, Blaine County.

DRAINAGE AREA.--12,641 square miles.

RECORDS AVAILABLE.--Chemical analyses.

Water temperatures: October 1951 to September 1952.

EXTREMES, 1951-52.--Dissolved solids: Maximum, 861 ppm Sept. 1-30; minimum, 272 ppm Oct. 1-31.

Hardness: Maximum, 343 ppm Sept. 1-30; minimum, 272 ppm Oct. 1-31.

Specific conductance: Maximum, 1,440 micromhos Sept. 23, 27, 30; minimum, 896 micromhos Oct. 8, Nov. 1.

Water temperatures: Maximum, 85°F July 31, Aug. 5, 7, 9; minimum, freezing point Dec. 20-21.

REMARKS.--Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of discharge for gaging station at Canton for water year October 1951 to September 1952 given in WSP 1241. 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 1951 to September 1952

Date of collection	Mean discharge (cfs)	Temperature (°F)	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	Tons per day	Calcium magnesium	Non-carbonate			
Oct. 1-31, 1951	21.5	24	0.00	68	25	88	7.8	206	123	115	0.7	1.9	--	--	557	0.76	32	272	104	40	906	7.9
Nov. 1-30	13.7	16	0.00	70	26	89	7.4	207	129	117	0.7	1.6	--	--	564	0.77	21	282	112	40	925	7.9
Dec. 1-31	13.0	16	0.00	70	25	94	5.6	215	137	122	0.5	0.7	0.06	0.06	594	0.81	21	278	102	42	961	8.0
Jan. 1-31, 1952	65.0	15	0.00	76	27	97	6.5	225	144	126	0.9	0.7	0.16	0.16	620	0.84	109	300	116	41	1,010	7.8
Feb. 1-29	193	14	0.00	80	29	105	6.2	225	152	135	0.7	0.4	0.58	0.58	651	0.89	339	318	134	41	1,050	7.9
Mar. 1-31	337	16	0.00	82	30	112	5.8	228	164	149	0.7	0.6	0.26	0.26	694	0.94	631	328	143	42	1,100	7.8
Apr. 1-30	311	17	0.00	82	31	118	5.9	228	187	160	0.7	0.4	0.25	0.25	744	1.01	625	332	145	43	1,190	8.1
May 1-31	148	18	0.05	82	31	125	6.0	218	190	162	0.7	0.6	0.18	0.18	754	1.03	301	332	154	44	1,170	8.1
June 1-30	61.8	17	0.00	79	33	133	6.6	200	212	175	0.7	1.1	0.20	0.20	772	1.05	129	332	169	46	1,230	8.3
July 1-31	92.9	16	0.00	77	32	145	7.1	180	236	165	0.9	0.8	0.46	0.46	792	1.08	70	318	171	49	1,280	8.1
Aug. 1-31	97.1	16	0.00	68	38	136	7.8	180	231	212	0.7	1.4	0.44	0.44	824	1.12	83	326	178	51	1,350	8.2
Sept. 1-30	33.2	12	0.00	70	41	169	8.6	166	239	212	1.1	1.0	0.38	0.38	861	1.17	77	343	190	51	1,420	7.9
Weighted average	105	16	--	80	31	117	6.2	220	176	154	0.7	0.6	--	--	713	0.97	202	327	146	43	1,140	--

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

## LOWER MISSISSIPPI RIVER BASIN

## ARKANSAS RIVER BASIN--Continued

## NORTH CANADIAN RIVER AT CANTON RESERVOIR NEAR CANTON, OKLA.--Continued

Temperature (°F) of water, water year October 1951 to September 1952

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



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

LOCATION.--At gaging station at county highway bridge, 3 miles upstream from Adams Creek, 8 miles downstream from Flat Rock Creek, and 4 miles south of Beggs, Okmulgee County.  
DRAINAGE AREA.--2,018 square miles.  
RECORDS AVAILABLE.--Chemical analyses: November 1951 to September 1952.  
Water temperatures: November 1951 to September 1952.  
EXTREMES: 1951-52.--Dissolved solids: Maximum, 2,330 ppm July 5; minimum, 206 ppm May 29-30.  
Hardness: Maximum, 545 ppm July 5; minimum, 80 ppm Apr. 20.  
Specific conductance: Maximum daily, 3,720 micromhos July 5; minimum daily, 260 micromhos June 1.  
Water temperatures: Maximum, 92 F Aug. 16, 19-20; minimum, freezing point Jan. 4.  
REMARKS.--Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of discharge for water year October 1951 to September 1952 given in Water-Supply Paper 1241.

Chemical analyses, in parts per million, November 1951 to September 1952

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-lu-ble	Specific conduct-ance (micro-mhos at 25° C)	pH
															Parts per mil-lion	Tons per acre-foot	Tons per day	Calcium	Non-carbon-ate			
Nov. 24, 28-29, 1951.	198	--	--	84	29	275	173	0	25	535	--	--	3.6	--	1,140	1.55	609	328	186	65	1,950	7.5
Nov. 25-27, 30	328	--	--	59	24	170	150	0	24	330	--	--	3.0	--	770	1.05	682	246	122	60	1,350	7.5
Dec. 1-5, 7, 10	153	--	--	70	34	190	227	0	30	360	--	--	3.7	--	814	1.11	336	314	128	57	1,570	7.9
Dec. 6, 8-9	145	--	--	93	43	279	270	0	35	585	--	--	2.9	--	1,130	1.54	442	409	188	60	2,090	7.9
Dec. 11-20	87.8	--	--	90	42	264	255	0	32	515	--	--	3.0	--	1,120	1.52	266	397	188	59	2,030	8.0
Dec. 21-23, 25-31	80.7	--	--	89	46	282	276	0	38	535	--	--	3.8	--	1,150	1.56	251	411	185	60	2,110	8.0
Dec. 24-28	79.6	--	--	100	49	340	281	0	40	650	--	--	3.6	--	1,370	1.86	294	451	221	62	2,480	8.0
Jan. 1-3, 1952.	87.3	--	--	102	48	296	308	0	42	565	--	--	4.5	--	1,240	1.69	292	452	200	59	2,300	8.0
Jan. 4-5	288	--	--	122	41	414	166	0	36	850	--	--	1.9	--	1,690	2.30	1,310	473	337	66	3,010	7.4
Jan. 6-10	372	--	--	62	26	196	140	0	30	332	--	--	3.7	--	828	1.13	832	262	147	62	1,510	7.6
Jan. 11-13	218	--	--	66	33	174	211	0	34	332	--	--	3.2	--	796	1.08	469	300	127	56	1,450	7.7
Jan. 14-20	145	--	--	76	37	219	228	0	32	422	--	--	2.3	--	964	1.31	377	342	154	58	1,740	7.6
Jan. 21-31	155	12	0.00	87	40	260	239	0	36	490	0.00	0.00	1.6	0.32	1,100	1.50	460	382	186	59	2,020	7.8
Feb. 1-2, 4-5, 7-8, 10.	119	--	--	87	42	257	249	0	34	500	--	--	3.8	--	1,050	1.43	337	390	186	59	1,980	7.6
Feb. 3, 6, 9	134	--	--	106	45	326	248	0	35	650	--	--	3.6	--	1,370	1.86	466	450	248	61	2,490	7.6
Feb. 11-12, 15-16, 19-20	153	--	--	90	41	267	251	0	36	515	--	--	4.3	--	1,120	1.52	463	393	188	60	2,080	7.8
Feb. 13-14, 17-18	154	--	--	120	47	395	242	0	35	790	--	--	3.3	--	1,600	2.18	665	492	294	64	2,860	7.8
Feb. 21-23	151	--	--	60	39	244	226	0	37	470	--	--	3.8	--	1,020	1.39	416	360	175	60	1,870	7.9
Feb. 24-25	1,080	--	--	43	17	144	80	0	26	280	--	--	3.2	--	596	.81	1,740	178	112	64	1,100	7.2
Feb. 26-29	1,257	--	--	30	15	75	102	0	21	137	--	--	2.4	--	367	.50	1,250	136	53	55	666	7.8
Mar. 1-3, 9-10	1,509	--	--	36	16	52	90	0	22	183	--	--	2.5	--	438	.60	1,780	156	82	56	793	7.1
Mar. 4-8	2,124	--	--	25	13	48	97	0	17	88	--	--	1.9	--	315	.43	1,810	116	36	48	488	7.1
Mar. 11-16	2,603	--	--	24	13	40	137	0	15	78	--	--	1.6	--	322	.44	2,260	114	40	43	439	7.1
Mar. 17-20	1,725	--	--	34	18	81	89	0	22	141	--	--	1.3	--	393	.53	1,830	159	47	53	725	7.4

## ARKANSAS RIVER BASIN--Continued

## DEEP FORK RIVER NEAR BEGGS, OKLA.--Continued

Chemical analyses, in parts per million, November 1951 to September 1952.—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	Specific conductance (micro-mhos at 25°C)	pH	
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
Mar. 21, 1952	1,130	--	--	28	14	46		114	0	18	80	--	2.3	276	0.38	842	128	34	44	481	8.1	
Mar. 22, 24, 26, 28	669	--	--	44	21	80		165	0	21	150	--	3.3	451	.61	815	196	62	47	790	7.8	
Mar. 23, 25, 27	678	--	--	56	27	107		192	0	24	212	--	3.1	606	.82	1,110	250	93	48	1,050	8.0	
Mar. 29-31	313	--	--	70	32	143		229	0	27	282	--	3.5	747	1.02	631	306	118	50	1,330	8.1	
Apr. 1-4, 7-8	308	--	--	76	37	177		242	0	32	348	--	3.5	862	1.17	717	342	143	53	1,530	8.1	
Apr. 5-6, 9-10	358	--	--	67	32	149		222	0	31	288	--	2.5	751	1.02	726	298	116	52	1,340	7.8	
Apr. 11-13	449	--	--	73	37	193		221	0	33	380	--	2.2	924	1.26	1,120	334	153	56	1,630	7.6	
Apr. 14-19	414	--	--	59	30	145		201	0	31	275	--	1.8	711	.97	795	270	106	54	1,270	7.5	
Apr. 20	2,120	--	--	17	9.0	35		55	0	14	67	--	1.4	288	.41	1,710	80	34	49	351	7.2	
Apr. 21, 24, 27	3,870	--	--	21	8.7	39		72	0	12	71	--	1.7	274	.37	2,860	88	30	49	385	7.5	
Apr. 22, 25-26, 28	3,770	--	--	30	15	54		120	0	17	96	--	1.6	316	.43	3,220	136	38	46	533	7.3	
Apr. 23, 29-30	2,723	--	--	44	21	96		161	0	21	177	--	1.8	484	.66	3,560	196	64	51	852	7.9	
May 1	663	--	--	36	18	65		137	4	23	114	--	2.6	390	.53	698	164	46	46	638	8.3	
May 2-4, 6-9	463	--	--	56	29	117		221	0	25	215	--	3.9	644	.88	805	258	78	50	1,090	8.0	
May 5, 10	372	--	--	67	33	152		233	0	26	282	--	3.7	766	1.04	769	302	112	52	1,330	8.1	
May 11	202	--	--	96	46	288		275	0	42	555	--	3.9	1,300	1.77	709	428	203	59	2,190	7.6	
May 12, 14, 16, 19	285	--	--	66	34	158		252	0	29	280	--	3.2	801	1.09	638	304	98	53	1,360	7.8	
May 20, 15, 17-18	194	--	--	80	43	190		300	0	32	360	--	2.3	964	1.31	427	376	130	52	1,650	7.8	
May 21-23, 26-28	2,175	--	--	44	23	113		159	0	31	202	--	4.6	359	.76	1,170	204	74	55	950	8.0	
May 24-25, 31	3,443	--	--	16	17	63		146	0	17	109	--	2.9	341	.46	2,000	155	36	47	633	8.1	
May 26-30	5,800	--	--	19	9.9	39		75	0	10	70	--	3.0	257	.35	2,460	88	26	49	373	7.5	
May 31		--	--	17	9.8	25		92	0	10	34	--	4.2	206	.28	3,230	63	8	40	289	7.8	
June 1-2, 5	2,593	--	--	17	9.4	28		76	0	9.5	47	--	2.3	229	.31	1,600	81	18	43	300	7.7	
June 3-4, 6-7	1,232	--	--	38	17	81		131	5	15	148	--	2.4	413	.56	1,370	165	49	52	741	8.4	
June 8-10	429	--	--	61	33	150		234	15	32	255	--	3.5	718	.98	832	288	70	53	1,230	8.6	
June 9-10	328	--	--	51	28	104		216	0	20	190	--	2.6	550	.75	487	242	65	48	963	8.1	
June 11-14	200	--	--	56	29	126		213	8	24	225	--	3.9	648	.88	350	258	70	52	1,170	8.4	
June 15-20	102	--	--	65	37	160		256	5	28	292	--	2.9	803	1.09	221	314	96	53	1,370	8.3	
June 21-30	49.3	12	0.00	80	42	205	5.1	295	0	34	378	0.3	1.3	880	1.33	130	372	130	54	1,740	8.2	
July 1, 4, 7-8	69.0	--	--	80	37	304		202	4	31	570	--	5.6	980	1.73	237	352	180	65	2,180	8.4	
July 2, 6, 9-10	41.0	--	--	68	40	200		274	5	38	350	--	3.3	948	1.29	105	334	101	57	1,620	8.4	
July 3	61.0	--	--	71	51	152		122	0	25	280	--	3.2	686	.93	113	206	106	62	1,180	8.2	
July 5	67.0	--	--	136	50	559		169	3	32	1,120	--	5.5	2,330	3.17	421	545	402	69	3,720	8.3	
July 11-18	74.5	--	--	66	41	198		290	0	45	335	--	3.7	891	1.21	179	333	96	56	1,560	8.2	

July 19-20, 1952.....	239	--	--	44	27	142	209	0	30	230	--	3.1	--	623	.85	402	221	50	58	1,120	8.2
July 21 .....	874	--	--	96	30	387	130	0	15	765	--	4.3	--	1,640	2.23	3,870	363	256	70	2,610	8.1
July 22-23, 27-28, 30	539	--	--	22	12	29	113	0	10	44	--	2.0	--	207	.28	301	104	12	37	361	7.7
July 24-26, 29, 31 ...	358	--	--	31	15	46	134	0	13	80	--	1.7	--	291	.40	281	139	29	42	507	7.7
Aug. 1-2 .....	142	--	--	34	16	68	144	4	15	111	--	3.1	--	352	.48	135	151	28	49	631	8.3
Aug. 3, 10 .....	99.5	--	--	70	22	278	126	0	16	530	--	2.9	--	1,100	1.50	296	265	162	70	1,910	7.8
Aug. 4, 7, 9 .....	79.7	--	--	47	19	143	152	0	16	258	--	2.5	--	618	.84	133	196	71	61	1,110	7.5
Aug. 5-6, 8 .....	63.0	--	--	42	20	109	169	0	18	188	--	3.1	--	508	.69	86	187	48	56	899	7.8
Aug. 11, 13, 15 .....	118	--	--	37	23	99	198	0	32	145	--	2.5	--	450	.61	143	187	25	53	818	8.1
Aug. 12 .....	110	--	--	51	22	155	149	7	21	280	--	3.5	--	690	.94	205	218	84	61	1,200	8.3
Aug. 14, 16-20 .....	72.5	--	--	34	20	76	184	1	25	107	--	2.6	--	376	.51	74	167	14	50	687	8.3
Aug. 21-23 .....	41.0	--	--	32	20	77	183	0	28	107	--	2.3	--	371	.50	41	162	12	51	686	7.9
Aug. 24, 31 .....	30.0	--	--	41	23	113	191	0	28	182	--	2.5	--	512	.70	41	197	40	55	939	7.6
Aug. 25-26 .....	49.0	--	--	66	26	246	162	0	17	465	--	1.7	--	996	1.35	132	272	139	68	1,770	7.8
Aug. 27-28 .....	31.0	--	--	82	30	340	148	0	23	670	--	1.6	--	1,360	1.85	114	353	232	68	2,380	7.8
Aug. 29-30 .....	27.5	--	--	51	23	147	165	0	26	295	--	2.9	--	646	.88	46	222	70	39	1,150	8.0
Sept. 1-10 .....	13.0	8.8	--	49	27	119	207	0	32	196	.5	1.3	.37	548	.75	19	231	62	52	998	8.2
Sept. 11-20 .....	5.39	8.8	.02	52	30	128	238	0	39	198	.5	1.2	.38	588	.80	8.6	253	56	52	1,060	8.2
Sept. 21-30 .....	3.34	8.6	.00	52	30	129	242	0	35	201	.3	1.6	.37	594	.81	5.4	253	54	52	1,090	7.9
Weighted average ..	580	--	--	37	18	85	a 130	--	19	187	--	2.5	--	445	0.61	697	166	60	53	754	--

a Includes equivalent of individual carbonate values shown above.

## LOWER MISSISSIPPI RIVER BASIN

## ARKANSAS RIVER BASIN--Continued

## DEEP FORK RIVER NEAR BEGGS, OKLA.--Continued

Temperature (°F) of water, November 1951 to September 1952

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1		--	57	40	60	39	59	72	77	86	84	89
2		--	59	38	62	38	60	74	79	87	85	76
3		--	62	38	50	36	59	73	78	87	88	81
4		--	58	32	49	41	54	74	79	88	86	84
5		--	62	38	50	43	58	75	80	88	88	76
6		--	61	43	52	47	59	76	79	88	89	86
7		--	58	50	62	49	57	74	78	88	88	86
8		--	45	49	61	48	59	73	73	87	89	83
9		--	45	48	51	49	59	70	74	84	89	83
10		--	44	48	57	48	57	69	74	84	87	87
11		--	46	48	53	46	57	71	76	83	90	87
12		--	--	61	52	45	57	73	77	80	89	88
13		--	--	68	50	42	58	74	78	76	90	87
14		--	39	41	54	49	59	73	79	78	91	82
15		--	34	50	51	55	58	72	78	83	91	87
16		--	38	69	43	57	58	71	82	85	92	90
17		--	37	61	43	59	57	73	82	86	89	76
18		--	40	40	43	58	59	72	78	86	87	83
19		--	41	64	50	58	57	67	80	85	92	80
20		--	34	57	53	57	57	71	84	83	92	70
21		--	33	55	56	55	59	72	82	83	--	71
22		--	46	51	56	52	65	70	84	82	88	--
23		--	42	55	58	--	56	73	86	83	86	78
24		--	42	48	57	43	58	70	86	84	87	79
25		--	49	34	51	45	53	57	74	87	86	74
26		49	35	56	49	56	58	79	86	83	84	80
27		49	34	54	51	58	61	79	85	83	89	84
28		50	44	59	41	59	62	79	85	82	86	80
29		54	48	59	40	57	65	78	87	83	86	81
30		52	68	63	--	59	66	77	89	83	89	84
31		--	70	69	--	64	--	78	--	83	83	--
Average		--	47	53	51	51	59	73	81	84	88	81

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

LOCATION:--At gaging station at bridge on State Highway 2, 5½ miles upstream from Snake Creek, and three-quarters of a mile north of Whitefield, Russell County, Okla.

DRAINAGE AREA: 17,576 square miles.

RECORDS AVAILABLE:--Chemical analyses: September 1944 to February 1945, September 1946 to September 1952.

Water temperatures: September 1944 to February 1945, September 1946 to September 1952.

EXTREMES: 1951-52--Dissolved solids: Maximum, 9,730 ppm July 18; minimum, 380 ppm Apr. 23-24, 26.

Hardness: Maximum, 1,670 ppm July 18; minimum, 117 ppm Apr. 13.

Specific conductance: Maximum daily, 13,600 micromhos July 18; minimum daily, 573 micromhos Apr. 23.

Water temperatures: Maximum, 85°F Aug. 3; minimum, freezing point on several days during November, December, and January.

EXTREMES: 1944-45, 1946-52--Dissolved solids: Maximum, 9,730 ppm July 18, 1952; minimum, 89 ppm Jan. 2, 5-7, 1948.

Hardness: Maximum, 1,810 ppm Jan. 21-24, 1949; minimum, 18 ppm Feb. 17, 1948.

Specific conductance: Maximum daily, 14,500 micromhos Jan. 22, 1949; minimum daily, 71.7 micromhos 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 1951 to September 1952 given in Water-Supply Paper 1241.

Chemical analyses, in parts per million, water year October 1951 to September 1952

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal-cium (Ca)	Mag-ne-sium (Mg)	So-dium (Na)	Pot-as-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 ratio	Specific conduct-ance (micro-mhos at 25°C)	pH
															Parts per mil-lion	Tons per acre-foot	Tons per acre-day	Calcium	Non-carbon-ate			
Oct. 1-2, 1951.....	360	--	--	132	37	623	126	0	37	1,200	--	--	3.6	--	2,350	3.20	2,280	482	378	74	4,060	7.8
Oct. 3-10.....	290	--	--	157	47	882	140	0	42	1,660	--	--	2.5	--	3,130	4.26	2,450	584	470	77	5,220	7.6
Oct. 11-19.....	294	--	--	183	51	989	147	0	41	1,860	--	--	1.8	--	3,480	4.73	2,760	666	546	76	5,700	7.6
Oct. 20.....	680	--	--	111	40	470	154	0	35	920	--	--	3.0	--	1,830	2.49	3,360	442	316	70	3,160	7.7
Oct. 21-23.....	356	--	--	137	47	626	168	0	36	1,220	--	--	1.4	--	2,240	3.05	2,150	535	398	72	3,800	8.0
Oct. 24-26, 31.....	912	--	--	172	52	803	116	0	34	1,600	--	--	2.5	--	3,010	4.09	7,410	643	548	73	5,070	7.8
Oct. 27-28.....	3,410	--	--	56	16	204	90	0	17	395	--	--	1.8	--	822	1.12	7,570	206	132	68	1,490	7.7
Oct. 29-30.....	2,400	--	--	87	25	361	72	0	22	725	--	--	1.4	--	1,410	1.92	9,140	320	261	71	2,450	7.4
Nov. 1.....	4,440	--	--	248	61	1,450	73	0	38	2,780	--	--	6.0	--	4,620	6.28	35,380	870	810	78	7,820	7.7
Nov. 2-3.....	4,560	--	--	78	20	356	71	0	27	685	--	--	2.9	--	1,260	1.71	15,510	276	218	74	2,360	7.5
Nov. 4-6.....	2,593	--	--	102	24	464	74	0	22	900	--	--	5.0	--	1,670	2.27	11,690	353	282	74	3,020	7.5
Nov. 7, 9-10.....	1,193	--	--	131	34	629	111	0	31	1,210	--	--	6.0	--	2,110	2.87	6,800	467	376	75	3,800	7.5
Nov. 8.....	1,180	--	--	158	42	818	91	0	35	1,580	--	--	6.0	--	2,840	3.86	9,950	566	482	76	3,500	7.8
Nov. 11-18.....	778	--	--	132	33	567	136	0	30	1,100	--	--	5.0	--	1,990	2.71	4,180	465	354	73	3,560	7.6
Nov. 19-20.....	446	--	--	161	40	725	153	0	37	1,400	--	--	5.6	--	2,520	3.43	3,030	566	440	74	4,480	7.6
Nov. 21-23.....	468	--	--	169	44	720	163	0	41	1,410	--	--	3.1	--	2,910	3.96	3,680	602	469	72	4,640	7.9
Nov. 24.....	1,100	--	--	100	26	424	96	0	33	825	--	--	2.5	--	1,700	2.31	5,050	356	278	72	2,850	7.7
Nov. 25, 27, 29-30.....	2,842	--	--	94	23	417	80	0	38	800	--	--	2.4	--	1,680	2.28	13,030	329	264	73	2,780	7.2
Nov. 26, 28.....	3,540	--	--	66	16	271	74	0	30	515	--	--	2.2	--	1,000	1.36	9,560	230	170	72	1,860	7.3
Dec. 1-4, 8-9.....	1,046	--	--	178	50	914	99	0	40	1,780	--	--	4.9	--	3,130	4.26	8,940	650	558	75	5,430	7.4
Dec. 5-7, 10.....	732	--	--	154	43	744	106	0	42	1,480	--	--	4.3	--	2,640	3.59	5,970	581	474	74	4,630	7.2
Dec. 11-14, 17.....	665	--	--	196	54	966	129	0	34	1,880	--	--	4.3	--	3,310	4.50	5,930	711	606	75	5,700	7.4

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

Chemical analyses, in parts per million, water year October 1951 to September 1952--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-cent ad-sorp-tion ratio	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, nesium	Non-carbonate			
Dec. 15-16, 18-20, 1952	462	--	--	--	224	62	1,070	153	0	46	2,100	--	3.9	--	3,780	5.14	4,720	814	766	74	6,420	7.4
Dec. 21-26, 28-31..	374	--	--	--	258	64	1,230	172	0	58	2,400	--	4.9	--	4,240	5.77	4,280	906	693	75	7,110	7.5
Dec. 27-28.....	383	--	--	--	326	87	1,580	189	0	69	3,100	--	5.0	--	5,470	7.44	5,660	1,170	1,020	75	7,130	7.6
Jan. 1, 4-7, 1952..	1,012	--	--	--	213	56	1,170	144	0	47	2,220	--	4.3	--	4,000	5.44	10,930	762	644	77	8,450	7.7
Jan. 2-3, 8-10....	1,286	--	--	--	323	80	1,780	146	0	62	3,420	--	4.8	--	5,840	7.64	20,280	1,140	1,020	77	9,250	7.5
Jan. 11-15.....	1,156	--	--	--	276	70	1,500	132	0	54	2,680	--	6.6	--	5,070	6.90	15,820	976	868	77	8,260	7.3
Jan. 16-20.....	775	--	--	--	214	60	1,150	115	0	58	2,220	--	3.9	--	4,070	5.54	8,520	780	596	76	8,260	7.3
Jan. 21-22, 26....	876	--	--	--	200	60	1,030	145	0	121	1,940	--	3.8	--	3,780	5.14	8,540	746	626	75	8,110	7.7
Jan. 23-25.....	965	--	--	--	176	52	819	158	0	111	1,550	--	4.3	--	3,140	4.27	8,160	353	524	73	5,080	7.6
Jan. 27-31.....	594	--	--	--	298	78	1,600	155	0	97	3,050	--	2.5	--	5,500	7.48	8,160	1,030	928	77	8,780	7.6
Feb. 1, 6.....	1,088	--	--	--	367	90	1,660	130	0	70	3,340	--	5.1	--	6,290	8.55	18,480	1,290	1,180	74	10,500	7.2
Feb. 2, 7, 9-10....	661	--	--	--	264	69	1,230	126	0	59	2,490	--	4.2	--	4,190	6.12	10,440	872	882	74	7,890	7.8
Feb. 3-5, 8.....	1,397	--	--	--	297	64	1,610	112	0	55	2,700	--	4.8	--	3,100	7.32	16,370	876	594	74	5,530	7.3
Feb. 6-10.....	2,298	10	0.00	--	271	64	1,070	126	0	55	2,100	0.1	2.5	0.30	3,980	5.39	16,460	830	708	73	6,550	7.5
Feb. 21-25, 27-28..	2,398	--	--	--	215	66	1,020	126	0	50	2,040	--	3.8	--	3,830	5.21	24,800	808	705	73	6,250	7.4
Feb. 26, 28.....	4,380	--	--	--	126	40	581	96	0	37	1,150	--	3.5	--	2,170	2.95	25,720	479	400	72	3,770	7.2
Mar. 1.....	3,650	--	--	--	238	73	1,310	76	0	34	2,580	--	7.6	--	4,480	5.08	44,150	894	832	76	7,550	7.6
Mar. 2, 7.....	5,055	--	--	--	38	35	489	85	0	29	975	--	3.6	--	1,850	2.52	25,250	414	344	72	3,230	7.2
Mar. 3-4, 10.....	11,330	--	--	--	56	17	181	94	0	28	350	--	4.2	--	768	1.04	23,490	210	132	65	1,380	7.2
Mar. 5-6, 8-9.....	8,220	--	--	--	72	24	263	93	0	30	525	--	3.7	--	1,080	1.47	23,970	278	202	67	1,910	7.2
Mar. 11.....	15,500	--	--	--	43	11	96	98	0	33	173	--	3.1	--	468	.64	19,590	152	72	58	789	7.7
Mar. 12-13.....	10,990	--	--	--	80	23	305	91	0	27	605	--	3.2	--	1,220	1.65	86,200	294	220	69	2,130	7.2
Mar. 14-20.....	5,189	--	--	--	52	17	156	98	0	35	298	--	2.6	--	679	.92	9,510	200	120	63	1,210	7.2
Mar. 21.....	4,920	--	--	--	74	26	227	120	0	63	438	--	4.3	--	992	1.35	13,180	282	193	33	1,760	8.2
Mar. 22-25, 29, 31..	2,409	--	--	--	98	31	344	147	0	68	655	--	5.2	--	1,410	1.92	9,170	372	252	67	2,430	7.6
Mar. 28-29, 30....	2,533	--	--	--	133	40	534	139	0	69	1,040	--	5.5	--	2,070	2.82	14,720	496	382	70	3,520	7.5
Apr. 1-2, 6.....	4,080	--	--	--	74	23	279	100	0	45	535	--	3.3	--	1,150	1.56	12,670	279	197	59	1,970	7.5
Apr. 3, 7-8.....	2,923	--	--	--	131	38	312	97	0	47	1,120	--	2.9	--	2,330	3.17	18,390	483	404	72	3,800	7.5
Apr. 4-5.....	4,525	--	--	--	84	27	369	91	0	47	665	--	2.4	--	1,460	1.99	17,840	320	246	70	2,370	7.7
Apr. 9-10.....	1,795	--	--	--	167	55	802	101	0	56	1,590	--	4.4	--	3,310	4.50	16,040	642	580	73	5,030	7.6
Apr. 11, 16.....	6,380	--	--	--	114	35	515	85	0	36	1,020	--	3.2	--	2,130	2.90	86,690	428	359	72	3,400	7.5

# ARKANSAS RIVER BASIN

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	Apr. 12, 15, 17, 20, 1952.....	9,438 22,700	55	16	205	78	0	24	395	--	2.4	--	871	1.19	22,270	203	139	69	1,470	7.5
Apr. 13.....	8,443	34	7.8	74	74	77	0	16	139	--	2.9	--	399	.54	24,450	117	54	58	1,649	7.9
Apr. 14, 18-19....	8,443	68	22	312	312	93	0	27	590	--	2.2	--	1,190	1.62	27,130	260	184	72	1,930	7.3
Apr. 21-22, 28-30..	18,000	56	16	147	147	105	0	31	288	--	1.4	--	714	.97	34,700	206	120	61	1,220	7.4
Apr. 23-24, 26.....	31,530	36	9.0	66	66	89	0	14	128	--	1.6	--	380	.52	32,350	127	54	53	1,602	7.7
Apr. 25, 27.....	15,300	40	10	92	92	88	0	20	176	--	1.4	--	495	.67	20,450	141	69	59	967	7.3
May 1-2.....	5,845	66	21	195	195	125	0	47	370	--	1.7	--	848	1.15	13,380	251	148	63	1,480	8.0
May 3, 5, 7-10....	2,572	128	40	465	465	163	0	87	900	--	1.6	--	1,930	2.62	13,400	484	350	68	3,220	7.9
May 4.....	3,650	94	29	311	311	142	0	76	590	--	2.5	--	1,330	1.81	13,110	350	237	66	4,200	8.1
May 6.....	2,750	153	47	614	614	148	2	72	1,210	--	2.9	--	2,470	3.36	18,340	375	430	66	4,000	8.3
May 11-13, 16-20..	2,535	123	42	589	589	197	0	88	900	--	2.8	--	1,980	2.69	13,350	586	342	66	3,520	8.1
May 14-15.....	1,180	142	49	464	464	172	0	99	1,120	--	3.0	--	2,400	3.35	20,550	470	372	72	3,560	7.8
May 21.....	5,820	126	38	550	550	120	0	41	1,080	--	6.2	--	1,330	1.50	20,550	330	205	67	2,190	7.8
May 22-25.....	6,868	86	28	309	309	152	0	43	585	--	4.2	--	1,390	1.21	26,550	249	142	65	1,560	7.8
May 26, 31.....	11,040	67	20	208	208	130	0	40	585	--	4.4	--	548	.75	13,540	170	76	60	1,954	7.8
May 27-30.....	9,148	47	13	119	119	116	0	27	215	--	3.7	--	738	1.00	10,030	200	110	65	1,280	7.6
June 1, 7-9.....	5,035	52	17	170	170	109	0	21	322	--	3.1	--	561	.76	10,250	166	76	62	1,988	7.6
June 2, 5-6.....	6,770	42	15	126	126	111	0	18	232	--	4.3	--	1,390	1.89	42,410	338	244	68	2,330	8.1
June 3, 10.....	14,300	91	27	331	331	114	0	22	665	--	4.8	--	970	1.32	12,620	251	172	65	1,650	7.5
June 11, 12.....	1,375	66	21	219	219	96	0	23	440	--	2.6	--	1,300	1.77	4,830	306	210	68	2,120	7.9
June 13-14.....	4,375	80	26	306	306	118	0	40	580	--	2.6	--	1,320	2.61	5,140	426	320	71	3,190	8.0
June 15-16.....	991	108	38	469	469	128	0	33	825	--	2.6	--	2,600	3.54	5,150	546	440	72	4,110	7.6
June 17-18.....	734	135	51	635	635	130	0	41	1,260	--	2.8	--	3,060	4.16	4,860	634	520	71	4,760	7.9
June 19-20.....	588	155	60	715	715	138	0	41	1,440	--	1.3	--	3,380	4.60	4,200	688	557	71	5,230	8.0
June 21-30.....	480	177	60	789	789	160	0	42	1,580	--	.39	--	3,880	5.28	2,720	790	650	72	6,160	8.1
July 1-8.....	217	222	73	1,090	1,090	178	0	48	2,150	--	--	--	4,140	5.63	2,430	854	708	74	6,630	8.0
July 9-10.....	218	173	61	805	805	181	0	40	1,580	--	--	--	3,290	4.47	1,940	682	534	72	5,240	7.6
July 11, 17, 19....	1,296	180	61	892	892	138	0	42	1,760	--	--	--	3,590	5.02	12,910	700	587	73	5,600	7.9
July 12-16.....	1,245	259	78	1,280	1,280	167	0	56	2,520	--	--	--	5,150	7.00	3,410	966	830	74	7,560	7.8

ARKANSAS RIVER BASIN--Continued  
CANADIAN RIVER NEAR WHITEFIELD, OKLA.--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-cent so-dium	So-dium adsorp-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 18, 1952 .....	2,760	--	--	461	127	2,500		99	0	47	4,940	--	--	--	9,730	13.23	72,510	1,670			13,600	8.1
July 20 .....	2,320	--	--	102	32	500		106	0	39	950	--	7.1	--	2,000	2.72	12,530	386	299	74	3,120	8.1
July 21 .....	2,000	--	--	203	60	1,050		86	0	31	2,080	--	--	--	3,700	5.03	19,980	753	682	75	6,360	8.2
July 22 .....	1,440	--	--	171	50	821		111	4	33	1,620	--	--	--	3,040	4.13	11,820	632	534	74	5,250	8.3
July 23-24 .....	1,330	--	--	109	35	490		119	3	31	950	--	4.8	--	1,860	2.53	6,680	416	314	72	3,240	8.3
July 25-31 .....	1,080	--	--	82	31	322		151	4	33	615	--	3.3	--	1,310	1.78	3,450	332	202	68	2,270	8.3
July 26-28 .....	1,080	--	--	50	19	190		118	0	19	352	--	3.0	--	779	1.06	2,270	203	106	67	1,380	8.1
July 29-30 .....	542	--	--	62	23	239		117	0	20	460	--	2.6	--	948	1.29	1,930	249	153	68	1,680	8.1
Aug. 1, 8 .....	360	--	--	88	28	369		115	0	24	720	--	3.0	--	1,450	1.97	1,410	334	240	71	2,480	8.2
Aug. 2-4, 7 .....	328	--	--	108	35	491		115	0	28	962	--	2.4	--	1,850	2.52	1,640	414	320	72	3,290	7.6
Aug. 5-6, 8-10 .....	440	--	--	125	41	560		107	0	30	1,320	--	--	--	2,180	2.96	2,000	460	393	72	3,710	7.9
Aug. 11-13 .....	542	--	--	129	54	692		101	0	34	1,840	--	--	--	2,620	3.56	2,420	503	438	72	4,380	7.0
Aug. 14, 15 .....	230	--	--	161	43	73		117	0	31	1,340	--	--	--	3,090	4.30	2,400	603	507	74	4,930	8.0
Aug. 16-19 .....	192	--	--	161	43	73		117	0	31	1,540	--	--	--	3,090	4.30	2,400	603	507	74	4,930	8.0
Aug. 21-23, 27 .....	192	--	--	207	53	999		144	0	36	1,980	--	--	--	3,710	5.03	1,920	776	658	74	6,130	8.2
Aug. 24-26, 31 .....	132	--	--	170	53	812		166	0	28	1,590	--	--	--	3,110	5.23	1,110	642	506	73	5,070	8.0
Aug. 28 .....	200	--	--	116	36	506		118	2	25	1,000	--	1.8	--	1,980	2.69	1,070	438	338	72	3,340	8.3
Aug. 29-30 .....	142	--	--	147	50	644		154	0	27	1,290	--	--	--	2,590	3.52	1,040	572	446	71	4,210	8.0
Sept. 1-10 .....	67.2	1.2	0.00	186	59	813	15	184	0	31	1,650	0.3	--	0.53	3,050	4.15	553	712	560	71	5,130	8.1
Sept. 11-20 .....	42.4	1.3	0.00	189	56	792	16	200	0	28	1,580	1.1	--	4.2	3,010	4.09	345	702	538	70	5,090	8.0
Sept. 21-22, 26 .....	151	--	--	147	46	617		148	0	26	1,240	--	--	--	2,350	3.20	958	556	434	71	4,020	8.1
Sept. 23 .....	1,737	--	--	228	78	1,080		97	0	23	2,220	--	3.1	--	4,080	5.55	13,080	890	810	73	6,800	8.0
Sept. 24 .....	386	--	--	90	29	389		84	0	30	770	--	2.2	--	1,470	2.00	2,930	344	274	71	2,680	7.7
Sept. 25 .....	122	--	--	68	20	270		70	0	16	540	--	2.2	--	1,030	1.40	1,070	252	194	70	1,890	7.8
Sept. 27-30 .....	2,620	--	--	185	59	858		108	0	26	1,740	--	--	--	3,150	4.28	1,040	704	618	73	5,440	7.6
Weighted average ..	2,620	--	--	89	26	360		a108	--	35	700	--	--	--	1,420	1.93	10,050	329	240	70	2,390	--

a Includes equivalent of individual carbonate values shown above.



## ARKANSAS RIVER BASIN--Continued

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

Temperature (°F) of water, water year October 1951 to September 1952

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

## ARKANSAS RIVER BASIN

## ARKANSAS RIVER AT VAN BUREN, ARK.

LOCATION --At gaging station at Van Buren, Crawford County, 1.3 miles downstream from Lee Creek and 8.6 miles downstream from Poteau River.  
DRAINAGE --150,218 square miles.  
RECORDS AVAILABLE --Chemical analyses: October 1945 to September 1952.

Water temperatures: October 1945 to September 1952.  
EXTREMES, 1951-52.--Dissolved solids: Maximum, 1,530 ppm July 22, 24-25; minimum, 297 ppm Apr. 13-15.

Hardness: Maximum, 388 ppm July 22, 24-25; minimum, 116 ppm Apr. 13-15.  
Specific conductance: Maximum, 4,900 micromhos July 21; minimum daily, 412 micromhos Apr. 14.

Water temperatures: Maximum, 85°F July 29-31, Aug. 3, 9; minimum, 33°F Dec. 21-22, 1951.  
EXTREMES, 1943-52.--Dissolved solids: Maximum, 1,740 ppm Jan. 11-13, 1951; minimum, 216 ppm July 18-27, 1951.

Hardness: Maximum, 476 ppm Jan. 11-13, 1951; minimum, 170 ppm Jan. 11-13, 1951.  
Specific conductance: Maximum, 4,900 micromhos July 21, 1952; minimum daily, 132 micromhos May 11, 1948.

Water temperatures: Maximum, 88°F July 29, 1951; minimum, freezing point Jan. 30, 1947.  
REMARKS --Values reported for dissolved solids concentrations are residue after evaporation. Records of specific conductance of daily samples available in District office at Fayetteville, Ark. Records of discharge for water year October 1951 to September 1952 given in Water-Supply Paper 1551.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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 (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	Color	
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate					
Oct. 1-6, 1951...	27,980	--	--	46	7.9	64	--	116	41	107	--	4.0	--	358	0.49	27,050	148	52	49	2.3	614	7.7	22
Oct. 7-10.....	18,660	--	--	59	11	100	--	143	56	166	--	5.2	--	518	.70	26,130	192	73	53	3.1	866	7.5	35
Oct. 11-20.....	16,320	14	0.03	68	16	126	5.6	160	72	215	0.3	2.9	0.12	634	.86	28,280	230	100	94	3.6	1,080	7.8	45
Oct. 21-24, 26..	17,450	--	--	72	16	158	--	166	82	270	--	4.7	--	726	.89	34,170	246	110	56	4.4	1,260	7.7	22
Oct. 25-27.....	22,750	--	--	62	11	75	--	128	93	143	--	2.6	--	438	.60	27,140	200	94	43	2.3	770	7.6	20
Oct. 28-31.....	47,200	--	--	62	8.6	58	--	96	33	103	--	2.4	--	321	.44	39,660	130	57	49	2.2	657	7.4	50
Nov. 1-2, 8.....	47,200	--	--	39	9.4	76	--	92	32	129	--	1.8	--	375	.51	47,790	136	60	55	2.8	892	7.5	31
Nov. 3-7, 9-10..	38,870	14	.17	44	11	94	4.4	104	43	168	.3	2.1	.08	464	.63	48,700	160	75	55	3.2	820	7.6	23
Nov. 11-16.....	43,280	--	--	56	11	102	--	130	50	169	--	4.5	.00	492	.67	57,490	184	78	55	3.3	837	7.6	21
Nov. 17-20.....	72,120	--	--	46	9.4	56	--	125	41	89	--	2.2	.00	342	.47	66,600	154	51	44	2.0	569	7.7	23
Nov. 21-24, 28..	48,460	--	--	49	9.7	73	--	123	46	121	--	2.3	.00	402	.55	52,600	162	61	49	2.5	673	7.7	23
Nov. 25-27.....	56,100	--	--	37	7.8	57	--	94	37	90	--	2.0	--	319	.43	48,320	124	48	50	2.2	520	7.8	23
Dec. 1-10.....	37,100	--	--	54	12	87	--	128	53	144	--	3.2	.11	458	.62	45,880	184	80	51	2.8	756	7.8	14
Dec. 11-17.....	27,170	--	--	58	13	102	--	136	66	166	--	4.0	.13	519	.71	38,070	198	86	53	3.2	856	8.0	8
Dec. 18-31.....	15,290	10	.12	79	15	151	5.0	177	81	242	.1	2.5	--	711	.97	29,350	258	114	55	4.1	1,190	8.0	12
Jan. 1-10, 1952..	18,790	11	.12	69	16	149	4.4	150	67	253	.1	3.3	.00	694	.94	35,210	238	115	57	4.2	1,160	8.1	22
Jan. 11-13.....	20,630	--	--	91	21	238	--	157	86	418	--	4.0	.00	1,010	1.37	56,260	314	185	62	5.8	1,650	8.2	10
Jan. 14-20.....	19,830	--	--	82	18	187	--	170	108	318	--	3.1	.00	822	1.12	44,010	278	139	59	4.9	1,380	7.1	10
Jan. 21-22, 27..	15,780	--	--	78	18	177	--	a 169	99	285	--	2.6	.00	787	1.07	33,530	268	130	59	4.7	1,300	8.3	7
Jan. 23-26, 29..	15,190	--	--	83	19	212	--	170	104	345	--	3.3	.00	895	1.22	36,710	285	146	62	5.5	1,490	7.7	22
31.....		--	--								--												

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

ARKANSAS RIVER BASIN

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Feb. 1-3, 1952.	15,670	--	--	88	21	202	b 171	128	338	--	3.4	.00	892	1.21	37,740	306	166	58	5.0	1,480	8.3	12
Feb. 4-9, .....	27,070	--	--	60	16	154	140	82	260	--	4.3	.00	690	.84	50,430	240	126	58	4.3	1,170	7.7	10
Feb. 10-20, .....	21,400	12	.08	65	16	127	138	80	208	.2	3.3	--	596	.91	34,440	228	115	54	3.6	1,010	7.7	15
Feb. 21-28, .....	22,690	--	--	70	17	176	140	92	278	--	2.9	.00	733	1.00	44,910	244	130	61	4.9	1,230	7.8	17
Feb. 29, Mar.		--	--							--												
1-3, .....	29,350	--	--	78	20	234	123	73	422	--	2.8	.10	1,020	1.39	80,830	276	176	65	6.1	1,670	7.4	15
Mar. 4-10, .....	53,700	--	--	47	12	102	107	51	175	--	3.5	.23	501	.68	72,640	170	82	57	3.4	853	7.4	20
Mar. 11-21, .....	82,160	--	--	60	13	56	104	65	93	--	2.5	.12	.331	.73	73,430	144	59	46	2.0	561	8.0	35
Mar. 22-31, .....	41,280	12	.18	62	13	104	3.4	141	172	.1	3.6	.10	538	.73	59,960	203	88	52	3.2	894	7.9	7
Apr. 1-10, .....	36,240	11	.04	58	12	104	3.7	124	175	.3	3.1	.10	536	.73	52,450	194	92	53	3.2	881	7.1	7
Apr. 11-12, 16-20, .....	52,910	--	--	47	12	85	106	50	142	--	1.9	.03	439	.60	62,710	166	80	53	2.9	741	7.7	30
Apr. 13-15, .....	83,570	--	--	32	8	54	76	32	94	--	1.9	--	297	.40	67,010	116	54	50	2.2	501	7.7	65
Apr. 21, 24-27, .....	98,120	--	--	42	13	75	114	41	125	--	1.9	.05	398	.54	105,400	158	65	51	2.6	671	7.8	40
Apr. 22-23, 28-30, .....	86,500	--	--	56	11	127	127	55	210	--	4.1	.05	600	.82	140,100	184	80	60	4.1	987	7.4	10
May 1-8, .....	44,350	--	--	61	14	143	134	83	230	--	3.0	.45	668	.94	82,360	210	100	60	4.3	1,100	7.0	7
May 9-13, .....	20,670	12	.02	66	21	239	176	124	368	.3	3.0	.10	1,010	1.37	56,370	301	157	53	6.0	1,080	7.1	7
May 16-20, .....	26,420	--	--	78	19	165	160	118	235	--	2.4	.50	805	1.27	40,040	272	142	57	4.4	1,280	7.6	7
May 21-23, .....	24,700	--	--	76	24	261	146	99	253	--	2.5	--	1,190	1.62	77,210	288	168	56	6.7	1,060	7.7	17
May 24-27, .....	39,750	--	--	66	16	134	142	73	255	--	3.0	.25	1,112	.97	76,420	230	114	59	4.4	1,180	7.7	16
May 28-31, .....	31,980	--	--	64	12	109	124	56	185	--	3.1	--	948	.73	47,320	184	83	56	3.3	897	7.1	5
June 1, 5-9, .....	32,020	--	--	50	15	113	116	66	182	--	3.1	--	572	.78	49,450	186	92	54	3.6	912	8.1	14
June 2-4, 10, .....	28,650	--	--	60	17	152	131	69	253	--	3.7	--	716	.97	55,390	220	112	58	4.5	1,170	7.6	20
June 11-20, .....	17,470	--	--	61	15	121	148	66	196	--	3.9	.10	610	.83	28,770	214	92	49	3.6	1,000	7.5	13
June 21-30, .....	7,352	12	.04	73	23	172	5.4	145	300	.3	2.1	.15	811	1.10	16,100	260	141	58	4.6	1,360	7.5	10
July 1-7, .....	4,237	17	.08	74	23	221	6.8	161	95	.2	2.0	.30	934	1.27	10,680	279	147	63	5.7	1,620	8.3	8
July 8-12, .....	5,016	--	--	90	35	317	152	125	595	--	2.4	.35	1,380	1.88	18,690	368	244	65	7.2	2,320	7.7	10
July 13-16, .....	4,795	--	--	68	21	174	145	87	300	--	2.5	--	811	1.10	10,500	256	137	58	4.7	1,310	7.5	14
July 17-19, .....	6,373	--	--	77	21	235	149	93	400	--	2.0	.29	959	1.30	16,500	278	156	65	6.1	1,660	7.7	10
July 20-21, 23, 26-27, .....	7,184	--	--	86	27	317	134	77	578	--	2.1	.23	1,230	1.67	23,860	326	216	68	7.6	2,140	7.6	12
July 22-24-25, .....	6,733	--	--	108	30	398	139	71	745	--	3.2	.25	1,330	2.08	27,810	388	274	69	8.8	2,620	7.8	10
July 28-31, .....	5,295	--	--	60	17	146	141	60	248	--	2.2	.15	1,636	.86	9,090	220	104	59	4.3	1,140	7.3	11

b Includes equivalent of 3 parts per million of carbonate (CO<sub>3</sub>).  
c Includes equivalent of 2 parts per million of carbonate (CO<sub>3</sub>).

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

Chemical analyses, in parts per million, water year October 1951 to September 1952.--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 carbonate	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	Color	
														Parts per million	Tons per acre-foot	Tons per day							
Aug. 1-5, 7-9, 1952.....	4,408	--	--	64 19	166	166	--	136	74	290	--	3.0	0.00	728	0.99	8,660	238	126	60	4.7	1,260	8.2	6
Aug. 6, 10-16..	4,365	12	0.02	78 21	234	234	6.9	b130	73	420	0.3	2.5	.10	980	1.33	11,550	281	174	64	6.1	1,690	8.3	9
Aug. 17-18, 22-23.....	4,790	--	--	78 26	309	309	--	122	94	540	--	2.0	.05	1,230	1.67	15,910	302	202	69	7.8	2,100	7.8	10
Aug. 19-21, 24, 28-31.....	4,120	--	--	72 22	222	222	--	136	81	390	--	1.4	.10	932	1.27	10,370	270	158	64	5.9	1,610	7.5	9
Aug. 25-28....	3,600	--	--	67 20	169	169	--	140	73	288	--	2.3	.05	734	1.00	7,130	249	134	60	4.6	1,300	7.7	10
Sept. 1-8.....	2,808	10	.04	77 23	235	235	6.7	b145	74	418	.3	2.7	.00	979	1.33	7,690	266	172	63	6.1	1,660	8.3	7
Sept. 9-14....	3,585	--	--	77 25	264	264	--	144	89	485	--	3.8	.00	1,060	1.44	10,260	295	177	66	6.7	1,940	7.7	10
Sept. 15-20....	3,435	--	--	70 18	176	176	--	153	80	310	--	1.6	.00	772	1.05	7,160	248	123	61	4.8	1,390	8.1	8
Sept. 21, 28....	4,165	--	--	92 27	325	325	--	c152	62	588	--	2.0	--	1,290	1.75	4,510	340	216	67	7.7	2,210	8.3	14
Sept. 22-25, 27	3,610	--	--	63 15	125	125	--	156	71	208	--	1.3	--	602	.82	5,870	218	90	55	3.7	1,040	8.0	16
Sept. 26, 29-30	3,250	--	--	74 20	180	180	--	154	70	338	--	1.8	.00	830	1.13	7,280	266	140	59	4.8	1,480	8.1	10
Weighted average	26,750	--	--	56 13	114	114	--	127	61	192	--	2.9	--	556	0.76	40,160	193	89	56	--	928	--	16

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

c Includes equivalent of 2 parts per million of carbonate (CO<sub>3</sub>).

## ARKANSAS RIVER BASIN--Continued

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

Temperature (°F) of water, water year October 1951 to September 1952

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

## ARKANSAS RIVER BASIN

## ARKANSAS RIVER AT DARDANELLE, ARK.

LOCATION:--At gaging station at bridge on State Highway 7 at Dardanelle, Yell County, 4.7 miles downstream from Illinois Bayou.

DRAINAGE AREA: 153,447 square miles.

RECORDS AVAILABLE:--Chemical analyses: October 1948 to September 1952.

Water temperatures: October 1948 to September 1952.

EXTREMES, 1951-52:--Dissolved solids: Maximum, 1,350 ppm July 24-30; minimum, 194 ppm Nov. 24-27.

Hardness: Maximum, 361 ppm July 24-27; minimum, 83 ppm Nov. 24-27.

Specific conductance: Maximum daily, 4,500 micromhos July 24; minimum daily, 239 micromhos Mar. 11.

Water temperatures: Maximum, 94°F Aug. 17; minimum, 35°F Dec. 21.

EXTREMES, 1948-52:--Dissolved solids: Maximum, 1,450 ppm Dec. 20-21, 24-26, 1950; minimum, 160 ppm Feb. 12-13, 1950.

Hardness: Maximum, 418 ppm Dec. 20-21, 24-26, 1950; minimum, 54 ppm Feb. 12-13, 1950.

Specific conductance: Maximum daily, 4,500 micromhos July 24, 1952; minimum daily, 171 micromhos Jan. 25, 1949.

Water temperatures: Maximum, 94°F Aug. 17, 1952; minimum, freezing point Jan. 30, 1949, Feb. 1-3, 1951.

REMARKS:--Values reported for dissolved solids concentrations are residue on evaporation. Records of specific conductance of daily samples available in district office at Fayetteville, Ark. Records of discharge for water year October 1951 to September 1952 given in Water-Supply Paper 1241.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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	Color			
														Parts per million	Tons per acre-foot						Tons per day	Calcium magnesium	Non-carbonate
Oct. 1-10, 1951	30,640	9.5	0.12	50	9.6	65	4.3	124	43	110	0.1	2.8		360	0.49	29,780	164	63	45	2.2	628	7.6	15
Oct. 11-20	17,160	14	.11	66	16	126	5.6	161	69	205	.3	1.9		614	.84	28,450	230	98	54	3.6	1,060	8.4	10
Oct. 21-24	20,200	14	.08	66	15	122	5.4	160	65	208	.4	2.2		612	.83	33,380	226	95	53	3.5	1,080	7.9	14
Oct. 25-28	29,750	11	.11	42	10	65	4.1	108	40	108		3	1.5	358		29,760	148	58	48	2.3	615	8.2	23
Oct. 29-31	56,700	--	--	33	7.3	45	--	87	28	77	--	2.2		276	.38	42,250	112	41	47	1.8	445	7.6	45
Nov. 1-2, 6	66,670	--	--	28	5.5	--	--	68	21	76	--	1.4		252	.34	45,360	94	38	51	2.0	400	7.4	14
Nov. 3-5, 7-10	51,610	14	.13	36	9.0	67	3.6	88	32	118	.3	1.3		357	.49	49,750	127	55	53	2.6	613	7.3	32
Nov. 11-13	42,210	12	.19	45	11	74	4.2	115	41	132	.3	1.9		403	.55	52,480	158	64	50	2.6	850	8.0	23
Nov. 19-23	62,540	13	.19	43	9.1	50	4.0	121	38	77	.3	2.5		322	.44	54,370	145	46	42	1.8	531	8.1	32
Nov. 24-27	85,480	8.6	.36	25	5.0	27	3.5	71	21	83	.3	1.6		194	.26	44,770	83	25	40	1.3	294	7.8	60
Nov. 28-30	67,500	14	.41	35	8.0	50	3.7	92	34	88	.4	2.0		289	.41	54,490	120	45	46	2.0	483	7.7	37
Dec. 1-8	49,060	11	.12	45	10	78	3.2	116	47	126	.1	2.1		401	.55	53,120	154	58	52	2.7	680	7.9	23
Dec. 9-13	42,320	12	.12	43	9.8	66	3.3	107	47	108	.1	2.2		358	.49	40,910	148	60	49	2.4	808	7.8	22
Dec. 14-19	31,570	8.0	.10	51	12	87	3.3	123	57	145	.1	2.0		452	.61	38,530	176	76	51	2.8	757	7.7	15
Dec. 20-31	19,280	7.2	.08	64	14	119	3.7	158	69	195	.1	2.7		591	.80	30,770	217	88	54	3.5	991	7.7	10
Jan. 1-9-12, 1952	24,580	12	.07	51	13	117	3.8	116	52	198	.2	1.9		539	.73	35,770	180	86	58	3.8	810	7.6	15
Jan. 10-12	31,390	13	.04	41	10	133	3.1	96	43	136	.2	1.6		404	.55	34,240	144	65	55	3.0	674	7.6	10
Jan. 13-20	23,340	11	.12	72	17	169	4.4	145	63	288	.2	4.2		762	1.04	48,020	250	130	59	5.2	1,270	7.9	12
Jan. 21-31	18,480	10	.12	69	17	155	4.1	152	79	262	.2	2.9		722	.98	36,020	242	118	58	4.4	1,210	8.1	15

Feb. 1-3, 1952 ..	16,600	10	.45	74	18	163	4.6	150	85	290	2	2.5	790	1.07	35,410	258	136	57	4.4	1,300	7.6	13
Feb. 4-10 .....	29,000	7.4	.22	64	15	134	4.1	129	71	232	.3	1.8	656	.89	51,360	221	116	56	3.9	1,090	7.2	16
Feb. 11-20 .....	24,470	9.0	.16	60	13	103	3.8	130	64	175	.2	2.8	548	.75	35,210	203	96	52	3.1	895	7.7	17
Feb. 21-29 .....	24,090	15	.11	59	14	131	4.1	120	69	220	.1	2.4	590	.80	38,380	202	104	58	4.0	1,350	7.1	23
Mar. 1-9 .....	33,700	9.7	.14	59	14	155	4.9	98	51	288	.1	2.3	684	.83	60,390	204	124	61	4.7	1,600	7.4	23
Mar. 4-9 .....	61,320	8.6	.32	44	9.7	98	3.6	92	40	168	.2	1.8	438	.60	72,520	150	74	58	3.5	1,778	7.3	37
Mar. 10-13, 17-22	83,610	9.8	.23	37	7.5	45	2.9	96	39	73	.3	2.8	388	.39	69,660	124	45	44	1.8	460	7.7	45
Mar. 14-16 .....	110,700	9.8	--	48	10	77	--	112	51	132	--	2.5	382	.52	114,200	161	69	51	2.6	690	8.2	17
Mar. 23-31 .....	48,320	11	.06	51	10	90	3.3	122	59	148	.2	1.8	457	.62	60,860	168	68	53	3.0	761	7.8	23
Apr. 1-9 .....	43,620	12	.09	48	10	83	2.5	110	53	136	.1	2.3	424	.58	49,940	161	71	52	3.8	718	7.7	8
Apr. 10-11, 17-20	81,900	10	.10	40	7.9	68	2.3	87	36	121	.1	1.6	356	.48	59,500	132	61	52	2.6	601	7.3	17
Apr. 12-16 .....	106,800	--	--	29	8.1	42	--	74	24	79	--	1.3	254	.35	73,240	106	46	46	1.8	417	6.8	50
Apr. 21-23, 25-27	107,100	9.7	.14	36	6.9	57	2.1	89	28	99	.1	1.8	304	.41	87,910	118	46	51	2.3	524	7.3	23
Apr. 24, 28-29 ..	106,100	12	--	46	9.1	84	--	114	38	138	--	2.1	438	.60	127,800	152	59	54	3.0	721	7.2	8
Apr. 30, May 1-9	55,460	12	.02	51	10	121	3.6	120	69	195	.2	3.0	558	.76	85,560	170	72	60	4.0	946	7.8	8
May 10-13 .....	26,720	12	.11	75	17	172	4.7	160	98	295	.3	3.3	823	1.12	59,370	257	126	59	4.7	1,350	7.6	10
May 14-17 .....	19,900	9.7	.06	88	21	236	5.4	178	130	368	.3	2.8	1,010	1.37	54,270	306	160	62	5.9	1,670	8.0	7
May 18-20, 22-23, 27-28 .....	34,010	12	.04	67	15	142	4.9	132	84	248	.3	3.2	695	.95	63,820	228	120	57	4.1	1,170	7.8	10
May 21, 24-26, 29-31 .....	36,640	11	.04	50	12	105	3.9	106	52	182	.3	2.1	514	.70	53,620	174	88	57	3.5	860	7.4	7
June 1-3, 5-9-10	30,130	10	.04	55	13	112	4.6	121	64	192	.3	2.8	562	.76	45,720	190	92	55	3.5	938	7.5	10
June 4, 7-8 .....	27,630	10	.05	69	16	174	5.5	130	74	305	.3	3.5	802	1.09	59,830	238	132	61	4.9	1,200	7.5	7
June 11-20 .....	21,650	14	.07	60	13	105	4.6	139	80	178	.3	3.0	542	.74	31,890	203	89	52	7.2	909	7.9	5
June 21-30 .....	8,830	9.0	.04	74	18	148	5.3	168	83	255	.3	1.8	726	.99	17,310	258	121	55	4.0	1,230	7.8	12
July 1-12 .....	5,188	9.8	.04	75	24	195	5.6	164	80	332	.3	1.8	1,270	1.14	11,740	286	151	59	5.0	1,483	7.5	10
July 13-16 .....	5,900	15	.03	92	32	319	7.9	162	113	552	.3	1.9	1,270	1.73	20,230	361	228	65	7.3	2,140	7.8	4
July 17-20 .....	5,900	12	.08	72	22	178	5.6	158	76	308	.3	1.9	789	1.07	12,360	270	140	58	4.7	1,360	7.0	7
July 21-23, 31 ..	7,012	10	.03	79	24	229	6.5	140	73	410	.3	2.4	854	1.30	18,060	296	181	62	5.8	1,660	7.4	5
July 24-30 .....	6,786	7.2	.03	90	29	349	8.1	112	70	655	.3	2.0	1,350	1.84	24,730	344	252	68	8.3	2,330	8.0	5

## ARKANSAS RIVER BASIN--Continued

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

Chemical analyses, in parts per million, water year October 1951 to September 1952--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 adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	Color	
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate					
Aug. 1-10, 1952.	4,867	12	0.12	63	19	151	4.7	150	70	264	0.3	1.1		665	0.90	8,739	235	112	58	4.3	1,190	7.8	5
Aug. 11-14 .....	4,708	13	.10	70	21	171	4.9	148	69	305	.3	1.0		544	1.01	9,457	261	140	58	4.6	1,330	7.7	7
Aug. 15-20, .....	4,742	8.0	.02	76	22	217	6.4	150	70	402	.3	1.9		985	1.34	12,610	280	157	62	5.6	1,650	7.9	8
Aug. 21-23, 26-27, 29, .....	4,757	6.6	.13	78	24	258	7.0	136	87	470	.3	1.4		1,130	1.54	14,510	293	182	65	6.5	1,890	7.9	7
Aug. 24-25, 28, 30-31, .....	4,318	8.0	.20	74	19	199	6.9	149	99	345	.3	2.1		826	1.12	9,630	262	140	61	5.4	1,490	7.1	10
Sept. 1-9 .....	3,529	8.6	.02	71	20	185	6.6	165	69	318	.3	1.5		808	1.10	7,699	259	124	60	5.0	1,420	8.2	8
Sept. 10-20, .....	3,480	5.1	.10	77	27	248	6.8	157	85	435	.3	1.9		1,060	1.44	9,960	303	174	63	6.2	1,810	7.7	7
Sept. 21-30 .....	3,798	7.4	.00	69	18	166	6.0	164	61	280	.2	1.4		737	1.00	7,558	246	112	59	4.6	1,290	8.2	8
Weighted average	32,280	--	--	48	11	91	--	112	50	155	--	2.2		457	0.62	39,830	165	73	55	--	768	--	17



## ARKANSAS RIVER BASIN--Continued

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

Temperature (°F) of water, water year October 1951 to September 1952  
 /Once-daily temperature measurement at approximately 5:30 p. m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	72	55	51	49	48	49	61	70	76	88	89	84
2	73	51	51	46	48	48	61	71	78	88	89	80
3	74	50	54	45	50	49	58	72	79	88	89	79
4	76	48	50	44	48	48	56	75	82	89	88	80
5	78	45	53	44	49	47	55	75	80	89	87	79
6	76	45	55	43	48	47	56	77	81	89	86	79
7	72	45	52	44	48	47	58	77	83	88	88	80
8	71	46	50	44	49	48	61	77	83	86	88	81
9	69	45	49	43	49	49	61	77	84	86	86	81
10	68	48	48	41	50	51	59	73	85	86	87	81
11	68	50	46	41	49	52	57	70	86	--	87	81
12	69	53	47	43	49	52	54	70	86	86	85	80
13	68	48	45	47	52	52	52	71	87	86	86	80
14	68	47	44	48	52	52	54	72	87	85	88	81
15	68	55	42	50	52	51	55	73	88	87	88	82
16	69	53	38	54	48	51	56	75	88	83	90	82
17	69	50	37	55	48	50	59	75	89	82	94	80
18	70	49	38	53	49	50	59	71	90	84	90	81
19	69	49	37	56	51	52	60	69	91	86	90	80
20	67	48	37	54	50	54	60	72	90	86	90	78
21	68	47	35	52	50	55	62	72	90	88	89	74
22	69	49	36	50	48	53	61	73	89	88	84	75
23	67	50	47	48	49	51	63	69	89	89	85	75
24	65	52	47	45	49	50	63	67	88	90	83	74
25	64	50	39	47	47	51	62	70	88	90	83	73
26	63	50	40	52	48	53	64	73	88	90	83	73
27	63	50	39	51	49	52	65	74	89	92	83	75
28	61	50	40	52	51	55	66	72	90	91	84	76
29	61	50	43	49	50	56	68	74	90	91	83	76
30	62	50	45	47	--	56	69	74	88	88	84	77
31	59	--	49	46	--	58	--	75	--	89	84	--
Average	68	49	45	48	49	51	60	73	86	88	87	79

## ARKANSAS RIVER BASIN--Continued

## PETIT JEAN CREEK AT DANVILLE, ARK.

LOCATION --At bridge on State Highway 10 at Danville, Yell County, 0.6 mile (revised) downstream from Dutch Creek, and 1,800 feet upstream from Chicago, Rev. Island and Pacific Railway bridge.

DRAINAGE AREA 741 square miles.

RECORDS AVAILABLE --Chemical analyses: October 1948 to September 1952.

Water temperatures: October 1948 to September 1952.

EXTREMES 1951-52 --Dissolved solids: Maximum 108 ppm Mar. 17-18, 20, 22; minimum 48 ppm Jan. 21-31.

Hardness: Maximum 34 ppm Mar. 17-18, 20, 22; minimum 15 ppm May 1-10.

Specific conductance: Maximum daily 138 microhmhos Mar. 20; minimum daily 20.9 microhmhos Mar. 22.

Water temperatures: Maximum 90° June 25, July 28; minimum 38° Dec. 18-19, 21.

EXTREMES 1948-51 --Dissolved solids: Maximum 108 ppm Mar. 17-18, 20, 22, 1952; minimum 13 ppm Feb. 1-3, 1950.

Hardness: Maximum 34 ppm Mar. 17-18, 20, 22, July 11-20, 1952; minimum 9 ppm Feb. 1-10, 1949; Feb. 1-3, 1950.

Specific conductance: Maximum daily 204 microhmhos July 25, 1950; minimum daily 20.9 microhmhos Mar. 22, 1952.

Water temperatures: Maximum 96° Sept. 8, 10, 1951; minimum, freezing point Feb. 2-3, 1951.

REMARKS --Records of specific conductance of daily samples available in district office at Fayetteville, Ark. Records of discharge for water year October .951 to September 1952 given in Water-Supply Paper 1241.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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 (microhmhos at 25°C)	pH	Color
														Calcium, magnesium	Non-carbonate			
Oct. 1-10, 1951.....	65.4	--	--	5.0	3.3	6.0	--	26	9.1	4.8	--	1.7	51	26	5	79.3	7.0	15
Oct. 11-22.....	25.8	7.5	0.06	5.4	3.6	6.2	2.2	30	9.8	4.8	0.1	1.3	55	28	4	64.7	7.2	15
Oct. 23-31.....	408	--	--	3.6	2.6	5.2	--	20	6.0	5.2	--	3.4	55	20	3	67.9	7.1	45
Nov. 1-10.....	2,802	--	--	4.0	2.4	3.5	--	16	7.4	4.2	--	1.5	55	20	7	56.2	6.9	60
Nov. 11-20.....	1,862	7.2	.42	4.6	2.4	4.2	2.2	17	8.6	4.5	.5	1.8	60	21	7	61.0	7.1	80
Nov. 21-22, 29-30.....	1,040	--	--	5.2	2.9	7.4	--	19	10	9.0	--	1.3	90	25	9	81.5	7.1	55
Nov. 23-28.....	1,286	--	--	3.6	3.5	1.6	--	14	7.0	4.8	--	1.6	73	23	12	58.5	7.1	--
Dec. 1-7.....	1,871	--	--	3.6	3.4	6.7	--	17	11	6.2	--	1.5	75	23	9	72.1	7.0	90
Dec. 8-10.....	2,263	--	--	2.7	2.8	3.0	--	12	7.0	3.8	--	1.0	60	18	8	43.2	7.0	9
Dec. 11-20.....	1,558	--	--	3.6	3.0	5.8	--	15	10	5.2	--	1.4	62	21	8	64.5	7.0	50
Dec. 21-31.....	427	9.2	.34	3.0	2.4	5.4	1.7	15	10	5.5	.4	.8	60	17	5	60.5	6.9	75
Jan. 1-2, 6-7, 1952.....	1,888	--	--	3.6	2.7	6.3	--	15	10	7.2	--	2.8	49	20	8	77.9	6.4	50
Jan. 3-5, 8-10.....	2,958	--	--	2.4	2.4	5.0	--	11	9.0	4.5	--	1.6	53	16	7	55.8	6.4	55
Jan. 11-20.....	1,291	7.9	.06	2.8	3.0	5.2	1.8	12	9.6	6.2	.3	1.3	63	19	10	62.2	6.8	80
Jan. 21-31.....	227	--	--	3.2	3.2	4.0	--	14	11	5.0	--	1.5	48	21	10	60.9	6.5	45
Feb. 1-10.....	4+6	7.9	.28	3.2	2.8	6.0	1.8	14	9.6	6.8	.3	2.3	62	20	8	67.3	7.2	70
Feb. 11-20.....	303	--	--	3.3	3.0	5.3	--	17	9.1	6.5	--	1.1	71	21	7	67.9	6.4	45
Feb. 21-29.....	681	--	--	3.6	3.1	6.1	--	16	11	6.5	--	1.0	60	21	9	73.2	6.5	45
Mar. 1-5, 9-12.....	2,180	--	--	3.2	3.0	4.1	4.1	13	9.2	6.3	--	1.9	57	20	10	69.8	6.7	70
Mar. 6-8.....	2,553	--	--	4.2	3.4	3.0	3.0	16	11	8.6	--	2.9	82	33	20	98.8	6.9	45

Mar. 12-16, 1952	2,440	--	--	4.5	2.3	2.6	13	9.0	6.5	--	1.5	67	25	14	89.2	7.2	70
Mar. 17-18, 20, 22	2,700	--	--	5.0	3.2	9.3	10	9.0	3.8	--	1.3	108	24	26	130	6.5	55
Mar. 21, 23-31	2,336	6.6	.97	3.8	1.6	5.8	15	10	5.5	.1	1.8	86	16	4	82.1	7.1	80
Apr. 1-4, 6-8	2,104	4.4	.82	3.7	1.9	5.5	16	9.2	4.5	.1	1.6	82	17	4	59.4	6.6	80
Apr. 5, 9-14	4,478	--	--	2.2	2.5	2.8	11	5.0	3.5	--	1.4	52	16	7	43.6	7.6	70
Apr. 15-20	2,578	--	--	2.6	2.9	3.5	14	6.0	3.5	--	1.9	60	18	7	52.3	6.6	65
Apr. 21-30	4,406	--	--	3.3	1.9	3.0	13	6.9	2.5	--	1.4	53	16	5	47.3	6.5	70
May 1-10	2,365	5.4	.91	3.1	1.7	4.5	13	8.6	3.5	.2	2.0	60	15	4	52.1	6.7	80
May 11-20	1,965	--	--	3.2	2.3	4.1	17	6.2	2.5	--	1.2	58	17	4	50.0	6.6	--
May 21-31	2,023	--	--	3.1	2.8	4.4	19	6.4	3.5	--	1.5	64	19	4	60.2	6.6	70
June 1-10	589	--	--	3.4	3.0	4.6	23	5.3	3.8	--	2.3	55	21	2	69.1	7.2	60
June 11-20	52.1	--	--	4.1	3.2	4.4	27	4.8	4.0	--	2.2	52	23	1	76.1	7.3	40
June 21-30	12.0	10	.13	4.6	3.8	6.1	35	5.8	5.2	.2	1.6	59	27	0	87.6	7.1	11
July 1-10	11.8	--	--	5.7	4.2	6.2	39	3.5	5.5	--	3.9	53	31	0	98.2	7.0	10
July 11-20	12.3	8.9	.10	6.3	4.4	5.8	42	5.2	5.2	.1	2.6	60	34	0	94.9	6.7	6
July 21-31	28.1	--	--	5.6	4.2	6.6	39	5.8	5.5	--	1.7	62	31	0	92.6	7.2	12
Aug. 1-10	70.8	--	--	4.3	3.4	6.2	29	6.4	5.8	--	3.5	81	25	1	87.3	6.9	10
Aug. 11-20	45.2	9.0	.16	5.8	3.8	6.4	32	7.6	5.0	.2	2.0	61	30	4	86.7	6.9	20
Aug. 21-31	27.3	--	--	5.1	3.8	6.1	34	6.5	4.2	--	.9	61	28	0	83.7	7.7	17
Sept. 1-10	20.0	8.6	.10	5.4	4.2	6.4	34	7.6	5.8	.2	1.0	56	31	3	86.7	7.0	15
Sept. 11-20	19.4	--	--	5.3	4.3	7.0	35	7.4	5.5	--	1.0	62	31	2	92.5	7.2	9
Sept. 21-30	21.9	9.4	.12	6.9	3.9	6.2	35	8.6	5.2	.1	.9	62	33	5	91.7	7.5	12
Average	1,124	--	--	4.1	3.2	5.2	21	8.0	5.6	--	1.7	62	23	6	72.2	--	47

## LOWER MISSISSIPPI RIVER BASIN

## ARKANSAS RIVER BASIN--Continued

## PETIT JEAN CREEK AT DANVILLE, ARK.--Continued

Temperature ( $^{\circ}$  F) of water, water year October 1951 to September 1952

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	71	53	51	50	50	50	60	65	74	89	85	82
2	73	50	52	47	51	50	60	64	70	85	85	88
3	75	52	53	44	48	50	52	64	71	82	86	75
4	76	51	52	43	48	48	51	67	72	82	87	76
5	76	51	52	44	45	47	52	69	78	81	84	74
6	70	46	53	44	46	48	56	71	75	82	84	74
7	66	46	54	44	47	49	68	76	75	83	80	75
8	66	49	52	47	50	50	60	74	78	79	80	73
9	63	54	51	46	50	52	54	74	80	80	80	74
10	65	54	46	43	51	55	55	65	77	77	85	74
11	63	56	48	42	51	54	53	66	80	79	86	76
12	63	56	52	45	50	56	56	68	80	79	86	76
13	64	57	48	47	54	53	60	68	81	72	--	77
14	65	57	47	48	55	53	60	68	79	77	86	77
15	64	57	--	49	52	51	58	68	85	79	86	77
16	62	52	41	48	48	52	58	67	85	78	85	80
17	66	50	40	49	52	50	54	68	86	--	86	79
18	66	49	38	55	--	52	58	69	88	81	85	77
19	63	46	38	56	50	53	60	69	87	82	84	76
20	63	46	40	53	52	57	62	70	88	83	89	74
21	64	48	38	51	50	57	63	70	88	84	86	74
22	64	49	40	47	50	57	64	69	87	86	83	73
23	63	50	42	47	50	55	64	67	87	82	81	73
24	62	50	44	46	49	53	64	68	89	86	81	76
25	61	53	43	48	48	53	62	72	90	--	80	69
26	61	51	42	51	45	54	61	74	89	83	80	67
27	62	52	40	52	50	52	60	70	82	89	80	75
28	61	50	40	51	53	52	62	69	83	90	80	73
29	--	--	41	47	--	56	65	67	84	84	79	73
30	--	51	47	--	--	57	65	71	84	85	85	71
31	54	--	49	--	--	57	--	70	--	--	86	--
Average	65	51	46	48	50	53	59	69	82	82	84	75

ARKANSAS RIVER BASIN  
ARKANSAS RIVER AT LITTLE ROCK, ARK.

LOCATION.--At gaging station at Missouri Pacific Railway bridge at Little Rock, Pulaski County.  
DRAINAGE AREA.--157,936 square miles (corrected).  
RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1952.  
EXTREMES, 1951-52.--Dissolved solids: Maximum, 1,400 ppm July 27, 29-31; minimum, 235 ppm Nov. 26-30, Apr. 13-17.  
Hardness: Maximum, 354 ppm July 27, 29-31; minimum, 92 ppm Nov. 26-30, Apr. 13-17.  
Specific conductance: Maximum daily, 4,290 micromhos July 28; minimum daily, 325 micromhos Nov. 27.  
Water temperatures: Maximum, 90° F June 20, July 27, Aug. 2; minimum, 36° F Dec. 19.  
EXTREMES, 1945-52.--Dissolved solids: Maximum, 1,730 ppm Oct. 24-29, 1946; minimum, 187 ppm Dec. 11-20, 1946.  
Hardness: Maximum, 420 ppm Dec. 28-29, 1950; minimum, 48 ppm Jan. 11-14, 1948.  
Specific conductance: Maximum daily, 4,290 micromhos July 28, 1952; minimum daily, 229 micromhos Jan. 10, 1948.  
Water temperatures: Maximum, 91° F Aug. 6, 9, 1947; minimum, freezing point Dec. 16, 1945, Feb. 10-11, 1947, Jan. 28-29, 1948.  
REMARKS.--Values reported for dissolved solids concentrations are residue on evaporation. Records of specific conductance of daily samples available in district office at Fayetteville, Ark. Records of discharge for water year October 1951 to September 1952 given in Water-Supply Paper 1241.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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	Soadsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	Color
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
Oct. 1-12, 1951..	30,850	14	0.11	47	10	66	4.6	125	47	105	0.2	3.0	3.0	378	0.51	31,480	158	56	47	649	7.8	15
Oct. 13-16.....	16,430	--	--	64	13	104	--	136	65	108	--	3.8	3.8	543	.75	27,300	213	84	51	931	7.9	16
Oct. 17-20.....	17,600	--	--	67	15	113	--	136	74	205	--	3.8	3.8	623	.85	29,650	228	100	52	1,090	7.8	9
Oct. 21-26.....	19,230	--	--	68	13	114	--	171	60	189	--	3.1	3.1	603	.82	31,340	231	88	52	1,010	7.1	28
Oct. 27-29.....	32,800	--	--	65	10	75	--	117	54	121	--	3.3	3.3	393	.53	34,590	154	58	51	675	7.9	32
Oct. 30-31, Nov. 1-4.....	73,590	--	--	30	6.4	44	--	82	28	72	--	2.1	2.1	254	.35	50,460	102	34	48	404	7.2	18
Nov. 5-6.....	71,800	--	--	40	8.3	79	--	74	23	155	--	4.0	4.0	409	.56	79,290	134	74	56	867	7.3	18
Nov. 7-10.....	70,100	--	--	31	6.3	60	--	74	30	98	--	2.0	2.0	294	.40	55,650	104	43	56	491	7.2	22
Nov. 11-13.....	51,500	--	--	31	8.0	46	--	81	27	87	--	1.6	1.6	290	.39	40,320	110	44	48	462	7.9	22
Nov. 14-20.....	67,940	12	.26	41	10	66	4.0	106	40	110	.3	2.3	2.3	370	.50	67,970	144	56	49	622	7.7	40
Nov. 21-25.....	61,980	--	--	28	41	8.4	--	113	37	75	--	2.9	2.9	308	.42	51,540	137	44	43	493	7.5	22
Nov. 26-30.....	94,780	--	--	28	5.3	38	--	76	25	57	--	2.0	2.0	235	.32	60,140	92	30	47	362	7.5	18
Dec. 1-10.....	56,970	--	--	39	8.7	65	--	100	40	105	--	3.1	3.1	333	.45	51,220	134	52	51	569	7.9	22
Dec. 11-20.....	41,940	--	--	40	9.1	65	--	100	48	100	--	2.7	2.7	344	.47	38,860	138	56	51	579	7.7	20
Dec. 21-31.....	23,790	11	.11	51	13	99	3.5	131	56	158	.2	2.8	2.8	473	.64	30,380	180	73	54	724	8.0	11
Jan. 1-3, 1952.....	28,930	--	--	52	12	86	--	123	66	145	--	2.8	2.8	457	.62	35,700	180	78	51	784	7.5	32
Jan. 4-10.....	60,340	--	--	28	6.4	48	--	66	32	118	--	3.1	3.1	252	.34	41,060	96	42	52	549	7.4	25
Jan. 11-14.....	44,580	--	--	32	7.8	69	--	77	31	118	--	2.0	2.0	325	.44	39,120	112	49	57	549	7.4	25
Jan. 15-20.....	32,300	--	--	57	13	136	--	117	57	232	--	3.0	3.0	604	.82	52,670	196	100	60	1,000	8.0	10
Jan. 21-27.....	23,730	10	.09	51	15	127	4.1	140	61	210	.2	3.0	3.0	594	.81	33,060	208	94	57	1,010	7.5	10
Jan. 28-31.....	20,250	--	--	66	17	158	--	158	70	255	--	1.2	1.2	652	.89	35,650	234	105	59	1,160	7.5	11

ARKANSAS RIVER BASIN--Continued  
 ARKANSAS RIVER AT LITTLE ROCK, ARK.--Continued

Chemical analyses, in parts per million, water year October 1951 to September 1952--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)	Color or pH			
													Parts per million	Tons per acre-foot	Tons per acre-foot	Calcium, mg./nesium	Non-carbonate						
Feb. 1-10, 1952.	30,180	10	0.23	53	12	115	3.8	115	62	195	0.2	2.6	2.6	539	0.73	43,840	182	88	57	3.7	927	7.9	15
Feb. 11-13	34,700	--	--	56	13	115	--	113	56	200	--	4.8	4.8	542	.74	50,780	193	100	56	3.3	964	7.8	8
Feb. 14-19	30,330	--	--	52	12	93	--	116	63	148	--	3.2	3.2	464	.63	33,000	180	84	53	3.0	774	7.9	15
Feb. 20-24	32,340	--	--	43	9.8	75	--	96	55	120	--	2.4	2.4	376	.51	32,830	148	70	52	2.7	640	7.7	20
Feb. 25-29	31,200	--	--	45	13	100	--	99	54	162	--	8.4	8.4	470	.64	39,590	166	85	57	3.4	776	7.3	22
Mar. 1-6	47,430	--	--	54	12	130	--	97	43	230	--	5.3	5.3	660	.90	84,820	184	105	60	4.2	1,020	7.2	7
Mar. 7-11	75,880	--	--	46	9.4	82	--	95	38	143	--	3.6	3.6	453	.62	82,810	154	76	54	2.9	707	7.8	13
Mar. 12-14, 19--20	120,600	--	--	32	5.5	37	--	84	25	60	--	3.2	3.2	255	.35	83,030	102	34	44	1.6	394	7.3	25
Mar. 15-18	122,500	--	--	41	7.5	63	--	98	41	100	--	5.2	5.2	360	.49	119,100	134	53	51	2.4	596	7.6	22
Mar. 21-24	84,950	--	--	35	6.4	44	--	90	35	67	--	3.8	3.8	306	.42	70,100	114	40	46	1.8	446	7.7	9
Mar. 25-31	58,610	11	.07	44	9.4	71	3.4	104	44	122	.3	2.8	2.8	389	.53	61,560	148	64	50	2.5	654	7.6	9
Apr. 1-10	52,440	--	--	40	8.1	68	--	99	44	107	--	3.0	3.0	369	.50	52,250	134	52	53	2.6	610	7.6	7
Apr. 11-12, 18-20	77,160	--	--	35	7.3	62	--	80	29	108	--	2.3	2.3	328	.45	68,330	118	52	53	2.5	553	7.4	11
Apr. 13-17	127,400	--	--	28	5.2	38	--	73	22	64	--	2.0	2.0	235	.32	80,840	92	32	47	1.7	384	7.6	45
Apr. 21-30	121,600	11	.18	37	7.3	54	2.9	96	28	95	.3	2.7	2.7	305	.41	100,100	122	44	48	2.1	527	7.8	14
May 1-10	65,590	14	.04	48	9.7	101	3.7	110	56	158	.2	3.4	3.4	476	.65	84,300	160	70	57	3.5	811	7.6	10
May 11-15, 20	34,320	--	--	56	13	120	--	123	71	196	--	2.6	2.6	585	.80	54,210	193	92	57	3.8	966	7.5	8
May 16-19	29,080	--	--	63	15	157	--	137	89	249	--	2.4	2.4	717	.98	56,290	218	106	61	4.6	1,180	7.6	8
May 21-23, 27--28, 31	36,730	--	--	49	12	95	125	110	58	163	--	2.6	2.6	490	.67	51,240	172	82	55	3.2	824	7.7	8
May 24-26, 29-30	53,360	--	--	59	14	125	--	118	57	225	--	2.5	2.5	626	.85	90,190	204	108	57	3.8	1,030	6.6	7
June 1-6	31,050	--	--	50	13	102	--	124	49	170	--	2.6	2.6	494	.67	41,410	178	77	55	3.3	860	7.9	11
June 7-11, 13-14	33,970	--	--	61	15	130	--	a 132	71	210	--	4.3	4.3	644	.88	59,070	214	106	57	3.9	1,080	8.4	12
June 12, 15-20	21,970	--	--	52	13	94	--	138	49	148	--	3.2	3.2	496	.67	29,420	183	70	53	3.0	828	8.2	12
June 21-30	10,230	14	.05	70	16	125	6.3	177	71	205	.3	3.1	3.1	619	.84	16,930	240	96	52	3.3	1,100	8.0	10
July 1-10	5,853	12	.03	69	20	171	5.8	163	85	285	.3	1.7	1.7	768	1.04	12,140	254	120	59	4.7	1,340	8.1	10
July 11-15	5,160	--	--	87	26	185	--	168	83	320	--	1.4	1.4	816	1.11	11,370	274	136	59	4.8	1,420	7.8	9
July 16-20	5,908	--	--	86	31	283	--	159	103	490	--	3.4	3.4	1,180	1.60	18,820	342	212	63	6.7	2,030	7.8	10
July 21-26, 28	7,043	--	--	74	23	194	--	165	79	338	--	1.7	1.7	860	1.17	16,350	279	144	60	5.0	1,480	8.2	10
July 27, 29-31	7,270	--	--	94	29	351	--	126	64	655	--	1.6	1.6	1,400	1.90	21,460	354	248	68	8.1	2,410	8.2	10

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

Aug. 1-2, 1952...	5,905	--	--	86	28	344	--	110	70	628	--	3.5	1,320	1.80	21,050	330	240	69	8.2	2,330	7.9	10
Aug. 3-4, .....	3,115	--	--	73	26	236	--	130	67	462	--	3.0	864	1.31	13,586	280	176	86	6.6	1,960	8.0	9
Aug. 5-10, .....	4,761	--	--	67	22	153	--	164	55	272	--	2.1	713	.87	6,586	260	176	55	3.9	1,470	7.0	8
Aug. 11-19, .....	4,738	--	--	67	21	154	--	164	82	271	--	2.1	713	.87	6,586	260	176	55	3.9	1,470	7.0	8
Aug. 20-31, .....	4,973	7.8	.03	77	22	205	6.7	167	73	402	.3	1.5	984	1.34	13,210	283	154	61	4.2	1,560	7.5	8
Sept. 1-3, .....	4,207	--	--	78	24	235	--	162	88	402	--	3.2	1,020	1.39	17,590	293	160	64	6.0	1,770	8.2	10
Sept. 4-10, .....	3,809	--	--	76	21	168	--	184	65	290	--	1.8	752	1.02	7,734	276	125	56	4.4	1,300	8.1	5
Sept. 11-15, 17, .....	3,748	--	--	73	21	192	--	191	68	330	--	2.2	834	1.13	8,440	268	112	61	5.1	1,470	7.1	17
Sept. 16, 18-20, .....	3,915	--	--	77	23	232	--	164	88	420	--	2.2	976	1.33	10,320	286	152	66	6.5	1,740	7.9	15
Sept. 21-24, .....	3,482	--	--	72	23	251	--	b 169	84	425	--	2.1	992	1.35	9,353	274	136	67	6.6	1,770	8.4	13
Sept. 25-30, .....	3,625	--	--	72	19	179	--	179	74	300	--	1.9	776	1.06	7,795	258	111	60	4.8	1,370	8.2	9
Weighted average	38,730	--	--	43	9.6	79	--	103	43	131	--	3.0	407	0.55	42,560	147	62	54	--	879	--	15

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

## LOWER MISSISSIPPI RIVER BASIN

## ARKANSAS RIVER BASIN--Continued

## ARKANSAS RIVER AT LITTLE ROCK, ARK.--Continued

Temperature (°F) of water, water year October 1951 to September 1952  
 /Once-daily temperature measurement at approximately 6:00 a. m.\_7

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	74	55	52	51	52	49	61	70	77	88	88	84
2	74	50	53	46	52	--	56	72	79	88	90	79
3	75	50	54	44	52	51	56	73	80	86	89	78
4	76	49	52	44	49	49	55	74	82	88	87	78
5	76	47	54	44	50	48	56	75	82	88	87	78
6	76	44	56	44	49	49	56	76	82	88	--	78
7	71	44	54	44	51	48	59	77	83	88	88	80
8	69	45	52	46	48	50	62	78	84	82	83	81
9	68	46	50	44	50	51	60	75	86	84	85	82
10	67	48	50	44	52	55	59	71	86	84	87	82
11	68	50	48	44	51	53	57	69	86	84	88	81
12	68	51	48	46	50	52	57	70	87	86	86	80
13	68	56	46	46	52	54	53	71	86	86	82	80
14	68	56	43	50	53	53	--	72	88	--	88	80
15	68	56	42	49	51	51	58	73	--	86	87	82
16	68	54	40	52	47	53	58	74	87	82	86	82
17	68	50	40	51	49	51	58	75	88	82	88	75
18	70	49	38	54	50	53	58	70	88	82	86	76
19	65	48	36	58	52	55	62	69	89	84	87	78
20	67	47	38	54	50	57	61	71	90	84	89	76
21	67	49	38	52	50	58	--	72	88	86	88	74
22	69	52	38	50	49	53	64	75	88	86	85	74
23	66	54	40	48	49	52	--	70	88	86	84	73
24	66	48	40	48	49	54	62	72	88	86	84	72
25	64	51	42	50	47	52	62	70	87	89	84	72
26	65	50	40	56	47	54	64	73	86	88	83	73
27	62	50	40	54	50	53	64	72	88	90	82	74
28	62	50	42	50	53	55	64	72	88	89	83	75
29	62	51	43	48	52	58	68	74	88	88	84	75
30	62	52	48	48	--	56	70	75	88	82	82	76
31	57	--	52	50	--	58	--	76	--	87	84	--
Average	68	50	45	49	50	53	60	73	86	86	86	78



ARKANSAS RIVER BASIN--Continued

BAYOU METO NEAR STUTTGART, ARK.

LOCATION.--At gaging station at bridge on U. S. Highway 79, 5½ miles southwest of Stuttgart, Arkansas County, and 8 miles upstream from Crooked Creek. DRAINAGE AREA.--560 square miles.

RECORDS AVAILABLE.--Chemical analyses: November 1949 to September 1952.

Water temperatures: November 1949 to September 1952.

EXTREMES, 1951-52.--Dissolved solids: Maximum, 246 ppm Sept. 15-17, minimum, 47 ppm Feb. 21-29.

Hardness: Maximum, 142 ppm Sept. 15-17, minimum, 18 ppm Feb. 21-29, Mar. 1-10.

Specific conductance: Maximum daily, 420 microhos Sept. 17; minimum daily, 43.2 microhos Mar. 20.

Water temperatures: Maximum, 90°F June 16; minimum, 38°F Nov. 3, Dec. 26.

EXTREMES, 1949-52.--Dissolved solids: Maximum, 246 ppm Sept. 15-17, 1952; minimum, 20 ppm Jan. 14-20, 1951.

Hardness: Maximum, 142 ppm Sept. 15-17, 1952; minimum, 12 ppm Jan. 11-20, 1950.

Specific conductance: Maximum daily, 420 microhos Sept. 17, 1952; minimum daily, 30.8 microhos Mar. 2, 1950.

Water temperatures: Maximum, 90°F Aug. 31, 1951, June 16, 1952; minimum, freezing point 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 1951 to September 1952 given in Water-Supply Paper 1241.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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, 1951.....	51.0	--	--	20	7.3	17	--	106	4.8	14	--	2.0	137	80	0	216	7.6	24
Oct. 11-20.....	1.49	12	0.62	17	6.5	16	2.8	100	3.0	12	0.2	1.2	131	69	0	198	7.6	33
Oct. 21-27.....	1.16	--	--	20	8.0	17	--	108	5.0	15	--	2.8	147	83	0	225	7.2	38
Oct. 28-31.....	1.35	--	--	14	8.0	8.9	--	72	9.0	12	--	2.4	147	68	9	170	7.0	70
Nov. 1-3, 5.....	7.70	--	--	6.0	3.6	9.4	--	24	7.0	12	--	2.0	94	30	10	99.4	6.7	60
Nov. 4, 6-10.....	80.0	--	--	11	5.5	10	--	53	7.8	14	--	1.6	117	50	7	147	7.5	60
Nov. 11-20.....	138	--	--	9.8	5.4	12	--	47	8.3	14	--	1.8	119	47	8	144	7.6	80
Nov. 21-27.....	16.4	--	--	10	5.2	12	--	50	8.3	13	--	1.0	116	46	5	142	7.8	60
Nov. 28-30.....	204	--	--	6.8	3.3	2.0	--	19	7.0	8.0	--	1.0	88	30	15	76.1	7.8	55
Dec. 1-10.....	743	--	--	5.3	4.2	4.9	--	25	6.3	8.5	--	2.5	100	30	10	88.2	7.0	65
Dec. 11-20.....	1,354	--	--	4.2	3.1	5.0	--	21	6.0	6.2	--	1.6	83	23	6	67.9	7.3	90
Dec. 21-31.....	1,295	--	--	3.8	2.9	5.4	--	18	6.3	5.8	--	1.4	63	21	9	59.8	6.5	60
Jan. 1-10, 1952.....	1,063	--	--	4.2	3.5	4.4	--	19	6.9	5.8	--	1.4	71	23	10	54.5	7.2	65
Jan. 11-20.....	1,224	--	--	3.6	3.5	2.7	--	16	6.4	4.5	--	1.9	73	23	10	56.3	7.3	22
Jan. 21-31.....	1,143	7.0	.53	4.0	2.2	4.3	2.6	21	5.4	5.2	.3	1.0	74	19	2	60.8	7.2	80
Feb. 1-10.....	726	--	--	4.6	2.6	4.2	--	22	4.2	6.8	--	1.1	69	22	4	66.6	7.2	75
Feb. 11-20.....	818	--	--	4.3	2.8	4.5	--	20	4.9	6.0	--	1.4	82	22	6	63.0	6.7	120
Feb. 21-29.....	1,223	--	--	3.5	2.3	3.6	--	18	5.2	3.2	--	1.0	47	18	3	48.4	6.9	130
Mar. 1-10.....	1,296	--	--	3.3	2.4	3.6	--	18	5.1	3.5	--	1.3	77	18	3	50.7	6.5	120
Mar. 11-20.....	1,370	--	--	3.9	3.6	3.4	--	18	4.8	3.2	--	1.3	75	25	10	50.6	6.9	80
Mar. 21-31.....	1,186	--	--	4.4	2.7	3.4	--	20	5.3	3.2	--	1.4	56	22	6	52.0	7.3	80

0.3

ARKANSAS RIVER BASIN--Continued  
 BAYOU METO NEAR STUTTGART, ARK.--Continued

Chemical analyses, in parts per million, water year October 1951 to September 1952--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	Non-carbonate			
Apr. 1-10, 1952.....	890	3.4	1.2	4.8	2.2	4.0	2.0	23	3.9	4.0	0.1	1.0	74	21	2	55.8	6.9	70
Apr. 11-20.....	915	--	--	5.6	2.4	3.3	--	21	4.3	3.8	--	1.8	69	22	5	57.2	7.6	70
Apr. 21-30.....	1,033	--	--	4.6	2.4	3.1	--	21	4.3	3.2	--	1.8	61	22	5	61.7	7.6	70
May 1-10.....	556	--	--	5.4	3.1	4.6	--	28	4.7	4.0	--	2.5	65	20	3	69.7	6.1	70
May 11-20.....	104	--	--	6.7	4.2	--	--	32	4.2	6.0	--	2.4	80	34	8	89.8	6.8	65
May 21-31.....	344	--	--	5.8	3.3	2.3	--	23	5.2	4.8	--	2.4	86	28	9	69.4	6.5	90
June 1-8.....	340	--	--	5.0	1.6	5.7	--	22	5.7	3.8	--	2.5	78	19	1	61.3	6.6	90
June 9-15.....	33.8	--	--	6.6	4.7	3.7	--	34	6.0	5.5	--	2.4	87	36	8	85.2	7.0	90
June 16-20.....	70	--	--	19	8.7	18	--	104	5.0	20	--	3.4	152	83	0	237	7.4	30
June 21-24.....	10	--	--	14	7.5	8.2	--	74	6.0	18	--	3.3	128	66	5	170	7.2	60
June 25-27.....	.00	--	--	22	9.4	19	--	113	6.0	18	--	2.6	144	94	1	244	8.0	25
June 28-30.....	.00	--	--	27	12	20	--	145	2.0	23	--	5.4	178	117	0	308	7.4	20
July 1-4.....	.00	--	--	33	13	21	--	170	1.0	24	--	5.1	199	136	0	351	7.3	20
July 5-10.....	.00	--	--	20	9.4	17	--	114	3.5	22	--	3.2	154	89	0	259	7.2	18
July 11-20.....	.04	14	.04	20	9.6	18	3.8	124	2.6	16	.3	2.9	169	89	0	263	7.8	10
July 21-31.....	.00	--	--	23	11	19	--	124	1.6	24	--	3.5	169	103	1	268	7.6	20
Aug. 1-2, 7.....	.53	--	--	13	5.5	9.6	--	42	34	6.2	--	2.3	127	55	21	165	7.5	35
Aug. 3-6, 8-10.....	28.3	--	--	18	6.2	12	--	63	27	10	--	2.1	160	70	19	195	7.3	35
Aug. 11-20.....	80.2	--	--	13	5.4	14	--	69	11	10	--	6.4	124	55	0	167	7.8	60
Aug. 21-31.....	18.0	--	--	20	8.7	18	--	110	5.1	13	--	6.3	170	86	0	218	7.9	80
Sept. 1-9.....	6.54	--	--	17	6.8	18	--	98	3.5	14	--	8.3	148	70	0	200	8.0	80
Sept. 10-14.....	4.18	--	--	25	10	22	--	143	5.1	18	--	1.0	195	104	0	276	7.9	40
Sept. 15-17.....	2.46	--	--	32	15	29	--	209	1.0	25	--	.7	246	142	0	392	8.0	30
Sept. 18-30.....	39.0	16	.32	15	7.5	19	3.0	102	4.6	15	.3	.9	147	68	0	216	7.8	30
Average.....	501	--	--	12	5.7	10	--	63	6.3	11	--	2.3	115	53	5	147	--	59

## ARKANSAS RIVER BASIN--Continued

## BAYOU METO NEAR STUTTGART, ARK.--Continued

Temperature (°F) of water, water year October 1951 to September 1952  
 [Once-daily temperature measurement at approximately 8 a.m.]

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

ARKANSAS RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN ARKANSAS RIVER BASIN IN ARKANSAS

Chemical analyses, in parts per million, water year October 1951 to September 1952

Chemical analyses, in parts per million, water year October 1951 to September, 1952

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, mg-nestum	Non- carbon- ate			
OSAGE CREEK NEAR ELM SPRINGS																		
Feb. 11, 1952.....	--							107	1.0	4.5		9.1		103	15	194	8.2	
Aug. 26 .....	--							a106	5.0	4.2		8.5		102	10	208	8.4	
POTEAU RIVER AT CAUTHRON																		
Mar. 3, 1952 .....	946							16	13	5.0		1.4		22	9	70.4	7.3	
Sept. 11 .....	0							37	8.0	4.0		1.7		39	9	85.8	8.0	
COVE CREEK NEAR LEE CREEK																		
Feb. 26, 1952 .....	47							78	8.0	2.2		0.7		80	16	140	8.0	
Sept. 19 .....	.1							b141	8.0	4.5		1.9		128	12	241	8.6	
LEE CREEK NEAR VAN BUREN																		
Feb. 13, 1952.....	300							36	7.0	3.5		1.0		37	7	76.4	7.7	
Sept. 4 .....	1.6							55	5.0	3.5		1.0		52	7	109	7.9	
FROG BAYOU NEAR MOUNTAINBURG																		
Apr. 3, 1952.....	49							2	6.0	23		6.1		36	34	106	6.0	
Sept. 4 .....	0							17	4.0	2.0		3.5		33	19	46.0	7.5	
FROG BAYOU NEAR RUDY																		
Feb. 13, 1952.....	192							12	5.0	2.2		0.4		17	7	34.0	7.2	
Sept. 4 .....	0							23	4.0	5.5		2.5		38	19	64.9	7.7	
MULBERRY RIVER NEAR MULBERRY																		
Feb. 28, 1952.....	645							13	7.0	4.0		1.7		14	3	45.9	7.1	
Sept. 3 .....	13							22	2.0	1.5		1.0		38	20	45.4	7.8	
Sept. 8 .....	6.2							25	3.0	1.8		.8		28	8	51.4	7.2	

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

<sup>b</sup> Includes equivalent of 5 parts per million of carbonate (CO<sub>3</sub>).

## PINEY CREEK NEAR DOVER

Feb. 26, 1952.....	459					21	4.0	1.8		1.2		22	5	44.0	7.5
Sept. 17.....	.6					49	5.0	2.5		1.0		49	9	94.1	8.1

## ILLINOIS BAYOU NEAR SCOTTSVILLE

Feb. 27, 1952.....	455					13	1.0	1.8		0.6		12	1	37.8	7.2
Sept. 16.....	.8					21	3.0	2.2		1.0		34	17	46.7	7.7

## PETIT JEAN CREEK NEAR BOONEVILLE

Feb. 25, 1952.....	424					19	22	12		1.3		36	20	140	7.3
Sept. 15.....	0					61	12	8.5		2.1		54	4	149	8.2

## PETIT JEAN CREEK NEAR WAVELAND

Feb. 25, 1952.....	318					18	10	5.8		1.7		22	7	77.9	7.4
Sept. 15.....	18					34	9.0	4.5		.8		38	10	85.0	8.0

## DUTCH CREEK AT WALTREAK

Feb. 26, 1952.....	111					12	5.0	4.0		0.6		12	2	40.9	7.2
Sept. 15.....	0					25	3.0	3.5		3.2		44	24	63.9	7.7

## FOURCHE LA FAVE RIVER NEAR GRAVELLY

Feb. 26, 1952.....	951					10	6.0	2.8		0.5		13	5	31.0	7.1
Sept. 15.....	0					35	2.0	4.0		1.6		38	9	74.0	8.0

## FOURCHE LA FAVE RIVER NEAR NINROD

Feb. 26, 1952.....	1,880					13	5.0	3.0		1.0		15	4	37.8	7.1
Sept. 16.....	33					16	3.0	3.8		2.0		15	2	45.3	7.5

## CROOKED CREEK NEAR HUMPHREY

Oct. 4, 1951.....	5.0					97	4.0	8.5		2.7		68	0	185	8.2
Mar. 6, 1952.....	736					20	7.0	2.8		2.6		18	2	48.6	7.3
Sept. 16.....	.1					a118	7.0	32		2.8		116	19	300	8.4

<sup>a</sup> Includes equivalent of 3 parts per million of carbonate (CO<sub>2</sub>).

ARKANSAS RIVER BASIN—Continued  
MISCELLANEOUS ANALYSES OF STREAMS IN ARKANSAS RIVER BASIN IN OKLAHOMA AND MISSOURI

Chemical analyses, in parts per million, water year October 1951 to September 1952

Date of collection	Water discharge (cfs.)	Temperature (°F.)	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			Hardness as CaCO <sub>3</sub>	Percent non-carbonate	Specific conductance (micro-mhos at 25°C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium-magnesium			

SALT FORK ARKANSAS RIVER NEAR ALVA, WOODS COUNTY, OKLA.

Sept. 6, 1951.....	276	70		329	83	--	--	97	0		62						1,160	1,080	--	1,880	7.4
Sept. 9.....	289	78		345	39	--	--	99	0		224						1,020	939	--	1,740	7.4
Sept. 24.....	59.5	78		248	73	--	--	137	0		224						920	808	--	2,080	8.1
Nov. 1.....	100	39		196	83	--	--	180	0		133						830	682	--	1,760	7.5
Dec. 11.....	105	37		331	50	148		209	0		192						1,030	859	24	2,150	7.7
Jan. 9, 1952.....	173	38		281	40	158		207	0		195						890	720	28	2,030	7.8
Feb. 5.....	95	40		287	46	164		185	0		205						930	778	28	2,050	7.8
Mar. 4.....	109	32		307	36	158		196	0		185						919	754	27	2,060	7.3
Apr. 1.....	145.5	32		351	58	163		143	0		223						905	788	28	2,140	8.1
May 13.....	115	72		359	82	167		143	2		142						1,240	1,090	18	2,350	7.3
June 1.....	56.7	72		357	95	135		142	0		187						1,260	1,120	19	2,350	7.3
July 21.....	.61	98		40	16	99		218	0		57						1,166	1,166	59	793	7.5
Sept. 2.....	.12	79		105	37	92		326	0		102						415	148	33	1,190	7.3

SALT FORK ARKANSAS RIVER NEAR JET, ALPAPPA COUNTY, OKLA.

Sept. 7, 1951.....	901	74		157	36			149	0		1,200						540	418		4,500	7.7
Oct. 10.....	487	65		178	21			145	0		988						530	411		3,680	7.9
Dec. 10.....	263	48		136	58			184	0		958						580	429		3,950	8.0
Mar. 5, 1952.....	326	32		182	39			189	0		1,270						615	460		4,900	7.9
Apr. 1.....	283	56		166	56			198	0		1,090						645	483		4,490	7.7
Apr. 23.....	3,550	59		174	56			154	0		920						665	539		3,940	8.1
May 13.....	560	61		224	71			168	0		725						850	712		3,520	8.0
June 5.....	484	70		226	72			160	0		820						860	729		3,910	7.6
July 21.....	37.9	95		255	94			106	0		1,710						1,020	933		6,690	8.0
Sept. 3.....	38.9	75		269	102			95	0		2,700						1,090	1,010		9,340	6.8

POND CREEK NEAR LAMONT, GRANT COUNTY, OKLA.

Sept. 19, 1951.....	31.5	65		40	3.4			140	0		38						115	0	--	412	8.1
Oct. 24.....	4.97	56		101	26	--	--	488	0		155						360	0	--	1,370	7.9
Dec. 11.....	11.0	35		85	43	--	--	509	0		163						388	0	--	1,430	8.0
Jan. 23, 1952.....	9.97	35		103	34	243		516	0		197						398	0	57	1,600	8.2
Mar. 4.....	37.4	73		7	37	167		320	0		137						258	0	58	1,090	7.9
May 8.....	15.4	73		7	37	124		362	4		142						346	43	44	1,280	8.3

June 2, 1952	3.99	74	44	197	595	0	164	364	0	54	1,480	8.1
July 24	.31	86	73	133	394	0	111	335	0	50	1,220	8.0
Sept. 3	.53	78	42	19	285	0	30	165	0	23	538	8.0

## SALT FORK ARKANSAS RIVER AT TONKAWA, KAY COUNTY, OKLA.

Sept. 7, 1951	5.030	71	12	5.8	48	0	26	54	14	193	7.1	
Oct. 24	3.224	54	144	44	264	0	810	540	373	3,480	7.8	
Dec. 11	386	39	160	56	266	0	865	630	412	3,690	8.1	
Jan. 23, 1952	391	--	174	39	241	0	870	595	398	3,690	8.0	
Mar. 4	525	43	142	33	218	0	780	490	312	3,330	7.8	
Apr. 22	6,530	62	64	21	282	0	398	246	154	71	1,780	7.6
June 2	740	79	190	54	375	0	550	695	568	54	2,890	7.9
July 24	50.5	91	206	64	--	0	1,870	780	640	--	6,630	7.9
Sept. 3	59.1	80	154	61	166	0	1,570	635	499	--	5,550	7.2

## CHIKASKIA RIVER AT BLACKWELL, KAY COUNTY, OKLA.

Sept. 10, 1951	1,020	74	22	19	136	0	24	132	20	356	7.7	
Dec. 11	226	41	93	25	292	0	131	336	97	--	974	8.2
Feb. 19, 1952	211	37	94	18	276	0	126	308	82	39	937	7.9
Mar. 5	274	37	88	17	267	0	93	280	71	37	834	7.9
Apr. 18	224	60	102	31	224	0	282	382	198	47	1,450	7.7
Apr. 23	2,700	61	33	11	123	0	22	127	26	31	353	7.3
June 3	139	73	121	37	246	0	348	455	254	46	1,650	7.7
July 21	22.6	85	295	74	240	0	1,490	1,040	844	--	5,250	7.6
Sept. 3	25.4	68	150	46	334	0	680	565	398	56	2,570	7.9

## RED ROCK CREEK NEAR RED ROCK, NOBLE COUNTY, OKLA.

Sept. 4, 1951	.87	80	134	21	568	0	79	420	0	--	1,160	8.2
Oct. 23	26.3	57	103	22	410	0	98	348	12	--	1,030	8.2

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 1951 to September 1952--Continued

Chemical analyses, in parts per million, water year October 1951 to September 1952--Continued																				
Date of collection	Water discharge (cfs)	Temperature (°F)	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		Hardness as CaCO <sub>3</sub>		Percent sodium carbonate (micro-mhos at 25° C)	pH	
														Parts per million	Tons per acre-foot	Calcium	Non-carbonate			
RED ROCK CREEK NEAR RED ROCK, NOBLE COUNTY, OKLA.--Continued																				
Dec. 11, 1951	8.75	38		112	51	--		443	0		182					490	127	--	1,340	7.9
Jan. 22, 1952	8.68	44		142	47	211		498	0		252					550	142	45	1,720	8.1
Mar. 4	191	40		68	15	116		182	0		158					230	81	52	958	7.5
Apr. 23	1,840	60		30	8.5	44		102	0		50					110	26	46	426	7.6
BLACK BEAR CREEK AT PANNEE, PANNEE COUNTY, OKLA.																				
Nov. 7, 1951	35.0	40		88	16	122		129	0		270					286	180	48	1,110	8.0
Jan. 9, 1952	26.7	36		156	43	242		285	0		530					565	332	48	2,190	7.9
Feb. 5	7.86	47		186	41	290		386	0		590					635	318	50	2,360	7.7
Mar. 6	99.3	40		69	13	93		186	0		158					226	74	47	836	7.4
Mar. 11	2,570	46		29	7.3	32		96	0		50					103	24	40	349	7.0
Mar. 18	1,060	44		42	6.3	33		127	0		50					130	26	35	400	7.2
Mar. 18	37.3	56		89	51	148		331	1		275					432	160	43	1,370	8.3
Apr. 24	452	58		38	15	51		89	0		76					157	84	41	532	6.8
Apr. 24	50.1	66		63	28	81		234	8		116					274	69	39	810	8.4
May 27	39.8	72		45	20	57		217	0		106					194	16	39	629	8.2
July 10	13.9	78		67	42	108		446	0		112					342	0	41	1,080	7.7
Aug. 7	2.18	86		37	14	27		190	2		22					151	0	28	391	6.3
Aug. 19	1.22	79		27	8.5	12		127	0		6.5					103	0	20	248	7.5
SKEDEE CREEK NEAR PANNEE, PANNEE COUNTY, OKLA.																				
Sept. 4, 1951		82		33	6.3	--		124	0		5.0					108	6	--	234	7.4
Nov. 19	45	45		28	7.8	--		122	0		3.5					102	2	--	220	7.9
Dec. 11	46	46		30	7.8	--		129	0		3.5					108	2	--	229	7.9
Jan. 22, 1952		46		34	9.5	11		137	0		4.2					125	13	16	250	7.8
Mar. 11	47	47		37	5.8	12		140	0		4.2					117	2	18	259	7.9
Apr. 25	62	62		36	17	14		159	0		5.5					158	28	16	300	8.2
June 4	79	79		39	13	12		136	0		5.2					150	14	15	312	7.9
July 22	80	80		41	14	13		177	0		5.8					158	13	15	328	8.2
Sept. 2	77	77		40	15	15		186	0		6.8					160	8	17	335	8.2





## 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 1951 to September 1952--Continued

Date of collection	Water discharge (cfs)	Tem- perature (°F)	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			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	Tons per day	Calcium	Non-mag- nesium																							
EAGLE CHIEF CREEK NEAR CLEO SPRINGS, MAJOR COUNTY, OKLA.--Continued																																									
Dec. 11, 1951	20	35		208	52	88		356	0		49						735	444	21	1,400	8.0																				
Jan. 9, 1952	25.5	44		210	41	85		322	0		48						695	431	21	1,380	7.7																				
Feb. 5	15.3	46		198	46	84		312	0		50						685	430	21	1,370	7.6																				
Mar. 5	21.7	46		222	41	92		320	0		55						725	463	22	1,480	7.8																				
Apr. 14	5.64	47		146	78	85		313	0		50						685	428	21	1,410	8.0																				
Apr. 23	236	58		180	50	90		125	0		32						655	552	14	1,220	7.5																				
June 5	16.4	70		190	72	64		260	0		42						770	557	15	1,420	7.8																				
Sept. 3	4.64	77		116	52	57		247	0		35						505	302	20	1,050	7.9																				
HOYLE CREEK NEAR AMES, MAJOR COUNTY, OKLA.																																									
Oct. 30, 1951	0.67	61		127	20	--		385	0		99						400	84	--	948	7.8																				
Dec. 10	0.27	33		102	29	69		335	0		98						375	100	29	886	8.0																				
Jan. 8, 1952	39	44		124	24	64		375	0		100						410	102	25	951	7.8																				
Feb. 4	39	41		123	22	63		371	0		96						395	91	26	929	7.8																				
Mar. 3	39	42		126	15	62		358	0		175						375	82	26	904	7.8																				
Apr. 4	12	46		100	30	65		366	0		95						372	72	28	923	8.0																				
Apr. 24	44	57		99	33	59		368	0		83						380	78	25	877	8.0																				
June 4	10	75		97	33	56		370	0		83						376	73	24	850	8.2																				
TURKEY CREEK NEAR DRUMMOND, GARFIELD COUNTY, OKLA.																																									
Oct. 10, 1951	2.7	74		127	47	--		397	0		720						510	209	--	3,050	7.9																				
Oct. 19	1.2	72		138	36	--		304	0		730						495	246	--	3,050	7.6																				
Dec. 10	6.51	35		128	46	--		433	0		505						510	155	--	2,490	8.1																				
Mar. 5	9.24	44		148	15	357		362	0		495						430	134	64	2,340	8.1																				
Apr. 1	6.39	74		76	56	356		382	10		465						420	90	65	2,300	8.4																				
Apr. 24	59.8	59		32	14	74		324	0		178						140	0	53	577	7.8																				
May 13	2.26	65		56	54	320		290	7		450						362	113	66	2,110	8.4																				
May 5	5.19	70		68	49	290		342	0		400						370	90	63	1,970	8.1																				

PREACHER CREEK NEAR DOVER, KINGFISHER COUNTY, OKLA.

	1.57	60	34	106	28	--	400	0	182																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												</
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TURKEY CREEK NEAR DOVER, KINGFISHER COUNTY, OKLA.

	8.19	8.26	9.0	9.7	10.4	11.1	11.8	12.5	13.2	13.9	14.6	15.3	16.0	16.7	17.4	18.1	18.8	19.5	20.2	20.9	21.6	22.3	23.0	23.7	24.4	25.1	25.8	26.5	27.2	27.9	28.6	29.3	30.0	30.7	31.4	32.1	32.8	33.5	34.2	34.9	35.6	36.3	37.0	37.7	38.4	39.1	39.8	40.5	41.2	41.9	42.6	43.3	44.0	44.7	45.4	46.1	46.8	47.5	48.2	48.9	49.6	50.3	51.0	51.7	52.4	53.1	53.8	54.5	55.2	55.9	56.6	57.3	58.0	58.7	59.4	60.1	60.8	61.5	62.2	62.9	63.6	64.3	65.0	65.7	66.4	67.1	67.8	68.5	69.2	69.9	70.6	71.3	72.0	72.7	73.4	74.1	74.8	75.5	76.2	76.9	77.6	78.3	79.0	79.7	80.4	81.1	81.8	82.5	83.2	83.9	84.6	85.3	86.0	86.7	87.4	88.1	88.8	89.5	90.2	90.9	91.6	92.3	93.0	93.7	94.4	95.1	95.8	96.5	97.2	97.9	98.6	99.3	100.0	100.7	101.4	102.1	102.8	103.5	104.2	104.9	105.6	106.3	107.0	107.7	108.4	109.1	109.8	110.5	111.2	111.9	112.6	113.3	114.0	114.7	115.4	116.1	116.8	117.5	118.2	118.9	119.6	120.3	121.0	121.7	122.4	123.1	123.8	124.5	125.2	125.9	126.6	127.3	128.0	128.7	129.4	130.1	130.8	131.5	132.2	132.9	133.6	134.3	135.0	135.7	136.4	137.1	137.8	138.5	139.2	139.9	140.6	141.3	142.0	142.7	143.4	144.1	144.8	145.5	146.2	146.9	147.6	148.3	149.0	149.7	150.4	151.1	151.8	152.5	153.2	153.9	154.6	155.3	156.0	156.7	157.4	158.1	158.8	159.5	160.2	160.9	161.6	162.3	163.0	163.7	164.4	165.1	165.8	166.5	167.2	167.9	168.6	169.3	170.0	170.7	171.4	172.1	172.8	173.5	174.2	174.9	175.6	176.3	177.0	177.7	178.4	179.1	179.8	180.5	181.2	181.9	182.6	183.3	184.0	184.7	185.4	186.1	186.8	187.5	188.2	188.9	189.6	190.3	191.0	191.7	192.4	193.1	193.8	194.5	195.2	195.9	196.6	197.3	198.0	198.7	199.4	200.1	200.8	201.5	202.2	202.9	203.6	204.3	205.0	205.7	206.4	207.1	207.8	208.5	209.2	209.9	210.6	211.3	212.0	212.7	213.4	214.1	214.8	215.5	216.2	216.9	217.6	218.3	219.0	219.7	220.4	221.1	221.8	222.5	223.2	223.9	224.6	225.3	226.0	226.7	227.4	228.1	228.8	229.5	230.2	230.9	231.6	232.3	233.0	233.7	234.4	235.1	235.8	236.5	237.2	237.9	238.6	239.3	240.0	240.7	241.4	242.1	242.8	243.5	244.2	244.9	245.6	246.3	247.0	247.7	248.4	249.1	249.8	250.5	251.2	251.9	252.6	253.3	254.0	254.7	255.4	256.1	256.8	257.5	258.2	258.9	259.6	260.3	261.0	261.7	262.4	263.1	263.8	264.5	265.2	265.9	266.6	267.3	268.0	268.7	269.4	270.1	270.8	271.5	272.2	272.9	273.6	274.3	275.0	275.7	276.4	277.1	277.8	278.5	279.2	279.9	280.6	281.3	282.0	282.7	283.4	284.1	284.8	285.5	286.2	286.9	287.6	288.3	289.0	289.7	290.4	291.1	291.8	292.5	293.2	293.9	294.6	295.3	296.0	296.7	297.4	298.1	298.8	299.5	300.2	300.9	301.6	302.3	303.0	303.7	304.4	305.1	305.8	306.5	307.2	307.9	308.6	309.3	310.0	310.7	311.4	312.1	312.8	313.5	314.2	314.9	315.6	316.3	317.0	317.7	318.4	319.1	319.8	320.5	321.2	321.9	322.6	323.3	324.0	324.7	325.4	326.1	326.8	327.5	328.2	328.9	329.6	330.3	331.0	331.7	332.4	333.1	333.8	334.5	335.2	335.9	336.6	337.3	338.0	338.7	339.4	340.1	340.8	341.5	342.2	342.9	343.6	344.3	345.0	345.7	346.4	347.1	347.8	348.5	349.2	349.9	350.6	351.3	352.0	352.7	353.4	354.1	354.8	355.5	356.2	356.9	357.6	358.3	359.0	359.7	360.4	361.1	361.8	362.5	363.2	363.9	364.6	365.3	366.0	366.7	367.4	368.1	368.8	369.5	370.2	370.9	371.6	372.3	373.0	373.7	374.4	375.1	375.8	376.5	377.2	377.9	378.6	379.3	380.0	380.7	381.4	382.1	382.8	383.5	384.2	384.9	385.6	386.3	387.0	387.7	388.4	389.1	389.8	390.5	391.2	391.9	392.6	393.3	394.0	394.7	395.4	396.1	396.8	397.5	398.2	398.9	399.6	400.3	401.0	401.7	402.4	403.1	403.8	404.5	405.2	405.9	406.6	407.3	408.0	408.7	409.4	410.1	410.8	411.5	412.2	412.9	413.6	414.3	415.0	415.7	416.4	417.1	417.8	418.5	419.2	419.9	420.6	421.3	422.0	422.7	423.4	424.1	424.8	425.5	426.2	426.9	427.6	428.3	429.0	429.7	430.4	431.1	431.8	432.5	433.2	433.9	434.6	435.3	436.0	436.7	437.4	438.1	438.8	439.5	440.2	440.9	441.6	442.3	443.0	443.7	444.4	445.1	445.8	446.5	447.2	447.9	448.6	449.3	450.0	450.7	451.4	452.1	452.8	453.5	454.2	454.9	455.6	456.3	457.0	457.7	458.4	459.1	459.8	460.5	461.2	461.9	462.6	463.3	464.0	464.7	465.4	466.1	466.8	467.5	468.2	468.9	469.6	470.3	471.0	471.7	472.4	473.1	473.8	474.5	475.2	475.9	476.6	477.3	478.0	478.7	479.4	480.1	480.8	481.5	482.2	482.9	483.6	484.3	485.0	485.7	486.4	487.1	487.8	488.5	489.2	489.9	490.6	491.3	492.0	492.7	493.4	494.1	494.8	495.5	496.2	496.9	497.6	498.3	499.0	499.7	500.4	501.1	501.8	502.5	503.2	503.9	504.6	505.3	506.0	506.7	507.4	508.1	508.8	509.5	510.2	510.9	511.6	512.3	513.0	513.7	514.4	515.1	515.8	516.5	517.2	517.9	518.6	519.3	520.0	520.7	521.4	522.1	522.8	523.5	524.2	524.9	525.6	526.3	527.0	527.7	528.4	529.1	529.8	530.5	531.2	531.9	532.6	533.3	534.0	534.7	535.4	536.1	536.8	537.5	538.2	538.9	539.6	540.3	541.0	541.7	542.4	543.1	543.8	544.5	545.2	545.9	546.6	547.3	548.0	548.7	549.4	550.1	550.8	551.5	552.2	552.9	553.6	554.3	555.0	555.7	556.4	557.1	557.8	558.5	559.2	559.9	560.6	561.3	562.0	562.7	563.4	564.1	564.8	565.5	566.2	566.9	567.6	568.3	569.0	569.7	570.4	571.1	571.8	572.5	573.2	573.9	574.6	575.3	576.0	576.7	577.4	578.1	578.8	579.5	580.2	580.9	581.6	582.3	583.0	583.7	584.4	585.1	585.8	586.5	587.2	587.9	588.6	589.3	590.0	590.7	591.4	592.1	592.8	593.5	594.2	594.9	595.6	596.3	597.0	597.7	598.4	599.1	599.8	600.5	601.2	601.9	602.6	603.3	604.0	604.7	605.4	606.1	606.8	607.5	608.2	608.9	609.6	610.3	611.0	611.7	612.4	613.1	613.8	614.5	615.2	615.9	616.6	617.3	618.0	618.7	619.4	620.1	620.8	621.5	622.2	622.9	623.6	624.3	625.0	625.7	626.4	627.1	627.8	628.5	629.2	629.9	630.6	631.3	632.0	632.7	633.4	634.1	634.8	635.5	636.2	636.9	637.6	638.3	639.0	639.7	640.4	641.1	641.8	642.5	643.2	643.9	644.6	645.3	646.0	646.7	647.4	648.1	648.8	649.5	650.2	650.9	651.6	652.3	653.0	653.7	654.4	655.1	655.8	656.5	657.2	657.9	658.6	659.3	660.0	660.7	661.4	662.1	662.8	663.5	664.2	664.9	665.6	666.3	667.0	667.7	668.4	669.1	669.8	670.5	671.2	671.9	672.6	673.3	674.0	674.7	675.4	676.1	676.8	677.5	678.2	678.9	679.6	680.3	681.0	681.7	682.4	683.1	683.8	684.5	685.2	685.9	686.6	687.3	688.0	688.7	689.4	690.1	690.8	691.5	692.2	692.9	693.6	694.3	695.0	695.7	696.4	697.1	697.8	698.5	699.2	699.9	700.6	701.3	702.0	702.7	703.4	704.1	704.8	705.5	706.2	706.9	707.6	708.3	709.0	709.7	710.4	711.1	711.8	712.5	713.2	713.9	714.6	715.3	716.0	716.7	717.4	718.1	718.8	719.5	720.2	720.9	721.6	722.3	723.0	723.7	724.4	725.1	725.8	726.5	727.2	727.9	728.6	729.3	730.0	730.7	731.4	732.1	732.8	733.5	734.2	734.9	735.6	736.3	737.0	737.7	738.4	739.1	739.8	740.5	741.2	741.9	742.6	743.3	744.0	744.7	745.4	746.1	746.8	747.5	748.2	748.9	749.6	750.3	751.0	751.7	752.4	753.1	753.8	754.5	755.2	755.9	756.6	757.3	758.0	758.7	759.4	760.1	760.8	761.5	762.2	762.9	763.6	764.3	765.0	765.7	766.4	767.1	767.8	768.5	769.2	769.9	770.6	771.3	772.0	772.7	773.4	774.1	774.8	775.5	776.2	776.9	777.6	778.3	779.0	779.7	780.4	781.1	781.8	782.5	783.2	783.9	784.6	785.3	786.0	786.7	787.4	788.1	788.8	789.5	790.2	790.9	791.6	792.3	793.0	793.7	794.4	795.1	795.8	796.5	797.2	797.9	798.6	799.3	800.0	800.7	801.4	802.1	802.8	803.5	804.2	804.9	805.6	806.3	807.0	807.7	808.4	809.1	809.8	810.5	811.2	811.9	812.6	813.3	814.0	814.7	815.4	816.1	816.8	817.5	818.2	818.9	819.6	820.3	821.0	821.7	822.4	823.1	823.8	824.5	825.2	825.9	826.6	827.3	828.0	828.7	829.4	830.1	830.8	831.5	832.2	832.9	833.6	834.3	835.0	835.7	836.4	837.1	837.8	838.5	839.2	839.9	840.6	841.3	842.0	842.7	843.4	844.1	844.8	845.5	846.2	846.9	847.6	848.3	849.0	849.7	850.4	851.1	851.8	852.5	853.2	853.9	854.6	855.3	856.0	856.7	857.4	858.1	858.8	859.5	860.2	860.9	861.6	862.3	863.0	863.7	864.4	865.1	865.8	866.5	867.2	867.9	868.6	869.3	870.0	870.7	871.4	872.1	872.8	873.5	874.2	874.9	875.6	876.3	877.0	877.7	878.4	879.1	879.8	880.5	881.2	881.9	882.6
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COTTONWOOD CREEK NEAR GUTHRIE, LOGAN COUNTY, OKLA.

Sept. 28, 1951	67	93	21	--	314	7	49				320	51	--	902	8.4
Nov. 23	10.5	144	35	106	392	0	67				505	184	31	1,220	7.9
Dec. 26, 1952	16.9	42	156	38	117	409	0	72			545	210	32	1,270	8.2
Jan. 26, 1953	38.1	44	111	23	102	322	0	72			372	108	37	1,060	7.8
Mar. 5	33.9	111	53	118	376	0	128				495	187	34	1,280	8.2
Mar. 9	11.2	72	21	71	252	0	67				288	82	35	806	8.2
June 9	13.8	80	70	28	252	0	62				250	0	52	924	7.9
July 22	1.15	93	55	27	122	0	62								

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 1951 to September 1952--Continued																						
Date of collection	Water discharge (cfs)	Temperature (°F)	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> )	Boiron (B)	Dissolved solids (residue at 100°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				
POLECAT CREEK NEAR HEYBURN, CREEK COUNTY, OKLA.																						
Jan. 7, 1952	2.75	37		28	10	50		80	0		94						114	48	49	473	7.4	
Feb. 7	3.91	51		32	7.3	58		84	0		102						111	42	53	490	7.1	
Mar. 7	63.3	46		32	8.0	58		74	0		110						113	52	53	489	7.5	
Mar. 20	82.2	52		27	6.3	46		61	0		93						93	43	52	428	7.3	
Apr. 15	8.85	54		24	11	42		72	0		88						105	46	47	420	8.0	
May 2	36.7	70		21	10	43		57	0		85						95	48	50	397	6.7	
May 5	--	98		24	10	36		80	0		70						104	38	43	389	6.9	
May 29	41.7	73		22	11	41		59	0		84						98	50	48	395	6.7	
July 9	14.3	79		23	9.0	41		59	0		84						95	46	48	416	7.2	
VERDIGRIS RIVER NEAR SOUTH COFFEYVILLE, NOWATA COUNTY, OKLA.																						
Feb. 13, 1952		45		76	12	42		230	0	56	88		1.8				386	50	28	634	7.7	
Feb. 28		44		92	16	53		274	0	64	84		.6				411	64	28	785	7.8	
Mar. 16		43		66	14	32		195	0	43	60		2.3				344	62	24	584	7.6	
Apr. 10		53		70	14	34		214	0	47	56		1.7				361	56	21	598	7.9	
May 6		72		79	18	32		254	0	46	60		.4				407	58	24	651	7.9	
May 16		70		78	18	39		256	0	45	48		.2				268	58	25	689	7.9	
May 30		72		71	16	37		229	0	53	56		1.7				365	56	25	620	7.9	
July 11		80		56	17	53		185	0	44	88		3.2				381	58	35	681	7.0	
Sept. 28		76		52	20	119		184	0	64	178		1.1				553	60	55	1,130	7.3	
POSSUM CREEK NEAR LENAPAH, NOWATA COUNTY, OKLA.																						
Apr. 10, 1952		46		49	11	43		147	0	54	69		1.0				314	46	36	520	7.7	
May 7		69		58	15	47		175	0	52	78		.2				398	62	33	623	7.6	
May 16		67		61	14	49		189	0	48	79		.1				381	52	34	638	7.8	
May 30		68		60	15	64		166	0	45	118		.4				434	59	40	727	7.8	
CALIFORNIA CREEK NEAR NOWATA, NOWATA COUNTY, OKLA.																						
Feb. 13, 1952		48		82	20	99		183	0	78	192		0.8				592	136	43	1,040	7.5	
Feb. 26		43		62	18	101		120	0	70	185		.8				588	80	49	955	7.3	
Mar. 16		43		66	16	80		152	0	58	155		1.8				507	106	43	864	7.4	

Apr. 10, 1952	52	66	16	88	199	0	64	158	1.2	524	71	230	100	45	871	17.5
May 7	71	84	22	98	208	0	58	186	.6	820	84	300	130	39	1,030	7.6
May 16	69	87	21	99	232	0	56	182	.2	838	86	304	114	42	1,080	7.8
May 30	72	58	15	72	152	0	48	135	.8	440	60	206	82	43	1,775	7.5
July 11	75	180	30	183	204	0	48	500	.5	1,210	1.65	522	356	43	2,010	7.5

## BIG CREEK NEAR NOWATA, NOWATA COUNTY, OKLA.

Feb. 13, 1953	48	83	6.2	12	268	0	31	6.2	0.7	284	0.39	232	14	10	470	8.0
Feb. 28	45	70	7.0	19	218	0	38	19	.7	286	.39	204	25	17	450	7.8
Mar. 10	44	84	7.0	15	260	0	30	18	1.3	306	.42	238	26	12	511	7.7
Apr. 16	52	83	7.0	18	247	0	34	26	.8	319	.43	236	34	14	512	7.9
May 7	72	94	13	25	266	0	33	64	.7	420	.57	288	70	16	656	7.9
May 16	71	100	11	30	281	0	35	66	.0	412	.56	294	64	18	683	8.0
May 31	72	70	7.2	34	195	0	31	60	1.0	325	.44	204	44	26	545	--
July 11	78	225	37	332	236	0	27	860	.4	1,810	2.46	714	520	50	3,020	7.5

## VERDIGRIS RIVER NEAR NOWATA, NOWATA COUNTY, OKLA.

Feb. 13, 1952	47	75	11	42	217	0	56	62	1.8	377	0.51	232	54	28	630	7.8
Feb. 28	45	82	14	66	238	0	59	105	.7	481	.65	262	67	35	787	7.9
Mar. 16	44	68	14	34	205	0	44	61	1.9	359	.49	227	59	25	604	7.6
Apr. 10	52	68	13	38	212	0	45	60	1.9	364	.50	223	50	27	596	7.9
May 7	73	73	15	39	234	0	45	63	.1	388	.53	244	52	26	649	8.1
May 16	71	82	17	45	268	0	45	75	.1	418	.57	274	55	26	715	8.1
May 31	73	72	16	49	233	0	47	80	.2	400	.54	246	54	30	700	7.8
July 11	82	62	20	84	197	0	40	153	.6	468	.66	236	73	44	678	7.4
Sept. 26	73	78	22	118	176	0	40	252	.1	654	.89	285	141	47	1,170	7.6

## SALT CREEK NEAR ALLUVE, NOWATA COUNTY, OKLA.

Feb. 13, 1952	48	89	5.7	37	253	0	31	62	0.1	354	0.48	248	38	25	576	8.0
Feb. 28	46	70	6.3	18	212	0	27	27	.5	294	.40	200	27	18	458	7.9
Mar. 16	43	78	5.2	17	225	0	23	31	.5	305	.41	216	32	14	497	7.6

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 1951 to September 1952--Continued

Date of collection	Water discharge (cfs)	Temp- era- ture (°F)	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 conduct- ance (micro- mhos at 25°C)	pH
															Parts per mil- lion	Tons per acre- foot	Calcium	Non- carbon- ate			
SALT CREEK NEAR ALLIWE, NOWATA COUNTY, OKLA.--Continued																					
Apr. 10, 1952		50		77	5.0	23	233	0	28	29			1.1		296	0.40	212	22	19	489	7.9
May 7		72		85	6.8	28	249	0	24	51			.5		349	.47	240	36	20	598	7.9
May 16		69		94	9.4	35	282	0	25	65			.0		406	.55	273	42	22	684	7.7
May 31		71		55	5.7	19	179	0	19	24			.6		233	.32	160	14	20	397	7.7
July 11		75		82	10	61	257	0	13	109			1.4		429	.58	246	35	35	791	7.3
LIGHTNING CREEK NEAR ALLIWE, NOWATA COUNTY, OKLA.																					
Feb. 13, 1952		48		100	12	80	208	0	107	136			0.2		572	0.78	269	128	37	951	7.7
Feb. 28		45		75	11	47	169	0	93	69			.5		424	.58	232	94	30	648	7.6
Mar. 16		45		92	12	44	189	0	104	78			1.2		456	.62	279	124	25	735	7.5
Apr. 10		57		90	12	69	194	0	96	116			1.6		519	.71	274	115	35	859	7.7
May 7		74		108	15	63	224	0	105	124			.5		573	.78	331	148	29	956	7.8
May 16		70		119	18	97	239	0	103	198			.2		722	.98	371	175	36	1,200	8.0
May 31		71		66	11	54	139	0	67	101			.7		420	.57	210	96	36	675	7.5
July 11		79		122	28	260	204	0	67	560			1.8		1,260	1.71	420	252	59	2,230	7.3
VERDIGRIS RIVER NEAR TALALA, ROGERS COUNTY, OKLA.																					
Feb. 13, 1952		48		70	10	61	216	0	55	80			1.7		416	0.57	216	38	36	686	7.7
Feb. 28		43		76	12	59	235	0	55	95			.5		454	.62	247	82	34	741	7.6
Mar. 16		44		66	12	34	195	0	43	58			1.5		382	.40	214	54	26	533	7.5
Apr. 10		53		66	12	42	205	0	44	64			1.9		368	.49	214	46	30	598	7.8
May 7		74		74	14	40	230	0	43	68			.0		395	.54	242	54	27	669	8.0
May 16		71		84	18	48	270	0	46	84			.2		439	.80	284	62	27	751	8.0
May 31		72		76	22	37	250	0	41	79			.4		414	.56	280	75	22	706	8.0
July 11		82		79	19	66	226	0	37	138			.4		474	.64	275	90	34	875	7.8
VERDIGRIS RIVER NEAR CLAREMORE, ROGERS COUNTY, OKLA. (State Highway 88 Bridge)																					
Feb. 13, 1952		48		76	12	51	214	0	57	80			1.8		414	0.56	239	64	32	696	7.8
Feb. 28		45		68	13	52	202	0	58	78			1.1		407	.55	223	58	34	657	7.8
Mar. 16		45		80	11	27	242	0	42	45			2.6		306	.42	194	50	23	509	7.5
Apr. 10		53		62	12	46	202	0	47	62			2.4		356	.48	204	38	33	582	7.8
May 7		74		74	14	40	230	0	44	66			.4		394	.54	242	54	26	653	8.1

May 16, 1952	73	82	18	49	266	0	49	82	0.2	458	0.62	278	60	28	749	8.1
May 31	73	71	19	62	247	0	44	100	1.4	460	.63	255	52	35	764	8.0
July 11	83	68	17	46	205	0	32	97	.4	381	.52	240	72	29	702	7.7

## BUCK CREEK NEAR BOULANGER, OSAGE COUNTY, OKLA.

Apr. 9, 1952	57	74	11	20	254	0	39	17	1.4	313	0.43	230	22	16	504	7.9
May 6	77	77	16	11	276	0	35	14	.2	322	.44	258	32	9	512	8.0
May 15	72	78	14	22	285	0	37	20	.4	327	.44	252	18	16	554	8.0
May 30	75	80	14	26	289	0	44	21	.4	327	.44	257	20	18	563	7.9
July 10	85	77	14	26	272	0	22	43	.4	341	.46	250	26	19	603	7.7

## CANEY RIVER NEAR BOULANGER, OSAGE COUNTY, OKLA.

Feb. 12, 1952	48	86	14	21	302	0	38	22	0.8	343	0.47	272	24	15	575	7.9
Feb. 27	45	80	13	23	281	0	40	22	.6	336	.46	253	23	17	567	7.9
Mar. 15	46	83	11	14	277	0	34	14	1.4	314	.43	252	25	11	525	7.9
Apr. 9	57	82	14	17	282	0	42	16	1.9	332	.45	262	31	12	540	8.0
May 6	76	77	17	9.9	272	0	36	16	.8	322	.44	262	39	8	512	8.0
May 15	73	79	17	17	284	0	41	20	1.6	327	.44	267	34	12	556	8.0
May 30	75	76	17	25	276	0	47	23	1.9	332	.43	260	32	17	575	7.9
July 10	85	68	17	21	250	0	29	35	1.4	316	.43	240	34	16	550	7.6

## POND CREEK NEAR BOULANGER, OSAGE COUNTY, OKLA.

Feb. 12, 1952	48	60	9.8	15	206	0	29	16	0.4	254	0.35	189	20	15	432	7.8
Feb. 27	46	56	9.4	18	203	0	31	13	.5	255	.35	178	12	18	414	7.8
Mar. 15	50	32	3.7	8.3	109	0	17	3.8	.8	169	.23	195	6	16	220	7.2
Apr. 9	57	56	7.6	13.3	198	0	28	4.8	.7	236	.32	170	8	14	370	7.8
May 6	77	72	11	6.0	251	0	24	4.8	.2	269	.37	224	19	5	435	8.0
May 15	75	73	10	10	259	0	24	6.0	.2	269	.37	223	11	9	464	8.1
May 30	78	72	11	9.0	256	0	25	5.8	.1	264	.36	224	14	8	452	8.0
July 10	86	34	6.0	6.9	130	0	12	3.5	.4	139	.19	110	3	12	253	7.5

## 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 1951 to September 1952--Continued

Chemical analyses, in parts per million, water year October 1951 to September 1952—Continued																				
Date of collection	Water discharge (cfs)	Temperature (° F)	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> )	Boiron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>		Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Calcium	Non-carbonate		
CANEY RIVER NEAR HULDAH, OSAGE COUNTY, OKLA.																				
Nov. 9, 1951	2,220	41	47	11	14	14	185	1	16	16	16	16	16	16	16	16	16	16	372	8.3
Nov. 19	615	45	48	9.5	14	14	179	0	32	22	22	0.5	0.38	283	0.38	283	0.38	283	483	8.1
Feb. 12, 1952	185	48	66	12	20	20	235	0	32	23	23	0.1	235	284	0.39	284	0.39	284	487	8.0
Feb. 27	472	44	67	12	20	20	237	0	32	24	24	0.1	237	284	0.39	284	0.39	284	488	7.9
Mar. 8	907	45	69	12	20	20	237	0	32	24	24	0.1	237	284	0.39	284	0.39	284	488	7.9
Mar. 14	4,590	45	50	9.5	16	16	176	0	28	16	16	1.2	1.2	223	0.30	223	0.30	223	369	8.1
Mar. 15	4,510	46	49	7.9	13	13	159	0	28	16	16	1.2	1.2	223	0.30	223	0.30	223	353	7.5
Mar. 24	303	45	56	11	15	15	193	5	28	16	16	1.1	1.1	277	0.36	277	0.36	277	396	8.4
Apr. 9	300	55	63	11	17	17	222	0	28	19	19	1.1	1.1	277	0.36	277	0.36	277	396	8.4
Apr. 11	291	53	63	13	18	18	229	0	31	20	20	0.8	0.8	280	0.39	280	0.39	280	447	8.1
May 6	208	66	67	14	10	10	227	0	31	22	22	0.6	0.6	282	0.40	282	0.40	282	462	8.2
May 15	324	71	71	13	19	19	247	0	33	21	21	0.4	0.4	286	0.39	286	0.39	286	474	8.2
May 27	344	71	71	13	19	19	247	0	33	21	21	0.4	0.4	286	0.39	286	0.39	286	474	8.2
May 30	14.0	70	75	14	20	20	275	0	34	22	22	0.4	0.4	288	0.39	288	0.39	288	491	7.6
June 3	44.2	76	59	11	15	15	218	0	30	22	22	0.8	0.8	284	0.44	284	0.44	284	525	8.0
June 12	44.2	76	59	11	15	15	218	0	30	22	22	0.8	0.8	284	0.44	284	0.44	284	525	8.0
July 10	20	80	58	13	17	17	209	0	30	23	23	0.8	0.8	281	0.35	281	0.35	281	425	7.8
July 10	20	80	58	13	17	17	209	0	30	23	23	0.8	0.8	281	0.35	281	0.35	281	457	8.1
COTTON CREEK NEAR COPAN, WASHINGTON COUNTY, OKLA.																				
Feb. 12, 1952	47	47	78	17	90	90	217	0	56	159	159	0.8	0.8	550	0.75	550	0.75	550	952	7.7
Feb. 27	615	44	82	20	138	138	185	0	66	260	260	1.3	1.3	688	0.95	688	0.95	688	1,220	7.6
Mar. 15	46	46	68	11	66	66	180	0	36	122	122	1.0	1.0	440	0.60	440	0.60	440	750	7.4
Apr. 9	57	57	68	12	67	67	192	0	39	118	118	1.0	1.0	458	0.62	458	0.62	458	754	7.7
May 6	73	73	96	16	83	83	276	0	40	124	124	2.2	2.2	544	0.74	544	0.74	544	883	7.8
May 15	107	73	100	17	77	77	301	0	40	141	141	2.2	2.2	608	0.83	608	0.83	608	980	7.9
May 30	75	75	103	18	95	95	303	0	43	172	172	2.6	2.6	636	0.86	636	0.86	636	1,080	7.8
July 10	84	84	76	15	68	68	250	0	26	118	118	0.8	0.8	452	0.61	452	0.61	452	823	7.4
CANEY RIVER NEAR BARTLESVILLE, WASHINGTON COUNTY, OKLA.																				
Feb. 12, 1952	273	48	84	16	80	80	233	0	49	130	130	1.0	1.0	480	0.87	480	0.87	480	869	7.7
Feb. 27	1,120	44	70	16	61	61	222	0	47	101	101	1.1	1.1	434	0.59	434	0.59	434	759	7.7
Mar. 15	4,880	46	45	25	18	18	147	0	27	23	23	1.3	1.3	227	0.31	227	0.31	227	362	7.3
Apr. 9	554	55	68	12	49	49	201	0	35	88	88	1.6	1.6	396	0.54	396	0.54	396	652	7.8
May 6	434	72	76	15	31	31	235	0	33	64	64	0.6	0.6	395	0.54	395	0.54	395	628	7.8
May 15	106	72	82	15	53	53	256	0	36	96	96	2.2	2.2	474	0.64	474	0.64	474	769	7.8
May 30	143	73	72	13	46	46	256	0	44	65	65	2.2	2.2	380	0.52	380	0.52	380	637	7.8
July 10	26	85	84	19	95	95	225	0	32	192	192	6.9	6.9	586	0.81	586	0.81	586	1,030	7.9



## COON CREEK NEAR DENEY, WASHINGTON COUNTY, OKLA.

Feb. 12, 1952	48	130	30	236	219	0	115	468	1.1	1,190	1.62	448	268	53	1,990	7.5
Feb. 27	46	86	23	185	156	0	109	300	1.2	824	1.12	309	180	54	1,410	7.5
Mar. 15	48	84	14	98	198	0	66	175	1.9	586	.80	267	105	44	1,000	7.4
Apr. 9	56	89	17	127	197	0	85	225	1.1	696	.95	282	130	49	1,160	7.7
May 6	78	102	20	141	242	0	72	282	.4	826	1.12	336	138	48	1,330	7.5
May 15	73	116	22	188	258	0	80	390	.6	1,010	1.37	380	168	52	1,700	7.6
May 30	74	96	17	160	178	0	80	285	.8	768	1.09	284	138	55	1,350	7.3
July 10	52	64	23	207	284	0	69	278	.2	821	1.12	254	13	64	1,530	6.9

## SAND CREEK NEAR PAWHUSKA, OSAGE COUNTY, OKLA.

Feb. 12, 1952	49	78	12	18	274	0	34	13	0.4	300	0.41	244	20	13	512	8.0
Feb. 27	45	67	11	14	238	0	34	8.2	.1	277	.38	212	17	12	449	7.9
Mar. 15	49	60	7	10	203	0	24	6.2	.5	241	.33	178	12	11	383	7.5
Apr. 9	57	68	9	18	241	0	34	11	.8	282	.38	209	12	16	448	7.9
May 6	77	74	13	6.0	253	0	27	8.8	.4	281	.38	236	28	5	454	7.9
May 15	71	74	9	20	271	0	27	13	.2	293	.40	225	3	16	496	8.1
May 30	72	60	9	14	218	0	26	8.8	.2	241	.33	188	10	14	410	7.7
July 10	82	44	7	11	167	0	13	8.5	.6	184	.25	140	3	14	320	7.3

## SAND CREEK NEAR OKESA, OSAGE COUNTY, OKLA.

Sept. 5, 1951	305	34	1.5	--	96	0	16					90	12	--	223	7.1
Oct. 31	109	30	14	--	138	0	12					132	27	--	273	7.7
Dec. 12	20.0	54	10	--	188	0	17					176	22	--	377	7.8
Jan. 7, 1952	11.0	83	13	23	270	0	24					258	37	16	534	7.9
Mar. 4	350	54	6.6	18	164	0	16					162	28	19	366	7.7
Apr. 22	291	37	8.0	15	135	0	18					125	22	21	295	7.7
June 3	5.03	79	28	11	97	0	17					101	22	19	243	7.9
July 21	19	43	10	19	145	0	36					151	32	22	368	7.6

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 1951 to September 1952--Continued

Date of collection	Water discharge (cfs)	Temperature (°F)	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 absorption ratio	Specific conductance (micro-mhos at 25°C)	pH	
															Parts per million	Tons per acre-foot					Calcium
SAND CREEK NEAR BARTLESVILLE, WASHINGTON COUNTY, OKLA.																					
Feb. 12, 1952	.....	51	50	12	52	150	0	27	96	343	0.47	174	52	39	609	7.4					
Feb. 27	.....	45	38	11	34	141	0	27	50	261	.35	140	24	35	438	7.5					
Mar. 15	.....	47	29	6.4	18	87	0	21	31	217	.30	99	28	28	286	7.0					
Apr. 9	.....	56	47	11	39	148	0	25	70	312	.42	162	40	34	508	7.3					
May 6	.....	76	46	12	33	152	0	23	62	307	.42	164	40	30	488	7.5					
May 15	.....	73	57	13	61	186	0	25	106	402	.55	196	43	40	681	7.5					
May 30	.....	75	38	9.6	43	123	0	18	75	287	.39	134	34	41	479	7.2					
July 10	.....	82	76	23	182	205	0	16	350	852	1.16	284	116	58	1,480	6.9					
CANEE RIVER NEAR RAMONA, WASHINGTON COUNTY, OKLA.																					
Nov. 15, 1951	4,620	50	47	11	22	157	0	--	32	--	--	163	34	23	392	8.0					
Dec. 27	289	36	44	6.3	58	231	0	--	99	--	--	137	0	48	743	8.2					
Feb. 4, 1952	839	50	87	14	102	206	0	--	177	--	--	274	105	45	975	7.9					
Feb. 12	339	48	77	15	108	248	0	46	118	469	.64	254	50	39	818	7.7					
Feb. 27	944	43	72	18	105	171	0	53	202	596	.81	254	114	47	1,020	7.5					
Mar. 15	4,540	45	43	6.8	20	146	0	26	22	227	.31	136	16	24	612	7.3					
Mar. 24	946	49	66	14	50	177	3	--	78	--	--	222	72	33	605	8.3					
Apr. 9	731	58	68	12	36	210	0	35	62	350	.48	219	47	26	587	7.8					
Apr. 9	599	65	75	14	48	235	0	--	84	--	--	242	50	30	682	8.1					
May 5	562	73	68	15	58	226	0	34	78	422	.57	251	66	24	663	7.8					
May 6	141	72	82	15	37	256	0	36	102	469	.64	266	56	32	775	8.1					
May 30	258	72	90	20	185	188	0	47	358	844	1.15	306	152	57	1,480	7.8					
July 10	36	81	85	17	67	234	0	36	141	504	.69	282	90	34	893	7.0					
Aug. 13	27.2	90	75	16	106	194	0	--	208	--	--	252	93	48	1,020	7.8					
CANEE RIVER NEAR COLLINSVILLE, TULSA COUNTY, OKLA.																					
Feb. 12, 1952	.....	47	81	17	52	213	0	48	114	472	0.64	86	30	811	7.8						
Feb. 27	.....	43	68	17	110	166	0	61	198	596	.81	240	104	50	1,020	7.4					
Mar. 15	.....	44	43	7.1	17	138	0	27	22	227	.31	136	24	21	340	7.3					
Apr. 9	.....	58	65	11	36	202	0	35	58	336	.46	207	42	27	563	7.7					
May 6	.....	73	75	15	40	226	0	36	80	422	.57	248	64	26	665	7.8					
May 15	.....	70	86	15	57	262	0	39	102	471	.64	276	62	31	794	8.0					
May 30	.....	71	76	17	131	194	0	42	242	678	.82	242	100	52	1,130	7.8					
July 10	.....	82	82	17	64	254	0	33	122	478	.65	274	66	34	854	7.4					

VERDIGRIS RIVER NEAR CLAREMORE, ROGERS COUNTY, OKLA. (State Highway 20 Bridge)

Feb. 13, 1952	1,260	48	78	12	55	219	0	54	89	1.6	434	59	244	64	33	727	7.8
Feb. 28	2,620	45	70	15	76	180	0	56	137	.8	505	.69	236	88	41	828	7.5
Mar. 16	11,300	45	53	19	53	161	0	35	32	2.4	263	.36	170	38	21	434	7.4
Apr. 10	3,580	53	64	12	352	192	0	44	59	2.0	352	.48	209	52	27	566	7.8
May 6	1,510	74	76	14	39	231	0	41	70	.5	400	.54	247	56	25	667	8.0
May 16	754	72	84	15	53	266	0	46	85	.2	462	.63	271	53	30	756	8.1
May 31	906	73	72	18	74	226	0	44	130	.7	515	.70	254	68	39	849	8.0
July 11	90	81	70	16	54	222	0	34	99	.2	405	.55	240	58	33	728	7.6

BIRD CREEK NEAR PAWUSKA, OSAGE COUNTY, OKLA.

Feb. 12, 1952			80	15	27	284	0	43	30	0.2	348	0.47	261	28	18	594	7.9
Feb. 27		44	80	16	42	282	0	46	50	.0	394	.54	266	26	26	666	7.9
Mar. 15		47	51	8.0	15	176	0	24	17	.8	239	.33	160	16	17	373	7.5
Apr. 9		58	76	14	25	273	0	39	26	.6	332	.45	246	24	18	558	7.9
May 6		79	69	12	23	246	0	30	27	.4	306	.42	222	20	18	519	8.1
May 15		72	71	14	24	260	0	33	28	.4	321	.44	234	22	18	539	8.1
May 30		74	51	9.9	21	191	0	32	16	.4	238	.32	168	11	21	403	7.8
July 10		85	49	9.4	24	181	0	19	32	.4	243	.53	161	12	25	423	7.4

BIRD CREEK NEAR BARNSDALL, OSAGE COUNTY, OKLA.

Feb. 12, 1952			64	14	41	222	0	40	58	0.6	339	0.46	217	35	26	539	7.7
Feb. 27		45	60	18	44	201	0	46	76	.3	271	.50	224	54	30	647	7.7
Mar. 15		47	32	15	15	111	0	19	13	1.3	215	.29	104	13	24	272	7.2
Apr. 9		56	60	12	31	203	0	30	48	1.7	308	.42	199	32	25	516	7.6
May 6		78	55	12	26	192	0	29	44	1.0	306	.42	186	29	26	499	7.8
May 15		73	60	12	32	214	0	28	46	.2	314	.43	199	24	26	515	7.8
May 30		74	53	11	34	188	0	26	49	.4	298	.41	177	23	29	499	7.7
July 10		85	49	11	36	184	0	21	61	2.8	280	.38	168	33	32	513	7.0

CANDY CREEK NEAR AVANT, OSAGE COUNTY, OKLA.

Feb. 12, 1952			82	14	56	230	0	36	112	0.4	445	0.61	262	74	32	782	7.8
Feb. 27		45	47	9.5	37	122	0	21	80	.4	324	.44	156	56	34	522	7.5
Mar. 15		46	57	6.5	26	176	0	27	38	.8	276	.35	168	24	25	446	7.5

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 1951 to September 1952--Continued

Date of collection	Water discharge (cfs)	Temperature (°C)	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	Tons per day	Calcium, magnesium				Non-carbonate	
CANDY CREEK NEAR AVANT, OSAGE COUNTY, OKLA.--Continued																							
Apr. 9, 1952		58		61	10	35		178	0	32	64			0.8	336	0.44		193	47	29	543	7.7	
May 6		76		79	11	30		241	0	32	54			.1	362	.48		242	44	21	625	7.9	
May 15		71		50	12	36		276	0	34	65			.0	406	.55		274	48	22	681	8.0	
May 30		71		52	9.8	30		172	0	18	52			.5	288	.39		170	28	28	475	7.4	
BIRD CREEK NEAR SKIATOOK, TULSA COUNTY, OKLA.																							
Feb. 12, 1952		51		82	19	70		252	0	43	139			0.4	485	0.87		282	76	35	878	7.7	
Feb. 27		44		51	14	65		137	0	38	123			.4	410	.56		184	72	43	697	7.4	
Mar. 15		46		53	6.1	24		109	0	20	34			1.2	244	.33		108	18	33	330	7.2	
Apr. 9		57		56	12	47		170	0	29	85			1.1	364	.50		189	50	35	595	7.5	
May 6		76		58	12	34		184	0	31	60			.8	330	.45		194	43	28	287	7.7	
May 15		72		72	14	50		237	0	30	85			1.2	412	.56		237	43	31	688	7.6	
May 30		72		41	9.5	28		139	0	16	50			1.6	267	.36		142	28	30	421	7.5	
July 10		82		56	15	53		197	0	25	91			.6	369	.50		201	40	36	661	7.3	
HOMINY CREEK NEAR HOMINY, OSAGE COUNTY, OKLA.																							
Feb. 12, 1952		48		114	28	203		251	0	40	420			1.3	930	1.26		400	194	52	1,620	7.9	
Feb. 27		40		88	21	109		223	0	45	222			1.0	666	.91		306	123	44	1,140	7.8	
Mar. 15		42		56	12	146		145	0	23	140			.6	432	.59		194	75	43	730	7.4	
Apr. 9		62		83	20	107		186	0	36	236			.8	664	.90		289	136	45	1,100	7.7	
May 6		71		94	25	117		240	0	28	260			.7	801	1.09		338	141	43	1,240	8.0	
May 15		66		114	28	178		251	0	32	368			1.2	1,020	1.39		400	194	49	1,660	8.0	
May 30		66		65	17	109		184	0	20	228			1.2	606	.82		232	106	51	1,010	7.9	
July 10		76		212	63	661		168	0	25	1,460			2.2	2,710	3.69		788	650	65	4,660	7.2	
HOMINY CREEK NEAR SKIATOOK, TULSA COUNTY, OKLA.																							
Nov. 14, 1951	186	56		30	6.8	83		47	0	--	125			--	--	--		102	64	57	523	7.4	
Dec. 26	16.4	36		99	17	148		--	198	0	--	280			--	--		316	154	50	1,260	8.1	
Feb. 12, 1952	1,080	48		43	16	80		--	111	0	24	161			1.4	452	0.61		171	80	50	761	7.2
Feb. 25		46		63	13	131		--	108	0	--	255			--	--		212	124	57	1,050	7.2	

Feb. 27, 1952	182	41	47	15	88	90	0	25	190	1.2	490	0.67	178	104	82	834	7.3
Mar. 15	105	47	27	8.1	36	75	0	17	70	1.1	278	.38	101	40	43	384	6.9
Apr. 9	47	61	60	17	90	143	0	28	190	.7	535	.73	220	102	47	879	7.5
May 7	27	76	54	16	79	145	0	22	163	1.8	491	.67	201	82	46	820	7.8
May 15	26	70	75	21	113	194	0	24	236	1.2	675	.82	274	114	47	1,120	7.8
May 30	21	69	33	8.7	47	90	0	12	84	1.2	317	.53	116	44	46	561	6.8
July 10	5.6	75	31	9.5	74	66	0	6.8	131	1.2	368	.50	116	62	58	643	6.8
Aug. 12	7.69	88	62	17	122	136	0	--	236	--	--	--	222	110	54	1,070	8.0

## HOMINY CREEK NEAR SPERRY, TULSA COUNTY, OKLA.

Feb. 12, 1952	47	59	19	83	138	0	23	190	1.3	560	0.80	235	112	45	1,030	7.3
Feb. 27	42	42	13	80	80	0	24	170	1.2	457	.82	158	93	52	747	7.1
Mar. 15	46	31	8	39	81	0	19	79	1.1	300	.41	114	48	43	442	7.0
Apr. 9	61	63	17	99	145	0	28	208	.8	551	.79	227	108	49	962	7.5
May 6	75	60	17	88	159	0	22	182	.5	563	.77	230	89	47	894	7.5
May 15	69	82	23	130	216	0	22	270	.4	761	1.03	299	122	49	1,250	7.6
May 30	69	42	11	67	112	0	13	134	1.1	323	.44	150	58	49	648	7.4
July 10	76	54	16	92	136	0	9.1	186	1.2	502	.66	200	89	50	915	7.0

## DELAWARE CREEK NEAR SPERRY, TULSA COUNTY, OKLA.

Feb. 12, 1952	48	246	89	865	125	0	62	1,910	1.2	3,480	4.75	980	878	66	5,760	7.2
Feb. 27	41	40	14	140	36	0	25	280	1.4	629	.86	162	132	65	1,040	6.8
Mar. 15	44	43	15	141	39	0	25	285	1.7	616	.84	169	137	64	1,080	6.7
Apr. 9	61	110	36	328	92	0	40	722	.7	1,570	2.14	422	347	63	2,500	7.3
May 6	72	100	33	310	88	0	39	670	2.2	1,450	1.87	385	313	64	2,340	7.4
May 15	69	174	56	492	122	0	53	1,120	.2	2,470	3.36	664	564	62	3,730	7.4
May 30	67	88	33	276	75	0	33	610	1.7	1,280	1.74	358	286	63	2,110	7.2
July 10	79	358	108	843	97	0	123	2,100	--	3,880	5.29	1,340	1,260	58	6,580	6.8

## 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 1951 to September 1952--Continued

Date of collection	Water discharge (cfs)	Temperature (°F)	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> )	Borate (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	Carbonate			
BIRD CREEK NEAR OWASSO, TULSA COUNTY, OKLA.																						
Feb. 12, 1952		50		78	24	154	197	0	47	285			1.2		752	1.02	283	132	53	1,370	7.2	
Feb. 27		43		42	12	69	98	0	33	133			1.0		416	.97	154	74	49	669	7.2	
Mar. 15		67		36	10	49	87	0	26	98			2.6		350	.46	131	60	45	536	6.8	
Apr. 5		61		54	15	78	129	0	41	152			2.6		468	.64	196	91	46	791	7.3	
May 6		76		56	13	72	134	0	31	134			2.6		441	.60	193	67	45	760	7.5	
May 15		70		58	13	88	164	0	31	158			1.9		476	.65	198	664	49	832	7.5	
May 30		72		38	9.6	61	105	0	23	111			1.9		340	.46	134	48	50	587	7.3	
July 10		81		111	31	352	195	0	21	700			.1		1,410	1.92	404	244	65	2,520	7.0	
VERDIGRIS RIVER NEAR CLAREMORE, ROGERS COUNTY, OKLA. (U. S. HIGHWAY 66 BRIDGE)																						
Feb. 13, 1952		49		77	10	62	214	0	54	96			1.7		448	0.61	233	58	37	741	7.7	
Feb. 28		46		62	15	69	170	0	52	122			1.2		470	.64	216	76	41	754	7.5	
Mar. 16		46		46	8.2	19	143	0	32	30			2.4		250	.34	154	36	21	401	7.4	
Apr. 10		54		62	12	37	182	0	45	62			2.3		350	.48	204	55	29	575	7.7	
May 7		75		74	14	46	227	0	40	80			.6		393	.53	242	56	29	687	8.1	
May 16		72		80	16	50	253	0	43	87			.1		438	.60	266	58	29	737	8.2	
May 31		74		68	17	80	218	0	43	135			.8		505	.69	240	61	42	840	8.0	
July 11		82		79	19	143	193	0	28	278			7.6		704	.96	275	117	53	1,270	7.2	
DOG CREEK NEAR CLAREMORE, ROGERS COUNTY, OKLA.																						
Apr. 10, 1952		56		15	7.0	8.5	46	0	33	8.5			1.4		136	0.18	66	29	22	179	7.2	
May 7		70		21	11	24	85	0	49	20			.4		195	.27	98	28	35	315	7.1	
May 16		67		26	6.4	16	97	0	29	11			.8		153	.21	92	12	27	251	7.5	
May 31		67		11	5.1	8.7	41	0	23	6.0			2.0		127	.17	48	15	28	144	6.9	
July 11		78		32	18	39	64	0	108	52			.8		298	.41	154	102	36	514	6.7	
ADAMS CREEK NEAR COWETA, WAGONER COUNTY, OKLA.																						
Feb. 13, 1952		52		126	65	65	129	0	570	16			0.8		971	1.32	582	476	19	1,210	7.4	
Feb. 28		50		118	63	61	123	0	543	13			1.1		937	1.27	554	452	19	1,160	7.5	
Mar. 16		46		125	64	53	121	0	547	14			1.2		942	1.28	575	476	17	1,170	7.3	
Apr. 10		54		188	94	85	150	0	817	16			.8		1,370	1.86	886	732	14	1,600	7.7	
May 7		71		236	116	90	173	0	1,040	17			.4		1,680	2.30	1,070	824	15	1,970	7.7	
May 16		69		268	130	85	190	0	1,160	17			.4		1,920	2.61	1,180	1,040	14	2,100	7.7	
May 31		69		140	61	45	116	0	559	14			.4		1,929	1.26	1,600	506	14	1,190	7.5	
July 11		80		293	169	106	199	0	1,410	17			1.7		2,260	3.07	1,430	1,260	14	2,520	7.2	

## VERDIGRIS RIVER NEAR WAGONER, WAGONER COUNTY, OKLA.

Feb. 13, 1952	49	76	12	82	225	55	92	1.9	438	0.60	239	54	36	740	7.7
Feb. 28	45	58	14	65	142	0	32	122	446	.61	202	86	41	717	7.5
Mar. 16	48	41	7.0	24	115	0	32	38	266	.36	132	38	28	386	7.7
Apr. 10	55	55	12	37	162	0	42	63	336	.46	186	54	30	543	7.7
May 7	75	72	14	44	215	0	42	80	391	.53	237	61	29	679	8.1
May 16	72	82	17	61	249	0	48	108	494	.67	274	70	32	811	8.1
May 31	75	68	16	52	213	0	44	90	410	.56	236	61	32	712	7.9
July 11	81	69	19	89	192	0	45	169	536	.73	250	92	44	958	7.0

## VERDIGRIS RIVER NEAR OKAY, WAGONER COUNTY, OKLA.

Feb. 13, 1952	49	76	13	55	221	0	54	88	430	0.58	243	62	33	713	8.0
Feb. 28	45	58	14	64	144	0	51	120	437	.59	202	84	41	703	7.4
Mar. 16	47	39	6.3	24	111	0	32	35	256	.35	124	32	30	368	7.3
Apr. 10	56	54	11	39	198	0	42	63	332	.45	180	50	32	527	7.7
May 7	75	73	13	46	218	0	45	95	400	.54	276	77	28	782	8.1
May 16	72	83	13	50	243	0	45	98	431	.54	200	52	38	671	7.9
May 31	75	63	13	56	173	0	42	86	398	.54	200	52	38	671	7.9
July 11	84	70	20	79	200	0	49	150	589	.69	256	92	40	902	7.1

## SPRING RIVER NEAR QUAPAW, OTTAWA COUNTY, OKLA.

Sept. 30, 1951	255	83	6.8	--	100	0	6.0	4.2	186	104	--	403	7.2
Nov. 13	21,600	58	2.4	--	46	0	6.0	4.2	81	44	--	192	7.5
Jan. 8, 1952	2,650	40	8.0	15	97	0	6.0	6.0	186	106	15	192	7.2
Jan. 28	228	44	62	9.5	124	0	7.0	7.0	193	92	10	403	7.6
Feb. 4	16,200	--	20	4.9	6.3	46	0	5.8	93	56	13	212	7.4
Feb. 11	9,070	49	38	8.3	11	70	0	4.2	129	72	16	293	7.9
May 28	72	57	8.0	11	106	0	6.0	6.0	174	87	12	387	8.0
June 24	231	79	69	7.1	140	0	8.2	8.2	202	88	11	436	7.7
July 29	240	86	60	5.8	130	0	8.2	8.2	173	66	10	379	7.0
Aug. 14	168	83	62	6.1	137	0	8.8	8.8	180	68	11	386	8.1
Aug. 23	3,520	83	34	2.4	3.5	74	0	3.5	95	34	7	216	7.0
Aug. 29	204	79	39	3.4	4.6	95	0	4.0	112	34	8	246	7.8

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 1951 to September 1952--Continued

Date of collection	Water discharge (cfs)	Temperature (°F)	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> )	Boiron (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 magnesium	Non-carbonate				
ELK RIVER NEAR TIFF CITY, McDONALD COUNTY, MO.																						
Sept. 19, 1951	270	73		41	4.1	--		145	0		4.2						119	0	--	245	8.2	
Dec. 28	442	41		44	6.3	3.0		142	0		3.8						135	18	5	243	7.7	
Feb. 5, 1952	2,220	54		38	6.8	2.6		137	0		3.5						123	11	4	234	7.5	
Mar. 10	2,680	52		40	3.2	3.9		123	0		3.0						114	13	7	223	8.1	
Apr. 15	2,720	52		44	4.4	2.9		128	2		3.2						127	19	5	236	8.3	
Apr. 28	784	64		40	3.9	2.8		124	0		3.2						117	16	5	221	8.2	
June 12	218	82		47	2.2	3.5		147	0		4.5						127	6	6	254	8.2	
June 25	139	81		46	2.2	3.8		144	0		5.0						125	6	7	250	8.2	
July 11	104	81		43	2.4	4.1		136	0		5.0						118	6	7	243	7.9	
Aug. 12	131	81		43	2.7	4.5		142	0		4.8						119	2	8	245	7.9	
Aug. 23	4,580	82		40	2.7	3.7		120	0		3.0						110	12	7	232	7.3	
Sept. 9	195	73		48	2.7	3.9		154	0		4.5						131	5	6	275	8.2	
LOST CREEK NEAR SENECA, McDONALD COUNTY, MO.																						
Sept. 19, 1951	17.9	66		32	9.2	--		122	1		3.8						118	16	--	232	8.3	
Nov. 1	97.1	32		44	2.2	--		121	0		3.8						116	19	--	228	8.0	
Dec. 28	21.8	42		44	2.4	3.2		124	0		3.8						119	18	6	232	7.5	
Feb. 5, 1952	43.1	44		41	2.9	3.0		108	0		3.8						115	26	6	230	7.6	
Feb. 19	23.6	55		44	2.7	3.6		120	2		4.0						120	22	6	235	8.3	
Mar. 10	63.3	54		41	2.2	3.1		118	0		3.0						111	14	6	222	8.0	
Apr. 15	52.0	54		42	2.4	3.6		121	0		3.5						115	16	7	220	8.1	
Apr. 28	29.0	62		44	2.9	3.2		124	2		3.2						123	22	5	231	8.3	
May 27	50.6	66		39	1.5	3.0		113	0		3.0						103	10	6	212	8.0	
June 25	11.3	75		41	1.5	3.8		140	0		3.5						123	8	6	251	8.2	
Aug. 12	7.26	77		44	1.5	3.5		134	0		3.8						117	7	6	242	8.0	
Sept. 9	6.06	74		47	1.7	4.2		145	0		4.0						124	5	7	255	7.9	



Apr. 24, 1952.....	305	60	36	11	17	82	0	6.0	136	69	21	309	7.8
May 8.....	32.2	76	53	13	21	134	0	13	185	75	20	411	7.7
June 3.....	31.0	76	30	11	19	66	0	10	121	67	26	303	7.3
June 10.....	4.01	85	43	12	22	115	0	21	155	61	24	371	7.8
July 17.....	2.12	78	58	12	16	171	0	14	194	54	15	391	7.9

## SALINA CREEK NEAR SALINA, MAYES COUNTY, OKLA.

Sept. 22, 1951.....	8.96	75	29	5.4	--	104	2	3.2	94	6	--	185	8.4
Nov. 19.....	133	54	37	1.5	--	108	0	3.0	98	10	--	188	7.7
Jan. 15, 1952.....	71.3	49	31	3.4	2.5	99	0	2.5	91	10	6	178	7.9
Feb. 15.....	78.2	42	32	2.4	2.0	94	0	3.0	89	12	5	169	7.4
Mar. 28.....	68.4	52	30	1.5	2.4	95	2	2.0	81	6	9	162	8.3
Apr. 25.....	188	59	32	2.2	3.0	95	0	2.5	88	11	13	202	8.2
June 11.....	16.8	76	34	1.0	6.3	108	0	9.0	93	6	13	203	8.0
July 6.....	8.52	82	38	1.4	3.4	107	0	2.2	97	6	7	193	7.9
Aug. 8.....	6.94	80	36	1.5	3.1	110	0	3.0	97	7	6	198	7.8

## NEOSHO RIVER NEAR CHOTEAU, MAYES COUNTY, OKLA.

Oct. 11, 1951.....	3,190	70	34	5.6	--	101	0	6.5	109	26	--	247	7.9
Nov. 19.....	14,400	54	47	3.2	--	112	0	8.8	130	38	--	286	7.6
Jan. 15, 1952.....	3,150	50	45	5.8	8.8	112	0	8.0	137	45	12	288	7.5
Feb. 6.....	29,400	44	46	6.6	8.8	110	0	8.5	141	51	12	309	7.7
Apr. 25.....	15,800	57	49	10	13	117	0	9.5	164	68	15	349	8.1
May 12.....	3,540	64	51	9.7	13	125	0	10	167	64	15	356	8.2
July 7.....	589	84	51	8.3	13	140	0	11	161	46	15	365	8.0
Aug. 11.....	242	88	48	8.3	13	128	0	11	153	48	16	353	8.1
Sept. 2.....	218	78	46	9.0	14	136	0	12	153	42	17	343	8.2

## 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 1951 to September 1952--Continued

Date of collection	Water discharge (cfs)	Temperature (°F)	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	Specific conductance (micro-mhos at 25°C)	pH
														Parts per million	Tons per acre-foot	Calcium	Non-carbonate			
PRYOR CREEK NEAR PRYOR, MAYES COUNTY, OKLA.																				
Sept. 18, 1951.....	13.9	63		15	5.4	--		28	0		34					59	36	252	6.9	
Oct. 27.....	2,560	62		6.8	.7	--		18	0		4.8					20	5	77.3	7.0	
Dec. 29.....	22.0	34		31	8.8	48		55	0		51					114	69	434	7.3	
Feb. 11, 1952.....	40.4	49		23	10	35		44	0		36					99	63	361	6.8	
Feb. 27.....	121	42		16	9.2	23		33	0		13					77	50	250	7.3	
Mar. 20.....	95.7	54		19	9.2	25		51	0		20					85	38	282	7.8	
Apr. 11.....	41.6	56		23	13	31		56	0		28					109	63	355	7.9	
May 8.....	14.6	68		19	9.0	21		48	0		19					85	46	269	7.6	
June 2.....	5.16	79		20	9.5	32		59	0		36					90	42	330	7.1	
June 27.....	5.04	88		35	14	98		107	5		143					146	50	796	8.5	
Aug. 7.....	52.1	91		58	12	76		137	0		105					192	80	763	7.8	
Aug. 13.....	4.26	85		11	4.4	20		30	0		26					45	20	202	6.8	
GREENLEAF LAKE NEAR BRAGGS, MUSKOGEE COUNTY, OKLA.																				
Sept. 14, 1951.....		74		31	14	--		184	0		6.0					137	11	247	7.5	
Dec. 6.....		54		22	3.2	7.8		80	0		4.0					67	2	168	7.1	
Feb. 14, 1952.....		49		21	5.4	3.2		71	0		5.8					75	17	150	7.4	
May 9.....		66		27	4.1	3.4		80	0		3.5					84	18	166	8.0	
June 20.....		85		32	2.7	4.6		96	0		6.2					91	12	200	7.8	
Sept. 5.....		76		40	3.9	14		131	0		21					116	8	288	8.1	
ILLINOIS RIVER NEAR GORE, SEQUOYAH COUNTY, OKLA.																				
Dec. 12, 1951.....	1,350	45		32	2.9	4.3		94	0		6.2					91	14	183	7.6	
Feb. 18, 1952.....	948	44		30	4.1	4.4		93	0		6.5					91	15	191	7.6	
Mar. 14.....	6,950	55		24	1.7	4.2		73	0		4.2					68	8	153	6.6	
Mar. 27.....	1,790	54		30	1.9	3.9		88	0		4.8					84	12	179	8.0	
CANADIAN RIVER NEAR ROLL, ROGER MILLS COUNTY, OKLA.																				
May 24, 1952.....		71		49	19	130		138	0	187	124		0.6	578	0.79	200	87	921	7.8	
CANADIAN RIVER NEAR CAMARGO, DEWEY COUNTY, OKLA.																				
May 24, 1952.....		86		172	44	43		94	0	539	46		1.2	1,020	1.39	610	533	1,250	7.7	

## CANADIAN RIVER NEAR THOMAS, CUSTER COUNTY, OKLA.

May 25, 1952	.....	61	183	38	77	175	0	538	54	0.4	988	1.36	612	489	21	1,300	7.9
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## DEER CREEK NEAR HYDRO, CADDO COUNTY, OKLA.

Sept. 6, 1951	.....	7.53	103	20	--	287	0	11	338	128	680	8.0
Oct. 8	.....	14.4	113	26	--	161	0	9.5	340	208	695	7.8
Nov. 28	.....	21.4	117	34	--	294	0	9.5	416	232	792	7.7
Jan. 14, 1952	.....	22.6	182	24	36	267	0	13	555	320	1,010	7.9
Mar. 14	.....	14.4	158	23	32	262	0	13	485	270	1,010	8.1
Apr. 23	.....	74.3	84	14	15	161	0	6.8	268	136	11	568
June 6	.....	22.6	124	33	27	318	0	13	445	184	12	808
July 22	.....	1.81	89	15	29	232	5	10	262	84	18	618
Aug. 19	.....	2.62	71	18	33	234	4	12	250	52	22	578

## CANADIAN RIVER AT BRIDGEPORT, CADDO COUNTY, OKLA.

May 25, 1952	.....	33	142	28	57	132	0	422	32	1.0	747	1.01	470	362	21	1,010	7.7
July 13	.....	1.00	74	22	42	149	0	198	26	1.1	472	.64	275	153	25	702	7.2

## CANADIAN RIVER NEAR UNION, CANADIAN COUNTY, OKLA.

May 25, 1952	.....	66	45	12	36	111	0	95	34	1.6	279	.38	162	71	32	481	7.6
July 13	.....	78	88	36	76	163	0	295	65	1.3	691	.93	368	234	31	1,020	7.2

## CANADIAN RIVER NEAR PURCELL, MCCLAIN COUNTY, OKLA.

May 25, 1952	.....	76	42	13	42	138	0	82	36	1.2	287	0.40	158	46	37	501	7.6
July 14	.....	85	17	13	224	360	14	150	77	.5	748	1.02	96	0	84	1,150	8.4

## BEAVER CREEK NEAR PURCELL, MCCLAIN COUNTY, OKLA.

Sept. 4, 1952	.....	0.04	67	50	33	18	291	0	8.0		260		22	13	483	7.5
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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 1951 to September 1952--Continued

Date of collection	Water discharge (cfs)	Temperature (°F)	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> )	Bo-iron (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			
WALNUT CREEK NEAR PURCELL, MCCLAIN COUNTY, OKLA.																					
Sept. 5, 1951	5.21	78		77	37	--	--	360	20	--	20		--	--	--	--	344	16	--	719	8.5
Oct. 9	6.28	60		82	41	--	--	423	0	--	20		--	--	--	--	372	26	--	731	8.2
Nov. 26	20.4	45		80	44	--	--	403	0	--	11		--	--	--	--	360	50	--	647	8.2
Jan. 14, 1952	6.38	59		86	33	31	--	396	0	--	15		--	--	--	--	350	26	16	673	8.0
Mar. 3	90.8	47		86	16	23	--	324	0	--	10		--	--	--	--	278	12	15	557	7.6
Apr. 21	84.7	73		36	26	14	--	211	0	--	7.0		--	--	--	--	197	24	13	386	8.1
May 25	--	81		56	36	15	--	338	0	27	10		2.5	325	0.44	--	288	10	10	570	8.2
June 13	29.2	86		34	59	26	--	350	0	--	9.2		--	--	--	--	326	39	15	621	8.2
July 13	--	88		26	63	30	--	374	8	45	16		.5	397	.54	--	324	4	17	675	8.3
July 24	2.10	90		25	62	37	--	364	9	--	18		--	--	--	--	318	4	20	683	8.4
Sept. 4	.60	66		21	95	57	--	445	36	--	25		--	--	--	--	445	20	22	881	8.8
CANADIAN RIVER NEAR ASHER, POTTAWATOMIE COUNTY, OKLA.																					
May 25, 1952				42	14	51		144	0	82	48		1.8	316	0.43		162	44	40	541	7.7
July 14		80		62	55	368		132	0	94	725		1.1	1,490	2.03		430	322	65	2,560	7.4
SPRING CREEK NEAR ADA, PONTOTOC COUNTY, OKLA.																					
Feb. 26, 1952	2.50	36		116	26	488		281	0		820						395	181	73	3,030	8.0
Apr. 21	81.6	66		24	7.3	46		104	0		62						91	6	52	397	7.4
June 2	42.8	89		29	10	50		168	0		45						114	0	49	428	7.8
CANADIAN RIVER NEAR KONAWA, SEMINOLE COUNTY, OKLA.																					
May 25, 1952		76		43	15	48		148	0	80	47		1.9	336	0.46		169	48	38	544	7.8
July 14		79		34	24	54		168	0	44	71		1.0	347	.47		184	30	39	619	7.2
LITTLE RIVER NEAR TECUMSEH, POTTAWATOMIE COUNTY, OKLA.																					
Sept. 7, 1951	52.3	77		66	30	--		264	0		305						288	72	--	1,610	8.1
Oct. 31	95.8	36		53	7.8	214		109	0		76						115	26	47	496	7.4
Dec. 11	10.5	42		110	26	214		324	0		305						360	114	86	1,540	8.0

Jan. 14, 1952	18.3	53	94	25	122	312	0	208				336	90	46	1,100	8.1
Feb. 3	94.3	33	73	18	38	265	0	56				254	37	25	598	7.9
Mar. 6	40.6	--	95	17	78	302	0	120				306	56	36	860	8.1
Apr. 21	358	70	40	23	37	212	0	44				195	22	29	528	7.7
June 2	74.0	82	54	41	53	297	9	84				302	44	28	744	8.5
July 21	9.45	90	50	26	97	221	0	159				230	49	48	913	8.2

## SALT CREEK NEAR DEWRIGHT, SEMINOLE COUNTY, OKLA.

Sept. 9, 1951	0.38	89	3,990	2,740		87	0	184,500				21,200	21,100		114,000	6.9
Oct. 31	18.0	37	2,540	498		80	0	24,400				8,380	8,310		56,100	7.5
Dec. 12	4.80	42	6,460	1,020		84	0	60,600				20,200	20,200		115,000	7.2
Jan. 15, 1952	5.81	--	5,770	1,270		115	0	60,700				19,600	19,500		115,000	7.0
Feb. 26	23.5	49	881	184		100	0	8,330				2,980	2,900	69	22,900	7.4
Apr. 23	1,560	62	52	32	378	101	0	735				362	279		2,580	7.4
June 3	53.6	88	578	186		145	0	5,720				2,250	2,130		15,900	7.9
July 22	9.83	82	1,210	317		85	0	12,600				4,340	4,280		32,100	--
Sept. 2	.17	90	7,300	1,860		58	0	82,000				25,900	25,800		142,000	7.6

## LITTLE RIVER NEAR SASAKWA, SEMINOLE COUNTY, OKLA.

Sept. 7, 1951	1.77	83	1,590	569		116	0	18,100				4,300	8,210		45,700	7.2
Oct. 31	83.6	44	2,642	100		118	0	5,520				9,410	1,800		52,100	7.2
Dec. 11	36.4	44	2,300	943		122	0	22,500				7,940	7,890		57,400	7.4
Jan. 15, 1952	30.1	--	1,690	376		123	0	15,300				5,230	5,050		37,400	7.4
Feb. 26	346	42	281	97		123	0	2,590				950	840		7,190	7.5
Apr. 21	4,950	65	168	119	119	196	0	4,535				680	582	28	1,910	7.5
Apr. 25	2,940	69	38	15	125	103	0	12	235	0.6		156	72	64	953	7.4
June 2	502	83	108	41	447	118	0	--	900			440	345	69	3,060	7.5
July 14	137	83	2,100	564	11,100	107	0	93	22,200			7,560	7,470	76	54,600	7.0
July 21	77.8	87	231	71	--	96	0	--	2,860			960	912	--	8,280	7.7
Sept. 3	1.00	80	1,250	353	--	88	0	--	14,000			4,590	4,520	--	35,600	8.1

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 1951 to September 1952--Continued

Date of collection	Water discharge (cfs)	Temperature (°F)	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)	Bo- ron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>		Per- cent so- dium	Specific conduct- ance (micro- mhos at 25°C)	pH	
															Parts per mil- lion	Tons per acre- foot	Calcium	Non-carbon- ate				
CANADIAN RIVER AT CALVIN, HUGHES COUNTY, OKLA.																						
May 25, 1952	6,900	76		50	17		115	135	0	61	191		1.8		684	0.93		195	84	56	982	7.7
July 14	19	80		827	253		4,160	151	0	64	8,480				15,100	20.54		3,100	2,980	74	22,800	7.4
CANADIAN RIVER NEAR EUFAULA, MCINTOSH COUNTY, OKLA.																						
May 25, 1952		75		59	21		148	148	0	79	245		1.4		855	0.89		234	112	58	1,150	7.6
July 14		75		184	69		879	125	0	39	1,780				3,280	4.46		742	640	72	5,630	7.2
NORTH CANADIAN RIVER NEAR GUYMON, TEXAS COUNTY, OKLA.																						
Oct. 10, 1951	2.19	65		62	21		34	263	0		14							242	26	23	550	8.1
Feb. 20, 1952	7.41	53		89	3.4		33	253	4		13							236	22	23	544	8.4
Apr. 16	6.38	61		18	30		31	165	3		14							166	26	29	431	8.5
June 6	2.16	84		45	31		33	217	15		13							240	37	23	532	8.7
July 17	142	67		40	12		16	140	0		5.5							148	34	19	338	8.2
COLDWATER CREEK NEAR HARDESTY, TEXAS COUNTY, OKLA.																						
Dec. 28, 1951	4.57	32		95	29		44	283	0		26							358	126	21	788	8.0
Feb. 20, 1952	5.59	53		68	43		47	247	9		28							346	129	23	791	8.4
Apr. 16	4.00	54		30	47		50	139	5		33							270	148	29	698	8.4
PALO DURO CREEK NEAR RANGE, TEXAS COUNTY, OKLA.																						
Dec. 21, 1951	2.42	32		172	34		256	323	0		306							570	306	49	1,980	7.9
Feb. 29, 1952	8.74	51		78	49		172	232	4		230							395	198	49	1,460	8.3
May 6	6.43	64		100	47		174	204	20		255							445	244	46	1,560	8.7
July 24	1.16	71		109	40		210	218	0		338							435	256	51	1,830	7.4
NORTH CANADIAN RIVER AT BEAVER, BEAVER COUNTY, OKLA.																						
Oct. 8, 1951	1.05	74		144	63		417	176	3		570							620	471	59	2,820	8.3

## AURORA CREEK NEAR BEAVER, BEAVER COUNTY, OKLA.

Oct. 23, 1951 .....	0.54	58	70	11	64	284	0	42	222	0	39	626	7.8
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## CLEAR CREEK NEAR ELWOOD, BEAVER COUNTY, OKLA.

Oct. 8, 1951 .....	1.11	62	57	20	28	240	0	25	224	28	21	502	7.8
Feb. 28, 1952 .....	1.63	54	44	21	25	211	0	24	194	21	22	446	8.2
Apr. 17 .....	2.04	--	21	20	25	128	6	25	136	21	28	354	8.5
June 19 .....	72	70	58	20	25	253	4	27	228	14	19	536	8.3
Aug. 11 .....	.51	68	63	21	24	281	0	25	244	14	18	556	8.1

## KIOWA CREEK NEAR SLAPOUT, BEAVER COUNTY, OKLA.

Oct. 8, 1951 .....	7.33	61	55	18	86	204	0	106	210	43	47	764	8.1
Feb. 28, 1952 .....	12.9	55	66	23	76	243	4	90	258	48	39	780	8.4

## WOLF CREEK NEAR FT. SUPPLY, WOODWARD COUNTY, OKLA.

Sept. 5, 1951 .....	1.26	82	56	16	--	191	0	64	204	43	--	591	7.6
Oct. 1 .....	1.29	78	59	14	--	190	0	68	204	48	--	608	7.7
Oct. 31 .....	105	58	55	20	--	202	0	72	220	54	--	659	8.0
Dec. 11 .....	20.3	55	88	17	74	232	0	89	280	100	36	833	8.0
Feb. 12, 1952 .....	59.8	--	68	19	89	233	0	101	250	59	44	822	8.0
Mar. 19 .....	105	46	59	21	91	200	5	107	232	60	46	816	8.3
Apr. 22 .....	122	57	72	25	94	231	0	111	284	94	42	900	7.9
June 19 .....	2.86	90	55	30	94	200	0	119	260	96	44	868	7.8

## INDIAN CREEK NEAR WOODWARD, WOODWARD COUNTY, OKLA.

Sept. 25, 1951 .....	0.97	76	101	28	--	128	0	158	360	257	--	1,140	8.0
Oct. 16 .....	1.23	74	156	66	--	318	0	418	660	400	--	2,500	7.6
Feb. 12, 1952 .....	7.46	58	108	21	94	214	0	115	338	382	36	1,040	7.9
Apr. 5 .....	5.76	66	173	24	89	86	0	138	432	314	33	867	6.2
Apr. 22 .....	5.00	54	116	34	173	242	0	212	430	232	47	1,480	7.4

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 1951 to September 1952--Continued

Date of collection	Water discharge (cfs)	Temperature (°F)	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				
PERSIMMON CREEK NEAR MUTUAL, WOODWARD COUNTY, OKLA.																						
Sept. 5, 1951	.....	74		128	50			708	0		118							524	0		1,450	7.9
NORTH CANADIAN RIVER NEAR YUKON, CANADIAN COUNTY, OKLA.																						
Feb. 21, 1952	.....			71	31	118		236	0	161	141							304	111	46	1,100	7.8
Feb. 29	.....			76	31	107		230	0	158	138							317	128	42	1,080	7.4
Mar. 7	.....			76	31	108		224	0	161	141							317	134	42	1,080	7.8
Mar. 14	.....			68	30	109		227	0	153	131							263	107	45	1,040	8.0
NORTH CANADIAN RIVER AT OKLAHOMA CITY, OKLAHOMA COUNTY, OKLA. (23rd Street Bridge)																						
June 20, 1952	.....	70		542	131	2,740		112	0	179	5,330			68				1,890	1,800	76	15,200	7.9
June 27	.....	62		623	142	3,170		101	0	180	6,170			71				2,140	2,060	76	17,300	7.1
July 4	.....	46		908	186	4,370		219	0	152	8,640			4.8				3,030	2,850	76	23,400	6.9
NORTH CANADIAN RIVER NEAR WETUMKA, HUGHES COUNTY, OKLA.																						
Dec. 11, 1951	.....	92.4	43	551	85			131	0		4,830							1,720	1,610		13,600	7.2
Mar. 13, 1952	.....	993	55	126	36	418		170	0		765							465	326	66	2,880	7.4
Mar. 26	.....	472	54	194	60			216	0		1,340							730	553		4,700	7.3
WEWOKA CREEK NEAR WETUMKA, HUGHES COUNTY, OKLA.																						
Sept. 19, 1951	.....	2.19	69	1,160	212	--		81	0		11,100							3,760	3,680	--	28,700	7.1
Sept. 27	.....	1.84	77	1,040	365	--		55	0		11,900							4,100	4,060	--	31,100	7.5
Dec. 11	.....	7.52	46	2,170	440	--		68	0		20,200							7,240	7,180	--	49,200	7.0
Dec. 11	.....	12.2	--	1,400	312	--		71	0		13,900							4,760	4,720	--	35,300	7.1
Jan. 15, 1952	.....	87.1	44	232	39	--		51	0		2,180							740	698	--	6,620	7.0
Feb. 27	.....	--	64	53	16	248		61	0		442							196	146	73	1,580	7.0
Apr. 22	.....	--	63	33	12	143		46	0		272							334	284	70	2,981	6.9
Apr. 23	.....	8,470	78	85	30	374		49	0		740							384	384	71	2,920	7.3
June 3	.....	282	78																			
July 22	.....	1.48	84	792	190	--		53	0		8,330							2,760	2,720	--	21,700	7.4



## BELLOM CREEK AT CHANDLER, LINCOLN COUNTY, OKLA.

Oct. 3, 1951	1.06	69	50	49	--	322	0	18	325	12	--	638	8.2
Oct. 29	20.4	49	64	13	15	241	0	14	214	16	13	423	7.7
Dec. 12	2.86	37	87	27	21	379	0	16	330	20	12	615	8.1
Jan. 23, 1952	2.84	42	94	24	25	381	0	18	334	14	14	628	7.9
Mar. 6	7.6	46	73	37	45	317	0	74	335	75	23	743	8.1
Apr. 21	38.0	70	30	15	23	150	0	28	137	14	27	361	7.4
June 23	.56	85	44	55	26	358	0	36	334	40	14	652	8.2

## LITTLE DEEP FORK CREEK NEAR EDNA, CREEK COUNTY, OKLA.

Sept. 18, 1951	16.8	72	88	32	--	64	0	635	350	238	--	2,170	7.0
Oct. 29	20.9	40	99	19	425	26	0	825	325	304	74	2,740	6.6
Dec. 12	13.4	40	401	71	--	109	0	3,280	1,290	1,200	--	9,870	7.3
Jan. 15, 1952	19.8	--	246	47	--	115	0	1,740	810	716	--	5,590	6.9
Feb. 27	64.3	41	70	14	245	59	0	450	230	182	70	1,590	7.0
Apr. 24	271	59	32	11	105	53	0	188	128	84	64	774	7.0
June 3	37.5	83	125	39	400	146	0	825	474	354	65	2,400	7.9
July 14	3.93	82	190	41	--	158	0	1,360	645	516	--	4,490	7.8
Sept. 3	.20	69	259	63	--	111	0	1,920	905	814	--	6,300	6.9

## NORTH CANADIAN RIVER NEAR EUFAULA, MCINTOSH COUNTY, OKLA.

May 25, 1952		74	94	25	371	117	0	22	725	1,450	1.97	338	242	70	2,540	7.5
July 14		78	254	75	1,280	139	0	45	2,520	4,500	6.12	942	828	75	7,610	7.1

## LONGTOWN CREEK NEAR ENTERPRISE, HASKELL COUNTY, OKLA.

May 25, 1952		70	12	6.0	13	52	0	23	11	106	0.14	54	12	34	169	7.1
July 14		80	23	7.1	7.4	99	0	5.7	8.5	134	.18	86	6	16	507	6.6

## CANADIAN RIVER NEAR WHITEFIELD, HASKELL COUNTY, OKLA.

May 25, 1952	17.700	73	74	21	238	132	0	40	442	980	1.33	271	163	65	1,710	7.7
July 15	293	73	255	76	1,190	156	0	48	2,860	4,340	5.90	948	820	73	7,340	7.3

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 1951 to September 1952--Continued

Date of collection	Water discharge (cfs)	Temperature (°F)	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 carbonate	Specific conductance (micro-mhos at 25°C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium			
SALLISAW CREEK NEAR SALLISAW, SEQUOYAH COUNTY, OKLA.																				
Oct. 5, 1951	12.0	78	26	1.9	--	--	--	82	0	4.0						24	7	--	160	7.8
Nov. 16	102	53	27	1.2	2.8	69	0	0	0	3.5						68	12	--	139	7.7
Jan. 10, 1952	89.2	45	25	1.9	3.3	62	0	0	0	2.2						70	14	8	141	7.4
Mar. 6	354	43	21	2.4	2.8	61	0	0	0	2.2						62	11	10	132	7.4
Mar. 19	286	46	20	2.4	2.8	70	0	0	0	2.5						57	13	9	137	7.7
Apr. 6	552	65	22	2.7	2.8	54	0	0	0	2.5						81	14	7	159	7.9
Apr. 21	527	74	27	3.2	2.7	91	0	0	0	3.2						81	8	7	174	7.1
May 9	37.7	74	29	1.3	2.7	90	0	0	0	2.8						85	6	9	179	7.9
May 20	24.9	68	29	1.9	2.7	96	0	0	0	3.0						87	8	9	186	7.6
July 2	11.5	84	31	1.9	3.7	96	0	0	0	4.0						83	7	9	177	7.6
July 15	10.9	83	30	2.7	3.9	93	0	0	0	3.2						83	2	10	174	7.8
July 31	3.32	85	30	2.2	3.7	93	0	0	0	4.2										
Sept. 5	2.17	80	29	2.7	4.1	99	0	0	0											
FOURCHE MALINE NEAR RED OAK, LATIMER COUNTY, OKLA.																				
Dec. 17, 1951	23.4	34	6.4	4.1	8.6	22	0	0	0	6.8						33	15	36	101	6.8
Dec. 27	13.3	--	9.6	4.6	12	32	0	0	0	7.5						43	17	38	136	7.0
Mar. 11, 1952	1,590	54	3.6	2.2	5.3	11	0	0	0	3.0						18	9	39	53.3	7.1
Mar. 25	40.0	57	6.0	3.4	13	25	0	0	0	8.0						29	8	50	124	7.1
Apr. 10	307	55	6.0	3.9	9.6	23	0	0	0	5.2						31	12	40	112	7.1
Apr. 12	5,180	59	2.8	1.5	4.4	13	0	0	0	4.5						13	2	42	49.2	6.6
POTEAU RIVER NEAR WISTER, LEFLORE COUNTY, OKLA.																				
Dec. 10, 1951	606	48	5.2	2.2	6.9	14	0	0	0	6.5						22	10	41	83.7	6.6
Jan. 9, 1952	1,120	46	3.2	2.4	4.5	14	0	0	0	4.0						18	6	36	57.1	6.5
Feb. 27	7,170	45	3.6	2.4	4.4	13	0	0	0	4.0						19	8	33	57.6	6.7
Mar. 25	6,520	54	3.2	3.2	5.2	13	0	0	0	4.0						21	10	35	66.0	6.7
Apr. 10	617	55	3.6	3.4	6.7	19	0	0	0	4.5						23	8	39	75.3	6.7

ARKANSAS RIVER BASIN--Continued  
MISCELLANEOUS ANALYSES OF STREAMS IN ARKANSAS RIVER BASIN IN NEW MEXICO

Chemical analyses, in parts per million, August 1952

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 (sum)		Hardness as CaCO <sub>3</sub>		Per-cent so-dium adsorp-tion ratio	Specific conduct-ance (micro-mhos at 25°C)	
														Parts per mil-lion	Tons per acre-foot	Calcium, mag-nesium	Non-carbonate			
UTE CREEK AT GALLEGOS																				
Aug. 4-5, 1952.....		16		32	12	36	177	0	45	8	1.2	1.2		238	0.32	130	0	38	1.4	377
Aug. 7.....		16		54	21	120	260	0	210	35	--	1.0		585	.80	221	8	54	3.5	889
Aug. 22-26, 30-31...		19		40	15	53	215	0	78	12	1.0	.4		324	.44	162	0	42	1.8	509
Aug. 28.....		15		56	20	91	250	0	172	23	--	2.7		503	.68	222	16	47	2.7	764

## RED RIVER BASIN

## SALT FORK RED RIVER NEAR WELLINGTON, TEX.

LOCATION.--At gaging station at bridge on U. S. Highway 83, 4 miles downstream from Fort Worth & Denver (Burlington) Railroad bridge, 4½ miles south of Lutie, and 6½ miles north of Wellington, Collingsworth County.  
DRAINAGE AREA.--1,222 square miles, of which 209 square miles is probably noncontributing.  
RECORDS AVAILABLE.--Chemical analyses: June to September 1952.  
Water temperatures: June to September 1952.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Values reported for dissolved solids are sums of determined constituents. Records of discharge for period June to September 1952 given in Water-Supply Paper 1281.

## Chemical analyses, in parts per million, November 1951 to September 1952

LOWER MISSISSIPPI RIVER BASIN																							
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			Hardness as CaCO <sub>3</sub>		Per-cent 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, mag-nesium	Non-carbon-ate				
Nov. 18, 1951	a3.77	26		516	94	150		115		1,510	235	--	2.5		2,590	3.52	26.4		1,670	1,580	16	3,140	7.6
Jan. 21, 1952	a27.2	19		--	--	--	--	--	--	1,060	252	--	3.0		--	--	--	--	--	--	--	2,680	--
Mar. 18	a36.8	32		330	82	216		97		1,080	300	--	3.5		2,090	2.84	208		1,160	1,080	29	2,870	7.9
Apr. 17	a16.4	26		472	95	173		118		1,450	238	--	3.0		2,520	3.43	112		1,570	1,470	19	3,060	7.6
May 23	a5.70			--	--	--		58		--	180	--	--		--	--	--	--	1,590	--	--	2,930	7.5
June 8-20	1.54	41		510	91	138		81		1,580	162	0.6	6.9		2,570	3.50	10.7		1,650	1,580	15	2,980	7.6
June 21, 25-30	.96	36		498	88	145		83		1,540	170	.6	5.9		2,520	3.43	6.53		1,600	1,540	16	2,970	7.6
June 22-24	51.4	40		199	47	115		136		621	125	.6	4.8		1,220	1.66	169		690	578	27	1,710	7.9
July 1-10	1.55	36		516	87	138		74		1,580	165	.7	5.8		2,560	3.48	10.7		1,640	1,580	15	2,960	7.5
July 11-20	3.02	32		528	94	131		70		1,620	170	.7	4.4		2,610	3.55	21.3		1,700	1,650	14	2,990	7.6
July 21-31	1.34	34		536	88	130		78		1,610	168	.7	4.4		2,610	3.55	9.44		1,700	1,640	14	3,010	7.6
Aug. 1-10	.89	43		538	87	160		73		1,650	168	.7	5.2		2,710	3.69	6.51		1,700	1,640	17	3,280	8.0
Aug. 11-20	1.06	42		540	87	152		79		1,660	168	.7	4.2		2,690	3.66	7.70		1,700	1,640	16	3,160	8.0
Aug. 21-31	1.05	36		554	87	151		86		1,680	172	.7	4.0		2,730	3.71	7.74		1,740	1,670	16	3,220	8.0
Sept. 1-10	1.48	30		544	96	152		79		1,690	180	.7	3.8		2,740	3.73	10.9		1,750	1,690	16	3,290	8.1
Sept. 11-20	1.63	29		568	101	130		115		1,700	175	.8	3.0		2,760	3.75	12.1		1,830	1,740	13	3,270	7.8
Sept. 21-30	3.22	28		558	101	151		135		1,680	185	.8	3.0		2,780	3.78	24.2		1,810	1,700	15	3,240	7.8
Instantaneous discharge (cfs).																							

a instantaneous discharge (cfs).

## RED RIVER BASIN--Continued

## SALT FORK RED RIVER NEAR WELLINGTON, TEX.--Continued

Temperature (°F) of water, water year June to September 1952

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1									--	68	68	70
2									--	68	69	68
3									--	68	68	68
4									--	70	68	69
5									--	68	70	68
6									--	70	71	65
7									--	71	70	68
8									--	70	70	67
9									--	65	70	66
10									--	65	70	68
11									--	65	70	65
12									--	65	70	65
13									--	70	68	65
14									--	70	70	65
15									--	70	71	65
16									--	70	72	68
17									--	70	71	70
18									68	70	70	70
19									68	71	71	68
20									68	69	70	70
21									66	70	75	65
22									70	70	75	58
23									70	70	73	58
24									70	69	72	58
25									70	70	71	64
26									70	70	70	55
27									68	70	70	65
28									68	65	70	63
29									68	66	72	45
30									68	69	72	50
31									--	69	73	--
Average									--	69	71	64

## RED RIVER BASIN

## NORTH FORK RED RIVER NEAR CARTER, OKLA.

LOCATION.--At gaging station at bridge on State Highway 34, 3 miles south of Carter, Beckham County, and 10.8 miles downstream from Timber Creek.

DRAINAGE AREA.--2,337 square miles (revised), of which 399 square miles is probably non-contributing.

RECORDS AVAILABLE.--Sediment records: March 1948 to September 1952.

EXTREMES, 1951-52.--Sediment concentrations: Maximum daily, 10,700 ppm Apr. 23; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 31,900 tons Apr. 22; minimum, no flow on many days.

EXTREMES, 1948-52.--Sediment concentrations: Maximum daily, 19,600 ppm Sept. 26, 1950; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 633,000 tons May 18, 1951; minimum, no flow at times each year.

REMARKS.--Records of discharge for water year October 1951 to September 1952 given in Water-Supply Paper 1241.

Suspended sediment, water year October 1951 to September 1952

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	0	--	0	28	e 500	38
2-----	0	--	0	0	--	0	22	469	28
3-----	0	--	0	.1	118	0	16	448	19
4-----	0	--	0	.3	308	.2	14	477	18
5-----	0	--	0	.3	86	.1	13	458	16
6-----	8.7	623	s 44	.6	91	.1	9.9	394	11
7-----	30	1,480	120	3.3	132	1.2	6.1	326	5.4
8-----	5.2	290	4.1	2.1	130	.7	4.4	282	3.4
9-----	.5	71	.1	2.1	128	.7	4.8	378	4.9
10-----	0	--	0	1.9	72	.4	11	832	25
11-----	0	--	0	2.4	58	.4	13	390	14
12-----	0	--	0	3.6	36	.4	13	152	5.3
13-----	0	--	0	3.6	42	.4	16	244	11
14-----	0	--	0	3.0	23	.2	39	984	103
15-----	0	--	0	3.6	18	.2	26	408	29
16-----	0	--	0	3.3	15	.1	38	e 300	31
17-----	0	--	0	4.4	82	1.0	42	216	25
18-----	0	--	0	3.6	114	1.1	43	202	23
19-----	0	--	0	3.0	88	.7	33	185	16
20-----	0	--	0	3.0	56	.5	34	364	33
21-----	0	--	0	3.6	70	.7	27	472	34
22-----	0	--	0	4.0	112	1.2	30	240	19
23-----	0	--	0	4.8	110	1.4	34	200	18
24-----	0	--	0	7.1	113	2.2	34	186	17
25-----	0	--	0	148	2,810	s 1,900	36	206	20
26-----	0	--	0	203	4,500	2,470	38	376	39
27-----	0	--	0	66	1,870	333	27	1,420	103
28-----	0	--	0	44	1,230	146	42	1,060	120
29-----	0	--	0	39	e 1,260	133	113	1,380	422
30-----	0	--	0	32	e 1,280	111	117	2,750	869
31-----	0	--	0	--	--	--	68	3,060	562
Total--	44.4	--	168.2	595.7	--	5,108.9	992.2	--	2,682.0

e Estimated or interpolated.

s Computed by subdividing day.

## RED RIVER BASIN--Continued

## NORTH FORK RED RIVER NEAR CARTER, OKLA.--Continued

Suspended sediment, water year October 1951 to September 1952--Continued

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-----	39	1,150	121	35	204	19	61	920	151
2-----	57	261	40	35	306	29	48	880	114
3-----	55	152	23	42	162	18	50	939	127
4-----	53	167	24	42	246	28	50	676	91
5-----	52	196	28	40	198	21	71	1,130	216
6-----	52	144	20	36	168	16	76	704	144
7-----	50	185	25	35	164	15	71	602	115
8-----	64	674	116	33	182	16	64	762	132
9-----	139	1,640	s 891	33	210	19	62	588	98
10-----	222	3,180	1,900	34	124	11	110	858	255
11-----	98	3,380	894	35	160	15	95	764	196
12-----	74	2,400	479	44	320	38	95	944	242
13-----	66	1,120	200	48	706	92	95	856	220
14-----	62	1,750	293	76	1,190	244	55	379	56
15-----	61	788	130	61	425	70	45	232	28
16-----	59	802	128	48	202	26	39	190	20
17-----	57	872	134	44	207	25	36	192	19
18-----	48	415	54	42	109	12	40	220	24
19-----	45	342	42	42	206	23	40	258	28
20-----	44	270	32	39	96	10	33	137	12
21-----	42	278	32	38	600	62	29	104	8.1
22-----	40	448	48	36	170	17	24	142	9.2
23-----	34	e 550	50	33	118	11	22	222	13
24-----	31	650	54	35	199	19	21	129	7.3
25-----	30	363	29	47	162	21	24	124	8.0
26-----	31	277	23	112	1,330	402	27	90	6.6
27-----	29	284	22	187	3,250	1,640	30	84	6.8
28-----	31	202	17	154	1,220	507	29	72	5.6
29-----	38	240	25	106	1,690	484	27	104	7.6
30-----	34	151	14	--	--	--	24	52	3.4
31-----	33	174	16	--	--	--	23	86	5.3
Total--	1,770	--	5,904	1,592	--	3,910	1,516	--	2,368.9
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-----	22	35	2.1	185	3,830	s2,170	13	223	7.8
2-----	19	24	1.2	86	1,600	371	33	887	79
3-----	19	44	2.3	76	918	188	35	1,720	162
4-----	16	32	1.4	64	714	123	33	99	8.8
5-----	14	12	.5	50	605	82	23	159	9.9
6-----	13	14	.5	34	398	37	14	88	3.3
7-----	12	13	.4	25	558	38	7.6	90	1.8
8-----	11	103	.3	20	238	13	2.7	101	.7
9-----	96	2,680	s1,110	14	166	6.3	1.1	e 100	.3
10-----	66	4,940	880	18	195	9.5	.3	e 100	.1
11-----	44	1,260	150	26	449	32	0	--	0
12-----	53	530	76	15	182	7.4	0	--	0
13-----	53	775	111	9.9	184	4.9	0	--	0
14-----	47	404	51	8.1	128	2.8	0	--	0
15-----	44	350	42	6.6	124	2.2	0	--	0
16-----	43	118	14	3.6	360	3.5	0	--	0
17-----	40	150	16	8.7	208	4.9	0	--	0
18-----	43	162	19	12	214	6.9	0	--	0
19-----	47	234	30	14	230	8.7	0	--	0
20-----	261	4,060	s5,890	11	560	17	0	--	0
21-----	873	8,600	15,600	7.6	222	4.6	0	--	0
22-----	1,230	9,600	31,900	6.6	202	3.6	23	194	12
23-----	396	10,700	11,400	52	1,470	s 234	1.8	570	2.8
24-----	124	4,900	1,640	187	4,260	s3,050	0	--	0
25-----	52	6,600	926	40	450	49	0	--	0
26-----	38	1,300	133	19	144	7.4	0	--	0
27-----	30	1,300	105	12	131	4.2	0	--	0
28-----	24	1,500	97	12	113	3.7	0	--	0
29-----	38	1,400	144	9.3	144	3.6	0	--	0
30-----	205	4,750	s4,110	6.6	140	2.5	0	--	0
31-----	--	--	--	7.6	148	3.0	--	--	--
Total--	3,773	--	74,452.7	1,046.6	--	6,493.7	187.5	--	288.5

e Estimated or interpolated.

s Computed by subdividing day.

## LOWER MISSISSIPPI RIVER BASIN

## RED RIVER BASIN--Continued

## NORTH FORK RED RIVER NEAR CARTER, OKLA.--Continued

Suspended sediment, water year October 1951 to September 1952--Continued

[illegible]



## RED RIVER BASIN--Continued

CACHE CREEK NEAR WALTERS, OKLA.

LOCATION --At gaging station at bridge on State Highway 53, 12 miles upstream from West Cache Creek, and 1 1/4 miles east of Walters, Cotton County.  
DRAINAGE AREA --630 square miles.

RECORDS AVAILABLE --Chemical analyses: October 1951 to September 1952.

WATER TEMPERATURES: October 1951 to September 1952.

EXTREMES, 1951-52 --Dissolved solids: 31, minimum, 73, maximum, 75 ppm May 18-19.

Hardness: Maximum, 305 ppm Mar. 1; minimum, 52 ppm Nov. 1-2.

Sulfate: Maximum, 1,280, minimum, 148 micrograms May 18.

Specific conductance: Maximum, 1,280, minimum, 36 $\mu$ S/cm Dec. 20.

Water temperature: Maximum, 55 $^{\circ}$ F, July 31; minimum, 36 $^{\circ}$ F, Dec. 20.

REMARKS --Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of discharge for water year October 1951 to September 1952 given in Water-Supply Paper 1241.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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)	Nitrate (NO <sub>3</sub> )	Phosphate (PO <sub>4</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	Non-carbonate			
Oct. 1-10, 1951	15.0	16	0.00	66	13	87	7.2	290	0	50	74	19	5.5	0.22	466	0.66	20	218	0	45	795	8.0
Oct. 11-20	14.9	16	.02	66	13	97	8.0	293	0	51	81	22	6.0	.22	516	.70	21	218	0	48	847	7.8
Oct. 21-26	35.0	--	--	62	15	--	95	290	0	49	82	22	--	--	511	.69	21	216	0	49	839	8.1
Oct. 27-28	380	--	--	20	4	4	21	97	0	12	14	4.6	--	--	166	.23	174	70	0	40	239	7.6
Oct. 30-31	130	--	--	33	6.5	--	46	150	0	27	36	8.5	--	--	261	.35	92	109	0	48	421	7.8
Nov. 1-2	295	--	--	15	3.7	19	19	71	0	12	14	3.3	--	--	181	.25	144	52	0	44	186	7.5
Nov. 3	30.0	--	--	23	4.3	31	31	96	0	13	26	3	--	--	232	.32	13	136	0	47	282	7.5
Nov. 4-5	27.0	--	--	42	8.0	49	49	172	0	33	42	15	--	--	341	.62	23	138	0	43	304	7.7
Nov. 6-10	20.8	--	--	60	12	82	82	265	0	45	66	26	--	--	461	.63	26	199	0	42	753	7.9
Nov. 11-20	17.8	17	.02	66	14	91	8.7	300	0	51	75	18	7.5	.16	497	.68	24	222	0	46	819	8.0
Nov. 21-30	21.2	17	.08	64	14	94	8.7	296	0	46	79	19	7.5	.18	502	.68	29	217	0	47	824	7.9
Dec. 1-10	19.6	--	--	71	15	92	92	300	0	62	83	15	--	--	527	.72	28	238	0	46	866	7.5
Dec. 11-20	20.8	13	.00	76	17	100	7.9	301	0	61	96	22	7.5	.12	556	.76	31	260	13	45	915	8.0
Dec. 21-31	19.8	8.8	.00	68	15	88	7.2	278	0	49	87	22	6.5	.12	516	.70	28	231	3	44	834	7.6
Jan. 1-10, 1952	22.3	--	--	72	15	--	100	289	0	57	104	18	--	--	546	.74	33	241	4	47	920	7.8
Jan. 11-20	19.8	7.7	.00	83	20	105	6.7	292	0	67	120	19	6.5	.49	580	.79	31	289	50	-3	1,000	7.7
Jan. 21-31	18.3	6.8	.00	84	22	116	7.2	307	0	77	130	22	7.5	.70	630	.86	31	300	-8	-5	1,070	7.6
Feb. 1-10	17.4	8.4	.00	84	22	115	7.1	305	0	74	128	23	6.5	.60	626	.85	29	300	50	45	1,040	8.1
Feb. 11-20	18.0	9.0	.00	77	20	113	7.3	290	0	70	120	26	7.5	.52	600	.82	29	274	36	46	1,010	7.5

**RED RIVER BASIN--Continued**  
**CACHE CREEK NEAR WALTERS, OKLA.--Continued**

Chemical analyses, in parts per million, water year October 1951 to September 1952--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)	Ni-trate (NO <sub>3</sub> )	Phos-phate (PO <sub>4</sub> )	Bo-ron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Per-cent so-dium ratio	Specific conduct-ance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate			
Feb. 21-29, 1952...	19.9	11	0.00	76	20	107	6.7	301	0	74	11.1	24	8.5	0.51	606	0.82	33	272	25	45	1,010	7.5
Mar. 1-10.....	25.3	12	.00	76	20	98	6.1	268	0	78	102	21	6.5	.80	553	.75	38	272	52	43	914	7.8
Mar. 11-20.....	22.2	13	.00	83	21	105	6.6	280	0	89	121	22	6.5	.51	623	.85	37	294	64	43	1,030	7.8
Mar. 21-31.....	21.0	14	.00	86	22	106	6.8	282	0	108	125	20	6.5	.45	642	.87	36	305	74	42	1,070	8.0
Apr. 1-10.....	16.2	14	.00	82	20	99	6.2	300	0	84	111	18	7.5	.49	601	.82	26	286	40	42	1,000	7.6
Apr. 11-17.....	16.9	14	.00	74	18	94	94	286	0	77	93	21	7.5	.49	557	.76	25	258	24	44	909	7.4
Apr. 18-20.....	18.3	14	.00	77	20	139	139	268	0	73	186	23	7.5	.49	696	.95	34	274	54	52	1,190	7.1
Apr. 21.....	25.0	14	.00	75	22	153	153	241	6	71	220	24	7.5	.49	737	1.00	50	278	70	55	1,280	8.4
Apr. 22-23, 26-27..	34.2	14	.00	66	17	87	87	255	0	72	88	20	7.5	.49	515	.70	48	234	26	45	853	7.4
Apr. 24-25, 28-30..	20.2	14	.00	56	13	58	58	190	0	62	62	14	7.5	.49	390	.53	21	193	38	39	642	7.4
May 1-3, 6-10.....	74.4	14	.00	59	14	61	61	205	0	72	59	14	7.5	.49	411	.56	83	204	36	39	672	7.6
May 4-5.....	36.5	14	.00	76	19	69	69	208	0	106	92	8.8	7.5	.49	514	.70	51	268	97	36	830	7.4
May 11-16.....	12.3	14	.00	62	14	83	83	256	0	61	74	17	7.5	.49	480	.65	16	212	2	46	807	7.7
May 17-20.....	1,290	14	.00	36	6.3	19	19	127	0	22	20	3.6	7.5	.49	208	.28	724	116	12	27	330	7.5
May 18-19.....	7,480	14	.00	17	6.0	3.0	3.0	69	0	8.3	4.5	4.5	7.5	.49	75	1.0	510	87	10	9	149	7.1
May 21, 23-28.....	741	14	.00	40	7.3	22	22	139	0	31	20	4.3	7.5	.49	209	.28	418	130	16	27	365	8.1
May 22, 29.....	536	14	.00	31	4.9	19	19	123	0	14	15	2.0	7.5	.49	166	.23	240	198	0	29	274	8.0
May 30-31.....	126	14	.00	45	8.0	41	41	178	0	38	32	4.3	7.5	.49	267	.36	91	146	0	38	456	8.2
June 1, 3, 7.....	637	14	.00	41	8.0	29	29	157	0	34	23	3.3	7.5	.49	233	.32	401	136	7	32	389	8.0
June 2, 5.....	1,122	14	.00	55	12.1	40	40	120	0	34	11	2.5	7.5	.49	176	.24	680	110	12	28	285	7.9
June 4-6.....	114	14	.00	57	12	40	40	135	0	34	11	2.5	7.5	.49	229	.43	101	186	12	36	555	8.5
June 9-10.....	50.5	14	.00	71	18	55	55	303	5	75	65	8.7	7.5	.49	366	.60	50	231	0	42	651	8.3
June 11-20.....	23.0	14	.00	92	17	91	91	363	0	90	75	8.2	7.5	.49	592	.91	32	300	2	43	829	8.3
June 21-30.....	23.0	14	.00	84	17	101	101	362	2	68	83	8.5	7.5	.49	571	.76	33	280	0	43	867	8.3
July 1-10.....	18.5	14	.00	74	15	126	126	360	0	62	99	9.2	7.5	.49	601	.82	30	246	0	52	988	8.2
July 11.....	17.0	14	.00	66	16	119	119	360	19	60	101	7.8	7.5	.49	594	.81	27	230	0	52	1,010	8.5
July 12-19.....	184	14	.00	35	6.2	15	15	118	0	35	9	9.0	7.5	.49	197	.27	98	113	18	23	322	7.6
July 20-21.....	30.0	14	.00	41	8.5	37	37	156	0	42	28	7.9	7.5	.49	277	.38	22	138	10	37	445	8.2
July 22-31.....	19.3	14	.00	56	12	74	74	245	0	48	65	9.9	7.5	.49	438	.60	23	189	0	46	717	7.9

Aug. 1-10, 1952	13.8	13	.02	62	13	125	6.9	296	9	55	101	8.7	5.5	.61	560	.76	21	208	0	56	928	8.4
Aug. 11-20	11.3	11	.02	59	12	138	7.6	304	7	54	111	8.6	7.5	.59	588	.80	18	196	0	59	870	8.4
Aug. 21-31	9.38	14	.08	55	12	134	8.3	303	0	52	112	7.3	9.0	.63	571	.78	14	186	0	60	959	7.8
Sept. 1-10	7.59	18	.02	53	12	136	8.3	301	0	48	113	5.0	8.5	.53	552	.75	11	182	0	61	948	7.9
Sept. 11-20	7.96	10	.02	52	12	136	8.9	291	0	53	112	8.4	10	.64	548	.75	12	179	0	61	924	8.0
Sept. 21-30	7.72	8.0	.02	52	12	137	9.6	280	0	52	115	12	9.5	.60	565	.77	12	179	0	61	946	8.0
Weighted average	107	--	--	34	8.0	28	a 132	--	--	27	25	5.4	--	--	209	0.28	60	118	10	34	356	--

a Includes equivalent of individual carbonate values shown above.

## LOWER MISSISSIPPI RIVER BASIN

## RED RIVER BASIN--Continued

## CACHE CREEK NEAR WALTERS, OKLA.--Continued

Temperature (° F) of water, water year October 1951 to September 1952

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

RED RIVER BASIN--Continued  
LITTLE WASHITA RIVER NEAR NINNEKAH, OKLA.

LOCATION.--At gaging station at bridge on county highway, 7 miles south of Chickasha, and half a mile west of Ninnekah, Grady County.  
DRAINAGE AREA.--227 square miles.  
RECORDS AVAILABLE.--Chemical analyses: October 1951 to September 1952.

Water temperatures: October 1951 to September 1952.  
EATREMES, 1951-52.--Dissolved solids: Maximum, 2,810 ppm Sept. 11-20; minimum, 213 ppm May 17.

Hardness: Maximum, 1,790 ppm Sept. 11-20; minimum, 474 micromhos May 17.  
Specific conductance: Maximum, 3,340 micromhos Oct. 7; minimum, 474 micromhos May 17.

Water temperatures: Maximum, 82°F Aug. 9; minimum, 33°F Dec. 16, 27.  
REMARKS.--Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of discharge for water year October 1951 to September 1952 given in Water Supply Paper 1241.

Chemical analyses, in parts per million, water year October 1951 to September 1952

Date of collection	Mean discharge (cfs)	Tem- perature (° F)	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 (residue at 180°C)		Hardness as CaCO <sub>3</sub>		Per- cent so- dium	Specific conduct- ance (micro- mhos at 25°C)	pH	
															Parts per mil- lion	Tons per acre- foot	Tons per day	Calcium, mg-%				Non-carbon- ate
Oct. 1-2, 6-7, 9-10, 1951	8.83	--	--	--	361	39	260		175	908	380	--	2.7	--	2,130	2.30	51	1,060	218	35	2,870	7.4
Oct. 3-5, 8	6.82	--	--	--	377	38	170		171	876	223	--	1.4	--	2,340	2.64	32	1,100	956	25	2,420	7.6
Oct. 11-20	6.75	19	0.00	0.00	372	40	205	4.8	191	876	315	0.1	2.5	0.22	2,100	2.86	38	1,070	936	23	2,640	7.8
Oct. 21-31	14.1	24	0.00	0.00	341	41	197	9.2	212	757	330	0.5	2.2	0.4	1,920	2.81	73	1,020	846	20	2,510	7.7
Nov. 1-2	25.5	--	--	--	281	35	122		197	625	210	--	3.0	--	1,470	2.00	101	1,845	684	24	1,960	7.7
Nov. 3-10	17.1	--	--	--	333	43	184		259	696	332	--	4.1	--	1,880	2.56	87	1,010	796	28	2,480	7.8
Nov. 11-23	18.1	13	0.00	0.00	346	43	175	9.6	281	725	308	5	2.0	91	1,870	2.55	91	1,040	810	27	2,460	8.0
Nov. 21-30	27.0	25	0.00	0.00	319	42	156	8.4	256	680	260	5	2.0	82	1,710	2.33	125	968	758	26	2,230	7.9
Dec. 1-10	22.2	19	0.00	0.00	308	42	168	7.2	190	707	290	5	1.9	1.20	1,750	2.38	105	941	786	28	2,300	7.8
Dec. 11-20	22.8	--	--	--	317	43	172		227	725	282	--	3.6	--	1,740	2.37	107	968	782	28	2,300	7.8
Dec. 21-31	25.2	31	0.00	0.00	331	42	162	3.2	258	715	268	3	3.9	--	1,800	2.45	122	968	787	26	2,340	7.8
Jan. 1-10, 1952	33.7	19	0.00	0.00	313	42	132	2.2	273	663	229	3	1.7	25	1,620	2.20	143	954	730	23	2,120	8.0
Jan. 11-20	25.8	20	0.00	0.00	317	44	142	2.0	234	713	238	5	1.1	25	1,680	2.28	117	972	780	24	2,190	7.8
Jan. 21-31	26.8	--	--	--	317	42	149		237	721	242	--	1.6	--	1,700	2.31	123	964	770	25	2,180	7.7
Feb. 1-10	25.3	19	0.00	0.00	322	44	138	1.9	243	717	225	5	1.4	24	1,650	2.30	115	984	766	23	2,210	7.8
Feb. 11-20	28.0	18	0.00	0.00	308	44	129	1.8	229	699	229	5	1.4	29	1,670	2.27	126	950	762	23	2,110	7.8
Feb. 21-28	40.6	18	0.00	0.00	314	45	122	2.3	258	698	200	5	1.3	25	1,620	2.20	178	968	757	21	2,070	7.8
Mar. 1-10	39.5	25	0.00	0.00	314	46	119	2.2	240	723	188	3	1.9	11	1,530	2.16	170	973	776	21	2,040	7.9
Mar. 11-20	44.1	30	0.00	0.00	318	45	112	2.6	258	711	175	3	1.8	32	1,590	2.16	180	968	767	20	2,040	7.9
Mar. 21-31	32.9	25	0.00	0.00	317	42	113	2.2	249	724	185	5	3.6	23	1,650	2.54	147	964	760	20	2,070	7.9
Apr. 1-10	27.2	23	0.00	0.00	322	44	130	2.1	217	765	215	5	1.1	21	1,750	2.38	129	964	760	22	2,170	8.0
Apr. 11-18	23.8	--	--	--	315	44	126		223	733	208	--	1.7	--	1,660	2.26	139	967	784	22	2,150	7.8
Apr. 19-26	110	--	--	--	162	32	45		166	492	54	--	3.9	--	1,837	1.14	458	538	400	15	1,110	8.2
Apr. 21, 33	110	--	--	--	236	38	81		273	561	120	--	2.9	--	1,240	1.63	368	745	578	13	1,620	8.0
Apr. 22-28	25.0	--	--	--	317	48	115		228	751	190	--	3.0	--	1,730	2.35	117	988	802	20	2,100	7.9

## RED RIVER BASIN--Continued

## LITTLE WASHITA RIVER NEAR NINNEKAH, OKLA.--Continued

Chemical analyses, in parts per million, water near October, 1951 to September 1952--Continued

Date of collection	Mean discharge (cfs)	Temperature (°F)	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	Tons per day	Calcium, magnesium	Non-carbonate			
May 1-3, 1952	105	--	--	--	267	41	59	224	644	75	--	--	2.8	--	1,290	1.75	366	834	651	13	1,600	7.9
May 4-10	26.4	--	--	--	352	49	139	256	800	238	--	--	3.5	--	1,880	2.56	124	1,080	870	25	2,340	7.9
May 11-16, 20	30.6	--	--	--	344	45	132	240	777	230	--	--	1.3	--	1,830	2.49	151	1,040	847	22	2,230	8.1
May 17	1,393.6	--	--	--	64	13	15	108	130	14	--	--	2.0	--	328	4.4	121	213	124	13	474	7.8
May 18	1,503	--	--	--	114	12	18	102	254	16	--	--	2.4	--	507	69	2,050	334	250	10	694	7.5
May 19	189	--	--	--	269	38	47	243	602	73	--	--	1.7	--	1,250	1.70	638	827	628	11	1,540	7.9
May 21-22, 26	67.0	--	--	--	351	48	95	254	796	170	--	--	4.9	--	1,780	2.42	322	1,070	865	16	2,170	7.9
May 23-24, 27	261	--	--	--	278	29	47	177	486	62	--	--	2.4	--	1,020	1.39	719	638	493	14	1,300	8.0
May 25, 29-31	87.2	--	--	--	310	47	76	264	710	124	--	--	2.4	--	1,590	2.16	374	966	750	15	1,900	8.0
May 28	349	--	--	--	139	19	26	131	319	26	--	--	6.2	--	656	.89	618	425	318	12	862	7.8
June 1	2,280	--	--	--	85	11	14	106	173	12	--	--	5.2	--	398	.54	2,450	257	170	11	538	8.0
June 2-3	178	--	--	--	291	37	40	175	718	50	--	--	2.8	--	1,360	1.84	654	878	734	9	1,600	7.8
June 4-10	69.1	--	--	--	350	50	98	197	881	150	--	--	2.8	--	1,790	2.43	290	1,080	918	17	2,100	8.3
June 11-18	25.9	--	--	--	367	53	133	179	939	210	--	--	3.0	--	1,970	2.68	138	1,130	987	20	2,330	8.1
June 19-20	17.5	--	--	--	374	56	198	185	947	350	--	--	3.2	--	2,290	3.11	178	1,160	1,050	27	2,310	7.5
June 21-30	14.1	--	--	--	32	32	170	186	953	318	0.5	1.4	0.36	--	2,250	3.06	86	1,180	1,030	45	2,720	8.0
July 1-10	11.6	--	--	--	393	45	184	3.7	212	924	300	5	1.0	.33	2,200	2.99	69	1,170	982	25	2,710	8.1
July 11-14	10.8	--	--	--	374	41	163	174	947	230	--	--	2.6	--	1,990	2.71	58	1,100	959	24	2,410	8.0
July 15	482	--	--	--	107	16	35	121	212	49	--	--	2.8	--	535	.73	624	316	216	19	752	7.8
July 16	85.0	--	--	--	211	15	46	174	532	32	--	--	3.5	--	959	1.30	220	588	503	14	1,170	8.0
July 17	44.0	--	--	--	256	25	78	163	654	66	--	--	3.1	--	1,230	1.67	146	742	608	19	1,500	8.2
July 18-27	23.7	--	--	--	328	35	117	213	763	174	--	--	3.3	--	1,720	2.34	110	962	788	21	2,050	8.1
July 21-31	9.46	--	--	--	362	37	128	3.5	177	877	200	5	1.1	.39	1,860	2.53	48	1,060	910	21	2,280	8.3
Aug. 1-10	5.81	--	--	--	341	49	119	3.5	159	905	137	5	1.2	.46	1,780	2.42	28	1,020	885	20	2,130	8.0
Aug. 11-20	3.02	--	--	--	362	42	103	3.7	154	986	107	5	1.1	.48	1,840	2.50	15	1,080	950	17	2,420	8.1
Aug. 21-31	1.15	--	--	--	399	54	126	4.1	181	1,109	116	3	1.2	.48	2,010	2.73	6.2	1,190	1,040	19	2,320	8.1
Sept. 1-10	.10	--	--	--	404	91	105	3.4	233	1,370	70	5	1.8	.70	2,360	3.21	.6	1,480	1,260	13	2,540	8.1
Sept. 11-20	.10	--	--	--	511	125	99	2.9	352	1,570	42	5	1.1	.79	2,320	3.70	.7	1,790	1,500	11	2,810	8.1
Sept. 21-30	.27	--	--	--	512	114	135	4.1	309	1,580	92	5	.5	.55	2,810	3.82	2.0	1,750	1,490	14	2,950	8.0
Weighted average...	43.6	--	--	--	225	31	79	179	514	121	--	--	2.8	--	1,160	1.58	137	689	542	20	1,480	--

## RED RIVER BASIN--Continued

## LITTLE WASHITA RIVER NEAR NINNEKAH, OKLA.--Continued

Temperature (°F) of water, water year October 1951 to September 1952

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

## RED RIVER BASIN--Continued

## WASHITA RIVER NEAR TABLER, OKLA.

LOCATION.--At gaging station at bridge on county highway, 1 mile downstream from Little Washita River, 7 $\frac{1}{2}$  miles upstream from Winter Creek, and 5 miles south of Tabler, 7 $\frac{1}{2}$  square miles (revised).

DEATHS AVAILABLE.--Chemical analyses: September 1946 to September 1952.

RECORDS AVAILABLE.--Chemical analyses: September 1946 to September 1952.

EXTREMES: Maximum, 778 ppm Nov 7-10; minimum, 196 ppm Nov 7-10; minimum, 304 ppm June 1.

Hardness: Maximum, 778 ppm Nov 7-10; minimum, 196 ppm Nov 7-10; minimum, 304 ppm June 1.

Specific conductance: Maximum, 85°F June 8-10; minimum, freezing point on several days during December and January.

Water temperatures: Maximum, 85°F June 8-10; minimum, freezing point on several days during December and January.

Hardness: Maximum, 851 ppm Jan 1-10, 1948; minimum, 127 ppm May 22-24, 1949.

Specific conductance: Maximum, 85°F June 8-10; minimum, freezing point on several days during December and January.

Water temperatures: Maximum, 88°F Aug. 18, 1948; July 11, 20, 1951; 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 1951 to September 1952 given in Water-Supply Paper 1241.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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 adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate			
Oct. 1-6, 1951.....	113	--	--	136	49	50	88	240	0	353	59	--	2.7	--	833	1.13	541	344	17	1,140	7.9
Oct. 7-10.....	112	--	--	160	51	88	9.6	276	0	414	100	--	3.3	--	1,000	1.36	608	382	24	1,380	7.9
Oct. 11-20.....	106	19	0.00	175	54	92	1	252	0	440	105	0.5	3.2	0.98	1,060	1.44	658	420	23	1,460	8.1
Oct. 21-24, 29, 31	110	--	--	188	59	92	257	289	0	472	124	--	2.5	--	1,160	1.58	712	468	22	1,580	7.8
Oct. 25-28, 30.....	95.8	--	--	165	54	70	289	0	416	88	--	--	3.3	--	4,010	1.37	644	406	19	1,370	7.8
Nov. 1-6.....	153	--	--	178	43	109	109	285	0	435	120	--	2.3	--	1,060	1.44	621	388	28	1,500	8.2
Nov. 7-10.....	124	--	--	201	55	146	8.8	303	0	575	174	--	4.0	--	1,380	1.88	778	529	29	1,900	8.2
Nov. 11-20.....	114	18	0.00	201	52	82	1	321	0	451	111	5	2.9	1.37	1,100	1.50	716	452	20	1,510	8.2
Nov. 21-30.....	168	21	0.00	209	53	91	4.8	338	0	463	127	5	2.3	1.16	1,160	1.58	526	462	21	1,610	8.2
Dec. 1-10.....	167	--	--	212	56	93	3.7	323	0	500	123	--	2.5	--	1,220	1.66	759	494	21	1,640	7.9
Dec. 11-20.....	132	18	0.00	199	49	84	3.7	328	0	441	110	3	3.3	1.6	1,330	1.54	698	428	21	1,510	8.2
Dec. 21-31.....	138	--	--	216	55	86	3.2	336	0	485	123	--	3.6	0.33	1,220	1.66	763	490	20	1,640	7.9
Jan. 1-10, 1952.....	179	21	0.00	213	52	91	100	335	0	490	118	3	3.0	--	1,280	1.63	784	453	21	1,640	8.0
Jan. 11-20.....	189	--	--	217	47	88	2.9	337	0	490	118	--	2.0	0.31	1,190	1.63	719	457	23	1,600	7.9
Jan. 21-31.....	189	18	0.00	215	51	88	2.9	323	0	496	108	3	2.0	--	1,190	1.62	746	482	20	1,600	7.9



## RED RIVER BASIN

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	166	17	--	--	208	56	83	307	0	493	116	--	1.9	--	1,200	1.63	538	749	498	19	7.7
Feb. 1-10, 1952	...	17	--	--	208	56	83	307	0	493	116	--	1.9	--	1,200	1.63	538	749	498	19	7.7
Feb. 11-20	200	16	--	--	208	52	89	304	0	499	107	.3	1.6	.29	1,180	1.60	637	733	484	21	1,610
Feb. 21-29	219	16	--	--	209	52	84	300	0	499	109	.3	1.2	.32	1,180	1.60	698	736	490	20	1,580
Mar. 1-10	223	19	--	--	206	47	83	295	0	497	102	.5	2.0	.32	1,160	1.58	698	707	465	20	1,570
Mar. 11-20	268	--	--	--	190	50	79	283	0	477	86	--	2.4	--	1,110	1.51	803	680	448	20	1,520
Mar. 21-31	231	18	--	--	207	51	78	287	0	514	92	.3	2.0	.26	1,200	1.63	748	726	491	19	1,460
Apr. 1-10	181	--	--	--	189	47	96	245	0	506	102	--	1.4	--	1,160	1.58	567	664	464	24	1,530
Apr. 11-19	197	--	--	--	192	52	85	268	0	493	102	--	1.3	--	1,150	1.56	612	693	474	21	1,520
Apr. 20, 26-29	636	--	--	--	114	30	36	153	0	299	33	--	4.6	--	663	.90	1,140	408	282	16	1,540
Apr. 21, 25	785	--	--	--	133	44	58	228	0	365	48	--	5.2	--	829	1.13	1,760	513	328	20	896
Apr. 22-24	284	--	--	--	203	56	71	283	0	541	78	--	2.0	--	1,170	1.59	897	736	521	17	1,120
Apr. 30	1,090	--	--	--	56	22	10	147	0	95	18	--	9.0	--	365	.50	1,070	230	110	9	1,520
May 1-3	628	--	--	--	124	32	41	156	0	335	36	--	4.3	--	704	.96	1,190	441	313	17	961
May 4-10	292	--	--	--	170	44	71	219	0	445	51	--	3.7	--	1,010	1.37	796	605	426	20	1,340
May 11-16, 20	219	--	--	--	183	50	65	234	0	476	78	--	3.8	--	1,060	1.43	821	582	297	18	1,340
May 17, 19	1,232	--	--	--	108	28	42	135	0	293	40	--	5.0	--	481	.63	2,600	293	203	21	1,870
May 18	2,770	--	--	--	19	28	33	141	0	256	46	--	5.1	--	748	1.03	2,390	442	326	21	614
May 21-22, 25	1,182	--	--	--	32	23	35	148	0	215	29	--	3.2	--	508	.68	1,880	320	192	19	1,020
May 23, 25, 30-31	1,311	--	--	--	74	13	23	130	0	158	16	--	4.0	--	387	.50	1,840	246	140	17	7.6
May 24, 27-29	1,856	--	--	--	54	15	15	117	3	104	10	--	6.6	--	394	.41	3,320	196	96	14	570
June 1	4,290	--	--	--	123	22	35	141	4	306	21	--	5.5	--	655	.89	1,570	398	276	16	8.3
June 2-3	890	--	--	--	132	24	56	157	6	356	56	--	3.0	--	792	1.08	973	470	331	20	439
June 4-10	455	--	--	--	165	47	80	205	5	487	81	--	2.0	--	1,050	1.43	581	604	428	22	8.5
June 11-20	205	--	--	--	167	52	95	242	8	473	103	--	1.9	--	1,120	1.52	294	630	418	26	8.3
June 21-30	97.3	--	--	--	156	53	95	201	0	505	110	.5	1.8	.60	1,140	1.55	197	607	442	25	1,470
July 1-10	64.1	26	--	--	153	58	124	228	0	523	110	--	2.6	--	1,160	1.58	698	620	433	30	8.0
July 11-15, 17	223	--	--	--	128	27	58	170	0	323	56	--	3.1	--	724	.98	594	430	291	23	1,480
July 16, 18-20	304	--	--	--	128	27	58	170	0	323	56	--	3.1	--	724	.98	594	430	291	23	1,520
July 21-31	70.2	23	--	--	128	28	54	202	0	291	68	.3	1.9	.53	710	.57	135	434	269	21	8.0

## RED RIVER BASIN--Continued

## WASHITA RIVER NEAR TABLER, OKLA.--Continued

Chemical analyses, in parts per million, water year October 1951 to September 1952--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 adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium	Non-carbonate			
Aug. 1-10, 1952 ...	47.2	--	--	149	58	107		212	5	481	112	--	2.2	--	1,110	1.51	141	610	428	28	1,490	8.4
Aug. 11-20 .....	34.6	--	--	148	63	120		220	14	496	118	--	3.0	--	1,160	1.58	108	628	424	29	1,550	8.5
Aug. 21-31 .....	19.7	--	--	132	66	117		276	0	456	108	--	3.0	--	1,060	1.47	57	601	375	30	1,500	8.0
Sept. 1-10 .....	13.5	--	--	126	73	102		334	0	418	92	--	.5	--	1,140	1.46	39	614	341	27	1,480	8.0
Sept. 11-20 .....	2.06	8.0	0.00	131	75	111	6.9	346	12	348	92	0.3	.65	0.65	1,060	1.44	5.9	636	332	27	1,480	8.4
Sept. 21-27 .....	1.00	--	--	127	79	109		341	0	464	82	--	.6	--	1,140	1.53	3.1	642	362	27	1,560	8.0
Sept. 28-30 .....	1.00	--	--	94	70	29		380	0	222	31	--	.8	--	708	.96	1.9	522	211	11	1,140	7.6
Weighted average	235	--	--	148	38	64		a220	--	370	69	--	3.3	--	863	1.17	548	526	345	21	1,170	--

a Includes equivalent of individual carbonate values shown above.

## RED RIVER BASIN--Continued

## WASHITA RIVER NEAR TABLER, OKLA.--Continued

Temperature (°F) of water, water year October 1951 to September 1952

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

## LOWER MISSISSIPPI RIVER BASIN

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 (revised).

RECORDS AVAILABLE.--Chemical analyses: May 1944 to September 1952.

Water temperatures: April 1947 to September 1952.

EXTREMES, 1951-52.--Dissolved solids: Maximum, 912 ppm Dec. 11-20; minimum, 70 ppm Nov. 2.

Hardness: Maximum, 558 ppm Dec. 11-20; minimum, 41 ppm Nov. 2.

Specific conductance: Maximum daily, 1,490 micromhos Dec. 13; minimum daily, 94.9 micromhos Nov. 2.

Water temperatures: Maximum, 83°F July 27, Aug. 12, 20; minimum, freezing point Dec. 21-22, 27, Jan. 10.

EXTREMES, 1944-52.--Dissolved solids: Maximum, 936 ppm July 21-25, 30-31, 1944, Jan. 21-31, 1951; minimum, 70 ppm Nov. 2, 1951.

Hardness: Maximum, 628 ppm Jan. 21-31, 1951; minimum, 41 ppm Nov. 2, 1951.

Specific conductance: Maximum daily, 1,520 micromhos Sept. 13, 1947; minimum daily, 94.9 micromhos Nov. 2, 1951.

Water temperatures, 1947-52: Maximum, 87°F Aug. 6, 1950; 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 1951 to September 1952 given in Water-Supply Paper 1241.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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)
															Tons per acre-foot	Tons per day	Calcium, mg./l.	Non-carbonate, mg./l.		
Oct. 1-10, 1951.....	186	--	--	84	41	55	227	0	220	57	--	--	1.1	--	604	0.82	303	378	24	920
Oct. 11-20.....	159	--	--	100	51	64	266	0	270	70	--	--	1.0	--	733	1.00	459	241	23	1,070
Oct. 21-26.....	191	--	--	106	55	75	279	0	282	93	--	--	1.4	--	815	1.11	420	490	25	1,190
Oct. 27-31.....	944	--	--	56	24	35	179	0	101	39	--	--	8.7	--	364	.50	928	238	92	599
Nov. 1, 3.....	1,021	--	--	52	15	41	161	0	91	34	--	--	6.4	--	318	.43	877	192	60	530
Nov. 2.....	1,060	--	--	11	3.3	7.1	22	0	23	4.5	--	--	10	--	70	.10	200	41	23	94.9
Nov. 4-5.....	439	--	--	72	37	27	202	0	147	50	--	--	2.5	--	452	.61	536	332	168	740
Nov. 6-10.....	300	--	--	103	40	73	272	0	233	80	--	--	2.8	--	678	.92	549	422	198	1,050
Nov. 11-20.....	231	--	0.00	118	50	80	274	0	307	106	0.5	0.88	1.3	.94	840	1.14	524	500	276	1,240
Nov. 21-30.....	234	15	.00	116	50	67	298	0	269	91	1.3	1.06	1.3	.94	776	1.06	490	495	251	1,130
Dec. 1-10.....	255	--	--	124	54	78	283	0	312	101	--	--	1.1	--	878	1.19	605	532	300	1,250
Dec. 11-20.....	233	15	.00	136	53	77	307	2	337	95	3	1.3	.94	.94	912	1.24	574	558	302	1,290
Dec. 21-31.....	230	--	--	118	54	78	297	0	297	92	--	--	2.8	--	844	1.15	524	516	273	1,220
Jan. 1-10, 1952.....	268	18	.00	121	51	77	289	0	294	84	1	2.0	.86	.86	846	1.15	638	512	266	1,220
Jan. 11-20.....	207	--	--	132	53	78	283	0	338	101	--	--	1.8	--	900	1.22	649	548	314	1,300
Jan. 21-31.....	273	14	.00	126	51	76	274	0	331	92	3	1.8	.89	.89	860	1.17	634	524	300	1,240
Feb. 1-10.....	268	13	.00	116	51	79	275	0	305	94	3	1.0	.85	.85	834	1.13	646	499	274	1,220
Feb. 11-20.....	304	--	--	114	53	77	271	0	323	93	--	--	1.5	--	892	1.21	732	510	288	1,270
Feb. 21-29.....	319	9.7	.00	123	51	77	271	0	322	93	3	1.6	.84	.84	850	1.16	732	516	294	1,240
Mar. 1-2, 9.....	341	--	--	118	47	75	272	0	284	93	--	--	1.8	--	794	1.08	731	488	264	1,160
Mar. 3, 10.....	712	--	--	70	25	41	171	0	155	45	--	--	2.2	--	458	.62	880	278	138	697
Mar. 4-8.....	571	--	--	92	38	63	238	0	212	74	--	--	2.8	--	644	.88	993	386	190	961

53	30	53	200	6	187	70	54	544	74	997	320	156	96	815	8.0
82	42	64	248	0	277	70	54	783	1.00	1,140	450	240	24	1,060	8.0
45	64	213	0	161	44	70	54	484	.66	1,647	308	134	24	744	7.8
117	46	234	0	316	70			786	1.07	1,300	481	289	22	1,110	7.8
60	33	228	0	197	76			642	.87	1,150	370	183	26	946	7.9
58	40	246	0	271	74			761	1.03	873	454	252	22	1,060	8.0
61	45	246	0	271	74			768	1.04	751	457	256	23	1,100	7.6
85	31	206	0	182	55			576	.78	1,170	340	170	22	836	7.7
80	23	221	0	130	44			467	.64	4,320	294	173	22	720	7.1
39	15	221	0	63	30			308	.42	2,040	204	46	24	505	7.6
22	7.6	149	0	24	17			221	.30	2,230	128	6	27	323	8.0
32	22	220	0	321	43			548	.75	1,870	382	206	15	850	8.3
102	31	225	2	269	43			840	1.14	3,120	527	339	18	1,140	8.3
55	45	225	2	329	50										
32	29	171	0	185	41			497	.68	1,630	324	184	18	744	7.9
64	45	202	0	277	50			663	.90	625	429	264	19	955	8.0
114	37	209	0	304	73			752	1.02	668	453	282	23	1,070	8.0
62	25	169	0	144	36			414	.56	12,600	258	119	25	627	8.2
36	13	134	0	51	15			227	.31	6,560	148	38	20	357	8.0
12	14	129	0	58	18			277	.38	2,940	168	62	13	390	7.7
32	17	145	0	90	25			316	.43	3,620	200	81	20	452	7.7
46	24	152	0	136	34			446	.61	5,540	258	134	30	636	7.2
21	153	3	3	101	21			352	.48	2,760	224	93	17	535	8.3
31	155	6	6	241	40			568	.80	1,530	306	228	16	808	8.4
61	181	7	7	248	66			680	.88	1,746	332	232	16	847	8.4
69	231	5	5	282	67			722	.98	454	436	236	26	1,040	8.4
79	177	0	295	81				722	.58	542	395	250	30	1,020	8.1
69	169	0	233	72				634	.86	377	333	194	31	852	8.0
72	199	0	201	85				634	.86	576	323	179	32	920	7.5
54	27	177	7	137	46			448	.61	212	246	89	33	655	8.4
50	16	131	0	97	23			316	.43	1,880	191	84	22	460	7.8
24	115	0	44	13				200	.27	1,040	125	31	22	310	7.8
17	141	0	32	14				523	.71	438	304	167	26	737	8.1
50	168	0	208	41				714	.57	360	384	228	30	967	7.8
77	190	0		65											

RED RIVER BASIN--Continued  
 WASHITA RIVER NEAR DURWOOD, OKLA.--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-trate (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Per-cent so-dium 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, 1952 ....	104	20	0.02	53	37	55	4.3	147	0	183	72	0.1	1.2	0.42	506	0.69	142	284	164	29	802	7.5
Aug. 11-20 .....	94.4	--	--	63	39	69	99	195	0	183	75	--	1.4	--	556	.76	142	318	158	32	913	8.1
Aug. 21-31 .....	54.8	--	--	67	51	99	220	220	0	268	93	--	1.8	--	718	.98	106	376	196	36	1,070	8.0
Sept. 1-10 .....	32.4	--	--	64	58	83	203	203	0	251	121	--	1.0	--	756	1.03	66	398	232	34	1,160	7.5
Sept. 11-20 .....	25.8	--	--	63	57	94	246	246	0	222	116	--	.7	--	719	.98	50	382	190	34	1,110	7.9
Sept. 21-30 .....	19.1	5.6	.00	70	56	97	4.9	299	2	186	119	.3	.4	.55	700	.95	36	405	136	34	1,130	8.3
Weighted average	629	--	--	75	29	43	a 189	a 189	--	169	46	--	5.2	--	499	0.68	847	306	151	23	736	--

a Includes equivalent of individual carbonate values shown above.

## RED RIVER BASIN--Continued

## WASHITA RIVER NEAR DURWOOD, OKLA.--Continued

Temperature (°F) of water, water year October 1951 to September 1952

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

## LOWER MISSISSIPPI RIVER BASIN

## 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.--39,779 square miles above gaging station, of which 6,697 square miles is probably noncontributing.

RECORDS AVAILABLE.--Chemical analyses available from 1944 to September 1952.

Water temperatures: October 1945 to September 1952.

EXTREMES 1951-52.--Dissolved solids: Maximum, 894 ppm Aug. 1-31; minimum, 722 ppm Oct. 1-31.

Hardness: Maximum, 340 ppm Sept. 1-30; minimum, 264 ppm Oct. 1-31.

Specific conductance: Maximum daily, 1,540 micromhos July 14, 16-18; minimum daily, 1,150 micromhos Oct. 12, 15-18, 26, 29-31.

EXTREMES 1944-52.--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 (1950-52): Maximum daily, 1,740 micromhos May 31, 1951; minimum daily, 1,150 micromhos Oct. 12, 15-18, 26, 29-31, 1951.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Values reported for dissolved solids are residues on evaporation. Records of discharge for gaging station near Colbert, Okla., for water year October 1951 to September 1952 given in Water-Supply Paper 1241. No appreciable inflow between dam and gaging station except during periods of heavy local rains.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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> )	Bo- ron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Per- cent so- ad- sorp- tion ratio 25°C	Specific conduct- ance (micro- mhos at 25°C)	
															Parts per mil- lion	Tons per acre- foot	Tons per acre- day	Calcium, mag- nesium	Non- carbon- ate			
Oct. 1-31, 1951.....	1,841	11		66	23	144	144	135		180	212		2.0		722	0.96	3,590	264	154	54	3.9	1,180
Nov. 1-30.....	1,660	12		79	25	141	141	138		176	220		1.0		739	1.01	3,310	300	187	51	3.5	1,200
Dec. 1-31.....	1,815	13		80	25	141	141	138		187	226		1.8		750	1.02	3,660	302	190	50	3.6	1,230
Jan. 1-31, 1952.....	2,654	10		72	27	144	144	139		170	222		.5		751	1.02	5,360	290	176	52	3.7	1,240
Feb. 1-29.....	1,837	11		84	24	159	140	140		180	246		3.8		806	1.10	4,000	308	194	53	3.9	1,300
Mar. 1-31.....	1,895	8.0		86	25	157	140	140		184	248		4.5		834	1.13	4,270	318	203	52	3.8	1,340
Apr. 1-30.....	3,031	9.6		82	25	160	142	142		185	245		1.2		824	1.12	6,740	308	191	53	4.0	1,370
May 1-31.....	2,461	9.2		84	27	157	160	145		189	245		1.2		835	1.14	5,550	320	202	52	3.8	1,390
June 1-30.....	2,844	7.6		90	26	168	168	146		195	262		2.8		884	1.20	6,790	332	210	52	4.0	1,510
July 1-31.....	2,709	8.0		91	27	181	181	147		201	277		1.5		892	1.21	6,520	336	218	54	4.3	1,530
Aug. 1-31.....	3,140	8.2		89	27	183	183	145		200	285		2.0		894	1.22	7,560	333	214	54	4.3	1,530
Sept. 1-30.....	1,692	10		90	28	178	178	144		198	285		1.8		862	1.17	3,940	340	222	53	4.2	1,480
Weighted average.....	2,301	9.5		83	26	161	161	142		185	250		1.9		827	1.12	5,140	314	196	53	3.9	1,380





RED RIVER BASIN--Continued  
KIAMICHI RIVER NEAR BELZONI, OKLA.

LOCATION.--At gaging station at bridge on State Highway 7, 6 miles downstream from Cedar Creek, and 1½ miles northwest of Belzoni, Pushmataha County.  
DRAINAGE AREA.--1,420 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1952.

Water temperatures: October 1947 to September 1952.

EXTREMES, 1951-52.--Dissolved solids: Maximum 82 ppm June 1-30; minimum 55 ppm Sept. 1, 23-30.

Hardness: Maximum, 24 ppm July 17-31, Aug. 1-31; minimum 15 ppm Sept. 1-30.

Specific conductance: Maximum 98 µmhos July 23-31, Aug. 1-30; minimum 33 µmhos Nov. 3.

Water temperatures: Maximum 98°F July 23-31, Aug. 1-30; minimum 64°F Jan. 2.

EXTREMES, 1947-52.--Dissolved solids: Maximum 82 ppm May 21-22, 27-28, 31, 1948; minimum 44 ppm Apr. 21-30, Nov. 11-20, 1948.

Hardness: Maximum 24 ppm May 21-22, 27-28, 31, 1948; minimum 11 ppm Feb. 11-20, 1949, Jan. 1-10, 1950.

Specific conductance: Maximum 98 µmhos May 21-22, 27-28, 31, 1948; minimum 22 µmhos Jan. 25, 1948.

Water temperatures: Maximum 98°F Aug. 17, 1951, July 3, 1952; minimum freezing point on several 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 1951 to September 1952 given in WSP 1241.

Chemical analyses, in parts per million, water year October 1951 to September 1952

Date of collection	Mean discharge (cfs)	Temperature (°F)	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	Tons per day	Calcium, mg./l.	Non-carbonate			
Oct. 1-31, 1951 ....	506		5.0	1.1	3.3	1.5	4.7	2.0	16	6.6	4.8	0.1	1.2	0.06	69	0.09	94	17	4	34	54.7	6.6
Nov. 1-30, ..... 2,532			9.2	.70	2.9	1.4	5.0	1.6	14	6.9	6.2	.1	.7	.04	62	.08	424	15	3	39	92.3	6.4
Dec. 1-31, ..... 841			10	.65	3.0	1.6	5.2	1.0	14	8.1	6.2	.1	.7	.04	59	.08	134	16	4	40	58.4	6.6
Jan. 1-31, 1952 .... 561			8.4	.65	3.7	1.7	5.4	1.4	14	7.9	6.8	.1	.5	.16	60	.08	91	18	7	37	62.9	6.5
Feb. 1-29, ..... 782			8.2	.90	4.0	1.9	6.7	1.7	14	10	9.5	.0	.6	.06	73	.10	154	20	9	39	77.7	6.6
Mar. 1-31, ..... 2,751			8.7	.90	3.1	1.6	5.2	1.4	13	7.8	6.0	.1	.6	.13	66	.09	490	17	6	38	62.2	6.4
Apr. 1-30, ..... 7,723			8.1	.75	3.1	1.5	4.5	1.5	14	6.5	5.5	.1	.7	.31	66	.09	1,380	16	4	36	51.9	6.5
May 1-31, ..... 718			8.9	.90	4.0	1.8	6.1	1.6	21	7.5	6.2	.1	1.3	.18	65	.09	126	20	3	38	73.6	6.7
June 1-30, ..... 286			8.2	.90	3.6	1.7	4.8	2.2	18	5.9	5.0	.2	1.1	.28	82	.11	59	16	1	33	63.2	6.8
July 1-31, ..... 17.7			7.4	1.1	4.4	2.4	7.2	2.4	24	6.3	6.5	.2	1.2	--	68	.09	3.2	24	4	37	80.0	6.9
Aug. 1-31, ..... 2.91			6.8	.35	4.8	2.6	8.2	2.3	28	5.7	7.2	.2	1.3	--	62	.08	.5	24	1	40	88.2	6.8
Sept. 1, 23-30, ..... 78.2			4.6	.25	4.4	2.6	8.9	2.2	30	5.1	6.0	.3	.6	--	55	.07	12	22	0	43	87.1	6.6
Weighted average .. 1,383			8.4	0.79	3.2	1.6	4.9	1.5	14	7.1	6.0	0.1	0.7	--	65	0.09	243	17	5	36	56.4	--

## RED RIVER BASIN--Continued

## KIAMICHI RIVER NEAR BELZONI, OKLA.--Continued

Temperature (°F) of water, water year October 1951 to September 1952

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	76	54	55	40	52	50	63	69	83	85	87	85
2	73	42	60	34	54	52	67	70	80	96	85	87
3	78	51	59	47	54	45	65	75	89	98	90	85
4	71	56	65	57	53	46	55	78	82	89	88	85
5	80	47	56	47	53	50	60	74	80	90	93	84
6	77	47	55	42	55	47	59	75	81	87	90	86
7	61	48	55	45	53	65	67	--	81	88	85	85
8	68	49	52	49	54	54	65	77	82	81	90	88
9	74	49	65	46	55	56	60	80	85	80	85	85
10	74	56	47	59	65	55	63	75	86	80	85	87
11	74	54	51	46	54	59	60	74	85	81	90	87
12	70	60	50	48	57	59	69	75	80	89	88	86
13	68	61	50	59	60	61	56	80	83	91	88	83
14	65	59	43	58	59	62	61	78	88	94	90	84
15	68	58	40	58	61	63	62	88	86	85	88	85
16	--	44	45	59	53	51	64	88	89	85	89	87
17	70	51	40	61	45	68	60	80	80	72	87	85
18	70	46	51	68	45	55	61	72	91	83	85	83
19	72	--	47	65	51	71	63	70	87	84	90	82
20	76	48	47	57	59	59	62	70	87	79	90	85
21	63	60	43	56	55	65	64	71	87	87	87	78
22	70	64	43	55	50	68	69	75	88	82	85	81
23	65	64	61	53	59	59	67	70	87	85	83	80
24	67	--	59	52	60	57	67	70	90	86	85	80
25	62	57	63	61	49	60	61	75	89	85	90	--
26	63	64	48	75	52	57	71	75	87	92	85	80
27	65	50	45	55	58	60	73	77	81	87	88	83
28	59	53	43	55	59	61	71	70	88	88	88	83
29	65	57	45	55	52	65	70	77	88	85	87	85
30	68	55	50	52	--	57	71	77	90	85	87	72
31	57	--	64	53	--	64	--	80	--	90	85	--
Average	69	54	52	54	55	58	64	76	85	86	88	84

## RED RIVER BASIN--Continued

## LITTLE RIVER BELOW LUKFATA CREEK, NEAR IDABEL, OKLA.

LOCATION.--At gaging station at bridge on U. S. Highway 70, just downstream from Lukfata Creek, and 5 miles northeast of Idabel, McCurtain County.

DRAINAGE AREA.--1,239 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1952.

Water temperatures: October 1947 to September 1952.

EXTREMES, 1951-52.--Dissolved solids: Maximum, 297 ppm Sept. 1-30; minimum, 46 ppm Nov. 2-10.

Hardness: Maximum, 61 ppm Sept. 1-30; minimum, 11 ppm Nov. 2-10, 23, 28-30.

Specific conductance: Maximum, 630 micromhos Sept. 30; minimum, 26.8 micromhos Apr. 14.

Water temperatures: Maximum, 88°F Aug. 2, 9; minimum, 36°F Dec. 22.

EXTREMES, 1947-52.--Dissolved solids: Maximum, 369 ppm Oct. 11-19, 1948; minimum, 40 ppm July 21-31, 1950.

Hardness: Maximum, 72 ppm Oct. 11-19, 1948; minimum, 9 ppm Apr. 21-30, 1948.

Specific conductance: Maximum, 701 micromhos Oct. 7-8, 1948; minimum, 21.5 micromhos Feb. 14, 1950.

Water temperatures: Maximum, 94°F Aug. 16, 1950; minimum, freezing point Feb. 26, 1948, Feb. 14, 1950, Feb. 2-3, 1951.

REMARKS.--Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of discharge for water year October 1951 to September 1952 given in Water-Supply Paper 1241.

Chemical analyses, in parts per million, water year October 1951 to September 1952

Date of collection	Mean discharge (cfs)	Temperature (°F)	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	Tons per day	Calcium, magnesium	Non-carbonate			
Oct. 1-10, 1951.....	75.9	--	8.2	--	8.8	3.1	26	26	39	6.9	36	--	1.5	--	113	0.15	23	35	3	62	199	7.1
Oct. 11-26.....	137	--	8.2	0.06	8.8	2.9	26	5.5	39	7.4	4	0.1	0.07	0.07	157	.17	46	35	8	61	211	6.8
Oct. 29-31.....	1,437	--	--	--	9.7	1.3	16	4.6	16	4.6	5.5	--	1.0	--	166	.06	217	15	2	49	56.0	6.7
Nov. 1.....	5,220	--	--	--	12	2.3	6.1	4.1	41	13	3.0	--	1.2	--	100	.14	1,410	39	5	26	86.0	7.4
Nov. 2-10.....	4,392	--	--	--	2.8	1.0	5.3	15	15	4.9	3.0	--	1.1	--	46	.06	545	11	0	51	40.9	6.5
Nov. 11-20.....	821	--	--	--	4.1	1.5	7.3	18	6.3	6.3	7.5	--	5	--	57	.08	146	16	2	49	64.2	6.7
Nov. 21-22, 24-27.....	973	--	--	--	6.5	1.7	9.8	25	6.2	12	12	--	8	--	69	.09	181	23	3	48	92.5	6.5
Nov. 23, 28-30.....	2,516	--	--	--	2.6	1.2	5.0	12	6.5	3.8	--	--	1.0	--	51	.07	346	11	2	49	43.5	6.5
Dec. 1-31.....	1,339	--	9.4	.55	4.0	1.3	5.6	.8	16	5.9	6.2	1	.6	.00	54	.07	195	17	4	41	58.7	6.7
Jan. 1-31, 1952.....	1,252	--	9.0	.35	5.2	1.4	5.7	1.0	19	4.4	8.2	0	.5	.19	56	.08	189	20	4	37	71.8	6.6
Feb. 1-29.....	1,154	--	8.5	.40	6.7	1.5	6.3	1.0	25	5.1	8.0	0	.4	.09	65	.09	213	24	3	35	75.3	6.8
Mar. 1-31.....	2,708	--	8.7	.55	5.0	1.2	5.0	1.1	19	4.9	6.5	1	.5	.19	57	.08	407	19	3	35	64.8	6.5
Apr. 1-30.....	8,703	--	7.4	.55	4.4	1.2	3.3	1.3	16	4.9	4.5	0	.4	.15	59	.08	1,390	17	4	27	57.4	6.2
May 1-10.....	710	--	--	--	5.4	2.2	8.3	8.3	28	4.9	8.2	--	1.2	--	57	.08	109	23	0	44	79.0	7.0
May 11-18.....	295	--	--	--	7.2	2.2	13	13	32	5.4	16	--	1.0	--	74	.10	59	27	1	51	117	7.4
May 19-31.....	1,713	--	--	--	3.9	2.1	4.9	4.9	21	4.0	5.0	--	.8	--	55	.07	254	18	1	37	60.8	6.7
June 1-16.....	475	--	--	--	4.4	1.9	8.0	8.0	21	4.9	9.2	--	1.0	--	62	.08	80	19	2	48	87.7	7.2
June 17-23.....	119	--	--	--	6.4	2.0	15	15	27	5.4	21	--	.5	--	86	.12	28	24	2	58	129	6.9
June 24-30.....	55.9	--	--	--	7.7	2.2	23	23	31	6.3	32	--	.7	--	108	.15	16	28	3	64	177	7.3
July 1-8.....	34.5	--	--	--	9.2	5.8	27	27	35	5.3	41	--	1.0	--	129	.18	12	34	6	63	217	7.3

July 9-15, 1952.....	--	11	3.5	37	41	5.4	58	--	5	--	180	22	42	8	380	7.4
July 16-22.....	--	10	3.7	43	43	6.7	88	--	6	--	181	25	45	11	397	318
July 23-29.....	--	10	3.4	32	40	7.8	47	--	4	--	142	19	31	39	242	7.3
Aug. 3-9.....	--	12	3.0	33	29	6.1	59	--	1.0	--	181	22	42	19	63	
Aug. 10-16.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aug. 17-23.....	--	12	3.7	54	44	7.7	84	--	5	--	200	27	7.9	45	370	6.9
Aug. 24-30.....	--	14	4.2	76	58	7.2	115	--	4	--	280	35	21	52	5	489
Sept. 1-7.....	9.8	.01	16	84	2.1	8.3	137	.1	.8	.39	287	.40	11	61	74	557
Sept. 8-14.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sept. 15-21.....	--	--	4.7	1.3	5.5	18	5.1	6.1	--	0.5	59	0.08	251	17	41	65.3
Sept. 22-28.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sept. 29-Oct. 5.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Oct. 6-12.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Oct. 13-19.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Oct. 20-26.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Oct. 27-Nov. 2.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nov. 3-9.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nov. 10-16.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nov. 17-23.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nov. 24-30.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dec. 1-7.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dec. 8-14.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dec. 15-21.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dec. 22-28.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dec. 29-Jan. 4.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Jan. 5-11.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Jan. 12-18.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Jan. 19-25.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Jan. 26-Feb. 1.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Jan. 2-8.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Jan. 9-15.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Jan. 16-22.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Jan. 23-29.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Jan. 30-Feb. 5.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Feb. 6-12.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Feb. 13-19.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Feb. 20-26.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Feb. 27-Mar. 5.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mar. 6-12.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mar. 13-19.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mar. 20-26.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mar. 27-Apr. 2.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Apr. 3-9.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Apr. 10-16.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Apr. 17-23.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Apr. 24-30.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
May 1-7.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
May 8-14.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
May 15-21.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
May 22-28.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
May 29-Jun. 4.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Jun. 5-11.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Jun. 12-18.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Jun. 19-25.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Jun. 26-Jul. 2.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Jul. 3-9.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Jul. 10-16.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Jul. 17-23.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Jul. 24-30.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aug. 1-7.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aug. 8-14.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aug. 15-21.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aug. 22-28.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aug. 29-Sep. 4.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sept. 5-11.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sept. 12-18.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sept. 19-25.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sept. 26-Oct. 2.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Oct. 3-9.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Oct. 10-16.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Oct. 17-23.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Oct. 24-30.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nov. 1-7.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nov. 8-14.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nov. 15-21.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nov. 22-28.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nov. 29-Dec. 5.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dec. 6-12.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dec. 13-19.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dec. 20-26.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dec. 27-Jan. 2.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Jan. 3-9.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Jan. 10-16.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Jan. 17-23.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Jan. 24-30.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Feb. 6-12.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Feb. 13-19.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Feb. 20-26.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Feb. 27-Mar. 5.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mar. 6-12.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mar. 13-19.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mar. 20-26.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mar. 27-Apr. 2.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Apr. 3-9.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Apr. 10-16.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Apr. 17-23.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Apr. 24-30.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
May 1-7.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
May 8-14.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
May 15-21.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
May 22-28.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
May 29-Jun. 4.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Jun. 5-11.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Jun. 12-18.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Jun. 19-25.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Jun. 26-Jul. 2.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Jul. 3-9.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Jul. 10-16.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Jul. 17-23.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Jul. 24-30.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aug. 1-7.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aug. 8-14.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aug. 15-21.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aug. 22-28.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aug. 29-Sep. 4.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sept. 5-11.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sept. 12-18.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sept. 19-25.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sept. 26-Oct. 2.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Oct. 3-9.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Oct. 10-16.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Oct. 17-23.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Oct. 24-30.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nov. 1-7.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nov. 8-14.....	--	--														

## LOWER MISSISSIPPI RIVER BASIN

## RED RIVER BASIN--Continued

## LITTLE RIVER BELOW LUKFATA CREEK, NEAR IDABEL, OKLA.--Continued

Temperature (°F) of water, water year October 1951 to September 1952

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

## RED RIVER BASIN--Continued

## OUACHITA RIVER NEAR MOUNT IDA, ARK.

LOCATION.--At bridge on U. S. Highway 270, (350 feet downstream from gaging station, 4½ miles upstream from Fiddler's Creek, and 5½ miles northwest of Mount Ida, Montgomery County.

DRAINAGE AREA.--410 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1949 to September 1952.

Water temperatures: October 1949 to September 1952.

EXTREMES, 1951-52.--Dissolved solids: Maximum, 66 ppm Aug. 1-10; minimum, 32 ppm Apr. 21-24.

Hardness: Maximum, 44 ppm Aug. 1-10; minimum, 13 ppm Apr. 21-24.

Specific conductance: Maximum daily, 99.1 microhos Aug. 7; minimum daily, 18.3 microhos Apr. 12.

Water temperatures: Maximum, 86° F July 25; minimum, 33° F Dec. 22.

EXTREMES, 1949-52.--Dissolved solids: Maximum, 66 ppm Aug. 1-10, 1952; minimum, 19 ppm Jan. 11-20, 1950.

Hardness: Maximum, 44 ppm Aug. 1-10, 1952; minimum, 10 ppm Jan. 11-20, 1950.

Specific conductance: Maximum daily, 99.1 microhos Aug. 7, 1952; minimum daily, 18.3 microhos Apr. 12, 1952.

Water temperatures: Maximum, 86° F Aug. 29-31, 1951, July 25, 1952; minimum, freezing point Jan. 31, Feb. 1-2, 1951.

REMARKS.--Records of specific conductance of daily samples available in district office in Fayetteville, Ark. Records of discharge for water year October 1951 to September 1952 given in Water-Supply Paper 1241.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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, mg-nessum	Non-carbonate			
Oct. 1-10, 1951.....	75.9	5.2	0.05	9.8	1.9	2.3	0.9	33	3.9	3.0	0.2	1.5	38	32	5	66.1	7.2	10
Oct. 11-23.....	59.8	5.2	0.04	11	2.3	2.4	9	40	4.0	3.0	0.1	1.6	45	37	4	78.3	7.4	7
Oct. 24-31.....	668	7.2	0.05	7.2	2.0	2.4	--	27	4.0	2.0	--	1.3	48	26	4	61.5	7.4	33
Nov. 1-10.....	2,411	7.5	0.05	4.5	1.6	2.0	1.1	16	4.4	2.5	0.1	0.9	34	18	5	38.3	7.0	60
Nov. 11-22.....	382	11	0.03	6.0	1.7	2.8	7	25	3.7	2.8	0.1	0.8	46	22	1	55.7	7.5	22
Nov. 23-30.....	1,345	7.6	0.09	5.0	1.4	2.6	8	18	3.6	2.8	0.2	0.6	38	18	4	39.3	7.5	35
Dec. 1-7.....	676	7.6	0.06	5.2	1.6	2.1	6	21	4.6	2.5	0.1	0.6	42	20	2	44.9	7.6	30
Dec. 8-14.....	1,617	7.4	0.17	5.2	1.4	1.9	--	16	6.6	2.5	0.1	0.8	38	19	6	38.6	7.2	32
Dec. 15-20.....	491	8.8	0.19	5.5	1.6	2.6	6	22	4.4	3.5	0.2	0.8	45	20	2	48.4	7.5	20
Dec. 21-31, 1951.....																		
Jan. 1-2, 1952.....	707	7.7	0.09	5.0	1.8	2.0	8	20	3.6	3.2	0.1	1.0	41	20	4	48.5	7.1	25
Jan. 3-10.....	3,006	7.6	0.02	3.3	1.6	1.6	9	13	3.6	2.2	0.2	1.2	36	15	4	33.0	6.7	30
Jan. 11-20.....	512	8.9	0.02	5.0	1.9	1.6	7	20	4.1	2.0	0.1	1.2	38	20	4	44.5	7.0	25
Jan. 21-31.....	244	7.4	0.09	6.1	1.9	3.1	4	25	4.0	2.5	0.2	0.9	44	23	2	58.4	7.2	15
Feb. 1-10.....	1,280	6.7	0.02	4.2	1.6	2.1	7	18	3.2	2.2	0.2	1.2	42	17	2	43.8	6.8	27
Feb. 11-20.....	466	7.4	0.12	7.0	1.6	1.7	4	22	4.4	2.5	0.2	0.7	43	24	6	53.1	7.4	20
Feb. 21-29.....	882	6.8	0.05	5.4	1.2	2.5	9	18	4.1	3.0	0.1	0.9	49	18	4	43.7	6.6	22
Mar. 1-9.....	808	7.4	--	5.4	1.2	2.3	7	20	4.4	2.8	0.1	1.7	43	18	2	44.0	6.6	20
Mar. 10-13, 15.....	3,240	7.4	--	3.0	1.7	1.8	--	12	4.0	2.0	--	1.5	35	14	5	34.5	6.5	33
Mar. 14, 16-21.....	869	--	--	5.1	1.7	2.1	--	19	4.0	2.2	--	1.1	38	20	4	47.8	6.8	17
Mar. 22-31.....	1,963	8.6	0.01	4.5	1.4	2.7	8	19	3.5	2.3	0.1	0.6	39	17	1	40.9	7.3	30

## RED RIVER BASIN--Continued

## OUACHITA RIVER NEAR MOUNT IDA, ARK.--Continued

Chemical analyses, in parts per million, water year October 1951 to September 1952--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, 1952 .....	3,572	7.6	0.01	4.0	1.2	2.5	0.8	17	2.8	2.8	0.1	1.6	33	15	1	34.6	7.2	25
Apr. 11-20 .....	3,876	--	--	3.4	1.4	1.0	--	13	4.0	2.5	--	1.2	2	14	4	33.0	6.5	30
Apr. 21-30 .....	9,886	--	--	5.8	1.7	2.9	0.6	10	3.0	1.5	--	1.3	32	13	5	32.0	7.3	36
Apr. 29-30 .....	1,374	--	--	5.2	1.5	2.6	--	23	2.0	2.0	--	1.0	38	16	1	42.5	7.0	17
May 1-10 .....	247	7.6	.06	5.4	1.5	2.6	.9	28	2.6	3.0	--	1.3	41	20	2	57.3	7.0	7
May 11-18 .....	247	10	.02	8.0	2.0	2.7	.4	28	4.4	2.5	--	1.9	43	28	5	57.3	6.7	5
May 19-31 .....	611	11	.03	5.4	1.8	2.2	.6	20	3.7	2.5	.1	1.6	45	21	4	48.8	7.3	27
June 1-10 .....	194	9.4	.02	7.6	1.8	2.4	.2	26	3.8	2.5	.1	.9	42	26	5	54.1	7.0	10
June 11-20 .....	81.0	8.4	.03	8.2	1.5	2.9	.8	32	2.5	2.5	.1	.8	43	27	0	70.9	6.9	4
June 21-30 .....	42.0	10	.03	9.4	2.0	2.4	.9	38	3.2	2.5	.1	1.2	54	32	0	77.1	7.1	7
July 1-10 .....	38.1	10	.08	11	1.7	2.6	1.1	41	3.4	2.0	.1	1.6	54	34	1	79.7	6.9	5
July 11-20 .....	35.6	11	.06	12	1.7	2.7	1.0	45	3.5	3.0	.1	.5	59	37	0	85.6	7.1	4
July 21-31 .....	37.7	10	.06	12	2.2	2.7	1.1	44	3.8	3.2	.1	1.3	61	39	3	88.9	6.5	5
Aug. 1-10 .....	33.9	12	.08	14	2.2	2.6	1.0	49	3.6	3.0	.1	.8	66	44	4	92.7	7.9	4
Aug. 11-20 .....	35.9	9.4	.12	12	1.9	2.6	1.1	45	3.7	2.8	.1	.7	58	38	1	86.8	6.9	5
Aug. 21-31 .....	31.4	9.0	.08	14	1.7	2.7	1.1	48	4.0	3.5	.1	.5	82	42	3	92.3	7.0	6
Sept. 1-10 .....	71.0	9.6	.06	13	1.4	3.2	.9	43	3.5	3.2	.1	1.4	55	38	3	90.8	7.9	7
Sept. 11-20 .....	30.5	8.8	.04	12	1.9	3.2	.9	43	4.3	3.0	.1	.6	55	38	2	84.9	7.9	5
Sept. 21-30 .....	30.4	7.6	.05	13	1.9	3.8	1.0	45	4.0	4.0	.1	.8	62	40	3	91.7	7.6	5
Average .....	882	8.6	0.07	7.4	1.7	2.4	0.8	27	3.8	2.7	0.1	1.0	45	25	3	57.8	--	18



## RED RIVER BASIN--Continued

## OUACHITA RIVER NEAR MOUNT IDA, ARK.--Continued

Temperature (°F) of water, water year October 1951 to September 1952

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

**RED RIVER BASIN--Continued**  
**CADDO RIVER NEAR ARKADDELPHIA, ARK.**

LOCATION --At bridge on U. S. Highway 67, 6 miles north of Arkadelphia, Clark County.

DRAINAGE AREA --450 square miles approximately.

RECORDS AVAILABLE --Chemical analyses: October 1949 to September 1952.

Water temperatures: October 1949 to September 1952.

EXTREMES 1951-52 --Dissolved solids: Maximum, 75 ppm Aug. 11-20; minimum, 37 ppm Jan. 1-10.

Hardness: Maximum, 45 ppm Sept. 1-10; minimum, 16 ppm Apr. 1-13.

Specific conductance: Maximum daily, 188 microhos Sept. 5; minimum daily, 23.5 microhos Apr. 12.

Water temperatures: Maximum, 96°F June 20, Aug. 13, 18-19; minimum, 37°F Dec. 16.

EXTREMES 1949-52 --Dissolved solids: Maximum, 104 ppm Nov. 12, 14-16, 21, 1949; minimum, 17 ppm Feb. 17-20, 1950.

Hardness: Maximum, 45 ppm July 11-20, 1950; Sept. 1-10, 1951; minimum, 12 ppm Feb. 17-20, 1950.

Specific conductance: Maximum daily, 439 microhos Apr. 2, 1950; minimum daily, 16.8 microhos Mar. 12, 1950.

Water temperatures: Maximum, 96°F on several days during summer months.

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

Chemical analyses, in parts per million, water year October 1951 to September 1952

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, mg./ml.	Non-carbonate			
Oct. 1-10, 1951.....		--	--	11	2.1	3.2	--	40	4.8	2.2	--	1.3	56	36	3	80.2	7.4	7
Oct. 11-20.....		--	--	12	2.6	3.8	--	46	4.4	3.2	--	1.2	60	41	3	92.2	7.5	2
Oct. 21-31.....		6.9	0.03	13	2.7	3.0	1.0	48	3.2	4.0	0.1	2.5	66	44	4	96.1	7.5	6
Nov. 1-10.....		--	--	--	1.4	1.9	--	26	4.0	3.0	--	1.8	61	24	3	61.9	7.1	23
Nov. 11-20.....		13	.02	8.2	2.3	2.7	.7	34	4.2	3.0	.2	1.6	54	30	2	73.4	7.0	25
Nov. 21-30.....		--	--	10	2.0	4.1	--	39	2.7	3.5	--	.6	69	33	1	96.3	7.3	8
Nov. 27-30.....		--	--	--	2.0	2.8	--	29	5.0	2.0	--	.8	60	27	3	62.0	7.2	23
Dec. 1-10.....		9.7	.41	6.4	2.4	3.0	1.0	28	4.4	3.0	1	.7	54	28	3	57.0	7.5	35
Dec. 11-20.....		--	--	--	2.4	3.3	--	27	3.8	3.2	--	.9	50	28	4	56.0	7.3	18
Dec. 21-31.....		--	--	6.5	2.1	3.4	--	26	3.5	3.2	--	1.3	49	23	4	57.3	7.2	22
Jan. 1-10, 1952.....		--	--	4.9	1.7	3.1	--	19	3.5	2.5	--	1.0	37	16	3	52.6	6.7	17
Jan. 11-20.....		--	--	6.1	1.8	4.2	--	27	4.0	3.2	--	1.0	42	23	1	58.8	6.7	17
Jan. 21-31.....		8.2	.14	6.2	1.9	4.0	1.2	27	3.9	3.0	1	.0	49	23	1	59.8	6.6	33
Feb. 1-10.....		8.6	.11	6.0	1.8	3.4	1.1	26	4.0	3.2	.2	.9	50	22	1	58.2	7.1	35
Feb. 11-20.....		--	--	5.3	1.9	3.3	--	21	4.0	3.2	--	.8	49	21	4	50.0	7.1	45
Feb. 21-29.....		--	--	--	2.1	2.1	--	22	3.6	3.2	--	.8	47	21	3	50.8	7.0	35
Mar. 1-10.....		7.9	.05	5.7	1.8	2.7	1.0	24	4.0	2.8	.2	.5	46	22	2	55.2	6.9	30
Mar. 11-20.....		--	--	5.2	1.7	2.4	--	21	3.3	2.8	--	.7	44	20	3	48.8	7.3	29
Mar. 21-31.....		--	--	7.5	1.8	1.8	--	27	3.5	2.8	--	.7	49	26	4	56.0	6.6	18
Apr. 1-13.....		8.4	.32	4.6	1.2	2.0	1.1	19	3.0	2.8	.1	.9	46	16	1	45.0	6.8	40
Apr. 14-20.....		8.6	.07	5.0	1.3	2.9	1.0	19	3.8	2.8	.1	1.2	43	18	2	53.9	6.2	49
Apr. 21-30.....		--	--	5.9	1.6	2.8	--	21	4.4	2.5	--	1.4	49	21	4	50.3	7.9	12

May 1-10, 1952.....	--	7.7	1.7	2.5	--	30	3.4	2.8	--	.8	51	26	2	66.0	6.9	7
May 11-20.....	6.3	7.4	1.8	3.2	1.1	31	3.0	2.8	.1	1.0	48	26	0	67.1	6.7	9
May 21-31.....	--	6.2	1.8	3.0	--	27	2.6	1.8	--	.7	48	23	1	55.8	6.9	22
June 1-10.....	11	9.2	1.7	2.8	.9	37	3.3	2.8	.2	.9	52	30	0	76.1	7.3	7
June 11-20.....	--	11	2.1	3.4	--	44	4.4	3.0	--	1.7	57	36	0	87.7	7.2	5
June 21-30.....	--	12	2.2	3.1	--	48	4.5	3.0	--	.7	61	39	0	93.5	7.7	6
July 1-10.....	13	.06	2.4	3.3	1.0	51	3.2	3.2	.1	.8	73	42	0	97.8	7.1	6
July 11-20.....	--	13	2.4	4.2	--	51	3.1	3.0	--	.8	66	42	0	99.4	7.2	4
July 21-31.....	--	13	2.5	4.1	--	50	3.3	3.2	--	.6	61	43	2	95.8	6.9	5
Aug. 1-10.....	10	.08	1.9	3.3	1.3	46	3.5	4.0	.1	.6	67	38	0	88.6	7.8	5
Aug. 11-20.....	--	13	1.6	4.0	--	49	3.1	3.5	--	.9	75	39	0	98.3	7.7	7
Aug. 21-31.....	--	13	1.9	3.5	--	50	3.5	3.8	--	.5	70	40	0	98.0	7.3	5
Sept. 1-10.....	--	15	1.9	3.6	--	55	3.8	3.8	--	.2	55	43	0	106	8.0	4
Sept. 11-20.....	9.2	.04	2.1	3.8	1.0	51	3.8	3.5	.1	.9	65	44	2	101	7.9	4
Sept. 21-30.....	--	13	2.1	4.1	--	50	4.4	4.5	--	.9	59	41	0	97.9	7.6	4
Average.....	--	8.9	2.0	3.2	--	35	3.7	3.1	--	0.9	55	30	2	73.0	--	16

## LOWER MISSISSIPPI RIVER BASIN

## RED RIVER BASIN--Continued

## CADD O RIVER NEAR ARKADDELPHIA, ARK.--Continued

Temperature (°F) of water, water year October 1951 to September 1952

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	74	60	54	60	50	47	57	70	77	94	81	--
2	81	56	55	56	54	48	56	71	79	94	92	--
3	82	58	--	42	52	54	58	72	82	94	89	84
4	84	--	58	41	50	54	56	75	82	91	90	84
5	85	48	58	44	52	49	--	76	82	90	88	84
6	84	48	60	42	50	50	56	--	82	88	85	82
7	76	48	58	44	50	47	59	78	83	90	88	82
8	70	46	56	50	46	52	--	78	88	88	88	82
9	73	53	56	48	46	52	62	76	88	90	86	82
10	72	54	53	40	52	52	58	70	90	90	86	85
11	72	57	54	44	56	49	52	67	90	88	91	82
12	68	56	54	43	50	50	50	68	90	90	--	81
13	72	62	48	42	54	54	52	70	92	90	96	84
14	72	63	54	43	56	56	51	72	90	88	93	84
15	71	56	--	54	52	58	51	73	88	89	92	85
16	71	57	37	54	48	50	52	74	92	86	92	86
17	71	54	40	47	49	52	56	78	92	86	95	88
18	75	54	40	56	50	52	60	71	95	92	96	84
19	--	52	40	55	50	52	62	68	95	91	96	81
20	72	42	46	54	52	54	60	70	96	88	91	80
21	67	48	42	52	48	56	62	72	90	88	91	80
22	74	50	45	50	51	54	60	74	90	94	88	80
23	72	58	43	47	--	52	60	70	93	92	86	82
24	71	56	44	42	50	56	60	70	--	92	84	80
25	68	56	--	46	50	48	60	72	92	89	84	78
26	69	54	48	55	--	50	62	72	92	86	85	80
27	70	56	50	52	46	50	60	76	94	94	86	76
28	68	52	47	52	50	58	66	76	90	94	83	77
29	66	51	50	52	52	60	67	72	90	90	82	74
30	67	54	52	46	--	58	70	78	90	90	88	77
31	64	--	54	48	--	56	--	76	--	90	88	--
Average	73	54	50	48	51	53	58	73	89	90	89	82

## RED RIVER BASIN--Continued

OUACHITA RIVER AT ARKADAPLHIA, ARK.

LOCATION.--At gaging station at bridge on State Highway 8, at Arkadelphia, Clark County, 800 feet upstream from Missouri Pacific Railway bridge.

DRAINAGE AREA.--2,311 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1948 to September 1952.

Water temperatures: October 1948 to September 1952.

EXTREMES, 1951-52.--Dissolved solids: Maximum, 103 ppm Aug. 1-10; minimum, 42 ppm Apr. 1-30.

Hardness: Maximum, 42 ppm Sept. 21-30; minimum, 20 ppm Jan. 11-20, Apr. 11-30.

Specific conductance: Maximum, 42 ppm Sept. 21-30; minimum, 20 ppm Jan. 11-20, Apr. 11-30.

Water temperatures: Maximum, 92°F Aug. 18-21, minimum, 44°F Dec. 18, 24, Jan. 1-2.

EXTREMES, 1949-52.--Dissolved solids: Maximum, 103 ppm Aug. 1-10, 1952; minimum, 33 ppm Jan. 11-20, 1950, Sept. 28-30, 1951.

Hardness: Maximum, 42 ppm Sept. 21-30, 1952; minimum, 11 ppm Jan. 25-31, 1949.

Specific conductance: Maximum, 42 ppm Sept. 21-30, 1952; minimum daily, 26.7 micromhos Jan. 27, 1949.

Water temperatures: Maximum, 92°F Aug. 18-21, 1952; 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 1951 to September 1952 obtained from Corps of Engineers, Vicksburg District.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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, 1951	628	7.6	0.35	9.2	2.3	4.8	1.1	29	7.2	6.0	0.2	2.4	57	32	9	85.0	7.3	27
Oct. 11-20	633	5.9	.17	9.1	2.2	4.5	1.2	30	5.2	6.0	.3	2.3	49	32	7	79.4	7.2	10
Oct. 21-31	549	4.7	.10	11	2.3	5.7	1.3	36	6.3	7.2	.3	3.0	58	37	7	96.9	7.1	12
Nov. 1-10	7,475	5.6	.02	8.0	2.7	2.6	.9	33	5.3	3.8	.3	1.4	52	31	4	77.5	7.0	20
Nov. 11-20	2,847	7.7	.04	7.5	2.4	3.3	1.0	29	5.6	4.5	.3	1.6	51	29	5	75.3	6.7	25
Nov. 21-30	3,651	5.1	.14	7.6	2.1	3.7	1.1	28	5.1	4.5	.2	1.2	52	28	5	68.1	7.2	27
Dec. 1-10	5,371	6.4	.23	7.4	2.2	3.1	1.1	28	5.1	3.0	.1	1.7	52	28	5	66.7	7.5	32
Dec. 11-20	5,130	6.0	.08	7.9	2.3	3.4	.8	29	5.4	4.0	.2	1.5	47	29	5	66.7	7.3	20
Dec. 21-31	2,863	5.8	.10	7.0	1.6	4.2	.9	27	5.7	4.2	.1	1.3	51	24	2	67.7	7.2	22
Jan. 1-10, 1952	15,760	7.0	.17	5.7	1.9	2.5	1.1	22	4.9	3.8	.1	2.0	47	22	4	60.6	7.2	30
Jan. 11-20	3,848	7.8	.13	5.2	1.7	2.5	.9	20	5.4	3.5	.1	1.0	52	20	4	57.1	7.4	35
Jan. 21-31	2,837	7.9	.12	5.8	2.2	2.5	1.0	20	5.7	3.8	.1	1.7	50	24	7	57.4	7.4	35
Feb. 1-10	3,345	7.5	.01	5.4	1.9	2.9	.5	20	5.6	3.5	.1	1.4	50	21	5	57.8	7.1	30
Feb. 11-20	5,058	7.0	.14	5.8	1.6	3.0	.5	22	4.7	4.0	.2	1.2	51	21	3	60.8	6.7	25
Feb. 21-29	6,059	7.9	.03	5.8	1.9	3.1	.5	21	5.2	3.2	.2	1.2	50	22	5	58.7	6.9	30
Mar. 1-10	3,859	7.4	.17	7.2	2.2	3.2	.9	26	6.7	4.2	.1	1.2	59	27	6	64.0	7.3	25
Mar. 11-20	10,380	7.2	.37	7.5	2.0	2.9	1.0	26	6.1	4.8	.1	1.2	59	27	6	65.7	7.0	35
Mar. 21-31	6,290	6.8	.28	6.8	2.2	2.7	1.1	22	5.4	5.2	.2	1.0	56	26	8	60.4	7.1	33
Apr. 1-10	16,400	7.8	.03	6.0	1.9	3.0	.9	24	4.1	2.2	.2	.8	42	23	3	52.9	7.6	50
Apr. 11-20	21,210	7.9	.07	5.1	1.7	2.5	.7	20	3.9	2.0	.1	.4	42	20	3	46.0	7.3	45
Apr. 21-30	18,990	8.0	.11	5.1	1.7	2.7	.9	20	4.0	2.5	.2	.7	42	20	3	46.4	7.1	45

## RED RIVER BASIN--Continued

OUACHITA RIVER AT ARKADLPHIA, ARK.--Continued

Chemical analyses, in parts per million, water year October 1951 to September 1952--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./l.	Non-carbonate			
May 1-10, 1952	2,712	5.8	0.22	6.2	1.4	3.0	1.2	19	4.5	4.2	0.1	1.8	46	21	6	54.6	7.1	28
May 11-20	3,900	7.4	.15	7.5	1.8	5.8	1.4	23	7.7	6.8	.2	2.1	59	26	7	51.6	7.1	17
May 21-27	3,473	--	--	7.1	1.5	4.8	--	26	7.0	5.0	--	1.3	56	24	3	77.4	6.4	8
May 28-31	2,322	--	--	5.6	2.2	1.8	--	21	3.0	4.0	--	1.3	51	23	6	56.6	6.2	25
June 1-10	906	7.9	.05	7.5	1.7	5.9	1.4	23	6.8	7.5	.2	2.8	57	26	7	89.2	7.3	6
June 11-22	648	8.8	.04	7.3	1.7	5.5	1.3	25	7.9	6.2	.3	2.2	57	25	5	83.4	6.7	7
June 23-30	328	9.0	.02	8.5	2.6	3.1	1.4	28	8.1	9.5	.1	2.4	63	29	6	105	7.6	3
July 1-10	292	9.8	.06	10	1.7	8.5	1.6	34	9.6	10	.1	1.4	72	32	4	109	7.1	5
July 11-20	274	9.4	.06	9.6	3.2	8.3	1.6	34	11	9.2	.2	1.2	71	37	9	111	7.6	5
July 21-31	230	8.6	.04	10	2.3	7.8	1.7	34	11	9.2	.1	1.7	70	34	7	111	6.9	5
Aug. 1-10	285	34	.06	10	2.7	8.6	1.7	34	10	10	.2	1.5	103	36	8	117	7.1	5
Aug. 11-20	250	9.8	.06	11	2.0	7.3	1.6	28	15	8.2	.2	1.0	72	36	13	112	7.1	6
Aug. 21-31	247	9.0	.06	10	2.3	7.1	1.7	29	13	8.8	.2	1.2	70	34	11	109	7.4	5
Sept. 1-10	247	13	.06	12	2.2	8.4	1.8	30	15	11	.3	1.9	81	39	14	124	7.3	8
Sept. 11-20	271	11	.04	11	1.9	6.1	1.4	30	12	8.0	.3	1.4	66	35	11	107	7.1	8
Sept. 21-30	185	8.9	.04	13	2.3	7.8	1.4	33	16	10	.3	.8	69	42	15	123	7.2	8
Average	4,240	8.5	0.11	7.9	2.1	4.7	1.2	27	7.3	5.8	0.2	1.5	58	28	6	79.6	--	21

## RED RIVER BASIN--Continued

## OUACHITA RIVER AT ARKADELPHIA, ARK.--Continued

Temperature (°F) of water, water year October 1951 to September 1952  
 /Once-daily temperature measurement at approximately 4:30 p. m. /

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

## RED RIVER BASIN--Continued

## LITTLE MISSOURI RIVER NEAR BOUGHTON, ARK.

LOCATION --At gaging station at bridge on U. S. Highway 67, 2 miles northeast of Boughton, Nevada County, and 8.7 miles downstream from Antoine Creek. DRAINAGE AREA --1,070 square miles.

RECORDS AVAILABLE --Chemical analyses: October 1947 to September 1952.

TEMPERATURES --October 1947 to September 1952: 10-11, 15; minimum, 25 ppm Sept. 11-20.

EXTREMES 1951-52 --Dissolved solids: 10-11, 15; maximum, 7 ppm July 27 to Aug. 7, Aug. 21-Sept. 13.

Specific conductance: Maximum, 46 ppm Nov. 7-8, 10-11, 15; minimum, 14 ppm July 27 to Aug. 7, Aug. 21-Sept. 13.

Hardness: Maximum, 82°F on several days in July and August; minimum, 42°F Dec. 20.

Water temperatures: Maximum, 82°F on several days in July and August; minimum, 42°F Dec. 20.

EXTREMES 1947-52 --Dissolved solids: Maximum, 112 ppm June 6-8, 1951; minimum, 25 ppm Feb. 2-3, 5, 9-11, 1950, Sept. 11-20, 1952.

Hardness: Maximum, 96 ppm June 6-8, 1951; minimum, 14 ppm July 27-31, Aug. 1-7, Aug. 21-Sept. 30, 1952.

Specific conductance: Maximum, 94°F July 29, 1948; minimum, not determined.

Water temperatures: Maximum, 94°F July 29, 1948; minimum, not determined.

REMARKS --Records of specific conductance of daily samples available in district office at Fayetteville, Ark. Records of discharge for water year October 1951 to September 1952 obtained from Corps of Engineers, Vicksburg District.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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, 1951 .....	284	--	--	6.2	1.7	3.3	--	26	3.3	3.0	--	--	44	22	1	58.5	7.4	14
Oct. 11-20 .....	73.1	7.9	0.88	8.2	1.7	3.9	1.2	29	5.5	4.0	0.1	1.5	50	27	4	71.5	7.3	20
Oct. 21-22, 24-28 .....	115	--	--	6.9	1.6	3.7	--	27	4.8	3.5	--	2.0	49	24	2	64.0	7.4	8
Oct. 29, 29-31 .....	172	--	--	11	1.5	5.0	--	36	10	4.2	--	2.3	64	34	4	94.4	7.0	17
Nov. 1-6, 9 .....	498	--	--	9.8	1.9	3.4	--	30	8.0	4.0	--	1.1	62	32	8	80.1	7.5	38
Nov. 7-8, 10-11, 15 .....	780	--	--	14	2.6	1.7	--	36	11	5.0	--	1.6	97	46	16	112	7.3	23
Nov. 12-14, 16-18 .....	305	--	--	9.1	1.7	5.0	--	29	5.9	5.5	--	1.4	72	30	6	82.7	6.8	28
Nov. 19-30 .....	568	7.7	.02	6.4	1.6	3.7	1.7	25	5.1	3.5	.2	.5	43	23	2	60.2	7.2	24
Dec. 1-10 .....	1,141	9.2	.19	9.3	1.7	4.1	0.9	17	9.5	5.0	.3	.5	61	30	16	76.3	6.9	40
Dec. 11-20 .....	1,081	--	--	5.7	1.9	4.9	--	26	6.2	3.8	--	1.0	64	22	1	76.2	7.2	18
Dec. 21-31 .....	803	--	--	8.4	1.7	4.9	--	29	8.2	5.0	--	1.0	64	28	4	82.5	7.5	22
Jan. 1-10, 1952 .....	3,691	--	--	8.5	2.4	2.0	--	24	7.6	5.0	--	1.1	64	31	11	68.4	7.3	22
Jan. 11-20 .....	1,324	7.4	.03	8.4	1.5	2.9	.9	25	6.8	5.0	.1	1.0	52	27	7	70.7	7.2	23
Jan. 21-25 .....	1,618	--	--	15	1.4	2.9	--	42	10	4.5	--	1.3	76	43	9	104	7.2	32
Jan. 26-31 .....	933	--	--	10	2.1	1.9	--	32	6.0	5.5	--	1.2	60	34	7	82.7	7.1	22
Feb. 1-10 .....	1,052	7.8	.13	8.8	1.8	3.7	1.6	28	7.7	4.5	.2	1.5	59	29	6	76.1	7.1	35
Feb. 11-20 .....	2,006	--	--	10	2.6	3.3	--	30	7.8	4.2	--	.9	66	34	9	79.4	7.0	40
Feb. 21-30 .....	2,050	--	--	19.1	1.6	3.6	--	30	7.4	4.2	--	1.0	60	29	6	72.2	7.0	36
Mar. 1-11 .....	2,813	--	--	10	1.6	3.7	--	21	5.6	5.0	--	1.3	57	31	6	79.1	6.8	39
Mar. 12-20 .....	2,490	--	--	7.8	1.6	2.7	--	21	5.6	5.0	--	1.3	57	31	6	66.3	7.1	28
Mar. 21-31 .....	1,223	6.8	.31	9.2	1.4	3.9	1.1	32	7.1	5.2	.1	1.1	62	23	2	73.6	6.8	30



Apr. 1-9, 1952.....	2,440	8.0	.18	6.8	1.2	3.4	1.3	22	4.5	4.2	.1	1.2	52	4	63.3	7.1	22
Apr. 10-12, 18.....	3,575	--	--	12	.6	4.7	--	30	7.0	5.2	--	2.0	56	8	79.9	6.7	32
Apr. 13-17, 19-20....	8,350	--	--	7.8	1.5	1.8	--	24	4.4	2.8	--	.9	54	6	54.7	7.2	45
Apr. 21-30.....	8,965	--	--	6.7	1.4	2.2	--	21	4.4	4.0	--	.9	54	5	54.8	7.0	30
May 1-7.....	3,673	--	--	5.5	1.4	2.9	--	23	4.0	2.0	--	.8	77	1	47.3	6.6	--
May 8-19.....	668	8.2	.43	7.6	1.4	3.9	1.3	29	3.8	3.5	.1	1.4	53	1	67.1	7.0	22
May 20-28.....	898	--	--	8.1	1.5	3.6	--	31	5.0	2.8	--	1.1	58	1	71.8	7.2	36
May 29-31, June 1-12..	644	12	.35	9.5	1.3	4.1	1.2	34	5.3	4.5	.2	1.2	64	1	81.0	6.9	22
June 13-20.....	476	--	--	5.1	1.3	3.6	--	22	3.1	2.5	--	1.0	39	0	51.4	6.8	9
June 21-30.....	351	--	--	4.6	1.0	3.6	--	19	2.6	2.8	--	.8	36	0	45.7	7.1	14
July 1-13.....	174	10	.08	5.8	1.5	3.2	.9	20	3.1	2.8	.1	1.2	40	0	50.0	6.6	15
July 14-26.....	95.8	--	--	7.1	1.4	4.9	--	30	4.0	3.8	--	1.0	47	0	70.3	7.1	10
July 27-31.....	321	--	--	3.9	1.1	3.4	--	18	3.0	2.8	--	1.5	34	0	46.0	6.5	10
Aug. 1-7.....	396	--	--	4.0	1.0	5.1	--	21	2.8	4.0	--	.8	39	0	47.0	7.7	16
Aug. 8-13.....	338	--	--	10	.9	5.0	--	37	4.4	3.0	--	.7	48	0	74.3	7.3	20
Aug. 14-20.....	409	--	--	5.4	.6	4.4	--	23	2.6	2.8	--	.7	42	0	40.6	7.9	15
Aug. 21-31.....	510	9.6	.12	4.4	.7	3.2	.9	20	2.5	3.5	.1	.8	37	0	43.9	7.7	13
Sept. 1-10.....	253	8.8	.16	4.4	.7	2.9	.9	19	2.4	2.2	.1	.8	37	0	43.9	7.7	13
Sept. 11-20.....	556	--	--	4.0	1.1	3.0	--	18	1.8	2.2	--	.8	35	0	38.3	7.1	8
Sept. 21-30.....	192	7.8	.14	4.4	.7	3.2	1.0	18	2.4	3.2	.1	.3	34	0	45.3	6.5	8
Average.....	1,326	--	--	7.8	1.4	3.4	--	26	5.5	3.9	--	1.1	54	4	67.1	--	22

## LOWER MISSISSIPPI RIVER BASIN

## RED RIVER BASIN--Continued

## LITTLE MISSOURI RIVER NEAR BOUGHTON, ARK.--Continued

Temperature (°F) of water, water year October 1951 to September 1952

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

## RED RIVER BASIN--Continued

## OUACHITA RIVER AT CAMDEN, ARK.

LOCATION --At gaging station at bridge on U.S. Highway 79, half a mile northeast of Camden, Ouachita County, and 26 miles downstream from Little Missouri River. DRAINAGE AREA --5,390 square miles.

RECORDS AVAILABLE --Chemical analyses: October 1946 to September 1952.

Water temperatures: October 1946 to September 1952.

EXTRME8, 1951-52.--Dissolved solids: Maximum, 94 ppm July 29-31; minimum, 46 ppm Sept. 18-23.

Hardness: Maximum, 35 ppm Mar. 21-25, July 21-28; minimum, 15 ppm Apr. 11-20.

Specific conductance: Maximum daily, 165 micromhos Aug. 3; minimum daily, 46.6 micromhos Apr. 12.

Water temperatures: Maximum, 92°F June 29.

EXTRME8, 1946-52.--Dissolved solids: Maximum, 193 ppm Nov. 22-24, 1948; minimum, 30 ppm Feb. 11-13, 1950.

Hardness: Maximum, 45 ppm Sept. 19-21, 26, 1946; minimum, 15 ppm Jan. 11-20, Feb. 21-28, 1949, Jan. 11-20, Feb. 14-15, 17-20, 1950, Apr. 11-20, 1952.

Specific conductance: Maximum daily, 462 micromhos Sept. 26, 1947; minimum daily, 40.8 micromhos Mar. 23, 1948, Feb. 15, 1950.

Water temperatures: Maximum, 92°F July 22, 1949, June 18, 1950, June 29, 1952; minimum, not determined.

REMARKS --Records of specific conductance of daily samples available in district office at Fayetteville, Ark. Records of discharge for water year October 1951 to September 1952 obtained from Corps of Engineers, Vicksburg District.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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./l.	Non-carbonate, mg./l.			
Oct. 1-10, 1951.....	1,307	5.9	0.76	8.6	2.0	12	1.4	27	6.3	17	0.3	2.4	73	30	8	113	6.9	32
Oct. 11-20.....	721	4.5	.25	7.6	2.1	7.3	1.2	28	5.9	11	.3	1.8	60	28	5	95.6	6.8	25
Oct. 21-31.....	815	5.0	.14	9.7	2.5	6.6	1.2	30	5.7	9.5	.2	1.6	61	32	7	100	6.7	21
Nov. 1-10.....	7,380	7.7	.11	8.6	2.4	7.1	1.1	32	6.6	11	.4	2.2	70	34	8	102	7.3	17
Nov. 11-20.....	4,941	7.6	.07	8.7	2.5	7.9	1.1	27	6.9	12	.3	1.0	71	32	10	94.3	7.5	36
Nov. 21-30.....	4,947	7.9	.14	8.2	2.2	8.5	1.7	28	6.7	12	.1	.7	75	30	7	98.5	7.7	35
Dec. 1-20.....	8,377	8.2	.15	6.4	2.1	8.9	1.7	23	7.0	12	.1	2.1	66	25	6	93.2	7.5	25
Dec. 21-30.....	5,916	8.6	.22	8.1	2.3	7.9	1.6	28	7.6	12	.1	.8	75	30	7	99.1	7.8	40
Dec. 31, Jan. 1-10, 1952	17,140	6.8	.15	6.3	1.3	3.7	1.7	24	5.6	5.0	.1	.8	62	21	1	53.7	7.2	65
Jan. 11-20.....	10,520	8.2	.41	6.8	1.8	7.6	1.0	22	6.8	12	.3	1.0	76	24	6	96.6	6.9	60
Jan. 21-31.....	7,034	10	.25	7.0	2.8	5.7	1.7	22	7.1	9.2	.4	1.4	70	29	11	94.0	7.5	40
Feb. 1-10.....	7,247	6.1	.39	5.4	3.6	4.1	.8	18	6.2	8.2	.3	.9	62	28	14	86.3	7.0	55
Feb. 11-20.....	12,340	6.4	.07	5.2	3.1	4.7	.8	18	5.8	8.2	.3	.7	63	28	11	86.5	6.8	50
Feb. 21-29.....	13,900	6.3	.05	5.3	2.3	4.4	.9	17	6.5	8.2	.3	.6	54	23	9	84.3	6.7	40
Mar. 1-12.....	13,350	7.0	.27	5.6	1.1	5.2	1.1	16	5.8	8.2	.2	.3	58	18	7	90.0	6.9	40
Mar. 13-20.....	19,820	8.2	.08	7.6	1.8	8.9	1.2	24	7.6	14	.3	1.3	76	36	18	107.0	7.9	25
Mar. 21-25.....	10,660	5.8	.12	6.8	3.1	3.1	.3	20	7.0	14	.1	.3	76	35	18	107.0	7.9	25
Mar. 26-31.....	10,230	5.8	.12	5.8	1.2	3.3	1.2	20	5.5	4.5	.1	.6	54	19	3	57.8	7.7	45
Apr. 1-10.....	19,360	4.2	.18	5.8	1.6	4.0	1.2	21	5.7	4.5	.1	1.2	52	21	4	58.4	7.0	40
Apr. 11-20.....	36,550	7.0	.36	4.4	1.0	3.4	1.4	19	3.7	3.8	.1	1.3	56	15	0	54.0	6.9	45
Apr. 21-25.....	29,820	1.4	---	6.4	1.9	4.1	---	19	4.0	4.0	---	1.6	48	20	4	55.8	6.7	38
Apr. 26-30.....	49,160	---	---	7.8	1.1	6.9	---	24	7.0	9.0	---	2.2	61	24	4	86.0	6.5	15

## RED RIVER BASIN--Continued

## OQUACHITA RIVER AT CAMDEN, ARK.--Continued

Chemical analyses, in parts per million, water year October 1951 to September 1952--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			
May 1-10, 1952.....	13,980	7.3	0.39	7.6	1.7	6.6	1.5	23	5.9	10	0.1	1.7	67	26	7	85.7	6.8	32
May 11-20.....	2,962	7.9	.54	7.7	1.7	8.7	1.5	23	6.6	14	.1	1.5	75	26	7	97.3	6.9	45
May 21-31.....	6,101	8.4	.60	7.9	1.8	10	1.4	22	6.3	17	.1	1.6	83	27	9	109	7.2	45
June 1-5.....	4,976		--	7.9	1.6	11	--	24	6.3	16	--	1.1	79	26	7	108	7.5	40
June 6-20.....	1,406	9.8	.08	6.7	1.5	5.9	.9	25	5.6	7.5	.1	.5	55	23	2	83.8	7.4	6
June 21-30.....	1,093	11	.06	6.9	1.6	6.4	1.0	25	5.0	8.0	.1	.7	54	24	3	87.4	7.0	4
July 1-10.....	755	12	.02	7.6	2.0	7.7	1.1	30	7.5	8.8	.1	1.4	64	27	3	93.3	7.0	5
July 11-15.....	561	--	--	7.6	1.9	8.1	--	31	6.6	9.0	--	1.0	61	27	1	94.2	7.1	9
July 16-20.....	555	--	--	8.1	2.8	13	--	33	8.9	16	--	.8	77	32	5	127	7.8	5
July 21-28.....	515	14	.02	9.5	2.8	11	1.2	33	9.1	16	.2	.5	80	35	8	126	6.9	6
July 29-31.....	781	--	--	8.0	1.9	20	--	25	6.7	31	--	1.0	94	28	7	162	7.3	5
Aug. 1-4.....	776	--	--	8.5	1.8	18	--	25	8.0	29	--	1.0	92	29	8	162	7.2	3
Aug. 5-10.....	886	10	.03	7.9	2.0	12	1.3	24	3.4	23	.1	.8	81	28	8	132	6.7	5
Sept. 1-10.....	616	10	.12	8.1	1.6	5.9	1.5	23	7.4	7.5	.2	1.3	57	27	8	81.3	7.4	12
Sept. 11-17.....	984	8.2	.02	8.9	2.1	6.4	1.6	18	18	8.0	.3	1.0	63	31	16	102	7.4	10
Sept. 18-23.....	638	7.0	.15	6.0	1.7	3.9	1.5	19	8.1	5.0	.2	1.9	46	22	6	87.4	6.5	14
Sept. 24-27.....	376	--	--	10	2.3	7.3	--	17	22	9.8	--	1.9	77	34	20	116	7.2	4
Sept. 28-30.....	327	--	--	10	2.3	8.0	--	17	22	10	--	2.4	60	34	20	119	7.0	4
Average.....	as 245	--	--	7.5	2.0	7.7	--	24	7.5	11	--	1.3	67	27	8	94.1	--	27

A mean discharge for water year October 1951 to September 1952 was 7,809 cubic feet per second.

## RED RIVER BASIN--Continued

## OUACHITA RIVER AT CAMDEN, ARK.--Continued

Temperature (°F) of water, water year October 1951 to September 1952

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

RED RIVER BASIN--Continued  
SMACKOVER CREEK NEAR SMACKOVER, ARK.

LOCATION. --At bridge on county road, half a mile northeast of Smackover, Union County.  
RECORDS AVAILABLE. --Chemical analyses: October 1949 to September 1952.  
Water temperatures: October 1949 to September 1952.  
EXTREMES. 1951-52. --Dissolved solids: Maximum, 4,520 ppm Aug. 14-20; minimum, 166 ppm Apr. 8-15.  
Hardness: Maximum, 773 ppm Aug. 14-20; minimum, 29 ppm Apr. 8-15.  
Specific conductance: Maximum daily, 7,570 micromhos Aug. 20; minimum daily, 150 micromhos Mar. 11.  
Water temperatures: Maximum, 91°F June 21, 1952; minimum, 41°F Nov. 7.  
EXTREMES. 1949-52. --Dissolved solids: Maximum, 4,520 ppm Aug. 14-20, 1952; minimum, 76 ppm Jan. 14-16, 1950.  
Hardness: Maximum, 864 ppm Sept. 17-27, 1951; minimum, 133 ppm Jan. 14-16, 1950.  
Specific conductance: Maximum daily, 7,703; minimum, 133 ppm Jan. 14-16, 1950.  
Water temperatures: Maximum, 91°F June 21, 1952; minimum, 41°F Nov. 7.  
Spec. temperatures: Maximum, 91°F June 21, 1952; minimum, 41°F Nov. 7.  
Remarks. --Records of specific conductance of water year October 1951 to September 1952.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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./l.	Non-carbonate			
Oct. 1, 1951	.....	14	0.68	48	11	263	12	5	4.1	515	--	3.3	932	165	161	1,870	5.6	9
Oct. 2-10	.....	15	0.56	174	44	887	9.1	3	13	1,780	0.0	1.4	3,080	615	612	5,370	5.4	7
Oct. 11-17	.....	15	0.56	115	30	619	9.1	3	12	1,220	--	1.4	2,140	410	408	3,800	5.5	6
Oct. 18-24	.....	16	0.45	110	29	541	8.4	4	7.8	1,080	--	1.6	1,950	394	390	3,420	5.7	7
Oct. 25-28	.....	16	0.75	153	39	834	11	3	9.1	1,640	--	1.2	2,880	542	540	5,000	5.8	7
Oct. 29-31	.....	15	0.52	180	50	1,050	12	5	9.5	2,040	--	1.2	3,610	654	650	6,140	5.7	8
Nov. 1-3	.....	18	0.33	124	35	682	14	3	9.1	1,360	--	1.4	2,400	454	451	4,220	5.1	10
Nov. 4-6	.....	18	0.08	97	28	482	9.2	5	13	980	--	1.7	1,740	357	353	3,140	5.5	10
Nov. 7-9	.....	15	0.20	83	21	404	8.3	2	9.5	800	--	1.8	1,490	294	292	2,520	4.7	20
Nov. 10-13	.....	13	0.11	55	15	261	6.7	2	9.3	535	--	1.6	1,400	198	197	1,780	4.9	16
Nov. 14-16	.....	17	0.30	75	19	360	7.8	4	10	755	--	1.2	1,400	265	262	2,330	5.3	17
Nov. 17-20	.....	19	0.22	107	26	517	9.2	2	9.5	1,060	--	1.8	1,910	374	372	3,320	4.9	15
Nov. 21-30	.....	18	0.22	96	24	457	8.2	2	9.9	945	--	1.9	1,710	338	336	2,980	4.9	15
Dec. 1-3	.....	19	0.06	98	25	473	7.7	4	19	955	--	1.8	1,850	344	344	2,980	5.2	10
Dec. 4-7	.....	18	0.17	84	19	330	6.7	5	15	688	--	2.2	1,350	284	284	2,210	5.4	15
Dec. 8-14	.....	10	0.09	21	6.3	90	3.9	4	8.9	182	--	2.2	376	78	75	638	5.8	40
Dec. 15-16	.....	15	0.09	33	8.7	137	3.7	4	13	275	--	2.1	581	115	115	889	5.4	24
Dec. 17-19	.....	17	0.02	40	12	130	4.2	3	13	392	--	2.1	796	150	147	1,270	5.3	15
Dec. 23-31	.....	19	0.11	36	12	176	4.6	2	12	352	--	1.9	690	140	138	1,170	5.2	8
Jan. 1-2, 1952	.....	22	0.16	52	19	273	5.4	2	12	545	--	2.3	1,050	208	206	1,740	5.0	10
Jan. 3-7	.....	17	0.15	38	12	168	4.5	5	9.5	340	--	2.0	668	140	136	1,140	5.5	27
Jan. 8-10	.....	20	0.04	43	15	195	4.9	3	14	422	--	2.1	826	169	166	1,380	5.2	13
Jan. 11-14	.....	20	0.17	51	16	238	4.3	2	9.9	480	--	1.5	898	183	182	1,550	4.9	6
Jan. 15-21	.....	22	0.23	51	16	232	5.2	2	11	570	--	1.6	1,050	201	200	1,800	4.9	11
Jan. 22-25	.....	15	0.05	27	8.2	112	3.5	5	9.4	232	--	1.4	473	101	96	802	5.3	31
Jan. 26-31, Feb. 1	.....	11	0.05	16	5.0	57	2.7	5	7.4	127	--	1.2	286	60	58	453	5.6	45

## RED RIVER BASIN

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	21	12	26	6.7	116	4.0	4	9.5	235	2	1.0	462	92	89	759	5.7	12
Feb. 2-10, 1952.....																	
Feb. 11-20.....	12	.06	16	4.8	66	3.1	6	6.4	136	.2	.8	285	60	55	470	5.7	45
Feb. 21-25.....	16	.08	17	5.2	67	2.9	4	6.7	138	.2	.6	299	64	60	475	5.9	40
Feb. 26-29.....	17	.04	24	6.7	108	3.3	4	7.4	220	.1	.9	452	88	84	731	5.6	20
Mar. 1-2, 6-10.....	16	.09	27	9.9	130	3.3	4	9.4	262	.1	1.2	566	108	104	865	5.6	15
Mar. 3-5.....	20	.20	20	5.9	90	3.0	7	6.0	178	--	2.4	412	74	68	637	5.9	22
Mar. 11-18.....	12	.04	17	3.8	76	3.1	4	5.8	150	.3	.6	328	58	55	520	5.9	23
Mar. 19-26.....	19	.02	37	8.4	160	3.1	4	5.9	328	.1	1.1	719	127	124	1,080	6.3	8
Mar. 27-31.....	18	.06	42	10	192	3.7	2	6.6	395	.1	1.7	803	146	144	1,300	5.3	7
Apr. 1-3.....	7.4	.13	43	11	209	3.7	4	5.4	428	.1	1.2	870	152	149	1,410	5.6	5
Apr. 4-7.....	13	.34	40	4.8	86	2.6	7	4.6	180	.1	1.2	404	70	64	632	6.1	45
Apr. 8-15.....	7.4	.07	7.8	2.3	30	1.6	5	3.5	62	.2	1.2	466	23	23	235	5.9	65
Apr. 16-20.....	15	.14	27	6.6	119	2.7	3	5.1	245	.1	1.3	484	84	80	840	6.4	12
Apr. 21-26.....	17	.06	29	7.3	229	3.1	2	9.6	465	.1	1.4	597	102	98	1,074	6.2	10
Apr. 27-30.....	18	.05	47	12	236	4.6	2	6.3	470	--	1.5	969	166	164	1,520	5.6	6
May 1-5.....	18	.05	47	11	233	4.6	2	6.3	470	.2	1.5	969	166	164	1,520	5.6	6
May 6-10.....	15	.04	56	14	303	5.8	2	6.7	595	.2	2.2	1,210	197	196	1,820	5.0	7
May 11-16.....	12	.02	56	14	303	5.7	2	7.7	588	.2	2.2	1,210	197	196	1,820	5.0	7
May 17-23.....	17	.08	76	19	386	6.8	2	5.4	772	.2	1.9	1,610	268	266	1,890	4.7	5
May 24-31.....	12	.04	28	6.4	128	3.8	3	6.4	265	.2	1.3	583	96	94	880	5.3	12
June 1-2.....	--	--	24	9.0	131	--	3	5.4	275	--	1.3	546	97	94	896	5.9	10
June 3-9.....	16	.04	54	13	252	5.6	3	5.6	520	.2	2.4	1,110	188	186	1,700	5.3	5
June 10-19.....	19	.10	76	19	374	6.9	2	4.0	755	.1	2.1	1,400	268	266	2,410	4.9	6
June 20-30.....	16	.10	78	23	448	7.1	4	4.3	892	.1	2.0	1,630	289	286	2,830	5.7	7
July 1-13.....	13	.03	88	23	444	8.1	4	6.8	890	.2	2.1	1,580	314	310	2,810	5.6	10
July 14-20.....	14	.04	131	35	665	9.6	3	5.1	1,340	.2	2.4	2,350	471	468	4,160	5.2	5
July 21-31.....	12	.06	114	33	666	9.9	2	5.1	1,300	.2	1.6	2,300	418	418	4,060	5.4	6
Aug. 1-10.....	11	.06	121	34	694	10	2	5.8	1,360	.2	2.3	2,390	442	440	4,200	5.4	7
Aug. 11-13.....	8.9	.06	134	38	752	11	2	8.4	1,490	.2	1.8	2,620	490	489	4,560	5.0	6
Aug. 14-20.....	11	.08	206	63	1,320	16	4	7.4	2,540	.2	1.0	4,520	770	773	7,540	5.6	7
Aug. 21-31.....	6.2	.08	177	45	1,050	15	3	24	2,050	.0	1.8	3,620	628	624	6,210	5.4	7
Sept. 1-3, 5, 7.....	2.4	.24	168	44	985	13	4	7.4	1,940	.1	1.4	3,620	600	596	5,910	5.5	8
Sept. 4, 6, 8-10.....	2.6	.16	160	42	851	12	4	7.8	1,740	.1	.4	3,250	572	568	5,330	5.6	5
Sept. 11-20.....	3.6	.16	161	41	905	15	4	5.4	1,770	.0	.9	3,130	570	566	5,470	6.1	9
Sept. 21-30.....	2.8	.09	181	44	951	14	7	5.8	1,900	.0	.3	3,270	632	626	5,830	6.3	9
Average.....	14	0.15	74	20	389	7.0	4	8.4	777	0.2	1.5	1,440	268	265	2,440	--	1..

## LOWER MISSISSIPPI RIVER BASIN

## RED RIVER BASIN--Continued

## SMACKOVER CREEK NEAR SMACKOVER, ARK.--Continued

Temperature (°F) of water, water year October 1951 to September 1952

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



RED RIVER BASIN--Continued  
OUMCHITA RIVER AT CALION, ARK.

LOCATION.--At Rock Island and Pacific Railway bridge in Calion, Union County.

DRAINAGE AREA.--6,540 square miles, approximately.

RECORDS AVAILABLE.--Chemical analyses: October 1949 to September 1952.

Water temperatures: October 1949 to September 1952.

EXTREMES, 1951-52.--Dissolved solids: Maximum, 779 ppm Mar. 15-16, 20; minimum, 98 ppm Jan. 6-10.

Hardness: Maximum, 141 ppm Nov. 25-26; minimum, 30 ppm Apr. 3-7.

Specific conductance: Maximum daily, 4,500 micromhos Aug. 22; minimum daily, 59.3 micromhos Jan. 9.

Water temperatures: Maximum, 91°F on several days in July and Aug.; minimum, 44°F Dec. 22-23.

EXTREMES, 1949-52.--Dissolved solids: Maximum, 1,220 ppm Oct. 22-23, 1949; minimum, 98 ppm Jan. 6-10, 1952.

Hardness: Maximum, 350 ppm July 16, 1950; minimum, 20 ppm May 3, 1950.

Specific conductance: Maximum daily, 4,500 micromhos Aug. 22, 1952; minimum daily, 59.3 micromhos Jan. 9, 1952.

Water temperatures: Maximum, 91°F on several days in July and Aug.; minimum, not determined.

REMARKS.--Once-daily sampling near surface. Records of specific conductance of daily samples available in district office at Fayetteville, Ark. No records of discharge available for this station.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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./l.	Non-carbonate, mg./l.			
Oct. 1, 8-9, 1951.....	6.1	5.7	0.29	34	8.7	148	3.6	16	9.5	285	0.3	7.2	552	121	108	946	6.4	17
Oct. 2-7, 10.....	7.4	5.8	.42	24	5.4	89	2.9	19	5.6	172	.4	5.8	358	82	66	607	6.8	30
Oct. 11-16.....	7.4	5.8	.58	20	4.6	77	2.6	23	8.4	146	.2	4.4	312	69	50	527	6.7	32
Oct. 17-20.....	4.6	4.6	..	14	2.9	43	..	28	9.0	79	..	3.0	190	47	24	327	7.0	12
Oct. 21-29.....	..	..	..	..	3.8	55	2.7	29	9.1	103	.3	2.3	236	53	29	401	7.0	20
Nov. 4-5.....	..	..	..	18	4.0	54	..	29	9.0	99	..	2.6	255	61	38	395	6.9	17
Nov. 6-7.....	..	..	..	27	7.1	109	..	28	5.6	212	..	5.2	442	96	74	751	7.1	7
Nov. 8-10.....	..	..	..	15	3.2	30	..	31	8.0	56	..	2.6	163	51	25	260	7.4	18
Nov. 11-13, 18-20.....	9.8	..	.24	22	6.7	83	2.9	24	7.7	165	.3	3.8	344	82	63	597	7.3	26
Nov. 14-17.....	7.3	..	.18	28	9.1	113	3.5	19	13	230	.2	5.6	464	108	92	774	7.1	25
Nov. 21-24, 27-30.....	7.0	..	.20	25	6.2	98	3.0	25	9.5	188	.2	3.0	394	88	68	692	7.1	25
Nov. 25-26.....	..	..	..	40	10	175	..	19	8.0	335	..	8.8	708	141	126	1,180	6.3	22
Dec. 1-3, 6-8.....	6.6	..	.26	20	5.6	74	2.2	25	8.4	140	.1	2.2	308	73	52	526	7.2	35
Dec. 4-5.....	..	..	..	29	7.9	129	..	24	8.0	245	..	3.0	469	105	86	850	6.8	13
Dec. 9-13.....	7.4	..	.16	14	4.0	47	2.4	16	9.4	89	.3	4.4	211	51	38	353	6.9	45
Dec. 14-20.....	7.7	..	.10	19	6.5	80	2.9	10	13	152	.3	6.0	344	74	66	550	6.6	32
Dec. 21-23.....	..	..	..	..	5.0	68	..	17	9.1	128	..	4.6	275	68	54	471	7.1	23
Dec. 24-31.....	9.6	..	.16	20	5.8	83	2.6	16	11	157	.4	3.3	353	74	61	569	6.9	32
Jan. 1-5, 1952.....	9.0	..	.14	22	6.6	87	2.9	18	9.5	168	.3	3.3	373	82	67	586	7.0	30
Jan. 6-10.....	..	..	..	..	8.7	..	..	..	..	..	..	..	..	..	..	..	..	..
Jan. 11-13.....	..	..	..	..	2.8	17	..	19	6.0	32	..	1.4	98	33	18	144	6.8	38
Jan. 14-16.....	..	..	..	..	5.5	61	..	17	9.5	120	..	1.7	266	68	54	427	6.9	30
Jan. 17-20.....	9.4	..	.17	25	7.4	105	3.1	15	9.5	170	..	2.0	358	82	69	600	6.9	22
Jan. 21-22, 28.....	5.6	..	.35	30	8.0	122	2.8	10	12	218	.2	4.9	471	93	82	770	6.5	32
Jan. 23-24, 29, 31.....	..	..	..	..	5.4	58	..	10	8.6	110	..	4.6	518	108	100	836	6.8	55
Jan. 25-27, 30.....	8.6	..	.30	21	5.8	83	2.8	16	13	160	.2	9.1	378	76	64	593	5.9	70

RED RIVER BASIN--Continued  
OJACHITA RIVER AT CATION, ARK.--Continued

Chemical analyses, in parts per million, water year October 1951 to September 1952--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./nestum	Non-carbonate			
Feb. 1-10, 1952.....	9.2	0.47	22	5.7	86	2.6	13	9.9	168	0.2	3.0	388	388	78	68	594	6.4	60
Feb. 11, 14, 19.....	--	--	18	5.1	78	--	2	14	148	--	--	6	322	66	64	536	4.9	45
Feb. 12-13, 20.....	8.0	.47	24	6.4	108	2.6	6	8.9	215	2.3	5.3	483	386	86	82	745	6.3	45
Feb. 15-18.....	5.6	.60	13	2.7	43	2.4	13	7.6	84	3	2.6	223	223	44	33	336	6.8	50
Feb. 21-26.....	--	--	14	3.4	90	--	16	7.6	95	--	2.1	225	49	38	35	351	6.6	50
Feb. 27-29.....	--	--	28	6.6	116	--	3.6	11	232	--	3.3	464	97	92	793	6.3	35	
Mar. 3-4.....	--	--	16	4.7	70	--	18	8.7	136	--	1.5	288	59	44	498	6.5	33	
Mar. 5-9.....	--	--	9.2	3.5	19	--	17	7.0	136	--	1.1	114	37	23	164	6.7	35	
Mar. 10-14, 17-19.....	7.2	.16	16	6.9	87	2.5	13	6.6	162	3	4.4	351	68	58	585	7.0	40	
Mar. 15-16, 20.....	--	--	35	11	182	--	0	7.0	362	--	8.1	779	132	132	1,250	4.3	23	
Mar. 21-24, 28-29, 31.....	6.6	.18	19	4.4	87	2.2	14	8.6	160	3	4.0	360	66	54	575	6.6	38	
Mar. 25-27, 30.....	--	--	15	4.5	48	--	21	7.2	95	--	1.6	214	56	39	375	6.8	32	
Apr. 1-2, 8-10.....	--	--	14	3.8	51	--	16	6.0	98	--	2.3	235	51	37	384	6.4	26	
Apr. 3-7.....	--	--	8.5	2.1	16	--	19	4.0	30	--	1.4	105	30	15	142	6.9	37	
Apr. 11-13.....	--	--	12	3.3	39	--	18	7.0	71	--	1.4	171	44	29	282	6.6	36	
Apr. 14-20.....	8.9	.14	28	6.5	127	2.8	2	4.3	255	2	4.8	530	96	70	874	5.1	32	
Apr. 21-22, 25, 27-30.....	10	.19	22	5.6	101	2.3	10	4.8	205	2	3.4	484	78	70	710	6.3	30	
Apr. 23-24, 26.....	--	--	15	4.4	63	--	14	7.0	122	--	1.6	281	56	44	449	6.4	30	
May 1-2, 4-5, 7-8, 10.....	9.7	.31	26	5.6	97	2.4	16	6.6	195	1	2.8	436	88	75	574	6.7	40	
May 6, 9, 11, 14, 18-20.....	12	.43	38	8.6	171	3.4	16	6.6	341	1	4.4	724	130	118	1,130	6.8	30	
May 12-13, 15-17.....	8.6	.43	25	5.8	94	2.3	22	6.8	187	1	2.4	416	86	68	668	6.9	35	
May 21-25, 29.....	12	.28	27	7.8	118	2.7	23	8.6	228	2	2.3	512	100	80	803	6.9	15	
May 26-28, 30-31.....	--	--	16	5.1	67	--	18	6.0	128	--	1.5	299	61	46	470	6.9	35	
June 1-5.....	11	.13	18	3.6	62	2.1	20	6.3	123	3	1.8	278	60	43	469	7.3	45	
June 6-10.....	11	.18	22	5.6	85	2.7	22	6.3	174	--	2	1.8	357	78	60	633	7.3	22
June 11-13, 19-20.....	--	--	22	5.7	86	--	26	7.2	173	--	1.7	403	78	57	643	6.9	18	
June 14-18.....	11	.12	28	6.6	118	2.8	28	7.6	234	--	1.9	475	97	74	834	6.5	10	
June 21-25.....	9.4	.10	23	5.9	86	2.5	27	7.6	172	1	1.8	349	82	60	637	6.6	7	
June 26-30.....	--	--	13	3.9	47	--	28	9.1	82	--	1.0	183	48	26	345	6.5	14	
July 1-10.....	8.8	.08	18	3.4	60	2.3	27	8.9	112	1	1.4	248	59	37	440	7.1	6	
July 11-15, 17-20.....	9.6	.09	14	3.3	40	2.1	30	9.7	74	1	1.4	169	48	24	316	7.0	5	
July 21-24, 26-31.....	10	.08	13	3.4	37	2.3	34	11	65	2	1.0	165	46	19	274	6.8	4	
Aug. 1-4.....	--	--	12	3.3	35	--	39	13	53	--	1.4	147	44	12	285	7.1	15	
Aug. 5-10.....	12	.08	19	5.1	37	2.1	68	16	122	2	1.0	485	38	38	485	6.6	7	
Aug. 11-14.....	12	.03	22	6.0	85	2.4	32	10	160	2	1.0	356	89	54	605	7.4	10	
Aug. 15-20.....	--	--	13	3.5	47	--	47	30	10	81	--	184	47	22	347	6.9	15	
Aug. 21-27.....	--	--	20	5.4	88	--	30	10	160	--	2.2	338	72	48	606	6.7	10	
Aug. 28-31, 28-31.....	9.4	.07	20	4.1	65	3.0	38	12	119	2	1.0	262	67	36	501	7.1	15	

Sept. 1-7, 1952.....	11	.06	17	3.9	53	2.1	34	10	98	.2	1.4	241	58	31	411	7.1	15
Sept. 8-12.....	9.8	.09	13	3.2	39	1.8	29	11	68	.2	.7	167	46	22	291	7.1	14
Sept. 13-16.....	6.0	.08	17	4.2	65	2.3	26	11	123	.1	1.1	261	60	38	483	6.6	12
Sept. 19-30.....	8.0	.08	13	3.4	44	2.9	24	9.4	82	.1	1.0	184	46	27	339	7.4	15
Average.....	--	--	20	5.3	78	--	20	8.8	150	--	2.9	332	72	55	551	--	27

## LOWER MISSISSIPPI RIVER BASIN

## RED RIVER BASIN--Continued

## OUACHITA RIVER AT CALION, ARK.--Continued

Temperature (°F) of water, water year October 1951 to September 1952

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

## RED RIVER BASIN--Continued

SALINE RIVER AT BENTON, ARK.

LOCATION.--At gaging station, three-quarters of a mile west of Benton, Saline County, 3 miles downstream from confluence of North Fork and Alum Fork. DRAINAGE AREA.--569 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1949 to September 1952.

EXTREMES, 1951-52.--Dissolved solids: Maximum, 90 ppm Oct. 11-20; minimum, 46 ppm Apr. 12-16.

Hardness: Maximum, 72 ppm Oct. 21-31; minimum, 26 ppm Apr. 12-16.

Specific conductance: Maximum, 168 micromhos Oct. 22; minimum daily, 47.8 micromhos Apr. 1.

Water temperatures: Maximum, 91° F July 2-3; minimum, 41° F Dec. 18.

EXTREMES, 1949-52.--Dissolved solids: Maximum, 96 ppm Nov. 1-10, 1950; minimum, 29 ppm Mar. 12-14, 1950.

Hardness: Maximum, 74 ppm Oct. 21-31, 1950; minimum, 22 ppm Mar. 12-14, 1950.

Specific conductance: Maximum, 168 micromhos Oct. 22, 1951; minimum daily, 31.9 micromhos Feb. 13, 1950.

Water temperatures: Maximum, 91° F July 2-3, 1952; minimum, freezing point Dec. 16, 1949, Jan. 5, 1950, Jan. 30-31, Feb. 4, 1951.

REMARKS.--Records of specific conductance available in district office at Fayetteville, Ark. Records of discharge for water year October 1951 to September 1952 given in Water-Supply Paper 1241.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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./liter	Non-carbonate			
Oct. 1-10, 1951	37.6	--	--	20	4.1	2.9	--	77	4.9	2.8	--	1.5	81	67	67	4	135	7.4	8
Oct. 11-20	31.6	--	--	21	4.5	2.8	--	--	5.5	2.8	--	2.1	90	71	5	5	142	7.8	6
Oct. 21-31	75.5	8.0	0.04	21	4.7	2.5	1.2	80	6.2	3.0	0.1	2.5	85	85	72	6	145	7.3	10
Nov. 1-5	993	--	--	16	4.2	2.4	--	57	6.0	3.0	--	1.0	79	57	10	10	117	7.3	22
Nov. 6-10	973	--	--	13	3.0	1.4	--	44	6.0	2.8	--	3.1	69	45	9	9	91.8	7.1	17
Nov. 11-21	282	--	--	14	3.2	2.1	--	54	6.6	3.5	--	1.3	67	48	4	4	110	7.6	9
Nov. 22-30	2,365	--	--	10	3.0	1.3	--	36	7.0	3.0	--	1.2	57	37	8	8	81.5	7.6	23
Dec. 1-9	1,892	--	--	11	3.5	2.3	--	40	7.5	2.5	--	1.0	72	42	9	9	83.1	7.4	19
Dec. 10-20	849	--	--	14	3.8	2.7	--	52	6.0	3.0	--	1.0	71	51	8	8	104	7.6	13
Dec. 21-31	718	--	--	13	3.7	2.4	--	48	5.7	4.2	--	.9	68	48	8	8	103	7.3	13
Jan. 1-10, 1952	3,281	--	--	11	3.5	2.4	--	41	5.2	3.2	--	.8	63	42	8	8	85.5	7.3	38
Jan. 11-20	641	--	--	13	3.4	2.8	--	49	6.4	3.0	--	1.7	63	46	6	6	98.3	7.6	12
Jan. 21-31	411	8.2	.06	15	4.5	2.0	.5	58	7.6	3.5	.1	1.9	76	56	8	8	110	7.4	15
Feb. 1-10	1,087	--	--	11	3.5	2.9	--	40	6.3	3.2	--	3.2	60	42	9	9	87.4	7.4	10
Feb. 11-20	1,661	--	--	11	3.5	2.1	--	42	6.6	2.2	--	1.1	56	42	7	7	86.8	7.3	27
Feb. 21-29	1,446	--	--	12	3.5	2.4	--	48	5.4	2.2	--	1.4	60	44	5	5	100	7.4	6
Mar. 1-11	1,800	--	--	11	3.2	3.1	--	40	4.5	4.0	--	2.6	63	41	8	8	94.2	7.3	6
Mar. 12-20	1,402	--	--	13	3.5	2.6	--	48	5.0	3.5	--	1.0	66	47	9	9	100	7.6	7
Mar. 21-31	1,124	--	--	15	3.5	3.0	--	52	5.7	3.8	--	1.9	71	52	9	9	109	7.3	8
Apr. 1-11	2,236	8.2	.07	10	2.9	2.2	.9	39	6.0	3.0	.3	.8	58	37	5	5	79.9	7.0	25
Apr. 12-16	6,934	--	--	7.3	1.8	2.3	--	28	6.0	1.2	--	1.2	46	26	3	3	60.1	7.5	23
Apr. 17-30	914	--	--	12	2.5	2.8	--	44	6.0	2.8	--	1.4	55	40	4	4	91.9	7.4	22

## RED RIVER BASIN--Continued

SALINE RIVER AT BENTON, ARK.--Continued

Chemical analyses, in parts per million, water year October 1951 to September 1952.--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./l.	Non-carbonate, mg./l.			
Apr. 21-22, 27-30, 1952	1,155	--	--	13	2.5	2.6	--	48	6.0	2.2	--	1.4	52	43	3	92.8	7.2	12
Apr. 23-26	4,732	--	--	9.4	2.1	2.3	--	32	5.0	1.5	--	1.8	50	32	6	70.3	7.3	24
May 1-10	416	--	--	14	3.6	1.8	--	53	5.5	2.0	--	3.1	75	50	6	106	7.4	8
May 11-20	490	--	--	12	3.5	2.1	--	47	4.9	3.0	--	1.8	73	49	6	104	7.0	9
May 21-31	645	--	--	12	3.2	1.7	--	47	4.4	2.5	--	1.9	70	43	5	92.9	7.7	11
June 1-10	155	--	--	15	3.6	2.0	--	60	1.6	2.2	--	2.4	83	52	3	115	7.6	7
June 11-20	68.9	--	--	17	4.4	2.7	--	68	5.6	2.5	--	1.8	73	61	5	126	7.1	7
June 21-30	34.6	--	--	19	4.6	2.9	--	73	5.8	2.5	--	2.4	84	66	6	135	7.4	8
July 1-10	22.5	--	0.04	19	4.4	4.6	--	77	4.1	3.8	--	1.8	85	66	2	160	7.3	7
July 11-20	29.5	10	--	19	4.1	2.8	1.0	75	3.4	3.2	0.1	2.1	86	64	3	137	7.1	5
July 21-31	26.9	--	--	18	4.0	4.6	--	70	3.5	3.5	--	2.3	87	61	4	139	7.5	6
Aug. 1-10	46.3	--	--	18	3.8	3.9	--	73	4.0	3.8	--	1.0	79	60	1	136	7.5	8
Aug. 11-20	42.3	--	--	18	3.7	3.9	--	71	4.6	3.0	--	.8	82	60	2	140	8.1	9
Aug. 21-31	21.6	--	--	18	3.8	5.1	--	70	4.0	3.2	--	1.3	82	60	3	129	8.1	7
Sept. 1-10	15.9	--	--	18	3.9	3.4	--	69	4.2	3.2	--	1.7	80	61	4	125	8.2	7
Sept. 11-18	56.5	--	--	17	3.7	3.0	--	65	3.8	3.5	--	1.8	83	58	4	123	7.8	5
Sept. 19-30	68.7	--	--	14	2.8	3.4	--	48	6.1	2.8	--	1.7	69	46	7	102	7.6	16
Average	835	--	--	15	3.6	2.7	--	55	5.3	2.9	--	1.6	71	51	6	109	--	13

## RED RIVER BASIN--Continued

## SALINE RIVER AT BENTON, ARK.--Continued

Temperature (°F) of water, water year October 1951 to September 1952

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

RED RIVER BASIN--Continued  
HURRICANE CREEK NEAR SHERIDAN, ARK.

LOCATION --At bridge on U. S. Highway 270, 5 miles east of Sheridan, Grant County.

RECORDS AVAILABLE Chemical analyses, October 1949 to September 1952.

Water temperatures: Maximum 104° F., September 1952.

EXTREMES 1951-52--Dissolved solids: Maximum 1,170 ppm Sept. 23-26; minimum, 88 ppm Apr. 11-17.

Hardness: Maximum, 228 ppm Oct. 19-22; minimum, 25 ppm Mar. 16-18, 20.

Specific conductance: Maximum daily, 1,910 microhmhos Sept. 24; minimum daily, 60.5 microhmhos Apr. 13.

Water temperatures: Maximum 87° F. on several days in June and July; minimum, 40° F. Dec. 19.

EXTREMES 1949-52--Dissolved solids: Maximum, 1,170 ppm Sept. 23-26; minimum, 41 ppm May 3, 7-9, 1950.

Hardness: Maximum, 287 ppm Aug. 25-27, 1951; minimum, 21 ppm May 3, 7-9, 1950.

Specific conductance: Maximum daily, 1,910 microhmhos Sept. 24, 1952; minimum daily, 33.6 microhmhos Feb. 12, 1950.

Water temperatures: Maximum 87° F. on several days during summer months; minimum, 36° F. Jan. 5, 1950.

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

Chemical analyses, in parts per million, water year October 1951 to September 1952

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 (microhmhos at 25° C)	pH	Color
														Calcium	Non-carbonate			
Oct. 1-10, 1951.....		12	0.20	70	11	66	5.2	3	323	16	1.6	0.5	522	220	217	761	5.1	7
Oct. 11-18.....		5.0	.34	32	5.6	109	6.3	47	256	26	.8	1.2	456	103	64	710	6.9	5
Oct. 19-22, 24.....		8.7	.27	82	5.8	151	7.2	65	459	16	1.6	.4	794	228	176	1,110	7.7	7
Oct. 23, 25-31.....		4.8	.70	41	5.1	143	7.4	114	304	16	4.8	.4	581	124	30	880	7.5	10
Nov. 1-5.....		6.8	.38	70	8.3	58	4.0	47	266	8.0	1.4	.2	451	208	170	643	6.9	5
Nov. 6-10.....		5.6	.09	34	5.6	61	4.6	53	171	7.8	1.6	.7	325	108	64	473	7.3	5
Nov. 11-14, 17.....		2.3	.10	17	4.5	164	8.2	130	261	12	10	1.0	541	61	0	846	8.1	7
Nov. 15-18, 18-20.....		7.1	.05	32	6.0	82	4.4	61	163	12	2.4	.8	324	104	54	503	7.6	7
Nov. 21-30.....		3.1	.09	20	4.5	80	5.2	101	131	12	3.2	.9	309	68	0	488	8.0	8
Dec. 1-4.....		--	--	11	3.2	102	--	152	114	8.8	--	.8	330	40	0	502	8.2	5
Dec. 5-8.....		--	--	19	3.7	52	--	80	66	6.2	3.2	.6	215	63	0	343	7.6	6
Dec. 9-12, 16-17, 20.....		6.2	.26	12	3.0	26	2.4	53	43	6.0	1.8	.9	136	42	0	211	7.7	18
Dec. 13, 15, 18-19.....		8.6	.11	16	4.1	44	2.9	73	61	6.2	3.6	.6	183	43	0	294	7.2	20
Dec. 21-23, 26.....		3.6	.28	26	3.1	42	3.5	72	58	3.8	3.2	.6	172	39	0	281	7.9	21
Dec. 25-27, 28-31.....		1.6	.16	13	8.8	41	3.5	104	86	9.5	6.0	1.6	230	43	0	368	8.2	22
Jan. 1-3, 1952.....		--	--	13	2.1	81	--	122	38	4.5	1.2	.4	209	40	6	176	8.5	22
Jan. 4-8, 10-11.....		--	--	11	4.2	20	--	74	47	6.0	2.8	.6	157	34	0	250	7.7	25
Jan. 9, 12-31.....		5.4	.11	10	2.2	39	2.8	74	47	6.5	1.4	.9	140	41	0	209	7.5	27
Feb. 1-3, 7-12.....		7.2	.28	12	2.8	31	2.8	59	49	5.5	1.4	.7	147	41	0	228	7.5	22
Feb. 4-6.....		--	--	10	3.1	18	--	35	34	4.5	2.0	.7	122	36	9	158	7.0	30
Feb. 13-21.....		11	.03	11	3.0	12	1.3	30	32	4.5	8.8	1.2	100	40	15	138	6.7	35
Mar. 1-2, 8-10.....		--	--	9.4	2.4	25	1.3	35	35	7.2	1.8	1.6	127	33	5	185	7.2	30
Mar. 3-7, 11-12.....		--	--	6.3	7.9	35	--	53	50	5.8	--	4.4	141	30	0	219	7.7	40
Mar. 13-15, 19.....		--	--	8.8	3.3	15	--	31	24	4.5	--	1.9	93	29	4	121	7.3	45
		--	--	8.8	2.7	19	--	40	31	4.0	--	.9	103	33	0	149	7.4	30



	6.0	--	6.6	2.1	38	--	62	47	4.2	--	2.1	146	25	0	230	7.2	15
Mar. 16-18, 20, 1952.																	
Mar. 21, 27-31.....	6.0	.06	6.8	2.7	47	2.9	72	53	7.0	3.2	.4	166	28	0	261	7.3	15
Mar. 22-26.....	--	--	7.7	2.7	29	--	47	43	4.5	--	.9	130	30	0	192	7.2	30
Apr. 1, 5, 8-10.....	--	--	8.8	3.7	27	--	51	41	4.5	--	.6	129	33	0	189	7.0	35
Apr. 2-4, 6-7.....	--	--	8.8	2.0	13	--	34	27	3.2	--	.8	100	34	6	132	6.8	50
Apr. 11-17.....	--	--	9.9	2.6	12	--	33	25	3.5	--	.6	88	35	8	124	7.2	32
Apr. 18-22.....	--	--	11	2.5	21	--	42	41	4.8	--	.4	118	38	3	173	7.2	22
Apr. 23-29.....	12	.03	12	2.5	18	1.4	43	33	7.0	1.4	1.2	110	40	3	164	7.1	30
Apr. 30, May 1-4.....	--	--	11	2.5	16	--	60	25	7.0	--	.7	83	36	0	208	7.2	10
Apr. 5-11.....	9.2	.03	12	1.8	70	4.0	108	70	12.0	4.4	1.2	233	39	0	300	7.1	40
Apr. 12-19.....	7.0	.03	12	2.5	95	6.1	108	141	16	4.4	1.3	352	59	0	508	7.5	12
May 20-22.....	--	--	25	4.1	73	--	108	143	14	--	.8	332	79	16	508	7.1	10
May 23, 28-30.....	--	--	26	3.9	28	--	77	143	7.0	--	1.8	211	81	64	312	6.8	10
May 24-27, 31.....	--	--	21	2.8	18	--	20	114	4.8	--	1.0	161	64	48	231	6.2	12
June 1-9.....	12	.02	21	3.1	37	3.0	33	99	10	1.2	.5	204	65	38	321	7.1	4
June 10-20.....	10	.04	31	4.0	69	4.6	61	161	18	2.2	.9	344	94	44	529	6.9	7
June 21-30.....	7.2	.03	22	3.6	87	5.4	107	126	27	4.0	.6	344	70	44	560	7.2	4
July 1-10.....	4.6	.03	18	4.4	113	6.3	140	116	38	9.0	2.5	380	63	0	634	7.2	5
July 11-15.....	--	--	11	2.4	156	--	192	134	46	--	.4	488	38	0	790	7.1	10
July 16-23.....	2.4	.04	8.2	1.2	234	11	a 298	192	43	14	1.4	667	26	0	1,070	8.4	12
July 24-31.....	2.2	.04	11	2.1	162	8.8	208	154	37	11	.8	498	36	0	823	8.1	5
Aug. 1, 6, 8, 10.....	3.4	.02	14	2.1	176	9.5	183	181	39	9.0	.8	538	44	0	864	7.9	10
Aug. 2-5, 7, 9.....	2.6	.03	14	2.2	252	12	b 284	278	43	10	1.6	773	44	0	1,190	8.6	10
Aug. 11-20.....	2.8	.04	47	9.8	186	10	121	382	22	5.0	1.1	734	141	42	1,100	7.9	10
Aug. 21-27.....	3.2	.02	32	3.9	250	11	a 177	453	21	9.0	.8	920	96	0	1,350	8.5	6
Aug. 28-31.....	3.6	.03	57	8.1	162	8.8	118	371	18	5.0	.4	718	176	79	1,060	7.6	7
Sept. 1-10.....	2.3	.01	27	2.9	165	7.9	155	239	32	7.0	.7	558	80	0	893	7.5	7
Sept. 11-14, 19.....	2.3	.02	13	1.8	190	8.1	188	183	38	11	.5	538	36	0	881	7.7	10
Sept. 15-18, 20.....	2.3	.06	18	1.0	218	9.0	b 237	246	34	11	.8	672	49	0	1,070	8.6	12
Sept. 21-22, 27-30.....	1.5	.04	49	3.9	228	12	159	450	16	7.0	.9	837	138	8	1,280	8.0	6
Sept. 23-26.....	.4	.04	10	.2	383	16	c 412	493	22	12	1.1	1,170	26	0	1,130	8.8	30
Average.....	--	--	21	3.5	90	--	98	148	15	--	0.9	350	66	21	535	--	16

a Includes equivalent of 4 parts per million of carbonate (CO<sub>2</sub>).b Includes equivalent of 9 parts per million of carbonate (CO<sub>2</sub>).c Includes equivalent of 36 parts per million of carbonate (CO<sub>2</sub>).

## LOWER MISSISSIPPI RIVER BASIN

## RED RIVER BASIN--Continued

## HURRICANE CREEK NEAR SHERIDAN, ARK.--Continued

Temperature (°F) of water, water year October 1951 to September 1952

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

RED RIVER BASIN--Continued  
SALINE RIVER NEAR RYE, ARK.

LOCATION.--At gaging station at bridge on State Highway 15, 4 miles southwest of Rye, Cleveland County, and 5 miles upstream from Hudgen Creek.

DRAINAGE AREA.--2,062 square miles (Revised).

RECORDS AVAILABLE.--Chemical analyses: October 1946 to September 1947, October 1948 to September 1952.

Water temperatures: October 1946 to September 1947, October 1948 to September 1952.

EXTREMES, 1951-52.--Dissolved solids: Maximum, 136 ppm Sept. 1-10; minimum, 49 ppm Apr. 17, 20-23.

Hardness: Maximum, 53 ppm Oct. 16-20, Nov. 1-9; minimum, 16 ppm Apr. 17, 20-23.

Specific conductance: Maximum, 251 micromhos Oct. 16; minimum daily, 41.7 micromhos Apr. 20.

Water temperatures: Maximum, 90°F on several days in June, July, and August; minimum, 41°F Dec. 16.

EXTREMES, 1946-47, 1948-52.--Dissolved solids: Maximum, 136 ppm Sept. 1-10, 1952; minimum, 18 ppm Jan. 1-14, 1950.

Hardness: Maximum, 77 ppm Jan. 24, 30, 1949; minimum, 8 ppm June 1-7, 9-10, 1947.

Specific conductance: Maximum daily, 534 micromhos Jan. 18, 1949; minimum daily, 19.7 micromhos June 4, 1947.

Water temperatures: Maximum, not determined; minimum, 36°F Feb. 1, 1951.

REMARKS.--Records of specific conductance of daily samples available in district office at Fayetteville, Ark. Records of discharge for water year October 1951 to September 1952 given in Water-Supply Paper 1241.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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, 1951 .....	111	5.8	0.10	13	3.7	6.3	1.4	47	13	4.5	0.3	3.0	72	48	9	118	7.3	15
Oct. 11-15 .....	84.4	7.2	.08	14	3.1	11	2.0	45	23	5.2	.2	1.3	93	48	11	140	7.2	13
Oct. 16-20 .....	80.6	--	--	15	3.7	12	--	49	32	4.2	--	1.2	103	53	12	158	7.2	8
Oct. 21-31 .....	80.1	6.8	.04	16	3.7	9.6	2.0	47	26	5.2	.1	4	91	50	12	146	7.4	10
Nov. 1-9 .....	424	10	.06	15	3.8	9.1	1.8	45	27	4.5	.3	1.8	99	53	16	149	7.4	10
Nov. 10-20 .....	924	4.8	.05	11	3.5	5.0	1.7	28	22	3.5	.4	.8	76	42	19	110	7.2	25
Nov. 21-28 .....	392	9.3	.10	12	3.7	12	1.4	42	27	3.2	.5	1.0	94	45	11	142	7.5	10
Nov. 29-30, Dec. 1-9 ..	1,827	7.9	.05	8.2	3.3	7.1	1.6	32	15	3.5	.5	.9	71	34	8	96.5	7.4	35
Dec. 10-30 .....	3,837	7.9	.03	6.6	2.5	5.1	1.6	22	15	4.2	.5	.6	63	27	9	80.7	7.0	40
Dec. 31-31 .....	3,063	9.9	.20	8.2	3.7	8.0	1.5	28	18	5.2	.5	2.2	78	36	13	102	7.6	30
Jan. 1-7, 1952 .....	1,871	9.4	.08	3.4	3.6	8.5	1.3	32	18	4.8	.5	1.0	78	36	10	105	7.6	32
Jan. 8-10 .....	3,437	--	--	5.7	2.2	3.4	--	17	12	3.2	--	1.2	59	23	9	74.5	6.8	45
Jan. 11-15 .....	3,995	7.2	.08	4.4	2.2	3.6	1.8	17	12	3.0	.3	1.2	55	20	6	80.6	7.2	40
Jan. 16-20 .....	3,182	8.9	.08	6.2	2.4	4.4	1.4	24	16	4.5	.5	.9	71	25	6	86.1	7.3	40
Jan. 20-31 .....	6,033	8.3	.05	4.2	2.2	3.1	1.7	13	10	3.5	.4	1.3	56	20	9	56.5	7.0	70
Feb. 1-10 .....	3,967	9.9	.32	7.8	2.9	5.6	1.5	20	16	6.8	.3	1.6	74	31	15	93.3	7.2	40
Feb. 11-19 .....	4,418	8.2	.16	5.7	2.3	4.4	1.7	18	12	4.5	.3	1.3	63	24	9	73.2	7.0	70
Feb. 20-29 .....	6,512	7.6	.10	5.5	2.8	3.8	1.1	17	11	3.8	.3	1.6	62	25	11	67.8	6.7	65
Mar. 1-10 .....	6,681	8.2	.08	6.0	1.9	4.1	1.1	17	11	3.2	.2	.8	61	23	9	63.7	7.3	40
Mar. 11-20 .....	7,372	7.0	.16	4.4	1.9	3.6	1.2	17	8.8	3.0	.2	.8	50	19	5	53.7	6.9	45
Mar. 21-31 .....	4,802	8.1	.33	7.0	2.2	5.0	1.0	25	10	3.0	.3	.9	62	26	6	79.7	7.2	40

## RED RIVER BASIN--Continued

SALINE RIVER NEAR RYE, ARK.--Continued

Chemical analyses, in parts per million, water year October 1951 to September 1952--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, 1952.....	5,330	7.6	0.29	6.0	1.9	3.9	1.1	19	9.5	2.5	0.3	1.3	57	23	7	61.3	6.9	50
Apr. 11-16, 18-19.....	7,572	6.0	.01	5.4	1.9	3.7	1.5	18	9.2	3.5	.2	1.4	56	21	7	60.0	6.9	40
Apr. 17, 20-23.....	12,080	5.4	.02	4.1	1.5	2.5	1.5	14	9.1	2.2	.2	1.2	49	16	5	46.6	6.7	45
Apr. 24-30.....	6,608	8.0	.19	7.4	1.9	3.7	1.2	28	9.1	3.0	.3	1.6	64	26	5	71.4	7.1	40
May 1-6.....	4,402	9.0	.28	8.2	2.4	2.6	1.0	27	8.1	2.8	.3	1.9	59	30	8	70.7	7.0	27
May 7-20.....	938	11	.49	9.5	2.6	5.0	1.4	34	9.4	4.0	.2	1.9	71	34	7	83.8	7.1	32
May 21-31.....	2,221	6.4	.11	7.4	2.1	5.6	1.5	23	12	3.5	.2	1.8	69	27	8	77.8	6.7	40
June 1-10.....	840	12	.24	10	3.0	4.2	.6	28	14	3.2	.2	1.6	69	37	14	78.2	7.1	22
June 11-20.....	210	12	.02	12	2.7	4.9	.6	36	12	3.8	.2	1.6	74	41	11	99.5	7.7	35
June 21-30.....	175	12	.18	11	2.9	6.0	1.3	42	10	5.0	.2	1.7	72	39	15	114	7.6	7
July 1-10.....	71.4	12	.08	12	2.7	7.4	1.0	47	8.7	5.0	.2	1.1	79	40	1	114	7.9	10
July 11-20.....	63	11	.08	13	2.7	7.4	1.0	47	19	5.0	.3	2.5	76	41	2	115	6.8	7
July 21-31.....	67.3	10	.08	12	2.9	7.8	1.3	48	9.6	5.0	.2	1.2	76	42	2	119	7.1	7
Aug. 1-10.....	55.4	12	.04	11	2.7	9.1	1.4	51	10	5.8	.3	1.1	79	39	0	120	7.0	10
Aug. 11-19.....	112	13	.04	11	2.4	10	1.6	49	8.1	6.5	.3	1.0	75	37	0	115	7.4	13
Aug. 20-31.....	54.0	11	.06	10	2.9	26	1.9	65	24	9.5	.9	.5	122	37	0	188	8.0	8
Sept. 1-10.....	40.6	11	.08	9.2	3.2	32	2.4	64	32	10	1.1	.5	136	32	0	216	8.0	5
Sept. 11-18.....	57.6	9.4	.12	8.4	2.2	24	2.4	56	29	7.0	.7	1.0	115	34	0	183	7.8	5
Sept. 19-25.....	158	6.0	.16	6.9	2.3	11	2.1	34	15	5.2	.4	1.0	76	27	0	124	7.0	17
Sept. 26-30.....	124	11	.00	10	3.4	25	1.4	50	41	7.8	.5	.6	123	39	0	196	7.2	15
Average.....	2,423	9.0	0.14	9.0	2.7	8.3	1.5	34	16	4.6	0.4	1.3	77	33	7	105	--	28

## RED RIVER BASIN--Continued

## SALINE RIVER NEAR RYE, ARK.--Continued

Temperature (°F) of water, water year October 1951 to September 1952

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

## 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 1952.

EXTREMES, 1951-52.--Dissolved solids: Maximum, 1,670 ppm Oct. 4-9; minimum, 84 ppm Apr. 21-30.

Hardness: Maximum, 335 ppm Oct. 4-9; minimum, 23 ppm Apr. 21-30.

Specific conductance: Maximum, 417, 4,160 micromhos Nov. 6; minimum, 155 micromhos Jan. 11.

EXTREMES, 1949-52.--Dissolved solids: Maximum, 944 ppm July 23; minimum, 107 ppm Dec. 24-25.

Hardness: Maximum, 335 ppm Oct. 4-9; minimum, 15 ppm Jan. 23-31, Mar. 1-9, 1950.

Specific conductance: Maximum daily, 4,140 micromhos Nov. 6, 1951; minimum daily, 55.7 micromhos Mar. 4, 1950.

Water temperatures: Maximum, 94°F July 23, 1952; minimum, 35°F Feb. 3, 1951.

REMARKS.--Once-daily sampling near surface. Records of specific conductance of daily samples available in district office at Fayetteville, Ark. No records of discharge available for this station.

Chemical analyses, in parts per million, water year October 1951 to September 1952

Date of collection	Mean discharge (cfs)	Temperature (°F)	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-nestum	Non-carbonate			
Oct. 1-3, 10, 1951...			7.4	0.60	67	19	325	5.3	12	18	640	0.1	10	1,220	245	235	2,090	6.8	5
Oct. 4-9, 1951...			7.6	.38	93	25	482	7.1	15	18	938		17	1,870	335	331	3,010	5.9	7
Oct. 11-12, 1951...			8.0	.37	40	10	133	18	16	14	358		10	544	141	128	1,240	7.1	11
Oct. 13-20, 1951...			8.7	.37	34	8.6	147	3.1	19	12	285	2	4.8	649	120	105	1,000	7.0	5
Oct. 21-25, 1951...			8.0	.30	29	8.0	119	2.9	20	11	230	1	2.7	649	106	89	1,822	7.0	10
Oct. 26-31, 1951...			7.6	.22	37	11	175	4.2	17	9.4	342	1	4.4	624	138	124	1,160	6.6	10
Nov. 1-6, 1951...			11	.11	38	11	169	3.6	20	13	328	1	4.4	413	140	124	1,170	7.0	12
Nov. 7-10, 1951...			7.6	.13	25	7.1	96	2.6	28	10	192	2	4.4	218	62	38	408	7.2	16
Nov. 11-12, 1951...			7.4	.17	23	6.4	75	2.4	48	7.0	97		3.5	341	84	62	577	7.2	28
Nov. 13-14, 1951...			7.4	.17	23	6.4	75	2.4	48	7.0	97		3.5	341	84	62	577	7.2	28
Nov. 15-18, 1951...			6.5	.08	33	9.4	137	3.9	20	13	275		4.2	546	121	104	952	7.3	21
Nov. 19-22, 1951...			8.2	.18	25	7.4	102	3.3	23	12	205	3	2.8	424	93	74	747	6.8	20
Nov. 23-30, 1951...																			
Dec. 1-2, 4, 7-9, 1951...			7.6	.11	26	6.6	111	3.0	24	11	210	2	3.4	425	92	72	743	6.9	24
Dec. 3, 5-6, 10, 1951...			6.3	.16	18	5.8	77	2.6	26	10	145	2	1.4	316	69	47	550	7.4	33
Dec. 11-12, 16-20, 1951...			7.1	.16	15	4.6	53	2.7	22	8.9	101	3	1.2	228	56	38	384	6.8	37
Dec. 13-15, 1951...			--	--	11	4.1	31	--	20	10	60	--	1.9	151	44	28	244	6.9	45
Dec. 21-31, 1951...			7.8	.04	15	5.6	57	2.7	17	12	109	4	1.8	243	60	46	387	6.8	36
Jan. 1-10, 1952...			9.0	.19	15	5.4	63	2.7	19	12	123	4	1.2	272	60	44	453	6.7	35
Jan. 11-18, 1952...			--	--	11	3.2	32	--	16	8.4	61	--	1.3	138	41	28	248	6.3	33
Jan. 19-23, 26-27, 29, 1952...			8.9	.09	14	4.7	46	1.9	15	10	92	3	2.7	223	54	42	351	6.9	40
Jan. 24-25, 1952...			--	--	16	4.9	65	--	14	12	123	--	1.8	239	60	49	451	6.7	22
Jan. 26, 30-31, 1952...			--	--	12	2.7	38	--	14	10	68	--	3.2	148	41	30	268	6.1	45

Feb. 1-13, 1952	9.1	.04	9.9	3.4	32	1.7	12	9.5	64	.4	1.5	187	39	29	254	6.5	60
Feb. 14-20	7.7	.07	8.8	3.0	28	1.5	14	8.1	48	.4	1.2	142	32	21	202	7.0	45
Feb. 21-29	7.6	.07	8.9	3.7	23	1.5	14	8.1	48	.4	1.2	138	37	26	202	7.0	45
Feb. 30	8.0	.14	9.9	3.8	28	1.8	16	9.4	57	.3	1.1	157	41	27	224	6.8	50
Mar. 1-9	8.6	.15	10.0	3.8	20	1.6	14	7.7	40	.4	1.0	120	30	19	170	6.7	60
Mar. 10-20	6.6	.08	8.6	2.2	20	1.6	14	7.7	40	.4	1.0	120	30	19	170	6.7	60
Mar. 21-31	5.3	.08	8.2	3.7	22	1.8	16	7.7	43	.3	.9	126	36	23	179	6.7	55
Apr. 1-5	--	--	12	3.6	40	--	18	9.0	75	--	1.4	179	45	30	303	6.2	22
Apr. 6-20	7.8	.27	8.6	2.1	20	1.2	16	5.7	41	.2	1.7	120	30	17	175	6.5	45
Apr. 21-30	5.6	.11	6.5	1.7	13	1.1	16	4.3	24	.1	1.4	84	23	10	115	6.7	45
May 1-10	8.6	.10	7.5	1.7	13	1.9	20	4.5	24	.1	1.1	87	26	9	121	6.4	45
May 11-13	--	--	8.4	2.2	15	--	22	4.0	29	--	1.2	110	30	12	138	6.5	38
May 14-16	--	--	12	3.2	32	--	22	8.0	62	--	1.5	166	43	25	248	7.2	--
May 17-23	9.8	.61	17	5.2	51	.6	23	5.9	100	.2	1.7	254	64	45	379	6.5	23
May 24-31	12	.43	26	7.6	87	1.0	23	8.6	177	.2	2.1	409	96	77	632	6.5	10
June 1-10	11	.37	16	4.2	60	2.4	21	6.3	115	.2	1.0	248	57	40	441	6.5	22
June 11-16	11	.39	18	4.2	58	2.1	24	7.7	115	.5	1.3	256	62	42	449	6.8	22
June 17-26	14	.18	24	6.0	99	2.5	25	7.6	189	.2	.8	391	84	64	696	7.0	13
June 27-30	--	--	38	9.8	151	--	26	9.5	300	--	1.7	569	136	114	1,050	6.9	10
July 1-3	--	--	37	9.2	164	--	28	7.7	327	--	1.8	733	130	108	1,130	7.6	7
July 4-10	12	.05	30	8.3	128	3.2	28	9.1	245	.1	1.7	486	109	86	860	6.8	6
July 11-20	4.2	.04	34	8.0	139	3.3	28	9.5	268	.1	1.5	525	118	95	946	6.8	7
July 21-28	3.6	.08	29	7.2	114	3.6	30	6.2	223	.1	.6	426	102	78	809	7.0	8
July 29-31	--	--	33	9.0	139	--	30	7.8	280	--	.8	545	120	95	983	6.8	10
Aug. 1-3	--	--	36	11	192	--	29	8.6	360	--	.9	711	135	111	1,280	6.9	8
Aug. 4-7	10	.04	54	14	249	4.5	28	8.4	485	.1	1.5	916	182	170	1,620	6.7	5
Aug. 8-10	10	.06	76	22	380	6.1	23	8.8	748	.1	3.2	1,370	265	266	2,420	6.6	5
Aug. 11-19	7.9	.11	64	23	380	6.7	27	12	632	.1	4.3	1,630	304	282	2,460	6.4	5
Aug. 20-31	8.7	.09	70	16	394	6.2	29	14	890	.1	5.0	1,310	248	248	2,330	6.8	8
Sept. 1-10	7.7	.12	69	16	358	5.9	30	13	630	.1	3.6	1,240	240	222	2,180	7.1	7
Sept. 11-16	7.3	.07	64	17	323	5.6	23	12	500	.1	2.6	1,240	230	209	2,180	7.2	7
Sept. 17-20	6.2	.03	61	16	353	5.6	23	12	705	.1	5.2	1,370	251	230	2,330	7.2	7
Sept. 21-30	10	.03	71	16	394	5.6	23	9.1	705	.1	5.5	1,280	251	230	2,360	6.9	10
Average	--	--	30	8.3	131	--	21	9.6	257	--	2.8	516	109	92	893	--	24

## LOWER MISSISSIPPI RIVER BASIN

## RED RIVER BASIN--Continued

## OUACHITA RIVER NEAR FELSENTAL, ARK.--Continued

Temperature (°F) of water, water year October 1951 to September 1952

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



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

Chemical analyses, in parts per million, water year October 1951 to September 1952

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			
RED RIVER AT INDEX																		
Feb. 28, 1952	5,300	7.4	0.04	92	28	123	4.7	a 130	114	141		1.0		212	105	840	8.4	
June 18								184	144	200	0.1	.2	758	324	173	1,170	7.9	18
SOUTH FORK OUACHITA RIVER NEAR MOUNT IDA																		
Mar. 3, 1952								76	10	1.8		1.4		72	10	134	8.0	
Sept. 29								b 110	2.0	4.0		2.2		95	5	192	8.3	
MORO CREEK NEAR FORDYCE																		
Oct. 15, 1951								98	8.0	14		1.7		51	0	205	8.1	
Mar. 6, 1952								8	3.0	3.2		1.0		13	6	35.2	8.7	
June 17	14		6.8	1.8	9.7	3.0	37	3.0	7.5	0.3	1.7	105	25	0	101	6.6	110	

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

b Includes equivalent of 2 parts per million of carbonate (CO<sub>3</sub>).

## RED RIVER BASIN--Continued

## MISCELLANEOUS ANALYSES OF STREAMS IN RED RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1951 to September 1952

Date of collection	Water 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)	Parts per million	Tons per acre-foot	Hardness as CaCO <sub>3</sub>	Percent sodium sulfate	Specific conductance (micro-mhos at 25°C)
NORTH GROESBECK CREEK 3 MILES SOUTHEAST OF NORTH GROESBECK																		
Jan. 22, 1952	4.14	20								1,830	530		0.0					4,410
SOUTH GROESBECK CREEK 3 MILES NORTHEAST OF ACME																		
Jan. 22, 1952	4.00	17		612	102			203		1,690	290		1.8	2,990	4.07	1,950	1,780	17 1.8 3,560 7.9
GROESBECK CREEK NEAR QUANAHA																		
Oct. 1, 1951	9.96	15		598	116	282		141		1,800	418		3.0	3,300	4.49	1,970	1,850	24 2.8 4,010 7.7
Nov. 18	9.92	15		600	118	284		148		1,760	425		5.0	3,260	4.43	1,980	1,860	22 2.6 3,980 7.6
Jan. 22, 1952	9.66	23		600	115	246		192		1,710	400		4.5	3,190	4.34	1,970	1,810	21 2.4 3,900 7.8
July 15	83.8	22		254	52	117		106		714	190		3.5	1,400	1.90	848	760	23 1.7 1,830 7.9
WANDERERS CREEK AT ODELL																		
Dec. 17, 1951	3.98	16						106		524	170		11					1,720
July 15, 1952	77.8	21		22				13		52	13		2.8	a 205	0.28	114	27	29 0.9 329 7.9
SALT FORK RED RIVER NEAR CLARENDON																		
Apr. 22, 1952	19.2	39		40	17	41		153		76	38		1.5	a 343	0.47	170	44	34 1.4 526 8.2
LELIA LAKE CREEK NEAR HEDLEY																		
Oct. 4, 1951	5.22	41		78	28	58		161		223	48		6.3	561	0.76	310	178	29 1.4 858 7.9
Jan. 22, 1952	7.17	31						--		205	54		6.9	--	--	--	--	942 --
Apr. 22	11.1	46		60	30	74		108		237	66		6.0	a 569	.81	273	184	37 1.9 864 8.2
SALT FORK RED RIVER NEAR WELLINGTON																		
Oct. 1, 1951	3.61	30		550	93	126		101		1,640	168		4.0	2,660	3.62	1,750	1,670	14 1.3 3,030 7.6

a Residue on evaporation at 180°C.

## NORTH FORK RED RIVER NEAR SHAMROCK

Nov. 18, 1951 .....	0.73	26				117	107		1,040	210		1.5		1,900	2.58		1,210	1,120	17	1.5	2,580	7.6
Jan. 21, 1952 .....	18.5	21							428	308		1.5									1,970	

## SWEETWATER CREEK NEAR WHEELER

Nov. 18, 1951 .....	7.77	30				51	230		38	30		1.0		318	0.43		162	0	41	1.7	560	8.0
Jan. 21, 1952 .....	10.7	35				--	--		20	18		.8		--	--		--	--	--	--	506	--
Apr. 17 .....	16.9	40				41	206		22	21		1.0		a270	.37		132	0	40	1.6	426	8.2

## HACKBERRY CREEK NEAR WHEELER

Nov. 18, 1951 .....		28				56	172		38	40		2.5		290	0.39		117	0	51	2.3	463	7.9
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## ROARING SPRINGS CREEK NEAR ROARING SPRINGS

May 16, 1952 .....	1.80	68				83	138		.78	97		23		a498	0.68		170	57	51	2.8	749	8.1
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## NORTH FORK WICHITA RIVER 10 MILES SOUTHEAST OF PADUCAH

Nov. 28, 1951 .....	4.45	22				879	138		1,590	1,440		13		4,690	6.38		1,900	1,790	50	8.8	6,790	7.6
Mar. 12, 1952 .....	4.17	16				2,190	183		1,890	3,460				8,450	11.5		2,240	2,100	68	20	12,800	7.7

## SALT CREEK 10 MILES SOUTHEAST OF PADUCAH

Mar. 12, 1952 .....	2.22	7.0				11,500	312		3,650	18,200				35,000	47.6		4,500	4,430	85	75	47,000	7.8
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a Residue on evaporation at 180° C.

## RED RIVER BASIN--Continued

## MISCELLANEOUS ANALYSES OF STREAMS IN RED RIVER BASIN IN TEXAS--Continued

Chemical analyses, in parts per million, water year October 1951 to September 1952--Continued

Date of collection	Water 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 (sum)		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					
NORTH FORK WICHITA RIVER 11 MILES SOUTHEAST OF PADUCAH																							
Mar. 12, 1952 .....	5.89	11		871	209			138		2,490	8,440				17,400	23.7		3,030	2,920	79	42	25,900	7.7
COTTONWOOD CREEK 11 MILES SOUTHEAST OF PADUCAH																							
Mar. 12, 1952 .....		15		722	144		558	196		1,820	1,100		1.0		4,460	6.07		2,390	2,230	34	5.0	6,060	7.6
NORTH FORK WICHITA RIVER 14 MILES SOUTHEAST OF PADUCAH																							
Nov. 28, 1951 .....	13.9	18		767	180		4,060	156		2,230	6,410				13,700	18.6		2,650	2,530	77	34	20,500	7.7
Mar. 12, 1952 .....	11.3	10		821	194		4,380	150		2,300	6,990				14,800	20.1		2,850	2,720	77	36	22,100	7.7
LAKE KEMP NEAR MABELLE																							
June 16, 1952 .....		7.4	0.02	240	57		694	106		675	1,100	0.4	0.0		2,830	3.85		834	746	64	10	4,650	7.4
SANTA ROSA LAKE NEAR VERNON																							
June 16, 1952 .....		8.8	0.14	35	13		27	176		34	14	0.4	0.0		a 230	0.31		141	0	30	1.0	393	7.9
WICHITA RIVER AT WICHITA FALLS																							
Oct. 12, 1951 .....	b 354	12		230	61		614	113		629	1,000		2.0		2,600	3.54		825	732	62	9.3	4,320	7.4
LAKE WICHITA AT WICHITA FALLS																							
Mar. 24, 1952 .....		8.6	0.03	120	36	304	0.8	104		239	552	0.2	1.5	0.38	1,310	1.78		448	382	60	6.2	2,440	7.4

a Residue on evaporation at 180°C.

b Mean discharge.

a Residue on evaporation at 180°C.

b Mean discharge.

WICHITA RIVER 4 MILES WEST OF BYERS<sup>c</sup>

Dec. 12, 1951	.....			248	84	670	226	573	1,160		4.4		2,850	3.88		964	780	60	9.4	4,720	7.5
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WICHITA FALLS PROJECT IRRIGATION CANAL 1 1/4 MILES SOUTH OF IOWA PARK<sup>c</sup>

Dec. 13, 1951	.....			236	52	624	110	668	980		2.3		2,610	3.55		803	713	63	9.6	4,260	7.8
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## LAKE KICKAPOO NEAR ARCHER CITY

Feb. 20, 1952	.....		4.3	0.00	33	11	25	0.8	176		8.4	18	0.5	0.5	0.07	a197	0.27		128	0	30	1.0	335	7.9
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## RED RIVER NEAR GAINESVILLE

Mar. 18, 1952	.....	684	5.9	0.01	143	43	384	4.8	146		326	650	0.4	7.8	0.18	1,640	2.23		534	414	61	7.2	2,860	7.4
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## LAKE TEXOMA AT PERRIN AIR FORCE BASE RECREATION AREA NEAR POTTSBORO

July 24, 1952	.....		6.1	0.05	101	28	236		132		228	378	0.3	1.8		1,040	1.41		367	259	58	5.4	1,830	7.6
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## GAGEBY CREEK 2 MILES NORTHWEST OF BRISCO

Dec. 17, 1951	.....	0.18	22								12	14		0.2									245	
Mar. 16, 1952	.....	.17									15	15											291	

## LAKE RANDALL NEAR DENISON

Feb. 15, 1952	.....		3.5	0.00	47	6.5	13	1.2	146		23	23	0.3	0.2	0.10	a193	0.20		144	24	16	0.5	333	7.5
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<sup>a</sup> Residue on evaporation at 180°C.

<sup>c</sup> Chemical analysis made by Quality of Water Laboratory, Oklahoma City, Okla.

## RED RIVER BASIN--Continued

## MISCELLANEOUS ANALYSES OF STREAMS IN RED RIVER BASIN IN TEXAS--Continued

Chemical analyses, in parts per million, water year October 1951 to September 1952--Continued

Date of collection	Water 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		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		

## LAKE CROOK NEAR PARIS

Mar. 25, 1952 .....		9.6	0.02	13	2.6	8.7	1.6	41		15	4.0	0.3	1.0	0.11	77	0.10	43	10	29	0.6	115	6.8
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## CANEY LAKE AT RED RIVER ARSENAL NEAR TEXARKANA

July 11, 1952 .....		7.4	0.09	3.6	2.5	9.8		28		8.7	5.2	0.2	0.8		52	0.07	19	0	52	1.0	70.0	7.2
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## CADDO LAKE NEAR KARNACK

Feb. 26, 1952 .....		15	0.73	6.9	3.4	17	3.6	16		20	27	0.3	0.5		a 127	0.17	31	18	51	1.3	168	6.4
June 21 .....		28	.20	6.2	3.9	22		23		19	27	.2	1.5		119	.16	32	13	60	1.7	172	7.1

a Residue on evaporation at 180°C.

RED RIVER BASIN--Continued  
MISCELLANEOUS ANALYSES OF STREAMS IN RED RIVER BASIN IN OKLAHOMA  
Chemical analyses, in parts per million, water year October 1951 to September 1952

Date of collection	Water discharge (cfs)	Temperature (°F)	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		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			

## LEBOS CREEK NEAR ELDORADO, JACKSON COUNTY

Jan. 15, 1952	7.33	60		770	107			152	0		1,350						2,360	2,240		7,240	7.7
Mar. 17	7.11	57		635	165			176	0		1,310						2,340	2,200		7,540	7.9
June 10	8.06	74		721	180			140	0		1,400						2,400	2,160		7,560	7.5
July 24	8.04	73		677	168			219	0		1,360						2,390	2,450		7,840	8.2
Aug. 26	8.13	58		697	195			104	0		1,420						2,540	2,410		7,370	8.2

## SALT FORK RED RIVER NEAR VINSON, HARMON COUNTY

Jan. 15, 1952	31.4	58		397	66	197		147	0		228						1,260	1,140	25	2,580	7.9
Mar. 17	12.0	62		397	97	198		145	0		208						1,390	1,270	24	2,750	7.7

## SALT FORK RED RIVER NEAR MANGUM, GREER COUNTY

Jan. 16, 1952	32.8	53		389	88	189		149	0		212						1,330	1,210	24	2,610	7.7
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## TURKEY CREEK NEAR OLUSTEE, JACKSON COUNTY

Jan. 15, 1952	5.19	53		762	126			218	0		805						2,420	2,240		5,430	7.7
Mar. 17	6.34	55		641	190			155	0		810						2,380	2,250		5,500	7.9
June 10	5.64	73		705	214			150	0		800						2,640	2,520		5,490	8.0
July 24	3.72	76		242	67	122		139	3		188						880	761	23	1,870	8.3

## SWEETWATER CREEK NEAR SWEETWATER, ROGER MILLS COUNTY

Dec. 11, 1951	11.9	36		140	30	115		296	0		87						475	232	34	1,220	7.7
Feb. 6, 1952	15.5	51		118	42	106		282	0		78						465	234	33	1,210	8.2
Mar. 24	10.2	42		117	47	120		245	0		86						485	284	35	1,380	8.1
June 11	1.63	78		142	80	261		172	0		285						585	544	45	2,240	8.1

## RED RIVER BASIN--Continued

## MISCELLANEOUS ANALYSES OF STREAMS IN RED RIVER BASIN IN OKLAHOMA--Continued

Chemical analyses, in parts per million, water year October 1951 to September 1952--Continued

Date of collection	Water discharge (cfs)	Temperature (°F)	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>		Per cent sodium	Specific conductance (micro-mhos at 25°C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium magnesium	Non-carbonate			

## NORTH FORK RED RIVER NEAR ERICK, BECKHAM COUNTY

Dec. 11, 1951 .....	5.50	33		413	112			188	0		345						1,400	1,340		3.150	7.7
Feb. 6, 1952 .....	7.21	50		323	92	258		171	0		335						1,190	1,080	32	21,870	8.1

## ALTUS-LUGERT RESERVOIR NEAR LUGERT, KIOWA COUNTY

Sept. 26, 1951 .....		73		129	36	112	113	148	0	--	143		--	--	--		470	348	34	1,380	7.9
Oct. 2, 1951 .....		68		124	40	122	113	147	0	384	142		0.8	916	1.25		474	354	34	1,320	7.5
Oct. 16, 1952 .....		44		154	39	122	120	145	0	--	143		--	--	--		545	426	33	1,380	7.8
Feb. 11, 1952 .....		46		132	38	132	120	147	0	398	149		--	970	1.32		486	365	35	1,390	8.0
Mar. 25, 1952 .....		46		138	46	127	130	154	0	--	155		--	--	--		535	409	34	1,470	8.1
Apr. 3, 1952 .....		55		138	40	130	151	151	0	424	160		1.3	1,030	1.40		509	385	36	1,470	8.0
May 2, 1952 .....		62		140	43	139	139	156	0	449	165		1.0	1,080	1.47		526	398	36	1,530	7.9
June 2, 1952 .....		69		148	47	135	150	150	0	467	175		.6	1,130	1.54		563	440	34	1,570	8.1
Aug. 6, 1952 .....		81		151	50	144	144	141	0	493	188		.7	1,190	1.62		582	466	35	1,680	7.5

## ELK CREEK NEAR HOBART, KIOWA COUNTY

Mar. 25, 1952 .....	3.74	42		206	109	153		480	9		129						965	557	26	2,020	8.3
June 11, 1952 .....	2.60	74		123	60	76		268	22		76						555	299	23	1,190	8.6
Aug. 4, 1952 .....	.02	--		100	112	214		264	0		210						710	494	40	2,000	7.4

## NORTH FORK RED RIVER NEAR HEADRICK, JACKSON COUNTY

Mar. 31, 1952 .....	18.7	46		419	181			193	0		3,980						1,790	1,630		13,600	7.8
June 11, 1952 .....	16.2	78		380	126			174	0		3,070						1,470	1,330		10,600	7.8

## OTTER CREEK NEAR MOUNTAIN PARK, KIOWA COUNTY

June 11, 1952 .....		68		24	6.9	8.4		100	0		6.2						89	8	17	208	7.2
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## DEEP RED RUN NEAR RANDLETT, COTTON COUNTY

Jan. 14, 1952 .....	1.13	54		154	39	374		389	0		498						545	226	60	2,520	8.1
Apr. 3, 1952 .....	2.60	50		147	47	24	134	292	0		195						264	64	53	1,080	7.8
June 11, 1952 .....	4.96	76		109	41	204		296	0		332						425	182	51	1,720	8.1





## RED RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN RED RIVER BASIN IN OKLAHOMA--Continued  
Chemical analyses, in parts per million, water year October 1951 to September 1952--Continued

Date of collection	Water discharge (cfs)	Temperature (°F)	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>	Percent sodium carbonate	Specific conductance (micro-mhos at 25°C)	pH
														Parts per million	Tons per acre-foot	Calcium magnesium	gate		

## WASHITA RIVER NEAR MIDWAY, ROGER MILLS COUNTY

Oct. 10, 1951	7.92	69		61	29	--		284	0		33					272	40	--	655	8.2
Jan. 21, 1952	14.5	44		85	16	45		291	0		34					278	40	26	669	8.1
Mar. 6	15.0	43		89	13	43		298	0		34					276	32	25	666	8.1
Apr. 23	23.6	68		30	24	50		160	0		37					174	43	38	540	8.1
June 11	2.23	87		32	27	55		155	4		38					190	56	39	590	8.4

## WASHITA RIVER NEAR CHEYENNE, ROGER MILLS COUNTY

Sept. 12, 1951	60.6	79		55	18	--		188	0		20					212	58	--	552	7.6
Dec. 19	57.0	32		153	17	96		188	0		44					405	251	34	1,380	7.8
Jan. 28, 1952	50.3	32		196	52	49		316	0		46					385	286	30	1,280	7.6
Mar.	36.3	58		134	54	194		279	0		53					435	47	30	1,430	7.9
June 11	.81	98		150	77	119		141	0		56					640	524	29	1,490	8.1

## SANDSTONE CREEK NEAR CHEYENNE, ROGER MILLS COUNTY

Sept. 12, 1951	9.54	72		56	36	--		112	0		7.5					286	194	--	575	7.6
Feb. 19, 1952	.52	54		541	129	150		254	0		41					1,880	1,670	15	2,970	7.9
Apr. 21	160	58		83	22	17		172	0		6.5					298	157	11	637	7.4

## BARNITZ CREEK NEAR ARAPAH0, CUSTER COUNTY

Oct. 8, 1951	0.65	64		147	30	--		156	0		6.5					490	362	--	983	8.1
Nov. 28	3.02	44		160	11	--		114	0		6.2					446	352	--	811	6.8
Mar. 4, 1952	.47	37		609	119	54		318	0		32					2,010	1,750	6	2,840	7.8
Apr. 23	45.9	47		270	57	15		187	0		7.8					910	757	3	1,510	7.2

## WASHITA RIVER NEAR CORDELL, WASHITA COUNTY

Aug. 4, 1952	1.46			382	110			569	288	0	1,190	845	1.2	3,410	4.64	1,410	1,190	47	4,650	7.2
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## RAINY MOUNTAIN CREEK NEAR MOUNTAIN VIEW, KIOWA COUNTY

Oct. 8, 1951	11.9	64	38	24	--	101	0	174			196	113	--	852	7.1
Nov. 29	.15	38	242	52	--	376	0	522			820	512	--	2,770	7.0
Jan. 15, 1952	.09	38	255	60	--	437	0	920			880	522	--	3,170	8.1
Mar. 5	.38	37	233	40	395	444	0	405			870	506	50	2,980	7.9
Apr. 22	1.65	49	123	36	164	122	0	174			470	364	43	1,580	8.2

## STINKING CREEK NEAR CARNEGIE, KIOWA COUNTY

Nov. 29, 1951	0.74	42	135	50	--	478	0	58			540	148	--	1,250	7.2
Jan. 15, 1952	.35	40	166	33	280	428	0	360			575	224	51	2,130	7.8
Mar. 5	1.06	37	124	40	142	425	0	132			475	126	39	1,330	7.9
Apr. 22	8.70	52	57	26	80	258	8	77			250	25	41	818	8.4

## WASHITA RIVER NEAR CARNEGIE, CADDO COUNTY

Oct. 9, 1951	1.08	60	200	58	--	244	0	90			740	540	--	1,970	7.6
Nov. 29	1.43	46	305	71	--	344	0	73			1,050	766	--	1,890	7.6
Jan. 30, 1952	59.9	45	263	56	106	293	0	76			885	645	21	1,690	8.0
May 22	12.5	32	131	36	62	189	0	62			478	320	22	1,100	8.1
July 9	18.5	30	226	66	166	269	6	208			584	30	30	2,040	8.3
Aug. 20	5.83	30	182	68	141	248	0	171			735	531	23	1,780	7.7

## POND CREEK NEAR FORT COBB, CADDO COUNTY

Sept. 5, 1951	5.84	--	61	41	--	188	0	16			320	166	--	689	8.1
Oct. 9	11.7	63	102	29	--	282	0	13			375	180	--	748	8.2
Nov. 29	23.3	48	125	17	--	302	0	12			380	132	--	731	8.0
Jan. 30, 1952	30.4	43	118	16	29	302	0	12			360	112	15	703	8.0
Mar. 5	34.9	39	103	20	32	311	0	14			338	83	17	705	8.0
Apr. 22	603	49	65	13	17	298	0	7.2			214	0	15	487	7.4
June 4	36.4	61	99	24	25	281	0	12			346	132	14	676	7.8
July 23	10.3	62	118	27	33	252	5	18			405	190	15	816	8.4
Aug. 20	5.38	76	107	40	36	224	0	19			430	246	15	828	7.9

## RED RIVER BASIN--Continued

## MISCELLANEOUS ANALYSES OF STREAMS IN RED RIVER BASIN IN OKLAHOMA--Continued

Chemical analyses, in parts per million, water year October 1951 to September 1952--Continued

Date of collection	Water discharge (cfs)	Temperature (° F)	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	Tons per day	Calcium magnesium	Non-carbonate				
WASHITA RIVER NEAR ANADARKO, CADDO COUNTY																							
Aug. 5, 1952 .....	28.3			159	54	107		213	0	468	133		1.8			1,120	1.51		618	444	27	1,550	7.2
SUGAR CREEK NEAR ANADARKO, CADDO COUNTY																							
Nov. 29, 1951 .....	2.89	56		124	24	--		268	0		14								410	190	--	732	8.1
Jan. 16, 1952 .....	3.90	37		123	9.5	29		242	5		12								345	138	15	692	8.3
Mar. 5, 1952 .....	2.53	39		150	14	33		286	0		16								430	196	14	834	8.2
Apr. 30, 1952 .....	15.9	56		147	33	40		237	2		20								500	302	15	1,010	8.3
June 4, 1952 .....	8.45	58		178	44	44		291	0		23								625	386	13	1,120	8.2
WASHITA RIVER NEAR CHICKASHA, GRADY COUNTY																							
Aug. 5, 1952 .....	33.6			143	69	106		254	0	482	114		0.4			1,150	1.56		640	432	26	1,580	7.3
Sept. 27, 1952 .....	9.56			137	80	95		346	0	482	65		1.8			1,100	1.50		671	388	24	1,460	7.8
BITTER CREEK NEAR CHICKASHA, GRADY COUNTY																							
Nov. 30, 1951 .....	8.74	40		107	54	--		466	0		14								492	110	--	919	7.9
Jan. 16, 1952 .....	1.39	41		55	70	37		390	0		14								425	106	16	852	8.0
Mar. 6, 1952 .....	4.23	38		137	23	33		437	0		13								435	77	14	835	8.0
June 3, 1952 .....	13.3	86		54	43	17		308	4		8.0								310	51	11	577	8.3
FINN CREEK NEAR STORY, GARVIN COUNTY																							
Sept. 5, 1951 .....	0.06	80		90	43	--		484	0		20								400	4	--	814	7.7
Oct. 9, 1951 .....	.08	47		102	29	--		533	3		17								375	15	--	737	8.3
Nov. 26, 1951 .....	.70	44		122	46	--		548	0		12								495	46	--	855	7.9
Jan. 14, 1952 .....	1.50	56		119	44	26		305	0		12								475	60	15	918	8.1
Mar. 4, 1952 .....	1.60	46		103	11	26		347	0		12								305	20	15	604	7.7
Apr. 22, 1952 .....	32.2	66		24	13	10		134	0		4.5								115	55	16	232	7.6
June 13, 1952 .....	1.00	85		87	45	37		444	0		16								405	41	17	778	8.0
July 23, 1952 .....	.68	88		61	47	32		423	0		12								344	0	17	713	8.0
Sept. 4, 1952 .....	.05	68		80	54	38		420	0		17								370	26	18	737	8.2

## WASHITA RIVER NEAR PAULS VALLEY, GARVIN COUNTY

Sept. 5, 1951.....	109	82	120	83	--	--	261	0	86				640	426	--	1,360	7.5
Oct. 9.....	177	58	75	71	--	--	299	0	42				480	235	--	1,050	7.8
Nov. 28.....	169	46	156	56	--	--	348	0	88				620	335	--	1,300	7.8
Jan. 14, 1952.....	235	58	214	43	--	--	324	0	90				710	444	21	1,430	7.9
Mar. 3.....	273	49	182	35	76	71	259	0	71				600	388	22	1,270	7.7
Apr. 21.....	1,390	70	183	18	13	9.0	194	0	9.0				194	35	13	381	8.0
June 13.....	390	84	113	41	46	60	235	0	60				450	258	18	954	7.8
July 24.....	127	85	102	34	42	47	183	0	47				395	245	19	906	7.3
Sept. 2.....	21.5	69	94	71	93	96	272	0	96				525	302	28	1,270	7.5

## RUSH CREEK NEAR PURDY, GARVIN COUNTY

Sept. 5, 1951.....	3.90	79	79	79	--	--	175	0	338				520	376	--	1,710	8.1
Oct. 9.....	5.93	68	117	64	--	--	288	0	290				555	319	--	1,650	7.9
Nov. 26.....	18.4	45	136	58	--	--	339	0	288				580	302	--	1,680	7.8
Jan. 14, 1952.....	16.2	60	138	47	84	222	295	0	222				540	298	25	1,420	7.8
Mar. 4.....	22.3	48	140	16	76	129	265	0	129				415	198	28	1,060	7.8
Apr. 22.....	23.1	66	199	58	127	228	294	0	228				485	232	36	1,370	8.0
June 13.....	17.4	85	117	72	89	171	235	0	171				590	398	25	1,350	8.1
July 23.....	4.94	103	103	65	124	265	210	0	265				525	353	34	1,390	7.7

## RUSH CREEK NEAR PAULS VALLEY, GARVIN COUNTY

July 2, 1952.....			67	101	203	199	0	412	305	1.7	1,260	1.71	582	420	43	1,960	8.1
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## WILDHORSE CREEK NEAR HOOVER, GARVIN COUNTY

Sept. 10, 1951.....	5.11	79	74	22	--	--	284	0	28				276	44	--	686	8.0
Nov. 28.....	3.40	47	119	31	--	--	393	0	44				432	100	--	861	7.8
Jan. 16, 1952.....	10.6	57	136	33	56	55	409	0	55				475	140	20	933	7.9
Mar. 5.....	63.3	45	82	16	44	46	251	0	46				296	90	24	667	7.6
Apr. 23.....	496	64	61	12	23	42	200	0	42				202	38	20	495	8.2
June 12.....	37.2	78	71	61	70	122	340	0	122				430	152	26	1,040	8.2
July 24.....	5.83	83	51	18	18	20	182	0	20				202	53	16	453	8.1

## RED RIVER BASIN--Continued

## MISCELLANEOUS ANALYSES OF STREAMS IN RED RIVER BASIN IN OKLAHOMA--Continued

Chemical analyses, in parts per million, water year October 1951 to September 1952--Continued

Date of collection	Water charge (cfs)	Temperature (°F)	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		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			

## LAWRENCE SPRINGS NEAR SULFUR, MURRAY COUNTY

Mar. 5, 1952 .....	4.27	63		104	22	10		396	0		13					352	28	6	638	7.5
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## ROCK CREEK NEAR DOUGHERTY, MURRAY COUNTY

Sept. 10, 1951 ....	28.2	84		78	17	--		224	0		219					262	78	--	1,090	8.2
Oct. 10, .....	9.19	71		77	22	--		242	0		208					232	85	--	1,260	7.8
Nov. 27, .....	14.7	49		88	24	--		309	0		215					318	65	--	1,270	8.2
Jan. 16, 1952 .....	10.8	55		99	24	188		307	0		262					346	94	54	1,410	8.0
Mar. 5, .....	17.5	46		87	13	49		216	0		27					218	41	33	635	7.9
Apr. 22, .....	59.4	63		68	13	21		256	0		195					210	40	18	448	8.0
June 22, .....	13.5	73		48	33	11		256	0		195					270	62	48	1,010	8.1
July 28, .....	3.48	83		48	25	148		219	3		245					242	53	57	1,190	8.3
Sept. 2, .....	3.30	82		54	40	240		230	4		398					300	105	64	1,170	8.4

## THREE MILE CREEK NEAR MILL CREEK, JOHNSTON COUNTY

Sept. 10, 1951 ....	0.12	74		46	14	--		190	0		5.5					172	16	--	320	7.4
Nov. 27, .....	52	49		108	21	--		397	0		8.8					358	32	--	613	8.1
Mar. 5, 1952 .....	48	48		111	18	11		388	0		11					350	32	6	632	7.7
Apr. 23, .....	1.61	62		67	39	7.8		336	0		8.5					328	52	5	566	7.6
June 11, .....	.30	77		55	49	6.8		376	2		6.8					340	28	4	560	8.3
Sept. 3, .....	.01	70		45	45	6.2		325	0		7.5					300	34	4	513	8.1

## MILL CREEK NEAR MILL CREEK, JOHNSTON COUNTY

Sept. 3, 1952 .....	2.15	67		42	46	5.0		316	0		6.5					294	35	4	490	7.9
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## PENNINGTON CREEK NEAR REAGAN, JOHNSTON COUNTY

Sept. 10, 1951.....	28.6	75	31	32	--	236	0	4.8				208	14	--	361	8.2
Nov. 27.....	16.1	52	83	29	--	368	0	3.5				326	24	--	542	7.9
Jan. 16, 1952.....	13.6	52	79	25	3.3	338	0	4.2				300	23	2	459	8.1
Mar. 5.....	15.1	47	93	18	2.8	354	0	4.0				308	18	2	533	8.0
Apr. 23.....	124	58	55	23	2.7	244	0	3.0				232	32	3	396	8.2
June 11.....	25.7	72	59	45	3.7	354	0	4.8				334	44	2	545	8.0
Sept. 3.....	9.93	74	36	45	3.0	296	0	3.8				276	34	2	450	7.9

## BLUE RIVER NEAR CONNERSVILLE, JOHNSTON COUNTY

Sept. 10, 1951.....	38.3	69	55	31	--	306	0	3.5				264	13	--	459	8.0
Nov. 27.....	25.9	54	94	30	--	398	0	3.5				356	30	--	578	8.0
Jan. 16, 1952.....	18.7	53	87	31	2.6	362	0	2.5				346	50	2	521	8.0
Mar. 5.....	23.8	45	89	28	2.6	386	0	3.0				338	22	2	571	7.8
Apr. 23.....	160	60	34	17	2.8	161	0	2.2				153	21	4	276	7.4
June 11.....	37.5	74	57	46	2.7	379	0	2.5				330	20	2	536	7.9
July 22.....	21.6	79	58	39	5.2	362	0	2.5				330	17	3	594	7.6
Sept. 3.....	13.3	60	57	43	2.6	347	0	2.8				320	36	2	525	7.6

## BLUE RIVER NEAR BLUE, BRYAN COUNTY

Oct. 2, 1951.....	25	76	71	13	6.4	278	0	5.5				252	24	5	445	7.8
Oct. 30.....	80	68	40	15	6.0	186	0	5.0				161	8	7	298	7.9
Nov. 23.....	43	55	70	30	10	323	9	7.8				296	16	7	497	8.5
Jan. 8, 1952.....	45	46	57	18	6.8	245	0	7.0				214	13	7	395	8.1
Feb. 5.....	43	48	84	16	9.2	320	0	8.0				274	12	7	501	8.1
Feb. 19.....	49	55	70	21	7.0	304	0	7.2				262	13	5	432	8.0
Mar. 11.....	--	55	36	8.5	16	149	8	6.5				126	0	2	303	8.5
July 22.....	--	86	42	31	5.9	285	0	5.0				232	0	5	438	7.9

**RED RIVER BASIN--Continued**  
**MISCELLANEOUS ANALYSES OF STREAMS IN RED RIVER BASIN IN OKLAHOMA--Continued**

Chemical analyses, in parts per million, water year October 1951 to September 1952--Continued

Date of collection	Water charge (cfs)	Temperature (° F)	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			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			
MUDDY BOGGY CREEK NEAR FARRIS, ATOKA COUNTY																						
Oct. 2, 1951	1.93	73		14	5.1	12		58	0		9.0							55	8	32	144	6.8
Oct. 30	282	64		8.4	2.9	7.6		29	0		4.0							33	9	33	91.4	6.7
Nov. 29	731	50		8.8	4.6	11		32	0		6.8							41	15	37	119	7.2
Dec. 24	--	40		10	3.9	11		34	0		11							41	13	37	124	7.1
Feb. 5, 1952	249	48		10	3.9	11		36	0		9.8							41	12	37	129	7.0
Feb. 19	189	52		7.6	3.6	11		27	0		12							34	12	41	120	6.8
Mar. 11	3,830	54		6.8	3.4	7.1		123	0		5.2							31	12	33	97.9	6.5
July 22	.06	91		32	11	23		159	3		19							123	0	29	339	8.4
CLEAR BOGGY CREEK NEAR CANEY, ATOKA COUNTY																						
Oct. 2, 1951	10.4	78		267	58	--		191	0		1,660							905	748	--	5,340	7.9
Oct. 30	101	65		45	17	141		116	0		191							182	87	63	844	7.9
Nov. 29	68.0	47		162	35	395		242	0		765							550	352	61	2,810	8.1
Dec. 24	26.1	37		127	33	296		231	0		550							455	265	59	2,100	7.8
Feb. 5, 1952	36.0	52		71	17	98		204	0		172							246	79	46	908	7.8
Feb. 19	44.6	52		144	38	380		254	0		770							515	307	62	2,740	7.9
Mar. 11	1,890	53		43	7.3	37		124	0		60							138	36	37	439	7.3
July 22	5,200	84		57	21	99		222	6		178							230	38	48	937	8.4



## MISSISSIPPI RIVER DELTA

VERMILION RIVER AT BANCER'S FERRY NEAR ABBEVILLE, LA.

LOCATION. --At Bancer's Ferry about 6 miles south of Abbeville, Vermilion Parish.

RECORDS AVAILABLE. --Chemical analyses: January 1949 to September 1952.

Water temperatures: January 1949 to September 1952.

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 sums of determined constituents. No records of discharge available for this station.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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	Color
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate	Sodium adsorption ratio				
Aug. 22-26, 1952.		16		13	9.0	57		86	9.4	90		2.5		244	0.33		69	15	64	3.0	420	7.3	
Aug. 27-31, .....		9.8		36	79	667		64	155	1,170		1.5		2,150	2.92		415	362	78	14	3,990	7.5	
Sept. 1-6, 20 .....		11		40	80	667		64	155	1,160		1.5		2,170	2.95		429	376	77	14	4,000	7.5	
Sept. 9-19 .....		12		80	202	1,640		68	405	2,920		--		5,290	7.19		1,030	974	78	22	9,350	7.5	

## MISSISSIPPI RIVER DELTA

## VERMILION RIVER AT BANCER'S FERRY NEAR ABBEVILLE, LA.

Specific conductance (micromhos) at 25°C and chloride, in parts per million, water year October 1951 to September 1952

Date of collection	Specific conductance	Chloride	Date of collection	Specific conductance	Chloride
Oct. 8, 1951 .....	286	51	Aug. 4 .....	256	47
Oct. 15 .....	295	59	Aug. 10 .....	165	29
Oct. 22 .....	357	79	Aug. 19 .....	303	63
Oct. 29 .....	397	58	Aug. 22 .....	286	--
Nov. 5 .....	683	160	Aug. 23 .....	286	--
Nov. 12 .....	505	108	Aug. 24 .....	295	--
Nov. 19 .....	404	77	Aug. 25 .....	347	--
Nov. 26 .....	1,210	318	Aug. 26 .....	876	--
Dec. 3 .....	1,920	530	Aug. 27 .....	2,930	--
Dec. 10 .....	403	90	Aug. 28 .....	4,260	--
Dec. 17 .....	1,090	310	Aug. 29 .....	4,240	--
Dec. 24 .....	335	74	Aug. 30 .....	4,200	--
Dec. 31 .....	203	36	Aug. 31 .....	4,130	--
Jan. 6, 1952 .....	303	57	Sept. 1 .....	4,370	--
Jan. 13 .....	385	79	Sept. 2 .....	4,160	--
Jan. 21 .....	378	77	Sept. 3 .....	3,780	--
Jan. 27 .....	400	79	Sept. 4 .....	3,550	--
Feb. 3 .....	249	53	Sept. 5 .....	3,680	--
Feb. 10 .....	228	39	Sept. 6 .....	3,560	--
Feb. 17 .....	189	32	Sept. 7 .....	3,670	--
Feb. 24 .....	99	15	Sept. 8 .....	3,970	--
Mar. 2 .....	213	38	Sept. 9 .....	5,350	--
Mar. 10 .....	227	35	Sept. 10 .....	7,580	--
Mar. 17 .....	356	71	Sept. 11 .....	9,180	--
Mar. 23 .....	319	63	Sept. 12 .....	9,310	--
Mar. 30 .....	264	47	Sept. 13 .....	10,100	--
Apr. 6 .....	156	29	Sept. 14 .....	11,400	--
Apr. 13 .....	112	18	Sept. 15 .....	10,900	--
Apr. 20 .....	188	30	Sept. 16 .....	9,800	--
Apr. 27 .....	249	60	Sept. 17 .....	9,800	--
May 5 .....	221	38	Sept. 18 .....	9,630	--
May 11 .....	258	49	Sept. 19 .....	8,130	--
May 18 .....	239	47	Sept. 20 .....	4,830	--
May 26 .....	203	39	Sept. 21 .....	5,070	1,510
June 2 .....	100	14	Sept. 22 .....	4,880	--
June 8 .....	98	13	Sept. 23 .....	3,420	980
June 15 .....	106	13	Sept. 24 .....	2,800	--
June 22 .....	115	19	Sept. 25 .....	2,220	150
June 29 .....	195	36	Sept. 26 .....	1,740	518
July 6 .....	6,760	2,070	Sept. 27 .....	1,010	192
July 13 .....	6,540	1,970	Sept. 28 .....	777	177
July 20 .....	556	138	Sept. 29 .....	688	--
July 28 .....	280	58	Sept. 30 .....	698	161



## PART 8. WESTERN GULF OF MEXICO BASINS

## MERMENTAU RIVER BASIN

## MERMENTAU RIVER AT LAKE ARTHUR, LA.

LOCATION.--At bridge on State Highway 25, about half a mile east of Lake Arthur, Jefferson Davis Parish.

RECORDS AVAILABLE.--Chemical analyses: January 1949 to September 1952.

Water temperatures: January 1949 to September 1952.

REMARKS.--Values reported for dissolved solids are residues on evaporation. No records of discharge available for this station.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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)	pH	Color
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate					
Aug. 22-31, 1952		12		6.4	4.9	25	25	56	3.5	28		1.8		119	0.16		36	0	60	1.8	194	7.4	
Sept. 1-10, .....		11		6.0	4.8	27	27	56	2.8	31		1.8		122	.17		35	0	63	2.0	203	7.3	
Sept. 11-20, .....		9.8		6.9	5.1	32	32	63	2.9	36		1.8		132	.18		38	0	64	2.2	229	7.0	

## MERMENTAU RIVER BASIN

## MERMENTAU RIVER AT LAKE ARTHUR, LA.

Specific conductance (micromhos) at 25°C and chloride, in parts per millions, water year October 1951 to September 1952

Date of collection	Specific Conductance	Chloride	Date of collection	Specific Conductance	Chloride
Oct. 8, 1951 .....	313	60	Aug. 22 .....	177	--
Oct. 16 .....	328	60	Aug. 23 .....	192	--
Oct. 22 .....	328	64	Aug. 24 .....	191	--
Oct. 29 .....	308	62	Aug. 25 .....	191	--
Nov. 5 .....	323	66	Aug. 26 .....	196	--
Nov. 12 .....	347	73	Aug. 27 .....	185	--
Nov. 19 .....	476	108	Aug. 28 .....	177	--
Nov. 26 .....	420	96	Aug. 29 .....	187	--
Dec. 3 .....	490	113	Aug. 30 .....	183	--
Dec. 10 .....	506	119	Aug. 31 .....	187	--
Dec. 17 .....	422	101	Sept. 1 .....	188	--
Dec. 31 .....	229	48	Sept. 2 .....	189	--
Jan. 6, 1952 .....	226	46	Sept. 3 .....	201	--
Jan. 14 .....	261	50	Sept. 4 .....	208	--
Feb. 11 .....	160	31	Sept. 5 .....	214	--
Feb. 18 .....	129	26	Sept. 6 .....	201	--
Feb. 25 .....	176	35	Sept. 7 .....	234	--
Mar. 3 .....	119	19	Sept. 8 .....	192	--
Mar. 11 .....	142	24	Sept. 9 .....	205	--
Mar. 17 .....	140	27	Sept. 10 .....	187	--
Mar. 24 .....	276	54	Sept. 11 .....	193	--
Mar. 31 .....	165	28	Sept. 12 .....	184	--
Apr. 7 .....	109	20	Sept. 13 .....	193	--
Apr. 14 .....	88.2	18	Sept. 14 .....	202	--
Apr. 22 .....	86.0	14	Sept. 15 .....	197	--
Apr. 28 .....	75.8	12	Sept. 16 .....	260	--
May 5 .....	70.1	9	Sept. 17 .....	256	--
May 12 .....	74.3	9	Sept. 18 .....	264	--
May 19 .....	72.3	8	Sept. 19 .....	257	--
May 28 .....	85.0	11	Sept. 20 .....	258	--
June 2 .....	239	34	Sept. 21 .....	331	53
June 8 .....	224	34	Sept. 22 .....	305	--
June 15 .....	329	58	Sept. 23 .....	303	51
June 23 .....	2,550	715	Sept. 24 .....	244	37
June 30 .....	6,330	1,960	Sept. 25 .....	245	--
July 11 .....	238	49	Sept. 26 .....	262	41
July 14 .....	277	56	Sept. 27 .....	259	--
July 28 .....	184	29	Sept. 28 .....	270	--
Aug. 11 .....	194	26	Sept. 29 .....	272	--
Aug. 18 .....	191	27	Sept. 30 .....	283	46

## WESTERN GULF OF MEXICO BASINS

## MERMENTAU RIVER BASIN--Continued

## MERMENTAU RIVER AT LAKE ARTHUR, LA.--Continued

Temperature (°F) of water, water year October 1951 to September 1952

[illegible]



## CALCASIEU RIVER BASIN--Continued

## CALCASIEU RIVER AT MOSS BLUFF, LA.--Continued

Specific conductance (micromhos) at 25°C and chloride, in parts per million, water year October 1951 to September 1952

Date of collection			Specific conductance		Chloride		Date of collection		Specific conductance		Chloride	
Top	Bottom		Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom
Oct. 8, 1951.....	655	20,300	175	7,000	Aug. 4, 1952.....	79.8	77.0	13	14			
Oct. 15.....	2,540	18,400	1,340	6,500	Aug. 11.....	227	3,720	54	1,110			
Oct. 22.....	4,550	27,500	1,340	8,920	Aug. 18.....	1,160	8,190	312	2,580			
Oct. 29.....	4,910	25,800	1,480	9,160	Aug. 23.....	1,110	18,300					
Nov. 5.....	6,420	25,800	1,970	9,150	Aug. 24.....	1,170	18,300					
Nov. 12.....	5,080	25,800	1,500	9,320	Aug. 25.....	1,740	20,100					
Nov. 19.....	25,000	25,000	1,650	8,820	Aug. 26.....	1,920	21,700					
Nov. 26.....	5,200	29,600	1,500	10,400	Aug. 27.....	2,740	23,600					
Dec. 3.....	7,240	28,600	2,270	10,600	Aug. 28.....	3,700	27,000					
Dec. 9.....	8,010	18,200	2,520	6,320	Aug. 29.....	4,250	28,600					
Dec. 17.....	174	159	42	36	Aug. 30.....	4,490	28,100					
Dec. 24.....	73	89	13	17	Aug. 31.....	4,810	28,800					
Dec. 31.....	177	248	38	58	Sept. 1.....	6,280	30,400					
Jan. 7, 1952.....	408	--	88	--	Sept. 2.....	7,880	29,800					
Jan. 9.....	19,800	--	6,800	--	Sept. 3.....	6,300	28,600					
Jan. 16.....	473	--	103	7,450	Sept. 4.....	6,800	29,800					
Jan. 21.....	1,160	17,600	305	6,000	Sept. 5.....	7,200	29,600					
Feb. 4.....	166	87	40	18	Sept. 6.....	7,870	28,800					
Feb. 11.....	50	--	9	--	Sept. 7.....	8,630	30,400					
Feb. 18.....	82	82	15	15	Sept. 8.....	9,880	30,400					
Feb. 25.....	78	81	15	15	Sept. 9.....	9,860	31,200					
Mar. 3.....	99	98	21	20	Sept. 10.....	11,700	31,200					
Mar. 10.....	403	20,100	101	6,900	Sept. 11.....	13,500	32,100					
Mar. 17.....	134	275	27	64	Sept. 12.....	13,400	31,200					
Mar. 24.....	103	145	20	20	Sept. 13.....	14,300	30,400					
Mar. 31.....	130	465	28	119	Sept. 14.....	13,500	30,600					
Apr. 7.....	71.4	153	14	14	Sept. 15.....	14,100	30,400					
Apr. 14.....	85.5	61.2	10	12	Sept. 16.....	12,700	29,800					
Apr. 21.....	59.2	61.2	10	12	Sept. 17.....	11,000	30,400					
Apr. 28.....	49.8	--	10	--	Sept. 18.....	10,300	30,100					
May 5.....	49.2	56.1	8	9	Sept. 19.....	8,980	30,100					
May 11.....	99.3	104	19	22	Sept. 20.....	8,210	29,300					
May 19.....	119	107	24	22	Sept. 21.....	7,940	30,300					
May 26.....	73.2	--	11	--	Sept. 22.....	8,470	30,300					
June 2.....	61.4	63.1	7	8	Sept. 23.....	7,950	30,300					
June 16.....	130	148	23	23	Sept. 24.....	7,660	29,700					
June 23.....	275	578	63	148	Sept. 25.....	7,710	29,700					
June 30.....	853	6,390	219	1,920	Sept. 26.....	7,660	30,000					
July 7.....	2,620	13,200	750	4,300	Sept. 27.....	8,010	30,300					
July 14.....	3,50	19,700	1,080	6,675	Sept. 28.....	7,430	30,000					
July 21.....	254	83.3	56	16	Sept. 29.....	7,940	29,700					
July 28.....	114	135	22	27	Sept. 30.....	7,970	29,300					





## 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 C. C. May, and at mile 333.

DRAINAGE AREA: 3,586 square miles.

RECORDS AVAILABLE: 1952--Chemical analyses: February to September 1952.

Water temperatures: February to September 1952.

EXTREMES: 1952--Dissolved solids: Maximum, 532 ppm July 14-17, 19 21-26; minimum, 115 ppm May 1-6, 8, 27-29.

Hardness: Maximum, 92 ppm June 22-30; minimum, 39 ppm May 1-6, 8, 27-29.

Specific conductance: Maximum daily, 1,130 micromhos July 22; minimum daily, 144 micromhos May 5.

Water temperatures: Maximum observed, 90°F July 31.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Values reported for dissolved solids are residues on evaporation. Records of discharge for water year October 1951 to September 1952 given in Water-Supply Paper 1242.

Chemical analyses, in parts per million, February to September 1952

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	Non-magnesium				
Feb. 26-29, 1952.....	2,170	14		12	4.7	50		15		26	84		1.0		232	0.32	1,360	49	37	69	3.1	384	6.1
Mar. 1-4, 7-9, 17-18..	1,873	15		15	6.7	54		18		41	88		1.4		257	.35	1,300	65	50	64	2.9	422	7.0
Mar. 5-6, 10, 26-31..	1,611	15		18	7.6	69		17		48	114		1.2		312	.42	1,360	76	62	66	3.4	523	6.4
Mar. 11-16, 19-25....	2,304	14		13	6.2	45		17		38	72		1.3		223	.30	1,390	58	44	63	2.6	354	6.2
Apr. 1-11.....	1,065	18		16	6.8	64		20		42	104		1.3		279	.38	802	68	51	67	3.4	478	6.9
Apr. 12-20.....	5,097	9.4		8.9	4.4	29		14		24	46		1.8		140	.19	1,930	40	29	61	2.0	234	6.5
Apr. 21-30.....	6,057	11		9.9	3.6	25		24		22	35		1.6		123	.17	2,010	40	20	58	1.7	206	6.8
May 1-6, 8, 27-29....	9,517	12		9.6	3.6	21		30		18	27		2.4		115	.16	2,970	39	14	54	1.4	175	6.4
May 7, 9-13, 24-26..	5,784	15		15	5.5	39		39		24	61		2.4		191	.26	2,980	60	28	59	2.2	326	6.5
May 30-31.....	746	20		20	7.4	82		37		33	137		1.9		340	.46	685	80	50	69	4.0	991	6.7
June 1-11.....	6,710	15		12	3.8	21		38		18	27		2.9		125	.17	2,260	46	14	50	1.3	196	7.2
June 12-21.....	2,713	20		21	6.3	31		64		23	47		3.1		192	.26	1,410	78	26	46	1.5	316	7.6
June 22-30.....	242	20		23	7.1	68		67		28	109		2.5		313	.43	205	92	37	62	3.1	536	7.7
July 1-10.....	136	22		23	8.1	94		70		24	150		1.2		385	.52	141	91	34	69	4.3	675	6.8
July 11-13, 18, 20..	163	16		20	7.5	97		58		23	156		1.2		377	.51	166	81	34	72	4.7	673	6.8
July 27-31.....	173	18		22	8.0	147		59		22	236		1.5		332	.72	246	86	40	78	6.8	942	6.7
July 14-17, 19, 21-26																							
Aug. 1-9.....	80.8	17		16	5.7	70		61		20	102		1.8		281	.38	61.3	63	13	71	3.8	494	7.3
Aug. 10-20.....	45.1	14		16	7.3	96		74		15	134		1.5		327	.44	39.8	82	20	69	4.1	610	7.5
Aug. 21-31.....	21.8	12		20	7.9	99		76		16	138		1.2		332	.45	27.7	80	21	70	4.3	624	7.5
Sept. 1-10.....	20.2	12		21	7.5	104		93		9.7	159		1.0		395	.52	22.7	85	9	73	4.9	691	7.7
Sept. 11-20.....	20.2	18.8		20	7.6	108		82		13	187		.8		435	.53	21.4	81	14	74	5.2	697	7.7
Sept. 21-30.....	22.2	16		22	8.1	122		99		8.4	187		.8		435	.59	26.1	88	8	75	5.6	775	7.6
Weighted average ..	2,134	14		13	4.8	34		31		24	61		2.1		169	0.23	974	52	27	59	2.0	277	--

a Mean discharge for water year October 1951 to September 1952 was 1,547 cfs. Runoff Feb. 26 - Sept. 30, 1952 was 82 percent of total for water year.

## SABINE RIVER BASIN--Continued

## SABINE RIVER NEAR TATUM, TEX.--Continued

Temperature (°F) of water, February to September 1952

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1						53	64	70	72	88	85	84
2						53	69	70	72	87	85	84
3						57	66	71	72	--	85	80
4						54	64	72	72	88	85	80
5						54	63	73	74	88	88	70
6						54	64	75	74	89	85	75
7						54	63	75	75	89	84	80
8						55	68	74	76	85	85	78
9						55	69	75	78	84	86	78
10						56	64	73	79	84	86	75
11						56	63	73	79	84	88	78
12						59	61	73	80	85	87	78
13						59	59	73	80	87	87	78
14						58	60	73	80	87	87	78
15						59	60	75	80	85	87	80
16						58	--	77	80	85	87	80
17						58	61	--	81	82	87	82
18						59	62	75	82	85	87	82
19						60	63	73	84	85	87	80
20						62	63	73	84	83	85	79
21					51	65	65	73	84	84	87	79
22						65	65	75	84	84	87	79
23						57	65	75	84	84	87	79
24						57	65	73	85	84	85	79
25						--	65	75	84	85	85	79
26						57	65	74	87	--	85	80
27						60	66	74	87	--	85	80
28						57	68	74	87	--	85	--
29						60	68	73	87	--	84	75
30						60	69	75	89	85	84	75
31						63	--	74	--	90	84	--
Average						58	64	74	80	86	86	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.--October 1945 to September 1946, October 1947 to September 1952.

Water temperatures: October 1947 to September 1952.

EXTREMES AVAILABLE.--Dissolved solids: Maximum, 258 ppm Nov. 1-15, 21-25; minimum, 59 ppm Apr. 22-30.

Hardness, 1951-52.--Dissolved solids: Maximum, 49 ppm July 1-11, 13; minimum, 16 ppm Dec. 15-17, 19-31, Apr. 22-30.

Specific conductance: Maximum daily, 517 microhos Nov. 14; minimum daily, 60.0 microhos Apr. 25.

Water temperatures: Maximum observed, 90°F Aug. 7, 18.

EXTREMES, 1945-46, 1947-52.--Dissolved solids: Maximum, 411 ppm Dec. 26-27, 1948; minimum, 35 ppm June 5-11, 1950.

Hardness: Maximum, 64 ppm Aug. 1, 11, 16-19, 21-23, 1948; minimum, 13 ppm June 5-11, 1950.

Specific conductance (1945-52): Maximum daily, 663 microhos June 22, 1951; minimum daily, 60.0 microhos Apr. 25, 1952.

Water temperatures (1947-52): Maximum observed, 90°F on several days during summer months; minimum observed, 34°F Jan. 24, 1948.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Values reported for dissolved solids are residues on evaporation unless otherwise noted. Records of discharge for water year October 1951 to September 1952 given in Water-Supply Paper 1242.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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 1.0°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				
Oct. 1-2, 6-15, 19, 21, 1951.....	1,039	17		6.7	2.4		23	31		6.4	31		2.0		114	0.16	320	27	1	66	1.9	163	6.9
Oct. 3-5, 16-18, 20, 22-31.....	832	16		8.0	2.7		34	30		8.9	49		2.5		138	.19	310	31	6	70	2.7	238	6.8
Nov. 1-15, 21-25.....	980	16		12	4.4		75	43		15	114		1.0		258	.35	683	48	13	77	4.8	472	6.8
Nov. 16-20, 26-30 ..	1,049	16		9.5	3.5		44	34		12	65		1.0		168	.23	476	38	10	71	3.1	312	6.7
Dec. 1-10.....	1,392	17		9.9	3.9		53	30		13	83		1.0		201	.27	755	41	16	74	3.6	355	7.4
Dec. 11-14.....	4,194	13		8.8	3.7		41	18		15	67		2.0		179	.24	2,030	37	22	71	3.0	289	6.9
Dec. 15-17, 19-31.....	3,611	9.4		--	--		20	12		11	26		1.0		100	.14	1,030	16	6	73	2.2	129	6.9
Jan. 1-10, 1952.....	3,134	15		6.3	3.5		29	15		18	43		1.5		132	.18	1,120	30	18	68	2.2	207	6.5
Jan. 11-20.....	2,242	18		8.5	4.2		43	20		18	68		1.2		183	.25	1,110	39	22	70	3.0	310	6.6
Jan. 21-31.....	2,771	19		9.7	4.5		50	19		20	80		2.0		201	.27	1,500	43	27	72	3.4	350	6.4
Feb. 1-3, 6-8, 15-16, 19-20, 13-14, 17, 19-20.....	14,130	16		7.8	4.2		45	16		22	69		1.5		179	.24	6,830	37	24	72	3.3	295	6.3
Feb. 4-5, 13-14, 17, 19-20.....	11,540	8.8		3.2	2.8		14	10		12	20		1.0		387	.09	2,090	20	11	61	1.4	109	6.2
Feb. 9-12, 18, 21-29.....	12,650	12		6.4	3.4		23	12		19	34		1.0		109	.15	3,720	20	11	62	1.8	176	6.4
Mar. 1-10.....	10,440	14		8.1	4.2		30	16		27	43		2.3		137	.19	3,860	37	24	64	2.1	228	6.7
Mar. 11-15, 26-31.....	8,505	14		8.8	4.2		28	13		26	41		1.4		144	.20	3,810	39	24	61	1.9	224	6.6
Mar. 16-25.....	12,800	11		6.6	3.9		20	14		20	30		1.4		106	.14	3,660	32	21	57	1.5	172	6.4

a Sum of determined constituents.

Apr. 1-10, 1952.....	6,024	16	9.6	4.7	29	21	25	44	2.6	149	.20	2,420	43	26	60	2.0	246	6.9
Apr. 11-21.....	12,160	10	5.5	2.9	18	14	16	24	2.3	94	.13	3,090	26	14	60	1.6	139	6.4
Apr. 22-30.....	34,780	6.4	3.1	1.9	10	10	11	12	1.8	59	.08	5,540	16	7	59	1.1	81.5	6.2
May 1-10.....	18,300	11	6.3	3.1	17	18	17	23	2.0	99	.13	4,890	28	14	57	1.4	151	6.3
May 11-19.....	12,110	12	8.0	3.6	17	31	14	22	2.2	103	.14	3,370	35	9	52	1.4	160	6.8
May 20-31.....	16,580	9.0	5.0	2.4	16	15	11	22	3.1	80	.11	3,580	22	10	61	1.5	128	6.4
June 1-22.....	10,530	15	12	3.8	26	47	16	32	1.7	134	.18	3,810	46	7	55	1.6	220	7.4
June 23-30.....	3,336	19	12	4.4	29	52	15	37	1.6	151	.21	1,360	48	5	57	1.9	243	7.4
July 1-11, 13.....	1,660	23	12	4.6	33	58	14	40	1.8	a157	.21	704	49	1	59	2.0	284	7.5
July 12, 14, 16, 23-24, 26-27, 30.....	3,320	20	7.3	3.2	26	38	12	30	1.5	a119	.16	1,070	31	0	64	2.0	187	7.4
July 15, 17-22, 25, 28-29, 31.....	5,208	14	4.7	2.0	16	21	7.6	20	2.0	82	.11	1,150	20	3	64	1.6	119	7.0
Aug. 1-10.....	1,840	20	8.2	3.3	24	38	8.7	31	3.0	a117	.16	481	34	3	60	1.7	197	7.1
Aug. 11-20.....	1,126	20	9.1	3.9	32	48	8.3	42	1.0	144	.20	432	39	0	64	2.3	227	7.7
Aug. 21-31.....	709	23	10	4.3	36	52	8.1	42	1.2	165	.22	318	43	0	68	2.6	268	7.7
Sept. 1-10.....	528	24	7	3.7	34	46	6.6	47	1.8	165	.22	336	39	0	68	2.4	260	7.6
Sept. 11-20.....	420	24	8.9	3.5	35	46	6.3	48	2.0	162	.22	208	37	0	68	2.5	258	7.5
Sept. 21-30.....	454	22	7.7	2.9	32	43	5.5	42	1.8	148	.20	181	31	0	69	2.5	227	7.3
Weighted average ..	6,415	12	6.9	3.2	23	21	16	32	1.8	112	0.15	1,940	30	13	62	1.8	176	--

a Sum of determined constituents.

## WESTERN GULF OF MEXICO BASINS

## SABINE RIVER BASIN--Continued

## SABINE RIVER NEAR RULIFF, TEX.--Continued

Temperature (°F) of water, water year October 1951 to September 1952

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	77	--	60	--	64	57	65	69	--	78	89	87
2	77	--	60	--	56	58	65	69	--	78	89	87
3	78	--	61	59	57	58	65	70	--	79	89	86
4	80	--	62	59	57	--	65	70	--	79	--	86
5	81	--	63	59	56	57	66	70	--	79	--	86
6	78	--	64	59	56	56	67	72	--	80	88	86
7	78	--	64	59	56	57	67	74	--	85	90	86
8	77	--	65	60	57	58	66	75	--	--	88	85
9	75	--	64	--	57	59	66	75	--	81	87	85
10	73	--	62	59	57	60	66	--	--	80	89	85
11	--	--	60	57	58	60	66	74	--	81	88	85
12	--	--	59	55	57	60	65	74	--	82	88	84
13	--	--	58	56	57	60	65	74	--	82	88	84
14	--	--	56	57	57	--	65	75	--	82	89	83
15	--	--	53	58	56	60	64	75	--	82	89	83
16	--	--	--	58	56	60	64	75	84	82	88	82
17	70	--	65	59	57	--	64	75	85	83	89	82
18	--	--	55	59	59	61	65	75	85	83	90	82
19	71	--	--	59	59	61	65	--	86	83	89	82
20	82	59	--	60	59	62	66	75	86	83	89	80
21	71	59	--	60	--	61	67	75	86	84	89	79
22	82	59	--	61	58	62	--	75	85	84	89	78
23	--	60	--	61	58	61	67	75	85	85	89	78
24	--	61	--	61	57	60	67	75	85	85	89	77
25	--	61	--	61	56	61	68	75	85	86	--	77
26	--	62	--	62	56	62	68	75	86	86	88	78
27	--	62	--	62	56	61	68	--	86	86	88	77
28	--	60	--	63	57	62	68	--	87	87	88	78
29	--	60	--	63	57	63	69	--	85	87	87	78
30	--	60	--	63	--	64	69	--	86	88	89	78
31	--	--	--	64	--	65	--	--	--	88	88	--
Average	--	--	--	60	57	60	66	--	--	83	89	82

SABINE RIVER BASIN--Continued  
COW BAYOU NEAR MAURICEVILLE, TEX.

LOCATION.--At gaging station at bridge on State Highway 235, half a mile upstream from Kansas City Southern Railway bridge, and 3 miles southwest of Mauriceville, Orange County.

DRAINAGE AREA.--127 square miles.

RECORDS AVAILABLE.--Chemical analyses: March to September 1952.

Water temperatures: March to September 1952.

EXTREMES, 1952.--Dissolved solids: Maximum, 692 ppm Sept. 21-30; minimum, 23 ppm Apr. 23-30.

Hardness: Maximum, 172 ppm Sept. 11-20, 21-30; minimum, 10 ppm Apr. 23-30, July 21-31.

Specific conductance: Maximum daily, 1,210 micromhos Sept. 24, 27-28; minimum daily, 22.0 micromhos Apr. 24.

Water temperatures: Maximum observed, 93°F June 15, Aug. 13.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Values reported for dissolved solids are residues on evaporation unless otherwise noted. Records of discharge for period March to September 1952 given in Water-Supply Paper 1242.

Chemical analyses, in parts per million, March to September 1952

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-tro-gen (NO <sub>3</sub> )	Bo-iron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Per-cent so-lids	So-lids adsorp-tion ratio	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium	Non-carbonate				
Mar. 21-20, 1952 ..	5.67	12		4.2	2.9	13		8		14	20		1.0		81	0.11	1.24	22	16	55	1.2	90.1	5.8
Mar. 21-31 .....	3.83	11		3.6	2.6	15		9		11	22		2.0		76	.10	.74	20	12	62	1.4	99.4	6.0
Apr. 1-4, 10-11, 13-14	197	7.0		4.3	2.9	14		7		11	24		1.2		78	.11	41.5	23	17	56	1.2	106	5.8
Apr. 5-9 .....	9.26	7.6		12	6.0	80		8		12	151		1.2		313	.43	7.83	55	50	76	4.7	538	5.5
Apr. 12, 15-22 .....	220	6.6		3.2	2.5	8.0		8		12	10		1.0		a47	.06	27.9	18	12	49	.8	54.8	5.7
Apr. 23-30 .....	1,541	3.5		1.8	1.3	3.6		7		5	4.2		1.0		a23	.03	95.7	10	4	44	.5	28.4	6.0
May 1-13 .....	40.3	5.6		1.4	2.1	6.9		8		6.3	8.5		2.0		a37	.05	4.03	12	6	55	.9	51.2	6.6
May 14-18 .....	2.84	11		5.0	3.6	29		16		10	46		2.8		121	.16	.93	27	14	70	2.4	192	7.0
May 19-31 .....	284	6.2		1.9	1.6	5.0		7		5.8	6.0		1.5		39	.05	26.7	11	6	49	.6	41.3	6.1
June 1-8 .....	19.9	9.4		2.1	1.7	8.6		7		5.4	13		2.2		61	.08	3.28	12	6	60	1.1	71.7	6.0
June 9-13 .....	1.56	10		6.2	4.1	28		13		8.3	49		2.2		134	.18	.96	32	18	66	2.2	211	6.6
June 14-21 .....	44	23		19	11	86		56		21	150		1.5		344	.47	.41	92	46	67	3.9	538	7.2
June 22-30 .....	.23	30		32	17	136		94		20	246		1.8		342	.74	.94	150	73	67	4.9	1,020	7.4
July 1-15 .....	.21	32		36	19	161		107		22	288		2.5		a16	.67	.84	168	80	68	5.4	1,130	7.6
July 16-20 .....	405	6.4		2.5	2.1	12		8		6.9	18		1.0		a56	.08	61.2	15	8	63	1.3	77.6	6.3
July 21-31 .....	72.5	9.8		3.6	2.4	6.8		9		6.2	9.0		1.0		51	.07	9.88	10	2	60	.9	55.7	6.3
Aug. 1-5 .....	1.54	11		1.8	1.3	12		11		6.7	20		1.5		a82	.08	.86	19	10	58	1.2	108	6.8
Aug. 6-8 .....	.17	15		9.4	6.9	35		29		7.4	68		1.8		a158	.21	.07	52	28	60	2.1	294	7.1
Aug. 9-14 .....	.10	23		20	11	84		58		14	152		1.2		386	.50	.10	95	48	66	3.7	630	7.7
Aug. 15-20 .....	b.03	31		28	16	125		84		18	226		1.2		512	.70	.04	136	67	67	4.6	913	7.9
Aug. 21-31 .....	b.10	29		31	18	141		96		21	255		1.0		586	.80	.16	154	75	67	5.0	1,030	7.3
Sept. 1-10 .....	.1	28		35	20	160		109		21	288		.8		642	.87	.17	170	80	67	5.4	1,170	7.5
Sept. 11-20 .....	b.05	28		36	20	166		110		22	298		.8		647	.88	.09	172	82	68	5.5	1,170	7.5
Sept. 21-30 .....	b.01	27		36	20	173		109		23	308		.8		692	.94	.02	172	82	69	5.7	1,210	7.5
Weighted average .	112	5.0		2.2	1.7	6.2		7		6.4	8.4		1.1		37	0.05	11.2	12	7	52	0.8	46.0	--

a Sum of determined constituents.

b Includes days of less than 0.05 second-foot flow.

## WESTERN GULF OF MEXICO BASINS

## SABINE RIVER BASIN--Continued

## COW BAYOU NEAR MAURICEVILLE, TEX.--Continued

Temperature (°F) of water, March to September 1952

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1						--	72	75	80	85	87	89
2						--	74	72	82	--	88	88
3						--	70	77	82	87	89	82
4						--	69	81	84	89	89	80
5						--	68	83	82	89	92	85
6						--	70	84	83	87	91	86
7						--	70	84	83	86	91	86
8						--	72	82	87	86	90	85
9						--	74	81	85	84	91	82
10						--	57	76	89	88	--	--
11						66	64	78	89	86	89	83
12						65	68	80	90	85	90	84
13						67	67	80	90	87	93	89
14						64	67	81	91	87	88	--
15						66	68	80	93	80	90	87
16						65	69	81	89	--	92	89
17						63	68	80	92	76	91	--
18						67	69	78	90	78	92	85
19						66	--	73	92	78	89	81
20						69	67	74	--	--	87	81
21						71	75	74	88	--	84	--
22						66	72	75	87	--	90	84
23						65	71	77	89	85	91	83
24						65	70	77	88	86	91	82
25						63	71	77	87	88	90	81
26						67	72	80	89	85	90	82
27						69	73	78	87	86	86	81
28						72	73	74	87	87	85	81
29						71	73	72	86	88	87	83
30						68	76	76	84	84	89	84
31						65	--	79	--	85	--	--
Average						--	70	78	87	85	89	84



SABINE RIVER BASIN--Continued  
MISCELLANEOUS ANALYSES OF STREAMS IN SABINE RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1951 to September 1952

Date of collection	Water 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)	Color or pH			
														Parts per million	Tons per acre-foot					Calcium, magnesium	Non-carbonate	
GREENVILLE RESERVOIR NO. 2 NEAR GREENVILLE																						
Mar. 25, 1952	.....	2.4	0.01	38	6.5	21	0.8	142	32	13	0.3	0.0	0.16	205	0.28		122	5	27	0.8	347	7.9
CHEROKEE LAKE NEAR LONGVIEW																						
Feb. 27, 1952	.....	7.8	0.70	3.5	2.3		8.7	14	13	7.8	0.2	0.5		a 52	0.07		18	7	51	0.9	81	6.6
TENAHA CREEK NEAR SHELBYVILLE																						
June 12, 1952	.....	9.20	19				24	53	26	18				139	0.19		44	1	54	1.6	198	7.9
PATROON BAYOU AT COUNTY ROAD BRIDGE 7 MILES NORTHEAST OF MILAM																						
June 12, 1952	.....	18.7	17				22	53	31	18				135	0.18		54	11	47	1.3	217	7.0
PALO GAUCHO CREEK NEAR HEMPHILL																						
May 15, 1952	...	25.6	19				7.5	28	8.0	7.8				75	0.10		26	3	38	0.6	89.3	6.8
PALO GAUCHO CREEK 7 MILES EAST SOUTHEAST OF MILAM																						
May 16, 1952	...	39.9	18				10	31	11	8				79	0.11		26	1	46	0.9	91.0	7.0
HOUSEN BAYOU 9 MILES EAST OF YELLOWPINE																						
June 13, 1952	.....	7.87	29				19	36	22	17				135	0.18		34	4	55	1.5	172	7.1
Sum of determined constituents.																						

a Sum of determined constituents.

SABINE RIVER BASIN--Continued  
MISCELLANEOUS ANALYSES OF STREAMS IN SABINE RIVER BASIN IN TEXAS--Continued

Chemical analyses, in parts per million, water year October 1951 to September 1952--Continued

Date of collection	Water 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)	Color or pH	
														Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate				
SANDY CREEK 9.5 MILES EAST OF YELLOWPINE																					
June 13, 1952 .....	24.7	23				7.7		16	6.2	7.2				64	0.09	13	0	56	0.9	60.0	6.6
MILL CREEK 12 MILES SOUTHEAST OF YELLOWPINE																					
June 13, 1952 .....	13.1	20				5.7		12	2.6	5.5				44	0.06	8	0	60	0.9	41.4	6.7
LITTLE COW CREEK AT BIRKEVILLE																					
Feb. 13, 1952 .....		12						9		9			0.2			21				60	7.7
CANEY CREEK AT BON WIER																					
May 13, 1952 .....	19.5	16				6.0		21	1.6	7.2				53	0.07	16	0	45	0.7	62.1	6.5
DEMPEY CREEK 5 MILES SOUTHWEST OF BON WIER																					
June 20, 1952 .....	5.11	28		1.9	0.8	5.9		18	1	6.2	0.3	0.5		54	0.07	8	0	6	0.9	51.9	6.5
BIG COW CREEK NEAR NEWTON																					
May 9, 1952 .....	53.8	13				5.8		14	1.6	6.0				38	0.05	9	0	58	0.8	41.2	6.5
DONAHOE CREEK 3 MILES SOUTHWEST OF BON WIER																					
June 20, 1952 .....	6.52	24		3.2	1.3	6.4		14	2	7.2		1.0		68	0.09	13	2	51	0.8	58.3	6.3
CYPRESS CREEK NEAR BUNA																					
June 4, 1952 .....	5.15	7.9				6.0		10	1.3	8.8				56	0.08	9	0	59	0.9	57.7	6.8
a Sum of determined constituents.																					

a Sum of determined constituents.

## NECHES RIVER BASIN

## NECHES RIVER AT EVADALE, TEX.

LOCATION --At gaging station on U. S. Highway 96, 200 feet upstream from Gulf, Colorado & Santa Fe Railway bridge at Evadale, Jasper County, 600 feet downstream from Mill Creek and 15 miles upstream from Village Creek.

DRAINAGE AREA --7,908 square miles.

RECORDS AVAILABLE --Chemical analyses: October 1947 to September 1952.

Water temperatures: October 1947 to September 1952.

EXTREMES, 1951-52. --Dissolved solids: Maximum, 180 ppm Dec. 1-10; minimum, 78 ppm Apr. 20-30.

Hardness: Maximum, 67 ppm July 1-10; minimum, 22 ppm Feb. 1-2, 4-8.

Specific conductance: Maximum daily, 342 micromhos Jan. 1; minimum observed, 49° F July 27; minimum observed, 49° F Nov. 21.

Water temperatures: Maximum daily, 93° F July 27; minimum observed, 49° F Nov. 21.

EXTREMES, 1947-52. --Dissolved solids: Maximum, 218 ppm Dec. 11-20, 1948; minimum, 46 ppm June 4-18, 1950.

Hardness: Maximum, 70 ppm Nov. 1-10, 1947; minimum, 16 ppm Sept. 22-25, 27, 1950.

Specific conductance: Maximum daily, 370 micromhos Aug. 29, 1951; minimum daily 53.7 micromhos Sept. 23, 1951.

Water temperatures: Maximum observed, 93° F July 27, 1952; minimum observed, 37° F Jan. 30-31, 1948, Jan. 31, 1949.

REMARKS --Records of specific conductance of daily samples available in district office at Austin, Tex. Values reported for dissolved solids are residues on evaporation unless otherwise noted. Records of discharge for water year October 1951 to September 1952 given in Water-Supply Paper 1242.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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 adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH		
															Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate					
Oct. 1-10, 1951	900	17	12	12	5.5	20	46	46	13	13	30	0.3	1.0	7.4	141	0.19	343	53	15	45	1.2	208	7.3
Oct. 11-20	344	20	13	13	6.6	28	59	59	18	18	37	3	1.5	7.4	173	24	161	60	11	50	1.6	261	7.4
Oct. 21-31	352	20	11	11	3.9	36	52	52	16	16	43	2	1.5	6.1	159	22	151	44	1	64	2.4	255	7.7
Nov. 1-10	343	21	11	11	4.5	37	52	52	20	20	43	2	2.0	6.3	166	23	154	46	3	84	2.4	263	7.6
Nov. 11-20	375	21	12	12	4.8	40	46	46	18	18	55	2	1.0	7.6	a 175	24	177	50	12	63	2.4	284	7.6
Nov. 21-30	343	22	11	11	3.7	40	49	49	20	20	48	2	1.5	7.5	172	23	159	43	2	67	2.6	276	7.5
Dec. 1-10	692	20	11	11	3.8	42	47	47	22	22	51	2	5	7.6	180	24	336	43	5	68	2.7	290	7.6
Dec. 11-20	1,997	17	8.3	8.3	3.4	34	28	28	22	22	44	3	1.0	7.1	143	19	771	35	12	68	2.6	233	7.2
Dec. 21-31	1,416	19	8.5	8.5	3.9	35	22	22	22	22	50	2	1.2	7.0	155	21	593	37	19	67	2.5	260	7.0
Jan. 1-10, 1952	1,909	18	8.5	8.5	4.0	35	19	19	24	24	51	3	5	6.9	156	21	804	38	22	67	2.4	258	6.9
Jan. 11-20	1,339	19	8.4	8.4	3.8	27	21	21	22	22	38	2	5	6.9	139	19	503	37	19	61	2.0	223	6.9
Jan. 21-31	1,713	19	8.7	8.7	4.3	33	14	14	24	24	51	3	1.0	7.1	156	21	722	39	28	65	2.2	266	7.1
Feb. 1-2, 4-8	7,737	10	4.2	4.2	2.7	15	13	13	17	17	18	--	5	6.4	85	12	1,780	22	11	60	1.4	112	6.4
Feb. 9-20	4,413	16	8.8	8.8	4.4	30	18	18	27	27	43	3	5	6.5	148	20	1,760	40	25	62	2.1	231	6.5
Feb. 21-29	5,710	17	8.5	8.5	4.5	30	18	18	30	30	41	3	8	6.5	148	20	2,280	40	25	62	2.1	235	6.5
Mar. 1-10	7,253	16	8.1	8.1	4.2	26	17	17	32	32	32	2	1.0	6.6	138	19	2,700	37	24	60	1.8	197	6.6
Mar. 11-20	4,286	16	8.5	8.5	4.3	25	17	17	32	31	31	2	1.2	6.6	138	19	1,600	39	25	58	1.8	209	6.6
Mar. 21-31	9,233	14	7.8	7.8	3.6	22	17	17	29	29	27	1	8	6.6	120	16	2,990	34	20	58	1.6	177	6.6

a Sum of determined constituents.

## NECHES RIVER BASIN--Continued

## NECHES RIVER AT EWDALE, TEX.--Continued

Chemical analyses, in parts per million, water year October 1951 to September 1952.--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> )	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, mg./l.	Non-carbonate			
Apr. 1-10, 1952.....	5,810	15		10	4.8	25		22		32	33	0.2	0.8		138	0.19	2,160	45	27	55	216	6.7
Apr. 11-19.....	9,267	14		8.5	4.3	22		23		26	28	.2	1.0		120	.16	3,000	39	20	56	185	6.8
Apr. 20-30.....	12,090	10		5.1	2.7	14		18		17	15	.1	1.2		78	.11	2,550	24	9	57	111	6.7
May 1-10.....	12,560	14		6.0	3.1	19		21		20	21	.0	2.0		96	.13	3,260	28	10	60	140	6.8
May 11-20.....	6,837	17		7.5	4.1	24		26		22	28	.1	1.0		a 118	.16	2,180	36	14	59	117	6.9
May 21-31.....	14,620	13		5.8	3.2	13		20		17	14	.1	1.5		82	.11	3,240	28	11	50	110	6.4
June 1-10.....	9,856	15		5.5	2.9	15		24		16	14	.1	2.0		88	.12	2,340	26	6	56	134	7.1
June 11-20.....	2,896	18		8.4	4.2	24		30		21	29	.1	3.5		a 123	.17	962	38	14	58	163	7.3
June 21-30.....	1,736	18		9.4	4.5	27		36		20	35	.1	1.0		a 133	.18	623	42	12	58	188	7.3
July 1-10.....	1,502	21		18	5.4	24		44		21	42	.3	1.0		a 155	.21	629	67	30	44	248	7.1
July 11-20.....	1,458	19		15	5.0	24		46		20	36	.3	.8		a 143	.19	563	58	21	47	230	7.0
July 21-31.....	1,055	18		12	4.8	24		46		15	33	.3	1.0		a 131	.18	373	49	12	51	220	7.1
Aug. 1-10.....	1,432	21		12	4.9	28		53		13	38	.1	1.5		159	.22	615	50	7	55	248	7.5
Aug. 11-20.....	1,168	22		12	4.9	31		56		12	41	.1	1.8		165	.22	620	50	4	57	256	7.5
Aug. 21-31.....	720	22		12	5.1	32		55		11	43	.1	2.2		165	.22	621	51	6	59	264	7.4
Sept. 1-10.....	574	25		12	5.2	34		62		8	42	.3	2.8		167	.23	633	51	1	59	261	7.5
Sept. 11-20.....	268	23		13	5.1	31		73		7	38	.2	1.8		165	.22	586	53	0	58	261	7.5
Sept. 21-30.....	216	26		13	4.5	34		73		7	38	.2	2.2		165	.22	586	53	0	58	261	7.5
Weighted average	3,718	15		7.6	3.7	22		23		22	27	0.1	1.3		115	0.16	1,150	34	15	59	174	--

a Sum of determined constituents.

## NECHES RIVER BASIN--Continued

## NECHES RIVER AT EVADALE, TEX.--Continued

Temperature (°F) of water, water year October 1951 to September 1952

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	75	70	56	63	61	57	64	69	72	84	85	85
2	77	62	58	63	59	56	64	70	75	85	85	85
3	77	56	63	63	61	58	65	70	76	86	86	81
4	80	56	59	60	--	55	64	71	76	87	86	80
5	79	61	63	58	55	56	63	73	79	87	87	75
6	78	56	66	57	55	55	64	74	78	--	87	78
7	75	56	67	55	53	56	66	74	79	86	87	79
8	79	55	70	55	54	57	65	74	79	85	87	70
9	70	56	60	61	57	58	66	75	79	86	86	80
10	64	59	57	55	58	61	65	76	80	84	87	79
11	66	60	55	55	60	58	65	72	81	85	86	78
12	67	67	55	56	61	69	65	71	81	--	87	78
13	67	66	56	59	63	60	63	71	81	86	87	79
14	67	68	63	60	60	61	62	73	82	87	87	81
15	68	68	56	63	63	59	62	74	84	86	87	81
16	69	65	50	63	59	60	62	73	82	85	85	81
17	69	57	51	64	57	60	63	75	84	82	87	80
18	71	--	54	65	56	60	65	75	85	84	87	80
19	70	55	54	66	59	--	65	72	85	81	88	80
20	70	50	60	66	60	61	66	69	85	82	87	80
21	72	49	50	67	60	66	67	69	85	83	87	79
22	75	51	50	68	60	64	70	71	85	83	86	--
23	75	60	50	62	60	51	68	74	85	85	86	--
24	71	63	--	59	59	55	65	72	85	85	--	--
25	71	60	59	61	58	58	65	75	87	85	86	--
26	70	65	56	61	55	59	65	74	86	88	86	72
27	72	67	53	67	52	60	65	75	86	93	85	72
28	72	56	51	60	56	62	67	75	85	86	83	73
29	71	56	60	60	--	63	67	74	85	86	81	73
30	76	57	57	59	--	64	69	72	85	87	83	73
31	75	--	54	61	--	66	--	73	--	85	83	--
Average	72	60	57	61	58	60	65	73	82	85	86	78

## NECHES RIVER BASIN--Continued

## MISCELLANEOUS ANALYSES OF STREAMS IN NECHES RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1951 to September 1952

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	Color
														Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate				
NECHES RIVER AT STATE HIGHWAY 31 NEAR CHANDLER																					
Feb. 27, 1952 ...		12		8.6	4.8	25		22	33	29		1.8		130	0.18		41	23	57	207	6.8
LAKE TYLER NEAR WHITEHOUSE																					
Feb. 27, 1952 ...		4.0	0.03	9.0	4.6	10		46	7.3	12	0.3	0.5		92	0.13		41	4	35	138	6.8

# TRINITY RIVER BASIN

## CLEAR FORK TRINITY RIVER AT FORT WORTH, TEX.

**LOCATION** --At Texas & Pacific water plant one-eighth of a mile downstream from gaging station which is at bridge on Vickery Boulevard at 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, and 5 miles downstream from Mays Creek.

**DRAINAGE AREA** --526 square miles.

**RECORDS AVAILABLE** --Chemical analyses: October 1948 to September 1952.

**Water temperatures:** October 1948 to September 1952

**EXTREMES 1951-52** --Dissolved solids: Maximum, 366 ppm Dec. 21-31; minimum, 191 ppm Aug. 11-20.

**Hardness:** Maximum, 218 ppm Jan. 21-31; minimum, 109 ppm Aug. 11-20.

**Specific conductance:** Maximum daily, 600 microhmhos Dec. 13; minimum daily, 201 microhmhos May 24.

**Water temperatures:** Maximum observed, 97°F Aug. 6; minimum observed, 41°F Dec. 22.

**EXTREMES, 1948-52** --Dissolved solids: Maximum, 631 ppm Jan. 11-31, 1949; 6; minimum observed, 41°F Dec. 22.

**Hardness:** Maximum, 322 ppm Dec. 1-10, 1950; minimum, 68 ppm May 17, 1949.

**Specific conductance (1950-52):** Maximum daily, 842 microhmhos Mar. 31, 1951; minimum daily, 201 microhmhos May 24, 1952.

**Water temperatures:** Maximum observed, 97°F Aug. 6, 1952; minimum observed, freezing point on several days in January 1949.

**REMARKS** --Values reported for dissolved solids are residues on evaporation unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1951 to September 1952 given in Water-Supply Paper 1242.

## TRINITY RIVER BASIN

Chemical analyses, in parts per million, water year October 1951 to September 1952

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 (microhmhos at 25°C)	pH	Color
														Parts per million	Tons per acre-foot	Tons per day					
Oct. 1-10, 1951..	a 0	5.0	4.1	7.6	42	172	28	38	0.4	1.2	267	0.36	0.0	134	0	41	1.6	456	7.7		
Oct. 11-20.....	a 0	4.0	4.4	7.6	49	190	29	42	4	1.0	287	3.39	0	141	0	43	1.8	494	7.8		
Oct. 21-31.....	a 0	5.8	4.6	7.4	49	193	28	44	4	2.0	283	3.38	0	146	0	42	1.8	494	7.8		
Nov. 1-10.....	a 0	7.2	5.0	7.2	46	188	29	42	4	2.5	287	3.39	0	154	0	39	1.6	492	7.8		
Nov. 11-20.....	a .09	7.6	5.4	6.9	48	210	30	44	4	2.0	302	4.1	.07	163	0	39	1.6	524	8.0		
Nov. 21-30.....	a .50	7.6	5.6	6.2	47	208	32	43	4	1.5	297	4.0		165	0	38	1.6	526	7.6		
Dec. 1-10.....	1.52	7.4	5.6	6.6	54	204	37	54	4	5	322	4.4	1.32	166	0	41	1.8	556	7.3		
Dec. 11-20.....	3.69	9.4	6.3	9.6	53	222	52	58	3	5	b 352	4.8	3.51	196	14	37	1.6	601	7.7		
Dec. 21-31.....	4.25	13	6.7	8.2	54	232	53	50	3	5	366	5.0	4.20	202	10	37	1.6	584	7.7		
Jan. 1-10, 1952..	9.34	9.2	7.0	8.3	42	239	45	42	3	2	354	4.8	3.29	212	16	30	1.2	576	7.5		
Jan. 11-20.....	9.35	9.5	7.1	8.4	37	240	45	36	3	5	341	4.6	4.56	216	19	27	1.1	568	7.9		
Jan. 21-31.....	9.79	12	7.1	8.5	33	243	43	32	--	5	330	4.5	8.72	218	18	25	1.0	534	8.0		
Feb. 1-10.....	24.4	9.2	5.5	8.8	24	183	43	20	3	1.2	258	3.5	17.0	173	24	23	8	424	7.7		
Feb. 11-20.....	8.99	9.6	5.2	6.7	25	177	37	22	3	1.0	245	3.5	5.95	157	17	28	9	404	7.7		
Feb. 21-30.....	9.83	9.6	5.5	5.8	26	179	34	25	3	1.0	253	3.4	6.71	161	14	28	9	417	7.7		
Mar. 1-10.....	9.99	9.6	5.9	5.9	30	198	37	30	4	1.5	277	3.8	7.47	181	19	26	1.0	465	7.7		
Mar. 11-20.....	9.96	7.8	6.3	9.3	36	217	44	34	4	1.0	305	4.1	8.20	195	17	29	1.1	515	7.6		
Mar. 21-31.....	11.5	9.2	6.1	9.9	37	215	44	35	3	1.0	310	4.2	9.63	192	16	30	1.2	530	7.9		

a Includes days of less than 0.05 cubic foot per second discharge.

b Sum of determined constituents.

TRINITY RIVER BASIN--Continued  
CLEAR FORK TRINITY RIVER AT FORT WORTH, TEX.--Continued

Chemical analyses, in parts per million, water year October 1951 to September 1952--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>		Per cent sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH	Color	
													Parts per million	Tons per acre-foot	Tons per day	Calcium magnesium	Non-carbonate					
Apr. 1-10, 1952	10.2	7.6		58	9.9	40		207	44	39	0.4	1.0	308	0.42	8.48	185	16	32	1.3	532	7.8	
Apr. 11-20	27.6	8.2		55	11	33		193	41	36	.3	2.0	311	.42	23.2	182	24	28	1.1	492	8.1	
Apr. 21-30	166	10		43	6.9	11		133	24	13	.2	4.0	213	.29	95.5	136	27	15	.4	315	7.7	
May 1-10	47.7	10		54	9.7	21		170	38	27	.2	2.5	277	.38	35.7	175	35	20	.7	432	7.9	
May 11-20	189	10		50	6.7	35		166	44	30	.3	3.2	256	.35	131	152	16	33	1.2	437	7.7	
May 21-31	149	15		50	4.0	20		159	29	14	.3	3.2	211	.29	84.9	141	11	23	.7	347	7.9	
June 1-10	17.4	13		62	6.0	21		199	28	22	.3	1.8	260	.35	12.2	179	16	20	.7	438	8.1	
June 11-20	4.80	15		50	7.5	21		171	29	20	.3	2.2	243	.33	3.15	156	16	23	.7	413	8.2	
June 21-30	a. 05	14		54	7.8	26		185	30	28	.3	1.8	253	.34	.03	168	16	25	.9	439	8.2	
July 1-10	a. 23	12		55	7.5	27		184	29	28	.3	1.8	249	.34	.15	163	12	27	.9	431	8.2	
July 11-20	a. 07	9.0		55	7.3	28		192	28	29	.3	1.2	252	.34	.05	167	10	27	1.0	450	8.2	
July 21-31	a. 0	10		54	6.7	27		185	26	29	.4	1.8	262	.36	.0	162	11	27	.9	450	7.8	
Aug. 1-10	a. 3.2	11		41	5.0	26		146	22	24	.4	2.2	205	.28	1.77	123	3	31	1.0	363	7.6	
Aug. 11-20	a. 0	10		38	4.6	27		133	21	24	.4	1.2	191	.26	.0	109	0	35	1.1	346	7.5	
Aug. 21-30	a. 0	10		36	4.8	28		137	21	26	.4	1.8	197	.27	.0	110	0	37	1.2	354	7.6	
Sept. 1-10	a. 0	9.8		44	4.6	28		156	20	27	.4	2.8	234	.32	.0	129	1	32	1.1	375	7.4	
Sept. 11-20	a. 0	12		44	4.3	29		156	20	27	.4	2.8	236	.32	.0	128	0	33	1.1	377	8.0	
Sept. 21-30	a. 69	11		48	4.6	28		170	20	26	.4	2.2	247	.34	.46	139	0	31	1.0	395	7.8	
Weighted average	20.1	11		51	6.8	24		165	35	23	0.3	2.9	245	0.33	13.3	155	20	25	0.8	399	--	

Includes days of less than 0.05 cubic foot per second discharge.

a Includes days of less than 0.05 cubic foot per second discharge.



TRINITY RIVER BASIN--Continued  
 CLEAR FORK TRINITY RIVER AT FORT WORTH, TEX.--Continued  
 Temperature (°F) of water, water year October 1951 to September 1952.

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	75	68	56	48	56	54	57	52	60	58	52	50	73	69	74	70	82	77	89	84	80	77	84	--
2	77	70	55	--	56	52	48	59	58	54	51	50	70	65	74	73	84	78	90	87	--	--	84	--
3	81	70	a53	--	62	59	48	45	59	57	57	53	68	64	76	73	86	80	90	87	--	--	88	83
4	75	71	a55	--	60	57	48	45	58	55	54	50	64	60	80	73	85	81	94	87	a92	--	--	a84
5	76	72	a56	--	57	56	47	44	58	53	55	50	64	57	82	76	87	82	93	87	85	80	a83	--
6	74	69	a50	--	57	56	47	44	57	53	57	53	65	60	79	76	86	82	92	88	97	85	a82	--
7	70	66	a51	--	57	55	46	44	55	52	57	53	65	62	80	75	85	83	91	88	93	87	a80	--
8	70	63	a54	--	55	52	48	47	56	53	58	55	68	65	81	75	88	82	88	83	90	86	a82	--
9	70	62	a52	--	52	49	49	47	56	52	58	57	68	61	82	78	89	83	89	82	93	86	a83	--
10	68	61	a55	--	50	47	48	46	57	54	59	56	63	58	78	71	89	86	88	82	92	88	a82	--
11	66	61	a80	--	50	46	46	45	61	57	59	53	61	58	76	69	88	86	89	82	91	86	a82	--
12	66	61	a59	--	50	46	49	46	61	59	63	58	59	55	77	69	88	84	89	85	a84	--	--	a82
13	66	62	a63	--	51	50	52	48	62	59	61	57	59	55	76	71	90	84	90	86	a87	--	--	a82
14	66	63	a58	--	51	48	55	52	61	57	62	58	63	59	76	72	90	85	a89	--	a90	--	--	a85
15	67	63	a58	--	48	44	58	55	57	52	61	57	66	59	75	72	90	86	a89	--	a90	--	--	a83
16	67	64	a57	--	44	42	60	57	52	51	59	55	66	62	75	72	90	86	a87	--	a90	--	--	a85
17	66	64	a54	--	45	44	64	60	53	48	54	53	65	63	76	71	93	87	a84	--	a91	--	--	a86
18	70	64	a47	--	46	44	63	60	54	52	61	57	65	63	71	63	93	88	83	81	a89	--	--	a84
19	87	63	a48	--	47	44	65	61	58	54	64	58	66	65	63	62	93	87	85	81	a90	--	--	a82
20	65	62	a50	--	47	45	64	60	56	53	67	62	65	62	67	63	92	88	86	82	a89	--	--	a82
21	--	--	--	--	45	42	62	59	55	52	70	67	66	64	75	65	91	87	85	82	a89	--	--	a76
22	--	--	--	--	44	41	61	56	56	54	67	58	66	64	77	70	89	86	85	81	a91	--	--	a75
23	--	--	--	--	46	43	56	52	55	54	58	55	65	62	76	66	88	85	88	--	a91	--	--	a78
24	--	--	--	--	46	44	54	51	54	53	58	54	65	63	68	63	88	84	80	--	a91	--	--	85
25	--	--	--	--	49	46	58	54	53	50	61	55	70	63	68	65	88	85	a89	--	a90	--	--	84
26	--	--	--	--	47	44	62	57	52	48	61	57	73	63	73	69	89	84	90	--	a92	--	--	85
27	--	--	--	--	45	42	61	56	54	48	61	56	71	63	76	73	88	85	a90	--	a89	--	--	84
28	--	--	--	--	46	42	56	54	55	52	61	53	70	66	74	72	92	84	a91	--	a87	--	--	84
29	--	--	--	--	52	48	46	55	52	55	61	59	70	66	73	70	93	85	a91	--	a86	--	--	83
30	--	--	--	--	54	50	52	49	47	56	54	60	75	68	77	71	92	85	a89	--	a85	--	--	79
31	--	--	--	--	56	50	58	56	--	--	--	73	63	--	--	79	73	--	--	--	--	--	--	--
Average	68	63	--	--	50	48	55	52	57	53	60	56	66	62	75	70	89	84	--	--	--	--	--	--

a No thermograph record, once-daily temperature measurement.

## TRINITY RIVER BASIN--Continued

## TRINITY RIVER NEAR OAKWOOD, TEX.

LOCATION.--At gaging station at bridge on U. S. Highways 79 and 84, 1½ miles upstream from International-Great Northern Railroad bridge, 6 miles northeast of Oakwood, Leon County, and at mile 313.

DRAINAGE AREA.--12,912 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1952.

EXTREMES, 1951-52.--Dissolved solids: Maximum, 1,430 ppm Sept. 1-9; minimum, 234 ppm Apr. 22-30.

Hardness: Maximum, 244 ppm July 2, 2, 25-28, 31; minimum, 124 ppm Mar. 4-13-16.

Water temperature: Maximum daily, 2, 950 microns Dec. 1; minimum daily, 351 microns Apr. 29.

Water temperature: Maximum daily, 2, 950 microns Dec. 1; minimum daily, 351 microns Apr. 29.

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Chemical analyses, in parts per million, water year October 1951 to September 1952

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Potassium (K)		Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Bo-ron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Per-cent sodium adsorp-tion ratio	Specific conductance (micro-mhos at 25°C)	pH	Col-or	
						Sodium (Na)	Sodium (Na)							Parts per mil-lion	Tons per acre-foot	Tons per day	Calcium, mg. per nesium	Non-carbon-ate					
Oct. 1-10, 1951...	329	14		58	8.2	185		148	108	230		26		712	0.97	632	178	56	69	6.0	1,230	7.7	
Oct. 11-20, 1951...	301	14		60	8.7	214		151	127	265		26		807	1.10	656	186	62	71	6.8	1,400	7.6	
Oct. 21-31, 1951...	340	14		60	9.2	235		137	130	295		42		891	1.21	818	188	75	73	7.4	1,470	7.5	
Nov. 1-10, 1951...	482	11		47	6.9	178		102	106	218		40		687	0.93	894	146	62	73	6.5	1,140	7.3	
Nov. 11-15, 1951...	263	15		58	7.9	195		116	100	268		37		771	1.05	547	177	82	71	6.4	1,290	7.8	
Nov. 16-20, 1951...	340	14		56	10	324		128	108	475		34		1,080	1.47	700	180	76	80	10	1,930	7.5	
Nov. 21-30, 1951...	273	14		60	10	288		129	145	378		49		1,010	1.37	744	190	85	77	9.1	1,780	7.1	
Dec. 1-10, 1951...	350	19		62	14	410		99	153	578		60		1,340	1.82	1,270	212	131	81	12	2,370	7.8	
Dec. 11-20, 1951...	333	18		57	12	253		84	140	325		58		926	1.26	833	170	102	76	8.5	1,590	7.3	
Dec. 21-31, 1951...	307	17		57	12	311		109	138	415		62		1,070	1.46	887	192	102	78	9.7	1,860	7.8	
Jan. 1-10, 1952...	417	14		54	12	341		95	162	442		68		1,140	1.55	1,280	184	106	80	11	2,000	7.6	
Jan. 11-20, 1952...	342	15		46	8.4	227		84	117	305		28		849	1.15	784	150	80	77	8.1	1,430	7.4	
Jan. 21-31, 1952...	368	13		54	12	299		95	144	398		56		1,020	1.39	1,010	184	106	78	9.6	1,850	7.1	
Feb. 1, 4-6, 8-10	511	15		58	9.5	269		130	135	338		55		965	1.31	1,330	184	77	76	8.7	1,680	7.0	
Feb. 2-3, 7, 10	629	16		62	14	436		122	149	610		55		1,400	1.90	2,380	212	112	82	13	2,530	7.3	
Feb. 11-14, 1952...	453	18		49	8.6	231		93	115	300		52		835	1.14	1,020	158	82	76	8.0	1,430	7.3	
Feb. 15-16, 1952...	1,040	14		48	12	434		145	142	585		68		1,390	1.89	3,900	204	85	82	13	2,410	7.5	
Feb. 17-21, 1952...	738	15		48	6.6	129		110	63	184		14		534	.73	1,060	147	57	66	4.6	936	7.5	
Feb. 22-29, 1952...	876	13		45	6.8	98		118	68	125		13		444	.60	1,050	140	44	60	3.7	752	7.5	

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Values reported for dissolved solids concentrations less than 1,000 ppm are residues on evaporation and for concentrations more than 1,000 ppm are sums of determined constituents. Records of discharge for water year October 1951 to September 1952 given in Water-Supply Paper 1242.

Mar. 1-4, 13-16, 1952.....	1,513	13	39	6.4	77	95	59	100	13	378	.51	1,540	124	46	57	3.0	642	7.3	
Mar. 5-12, 17-20.....	1,089	14	45	6.7	133	117	76	171	17	542	.74	1,590	150	44	68	4.9	939	7.2	
Mar. 21-31.....	572	10	48	9.1	138	111	109	194	28	639	.87	987	156	66	69	5.5	1,100	7.2	
Apr. 1-9.....	456	12	49	11	166	100	111	223	21	652	.89	803	168	96	68	5.5	1,160	8.1	
Apr. 10-21.....	2,542	16	41	5.6	31	122	39	95	3	7	.89	1,880	135	25	47	2.9	489	8.0	
Apr. 22-30.....	14,520	18	40	4.5	30	135	38	20	3	9	.74	9,170	131	20	33	1.9	391	8.1	
May 1-4.....	16,710	20	43	4.3	27	186	39	28	3	3	.89	11,600	136	24	30	1.0	392	7.4	
May 5-6, 26-31.....	13,020	26	52	4.6	73	130	43	95	3	5	.58	13,920	149	26	51	2.9	642	7.4	
May 7-13.....	7,736	20	71	7.3	124	182	91	160	10	596	.81	1,180	207	58	57	3.8	994	7.5	
May 14-25.....	4,204	15	44	3.7	58	133	38	70	3	9	.43	3,560	125	16	50	2.2	529	7.7	
June 1-10.....	9,120	14	56	5.5	103	159	151	141	3	6	.64	11,620	162	32	58	3.6	823	8.1	
June 11-20.....	963	12	55	6.9	164	165	62	180	4	4	.55	1,430	166	30	64	4.5	994	8.0	
June 21-30.....	297	6	62	7.2	171	194	86	212	4	1	.67	91	535	20	68	5.6	1,180	8.2	
July 1-5, 7-10, 27, 30.....	235	8	63	8.8	263	182	111	350	8	2	.92	585	193	44	75	8.2	1,670	7.8	
July 6, 11-20.....	291	11	77	11	420	192	156	575	23	1	.37	1,080	237	80	79	12	2,500	7.8	
July 21-26, 28-29, 31.....	280	14	80	11	422	190	161	580	25	1	.39	1,090	244	89	79	12	2,520	7.8	
Aug. 1-10.....	178	13	68	9.0	301	195	156	375	12	1	.03	1,40	495	46	76	9	2	1,840	7.7
Aug. 11-20.....	182	20	70	9.6	348	178	172	435	15	1	.18	1,60	580	68	78	10	2,080	7.6	
Aug. 21-31.....	183	20	66	8.5	371	212	136	478	22	1	.21	1,65	533	200	26	80	11	2,160	7.4
Sept. 1-9.....	181	28	71	10	454	255	117	612	13	1	.43	1,94	699	218	9	82	13	2,640	8.2
Sept. 10-18.....	199	21	66	8.2	244	211	143	280	15	1	.90	1,23	486	198	25	7	5	1,510	8.2
Sept. 19-30.....	200	24	66	11	428	188	226	510	39	1	.40	1,90	756	56	82	13	2,440	7.5	
Weighted average	1,663	16	50	5.6	93	140	57	119	9	1	.59	1,949	148	34	56	3.3	738	--	

## TRINITY RIVER BASIN--Continued

## TRINITY RIVER NEAR OAKWOOD, TEX.--Continued

Temperature (°F) of water, water year October 1951 to September 1952

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

TRINITY RIVER BASIN--Continued  
TRINITY RIVER NEAR MOSS BLUFF, TEX.

LOCATION.--At Devers Pumping Plant Number One, one mile west of Moss Bluff, Liberty County.  
RECORDS AVAILABLE.--Chemical analyses: Short periods during summers of 1946 to 1949, daily records October 1949 to September 1952.  
EXTREMES, 1951-52.--Dissolved solids: Maximum, 3,640 ppm Aug. 26-27; minimum, 198 ppm Feb. 4-6.  
Hardness: Maximum, 782 ppm Aug. 26-27; minimum, 54 ppm Feb. 4-6.  
Specific conductance: Maximum daily, 7,630 microhos Aug. 27; minimum daily, 264 microhos Feb. 6.  
EXTREMES, 1949-52.--Dissolved solids: Maximum, 3,640 ppm Aug. 26-27, 1952; minimum, 110 ppm Oct. 4-10, 1949.  
Hardness: Maximum, 782 ppm Aug. 26-27, 1952; minimum, 50 ppm Oct. 11-14, 26-27, 1949.  
Specific conductance: Maximum daily, 7,630 microhos Aug. 27, 1952; minimum daily, 127 microhos Oct. 7, 1949.  
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 sums of determined constituents unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. No records of discharge available for this station.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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> )	Boiling point (°B)	Dissolved solids		Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (microhos at 25° C)	pH	Color
														Parts per million	Tons per acre-foot	Tons per day	Calcium, medium	Non-carbonate				
Oct. 1-10, 1951..	17	6.6		43	4.7	81	133	134	31	112		4.0		a 358	0.49	127	127	18	58	3.1	643	7.4
Oct. 11-20 .....	6.6			46	5.9	127	134	134	51	177		3.5		a 483	.66	140	140	30	66	4.7	875	7.5
Oct. 21-31 .....	5.6			43	10	142	124	124	58	208		3.0		555	.75	148	148	47	68	5.1	989	7.6
Nov. 1-10 .....	6.6			51	9.6	151	140	140	72	214		4.0		611	.83	166	166	52	66	5.1	1,940	7.6
Nov. 11-14, 17-22	13			66	11	196	167	167	83	279		17		1,064	1.04	210	210	72	71	8.7	1,980	7.9
Nov. 15-16, 23-28	8.2			78	12	314	172	172	90	479		20		1,090	1.46	244	244	103	74	8.7	1,980	7.9
Dec. 1-10 .....	12			48	8.1	141	134	134	57	207		8.3		549	.75	154	154	52	67	4.9	980	7.3
Dec. 11-20 .....	15			50	9.6	162	119	119	71	238		12		623	.85	164	164	67	68	5.5	1,090	7.2
Dec. 21-31 .....	18			56	8.0	187	126	126	78	272		15		724	.98	172	172	70	70	6.2	1,260	7.5
Jan. 1-10, 1952..	14			56	8.1	183	129	129	90	270		17		744	1.01	173	173	68	71	6.4	1,300	7.4
Jan. 11-20 .....	17			62	7.6	169	127	127	77	235		14		660	.90	160	160	56	70	5.8	1,150	7.5
Jan. 21-31 .....	16			62	8.7	234	141	141	84	344		15		869	1.18	190	190	75	73	7.4	1,520	7.7
Feb. 1-3, 7-12 ..	12			28	5.5	63	74	74	32	92		6.1		305	.41	92	92	32	60	2.8	506	7.0
Feb. 4-6 .....	8.0			18	2.3	37	59	59	17	45		7.2		198	.27	54	54	6	60	2.2	292	6.9
Feb. 13-20 .....	14			47	6.7	154	95	95	77	220		15		622	.85	145	145	67	70	5.6	1,050	7.2
Feb. 21, 27-29 ..	17			50	7.9	234	89	89	64	365		14		867	1.18	158	158	84	76	8.1	1,470	7.5
Feb. 22-28 .....	18			39	5.6	104	95	95	62	138		13		466	.63	120	120	42	65	4.1	758	7.6
Mar. 1, 10-13 ..	15			49	9.7	241	88	88	59	385		12		840	1.14	162	162	90	76	8.2	1,510	7.4
Mar. 2-9 .....	13			38	3.7	49	61	61	43	67		6.0		a 240	.33	85	85	35	52	2.1	418	7.3
Mar. 14-20 .....	14			36	5.1	71	103	103	37	98		5.8		346	.47	111	111	26	58	2.9	577	7.5
Mar. 21-31 .....	16			42	6.0	61	105	105	51	84		7.0		342	.47	130	130	44	51	2.3	565	7.5
Apr. 1-6, 12-14 ..	16			40	8.7	68	95	95	55	104		3.0		386	.52	136	136	58	52	2.5	625	7.7
Apr. 7-11, 15-20	10			23	5.1	30	83	83	31	41		3.0		201	.27	78	78	27	46	1.5	309	7.5
Apr. 21-30 .....	10			27	4.2	28	63	63	26	34		3.0		200	.27	85	85	17	42	1.3	307	7.6
May 1-10, 27-31 ..	18			39	3.5	26	123	123	27	27		1.5		216	.29	112	112	11	34	1.1	350	7.8

a Sum of determined constituents

TRINITY RIVER BASIN--Continued  
TRINITY RIVER NEAR MOSS BLUFF, TEX.--Continued

Chemical analyses, in parts per million, water year October 1951 to September 1952--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 adsorption ratio	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	Color
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate					
May 11-20, 1952.		17		38	3.8	40		114	26	53		1.0		245	0.33		110	17	44	1.6	420	7.8	
May 21-26, .....		17		38	4.0	56		106	37	75		1.5		291	.40		111	24	52	2.3	501	7.6	
June 1-9, .....		17		43	3.7	29		136	29	32		2		228	.31		122	11	34	1.2	398	7.5	
June 10-16, .....		17		45	4.2	39		138	31	47		3.5		262	.36		130	16	40	1.3	443	7.7	
June 17-30, .....		18		56	5.0	64		170	40	83		2.5		a 534	.50		160	20	47	2.2	633	7.7	
July 1-10, .....		16		56	5.6	56		171	51	81		2.2		a 534	.45		157	17	42	1.9	603	7.2	
July 11-16, 20-23		10		29	4.1	49		87	21	72		1.5		a 529	.51		169	17	55	2.3	471	7.1	
July 18-19, 24-31		19		55	6.1	79		160	35	118		1.5		a 563	.53		163	32	51	2.7	703	8.2	
Aug. 1-4, 9-12, ..		21		64	7.2	119		188	46	173		3.2		544	.74		189	35	58	3.8	566	8.1	
Aug. 5-8, 13-14, ..		18		68	11	174		174	67	270		1.5		718	.98		214	72	64	5.2	1,300	7.9	
Aug. 15-18, .....		15		74	19	261		136	100	435		1.8		997	1.36		262	151	68	7.0	1,860	7.7	
Aug. 23-25, 28-31		16		86	38	444		200	121	740		2.8		1,550	2.11		370	206	72	10	2,810	7.5	
Aug. 26-27, .....		17		114	121	1,080		201	295	1,900		2.5		3,640	4.95		782	618	75	17	6,550	7.5	
Sept. 1-7, .....		20		76	24	314		214	93	495		1.2		1,130	1.54		288	112	70	8.0	2,090	8.2	
Sept. 8-20, .....		20		71	13	232		206	76	345		1.2		1,895	1.22		230	62	69	6.7	1,560	8.2	
Sept. 21-30, .....		18		70	12	270		206	80	395		1.0		994	1.35		224	55	72	7.8	1,720	8.1	

a Sum of determined constituents.

TRINITY RIVER BASIN--Continued  
OLD RIVER NEAR COVE, TEX.

TRINITY RIVER BASIN

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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, daily records October 1949 to September 1952.  
EXTREMES. 1951-52.--Dissolved solids: Maximum, 3 430 ppm Aug. 18-19, 22; minimum, 156 ppm Jan. 26-31, Apr. 21-30.  
Hardness: Maximum, 701 ppm Aug. 18-19, 22; minimum, 57 ppm Jan. 26-31.

Specific conductance: Maximum daily, 7,710 microhmhos Aug. 22; minimum daily, 224 microhmhos Apr. 26, May 1.  
EXTREMES, 1949-52.--Dissolved solids: Maximum, 3 430 ppm Aug. 18-19, 22, 1952; minimum, 156 ppm Jan. 26-31, Apr. 21-30, 1952.  
Hardness: Maximum, 701 ppm Aug. 18-19, 22, 1952; minimum, 57 ppm Jan. 26-31, 1952.

Specific conductance: Maximum daily, 7,710 microhmhos Aug. 22, 1952; minimum daily, 224 microhmhos Apr. 26, May 1, 1952.  
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 sums of determined constituents unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. No records of discharge available for this station.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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 at 180°C)			Hardness as CaCO <sub>3</sub>	Percent sodium adsorption ratio	Specific conductance (microhmhos at 25°C)	pH	Color
													Parts per million	Tons per acre-foot	Tons per day					
Oct. 1-10, 1951..	17			58	14		184	137	57	303		2.0	767	1.04		202	90	1,270	7.7	
Oct. 11-20 .....	14			57	13		173	155	52	277		1.5	703	.96		196	88	1,200	7.6	
Oct. 21-31 .....	11			57	13		220	147	67	362		2.0	866	1.18		223	102	1,460	7.5	
Nov. 1-10 .....	15			61	15		171	166	53	276		2.0	699	.93		214	78	1,240	8.1	
Nov. 11-20 .....	13			61	14		169	175	52	268		2.0	678	.92		210	86	1,210	8.2	
Nov. 21-30 .....	15			62	14		168	183	51	265		1.5	683	.86		212	62	1,210	8.2	
Dec. 1-6 .....	15			64	14		163	174	54	292		2.8	678	.92		217	74	1,200	8.1	
Dec. 7-10 .....	17			36	6.4		51	75	51	82		1.8	304	.41		116	55	2.1	493	7.9
Dec. 11-20 .....	19			45	8.1		73	100	60	112		1.8	380	.52		146	64	52	636	7.8
Dec. 21-31 .....	19			48	8.5		74	109	60	116		1.2	396	.54		155	66	51	653	7.7
Jan. 1-10, 1952..	22			51	9.0		76	121	58	120		1.0	397	.54		164	65	50	714	7.9
Jan. 11-25 .....	18			53	9.5		90	132	60	139		2.2	456	.62		171	63	53	788	7.8
Jan. 26-31 .....	13			16	4.2		27	48	24	36		2.2	156	.21		57	18	51	257	7.1
Feb. 1-10 .....	13			18	3.9		31	56	25	39		2.0	163	.22		61	15	53	264	7.4
Feb. 11-20 .....	13			32	5.5		41	95	30	58		1.8	232	.32		102	25	47	1.8	511
Feb. 21-29 .....	15			42	6.8		66	116	32	104		1.8	339	.48		133	38	52	2.5	564
Mar. 1-10 .....	14			44	8.5		64	130	35	99		1.2	374	.51		145	38	49	2.3	599
Mar. 11-20 .....	14			43	8.7		69	122	38	102		1.8	379	.52		135	35	53	2.6	619
Mar. 21-31 .....	14			46	9.0		72	131	38	114		1.8	404	.55		152	44	51	2.6	665
Apr. 1-10 .....	7.1			43	9.2		90	120	43	140		1.2	482	.56		146	47	57	3.3	745
Apr. 11-12 .....	20			--	--		106	116	54	142		5.1	410	.56		125	30	65	4.1	743
Apr. 13-20 .....	18			20	3.6		34	56	28	43		4.6	a.181	.25		65	19	54	1.9	301
Apr. 21-30 .....	18			19	3.1		28	61	21	33		4.2	a.156	.21		60	10	51	1.6	260

a Sum of determined constituents.

TRINITY RIVER BASIN--Continued  
OLD RIVER NEAR COVE, TEX.--Continued

Chemical analyses, in parts per million, water year October 1951 to September 1952--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 carbonate	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH or
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
May 1-10, 1952...	18			29	3.8	31		101	28	28		4.0		a192	0.26		88	5	43	1.4	317	7.7
May 11-20.....	20			39	4.6	30		132	33	26		3.8		a221	.30		116	8	36	1.2	369	8.1
May 21-31.....	20			34	4.2	40		111	33	43		3.0		a232	.32		102	11	46	1.7	396	8.0
June 1-12.....	23			36	3.7	30		127	27	25		3.0		a210	.29		105	1	38	1.3	338	8.1
June 13-24.....	23			42	6.2	52		140	33	67		3.5		a296	.40		130	16	46	2.0	513	8.2
June 25-30.....	18			50	11	113		154	52	166		3.0		a494	.67		170	44	59	3.8	886	8.2
July 1-4, 12-14, 19	18			53	13	129		162	55	196		2.5		546	.74		186	53	60	4.1	997	8.2
July 5-11.....	14			64	30	310		154	98	515		3.0		1,110	1.51		283	157	70	8.0	2,060	7.9
July 16-18.....	14			30	7.9	79		102	43	105		3.0		a332	.45		108	24	61	3.3	577	7.9
July 21-31.....	17			44	7.2	93		b133	31	140		2.2		a402	.55		140	38	59	3.4	735	8.4
Aug. 2-11, 23...	17			74	21	287		136	102	478		3.2		1,050	1.43		271	160	70	7.6	1,950	8.2
Aug. 12-13, 20,																						
24-31.....	19			82	38	457		c192	133	750		.2		1,570	2.14		360	220	73	10	2,900	8.5
Aug. 14-17, 21...	18			84	57	618		134	174	1,060		1.0		2,080	2.83		444	334	75	13	3,820	8.2
Aug. 18-19, 22...	15			103	66	1,040		122	281	1,820		4.0		3,430	4.66		701	601	76	17	6,130	8.2
Sept. 1-10.....	18			86	41	476		d197	135	790		1.8		1,640	2.23		383	221	73	11	3,060	8.4
Sept. 11-20.....	18			82	38	473		e195	128	775		2.2		1,610	2.19		360	210	74	11	2,910	8.4

a Sum of determined constituents.

b Includes equivalent of 5 parts per million of carbonate (CO<sub>3</sub>).

c Includes equivalent of 10 parts per million of carbonate (CO<sub>3</sub>).

d Includes equivalent of 8 parts per million of carbonate (CO<sub>3</sub>).

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



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 the summers of 1946 to 1949, daily records December 1949 to September 1952.  
EXTREMES, 1951-52.--Dissolved solids: Maximum, 12,500 ppm Sept. 21-30; minimum, 226 ppm June 4-6, 8-12, 14.  
Hardness: Maximum, 2,490 ppm Sept. 21-30; minimum, 84 ppm Apr. 19-22, 24-25, 28-30.  
Specific conductance: Maximum daily, 22,000 microhos Sept. 29-30; minimum daily, 330 microhos June 4.  
EXTREMES, 1949-51.--Dissolved solids: Maximum daily, 12,500 ppm Sept. 21-30, 1952; minimum, 184 ppm Mar. 1-10, 1950.  
Hardness: Maximum, 2,940 ppm Sept. 21-30, 1952; minimum, 52 ppm Dec. 25-31, 1949.  
Specific conductance: Maximum daily, 22,000 microhos Sept. 29, 30, 1952; minimum daily, 235 microhos Dec. 27, 1949.  
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 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 for this station.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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			Hardness as CaCO <sub>3</sub>		Per-cent ad-sorp-tion ratio	Specific conductance (micro-mhos at 25°C)	pH	Col-or	
														Parts per million	Tons per acre-foot	Tons per day	Calcium	Non-carbonate					
Oct. 1-2, 6-9, 1951		17		34	9.1	98		101	25	159		2.5		408	0.55		122	40	63	3.8	726	7.7	
Oct. 3, 17, 19-20, 22-23, 25-26, 30		15		94	143	1,220		133	319	2,150		--		4,010	5.45		822	714	76	19	7,140	7.7	
Oct. 4, 15-16, 31		18		72	92	789		121	204	1,390		3.0		2,630	3.58		598	459	75	15	4,760	7.7	
Oct. 5, 24, 27-29		17		57	46	425		127	105	738		1.8		1,450	1.97		331	227	74	10	2,690	7.7	
Oct. 10-14		19		45	25	242		122	60	410		1.5		918	1.25		216	116	71	7.2	1,610	7.7	
Oct. 18, 21		18		144	293	2,340		132	610	4,190		--		7,660	10.4		1,560	1,460	76	26	13,200	7.9	
Nov. 1-2, 7-9		12		53	26	1,777		134	77	460		2.2		4,673	1.32		239	129	72	7.8	1,840	7.6	
Nov. 3-6		10		98	155	1,300		122	345	2,310		2.2		4,280	5.82		882	782	76	19	7,970	7.6	
Nov. 11-12, 16		11		59	35	340		140	84	585		3.0		1,190	1.62		291	176	72	8.7	2,180	8.0	
Nov. 13-15, 19-20		9.6		72	65	589		143	164	1,020		3.0		1,990	2.71		447	330	74	12	3,650	7.6	
Nov. 17-18		18		64	22	204		149	46	352		1.5		811	1.10		225	103	66	5.9	1,410	8.1	
Nov. 21-24		7.2		134	253	2,070		134	526	3,700		--		6,760	9.19		1,380	1,260	77	24	11,500	7.5	
Nov. 25-30		13		81	91	765		148	202	1,350		3.0		2,560	3.51		576	454	74	14	4,730	7.5	
Dec. 1-3		8.8		118	191	1,640		146	436	2,880		--		5,350	7.28		1,080	960	77	22	9,210	7.6	
Dec. 4-8		10		78	58	564		158	162	960		10		1,920	2.61		433	304	74	12	3,510	7.6	
Dec. 9-10		18		54	18	189		146	57	310		4.5		754	1.03		208	89	66	5.7	1,320	8.1	
Dec. 11-15, 18-20		12		50	17	185		132	60	300		4.5		726	.99		195	87	67	5.8	1,340	8.0	
Dec. 16-17		12		175	427	3,570		119	875	6,340		--		11,500	15.6		2,190	2,100	78	33	18,600	8.0	
Dec. 21-23, 27		12		46	15	156		134	39	258		1.2		630	.86		176	166	66	5.1	1,130	8.0	
Dec. 24-26, 28		12		52	25	247		136	61	420		1.8		930	1.26		232	121	70	7.1	1,680	8.0	
Dec. 29-31		12		62	59	536		130	137	930		1.5		1,800	2.45		397	290	75	12	3,240	8.0	
Jan. 1, 3-6, 8-10, 1952		12		44	14	139		124	38	232		1.0		580	.79		168	66	64	4.7	1,040	7.7	
Jan. 2, 7		19		55	46	386		126	100	678		1.8		1,350	1.84		326	223	72	9.3	2,490	8.1	
Jan. 11-12, 25		13		133	277	2,240		126	551	4,020		--		7,300	9.93		1,470	1,370	77	25	12,400	7.8	

a Sum of determined constituents.

TRINITY RIVER BASIN--Continued  
 TRINITY RIVER AT ANAHUAC, TEX.--Continued  
 Chemical analyses, in parts per million, water year October 1951 to September 1952--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)	Col- or pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, mg./l.	Carbonate, mg./l.				
Jan. 18, 20-21, 1952.....	11			50	28	265		128	71	450		4.5		a 942	1.28		240	135	71	7.4	1,760	8.0
Jan. 13-15, 17, 19, 22.....	12			58	46	428		129	114	785		4.0		1,460	1.99		334	228	74	10	2,690	7.5
Jan. 23, 27, 29-31.....	11			132	48	178		132	54	292		1.5		718	1.98		190	82	67	5.6	1,220	7.4
Jan. 24, 26.....	13			97	168	1,350		129	337	2,420		--		4,450	6.05		933	828	76	19	7,960	7.9
Feb. 1-10.....	7.4			28	8.5	125		60	18	222		1.0		408	.68		105	56	72	5.3	864	7.1
Feb. 11-30.....	9.6			32	9.1	146		61	18	258		2.2		548	.74		118	68	73	5.8	988	7.2
Feb. 21, 23-29.....	11			30	8.5	138		68	19	236		1.5		514	.70		110	54	73	5.7	916	7.0
Mar. 1-10.....	12			32	8.5	128		74	32	210		3.0		503	.68		115	54	71	5.2	859	6.9
Mar. 11, 13-20.....	17			34	8.6	118		82	19	203		4.5		450	.61		120	54	68	4.7	846	7.1
Mar. 21-27, 29-31.....	15			38	7.1	99		97	34	156		5.2		438	.59		124	44	63	3.9	752	7.4
Apr. 1-10.....	12			36	8.6	115		93	24	194		2.8		465	.66		126	50	67	4.5	851	7.2
Apr. 11-13, 15-18, 23.....	13			32	7.1	109		82	22	181		2.2		480	.63		109	42	69	4.6	777	7.9
Apr. 19-22, 24-25, 28-30.....	8.8			24	5.8	82		62	15	138		1.9		321	.44		84	33	68	3.9	565	7.6
May 1-10.....	11			32	4.7	46		95	24	67		2.6		241	.33		99	21	50	2.0	423	7.6
May 11-19.....	13			41	4.7	40		120	31	54		1.7		253	.34		122	23	42	1.6	431	7.6
May 21-31.....	19			26	6.2	62		66	17	96		2.2		291	.40		90	20	60	2.8	504	8.0
June 1-3, 7-13, 15-20.....	18			41	5.6	46		130	29	62		3.2		281	.38		125	19	45	1.8	479	8.0
June 4-6, 8-12, 14, 19.....	19			38	4.0	30		124	28	30		3.2		226	.31		111	10	37	1.2	359	7.8
June 21-24, 29.....	21			54	8.8	97		153	50	143		2.2		466	.63		171	46	55	3.2	821	8.2
June 25-28, 30.....	17			59	21	208		153	76	340		2.2		857	1.17		234	108	66	5.9	1,510	8.1
July 1-2, 19-20.....	15			58	23	224		142	75	375		2.8		913	1.24		239	122	67	6.3	1,580	7.8
July 3-4, 7-12.....	13			75	63	603		134	172	1,040		2.5		2,080	2.76		446	336	75	12	3,770	7.7
July 5-6, 13-18.....	12			81	116	1,050		106	269	1,840		3.5		3,420	4.65		679	592	77	18	6,170	7.5
July 21-28.....	12			41	12	129		101	43	214		1.8		538	.73		152	69	65	4.5	964	7.8
July 29-30, Aug. 1.....	13			51	26	270		106	79	460		4.2		a 955	1.30		234	147	71	7.7	1,800	7.8
July 31, Aug. 2-3, 5, 7.....	14			64	62	586		104	156	1,020		2.5		1,960	2.67		414	330	75	13	3,520	7.7
Aug. 4, 6, 8-10.....	12			49	150	1,330		95	337	2,350		--		4,320	5.88		852	774	77	20	7,750	7.1
Aug. 11-20.....	11			122	242	2,080		95	519	3,690		--		6,710	9.13		1,300	1,220	78	25	11,600	7.2
Aug. 21-31.....	13			138	289	2,420		98	615	4,310		--		7,830	10.6		1,530	1,450	77	27	13,400	7.8
Sept. 1-7.....	14			146	327	2,660		98	680	4,760		--		8,640	11.8		1,710	1,630	77	28	14,700	7.5
Sept. 8-20.....	12			200	442	3,560		106	909	6,430		--		11,600	15.8		2,320	2,230	77	32	19,300	7.5
Sept. 21-30.....	15			258	450	3,860		114	998	6,910		--		12,500	17.0		2,490	2,400	77	34	20,200	7.7

a Sum of determined constituents.

TRINITY BAY AT MOUTH OF TRINITY RIVER NEAR ANAHUAC, TEX.

LOCATION.--At seven sampling stations in Trinity Bay opposite mouth of Trinity River, near Anahuac, Chambers County. Station 1 - In upper reaches of New Navigation Channel at Fort Anahuac. Station 2 - In Anahuac Channel immediately below delta, about half a mile west of Station 1. Station 3 - In Anahuac Channel about 1 1/2 miles southwest of Station 2. Station 4 - In Trinity Bay at mid-point between Station 3 and New Navigation Channel. Station 5 - In Trinity Bay at mid-point between Ash Point and south end of Anahuac Channel. Station 6 - In Anahuac Channel at south end. Station 7 - In Trinity Bay about 1 1/2 miles west of Station 6.

RECORDS AVAILABLE.--Chemical analyses: Biweekly October 1950 to September 1952.

REMARKS.--Top and bottom samples collected at all points except Stations 4 and 5.

Station Number	Specific conductance (micromhos at 25° C) and chloride in parts per million, water year October 1951 to September 1952					
	Specific conductance	Chloride	Specific conductance	Chloride	Specific conductance	Chloride
Oct. 3, 1951						
1 Top.....	23,800	8,330	23,500	8,310	23,900	8,330
1 Bottom.....	23,800	8,330	23,400	8,310	23,900	8,330
2 Top.....	23,800	8,330	23,400	8,310	23,900	8,330
2 Bottom.....	23,800	8,330	23,400	8,310	23,900	8,330
3 Top.....	18,900	6,110	5,190	1,210	12,100	3,450
3 Bottom.....	6,800	6,110	5,190	1,210	12,100	3,450
3 Shallow.....	19,800	6,780	7,370	2,260	17,800	5,770
4 Shallow.....	19,200	6,540	7,070	2,120	17,400	5,770
5 Shallow.....	18,300	6,260	7,070	2,120	17,400	5,770
6 Top.....	18,100	6,140	7,070	2,120	17,400	5,770
6 Bottom.....	21,900	7,660	21,200	7,420	19,800	6,660
7 Top.....	18,300	6,240	7,070	2,120	17,400	5,770
7 Bottom.....	18,700	6,440	22,300	8,040	23,300	8,040
Oct. 23, 1951						
1 Top.....	23,800	8,330	23,900	8,330	24,800	8,680
1 Bottom.....	23,800	8,330	23,900	8,330	24,800	8,680
2 Top.....	11,300	3,970	4,350	1,190	8,260	2,500
2 Bottom.....	17,100	5,770	5,100	1,480	23,300	8,060
3 Top.....	14,700	4,860	7,100	2,270	11,800	3,720
3 Bottom.....	20,600	5,500	24,900	8,800	19,400	6,560
4 Shallow.....	20,600	7,100	7,080	2,100	16,100	5,250
5 Shallow.....	20,600	7,120	7,120	2,100	15,900	5,250
6 Top.....	20,600	7,120	7,120	2,100	15,900	5,250
6 Bottom.....	21,300	7,350	20,300	6,950	25,100	8,800
7 Top.....	19,900	6,850	7,220	2,150	16,100	5,330
7 Bottom.....	20,200	6,950	23,700	8,310	25,000	8,710
Oct. 30, 1951						
1 Top.....	23,700	8,330	22,200	7,740	22,200	7,740
1 Bottom.....	23,700	8,330	22,200	7,740	22,200	7,740
2 Top.....	8,530	1,950	11,800	3,740	26,600	9,530
2 Bottom.....	6,560	1,950	11,800	3,740	26,600	9,530
3 Top.....	14,700	4,860	12,300	4,040	11,400	3,920
3 Bottom.....	14,700	4,860	12,300	4,040	11,400	3,920
Nov. 22, 1951						
1 Top.....	23,800	8,330	24,800	8,680	24,800	8,680
1 Bottom.....	23,800	8,330	24,800	8,680	24,800	8,680
2 Top.....	11,300	3,970	4,350	1,190	8,260	2,500
2 Bottom.....	17,100	5,770	5,100	1,480	23,300	8,060
3 Top.....	14,700	4,860	7,100	2,270	11,800	3,720
3 Bottom.....	20,600	5,500	24,900	8,800	19,400	6,560
4 Shallow.....	20,600	7,100	7,080	2,100	16,100	5,250
5 Shallow.....	20,600	7,120	7,120	2,100	15,900	5,250
6 Top.....	20,600	7,120	7,120	2,100	15,900	5,250
6 Bottom.....	21,300	7,350	20,300	6,950	25,100	8,800
7 Top.....	19,900	6,850	7,220	2,150	16,100	5,330
7 Bottom.....	20,200	6,950	23,700	8,310	25,000	8,710
Nov. 29, 1951						
1 Top.....	23,700	8,330	22,200	7,740	22,200	7,740
1 Bottom.....	23,700	8,330	22,200	7,740	22,200	7,740
2 Top.....	8,530	1,950	11,800	3,740	26,600	9,530
2 Bottom.....	6,560	1,950	11,800	3,740	26,600	9,530
3 Top.....	14,700	4,860	12,300	4,040	11,400	3,920
3 Bottom.....	14,700	4,860	12,300	4,040	11,400	3,920
Dec. 12, 1951						
1 Top.....	24,300	8,330	24,300	8,330	24,300	8,330
1 Bottom.....	24,300	8,330	24,300	8,330	24,300	8,330
2 Top.....	24,300	8,330	24,300	8,330	24,300	8,330
2 Bottom.....	24,300	8,330	24,300	8,330	24,300	8,330
3 Top.....	15,700	5,770	13,400	4,040	13,400	4,040
3 Bottom.....	15,700	5,770	13,400	4,040	13,400	4,040
4 Shallow.....	17,800	5,770	13,400	4,040	13,400	4,040
5 Shallow.....	17,800	5,770	13,400	4,040	13,400	4,040
6 Top.....	17,800	5,770	13,400	4,040	13,400	4,040
6 Bottom.....	17,800	5,770	13,400	4,040	13,400	4,040
7 Top.....	17,800	5,770	13,400	4,040	13,400	4,040
7 Bottom.....	17,800	5,770	13,400	4,040	13,400	4,040
Dec. 18, 1951						
1 Top.....	24,300	8,330	24,300	8,330	24,300	8,330
1 Bottom.....	24,300	8,330	24,300	8,330	24,300	8,330
2 Top.....	24,300	8,330	24,300	8,330	24,300	8,330
2 Bottom.....	24,300	8,330	24,300	8,330	24,300	8,330
3 Top.....	15,700	5,770	13,400	4,040	13,400	4,040
3 Bottom.....	15,700	5,770	13,400	4,040	13,400	4,040
4 Shallow.....	17,800	5,770	13,400	4,040	13,400	4,040
5 Shallow.....	17,800	5,770	13,400	4,040	13,400	4,040
6 Top.....	17,800	5,770	13,400	4,040	13,400	4,040
6 Bottom.....	17,800	5,770	13,400	4,040	13,400	4,040
7 Top.....	17,800	5,770	13,400	4,040	13,400	4,040
7 Bottom.....	17,800	5,770	13,400	4,040	13,400	4,040
Dec. 27, 1951						
1 Top.....	19,400	6,560	19,400	6,560	19,400	6,560
1 Bottom.....	19,400	6,560	19,400	6,560	19,400	6,560
2 Top.....	23,900	8,330	23,900	8,330	23,900	8,330
2 Bottom.....	23,900	8,330	23,900	8,330	23,900	8,330
3 Top.....	12,300	4,040	12,300	4,040	12,300	4,040
3 Bottom.....	12,300	4,040	12,300	4,040	12,300	4,040
Jan. 10, 1952						
1 Top.....	28,300	10,100	28,300	10,100	28,300	10,100
1 Bottom.....	28,300	10,100	28,300	10,100	28,300	10,100
2 Top.....	28,300	10,100	28,300	10,100	28,300	10,100
2 Bottom.....	28,300	10,100	28,300	10,100	28,300	10,100
3 Top.....	15,700	5,770	15,700	5,770	15,700	5,770
3 Bottom.....	15,700	5,770	15,700	5,770	15,700	5,770
4 Shallow.....	17,800	5,770	17,800	5,770	17,800	5,770
5 Shallow.....	17,800	5,770	17,800	5,770	17,800	5,770
6 Top.....	17,800	5,770	17,800	5,770	17,800	5,770
6 Bottom.....	17,800	5,770	17,800	5,770	17,800	5,770
7 Top.....	17,800	5,770	17,800	5,770	17,800	5,770
7 Bottom.....	17,800	5,770	17,800	5,770	17,800	5,770
Jan. 16, 1952						
1 Top.....	28,600	10,300	28,600	10,300	28,600	10,300
1 Bottom.....	28,600	10,300	28,600	10,300	28,600	10,300
2 Top.....	28,600	10,300	28,600	10,300	28,600	10,300
2 Bottom.....	28,600	10,300	28,600	10,300	28,600	10,300
3 Top.....	26,200	9,240	26,200	9,240	26,200	9,240
3 Bottom.....	26,200	9,240	26,200	9,240	26,200	9,240
4 Shallow.....	29,300	10,500	29,300	10,500	29,300	10,500
5 Shallow.....	29,300	10,500	29,300	10,500	29,300	10,500
6 Top.....	29,300	10,500	29,300	10,500	29,300	10,500
6 Bottom.....	29,300	10,500	29,300	10,500	29,300	10,500
7 Top.....	29,300	10,500	29,300	10,500	29,300	10,500
7 Bottom.....	29,300	10,500	29,300	10,500	29,300	10,500
Jan. 25, 1952						
1 Top.....	28,000	10,500	28,000	10,500	28,000	10,500
1 Bottom.....	28,000	10,500	28,000	10,500	28,000	10,500
2 Top.....	28,000	10,500	28,000	10,500	28,000	10,500
2 Bottom.....	28,000	10,500	28,000	10,500	28,000	10,500
3 Top.....	4,980	1,470	4,980	1,470	4,980	1,470
3 Bottom.....	6,920	2,150	6,920	2,150	6,920	2,150

TRINITY RIVER BASIN--Continued  
TRINITY BAY AT MOUTH OF TRINITY RIVER NEAR ANAHUAC, TEX.--Continued

Station Number	Specific conductance (micromhos at 25° C) and chloride in parts per million, water year October 1951 to September 1952--Continued					
	Specific conductance	Chloride	Specific conductance	Chloride	Specific conductance	Chloride
Oct. 9, 1951						
3 Bottom.....	16,200	5,400				
4 Shallow.....	20,600	7,080				
5 Shallow.....	20,600	7,080				
6 Top.....	16,700	6,410				
7 Bottom.....	21,400	7,350				
8 Top.....	16,600	6,380				
9 Bottom.....	19,600	6,830				
Oct. 12, 1951						
1 Top.....	23,700	8,310				
2 Bottom.....	23,900	8,330				
3 Top.....	4,120	1,130				
4 Bottom.....	16,600	5,600				
5 Top.....	7,180	2,170				
6 Bottom.....	24,900	8,850				
7 Shallow.....	7,250	2,180				
8 Shallow.....	7,910	2,450				
9 Top.....	7,550	2,350				
6 Bottom.....	24,900	8,880				
7 Top.....	7,470	2,270				
7 Bottom.....	19,900	6,850				
Feb. 12, 1952						
1 Top.....	19,200	6,540				
1 Bottom.....	19,400	6,610				
2 Top.....	500	113				
2 Bottom.....	500	113				
3 Top.....	523	121				
3 Bottom.....	527	122				
4 Shallow.....	583	131				
5 Shallow.....	576	130				
6 Top.....	573	128				
6 Bottom.....	576	132				
7 Top.....	575	130				
7 Bottom.....	575	130				
Feb. 20, 1952						
1 Top.....	14,400	4,710				
1 Bottom.....	14,700	4,860				
Oct. 30, 1951						
	Specific conductance	Chloride				
	17,200	5,750				
	13,200	4,260				
	13,400	4,390				
	19,700	6,710				
	20,900	7,260				
	12,600	4,040				
	23,900	8,460				
Nov. 7, 1951						
	23,900	8,310				
	23,900	8,330				
	12,100	3,840				
	19,200	6,460				
	12,000	3,790				
	13,200	4,240				
	12,900	4,110				
	13,000	4,160				
	13,600	4,390				
	12,600	4,060				
	13,600	4,390				
Nov. 12, 1952						
	15,100	4,960				
	15,700	5,180				
	555	88				
	502	89				
	510	89				
	497	86				
	768	165				
	697	143				
	728	151				
	722	142				
	6,820	2,050				
	745	142				
	12,500	3,970				
Mar. 19, 1952						
	13,200	4,260				
	13,100	4,260				
Nov. 29, 1951						
	Specific conductance	Chloride				
	24,100	8,610				
	18,300	6,270				
	18,200	6,290				
	18,000	6,220				
	23,600	8,360				
	16,100	6,320				
	23,000	8,310				
Dec. 5, 1951						
	25,000	9,240				
	25,600	9,240				
	3,450	980				
	4,070	1,100				
	8,250	2,580				
	15,100	5,100				
	18,300	6,340				
	18,500	6,410				
	8,650	2,720				
	26,200	9,560				
	8,690	2,720				
	26,000	9,420				
Dec. 27, 1951						
	Specific conductance	Chloride				
	21,700	8,610				
	23,900	8,560				
	23,900	8,580				
	23,900	8,580				
	23,800	8,580				
	28,100	9,440				
	23,600	8,580				
	27,100	9,960				
Jan. 3, 1952						
	Specific conductance	Chloride				
	24,600	8,580				
	3,150	810				
	20,000	6,830				
	4,270	1,180				
	28,100	10,100				
	4,350	1,200				
	4,220	1,190				
	4,220	1,190				
	27,000	9,730				
	4,310	1,200				
	20,500	7,030				
Jan. 5, 1952						
	Specific conductance	Chloride				
	--	--				
	14,400	4,910				
	14,300	4,880				
	485	112				
	483	122				
	515	120				
	515	120				
	572	130				
	572	130				
	562	132				
	572	130				
	562	132				
	563	132				
Apr. 21, 1952						
	Specific conductance	Chloride				
	10,200	3,200				
	10,200	3,200				
	394	61				
	388	62				
	1,170	351				
	2,580	710				
	1,100	265				
	1,100	265				
	1,100	265				
	1,170	348				
	1,460	368				
	1,130	351				
	1,130	346				
	1,130	346				
	275	37				
Apr. 30, 1952						
	Specific conductance	Chloride				
	6,500	1,960				
	6,740	2,040				
	353	35				
	346	36				
	351	37				
	346	37				
	351	36				
	348	36				
	351	36				
	346	37				
	346	37				
May 3, 1952						
	Specific conductance	Chloride				
	4,590	1,320				
	4,960	1,360				



## TRINITY RIVER BASIN--Continued

## TRINITY BAY AT MOUTH OF TRINITY RIVER NEAR ANAHUAC, TEX.--Continued

Station Number	Specific conductance (micromhos at 25° C) and chloride in parts per million, water year October 1951 to September 1952--Continued					
	Specific conductance	Chloride	Specific conductance	Chloride	Specific conductance	Chloride
May 10, 1952						
1 Top.....	3,130	870				
1 Bottom.....	3,130	870				
2 Top.....	3,127	870				
2 Bottom.....	3,127	870				
3 Top.....	3,127	870				
3 Bottom.....	3,127	870				
4 Shallow.....	3,127	870				
5 Shallow.....	3,127	870				
6 Top.....	3,127	870				
6 Bottom.....	3,127	870				
7 Top.....	3,127	870				
7 Bottom.....	3,127	870				
May 12, 1952						
1 Top.....	3,160	880				
1 Bottom.....	3,160	880				
2 Top.....	3,160	880				
2 Bottom.....	3,160	880				
3 Top.....	3,160	880				
3 Bottom.....	3,160	880				
4 Shallow.....	3,160	880				
5 Shallow.....	3,160	880				
6 Top.....	3,160	880				
6 Bottom.....	3,160	880				
7 Top.....	3,160	880				
7 Bottom.....	3,160	880				
May 14, 1952						
1 Top.....	2,910	720				
1 Bottom.....	2,910	720				
2 Top.....	433	47				
2 Bottom.....	433	47				
3 Top.....	466	54				
3 Bottom.....	466	54				
4 Shallow.....	466	54				
5 Shallow.....	466	54				
6 Top.....	466	54				
6 Bottom.....	466	54				
7 Top.....	466	54				
7 Bottom.....	466	54				
May 18, 1952						
1 Top.....	3,250	880				
1 Bottom.....	3,250	880				
2 Top.....	3,250	880				
2 Bottom.....	3,250	880				
3 Top.....	3,250	880				
3 Bottom.....	3,250	880				
4 Shallow.....	3,250	880				
5 Shallow.....	3,250	880				
6 Top.....	3,250	880				
6 Bottom.....	3,250	880				
7 Top.....	3,250	880				
7 Bottom.....	3,250	880				
May 21, 1952						
1 Top.....	3,210	880				
1 Bottom.....	3,210	880				
2 Top.....	3,210	880				
2 Bottom.....	3,210	880				
3 Top.....	3,210	880				
3 Bottom.....	3,210	880				
4 Shallow.....	3,210	880				
5 Shallow.....	3,210	880				
6 Top.....	3,210	880				
6 Bottom.....	3,210	880				
7 Top.....	3,210	880				
7 Bottom.....	3,210	880				
May 24, 1952						
1 Top.....	3,210	880				
1 Bottom.....	3,210	880				
2 Top.....	3,210	880				
2 Bottom.....	3,210	880				
3 Top.....	3,210	880				
3 Bottom.....	3,210	880				
4 Shallow.....	3,210	880				
5 Shallow.....	3,210	880				
6 Top.....	3,210	880				
6 Bottom.....	3,210	880				
7 Top.....	3,210	880				
7 Bottom.....	3,210	880				
May 28, 1952						
1 Top.....	2,760	750				
1 Bottom.....	2,760	750				
2 Top.....	2,760	750				
2 Bottom.....	2,760	750				
3 Top.....	2,760	750				
3 Bottom.....	2,760	750				
4 Shallow.....	2,760	750				
5 Shallow.....	2,760	750				
6 Top.....	2,760	750				
6 Bottom.....	2,760	750				
7 Top.....	2,760	750				
7 Bottom.....	2,760	750				
May 31, 1952						
1 Top.....	2,820	760				
1 Bottom.....	2,820	760				
2 Top.....	2,820	760				
2 Bottom.....	2,820	760				
3 Top.....	2,820	760				
3 Bottom.....	2,820	760				
4 Shallow.....	2,820	760				
5 Shallow.....	2,820	760				
6 Top.....	2,820	760				
6 Bottom.....	2,820	760				
7 Top.....	2,820	760				
7 Bottom.....	2,820	760				
June 7, 1952						
1 Top.....	1,790	445				
1 Bottom.....	1,790	445				
2 Top.....	1,790	445				
2 Bottom.....	1,790	445				
3 Top.....	1,790	445				
3 Bottom.....	1,790	445				
4 Shallow.....	1,790	445				
5 Shallow.....	1,790	445				
6 Top.....	1,790	445				
6 Bottom.....	1,790	445				
7 Top.....	1,790	445				
7 Bottom.....	1,790	445				
June 9, 1952						
1 Top.....	1,790	445				
1 Bottom.....	1,790	445				
2 Top.....	1,790	445				
2 Bottom.....	1,790	445				
3 Top.....	1,790	445				
3 Bottom.....	1,790	445				
4 Shallow.....	1,790	445				
5 Shallow.....	1,790	445				
6 Top.....	1,790	445				
6 Bottom.....	1,790	445				
7 Top.....	1,790	445				
7 Bottom.....	1,790	445				
June 11, 1952						
1 Top.....	1,790	445				
1 Bottom.....	1,790	445				
2 Top.....	1,790	445				
2 Bottom.....	1,790	445				
3 Top.....	1,790	445				
3 Bottom.....	1,790	445				
4 Shallow.....	1,790	445				
5 Shallow.....	1,790	445				
6 Top.....	1,790	445				
6 Bottom.....	1,790	445				
7 Top.....	1,790	445				
7 Bottom.....	1,790	445				
June 16, 1952						
1 Top.....	2,180	445				
1 Bottom.....	2,180	445				
2 Top.....	2,180	445				
2 Bottom.....	2,180	445				
3 Top.....	2,180	445				
3 Bottom.....	2,180	445				
4 Shallow.....	2,180	445				
5 Shallow.....	2,180	445				
6 Top.....	2,180	445				
6 Bottom.....	2,180	445				
7 Top.....	2,180	445				
7 Bottom.....	2,180	445				
June 18, 1952						
1 Top.....	2,180	445				
1 Bottom.....	2,180	445				
2 Top.....	2,180	445				
2 Bottom.....	2,180	445				
3 Top.....	2,180	445				
3 Bottom.....	2,180	445				
4 Shallow.....	2,180	445				
5 Shallow.....	2,180	445				
6 Top.....	2,180	445				
6 Bottom.....	2,180	445				
7 Top.....	2,180	445				
7 Bottom.....	2,180	445				
June 21, 1952						
1 Top.....	2,180	445				
1 Bottom.....	2,180	445				
2 Top.....	2,180	445				
2 Bottom.....	2,180	445				
3 Top.....	2,180	445				
3 Bottom.....	2,180	445				
4 Shallow.....	2,180	445				
5 Shallow.....	2,180	445				
6 Top.....	2,180	445				
6 Bottom.....	2,180	445				
7 Top.....	2,180	445				
7 Bottom.....	2,180	445				

	May 17, 1952		May 26, 1952		June 4, 1952		June 14, 1952		June 23, 1952	
	1 Top	1 Bottom	2 Top	2 Bottom	3 Top	3 Bottom	4 Top	4 Bottom	5 Top	5 Bottom
1 Top	2,710	725	3,190	880	1,770	440	1,770	442	2,200	555
1 Bottom	2,710	725	3,200	870	2,130	538	1,770	442	2,200	550
2 Top	37	37	336	43	314	24	386	33	638	93
2 Bottom	405	41	336	43	352	29	386	34	638	93
3 Top	456	51	336	40	317	26	381	34	638	108
3 Bottom	456	51	338	42	323	25	384	34	638	108
4 Top	467	54	335	42	317	25	384	34	638	108
4 Shallow	471	56	335	42	316	25	382	34	638	108
5 Shallow	464	56	335	42	316	25	382	34	638	108
6 Top	464	56	335	42	316	25	382	34	638	108
6 Bottom	464	56	335	42	316	25	382	34	638	108
7 Top	438	51	336	40	314	25	381	35	671	102
7 Bottom	502	60	336	44	324	25	386	34	692	108
July 5, 1952										
1 Top	3,800	1,060	2,220	565	6,370	1,860	6,450	1,940	9,380	2,950
1 Bottom	3,790	1,060	2,210	585	6,400	1,920	6,450	1,940	9,380	2,950
2 Top	1,330	225	3,090	840	6,560	1,970	906	198	4,970	1,450
2 Bottom	1,450	225	3,160	860	6,560	1,970	906	198	5,060	1,470
3 Top	1,470	325	2,900	760	6,780	2,040	890	183	6,800	2,040
3 Bottom	1,440	325	3,130	860	6,870	2,080	895	197	6,800	2,070
4 Shallow	1,440	325	3,450	940	7,090	2,140	915	202	6,420	1,920
5 Shallow	1,440	325	3,440	950	7,090	2,130	918	206	6,420	1,920
6 Top	1,440	320	3,520	970	--	--	973	217	6,420	1,920
6 Bottom	1,420	315	5,780	1,710	7,270	2,200	983	222	6,820	2,050
7 Top	1,440	320	3,620	1,000	7,090	2,160	915	203	6,430	1,980
7 Bottom	1,410	315	5,790	1,700	7,220	2,200	945	210	6,720	2,050
July 16, 1952										
1 Top	3,260	860	2,270	568	--	--	6,870	2,080	10,600	3,370
1 Bottom	3,350	910	2,340	580	6,440	1,940	6,870	2,080	10,700	3,340
2 Top	1,140	225	4,470	1,280	7,910	2,450	2,040	525	6,830	2,150
2 Bottom	1,130	228	4,490	1,260	7,910	2,425	2,040	525	7,080	2,150
3 Top	1,460	328	5,150	1,490	7,850	2,425	3,080	1,960	7,750	2,350
3 Bottom	1,470	330	5,190	1,510	8,500	2,650	3,900	1,900	7,750	2,380
4 Shallow	1,460	325	5,290	1,540	8,500	2,900	4,520	1,300	8,130	2,500
5 Shallow	1,440	320	5,290	1,540	9,140	2,850	4,580	1,300	8,130	2,450
6 Top	1,440	320	5,290	1,540	12,600	4,140	4,580	1,370	8,190	2,550
6 Bottom	1,420	315	5,290	1,540	12,600	4,140	4,580	1,370	8,190	2,550
7 Top	1,440	325	5,290	1,540	8,140	2,900	4,580	1,310	8,290	2,570
7 Bottom	1,410	312	5,390	1,570	12,600	4,090	4,760	1,370	8,360	2,600
July 28, 1952										
1 Top	3,260	860	2,270	568	--	--	6,870	2,080	10,600	3,370
1 Bottom	3,350	910	2,340	580	6,440	1,940	6,870	2,080	10,700	3,340
2 Top	1,140	225	4,470	1,280	7,910	2,450	2,040	525	6,830	2,150
2 Bottom	1,130	228	4,490	1,260	7,910	2,425	2,040	525	7,080	2,150
3 Top	1,460	328	5,150	1,490	7,850	2,425	3,080	1,960	7,750	2,350
3 Bottom	1,470	330	5,190	1,510	8,500	2,650	3,900	1,900	7,750	2,380
4 Shallow	1,460	325	5,290	1,540	8,500	2,900	4,520	1,300	8,130	2,500
5 Shallow	1,440	320	5,290	1,540	9,140	2,850	4,580	1,300	8,130	2,450
6 Top	1,440	320	5,290	1,540	12,600	4,140	4,580	1,370	8,190	2,550
6 Bottom	1,420	315	5,290	1,540	12,600	4,140	4,580	1,370	8,190	2,550
7 Top	1,440	325	5,290	1,540	8,140	2,900	4,580	1,310	8,290	2,570
7 Bottom	1,410	312	5,390	1,570	12,600	4,090	4,760	1,370	8,360	2,600

Aug. 4, 1952

Aug. 6, 1952

## 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 1951 to September 1952.—Continued						
Station Number	Specific conductance	Chloride	Specific conductance	Chloride	Specific conductance	Chloride
June 30, 1952						
1 Top.....	2,380	612	4,080	1,150	6,860	2,080
1 Bottom.....	2,920	780	4,720	1,360	6,830	2,070
2 Top.....	1,930	475	2,840	750	4,510	1,310
2 Bottom.....	2,100	523	2,870	750	4,600	1,340
3 Top.....	2,730	723	3,250	880	6,560	1,970
3 Bottom.....	2,730	720	3,280	880	7,230	2,180
4 Shallow.....	3,310	900	3,600	1,010	6,190	1,840
4 Shallow.....	3,290	910	3,600	1,000	6,410	1,860
6 Top.....	3,890	980	3,610	1,000	6,230	1,930
6 Bottom.....	3,670	1,020	3,960	1,100	7,090	2,150
7 Top.....	3,290	900	3,640	1,010	6,110	1,820
7 Bottom.....	3,590	990	3,840	1,070	6,230	1,880
July 2, 1952						
1 Top.....	2,470	630	4,030	1,140	9,420	2,920
1 Bottom.....	2,920	780	4,720	1,360	9,420	2,920
2 Top.....	3,060	830	2,820	740	4,570	1,320
2 Bottom.....	3,090	830	2,840	760	4,610	1,340
3 Top.....	2,860	770	3,260	880	6,560	1,970
3 Bottom.....	3,180	850	3,300	900	7,320	2,200
4 Shallow.....	3,540	980	3,610	1,000	6,280	1,860
4 Shallow.....	3,440	940	3,610	1,000	6,490	1,930
6 Top.....	3,520	960	3,660	1,010	6,310	1,860
6 Bottom.....	3,630	1,050	3,830	1,070	7,180	2,150
7 Top.....	3,530	980	3,650	1,000	6,200	1,830
7 Bottom.....	5,330	1,550	3,860	1,080	7,210	2,180
July 9, 1952						



	Aug. 16, 1952	Aug. 25, 1952	Sept. 3, 1952	Sept. 13, 1952	Sept. 22, 1952
1 Top.....	8,750	22,680	28,460	27,000	27,800
1 Bottom.....	3,470	23,190	28,460	27,000	27,800
2 Top.....	11,900	13,470	16,010	21,800	24,800
2 Bottom.....	12,000	4,390	5,350	8,640	10,000
3 Top.....	11,700	13,470	16,010	21,800	24,800
3 Bottom.....	11,900	13,350	16,400	21,800	24,800
4 Top.....	11,400	13,350	16,400	21,800	24,800
4 Bottom.....	11,100	13,350	16,400	21,800	24,800
5 Top.....	3,470	13,100	17,250	23,200	26,100
5 Shallow.....	11,800	13,150	17,250	23,200	26,100
6 Top.....	3,680	13,250	17,250	24,200	26,900
6 Bottom.....	11,800	13,250	17,250	24,200	26,900
7 Top.....	3,720	13,080	17,250	24,000	26,300
7 Bottom.....	11,800	13,250	17,250	24,000	26,300
	Aug. 18, 1952	Aug. 27, 1952	Sept. 6, 1952	Sept. 15, 1952	Sept. 24, 1952
1 Top.....	9,240	23,030	27,070	26,800	27,700
1 Bottom.....	2,900	7,960	9,600	9,650	10,000
2 Top.....	11,400	23,030	27,070	26,800	27,700
2 Bottom.....	3,990	8,010	9,600	9,650	10,000
3 Top.....	12,600	15,110	15,930	21,500	23,500
3 Bottom.....	3,820	5,080	5,350	7,520	8,380
4 Top.....	12,000	14,710	16,320	25,800	25,800
4 Bottom.....	3,820	5,000	5,350	9,360	9,090
5 Top.....	12,300	15,110	16,320	28,400	26,600
5 Shallow.....	3,970	5,080	5,820	10,200	9,600
6 Top.....	12,300	15,390	17,160	26,200	27,500
6 Shallow.....	3,920	5,100	5,820	9,370	10,000
7 Top.....	12,300	15,390	17,160	26,000	27,500
7 Bottom.....	12,500	15,830	17,160	26,000	27,500
8 Top.....	3,940	5,080	5,820	9,280	9,950
8 Bottom.....	12,300	15,390	17,160	26,400	27,500
9 Top.....	3,940	5,080	5,820	9,320	10,000
9 Bottom.....	12,400	15,750	17,160	26,200	27,500
10 Top.....	3,970	5,180	5,850	10,200	10,000
10 Bottom.....	12,400	15,750	17,160	26,400	27,500
	Aug. 20, 1952	Aug. 30, 1952	Sept. 8, 1952	Sept. 17, 1952	Sept. 27, 1952
1 Top.....	19,880	24,590	26,900	26,800	27,700
1 Bottom.....	6,780	8,630	9,460	9,650	10,100
2 Top.....	12,400	20,120	26,900	27,500	27,700
2 Bottom.....	3,990	8,680	9,460	9,650	10,100
3 Top.....	12,870	15,090	18,100	19,700	23,500
3 Bottom.....	4,160	4,960	6,120	6,780	8,380
4 Top.....	13,070	14,690	19,100	23,700	25,800
4 Bottom.....	4,160	4,860	5,870	7,060	8,120
5 Top.....	13,070	15,370	21,200	24,200	26,400
5 Shallow.....	4,160	5,080	5,870	8,380	9,600
6 Top.....	12,970	15,300	19,700	21,200	27,200
6 Shallow.....	4,210	5,080	5,870	7,450	8,380
7 Top.....	13,070	15,300	19,700	21,200	27,200
7 Bottom.....	13,070	15,300	19,700	21,200	27,200
8 Top.....	4,240	5,180	5,870	7,450	8,380
8 Bottom.....	13,070	15,300	19,700	21,200	27,200
9 Top.....	4,240	5,180	5,870	7,450	8,380
9 Bottom.....	13,070	15,300	19,700	21,200	27,200
10 Top.....	4,240	5,180	5,870	7,450	8,380
10 Bottom.....	13,070	15,300	19,700	21,200	27,200

## 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 1951 to September 1952.--Continued

Station Number	Specific conductance	Chloride
Sept. 29, 1952		
1 Top.....	27,700	10,000
1 Bottom.....	27,700	10,100
2 Top.....	17,900	8,970
2 Bottom.....	24,700	10,100
3 Top.....	19,300	6,730
3 Bottom.....	25,300	9,070
4 Shallow.....	26,000	9,490
5 Shallow.....	26,000	9,440
6 Top.....	26,000	9,460
6 Bottom.....	26,800	9,800
7 Top.....	26,000	9,460
7 Bottom.....	26,600	9,700

TRINITY RIVER BASIN--Continued  
 MISCELLANEOUS ANALYSES OF STREAMS IN TRINITY RIVER BASIN IN TEXAS  
 Chemical analyses, in parts per million, water year October 1951 to September 1952

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-tron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>		Per-cent so-dium	So-dium absorp-tion ratio	Specific conduct-ance (micro-mhos at 25°C)	pH	
															Parts per mil-lion	Tons per acre-foot	Calcium	Non-mag-nesium					
EAGLE MOUNTAIN RESERVOIR ABOVE FORT WORTH																							
Apr. 2, 1952 .....		5.6	0.01	40	7.3	17	1.2	151		15	21	0.3	0.3	0.5	0.10	a.182	0.32	130	6	22	0.6	335	7.7
LAKE WORTH NEAR FORT WORTH																							
Mar. 31, 1952 .....		5.6	0.05	43	7.8	18	0.8	161		17	23	0.4	0.2	0.12		197	0.27	139	7	22	0.7	363	7.9
WEST FORK TRINITY RIVER AT FORT WORTH																							
Apr. 1, 1952 .....	45	5.4	0.01	49	9.5	23	2.8	184		22	27	0.4	1.5	0.12		237	0.32	161	10	23	0.8	426	7.5
ELM FORK TRINITY RIVER NEAR CARROLLTON																							
Mar. 29, 1952 .....	22	6.0	0.01	54	6.3	35	0.4	169		35	43	0.3	0.8	0.18		277	0.38	161	22	32	1.2	481	7.9
TRINITY RIVER AT DALLAS																							
Apr. 1, 1952 .....	106	10	0.35	63	8.7	165	38	291		207	119	1.2	7.7	0.19		a.763	1.04	193	0	60	5.2	1,310	7.5
CITY LAKE NEAR TERRELL																							
Mar. 24, 1952 .....		7.6	0.03	19	5.2	13	0.0	87		15	7.2	0.4	0.2			125	0.17	69	0	29	0.7	200	7.6
TRINITY RIVER NEAR ROSSER																							
Mar. 24, 1952 .....	195	13		59	11	175	153		202	116			89			740	1.01	192	66	66	5.5	1,230	6.6

Sum of determined constituents.

a Sum of determined constituents.



SAN JACINTO RIVER BASIN  
SAN JACINTO RIVER NEAR HUFFMAN, TEX.

LOCATION --At Sheldon Pumping Plant of City of Houston, 5½ miles downstream from Huffman gaging station which is at Beaumont, Sour Lake & Western Railway bridge, 0.4 mile downstream from confluence of East and West Forks, and 3.4 miles southwest of Huffman, Harris County.

DRAINAGE AREA --2,791 square miles at gaging station.

RECORDS AVAILABLE --Chemical analyses: October 1945 to July 1948, December 1948 to September 1952.

Water temperatures: January 1949 to September 1952.

EXTREMES 1951-52 --Dissolved solids: Maximum, 2,820 ppm Nov. 21-23, 28; minimum, 79 ppm Apr. 12-15, 24-28.

Hardness: Maximum, 566 ppm Nov. 21-23, 28; minimum, 36 ppm Apr. 12-15, 24-28.

Specific conductance: Maximum daily, 6,340 micromhos Nov. 23; minimum daily, 89.9 micromhos May 19.

Water temperatures: Maximum observed, 92°F July 3; minimum observed, 42°F Dec. 16.

EXTREMES 1945-52 --Dissolved solids: Maximum, 2,820 ppm Nov. 21-23, 28, 1951; minimum, 44 ppm Oct. 4-10, 1949.

Hardness: Maximum, 566 ppm Nov. 21-23, 28, 1951; minimum, 16 ppm Oct. 4-10, 1949.

Specific conductance (1945-52): Maximum daily, 6,340 micromhos Nov. 23, 1951; minimum observed, freezing point Feb. 2, 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 sums of determined constituents unless otherwise noted. During periods of extremely low flow and heavy pumping, salt-water intrusion from Galveston Bay occurs at this station. Some salt-water intrusion occurred during November 1951. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for gaging station near Huffman for water year October 1951 to September 1952 given in Water-Supply Paper 1242. No appreciable inflow between gaging station and sampling point except during periods of heavy local rains.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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 (micro-mhos at 25°C)	pH or		
														Parts per million	Tons per acre-foot	Tons per day						
Oct. 1-10, 1951...	134	19		17	5.2	92		63	5.7	145		1.0		336	0.46	122	64	12	76	5.0	577	7.7
Oct. 11-20 .....	82.5	18		23	5.7	110		74	5.8	179		1.0		401	.55	89	81	20	75	5.3	704	7.7
Oct. 21-31 .....	103	17		22	5.2	86		68	5.0	143		2.0		330	.45	92	76	21	71	4.2	593	7.6
Nov. 1-10 .....	143	15		20	5.4	85		67	5.1	139		1.0		318	.43	123	72	17	72	4.4	585	7.6
Nov. 11-15 .....	120	14		17	4.9	84		57	9.0	134		.5		292	.40	95	63	16	75	4.7	545	7.4
Nov. 16-18 .....	87.7	14		20	12	136		60	30	223		2.0		486	.66	115	100	50	75	5.9	873	7.6
Nov. 19-20 .....	915	14		50	87	726		72	161	1,300		2.5		2,380	3.24	588	482	424	77	14	4,520	7.5
Nov. 21-23, 28 .....	105	17		39	102	865		91	200	1,540		2.0		2,820	3.84	799	566	500	77	16	5,240	7.5
Nov. 24-25, 29-30	118	18		38	43	414		71	83	725		1.5		1,360	1.85	433	267	209	77	11	2,550	7.4
Nov. 26-27 .....	111	22		29	26	282		70	52	450		3.0		910	1.24	273	180	122	76	8.6	1,610	7.7
Dec. 1-2 .....	126	26		36	45	437		72	90	760		2.5		1,430	1.94	486	275	216	78	11	2,640	7.7
Dec. 3-9-10 .....	239	17		31	4.6	86		60	10	160		1.5		331	.45	234	72	22	72	4.4	575	7.5
Dec. 4-8 .....	287	15		16	5.7	61		52	11	100		1.5		256	.35	136	63	25	68	3.3	415	7.4
Dec. 11-20 .....	199	18		23	5.2	78		66	7.5	132		1.2		316	.43	170	73	25	69	3.8	528	7.4
Dec. 21-31 .....	148	20		23	4.2	83		64	6.0	140		1.5		308	.42	123	75	22	71	4.2	581	7.4
Jan. 1-10, 1952 ..	135	20		24	4.2	80		65	6.0	138		1.0		303	.41	110	78	24	69	4.0	555	7.6
Jan. 11-20 .....	126	18		24	4.2	82		69	5.0	137		1.5		307	.42	104	78	21	70	4.1	566	7.5
Jan. 21-26 .....	123	16		30	5.9	132		71	9.0	225		1.0		482	.66	160	100	42	74	5.7	859	7.3
Jan. 27-31 .....	343	16		21	4.8	90		60	11	146		1.0		327	.44	303	72	23	73	4.6	599	7.1

a Sum of determined constituents.

SAN JACINTO RIVER BASIN--Continued  
SAN JACINTO RIVER NEAR HUFFMAN, TEX.--Continued

Chemical analyses, in parts per million, water year October 1951 to September 1952.--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			Hardness as CaCO <sub>3</sub>	Percent so-adsorption ratio	Specific conductance (microhmhos at 25°C)	pH	Color		
														Parts per million	Tons per acre-foot	Tons per day						Calcium, mg./nesium	Non-carbonate
Feb. 1-9, 1932...	2,427	12		16	3.2	39		44	7.7	66		1.8		186	0.25	1,220	53	17	62	2.3	309	6.9	
Feb. 10-21.....	281	19		24	4.9	61		64	9.3	106		1.5		274	.37	208	80	28	62	2.9	465	7.1	
Feb. 22-29.....	781	14		25	3.8	40		68	11	69		1.5		209	.28	441	78	22	53	2.0	363	7.2	
Mar. 1-10.....	358	18		29	3.8	50		76	10	86		1.7		255	.35	246	88	26	55	2.4	433	7.6	
Mar. 11-15.....	776	19		31	2.4	52		81	9.7	87		1.9		281	.38	569	87	21	56	2.5	445	7.2	
Mar. 16-22.....	732	13		19	3.0	35		60	9.0	54		1.7		176	.24	348	60	11	56	1.9	298	7.3	
Mar. 23-31.....	256	16		29	4.5	53		76	10	93		1.9		268	.39	199	91	29	56	2.4	458	6.9	
Apr. 1-11.....	215	17		30	4.6	70		79	8.3	122		2.3		327	.44	190	94	29	62	3.2	555	7.8	
Apr. 12-15, 24-28	11,330	6.4		9.5	3.1	12		29	9.6	18		2.4		79	.11	2,420	36	13	41	.9	123	7.3	
Apr. 16-23, 29-30	2,598	12		16	2.5	26		48	7.5	40		2.0		146	.20	1,020	50	11	52	1.6	232	7.5	
May 1-10.....	460	19		24	4.2	33		63	11	60		2.0		201	.27	250	77	26	48	1.6	329	7.1	
May 11-17.....	239	22		29	4.4	50		82	9.7	87		.6		266	.36	172	90	23	55	2.3	445	6.6	
May 18-31.....	4,196	7.8		11	3.4	12		32	5.6	24		2.4		101	.14	1,140	41	15	39	.8	146	6.9	
June 1-11.....	848	23		24	5.2	24		68	8.4	49		.8		187	.25	428	81	26	39	1.2	304	7.7	
June 12-20.....	302	24		29	4.4	46		84	7.7	79		1.9		260	.35	212	90	22	52	2.1	414	7.8	
June 21-30.....	175	27		21	5.5	57		90	8.8	99		1.2		297	.40	140	100	26	55	2.5	490	7.9	
July 1-10.....	177	22		25	4.4	54		90	6.3	90		1.8		260	.35	124	80	18	59	2.6	446	7.5	
July 11-19, 31.....	171	20		25	4.3	60		82	8.3	95		1.8		259	.35	120	80	13	62	2.9	461	7.5	
July 20-30.....	210	17		21	3.6	52		69	7.7	82		1.2		226	.31	128	67	11	63	2.8	461	7.4	
Aug. 1-9.....	110	22		22	3.9	73		70	6.8	116		1.5		319	.43	95	71	14	69	3.8	528	7.2	
Aug. 10-20.....	69.0	22		25	3.9	68		81	4.9	140		1.5		338	.47	65	78	12	71	4.3	623	7.4	
Aug. 21-31.....	70.6	19		25	4.1	85		79	5.5	137		1.2		348	.46	64	80	15	70	4.1	607	7.3	
Sept. 1-10.....	59.4	20		25	4.8	86		86	4.9	136		1.5		354	.48	57	82	12	69	4.1	608	7.8	
Sept. 11-20.....	110	20		24	4.3	79		88	5.1	121		1.2		328	.45	97	78	6	69	3.9	554	7.7	
Sept. 21-30.....	99.0	18		20	3.8	67		75	5.1	102		1.0		285	.39	76	66	4	69	3.6	475	7.6	
Weighted average	777	11		15	3.8	30		43	8.8	50		2.1		155	0.21	325	53	18	55	1.8	254	--	

## SAN JACINTO RIVER BASIN--Continued

## SAN JACINTO RIVER NEAR HUFFMAN, TEX.--Continued

Temperature (°F) of water, water year October 1951 to September 1952

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

## BRAZOS RIVER BASIN

## CLEAR FORK BRAZOS RIVER AT NUGENT, TEX.

LOCATION --- At gaging station at county road bridge in Nugent, Jones County, 4 miles upstream from Deadman Creek.

DRAINAGE AREA --- 2,220 square miles.

RECORDS AVAILABLE --- Chemical analyses: August 1948 to September 1952.

EXTREMES: Maximum, 3,590 ppm May 28-29; minimum, 201 ppm Sept. 22, 24-25.

Water temperatures: August 1948 to September 1952.

Hardness: Maximum, 1,210 ppm May 28-29; minimum, 122 ppm Sept. 22, 24-25.

Specific conductance: Maximum daily, 6,260 micromhos May 29; minimum observed, 41° F Dec. 15.

Water temperatures: Maximum observed, 95° F Aug. 16, 18; minimum observed, 41° F Dec. 15.

EXTREMES: 1948-52 --- Dissolved solids: Maximum, 3,910 ppm Mar. 21-31, 1949; minimum, 158 ppm Sept. 15-16, 1949.

Hardness: Maximum, 1,520 ppm Feb. 11-19, 1951; minimum, 89 ppm Sept. 15-16, 1949.

Specific conductance (1950-52): Maximum daily, 6,260 micromhos May 29, 1952; minimum observed, freezing point Jan. 29, 1949.

Water temperatures: Maximum observed, 95° F Aug. 16, 18, 1952; minimum observed, freezing point Jan. 29, 1949.

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 sums of determined constituents. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1951 to September 1952 given in Water-Supply Paper 1242.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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			Hardness as CaCO <sub>3</sub>		Percent sodium carbonate	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	Color	
														Parts per million	Tons per acre-foot	Tons per day	Calcium, mg./medium	Non-carbonate						
Oct. 1-9, 1951.....	8.06	22		75	65	143		240	175	285		1.8		921	1.25	0.1	454	258	41	2.9	1,530	7.9		
Oct. 10-20.....	b.0	22		85	66	188		259	205	330		1.5		1,020	1.39	0	484	272	46	3.7	1,770	7.9		
Oct. 26-30.....	23.9	17		113	76	221		287	284	390		1.2		1,240	1.69	8.0	594	376	45	3.9	2,140	7.9		
Oct. 31, Nov. 1-10	5.61	9.8		284	102	382		193	1,090	458		3.0		2,410	3.28	37	1,150	995	41	4.6	3,310	8.1		
Nov. 1-10.....	1.01	12		230	91	325		213	841	428		2.0		2,030	2.76	5.5	948	774	43	4.6	2,910	8.1		
Nov. 21-30.....	1.50	14		208	92	320		243	715	460		.8		1,930	2.62	7.8	898	698	44	4.6	2,880	8.1		
Dec. 1-7.....	1.60	12		168	81	296		261	568	418		.5		1,670	2.27	7.2	752	538	46	4.7	2,530	8.0		
Dec. 8-10.....	182	6.4		46	23	58		233	50	65		.5		1,366	.50	18	210	18	37	1.7	667	8.0		
Dec. 11-20.....	15.8	6.4		44	25	229		229	68	78		1.2		418	.57	18	213	26	42	2.1	720	8.2		
Dec. 21-25.....	.78	8.8		54	28	127		244	115	145		.5		606	.82	1.3	250	50	52	3.5	1,030	8.2		
Dec. 26-31.....	.93	12		110	72	202		223	450	253		1.5		1,210	1.65	3.0	570	388	43	3.7	1,820	7.9		
Jan. 1-10, 1952	2.39	9.6		122	81	217		206	567	248		1.8		1,350	1.84	8.7	638	468	43	3.7	2,020	7.9		
Jan. 11-20.....	2.53	10		170	78	235		194	534	260		3.2		1,320	1.80	9.0	595	436	45	4.0	1,980	8.0		
Jan. 21-31.....	1.85	9.2		170	101	312		196	650	482		2.0		1,820	2.48	9.1	840	679	45	4.6	2,820	7.9		
Feb. 1-10.....	1.49	9.6		188	108	348		208	700	545		2.0		2,000	2.72	8.0	913	742	45	5.0	3,010	7.8		
Feb. 11-20.....	1.85	10		198	114	351		221	762	530		4.1		2,080	2.83	10	962	782	44	4.9	3,070	7.6		
Feb. 21-29.....	1.53	9.4		187	121	364		126	851	540		5.5		2,140	2.91	8.8	964	861	45	5.1	3,230	7.8		
Mar. 1-10.....	1.73	9.0		206	125	377		152	953	518		2.0		2,260	3.07	11	1,030	904	44	5.1	3,260	8.0		
Mar. 11-20.....	1.41	8.8		221	132	385		156	1,050	502		3.2		2,380	3.24	9.1	1,090	966	43	5.1	3,350	8.0		
Mar. 21-31.....	.77	9.8		209	128	372		145	989	500		3.6		2,280	3.10	4.7	1,050	929	44	5.0	3,320	8.1		

Includes days of less than 0.05 cubic foot per second discharge.

No flow Oct. 10-25, June 25-30, July 1-14, 25-31, Aug. 1, 13-31, Sept. 1-3.



Apr. 1-10, 1933.	11	124	383	155	921	520	3.8	2,280	3.03	4.4	989	862	46	5.3	3,290	7.8
Apr. 11-20 .....	13	204	420	145	972	590	2.8	2,400	3.26	5.9	1,050	933	46	5.6	3,550	7.9
Apr. 21-30 .....	14	69	165	126	305	201	4.4	915	1.24	140	350	246	51	3.6	1,420	8.0
Apr. 1-30 .....	17	47	101	170	100	126	2.5	519	.71	2.8	204	64	52	3.1	858	8.1
May 1-3, 21-22,	15	44	34	121	81	36	2.8	294	.40	99	183	64	31	1.1	489	7.9
May 4-18 .....	17	116	156	166	319	246	1.2	1,040	1.41	7.8	480	344	41	3.1	1,610	8.0
May 19-20, 23, 27,	13	76	78	128	215	87	2.8	575	.78	80	284	179	37	2.0	909	7.8
May 30-31 .....	17	325	772	132	1,310	1,000	7.3	3,590	4.88	52	1,210	1,100	58	9.7	5,070	7.9
May 23-29 .....	26	42	39	144	57	34	4.5	297	.40	13	145	27	37	1.4	470	8.1
June 1-7 .....	17	94	32	114	218	44	4.5	534	.73	17	316	223	18	8	784	7.8
June 8-20 .....	18	86	66	111	239	101	2.8	656	.89	.0	342	251	29	1.6	994	7.8
June 21-24 .....	19	88	127	131	278	202	3.5	855	1.16	.0	408	301	40	2.7	1,370	7.9
July 1-14 .....	22	94	180	163	289	305	3.8	1,030	1.40	.5	477	344	45	3.6	1,720	7.9
July 15-20 .....	25	91	195	168	286	325	3.8	1,070	1.46	.0	474	336	47	3.9	1,760	8.0
July 21-24 .....	28	96	226	228	285	372	3.2	1,190	1.62	.5	519	332	49	4.3	1,990	8.0
Aug. 2-12 .....	20	91	233	210	281	390	2.8	1,190	1.62	.0	510	338	50	4.5	2,050	7.9
Aug. 13-20 .....	34	87	254	196	299	432	7.0	1,290	1.75	.0	534	373	51	4.8	2,200	8.2
Aug. 21-24 .....	10	37	78	c 215	67	80	2.8	414	.56	64	191	14	47	2.5	725	8.4
Sept. 4-12, 23, 26	11	54	92	188	121	110	3.0	525	.71	.1	238	84	46	2.6	883	8.2
Sept. 13-21, 27-30	8.8	37	14	104	44	12	5.2	201	.27	55	132	37	20	.5	318	7.7
Sept. 22, 24-25 ..																
Weighted average	10.8	65	81	165	165	106	2.8	558	0.76	16.3	277	142	39	2.1	895	--

a Includes days of less than 0.05 cubic foot per second discharge.

b No flow Oct. 10-25, June 25-30, July 1-14, 25-31, Aug. 1, 13-31, Sept. 1-3.

c Includes equivalent of 5 parts per million of carbonate (CO<sub>3</sub>).

## BRAZOS RIVER BASIN--Continued

## CLEAR FORK BRAZOS RIVER AT NUGENT, TEX.--Continued

Temperature (°F) of water, water year October 1951 to September 1952

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	81	56	60	50	58	52	69	73	79	83	--	--
2	84	50	69	45	58	60	69	71	83	90	89	--
3	84	55	54	42	53	55	70	76	84	84	91	--
4	74	50	60	45	53	55	68	77	--	82	92	--
5	82	48	60	44	54	59	71	78	81	90	91	82
6	70	50	55	44	55	61	71	78	81	88	86	80
7	68	54	53	52	56	62	74	78	84	92	91	79
8	70	54	48	55	54	64	75	84	--	77	90	80
9	71	59	50	50	60	61	67	80	--	82	93	88
10	74	60	54	49	59	60	60	70	--	84	85	79
11	80	58	51	50	58	61	60	70	86	88	87	75
12	74	62	53	50	58	59	61	80	--	84	89	83
13	79	60	51	51	57	59	64	81	79	84	92	86
14	88	59	50	56	53	62	64	84	--	90	88	82
15	75	61	41	60	50	59	70	82	90	80	92	82
16	75	58	44	62	53	58	73	81	91	85	95	84
17	74	53	49	62	52	60	68	68	90	88	90	82
18	74	51	48	60	56	60	71	62	85	84	95	85
19	71	47	47	64	54	68	70	63	88	81	93	89
20	70	51	46	56	58	69	68	68	82	87	90	83
21	70	58	45	61	56	66	72	81	86	90	92	--
22	64	60	48	57	59	55	69	82	86	91	90	63
23	66	54	48	54	54	55	65	80	85	93	91	67
24	64	53	51	57	55	55	73	74	85	92	89	66
25	66	55	51	59	50	60	73	77	88	90	--	70
26	70	51	50	60	53	64	75	78	88	91	--	75
27	67	49	49	58	55	54	75	74	89	89	--	78
28	59	54	51	55	58	63	73	69	90	89	--	75
29	66	57	53	60	57	60	76	79	86	--	--	78
30	65	58	59	54	--	68	77	77	86	--	--	75
31	60	--	60	57	--	74	--	81	--	--	--	--
Average	72	55	52	54	55	61	70	76	--	87	--	79

## 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 1952.

Water temperatures: October 1949 to September 1952.

EXTREMES, 1951-52.--Dissolved solids: Maximum, 1,500 ppm Sept. 1-30; minimum, 1,310 ppm Feb. 1-29.

Hardness: Maximum, 490 ppm Sept. 1-30; minimum, 352 ppm Nov. 1-30.

Specific conductance: Maximum daily, 2,600 micromhos Aug. 26; minimum daily, 2,150 micromhos Nov. 30.

Water temperatures: Maximum observed, 73°F on several days during October, August and September.

EXTREMES, 1942-52.--Dissolved solids: Maximum, 2,130 ppm Feb. 2-9, 1942; minimum, 829 ppm Sept. 1-10, 1942.

Hardness: Maximum, 661 ppm Feb. 2-9, 1942; minimum, 318 ppm Dec. 21-31, 1942.

Specific conductance (1950-52): Maximum daily, 2,690 micromhos Sept. 17-18, 1950; minimum daily, 1,840 micromhos Jan. 6, 1951.

Water temperatures: Maximum and minimum not determined.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Values reported for dissolved solids are sums of determined constituents. Records of discharge for gaging station near Palo Pinto for water year October 1951 to September 1952 given in Water-Supply Paper 1242. No appreciable inflow between dam and gaging station except during periods of heavy local rains.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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			Hardness as CaCO <sub>3</sub>		Percent sodium chloride 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, 1951 ...	294	14		137	23	336		124		287	542		2.5		1,400	1.90	1,110	436	335	63	7.0	2,470
Nov. 1-30, ...	202	12		105	22	355		115		300	505		2.0		1,360	1.85	742	352	255	69	8.2	2,250
Dec. 1-31, ...	175	14		133	26	303		120		284	498		.8		1,320	1.80	624	439	340	60	6.3	2,270
Jan. 1-31, 1952 ...	262	13		130	23	312		119		293	492		1.0		1,320	1.80	934	419	322	62	6.6	2,250
Feb. 1-29, ...	84.9	11		130	24	308		119		288	492		1.8		1,310	1.78	300	423	326	61	6.6	2,240
Mar. 1-31, ...	48.2	12		134	23	321		115		293	512		3.5		1,360	1.85	177	429	332	62	6.7	2,300
Apr. 1-30, ...	121	13		133	23	318		121		297	502		1.0		1,350	1.84	441	426	328	62	6.8	2,290
May 1-31, ...	70.9	15		136	24	313		126		291	505		.8		1,350	1.84	258	436	335	61	6.5	2,340
June 1-30, ...	616	13		134	23	325		123		292	518		1.0		1,370	1.86	2,280	429	328	62	6.8	2,440
July 1-31, ...	856	11		138	23	328		125		293	528		.5		1,380	1.88	3,190	439	336	62	6.7	2,410
Aug. 1-31, ...	730	15		141	24	351		126		306	560		2.8		1,460	1.99	2,880	450	348	63	7.2	2,510
Sept. 1-30, ...	48.5	12		152	27	352		136		307	578		1.5		1,500	2.04	1,196	490	378	61	6.9	2,510
Weighted average.	294	13		135	23	331		124		295	527		1.5		1,390	1.89	1,100	432	330	63	6.6	2,410
																						--

## WESTERN GULF OF MEXICO BASINS

## BRAZOS RIVER BASIN--Continued

## BRAZOS RIVER AT POSSUM KINGDOM DAM NEAR GRAFORD, TEX.--Continued

Temperature (°F) of water, March to September 1952

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1						--	53	58	58	62	68	73
2						--	53	58	58	64	68	73
3						--	54	58	58	64	68	73
4						--	54	58	64	64	68	65
5						--	54	58	64	64	68	65
6						--	54	58	64	64	68	65
7						--	54	58	64	64	71	65
8						--	54	58	64	64	71	65
9						--	55	58	64	64	71	65
10						52	55	58	64	67	71	68
11						52	55	58	64	67	71	68
12						52	55	58	60	67	71	68
13						52	55	58	60	67	71	68
14						52	55	58	60	67	71	68
15						52	55	57	60	67	71	68
16						52	55	57	60	66	71	68
17						52	56	57	60	66	71	68
18						52	56	57	62	66	71	69
19						52	56	57	62	66	71	69
20						53	56	57	62	66	71	69
21						53	56	58	62	66	73	69
22						53	56	58	62	66	73	69
23						53	56	58	62	66	73	69
24						53	55	58	62	61	73	69
25						53	55	58	62	61	73	66
26						53	55	58	62	61	73	66
27						53	55	58	62	61	73	66
28						53	55	58	62	61	73	66
29						53	55	58	62	61	73	66
30						53	58	58	62	68	73	66
31						53	--	58	--	68	73	--
Average						--	55	58	62	65	71	68

BRAZOS RIVER BASIN--Continued  
BRAZOS RIVER NEAR WHITNEY, TEX.

LOCATION.--At Whitney Dam, on State Highway 22, 3.4 miles upstream from gaging station which is 1.0 mile downstream from Coon Creek, 7.5 miles south of Whitney, Hill County, and at mile 439.

DRAINAGE AREA.--26,190 square miles, approximately, at gaging station, of which 9,240 square miles is probably noncontributing.

RECORDS AVAILABLE.--Chemical analyses: October 1947 to May 1948, October 1948 to September 1952.

Water temperatures: October 1947 to May 1948, October 1948 to September 1952.

EXTREMES, 1951-52.--Dissolved solids: Maximum, 1,350 ppm Oct. 1-10; minimum, 183 ppm June 11-20.

Hardness: Maximum, 442 ppm Oct. 1-10; minimum, 96 ppm June 11-20.

Specific conductance: Maximum daily, 2,560 micromhos Oct. 3, 4; minimum daily, 203 micromhos May 23.

Water temperatures: Maximum observed, 83° F on several days in August and September; minimum observed, 51° F on several days during December, January, and March.

EXTREMES, 1947-51.--Dissolved solids: Maximum, 1,560 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 (1950-52): Maximum daily, 2,560 micromhos Oct. 3, 4, 1951; minimum daily, 203 micromhos May 23, 1952.

Water temperatures: Maximum observed, 87° F July 12, 1948; minimum observed, freezing point Jan. 28-29, 1948.

Notes.--Records of specific conductance of daily samples available in district office at Austin, Tex. Values reported for dissolved solids concentrations are sums of determined constituents unless otherwise stated. Records of discharge for gaging station near Whitney for water year October 1951 to September 1952 given in Water-Supply Paper 1242. 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 1951 to September 1952

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			Hardness as CaCO <sub>3</sub>		Percent sodium-sulfate	Specific conductance (micro-mhos at 25° C)
														Parts per million	Tons per acre-foot	Tons per day	Calcium	Non-carbonate		
Oct. 1-10, 1951	514	9.0	131	28	317	144	278	512	2.0	1.350	1.84	1,870	442	324	61	8.6	2,350	7.7		
Oct. 11-20	254	10.0	123	27	295	165	282	470	1.5	1,270	1.73	895	430	296	60	6.1	2,190	7.7		
Oct. 21-31	254	9.0	124	25	303	138	259	488	1.5	1,280	1.74	878	412	300	62	6.5	2,260	7.7		
Nov. 1-10	386	4.9	125	27	319	134	264	515	3.0	1,320	1.80	1,380	423	313	62	6.8	2,240	7.8		
Nov. 11-20	214	4.3	126	25	314	132	270	508	2.2	1,310	1.78	757	418	310	62	6.7	2,230	7.7		
Nov. 21-30	226	4.2	123	28	312	133	268	508	1.0	1,300	1.77	783	414	305	62	6.7	2,230	7.8		
Dec. 1-10	202	2.0	126	28	301	144	270	485	.5	1,280	1.74	698	430	312	60	6.3	2,250	7.8		
Dec. 11-20	202	2.1	124	28	299	148	265	480	.0	1,270	1.73	683	424	303	60	6.4	2,230	7.8		
Dec. 21-31	230	5.6	94	21	279	210	225	370	.5	1,100	1.50	683	321	149	65	6.8	1,910	8.0		
Jan. 1-10, 1952	176	2.8	123	28	312	137	282	492	.5	1,310	1.78	623	422	310	62	6.7	2,260	7.5		
Jan. 11-20	208	2.6	121	28	311	135	276	492	1.0	1,300	1.77	730	417	308	62	6.6	2,250	7.8		
Jan. 21-31	164	3.5	118	27	302	133	272	475	.5	1,260	1.71	558	406	296	62	6.6	2,220	7.6		
Feb. 1-10	162	3.9	124	25	296	137	270	468	2.0	1,260	1.71	551	412	300	51	6.3	2,210	7.7		
Feb. 11-20	157	2.9	120	24	284	141	254	450	1.0	1,200	1.63	509	398	282	61	6.2	2,120	7.5		
Feb. 21-29	145	1.7	115	25	287	139	257	455	1.2	1,210	1.65	474	400	286	61	6.2	2,120	7.6		

## BRAZOS RIVER BASIN--Continued

## BRAZOS RIVER NEAR WHITNEY, TEX.--Continued

Chemical analyses, in parts per million, water year October 1951 to September 1952.--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		Hardness as CaCO <sub>3</sub>		Per-cent so-dium adsorp-tion ratio	So-dium micro-mhos at 25°C)	pH		
															Parts per million	Tons per acre-foot	Calcium, mg./nestum	Non-carbonate					
Mar. 1-10, 1952 . . .	127	2.5		120	24	290		141		263	452		1.8		1,220	1.66	398	282	61	6.3	2,140	7.6	
Mar. 11-20 . . . . .	116	3.5		120	25	294		146		262	460		2.0		1,240	1.69	388	402	283	61	6.4	2,160	7.5
Mar. 21-31 . . . . .	100	3.0		118	24	300		143		265	462		1.0		1,240	1.69	3335	393	276	62	6.5	2,160	7.6
Apr. 1-10 . . . . .	92.3	5.2		54	11	112		89		102	171		5.1		520	.71	130	180	106	58	3.7	914	7.7
Apr. 11-20 . . . . .	96.7	5.0		54	11	111		89		102	168		5.0		518	.70	135	180	106	57	3.6	905	7.6
Apr. 21-30 . . . . .	203	6.0		52	11	106		90		97	162		3.9		498	.68	273	174	101	57	3.5	870	7.7
May 1-10 . . . . .	49.9	8.0		53	8.6	101		98		90	150		2.2		479	.65	64.5	168	87	57	3.4	836	7.3
May 11-22, 28-31 . . .	54.1	9.2		49	7.2	75		106		66	112		2.2		387	.53	56.5	152	65	52	2.7	697	7.5
May 23-27 . . . . .	137	16		34	3.7	25		121		14	21		14		200	.27	74.0	100	9	35	1.1	317	7.5
June 1-10 . . . . .	44.5	10		32	5.4	43		99		28	58		4.0		a229	.31	27.5	102	21	48	1.8	389	7.9
June 11-20 . . . . .	94.1	9.0		30	5.2	27		100		22	35		2.2		183	.25	46.5	96	14	38	1.2	328	7.8
June 21-30 . . . . .	927	9.6		34	5.7	26		108		21	38		2.0		189	.26	473	108	20	35	1.1	342	7.9
July 1-9 . . . . .	1,214	13		41	7.0	75		158		50	78		2.2		a344	.47	1,130	132	2	55	2.8	611	8.1
July 10-13 . . . . .	268	11		68	14	132		132		111	205		2.2		628	.85	454	227	12	56	3.9	1,110	7.9
July 14-16, 24-31 . . .	875	10		90	18	156		134		170	310		.8		901	1.23	2,130	288	19	59	4.9	1,550	7.9
July 17-23 . . . . .	255	11		109	20	252		130		218	402		1.8		1,080	1.47	744	354	25	61	5.8	1,920	7.9
Aug. 1-10 . . . . .	1,160	8.8		99	18	214		142		176	345		1.2		948	1.29	2,970	321	204	59	5.2	1,660	8.1
Aug. 11-20 . . . . .	1,320	8.6		100	17	218		145		177	348		.8		964	1.31	3,440	320	200	60	5.3	1,670	8.1
Aug. 21-31 . . . . .	1,091	7.8		101	17	245		159		167	368		3.5		1,010	1.37	2,980	322	192	62	5.9	1,780	8.0
Sept. 1-10 . . . . .	1,077	11		92	16	224		206		91	365		5.5		934	1.27	2,720	296	126	62	5.6	1,670	7.8
Sept. 11-30 . . . . .	45.3	9.2		116	19	246		144		214	398		1.2		1,070	1.46	131	368	250	59	5.6	1,890	7.5
Weighted average . .	348	8.3		92	18	211		146		167	332		2.1		912	1.24	857	304	184	60	5.2	1,590	--

a Sum of determined constituents.

## BRAZOS RIVER BASIN--Continued

## BRAZOS RIVER NEAR WHITNEY, TEX.--Continued

Temperature (°F) of water, water year October 1951 to September 1952

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

## BRAZOS RIVER BASIN--Continued

## LEON RIVER NEAR EASTLAND, TEX.

LOCATION.--At bridge on county road, 4.2 miles upstream from mouth of Colony Creek, 6.2 miles downstream from Texas Electric Service Company dam forming Olden Lake, and 6.6 miles southeast of Eastland, Eastland County.

DRAINAGE AREA.--279 square miles.

RECORDS AVAILABLE.--Chemical analyses: September 1950 to September 1952.

Water temperatures: September 1950 to September 1952.

Hardness: Maximum, 157 ppm May 17-20; minimum, 80 ppm Sept. 18-19, 22-24.

Specific conductance: Maximum daily, 512 micromhos May 31; minimum daily, 159 micromhos Sept. 23.

EXTREMES, 1951-52.--Dissolved solids: Maximum, 316 ppm Jan. 21-31, Feb. 1-10, 1951; minimum, 119 ppm Sept. 18-19, 22-24, 1952.

Hardness: Maximum, 200 ppm Feb. 1-10, 1951; minimum, 80 ppm Sept. 18-19, 22-24, 1952.

Specific conductance (1950-52): Maximum daily, 636 micromhos Mar. 24, 1951; minimum daily, 159 micromhos Sept. 23, 1952.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Values reported for dissolved solids are residues on evaporation unless otherwise noted. No records of discharge available for this station.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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>2</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 dissolved	So-lu-m adsorp-tion ratio	Specific conduct-ance (micro-mhos at 25° C)		
															Parts per million	Tons per acre-foot					Calcium, magnesium	Non-carbonate
October 19-31, 1951	8.8			33	4.5	15		103		21	18		3.5		a155	0.21	101	16	25	0.7	260	7.8
Nov. 1-12.....	8.2			28	4.1	11		92		12	16		3.0		a127	.17	87	11	22	.5	219	7.5
Nov. 24-30.....	7.6			39	5.0	12		130		13	16		1.0		a158	.21	118	11	18	.5	271	7.8
Dec. 1-10.....	13			37	6.1	15		137		13	16		1.8		a169	.23	117	5	22	.6	285	7.8
Dec. 17-20.....	14			40	6.6	14		145		16	16		.5		a178	.24	127	8	20	.5	299	7.7
Dec. 21-31.....	13			41	6.3	14		150		12	16		.5		a177	.24	128	5	19	.5	305	8.0
Jan. 1-10, 1952.....	12			45	6.0	14		159		14	16		.5		200	.27	137	7	18	.5	328	8.0
Jan. 11-20.....	11			47	5.8	15		161		16	18		.5		204	.28	141	9	19	.6	338	7.5
Jan. 21-31.....	9.0			47	5.9	17		162		16	20		.5		210	.29	142	9	21	.6	348	7.6
Feb. 1-10.....	7.8			45	6.1	17		157		16	21		.5		204	.28	137	9	22	.6	338	8.0
Feb. 11-20.....	8.4			46	6.1	17		157		17	22		.5		207	.28	140	11	21	.6	350	8.0
Feb. 21-29.....	5.9			43	5.8	16		148		16	20		1.0		193	.26	131	10	21	.6	331	7.9
Mar. 1-10.....	4.6			44	6.2	15		150		16	20		1.0		197	.27	135	12	20	.6	341	7.8
Apr. 12-17.....	4.4			40	7.3	22		146		17	27		1.7		195	.27	130	10	27	.8	349	8.2
Apr. 18-26.....	9.2			35	5.0	12		124		8.9	16		1.6		158	.21	108	6	20	.5	288	8.2
May 17-20.....	8.8			52	6.6	30		124		21	70		1.3		251	.40	157	55	30	1.1	466	7.4
May 21-31.....	17			44	5.7	26		116		16	54		2.2		251	.34	133	38	30	1.0	411	7.9
June 1-3, 16-18 ...	14			46	6.7	25		140		12	48		1.2		240	.33	142	28	27	.9	407	8.2
Sept. 18-19, 22-24.	9.0			26	3.6	11		81		8.6	18		3.0		a119	.16	80	13	23	.5	211	7.5

a Sum of determined constituents.



## BRAZOS RIVER BASIN--Continued

## LEON RIVER NEAR EASTLAND, TEX.--Continued

Temperature (°F) of water, water year October 1951 to September 1952

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



Apr. 18-22, 26-28, 1952.....	9,006	14	.10	46	7.2	37	3.6	136		43	48	3	4.5	12	287	.39	6,980	144	33	35	1.3	468	7.8
May 1-10.....	2,621	13	.01	39	6.1	21	4.8	122		40	45	3	2.5	13	259	.35	1,720	122	22	35	1.3	406	7.8
May 11-20.....	5,637	23	.03	52	8.1	45	4.8	155		43	65	3	2.6	24	342	.47	773	167	36	36	1.5	551	7.9
May 21-26.....	5,103	25	.02	52	8.2	46	4.0	155		43	65	3	4.0	21	328	.45	4,520	163	36	37	1.6	525	8.2
May 27-31.....	22,620	24	.06	36	4.6	16		124		21	13	4	6.5	--	188	.26	11,600	114	12	23	7	286	8.0
June 1-10.....	7,734	21	.05	37	4.5	13	1.6	123		16	16	2	4.0	19	187	.25	3,900	111	10	20	6	290	8.0
June 11-20.....	2,563	22	.03	43	5.8	26	2.8	136		29	33	3	2.5	20	254	.35	1,760	131	20	30	1.0	389	8.0
June 21-30.....	434	19	--	54	6.2	35	3.2	180		40	43	3	2.0	14	300	.41	352	168	20	31	1.2	501	8.2
July 1-10.....	697	17	--	56	10	49	2.4	192		48	62	4	1.8	21	346	.47	651	180	23	37	1.6	591	8.0
July 11-19.....	998	13	.00	45	7.3	39	1.6	150		33	51	3	1.8	10	274	.37	738	142	19	37	1.4	473	8.1
July 20-24, 30-31.....	1,203	14	.00	51	8.5	51	1.6	160		42	71	4	2.5	10	334	.45	1,080	162	31	40	1.7	574	7.8
July 25-29.....	788	16	.06	35	6.1	32	6.0	123		28	40	4	1.5	15	243	.33	517	112	12	37	1.3	391	7.8
Aug. 1-5.....	414	21	.01	62	12	72	5.0	187		61	106	4	2.0	16	452	.61	505	204	51	43	2.2	759	7.3
Aug. 6-10.....	486	16	.01	70	18	132	5.5	153		123	201	2	2.5	16	655	.89	859	248	123	53	3.6	1,120	7.7
Aug. 11-20.....	607	14	.01	85	18	191	6.1	144		172	292	3	1.0	18	697	1.22	1,470	266	168	59	4.9	1,540	7.8
Aug. 21-31.....	731	17	.01	94	18	205	6.3	144		182	322	3	1.5	21	960	1.31	1,890	308	190	58	5.1	1,610	7.7
Sept. 1-10.....	687	15	.01	98	18	201	6.4	146		184	320	2	1.5	33	964	1.31	1,780	318	199	57	4.9	1,600	7.3
Sept. 11-20.....	809	14	.02	102	19	227	6.7	145		200	365	2	1.5	18	1,010	1.37	2,210	332	214	57	5.4	1,740	8.0
Sept. 21-30.....	332	14	.00	88	19	181	6.1	167		156	288	3	2.0	17	872	1.19	782	298	160	56	4.6	1,480	7.9
Weighted average.....	1,820	18	0.04	51	8.8	60	2.8	143		54	85	0.3	3.5	0.19	370	0.50	1,820	163	46	44	2.0	608	--

## BRAZOS RIVER BASIN--Continued

## BRAZOS RIVER AT RICHMOND, TEX. --Continued

Temperature (°F) of water, water year October 1951 to September 1952

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

BRAZOS RIVER BASIN--Continued  
MISCELLANEOUS ANALYSES OF STREAMS IN BRAZOS RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1951 to September 1952

Date of collection	Water 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 (sum)		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	Non-magnesium					
SODA LAKE NEAR EARTH																							
May 12, 1952		6.2		234	3,020	5,960		663	0	14,500	7,310	8.8		8.4	31,400	42.7		13,000	12,500	50	33,100	7.9	
BULL LAKE NEAR LITTLEFIELD																							
June 5, 1952		6.4		711	815	5,030		74	0	3,860	8,500	2.0		3.3	19,000	25.8		5,120	5,060	68	26,400	8.2	
DOUBLE MOUNTAIN FORK BRAZOS RIVER 4.3 MILES SOUTHEAST OF LUBBOCK																							
Mar. 4, 1952	1.77	45		92	172	280		452	0	523	425	5.6	48		1,820	2.48		936	566	40	4.1	2,910	7.6
Apr. 3	1.85	52		90	173	301		479	0	549	422		38		1,860	2.53		936	544	41	4.3	2,860	8.1
Apr. 30	2.00	49		82	138	251		343	24	453	342		54		1,580	2.12		772	451	41	3.9	2,430	8.6
Aug. 5	1.68	58		63	168	305		334	22	542	422		52		1,800	2.45		848	538	44	4.5	3,100	8.5
DOUBLE MOUNTAIN FORK BRAZOS RIVER 7.8 MILES SOUTHEAST OF LUBBOCK																							
Mar. 4, 1952	2.79	19		58	154	269		417	0	479	355	6.0	8.2		1,550	2.11		778	436	43	4.2	2,500	8.0
Apr. 3	2.84	21		42	159	278		343	23	506	362	8.7	8.7		1,570	2.14		759	440	44	4.4	2,540	8.6
Apr. 30	12.2	15		35	34	80		145	6	134	92		5.1		1,505	.69		228	98	43	2.3	815	8.5
Aug. 5	1.57	14		52	116	227		301	20	389	298		3.8		1,270	1.73		614	334	45	4.0	2,110	8.5
Sept. 3	1.15	15		59	139	261		376	11	454	342		5.6		1,470	2.00		718	392	44	4.2	2,370	8.3
DOUBLE MOUNTAIN FORK BRAZOS RIVER 7.5 MILES NORTHWEST OF SLATON																							
Mar. 4, 1952	2.35	2.6		63	132	250		390	0	421	335	5.0	2.0		1,400	1.90		700	380	44	4.1	2,320	8.2
Apr. 3	1.68	10		84	142	321		363	14	503	458		1.0		1,710	2.33		794	472	47	5.0	2,940	8.5
Apr. 30	22.5	7.4		40	131	248		307	17	430	318		2.0		1,340	1.82		638	358	46	4.3	2,230	8.6
Aug. 5	.18	43		40	124	247		324	17	371	328		4.8		1,330	1.81		610	316	47	4.3	2,220	8.5
Sept. 3	.29	38		42	123	245		367	13	352	320		5.8		1,320	1.80		611	289	47	4.3	2,170	8.4
a. Residue on evaporation at 180°C.																							

a Residue on evaporation at 180°C.

BRAZOS RIVER BASIN--Continued  
MISCELLANEOUS ANALYSES OF STREAMS IN BRAZOS RIVER BASIN IN TEXAS--Continued  
Chemical analyses, in parts per million, water year October 1951 to September 1952--Continued

Date of collection	Water 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 (sum)		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				
DOUBLE MOUNTAIN FORK BRAZOS RIVER 5.5 MILES NORTH OF SLATON																					
Mar. 4, 1952	1.04	9.6		64	116	225		504	0	316	260	6.0	0.5	1,250	1.70	636	224	43	2,090	8.1	
Apr. 30	39.2	11		42	129	254		322	25	420	315		1.5	1,360	1.85	636	330	46	2,250	8.7	
Aug. 5	.10	26		28	125	259		353	27	358	310		2.2	1,310	1.78	584	250	49	2,180	8.5	
DOUBLE MOUNTAIN FORK BRAZOS RIVER 4.2 MILES NORTHEAST OF SLATON																					
Mar. 4, 1952	0.64	12		68	138	345		599	0	488	335	6.0	0.0	1,680	2.30	737	246	50	2,780	8.0	
Apr. 30	57.1	17		44	123	260		314	24	422	315		1.0	1,360	1.85	616	318	48	2,250	8.7	
DOUBLE MOUNTAIN FORK BRAZOS RIVER NEAR ASPERMONT																					
Oct. 9, 15, 28, 1951	0	14		694	126	436		94	0	2,130	640		0.2	4,080	5.56	2,250	2,170	30	4,980	7.5	
Oct. 30	b.1.6	12		202	18	12		53	0	504	24		3.5	4,835	1.14	578	534	4	1,030	7.6	
Nov. 1	b.2	12		258	24	34		54	0	652	66		1.5	1,070	1.46	1,742	698	9	1,370	7.6	
Nov. 2-4	0	11		412	49	160		96	0	1,060	265		1.0	2,020	2.75	1,230	1,150	22	2,650	7.6	
Nov. 6-13	0	16		376	76	342		138	0	1,560	520		2.0	3,160	4.32	1,530	1,840	30	3,750	7.7	
Nov. 11-13	0	16		380	100	385		166	0	1,750	600		1.5	3,560	4.84	1,960	1,820	30	4,470	7.7	
Nov. 26, 29-30	0	5.0		702	101	443		121	0	1,950	680		2.0	3,980	5.41	2,170	2,070	31	4,930	7.5	
WHITE RIVER 4.5 MILES EAST OF CROSBYTON																					
Nov. 21, 1951	2.06	38		28	42	58		344	0	51	22		2.0	410	0.56	242	0	34	1.6	701	8.2
LAKE SWEETWATER NEAR SWEETWATER																					
Jan. 18, 1952		3.0	0.05	59	13	13		3.6	197	0	41	20	0.0	0.0	0.37	201	39	12	0.4	453	7.7

a Residue on evaporation at 180°C.  
a Mean discharge.

a Residue on evaporation at 180°C.

b Mean discharge.

FORT PHANTOM HILL RESERVOIR NEAR NUGENT

Jan. 18, 1952	.....	1.2	0.05	40	23	57	8.0	236	0	40	65	0.3	0.2	0.17	a 362	0.49	194	1	38	1.8	642	7.8
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LAKE WACO NEAR WACO

Feb. 29, 1952	.....	6.2	0.01	50	6.6	15	0.0	164	0	30	14	0.3	0.5	0.30	a 225	0.31	152	18	18	0.5	367	7.6
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LAMPASAS RIVER AT FORT HOOD NEAR BELTON

July 10, 1952	.....	11	0.04	56	27	128	211	0	22	234	0.3	2.5			a 624	0.85	250	78	53	3.5	1,160	7.9
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BRAZOS RIVER NEAR BRYAN

Oct. 18, 1951	.....	414	9.0	123	25	322	146	0	245	520		1.5			1,320	1.80	410	290	63	6.9	2,270	8.0
Feb. 12, 1952	.....	224	9.0	96	26	230	205	0	201	335		1.2			1,000	1.36	352	194	89	5.3	1,730	8.2

a Residue on evaporation at 180°C.

## COLORADO RIVER BASIN

## COLORADO RIVER BASIN

## COLORADO RIVER ABOVE BULL CREEK NEAR KNAPP, TEX.

LOCATION.--About 2½ miles above mouth of Bull Creek, 4½ miles south of Knapp, Scurry County, 6.7 miles west of Ira, and 14½ miles southwest of Snyder.  
 RECORDS AVAILABLE.--Chemical analyses: April 1950 to September 1952.  
 Water temperatures: April 1950 to September 1952.

Specific conductance (micromhos) at 25°C and chloride, in parts per million, water year October 1951 to September 1952

Date of collection	Specific Conductance	Chloride	Date of collection	Specific Conductance	Chloride
Oct. 5, 1951.....	1,180	155	Apr. 9, 1952 .....	8,860	2,700
Oct. 12.....	1,180	145	Apr. 14 .....	10,200	3,100
Oct. 20.....	36,000	13,800	Apr. 21 .....	10,500	3,250
Nov. 3 .....	31,500	11,400	May 1 .....	6,020	1,660
Nov. 10 .....	2,910	610	May 6 .....	7,930	2,380
Nov. 17 .....	33,200	12,300	May 15 .....	9,810	2,980
Nov. 24 .....	1,600	225	May 19 .....	5,020	1,400
Dec. 1 .....	2,850	640	May 29 .....	1,340	270
Dec. 5 .....	1,740	295	June 5 .....	1,720	370
Dec. 13 .....	118,900	64,600	June 12 .....	2,440	545
Dec. 17 .....	3,230	590	June 16 .....	3,070	730
Dec. 27 .....	29,200	10,600	June 23 .....	3,410	1,270
Jan. 3, 1952.....	3,760	918	July 2 .....	14,200	4,300
Jan. 9 .....	2,690	568	July 7 .....	39,700	15,700
Jan. 16 .....	3,330	655	July 15 .....	7,910	2,350
Jan. 23.....	7,430	2,100	July 24 .....	40,300	15,400
Feb. 2 .....	35,200	13,100	July 28 .....	50,300	21,200
Feb. 13 .....	13,100	4,020	Aug. 4 .....	46,300	19,800
Feb. 21.....	11,800	3,320	Aug. 8 .....	5,630	1,560
Feb. 28 .....	14,400	4,500	Aug. 11 .....	4,280	1,140
Mar. 4 .....	16,100	5,200	Aug. 19 .....	1,510	322
Mar. 12 .....	21,500	7,450	Aug. 27 .....	2,210	528
Mar. 19 .....	5,220	1,310	Sept. 2 .....	3,340	880
Mar. 26 .....	5,730	1,630	Sept. 26 .....	636	139
Apr. 2 .....	6,840	1,940			





COLORADO RIVER BASIN--Continued  
BULL CREEK NEAR IRA, TEX.

LOCATION.--At gaging station 267 feet upstream from highway crossing, 1.5 miles upstream from Colorado River, 5.5 miles upstream from Chimney Creek, 5.8 miles west of Ira, Scurry County and 6.9 miles northwest of Culbert, Texas.  
DRAINAGE AREA.--389 square miles, approximately 150 square miles contributing area.  
RECORDS AVAILABLE.--Chemical analyses: April 1950 to September 1952.  
Water temperatures: April 1950 to September 1951.

EXTREMES 1951-52.--Specific conductance: Maximum daily, 4,960 micromhos Aug 11; minimum daily, 235 micromhos Sept. 26.

EXTREMES 1950-52.--Specific conductance: Maximum daily, 5,510 micromhos Aug. 18, 1950; minimum daily, 235 micromhos Sept. 6, 1950. Sept. 26, 1952.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Values reported for dissolved solids are sums of determined constituents. Records of discharge for water year October 1951 to September 1952 given in Water-Supply Paper 1282.

Chemical analyses, in parts per million water year October 1951 to September 1952

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 (sum)			Hardness as CaCO <sub>3</sub>	Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH or Col.
													Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate		
Oct. 1-31, 1951...	0	--	--	--	--	--	--	--	--	387	--	--	--	--	--	--	--	1,800	--
Nov. 1-30 .....	0	--	--	--	--	--	--	--	--	525	--	--	--	--	--	--	--	2,360	--
Dec. 1-31 .....	a. 06	--	--	--	--	--	--	--	--	755	--	--	--	--	--	--	--	3,190	--
Jan. 1-31, 1952...	.10	--	--	--	--	--	--	--	--	769	--	--	--	--	--	--	--	3,210	--
Feb. 1-29 .....	a. 07	--	--	--	--	--	--	--	--	809	--	--	--	--	--	--	--	3,410	--
Mar. 1-9 .....	.10	10	--	85	57	559	108	482	780	790	0.8	--	2,010	2.73	0.54	446	73	3,420	7.8
Mar. 10-31 .....	a. 03	--	--	--	--	--	--	--	--	790	--	--	--	--	--	--	--	3,580	--
Apr. 1-30 .....	a. 08	7.0	--	96	67	598	122	593	780	525	3.2	--	2,210	3.01	.48	520	71	3,670	7.9
May 1-31 .....	a. 10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3,020	--
June 1-30 .....	a. 003	--	--	--	--	--	--	--	--	585	--	--	--	--	--	--	--	3,250	--
July 1-31 .....	0	--	--	--	--	--	--	--	--	823	--	--	--	--	--	--	--	4,030	--
Aug. 1-31 .....	a. 01	--	--	--	--	--	--	--	--	980	--	--	--	--	--	--	--	4,450	--
Sept. 22-28 .....	13.8	--	--	--	--	--	--	--	--	11	--	--	--	--	--	--	--	238	--

a includes days of less than 0.05 cubic foot per second discharge.

COLORADO RIVER BASIN--Continued  
COLORADO RIVER AT COLORADO CITY, TEX.

COLORADO RIVER BASIN

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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 & Pacific Railway bridge, 1.6 miles upstream from Lone Wolf Creek.

DRAINAGE AREA.--4,082 square miles, of which 2,590 square miles is probably noncontributing.

RECORDS AVAILABLE.--Chemical analyses: May 1946 to September 1952.

EXTREMES, 1951-52.--Dissolved solids: Maximum, 32,800 ppm Apr. 1-10; minimum, 571 ppm July 16-17.

Hardness: Maximum, 4,190 ppm Apr. 1-10; minimum, 148 ppm July 16-17.

Specific conductance: Maximum, 45,800 microhos Apr. 1-10; minimum daily, 1,030 microhos July 17.

EXTREMES, 1946-52.--Dissolved solids: Maximum, 32,800 ppm Apr. 1-10, 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 (1950-52): Maximum, 45,800 microhos Apr. 1-10, 1952; minimum daily, 472 microhos Aug. 24, 1951.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Values reported for dissolved solids are sums of determined constituents. Records of discharge for water year October 1951 to September 1952 given in Water-Supply Paper 1242.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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 (sum)		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	Calcium, magnesium	Non-carbonate				
Oct. 1, 1951.....	a 0	13		146	66	1,090		190	433	1,660		0.8		3,500	4.76	638	480	79	6,110	8.1	
Oct. 3-8.....	a 0	12		247	96	2,180		62	683	3,540		--		6,790	9.23	1,010	960	82	11,500	7.2	
Oct. 21-28, Nov. 1-4.....	1.18	8.4		414	140	3,670		100	1,200	5,850		--		11,300	15.4	1,610	1,530	83	17,700	7.3	
Nov. 27-30, Dec. 1-5.....	.37	8.4		438	150	3,810		109	1,260	6,090		--		11,800	16.0	1,700	1,520	83	18,400	7.4	
Dec. 14-18, 20-21.....	.20	5.4		590	218	5,810		105	1,850	9,210		--		17,700	24.1	2,370	2,230	84	27,100	6.8	
Dec. 24, 26-31.....	.33	6.0		579	228	5,800		115	1,890	9,170		--		17,700	24.1	2,380	2,290	84	27,100	7.2	
Jan. 1-31, 1952.....	1.09	4.6		570	225	5,810		137	1,890	9,150		--		17,700	24.1	2,350	2,230	84	26,900	7.5	
Feb. 1-20.....	.72	4.2		655	268	7,070		98	2,000	11,300		--		21,300	29.0	2,740	2,660	85	34,500	7.2	
Feb. 21-29.....	.91	5.4		668	292	7,560		82	2,030	12,200		--		22,800	31.0	2,920	2,830	85	33,900	7.2	
Mar. 1-10.....	.53	8.8		749	322	8,320		124	2,320	13,300		--		25,100	34.1	3,190	3,090	85	36,200	7.0	
Mar. 11-20.....	a .10	8.0		907	379	9,320		98	2,800	15,900		--		30,600	40.8	3,620	3,740	85	42,500	6.6	
Mar. 21-31.....	a 0	9.6		938	391	10,400		95	2,910	16,800		--		31,300	42.6	3,950	3,870	85	43,700	6.7	
Apr. 1-10.....	a 0	6.4		899	413	10,900		81	3,080	17,400		--		32,800	44.6	4,190	4,120	85	45,800	6.7	
Apr. 11-20.....	1.71	12		746	290	7,740		93	2,490	12,200		--		32,500	32.0	3,050	2,980	85	41,100	7.3	
Apr. 21-30.....	6.75	13		482	162	4,480		56	1,330	7,220		--		13,700	18.6	1,870	1,820	84	21,700	--	
May 1-2.....	182	15		95	21	408		152	196	622		7.0		1,440	1.96	324	199	73	2,640	7.8	
May 3-6.....	6.20	7.8		241	75	1,910		58	1,104	3,100		--		5,980	8.13	910	862	82	10,000	7.2	
May 7-8.....	.80	6.2		396	139	3,470		50	1,070	5,640		--		10,700	14.6	2,560	1,520	83	23,900	7.0	
May 23-26.....	7.10	7.4		573	199	4,980		67	1,570	8,060		--		15,400	20.9	2,250	2,190	83	23,500	7.4	
May 27-31.....	24.9	6.6		185	68	1,870		57	1,070	2,980		--		5,670	7.71	581	541	68	9,550	7.8	
June 1-6.....	2.23	9.8		125	57	1,540		88	395	2,430		--		4,590	6.24	741	686	85	8,030	7.3	
June 10-18.....	a 0	18		149	70	1,990		45	481	3,150		--		5,880	8.00	.0	660	623	87	10,000	7.0
June 8-9, 19-22.....	1.55	15		165	49	1,540		46	414	2,480		--		4,690	6.38	613	576	85	8,330	6.9	

a Includes days of less than 0.05 cubic foot per second discharge.

COLORADO RIVER BASIN--Continued  
COLORADO RIVER AT COLORADO CITY, TEX.--Continued

Chemical analyses, in parts per million, water year October 1951 to September 1952--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 (sum)			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	Calcium, magnesium	Non-carbonate					
July 16-17, 1952.	210	16		50	5.7	152	125	125	62	217		6.9		571	0.78	324	148	46	69	5.4	1,140	7.7	
July 18 .....	9.1	11		328	146	4,350	65	936	6,640			--		12,400	16.9	305	1,420	886	87	50	19,700	7.2	
Aug. 13-17, 28-31	4.85	12		417	134	3,800	82	1,120	6,130			--		11,600	15.8	146	1,590	1,540	84	41	18,900	6.9	
Sept. 1-10 .....	a 0	17		423	136	4,070	63	1,160	6,530			--		12,400	16.9	.0	1,610	1,560	85	44	19,900	7.0	
Sept. 22-23 .....	170	6.4		191	56	1,640	72	453	2,650			--		5,030	6.84	2,310	707	648	83	27	8,490	7.6	
Sept. 24-30 .....	22.0	6.8		240	83	2,420	69	669	3,870			--		7,320	9.96	435	940	884	85	34	12,100	7.4	
Weighted average	4.47	11		177	56	1,500	104	456	2,390			--		4,640	6.31	56.0	672	587	83	25	7,620	--	

a Includes days of less than 0.05 cubic foot per second discharge.

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 River and 9.2 miles east of San Saba, San Saba County. DRAINAGE AREA --30,600 square miles, approximately of which 11,900 square miles is probably noncontributing.

RECORDS AVAILABLE --Chemical analyses: October 1947 to September 1952.

Water temperatures: October 1947 to September 1952.

Sediment records: December 1950 to September 1952.

EXTREMES, 1951-52 --Dissolved solids: Maximum, 732 ppm June 3; minimum, 127 ppm Sept. 11-13.

Hardness: Maximum, 294 ppm Dec. 1-10; minimum, 83 ppm Sept. 11-13.

Specific conductance: Maximum daily, 1,220 micromhos June 3; minimum daily, 161 micromhos Sept. 11.

Water temperatures: Maximum observed, 92° F Aug. 9; minimum observed, 40° F Dec. 15.

Sediment concentrations: Maximum daily, 7,930 ppm June 3; minimum, 34 ppm for composite period Dec. 11-14, July 31, and composite period Aug. 1-4.

Sediment loads: Maximum daily, 394,000 tons Sept. 11; minimum 0.1 ton for composite period Aug. 21-25.

EXTREMES, 1947-52 --Dissolved solids: Maximum, 1,530 ppm Oct. 15-19, 1947; minimum, 127 ppm Sept. 11-13, 1952.

Hardness: Maximum, 522 ppm Oct. 15-19, 1947; minimum, 71 ppm June 25-30, 1949.

Specific conductance (1950-52): Maximum daily, 2,280 micromhos Aug. 30, 1951; minimum daily, 161 micromhos Sept. 11, 1952.

Water temperatures: Maximum observed, 92° F on several days during summer months; minimum observed, freezing point Jan. 29, 1948, Jan. 30, 1951.

Sediment concentrations (1950-52): Maximum daily, 15,800 ppm Aug. 14, 1951; minimum daily, 24 ppm July 27, 1951.

Sediment loads (1950-52): Maximum daily, 394,000 tons Sept. 11, 1952; minimum, 0.1 ton for composite period Aug. 21-25, 1952.

REMARKS --Values reported for dissolved solids are residues on evaporation unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1951 to September 1952 given in Water-Supply Paper 1242.

COLORADO RIVER BASIN

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Chemical analyses, in parts per million, water year October 1951 to September 1952

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-adso-rption ratio	So-dium adso-rption ratio	Specific conduct-ance (micro-mhos at 25° C)	
															Parts per mil-lion	Tons per acre-foot	Tons per day	Calcium, mag-nesium				Non-carbon-ate
Oct. 1-10, 1951 ..	37.6	14	--	45	16	54	54	210	24	24	69	--	1.5	--	339	0.46	34.4	178	6	40	1.7	581
Oct. 11-20 ..	19.0	14	--	46	23	43	235	235	16	16	66	--	1.0	--	335	.48	17.2	210	17	31	1.3	591
Oct. 21-31 ..	31.5	12	--	47	28	46	261	261	13	13	74	--	.5	--	356	.48	30.3	232	18	30	1.3	642
Nov. 1-10 ..	51.6	16	--	48	20	63	242	242	30	30	78	--	.8	--	395	.54	55.0	202	4	41	2.0	680
Nov. 11-20 ..	27.1	16	--	57	26	55	286	286	24	24	77	--	.5	--	414	.56	30.3	249	14	32	1.5	702
Nov. 21-30 ..	39.1	14	--	67	29	62	324	324	24	24	92	--	.0	--	478	.65	50.5	286	20	32	1.6	797
Dec. 1-10 ..	36.8	13	--	70	29	85	316	316	23	23	139	--	.0	--	565	.77	56.1	294	34	39	2.1	932
Dec. 11-20 ..	41.3	15	--	57	28	78	279	279	25	25	121	--	.5	--	462	.83	51.5	257	28	40	2.1	847
Dec. 21-31 ..	44.1	14	--	58	29	58	299	299	22	22	83	--	.8	--	410	.56	48.8	258	14	33	1.6	743
Jan. 1-10, 1952 ..	40.9	13	--	59	31	46	306	306	20	20	72	--	1.0	--	392	.53	43.3	274	24	27	1.2	715
Jan. 11-20 ..	51.2	11	--	60	31	48	305	305	21	21	74	--	.5	--	394	.54	54.5	277	27	27	1.2	715
Jan. 21-31 ..	48.4	13	--	61	32	37	315	315	17	17	62	--	.5	--	376	.51	49.4	284	26	22	.9	685
Feb. 1-10 ..	43.0	17	--	58	31	43	314	314	20	20	60	0.2	1.0	--	384	.52	44.6	272	14	25	1.1	670
Feb. 11-20 ..	44.3	24	--	58	30	48	310	310	20	20	60	.3	1.0	--	400	.54	47.8	268	14	28	1.3	690
Feb. 21-29 ..	33.6	15	--	47	31	49	272	272	21	21	75	--	1.0	--	392	.53	35.6	245	22	30	1.3	683
Mar. 1-10 ..	29.7	13	--	57	31	62	291	291	25	25	102	--	.5	--	452	.61	36.2	270	31	34	1.7	794
Mar. 11-20 ..	23.0	13	--	55	26	72	288	288	25	25	98	--	1.5	--	456	.59	27.1	244	8	39	2.0	777
Mar. 21-31 ..	20.7	10	--	55	30	76	282	282	27	27	118	--	.2	--	471	.64	26.3	260	30	39	2.0	838

a Sum of determined constituents.

COLORADO RIVER BASIN--Continued  
COLORADO RIVER NEAR SAN SABA, TEX.--Continued

Chemical analyses, in parts per million, water year October 1951 to September 1952--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-lidum	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 mag-nesium	Non-carbon-ate				
Apr. 1-10, 1952	35.2	8.8	--	56	30	82	289		29	123	--	--	0.8	--	478	0.63	45.4	263	26	40	2.2	864	7.9
Apr. 11-20	13.2	9.6	--	54	30	69	285		27	104	--	--	0.8	--	440	.90	137	238	24	37	1.9	799	7.9
Apr. 22-26	3,310	11	--	40	7.0	17	130		24	22	--	--	2.8	--	189	.271	1,780	129	22	22	.6	338	7.9
Apr. 27-30																							
May 1, 21, 27-30	634	9.0	--	63	17	59	137		117	82	--	--	3.1	--	448	.61	787	227	114	38	1.7	728	7.7
May 2-3, 6-7	4,080	13	--	35	5.2	8.4	116		15	12	--	--	2.0	--	154	.21	1,700	109	14	18	.4	268	7.5
May 4-5, 8-10	456	13	--	41	7.7	17	137		22	24	--	--	3.5	--	203	.28	250	134	22	22	.7	331	7.7
May 11-19	2,186	20	--	46	10	25	188		21	35	--	--	1.8	--	247	.34	1,480	156	18	26	.9	455	8.0
May 20-31	2,942	18	--	37	5.2	7.6	132		8.6	9.5	--	--	3.2	--	161	.22	1,280	114	6	13	.3	273	8.0
June 1-2, 4-10	959	17	--	40	7.5	21	144		19	26	--	--	2.8	--	214	.29	554	131	13	26	.8	369	8.1
June 3	3,640	19	--	86	17	137	145		142	223	--	--	1.2	--	732	1.00	7,180	284	166	51	3.5	1,220	8.1
June 11-20	245	19	--	42	10	21	173		13	25	--	--	2.2	--	225	.31	149	146	42	24	.8	384	8.1
June 21-30	44.9	21	--	50	17	30	224		16	42	--	--	1.5	--	288	.39	34.9	195	12	25	.9	505	7.7
July 1-10	18.3	22	--	46	23	41	236		15	63	--	--	1.5	--	328	.45	16.2	210	16	30	1.2	602	8.0
July 11-20	11.5	21	--	45	26	47	241		15	76	--	--	1.5	--	350	.48	10.9	220	22	32	1.3	647	8.0
July 21-31	8.88	18	--	43	29	59	248		14	97	--	--	1.2	--	383	.52	9.2	226	23	36	1.7	722	8.1
Aug. 1-10	3.68	17	--	38	31	62	238		17	99	--	--	1.2	--	380	.52	3.8	218	22	38	1.8	717	8.1
Aug. 11-20	2.72	16	--	35	31	69	239		17	107	--	--	.8	--	396	.54	2.9	215	19	41	2.0	747	8.2
Aug. 21-31	1.75	15	--	34	32	69	238		17	109	--	--	1.2	--	398	.54	1.9	216	22	41	2.0	756	8.2
Sept. 1-10	49.9	15	--	34	32	72	240		17	112	--	--	1.0	--	402	.55	54.2	216	20	42	2.1	761	8.0
Sept. 11-13	35.970	13	0.14	28	3.1	4.6	102		7.4	3.2	0.2	0.3	3.5	0.03	127	.17	13,330	83	0	10	.2	265	7.5
Sept. 14-23	1,059	15	.05	41	7.3	12	148		15	18	--	--	4.5	.05	197	.27	583	132	13	16	.5	332	8.1
Sept. 24-30	1,172	18	--	62	15	23	235		21	32	--	--	9.3	--	302	.41	140	216	24	19	6.8	522	7.8
Weighted average	65.1	15	--	36	6.4	16	129		16	19	--	--	3.0	--	184	0.25	323	116	11	23	0.7	311	--

a Sum of determined constituents.

## COLORADO RIVER BASIN--Continued

## COLORADO RIVER NEAR SAN SABA, TEX.--Continued

Temperature (°F) of water, water year October 1951 to September 1952

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

## COLORADO RIVER BASIN--Continued

## COLORADO RIVER NEAR SAN SABA, TEX.--Continued

Suspended sediment, water year October 1951 to September 1952

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-----	75	90	18	35			44		
2-----	61	65	11	58			39		
3-----	52	125	18	97			39	52	5.8
4-----	42	56	6.4	70			42		
5-----	35	56	5.3	59			42		
6-----	29	54	4.2	44	65	9.1	37		
7-----	21	56	3.2	42			31		
8-----	21	86	4.9	39			28	40	3.5
9-----	21	57	3.2	37			33		
10-----	19	76	3.9	35			33		
11-----	17	76	3.5	33			33		
12-----	16	66	2.9	33			33	34	3.3
13-----	14	78	2.9	29	58	4.6	37		
14-----	16	58	2.5	26			42		
15-----	19	63	3.2	26			42		
16-----	21	66	3.7	22			42		
17-----	21	66	3.7	22			42	53	6.3
18-----	21	66	3.7	24	47	3.1	44		
19-----	21	59	3.3	28			50		
20-----	24	67	4.3	28			48		
21-----	24	60	3.9	29			44		
22-----	24	52	3.4	33			46		
23-----	24	62	4.0	39	74	7.5	48	41	5.1
24-----	22	50	3.0	42			46		
25-----	21	36	2.0	44			46		
26-----	22	37	2.2	44			42		
27-----	28	52	3.9	42			39		
28-----	46	52	6.5	42			42		
29-----	48	38	4.9	37	40	4.4	42	48	5.5
30-----	46	46	5.7	39			44		
31-----	42	48	5.4	--			46		
Total-	913	--	156.7	1,178	--	189.0	1,266	--	154.8
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-----	46			45			30		
2-----	44			44			31		
3-----	44	48	5.6	42	64	7.3	35	90	7.8
4-----	42			40			32		
5-----	42			41			32		
6-----	39			42			30		
7-----	39			42			27		
8-----	39			44			26	79	5.8
9-----	39			45			26		
10-----	35	46	5.0	45	73	8.8	28		
11-----	42			46			30		
12-----	48			46			27		
13-----	54			46			26	77	5.2
14-----	54			46			22		
15-----	54			46			19		
16-----	52	66	9.4	45	50	6.1	18		
17-----	52			44			21		
18-----	52			42			25	80	4.6
19-----	52			42			22		
20-----	52			40			20		
21-----	50	56	7.4	36			18		
22-----	48			33	55	5.4	17		
23-----	46			33			15	66	2.9
24-----	46			33			14		
25-----	64			35			17		
26-----	50			35			19		
27-----	48	48	6.4	33	82	7.4	20		
28-----	46			32			21		
29-----	46			32			22	80	5.3
30-----	44			--	--	--	28		
31-----	44	61	7.2	--	--	--	37		
Total-	1,453	--	210.0	1,175	--	202.6	755	--	188.3



## COLORADO RIVER BASIN--Continued

## COLORADO RIVER NEAR SAN SABA, TEX.--Continued

Suspended sediment, water year October 1951 to September 1952--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-----	44			1,740	2,260	s 37,500	585	226	357
2-----	54			12,100	7,920	s 252,000	1,110	--	a 15,600
3-----	42	86	9.8	3,500	4,390	s 44,300	3,640	7,930	s 72,600
4-----	36			1,100	3,100	9,210	1,210	3,150	10,300
5-----	35			644	1,500	2,610	765	1,100	2,270
6-----	33			420	400	454	1,080	1,600	4,670
7-----	30			302	327	287	850	800	1,840
8-----	26	73	5.4	246	222	147	1,210	1,800	5,880
9-----	27			169	132	60	940	1,350	3,430
10-----	25			120	132	43	880	1,200	2,850
11-----	24			93	108	27	595	500	803
12-----	30			74	92	18	445	300	360
13-----	22	58	3.8	62	80	13	342	202	187
14-----	21			52	88	12	270	151	110
15-----	25			42	77	8.7	214	114	66
16-----	28			40	68	7.3	169	98	45
17-----	26	64	4.2	179	321	s 839	140	78	29
18-----	22			5,530	3,550	s 75,500	112	80	24
19-----	21			13,600	5,900	217,000	91	79	19
20-----	1,100	2,420	s 8,800	4,210	3,300	37,500	74	82	16
21-----	792	2,080	s 4,500	1,340	1,900	6,870	65	70	12
22-----	5,080	6,760	s 102,000	792	1,000	2,140	58	64	10
23-----	4,910	6,220	s 84,000	585	850	1,340	56	78	12
24-----	3,930	6,100	s 65,100	4,150	2,690	s 45,900	52	76	11
25-----	1,780	4,060	s 20,100	10,000	5,560	s 154,000	45	74	9.0
26-----	850	1,850	4,250	1,840	2,950	14,700	40		
27-----	535	480	693	4,110	3,540	s 61,400	36	62	6.2
28-----	342	126	116	2,600	2,790	s 25,200	35		
29-----	234	110	69	3,520	5,550	s 59,100	32		
30-----	158	92	39	1,360	5,000	18,400	30		
31-----	--	--	--	792	1,500	3,210	--	--	--
Total--	20,282	--	289,780.4	75,312	--	1,068,776	15,171	--	121,535.6
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-----	27	54	3.9	5.1			4.7		
2-----	26	40	2.8	4.7	34	0.4	4.0	42	0.5
3-----	21			4.4			4.0		
4-----	19			4.0			5.1		
5-----	18	62	3.0	3.1			5.8		
6-----	15			3.1	82	.7	6.3	41	.7
7-----	16			2.8			6.2		
8-----	16			3.1			5.8		
9-----	14			3.4			28	58	s 12
10-----	11	67	2.2	3.1			429	422	s 626
11-----	10			2.8	92	.9	51,200	2,950	s 394,000
12-----	10			3.1			36,600	3,120	s 317,000
13-----	11			4.4			20,100	1,770	s 97,700
14-----	17	73	3.0	5.1			1,920	1,740	s 9,560
15-----	17			4.0			1,030	800	2,220
16-----	12			3.1	78	.5	718	220	426
17-----	10			2.0			617	337	s 645
18-----	9.7			1.3			2,240	1,780	10,800
19-----	8.2			1.0			1,560	1,560	s 5,440
20-----	10	82	2.4	.4			748	420	848
21-----	14			.2	58	.1	485	--	a 380
22-----	15			.2			856	1,380	s 3,420
23-----	14			.4			420	239	271
24-----	9.7			1.0			238	159	102
25-----	7.7			1.3			206	114	63
26-----	6.8			1.1			180		
27-----	6.3			1.1	40	.3	169		
28-----	5.8	38	.6	1.8			149	70	29
29-----	6.3			3.4			134		
30-----	6.3			4.0			131		
31-----	5.8	34	.5	4.7			--	--	--
Total--	395.6	--	69.2	83.2	--	14.5	120,200.0	--	843,662.6

Total discharge for year (cfs-days) ..... 238,183.8  
 Total load for year (tons) ..... 2,325,914.7

s Computed by subdividing day.

a Computed from estimated concentration graph.

COLORADO RIVER BASIN--Continued  
COLORADO RIVER NEAR SAN SABA, TEX.--Continued

Particle-size analyses of suspended sediment, April to September 1952

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

Date of collection	Time	Water 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. 22, 1952 ..	1:25 p.m.	6,100		6,880	3,280	--	74	84	96	98	100	--	--	--	--	PCW
Apr. 22 .....	5:30 p.m.	5,820		6,040	4,460	--	74	85	93	96	100	--	--	--	--	PCW
Apr. 22 .....	12:00 p.m.	4,410		6,900	2,840	0	8	68	99	99	100	--	--	--	--	BN
Apr. 22 .....	12:00 p.m.	4,410		6,900	2,920	56	69	81	91	97	100	--	--	--	--	BCW
Apr. 23 .....	7:20 a.m.	3,910		6,060	3,490	--	72	83	92	96	100	--	--	--	--	PCW
Apr. 23 .....	8:55 a.m.	4,170		5,470	3,460	--	77	88	95	98	100	--	--	--	--	PCW
Apr. 23 .....	12:05 p.m.	5,040		4,990	3,300	--	73	85	93	98	100	--	--	--	--	PCW
Apr. 23 .....	7:10 p.m.	6,100		7,320	5,530	--	62	75	83	91	100	--	--	--	--	PCW
Apr. 24 .....	1:00 p.m.	3,910		5,920	3,790	--	69	86	95	100	--	--	--	--	--	PCW
May 1 .....	8:40 p.m.	5,300		5,180	2,580	--	76	84	95	99	99	100	--	--	--	SPCW
May 1 .....	11:10 p.m.	7,860		16,400	3,950	5	10	46	91	97	98	100	--	--	--	SPCW
May 1 .....	11:10 p.m.	7,860		16,400	3,900	61	71	80	94	97	99	100	--	--	--	SPCW
May 2 .....	4:35 a.m.	11,300		11,500	5,520	--	66	81	92	99	99	100	--	--	--	SPCW
May 2 .....	9:40 a.m.	12,900		6,960	4,730	--	75	87	95	97	99	100	--	--	--	SPCW
May 2 .....	4:00 p.m.	13,600		5,340	3,670	--	79	88	94	99	99	100	--	--	--	SPCW
May 3 .....	4:20 a.m.	5,990		4,990	4,200	--	77	87	97	98	100	--	--	--	--	PCW
May 3 .....	1:00 p.m.	2,210		3,980	2,780	65	77	87	95	99	100	--	--	--	--	BCW
May 4 .....	8:45 a.m.	1,210		4,040	3,640	--	64	75	85	93	100	--	--	--	--	PCW
May 19 .....	2:55 p.m.	14,700		5,260	3,390	60	69	81	91	96	99	100	--	--	--	SPCW
May 19 .....	5:55 p.m.	13,600		5,330	3,420	--	73	84	94	97	98	100	--	--	--	SPCW
May 19 .....	12:00 p.m.	10,100		4,300	2,270	63	75	87	95	98	100	--	--	--	--	BCW
May 20 .....	11:38 a.m.	3,540		3,300	1,910	64	77	85	94	98	100	--	--	--	--	BCW
May 24 .....	6:30 p.m.	7,360		3,920	2,660	--	76	88	95	96	98	100	--	--	--	SPCW
May 25 .....	12:00 m.	11,500		5,560	4,500	--	67	80	91	96	99	100	--	--	--	SPCW
June 3 .....	2,020			6,100	3,780	62	74	85	95	98	100	--	--	--	--	BCW
Sept. 11 .....	7:00 a.m.	50,700		4,120	3,100	--	61	77	89	94	95	98	100	--	--	SPCW
Sept. 11 .....	3:00 p.m.	68,800		2,140	1,960	64	79	84	93	97	98	99	100	--	--	SPCW
Sept. 12 .....	1:55 a.m.	50,700		3,440	2,620	61	76	86	95	99	100	--	--	--	--	BCW
Sept. 12 .....	3:54 p.m.	31,100		2,870	2,090	62	75	83	94	97	99	100	--	--	--	SPCW

COLORADO RIVER BASIN--Continued  
COLORADO RIVER AT AUSTIN, TEX.

LOCATION.--at raw water intake of Austin City Water Plant, 4½ miles upstream from gaging station which is at Montopolis Bridge on U. S. Highway 183 (renumbered) at southeast edge of Austin, Travis County, 2.8 miles upstream from Walnut Creek, 3.8 miles downstream from Waller Creek, 5 miles downstream from Barton Creek.

DRAINAGE AREA.--36,160 square miles, approximately, of which 11,900 square miles is probably noncontributing.

RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1952.

WATER TEMPERATURES: October 1947 to September 1952.

EXTREMES, 1954-52.--Discharge: Maximum, 340 ppm Nov. 1-30; minimum, 262 ppm Sept. 1-30.

Hardness: Maximum, 182 ppm Feb. 1-30; minimum, 151 ppm Nov. 1-30.

Specific conductance: Maximum daily, 578 micromhos Mar. 10; minimum daily, 422 micromhos Sept. 23.

Specific conductance: Maximum observed, 87°F Aug. 7; minimum observed, 53°F Dec. 16, 18, Jan. 7, 11.

WATER TEMPERATURES: Maximum observed, 87°F Aug. 7; minimum observed, 53°F Dec. 16, 18, Jan. 7, 11.

EXTREMES, 1947-52.--Dissolved solids: Maximum, 340 ppm Nov. 1-30, 1951; minimum, 251 ppm May 1-31, 1950.

Hardness: Maximum, 137 ppm Jan. 1-31, 1948; minimum, 151 ppm Nov. 1-30, 1951.

Specific conductance (1950-52): Maximum daily, 578 micromhos Mar. 10, 1952; minimum daily, 346 micromhos Dec. 7, 1950.

Water temperatures: Maximum observed, 87°F on several days during summer months; minimum observed, 43°F Jan. 28, 1948, Feb. 4, 1949.

REMARKS.--Values reported for dissolved solids concentrations are residues on evaporation unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for gaging station at Austin for water year October 1951 to September 1952 given in Water-Supply Paper 1242. 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 1951 to September 1952

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)	pH	Color
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate					
Oct. 1-31, 1951...	394	11		43	16	43		166	34	67	0.3	1.5		310	0.42	330	174	38	35	1.4	544	8.1	
Nov. 1-30.....	244	11		34	16	59		170	38	70	2	1.5		340	46	224	151	12	46	2.1	547	8.2	
Dec. 1-31.....	198	9.8		45	16	47		174	39	68	3	1.0		328	45	175	178	36	35	1.5	565	7.7	
Jan. 1-31, 1952 .	185	9.6		46	16	46		177	39	67	3	1.2		328	45	164	181	36	36	1.5	553	8.1	
Feb. 1-29.....	202	8.4		45	17	48		177	42	68	3	1.2		330	45	180	182	38	36	1.6	569	7.7	
Mar. 1-31.....	188	7.8		45	16	46		171	41	67	3	1.0		322	44	163	178	38	36	1.5	564	8.1	
Apr. 1-30.....	448	7.8		42	15	48		159	41	67	3	3.2		306	42	370	166	36	39	1.6	553	7.9	
May 1-31.....	1,023	9.8		42	14	46		158	38	64	3	2.0		304	41	840	162	33	38	1.6	541	7.9	
June 1-30.....	1,733	12		39	14	47		154	37	64	2	2.2		300	41	1,400	155	29	40	1.6	531	8.0	
July 1-31.....	1,801	11		40	14	42		156	36	62	3	1.0		290	39	1,410	157	30	37	1.4	521	7.9	
Aug. 1-31.....	1,707	10		39	14	40		159	31	55	3	0.8		271	37	1,250	155	25	36	1.4	494	8.0	
Sept. 1-30.....	891	13		41	13	36		168	27	47	3	1.8		a 262	36	637	156	18	33	1.3	470	8.0	
Weighted average	754	11		40	14	44		160	35	61	0.3	1.5		293	0.40	596	158	26	38	1.5	522	--	

a Sum of determined constituents.

## WESTERN GULF OF MEXICO BASINS

## COLORADO RIVER BASIN--Continued

## COLORADO RIVER AT AUSTIN, TEX.--Continued

Temperature (°F) of water, water year October 1951 to September 1952

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

## 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 & New Orleans Railroad bridge, 12 miles upstream from Jones Creek, and at mile 67.  
DRAINAGE AREA.--41,150 square miles, approximately, of which 11,900 square miles is probably noncontributing.

RECORDS AVAILABLE.--Chemical analyses: April 1941 to September 1952.  
Water temperatures: October 1943 to September 1952.

EXTREMES, 1951-52.--Dissolved solids: 31 Maximum, 354 ppm May 25-30.

Hardness: Maximum, 220 ppm Dec. 17, 1951; minimum, 154 ppm May 25-30.

Specific conductance: Maximum daily, 696 micromhos Jan. 8; minimum daily, 216 micromhos May 25.

EXTREMES, 1944-52.--Dissolved solids: Maximum, 386 ppm Apr. 1-10, 1948; minimum, 144 ppm Feb. 24-28, 1949.

Hardness: Maximum, 231 ppm Feb. 1-10, 1947; minimum, 87 ppm Feb. 24-28, 1949.

Specific conductance (1950-52): Maximum daily, 696 micromhos Jan. 8, 1952; minimum observed, 45°F Jan. 15-16, 1946, Dec. 12, 1947.

Water temperatures (1945-48, 50-52): Maximum observed, 94°F July 31, 1948; minimum on evaporation unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1951 to September 1952 given in Water-Supply Paper 1242.

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	Color
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
Oct. 1-31, 1951...	615	12	52	16	42	196	33	64	0.3	0.8	322	0.44	535	196	35	32	1.3	575	8.0			
Nov. 1-30 .....	423	11	42	17	60	216	36	64	.2	.2	354	.48	404	175	0	43	2.0	598	8.1			
Dec. 1-31 .....	352	11	60	17	44	232	35	62	.4	1.0	351	.48	384	220	30	31	1.3	609	8.1			
Jan. 1-31, 1952...	304	9.0	56	17	48	220	40	64	.3	.2	352	.48	289	210	29	33	1.4	616	7.7			
Feb. 1-28 .....	382	9.8	52	12	43	192	36	53	.3	1.5	307	.42	317	179	22	34	1.4	535	8.0			
Mar. 1-26 .....	338	7.8	55	16	40	206	36	57	.3	1.2	346	.47	316	203	34	30	1.2	580	8.0			
Mar. 27-31 .....	272	7.8	31	9	18	123	17	24	.4	3.0	186	.25	137	117	16	25	.7	309	7.5			
Apr. 1-4, 12-18 .....	1,716	14	32	5	20	110	13	26	.2	3.5	2,168	.33	778	100	10	30	.9	297	7.5			
Apr. 5-11, 19-30 .....	544	13	42	10	34	142	37	45	.2	1.5	253	.34	372	146	30	34	1.2	450	7.5			
May 1-24, 31 .....	921	8.8	45	13	44	166	39	59	.3	1.5	294	.40	731	166	30	37	1.5	533	7.4			
May 25-30 .....	7,153	11	29	5	13	104	15	14	--	2.0	154	.21	2,970	93	8	24	.6	250	7.5			
June 1-30 .....	956	14	41	11	44	149	36	57	.3	2.2	289	.39	746	148	25	39	1.6	502	8.1			
July 1-31 .....	1,049	9.2	42	15	42	167	34	60	.4	1.2	285	.39	807	166	30	35	1.4	530	7.9			
Aug. 1-30 .....	763	12	46	15	40	184	31	55	.3	.8	292	.40	602	176	26	33	1.3	538	7.8			
Sept. 1-30 .....	874	9.6	38	13	42	161	31	52	.4	.8	282	.38	665	148	16	38	1.5	479	7.6			
Weighted average	764	11	42	12	37	162	30	49	0.3	1.5	270	0.37	557	154	22	34	1.3	474	--			

a Sum of determined constituents.

## COLORADO RIVER BASIN--Continued

## COLORADO RIVER AT WHARTON, TEX.--Continued

Temperature (°F) of water, water year October 1951 to September 1952

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

COLORADO RIVER BASIN--Continued  
MISCELLANEOUS ANALYSES OF STREAMS IN COLORADO RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1951 to September 1952																						
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	Specific conductance (micro-mhos at 25°C)	Color or pH		
													Parts per million	Tons per acre-foot	Tons per day	Calcium magnesium	Non-carbonate					
DEEP CREEK NEAR DUNN																						
May 7, 1952 .....	0	7.4		44	6.3	126		94	28	215			2.0		509	0.69		136	59	67	4.7	909 7.1
SULPHUR CREEK 1.2 MILES NORTHEAST OF DUNN																						
May 7, 1952 .....	0.01	9.4		116	39	70		210	340	54			1.0		771	1.05		450	278	25	1.4	1,090 7.2
SOUTH CONCHO RIVER AT SAN ANGELO																						
Mar. 3, 1952 .....		13		68	25	63		280	57	94			1.2		481	0.65		272	60	33	1.7	785 8.0
COLORADO RIVER AT LA GRANGE																						
June 11, 1952 ....	1,880	9.4	0.00	42	13	37	1.2	148	37	56	0.3	2.0	0.21		265	0.39		158	37	33	1.3	493 7.6

## 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 & New Orleans Railroad bridge, 10 miles upstream from Coletto Creek.

DRAINAGE AREA.--5,311 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1952.

Water temperatures: November 1950 to September 1952.

EXTREMES, 1951-52.--Dissolved solids: Maximum, 830 ppm Apr. 25-26; minimum, 179 ppm July 23-31.

Hardness: Maximum, 331 ppm Apr. 25-26; minimum, 103 ppm July 23-31.

Specific conductance: Maximum daily, 1,560 microhos Apr. 26; minimum daily, 217 microhos Sept. 16.

Water temperatures: Maximum observed, 90° F Aug. 4, 27; minimum observed, 50° F Dec. 16.

EXTREMES, 1945-46, 1948-52.--Dissolved solids: Maximum, 1,040 ppm Jan. 11-17, 1946; minimum, 175 ppm June 4, 6, 15, 1951.

Hardness: Maximum, 428 ppm Jan. 11-17, 1946; minimum, 103 ppm July 23-31, 1952.

Specific conductance (1950-52): Maximum daily, 1,820 microhos June 24, 1951; minimum daily, 217 microhos Sept. 16, 1952.

Water temperatures (1950-52): Maximum observed, 90° F Aug. 4, 27, 1952; minimum observed, 40° F Feb. 1-2, 1951.

REMARKS.--Continuous records of specific conductance of daily samples for October 1945 to September 1952 available in district office at Austin, Tex. Some daily chloride determinations also available. Values reported for dissolved solids are residues on evaporation. Records of discharge for water year October 1951 to September 1952 given in Water-Supply Paper 1242.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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 160° C)		Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (microhmhos at 25°C)	pH or		
														Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate					
Oct. 1-2, 7-12, 16-20, 1951.....	227	17	0.02	52	18	60	2.8	195	34	99	0.3	1.5	0.24	386	0.52	237	204	44	39	1.8	677	8.0
Oct. 3-6, 13-15.....	252	16	.03	64	26	117	1.6	189	45	224	.3	.8	.75	619	.83	421	266	112	49	3.1	1,080	8.0
Oct. 21-31.....	243	17	.03	53	19	45	2.8	210	30	72	.4	1.8	.22	358	.49	235	210	38	31	1.4	611	8.2
Nov. 1-10.....	341	18	.04	58	21	52	2.8	229	33	83	.5	1.8	.26	407	.55	375	231	44	33	1.5	682	8.0
Nov. 11-20.....	278	18	.04	55	18	95	3.2	209	29	90	.4	1.8	.23	396	.54	297	211	40	36	1.7	675	8.2
Nov. 21-30.....	325	18	.03	57	23	76	3.6	210	33	135	.4	2.2	.28	495	.67	434	236	64	41	2.1	822	8.0
Dec. 1-10.....	336	16	.02	60	21	54	1.6	240	31	86	.4	2.5	.20	430	.58	390	236	40	33	1.6	697	8.1
Dec. 11-20.....	323	14	.02	68	24	86	2.0	254	35	117	.4	2.5	.20	463	.64	408	268	60	35	1.8	822	8.0
Dec. 21-31.....	321	16	.05	48	24	82	1.2	185	40	139	.3	2.2	.14	472	.64	409	218	67	45	2.4	820	8.0
Jan. 1-10, 1952.....	346	14	.05	56	20	55	.4	225	34	85	.3	2.2	.38	398	.54	372	222	37	35	1.6	694	8.0
Jan. 11-20.....	326	14	.05	57	21	59	.0	222	35	95	.3	2.5	.39	410	.56	381	228	46	36	1.7	712	8.0
Jan. 21-31.....	337	16	.01	42	19	58	.8	179	35	93	.3	2.0	.31	366	.50	333	183	36	41	1.9	638	8.0
Feb. 1-10.....	330	15	.01	47	19	56	2.4	197	35	88	.3	2.5	.19	374	.51	333	196	34	38	1.7	655	8.1
Feb. 11-20.....	309	16	.01	54	20	68	2.0	207	39	112	.3	2.0	.31	422	.57	352	216	47	40	2.0	763	8.1
Feb. 21-29.....	593	15	.01	56	17	52	2.8	222	34	76	.4	2.5	.29	372	.51	586	210	28	35	1.6	655	8.2
Mar. 1-11.....	350	17	.02	54	16	54	3.6	190	34	91	.2	3.5	.21	396	.54	374	200	45	36	1.7	663	7.6
Mar. 12-18.....	333	20	.00	67	27	109	4.8	205	45	212	.2	1.5	.35	598	.81	538	278	110	45	2.8	1,110	7.9
Mar. 19-31.....	323	17	.00	55	20	54	2.0	218	35	90	.3	2.0	.22	404	.55	352	219	40	35	1.6	703	8.0



Apr. 1-10, 1952	388	18	.01	44	19	48	2.4	187	31	79	2	1.8	.19	362	49	378	188	35	35	1.5	608	8.2
Apr. 11-20	604	18	.00	46	19	48	1.6	190	31	81	.3	1.5	.28	368	50	600	133	38	35	1.5	614	8.2
Apr. 21-24, 27-30	710	18	.06	50	15	44	4.0	192	28	68	.4	1.8	.13	348	47	687	186	29	33	1.4	578	8.2
Apr. 25-28	1,064	18	--	85	29	170	--	191	50	351	.2	2.0	--	830	1.13	2,360	331	174	53	4.1	1,500	8.2
May 1-10	443	24	.01	29	18	48	3.6	138	34	74	.2	3.0	.14	303	.41	362	146	34	41	1.7	534	7.8
May 11-20	328	26	.02	29	20	38	1.2	158	32	52	.3	1.5	.68	291	.40	256	155	25	35	1.3	472	8.1
May 21-27	445	26	.02	36	19	42	2.4	178	29	59	.2	1.5	.05	309	.42	371	168	22	35	1.4	530	8.1
May 28-31	7,762	21	.06	33	6.0	21		119	13	27	.2	4.8	.12	195	.27	4,090	107	10	30	.9	306	7.8
June 1-5, 9-10	2,681	18	--	58	11	61	2.8	177	23	111	.2	3.8	.15	400	.54	2,900	190	44	41	1.9	686	7.7
June 6-8, 11-20	1,359	20	.05	47	9.3	29	2.4	156	23	48	.3	3.0	.17	272	.37	998	156	28	28	1.0	527	8.1
June 21-30	421	20	.06	50	15	35	4.0	185	26	58	.3	2.8	.22	311	.42	354	188	35	28	1.1	534	8.1
July 1-10	428	19	.01	48	16	42	2.8	185	28	68	.2	1.5	.05	329	.45	380	188	34	33	1.3	564	8.1
July 11-14, 18-22	655	15	.01	56	16	41	1.6	210	31	63	.3	1.8	.10	343	.47	607	206	34	30	1.3	594	8.0
July 15-17	262	14	.00	72	23	118	--	198	47	230	.4	2.5	.14	638	.67	451	274	112	48	3.1	1,130	7.9
July 23-31	407	13	.05	32	5.7	16	2.4	114	18	18	.4	2.8	.08	179	.24	197	103	10	25	.7	291	7.4
Aug. 1-9	242	21	.03	44	11	29	1.6	a 164	21	40	.3	3.5	.17	266	.36	174	155	21	29	1.0	444	8.3
Aug. 10-30	178	20	.01	52	16	51	1.2	207	28	77	.3	1.8	.20	397	.49	172	196	26	36	1.6	622	8.2
Aug. 21-31	132	20	.01	52	16	50	1.6	b 208	32	74	.4	1.5	.20	360	.49	128	196	23	35	1.6	621	8.3
Sept. 1-9	131	19	.03	50	17	50	.4	b 210	28	72	.3	1.2	.22	352	.48	123	195	23	36	1.6	621	8.3
Sept. 10, 12, 15-19	11,690	15	.08	35	5.9	15	3.8	136	15	18	.3	2.5	.11	180	.24	5,680	112	0	22	.6	303	7.6
Sept. 11, 13-14, 20-23	3,867	17	.04	47	9.6	25	3.9	165	25	40	.3	3.0	.19	260	.35	2,710	187	22	25	.9	432	8.2
Sept. 24-30	1,589	18	.03	64	13	28	3.6	216	29	50	.3	4.0	.14	326	.44	1,220	213	36	22	.8	538	7.5
Weighted average	819	17	--	45	12	36	2.8	166	24	56	0.3	2.8	0.17	291	0.40	643	162	26	32	1.3	497	--

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

## GUADALUPE RIVER BASIN--Continued

## GUADALUPE RIVER AT VICTORIA, TEX.--Continued

Temperature (°F) of water, water year October 1951 to September 1952

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

GUADALUPE RIVER BASIN--Continued

Chemical analyses, in parts per million, water year October 1951 to September 1952

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)	Color or pH			
													Parts per million	Tons per acre-foot per day							
GUADALUPE RIVER NEAR HUNT																					
June 17, 1952 ....		13		51	22	6.6		251	4.9	12	0.3	1.5		236	0.32	218	12	6	0.2	423	8.1
JOHNSON CREEK AT INGRAM																					
June 17, 1952 ....		15		55	25	14		247	10	24	0.3	1.8		266	0.36	240	38	11	0.4	468	8.2
MEDINA LAKE NEAR SAN ANTONIO																					
Oct. 19, 1951 ....		11	0.00	58	21	8.5	3.6	168	93	13	0.1	2.2	0.61	350	0.48	235	0	7	0.2	484	8.1
a Sum of determined constituents.																					

## MUECES RIVER BASIN

## MUECES RIVER NEAR THREE RIVERS, TEX.

LOCATION. --At bridge on U. S. Highway 281, 4,100 feet downstream from gaging station, which is 2 miles south of Three Rivers, Live Oak County. DRAINAGE AREA. --15,600 square miles.

RECORDS AVAILABLE. --Chemical analyses: September 1945 to September 1952. Water temperatures: October 1950 to September 1952.

Sediment records: October 1950 to September 1952.

EXTREMES, 1951-52. --Dissolved solids: Maximum, 1,610 ppm Apr. 10 (6 p.m.-12 p.m.); minimum, 168 ppm July 19-23.

Hardness: Maximum, 216 ppm Dec. 1-10; minimum, 60 ppm Sept. 1-10.

Specific conductance: Maximum daily, 2,830 micromhos Apr. 10; minimum observed, 50°F Dec. 11-12, 16.

Water temperatures: Maximum observed, 90°F Aug. 6; minimum observed, 50°F Dec. 11-12, 16.

Sediment concentrations: Maximum daily, 4,040 ppm Apr. 23; minimum daily, no flow Aug. 12-16.

Sediment loads: Maximum daily, 36,200 tons May 28; minimum daily, 0 ton Aug. 12-16.

EXTREMES, 1945-46, 1950-52. --Dissolved solids: Maximum, 1,610 ppm Apr. 10 (6 p.m.-12 p.m.), 1952; minimum, 168 ppm July 19-23, 1952.

Hardness: Maximum, 283 ppm Dec. 21-31, 1945; minimum, 60 ppm Sept. 8-12, 13 (12 p.m.-12 m.), 1951, Sept 1-10, 1952.

Specific conductance (1950-52): Maximum daily, 2,830 micromhos Apr. 10, 1952; minimum daily, 194 micromhos July 20.

Water temperatures (1950-52): Maximum observed, 90°F Aug. 6, 1952.

Sediment concentrations (1950-52): Maximum daily, 10,300 ppm May 7, 1951; minimum daily, no flow on many days.

Sediment loads (1950-52): Maximum daily, 75,700 tons Sept. 14, 1951; minimum daily, 0 ton on many days.

REMARKS. --Values reported for dissolved solids are residues on evaporation unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. For the periods October 1941 to September 1945, October 1946 to September 1947, and July 1949 to September 1949 specific conductance, numerous spot chlorides, and a few partial analyses available in district office at Austin, Tex. Records of discharge for water year October 1951 to September 1952 given in Water-Supply Paper 1242. No appreciable inflow between sampling point and gaging station except during periods of local heavy rains.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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- cent so- dium sulfate	So- dium adsorp- tion ratio (25°C)	Specific conduct- ance (micro-mhos at 25°C)	
															Parts per mil-	Tons per acre-	Tons per day	Calcium	Non- mag- nesium				
Oct. 1-5, 1951.....	154	21		40	4.3	52		150	0	43	43		2.0		285	0.39	119	118	0	49	2.0	471	7.9
Oct. 6-10.....	36.0	26		58	6.2	88		222	0	68	77		2.8		433	.59	42.1	170	0	53	2.9	735	8.0
Oct. 11-22.....	17.1	22		60	10	158		264	0	104	148		2.0		672	.91	31.0	190	0	64	5.0	1,060	8.2
Oct. 23-24, 28.....	845	20		44	4.0	75		138	0	67	76		1.5		383	.49	828	126	14	56	2.9	604	8.0
Oct. 25-27, 29-31.....	696	20		36	3.7	54		136	0	50	40		2.5		a273	.37	513	105	0	53	2.3	447	8.1
Nov. 1-10.....	97.9	20		40	4.7	83		170	0	50	76		2.5		366	.50	96.7	120	0	60	3.3	824	8.0
Nov. 11-20.....	15.0	23		42	5.9	89		206	0	50	72		1.5		395	.54	16.0	130	0	60	3.4	657	8.1
Nov. 21-30.....	16.1	25		58	8.6	147		306	0	82	116		.5		590	.80	25.6	180	0	64	4.8	983	8.2
Dec. 1-10.....	11.6	23		67	12	200		354	0	109	176		.5		826	1.12	25.9	216	0	67	5.9	1,270	8.2
Dec. 11-20.....	11.9	31		32	11	236		330	0	107	181		.8		792	1.08	25.4	125	0	80	9.1	1,260	8.2
Dec. 21-31.....	18.7	28		26	13	261		386	12	108	170		1.0		843	1.15	42.6	121	0	82	10	1,360	8.4
Jan. 1-10, 1952.....	18.3	27		29	8.3	276		420	8	98	174		.5		848	1.15	41.9	106	0	85	12	1,370	8.4
Jan. 11-20.....	17.9	24		30	8.0	277		426	12	99	168		.5		854	1.16	41.3	108	0	85	12	1,380	8.4
Jan. 21-31.....	14.5	22		38	9.7	287		432	12	107	194		.2		914	1.24	35.8	135	0	82	11	1,480	8.4

a Sum of determined constituents.

NUECES RIVER BASIN

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Feb. 1-10, 1952	13.7	24	23	10	301	387	13	122	209	2.5	902	1.23	32.4	98	0	87	13	1,520	8.5
Feb. 11-21	15.6	23	26	9.1	294	431	12	118	175	1.8	892	1.27	31.6	105	0	86	13	1,480	8.4
Feb. 22-29	636	16	36	2.5	24	117	0	56	34	2.8	274	.27	47.6	100	4	51	5.4	1,433	7.8
Mar. 1-10	41.9	18	48	5.6	145	195	0	74	153	3.0	566	.97	64.0	138	0	70	5.8	1,937	8.0
Mar. 11-20	12.6	19	59	11	183	312	0	120	148	1.5	712	.97	24.2	192	0	67	5.8	1,170	8.2
Mar. 21-31	20.9	16	59	14	225	387	0	143	* 173	.8	898	1.13	46.7	204	0	71	6.9	1,370	8.2
Apr. 1, 7-9, 17-22, 23 (12 p.m. - 12 m.), Apr. 2 (12 p.m. - 12 m.), 3-6, 10 (12 p.m. - 6 p.m.), 15-16, 23 (6 p.m. - 12 p.m.), 24-30	63.4	24	35	5.6	136	238	0	61	102	3.5	492	.67	84.2	110	0	73	5.6	837	8.2
Apr. 2 (12 p.m. - 12 m.), p.m.), 15-16, 23 (6 p.m. - 12 p.m.), 24-30	228	19	30	3.8	53	125	0	45	37	3.9	257	.35	158	90	0	56	2.4	419	7.6
Apr. 2 (12 p.m. - 12 p.m.), 11-14, 23 (12 p.m. - 6 p.m.),	457	22	36	4.3	72	137	0	61	59	5.5	331	.45	408	108	0	59	3.0	538	8.1
Apr. 10 (6 p.m. - 12 p.m.), May 1-10	1096	30	70	8.3	537	226	8	196	685	8.8	1,610	2.19	4,760	208	24	85	16	2,830	8.5
May 11-20	11.5	23	45	7.3	114	217	0	90	83	1.8	484	.66	15.0	142	0	63	4.2	764	7.9
May 21-25, 26 (12 p.m. - 12 m.), 27, 28 (12 p.m. - 12 m.),	15.2	22	57	11	168	279	0	125	137	1.4	668	.91	27.4	187	0	66	5.3	1,110	7.9
May 26 (12 m. - 12 p.m.), May 28 (12 m. - 12 p.m.), May 29-31	348	20	28	2.5	93	163	0	47	69	3.5	364	.50	342	80	0	72	4.5	582	8.0
June 1-10	1,231	33	60	4.8	269	154	5	22	420	4.4	962	1.31	379	169	34	78	9.0	1,650	8.4
June 11-16	3,790	18	31	2.3	38	116	0	37	23	3.7	218	.30	2,230	87	0	49	1.7	341	7.7
June 17-30	2,331	19	39	4.0	26	141	0	28	18	1.3	221	.30	1,390	114	0	34	1.0	343	7.7
July 1-10	1,252	37	41	4.1	34	166	0	27	20	1.8	259	.35	876	119	0	38	1.4	388	8.1
July 11-14	16.2	42	49	5.6	64	214	0	36	51	.8	372	.51	16.3	146	0	49	2.3	578	8.2
July 15-16	37.6	38	49	5.5	76	199	0	59	63	1.2	398	.54	40.4	145	0	54	2.8	643	8.2
July 17-23	136	25	37	2.7	39	140	0	40	21	2.5	252	.34	108	103	0	45	1.7	387	7.9
July 24-31	569	21	22	2.2	23	96	0	17	10	4.8	168	.23	265	64	0	44	1.3	243	7.8
Aug. 1-10	1.98	30	32	4.2	59	170	0	36	32	1.8	285	.39	6.14	97	0	57	2.6	462	8.1
Aug. 11-19	98	40	44	5.7	85	232	0	52	51	1.8	432	.59	1.12	134	0	56	3.2	624	8.1
Aug. 20-31	b1, 97	39	43	5.0	93	236	0	52	60	1.6	454	.59	2.31	132	0	61	3.5	663	8.4
Sept. 1-10	7.98	33	35	5.0	244	492	14	52	99	1.5	785	1.02	17.9	128	0	91	3.9	1,083	8.4
Sept. 11-16, 19-20	8.35	49	16	4.8	258	493	35	42	99	3.0	785	1.02	17.9	128	0	91	3.9	1,083	8.4
Sept. 17-18, 21-30	811	16	22	3.4	93	93	0	23	14	3.0	184	.25	403	69	0	40	1.3	260	8.0
Weighted Average	39.8	22	41	7.5	56	177	0	60	49	1.8	346	.47	37.4	133	0	52	2.5	553	8.2
	228	21	35	3.7	48	c143	--	38	35	2.6	270	0.37	166	102	0	50	2.1	425	--

b Includes days of less than 0.05 cubic foot per second discharge.

c Includes carbonate as bicarbonate.

## NUECES RIVER BASIN--Continued

## NUECES RIVER NEAR THREE RIVERS, TEX.--Continued

Temperature (°F) of water, water year October 1951 to September 1952

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	78	68	64	60	--	--	60	72	74	80	78	81
2	78	62	64	58	64	62	68	72	74	80	80	80
3	84	58	64	54	64	62	70	72	78	82	80	80
4	82	58	66	54	64	64	70	72	78	82	80	80
5	86	62	66	54	52	62	68	74	78	84	80	78
6	80	56	66	52	54	60	68	74	78	82	90	80
7	74	58	64	56	56	58	70	76	76	82	80	78
8	74	60	64	56	66	58	68	76	78	82	82	78
9	74	58	54	54	68	60	68	76	78	80	80	78
10	70	56	52	52	66	62	66	80	80	82	82	78
11	72	64	50	54	66	62	66	68	80	82	82	76
12	72	64	50	54	66	62	66	68	80	82	82	76
13	70	66	56	58	66	64	64	68	80	82	82	76
14	72	64	56	62	62	64	66	70	82	82	82	76
15	72	66	52	66	64	64	64	70	80	82	82	76
16	72	64	50	64	64	60	68	70	80	82	82	76
17	72	58	54	68	64	64	68	70	80	84	80	78
18	74	54	56	66	66	62	68	74	84	80	80	76
19	70	54	--	66	66	62	68	68	84	82	82	76
20	70	54	--	68	68	64	70	68	84	80	88	76
21	74	60	54	70	66	68	72	68	82	82	--	76
22	74	60	52	68	64	62	72	70	84	82	82	76
23	72	64	52	58	64	60	70	80	82	82	82	76
24	68	64	52	58	64	--	70	68	82	82	84	74
25	70	68	56	66	62	58	72	72	84	80	84	74
26	70	62	--	66	64	62	70	68	80	80	84	72
27	74	58	56	66	56	58	68	76	86	80	82	72
28	72	60	52	60	60	62	76	70	82	80	82	74
29	72	60	52	62	60	62	68	72	80	80	84	74
30	74	58	56	62	--	64	70	74	80	80	78	72
31	74	--	56	64	--	62	--	74	--	80	80	--
Average	74	61	57	61	63	62	68	72	80	81	* 82	76

## NUECES RIVER BASIN--Continued

## NUECES RIVER NEAR THREE RIVERS, TEX.--Continued

Suspended sediment, water year October 1951 to September 1952

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-----	336	663	601	105	689	s 219	14		
2-----	168	674	306	156	400	168	13		
3-----	117	174	55	176	900	428	13	25	0.9
4-----	89	171	41	112	520	157	12		
5-----	62	108	18	83	170	38	12		
6-----	47	83	11	70	152	29	12		
7-----	38	100	10	109	112	33	12		
8-----	32	78	6.7	91	135	33	10	28	.8
9-----	34	74	6.8	44	234	28	9.4		
10-----	29	46	3.6	33	221	20	8.8		
11-----	22	46	2.7	28	123	9.3	8.8		
12-----	20	34	1.8	22	111	6.6	8.5		
13-----	23	31	1.9	18	81	3.9	8.5	31	.8
14-----	16	30	1.3	15	82	3.3	9.4		
15-----	14	29	1.1	14	62	2.3	10		
16-----	14	32	1.2	12	66	2.1	9.4	--	--
17-----	13	28	1.0	10	56	1.5	14	--	a 2
18-----	16	31	1.3	10	61	1.6	17	159	7.3
19-----	24	64	4.1	11	56	1.7	17	44	2.0
20-----	17	86	3.9	10	60	1.6	16	--	a 2
21-----	14	74	2.8	11	62	1.8	15		
22-----	12	82	2.7	12	62	2.0	15	--	a 2
23-----	321	2,190	s 2,690	12	68	2.2	19		
24-----	1,650	3,490	15,500	11	58	1.7	19	48	2.4
25-----	1,520	1,990	8,170	13	47	1.6	20		
26-----	1,260	2,070	7,040	13	60	2.1	21		
27-----	985	1,720	4,570	29			20		
28-----	564	832	s 1,340	26	34	2.0	19		
29-----	204	650	358	18			19	52	2.7
30-----	121	450	147	16			20		
31-----	88	230	55	--	--	--	19		
Total-	7,870	--	40,954.9	1,290	--	1,206.3	440.8	--	54.1
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-----	19			16	--	a 2	91	1,000	246
2-----	19			14			88	300	71
3-----	18	40	2.0	13			60	250	40
4-----	18			12	49	1.6	42	118	13
5-----	18			11			34	122	11
6-----	18			12			28	69	5.2
7-----	18			14			23	70	4.3
8-----	18	40	2.0	14			19	68	3.5
9-----	19			16	56	2.3	18	68	3.3
10-----	18			15			16		
11-----	18			16			14		
12-----	18			16			14	26	1.0
13-----	19	45	2.2	16			14		
14-----	18			15	66	2.8	14		
15-----	18			16			13		
16-----	18			16			13		
17-----	19			15			12	26	.8
18-----	17	46	2.2	15			11		
19-----	17			15			10		
20-----	17			16	64	2.7	11		
21-----	16			16			11		
22-----	15			337	1,390	s 3,020	11	18	.5
23-----	14	38	1.5	1,680	2,850	12,900	10		
24-----	14			785	1,940	4,110	11		
25-----	14			478	1,860	2,400	11		
26-----	15			805	1,850	4,020	11		
27-----	15			565	2,380	3,630	11		
28-----	14	37	1.4	304	2,140	1,760	13	20	1.2
29-----	14			133	1,050	377	19		
30-----	14			--	--	--	54		
31-----	14	43	1.6	--	--	--	68	188	s 56
Total-	521	--	58.3	5,396	--	32,266.0	775	--	471.3

s Computed by subdividing day.

a Computed from estimated concentration graph.

## NUECES RIVER BASIN--Continued

## NUECES RIVER NEAR THREE RIVERS, TEX.--Continued

Suspended sediment, water year October 1951 to September 1952--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-----	73	540	106	19	82	4.2	2,350	750	4,760
2-----	688	3,070	s6,000	16	77	3.3	1,700	750	3,440
3-----	183	3,050	1,510	13	58	2.0	2,140	770	4,450
4-----	68	940	173	12	52	1.7	2,710	570	4,170
5-----	43	690	80	11	43	1.3	2,830	390	2,980
6-----	61	620	102	9.7	41	1.1	2,530	370	2,530
7-----	42	220	25	10	41	1.1	2,920	900	7,100
8-----	34	120	11	9.7	44	1.2	2,230	820	4,940
9-----	31	100	8.4	7.9	28	.6	2,090	500	2,820
10-----	548	2,180	s4,290	6.8	25	.5	1,810	490	2,390
11-----	685	3,000	5,550	5.5	22	.3	1,810	420	2,050
12-----	262	2,600	1,840	5.2	20	.3	2,260	360	2,200
13-----	158	750	320	4.8	24	.3	2,680	250	1,610
14-----	73	600	118	4.2	22	.2	2,260	220	1,350
15-----	45	363	44	3.8	24	.2	516	310	432
16-----	35	362	34	3.2	18	.2	237	640	410
17-----	28	112	8.5	3.2	23	.2	140	450	170
18-----	23	115	7.1	3.8	26	.3	91	366	90
19-----	25	96	6.5	26	142	s23	56	185	28
20-----	29	105	8.2	92	280	70	38	184	19
21-----	48	87	11	33	980	87	28	98	7.4
22-----	53	86	12	17	950	44	19	96	4.9
23-----	1,380	4,040	s16,800	11	700	21	14	72	2.7
24-----	1,170	2,210	s7,090	9.6	580	15	11		
25-----	396	--	a2,250	17	460	21	8.2		
26-----	94	1,370	348	146	1,370	s1,240	5.8		
27-----	54	340	50	507	2,600	3,560	4.5		
28-----	38	304	31	3,540	3,550	s36,200	4.0		
29-----	29	122	9.6	4,990	2,020	s27,600	3.5	54	.5
30-----	22	123	7.3	3,390	1,540	14,100	2.5		
31-----	--	--	--	3,130	1,070	9,040	--	--	--
Total-	6,418	--	46,850.6	16,057.6	--	92,040.0	33,518.5	--	48,160.7
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-----	1.8			2.5	47	0.3	7.3		
2-----	1.4			1.8	48	.2	7.6		
3-----	1.1	52	0.2	1.6	37	.2	7.0	65	1.3
4-----	.6			1.2	36	.1	7.0		
5-----	17	503	s53	1.0	34	.1	7.0		
6-----	161	--	a805	.4			6.8		
7-----	49	--	a101	.4			7.0	53	1.0
8-----	16	130	5.6		27	(t)	7.6		
9-----	30	208	s21	.3			8.2		
10-----	9.5	100	2.6	.2			18	240	12
11-----	5.2	94	1.3	.1	20	(t)	2,040	1,590	s9,240
12-----	5.5	24	.4	0	--	0	2,380	1,210	7,780
13-----	53	325	s58	0	--	0	1,130	960	2,930
14-----	176	832	s516	0	--	0	270	770	561
15-----	271	1,800	1,320	0	--	0	81	640	140
16-----	154	1,800	748	0	--	0	44	560	67
17-----	76	800	164	4.7			32	180	16
18-----	130	841	s496	5.5			203	306	s248
19-----	1,100	1,730	5,140	7.4	40	.7	326	1,600	1,410
20-----	1,480	953	s3,940	8.8			215	1,450	842
21-----	244	782	s475	8.5			102	150	41
22-----	62	740	124	8.2			41	76	8.4
23-----	32	670	58	8.5	58	1.3	24	81	5.2
24-----	19	320	16	8.2			16	72	3.1
25-----	13	298	10	7.9			13	41	1.4
26-----	9.4	164	4.2	7.9			12	30	1.0
27-----	7.0	168	3.2	7.6			10	58	1.6
28-----	5.2	122	1.7	7.6		92	8.8	34	.8
29-----	4.2	95	1.1	7.6			8.2	32	.7
30-----	3.2	45	.4	7.6			7.3	26	.5
31-----	2.8	47	.4	7.3	65	1.3	--	--	--
Total-	4,139.9	--	14,066.7	123.0	--	21.1	7,046.8	--	23,319.9
Total discharge for year (cfs-days)									83,596.4
Total load for year (tons)									299,469.9

s Computed by subdividing day.

t Less than 0.05 ton.

a Computed from estimated concentration graph.



NUECES RIVER BASIN--Continued  
NUECES RIVER NEAR THREE RIVERS, TEX.--Continued

Particle-size analyses of suspended sediment, water year October 1951 to September 1952

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

Date of collection	Time	Water 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
Oct. 23, 1951	5:30 p. m.	336		3,500	2,860	--	83	87	95	99	100	--			PCW
Nov. 3	10:30 a. m.	197		1,220	1,770	84	94	96	99	100	--	--			BCW
Feb. 23, 1952	9:00 a. m.	2,030		2,880	4,360	--	85	91	94	95	99	100			SPCW
Feb. 23	4:30 p. m.	1,730		2,600	4,560	7	17	87	93	96	99	100			SPN
Feb. 23	4:30 p. m.	1,730		2,600	4,520	75	81	88	93	98	99	100			SPCW
Feb. 24	9:30 a. m.	785		1,830	3,080	--	91	95	96	99	100	--			PCW
Feb. 25	9:00 a. m.	460		1,780	1,380	86	92	96	100	--	--	--			BCW
Feb. 27	9:00 a. m.	585		2,290	1,740	85	96	97	99	100	--	--			BCW
Apr. 2	8:30 a. m.	965		3,790	3,500	--	91	93	96	96	100	--			PCW
Apr. 2	2:15 p. m.	825		3,080	5,000	24	72	90	96	96	99	100			SPN
Apr. 2	2:15 p. m.	825		3,080	4,970	70	87	90	97	98	99	100			SPCW
Apr. 23	7:00 a. m.	585		8,100	6,260	--	81	91	96	99	100	--			PCW
Apr. 23	4:00 p. m.	2,350		4,770	8,140	--	84	92	96	99	99	100			SPCW
Apr. 25	7:30 a. m.	488		1,340	1,100	96	97	98	99	100	--	--			BCW
May 27	7:30 a. m.	402		3,070	4,760	--	94	97	99	99	100	--			PCW
May 28	9:00 a. m.	3,100		4,840	4,230	71	81	90	97	99	100	--			PCW
May 28	9:00 a. m.	3,100		4,840	4,020	--	1	5	76	92	100	--			PN
May 29	8:00 a. m.	5,370		2,030	3,440	--	92	97	98	99	99	100			SPCW
July 19	4:00 p. m.	1,260		2,020	3,550	--	91	96	97	99	100	--			PCW
Sept. 11	9:00 a. m.	1,860		1,960	1,760	69	78	82	88	92	98	100			SBCW
Sept. 12	1:00 p. m.	2,260		1,260	1,190	76	87	90	95	97	100	--			BCW

## NUECES RIVER BASIN--Continued

## NUECES RIVER NEAR MATHIS, TEX.

LOCATION --At intake tower at Lake Corpus Christi Dam, 0.8 mile upstream from gaging station which is at bridge on U. S. Highway 59, 200 feet downstream from Texas & New Orleans Railroad bridge, and 4 miles southwest of Mathis, San Patricio County.

DRAINAGE AREA --16,680 acres, 16 miles.  
RECORDS AVAILABLE --Chemical analyses: October 1947 to September 1952.

Water temperatures: October 1947 to September 1952.  
EXTREMES 1951-52 --Dissolved solids: Maximum 478 ppm Apr. 1-30; minimum, 251 ppm Oct. 1-31.

Hardness: Maximum 178 ppm Apr. 1-30; minimum, 115 ppm Oct. 1-31 and June 1-30.  
Specific conductance: Maximum daily, 805 micromhos May 29; minimum daily, 371 micromhos June 13.

Water temperatures: October 1947 to September 1952.  
EXTREMES 1951-52 --Dissolved solids: Maximum 478 ppm Apr. 1-30; minimum, 251 ppm Oct. 1-31.

Hardness: Maximum 178 ppm Apr. 1-30; minimum, 115 ppm Oct. 1-31 and June 1-30.  
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Water temperatures: October 1947 to September 1952.  
EXTREMES 1951-52 --Dissolved solids: Maximum 478 ppm Apr. 1-30; minimum, 251 ppm Oct. 1-31.

## Chemical analyses, in parts per million, water year October 1951 to September 1952

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	Color
														Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate				
Oct. 1-31, 1951 ..	313	22	0.00	40	3.6	35	7.6	142	34	30	0.3	3.0	0.11	251	0.34	115	0	38	1.4	383	7.6
Nov. 1-30 .....	69.2	22	0.00	45	3.8	53	5.1	164	40	46	.3	1.0	.8	314	.43	128	0	47	2.0	482	7.8
Dec. 1-31 .....	40.5	22	0.00	51	5.2	51	5.1	174	42	47	.4	.8	.8	307	.42	144	2	43	1.8	505	7.9
Jan. 1-31, 1952 ..	44.3	22	0.00	52	4.9	49	4.9	182	41	44	.4	.5	.5	307	.42	150	0	41	1.7	519	8.1
Feb. 1-28 .....	59.3	24	0.00	55	5.1	56	5.1	196	44	53	.3	.2	.2	358	.49	137	0	44	2.0	551	8.0
Mar. 1-31 .....	75.3	22	0.00	55	5.9	91	9.1	216	53	86	.4	.5	.5	442	.60	162	0	55	3.2	718	8.1
Apr. 1-30 .....	157	18	0.00	57	8.9	93	9.3	224	57	97	.3	.5	.5	478	.65	203	0	53	3.0	772	8.2
May 1-31 .....	399	21	0.00	52	4.9	103	10.3	216	58	98	.3	1.2	.8	454	.52	489	0	60	3.7	766	8.0
June 1-30 .....	1,381	26	0.00	39	4.2	39	3.9	156	30	28	.3	.8	.8	259	.35	986	0	43	1.6	396	7.9
July 1-31 .....	155	24	0.00	42	4.0	41	4.1	176	28	26	.3	1.0	.8	259	.35	108	0	43	1.6	427	8.0
Aug. 1-31 .....	76.4	25	0.00	46	4.8	48	4.8	183	30	38	.4	4.2	.8	290	.39	80	0	44	1.8	495	7.6
Sept. 1-30 .....	175	26	0.00	43	4.3	49	4.9	180	29	36	.4	.8	.8	279	.38	132	0	46	1.9	457	7.7
Weighted average	244	25	0.00	44	4.6	54	5.4	172	37	45	0.3	1.2	1.2	308	0.42	203	0	48	2.1	492	--

REMARKS:--Values reported for dissolved solids are residues on evaporation. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1951 to September 1952 given in Water-Supply Paper 1242.

## NUECES RIVER BASIN--Continued

## NUECES RIVER NEAR MATHIS, TEX.--Continued

Temperature (°F) of water, water year October 1951 to September 1952

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	--	--	--	63	68	--	--	--	--	84	85	--
2	85	65	--	63	68	--	72	79	81	84	85	84
3	84	65	--	--	--	--	71	79	--	85	86	84
4	--	68	71	58	64	63	71	80	--	85	89	84
5	85	--	70	59	63	63	75	--	--	--	89	84
6	84	--	71	60	61	--	74	79	--	--	89	86
7	83	70	66	--	--	62	--	--	--	86	88	84
8	--	--	66	64	62	64	72	81	--	85	--	--
9	83	69	60	64	63	65	71	80	--	82	88	84
10	83	69	--	--	63	--	--	80	--	84	88	--
11	--	70	58	60	--	62	67	74	--	84	87	80
12	79	74	61	63	67	68	72	72	84	85	86	80
13	79	74	--	65	67	--	73	74	83	83	85	81
14	78	74	64	--	--	69	--	75	--	85	86	84
15	79	--	--	66	61	62	72	75	--	--	88	--
16	78	63	55	67	61	67	71	76	85	85	87	82
17	77	62	55	--	62	--	--	76	87	85	88	90
18	--	60	56	70	--	64	72	75	85	83	87	89
19	76	--	61	71	68	67	70	74	86	84	87	85
20	78	64	--	71	67	--	72	74	84	85	86	83
21	79	64	--	--	--	73	--	75	--	85	84	84
22	71	66	64	68	64	66	71	80	84	85	85	83
23	79	66	65	69	64	--	73	78	83	--	85	80
24	71	68	60	--	65	66	78	79	84	85	88	80
25	--	68	--	70	--	64	79	78	84	85	86	81
26	79	67	59	69	65	72	76	79	84	85	86	82
27	81	65	62	68	64	72	--	78	85	85	86	80
28	78	66	63	--	--	66	--	--	85	85	86	81
29	--	--	63	68	65	66	75	79	--	84	86	78
30	78	64	65	66	--	70	78	78	85	85	86	81
31	79	--	--	--	--	70	--	79	--	85	88	--
Average	--	--	--	--	--	--	--	77	--	85	87	83

NUECES RIVER BASIN--Continued  
MISCELLANEOUS ANALYSES OF STREAMS IN NUECES RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1951 to September 1952

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 ion	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH or Col.
														Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate				
NUECES RIVER NEAR CAMP WOOD																					
June 17, 1952 ....		13		43	16	7.1		a.190	7.7	13	0.3	4.0		197	0.27	173	17	8	0.2	357	8.4
NUECES RIVER NEAR LAGUNA																					
June 16, 1952 ....		13		53	15	6.3		215	9.5	13	0.2	4.0		230	0.31	194	18	7	0.2	391	8.2
FRIO RIVER AT U. S. HIGHWAY 83 NEAR LEAKEY																					
June 17, 1952 ....		11		58	18	5.7		246	0.7	12	0.2	6.1		240	0.33	219	17	5	0.2	423	8.2
FRIO RIVER AT CONCAN																					
June 16, 1952 ....		13		47	16		6.6	200	12	14	0.2	1.0		210	0.29	183	19	7	0.2	372	8.0
FRIO RIVER NEAR CONCAN																					
June 16, 1952 ....		10		58	15	7.1		219	16	16	0.3	0.8		240	0.33	206	27	7	0.2	407	8.1
CHACON LAKE 6 MILES NORTH OF DEVINE																					
Feb. 12, 1952 ....		12	0.05	90	23	24	2.0	206	137	46	0.3	0.2		493	0.67	319	150	14	0.6	715	7.7

a. Includes equivalent of 5 parts per million of carbonate (CO<sub>3</sub>).

a includes equivalent of 5 parts per million of carbonate (CO<sub>3</sub>).

# RIO GRANDE BASIN

## RIO GRANDE ABOVE CULEBRA CREEK NEAR LOBATOS, COLO.

LOCATION.--Half a mile southeast of La Saucos, 7 miles upstream from Culebra Creek, and 15 miles upstream from gaging station which is 10 miles east of Lobatos, Conejos County, drainage area, 7,700 square miles 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 1952.

EXTREMES, 1951-52.--Dissolved solids: Maximum, 551 ppm July 21-31; minimum, 121 ppm June 1-10.

Hardness: Maximum, 271 ppm July 21-31; minimum, 52 ppm May 1-10.

Specific conductance: Maximum observed, 814 micromhos July 25; minimum observed 127 micromhos May 2.

EXTREMES, 1946-52.--Dissolved solids: Maximum, 691 ppm July 21-31, 1948; minimum, 104 ppm May 2-10, 1947.

Hardness: Maximum, 306 ppm July 21-31, 1948; minimum, 52 ppm May 1-10, 1952.

Specific conductance: Maximum observed, 1,070 micromhos July 26, 1948; minimum observed, 122 micromhos June 1, 1949.

REMARKS.--Values reported for dissolved solids are residues on evaporation. Records of specific conductance of daily samples available in district office at

Albuquerque, N. Mex. Records of discharge for gaging station near Lobatos, Colo. for water year October 1951 to September 1952 given in Water-Supply Paper

1242, Culebra Creek which enters Rio Grande between the sampling point and the gaging station is usually dry at its mouth. Inflow from other sources between sampling point and gaging station occurs only at times of heavy local rainfall.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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	Color
														Parts per million	Tons per acre-foot	Calcium, mg./l.	Non-carbonate				
Oct. 1-10, 1951...	31.1	40	0.04	34	7.2	38	8.4	176	48	10	1.0	0.9	a 0.1	274	0.37	114	0	40	402	7.8	--
Oct. 11-20	44.3	--	--	34	6.9	42	--	--	--	--	--	--	--	246	33	114	--	45	401	--	--
Oct. 21-31	46.9	--	--	39	7.8	46	--	--	--	--	--	--	--	297	40	130	--	44	451	--	--
Nov. 1-10	61.3	--	--	40	8.7	47	--	--	--	--	--	--	--	303	41	136	--	43	456	--	--
Nov. 11-20	67.2	--	--	40	8.7	46	--	--	--	--	--	--	--	296	40	136	--	42	433	--	--
Nov. 21-30	104	--	--	39	8.0	36	--	--	--	--	--	--	--	276	38	130	--	38	409	--	--
Dec. 1-10	108	--	--	28	4.9	18	--	--	--	--	--	--	--	186	25	90	--	30	265	--	--
Dec. 11-20	185	--	--	28	5.8	18	--	--	--	--	--	--	--	190	26	94	--	29	267	--	--
Dec. 21-31	225	--	--	28	5.8	19	--	--	--	--	--	--	--	188	26	94	--	31	267	--	--
Jan. 1-10, 1952...	234	29	.05	26	5.8	17	4.5	106	33	4.8	4	1.0	a 1	177	24	89	2	28	250	7.6	--
Jan. 11-20	249	--	--	23	4.5	14	--	--	--	--	--	--	--	155	21	104	--	29	219	--	--
Jan. 21-31	229	--	--	25	4.8	16	--	--	--	--	--	--	--	164	22	101	--	30	229	--	--
Feb. 1-10	222	--	--	25	5.2	15	--	--	--	--	--	--	--	163	22	97	--	28	234	--	--
Feb. 11-20	230	--	--	29	6.1	19	--	--	--	--	--	--	--	193	26	120	--	30	275	--	--
Feb. 21-29	208	--	--	29	6.1	19	--	--	--	--	--	--	--	194	26	109	--	30	274	--	--
Mar. 1-10	284	--	--	28	6.0	18	--	--	--	--	--	--	--	193	26	148	--	29	267	--	--
Mar. 11-20	325	--	--	28	6.1	18	--	--	--	--	--	--	--	186	25	163	--	29	267	--	--
Mar. 21-31	300	--	--	28	5.9	18	--	--	--	--	--	--	--	187	25	151	--	29	266	--	--
Apr. 1-10	341	30	.12	27	5.3	19	4.0	100	41	6.2	3	.4	.04	189	26	174	8	31	267	7.6	--
Apr. 11-20	352	--	--	22	4.7	13	--	--	--	--	--	--	--	156	21	165	--	32	193	--	--
Apr. 21-30	833	--	--	15	6.4	11	--	--	--	--	--	--	--	134	18	64	--	27	156	--	--

a Reported boron is less than figure indicated.

## RIO GRANDE BASIN --Continued

## RIO GRANDE ABOVE CULEBRA CREEK NEAR LOBATOS, COLO. --Continued

Chemical analyses, in parts per million, water year October 1951 to September 1952 --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)	Boiron (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	Color
														Parts per million	Tons per acre-foot	Tons per day	Calcium, mg./nestum	Non-carbonate					
May 1-10, 1952...	2,520	--	--	14	4.2	7.5	--	--	--	--	--	--	--	128	0.17	871	52	--	24	0.4	138	--	--
May 11-20 .....	2,612	--	--	23	4.4	17	--	--	--	--	--	--	--	164	.22	1,160	76	--	33	.9	224	--	--
May 21-31 .....	2,165	--	--	20	4.4	14	--	--	--	--	--	--	--	143	.19	836	68	--	31	.7	191	--	--
June 1-10 .....	2,643	--	--	17	4.2	9.4	--	--	--	--	--	--	--	121	.16	863	60	--	25	.5	164	--	--
June 11-20 .....	2,821	--	--	18	4.2	9.9	--	--	--	--	--	--	--	130	.18	990	62	--	26	.5	178	--	--
June 21-30 .....	1,091	--	--	27	6.1	17	--	--	--	--	--	--	--	181	.25	533	92	--	29	.8	262	--	--
July 1-10 .....	798	--	0.06	30	6.4	24	5.7	94	67	7.5	--	--	--	222	.30	454	102	24	32	1.0	321	--	--
July 11-20 .....	494	--	--	46	10	40	--	--	--	--	--	--	--	319	.43	425	156	--	36	1.4	474	--	--
July 21-31 .....	135	--	--	79	18	69	--	--	--	--	--	--	--	551	.75	201	271	--	36	1.8	806	--	--
Aug. 1-10 .....	712	--	--	24	5.3	17	--	--	--	--	--	--	--	174	.24	334	82	--	31	.8	242	--	--
Aug. 11-20 .....	650	--	--	24	4.7	15	--	--	--	--	--	--	--	167	.23	293	80	--	29	.7	232	--	--
Aug. 21-31 .....	419	--	--	24	7.0	25	--	--	--	--	--	--	--	242	.33	274	114	--	32	1.0	343	--	--
Sept. 1-10 .....	216	--	--	52	11	42	--	154	--	--	--	--	--	368	.50	215	174	48	34	1.4	532	--	--
Sept. 11-20 .....	120	--	--	51	11	36	--	132	--	--	--	--	--	350	.48	113	172	48	32	1.3	513	--	--
Sept. 21-30 .....	176	--	--	51	11	37	--	146	--	--	--	--	--	348	.47	165	172	52	32	1.2	507	--	--
Weighted average	617	--	--	23	5.2	16	--	--	--	--	--	--	--	167	0.23	278	79	--	31	0.8	227	--	--

## RIO GRANDE BASIN--Continued

## RIO GRANDE AT EMBUDO, N. MEX.

LOCATION.--At gaging station a quarter of a mile downstream from bridge at Embudo, Rio Arriba County, and 2½ miles downstream from Embudo Creek.

DRAINAGE AREA.--10,400 square miles, approximately (includes 2,940 square miles in closed basin in northern part of San Luis Valley, Colo.).

RECORDS AVAILABLE.--Water temperatures: October 1948 to September 1952.

Sediment records: January 1948 to September 1952.

EXTREMES, 1951-52.--Water temperatures: Maximum observed, 74 °F Aug. 5; minimum, freezing point Dec. 21-26, Jan. 6.

Sediment concentrations: Maximum daily, 5,020 ppm Aug. 4; minimum daily, 9 ppm Mar. 8.

Sediment loads: Maximum daily, 36,500 tons May 8; minimum daily, 8 tons average during periods Oct. 11-20, Nov. 1-20.

EXTREMES, 1948-52.--Water temperatures: Maximum observed, 76 °F July 17, 1951; minimum, freezing point at times during winter months.

Sediment concentrations: Maximum daily, 10,200 ppm Aug. 5, 1948; minimum daily, 8 ppm average for period Nov. 30 - Dec. 9, 1948.

Sediment loads: Maximum daily, 51,000 tons May 25, 1948; minimum, 8 tons average during periods Oct. 11-20, Nov. 1-20, 1951.

REMARKS.--Records of discharge for water year October 1951 to September 1952 given in Water-Supply Paper 1242.

Temperature (°F) of water, water year October 1951 to September 1952

[Once-daily temperature measurement after 6:00 p. m.]

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

a Observations made between 11:00 a. m. and 6:00 p. m.

b Observations made prior to 11:00 a. m.

## RIO GRANDE BASIN--Continued

## RIO GRANDE AT EMBUDO, N. MEX.--Continued

Suspended sediment, water year October 1951 to September 1952

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-----	216			233			329		
2-----	219			222			342		
3-----	222			219			347		
4-----	219			226			340		
5-----	219			222			360		
6-----	212	19	11	248	13	8	350	14	13
7-----	216			260			330		
8-----	216			260			340		
9-----	219			260			340		
10-----	219			260			340		
11-----	219			264			365		
12-----	219			268			356		
13-----	216			276			380		
14-----	216			272			395		
15-----	222	14	8	272	12	8	385	19	19
16-----	222			260			365		
17-----	219			248			385		
18-----	226			240			375		
19-----	230			252			385		
20-----	230			264			395		
21-----	226			272			375	44	45
22-----	222			288			380	36	37
23-----	222			280			380	33	34
24-----	222			329			385	29	30
25-----	226			352			390	30	a 32
26-----	230	14	9	320	14	12	400	32	35
27-----	236			300			400	38	41
28-----	236			308			405	35	38
29-----	236			308			440	88	105
30-----	233			308			671	409	s 779
31-----	230			--	--	--	574	226	a 350
Total--	6,915	--	289	8,091	--	280	12,004	--	1,846
	January			February			March		
1-----	498			445			455	31	38
2-----	476			440			509	73	100
3-----	455			425			450	15	18
4-----	445			420			430	11	13
5-----	430			415			482	20	26
6-----	415	22	26	425	53	61	492	10	13
7-----	425			410			532	22	32
8-----	440			435			544	9	13
9-----	410			435			612	50	83
10-----	400			440			638	96	165
11-----	400	23	25	465			612		
12-----	395	25	27	476			544		
13-----	471	73	s 147	450			520		
14-----	708	427	s 833	460			562		
15-----	476	302	388	440	63	78	586	32	50
16-----	455	131	161	455			632		
17-----	460	72	89	470			612		
18-----	476	120	154	476			586		
19-----	2,070	2,560	s 18,500	470			593		
20-----	773	370	772	420			593		
21-----	632	192	328	460			593		
22-----	492	134	178	476			568		
23-----	455	59	72	487			482		
24-----	460	56	70	487			538		
25-----	476	52	67	470	39	49	580	33	51
26-----	460	52	65	405			593		
27-----	460	48	60	445			580		
28-----	445	48	58	504			600		
29-----	455	38	47	470			606		
30-----	450	44	53	--	--	--	612		
31-----	440	36	43	--	--	--	606		
Total--	16,303	--	22,397	13,076	--	1,831	17,342	--	1,562

s Computed by subdividing day.

a Computed from estimated concentration graph.



## RIO GRANDE BASIN--Continued

## RIO GRANDE AT EMBUDO, N. MEX.--Continued

Suspended sediment, water year October 1951 to September 1952--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-----	626	67	113	1,930	900	4,690	3,900	235	2,470
2-----	671	86	156	1,880	650	3,300	3,780	220	2,250
3-----	724	150	293	2,320	1,000	6,260	4,020	232	2,520
4-----	752	149	303	3,300	1,600	14,300	4,240	292	3,340
5-----	787	157	334	4,020	2,400	26,000	4,240	286	3,270
6-----	836	290	655	4,680	2,800	35,400	4,240	327	3,740
7-----	898	430	1,040	5,230	2,100	29,700	4,240	310	3,550
8-----	978	670	1,770	5,740	2,320	s 36,500	4,240	398	4,560
9-----	914	390	962	5,420	1,430	s 21,500	4,460	437	5,260
10-----	858	185	429	4,680	800	10,100	4,790	532	6,880
11-----	922	190	473	4,460	780	9,390	4,790	495	6,400
12-----	914	163	402	3,900	625	6,580	4,570	398	4,910
13-----	836	124	280	3,540	510	4,870	4,680	340	4,300
14-----	801	144	311	3,780	505	5,150	4,570	392	4,840
15-----	759	177	363	4,020	500	5,430	4,570	360	4,440
16-----	808	235	513	4,240	457	5,230	4,680	317	4,010
17-----	898	270	655	4,460	485	5,840	4,240	265	3,030
18-----	962	350	909	4,240	355	4,060	3,900	206	2,170
19-----	986	450	1,200	4,240	330	3,780	3,540	176	1,680
20-----	1,150	530	1,650	3,900	285	3,000	3,180	178	1,530
21-----	1,280	815	2,820	3,420	235	2,170	2,820	138	1,050
22-----	1,480	1,010	4,040	3,120	230	1,940	2,580	127	885
23-----	1,190	450	1,450	3,000	210	1,700	2,520	98	667
24-----	1,100	300	891	2,880	215	1,670	2,260	93	567
25-----	1,050	336	953	2,700	195	1,420	1,880	107	543
26-----	1,060	420	1,200	2,640	193	1,380	1,630	100	a 440
27-----	1,380	980	3,650	3,000	238	1,930	1,580	82	350
28-----	1,930	1,540	8,020	3,240	280	2,450	1,580	68	290
29-----	2,200	1,500	8,910	3,420	245	2,260	1,430	62	239
30-----	2,260	1,410	8,600	3,540	262	2,500	1,280	36	124
31-----	--	--	--	3,660	282	2,790	--	--	--
Total-	32,010	--	53,345	114,600	--	263,290	104,430	--	80,305
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-----	1,250	42	142	460	650	807	686	353	654
2-----	1,210	43	140	820	880	1,950	664	154	276
3-----	1,170	93	294	1,050	1,060	3,010	620	76	127
4-----	1,090	85	250	1,250	5,020	s 18,300	555	67	100
5-----	1,050	57	162	1,090	900	2,650	515	49	68
6-----	1,130	66	201	1,020	493	1,360	480	50	65
7-----	1,370	232	s 927	980	510	1,350	452	42	51
8-----	1,460	366	1,440	910	170	418	434	39	46
9-----	1,460	271	s 1,270	850	135	310	416	58	65
10-----	1,370	565	2,090	820	136	301	388	56	59
11-----	1,200	577	1,870	910	139	342	375	36	36
12-----	1,240	570	1,910	910	227	558	380	36	a 37
13-----	1,200	149	483	910	223	548	411	141	156
14-----	1,100	218	647	945	218	556	388	88	92
15-----	1,000	69	186	850	158	363	375	68	69
16-----	940	68	a 173	910	133	327	375	49	50
17-----	900	67	163	880	192	470	375	28	28
18-----	750	72	146	850	206	473	375	50	51
19-----	650	65	114	850	161	369	367	53	53
20-----	600	67	109	850	142	326	359	41	40
21-----	550	148	220	880	211	501	367	37	37
22-----	490	44	58	945	330	842	460	90	112
23-----	495	1,680	s 2,680	880	448	1,060	452	58	71
24-----	447	2,560	3,090	880	409	972	447	39	47
25-----	411	217	241	790	320	683	434	37	43
26-----	393	64	68	719	220	a 430	456	40	49
27-----	388	55	58	587	145	230	475	46	59
28-----	591	2,260	s 5,860	626	137	232	460	46	57
29-----	480	3,000	3,890	766	528	1,090	434	80	94
30-----	398	280	301	697	310	583	424	73	84
31-----	388	290	304	653	272	480	--	--	--
Total-	27,171	--	29,487	26,538	--	41,891	13,399	--	2,776
Total discharge for year (cfs-days)									391,879
Total load for year (tons)									499,299

s Computed by subdividing day.

a Computed from estimated concentration graph.

RIO GRANDE BASIN--Continued  
RIO GRANDE AT EMBUDO, N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1951 to September 1952  
(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date of collection	Time	Water 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 1, 1952	9:15 a. m.	1,960		512	2,010	--	21	--	29	--	45	56	68		88	SPWCM
May 8	3:05 p. m.	5,340		873	3,110	--	25	--	34	--	51	63	75		90	SPWCM
May 8	10:35 p. m.	8,720		3,240	1,960	13	14	18	23	34	53	72	80		100	SPWCM
May 9	4:35 a. m.	5,560		1,610	1,660	16	19	25	29	34	46	62	78		91	SPWCM

## RIO GRANDE BASIN--Continued

## RIO CHAMA NEAR ABIQUIU, N. MEX.

LOCATION--At gaging station at bridge on State Highway 96, in Juan Jose Lobato Grant, 1 3/4 miles upstream from El Rito Creek, 5 miles downstream from Abiquiu, Rio Arriba County, and 13.5 miles downstream from Abiquiu dam site.

DRAINAGE AREA--2,170 square miles, approximately.

RECORDS AVAILABLE.--Sediment records: January 1948 to September 1952.

EXTREMES, 1951-52.--Sediment concentrations: Maximum daily, 34,200 ppm March 17; minimum daily, 57 ppm Oct. 1, 23.

Sediment loads: Maximum daily, 113,000 tons July 28; minimum daily, less than 0.5 ton Oct. 1.

EXTREMES, 1948-52.--Sediment concentrations: Maximum daily, 36,300 ppm Aug. 8, 1949; minimum daily, 3 ppm March 30, 1951.

Sediment loads: Maximum daily, 113,000 tons July 28, 1952; minimum daily, less than 0.5 ton on many days.

REMARKS.--Stage-discharge relation affected by ice Nov. 15-17, Dec. 7-12, 14-18, 20-23, 26-28. Records of discharge for water year October 1951 to September 1952 given in Water-Supply Paper 1242.

## Suspended sediment, water year October 1951 to September 1952

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-----	1.7	57	(t)	34	190	a 17	50	190	26
2-----	2.4	104	1	49	260	a 34	52	140	20
3-----	2.8	95	1	49	200	26	54	216	31
4-----	2.2	113	1	38	222	23	45	253	31
5-----	4.1	74	1	32	180	a 16	44	300	36
6-----	5.3	78	1	32	178	15	44	245	29
7-----	7.5	82	2	36	181	19	45	288	36
8-----	8.5	85	a 2	38	203	21	50	185	25
9-----	6.0	90	a 1	35	110	a 10	40	240	26
10-----	5.3	95	1	32	127	11	40	240	26
11-----	7.0	101	2	38	110	11	45	240	29
12-----	8.5	210	5	44	136	16	50	172	23
13-----	8.5	103	2	44	178	21	41	137	15
14-----	10	73	2	50	162	22	35	132	12
15-----	8.5	70	2	50	182	25	40	190	21
16-----	8.0	108	2	45	189	23	50	222	30
17-----	8.0	63	1	40	177	19	50	110	15
18-----	10	81	2	35	147	14	45	178	22
19-----	11	80	2	50	131	18	59	152	24
20-----	12	85	3	60	106	17	45	130	16
21-----	15	118	5	60	111	18	35	149	14
22-----	16	100	4	a 5	93	16	45	163	20
23-----	16	57	2	70	200	38	60	147	24
24-----	14	65	a 2	65	270	47	61	127	21
25-----	16	88	4	60	353	57	63	150	a 26
26-----	18	106	5	45	238	29	60	173	28
27-----	32	237	20	45	212	26	62	223	37
28-----	25	288	19	46	197	24	65	263	46
29-----	32	359	31	45	154	19	67	220	40
30-----	38	208	21	49	154	20	109	1,700	500
31-----	34	170	16	--	--	--	790	21,000	44,800
Total--	393.3	--	163	1,381	--	671	2,341	--	46,049

t Less than 0.50 ton.

a Computed from estimated concentration graph.

## RIO GRANDE BASIN--Continued

## RIO CHAMA NEAR ABIQUIU, N. MEX.--Continued

Suspended sediment, water year October 1951 to September 1952--Continued

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-----	618	6,800	11,300	67	200	36	651	23,800	s 54,600
2-----	433	2,400	2,810	84	445	101	250	8,000	5,400
3-----	160	850	367	69	442	82	118	1,800	573
4-----	118	500	159	69	411	77	-103	1,000	278
5-----	96	800	207	71	350	67	109	1,200	353
6-----	84	1,000	a 227	61	310	51	120	750	243
7-----	81	800	175	61	258	42	118	950	303
8-----	75	375	76	65	240	42	132	3,300	1,180
9-----	89	800	192	61	250	41	398	15,500	s 19,200
10-----	67	320	58	65	209	37	300	14,000	11,300
11-----	71	600	115	81	270	59	300	8,800	7,130
12-----	67	395	71	91	398	98	250	8,750	5,910
13-----	79	470	100	81	533	117	250	5,800	3,920
14-----	91	1,080	265	86	611	142	400	7,300	7,880
15-----	109	1,500	441	77	510	106	300	9,600	7,780
16-----	96	1,350	350	65	578	101	500	17,800	24,000
17-----	93	1,100	276	65	455	80	1,040	34,200	a 112,000
18-----	96	800	207	73	282	56	485	15,100	19,800
19-----	282	7,220	s 6,670	67	279	50	492	14,200	s 21,000
20-----	271	4,700	3,440	56	270	41	426	7,000	8,050
21-----	167	2,900	1,310	63	290	49	349	4,000	3,770
22-----	106	1,000	286	71	248	48	246	1,800	1,200
23-----	81	500	109	71	266	51	160	1,100	475
24-----	96	530	137	77	248	52	153	2,400	991
25-----	93	254	64	73	329	65	139	1,600	600
26-----	89	240	58	61	420	69	192	1,460	767
27-----	77	203	42	67	435	79	367	4,300	4,260
28-----	71	210	40	67	360	65	492	7,680	10,400
29-----	63	196	33	214	3,830	s 3,030	582	12,800	20,100
30-----	59	158	25	--	--	--	339	10,600	s 10,200
31-----	63	155	26	--	--	--	655	10,300	s 18,600
Total--	4,041	--	29,636	2,179	--	4,934	10,416	--	382,063
	April			May			June		
1-----	779	7,200	15,100	1,200	2,200	7,130	2,050	1,870	10,400
2-----	790	4,400	9,390	1,260	1,750	5,950	2,130	2,130	12,200
3-----	814	3,620	7,960	1,360	2,400	8,810	2,270	2,040	12,500
4-----	826	4,120	9,190	1,510	3,800	15,500	2,440	1,880	12,400
5-----	898	4,630	11,200	1,560	4,370	18,400	2,660	1,770	12,700
6-----	962	5,240	13,600	1,610	5,700	24,800	2,660	1,650	11,800
7-----	988	4,180	11,200	1,640	5,350	23,700	2,780	1,310	9,830
8-----	1,100	6,150	18,300	1,630	4,780	21,000	2,660	1,400	10,100
9-----	975	3,300	8,690	800	2,730	s 7,250	2,660	1,210	8,690
10-----	910	1,900	4,670	1,700	5,020	23,000	2,620	1,130	7,990
11-----	936	1,330	3,360	1,710	3,480	16,100	2,570	880	6,110
12-----	886	1,900	4,550	1,710	3,500	16,200	2,480	1,040	6,960
13-----	874	1,830	4,320	1,750	3,570	16,900	2,400	910	5,900
14-----	988	3,630	9,680	1,730	2,800	13,100	2,310	880	5,490
15-----	1,080	4,250	12,400	1,750	2,800	13,200	2,230	870	5,240
16-----	1,100	3,750	11,100	1,770	2,800	13,400	2,150	800	4,640
17-----	1,170	4,080	12,900	1,840	3,230	16,000	2,070	580	3,240
18-----	1,080	3,140	9,160	1,730	2,320	10,800	1,980	550	2,960
19-----	1,070	2,900	8,380	1,730	2,300	10,700	1,920	670	3,470
20-----	1,150	2,630	8,170	1,710	1,730	7,990	1,800	640	3,110
21-----	1,110	2,530	7,580	1,700	1,300	5,970	1,730	505	2,360
22-----	1,080	2,480	7,230	1,700	1,675	7,690	1,660	508	2,280
23-----	1,050	2,500	7,090	1,700	1,540	7,070	1,590	456	1,960
24-----	1,110	2,580	7,730	1,700	1,770	8,120	1,560	458	1,930
25-----	1,120	2,420	7,320	1,710	1,480	6,830	1,560	390	1,640
26-----	1,170	2,750	8,690	1,710	1,570	7,250	1,540	390	1,620
27-----	1,200	2,800	9,070	1,750	1,430	6,760	1,510	340	1,390
28-----	1,320	2,650	9,440	1,750	1,430	6,760	1,510	410	1,670
29-----	1,350	2,960	10,800	1,800	1,290	6,270	1,490	300	1,200
30-----	1,210	2,550	8,330	1,900	1,700	8,720	1,490	330	1,330
31-----	--	--	--	1,990	2,070	11,100	--	--	--
Total--	31,096	--	276,600	51,121	--	372,470	62,490	--	173,110

s Computed by subdividing day.

a Computed from estimated concentration graph.

## RIO GRANDE BASIN--Continued

## RIO CHAMA NEAR ABIQUIU, N. MEX.--Continued

## Suspended sediment, water year October 1951 to September 1952--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-----	1,470	260	1,030	1,490	11,700	47,100	24	263	17
2-----	1,440	250	972	1,390	12,000	45,000	18	238	12
3-----	1,430	380	1,500	1,270	1,600	5,490	17	170	8
4-----	1,430	330	1,270	1,300	3,520	12,400	14	160	6
5-----	1,460	2,000	7,880	1,300	2,330	8,180	13	122	4
6-----	1,440	770	2,990	1,210	1,000	3,270	11	112	3
7-----	1,520	1,910	7,840	1,170	950	3,000	10	87	2
8-----	1,460	2,250	8,870	1,150	800	2,480	9.0	86	2
9-----	1,490	2,010	8,090	1,210	2,490	8,130	7.0	80	2
10-----	1,520	4,260	17,500	1,170	2,980	9,410	6.0	86	1
11-----	1,430	1,000	3,860	1,110	1,990	5,960	7.5	111	2
12-----	1,430	690	2,630	1,110	780	2,340	247	5,980	s 10,900
13-----	1,410	520	1,980	1,120	1,740	5,260	304	2,160	s 2,590
14-----	1,390	580	2,180	1,100	2,300	6,830	179	350	169
15-----	1,390	580	2,180	1,050	1,000	2,840	175	275	130
16-----	1,380	500	1,860	1,030	540	1,500	153	1,200	496
17-----	1,380	530	1,970	1,050	2,470	7,000	96	800	207
18-----	1,380	460	1,710	988	4,820	12,900	73	348	69
19-----	1,350	520	1,900	988	3,600	9,600	45	450	55
20-----	1,330	350	1,260	923	4,510	11,200	35	193	18
21-----	1,320	320	1,140	936	3,960	10,000	32	120	10
22-----	1,320	280	998	975	8,980	23,600	32	95	8
23-----	1,500	3,960	16,000	1,000	10,500	28,400	50	132	18
24-----	1,390	3,430	12,900	649	3,340	s 7,090	36	110	11
25-----	1,410	6,580	25,100	128	1,000	s 293	36	75	7
26-----	1,430	3,000	11,600	50	2,200	297	36	72	7
27-----	1,430	1,700	6,560	42	1,860	211	36	86	8
28-----	2,000	10,400	s 113,000	39	2,060	217	36	77	7
29-----	1,320	16,800	59,900	91	7,500	1,840	32	122	11
30-----	1,300	2,760	9,680	81	6,790	1,480	25	68	5
31-----	1,350	3,400	12,400	39	700	74	--	--	--
Total-	44,300	--	348,760	27,159	--	263,392	1,794.5	--	14,785
Total discharge for year (cfs-days) .....									238,711.8
Total load for year (tons) .....									1,932,633

s Computed by subdividing day.

RIO GRANDE BASIN--Continued  
RIO CHAMA NEAR ABIQUIU, N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1951 to September 1952  
(Methods of analysis: B, bottom withdrawal tube; D, decantation; F, pipettes; S, sieve; N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date of collection	Time	Water 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
Nov. 20, 1951.....	3:50 p. m.	49		94	453	71	90	91	91	93	96	98	99	100	SBWCM
Dec. 1.....	2:45 p. m.	71		146	1,110	73	82	90	95	96	97	98	99	100	SBWCM
Dec. 10.....	3:15 p. m.	52		141	799	79	81	92	95	96	98	99	100	100	SBWCM
Dec. 20.....	3:10 p. m.	52		883	69	79	75	84	88	92	96	96	97	100	SBWCM
Jan. 1, 1952.....	3:10 p. m.	565		124	4,260	--	61	--	91	--	91	95	98	100	SBWCM
Jan. 8.....	3:40 p. m.	86		253	1,890	--	51	--	73	--	99	99	100	100	SBWCM
Jan. 20.....	4:30 p. m.	241		3,090	3,080	58	73	77	79	84	99	99	100	100	SBWCM
Jan. 20.....	4:30 p. m.	241		3,090	2,790	4	13	80	92	98	99	99	100	--	SPN
Feb. 1.....	3:45 p. m.	63		120	861	83	83	90	93	95	97	98	99	100	SBWCM
Feb. 20.....	2:40 p. m.	67		271	2,390	--	55	--	89	--	94	96	99	100	SPWCM
Mar. 1.....	11:15 a. m.	737		28,300	4,400	--	55	--	80	--	95	97	99	100	SPWCM
Mar. 20.....	7:30 a. m.	470		9,680	4,380	--	62	--	85	--	95	98	99	100	SPWCM
Apr. 1.....	6:30 a. m.	802		9,170	2,770	--	59	--	77	--	94	96	99	100	SPWCM
Apr. 1.....	6:30 a. m.	802		9,170	2,260	49	61	74	84	90	92	97	99	100	SPWCM
Apr. 10.....	6:30 a. m.	962		2,160	3,220	--	41	--	50	--	55	82	93	100	SPWCM
Apr. 20.....	8:30 a. m.	1,120		3,260	3,120	--	34	--	43	--	60	85	95	99	SPWCM
May 1.....	7:00 a. m.	1,210		2,650	2,970	--	20	--	25	--	41	67	89	99	SPWCM
May 10.....	7:30 a. m.	1,790		5,310	5,070	--	21	--	31	--	56	84	97	100	SPWCM
May 20.....	8:30 a. m.	1,750		1,360	4,040	--	16	--	21	--	38	58	83	98	SPWCM
June 1.....	9:15 a. m.	2,010		1,450	3,050	--	19	--	26	--	51	67	83	99	SPWCM
June 1.....	9:15 a. m.	2,010		1,450	3,140	--	13	--	23	--	51	67	83	99	SPN
July 1.....	9:15 a. m.	1,490		223	--	--	--	--	--	--	22	38	74	97	S
July 10.....	8:15 a. m.	1,430		4,690	3,450	--	24	--	48	--	80	89	94	99	SPWCM
July 20.....	8:15 a. m.	1,430		4,690	3,040	--	23	--	54	--	80	89	94	99	SPN
July 20.....	9:15 a. m.	1,360		327	--	--	--	--	--	--	26	41	70	96	S
July 23.....	2:10 p. m.	1,350		363	--	--	--	--	--	--	21	33	54	84	S
Aug. 10.....	8:30 a. m.	1,110		1,340	2,230	--	19	--	27	--	57	84	95	99	SPWCM
Aug. 20.....	9:45 a. m.	874		2,240	5,830	--	21	--	36	--	81	98	100	--	SPWCM
Sept. 13.....	9:30 a. m.	266		1,350	5,230	--	74	--	94	--	99	100	--	--	SPWCM

## RIO GRANDE BASIN--Continued

## RIO CHAMA NEAR CHAMITA, N. MEX.

LOCATION.--At gaging station 200 feet downstream from Espanola-Ojo Caliente highway bridge, 2½ miles upstream from mouth, and 2½ miles northwest of Chamita, Rio Arriba County.

DRAINAGE AREA.--3,200 square miles, approximately.

RECORDS AVAILABLE.--Water temperatures: October 1950 to September 1952.

Sediment records: October 1947 to September 1952.

EXTREMES, 1951-52.--Water temperatures: Maximum observed, 78°F Aug. 15, Sept. 3, 4, 8;

minimum, freezing point on several days during winter months.

Sediment concentrations: Maximum daily, 30,400 ppm Mar. 17; minimum daily, no flow Oct. 18.

Sediment loads: Maximum daily, 139,000 tons Mar. 17; minimum daily, 0 ton Oct. 18.

EXTREMES, 1947-52.--Water temperatures (1950-52): Maximum observed, 89°F July 19, 1951; minimum, freezing point on many days during winter months.

Sediment concentrations: Maximum daily, 40,100 ppm Aug. 3, 1950; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 139,000 tons Mar. 17, 1952; minimum daily, 0 ton on many days.

REMARKS.--Flow affected by ice Nov. 17-19, 24-30, Dec. 20-23, 25-28. Records of discharge for water year October 1951 to September 1952 given in Water-Supply Paper 1242.

Temperature (°F) of water, water year October 1951 to September 1952  
/Once-daily temperature 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	a54	50	45	40	48	38	55	a54	57	67	76	a68
2	61	40	41	40	42	37	45	a54	a53	71	a69	71
3	a55	a33	41	33	39	43	56	a57	a54	66	a70	78
4	a49	a37	43	32	41	42	57	61	a55	a64	a68	78
5	a58	a42	39	32	40	a40	57	64	a55	67	74	76
6	a55	a34	33	--	37	50	a49	b56	a60	66	75	77
7	a56	47	32	34	45	48	58	61	66	60	75	74
8	a43	45	33	42	41	44	55	59	67	66	72	78
9	a44	46	33	37	36	a40	51	56	67	a65	68	77
10	a44	a39	32	34	a32	43	41	58	a60	68	73	75
11	a45	41	32	39	a38	a39	52	a51	68	64	72	73
12	a50	a37	32	32	43	40	a48	62	a60	72	a70	70
13	63	47	34	38	41	38	58	63	a58	70	a69	68
14	57	47	38	a32	39	--	a49	64	68	a65	69	a58
15	66	44	37	39	46	a36	58	a54	a57	66	78	67
16	63	42	35	36	33	48	57	57	a61	67	75	71
17	61	41	34	40	37	40	a51	a44	66	70	68	a60
18	63	41	34	44	43	45	53	a51	66	b67	70	74
19	61	a32	32	43	43	49	a48	58	66	70	a67	74
20	63	43	32	40	41	45	50	56	66	73	71	--
21	a51	45	32	32	a34	46	50	57	68	73	a71	56
22	a45	43	34	a32	45	36	a46	54	68	a68	70	a56
23	a48	48	32	a33	43	37	a52	59	65	75	a71	74
24	53	40	a32	40	40	46	a54	60	68	a69	71	74
25	49	43	--	41	45	47	a52	a57	68	73	a66	72
26	a51	44	34	43	44	51	a52	59	67	b70	74	74
27	52	35	36	36	47	55	a53	62	a62	b71	a65	73
28	50	a32	36	43	51	55	56	63	68	71	72	72
29	56	44	34	44	51	a45	56	a56	65	72	a65	71
30	50	44	44	45	--	a44	56	a56	69	a65	76	a56
31	53	--	36	46	--	a43	--	a54	--	73	71	--
Average	54	42	35	38	42	44	52	57	63	69	71	71

a Observations made before 11:00 a. m.

b Observations made after 6:00 p. m.

## WESTERN GULF OF MEXICO BASINS

## RIO GRANDE BASIN--Continued

## RIO CHAMA NEAR CHAMITA, N. MEX.--Continued

Suspended Sediment, water year October 1951 to September 1952

Day	October			November			December		
	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-----	0.3	35	(t)	34	388	36	73	1,180	233
2-----	.3	28	(t)	42	680	77	73	1,060	209
3-----	.3	22	(t)	40	350	38	57	1,070	165
4-----	.6	16	(t)	42	615	70	64	1,290	223
5-----	.9	26	(t)	40	370	40	64	1,410	244
6-----	.9	17	(t)	35	668	63	37	1,280	128
7-----	1.2	19	(t)	35	698	66	42	1,420	161
8-----	2.0	34	(t)	42	761	86	57	1,850	285
9-----	3.0	31	(t)	44	722	86	53	2,180	312
10-----	2.6	38	(t)	37	540	54	35	1,720	163
11-----	1.6	38	(t)	37	627	63	46	1,350	168
12-----	1.6	28	(t)	40	650	70	66	1,490	266
13-----	1.6	23	(t)	40	1,090	118	86	1,900	441
14-----	.9	14	(t)	35	1,200	113	62	1,400	234
15-----	1.6	25	(t)	46	1,590	197	49	1,000	132
16-----	2.3	19	(t)	44	1,860	221	64	1,990	344
17-----	1.6	26	(t)	48	1,060	137	62	2,350	393
18-----	0	--	0	40	860	93	49	1,850	245
19-----	.9	41	(t)	37	1,320	132	62	1,880	315
20-----	3.0	40	(t)	64	1,210	209	70	1,610	304
21-----	3.7	114	1	57	1,250	192	40	1,400	151
22-----	4.4	115	1	62	1,440	241	50	1,490	201
23-----	5.7	173	3	71	1,010	194	55	1,380	205
24-----	6.4	215	4	87	1,940	456	71	1,210	232
25-----	7.7	432	9	72	1,500	292	65	1,400	a 246
26-----	18	474	23	52	1,050	147	65	1,700	298
27-----	18	542	26	50	1,140	154	70	1,690	319
28-----	29	494	39	50	1,320	178	80	1,340	289
29-----	34	422	39	50	1,610	217	99	1,330	356
30-----	35	493	47	54	1,470	214	124	2,750	921
31-----	34	382	35	--	--	--	460	17,100	s 24,400
Total-	223.1	--	229	1,427	--	4,254	2,350	--	32,583
Day	January			February			March		
	Mean dis-charge (cfs)	Mean concen-tration (ppm)	Tons per day	Mean dis-charge (cfs)	Mean concen-tration (ppm)	Tons per day	Mean dis-charge (cfs)	Mean concen-tration (ppm)	Tons per day
1-----	472	11,500	14,700	118	722	230	596	22,900	s 41,300
2-----	388	5,350	5,600	121	1,150	376	260	12,900	9,750
3-----	166	2,700	1,210	126	1,210	418	170	4,400	2,020
4-----	134	1,490	539	115	1,250	388	121	2,350	768
5-----	118	1,510	481	115	1,100	342	134	2,000	724
6-----	105	1,400	a 397	115	856	266	152	2,200	903
7-----	112	1,270	384	115	1,110	345	156	1,500	632
8-----	115	800	248	115	1,070	332	166	2,100	941
9-----	112	990	299	118	1,300	414	364	10,900	s 14,300
10-----	88	1,090	259	118	974	310	346	14,300	13,400
11-----	91	1,230	302	134	1,450	525	310	9,780	8,190
12-----	97	1,070	280	141	1,900	723	340	11,100	10,200
13-----	124	1,250	418	136	1,750	652	198	6,620	3,540
14-----	163	2,610	1,150	125	1,650	567	338	8,980	s 9,240
15-----	152	1,980	813	120	1,550	502	340	9,900	9,090
16-----	131	1,900	672	120	1,930	625	477	15,800	s 25,800
17-----	131	1,330	470	128	1,530	529	1,500	30,400	s 139,000
18-----	156	1,000	421	138	1,390	518	1,070	20,200	58,400
19-----	240	3,270	2,120	131	1,340	474	840	10,000	22,700
20-----	270	7,100	5,180	115	1,150	357	860	9,800	22,800
21-----	202	3,300	1,800	128	1,150	397	652	9,250	18,300
22-----	170	1,500	688	134	1,400	507	472	4,450	5,670
23-----	138	1,500	559	138	1,350	503	358	2,900	2,800
24-----	131	1,100	389	150	1,390	563	352	3,550	3,370
25-----	131	784	277	140	1,200	454	334	3,660	3,300
26-----	134	1,020	369	138	1,150	428	352	3,200	3,040
27-----	138	698	259	156	1,060	446	451	4,000	4,870
28-----	131	600	212	159	1,080	464	596	9,400	15,100
29-----	131	681	241	220	6,160	3,660	705	10,900	20,700
30-----	108	950	277	--	--	--	669	10,400	18,800
31-----	118	890	284	--	--	--	744	9,800	19,700
Total-	4,897	--	41,298	3,631	--	16,305	14,443	--	507,348

s Computed by subdividing day.

t Discharge less than 0.50 ton.

a Computed from estimated concentration graph.



## RIO GRANDE BASIN--Continued

## RIO CHAMA NEAR CHAMITA, N. MEX.--Continued

Suspended sediment, water year October 1951 to September 1952--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-----	973	10,200	26,800	1,780	5,220	25,100	2,280	2,400	14,800
2-----	1,020	8,450	17,800	2,200	4,500	26,700	2,380	2,440	15,500
3-----	1,140	6,130	18,900	2,650	6,180	43,900	2,630	3,500	24,900
4-----	1,140	5,750	17,700	2,900	7,490	58,600	2,720	3,860	28,300
5-----	1,270	7,220	24,600	3,100	7,400	61,900	2,810	2,960	22,500
6-----	1,540	8,840	36,800	3,290	8,280	73,600	2,720	2,440	17,900
7-----	1,590	6,310	27,100	3,190	9,650	83,100	2,810	2,360	17,900
8-----	1,860	7,620	38,300	2,900	7,900	61,900	2,810	2,860	21,700
9-----	1,610	4,840	21,000	2,190	6,810	44,900	2,720	2,180	16,000
10-----	1,380	3,510	13,100	2,170	6,850	40,900	2,630	2,330	16,500
11-----	1,340	3,360	12,200	2,200	6,400	38,000	2,720	1,880	13,800
12-----	1,270	3,290	11,300	2,200	6,150	36,500	2,630	2,220	15,800
13-----	1,240	3,300	11,000	2,280	3,840	23,600	2,450	2,020	13,400
14-----	1,350	3,970	14,500	2,280	3,980	24,500	2,360	1,520	9,690
15-----	1,590	5,000	21,500	2,280	4,040	24,900	2,200	1,560	9,270
16-----	1,750	5,700	26,900	2,280	3,910	24,100	2,020	1,770	9,650
17-----	1,960	5,090	26,800	2,630	5,100	36,200	1,940	1,800	9,430
18-----	1,840	4,000	19,900	2,280	4,030	24,800	1,880	1,950	9,790
19-----	1,780	3,750	18,000	2,200	3,230	19,200	1,770	1,400	6,690
20-----	2,100	4,510	25,600	2,070	2,750	15,400	1,680	1,420	6,440
21-----	2,010	4,080	22,100	2,020	2,950	16,100	1,610	1,050	4,560
22-----	1,800	3,830	18,600	1,980	3,110	16,600	1,590	1,350	5,800
23-----	1,610	3,500	15,200	1,920	2,300	11,900	1,500	1,450	5,870
24-----	1,710	3,600	16,600	1,860	2,400	12,100	1,440	1,070	4,160
25-----	1,940	4,200	22,000	1,860	2,400	12,100	1,450	806	3,160
26-----	2,090	4,290	24,200	1,860	2,640	13,300	1,440	750	2,920
27-----	2,280	5,030	31,000	1,940	2,200	11,500	1,460	1,150	4,530
28-----	2,630	5,320	37,800	1,930	2,000	10,400	1,440	1,350	5,250
29-----	2,100	4,580	26,000	1,940	2,200	11,500	1,480	1,050	4,200
30-----	1,710	3,600	16,600	2,120	2,960	16,900	1,440	940	3,650
31-----	--	--	--	2,280	2,840	17,500	--	--	--
Total-	49,623	--	660,100	70,760	--	937,700	62,970	--	344,060

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-----	1,430	849	3,280	1,380	7,650	28,500	55	500	74
2-----	1,460	855	3,370	1,350	12,100	44,100	42	256	29
3-----	1,540	1,730	7,190	1,270	3,380	11,600	35	162	15
4-----	1,500	1,300	5,260	1,230	2,050	6,810	31	111	9
5-----	1,540	1,270	5,280	1,210	1,930	6,310	29	100	8
6-----	1,540	3,080	12,800	1,170	1,370	4,330	27	87	6
7-----	1,700	5,350	27,200	1,150	1,440	4,470	19	81	4
8-----	1,590	2,830	12,100	1,140	1,680	5,170	17	30	1
9-----	1,500	2,500	10,100	1,170	4,180	13,100	14	31	1
10-----	1,660	6,030	27,000	1,130	3,650	11,100	9.0	28	1
11-----	1,500	1,900	7,700	1,100	2,300	6,830	8.4	61	1
12-----	1,460	1,400	5,520	1,080	1,800	5,250	41	954	s 542
13-----	1,460	1,400	5,520	1,130	4,650	14,200	475	5,980	s 9,310
14-----	1,460	1,400	5,520	1,080	7,880	22,900	170	1,100	505
15-----	1,430	1,200	4,630	1,060	2,500	7,160	156	286	120
16-----	1,380	1,320	4,920	1,010	1,700	4,640	141	319	121
17-----	1,360	1,800	6,610	1,020	1,500	4,130	102	292	80
18-----	1,390	1,400	5,250	1,010	2,300	6,270	71	161	31
19-----	1,400	1,020	3,860	1,010	6,300	17,200	53	248	35
20-----	1,400	1,050	3,970	1,020	6,900	19,000	29	98	8
21-----	1,380	772	2,880	995	4,100	11,000	24	112	7
22-----	1,340	699	2,530	1,050	11,700	33,200	34	87	8
23-----	1,520	2,610	s 11,900	1,040	7,240	20,300	35	51	5
24-----	1,360	3,450	12,700	910	13,000	31,900	40	83	9
25-----	1,300	7,960	s 30,800	322	2,400	s 1,810	28	35	3
26-----	1,410	6,400	24,400	138	7,920	2,950	20	27	1
27-----	1,350	2,000	7,290	121	1,680	549	21	38	2
28-----	1,880	9,340	s 94,500	91	869	164	24	43	3
29-----	1,640	21,100	s 99,200	118	604	192	24	45	3
30-----	1,340	5,430	19,600	105	750	213	24	43	3
31-----	1,330	4,900	17,600	73	1,300	256	--	--	--
Total-	45,550	--	490,480	27,683	--	345,604	1,798.4	--	10,945

Total discharge for year (cfs-days) ..... 285,555.5  
 Total load for year (tons) ..... 3,390,906

s Computed by subdividing day.

## RIO GRANDE BASIN--Continued

## RIO CHAMA NEAR CHAMITA, N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1951 to September 1952  
(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date of collection	Time	Water discharge (cfs)	Water temperature (° F)	Suspended sediment											Methods of analysis		
				Concentration of sample (ppm)	Concentration of suspension analysed (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. 10, 1951	8:10 a.m.	4.0		41	--	--	--	--	--	--	24	41	65		92	--	S
Nov. 1	8:15 a.m.	32		388	1,060	37	38	41	45	49	53	81	97		100	--	SBWCM
Nov. 10	10:30 a.m.	40		413	921	33	38	37	39	41	44	67	95		99	--	SBWCM
Nov. 20	4:30 p.m.	68		1,010	1,220	14	17	18	20	22	24	45	86		100	--	SBWCM
Dec. 1	1:45 p.m.	73		1,160	1,190	11	12	14	16	18	20	34	74		98	--	SBWCM
Dec. 10	4:10 p.m.	40		--	764	4	4	6	8	10	12	29	80		99	--	SBWCM
Dec. 20	4:00 p.m.	70		1,270	1,150	10	12	13	14	16	18	31	66		99	--	SBWCM
Jan. 1, 1952	4:00 p.m.	458		9,270	4,300	--	51	--	69	--	79	83	95		100	--	SPWCM
Jan. 8	3:00 p.m.	118		--	1,340	32	35	39	41	45	47	58	86		100	--	SPWCM
Jan. 20	3:30 p.m.	240		6,740	2,840	51	59	64	69	72	78	82	94		100	--	SPWCM
Jan. 20	3:30 p.m.	240		6,740	2,890	4	9	61	75	77	78	82	94		100	--	SPWCM
Jan. 20	3:30 p.m.	240		6,740	2,330	54	63	71	74	77	78	82	94		100	--	SPWCM
Jan. 20	3:30 p.m.	240		6,740	2,280	6	6	21	74	77	78	82	94		100	--	SEN
Feb. 1	2:55 p.m.	115		783	1,070	11	12	14	15	16	19	26	57		97	--	SPWCM
Feb. 10	9:40 a.m.	118		1,100	695	--	5	--	6	--	7	12	42		99	--	SPWCM
Feb. 20	4:00 p.m.	108		540	888	--	12	--	15	--	17	22	47		98	--	SPWCM
Mar. 1	4:45 p.m.	620		25,500	4,110	28	43	59	78	89	91	94	99		100	--	SPWCM
Mar. 1	4:45 p.m.	620		25,500	4,860	2	11	45	77	88	91	94	99		100	--	SPN
Mar. 1	4:45 p.m.	620		25,500	3,830	41	53	66	78	87	91	94	99		100	--	SBWCM
Mar. 1	4:45 p.m.	620		25,500	4,580	5	6	20	83	89	91	94	99		100	--	SEN
Mar. 10	1:30 p.m.	486		15,300	4,590	--	58	--	75	--	87	91	98		100	--	SPWCM
Mar. 20	3:15 p.m.	920		11,600	4,370	--	57	--	74	--	87	91	98		100	--	SPWCM
Apr. 1	3:10 p.m.	984		8,860	4,930	--	52	--	66	--	79	85	96		100	--	SPWCM
Apr. 10	1:50 p.m.	1,360		3,810	4,920	--	18	--	24	--	36	50	80		100	--	SPWCM
Apr. 20	3:25 p.m.	2,200		4,440	2,480	--	11	--	21	--	33	52	80		96	99	SPWCM
Apr. 20	3:25 p.m.	2,200		4,440	2,730	--	12	--	20	--	33	52	80		96	99	SPN

May 1, 1952	10:20 a. m.	1,870	4,190	4,170	--	11	--	15	--	24	44	82	99	--	SPWCM
May 10	8:35 a. m.	2,360	7,090	2,760	--	16	--	23	--	10	50	89	99	--	SPWCM
May 20	8:00 p. m.	2,260	2,970	2,700	--	7	--	13	--	16	32	89	99	--	SPWCM
May 30	8:00 p. m.	2,260	2,970	4,190	--	8	--	13	--	25	41	73	97	--	SPWCM
June 10	6:40 a. m.	2,630	2,140	1,900	--	8	--	11	--	20	35	74	97	99	SPWCM
June 20	6:40 a. m.	2,630	2,140	1,960	--	6	--	11	--	20	35	74	97	99	SPN
June 30	5:25 p. m.	1,730	1,250	--	--	--	--	--	--	17	28	70	97	--	S
July 1	3:05 p. m.	1,440	872	--	--	--	--	--	--	14	23	64	96	--	S
July 10	7:20 a. m.	1,730	8,230	2,680	--	45	--	66	--	81	88	94	99	100	SPWCM
July 20	7:20 a. m.	1,730	8,230	3,020	--	25	--	62	--	81	88	94	99	100	SPN
July 30	2:00 p. m.	1,390	724	--	--	--	--	--	--	8	28	73	96	--	S
July 23	12:25 p. m.	1,270	965	--	--	--	--	--	--	11	25	62	91	--	S
Aug. 1	2:10 p. m.	1,400	10,100	5,080	--	61	--	79	--	90	94	98	100	--	SPWCM
Aug. 10	5:50 p. m.	1,070	1,950	4,100	--	20	--	46	--	50	65	80	95	100	SPWCM
Aug. 19	7:30 a. m.	1,020	5,950	4,760	--	41	--	68	--	83	88	94	99	100	SPWCM
Aug. 20	8:30 a. m.	1,020	5,820	4,890	--	52	--	72	--	82	87	94	99	100	SPWCM
Sept. 1	10:40 a. m.	57	466	3,830	--	91	--	99	--	100	--	--	--	--	SPWCM
Sept. 13	2:25 p. m.	388	3,180	5,060	--	63	--	86	--	95	97	98	100	--	SPWCM

## 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 (now removed), 400 feet downstream from bridge on State Highway 4, 1 3/4 miles southwest of San Ildefonso Pueblo, San Ildefonso Pueblo Grant 2 1/2 miles downstream from Rio Pojoaque, 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 northern part of San Luis Valley, Colo.). RECORDS AVAILABLE.--Chemical analyses: October 1946 to September 1952.

Water temperatures: October 1948 to September 1952.

Sediment records: October 1947 to September 1952.

EXTREMES, 1951-52.--Dissolved solids: Maximum, 583 ppm Sept. 13; minimum, 137 ppm June 11-20.

Hardness: Maximum, 348 ppm Sept. 13; minimum, 86 ppm June 11-20.

Specific conductance: Maximum observed, 861 micromhos Sept. 13; minimum observed, 165 micromhos June 13.

Water temperatures: Maximum observed, 77°F Aug. 16, 20, minimum, freezing point on several days in December.

Sediment concentrations: Maximum daily, 20,700 ppm March 17; minimum daily, 111 ppm Sept. 21.

Sediment loads: Maximum daily, 132,000 tons March 17; minimum daily, 108 tons Sept. 21.

EXTREMES, 1946-52.--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 observed, 1,230 micromhos Aug. 26, 1951; minimum observed, 165 micromhos June 13, 1952.

Water temperatures (1948-52): Maximum observed, 84°F July 14, 16, 18, 1951; minimum, freezing point on many days during winter months.

Sediment concentrations (1947-52): Maximum daily, 32,200 ppm July 14, 1950; minimum daily, 23 ppm Oct. 11, 1948.

Sediment loads (1947-52): Maximum daily, 184,000 tons July 14, 1950; minimum daily, 16 tons Oct. 11, 1948.

REMARKS.--Values reported for dissolved solids are sums of determined constituents. Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of discharge for water year October 1951 to September 1952 given in Water-Supply Paper 1242.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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 (sum)		Hardness as CaCO <sub>3</sub>	Percent non-solids	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH or Col.
														Parts per million	Tons per acre-foot	Calcium, magnesium	Carbonate			
Oct. 1-10, 1951.....	204	28		38	7.6	24		187	40	8.0		0.4		221	0.30	122		0.9	388	7.4
Oct. 11-20.....	290	30		39	8.1	25		182	40	8.5		.3		231	.38	137	0	0.9	363	7.4
Oct. 21-31.....	277	28		47	8.0	28		179	53	8.2		.8		262	.54	196	4	1.0	416	7.6
Nov. 1-10.....	297	28		48	9.9	30		177	69	9.8		.8		282	.68	226	16	1.0	437	7.5
Nov. 11-20.....	335	30		47	9.6	29		175	64	11		.6		277	.58	157	14	1.1	437	7.5
Nov. 21-30.....	401	30		48	9.6	31		175	71	11		.7		287	.89	160	16	1.1	449	7.6
Dec. 1-10.....	472	31		48	10	31		177	73	11		.9		292	.40	326	16	1.1	453	7.7
Dec. 11-20.....	414	32		47	10	30		168	68	9.2		1.2		280	.38	357	21	1.0	427	7.6
Dec. 21-30.....	519	29		44	9.3	24		163	54	8.2		1.3		250	.34	350	148	1.0	398	7.6
Dec. 31.....	1,210	21		76	14	32		206	132	7.5		3.2		387	.53	260	247	1.0	552	7.7
Jan. 1-10, 1952.....	691	25		45	10	23		146	77	7.8		1.8		262	.36	489	154	1.0	403	7.9
Jan. 11-20.....	905	23		47	9.2	23		161	66	7.2		2.1		256	.35	626	24	1.0	396	7.7
Jan. 21-31.....	687	24		44	9.4	21		142	70	7.2		1.7		247	.34	458	32	1.0	380	7.8
Feb. 1-10.....	602	27		44	9.9	26		154	68	8.2		1.4		280	.35	423	24	1.0	399	7.7
Feb. 11-20.....	601	25		42	9.4	25		152	63	8.2		.9		248	.34	402	19	1.0	382	7.7
Feb. 21-29.....	603	26		41	9.2	24		145	60	8.2		1.0		240	.33	391	22	1.0	375	7.8

Mar. 1-10, 1952 ..	852	23	51	10	26	160	84	8.0	2.0	283	.38	651	168	37	25	.9	441	7.9
Mar. 11-20 .....	1,207	24	58	12	27	182	109	6.8	2.9	316	.43	1,030	194	62	23	.8	489	8.1
Mar. 21-31 .....	1,075	20	57	12	28	161	104	6.8	2.4	313	.43	908	192	60	24	.9	483	7.8
Apr. 1-10 .....	2,175	22	55	7.0	19	153	72	5.0	5.0	260	.35	1,530	166	40	20	.6	409	7.7
Apr. 11-20 .....	2,523	21	48	4.5	13	146	41	4.0	4.2	208	.28	1,420	138	19	17	.5	332	7.7
Apr. 21-30 .....	3,695	20	44	3.8	11	136	31	3.8	2.9	184	.25	1,840	126	14	16	.4	288	7.6
May 1-10 .....	6,697	24	40	3.3	10	129	23	3.0	2.9	170	.23	3,060	114	8	16	.4	285	7.6
May 11-20 .....	6,681	16	34	4.3	7.8	111	23	2.2	2.0	146	.20	2,650	102	12	14	.3	233	7.4
May 21-31 .....	5,264	22	31	4.8	12	102	34	3.2	1.2	156	.21	2,250	147	64	21	.5	232	7.4
June 1-10 .....	6,779	18	33	4.1	9.8	111	24	2.8	1.0	148	.20	2,710	100	8	18	.4	228	7.4
June 11-20 .....	6,623	19	28	3.8	10	92	27	2.3	1.0	137	.19	2,450	86	10	20	.5	208	7.5
June 21-30 .....	3,513	20	29	4.3	13	97	35	3.2	.5	153	.21	1,450	90	10	24	.6	232	7.5
July 1-10 .....	2,881	20	32	4.8	13	113	33	3.2	.8	164	.22	1,280	100	7	23	.6	231	7.5
July 11-20 .....	2,457	21	34	4.6	14	112	35	3.6	.3	168	.23	1,110	104	12	23	.6	260	7.6
July 21-28, 31, Aug. 1 .....	1,862	22	40	5.6	12	132	36	4.0	.9	186	.25	985	123	15	17	.5	298	7.6
July 29-30, Aug. 2-3 .....	2,220	24	66	10	22	172	103	6.0	2.2	318	.43	1,910	206	64	19	.7	486	7.6
Aug. 4-10 .....	2,129	19	40	6.2	12	126	43	4.2	1.0	187	.25	1,070	126	22	17	.5	303	7.7
Aug. 11-20 .....	1,918	21	42	7.6	14	133	51	4.0	.9	206	.26	1,070	136	27	18	.5	339	7.6
Aug. 21-31 .....	1,339	25	53	7.9	19	156	67	7.0	1.0	257	.35	929	164	36	20	.6	402	7.8
Sept. 1-10 .....	540	30	44	8.4	26	157	60	10	.8	256	.35	373	144	16	28	.9	399	7.7
Sept. 11-12, 14-20 .....	439	22	48	9.8	28	159	79	10	.8	276	.36	327	160	30	28	1.0	437	7.7
Sept. 13 .....	763	28	110	18	55	244	233	18	.7	583	.79	1,200	348	148	26	1.3	861	7.7
Sept. 21-30 .....	465	28	47	9.9	30	160	75	11	.9	281	.38	353	158	27	29	1.0	436	7.8
Weighted average	1,896	21	39	5.6	14	125	42	4.2	1.7	188	0.26	963	120	18	20	0.6	295	--

## RIO GRANDE BASIN--Continued

## RIO GRANDE AT OTOWI BRIDGE NEAR SAN ILDEFONSO, N. MEX.--Continued

Temperature (°F) of water, water year October 1951 to September 1952

/Observations made between 11:00 a. m. and 6:00 p. m./

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

a Observations made before 11:00 a. m.

## RIO GRANDE BASIN--Continued

## RIO GRANDE AT OTOWI BRIDGE NEAR SAN ILDEFONSO, N. MEX.--Continued

Suspended sediment, water year October 1951 to September 1952

Day	October			November			December		
	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-----	195	531	280	294	960	762	406	760	833
2-----	195	508	267	288	930	723	430	900	1,040
3-----	205	478	265	291	1,200	943	435	930	1,090
4-----	203	439	241	291	1,010	794	445	1,140	1,370
5-----	211	465	265	285	910	700	435	1,300	1,530
6-----	205	426	236	288	760	591	435	950	1,120
7-----	205	482	267	297	750	601	380	1,050	1,080
8-----	207	495	277	307	720	597	360	840	862
9-----	205	557	308	314	788	666	425	1,000	1,150
10-----	211	460	273	314	790	670	371	1,450	1,450
11-----	209	333	188	318	800	687	400	575	621
12-----	213	395	227	321	1,150	997	460	940	1,170
13-----	220	470	279	332	1,080	968	480	1,175	1,520
14-----	220	458	272	339	860	787	498	1,400	1,880
15-----	220	453	269	347	1,020	956	490	1,420	1,880
16-----	218	592	348	359	800	775	480	1,120	1,450
17-----	222	421	252	339	800	732	470	1,150	1,460
18-----	225	495	301	332	920	825	460	1,100	1,370
19-----	225	484	294	318	650	558	492	1,080	1,430
20-----	230	484	301	343	710	658	486	1,050	1,380
21-----	230	412	256	359	1,030	998	445	1,100	1,320
22-----	230	523	325	367	1,000	991	411	1,300	1,440
23-----	230	400	248	375	1,020	1,030	476	1,300	1,670
24-----	225	378	230	402	750	814	514	1,550	2,150
25-----	232	479	300	476	1,280	1,650	520	1,300	1,830
26-----	397	12,100	s 24,200	440	860	1,020	520	850	1,190
27-----	304	3,750	3,080	398	600	645	514	960	1,330
28-----	304	2,100	1,720	393	770	817	508	1,140	1,560
29-----	297	1,400	1,120	398	720	774	547	1,560	2,300
30-----	294	1,100	873	398	890	956	732	2,400	4,740
31-----	304	1,050	862	--	--	--	1,210	8,990	s 31,700
Total-	7,291	--	38,624	10,323	--	24,685	15,255	--	76,916
Day	January			February			March		
	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-----	1,200	8,870	28,700	634	790	1,350	1,300	7,750	s 32,900
2-----	1,000	3,850	10,400	646	920	1,600	1,010	7,000	19,100
3-----	800	1,950	4,210	646	730	1,270	746	2,600	5,240
4-----	560	1,630	2,460	598	635	1,030	640	1,100	1,900
5-----	510	1,550	2,130	580	545	853	646	930	1,620
6-----	490	1,500	1,980	569	560	860	676	630	1,150
7-----	558	1,300	1,960	574	594	921	670	720	1,300
8-----	622	1,150	1,930	574	616	955	706	640	1,220
9-----	616	1,100	1,830	592	570	911	988	4,250	s 16,000
10-----	558	1,250	1,880	604	365	595	1,140	6,960	21,400
11-----	542	1,080	1,580	640	470	812	1,050	5,320	15,100
12-----	592	1,350	2,160	664	540	968	1,050	4,700	13,300
13-----	628	1,300	2,200	634	530	907	804	3,000	6,510
14-----	1,000	3,930	10,600	592	510	815	858	3,320	s 8,810
15-----	804	1,900	4,120	856	556	880	928	3,940	9,870
16-----	670	1,600	2,890	574	530	821	1,120	8,340	s 29,300
17-----	646	1,320	2,300	574	485	752	2,100	20,700	s 132,000
18-----	732	1,700	3,360	610	395	651	1,380	14,300	53,300
19-----	1,970	5,330	s 33,800	598	455	735	1,420	10,500	40,300
20-----	1,470	3,750	14,900	536	450	651	1,360	10,400	38,200
21-----	1,030	3,650	10,200	536	445	644	1,270	3,600	12,300
22-----	804	2,160	4,670	598	393	635	1,110	2,250	6,740
23-----	646	1,400	2,440	610	330	544	907	1,750	4,290
24-----	592	1,100	1,760	646	355	619	810	1,860	4,070
25-----	622	1,040	1,750	616	470	782	921	1,970	4,900
26-----	646	1,000	1,740	564	440	670	851	1,790	4,110
27-----	652	940	1,650	503	595	808	949	2,130	5,460
28-----	634	900	1,540	658	750	1,330	1,150	4,000	12,400
29-----	658	850	1,510	694	860	1,610	1,300	5,730	20,100
30-----	640	890	1,430	--	--	--	1,290	5,730	20,000
31-----	634	630	1,080	--	--	--	1,270	4,300	14,700
Total-	23,526	--	165,160	17,450	--	25,979	32,420	--	557,590

s Computed by subdividing day.

## RIO GRANDE BASIN--Continued

## RIO GRANDE AT OTOWI BRIDGE NEAR SAN ILDEFONSO, N. MEX.--Continued

Day	Suspended sediment, water year October 1951 to September 1952--Continued								
	April			May			June		
	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-----	1,650	4,830	21,500	4,110	1,720	19,100	6,080	1,720	28,100
2-----	1,750	3,560	16,800	4,590	2,220	27,500	6,060	1,500	24,500
3-----	1,900	3,520	18,100	5,230	3,160	44,600	6,460	1,450	25,300
4-----	2,000	3,550	19,200	6,250	3,960	66,800	6,880	1,580	29,400
5-----	2,170	4,000	23,400	6,960	4,480	84,200	6,880	1,720	32,000
6-----	2,340	4,130	26,100	7,720	4,300	89,600	7,090	1,530	29,300
7-----	2,520	3,880	26,400	8,370	3,280	74,100	6,880	1,350	25,100
8-----	2,780	4,200	31,500	8,370	3,080	69,600	7,090	1,200	23,000
9-----	2,520	3,720	25,300	8,090	3,720	82,700	7,090	1,320	25,300
10-----	2,120	2,890	16,500	6,880	3,220	59,800	7,300	1,500	29,600
11-----	2,220	2,600	15,800	6,880	2,660	49,400	7,510	1,370	27,800
12-----	2,170	2,480	14,500	6,460	2,330	40,600	7,300	1,520	30,000
13-----	2,060	2,050	11,400	6,060	1,980	32,400	7,300	1,180	23,300
14-----	2,170	2,250	13,200	6,260	1,830	30,900	7,090	1,200	23,000
15-----	2,340	2,900	18,300	6,460	2,070	36,100	6,880	1,120	20,800
16-----	2,580	3,650	25,400	6,670	2,240	40,300	6,880	1,100	20,400
17-----	2,850	3,850	29,600	7,300	2,380	46,900	6,870	1,090	19,600
18-----	2,850	2,790	21,500	6,880	1,800	33,400	6,060	970	15,900
19-----	2,780	2,040	15,300	6,880	2,080	38,600	5,460	1,000	14,700
20-----	3,210	2,500	21,700	6,460	1,860	32,400	5,080	1,030	14,100
21-----	3,440	2,800	26,000	5,860	1,970	31,200	4,710	900	11,400
22-----	3,440	2,400	22,300	5,460	1,600	23,600	4,350	850	9,980
23-----	3,210	2,750	23,800	5,270	1,700	24,200	4,100	905	10,000
24-----	3,140	2,100	17,800	5,080	1,890	25,900	3,760	880	8,930
25-----	3,360	2,320	21,000	4,890	1,730	22,800	3,440	680	6,320
26-----	3,580	2,330	22,500	4,800	1,520	19,700	3,150	670	5,700
27-----	3,810	2,470	25,400	4,890	2,070	27,300	3,010	780	8,340
28-----	4,430	3,350	40,100	5,080	1,880	25,800	2,940	830	6,590
29-----	4,270	2,550	29,400	5,270	1,380	19,600	2,870	870	6,740
30-----	4,270	1,960	22,600	5,660	1,630	24,900	2,800	780	5,900
31-----	--	--	--	5,860	1,820	28,800	--	--	--
Total--	83,930	--	682,200	191,000	--	1,272,800	169,150	--	559,100
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
	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-----	2,800	700	5,290	1,830	7,350	36,300	760	740	1,520
2-----	2,740	590	4,360	2,050	7,450	41,200	708	600	1,150
3-----	2,740	950	7,030	2,290	2,600	16,100	653	600	1,060
4-----	2,740	1,060	7,840	2,350	2,230	14,100	560	340	514
5-----	2,670	680	4,900	2,290	1,750	10,800	520	350	491
6-----	2,740	1,120	8,290	2,170	1,500	8,790	490	300	397
7-----	3,070	3,350	30,000	2,050	1,100	6,090	460	310	385
8-----	3,220	3,280	28,300	1,940	1,000	5,240	447	300	362
9-----	2,940	1,200	9,530	2,050	2,100	11,800	418	210	237
10-----	3,150	4,680	38,400	2,050	1,900	10,500	386	150	156
11-----	2,870	3,610	28,000	2,160	3,140	19,600	359	170	165
12-----	2,670	990	7,140	2,000	2,050	11,100	359	195	189
13-----	2,600	1,020	7,180	1,940	1,750	9,170	763	4,950	12,000
14-----	2,670	1,800	13,000	2,000	5,050	27,300	524	1,200	1,700
15-----	2,600	8,490	59,600	1,880	2,130	10,900	501	400	541
16-----	2,420	1,400	9,150	1,830	1,300	6,420	496	340	455
17-----	2,350	1,000	6,340	1,830	1,250	6,180	478	350	452
18-----	2,230	800	4,820	1,830	2,320	11,500	438	200	237
19-----	2,110	700	3,990	1,830	2,560	12,600	418	140	158
20-----	2,050	750	4,150	1,880	2,100	10,700	382	117	121
21-----	1,940	800	4,190	1,940	2,940	15,400	359	111	108
22-----	1,830	700	3,460	2,430	7,340	56,800	473	310	396
23-----	2,020	7,180	59,100	1,940	7,580	39,700	478	445	574
24-----	2,000	9,130	49,300	1,830	6,300	31,100	487	240	318
25-----	1,830	2,260	11,200	1,270	2,400	8,230	469	195	247
26-----	1,880	2,790	14,200	940	1,300	3,300	464	225	282
27-----	1,720	1,440	6,690	809	610	1,330	491	182	241
28-----	1,790	2,120	12,100	740	820	1,640	496	180	241
29-----	2,760	14,000	113,000	1,130	4,410	15,100	478	190	245
30-----	1,780	5,200	25,000	900	1,700	4,130	456	153	188
31-----	1,780	2,750	13,200	802	1,650	3,570	--	--	--
Total--	74,710	--	598,730	54,981	--	468,490	14,771	--	25,128

Total discharge for year (cfs-days) ..... 694,807  
 Total load for year (tons) ..... 4,473,402

s Computed by subdividing day.



RIO GRANDE BASIN--Continued

RIO GRANDE AT OTOWI BRIDGE NEAR SAN ILDEFONSO, N. MEX.--Continued

Particle size analyses of suspended sediment, water year October 1951 to September 1952

(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water;

W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date of collection	Time	Water 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. 1, 1951	4:20 p. m.	197		523	--	--	--	--	--	--	10	53	91		100	--	S
Oct. 10	4:20 p. m.	209		405	--	--	--	--	--	--	14	44	87		99	--	S
Oct. 20	4:30 p. m.	228		417	--	--	--	--	--	--	7	28	75		99	--	S
Nov. 1	9:15 a. m.	294		936	--	--	--	--	--	--	24	62	92		100	--	S
Nov. 10	2:30 p. m.	310		798	--	--	--	--	--	--	17	62	97		100	--	S
Nov. 20	12:40 p. m.	335		675	289	3	3	4	4	5	8	33	81		100	--	SBWCM
Dec. 1	10:30 a. m.	402		755	--	--	--	--	--	--	6	16	97		100	--	S
Dec. 10	12:20 p. m.	335		--	--	--	--	--	--	--	16	31	82		99	--	S
Dec. 20	1:30 p. m.	488		1,120	--	--	--	--	--	--	8	20	58		99	--	S
Jan. 1, 1952	2:00 p. m.	1,150		6,810	1,540	--	54	--	59	--	76	84	96		99	--	SPWCM
Jan. 8	12:30 p. m.	586		1,030	989	8	10	10	12	14	18	36	78		98	--	SBWCM
Jan. 20	10:35 a. m.	1,520		3,810	3,810	30	40	46	52	55	59	72	93		99	--	SPWCM
Jan. 20	10:35 a. m.	1,520		3,510	3,830	31	40	46	53	55	59	72	93		99	--	SBWCM
Feb. 1	12:15 p. m.	604		--	877	4	5	6	7	9	11	15	30		71	--	SBWCM
Feb. 20	11:50 a. m.	547		--	--	--	--	--	--	--	17	26	46		76	--	S
Mar. 1	3:20 p. m.	1,930		13,300	2,360	39	47	57	72	80	87	92	96		98	--	SPWCM
Mar. 1	3:20 p. m.	1,930		13,300	2,370	2	21	30	70	82	87	92	96		98	--	SPN
Mar. 1	3:20 p. m.	1,930		13,300	1,900	41	50	59	73	80	87	92	96		98	--	SBWCM
Mar. 1	3:20 p. m.	1,930		13,300	2,230	9	10	31	75	84	87	92	96		98	--	SPN
Mar. 10	9:20 a. m.	942		5,120	4,230	59	--	--	77	--	83	88	97		100	--	SPWCM
Mar. 20	11:50 a. m.	1,260		8,120	3,100	--	62	--	78	--	85	89	96		100	--	SPWCM
Apr. 1	9:15 a. m.	1,720		4,790	3,560	--	42	--	74	--	78	85	96		100	--	SPWCM
Apr. 1	9:15 a. m.	1,720		4,790	3,240	--	25	--	61	--	78	85	96		100	--	SPN
Apr. 2	1:00 p. m.	1,860		--	6,480	--	29	--	45	--	63	73	87		99	--	SPWCM
Apr. 10	8:35 a. m.	2,160		3,160	6,200	--	24	--	36	--	52	65	90		99	--	SPWCM
Apr. 20	12:20 p. m.	3,380		2,590	4,770	--	24	--	33	--	48	62	88		98	100	SPWCM
May 1	1:15 p. m.	4,330		1,780	5,670	--	17	--	26	--	39	61	87		98	--	SPWCM
May 10	9:55 a. m.	7,260		--	3,650	--	14	--	21	--	38	57	85		96	--	SPWCM
May 20	9:00 a. m.	6,500		1,760	2,650	--	7	--	10	--	18	32	64		98	--	SPWCM

RIO GRANDE BASIN--Continued  
RIO GRANDE AT OTOWI BRIDGE NEAR SAN ILDEFONSO, N. MEX.--Continued

Particle size analyses of suspended sediment, water year October 1951 to September 1952--Continued  
(Methods of analysis: B, bottom withdrawal tube; D, decantation; F, pipette; S, sieve; N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date of collection	Time	Water 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	
June 1, 1952.....	3:25 p. m.	6,140		1,580	--	--	--	--	--	--	24	55	69		95	S
June 10.....	8:00 a. m.	7,450		1,470	--	--	14	--	--	--	24	39	71		97	SPWCM
June 20.....	10:00 a. m.	5,250		942	--	--	--	--	--	--	19	32	64		94	S
July 1.....	9:20 a. m.	2,860		908	--	--	--	--	--	--	21	53	53		84	S
July 10.....	8:35 a. m.	3,400		3,850	4,390	--	39	--	57	--	70	77	85		95	SPWCM
July 20.....	11:25 a. m.	2,060		963	--	--	--	--	--	--	13	38	50		75	S
July 22.....	4:00 p. m.	1,830		1,180	--	--	--	--	--	--	7	10	30		52	S
Aug. 1.....	10:25 a. m.	1,920		2,040	4,000	--	31	--	45	--	61	71	84		95	SPWCM
Aug. 10.....	7:05 p. m.	1,970		2,060	4,380	--	29	--	45	--	64	72	84		96	SPWCM
Aug. 11.....	7:20 p. m.	2,100		10,300	6,660	--	31	--	42	--	65	90	97		100	SPWCM
Aug. 20.....	1:30 p. m.	1,830		1,410	4,020	--	18	--	27	--	44	56	73		85	SPWCM
Aug. 22.....	11:15 a. m.	2,090		6,000	6,610	--	58	--	76	--	90	94	97		99	SPWCM
Aug. 29.....	11:00 a. m.	1,060		4,340	3,730	--	22	--	26	--	46	64	86		100	SPWCM
Aug. 29.....	11:00 a. m.	1,060		4,340	3,710	--	9	--	24	--	46	64	86		100	SPN
Sept. 1.....	3:15 p. m.	774		647	1,300	16	19	20	23	25	32	48	69		97	SBWCM
Sept. 13.....	9:45 a. m.	1,110		9,570	2,760	--	62	--	86	--	89	92	93		99	SPWCM
Sept. 13.....	9:45 a. m.	1,110		3,000	3,000	--	10	--	79	--	89	92	93		99	SPN

## RIO GRANDE BASIN--Continued

## GALISTEO CREEK AT DOMINGO, N. MEX.

LOCATION.--At gaging station in Santo Domingo Pueblo Grant, at highway bridge 0.3 mile north-east of Domingo, Sandoval County, 2½ 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 1952.

EXTREMES, 1951-52.--Sediment concentrations: Maximum daily, 88,800 ppm July 4; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 360,000 tons Aug. 11; minimum daily, 0 ton on many days.

EXTREMES, 1948-52.--Sediment concentrations: Maximum daily, 88,800 ppm July 4, 1952; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 360,000 tons Aug. 11, 1952; minimum daily, 0 ton on many days.

REMARKS.--Maximum concentration observed this water year, 141,000 ppm Aug. 11. Records of water discharge for water year October 1951 to September 1952 given in Water-Supply Paper 1242.

## Suspended sediment, water year October 1951 to September 1952

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			0.1					
2-----	0			.1					
3-----	0			.1					
4-----	0			0					
5-----	0			0					
6-----	0			0					
7-----	0			.1					
8-----	0			0					
9-----	0			0					
10-----	0			.1					
11-----	0			.5					
12-----	0			.6					
13-----	0			.4					
14-----	0			.1					
15-----	0			.1					
16-----	0			.1					
17-----	0			.2					
18-----				.2					
19-----				.1					
20-----				0					
21-----	0			0					
22-----				0					
23-----				0					
24-----				0					
25-----				0					
26-----	0			0					
27-----	1			0					
28-----	.5			0					
29-----	.2			0					
30-----	.1			0					
31-----	.1			--					
Total-	1.9		e 1.4	2.8		e 1.1	0		0

e Estimated.

## WESTERN GULF OF MEXICO BASINS

## RIO GRANDE BASIN--Continued

## GALISTEO CREEK AT DOMINGO, N. MEX.--Continued

Suspended sediment, water year October 1951 to September 1952--Continued

Day	January			February			March		
	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-----	0			0					
2-----	0			0					
3-----	0			0					
4-----	0			0					
5-----	.2			0					
6-----	0			0					
7-----	0			0					
8-----	0			0					
9-----	0			0					
10-----	0			0					
11-----	0			.1					
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			--					
31-----	0			--					
Total--	0.2		e 0.1	0.1		e 0.1	0		0
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-----				0	--	0	33	26,900	s 3,180
2-----				0	--	0	.6	7,500	12
3-----				0	--	0	1	--	e 2.0
4-----				0	--	0	.1	--	e .3
5-----				0	--	0	0	--	0
6-----				0	--	0	0	--	0
7-----				0	--	0	0	--	0
8-----				0	--	0	0	--	0
9-----				0	--	0	0	--	0
10-----				0	--	0	0	--	0
11-----				0	--	0	0	--	0
12-----				0	--	0	0	--	0
13-----				0	--	0	0	--	0
14-----				0	--	0	0	--	0
15-----				0	--	0	0	--	0
16-----				0	--	0	0	--	0
17-----				5	--	e 20	0	--	0
18-----				.1	--	e 1	0	--	0
19-----				0	--	0	0	--	0
20-----				0	--	0	0	--	0
21-----				.6	550	s 2.5	0	--	0
22-----				.4	760	a 1.6	0	--	0
23-----				0	--	0	0	--	0
24-----				0	--	0	0	--	0
25-----				0	--	0	0	--	0
26-----				0	--	0	0	--	0
27-----				0	--	0	0	--	0
28-----				0	--	0	0	--	0
29-----				0	--	0	0	--	0
30-----				0	--	0	0	--	0
31-----				16	3,440	sa 1,900	--	--	--
Total--	0	--	0	22.1	--	2,105.1	34.7	--	3,194.3

e Estimated.

s Computed by subdividing day.

a Computed from estimated concentration graph.

## RIO GRANDE BASIN--Continued

## GALISTEO CREEK AT DOMINGO, N. MEX.--Continued

Suspended sediment, water year October 1951 to September 1952--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	0.2	--	e (t)	0	--	0
2-----	0	--	0	0	--	0	0	--	0
3-----	156	13,000	sa64,800	44	2,880	sa17,500	0	--	0
4-----	405	88,800	s193,000	186	48,800	sa42,800	0	--	0
5-----	8	13,500	s313	2	3,920	s39	0	--	0
6-----	2	10,300	56	.1	--	e.2	2	--	e.8
7-----	760	78,400	s214,000	0	--	0	1	--	e.2
8-----	47	15,800	s4,960	0	--	0	.1	--	e.2
9-----	0	--	0	0	--	0	.4	--	e.3
10-----	.2	--	e (t)	0	--	0	.1	--	e.1
11-----	0	--	0	990	26,800	s360,000	0	--	0
12-----	0	--	0	425	53,600	s113,000	.6	3,850	6
13-----	0	--	0	7	7,000	132	20	24,900	s2,130
14-----	80	12,300	sa24,700	1	800	2.2	1	2,400	6
15-----	270	57,600	s76,200	0	--	0	0	--	0
16-----	2	--	e 50	0	--	0	.5	800	1
17-----	.3	--	e 1	0	--	0	.1	--	e.1
18-----	0	--	0	0	--	0	0	--	0
19-----	0	--	0	0	--	0	0	--	0
20-----	0	--	0	0	--	0	0	--	0
21-----	0	--	0	0	--	0	0	--	0
22-----	0	--	0	109	49,500	s17,600	2	2,090	s14
23-----	0	--	0	36	11,900	s4,190	.4	--	e.4
24-----	.6	--	e 3	118	54,900	s24,100	.1	--	e.1
25-----	0	--	0	10	11,300	305	0	--	0
26-----	.5	--	e 2	70	29,700	s10,500	0	--	0
27-----	.1	--	e (t)	3	7,980	65	0	--	0
28-----	0	--	0	3	8,320	67	0	--	0
29-----	0	--	0	710	57,000	s216,000	0	--	0
30-----	0	--	0	4	8,170	88	0	--	0
31-----	0	--	0	.5	--	e 1	--	--	--
Total-	1,731.7	--	578,085	2,718.8	--	806,389.4	28.3	--	2,168.2

Total discharge for year (cfs-days) ..... 4,540.6

Total load for year (tons) ..... 1,391,944.7

e Estimated.

s Computed by subdividing day.

t Less than 0.05 ton.

a Computed from estimated concentration graph.

## RIO GRANDE BASIN--Continued

## GALISTEO CREEK AT DOMINGO, N. MEX.--Continued

Particle-size analyses of suspended sediment, June to August 1952

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

Date of collection	Time	Water 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
June 1, 1952 . . . . .	8:30 a. m.	27		29,500	3,900		85		97		99	99	100				SPWCM
June 1 . . . . .	8:30 a. m.	27		29,500	4,030		5		97		99	99	99	100			SPN
July 4 . . . . .	2:40 p. m.	41		59,700	4,420		76		96		98	99	99	100			SPWCM
July 7 . . . . .	4:20 p. m.	2,230		7,300			23		35		52	69	85		98		SPWCM
July 7 . . . . .	7:15 p. m.	1,600		79,700	4,220		31		45		64	83	94		99		SPWCM
July 15 . . . . .	11:00 a. m.	85		45,200	2,250		73		91		97	99	100				SPWCM
Aug. 11 . . . . .	7:30 p. m.	417		62,300	3,220		47		59		84	93	98		100		SPWCM
Aug. 11 . . . . .	9:40 p. m.	8,470		137,000	4,570		21		30		58	74	94		99	100	SPWCM
Aug. 11 . . . . .	9:40 p. m.	8,470		137,000	4,580		1		30		58	74	94		99	100	SPN
Aug. 11 . . . . .	10:45 p. m.	8,970		122,000	3,400		26		38		59	74	91		99	100	SPWCM
Aug. 24 . . . . .	1:45 a. m.	595		94,900	3,450		37		51		80	89	95		99	100	SPWCM
Aug. 29 . . . . .	8:00 a. m.	558		71,900	4,070		47		63		85	94	99		100		SPWCM

## RIO GRANDE BASIN--Continued

## JEMEZ RIVER NEAR BERNALILLO, N. MEX.

LOCATION.--At gaging station  $1\frac{1}{2}$  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 1952.

Sediment records: April 1948 to September 1952.

EXTREMES, 1951-52.--Water temperatures: Maximum observed, 90°F June 6, July 19; minimum, freezing point Dec. 14, 20, Feb. 20, Mar. 6.

Sediment concentrations: Maximum daily, 60,600 ppm Aug. 23; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 48,100 tons July 14; minimum daily, 0 ton on many days.

EXTREMES, 1948-52.--Water temperatures (1950-52): Maximum observed, 92°F Aug. 6, 1951; minimum, freezing point on many days.

Sediment concentrations: Maximum daily, 66,700 ppm Sept. 20, 1950; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 167,000 tons July 25, 1951; minimum daily, 0 ton on many days.

REMARKS.--Maximum sediment concentration observed this water year, 186,000 ppm Aug. 11.

Records of discharge for water year October 1951 to September 1952 given in Water-Supply Paper 1242.

Temperature (°F) of water, water year October 1951 to September 1952  
/Once-daily temperature 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		--	53	47	51	--	57	70	b 65	--	85	--
2		--	47	46	44	--	b 55	84	--	--	84	--
3		--	44	33	45	--	52	77	73	--	b 67	--
4		--	45	33	45	44	68	70	70	--	b 81	--
5		--	46	33	45	55	70	--	82	--	84	--
6		--	34	33	46	a 32	62	64	90	--	b 74	--
7		--	34	36	48	60	74	b 87	82	--	--	--
8		--	--	34	46	65	49	63	82	--	--	--
9		--	34	33	42	53	b 53	48	87	--	--	--
10		--	--	34	47	53	b 46	73	81	--	--	--
11		--	33	42	48	45	64	b 69	b 75	--	67	--
12		--	35	41	45	47	a 45	--	82	b 73	a 68	--
13		--	39	42	46	57	66	b 66	--	--	b 73	--
14		--	32	47	37	55	75	b 69	--	--	77	--
15		--	34	48	45	--	65	b 66	--	--	84	--
16		40	35	39	47	--	b 65	b 58	--	--	83	--
17		--	34	46	--	--	59	56	--	--	b 73	--
18		--	35	47	47	--	62	74	--	72	b 71	--
19		48	33	47	41	--	b 59	--	--	90	--	--
20		47	32	45	a 32	48	b 54	67	--	--	77	--
21		42	--	47	38	b 34	64	60	--	b 70	83	--
22		48	--	43	55	b 40	64	80	--	78	77	--
23		50	--	45	45	40	b 68	69	--	69	86	72
24		38	37	48	45	46	72	77	--	--	85	81
25		44	38	45	34	45	66	b 67	--	88	83	--
26		44	42	50	--	b 42	76	76	--	80	82	--
27		48	36	48	42	64	b 55	67	--	89	87	--
28		b 33	43	--	54	58	72	77	--	78	84	--
29		50	46	51	60	58	58	60	--	b 72	74	--
30		51	47	52	--	55	b 62	--	--	74	72	--
31		--	49	54	--	61	--	a 57	--	83	--	--
Average		--	39	43	45	--	62	67	--	--	--	--

a Observations made before 11:00 a.m.

b Observations made after 6:00 p.m.

## RIO GRANDE BASIN--Continued

## JEMEZ RIVER NEAR BERNALILLO, N. MEX.--Continued

Suspended sediment, water year October 1951 to September 1952

Day	October			November			December		
	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-----	0		0	1	--	e 6	22	4,100	244
2-----	0		0	1	--	e 4	25	4,500	304
3-----	0		0	0	--	0	22	4,400	261
4-----	0		0	1	--	e 4	17	4,500	207
5-----	0		0	1	--	e 4	13	4,500	158
6-----	0		0	0	--	0	5	3,400	s 62
7-----	0		0	1	--	e 4	2	1,250	7
8-----	0		0	1	--	e 4	1	700	a 2
9-----	0		0	1	--	e 4	0	--	0
10-----	0		0	1	--	e 6	0	--	0
11-----	0		0	2	--	e 16	6	2,100	s 88
12-----	0		0	2	--	e 14	10	3,420	s 80
13-----	0		0	8	--	e 125	20	2,800	s 263
14-----	0		0	10	--	e 175	13	5,200	s 195
15-----	0		0	13	--	e 230	2	850	5
16-----	0		0	3	4,700	s 72	4	1,350	15
17-----	0		0	2	6,600	sa 33	15	2,050	s 106
18-----	0		0	3	5,600	a 45	6	1,450	23
19-----	0		0	5	5,500	74	11	1,600	48
20-----	0		0	10	6,600	178	2	750	4
21-----	0		0	12	7,000	227	0	--	0
22-----	0		0	10	7,100	192	1	900	a 2
23-----	0		0	17	7,000	321	0	--	0
24-----	0		0	10	8,350	225	17	3,250	s 252
25-----	0		0	4	7,000	76	28	3,400	257
26-----	0		0	1	3,480	s 22	11	4,140	s 254
27-----	64	e 10,000	8	8	6,800	147	10	6,750	182
28-----	11	e 300	10	10	7,200	194	15	5,400	219
29-----	3	e 35	15	15	4,500	182	20	6,000	324
30-----	4	e 8	20	20	4,300	232	25	5,600	378
31-----	1	e 60	--	--	--	--	30	7,750	628
Total-----	83		10,403	173	--	2,816	353	--	4,568
Day	January			February			March		
	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-----	94	6,500	1,650	28	3,850	291	31	2,900	a 243
2-----	31	5,400	452	25	5,750	388	10	2,700	a 73
3-----	4	1,050	11	20	5,500	297	6	2,800	a 45
4-----	9	3,230	s 87	20	5,400	292	12	3,050	99
5-----	11	4,400	131	20	3,800	205	10	6,250	169
6-----	11	1,400	42	28	3,700	280	15	3,100	126
7-----	14	2,850	108	22	8,150	484	25	3,400	230
8-----	20	4,200	227	35	4,450	421	35	4,000	378
9-----	9	5,200	s 161	19	4,250	218	40	3,350	362
10-----	3	1,180	s 21	50	4,050	547	35	3,300	312
11-----	10	4,850	s 192	35	3,250	307	39	3,850	405
12-----	35	6,750	638	39	2,600	274	31	3,150	264
13-----	50	7,000	945	20	3,050	165	25	3,180	s 295
14-----	68	5,500	1,010	3	3,500	28	27	1,610	s 150
15-----	30	7,500	603	15	3,050	124	33	3,680	sa 423
16-----	20	6,600	356	31	2,700	226	17	2,700	a 124
17-----	15	5,050	205	31	2,700	a 226	6	2,080	sa 188
18-----	10	4,850	131	35	6,250	591	15	2,300	a 93
19-----	15	4,100	166	13	2,900	102	25	--	e 250
20-----	15	3,500	142	6	2,500	40	30	--	e 330
21-----	10	3,400	92	15	3,000	122	28	5,750	435
22-----	6	5,300	86	22	3,400	202	13	4,850	170
23-----	8	3,600	78	8	3,300	71	22	4,750	282
24-----	10	4,200	113	6	5,100	83	29	5,160	s 447
25-----	20	4,250	230	4	3,250	35	62	5,200	870
26-----	25	3,250	219	15	2,950	119	50	4,000	540
27-----	15	2,700	109	17	1,350	62	39	3,600	378
28-----	15	3,250	a 132	20	3,200	173	56	3,900	590
29-----	20	2,750	148	17	3,000	138	74	4,100	819
30-----	28	2,250	170	--	--	--	62	4,600	770
31-----	35	3,850	364	--	--	--	62	5,300	887
Total-----	666	--	9,024	--	--	6,511	964	--	10,748

e Estimated.

s Computed by subdividing day.

a Computed from estimated concentration graph.



## RIO GRANDE BASIN--Continued

## JEMEZ RIVER NEAR BERNALILLO, N. MEX.--Continued

Suspended sediment, water year October 1951 to September 1952--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-----	65	13,000	2,280	390	4,500	4,740	110	1,800	535
2-----	55	17,500	2,600	160	3,900	1,680	210	5,330	s 4,520
3-----	155	16,900	s 7,910	140	5,700	2,150	110	11,500	s 3,760
4-----	120	15,300	s 6,320	240	7,500	4,860	52	9,630	s 1,460
5-----	230	14,500	s 9,920	435	11,000	a 12,900	39	5,000	526
6-----	74	14,000	s 3,080	460	10,500	13,000	50	3,400	459
7-----	346	13,500	s 13,400	300	7,200	5,830	44	2,450	291
8-----	413	14,300	s 18,600	390	6,400	6,740	56	2,000	302
9-----	390	11,600	s 13,400	300	6,550	5,310	39	1,900	200
10-----	102	7,300	2,010	200	5,400	2,920	39	1,300	137
11-----	87	5,900	1,390	180	3,700	1,800	6	730	14
12-----	102	5,000	1,380	200	3,250	1,760	0	--	0
13-----	44	4,300	511	225	3,400	2,070	0	--	0
14-----	56	5,700	862	240	3,900	2,530	0	--	0
15-----	80	5,200	1,120	255	4,200	2,890	0	--	0
16-----	170	5,500	2,250	225	3,500	2,130	0	--	0
17-----	195	6,400	3,370	140	4,500	1,700	0	--	0
18-----	240	6,750	4,370	130	3,700	1,300	0	--	0
19-----	315	6,700	5,700	120	3,300	1,070	0	--	0
20-----	300	6,700	5,430	94	2,950	749	0	--	0
21-----	182	7,500	3,690	102	3,800	1,050	0	--	0
22-----	170	5,600	2,570	94	3,000	761	0	--	0
23-----	182	4,000	1,970	62	2,300	385	0	--	0
24-----	130	3,300	1,160	56	1,650	249	0	--	0
25-----	150	3,700	1,500	62	1,350	226	0	--	0
26-----	240	4,200	2,720	44	1,400	166	0	--	0
27-----	350	5,300	5,010	44	1,150	137	0	--	0
28-----	390	6,500	6,840	62	1,450	243	0	--	0
29-----	535	8,790	s 13,700	22	1,350	80	0	--	0
30-----	660	9,500	16,900	28	1,600	a 121	0	--	0
31-----	--	--	--	62	1,000	167	--	--	--
Total-	6,528	--	162,233	5,462	--	81,714	755	--	12,204
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	33	30,300	s 5,280	0	--	0
2-----	0	--	0	67	54,900	s 13,800	0	--	0
3-----	1	3,300	sa 60	2	7,000	38	0	--	0
4-----	0	--	0	1	4,200	11	0	--	0
5-----	0	--	0	0	--	0	0	--	0
6-----	0	--	0	0	--	0	0	--	0
7-----	0	--	0	0	--	0	0	--	0
8-----	95	54,500	sa 32,100	0	--	0	0	--	0
9-----	1	13,000	35	0	--	0	0	--	0
10-----	0	--	0	0	--	0	0	--	0
11-----	0	--	0	37	25,300	s 13,600	0	--	0
12-----	0	--	0	10	37,100	s 2,030	0	--	0
13-----	0	--	0	0	--	0	0	--	0
14-----	128	31,000	sa 48,100	1	10,000	27	0	--	0
15-----	1	12,000	a 32	0	--	0	0	--	0
16-----	1	3,000	a 8	0	--	0	0	--	0
17-----	0	--	0	0	--	0	0	--	0
18-----	0	--	0	0	--	0	0	--	0
19-----	0	--	0	0	--	0	0	--	0
20-----	0	--	0	0	--	0	0	--	0
21-----	0	--	0	0	--	0	0	--	0
22-----	0	--	0	22	28,300	s 4,190	0	--	0
23-----	0	--	0	94	60,600	s 16,800	25	38,500	s 4,200
24-----	0	--	0	130	46,200	s 9,570	0	--	0
25-----	0	--	0	226	41,600	s 41,800	0	--	0
26-----	67	22,300	s 9,340	3	32,000	269	0	--	0
27-----	0	--	0	1	7,000	19	1	9,190	sa 74
28-----	0	--	0	0	--	0	0	--	0
29-----	0	--	0	96	32,000	s 13,600	0	--	0
30-----	0	--	0	2	28,400	153	0	--	0
31-----	0	--	0	0	--	0	--	--	--
Total-	294	--	89,675	725	--	121,157	26	--	4,274

Total discharge for year (cfs-days) ..... 16,648

Total load for year (tons) ..... 515,327

s Computed by subdividing day.

a Computed from estimated concentration graph.

## RIO GRANDE BASIN--Continued

## JEMEZ RIVER NEAR BERNALILLO, N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1951 to September 1952  
 (Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water;  
 W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date of collection	Time	Water 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. 16, 1951 ...	11:40 a. m.	0.2		1,490	1,290	--	76	--	89	--	98	99	100		--	SPWCM
Nov. 30 ...	6:00 p. m.	17		4,660	3,450	55	69	78	85	91	92	95	99		100	SPWCM
Nov. 30 ...	6:00 p. m.	17		4,660	2,280	51	60	72	81	86	92	95	99		100	SPWCM
Dec. 14 ...	4:15 p. m.	50		6,900	2,740	--	43	--	56	--	66	80	97		100	SPWCM
Dec. 28 ...	2:35 p. m.	35		7,580	3,340	40	45	56	67	74	81	92	100		--	SPWCM
Dec. 28 ...	2:35 p. m.	35		7,580	3,110	37	46	58	68	76	81	92	100		--	SPWCM
Jan. 15, 1952 ...	4:10 p. m.	30		12,000	4,360	--	65	--	78	--	93	98	100		--	SPWCM
Feb. 1 ...	1:30 p. m.	20		3,040	2,170	--	47	--	63	--	66	82	95		100	SPWCM
Feb. 12 ...	4:10 p. m.	50		2,360	3,300	--	49	--	72	--	90	96	100		--	SPWCM
Feb. 22 ...	6:00 p. m.	20		3,510	2,390	--	46	--	61	--	72	87	98		100	SPWCM
Feb. 29 ...	5:10 p. m.	13		2,770	3,300	--	38	--	58	--	81	91	98		100	SPWCM
Mar. 10 ...	4:05 p. m.	35		3,180	4,190	--	39	--	55	--	74	82	98		99	SPWCM
Apr. 5 ...	11:00 a. m.	1,300		16,500	2,180	8	16	23	43	60	68	84	96		100	SPWCM
Apr. 5 ...	11:00 a. m.	1,300		16,500	3,080	4	19	29	32	57	68	84	96		100	SPN
Apr. 5 ...	11:00 a. m.	1,300		16,500	2,370	22	27	33	41	54	68	84	96		100	SPWCM
Apr. 5 ...	11:00 a. m.	1,300		16,500	2,640	7	14	31	40	54	68	84	96		100	SPN
Apr. 5 ...	10:00 p. m.	130	.3	8,600	4,450	--	33	--	45	--	65	85	98		100	SPWCM
Apr. 11 ...	2:45 p. m.	285		5,510	4,500	--	28	--	40	--	62	83	97		100	SPWCM
Apr. 21 ...	1:45 p. m.	255		7,880	3,450	--	31	--	39	--	60	86	99		100	SPWCM
May 1 ...	5:15 p. m.	240		3,830	3,160	--	25	--	32	--	55	76	94		99	SPWCM
May 8 ...	10:50 a. m.	535		7,170	4,100	--	19	--	27	--	48	76	96		100	SPWCM
May 8 ...	11:50 a. m.	680		7,090	3,590	--	15	--	24	--	50	68	91		100	SPWCM
May 8 ...	11:50 a. m.	680		7,090	3,980	--	17	--	29	--	50	68	91		100	SPN
May 20 ...	4:40 p. m.	102		2,650	3,290	--	19	--	24	--	51	84	99		100	SPWCM
June 3 ...	4:45 p. m.	95		12,500	4,920	--	68	--	66	--	76	87	98		100	SPWCM
July 26 ...	5:00 a. m.	110		47,600	3,410	--	86	--	95	--	97	98	100		--	SPWCM
Aug. 2 ...	6:00 a. m.	410		87,900	2,860	--	62	--	79	--	86	88	93		100	SPWCM
Sept. 23 ...	2:40 a. m.	140		58,000	3,810	--	77	--	95	--	98	99	99		100	SPWCM

## 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 northern part of San Luis Valley, Colo.).

RECORDS AVAILABLE.--Water temperatures: October 1948 to September 1952.

Sediment records: November 1947 to September 1952.

EXTREMES, 1951-52.--Water temperatures: Maximum observed, 80°F Aug. 3; minimum, freezing point on many days during winter months.

Sediment concentrations: Maximum daily, 30,800 ppm Aug. 12; minimum daily, 89 ppm Oct. 13.

Sediment loads: Maximum daily, 282,000 tons Aug. 12; minimum daily, 3 tons Oct. 13.

EXTREMES, 1947-52.--Water temperatures (1948-52): Maximum observed, 93 °F Aug 18, 1951 minimum, freezing point on many days during winter months.

Sediment concentrations: Maximum daily, 50,300 ppm Aug. 2, 1950; minimum daily 18 ppm May 13, 17, 1950.

Sediment loads: Maximum daily, 320,000 tons July 24, 1949; minimum daily, 2 tons May 18, 19, 1950.

REMARKS.--Maximum observed sediment concentration this water year, 63,400 ppm Aug. 12.

Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of discharge for water year October 1951 to September 1952 given in Water-Supply Paper 1242.

Temperature (°F) of water, water year October 1951 to September 1952

/Once-daily temperature measurement before 11:00 a.m./

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

a Observations made between 11:00 a. m. and 6:00 p. m.

## RIO GRANDE BASIN--Continued

## RIO GRANDE NEAR BERNALILLO, N. MEX.--Continued

Suspended sediment, water year October 1951 to September 1952

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-----	26	270	19	100	990	267	378	1,230	1,260
2-----	18	219	11	110	1,170	347	396	1,600	1,710
3-----	14	199	8	230	1,670	1,040	404	1,470	1,600
4-----	14	225	9	235	1,600	1,020	412	1,510	1,680
5-----	16	196	8	235	1,290	819	412	1,280	1,420
6-----	17	154	7	230	1,150	714	412	1,070	1,190
7-----	22	200	12	246	1,130	751	404	1,100	1,200
8-----	21	220	12	246	1,170	777	363	950	931
9-----	18	163	8	240	1,350	875	387	820	857
10-----	14	127	5	246	1,380	917	410	830	919
11-----	14	163	6	270	1,320	962	390	960	1,010
12-----	15	109	4	270	1,470	1,070	380	775	795
13-----	14	89	3	282	1,570	1,200	410	1,060	1,170
14-----	21	115	7	300	1,420	1,150	480	2,200	2,850
15-----	27	176	13	314	1,520	1,290	486	1,670	2,190
16-----	25	162	11	307	1,190	986	438	1,440	1,700
17-----	23	164	10	314	1,300	1,100	466	1,580	1,990
18-----	26	182	13	314	1,130	958	466	2,040	2,570
19-----	23	131	8	294	1,220	968	497	2,230	2,990
20-----	29	158	12	276	1,310	976	476	1,740	2,240
21-----	36	172	17	294	1,630	1,290	438	2,040	2,410
22-----	42	234	27	321	1,640	1,420	430	1,630	1,890
23-----	36	190	18	342	1,580	1,460	404	1,570	1,710
24-----	33	224	20	356	1,630	1,570	486	1,620	2,130
25-----	28	157	12	387	1,780	1,860	528	2,430	3,460
26-----	31	125	10	446	2,560	3,080	508	2,050	2,810
27-----	126	3,460	s 4,420	404	2,430	2,650	497	2,070	2,780
28-----	120	16,300	5,280	356	1,920	1,850	497	2,270	3,050
29-----	96	5,400	1,400	356	1,670	1,610	518	1,790	2,500
30-----	94	2,100	533	370	1,280	1,280	638	2,030	3,500
31-----	90	1,250	304	--	--	--	1,020	4,750	13,100
Total-	1,129	--	12,227	8,691	--	36,257	14,431	--	71,612
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-----	1,450	11,000	43,100	638	1,250	2,150	840	1,500	3,400
2-----	1,290	11,500	40,100	651	1,700	2,990	1,240	7,040	23,600
3-----	876	6,600	15,600	651	1,820	3,200	765	9,150	18,900
4-----	599	3,770	6,100	599	1,940	3,140	651	4,500	7,910
5-----	528	3,280	4,680	586	1,940	3,070	625	2,650	4,470
6-----	612	2,080	3,440	573	1,900	2,940	599	2,000	3,230
7-----	651	3,100	4,450	573	1,440	2,230	586	1,810	2,860
8-----	720	2,400	4,670	550	1,450	2,150	550	1,600	2,380
9-----	625	1,450	2,450	586	1,600	2,530	750	1,900	3,850
10-----	620	2,630	4,400	612	1,730	2,860	870	2,490	s 6,340
11-----	612	1,590	2,630	651	1,800	3,160	898	5,000	s 12,500
12-----	664	1,810	3,240	664	2,120	3,800	1,020	6,300	17,400
13-----	735	1,850	3,670	664	2,350	4,210	705	4,950	8,420
14-----	912	3,280	8,080	640	1,770	3,060	612	3,950	6,530
15-----	894	5,430	13,100	599	1,820	2,940	825	4,200	9,360
16-----	560	3,400	5,140	586	1,380	2,180	894	4,800	11,600
17-----	612	2,030	3,350	573	1,290	2,000	1,040	4,900	s 15,300
18-----	735	2,400	4,760	573	1,800	2,780	1,740	17,400	s 80,400
19-----	1,070	3,360	s 12,700	586	1,300	2,060	876	14,100	33,300
20-----	2,040	7,350	s 42,400	560	900	1,360	930	7,700	19,300
21-----	1,060	5,530	15,800	528	1,100	1,570	876	6,600	15,600
22-----	810	4,240	9,270	539	1,270	1,850	750	4,900	9,920
23-----	750	2,870	5,810	638	1,140	1,860	720	3,650	7,100
24-----	625	2,000	3,380	651	1,150	2,020	476	2,100	2,700
25-----	651	1,920	3,370	664	1,310	2,350	466	1,800	2,260
26-----	677	1,870	3,420	651	1,300	2,290	539	2,150	3,130
27-----	664	1,880	3,370	560	990	1,500	528	2,050	2,920
28-----	638	1,790	3,080	539	1,090	1,590	735	2,400	4,760
29-----	651	1,640	2,880	651	1,450	2,550	1,000	3,500	9,450
30-----	625	1,480	2,500	--	--	--	1,270	6,500	22,300
31-----	612	1,340	2,210	--	--	--	948	5,800	14,800
Total-	24,568	--	284,150	17,536	--	72,490	25,324	--	386,990

s Computed by subdividing day.

## RIO GRANDE BASIN--Continued

## RIO GRANDE NEAR BERNALILLO, N. MEX.--Continued

## Suspended sediment, water year October 1951 to September 1952--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-----	1,240	6,600	22,100	4,100	3,450	38,200	6,090	2,180	35,800
2-----	1,660	7,900	35,400	3,950	3,100	33,100	6,200	2,210	37,000
3-----	1,560	6,850	28,900	4,900	3,840	50,800	6,140	2,310	38,300
4-----	1,660	7,300	32,700	5,700	5,500	84,600	6,800	2,550	46,800
5-----	1,760	6,570	32,100	6,380	5,440	93,700	6,920	2,120	39,600
6-----	2,090	6,100	34,400	7,400	5,840	117,000	7,100	1,980	38,000
7-----	1,930	5,400	28,100	8,600	5,630	131,000	6,800	1,810	33,200
8-----	2,650	5,150	36,800	8,540	4,860	112,000	6,920	1,900	35,500
9-----	2,420	6,400	41,800	8,680	4,550	107,000	7,040	1,900	36,100
10-----	2,090	4,850	27,400	7,580	4,370	89,400	7,040	1,950	37,100
11-----	2,090	3,800	21,400	7,040	3,740	71,100	7,100	2,000	38,300
12-----	2,090	3,500	19,800	6,800	2,980	54,700	7,040	1,830	34,800
13-----	2,160	3,900	22,700	6,200	3,180	53,200	6,800	1,720	31,600
14-----	2,090	3,250	18,300	5,700	2,600	40,000	6,680	1,660	29,900
15-----	2,160	3,320	19,400	5,870	2,700	42,800	6,380	2,040	35,100
16-----	2,290	3,500	21,600	6,380	3,250	56,000	6,200	1,760	28,500
17-----	2,520	4,300	29,300	7,160	3,320	64,200	5,980	1,700	27,400
18-----	2,800	4,700	34,600	7,400	3,080	61,500	5,660	1,460	22,300
19-----	2,650	3,760	26,900	6,920	2,830	52,900	5,020	1,440	19,500
20-----	3,200	4,200	36,300	6,740	2,350	42,800	4,780	1,350	17,400
21-----	3,300	4,380	39,000	6,260	2,200	37,200	4,240	1,200	13,700
22-----	3,000	3,700	30,000	5,450	1,850	27,200	4,090	1,340	14,800
23-----	2,900	3,640	28,500	5,350	2,070	29,900	3,670	1,130	11,200
24-----	2,800	3,160	23,900	5,250	2,040	28,900	3,470	970	9,090
25-----	2,900	4,150	32,500	5,050	1,880	25,600	3,180	840	7,210
26-----	3,100	3,420	s30,200	4,800	1,800	23,300	2,970	810	6,500
27-----	3,300	3,050	27,200	4,900	1,910	25,300	2,880	630	4,900
28-----	3,650	3,850	37,900	5,000	1,670	22,500	2,770	620	4,640
29-----	4,700	4,070	51,600	5,000	1,750	23,600	3,030	980	8,020
30-----	4,300	3,700	43,000	5,200	1,820	25,600	2,710	900	6,590
31-----	--	--	--	5,400	1,940	26,300	--	--	--
Total-	77,060	--	913,800	189,700	--	1,693,400	161,700	--	749,850
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-----	2,240	1,000	a6,050	1,300	7,310	25,700	560	1,670	2,530
2-----	2,200	750	4,460	1,600	4,880	21,100	414	1,300	1,450
3-----	2,080	950	5,340	2,170	7,050	41,300	362	730	714
4-----	2,960	8,980	s81,100	1,990	5,600	30,100	308	550	457
5-----	2,100	2,000	11,300	1,840	3,300	16,400	250	390	263
6-----	2,600	1,850	13,000	1,680	2,800	12,700	213	310	178
7-----	2,870	16,700	s160,000	1,530	1,370	5,660	458	1,150	s1,590
8-----	2,680	9,590	69,400	1,440	1,230	4,780	390	530	558
9-----	2,520	3,600	24,500	1,680	1,400	6,350	141	230	88
10-----	2,620	3,030	s22,100	2,150	8,000	46,400	95	230	59
11-----	2,660	3,600	25,900	1,720	7,610	s63,800	98	150	40
12-----	2,340	4,070	25,700	2,700	30,800	s282,000	101	150	41
13-----	2,770	1,750	13,100	1,880	3,000	15,200	98	210	56
14-----	2,340	1,520	9,600	1,860	2,500	12,600	637	3,910	s7,620
15-----	2,560	6,890	s48,500	1,580	3,600	15,400	414	3,500	3,910
16-----	2,150	6,120	35,500	1,660	3,000	13,400	369	1,260	1,260
17-----	1,920	1,800	9,330	1,720	2,400	11,100	123	420	139
18-----	1,800	1,170	5,690	1,220	1,300	4,280	117	340	107
19-----	1,620	960	4,200	1,190	1,200	3,860	110	310	92
20-----	1,970	1,160	6,170	1,210	2,500	8,170	107	225	65
21-----	1,400	900	3,400	1,270	3,200	11,000	355	570	546
22-----	1,370	880	3,260	1,300	7,500	26,300	376	630	640
23-----	1,240	780	2,610	1,600	19,000	s85,100	430	1,460	1,700
24-----	1,870	2,680	s15,600	1,990	16,500	88,700	163	700	308
25-----	1,240	4,500	15,100	1,460	12,200	s52,200	130	400	140
26-----	1,490	4,700	18,900	1,000	4,550	12,300	117	230	73
27-----	1,820	3,000	14,700	700	2,800	5,290	126	175	60
28-----	1,080	1,600	4,670	560	1,900	2,670	383	680	703
29-----	1,970	4,770	s32,000	1,340	26,800	s128,000	438	530	627
30-----	1,570	11,300	47,900	660	14,000	24,900	406	460	504
31-----	1,180	9,400	29,900	890	5,300	12,700	--	--	--
Total-	63,230	--	768,980	46,890	--	1,089,660	8,289	--	26,518

Total discharge for year (cfs-days)..... 638,548  
 Total load for year (tons)..... 6,105,934

s Computed by subdividing day.

a Computed from estimated concentration graph.

RIO GRANDE BASIN--Continued  
RIO GRANDE NEAR BERNALILLO, N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1951 to September 1952

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

Date of collection	Time	Water 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. 9, 1951 . . .	3:15 p.m.	240		1,520	1,740	--	45	--	58	--	79	88	98		100	SPWCM
Nov. 23 . . .	12:20 p.m.	342		1,530	1,620	--	59	--	70	--	84	90	95		100	SPWCM
Dec. 14 . . .	7:55 a.m.	480		2,330	3,280	--	29	36	42	53	65	80	91		100	SBWCM
Dec. 21 . . .	3:00 p.m.	396		2,240	1,460	7	9	10	11	17	28	59	90		99	SBWCM
Jan. 1, 1952 . . .	9:55 a.m.	1,630		9,570	3,210	--	25	--	41	--	75	95	99		100	SPWCM
Jan. 4 . . .	1:25 p.m.	651		4,010	1,550	--	27	--	40	--	48	83	98		100	SPWCM
Jan. 20 . . .	9:55 a.m.	2,050		7,260	1,770	24	26	43	50	57	73	74	99		100	SPWCM
Jan. 20 . . .	9:55 a.m.	2,050		7,260	2,030	10	21	31	44	56	73	74	99		100	SPN
Jan. 20 . . .	9:55 a.m.	2,050		7,260	1,760	25	32	41	47	60	73	74	99		100	SBWCM
Jan. 20 . . .	9:55 a.m.	2,050		7,290	2,420	10	18	28	40	56	73	74	99		100	SBN
Feb. 1 . . .	9:40 a.m.	599		959	1,000	--	15	--	25	--	40	77	98		100	SPWCM
Feb. 10 . . .	10:00 a.m.	599		1,070	1,700	--	13	--	16	--	37	78	95		100	SPWCM
Mar. 1 . . .	9:50 a.m.	573		966	1,320	13	13	14	18	22	36	58	77		99	SBWCM
Mar. 10 . . .	6:55 p.m.	966		2,400	2,840	24	26	34	43	50	60	84	97		100	SBWCM
Mar. 20 . . .	8:45 a.m.	1,370		9,270	2,340	37	45	52	62	72	83	94	99		100	SPWCM
Mar. 20 . . .	8:45 a.m.	1,370		9,270	2,840	4	22	51	67	78	83	94	99		100	SPN
Mar. 20 . . .	8:45 a.m.	1,370		9,270	1,930	37	46	56	67	76	83	94	99		100	SBWCM
Mar. 20 . . .	8:45 a.m.	1,370		9,270	2,130	5	15	46	70	80	83	94	99		100	SBN
Apr. 3 . . .	8:25 a.m.	1,720		7,090	6,240	--	41	--	57	--	96	97	98		98	SPWCM
Apr. 10 . . .	9:45 a.m.	3,400		5,320	3,160	--	21	--	29	--	72	82	94		99	SPWCM
Apr. 20 . . .	10:00 a.m.	3,400		4,010	2,560	--	15	--	22	--	42	77	97		100	SPWCM
May 1 . . .	7:50 a.m.	3,460		3,570	3,980	--	16	--	23	--	39	70	93		100	SPWCM
May 5 . . .	10:55 a.m.	5,760		4,700	3,090	--	26	--	35	--	54	79	96		100	SPN
May 5 . . .	10:55 a.m.	5,760		4,700	3,100	--	20	--	33	--	54	79	96		100	SPWCM
May 9 . . .	5:45 p.m.	9,200		4,480	3,650	--	20	--	30	--	53	72	89		100	SPWCM
May 9 . . .	12:00 p.m.	8,000		5,300	2,980	--	14	--	24	--	36	57	81		99	SPWCM
May 20 . . .	6:45 a.m.	7,220		2,450	2,310	8	10	11	14	18	27	49	85		98	SBWCM

Date	8:40 a. m.	7,040	2,020	2,120	7	9	11	13	18	28	51	90	99	SEWCM S
June 10, 1952	8:40 a. m.	7,040	2,020	2,120	7	9	11	13	18	28	51	90	99	--
June 20	8:25 a. m.	4,820	1,370	--	--	--	--	--	--	28	53	89	99	--
July 4	9:40 a. m.	3,740	19,000	3,420	--	60	--	86	--	96	98	99	100	SPWCM
July 7	5:40 p. m.	3,700	44,300	5,120	--	50	73	--	93	98	100	--	--	SPWCM
July 10	7:05 p. m.	2,870	2,870	4,970	--	19	31	--	73	87	97	--	100	SPWCM
July 15	5:55 a. m.	4,280	10,700	4,220	38	--	57	--	81	89	96	--	99	SPWCM
July 20	8:35 a. m.	2,270	1,180	--	--	--	--	--	52	73	93	--	--	S
Aug. 3	6:10 p. m.	2,320	6,990	4,140	--	60	--	83	--	94	97	99	100	SPWCM
Aug. 12	4:30 a. m.	8,200	63,400	4,600	--	44	--	83	--	91	96	98	99	SPWCM
Aug. 25	11:45 a. m.	2,270	23,900	4,290	--	60	--	78	--	92	95	99	100	SPWCM
Aug. 29	2,660	48,000	10,000 a. m.	3,430	55	--	79	--	96	98	100	--	--	SPWCM
Aug. 29	2,660	48,000	10:00 a. m.	4,140	10	--	76	--	96	98	100	--	--	SPN
Sept. 1	570	1,220	10:45 a. m.	4,120	43	--	57	--	81	87	94	--	99	100 SPWCM
Sept. 16	385	1,280	6:15 p. m.	2,600	59	--	76	--	89	94	99	--	100	SPWCM

## RIO GRANDE BASIN--Continued

## RIO GRANDE NEAR BERNARDO, N. MEX.

LOCATION.--At gaging station at bridge on U. S. Highway 60, 2 1/4 miles east of Bernardo, Socorro County, and 3 1/2 miles upstream from Rio Puerco.

DRAINAGE AREA.--19,230 square miles approximately (includes 2,940 square miles in closed basin in northern part of San Luis Valley, Colo.).

RECORDS AVAILABLE.--Sediment records: October 1947 to September 1952.

EXTREMES, 1951-52.--Sediment concentrations: Maximum daily, 18,600 ppm Aug. 13; minimum daily, no river flow on many days. Not determined in interior drain.

Sediment loads: Maximum daily, 149,000 tons July 8; minimum daily, 0 ton in river on many days. Less than 0.50 ton in interior drain on many days.

EXTREMES, 1947-52.--Sediment concentrations: Maximum daily, 42,400 ppm Aug. 3, 1950; minimum daily, no river flow on many days. Not determined in interior drain.

Sediment loads: Maximum daily, 240,000 tons July 24, 1949; minimum daily, 0 ton in river on many days. Less than 0.50 ton in interior drain on many days.

REMARKS.--Records are summation of water and sediment discharges in main channel, San Francisco riverside drain, and Bernardo interior drain. Tables of particle-size analyses for each channel are published separately and show water discharges and concentrations in those channels at the time of sampling. Records of discharge for water year October 1951 to September 1952 given in Water-Supply Paper 1242.

## Suspended sediment, water year October 1951 to September 1952

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			3			97		288
2-----	3			3			103		288
3-----	1			3		(t)	111		567
4-----	1			3			122		1,120
5-----	1			3			124		860
6-----	1			4			156		1,110
7-----	1			4			145		953
8-----	2			5			225		1,570
9-----	2			6			285		2,180
10-----	2			5			275		1,710
11-----	2			5			325		1,870
12-----	2			7		e 1	330		2,100
13-----	2			7			309		1,790
14-----	2			7			313		2,370
15-----	2			7			425		3,820
16-----	2			7			469		3,760
17-----	2			7			485		3,290
18-----	2			31	15		433		3,090
19-----	2			51	99		426		3,040
20-----	2			42	75		422		2,820
21-----	2			51	65		406		2,610
22-----	2			50	37		406		2,510
23-----	2			42	26		456		2,860
24-----	3			39	21		446		2,510
25-----	3			50	48		466		2,380
26-----	3			75	125		546		3,060
27-----	3			86	182		566		3,430
28-----	3			97	241		518		2,940
29-----	3			106	284		507		2,940
30-----	3			107	305		475		2,450
31-----	3			--	--		464		2,360
Total--	64		(t)	913		1,535	10,836		68,644

e Estimated.

t Less than 0.50 ton, flow in interior drain only.



## RIO GRANDE BASIN--Continued

## RIO GRANDE NEAR BERNARDO, N. MEX.--Continued

Suspended sediment, water year October 1951 to September 1952--Continued

Day	January			February			March		
	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-----	591		4,030	667		2,800	568		1,810
2-----	1,256		26,100	627		2,950	728		2,530
3-----	1,186		27,100	607		2,920	1,368		20,700
4-----	1,086		18,500	647		3,110	807		11,400
5-----	806		10,200	667		2,960	667		8,820
6-----	686		5,230	607		2,370	555		4,960
7-----	647		4,840	567		1,840	507		3,040
8-----	607		4,050	555		1,790	494		2,090
9-----	626		4,100	555		1,970	435		1,620
10-----	626		4,020	567		2,420	407		1,190
11-----	606		3,810	627		2,850	537		2,570
12-----	567		3,020	647		2,300	867		7,660
13-----	568		2,870	667		2,580	988		11,800
14-----	606		3,080	707		3,120	727		7,480
15-----	647		4,410	747		2,800	588		4,700
16-----	1,002		12,300	668		2,510	316		1,870
17-----	827		7,420	648		2,450	560		4,620
18-----	728		4,370	629		2,430	815		9,320
19-----	747		4,200	627		2,290	1,398		34,100
20-----	836		7,730	608		1,980	953		22,700
21-----	1,888		55,500	647		1,920	946		22,600
22-----	1,187		15,900	607		1,730	1,157		25,100
23-----	947		10,300	567		1,480	1,097		18,700
24-----	787		6,740	587		1,610	908		14,600
25-----	707		4,540	627		1,760	508		3,980
26-----	667		3,740	647		1,970	233		772
27-----	667		3,350	648		1,990	176		548
28-----	687		3,410	627		1,840	194		753
29-----	647		2,850	607		1,670	205		691
30-----	627		2,560	--		--	628		7,940
31-----	627		2,510	--		--	1,258		22,400
Total-	24,689		272,870	18,205		66,420	21,595		283,064
	April			May			June		
1-----	588		4,310	3,742		41,700	5,350		66,600
2-----	634		7,950	3,515		37,900	6,340		89,900
3-----	1,374		23,500	3,420		40,800	6,870		96,200
4-----	1,464		21,900	4,374		58,400	6,580		72,600
5-----	1,501		20,700	5,168		86,100	6,760		71,000
6-----	1,746		26,900	5,576		87,000	6,980		71,900
7-----	2,072		31,100	6,500		105,000	6,960		65,600
8-----	1,713		21,100	7,420		111,000	6,860		61,300
9-----	2,146		33,400	7,630		108,000	6,990		68,800
10-----	2,246		30,400	7,950		113,000	6,800		61,600
11-----	2,229		27,600	7,280		91,800	6,560		55,900
12-----	2,051		22,200	7,080		90,900	6,590		51,000
13-----	2,134		25,800	6,280		79,900	6,450		52,600
14-----	2,063		23,600	5,455		61,000	6,110		54,700
15-----	1,452		11,600	5,490		55,300	5,930		57,700
16-----	1,760		17,100	5,610		59,000	5,730		45,800
17-----	1,854		18,900	6,290		79,500	5,500		39,100
18-----	2,202		25,700	7,350		95,800	5,340		40,900
19-----	2,366		28,300	7,410		78,800	4,950		32,800
20-----	2,623		27,900	6,610		61,200	4,650		26,300
21-----	3,263		38,700	6,110		63,000	4,250		24,400
22-----	3,173		32,100	5,450		52,500	3,990		20,000
23-----	2,950		30,500	5,030		45,500	3,514		19,800
24-----	2,942		31,200	4,654		46,200	3,004		14,600
25-----	2,712		26,400	4,846		45,500	2,612		12,000
26-----	2,950		26,700	4,682		47,900	2,360		10,200
27-----	3,225		34,600	3,994		45,400	2,042		9,130
28-----	3,249		35,300	4,238		43,500	1,871		8,960
29-----	3,398		38,400	4,431		44,500	1,722		7,360
30-----	4,022		47,400	4,717		48,900	2,185		13,400
31-----	--		--	4,881		48,800	--		--
Total-	68,102		790,900	173,183		2,073,800	151,850		1,322,150

## RIO GRANDE BASIN--Continued

## RIO GRANDE NEAR BERNARDO, N. MEX.--Continued

Suspended sediment, water year October 1951 to September 1952--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-----	1,632		7,130	896		9,990	485		10,100
2-----	1,450		5,190	1,041		14,200	381		5,080
3-----	1,480		6,820	1,047		13,600	253		1,470
4-----	1,787		11,100	1,474		25,200	235		764
5-----	2,346		39,300	1,368		21,700	210		523
6-----	1,776		31,900	1,403		25,900	182		394
7-----	2,432		65,800	1,349		16,100	130		194
8-----	3,802		149,000	1,140		9,010	105		98
9-----	2,904		84,200	1,089		7,880	104		76
10-----	2,522		45,100	1,129		7,890	101		60
11-----	2,180		36,800	1,601		12,200	95		41
12-----	2,102		20,900	2,164		58,400	70		24
13-----	2,045		21,400	1,704		86,300	81		23
14-----	2,120		24,700	985		30,200	72		15
15-----	1,827		22,000	1,081		19,400	67		13
16-----	2,192		43,100	1,186		14,100	54		12
17-----	1,845		25,400	1,548		20,400	51		11
18-----	1,327		16,300	1,530		14,800	49		9
19-----	1,186		7,760	914		5,840	46		6
20-----	1,103		5,640	828		3,760	43		5
21-----	1,358		9,010	828		3,990	47		14
22-----	734		2,440	868		5,340	73		35
23-----	570		1,510	1,320		16,600	95		42
24-----	505		1,210	2,164		52,000	117		122
25-----	568		1,970	1,633		45,500	124		117
26-----	771		4,100	1,263		34,600	109		74
27-----	897		7,120	910		23,100	151		155
28-----	1,197		14,200	767		16,600	147		81
29-----	838		5,780	567		5,570	142		48
30-----	1,008		8,190	724		14,900	92		28
31-----	1,194		10,200	667		17,500	--		--
Total-	49,798		735,270	37,188		652,750	3,911		19,634
Total discharge for year (cfs-days) .....									560,334
Total load for year (tons) .....									8,287,637

Note: The discharges and loads published are the sums of daily discharges and loads of the three channels. Composite concentrations for many days would be meaningless because of the varying conditions in the three channels. Thus no mean concentrations have been shown.

## RIO GRANDE BASIN--Continued

## RIO GRANDE MAIN CHANNEL NEAR BERNARDO, N. MEX.

Particle-size analyses of suspended sediment, April to August 1952

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

Date of collection	Time	Water discharge (cfs) <sup>a</sup>	Water temperature (° F)	Suspended sediment												Methods of analysis	
				Concentration of sample (ppm) <sup>b</sup>	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. 14, 1952	11:50 a. m.	603		4,890	6,680	--	45	--	73	--	98	99	99		100	--	SPWCM
Apr. 21	1:30 p. m.	1,230		3,260	4,090	--	39	--	59	--	86	96	99		100	--	SPWCM
May 11	9:00 a. m.	2,470		5,830	3,780	--	17	--	24	--	41	59	92		100	--	SPWCM
May 20	5:00 p. m.	2,470		3,490	3,850	--	14	--	22	--	46	74	96		100	--	SPWCM
June 3	2:20 p. m.	2,280		5,780	3,280	--	17	--	21	--	43	67	94		99	100	SPWCM
June 3	2:20 p. m.	2,280		5,780	2,910	--	13	--	22	--	43	67	94		99	100	SPN
June 10	3:30 p. m.	2,550		3,700	3,840	--	10	--	15	--	35	66	95		99	--	SPWCM
June 20	3:00 p. m.	1,590		1,750	1,870	13	15	18	23	32	45	68	93		99	--	SPWCM
July 5	10:00 a. m.	500		3,110	2,500	--	41	--	52	--	73	94	100		--	--	SPWCM
July 7	5:00 p. m.	e 400		12,400	4,570	--	21	--	38	--	76	95	99		100	--	SPWCM
July 14	3:00 p. m.	432		2,660	4,640	--	34	--	52	--	69	90	99		100	--	SPWCM
July 27	5:00 p. m.	e 10		2,700	3,130	--	83	--	99	--	100	--	--		--	--	SPWCM
July 31	7:00 a. m.	e 13		1,140	3,140	--	89	--	93	--	98	99	100		--	--	SPWCM
Aug. 12	11:00 p. m.	1,400		14,500	3,340	--	48	--	74	--	87	95	100		--	--	SPWCM
Aug. 12	11:00 p. m.	1,400		14,500	3,560	--	10	--	72	--	87	95	100		--	--	SPN
Aug. 12	11:00 p. m.	1,400		14,500	2,120	41	52	62	72	80	87	95	100		--	--	SPWCM
Aug. 12	11:00 p. m.	1,400		14,500	1,780	7	10	62	72	74	87	95	100		--	--	SEN
Aug. 24	6:00 a. m.	384		10,400	3,500	--	50	--	71	--	91	98	100		--	--	SPWCM

<sup>a</sup> Estimated.<sup>b</sup> No flow in main channel Oct. 1 - March 2, March 4 - April 2, July 22-26, Aug. 19-22, 28, 29, 31, Sept. 1-30.<sup>c</sup> Concentration and discharge in main channel at time of sampling.

RIO GRANDE BASIN--Continued  
BERNARDO INTERIOR DRAIN NEAR BERNARDO, N. MEX.

Particle-size analyses of suspended sediment, May to August 1952  
(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date of collection	Time	Water discharge (cfs) ab	Water temperature (° F)	Suspended sediment												Methods of analysis
				Concentration of sample (ppm) b	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 19, 1952 . . .	6:00 p. m.	2,180		1,530	2,900		32		44		66	85	97		100	SPWCM
June 3 . . . . .	9:30 a. m.	2,510		2,840	2,900		38		50		70	85	98		100	SPWCM
June 10 . . . . .	4:30 p. m.	1,970		1,400	--		--		--		57	78	93		99	S
June 19 . . . . .	4:30 p. m.	1,200		1,140	--		--		--		54	84	97		99	S
July 7 . . . . .	6:00 p. m.	134		7,960	3,960		25		39		83	97	99		100	SPWCM
Aug. 12 . . . . .	11:45 p. m.	1,120		14,900	3,490		54		79		95	98	100		--	SPWCM
Aug. 17 . . . . .	8:00 p. m.	96		5,050	3,290		71		96		100	--	--		--	SPWCM
Aug. 24 . . . . .	8:00 a. m.	91		6,450	3,870		65		91		100	--	--		--	SPWCM

a Drain carried river water April 2-12, April 12 - Aug. 31.

b Concentration and discharge in interior drain at time of sampling.

RIO GRANDE RIVER BASIN--Continued  
SAN FRANCISCO RIVERSIDE DRAIN NEAR BERNARDO, N. MEX.

Particle-size analyses of suspended sediment, November 1951 to August 1952  
(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date of collection	Time	Water discharge (cfs) <sup>a</sup> b	Water temperature (° F)	Suspended sediment										Methods of analysis	
				Concentration of sample (ppm) <sup>b</sup>	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
Nov. 26, 1951...	10:30 a.m.	76		567	996	66	79	91	94	97	98	100	--	SBWCM	
Dec. 17, 1951...	4:00 p.m.	484		2,450	1,840	--	42	--	44	--	79	87	98	SPWCM	
Jan. 2, 1952...	4:30 p.m.	1,420		8,200	4,540	31	42	50	56	63	73	84	96	SPWCM	
Jan. 2, 1952...	4:00 p.m.	1,420		8,200	2,760	32	41	50	58	65	73	86	96	SPWCM	
Jan. 7, 1952...	11:00 a.m.	656		3,030	3,960	--	35	--	40	--	52	70	94	SPWCM	
Jan. 27, 1952...	3:30 p.m.	672		1,750	1,640	--	42	--	57	--	71	85	98	SPWCM	
Feb. 15, 1952...	3:00 p.m.	644		1,330	1,730	--	37	--	47	--	52	70	94	SPWCM	
Mar. 4, 1952...	10:00 a.m.	804		5,780	2,620	--	49	--	65	--	69	81	94	SPWCM	
Mar. 13, 1952...	8:00 a.m.	1,040		4,390	2,960	42	56	62	66	72	76	86	96	SPWCM	
Mar. 13, 1952...	8:00 a.m.	1,040		4,390	1,910	43	53	62	67	71	76	86	96	SPWCM	
Mar. 31, 1952...	5:00 p.m.	1,180		5,600	5,660	--	49	--	65	--	83	84	84	SPWCM	
Apr. 14, 1952...	12:15 p.m.	1,660		3,720	3,140	--	34	--	50	--	93	94	97	SPWCM	
Apr. 22, 1952...	3:30 p.m.	2,000		4,590	3,470	--	30	--	42	--	61	79	95	SPWCM	
Apr. 30, 1952...	2:30 p.m.	2,380		5,050	4,030	--	23	--	36	--	66	83	100	SPWCM	
May 6, 1952...	1:30 p.m.	2,670		6,540	4,600	--	22	--	33	--	58	76	93	SPWCM	
May 10, 1952...	4:30 p.m.	2,700		6,960	4,590	--	18	--	28	--	50	77	98	SPWCM	
May 10, 1952...	4:30 p.m.	2,700		6,960	4,660	--	15	--	25	--	50	77	98	SPN	
May 20, 1952...	5:30 p.m.	2,380		4,310	2,440	--	10	--	17	--	37	52	87	SPWCM	
June 3, 1952...	2:35 p.m.	2,330		4,790	4,010	--	20	--	28	--	48	74	95	SPWCM	
June 10, 1952...	4:00 p.m.	2,280		4,320	3,840	--	8	--	13	--	30	58	85	SPWCM	
June 20, 1952...	3:30 p.m.	2,000		2,660	2,230	--	10	--	14	--	30	61	92	SPWCM	
June 30, 1952...	3:30 p.m.	1,640		2,180	--	--	--	--	--	--	27	57	92	S	
July 5, 1952...	(c)	--		6,840	5,560	--	53	--	66	--	76	88	98	SPWCM	
July 5, 1952...	(c)	--		6,840	5,940	--	3	--	68	--	76	88	98	SPN	
July 5, 1952...	(c)	--		6,840	7,140	39	53	60	66	69	76	88	98	SPWCM	
July 5, 1952...	(c)	--		6,840	6,630	1	3	10	70	72	76	88	98	SPN	
July 7, 1952...	5:30 p.m.	1,580		10,700	4,090	--	20	--	33	--	67	88	98	SPWCM	
July 18, 1952...	8:30 a.m.	1,240		5,110	4,430	--	58	--	70	--	75	86	98	SPWCM	
July 30, 1952...	4:30 p.m.	1,280		3,530	3,690	--	40	--	61	--	76	87	98	SPWCM	

a Low flow is confined to San Francisco drain. No flow Oct. 1 - Nov. 5.

b Concentration and discharge are for San Francisco drain at time of sampling.

c Composite of 3:30 p. m. and 4:30 p. m.

## RIO GRANDE BASIN--Continued

## SAN FRANCISCO RIVERSIDE DRAIN NEAR BERNARDO, N. MEX.--Continued

Particle-size analyses of suspended sediment, November 1951 to August 1952--Continued

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

82143

Date of collection	Time	Water discharge (cfs) ab	Water temperature (° F)	Suspended sediment												Methods of analysis
				W, in distilled water; C, chemically dispersed; M, mechanically dispersed)												
				Concentration of sample (ppm) <sup>b</sup>	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				
Aug. 5, 1952 ...	4:00 p. m.	1,330		5,410	4,670	--	59	--	76	--	85	91	99		100	SPWCM
Aug. 5 .....	4:00 p. m.	1,330		5,410	4,980	--	7	--	78	--	85	91	98		100	SPN
Aug. 12 .....	10:15 p. m.	2,430		16,000	4,080	--	43	--	72	--	89	94	98		100	SPWCM
Aug. 12 .....	10:15 p. m.	2,430		16,000	1,830	42	51	59	69	82	89	94	98		100	SPWCM
Aug. 17 .....	5:30 p. m.	1,540		5,550	4,090	--	48	--	72	--	85	90	97		100	SPWCM
Aug. 24 .....	12:10 a. m.	2,300		11,400	4,050	--	33	--	57	--	85	93	98		100	SPWCM
Aug. 30 .....	3:00 p. m.	1,000		3,890	4,140	--	43	--	61	--	70	81	95		100	SPWCM

<sup>a</sup> Low flow is confined to San Francisco drain. No flow Oct. 1 - Nov. 5.<sup>b</sup> Concentration and discharge are for San Francisco drain at time of sampling.

## RIO GRANDE BASIN--Continued

## RIO PUERCO BELOW CABEZON, N. MEX.

LOCATION.--One-fourth mile upstream from mouth of Chico Arroyo,  $4\frac{1}{2}$  miles southwest of Cabezon, Sandoval County, and  $1\frac{1}{2}$  miles downstream from gaging station above Chico Arroyo near Guadalupe.

DRAINAGE AREA.--420 square miles at gaging station above Chico Arroyo near Guadalupe.

RECORDS AVAILABLE.--Sediment records: April 1948 to September 1952.

EXTREMES, 1951-52.--Sediment concentrations: Maximum daily, 99,200 ppm Apr. 29; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 81,600 tons Aug. 12; minimum daily, 0 ton on many days.

EXTREMES, 1948-52.--Sediment concentrations: Maximum daily, 155,000 ppm July 13, 1949;

minimum daily, no flow on many days.

Sediment loads: Maximum daily, 155,000 tons Sept. 19, 1950; minimum daily, 0 ton on many days.

REMARKS.--Records of discharge for Rio Puerco above Chico Arroyo, near Guadalupe, N. Mex.

for water year October 1951 to September 1952 given in Water-Supply Paper 1242. No appreciable inflow between sampling point and gaging station except during period of heavy local rain.

Suspended sediment, water year October 1951 to September 1952

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			0		
2-----	0			0			0		
3-----	0			0			0		
4-----	0			0			0		
5-----	0			0			0		
6-----	0			0			0		
7-----	0			0			0		
8-----	0			0			0		
9-----	0			0			0		
10-----	0			0			0		
11-----	0			0			0		
12-----	0			0			0		
13-----	0			0			0		
14-----	0			0			0		
15-----	0			0			0		
16-----	0			0			0		
17-----	0			0			0		
18-----	0			0			0		
19-----	0			0			0		
20-----	0			0			0		
21-----	0			0			0		
22-----	0			0			0		
23-----	0			0			0		
24-----	0			0			0		
25-----	0			0			0		
26-----	0			.1			0		
27-----	19			.2			0		
28-----	1			.1			0		
29-----	.2			.1			0		
30-----	.1			.1			0		
31-----	0			--			7		
Total-	20.3		e 1,500	0.6		e 20	7		e 350

e Estimated.

## RIO GRANDE BASIN--Continued

## RIO PUERCO BELOW CABEZON, N. MEX.--Continued

Suspended sediment, water year October 1951 to September 1952--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			8		
2-----	2			0			1		
3-----	0			0			.5		
4-----	0			0			.2		
5-----	0			0			.1		
6-----	0			0			.1		
7-----	0			0			2		
8-----	0			0			6		
9-----	0			0			29		
10-----	0			0			37		
11-----	0			0			10		
12-----	0			0			5		
13-----	0			0			4		
14-----	0			0			2		
15-----	0			0			.7		
16-----	0			0			3		
17-----	0			0			13		
18-----	0			0			9		
19-----	20			0			4		
20-----	10			0			1		
21-----	5			.2			1		
22-----	4			.8			.5		
23-----	3			.1			.2		
24-----	1			0			0		
25-----	2			0			0		
26-----	0			0			0		
27-----	0			0			0		
28-----	0			0			0		
29-----	0			0			0		
30-----	0			--			0		
31-----	0			--			0		
Total-	50		e 3,100	1.1		e 40	137.3		e 12,000
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	35	41,800	4,100	8	15,000	324
2-----	0	--	0	35	60,400	5,920	15	27,700	s 1,980
3-----	0	--	0	50	65,800	s 9,660	72	62,400	s 12,500
4-----	0	--	0	75	69,000	a 14,500	69	49,500	9,560
5-----	0	--	0	98	84,000	23,000	35	28,700	2,710
6-----	0	--	0	135	90,400	s 36,400	20	29,400	1,590
7-----	0	--	0	120	71,000	23,900	15	25,000	1,010
8-----	0	--	0	102	74,000	21,100	10	24,600	664
9-----	0	--	0	99	77,900	s 23,100	8	13,700	296
10-----	0	--	0	73	55,000	11,200	7	15,000	284
11-----	0	--	0	54	49,000	7,410	4	--	b 160
12-----	0	--	0	45	39,200	s 4,850	2	--	b 85
13-----	0	--	0	31	42,000	3,650	.5	--	b 15
14-----	0	--	0	30	45,000	3,780	.3	--	b 5
15-----	0	--	0	33	30,000	2,670	0	--	0
16-----	0	--	0	32	33,000	2,960	0	--	0
17-----	1	--	b 80	29	36,000	2,920	0	--	0
18-----	8	71,100	1,590	28	39,500	3,100	0	--	0
19-----	9	69,700	1,760	22	30,000	1,780	0	--	0
20-----	15	61,800	s 2,960	19	23,000	1,180	0	--	0
21-----	25	78,500	s 5,900	14	15,000	567	0	--	0
22-----	25	75,200	s 5,820	10	11,700	316	0	--	0
23-----	11	52,000	1,600	7	14,000	265	0	--	0
24-----	11	37,000	1,140	4	16,200	175	0	--	0
25-----	9	26,000	632	2	15,800	85	0	--	0
26-----	11	35,000	1,080	12	--	b 600	0	--	0
27-----	17	42,000	2,000	4	--	b 160	0	--	0
28-----	46	75,400	s 11,600	2	6,420	s 63	0	--	0
29-----	43	99,200	s 12,500	5	17,000	230	0	--	0
30-----	35	62,700	6,140	8	16,000	348	0	--	0
31-----	--	--	--	9	15,500	377	--	--	--
Total-	266	--	54,802	1,222	--	210,384	265.8	--	31,183

e Estimated.

s Computed by subdividing day.

a Computed from estimated concentration graph.

b Computed from water - sediment discharge curve.



## RIO GRANDE BASIN--Continued

## RIO PUERCO BELOW CABEZON, N. MEX.--Continued

Suspended sediment, water year October 1951 to September 1952--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	20	81,200	s 5,250			
2-----	0	--	0	9	84,400	s 2,250			
3-----	136	16,000	s 38,600	2	51,000	a 290			
4-----	36	32,200	s 5,200	0	--	0			
5-----	16	9,560	s 3,350	0	--	0			
6-----	109	49,000	s 27,200	.6	30,100	s 86			
7-----	53	37,700	s 14,400	.1	10,000	a 3			
8-----	32	56,800	5,530	0	--	0			
9-----	4	34,500	386	.1	--	2			
10-----	2	22,000	119	0	--	0			
11-----	1	11,500	a 30	0	--	0			
12-----	0	--	0	288	15,800	s 81,600			
13-----	0	--	0	43	37,100	s 6,950			
14-----	0	--	0	5	37,800	532			
15-----	25	24,000	s 5,230	1	3,600	10			
16-----	1	22,000	a 60	.2	--	b 4			
17-----	0	--	0	.1	--	b 2			
18-----	0	--	0	.1	--	b 1			
19-----	0	--	0	0	--	0			
20-----	0	--	0	0	--	0			
21-----	0	--	0	0	--	0			
22-----	0	--	0	3	12,600	s 543			
23-----	4	--	b 800	5	63,900	s 947			
24-----	12	--	b 3,000	3	40,200	sa 370			
25-----	0	--	0	5	45,200	sa 720			
26-----	0	--	0	10	68,100	s 2,740			
27-----	0	--	0	2	35,500	199			
28-----	0	--	0	.2	--	b 9			
29-----	8	47,500	s 1,460	1	--	b 80			
30-----	3	62,800	s 495	.5	--	b 40			
31-----	38	96,800	s 12,300	.4	--	b 30			
Total-	480	--	118,160	399.3	--	102,658	0		0

Total discharge for year (cfs-days) ..... 2,849.4  
 Total load for year (tons) ..... 534,197

e Estimated.

s Computed by subdividing day.

a Computed from estimated concentration graph.

b Computed from water-sediment discharge curve.

## RIO GRANDE BASIN—Continued

## RIO PUERCO BELOW CABEZON, N. MEX.—Continued

Particle-size analyses of suspended sediment, April to August 1952  
 (Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water;  
 W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date of collection	Time	Water 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
		6		71,100	3,400		77		94		98	100	--		--		SPWCM
Apr. 18, 1952...	5:00 p. m.																SPWCM
Apr. 26 .....	8:00 a. m.	13		36,000	3,230		75		91		96	98	100		--		SPWCM
Apr. 26 .....	8:00 a. m.	13		36,000	2,880		1		92		96	98	100		--		SPN
May 6 .....	1:50 p. m.	180		104,000	4,320		39		52		74	92	98		100		SPWCM
May 20 .....	9:30 a. m.	21		26,700	3,690		51		62		85	97	89		99		SPWCM
May 21 .....	11:35 a. m.	17		19,100	5,760		56		75		91	99	100		--		SPWCM
June 1 .....	9:00 a. m.	8		16,500	5,280		74		89		98	99	100		--		SPWCM
June 4 .....	11:15 a. m.	56		76,300	3,650		40		51		77	85	99		100		SPWCM
June 4 .....	11:15 a. m.	56		76,300	3,690		6		48		77	85	99		100		SPN
July 6 .....	1:15 p. m.	320		94,700	4,740		38		52		82	97	100		--		SPWCM
July 7 .....	10:30 p. m.	202		87,400	3,780		42		58		79	95	100		--		SPWCM
July 29 .....	7:45 a. m.	16		85,400	4,110		78		99		100	--	--		--		SPWCM
July 31 .....	1:50 a. m.	230		138,000	5,480		47		65		83	95	100		--		SPWCM
July 31 .....	3:00 a. m.	143		120,000	3,350		57		73		88	97	100		--		SPWCM
Aug. 2 .....	10:15 a. m.	8		85,300	3,040		84		96		98	98	99		100		SPWCM
Aug. 2 .....	10:15 a. m.	8		85,300	5,060		4		97		98	98	99		100		SPN
Aug. 12 .....	9:30 p. m.	3,400		82,000	5,860		32		44		64	84	96		99		SPWCM
Aug. 12 .....	10:30 p. m.	1,030		95,700	3,480		33		42		65	85	97		100		SPWCM
Aug. 13 .....	10:50 a. m.	19		20,500	4,760		81		96		98	100	--		--		SPWCM
Aug. 26 .....	1:50 p. m.	4		47,800	3,900		87		91		99	99	100		--		SPWCM

## RIO GRANDE BASIN--Continued

## CHICO ARROYO NEAR GUADALUPE, N. MEX.

LOCATION.--At gaging station a quarter of a mile upstream from mouth, 4½ miles northwest of Gualalupe, Sandoval County, and 5½ miles southwest of Cabezón.

DRAINAGE AREA.--1,390 square miles, approximately.

RECORDS AVAILABLE.--Sediment records: July 1948 to September 1952.

EXTREMES, 1951-52.--Sediment concentrations: Maximum daily, 104,000 ppm Aug. 26; maximum observed, 191,000 ppm July 28; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 142,000 tons Aug. 22; minimum daily, 0 ton on many days.

EXTREMES, 1948-52.--Sediment concentrations: Maximum daily, 113,000 ppm July 23, 1949; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 744,000 tons Sept. 19, 1950; minimum daily, 0 ton on many days.

REMARKS.--Records of discharge for water year October 1951 to September 1952 given in Water-Supply Paper 1242. Records of suspended sediment October to December omitted; no flow during this period.

## Suspended sediment, January to September 1952

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-----	1								
2-----	2								
3-----	0								
4-----	0								
5-----	0								
6-----	0								
7-----	0								
8-----	0								
9-----	0								
10-----	0								
11-----	0								
12-----	0								
13-----	0								
14-----	0								
15-----	0								
16-----	0								
17-----	0								
18-----	0								
19-----	6								
20-----	9								
21-----	5								
22-----	1								
23-----	0								
24-----	0								
25-----	0								
26-----	0								
27-----	0								
28-----	0								
29-----	0								
30-----	0								
31-----	0								
Total-	22.2		e 1,240	0		0	0		0

e Estimated.

## WESTERN GULF OF MEXICO BASINS

## RIO GRANDE BASIN--Continued

## CHICO ARROYO NEAR GUADALUPE, N. MEX.--Continued

Suspended sediment, January to September 1952--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			0	--	0
2-----	0			0			0	--	0
3-----	0			0			161	74,500	s 42,360
4-----	0			0			32	75,100	s 6,310
5-----	0			0			2	74,000	s 320
6-----	0			0			2	48,000	27
7-----	0			0			0	--	0
8-----	0			0			0	--	0
9-----	0			0			0	--	0
10-----	0			0			0	--	0
11-----	0			0			0	--	0
12-----	0			0			0	--	0
13-----	0			0			0	--	0
14-----	0			0			0	--	0
15-----	0			0			0	--	0
16-----	0			0			0	--	0
17-----	0			0			0	--	0
18-----	0			0			0	--	0
19-----	0			0			0	--	0
20-----	0			0			0	--	0
21-----	0			0			0	--	0
22-----	0			0			0	--	0
23-----	0			0			0	--	0
24-----	0			0			0	--	0
25-----	0			0			0	--	0
26-----	0			0			0	--	0
27-----	0			0			0	--	0
28-----	55			0			0	--	0
29-----	48			0			0	--	0
30-----	11			0			0	--	0
31-----	--			0			--	--	--
Total-	114		e 14,000	0.4		e 15	195.2	--	48,957
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	33	40,100	s 4,820	0	--	0
2-----	0	--	0	91	52,500	s 21,200	0	--	0
3-----	92	17,500	s 18,000	2	25,000	135	0	--	0
4-----	183	49,300	s 45,300	2	9,000	s 9	0	--	0
5-----	85	29,100	s 17,300	0	--	0	0	--	0
6-----	376	77,500	s 92,400	0	--	0	0	--	0
7-----	350	49,800	s 124,000	0	--	0	0	--	0
8-----	300	78,100	s 78,300	0	--	0	0	--	0
9-----	19	30,300	1,550	0	--	0	0	--	0
10-----	10	13,500	364	56	51,500	s 11,200	0	--	0
11-----	5	7,500	101	4	44,700	s 521	0	--	0
12-----	.1	5,000	1	20	41,100	s 5,340	0	--	0
13-----	0	--	0	147	68,300	s 31,300	0	--	0
14-----	0	--	0	38	41,900	s 4,970	0	--	0
15-----	95	22,200	s 22,200	7	28,900	s 593	0	--	0
16-----	52	65,300	s 11,000	.1	21,000	6	52	39,500	s 7,600
17-----	3	27,500	223	0	--	0	3	29,400	s 337
18-----	.2	10,000	5	0	--	0	.2	16,000	9
19-----	0	--	0	46	31,000	s 10,600	0	--	0
20-----	0	--	0	42	40,800	s 4,980	0	--	0
21-----	0	--	0	246	41,200	s 79,500	0	--	0
22-----	0	--	0	480	73,600	s 142,000	0	--	0
23-----	0	--	0	365	62,700	s 96,400	0	--	0
24-----	0	--	0	41	39,400	s 4,880	0	--	0
25-----	2	30,900	s 900	12	34,200	sa 1,460	0	--	0
26-----	0	--	0	172	104,000	s 65,200	0	--	0
27-----	4	101,000	1,170	33	47,400	s 5,890	0	--	0
28-----	188	82,600	s 82,900	36	28,600	s 9,630	0	--	0
29-----	320	90,200	s 105,000	75	38,000	s 9,560	0	--	0
30-----	22	47,200	s 3,140	10	35,800	s 1,100	0	--	0
31-----	.8	27,600	s 69	.4	23,000	25	--	--	--
Total-	2,107.1	--	603,923	1,956.7	--	511,319	55.2	--	7,959
Total discharge for year (cfs-days).....									4,400.1
Total load for year (tons).....									1,187,470

e Estimated.

s Computed by subdividing day.

a Computed from estimated concentration graph.

RIO GRANDE BASIN--Continued  
CHICO ARROYO NEAR GUADALUPE, N. MEX.--Continued

Particle-size analyses of suspended sediment, June to September 1952

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

Date of collection	Time	Water 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
June 4, 1952	1:30 p. m.	22		90,800	3,800	76	87				91	92	96		100	SPWCM
July 3	7:30 p. m.	740		51,000	3,730	43	59				81	93	98		100	SPWCM
July 4	12:20 a. m.	1,120		154,000	6,070	41	58				76	89	98		100	SPWCM
July 4	12:20 a. m.	1,120		154,000	6,330	6	59				76	89	98		100	SPN
July 4	9:15 a. m.	89		40,800	11,800	73	88				92	96	100		--	SPWCM
July 5	9:15 a. m.	6		18,700	3,240	88	89				95	97	100		--	SPWCM
July 5	9:20 p. m.	1,180		68,900	3,170	42	55				74	90	98		100	SPWCM
July 6	2:30 a. m.	690		88,800	4,680	41	59				79	93	99		100	SPWCM
July 6	8:30 p. m.	690		78,500	4,730	52	68				85	97	100		--	SPWCM
July 7	1:00 a. m.	130		54,900	3,640	65	80				91	96	99		100	SPWCM
July 7	1:00 a. m.	130		54,900	4,050	23	78				91	96	99		100	SPN
July 7	9:15 p. m.	3,480		138,000	5,230	36	49				69	89	98		100	SPWCM
July 7	9:45 p. m.	3,370		107,000	4,760	44	59				81	95	99		100	SPWCM
July 7	11:00 p. m.	2,450		119,000	2,640	30	42				57	78	97		100	SPWCM
July 8	9:20 a. m.	394		101,000	4,340	52	63				75	88	98		100	SPWCM
July 9	9:00 a. m.	19		33,300	3,540	79	90				91	95	99		100	SPWCM
July 15	4:55 p. m.	919		110,000	4,140	37	53				67	81	97		100	SPWCM
July 16	3:10 p. m.	50		58,300	4,140	79	91				95	97	99		100	SPWCM
July 16	3:10 p. m.	50		58,300	4,040	7	99				95	97	99		100	SPN
July 28	10:30 p. m.	1,640		186,000	3,810	27	38				53	69	96		100	SPWCM
July 28	12:30 a. m.	820		108,000	5,240	38	51				65	78	96		100	SPWCM
July 29	4:15 p. m.	61		67,200	4,580	70	87				90	94	99		100	SPWCM
Aug. 1	8:00 a. m.	112		50,200	3,320	63	82				90	94	99		100	SPWCM
Aug. 1	6:45 p. m.	194		26,200	3,180	59	95				95	97	99		100	SPWCM
Aug. 10	4:15 a. m.	194		111,000	3,660	55	71				82	86	97		100	SPWCM
Aug. 10	4:15 a. m.	194		111,000	3,200	75	73				82	86	97		100	SPN
Aug. 10	9:00 p. m.	11		47,100	3,200	75	83				86	89	97		100	SPWCM
Aug. 13	3:10 a. m.	730		72,600	3,890	42	62				79	89	97		100	SPWCM
Aug. 21	10:00 p. m.	1,900		97,900	3,880	36	52				78	89	98		100	SPWCM
Aug. 21	10:00 p. m.	1,900		97,900	3,670	7	53				78	89	98		100	SPN

RIO GRANDE BASIN--Continued  
CHICO ARROYO NEAR GUADALUPE, N. MEX.--Continued

Particle-size analyses of suspended sediment June to September 1952.--Continued

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

Date of collection	Time	Water 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
Aug. 22, 1952 . . .	12:05 a. m.	1,540		109,000	4,160		33					61	75	96		100	SPWCM
Aug. 22 . . . . .	7:00 a. m.	620		74,800	5,620		41		45			67	77	90		99	SPWCM
Aug. 22 . . . . .	6:00 p. m.	100		46,800	2,900		67		55		78	84	92	98		100	SPWCM
Aug. 22 . . . . .	11:45 p. m.	2,030		104,000	3,180		37		78		53	74	90	99		100	SPWCM
Aug. 23 . . . . .	3:00 a. m.	720		94,300	3,910		40		51		69	84	98		100		SPWCM
Aug. 23 . . . . .	8:00 a. m.	370		70,600	3,250		46		64		76	86	97		100		SPWCM
Aug. 26 . . . . .	2:30 a. m.	1,280		121,000	4,830		37		53		76	95	98		100		SPWCM
Sept. 16 . . . . .	5:00 p. m.	58		45,800	4,830		74		90		95	98	99		100		SPWCM

## RIO GRANDE BASIN--Continued

## SAN JOSE RIVER AT CORREO, N. MEX.

LOCATION.--At gaging station 0.6 mile upstream from U. S. Highway 66, 0.7 mile northeast of Correo, Valencia County, and 13 miles upstream from mouth.

DRAINAGE AREA.--2,610 square miles, approximately.

RECORDS AVAILABLE.--Sediment records: July 1948 to September 1952.

EXTREMES, 1951-52.--Sediment concentrations: Maximum daily, 58,800 ppm Aug. 29; maximum observed, 131,000 ppm Aug. 29; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 83,000 tons Sept. 22; minimum daily, 0 ton on many days.

EXTREMES, 1948-52.--Sediment concentrations: Maximum daily, 58,800 ppm Aug. 29, 1952; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 83,000 tons Sept. 22, 1952; minimum daily 0 ton on many days.

REMARKS.--Records of discharge for water year October 1951 to September 1952 given in Water-Supply Paper 1242. Records of suspended sediment October to May omitted; no flow during this period.

## Suspended sediment, June to September 1952

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-----							8	9,700	sa 400
3-----							102	54,000	sb 27,100
4-----							.3	4,100	a 3
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-							110.3	--	27,503

s Computed by subdividing day.

a Computed from estimated concentration graph.

b Computed from partly-estimated concentration graph.

## WESTERN GULF OF MEXICO BASINS

## RIO GRANDE BASIN--Continued

## SAN JOSE RIVER AT CORREO, N. MEX.--Continued

Suspended sediment, June to September 1952--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	0	--	0	0	--	0
2-----	0	--	0	0	--	0	0	--	0
3-----	0	--	0	0	--	0	0	--	0
4-----	0	--	0	0	--	0	0	--	0
5-----	0	--	0	0	--	0	0	--	0
6-----	22	35,200	s 3,940	0	--	0	0	--	0
7-----	287	32,900	sb 49,200	0	--	0	0	--	0
8-----	13	7,000	246	.6	5,200	sa 30	0	--	0
9-----	19	7,500	sa 1,700	.5	4,500	sa 10	0	--	0
10-----	162	30,000	sb 30,700	0	--	0	0	--	0
11-----	6	5,000	81	47	58,000	sb 9,350	0	--	0
12-----	.1	375	(t)	16	15,600	s 1,020	0	--	0
13-----	0	--	0	1	2,000	a 5	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	0	--	0	0	--	0
20-----	0	--	0	0	--	0	0	--	0
21-----	0	--	0	8	13,800	sa 590	0	--	0
22-----	0	--	0	47	12,100	s 4,850	419	23,000	sa 83,000
23-----	.3	420	sa 8	17	8,000	s 591	17	23,600	s 1,940
24-----	2	2,580	s 30	1	22,900	sb 185	2	1,750	sa 12
25-----	0	--	0	.2	2,000	sa 2	0	--	0
26-----	0	--	0	14	13,800	s 663	0	--	0
27-----	0	--	0	2	4,000	22	0	--	0
28-----	0	--	0	1	3,500	a 9	0	--	0
29-----	33	44,200	s 8,270	154	58,800	s 35,700	0	--	0
30-----	0	--	0	.1	2,300	a 1	0	--	0
31-----	0	--	0	0	--	0	--	--	--
Total-	544.4	--	94,175	309.4	--	53,028	438	--	84,952
Total discharge for year (cfs-days).....									1,402.1
Total load for year (tons).....									259,658

s Computed by subdividing day.

t Less than 0.5 ton.

a Computed from estimated concentration graph.

b Computed from partly-estimated concentration graph.



RIO GRANDE BASIN--Continued  
SAN JOSE RIVER AT CORREO, N. MEX.--Continued

Particle-size analyses of suspended sediment, June to September 1952  
(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date of collection	Time	Water 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
June 3, 1952 . . . . .	11:00 a. m.	31		58,500	3,940	--	75	--	98	--	99	100	--		--		SPWCM
July 7 . . . . .	10:30 a. m.	130		21,200	3,240	--	78	--	88	--	95	98	100		--		SPWCM
July 7 . . . . .	10:30 a. m.	130		21,200	2,880	--	16	--	84	--	95	98	100		--		SPN
July 7 . . . . .	10:30 a. m.	130		21,200	2,550	71	84	90	93	95	95	98	100		--		SPWCM
July 7 . . . . .	10:30 a. m.	130		21,200	2,480	6	10	82	93	94	95	98	100		--		SEN
July 10 . . . . .	9:45 a. m.	81		11,500	6,810	--	81	--	88	--	91	97	100		--		SPWCM
Aug. 22 . . . . .	6:15 p. m.	196		38,700	3,510	--	76	--	88	--	97	98	99		100		SPWCM
Aug. 23 . . . . .	3.30 a. m.	3.5		3,330	3,700	--	96	--	99	--	100	--	--		--		SPWCM
Aug. 29 . . . . .	4:00 a. m.	1,440		77,500	3,700	--	65	--	84	--	94	97	99		100		SPWCM
Sept. 23 . . . . .	10:30 a. m.	9		30,300	3,840	--	83	--	97	--	100	--	--		--		SPWCM

## WESTERN GULF OF MEXICO BASINS

## RIO GRANDE BASIN--Continued

## RIO PUERCO AT RIO PUERCO, N. MEX.

LOCATION.--At gaging station at Atchison, Topeka and Santa Fe Railroad bridge, 7 miles downstream from San Jose River, and 15 miles west of Los Lunas, Valencia County.

DRAINAGE AREA.--5,160 square miles, approximately.

RECORDS AVAILABLE.--Water temperatures: October 1949 to September 1952.

Sediment records: July 1948 to September 1952.

EXTREMES, 1951-52.--Water temperatures: Maximum observed, 89°F July 11, minimum observed, 57°F May 17.

Sediment concentrations: Maximum daily, 153,000 ppm July 5; maximum observed, 315,000 ppm Aug. 23; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 394,000 tons Sept. 23; minimum daily, 0 ton on many days.

EXTREMES, 1948-52.--Water temperatures (1949-52): Maximum observed, 89°F July 11, 1952; minimum observed, 33°F Jan. 12, 1950.

Sediment concentrations: Maximum daily, 195,000 Aug. 8, 1949; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 1,090,000 tons Sept. 20, 1950; minimum daily, 0 ton on many days.

REMARKS.--Records of suspended sediment October to April omitted; no flow during this period. Records of discharge for water year October 1951 to September 1952 given in Water-Supply Paper 1242.

Temperature (°F) of water, May to September 1952

/Once-daily temperature measurement between 11:00 a. m. and 6:00 p. m. <sup>a</sup>

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1								--	--	--	81	--
2								--	--	--	84	78
3								--	67	--	83	--
4								--	--	--	85	--
5								--	74	b 68	79	--
6								84	74	--	79	--
7								68	84	72	--	--
8								68	--	72	--	--
9								c 60	--	b 68	--	--
10								69	--	74	--	--
11								--	--	89	81	--
12								--	--	b 74	84	--
13								77	--	--	c 74	--
14								76	--	--	78	--
15								69	--	--	84	--
16								--	--	--	84	--
17								57	--	--	83	--
18								--	--	--	--	--
19								--	--	--	--	--
20								64	--	--	--	--
21								--	--	--	--	--
22								--	--	--	c 74	--
23								--	--	--	c 74	72
24								82	--	--	c 73	74
25								--	--	--	--	75
26								--	--	--	79	--
27								--	--	--	76	--
28								--	--	--	82	--
29								--	--	82	74	--
30								--	--	76	77	--
31								--	--	--	78	--
Average								--	--	--	--	--

a There was no flow on most days when no temperature is indicated.

b Observations made before 11:00 a. m.

c Observations made after 6:00 p. m.

## RIO GRANDE BASIN--Continued

RIO PUERCO AT RIO PUERCO, N. MEX.--Continued

Suspended sediment, May to September 1952

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-----				8	16,000	sa 1,400	0	--	0
2-----				16	57,000	a 2,600	172	51,500	sb 83,400
3-----				11	56,000	a 1,700	373	124,000	sb 157,000
4-----				6	53,000	a 890	126	117,000	42,800
5-----				3	49,000	a 410	74	107,000	23,000
6-----				21	76,800	s 4,880	35	104,000	10,600
7-----				50	108,000	15,700	13	99,000	3,730
8-----				74	117,000	25,100	3	78,000	a 660
9-----				44	105,000	13,400	1	35,000	a 100
10-----				37	97,000	10,400	1	16,000	a 40
11-----				42	99,000	a 12,000	1	8,000	a 20
12-----				27	91,000	a 7,130	0	--	0
13-----				16	79,500	3,560	0	--	0
14-----				9	79,000	1,990	0	--	0
15-----				8	78,500	1,760	0	--	0
16-----				3	75,000	630	0	--	0
17-----				2	70,500	395	0	--	0
18-----				6	72,000	a 1,200	0	--	0
19-----				8	71,000	a 1,600	0	--	0
20-----				9	69,000	1,740	0	--	0
21-----				6	69,000	a 1,200	0	--	0
22-----				3	68,000	571	0	--	0
23-----				1	44,000	a 120	0	--	0
24-----				0	--	0	0	--	0
25-----				0	--	0	0	--	0
26-----				0	--	0	0	--	0
27-----				5	18,000	sa 1,300	0	--	0
28-----				10	74,000	a 2,100	0	--	0
29-----				1	52,000	146	0	--	0
30-----				0	--	0	0	--	0
31-----				0	--	0	--	--	--
Total-				426	--	113,892	799	--	321,350
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	14	96,500	3,920	8	58,000	a 1,300
2-----	0	--	0	132	106,000	s 49,300	2	62,500	350
3-----	0	--	0	96	98,000	27,300	0	--	0
4-----	8	1,690	s 3,130	18	90,000	4,700	0	--	0
5-----	261	153,000	s 143,000	4	81,000	907	0	--	0
6-----	201	98,000	sa 70,000	1	50,000	a 140	0	--	0
7-----	812	127,000	s 313,000	0	--	0	0	--	0
8-----	665	140,000	s 322,000	0	--	0	0	--	0
9-----	285	103,000	s 97,300	0	--	0	0	--	0
10-----	181	54,200	s 30,200	0	--	0	0	--	0
11-----	20	48,000	2,690	36	111,000	s 12,800	0	--	0
12-----	5	47,000	658	30	64,400	s 5,970	0	--	0
13-----	1	19,000	a 50	276	89,700	s 209,000	0	--	0
14-----	0	--	0	217	109,000	s 83,000	0	--	0
15-----	0	--	0	39	82,000	8,950	0	--	0
16-----	31	65,000	sa 11,000	12	76,000	2,550	0	--	0
17-----	48	97,000	sa 15,000	1	76,000	213	0	--	0
18-----	16	67,000	a 3,000	0	--	0	0	--	0
19-----	6	31,000	a 500	1	5,100	sa 260	0	--	0
20-----	2	13,000	a 70	4	32,000	a 360	0	--	0
21-----	1	8,000	a 20	14	27,000	sa 3,900	0	--	0
22-----	0	--	0	293	111,000	s 205,000	56	2,500	sa 19,000
23-----	0	--	0	783	135,000	s 327,000	782	115,000	sb 394,000
24-----	130	56,000	sa 44,000	456	106,000	s 145,000	25	54,000	s 3,940
25-----	6	40,000	a 670	74	73,000	s 15,700	4	29,000	a 310
26-----	1	25,000	a 70	124	77,900	s 39,600	1	18,000	a 50
27-----	0	--	0	233	101,000	s 75,200	0	--	0
28-----	0	--	0	50	73,000	10,200	0	--	0
29-----	21	36,900	s 3,760	570	108,000	s 254,000	0	--	0
30-----	214	137,000	s 116,000	88	56,000	13,800	0	--	0
31-----	31	108,000	9,710	14	42,000	1,650	--	--	--
Total-	2,946	--	1,185,828	3,580	--	1,500,420	878	--	417,300

Total discharge for year (cfs-days) ..... 8,629

Total load for year (tons) ..... 3,538,790

s Computed by subdividing day.

a Computed from estimated concentration graph.

b Computed from partly-estimated concentration graph.

RIO GRANDE BASIN--Continued  
RIO PUERCO AT RIO PUERCO, N. MEX.--Continued

Particle-size analyses of suspended sediment, May to August 1952  
(Methods of analysis: B, bottom withdrawal tube; D, decantation; F, pipette; S, sieve; N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date of collection	Time	Water 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 10, 1952.....	2:55 p. m.	47		90,900	4,980	--	78	--	96	--	99	100	--		100	SPWCM
May 20.....	2:45 p. m.	9		67,600	4,440	--	88	--	98	--	100	--	--		--	SPWCM
June 3.....	12:50 p. m.	307		77,500	3,350	--	67	--	85	--	94	97	100		--	SPWCM
June 3.....	12:50 p. m.	307		77,500	4,060	--	3	--	87	--	94	97	100		--	SPN
June 3.....	12:50 p. m.	307		77,500	2,980	56	68	77	85	89	94	97	100		--	SBWCM
June 3.....	12:50 p. m.	307		77,500	2,870	2	3	10	48	93	94	97	100		--	SBN
July 5.....	12:15 a. m.	1,020		247,000	3,970	--	49	--	72	--	93	97	99		100	SPWCM
July 7.....	12:45 p. m.	1,400		138,000	4,250	--	43	--	58	--	76	92	99		100	SPWCM
July 8.....	5:30 p. m.	1,700		184,000	3,280	--	40	--	49	--	72	88	99		100	SPWCM
July 30.....	12:05 a. m.	12		54,400	4,440	--	84	--	99	--	100	--	--		--	SPWCM
July 30.....	2:10 a. m.	658		144,000	4,700	--	59	--	77	--	91	96	100		--	SPWCM
July 30.....	2:10 a. m.	658		144,000	5,280	--	14	--	77	--	91	96	100		--	SPN
July 30.....	3:55 a. m.	512		168,000	4,020	--	48	--	69	--	83	91	97		100	SPWCM
July 30.....	12:30 p. m.	241		139,000	4,480	--	58	--	75	--	93	97	100		--	SPWCM
Aug. 2.....	2:00 p. m.	22		69,800	4,720	--	87	--	98	--	99	100	--		--	SPWCM
Aug. 2.....	3:45 p. m.	340		117,000	3,480	--	72	--	86	--	92	95	99		100	SPWCM
Aug. 2.....	5:30 p. m.	424		139,000	4,150	--	60	--	79	--	90	94	99		100	SPWCM
Aug. 4.....	2:00 p. m.	13		89,700	2,230	--	90	--	93	--	100	--	--		--	SPWCM
Aug. 4.....	2:00 p. m.	15		89,700	3,390	--	18	--	91	--	100	--	--		--	SPN
Aug. 11.....	1:50 p. m.	126		143,000	4,250	--	71	--	96	--	97	98	100		--	SPWCM
Aug. 11.....	6:00 p. m.	6		31,400	6,760	--	93	--	98	--	99	100	--		--	SPWCM
Aug. 13.....	6:45 p. m.	1,480		315,000	4,010	--	32	--	48	--	62	75	94		100	SPWCM
Aug. 13.....	7:40 p. m.	1,200		286,000	3,460	--	41	--	55	--	70	80	95		100	S
Aug. 22.....	7:10 p. m.	1,720		274,000	3,460	--	4	--	52	--	72	83	97		100	SPWCM
Aug. 22.....	9:00 p. m.	1,280		274,000	4,060	--	4	--	52	--	72	83	97		100	SPN
Aug. 22.....	12:00 p. m.	1,670		257,000	3,180	--	32	--	58	--	65	84	98		100	SPWCM
Aug. 23.....	1:00 p. m.	1,670		116,000	3,520	--	40	--	54	--	73	95	100		--	SPWCM
Aug. 24.....	3:45 a. m.	640		106,000	3,280	--	47	--	63	--	96	96	100		--	SPWCM

Aug. 29, 1952	8:30 a. m.	31	78,100	6,040	--	--	62	--	91	--	99	99	100	--	SPWCM
Aug. 29	9:40 a. m.	2,200	187,000	3,040	--	--	35	--	44	--	64	75	98	100	SPWCM
Aug. 29	9:40 a. m.	2,200	187,000	3,860	--	--	9	--	47	--	64	75	98	100	SPN
Aug. 29	10:15 a. m.	2,390	214,000	3,320	--	--	33	--	42	--	65	82	98	100	SPWCM
Aug. 29	11:15 a. m.	1,750	202,000	3,870	--	--	36	--	48	--	66	67	81	100	SPWCM
Aug. 29	11:15 a. m.	1,750	202,000	4,290	--	--	9	--	45	--	66	67	81	100	SPN
Aug. 29	7:45 p. m.	382	82,600	4,160	--	--	60	--	81	--	93	98	100	--	SPWCM

## 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 16 miles south of Belen.

DRAINAGE AREA.--5,860 square miles, approximately.

RECORDS AVAILABLE.--Sediment records: October 1947 to September 1952.

EXTREMES, 1951-52.--Sediment concentrations: Maximum daily, 189,000 ppm Aug. 23; maximum observed, 290,000 ppm Aug. 29; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 313,000 tons July 9; minimum daily 0 ton on many days.

EXTREMES, 1947-52.--Sediment concentrations: Maximum daily, 215,000 ppm July 22, 1949; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 958,000 tons July 24, 1949; minimum daily 0 ton on many days.

REMARKS.--Records of discharge for water year October 1951 to September 1952 given in Water-Supply Paper 1242. Suspended sediment records October to April omitted; no flow during this period.

## Suspended sediment, May to September 1952

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	0.2	3,000	a 2
2-----				0	--	0	141	66,800	s 33,300
3-----				0	--	0	483	104,000	s 152,000
4-----				0	--	0	218	76,000	s 49,800
5-----				0	--	0	96	88,900	24,700
6-----				1	3,000	e 8	52	122,000	18,400
7-----				10	30,000	e 800	26	108,000	8,140
8-----				40	130,000	e 15,000	10	103,000	2,990
9-----				45	130,000	17,000	4	92,000	1,070
10-----				40	128,000	14,800	1	56,000	157
11-----				35	114,000	11,600	.4	4,000	4
12-----				30	102,000	8,870	.2	3,000	e 2
13-----				20	92,000	5,340	0	--	0
14-----				10	60,900	1,710	0	--	0
15-----				5	62,900	881	0	--	0
16-----				2	596	3	0	--	0
17-----				0	--	0	0	--	0
18-----				1	1,940	5	0	--	0
19-----				2	514	3	0	--	0
20-----				3	953	8	0	--	0
21-----				3	200	b 2	0	--	0
22-----				1	18,400	s 193	0	--	0
23-----				.5	3,500	5	0	--	0
24-----				.5	120	(t)	0	--	0
25-----				0	--	0	0	--	0
26-----				0	--	0	0	--	0
27-----				0	--	0	0	--	0
28-----				0	--	0	0	--	0
29-----				0	--	0	0	--	0
30-----				3	36,000	e 300	0	--	0
31-----				1	7,400	a 20	--	--	--
Total--				253.0	--	76,548	1,031.8	--	290,565

e Estimated.

s Computed by subdividing day.

t Less than 0.50 ton.

a Computed from estimated concentration graph.

b Computed from partly-estimated concentration graph.

## RIO GRANDE BASIN--Continued

## RIO PUERCO NEAR BERNARDO, N. MEX.--Continued

Suspended sediment, May to September 1952--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	20	117,000	6,790	12	58,000	1,950
2-----	0	--	0	58	120,000	s 22,700	4	50,000	560
3-----	2	7,500	sa 240	116	138,000	s 48,000	3	30,000	243
4-----	1	11,000	a 30	53	121,000	18,600	.8	4,000	9
5-----	81	43,000	sa 44,000	20	94,800	5,500	0	--	0
6-----	75	153,000	34,400	5	72,300	1,010	0	--	0
7-----	439	174,000	s 280,000	1	38,000	106	0	--	0
8-----	493	147,000	s 227,000	.2	8,500	5	0	--	0
9-----	557	174,000	s 313,000	0	--	0	0	--	0
10-----	205	101,000	60,000	0	--	0	0	--	0
11-----	106	57,200	s 19,200	0	--	0	0	--	0
12-----	12	40,400	1,360	14	84,000	s 7,260	0	--	0
13-----	3	34,000	286	10	133,000	3,860	0	--	0
14-----	1	8,000	22	198	183,000	s 147,000	0	--	0
15-----	76	74,800	s 26,100	80	112,000	26,000	0	--	0
16-----	4	48,000	538	22	87,000	5,550	0	--	0
17-----	10	39,200	b 1,100	17	90,000	4,440	0	--	0
18-----	30	100,000	8,700	8	80,000	1,790	0	--	0
19-----	10	76,000	2,130	4	50,000	560	0	--	0
20-----	4	84,000	941	1	30,000	81	0	--	0
21-----	.4	46,000	52	2	10,000	54	0	--	0
22-----	0	--	0	6	7,670	s 1,330	0	--	0
23-----	0	--	0	422	189,000	s 299,000	341	79,400	s 166,000
24-----	1	28,000	a 76	466	162,000	s 241,000	95	83,200	s 23,600
25-----	160	98,000	sa 60,000	145	117,000	s 51,700	18	66,000	3,330
26-----	5	53,000	742	102	95,300	s 34,900	6	58,000	941
27-----	1	35,000	98	141	98,500	s 46,300	1	15,000	40
28-----	.5	3,000	4	110	100,000	31,900	0	--	0
29-----	.2	2,000	1	214	122,000	s 137,000	0	--	0
30-----	70	49,000	s 35,000	180	110,000	57,400	0	--	0
31-----	175	138,000	70,000	25	87,000	4,690	--	--	--
Total-	2,522.1	--	1,185,020	2,440.2	--	1,204,526	480.8	--	196,673
Total discharge for year (cfs-days) .....									6,727.9
Total load for year (tons) .....									2,953,332

e Estimated.

s Computed by subdividing day.

t Less than 0.50 ton.

a Computed from estimated concentration graph.

b Computed from partly-estimated concentration graph.

## RIO GRANDE BASIN--Continued

## RIO PUERTO NEAR BERNARDO, N. MEX.--Continued

Particle-size analyses of suspended sediment, May to September 1952

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

Date of collection	Time	Water 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 9, 1952	8:00 a. m.	45		129,000	4,240	--	88	--	98	--	100	--	--	--	--	SPWCM
May 15	10:30 a. m.	e 3		71,900	3,830	--	91	--	98	--	100	--	--	--	--	SPWCM
May 15	10:30 a. m.	e 3		71,900	1,540	80	87	96	98	99	100	--	--	--	--	SPWCM
May 22	4:30 p. m.	8		49,800	5,480	--	97	--	99	--	100	--	--	--	--	SPWCM
June 3	11:35 a. m.	890		126,000	3,310	55	65	66	71	79	87	94	99	100	100	SPWCM
June 3	11:35 a. m.	890		126,000	3,860	0	7	17	69	77	87	94	99	100	100	SPN
June 3	11:35 a. m.	890		126,000	3,500	50	55	64	71	79	87	94	99	100	100	SPWCM
June 4	12:00 m.	189		70,500	4,040	--	71	--	84	--	95	99	100	--	--	SPWCM
July 7	6:00 a. m.	19		132,000	4,330	--	81	--	97	--	100	--	--	--	--	SPWCM
July 7	12:30 p. m.	384		193,000	7,100	--	57	--	76	--	91	96	99	100	100	SPWCM
July 7	6:30 p. m.	960		223,000	6,510	--	45	--	60	70	81	88	98	100	100	SPWCM
July 8	6:15 a. m.	580		134,000	4,480	--	52	--	70	--	90	97	100	--	--	SPWCM
July 9	5:00 a. m.	890		201,000	4,430	--	38	--	51	--	70	81	99	100	100	SPWCM
July 9	5:00 a. m.	890		201,000	3,720	--	2	--	45	--	70	81	99	100	100	SPN
July 10	1:00 p. m.	147		92,900	7,560	--	78	--	96	--	98	99	100	--	--	SPWCM
July 30	5:30 p. m.	285		152,000	4,720	--	66	--	84	91	93	96	99	100	100	SPWCM
July 31	6:00 a. m.	e 14		180,000	4,910	--	87	--	84	95	97	99	99	100	100	SPWCM
Aug. 14	6:10 a. m.	660		104,000	3,420	--	85	--	99	--	100	--	--	--	--	SPWCM
Aug. 14	8:10 a. m.	544		240,000	4,680	--	52	--	69	80	86	93	97	100	100	SPWCM
Aug. 14	9:45 a. m.	544		273,000	3,620	--	44	--	59	--	82	89	96	99	100	SPWCM
Aug. 14	9:45 a. m.	544		273,000	3,500	--	6	--	60	--	82	89	96	99	100	SPN
Aug. 23	7:00 a. m.	775		273,000	5,200	--	44	--	56	--	71	81	94	100	100	SPWCM
Aug. 23	7:00 a. m.	775		273,000	3,710	--	11	--	59	--	71	81	94	100	100	SPN
Aug. 23	10:00 a. m.	660		274,000	7,220	--	35	--	49	59	69	83	96	100	100	SPWCM
Aug. 23	6:00 p. m.	728		187,000	3,760	--	45	--	58	--	77	88	99	100	100	SPWCM
Aug. 23	7:15 p. m.	608		199,000	4,510	--	40	--	52	--	75	91	99	100	100	SPWCM
Aug. 24	7:30 a. m.	910		186,000	5,650	--	41	--	54	--	73	94	100	--	--	SPWCM
Aug. 29	6:45 p. m.	920		281,000	5,810	--	29	--	40	--	58	81	98	100	100	SPWCM
Aug. 29	7:45 p. m.	810		273,000	5,620	--	30	--	39	--	61	77	97	100	100	SPWCM

e Estimated



## 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.--Sediment records: July 1948 to September 1952.

EXTREMES, 1951-52.--Sediment concentrations: Maximum daily, 143,000 ppm July 7; maximum observed, 292,000 ppm July 15; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 228,000 tons July 14; minimum daily 0 ton on many days.

EXTREMES, 1948-52.--Sediment concentrations: Maximum daily, 174,000 ppm Aug. 1, 1951; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 372,000 tons Aug. 24, 1951; minimum daily, 0 ton on many days.

REMARKS.--records of suspended sediment October to April omitted; no flow during this period.

Records of discharge for water year October 1951 to September 1952 given in Water-Supply Paper 1242.

## Suspended sediment, May to September 1952

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	--	0
2-----				0			116	70,000	sa 49,000
3-----				0			190	81,000	s 48,000
4-----				0			6	48,000	a 800
5-----				0			0	--	0
6-----				0			0	--	0
7-----				0			0	--	0
8-----				0			0	--	0
9-----				0			0	--	0
10-----				0			0	--	0
11-----				0			0	--	0
12-----				0			0	--	0
13-----				0			0	--	0
14-----				0			0	--	0
15-----				0			0	--	0
16-----				0			0	--	0
17-----				0			0	--	0
18-----				2			0	--	0
19-----				1			0	--	0
20-----				0			0	--	0
21-----				0			0	--	0
22-----				0			0	--	0
23-----				0			0	--	0
24-----				0			0	--	0
25-----				0			0	--	0
26-----				0			0	--	0
27-----				0			0	--	0
28-----				0			0	--	0
29-----				0			0	--	0
30-----				0			0	--	0
31-----				0			--	--	--
Total-				3		e 300	312	--	97,800

e Estimated.

s Computed by subdividing day.

a Computed from estimated concentration graph.

WESTERN GULF OF MEXICO BASINS  
RIO GRANDE BASIN--Continued  
RIO SALADO NEAR SAN ACACIA, N. MEX.--Continued

Suspended sediment, May to September 1952--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	0	--	0	0	--	0
2-----	0	--	0	62	84,100	s 15,800	0	--	0
3-----	0	--	0	10	60,000	1,680	0	--	0
4-----	0	--	0	0	--	0	0	--	0
5-----	0	--	0	0	--	0	0	--	0
6-----	220	44,900	s 68,100	0	--	0	0	--	0
7-----	95	143,000	s 50,200	0	--	0	0	--	0
8-----	4	70,000	784	5	51,500	s 1,190	0	--	0
9-----	120	52,000	sa 70,700	0	--	0	0	--	0
10-----	90	82,800	s 27,800	38	75,000	7,980	0	--	0
11-----	6	55,000	a 920	9	57,000	sa 1,700	0	--	0
12-----	4	26,000	sa 610	7	57,000	a 1,100	0	--	0
13-----	0	--	0	5	25,000	a 35	0	--	0
14-----	430	43,500	s 228,000	60	66,800	s 22,500	0	--	0
15-----	160	83,900	s 76,300	5	45,000	630	0	--	0
16-----	61	82,000	sa 14,500	0	--	0	0	--	0
17-----	10	54,000	a 1,500	0	--	0	0	--	0
18-----	2	36,000	a 200	10	57,000	1,600	0	--	0
19-----	0	--	0	1	35,000	98	0	--	0
20-----	0	--	0	0	--	0	0	--	0
21-----	0	--	0	25	74,300	s 6,950	0	--	0
22-----	0	--	0	120	104,000	s 96,500	218	72,100	s 46,400
23-----	0	--	0	224	126,000	s 83,200	225	69,900	s 47,800
24-----	0	--	0	54	76,800	s 14,900	10	47,000	1,320
25-----	0	--	0	90	68,500	s 23,300	0	--	0
26-----	0	--	0	4	47,200	s 695	0	--	0
27-----	0	--	0	143	90,800	s 57,600	0	--	0
28-----	0	--	0	40	64,400	s 7,630	0	--	0
29-----	0	--	0	80	61,100	s 25,500	0	--	0
30-----	0	--	0	3	37,000	a 310	7	45,100	s 1,490
31-----	0	--	0	0	--	0	--	--	--
Total-	1,202	--	539,614	990.5	--	370,898	480	--	97,010
Total discharge for year (cfs-days) .....									2,967.5
Total load for year (tons) .....									1,105,622

s Computed by subdividing day.

a Computed from estimated concentration graph.

## RIO GRANDE BASIN--Continued

## RIO SALADO NEAR SAN ACACIA, N. MEX.--Continued

Particle-size analyses of suspended sediment, June to September 1952

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

Date of collection	Time	Water 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
June 3, 1952 . . .	12:35 p. m.	108		89,400	6,330	--	72	--	89	--	95	98	99	100	SPWCM
July 6 . . . . .	3:00 p. m.	2,010		148,000	3,370	--	36	--	53	--	77	91	99	100	SPWCM
July 6 . . . . .	3:00 p. m.	2,010		148,000	3,430	--	8	--	48	--	77	91	99	100	SPN
July 6 . . . . .	3:00 p. m.	2,010		148,000	3,970	29	39	47	58	68	77	91	99	100	SPWCM
July 6 . . . . .	3:00 p. m.	2,010		148,000	4,810	4	6	17	45	62	77	91	99	100	SPN
July 10 . . . . .	5:00 a. m.	225		82,000	3,950	--	60	--	79	--	86	91	98	100	SPWCM
July 14 . . . . .	8:00 p. m.	1,000		228,000	2,680	--	30	--	48	--	66	82	95	100	SPWCM
Aug. 2 . . . . .	3:00 a. m.	196		94,000	4,650	--	66	--	85	--	96	98	100	--	SPWCM
Aug. 2 . . . . .	3:00 a. m.	196		94,000	3,600	--	3	--	86	--	96	98	100	--	SPN
Aug. 2 . . . . .	4:00 a. m.	82		89,900	5,360	--	64	--	87	--	96	98	100	--	SPWCM
Aug. 2 . . . . .	7:00 a. m.	33		87,500	5,360	--	64	--	88	--	96	99	100	--	SPWCM
Aug. 22 . . . . .	8:45 p. m.	72		84,200	5,000	--	62	--	81	--	89	93	98	100	SPWCM
Aug. 22 . . . . .	9:00 p. m.	3,500		289,000	3,760	--	19	--	28	--	38	58	85	98	SPWCM
Aug. 22 . . . . .	11:30 p. m.	364		122,000	4,500	--	40	--	55	--	75	86	97	100	SPWCM
Aug. 22 . . . . .	11:30 p. m.	364		122,000	3,980	--	4	--	55	--	75	86	97	100	SPN
Aug. 23 . . . . .	7:30 p. m.	500		135,000	3,950	--	42	--	58	--	78	91	99	100	SPWCM
Aug. 23 . . . . .	9:00 p. m.	312		119,000	5,740	--	46	--	66	--	83	93	99	100	SPWCM
Aug. 29 . . . . .	5:00 a. m.	531		152,000	3,610	--	35	--	52	--	74	91	99	100	SPWCM
Aug. 29 . . . . .	5:30 a. m.	434		159,000	4,480	--	34	--	46	--	67	86	98	100	SPWCM
Aug. 29 . . . . .	9:00 a. m.	182		91,100	4,840	--	55	--	74	--	92	98	100	100	SPWCM
Aug. 29 . . . . .	9:00 a. m.	182		91,100	4,740	--	5	--	73	--	92	98	100	--	SPN
Sept. 22 . . . . .	4:00 a. m.	294		88,900	4,930	--	58	--	76	--	88	96	100	--	SPWCM
Sept. 22 . . . . .	11:00 a. m.	123		71,400	4,240	--	64	--	81	--	95	99	100	--	SPWCM
Sept. 23 . . . . .	1:00 p. m.	350		111,000	3,460	--	51	--	71	--	90	98	100	100	SPWCM
Sept. 23 . . . . .	2:00 p. m.	344		94,700	3,220	--	47	--	68	--	86	96	99	--	SPWCM
Sept. 24 . . . . .	5:00 a. m.	13		48,100	4,440	--	86	--	97	--	100	--	--	--	SPWCM
Sept. 30 . . . . .	9:00 a. m.	32		110,000	4,800	--	76	--	92	--	97	98	100	--	SPWCM
Sept. 30 . . . . .	1:00 p. m.	25		81,100	4,800	--	81	--	97	--	99	100	--	--	SPWCM
Sept. 30 . . . . .	1:00 p. m.	25		81,100	4,820	--	1	--	92	--	99	100	--	--	SPN

## RIO GRANDE BASIN--Continued

## SOCORRO MAIN CANAL NORTH AT SAN ACACIA, N. MEX.

LOCATION.--At San Acacia Diversion Dam, half a mile upstream from canal gaging station, and 0.7 mile east of San Acacia, Socorro County.

RECORDS AVAILABLE.--Sediment records: October 1947 to September 1952.

EXTREMES, 1951-52.--Sediment loads: Maximum daily, 13,200 tons Aug. 30; minimum daily, 0 ton on many days.

EXTREMES, 1947-52.--Sediment loads: Maximum daily, 40,800 tons Aug. 1, 1951; minimum daily, 0 ton on many days.

REMARKS.--Records of discharge for water year October 1951 to September 1952 given in Water-Supply Paper 1242.

Monthly and annual summary of suspended-sediment discharge, water year October 1951 to September 1952

Month	Water discharge (cfs-days)	Suspended Sediment (tons)
1951		
October.....	0	0
November.....	646	1,571
December.....	718	4,893
1952		
January.....	0	0
February.....	499	4,364
March.....	2,444	28,819
April.....	3,486	51,134
May.....	3,806	44,845
June.....	3,039	20,791
July.....	4,448	104,855
August.....	4,042	153,590
September.....	2,526	31,985
Total for year.....	25,854	a 446,847

a Total suspended load for Rio Grande at San Acacia diversion dam is the sum of the load for the Rio Grande at San Acacia and the load for Socorro Main Canal North, or 10,055,440 tons.

LOCATION. --At San Acacia diversion dam 0.2 mile above gaging station, 0.7 mile east of San Acacia, Socorro County, and 1.8 miles downstream from Rio Salado. DRAINAGE AREA. --26,770 square miles, approximately (includes 2,940 square miles in closed basin in northern part of San Luis Valley, Colo.) RECORDS AVAILABLE. --Chemical analyses: July to December 1937, March 1939 to September 1952.

Water temperatures: October 1947 to September 1952.

Sediment records: July 1946 to September 1952.

EXTREMES, 1951-52. --Dissolved solids: Maximum, 933 ppm Sept. 22-25; minimum, 206 ppm June 11-20.

Hardness: Maximum, 540 ppm July 8-9; minimum, 116 ppm May 11-20.

Specific conductance: Maximum observed, 1,490 micromhos Sept. 23; minimum observed, 284 micromhos May 31.

Water temperatures: Maximum observed, 86° F. July 24; minimum observed, 36° F. Feb. 15.

Sediment concentrations: Maximum daily, 53,200 ppm Sept. 24; maximum observed, 90,600 ppm Aug. 29; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 358,000 tons July 8; minimum daily, 0 ton on many days.

EXTREMES, 1937, 1939-52. --Dissolved solids: Maximum, 2,470 ppm July 18, 1946; minimum, 183 ppm June 1-10, 1942.

Hardness: Maximum, 1,145 ppm Aug. 13-14, 1945; minimum, 101 ppm June 11-20, 1942.

Specific conductance: Maximum observed, 3,700 micromhos Sept. 23, 1946; minimum observed, 236 micromhos May 17, 1942.

Water temperatures: Maximum observed, 87° F. July 11, 1948; minimum observed, 36° F. Feb. 15, 1948.

Sediment concentrations (1947-52): Maximum daily, 196,000 tons Aug. 1, 1947; minimum daily, 0 ton on many days.

Sediment loads (1946-52): Maximum daily, 1,570,000 tons Aug. 1, 1947; minimum daily, 0 ton on many days.

REMARKS. --Values reported for dissolved solids are sums of determined constituents. Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Socorro Main Canal North at San Acacia, N. Mex. heads at San Acacia diversion dam and by-passes gaging station. Data reported do not include flow in canal. Monthly sediment records for the canal are given on page 412. Records of discharge for water year October 1951 to September 1952 given in Water-Supply Paper 1242.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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 (sum)			Hardness as CaCO <sub>3</sub>		Per-cent ad-sorp-tion ratio	So-dium ad-sorp-tion micro-mhos at 25°C)	pH	
															Parts per mil-lion	Tons per acre-foot	Tons per day	Calcium, mag-nesium	Non-carbon-ate				
Nov. 12-20, 1951 <sup>a</sup>	1.9	37		104	21	104		269	0	265	59		2.7		726	0.99	3,772	346	126	40	2.4	1,080	7.8
Nov. 21-30	8.9	35		91	21	90		256	0	221	54		2.5		640	.87	15.4	314	104	38	2.2	972	7.7
Dec. 1-10	125	34		82	17	68		239	0	174	35		4.2		532	.72	180	274	78	35	1.8	791	7.9
Dec. 11-20	363	33		82	17	62		241	0	161	32		4.3		510	.69	500	274	77	33	1.6	770	7.9
Dec. 21-31	455	29		76	15	59		221	0	150	32		4.6		475	.65	584	251	70	34	1.6	727	7.9
Jan. 1-10, 1952	782	25		74	14	49		210	0	142	26		4.8		438	.60	925	242	70	31	1.4	686	7.9
Jan. 11-20	698	28		70	14	53		205	0	132	30		3.1		431	.59	812	232	64	33	1.5	666	7.8
Jan. 21-31	849	26		69	13	46		207	0	119	25		3.2		403	.55	924	226	56	31	1.3	624	7.9
Feb. 1-10	604	30		66	11	55		201	0	123	29		3.2		416	.57	878	210	45	36	1.6	637	8.0
Feb. 11-20	944	30		62	12	51		195	0	118	27		3.1		399	.54	684	204	44	35	1.6	616	8.0
Feb. 21-28	614	31		62	12	52		192	0	120	28		2.5		402	.55	666	204	46	36	1.6	616	8.0
Mar. 1-10	636	27		68	12	52		196	0	132	27		3.6		419	.57	720	219	58	34	1.5	644	8.0
Mar. 11-20	684	25		70	11	50		197	0	137	25		3.3		418	.57	772	220	58	33	1.5	643	7.9
Mar. 21-31	609	30		74	10	53		202	0	141	24		3.3		435	.59	715	226	60	34	1.5	667	8.0
Apr. 1-10	1,390	28		73	9.8	49		203	0	128	24		5.0		417	.57	1,570	222	56	32	1.4	648	7.8
Apr. 11-20	1,950	27		55	7.6	35		167	0	84	16		5.3		312	.42	1,640	168	31	31	1.2	486	7.8
Apr. 21-30	2,970	26		50	6.6	32		160	0	69	16		3.3		282	.38	2,260	152	21	31	1.1	438	7.9

<sup>a</sup> No flow at gaging station Oct. 1-Nov. 11.

RIO GRANDE BASIN--Continued  
RIO GRANDE AT SAN ACACIA, N. MEX.--Continued

Chemical analyses, in parts per million, water year October 1951 to September 1952--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			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				
May 1-10, 1952	5,070	25		45	6.2	30		145	0	59	15		3.3	254	0.35	3,480	138	19	32	1.1	399	7.9
May 11-20	6,060	24		38	5.1	23		125	0	46	10		2.4	210	.29	3,440	116	14	30	1.1	327	7.8
May 21-31	4,630	23		42	5.1	24		134	0	52	9.3		2.3	224	.30	2,800	126	16	29	.9	349	7.9
June 1-10	6,650	21		155	6.1	25		155	0	53	11		2.4	242	.33	4,350	145	18	27	.9	383	7.7
June 11-20	5,480	21		42	5.4	18		136	0	42	7.8		2.8	206	.28	3,050	127	16	23	.7	323	7.9
June 21-30	2,520	22		47	6.2	27		150	0	60	9.8		1.7	248	.34	1,690	143	20	29	1.0	385	7.7
July 1-5	1,660	26		44	7.2	28		140	0	66	12		1.5	254	.35	1,140	140	25	30	1.0	400	7.9
July 6-7, 10-11	2,330	25		76	14	53		220	0	152	18		3.2	449	.61	2,820	247	66	31	1.5	685	7.8
July 8-9	3,790	23		197	30	84		249	0	467	21		.3	915	1.24	9,360	540	336	25	1.6	1,250	7.6
July 12-20	1,790	27		55	8.5	30		173	0	78	13		4.0	300	.41	1,450	172	30	27	1.0	470	7.8
July 21-29, 31	786	27		60	9.4	41		189	0	97	16		3.6	347	.47	736	188	33	32	1.3	541	7.6
July 30, Aug. 1	776	23		96	19	75		244	0	231	34		1.2	599	.81	1,260	318	118	33	1.8	902	7.9
Aug. 2-10, 13	1,220	25		76	12	45		196	0	144	18		4.0	421	.57	1,390	239	78	29	1.3	635	7.8
Aug. 11-12, 14-16	1,240	26		60	9.6	35		182	0	97	13		3.7	534	.45	1,120	189	40	29	1.1	520	7.8
Aug. 17-31	1,160	24		84	15	67		208	0	205	24		3.0	524	.71	1,670	271	100	35	1.8	797	7.7
Sept. 1-10	1,115	22		75	13	76		197	12	176	36		1.5	520	.71	1,164	248	68	40	2.1	788	--
Sept. 11-21	285.5	22		131	20	107		226	8	232	54		1.2	655	.89	9.73	284	8	45	2.8	965	--
Sept. 22-25	286	22		171	27	123		216	0	467	41		6.2	933	1.27	726	463	286	37	2.5	1,310	7.9
Sept. 26-30	31.6	33		70	15	85		162	0	186	37		2.3	545	.74	47.1	251	70	42	2.3	823	7.9
Weighted average <sup>b</sup>	1,646	24		54	8.1	34		162	--	85	15		3.0	303	0.41	1,190	168	36	31	1.1	469	--

b Average for 324 days of flow.

## RIO GRANDE BASIN--Continued

## RIO GRANDE AT SAN ACACIA, N. MEX.--Continued

Temperature (°F) of water, water year October 1951 to September 1952  
 /Once-daily temperature measurement, between 11:00 a. m. and 6:00 p. m. /<sup>c</sup>

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1					--	55	62	68	--	77	78	78
2					--	--	62	69	b68	b78	--	b77
3					--	45	63	69	68	76	--	b78
4					--	43	64	--	--	a70	78	79
5					--	a37	65	69	76	a71	b77	b78
6					50	55	66	b69	b76	74	b76	b78
7					55	54	b67	b70	b77	b75	a72	77
8					54	52	65	70	b76	75	b78	b78
9					59	a42	60	b71	b73	a70	b77	77
10					52	a38	60	71	76	--	--	b76
11					52	55	--	--	76	a71	b76	76
12					50	50	65	73	76	--	78	b76
13					51	52	a67	b74	b77	--	79	76
14					51	52	67	74	76	--	77	--
15					a36	53	65	74	--	77	b77	b76
16					48	50	68	b74	b77	77	78	b76
17					--	55	65	68	77	--	--	76
18					59	a40	63	71	76	75	b79	76
19					49	59	65	74	75	b78	79	76
20					49	53	--	b75	78	--	b78	a59
21					50	--	58	b75	b77	b77	79	--
22					54	50	b64	a59	a73	78	a70	70
23					51	50	65	a60	77	--	77	73
24				52	a40	48	66	75	b77	86	a71	73
25					45	54	65	--	77	--	78	b73
26					50	55	68	74	b77	--	--	a60
27					48	60	b65	b75	77	--	b79	--
28					55	60	66	76	a71	--	78	--
29					56	55	68	b76	b77	--	75	b73
30					--	a47	68	75	77	--	b79	77
31					--	62	--	b75	--	--	a78	--
Average					--	51	65	72	75	--	77	75

a Observations made before 11:00 a. m.

b Observations made after 6:00 p. m.

c No flow Oct. 1-Nov. 11.

## WESTERN GULF OF MEXICO BASINS

## RIO GRANDE BASIN--Continued

## RIO GRANDE AT SAN ACACIA, N. MEX.--Continued

Suspended sediment, water year October 1951 to September 1952

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	49	1,160	153
2-----				0	--	0	34	1,160	106
3-----				0	--	0	45	1,650	200
4-----				0	--	0	63	1,840	313
5-----				0	--	0	61	1,610	265
6-----				0	--	0	104	2,550	716
7-----				0	--	0	161	3,050	1,330
8-----				0	--	0	180	3,070	1,490
9-----				0	--	0	238	3,250	2,090
10-----				0	--	0	312	3,500	2,950
11-----				0	--	0	262	10,700	7,570
12-----				3	--	a (t)	336	14,000	12,700
13-----				1	--	a (t)	320	8,500	7,340
14-----				2	174	1	320	8,500	7,340
15-----				2	300	2	334	9,600	s 8,800
16-----				2	482	3	405	7,100	7,760
17-----				2	600	a 3	465	3,730	4,680
18-----				2	664	4	416	3,400	3,820
19-----				3	802	6	390	4,320	4,550
20-----				3	861	7	383	3,340	3,450
21-----				4	1,000	11	375	3,200	3,240
22-----				4	502	5	407	3,000	3,300
23-----				4	523	6	456	2,030	2,500
24-----				3	456	4	474	4,000	5,120
25-----				4	428	5	430	4,000	a 4,640
26-----				5	648	9	456	3,940	4,850
27-----				6	1,050	17	518	6,500	9,090
28-----				7	1,100	21	500	5,960	8,050
29-----				18	1,320	s 71	492	4,360	5,790
30-----				34	1,320	121	460	4,410	5,480
31-----				--	--	--	440	4,040	4,800
Total-----	0		0	106.3	--	296	9,886	--	134,483
Day	January			February			March		
	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-----	432	2,800	a 3,270	652	4,520	7,960	623	3,900	6,560
2-----	1,200	12,500	s 51,100	623	6,200	10,400	694	3,300	6,180
3-----	1,250	20,000	67,500	642	7,400	12,800	1,150	4,120	s 13,500
4-----	1,010	11,800	32,200	652	6,400	11,300	896	4,700	11,400
5-----	792	8,300	17,700	663	4,500	8,060	747	5,900	11,900
6-----	652	5,800	a 10,200	594	6,540	10,500	545	3,860	5,680
7-----	642	5,600	9,710	555	4,000	5,990	465	2,900	3,640
8-----	594	7,100	11,400	545	3,070	4,520	416	1,700	1,910
9-----	613	5,600	9,270	555	2,440	3,660	416	1,700	1,910
10-----	632	5,500	9,390	564	2,500	3,810	407	1,670	1,840
11-----	603	5,700	9,280	584	2,600	4,100	360	2,100	2,040
12-----	603	5,130	8,350	623	3,400	5,720	632	5,200	8,870
13-----	564	5,200	7,920	652	2,500	4,400	957	6,200	16,000
14-----	555	6,500	9,740	694	2,460	4,050	652	4,600	8,100
15-----	642	4,550	7,890	726	2,020	3,960	509	5,200	7,150
16-----	953	6,300	16,200	694	2,100	3,930	368	7,300	7,250
17-----	896	5,000	12,100	652	2,500	a 4,000	456	3,000	3,690
18-----	747	5,300	10,700	632	2,700	4,610	642	3,000	a 5,200
19-----	694	4,200	7,870	613	2,000	3,310	1,410	8,040	s 32,100
20-----	726	5,500	a 10,800	574	4,000	6,200	849	7,980	18,300
21-----	1,680	11,600	s 52,500	642	2,870	4,970	781	7,800	a 16,400
22-----	1,300	9,800	34,400	594	2,100	3,370	957	7,700	19,900
23-----	1,050	11,300	32,000	574	1,740	2,700	1,060	6,900	19,700
24-----	781	12,000	25,300	594	1,550	2,490	1,030	6,200	17,200
25-----	705	8,400	16,000	603	5,000	8,140	509	3,180	4,370
26-----	632	7,500	12,800	642	3,900	6,760	289	2,240	1,750
27-----	632	8,340	14,200	642	3,800	6,590	226	1,740	1,060
28-----	674	5,460	9,940	623	4,000	6,730	203	1,400	787
29-----	663	5,740	10,300	613	5,500	9,100	231	1,740	1,090
30-----	594	3,800	a 6,090	--	--	--	388	2,250	s 2,930
31-----	623	3,260	5,520	--	--	--	1,020	5,600	15,400
Total-----	24,134	--	541,640	18,016	--	174,530	19,888	--	273,787

s Computed by subdividing day.

t Less than 0.50 ton.

a Computed from estimated concentration graph.



## RIO GRANDE BASIN--Continued

## RIO GRANDE AT SAN ACACIA, N. MEX.--Continued

Suspended sediment, water year October 1951 to September 1952--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-----	623	5,600	9,420	3,650	5,300	52,200	4,830	3,400	a 44,300
2-----	432	10,000	11,700	3,460	4,900	45,800	6,220	9,560	s 184,000
3-----	1,110	10,400	31,200	3,290	6,100	54,200	7,710	14,700	s 307,000
4-----	1,230	6,700	22,300	4,020	7,200	a 78,100	7,320	5,700	113,000
5-----	1,320	5,700	20,300	4,690	6,800	86,100	6,980	4,500	84,800
6-----	1,660	6,250	28,000	5,110	6,700	92,400	6,650	6,240	112,000
7-----	1,890	6,580	33,600	5,550	5,800	86,900	6,820	4,740	87,300
8-----	1,660	7,300	32,700	6,490	5,180	90,800	6,650	3,400	61,000
9-----	1,790	8,140	39,300	6,980	5,400	102,000	6,820	3,820	70,300
10-----	2,200	5,300	31,500	7,500	4,870	98,600	6,490	3,100	54,300
11-----	2,200	5,400	a 32,100	7,150	5,300	a 102,000	6,330	3,720	63,600
12-----	2,070	4,640	25,900	6,650	4,500	80,800	6,170	3,200	53,300
13-----	2,110	4,060	23,100	5,860	7,000	111,000	6,010	2,780	45,100
14-----	2,000	3,820	20,600	5,110	5,500	75,900	5,860	3,220	50,900
15-----	1,330	3,800	13,600	4,830	3,800	49,600	5,700	2,800	a 48,100
16-----	1,530	4,660	19,300	5,110	3,700	51,000	5,550	2,310	34,600
17-----	1,710	4,460	20,600	5,550	4,200	62,900	5,260	2,120	30,100
18-----	1,890	5,100	26,000	6,330	4,000	68,400	4,970	2,400	a 32,200
19-----	2,100	3,650	s 20,900	7,150	3,500	67,600	4,690	1,680	21,300
20-----	2,550	3,820	sa 27,000	6,820	2,800	51,600	4,280	1,980	22,900
21-----	3,150	5,500	46,800	6,170	3,400	56,600	3,900	1,860	19,600
22-----	3,200	5,400	46,700	5,400	2,700	39,400	3,770	1,850	18,600
23-----	2,660	4,600	35,500	4,830	2,500	32,600	3,340	1,800	16,200
24-----	2,710	5,110	37,400	4,690	3,910	49,200	2,570	1,900	13,200
25-----	2,450	5,000	33,100	4,420	3,200	a 38,500	2,310	1,500	9,560
26-----	2,430	3,400	22,300	4,550	2,860	35,100	2,140	740	4,280
27-----	2,780	3,600	27,000	4,020	3,000	32,600	1,890	698	3,560
28-----	3,060	4,700	38,800	3,900	2,400	25,300	1,710	800	3,690
29-----	3,290	5,300	47,100	4,150	2,400	26,900	1,610	800	3,480
30-----	3,770	6,950	70,700	4,280	2,700	31,200	1,930	1,300	6,770
31-----	--	--	--	4,550	3,500	43,000	--	--	--
Total-	63,105	--	894,520	162,260	--	1,918,300	146,480	--	1,593,840
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-----	1,420	1,500	5,750	792	9,500	20,300	383	12,500	12,900
2-----	1,390	742	2,780	860	16,000	37,200	296	6,760	5,400
3-----	1,380	1,440	5,370	1,090	13,200	38,800	147	2,580	1,020
4-----	1,710	3,000	13,900	1,350	11,300	41,200	113	1,870	571
5-----	2,390	25,000	s 174,000	1,250	8,600	29,000	81	1,550	339
6-----	1,930	27,800	145,000	1,230	6,900	22,900	61	1,500	247
7-----	2,380	33,900	s 227,000	1,230	6,100	20,300	49	1,240	164
8-----	4,150	31,500	353,000	1,150	4,880	15,200	18	1,060	52
9-----	3,430	32,700	314,000	884	4,580	10,900	12	1,020	33
10-----	2,700	25,800	s 192,000	933	4,510	11,400	8	807	13
11-----	2,310	14,500	90,400	1,480	5,300	21,200	5	981	13
12-----	2,140	7,830	s 46,000	1,410	6,340	s 36,900	7	650	12
13-----	2,000	3,100	16,700	2,270	20,200	s 133,000	7	624	12
14-----	2,440	13,300	sa 120,000	1,150	37,400	s 136,000	6	500	a 8
15-----	1,980	12,800	s 92,400	1,010	18,300	49,900	5	548	7
16-----	2,260	8,500	51,900	1,150	6,820	21,200	5	294	4
17-----	1,840	2,500	12,400	1,300	5,000	a 17,600	5	258	3
18-----	1,210	4,710	15,400	1,360	5,550	20,400	5	251	3
19-----	1,140	3,740	11,500	981	4,000	10,600	5	246	3
20-----	1,080	4,500	a 13,100	642	8,300	14,400	5	426	6
21-----	1,290	2,540	8,830	747	10,000	20,200	5	400	a 5
22-----	813	1,150	2,520	955	12,100	s 52,300	312	52,900	s 53,900
23-----	465	763	958	1,740	44,000	s 216,000	478	50,700	s 96,600
24-----	353	669	638	2,740	29,100	s 126,000	263	53,200	s 49,900
25-----	391	10,000	10,600	1,950	35,300	s 198,000	78	14,500	3,050
26-----	588	8,220	s 13,900	1,210	25,900	84,600	42	6,000	680
27-----	726	2,100	4,120	1,060	21,700	s 82,400	36	7,000	a 680
28-----	1,180	3,520	11,200	747	20,000	40,300	32	6,500	a 562
29-----	837	2,790	6,310	788	32,000	s 83,900	27	1,400	102
30-----	760	9,400	s 25,600	740	38,300	s 88,100	21	5,500	312
31-----	1,220	16,200	s 57,200	694	13,800	25,900	--	--	--
Total-	49,903	--	2,044,496	36,893	--	1,806,100	2,535	--	226,601

Total discharge for year (cfs-days)..... 533,206.3

Total load for year (tons)..... 9,608,593

a Computed by subdividing day.

a Computed from estimated concentration graph.

## RIO GRANDE BASIN--Continued

## RIO GRANDE AT SAN ACACIA, N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1951 to September 1952

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

Date of collection	Time	Water 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. 13, 1951..... Dec. 2, 1952..... Jan. 2, 1952..... Jan. 2, 1952..... Jan. 2, 1952.....	9:00 a. m.	328		9,970	3,330	--	25	--	38	--	57	84	99		100	--	SPWCM
	2:00 p. m.	1,720		19,800	3,580	9	14	22	31	51	73	94	100		--	--	SPWCM
	2:00 p. m.	1,720		19,800	3,670	2	8	19	32	47	73	94	100		--	--	SPN
	2:00 p. m.	1,720		19,800	4,030	20	24	29	38	50	73	94	100		--	--	SBWCM
	2:00 p. m.	1,720		19,800	3,510	2	4	18	36	51	73	94	100		--	--	SBN
Jan. 24, 1952..... Jan. 24, 1952..... Mar. 24, 1952..... Apr. 7, 1952..... Apr. 28, 1952.....	2:45 p. m.	792		13,300	2,370	--	16	--	21	--	35	51	82		98	--	SPWCM
	9:30 a. m.	982		4,750	5,230	--	37	--	52	--	77	93	100		--	--	SPWCM
	9:30 a. m.	1,130		7,030	2,840	--	43	--	55	--	71	93	98		100	--	SPWCM
	7:00 p. m.	2,310		6,430	5,840	--	72	--	80	--	85	96	100		--	--	SPWCM
	10:30 a. m.	3,330		3,960	2,850	--	30	--	44	--	83	97	100		--	--	SPWCM
Apr. 28, 1952..... May 6, 1952..... May 10, 1952..... May 20, 1952..... May 30, 1952.....	10:30 a. m.	3,330		3,960	2,700	--	22	--	44	--	83	97	100		--	--	SPN
	6:30 p. m.	5,480		9,140	4,740	--	20	--	32	--	56	93	100		--	--	SPWCM
	6:30 p. m.	7,530		4,990	4,180	--	40	--	65	--	90	98	100		--	--	SPWCM
	7:00 a. m.	6,660		2,450	4,310	--	28	--	40	--	87	90	98		100	--	SPWCM
	7:00 a. m.	4,050		1,850	1,820	--	21	--	35	--	63	83	98		99	--	SPWCM
June 3, 1952..... June 3, 1952..... June 10, 1952..... July 8, 1952..... July 10, 1952.....	12:00 m.	8,390		18,500	3,320	--	50	--	65	--	81	90	96		100	SPWCM	
	12:00 m.	8,390		18,500	4,230	--	10	--	61	--	81	90	96		100	SPN	
	6:00 p. m.	6,620		4,120	--	--	--	--	--	--	49	88	100		--	S	
	12:00 m.	4,440		19,500	3,290	--	50	--	69	--	93	99	100		--	SPWCM	
	6:00 p. m.	2,800		19,100	4,310	--	59	--	77	--	93	99	100		--	SPWCM	
July 15, 1952..... July 25, 1952..... Aug. 2, 1952..... Aug. 13, 1952..... Aug. 13, 1952.....	6:00 p. m.	1,990		7,280	3,860	--	58	--	84	--	100	--	--		--	--	SPWCM
	9:00 a. m.	747		19,900	3,860	--	82	--	98	--	100	--	--		--	--	SPWCM
	6:00 a. m.	990		25,500	4,440	--	74	--	93	--	99	100	--		--	--	SPWCM
	6:30 a. m.	3,200		19,200	3,600	--	54	--	74	--	96	100	--		--	--	SPWCM
	6:30 a. m.	3,200		19,200	3,340	47	58	67	78	85	96	100	--		--	--	SBWCM

Aug. 23, 1952.....	5:30 a. m.	1,360	40,300	3,690	--	65	--	81	--	97	99	100	--	SPWCM
Aug. 31.....	7:00 a. m.	1,050	14,600	8,140	--	65	--	80	--	95	99	100	--	SPWCM
Sept. 22.....	6:00 a. m.	522	86,000	5,310	--	55	--	71	--	83	99	100	--	SPWCM
Sept. 22.....	6:00 p. m.	312	40,500	4,040	--	72	--	91	--	97	99	100	--	SPWCM
Sept. 23.....	4:30 p. m.	1,120	85,300	5,670	--	53	--	75	--	96	100	96	--	SPWCM
Sept. 24.....	7:00 a. m.	400	74,700	5,610	--	58	--	69	--	75	82	96	100	SPWCM
Sept. 24.....	7:00 a. m.	400	74,700	5,050	--	2	--	68	--	75	82	96	100	SPN

## RIO GRANDE BASIN--Continued

## RIO GRANDE AT SAN ANTONIO, N. MEX.

LOCATION.--At gaging station at bridge on U. S. Highway 380, about 0.9 mile east of San Antonio, Socorro County.

DRAINAGE AREA.--27,400 square miles, approximately: (includes 2,940 square miles in closed basin in northern part of San Luis Valley, Colo.).

RECORDS AVAILABLE.--Water temperatures: August 1951 to September 1952.

Sediment records: August 1951 to September 1952.

EXTREMES, 1951-52.--Water temperatures: Maximum observed, 88°F July 31; minimum, freezing point Feb. 2.

Sediment concentrations: Maximum daily, not determined, probably occurred Sept. 22-25; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 417,000 tons July 8; minimum daily, 0 ton on many days.

EXTREMES, August 1951 to September 1952.--Water temperatures: Maximum observed 88°F

July 31, 1952; minimum observed, freezing point Feb. 2, 1952.

Sediment concentrations: Maximum daily, 85,200 ppm Aug. 26, 1951; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 527,000 tons Aug. 26, 1951; minimum daily, 0 ton on many days.

REMARKS.--Stage discharge relation affected by ice Dec. 7-12. Records of discharge for water year October 1951 to September 1952 given in Water-Supply Paper 1242. Record of water temperature for the period August to September 1951 was not published in Water-Supply Paper 1199 and is included herein.

Temperature (°F) of water, August to September 1951  
/Once-daily temperature measurement between 7:00 a. m. and 9:00 a. m./<sup>c</sup>

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1											--	69
2											--	a 79
3											--	a 79
4											--	b 79
5											--	62
6											--	60
7											--	--
8											--	--
9											--	--
10											--	--
11											--	--
12											--	--
13											--	--
14											--	--
15											--	--
16											--	--
17											--	--
18											--	--
19											--	--
20											--	--
21											--	--
22											--	--
23											--	--
24											a 70	--
25											a 66	--
26											a 71	--
27											70	--
28											66	--
29											66	--
30											67	--
31											69	--
Average												

a Observations made between 10:00 a. m. and 12:00 m.

b Observation made at 5:45 p. m.

c No flow Sept. 7-30.

## RIO GRANDE BASIN--Continued

## RIO GRANDE AT SAN ANTONIO, N. MEX.--Continued

Temperature (°F) of water, December 1951 to September 1952  
 /Once-daily temperature measurement between 11:00 a. m. and 6:00 p. m./

Only daily temperature measurements taken between 11.00 a.m. and 6.00 p.m.													
Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	
1			55	5	--	51	a 45	67	75	b 68	74	b 85	a 64
2			--	--	--	a 31	a 41	65	78	b 59	b 74	--	--
3			47	--	--	45	--	63	b 75	87	b 74	a 78	a 63
4			47	--	--	47	41	65	76	77	a 68	--	a 64
5			49	--	--	--	55	b 65	69	a 61	76	b 85	a 76
6			38	33	47	56	65	b 71	79	83	70	a 66	
7			--	--	50	52	a 50	b 71	b 79	b 70	b 82	80	
8			--	--	50	42	b 53	b 61	b 80	69	b 80	85	
9			--	--	40	47	64	a 56	a 67	75	a 71	--	
10			--	--	47	54	55	64	b 80	64	--	--	
11			--	--	55	50	51	64	b 78	68	87	--	
12			--	--	49	51	60	73	a 60	a 69	b 80	--	
13			36	50	45	50	64	70	80	71	75	--	
14			40	--	34	56	65	68	b 81	78	85	--	
15			--	--	45	55	70	70	84	74	a 70	--	
16			37	--	50	55	55	62	b 77	80	b 82	--	
17			40	--	45	43	69	b 51	b 78	84	b 87	--	
18			38	--	46	57	65	b 59	b 63	a 63	a 70	--	
19			46	--	48	43	65	66	b 77	--	85	--	
20			39	--	49	50	64	60	b 79	--	b 83	--	
21			--	--	54	50	62	b 61	b 75	--	--	--	
22			35	46	50	b 46	70	b 60	a 68	--	b 76	--	
23			42	47	a 38	48	65	72	b 76	--	a 69	--	
24			--	47	52	57	73	70	b 74	--	83	--	
25			--	50	48	57	72	62	73	--	b 84	--	
26			49	50	48	60	72	b 63	70	--	85	--	
27			43	42	41	61	59	b 64	76	--	79	--	
28			48	41	54	60	63	67	a 70	--	80	--	
29			a 49	49	a 39	a 47	63	b 67	b 80	--	87	--	
30			--	49	--	64	72	63	70	--	85	--	
31			--	--	--	68	--	b 64	--	88	a 79	--	
Average			--	--	46	52	64	66	74	--	79	--	

a Observations made before 11:00 a. m.

b Observations made after 6:00 p. m.

c No flow Oct. 1 to Nov. 27, Sept. 10-21.



## RIO GRANDE BASIN--Continued

## RIO GRANDE AT SAN ANTONIO, N. MEX.--Continued

Suspended sediment, water year October 1951 to September 1952--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-----	765	10,700	s 24,000	3,610	10,600	103,000	4,880	7,100	93,500
2-----	431	5,600	6,520	3,210	11,000	95,300	6,280	9,800	166,000
3-----	702	9,040	s 19,400	3,000	9,700	78,600	7,800	14,100	297,000
4-----	970	12,800	33,500	3,340	9,800	88,400	7,200	12,500	243,000
5-----	1,150	12,800	39,700	4,550	11,600	143,000	4,000	10,700	202,000
6-----	1,360	15,600	57,300	5,220	11,300	159,000	7,000	9,750	184,000
7-----	1,710	16,800	77,600	5,920	12,200	195,000	6,800	9,200	169,000
8-----	1,650	15,900	70,800	6,800	11,900	218,000	7,000	7,200	136,000
9-----	1,860	14,600	73,300	7,200	12,700	247,000	6,800	5,800	106,000
10-----	2,150	15,600	90,600	7,400	11,200	224,000	6,620	5,700	102,000
11-----	2,240	16,400	99,200	7,600	10,400	213,000	6,280	6,200	105,000
12-----	2,080	14,900	83,700	7,000	10,300	195,000	6,100	6,800	112,000
13-----	1,820	14,200	69,800	6,280	9,900	168,000	5,920	5,400	86,300
14-----	1,900	12,800	65,700	5,400	8,900	130,000	5,750	5,600	86,900
15-----	1,290	9,680	s 35,200	5,050	8,200	112,000	5,580	6,500	97,900
16-----	1,190	8,300	26,700	5,220	8,600	121,000	5,580	6,200	93,400
17-----	1,570	9,100	38,600	5,750	10,300	160,000	5,220	5,750	81,000
18-----	1,820	12,000	59,000	6,450	9,200	160,000	5,050	5,600	76,400
19-----	2,040	10,800	59,500	7,200	8,400	163,000	4,700	5,400	68,500
20-----	2,310	10,800	67,400	7,000	8,200	155,000	4,400	4,400	52,300
21-----	2,920	13,400	106,000	6,620	9,000	161,000	4,100	5,200	57,600
22-----	3,180	11,600	99,600	5,580	8,800	133,000	3,710	4,300	43,100
23-----	3,280	10,600	93,900	5,050	8,100	110,000	3,410	5,100	47,000
24-----	3,020	10,500	85,600	4,400	7,100	84,300	2,800	3,750	26,400
25-----	2,600	8,700	61,100	4,250	6,760	77,500	2,420	3,300	21,600
26-----	2,550	9,100	62,700	4,400	6,900	82,000	2,180	3,250	19,100
27-----	2,900	10,100	79,100	3,800	6,800	69,800	2,020	4,000	21,800
28-----	3,210	10,700	92,700	3,800	7,400	75,900	1,570	3,400	14,400
29-----	3,150	10,600	90,200	4,100	8,700	96,300	1,430	3,200	12,400
30-----	3,630	10,600	104,000	4,250	7,800	89,500	1,630	4,500	19,800
31-----	--	--	--	4,550	7,100	87,200	--	--	--
Total--	61,448	--	1,972,420	164,000	--	4,194,800	147,230	--	2,843,400
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-----	1,680	3,200	14,500	1,300	12,100	42,500	355	13,300	12,700
2-----	1,320	2,500	8,910	1,050	9,400	26,600	263	11,000	a 7,800
3-----	1,130	1,700	5,190	828	17,100	38,200	175	9,100	4,300
4-----	1,520	2,900	11,900	676	11,000	a20,000	105	4,400	1,250
5-----	2,560	6,610	s 50,800	1,230	13,300	44,200	76	2,400	492
6-----	2,150	12,200	70,800	1,060	9,400	26,900	47	1,900	241
7-----	2,220	19,300	s117,000	952	9,000	22,100	38	2,150	231
8-----	3,860	37,400	s417,000	910	8,300	20,400	22	1,550	92
9-----	3,960	33,000	s361,000	687	7,000	13,000	2.3	800	a 5
10-----	3,340	35,000	s340,000	74	5,300	a 11,000	0	--	0
11-----	2,020	14,400	s 81,600	996	6,980	s 19,400	0	--	0
12-----	2,480	15,400	s105,000	1,190	7,400	23,800	0	--	0
13-----	1,900	7,700	39,500	2,780	20,100	s187,000	0	--	0
14-----	2,200	9,600	57,000	1,010	21,800	s 58,900	0	--	0
15-----	2,480	45,700	s361,000	927	15,500	s 42,000	0	--	0
16-----	2,480	17,300	116,000	632	8,300	14,200	0	--	0
17-----	1,850	10,700	53,400	687	9,000	16,700	0	--	0
18-----	1,420	10,200	s40,000	1,100	7,900	23,500	0	--	0
19-----	865	8,700	20,300	910	5,100	12,500	0	--	0
20-----	815	6,000	13,200	520	5,500	7,720	0	--	0
21-----	965	5,200	13,500	512	8,000	111,100	0	--	0
22-----	1,250	7,000	s 24,000	652	9,000	15,900	37	--	--
23-----	438	3,400	4,020	1,860	45,800	s289,000	212	--	--
24-----	322	2,500	2,170	2,840	38,000	s309,000	405	--	--
25-----	263	2,000	1,420	2,010	31,200	s177,000	120	--	--
26-----	335	5,500	4,970	1,100	22,500	66,800	76	--	--
27-----	592	7,500	a 12,000	1,170	17,300	54,700	49	--	--
28-----	934	8,280	s 22,400	763	22,200	46,000	44	--	--
29-----	973	8,100	s23,000	626	23,600	s 45,300	36	--	--
30-----	574	5,700	a 8,800	499	42,400	s 58,900	39	--	--
31-----	1,150	13,500	s46,600	575	26,800	41,600	--	--	--
Total--	50,046	--	2,446,980	32,781	--	1,786,920	2,101.3	--	158,101

Total discharge for year (cfs-days) ..... 516,457.7

Total load for year (tons) ..... 15,052,469

e Estimated.

s Computed by subdividing day.

a Computed from estimated concentration graph.

b Computed from partly-estimated concentration graph.

## RIO GRANDE BASIN--Continued

## RIO GRANDE AT SAN ANTONIO, N. MEX.--Continued

Particle-size analyses of suspended sediment, December 1951 to September 1952

(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water;

W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date of collection	Time	Water 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		
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.350		0.500
Dec. 13, 1951 ..	5:00 p.m.	340		14,100	2,710	38	45	51	62	77	84	94	99		SPWCM	
Dec. 13, .....	5:00 p.m.	340		14,100	4,630	34	43	52	63	75	84	94	99	100	SPWCM	
Jan. 2, 1952 ....	4:00 p.m.	1,150		30,700	3,200	22	35	41	59	81	89	95	99	100	SPWCM	
Jan. 2, .....	4:00 p.m.	1,150		30,700	3,960	2	9	29	53	76	89	95	99	100	SPN	
Jan. 2, .....	4:00 p.m.	1,150		30,700	3,530	4	4	19	53	77	89	95	99	100	SPN	
Jan. 6, .....	5:00 p.m.	495		9,860	2,860	--	25	--	55	--	75	89	99	100	SPWCM	
Jan. 21, .....	5:00 p.m.	1,860		26,300	10,200	28	28	--	54	--	85	92	99	100	SPWCM	
Jan. 28, .....	5:00 p.m.	561		12,800	3,650	--	38	--	62	--	89	95	100	--	SPWCM	
Feb. 10, .....	5:00 p.m.	533		6,030	4,300	--	30	--	49	--	74	91	100	--	SPWCM	
Feb. 20, .....	5:45 p.m.	463		6,170	3,280	--	28	--	43	--	68	87	99	100	SPWCM	
Mar. 1, .....	7:30 a.m.	423		4,500	3,260	30	36	40	51	68	78	92	100	--	SPWCM	
Mar. 1, .....	7:30 a.m.	423		4,500	1,510	29	37	43	52	64	78	92	100	--	SPWCM	
Mar. 13, .....	6:00 p.m.	880		8,750	4,870	--	30	--	47	--	68	86	99	100	SPWCM	
Mar. 22, .....	5:15 a.m.	1,220		13,900	4,430	--	47	--	59	--	75	85	98	100	SPWCM	
Mar. 31, .....	5:30 p.m.	829		8,760	2,560	32	41	45	--	70	83	93	100	--	SPWCM	
Mar. 31, .....	5:30 p.m.	829		8,760	2,610	0	10	27	50	69	83	93	100	--	SPN	
Mar. 31, .....	5:30 p.m.	829		8,760	1,970	31	40	45	54	69	83	93	100	--	SPWCM	
Mar. 31, .....	5:30 p.m.	829		8,760	5,540	5	17	42	48	66	83	93	100	--	SPN	
Apr. 20, .....	11:00 a.m.	2,380		10,900	5,920	--	25	--	37	--	65	82	97	100	SPWCM	
May 1, .....	6:00 a.m.	3,820		10,500	4,710	--	20	--	32	--	59	75	93	99	SPWCM	
May 10, .....	9:00 a.m.	7,400		12,600	4,240	--	20	--	26	--	49	72	92	100	SPWCM	
June 1, .....	8:00 a.m.	4,940		5,970	5,110	--	12	--	19	--	35	61	92	99	SPWCM	
June 10, .....	7:00 a.m.	6,700		6,300	4,800	--	12	--	17	--	34	58	91	100	SPWCM	
June 20, .....	6:30 p.m.	4,010		3,790	3,450	--	9	--	18	--	38	61	81	99	100	SPWCM
June 20, .....	6:30 p.m.	4,010		3,790	3,540	--	11	--	19	--	38	61	81	99	100	SPN
July 5, .....	7:30 p.m.	3,530		8,890	3,180	--	7	--	13	--	27	59	95	100	SPWCM	
July 10, .....	6:30 a.m.	4,980		50,800	3,940	--	51	--	70	--	84	89	98	100	SPWCM	
July 15, .....	3:00 p.m.	1,980		39,100	4,270	--	66	--	85	--	92	96	99	100	SPWCM	
July 20, .....	10:30 a.m.	1,040		5,720	3,960	--	46	--	59	--	71	84	98	100	SPWCM	



Aug. 5, 1952	6:30 a. m.	1,610	15,600	4,270	--	56	--	75	--	81	92	99	100	--	SPWCM
Aug. 11	2:00 p. m.	1,320	7,740	5,370	--	42	--	62	--	80	93	99	100	--	SPWCM
Aug. 13	8:00 a. m.	5,360	31,900	4,030	--	23	--	40	--	61	74	93	100	--	SPWCM
Aug. 24	11:00 a. m.	4,380	64,000	4,040	--	44	--	65	--	80	87	96	100	--	SPWCM
Aug. 24	12:00 m.	3,920	48,300	5,210	--	44	--	65	--	80	88	97	100	--	SPWCM
Aug. 25	6:30 a. m.	1,580	26,300	3,490	--	57	--	78	--	86	95	99	100	--	SPWCM
Sept. 1	6:30 a. m.	415	14,800	3,400	--	67	--	83	--	89	95	100	--	--	SPWCM

## RIO GRANDE BASIN--Continued

## RIO GRANDE TIFFANY CHANNEL AT SAN MARCIAL, N. MEX.

LOCATION.--At water-stage recorder at Atchison, Topeka, & Santa Fe Railway bridge over Tiffany Channel, 3 miles northeast of San Marcial, Socorro County. Tiffany Channel is bypass channel carrying water around the main channel gaging station at San Marcial.

RECORDS AVAILABLE.--Chemical analyses: April 1950 to September 1952.

Water temperatures: October 1950 to September 1952.

Sediment records: April 1950 to September 1952.

EXTREMES, 1951-52.--Dissolved solids: Maximum, 1,330 ppm Dec. 1-12; minimum, 220 ppm June 9-10.

Hardness: Maximum, 462 ppm Nov. 21-30; minimum, 120 ppm June 9-10.

Specific conductance: Maximum observed, 2,390 microhmhos Dec. 11; minimum observed 294 microhmhos June 12.

Water temperatures: Maximum observed, 86°F July 27; minimum observed, 33°F Jan. 6.

Sediment concentrations: Maximum daily, 28,900 ppm Aug. 24; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 40,600 tons Aug. 24; minimum daily, 0 ton on many days.

EXTREMES, 1950-52.--Dissolved solids: Maximum, 1,730 ppm Aug. 23-24, 1951; minimum, 220 ppm June 9-10, 1952.

Hardness: Maximum 849 ppm Aug. 23-24, 1951; minimum, 120 ppm June 9-10, 1952.

Specific conductance: Maximum observed, 2,390 microhmhos Dec. 11, 1951; minimum observed, 294 microhmhos June 12, 1952.

Water temperatures: Maximum observed, 94°F July 10, 18, 29, 1951; minimum observed, 33°F Jan. 6, 1952.

Sediment concentrations: Maximum daily, 41,700 ppm Sept. 22, 1950; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 40,600 tons Aug. 24, 1952; minimum daily, 0 ton on many days.

REMARKS.--Values reported for dissolved solids are residues on evaporation. Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of discharge for water year October 1951 to September 1952 furnished by Santa Fe district office of Surface Water Branch. Records for composite of Tiffany Channel and main channel given under Rio Grande at San Marcial in Water-Supply Paper 1242. Quality of water records for Rio Grande at San Marcial given on page 432.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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 adsorption ratio	Specific conductance (microhmhos at 25° C)	Color or pH		
														Parts per million	Tons per acre-foot	Tons per day	Calcium, mg./l.				Non-carbonate	
Oct. 1-10, 1951	0.14			84	23	182								894	1.22	0.34	304		57	4.5	1,420	
Oct. 11-14 "	.10			76	24	185								881	1.20	.24	288		58	4.7	1,410	
Oct. 26, 31 "	.15			86	25	203								961	1.31	.39	318		58	4.9	1,530	
Nov. 1-4 "	.12			106	28	202								1,050	1.43	.34	380		54	4.5	1,650	
Nov. 11-20	.20			121	32	245								1,200	1.63	.65	434		55	5.1	1,870	
Nov. 21-30	.59			131	33	272								1,310	1.78	2.09	462		56	5.5	2,030	
Dec. 1-12	.52			113	30	304								1,330	1.81	1.87	406		62	6.6	2,100	
Dec. 13-20	7.26			92	22	179								893	1.21	17.5	320		55	4.3	1,390	
Dec. 21-31	17.6			86	20	125								719	.98	34.2	296		48	3.2	1,180	
Jan. 1-10 1952	19.2			79	17	108								656	.89	34.0	267		47	2.9	1,010	
Jan. 11-17	5.24			86	22	182								890	1.21	12.6	305		56	4.5	1,410	
Jan. 18-20	14.0			74	17	111								637	.87	24.1	254		49	3.0	983	
Jan. 21-31	34.4			94	23	210								1,010	1.37	93.8	329		58	5.0	1,570	
Feb. 1-10	20.7			107	28	252								1,170	1.59	65.4	382		59	5.6	1,810	
Feb. 11-20	41.7			110	27	226								1,120	1.52	126	386		56	5.0	1,710	

a No flow Oct. 15-25, 27-30, Nov. 5-10.



## RIO GRANDE BASIN--Continued

## RIO GRANDE TIFFANY CHANNEL AT SAN MARCIAL, N. MEX.--Continued

Temperature (°F) of water, water year October 1951 to September 1952  
 /Once-daily temperature measurement generally between 11:00 a.m. and 6:00 p.m.<sup>7a</sup>

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

a No flow Oct. 15-25, 27-30, Nov. 5-10.

b Observations made before 11:00 a.m.

## RIO GRANDE BASIN--Continued

## RIO GRANDE TIFFANY CHANNEL AT SAN MARCIAL, N. MEX.--Continued

Suspended sediment, water year October 1951 to September 1952

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-----	0.3	381	0.3	0.2	290	0.2	0.5	3,300	4.5
2-----	.2	410	a.2	.1	233	.1	.6	2,050	3.3
3-----	.2	540	.3	.1	233	.1	.4	2,090	2.3
4-----	.1	580	a.2	.1	263	.1	.5	1,950	2.6
5-----	.1	650	a.2	0	--	0	.4	2,300	2.5
6-----	.1	790	.2	0	--	0	.2	2,040	1.1
7-----	.1	828	.2	0	--	0	.3	600	.5
8-----	.1	712	.2	0	--	0	.4	300	a.3
9-----	.1	617	.2	0	--	0	.6	250	a.4
10-----	.1	504	.1	0	--	0	.8	238	.5
11-----	.1	265	.1	.1	171	(t)	.7	164	.3
12-----	.1	290	a.1	.1	190	a.1	.9	450	1.1
13-----	.1	680	.2	.2	191	.1	1	250	1.1
14-----	.1	609	.2	.2	167	.1	2.2	202	1.2
15-----	0	--	0	.2	192	.1	4	74	1
16-----	0	--	0	.2	120	.1	5	94	1
17-----	0	--	0	.2	122	.1	7.9	91	1.9
18-----	0	--	0	.2	103	.1	9	153	4
19-----	0	--	0	.3	190	.2	14	144	5.4
20-----	0	--	0	.3	140	.1	15	205	8.3
21-----	0	--	0	.3	121	.1	10	94	2.5
22-----	0	--	0	.3	450	.4	7	45	1
23-----	0	--	0	.2	466	.3	7	55	1
24-----	0	--	0	.2	280	.1	14	92	3.5
25-----	0	--	0	.2	222	.1	40	250	a.30
26-----	.1	237	.1	.1	110	(t)	24	192	12
27-----	0	--	0	.2	71	(t)	20	150	8.1
28-----	0	--	0	3.1	204	sb 3	21	137	7.8
29-----	0	--	0	1.1	1,050	b 3	21	150	a.9
30-----	0	--	0	.5	1,050	1.4	17	150	a.7
31-----	.2	390	.2	--	--	--	13	150	5.3
Total-	2.1	--	3.0	8.4	--	10.0	258.4	--	130.4
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-----	12	102	3.3	22	30	1.8	38	88	9.0
2-----	10	100	2.7	21	30	a.2	41	80	8.9
3-----	30	317	s 32	20	25	1.4	45	51	6.2
4-----	42	735	83	20	49	2.6	57	85	13
5-----	32	500	43	19	49	2.5	78	193	41
6-----	23	254	s 19	20	46	2.5	58	156	24
7-----	11	60	1.8	21	73	4.1	58	70	11
8-----	17	200	9.2	21	45	2.6	57	42	6.5
9-----	9.7	158	4.1	22	34	2.0	58	63	9.9
10-----	5.5	90	1.3	21	26	1.5	59	62	9.9
11-----	7.9	120	2.6	25	25	1.7	59	110	18
12-----	7.0	105	2.0	24	24	1.6	59	114	18
13-----	5.5	94	1.4	28	30	a.2	62	89	15
14-----	3.7	96	1.0	43	24	2.8	65	103	18
15-----	3.0	87	.7	50	23	3.1	68	80	15
16-----	2.8	71	.5	54	21	3.1	64	82	14
17-----	6.8	129	s 4	53	20	2.9	62	60	10
18-----	24	300	19	49	20	a.3	62	77	13
19-----	11	150	4.5	46	29	3.6	65	84	15
20-----	7.0	93	1.8	45	35	4.3	86	103	24
21-----	4.8	53	.7	41	33	3.7	80	121	26
22-----	60	1,380	s 334	38	62	6.4	79	103	22
23-----	78	1,510	318	39	52	5.5	83	97	22
24-----	59	700	112	37	72	7.2	99	200	53
25-----	32	189	16	37	139	14	85	100	23
26-----	21	82	4.6	37	119	12	71	79	15
27-----	19	41	2.1	37	64	6.4	36	150	15
28-----	20	40	2.2	36	81	7.9	30	90	7.3
29-----	21	45	2.6	36	96	9.3	35	98	9.3
30-----	22	27	1.6	--	--	--	46	97	12
31-----	22	47	2.8	--	--	--	56	85	13
Total-	649.7	--	1,033.5	962	--	123.5	1,901	--	517

s Computed by subdividing day.

t Less than 0.05 ton.

a Computed from estimated concentration graph.

b Computed from partly-estimated concentration graph.

## WESTERN GULF OF MEXICO BASINS

## RIO GRANDE BASIN--Continued

## RIO GRANDE TIFFANY CHANNEL AT SAN MARCIAL, N. MEX.--Continued

Suspended sediment, water year October 1951 to September 1952--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-----	62	105	18	488	1,080	1,420	1,730	907	4,240
2-----	65	116	20	551	1,600	2,380	1,970	1,300	a 6,900
3-----	60	155	25	551	1,200	1,790	3,160	2,000	17,100
4-----	64	161	28	446	1,010	1,220	3,940	2,800	29,800
5-----	80	168	36	506	1,500	2,050	3,760	2,200	22,300
6-----	88	183	43	759	1,600	3,280	3,570	1,640	15,800
7-----	190	300	81	737	1,800	3,580	3,530	1,340	12,800
8-----	118	550	175	1,190	1,710	5,490	3,420	1,200	a 11,100
9-----	120	756	245	2,010	1,400	7,600	3,350	1,000	9,000
10-----	128	950	328	2,880	2,450	19,100	3,270	916	8,090
11-----	176	1,200	a 570	2,840	2,420	18,600	3,180	907	7,790
12-----	205	1,260	697	2,800	1,940	14,700	2,940	837	6,640
13-----	183	850	420	2,540	1,680	11,500	2,940	900	a 7,100
14-----	168	498	226	2,070	1,500	8,380	2,840	800	a 6,100
15-----	165	450	200	1,640	1,370	6,070	2,500	851	5,740
16-----	155	200	84	1,490	1,300	a 5,200	2,320	1,000	6,260
17-----	190	148	76	1,490	1,280	5,150	2,240	971	5,870
18-----	183	158	78	1,880	1,330	6,750	1,950	968	5,100
19-----	176	321	153	2,780	1,100	8,260	1,950	900	4,740
20-----	207	550	307	3,180	951	8,170	1,710	991	4,580
21-----	233	632	398	2,560	1,000	6,910	1,450	900	a 3,500
22-----	308	900	748	2,420	1,020	6,660	1,310	900	a 3,200
23-----	390	800	842	1,990	1,030	5,530	1,150	947	2,940
24-----	376	920	934	1,840	960	4,770	968	900	2,350
25-----	290	1,080	846	1,690	890	4,060	715	979	1,890
26-----	240	1,020	661	1,570	980	4,150	570	889	1,370
27-----	245	1,000	a 660	1,620	980	4,290	479	888	1,150
28-----	278	814	611	1,280	900	3,110	376	811	823
29-----	320	888	767	1,250	1,100	3,710	341	839	772
30-----	348	907	852	1,410	1,050	4,000	314	731	620
31-----	--	--	--	1,570	900	3,820	--	--	--
Total--	5,721	--	11,129	52,028	--	191,700	63,943	--	215,665
	July			August			September		
1-----	390	946	996	181	8,900	4,350	102	3,620	997
2-----	272	740	543	139	8,500	a 3,200	87	2,400	564
3-----	245	723	478	161	8,650	3,760	84	1,300	295
4-----	250	705	476	154	6,200	2,580	80	650	140
5-----	327	3,000	2,650	189	10,000	5,100	77	536	111
6-----	398	11,000	a 11,800	181	6,500	3,180	75	500	a 100
7-----	302	9,500	7,750	172	4,340	2,020	71	405	78
8-----	584	15,000	s 24,200	168	4,000	a 1,800	65	483	85
9-----	842	15,000	34,100	150	2,500	1,010	61	419	69
10-----	715	17,000	32,800	161	2,000	869	59	390	62
11-----	462	11,500	14,300	172	3,330	1,550	57	380	58
12-----	462	10,000	12,500	230	5,430	3,370	50	400	a 50
13-----	398	5,500	5,910	382	11,200	s 15,000	29	400	a 30
14-----	362	4,000	3,910	193	8,500	4,430	28	408	31
15-----	548	16,000	s 25,400	176	12,000	5,700	30	433	35
16-----	362	12,000	11,700	146	9,000	a 3,500	30	345	28
17-----	348	7,000	6,580	146	6,700	2,640	30	388	31
18-----	290	5,500	4,310	164	7,060	3,130	30	290	23
19-----	235	3,820	2,420	172	6,900	a 3,200	29	300	a 20
20-----	206	3,100	1,720	129	3,000	1,040	29	250	a 20
21-----	185	2,500	1,250	120	1,860	603	28	257	19
22-----	210	3,000	a 1,700	120	2,940	953	32	245	21
23-----	132	1,500	595	161	11,000	b 5,400	37	235	23
24-----	117	971	307	468	28,900	s 40,600	51	1,000	b 140
25-----	105	700	a 200	278	20,000	a 15,000	45	2,000	243
26-----	108	800	233	161	14,000	6,090	46	1,500	186
27-----	136	4,000	1,470	157	10,900	4,620	37	800	80
28-----	143	3,000	1,160	132	11,000	3,920	34	469	43
29-----	185	4,500	2,250	114	7,500	2,310	36	400	a 40
30-----	139	2,480	931	114	11,100	3,420	36	329	32
31-----	172	4,520	s 6,260	111	11,000	3,300	--	--	--
Total--	9,630	--	220,839	5,542	--	157,645	1,485	--	3,654
Total discharge for year (cfs-days) .....									142,130.6
Total load for year (tons) .....									802,449.4

s Computed by subdividing day.

a Computed from estimated concentration graph.

b Computed from partly-estimated concentration graph.

RIO GRANDE BASIN--Continued  
RIO GRANDE TIFFANY CHANNEL AT SAN MARCIAL, N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1951 to September 1952  
(Methods of analysis: B, bottom withdrawal tube; D, decantation; F, pipette; S, sieve; N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date of collection	Time	Water 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. 11, 1951	1:15 p.m.	0.1		--	--	--	--	--	--	--	100	99	99	100	--	--	S
Nov. 29	12:30 p.m.	9		1,520	1,700	--	95	--	96	--	99	99	99	99	100	--	SPWCM
Dec. 12	3:40 p.m.	14	9	516	598	--	77	--	90	--	98	99	99	99	100	100	SPWCM
Dec. 31	3:35 p.m.	44		150	--	--	--	--	--	--	76	79	100	100	--	--	S
Mar. 2, 1952	2:45 p.m.			81	--	--	--	--	--	--	77	80	83	87	87	87	S
Apr. 25	7:30 a.m.	314		947	3,200	--	83	--	92	--	97	99	100	100	--	--	SPWCM
Apr. 25	7:30 a.m.	314		947	2,700	--	15	--	93	--	97	99	100	100	97	97	SPN
May 9	10:50 a.m.	1,900		1,380	1,840	--	70	--	77	--	81	84	90	90	97	97	SPWCM
May 20	3:20 p.m.	3,140		one	2,040	69	84	90	96	97	97	98	99	99	100	100	SPWCM
May 31	12:55 p.m.	1,590		834	2,060	--	82	--	95	--	98	99	99	99	100	100	SPWCM
June 3	1:35 p.m.	3,220		2,030	5,700	--	82	--	98	--	99	99	99	99	100	--	SPWCM
June 12	1:40 p.m.	2,900		818	--	--	--	--	--	--	99	99	99	99	100	100	S
June 24	12:30 p.m.	255		916	--	--	--	--	--	--	97	98	99	99	99	99	S
July 4	11:30 a.m.	818		695	1,510	48	51	63	74	84	96	99	99	100	100	--	SBWCM
July 9	3:15 p.m.			13,200	4,160	--	72	--	87	--	96	99	99	100	--	--	SPWCM
July 20	1:20 p.m.	206		2,790	3,430	--	72	--	86	--	98	100	--	--	--	--	SPWCM
July 20	1:20 p.m.	206		2,790	2,880	--	16	--	89	--	98	100	--	--	--	--	SPN
Aug. 1	11:20 a.m.	181		8,480	4,760	--	81	--	94	--	98	100	--	--	--	--	SPWCM
Aug. 10	5:20 p.m.	164		2,000	3,670	53	61	71	77	85	89	98	100	100	--	--	SBWCM
Aug. 13	3:45 p.m.	704		19,000	4,170	--	59	--	64	--	76	85	100	--	--	--	SPWCM
Aug. 14	1:20 p.m.	157		6,900	4,250	--	76	--	90	--	99	100	--	--	--	--	SPWCM
Aug. 24	6:30 p.m.	650		35,800	2,670	--	65	--	88	--	96	99	100	100	--	--	SPWCM
Aug. 24	6:30 p.m.	650		35,800	1,440	--	3	--	87	--	96	99	100	100	--	--	SPN
Aug. 24	6:30 p.m.	650		35,800	1,980	54	71	78	87	92	96	99	100	100	--	--	SPWCM
Aug. 24	6:30 p.m.	650		35,800	1,660	4	9	31	87	92	96	99	100	100	--	--	SEN
Sept. 10	2:00 p.m.	59		390	820	70	79	86	92	93	94	95	98	98	100	100	SBWCM
Sept. 26	4:15 p.m.	50		1,290	3,620	--	93	--	97	--	99	100	--	--	--	--	SPWCM

RIO GRANDE BASIN--Continued  
RIO GRANDE AT SAN MARCIAL, N. MEX.

LOCATION.--At gaging station at Atchison, Topeka and Santa Fe Railway bridge, 1.1 miles downstream from San Marcial, Socorro County, and 17½ miles southwest of San Antonio.

DRAINAGE AREA.--27,700 square miles, approximately (includes 2,940 square miles in closed basin in northern part of San Louis Valley, Colo.).

RECORDS AVAILABLE.--Chemical analyses: July 1946 to September 1952.

Water temperatures: January 1949 to September 1952.

Sediment records: July 1946 to September 1952.

EXTREMES, 1951-52.--Dissolved solids: Maximum, 1,450 ppm Sept. 24-26; minimum, 233 ppm June 11-20.

Hardness: Maximum, 776 ppm Sept. 24-26; minimum, 138 ppm June 11-20.

Specific conductance: Maximum observed, 2,060 micromhos Sept. 25; minimum observed, 311 micromhos June 14.

Water temperatures: Maximum observed, 83°F Sept. 9; minimum observed, 33°F Jan. 6.

Sediment concentrations: Maximum daily, 74,400 ppm Sept. 25; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 259,000 tons Aug. 24; minimum daily, 0 ton on many days.

EXTREMES, 1946-52.--Dissolved solids: Maximum, 1,670 ppm Aug. 11-16, 19-22, 1946; minimum, 233 ppm June 11-20, 1952.

Hardness: Maximum, 820 ppm Aug. 11-16, 19-22, 1946; minimum, 138 ppm June 11-20, 1952.

Specific conductance: Maximum observed, 2,470 micromhos Sept. 28, 1946; minimum observed, 311 micromhos June 14, 1952.

Water temperatures (1949-52): Maximum observed, 97°F Aug. 11, 1946; minimum observed, freezing point on several days.

Sediment concentrations: Maximum daily, 93,600 ppm Aug. 11, 1946; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 366,000 tons July 25, 1949; minimum daily, 0 ton on many days.

REMARKS.--Values reported for dissolved solids are residues on evaporation. Records of chemical analyses and sediment loads for years prior to 1946

have been published in Water bulletins of International Boundary and Water Commission. Record of discharge for water year October 1951 to September

1952 given in Water-Supply Paper 1242, is composite of main channel and Tiffany Channel. Quality of water records for Rio Grande Tiffany Channel at

San Marcial given on page 426. Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex.

Chemical analyses, in parts per million, December 1951 to September 1952

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 adsorption ratio	Specific conductance (micro-mhos at 25°C)			
															Parts per million	Tons per acre-foot	Tons per day				Calcium, magnesium	Non-carbonate	
Dec. 13-20, 1951 <sup>a</sup>	163	--	--	86	16	67	--	--	--	--	--	--	--	--	--	541	0.74	238	280	--	34	1.7	808
Dec. 21-31, 1951	223	--	--	81	16	63	--	--	--	--	--	--	--	--	--	512	.70	308	268	--	34	1.7	768
Jan. 1-10, 1952	498	23	0.01	76	14	62	7.4	214	0	157	30	0.7	3.1	0.1	b	478	.65	643	247	72	34	1.7	726
Jan. 11-20, 1952	447	--	--	76	14	55	--	--	--	--	--	--	--	--	--	484	.66	584	247	--	33	1.5	725
Jan. 21-31, 1952	589	--	--	72	14	50	--	--	--	--	--	--	--	--	--	455	.62	724	237	--	31	1.4	698
Feb. 1-10, 1952	398	--	--	70	14	55	--	--	--	--	--	--	--	--	--	458	.62	492	232	--	34	1.6	691
Feb. 11-20, 1952	466	--	--	67	13	61	--	--	--	--	--	--	--	--	--	454	.62	571	220	--	38	1.8	681
Feb. 21-29, 1952	403	--	--	66	13	57	--	--	--	--	--	--	--	--	--	452	.63	555	223	--	36	1.7	699
Mar. 1-10, 1952	447	--	--	68	13	58	--	--	--	--	--	--	--	--	--	460	.63	555	223	--	36	1.7	695
Mar. 11-20, 1952	403	--	--	78	14	63	--	--	--	--	--	--	--	--	--	486	.66	529	252	--	35	1.7	739
Mar. 21-31, 1952	467	--	--	75	15	63	--	--	--	--	--	--	--	--	--	493	.67	622	246	--	36	1.7	746
Apr. 1-10, 1952	880	28	.01	72	13	60	5.5	196	0	152	29	.6	3.0	.18	477	.65	1,130	233	72	35	1.7	697	7.6
Apr. 11-20, 1952	1,544	--	--	64	12	43	--	--	--	--	--	--	--	--	--	374	.51	1,560	209	--	31	1.3	562
Apr. 21-30, 1952	2,300	--	--	60	10	39	--	--	--	--	--	--	--	--	--	342	.47	2,120	190	--	31	1.3	520

<sup>a</sup> No flow Oct. 1-Dec. 12, 1951, and Sept. 8, 10-22, 1952.

<sup>b</sup> Sum of determined constituents.



May 1-10, 1952	3,376	56	9.4	34	--	--	--	--	--	313	0.43	2,950	178	--	29	1.1	478
May 11-20	3,936	52	7.8	26	--	--	--	--	--	276	.88	2,930	162	--	27	1.0	431
May 21-31	3,082	50	7.8	26	--	--	--	--	--	262	.86	2,180	157	--	26	.9	399
June 1-10	3,323	50	8.6	31	--	--	--	--	--	294	.40	2,640	190	--	30	1.1	446
June 11-20	3,096	44	6.8	19	--	--	--	--	--	233	.32	1,950	138	--	23	.7	350
June 21-30	1,874	45	7.4	24	--	--	--	--	--	282	.36	1,330	143	--	27	.9	392
July 1-4	1,062	23	4.1	28	136	69	14	4	1.0	268	.36	768	142	30	29	1.0	401
July 5-10	1,833	.08	7.0	63	5.9	226	21	4	1.6	b 527	.72	2,750	268	122	33	1.7	791
July 11-20	1,488	62	13	43	--	--	--	--	--	368	.50	1,480	200	--	32	1.3	567
July 21-26, 29-31	1,480	52	9.4	41	--	--	--	--	--	340	.46	450	168	--	35	1.4	506
July 27-28	354	70	11	65	--	--	--	--	--	474	.64	453	220	--	39	1.9	709
Aug. 1-8	697	94	15	56	--	--	--	--	--	509	.69	958	296	--	29	1.4	751
Aug. 9-20	879	78	12	44	--	--	--	--	--	405	.55	961	244	--	28	1.2	604
Aug. 21-23, 26-28	735	72	12	52	--	--	--	--	--	424	.58	841	229	--	33	1.5	637
Aug. 24-25, 29-31	1,070	142	24	95	--	--	--	--	--	817	1.11	2,360	453	--	31	1.9	1,120
Sept. 1-7, 9	115	88	16	68	--	--	--	--	--	512	.70	159	286	--	34	1.8	755
Sept. 8-10	19.3	111	23	103	--	--	--	--	--	719	.98	37.5	372	--	38	2.3	1,040
Sept. 23, 27-30	106	232	48	172	--	--	--	--	--	1,450	1.97	41.5	776	--	33	2.7	1,840
Sept. 24-26					--	--	--	--	--					--			
Weighted average c	1,238	60	10	39	--	--	--	--	--	349	0.47	890	190	--	31	1.2	525

a No flow Oct. 1-Dec. 12, 1951, and Sept. 8, 10-22, 1952.

b Sum of determined constituents.

c Average for 279 days of flow.

## RIO GRANDE BASIN--Continued

## RIO GRANDE AT SAN MARCIAL, N. MEX.--Continued

Temperature (°F) of water, December 1951 to September 1952

/Once-daily temperature measurement, generally between 11:00 a.m. and 6:00 p.m.<sup>7b</sup>

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

a Observations made before 11:00 a.m.

b No flow Oct. 1-Dec. 12, Sept. 8, 10-22.

## RIO GRANDE BASIN--Continued

## RIO GRANDE AT SAN MARCIAL, N. MEX.--Continued

Suspended sediment, water year October 1951 to September 1952

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
2-----							0	--	0
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-----							58	3,560	sa 1,900
14-----							222	11,700	7,010
15-----							82	7,450	s 1,770
16-----							95	4,620	s 1,210
17-----							224	5,610	s 3,650
18-----							234	7,490	s 4,760
19-----							214	7,100	4,100
20-----							174	7,100	3,340
21-----							120	7,500	b 2,430
22-----							110	4,890	sb 1,610
23-----							121	2,980	s 1,040
24-----							222	3,190	s 2,150
25-----							360	7,700	a 7,500
26-----							232	7,000	s 4,400
27-----							222	6,900	4,140
28-----							270	7,000	5,100
29-----							292	6,860	5,410
30-----							262	6,800	a 4,800
31-----							238	6,500	4,180
Total-----	0		0	0		0	3,752	--	70,500
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-----	232	5,920	3,710	420	5,020	5,690	328	4,020	3,560
2-----	255	6,080	4,190	333	5,420	4,870	293	4,000	3,160
3-----	691	12,400	s 24,400	381	4,900	5,040	410	4,440	4,920
4-----	792	11,700	25,000	405	5,400	5,900	650	7,900	s 14,400
5-----	744	9,380	18,800	417	5,000	5,630	870	5,000	11,700
6-----	636	8,000	13,700	399	5,400	5,820	645	6,500	11,300
7-----	494	5,600	7,470	423	5,430	6,200	480	7,040	9,120
8-----	447	7,120	8,590	411	5,600	6,210	332	5,100	4,570
9-----	372	6,450	6,480	387	5,200	5,430	221	6,500	3,880
10-----	322	7,020	6,100	405	4,600	5,030	237	5,000	3,200
11-----	387	6,670	6,970	435	5,000	5,870	170	4,660	b 2,140
12-----	399	6,710	7,230	417	4,700	5,290	224	7,200	4,350
13-----	330	6,300	5,610	450	4,900	a 6,000	358	7,100	6,860
14-----	336	5,900	5,350	438	5,020	5,940	595	7,380	11,900
15-----	360	5,400	5,250	514	4,800	6,660	570	7,140	11,000
16-----	387	4,600	4,810	590	4,600	7,330	316	6,300	5,380
17-----	610	11,400	s 19,600	525	5,610	7,950	244	4,800	3,160
18-----	660	6,700	11,900	445	5,600	a 6,700	400	5,700	6,160
19-----	542	6,150	9,000	448	5,950	7,420	425	5,500	6,310
20-----	462	6,070	7,570	403	4,900	5,330	726	8,600	s 17,100
21-----	478	6,150	7,940	390	4,400	4,630	722	8,400	16,400
22-----	860	10,800	s 26,000	450	4,930	5,990	620	9,700	16,200
23-----	1,020	7,400	20,400	455	5,660	6,950	698	9,460	17,800
24-----	828	6,780	15,200	425	4,000	4,590	856	7,760	17,900
25-----	630	6,500	11,100	344	4,800	4,460	756	7,400	15,100
26-----	486	5,600	7,350	352	5,100	4,850	460	6,400	7,950
27-----	420	5,600	6,350	420	4,550	5,160	244	3,580	s 2,430
28-----	411	5,400	5,990	410	4,500	4,980	131	2,200	778
29-----	458	5,520	6,830	380	4,600	4,720	116	2,000	626
30-----	454	5,070	6,210	--	--	--	142	1,900	728
31-----	438	4,880	5,770	--	--	--	392	4,890	sb 5,300
Total-----	15,941	--	320,870	12,272	--	166,640	13,631	--	245,382

s Computed by subdividing day.

a Computed from estimated concentration graph.

b Computed from partly-estimated concentration graph.

## WESTERN GULF OF MEXICO BASINS

## RIO GRANDE BASIN--Continued

## RIO GRANDE AT SAN MARCIAL, N. MEX.--Continued

Suspended sediment, water year October 1951 to September 1952--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-----	630	9,600	16,300	2,780	3,700	27,800	2,780	2,800	21,000
2-----	455	5,980	7,350	2,990	2,940	23,700	2,850	3,200	a 25,000
3-----	370	5,850	s 5,920	2,900	2,200	17,200	3,320	4,140	37,100
4-----	625	8,200	13,800	2,780	2,500	18,800	3,800	5,100	52,300
5-----	740	6,880	13,700	2,680	2,680	22,400	3,600	4,680	45,500
6-----	905	6,100	14,900	3,320	2,890	25,900	3,440	4,060	37,700
7-----	1,050	6,900	19,600	3,560	2,930	28,200	3,360	3,960	35,900
8-----	1,250	6,800	23,000	4,100	2,650	29,300	3,360	3,800	34,500
9-----	1,360	8,400	30,800	4,050	2,910	31,800	3,240	4,220	36,900
10-----	1,420	4,300	16,500	4,400	2,480	29,500	3,480	3,270	30,700
11-----	1,600	4,300	18,600	4,150	2,350	26,300	3,240	2,870	25,100
12-----	1,720	4,600	21,400	4,500	2,420	29,400	3,200	3,700	32,000
13-----	1,670	4,250	19,200	4,400	1,960	23,300	3,200	3,850	33,100
14-----	1,560	4,930	20,800	4,000	1,980	21,400	3,140	3,950	33,500
15-----	1,600	5,720	24,700	3,600	2,100	a 20,000	3,140	4,000	a 34,000
16-----	1,350	4,000	14,600	3,520	1,600	15,200	3,110	4,080	34,300
17-----	1,320	4,900	17,500	3,480	1,600	a 15,000	3,200	3,420	29,500
18-----	1,400	3,600	13,600	3,640	1,740	17,100	3,020	3,360	27,400
19-----	1,520	3,700	15,200	3,920	1,510	16,000	2,930	3,300	26,100
20-----	1,700	3,360	15,400	4,150	1,500	16,800	2,780	4,100	30,800
21-----	1,910	3,100	16,000	3,800	1,400	14,400	2,780	3,640	27,300
22-----	2,070	4,400	24,600	3,680	1,620	16,100	2,550	3,700	a 25,000
23-----	2,360	4,780	30,500	3,600	1,520	14,800	2,400	3,670	23,800
24-----	2,400	4,900	31,800	3,240	1,520	13,300	2,130	3,700	21,300
25-----	2,400	4,000	25,900	2,930	1,430	11,300	1,830	2,850	14,100
26-----	2,220	4,210	25,200	2,820	1,690	12,900	1,680	2,700	12,200
27-----	2,180	3,680	21,700	2,850	1,860	14,300	1,640	2,480	11,000
28-----	2,380	3,470	22,300	2,620	1,980	14,000	1,390	2,600	9,760
29-----	2,500	3,460	23,400	2,600	2,330	16,400	1,240	2,600	a 8,700
30-----	2,580	3,500	24,400	2,650	2,450	17,500	1,100	2,220	6,590
31-----	--	--	--	2,780	3,280	24,600	--	--	--
Total--	47,245	259,000	588,670	106,690	--	624,700	82,930	--	822,150
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-----	1,300	2,390	8,390	731	16,200	s 32,700	384	20,200	s 23,200
2-----	1,120	2,340	7,080	465	9,250	11,600	200	16,000	8,640
3-----	988	2,180	5,820	605	15,500	25,300	192	15,000	6,160
4-----	842	2,400	5,460	640	13,500	23,300	93	9,800	2,460
5-----	1,170	3,800	12,000	856	18,200	42,100	51	5,500	757
6-----	1,580	4,900	a 21,000	814	12,100	26,600	31	2,000	a 170
7-----	1,440	11,300	43,900	752	9,700	19,700	5,7	500	8
8-----	1,910	21,900	113,000	710	9,400	18,000	0	--	0
9-----	2,650	17,000	122,000	630	6,900	11,700	5	500	1
10-----	2,850	22,000	169,000	665	5,600	10,100	0	--	0
11-----	2,130	16,200	93,200	698	7,300	13,800	0	--	0
12-----	1,890	13,500	68,900	1,080	9,000	26,200	0	--	0
13-----	1,610	7,500	32,600	1,590	16,500	s 83,200	0	--	0
14-----	1,460	6,200	24,400	1,250	18,600	s 63,500	0	--	0
15-----	1,780	17,500	84,100	1,020	19,600	s 54,300	0	--	0
16-----	1,530	19,100	78,900	740	15,500	a 31,000	0	--	0
17-----	1,450	9,500	37,200	680	11,800	21,700	0	--	0
18-----	1,230	9,200	30,600	788	10,300	21,900	0	--	0
19-----	956	7,000	18,100	877	9,730	23,000	0	--	0
20-----	842	6,500	14,800	535	5,700	8,230	0	--	0
21-----	704	5,100	9,690	352	5,400	5,130	0	--	0
22-----	884	4,900	11,700	390	6,400	6,740	0	--	0
23-----	425	4,120	4,730	781	23,100	sb 61,200	33	22,000	sa 6,000
24-----	290	2,300	1,800	2,000	45,400	s 259,000	141	63,600	s 28,900
25-----	200	1,720	929	1,820	37,000	182,000	125	74,400	s 26,800
26-----	182	1,260	619	1,140	24,900	s 81,800	53	54,000	8,010
27-----	329	7,310	s 7,290	964	16,000	41,600	28	28,600	s 2,390
28-----	378	5,750	s 6,320	782	20,500	43,300	16	10,000	432
29-----	740	7,590	15,200	520	22,600	31,700	11	4,500	a 130
30-----	465	5,400	6,780	501	44,800	s 63,400	8,4	1,920	44
31-----	516	10,100	sb 20,400	511	49,700	s 73,200	--	--	--
Total--	35,841	--	1,075,908	25,887	--	1,417,000	1,332,6	--	114,102
Total discharge for year (cfs-days).....									345,521.6
Total load for year (tons).....									5,445,922

s Computed by subdividing day.

a Computed from estimated concentration graph.

b Computed from partly-estimated concentration graph.

RIO GRANDE BASIN--Continued  
RIO GRANDE AT SAN MARCIAL, N. MEX.--Continued

Particle-size analyses of suspended sediment, December 1951 to September 1952

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

Date of collection	Time	Water 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
Dec. 24, 1951 . . .	2:10 p. m.	192		2,190	3,680	--	70	--	88	--	99	100	--		--	SPWCM
Jan. 2, 1952 . . .	12:00 m.	248		6,490	3,090	--	37	--	81	--	96	98	100		--	SPWCM
Jan. 10 . . .	1:30 p. m.	363		6,850	3,340	47	57	70	72	86	89	96	100		--	SPWCM
Jan. 10 . . .	1:30 p. m.	363		6,850	2,720	46	55	66	77	85	89	96	100		--	SPWCM
Jan. 23 . . .	9:45 a. m.	1,040		6,840	5,270	--	74	--	90	--	92	98	100		--	SPWCM
Feb. 3 . . .	2:25 p. m.	402		4,700	4,820	--	61	--	89	--	93	97	100		--	SPWCM
Feb. 11 . . .	11:10 a. m.	435		5,180	2,800	--	44	--	63	--	83	94	100		--	SPWCM
Feb. 21 . . .	12:00 m.	395		4,140	2,430	--	43	--	56	--	85	93	99	100		SPWCM
Mar. 3 . . .	3:30 p. m.	410		4,440	3,090	--	26	--	47	--	69	91	100		--	SPWCM
Mar. 8 . . .	12:40 p. m.	336		4,490	4,940	--	63	--	80	--	93	98	100		--	SPWCM
Mar. 10 . . .	12:15 p. m.	221		4,770	4,000	29	31	37	42	67	80	94	100		--	SPWCM
Mar. 10 . . .	12:15 p. m.	221		4,770	2,020	3	16	53	66	74	80	94	100		--	SEN
Mar. 10 . . .	12:15 p. m.	221		4,770	1,830	53	56	62	69	73	80	94	100		--	SEN
Mar. 10 . . .	12:15 p. m.	221		4,770	1,700	7	11	34	72	74	80	94	100		--	SEN
Mar. 21 . . .	11:25 a. m.	680		7,860	4,190	--	65	--	79	--	89	97	100		--	SPWCM
Mar. 29 . . .	11:45 a. m.	101		1,800	2,710	--	84	--	94	--	96	99	100		--	SPWCM
Apr. 2 . . .	1:05 p. m.	495		5,780	3,550	--	45	--	61	--	76	92	100		--	SPWCM
Apr. 10 . . .	9:30 a. m.	1,380		3,280	3,830	--	44	--	52	--	94	95	96	98		SPWCM
Apr. 13 . . .	10:15 a. m.	1,660		5,260	5,280	--	45	--	63	--	93	94	95	97		SPWCM
Apr. 19 . . .	9:15 a. m.	1,500		3,850	2,800	43	48	64	74	83	94	98	100		--	SPWCM
Apr. 19 . . .	9:15 a. m.	1,500		3,850	2,960	5	23	44	54	72	84	93	98	100		SPN
Apr. 19 . . .	9:15 a. m.	1,500		3,850	1,950	36	44	50	60	71	84	93	98	100		SPWCM
Apr. 19 . . .	9:15 a. m.	1,500		3,850	1,800	5	17	41	55	71	84	93	98	100		SEN
May 1 . . .	11:00 a. m.	2,720		3,660	6,910	--	35	--	46	--	69	92	99	100		SPWCM
May 11 . . .	10:15 a. m.	4,400		2,150	2,230	--	46	--	50	--	63	82	99	100		SPWCM
May 21 . . .	10:00 a. m.	3,800		1,340	1,200	--	47	--	59	--	60	80	99	100		SPWCM
June 1 . . .	9:30 a. m.	2,720		2,800	2,730	--	26	--	37	--	62	92	100		--	SPWCM

RIO GRANDE BASIN--Continued  
RIO GRANDE AT SAN MARCIAL N. MEX.--Continued

Particle-size analyses of suspended sediment, December 1951 to September 1952--Continued  
(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date of collection	Time	Water 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
June 12, 1952.....	11:00 a. m.	3,280		3,970	3,630	--	17	--	23	--	44	80	99		100	SPWCM	
June 12.....	11:00 a. m.	3,280		4,120	4,120	--	12	--	21	--	44	80	99		100	SPN	
June 21.....	11:05 a. m.	2,800		3,590	3,900	--	16	--	23	--	43	81	99		100	SPWCM	
July 1.....	10:30 a. m.	1,360		2,390	2,390	--	15	--	29	--	61	91	99		100	SPWCM	
July 9.....	10:30 a. m.	2,720		15,100	3,860	--	57	--	78	--	87	96	100		--	SPWCM	
July 20.....	11:20 a. m.	891		6,390	6,140	--	54	--	69	--	80	94	100		--	SPWCM	
Aug. 1.....	8:00 a. m.	788		17,200	3,820	--	70	--	82	--	91	96	100		--	SPWCM	
Aug. 1.....	8:00 a. m.	788		4,060	4,060	--	5	--	82	--	91	96	100		--	SPN	
Aug. 1.....	8:00 a. m.	788		17,200	2,110	68	77	81	82	85	91	96	100		--	SBWCM	
Aug. 1.....	8:00 a. m.	788		17,200	2,420	4	8	62	84	90	91	96	100		--	SBN	
Aug. 10.....	4:30 p. m.	680		5,110	4,720	--	57	--	72	--	86	98	100		--	SPWCM	
Aug. 13.....	2:30 p. m.	2,000		26,000	2,640	--	39	--	69	--	91	100	--		--	SPWCM	
Aug. 24.....	4:30 p. m.	2,580		60,200	5,460	--	57	--	76	--	89	93	99		100	SPWCM	
Sept. 4.....	11:25 a. m.	95		9,250	2,780	--	87	--	94	--	96	98	100		--	SPWCM	
Sept. 25.....	9:30 a. m.	135		79,400	3,540	--	86	--	99	--	99	100	--		--	SPWCM	
Sept. 26.....	2:30 p. m.	50		52,700	3,850	--	89	--	93	--	99	100	--		--	SPWCM	

## RIO GRANDE BASIN--Continued

## PECOS RIVER AT PUERTO DE LUNA, N. MEX.

LOCATION.--At bridge at Puerto de Luna, Guadalupe County, 18½ miles upstream from gaging station near Puerto de Luna which is 14 miles upstream from Alamogordo Dam.

DRAINAGE AREA.--3,970 square miles, approximately (contributing area above gaging station).

RECORDS AVAILABLE.--Chemical analyses: July 1939 to September 1952.

Water temperatures: June 1949 to September 1952.

Sediment records: January 1949 to September 1952.

EXTREMES, 1951-52.--Dissolved solids: Maximum, 2,670 ppm Mar. 11-20; minimum, 622 ppm Aug. 11-15.

Hardness: Maximum, 1,850 ppm Oct. 1-10; minimum, 449 ppm Aug. 11-15.

Specific conductance: Maximum observed, 3,810 micromhos Dec. 14; minimum observed, 36° Feb. 4.

Water temperatures: Maximum observed, 85° June 12; minimum daily, 78 ppm Apr. 1-7.

Sediment concentrations: Maximum daily, 46,600 ppm Aug. 12; (computed on basis of estimated discharge); minimum daily, 16 tons Apr. 1-7.

Sediment loads: 1946-52.--Dissolved solids: Maximum, 2,670 ppm Mar. 11-20, 1952; minimum, 287 ppm May 11-16, 18-20, 1941.

EXTREMES, 1939-41, 1946-52.--Dissolved solids: Maximum, 2,670 ppm Mar. 11-20, 1951; minimum, 200 ppm May 11-16, 18-20, 1941.

Hardness: Maximum, 1,880 ppm July 1-10, 1951; minimum, 200 ppm May 11-16, 18-20, 1941.

Specific conductance: Maximum observed, 3,810 micromhos Dec. 14, 1951; minimum observed, 344 micromhos Sept. 21, 1941.

Water temperatures (1949-52): Maximum observed, 98° July 5, 19, 1949; minimum, freezing point Jan. 5, 1950.

Sediment concentrations (1949-52): Maximum daily, 46,600 ppm Aug. 12, 1952; minimum daily, 5 tons Sept. 21-30, 1951.

Sediment loads (1949-52): Maximum daily, 450,000 tons Sept. 10, 1949; minimum daily, 5 tons Sept. 21-30, 1951.

REMARKS.--Values reported for dissolved solids are sums of determined constituents. 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 1951 to September 1952 given in Water-Supply Paper 1242. No appreciable inflow between sampling point and gaging station except during periods of heavy local rain.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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			Hardness as CaCO <sub>3</sub>		Percent sodium carbonate ratio	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, 1951	79.9	17		608	81	70	173	0	1,600	138		0.6		2,600	3.54	561	1,850	1,710	8	0.7	2,920	7.7
Oct. 11-20	84.6	16		604	76	79	171	0	1,580	139		.7		2,580	3.52	592	1,820	1,680	9	.8	2,910	7.5
Oct. 21-31	108	17		572	78	59	153	0	1,480	141		.9		2,430	3.30	709	1,750	1,620	7	.6	2,800	7.5
Nov. 1-10	93.2	18		598	77	75	176	0	1,570	136		.7		2,560	3.48	644	1,810	1,660	8	.7	2,890	7.6
Nov. 11-20	95.3	18		592	80	72	180	0	1,560	135		.7		2,550	3.47	656	1,810	1,660	8	.7	2,890	7.6
Nov. 21-30	109	16		602	77	57	182	0	1,540	134		.5		2,520	3.43	742	1,820	1,670	6	.6	2,870	7.5
Dec. 1-10	98.1	16		604	79	70	183	0	1,570	142		.3		2,570	3.50	681	1,830	1,680	8	.7	2,890	7.6
Dec. 11-20	102	17		596	78	89	184	0	1,550	168		.6		2,580	3.52	713	1,810	1,660	10	.9	2,960	7.7
Dec. 21-31	100	15		590	79	78	185	0	1,550	154		.5		2,550	3.47	688	1,800	1,660	9	.8	2,890	7.7
Jan. 1-10, 1952	97.8	17		598	80	52	176	0	1,560	118		.4		2,510	3.41	663	1,820	1,680	5	.5	2,900	7.8
Jan. 11-20	90.4	16		602	79	48	176	0	1,560	94		.6		2,520	3.43	615	1,830	1,680	5	.5	2,910	7.7
Jan. 21-31	88.7	16		602	80	68	174	0	1,590	128		.5		2,570	3.50	615	1,830	1,680	7	.7	2,930	7.8

## WESTERN GULF OF MEXICO BASINS

## RIO GRANDE BASIN--Continued

## PECOS RIVER AT PUERTO DE LUNA, N. MEX.--Continued

Chemical analyses, in parts per million, water year October 1951 to September 1952.--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 (gum)			Hardness as CaCO <sub>3</sub>		Percent adsorption (micro-mhos at 25°C)	Specific conductance (micro-mhos at 25°C)	pH	
															Parts per million	Tons per acre-foot	Tons per day	Calcium	Non-carbonate				
Feb. 1-10, 1952.....	88.0	19		600	80		89	176	0	1,600	149		0.3		2,620	3.56	623	1,830	1,680	10	0.9	2,940	7.8
Feb. 11-20.....	92.8	17		596	83		79	173	0	1,580	151		.5		2,590	3.52	649	1,830	1,680	9	.8	2,950	7.6
Feb. 21-28.....	91.4	16		596	81		75	164	0	1,580	144		.6		2,570	3.50	634	1,820	1,680	8	.8	2,940	7.6
Mar. 1-10.....	94.1	17		604	79		103	172	0	1,600	138		1.5		2,600	3.54	661	1,830	1,680	8	.8	2,920	7.6
Mar. 11-20.....	81.9	19		604	79		103	178	0	1,620	158		1.5		2,670	3.63	560	1,830	1,680	11	1.0	3,000	7.3
Mar. 21-31.....	91.2	18		610	76		79	166	0	1,610	136		2.5		2,610	3.55	643	1,830	1,700	9	.8	2,950	7.4
Apr. 1-8.....	75.8	18		606	77		78	166	0	1,600	139		1.3		2,600	3.54	532	1,830	1,680	9	.8	2,920	7.4
Apr. 9-12.....	199	20		318	36		32	186	0	1,742	61		1.3		1,300	1.77	688	1,942	1,769	7	.5	1,660	7.1
Apr. 13-18.....	148	19		348	62		61	164	0	1,260	105		.6		2,070	2.82	827	1,460	1,330	8	.7	2,410	7.4
Apr. 19-30.....	177	18		322	37		33	162	0	1,280	95		1.1		1,960	1.85	650	1,956	883	9	.6	1,710	7.4
May 1-4.....	215	16		302	36		33	157	0	1,233	58		.6		1,260	1.71	731	902	773	7	.5	1,600	7.4
May 5-10.....	445	16		162	18		20	176	0	324	26		1.4		653	.89	785	476	332	8	.4	917	7.5
May 11-20.....	361	13		166	21		13	140	0	356	31		.9		670	.91	653	500	386	5	.3	947	7.4
May 21-31.....	201	15		281	35		43	135	0	715	59		.6		1,220	1.66	662	845	734	10	.6	1,550	7.6
June 1-10.....	369	15		164	20		27	156	0	360	33		1.1		697	.95	694	491	363	11	.5	976	7.6
June 11-16.....	326	14		172	20		30	137	0	401	33		.5		738	1.00	650	511	398	11	.6	1,020	7.9
June 17-21.....	207	17		279	35		46	138	0	717	56		.5		1,220	1.66	682	840	727	11	.7	1,540	8.0
June 22-30.....	141	19		506	70		95	162	0	1,390	125		1.2		2,290	3.11	872	1,550	1,420	12	1.0	2,610	7.9
July 1-10.....	136	18		476	63		93	174	0	1,290	115		1.8		2,140	2.91	786	1,450	1,300	12	1.1	2,480	7.5
July 11-12, 16-20.....	201	16		442	53		58	163	0	1,140	89		1.5		1,860	2.56	1,020	1,320	1,190	9	.7	2,210	7.5
July 13-15.....	2,157	22		221	24		27	201	0	1,140	160		1.5		910	1.24	5,300	630	466	8	.3	1,160	8.0
July 21-31.....	124	19		552	74		74	155	0	500	16		.4		2,400	3.26	804	1,680	1,550	9	.8	2,720	7.6
Aug. 1-3, 7-8.....	262	17		358	45		44	161	0	906	70		1.5		1,520	2.07	108	1,080	946	8	.6	1,860	7.6
Aug. 4-6, 9-10.....	531	19		172	21		25	213	0	339	28		2.4		711	.97	1,020	516	341	9	.5	1,000	7.6
Aug. 11-15.....	884	18		152	17		25	222	0	278	22		1.1		622	.85	1,500	449	267	11	.5	882	7.5
Aug. 16-20.....	163	16		434	58		61	172	0	1,120	104		1.7		1,880	2.56	827	1,320	1,180	9	.7	2,230	7.5
Aug. 21-22, 28-30.....	243	15		394	52		59	170	0	1,020	86		2.3		1,710	2.33	1,120	1,200	1,060	10	.7	2,050	7.6
Aug. 23-27, 31.....	330	18		191	25		29	188	0	419	37		1.2		813	1.11	742	580	426	10	.5	1,120	7.6
Sept. 1-10.....	104	16		476	66		66	169	0	1,250	114		1.0		2,070	2.82	581	1,460	1,320	9	.7	2,420	7.6
Sept. 11-20.....	87.9	15		502	68		73	171	0	1,320	125		1.2		2,180	2.98	520	1,530	1,390	9	.8	2,530	7.7
Sept. 21-30.....	90.3	18		526	74		85	171	0	1,410	138		.4		2,340	3.18	571	1,620	1,490	10	.9	2,700	7.7
Weighted average.....	177	17		362	46		48	174	0	911	76		1.0		1,550	2.11	741	1,090	950	9	0.6	1,860	--



## RIO GRANDE BASIN--Continued

## PECOS RIVER AT PUERTO DE LUNA, N. MEX.--Continued

Temperature (°F) of water, water year October 1951 to September 1952  
 /Once-daily temperature measurement generally between 11:00 a. m. and 6:00 p. m. 7

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

a Observations made before 11:00 a. m.

b Observations made after 6:00 p. m.

## WESTERN GULF OF MEXICO BASINS

## RIO GRANDE BASIN--Continued

## PECOS RIVER AT PUERTO DE LUNA, N. MEX.--Continued

Suspended sediment, water year October 1951 to September 1952

Day	October			November			December		
	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-----	82	177	38	106	478	119	112	374	100
2-----	78			94			100		
3-----	78			82			115		
4-----	82			88			103		
5-----	80			85			97		
6-----	80	172	39	97	239	61	91	209	56
7-----	82			103			72		
8-----	75			97			100		
9-----	80			80			91		
10-----	82			100			100		
11-----	72	172	39	97	142	37	91	133	37
12-----	72			103			94		
13-----	80			80			109		
14-----	91			94			103		
15-----	85			88			109		
16-----	88	210	85	88	323	95	97	151	44
17-----	82			97			109		
18-----	88			91			103		
19-----	94			109			106		
20-----	94			106			97		
21-----	94	--	e 50	103	--	--	78	113	30
22-----	91			100			89		
23-----	94			100			88		
24-----	97			106			109		
25-----	91			100			115		
26-----	106	350	121	118	--	--	100	460	128
27-----	106			109			109		
28-----	150			126			106		
29-----	132			112			109		
30-----	100			118			97		
31-----	124	360	121	--	--	--	103	280	73
Total-	2,830	--	1,534	2,977	--	2,278	3,102	--	1,948
Day	January			February			March		
	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-----	89	206	50	93	102	24	87	167	41
2-----	95	226	58	91			98		
3-----	112	356	108	80			91		
4-----	100	158	42	82			98		
5-----	103			85			95		
6-----	93			100	106	28	93	130	33
7-----	100			93			93		
8-----	95			80			85		
9-----	93			89			91		
10-----	98			87			110		
11-----	87	113	28	100	213	51	103	163	36
12-----	95			107			91		
13-----	93			93			78		
14-----	93			91			85		
15-----	87			91			78		
16-----	85	154	37	91	81	20	78	144	35
17-----	89			91			76		
18-----	93			91			80		
19-----	93			80			76		
20-----	89			93			74		
21-----	93	81	19	89	81	20	85	116	28
22-----	87			91			91		
23-----	91			91			91		
24-----	95			89			91		
25-----	87			93			95		
26-----	85	116	28	91	--	--	93	--	--
27-----	82			95			93		
28-----	91			95			93		
29-----	89			89			91		
30-----	87			--			91		
31-----	89			--			89		
Total-	2,858	--	1,033	2,631	--	838	2,763	--	1,099

e Estimated.

## RIO GRANDE BASIN--Continued

## PECOS RIVER AT PUERTO DE LUNA, N. MEX.--Continued

Suspended sediment, water year October 1951 to September 1952--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-----	82			260	985	691	341	3,750	s 6,530
2-----	76			190	844	433	564	13,500	20,600
3-----	78			170	519	238	371	7,500	7,510
4-----	72	78	16	240	905	588	309	2,760	2,300
5-----	74			350	1,590	1,500	286	2,200	1,700
6-----	74			400	3,520	3,800	364	2,400	2,360
7-----	74			450	5,910	7,180	364	1,780	1,750
8-----	76	425	87	500	4,680	6,320	364	2,180	2,140
9-----	136	1,850	679	520	4,220	5,920	364	2,210	2,170
10-----	217	3,060	1,790	450	3,840	4,670	364	2,280	2,240
11-----	235	1,850	1,170	350	2,920	2,760	371	2,000	2,000
12-----	208	1,380	775	330	2,230	1,990	371	2,400	2,400
13-----	194	432	226	310	3,060	2,560	343	1,460	1,350
14-----	175	301	142	309	2,600	2,170	304	1,210	993
15-----	147	253	100	336	2,940	2,670	292	1,110	875
16-----	120	363	118	385	2,380	2,470	275	922	685
17-----	139	171	64	436	2,310	2,720	244	594	391
18-----	115	--	e 50	453	2,880	3,520	230	503	312
19-----	136	1,040	382	378	1,980	2,020	201	400	217
20-----	194	2,620	1,370	322	1,390	1,210	190	224	115
21-----	221	2,360	1,410	275	1,070	794	169	293	134
22-----	210	1,600	907	249	681	458	141	158	60
23-----	200	1,380	745	244	628	414	105	178	50
24-----	180	1,410	685	226	674	411	82	214	47
25-----	160	657	284	194	537	281	70	183	35
26-----	140	545	206	194	382	200	65	132	23
27-----	130	674	237	160	450	194	61	--	e 20
28-----	140	841	318	150	317	128	116	1,170	s 1,130
29-----	160	2,010	868	144	303	118	98	2,000	529
30-----	250	1,910	1,290	179	895	433	533	11,500	s 80,800
31-----	--	--	--	201	867	471	--	--	--
Total--	4,413	--	14,015	9,355	--	59,330	7,952	--	141,466
	July			August			September		
1-----	313	19,200	s 28,300	543	19,200	s 40,800	212	6,780	3,880
2-----	110	2,000	594	234	9,160	s 6,710	156	3,160	1,330
3-----	103	1,540	s 666	152	6,100	s 2,580	122	1,020	336
4-----	91	990	243	484	11,800	s 24,600	103	476	132
5-----	70	1,540	291	272	10,900	s 8,640	85	552	127
6-----	87	1,560	366	400	15,200	16,400	78	296	62
7-----	95	2,220	569	260	7,230	s 5,080	70	370	70
8-----	135	4,350	s 2,140	120	5,890	1,910	70	371	70
9-----	205	8,200	4,540	400	4,440	a 20,000	70	334	63
10-----	156	8,750	3,690	1,100	30,500	a 150,000	70	542	102
11-----	160	4,750	2,050	600	13,700	22,200	74	188	38
12-----	247	6,960	s 10,500	1,500	46,600	a 300,000	82	162	36
13-----	2,320	24,200	s 221,000	972	23,600	s 64,900	74	402	80
14-----	3,030	21,600	s 242,000	800	15,200	32,800	68	516	95
15-----	1,120	7,350	s 35,300	600	15,000	24,300	99	2,800	s 880
16-----	405	16,300	s 24,100	350	6,700	6,330	128	4,100	1,420
17-----	163	6,000	2,640	200	1,920	1,040	117	2,000	632
18-----	163	3,420	1,510	125	1,460	493	89	541	130
19-----	144	3,660	1,420	80	1,220	264	76	425	87
20-----	128	2,340	809	60	848	137	72	469	91
21-----	112	1,690	511	70	1,880	355	74	454	91
22-----	103	1,500	417	500	10,000	a 40,000	105	897	254
23-----	461	46,200	s 140,000	450	15,300	a 25,000	105	506	144
24-----	110	3,670	1,090	450	10,500	a 30,000	100	439	119
25-----	100	3,640	983	400	9,500	a 15,000	91	457	112
26-----	90	3,740	909	250	8,200	5,540	89	358	86
27-----	85	4,180	959	208	7,980	s 4,500	85	427	98
28-----	80	1,740	376	208	2,870	1,610	80	273	59
29-----	75	1,740	352	141	1,450	552	87	352	83
30-----	72	2,930	570	298	10,000	s 12,200	87	260	61
31-----	72	1,540	299	269	15,000	10,900	--	--	--
Total--	10,604	--	729,194	12,496	--	874,641	2,818	--	10,768
Total discharge for year (cfs-days).....									64,799
Total load for year (tons).....									1,838,344

e Estimated.

s Computed by subdividing day.

a Discharge estimated; distribution is not known. Concentrations from graph based on numerous samples. Loads computed from water-discharge relation curve.

## RIO GRANDE BASIN--Continued

## PECOS RIVER AT PUERTO DE LUNA, N. MEX.--Continued

Particle-size analyses of suspended sediment, April to September 1952  
 (Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water;  
 W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date of collection	Time	Water discharge (cfs) <sup>a</sup>	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. 10, 1952	5:31 p. m.	230		3,000	2,120	40		74		82	88	97		100		SPN
Apr. 10	5:31 p. m.	230		3,000	5,130	72		75		82	88	97		100		SPWCM
Apr. 20	1:40 p. m.	220		3,120	5,040	55		83		97	98	100		100		SPWCM
May 10	6:30 p. m.	e 400		3,750	1,470	0		14		74	90	98		100		SPN
May 10	6:30 p. m.	e 400		3,750	4,580	19		39		74	90	98		100		SPWCM
June 2	1:00 p. m.	510		12,900	5,870	59		77		90	98	100		--		SPWCM
July 10	8:15 a. m.	160		9,620	4,500	26		88		93	99	100		--		SPN
July 10	8:15 a. m.	160		9,620	3,900	85		87		93	99	100		--		SPWCM
July 16	7:35 p. m.	170		7,270	5,150	48		67		88	98	99		100		SPWCM
July 22	10:30 p. m.	930		117,000	4,240	23		34		65	80	99		100		SPWCM
July 23	1:20 p. m.	110		7,300	5,230	49		70		89	98	99		100		SPWCM
Aug. 1	6:25 a. m.	440		27,200	4,340	34		49		68	86	97		100		SPWCM
Aug. 2	7:03 p. m.	260		9,290	4,700	60		66		89	98	100		--		SPWCM
Aug. 5	4:15 p. m.	190		7,380	4,320	64		82		98	99	100		--		SPWCM
Aug. 6	1:35 p. m.	--		19,400	4,640	15		90		97	99	100		--		SPN
Aug. 6	1:35 p. m.	--		19,400	4,940	76		95		97	99	100		--		SPWCM
Aug. 10	3:30 a. m.	--		50,000	4,050	30		41		57	77	92		99		SPWCM
Aug. 11	7:00 p. m.	--		25,300	4,720	24		61		81	93	98		100		SPWCM
Aug. 12	5:23 a. m.	--		47,700	4,320	23		47		70	83	95		99		SPN
Aug. 12	5:23 a. m.	--		47,700	4,200	38		68		70	83	95		99		SPWCM
Aug. 12	3:00 p. m.	--		27,000	4,000	51		61		85	95	99		100		SPWCM
Aug. 14	2:10 p. m.	--		19,600	3,980	73		83		97	99	100		--		SPWCM
Aug. 15	9:15 a. m.	--		21,000	3,150	50		88		96	99	100		--		SPWCM
Aug. 15	9:15 a. m.	--		21,000	4,270	32		79		98	99	100		--		SPN
Aug. 15	2:05 p. m.	--		15,800	2,820	40		67		98	99	100		--		SPWCM
Sept. 1	8:15 a. m.	210		8,440	3,760	66		75		76	80	97		100		SPWCM

e Estimated.

a Discharges computed from record at gaging station with allowance for time of travel.

## 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,

Pecos County, 390 square miles, approximately (contributing area).

DATA AVAILABLE.--Chemical analyses: June 1937 to September 1952.

EXTREMES AVAILABLE.--Dissolved solids: Maximum, 2,620 ppm April 1-12, 1952; minimum, 684 ppm July 15-20.

EXTREMES 1951-52.--Dissolved solids: Maximum, 495 ppm April 1-12, 1951; minimum, 495 ppm April 1-12, 1951.

EXTREMES 1937-52.--Dissolved solids: Maximum, 495 ppm April 1-12, 1952; minimum, 435 ppm Oct. 1-8, 1941.

Specific conductance: Maximum, 3,000 micromhos at 25°C. April 1-12, 1952; minimum, 435 micromhos July 15-20.

Hardness: Maximum, 1,800 ppm Jan. 11-16, 1948; minimum, 294 ppm Oct. 1-8, 1941.

Specific conductance: Maximum observed, 3,200 micromhos Jan. 14, 1948; minimum observed, 513 micromhos July 22, 1937.

REMARKS. Values reported for dissolved solids are sums of determined constituents. Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of discharge for water year October 1951 to September 1952 given in Water-Supply Paper 1242.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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 (sum)			Hardness as CaCO <sub>3</sub>		Percent adsorption	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium	Non-magnesium				
Oct. 1-10, 1951 ...	90.8	14		442	61	73		157	0	1,180	101		1.5		1,950	2.65	478	1,350	1,230	10	0.9	2,330	7.5
Oct. 11-20	82.4	10		432	63	75		133	0	1,180	103		.8		1,930	2.62	428	1,340	1,230	11	.9	2,290	7.5
Oct. 21-31	85.5	13		460	70	71		153	0	1,260	110		1.1		2,060	2.80	476	1,440	1,310	10	.8	2,420	7.5
Nov. 1-10	4.37	16		442	72	68		147	0	1,220	111		1.1		2,000	2.72	23.6	1,400	1,280	10	.8	2,390	7.5
Nov. 11-20	1.02	14		446	68	78		158	0	1,240	114		1.7		2,040	2.77	5.62	1,390	1,260	11	.9	2,430	7.5
Nov. 21-30	.98	14		444	75	60		160	0	1,210	112		1.3		2,000	2.72	5.29	1,420	1,290	8	.7	2,410	7.5
Dec. 1-10	.53	15		428	77	71		152	0	1,210	112		1.3		1,990	2.71	2.85	1,380	1,260	10	.8	2,390	7.5
Dec. 11-20	.39	16		456	74	71		154	0	1,260	117		1.3		2,070	2.82	2.18	1,440	1,320	10	.8	2,450	7.6
Dec. 21-31	.25	16		452	73	69		150	0	1,240	116		1.1		2,040	2.77	1.38	1,430	1,300	10	.8	2,430	7.6
Jan. 1-10, 1952	.24	15		464	72	73		158	0	1,280	120		1.1		2,100	2.86	1.36	1,450	1,320	10	.8	2,430	7.7
Jan. 11-20	.27	16		474	75	72		168	0	1,290	124		1.1		2,140	2.91	1.56	1,490	1,350	9	.8	2,510	7.7
Jan. 21-31	.25	16		462	74	76		170	0	1,280	123		1.0		2,120	2.88	1.43	1,460	1,320	10	.9	2,500	7.7
Feb. 1-10	.29	16		480	80	74		168	0	1,320	126		1.0		2,180	2.96	1.71	1,530	1,390	10	.8	2,550	7.7
Feb. 11-17 a	64.4	17		528	80	100		154	0	1,460	132		.6		2,390	3.25	416	1,650	1,520	12	1.1	2,730	7.7
Feb. 25-29 a	.22	15		496	79	100		144	0	1,410	127		.6		2,300	3.13	1.37	1,580	1,440	12	1.1	2,650	7.7
Mar. 1-10	88.3	15		546	83	101		140	0	1,520	136		.6		2,470	3.36	598	1,700	1,590	11	1.1	2,810	7.7
Mar. 11-20	82.2	17		560	82	107		122	0	1,860	143		.5		2,550	3.47	566	1,730	1,630	12	1.1	2,890	7.4
Mar. 21-31	368	16		554	81	109		126	0	1,970	141		.9		2,530	3.44	2,510	1,720	1,610	12	1.1	2,840	7.5

a No flow Feb. 18-24.

## RIO GRANDE BASIN--Continued

PECOS RIVER BELOW ALAMOGORDO DAM, N. MEX.--Continued

Chemical analyses, in parts per million, water year October 1951 to September 1952--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			Hardness as CaCO <sub>3</sub>		Per-cent so-lu-sion ratio	So-lu-m absorp-tion at 25° C	Specific conduct-ance (micro-mhos at 25° C)	pH
															Parts per mil-lion	Tons per acre-foot	Tons per day	Calcium	Non-carbon-ate				
Apr. 1-12, 1952	866	15		580	80	111		137	0	1,620	147		0.7		2,620	3.56	6,130	1,780	1,660	12	1.1	2,950	7.5
Apr. 13-20	90.2	15		402	53	73		153	0	1,070	94		1.3		1,780	2.42	434	1,220	1,100	11	.9	2,130	7.5
Apr. 21-30	76.6	13		374	52	70		131	0	1,010	88		1.2		1,670	2.27	345	1,150	1,040	12	.9	2,010	7.5
May 1-10	94.8	13		323	43	60		132	0	852	76		1.5		1,430	1.94	366	1,093	1,070	12	.8	1,780	7.3
May 11-20	111	13		232	30	40		122	0	569	50		1.2		1,020	1.39	306	702	602	11	.7	1,330	7.4
May 21-31	95.6	12		204	28	33		121	0	505	43		1.3		886	1.20	229	624	525	10	.6	1,190	7.3
June 1-10	86.5	12		211	28	35		123	0	522	44		1.1		914	1.24	213	642	540	11	.6	1,210	7.3
June 11-20	231	12		211	27	37		125	0	525	46		1.0		921	1.25	574	638	535	11	.6	1,230	7.2
June 21-24	1,125	12		196	28	32		116	0	495	42		1.0		863	1.17	2,620	604	509	10	.6	1,170	7.5
June 25-30	1,202	15		438	63	91		163	0	1,220	110		2.0		2,020	2.75	6,560	1,350	1,220	13	1.1	2,370	7.5
July 1-2, 4-10	228	14		457	59	81		138	0	1,250	105		1.7		2,040	2.77	1,260	1,380	1,270	11	.9	2,370	7.5
July 3	132	14		240	43	44		132	0	662	35		1.4		1,120	1.52	460	1,776	1,668	11	.7	1,450	7.5
July 11-14	103	12		386	49	50		160	0	1,030	62		1.7		1,680	2.28	467	1,190	1,060	8	.6	1,860	7.3
July 15-20	65.0	16		159	24	24		201	0	1,337	16		6.6		684	.93	120	1,495	330	10	.5	1,845	7.7
July 21-31	315	9.3		197	24	29		104	0	511	24		2.9		848	1.15	721	590	505	10	.5	1,120	7.3
Aug. 1-10	242	10		266	33	37		112	0	700	39		2.0		1,140	1.55	745	799	707	9	.6	1,440	7.4
Aug. 11-20	959	12		198	25	29		112	0	503	28		1.3		851	1.16	1,970	597	505	10	.5	1,120	7.3
Aug. 21-31	404	13		185	25	30		128	0	457	30		1.4		804	1.09	877	564	460	10	.5	1,080	7.5
Sept. 1-10	97.4	12		209	28	35		136	0	522	40		1.1		914	1.24	240	636	525	11	.6	1,210	7.5
Sept. 11-20	87.1	11		245	32	46		132	0	637	49		.6		1,090	1.48	256	743	635	12	.7	1,400	7.5
Sept. 21-30	90.2	11		305	41	53		147	0	799	66		.5		1,350	1.84	329	930	809	11	.8	1,680	7.5
Weighted average ..	173	13		354	49	65		131	0	959	80		1.3		1,590	2.16	743	1,080	977	12	0.9	1,900	--

# 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.--11,380 square miles, approximately (contributing area).

RECORDS AVAILABLE.--Chemical analyses: July 1937 to September 1952.

Water temperatures: May 1952 to September 1952.

EXTREMES, 1951-52.--Dissolved solids: Maximum, 12,000 ppm Mar. 3-5; minimum, 968 ppm Aug. 21-28.

Hardness: Maximum, 3,760 ppm Mar. 3-5; minimum, 666 ppm Aug. 21-28.

Specific conductance: Maximum observed, 16,600 micromhos Mar. 3-5; minimum observed, 1,190 micromhos Aug. 25.

Temperatures: Maximum observed, 86° F July 4.

EXTREMES, 1951-52.--Dissolved solids: Maximum 19,870 ppm May 23-June 2, 1938; minimum, 806 ppm May 24, 1941.

Hardness: Maximum, 5,520 ppm May 23-June 2, 1938; minimum, 528 ppm May 24, 1941.

Specific conductance: Maximum observed, 39,300 micromhos Aug. 9, 1945; minimum observed, 955 micromhos Aug. 21, 1941.

REMARKS.--Values reported are sums of determined constituents. Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. until April 17, 1951. Samples were collected at bridge on U. S. Highway 70, approximately 3 miles above gaging station. Records of discharge for water year October 1951 to September 1952 given in Water-Supply Paper 1242.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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 (sum)			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	Non-carbonate		
Oct. 12-20, 1951 a..	10.9	13		516	110	201		94	0	1,580	315		1.4		2,790	3.79	82.1	1,740	1,660	20	2.1
Oct. 21-25 .....	15.4	10		488	101	239		93	0	1,500	365		1.2		2,750	3.74	114	1,630	1,560	24	2.6
Oct. 26-31 .....	74.7	12		332	71	139		121	0	999	200		3.1		1,820	2.48	367	1,120	1,020	21	1.8
Nov. 1-10 .....	41.0	14		492	105	216		131	0	1,480	340		1.5		2,710	3.69	300	1,660	1,550	22	2.3
Nov. 11-20 .....	9.1	15		528	128	342		132	0	1,670	525		1.8		3,270	4.45	80.3	1,840	1,740	23	3.5
Nov. 21-30 .....	7.3	15		538	140	400		143	0	1,710	630		1.9		3,500	4.76	69.0	1,920	1,800	31	4.0
Dec. 1-3, 6, 8-10 ..	4.4	14		556	140	519		150	0	1,760	805		2.1		3,870	5.26	46.0	1,960	1,840	37	5.1
Dec. 4-5 .....	3.5	16		644	183	920		156	0	1,950	1,560		2.4		5,350	7.28	50.6	2,360	2,230	46	8.2
Dec. 11-20 .....	8.0	16		618	157	656		137	0	1,810	1,060		2.3		5,300	6.12	67.2	2,390	2,260	39	7.5
Dec. 21-31 .....	4.6	13		634	182	894		144	0	2,840	1,440		2.8		4,690	6.30	79.1	2,400	2,030	43	8.1
Jan. 1-2, 4-10, 1952	6.33	14		583	164	733		138	0	2,060	1,800		1.9		6,100	8.30	97.2	2,430	2,300	51	10.9
Jan. 3 .....	5.9	14		644	199	1,760		136	0	1,920	1,180		1.7		4,680	6.36	59.9	2,140	2,030	43	7.0
Jan. 4-22 .....	4.4	12		529	162	749		133	0	1,920	1,180		1.7		4,680	6.36	59.9	2,140	2,030	43	7.0
Jan. 23-26 .....	1.28	13		812	282	1,720		176	0	2,400	3,070		--		8,390	11.4	29.0	3,230	3,080	54	13
Feb. 17-27 .....	13.8	12		636	150	452		129	0	1,930	760		2.0		4,000	5.44	149	2,200	2,100	31	4.2
Feb. 28-29 .....	4.50	12		698	191	982		139	0	2,200	1,000		2.0		5,750	7.82	69.9	2,530	2,410	46	8.5
Mar. 1-2 .....	1.45	12		746	242	1,200		138	0	2,440	2,000		--		6,710	9.13	26.3	2,860	2,740	48	9.8
Mar. 3-5 .....	1.57	17		921	356	2,850		203	0	2,900	4,810		--		12,000	16.3	18.5	3,760	3,600	62	20
Mar. 9-20 .....	12.1	15		656	151	400		137	0	2,080	600		2.8		3,970	5.40	130	2,260	2,140	28	3.7
Mar. 21-29 .....	28.3	18		648	146	366		107	0	2,090	530		4.6		3,860	5.25	295	2,220	2,130	26	3.4
Mar. 30-31, Apr. 1-10	682	18		616	101	132		148	0	1,740	216		2.9		2,900	3.64	5,340	1,850	1,830	13	1.3

a No flow Oct. 1-11, Dec. 7, Jan. 27, Feb. 16, Mar. 6-8.

## RIO GRANDE BASIN--Continued

## PECOS RIVER NEAR ACME, N. MEX.--Continued

Chemical analyses, in parts per million, water year October 1951 to September 1952--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 (sum)			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 mil-lion	Tons per acre-foot	Tons per day	Calcium, mag-nesium	Non-carbonate				
Apr. 11-17, 1952 a	529	17		584	89	112	182	182	0	1,820	174		3.1	2,890	3.64	3,830	1,820	1,690	12	1.1	3,040	7.4
Apr. 29-30, May 1-10	8, 98	18		665	127	344	113	113	0	2,050	510		3.0	3,790	5.15	91.9	2,210	2,120	25	3.2	4,520	7.4
May 11-16.....	11, 80	20		792	184	633	119	119	0	2,560	960		2.9	5,200	7.07	11.2	2,730	2,640	33	5.3	6,300	7.5
May 31-June 1-7...	856	15		534	115	274	88	88	0	1,750	358		3.4	3,090	4.20	95.1	1,810	1,730	25	2.8	3,680	7.9
June 22-30.....	352	17		319	49	87	143	143	0	875	110		4.9	1,530	2.08	3,410	998	880	16	1.2	1,830	7.5
July 1-7, 9-10.....	94	16		361	55	90	117	117	0	1,020	113		5.0	1,720	2.34	1,630	1,130	1,030	15	1.2	2,100	7.6
July 8-10.....	76.8	18		426	93	523	128	128	0	1,260	825		4.6	3,210	4.37	815	1,450	1,340	44	6.0	4,500	7.3
July 11-14.....	839	14		436	80	180	93	93	0	1,340	238		2.4	2,340	3.18	485	1,420	1,340	22	2.1	2,840	7.2
July 15-20.....	56.4	15		252	35	51	142	142	0	647	64		4.5	1,140	1.55	2,580	772	656	13	8	1,480	7.5
July 21-25.....	21.9	16		291	42	88	98	98	0	834	115		1.7	1,450	1.97	221	898	818	19	1.4	1,830	7.5
July 26-31.....		20		468	88	216	106	106	0	1,450	284		2.8	2,580	3.51	153	1,530	1,440	24	2.4	3,100	7.9
Aug. 1-8.....	418	16		293	40	67	122	122	0	807	70		3.1	1,360	1.85	1,530	896	796	14	1.0	1,710	7.6
Aug. 9-10.....	60.5	11		486	87	810	101	101	0	1,370	1,290		3.9	4,110	5.59	671	1,570	1,490	53	8.9	5,870	7.7
Aug. 11-20.....	749	15		270	38	52	130	130	0	716	62		2.7	1,220	1.66	2,470	830	723	12	8	1,570	7.7
Aug. 21-28.....	720	15		211	34	40	137	137	0	551	52		1.7	968	1.32	1,880	666	562	11	7	1,310	7.8
Aug. 29-31, Sept. 1-9	21.2	15		360	69	129	104	104	0	1,080	178		2.6	1,880	2.56	108	1,180	1,100	19	1.6	2,380	7.5
Sept. 25-30.....	17.3	12		391	86	176	91	91	0	1,270	222		2.0	2,200	2.99	103	1,330	1,250	22	2.1	2,740	7.4
Weighted average b	178	16		376	60	97	136	136	0	1,040	137		3.3	1,800	2.45	865	1,180	1,070	15	1.2	2,200	--

a No flow May 17-30, June 8-21, Sept. 10-24.

b Average for 276 days of flow which includes 97 percent of runoff for water year.



## RIO GRANDE BASIN--Continued

## PECOS RIVER NEAR ACME, N. MEX.--Continued

Temperature (°F) of water, May to September 1952

[Once-daily temperature measurement, generally between 2:00 p. m. and 9:00 p. m.]

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1								--	--	78	82	a 81
2								--	81	81	a 76	a 75
3								--	82	--	84	83
4								--	79	86	81	80
5								--	--	--	85	80
6								--	81	80	85	84
7								--	--	75	--	--
8								--	--	a 69	84	80
9								--	--	80	a 80	80
10								--	--	80	--	--
11								69	--	78	80	--
12								80	--	78	84	--
13								80	--	--	83	--
14								80	--	--	85	--
15								78	--	76	82	--
16								70	--	83	--	--
17								--	--	80	84	--
18								--	--	80	84	--
19								--	--	a 70	85	--
20								--	--	--	84	--
21								--	--	--	84	--
22								--	--	82	79	--
23								--	78	80	--	--
24								--	80	81	83	--
25								--	75	80	80	--
26								--	75	a 80	84	68
27								--	75	--	81	a 61
28								--	74	81	79	a 61
29								--	--	81	--	70
30								--	80	78	80	68
31								--	--	84	81	--
Average								--	--	--	82	75

a Observations made between 8:00 a. m. and 1:00 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.

DRAINAGE AREA.--960 square miles (contributing area).

RECORDS AVAILABLE.--Water temperatures; September 1951 to September 1952.

Sediment records: September 1951 to September 1952.

EXTREMES, 1951-52.--Water temperatures: Maximum observed, 86°F July 24, 25; minimum, not determined.

Sediment concentrations: Maximum daily, 60,100 ppm Aug. 14; maximum observed, 90,000 ppm Aug. 14; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 103,000 tons July 14; minimum daily, 0 ton on many days.

REMARKS.--Tables omitted for September 1951; no flow during this period. Records of discharge for water year October 1950 to September 1951 given in Water-Supply Paper 1212. Records of discharge for water year October 1951 to September 1952 given in Water-Supply Paper 1242.

Temperature (°F) of water, July to September 1952  
/Once-daily temperature measurement between 11:00 a. m. and 6:00 p. m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1										a 68	--	--
2										--	--	--
3										--	--	--
4										--	74	--
5										--	82	--
6										--	70	--
7										75	--	--
8										65	--	--
9										b 76	77	--
10										72	80	--
11										b 74	80	--
12										77	82	--
13										79	b 80	--
14										69	81	--
15										75	81	--
16										78	--	--
17										--	--	--
18										--	--	--
19										--	--	--
20										--	--	--
21										--	--	--
22										--	--	--
23										80	--	82
24										86	--	87
25										86	--	--
26										84	--	--
27										--	--	--
28										--	--	--
29										--	--	--
30										--	--	--
31										--	--	--
Average										--	79	--

a Observation made before 11:00 a. m.

b Observations made after 6:00 p. m.

c No flow on most days where no temperature measurements are shown.

## RIO GRANDE BASIN--Continued

RIO HONDO AT DIAMOND A RANCH, NEAR ROSWELL, N. MEX.--Continued

Suspended sediment, water year October 1951 to September 1952

Day	October			November			December		
	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-----							0		
2-----							0		
3-----							1		
4-----							0		
5-----							0		
6-----							0		
7-----							0		
8-----							0		
9-----							1		
10-----							13		
11-----							6		
12-----							4		
13-----							1		
14-----							1		
15-----							0		
16-----							0		
17-----							0		
18-----							0		
19-----							1		
20-----							0		
21-----							0		
22-----							0		
23-----							0		
24-----							0		
25-----							0		
26-----							0		
27-----							0		
28-----							0		
29-----							0		
30-----							0		
31-----							0		
Total-	0		.0	0		0	28		e 20
Day	January			February			March		
	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-----				0					
2-----				0					
3-----				0					
4-----				0					
5-----				0					
6-----				0					
7-----				1					
8-----				0					
9-----				0					
10-----				0					
11-----				0					
12-----				1					
13-----				0					
14-----				0					
15-----				0					
16-----				0					
17-----				0					
18-----				0					
19-----				0					
20-----				0					
21-----				0					
22-----				0					
23-----				0					
24-----				0					
25-----				0					
26-----				0					
27-----				0					
28-----				0					
29-----				0					
30-----				--					
31-----				--					
Total-	0		0	2		e 1	0		0

e Estimated.

## WESTERN GULF OF MEXICO BASINS

## RIO GRANDE BASIN--Continued

## RIO HONDO AT DIAMOND A RANCH, NEAR ROSWELL, N. MEX.--Continued

Suspended sediment, water year October 1951 to September 1952--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-----	0			5					
2-----	0			5					
3-----	0			5					
4-----	0			5					
5-----	0			5					
6-----	0			5					
7-----	0			5					
8-----	0			5					
9-----	0			6					
10-----	0			6					
11-----	0			6					
12-----	0			2					
13-----	0			0					
14-----	0			0					
15-----	0			0					
16-----	0			0					
17-----	0			0					
18-----	1			0					
19-----	5			0					
20-----	5			0					
21-----	5			0					
22-----	6			0					
23-----	8			0					
24-----	5			0					
25-----	4			0					
26-----	3			0					
27-----	3			0					
28-----	4			0					
29-----	4			0					
30-----	5			0					
31-----	--			0					
Total-	58		e 25	60		e 25	0		0
July				August			September		
1-----	28	8,600	sb930	0	--	0	0	--	0
2-----	6	6,000	sa100	0	--	0	0	--	0
3-----	0	--	0	0	--	0	0	--	0
4-----	0	--	0	420	42,000	sa80,000	0	--	0
5-----	0	--	0	20	9,000	486	0	--	0
6-----	0	--	0	2	700	4	0	--	0
7-----	48	1,380	s2,220	0	--	0	0	--	0
8-----	158	12,400	s7,000	0	--	0	0	--	0
9-----	30	3,500	284	145	26,600	s15,000	0	--	0
10-----	103	12,200	s10,700	33	16,000	1,430	0	--	0
11-----	70	9,900	sa2,300	15	2,000	81	0	--	0
12-----	166	13,800	sb9,100	7	500	9	0	--	0
13-----	27	7,200	525	2	250	1	0	--	0
14-----	553	31,700	sb103,000	157	60,100	s45,000	0	--	0
15-----	160	18,200	s8,630	5	28,000	378	0	--	0
16-----	191	19,200	s12,500	0	--	0	0	--	0
17-----	95	5,000	sa1,700	0	--	0	0	--	0
18-----	60	1,050	170	0	--	0	0	--	0
19-----	56	600	91	0	--	0	0	--	0
20-----	62	1,000	a170	0	--	0	0	--	0
21-----	41	1,300	144	0	--	0	0	--	0
22-----	26	600	42	0	--	0	0	--	0
23-----	17	160	7	0	--	0	6	70	s2
24-----	9	75	2	0	--	0	13	140	5
25-----	6	35	1	0	--	0	1		
26-----	1	52	(t)	0	--	0	1		
27-----	0	--	0	0	--	0	3		
28-----	0	--	0	0	--	0	4	--	e1
29-----	0	--	0	0	--	0	1		
30-----	0	--	0	0	--	0	1		
31-----	0	--	0	0	--	0	--	--	--
Total-	1,913	--	159,616	806	--	142,389	30	--	13

## RIO GRANDE BASIN--Continued

## RIO HONDO AT DIAMOND A RANCH NEAR ROSWELL, N. MEX.--Continued

Particle-size analyses of suspended sediment, July to August 1952  
(Methods of analysis: B, bottom withdrawal tube; D, decantation; F, pipette; S, sieve; N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date of collection	Time	Water 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	
July 13, 1952 ...	2:20 p. m.	42		13,100	3,420		87		97		98	99	99				SPWCM
July 13, .....	4:20 p. m.	42		10,400	3,230		63		95		99	99	99			100	SPWCM
July 14, .....	10:10 a. m.	396		35,400	4,260		51		70		84	92	96			99	SPWCM
July 14, .....	12:00 m.	276		27,100	4,280		51		66		88	92	97			99	SPWCM
July 15, .....	1:15 p. m.	278		10,800	5,590		3		39		83	91	97			99	SPN
July 15, .....	1:15 p. m.	278		10,800	4,780		36		58		83	91	97			99	SPWCM
July 15, .....	3:15 p. m.	245		11,300	3,510		45		70		88	92	96			99	SPWCM
July 15, .....	5:15 p. m.	181		31,600	4,460		65		92		96	97	99			100	SPWCM
July 15, .....	7:00 p. m.	157		53,400	3,820		66		78		97	98	99			100	SPWCM
July 16, .....	11:50 a. m.	200		13,300	3,880		59		76		93	95	97			99	SPN
July 16, .....	1:40 p. m.	155		11,900	4,290		4		73		93	94	97			99	SPN
July 16, .....	1:40 p. m.	155		11,900	4,460		53		80		93	94	97			99	SPWCM
July 16, .....	4:20 p. m.	121		20,500	4,110		70		86		97	97	98			100	SPWCM
Aug. 5, .....	12:08 p. m.	19		8,050	3,830		11		57		99	99	100		--	--	SPN
Aug. 5, .....	2:06 p. m.	18		7,850	3,980		81		98		99	99	100		--	--	SPWCM
Aug. 5, .....	4:16 p. m.	16		7,180	4,400		83		91		98	98	100		--	--	SPWCM
Aug. 5, .....	4:35 p. m.	12		5,370	5,340		84		94		98	98	99		100	100	SPWCM
Aug. 5, .....	8:50 p. m.	9		3,020	4,570		97		94		97	97	98		100	100	SPWCM
Aug. 6, .....	12:20 a. m.	7		1,860	5,560		91		97		98	99	100		--	--	SPWCM
Aug. 6, .....	2:00 a. m.	7		1,380	4,280		88		91		97	98	99		99	99	SPWCM
Aug. 9, .....	9:55 a. m.	63		10,100	5,340		7		27		80	92	97		99	99	SPN
Aug. 9, .....	9:55 a. m.	63		10,100	5,140		29		44		80	92	97		99	99	SPWCM
Aug. 9, .....	11:15 a. m.	35		3,790	4,270		38		67		86	94	98		100	100	SPWCM
Aug. 9, .....	2:15 p. m.	271		36,800	5,340		34		54		87	95	98		100	100	SPWCM
Aug. 9, .....	5:00 p. m.	157		53,300	4,080		51		75		95	97	99		100	100	SPWCM

RIO GRANDE BASIN--Continued  
RIO HONDO AT DIAMOND A RANCH NEAR ROSWELL, N. MEX.--Continued

Particle-size analyses of suspended sediment, July to August 1952.--Continued  
(Methods of analysis: B, bottom withdrawal tube; D, decantation; F, pipette; S, sieve; N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date of collection	Time	Water 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	
Aug. 10, 1952 ..	6:00 a. m.	44		20,700	3,830		74		96		99	100	--		--	SPWCM
Aug. 10.....	8:30 a. m.	33		18,300	4,070		75		97		99	100	--		--	SPWCM
Aug. 10.....	10:30 a. m.	30		16,500	3,520		5		93		99	100	--		--	SPN
Aug. 10.....	10:30 a. m.	30		16,500	3,780		80		97		99	100	--		--	SPWCM
Aug. 10.....	12:45 p. m.	30		14,900	4,080		88		98		100	--	--		--	SPWCM
Aug. 10.....	2:45 p. m.	29		12,200	3,980		88		98		100	--	--		--	SPWCM
Aug. 10.....	4:45 p. m.	27		11,600	4,450		90		99		100	--	--		--	SPWCM
Aug. 10.....	6:15 p. m.	27		9,230	4,520		83		96		100	--	--		--	SPWCM
Aug. 10.....	7:15 p. m.	25		7,960	5,100		93		98		99	100	--		--	SPWCM
Aug. 11.....	7:30 a. m.	14		2,120	6,550		86		92		96	97	99	100		SPWCM
Aug. 11.....	9:30 a. m.	14		1,880	6,000		85		92		96	97	98	100		SPWCM
Aug. 11.....	11:30 a. m.	12		1,480	4,500		81		90		95	97	98	100		SPWCM
Aug. 14.....	10:00 a. m.	163		78,100	3,750		55		78		97	97	99	100		SPWCM
Aug. 14.....	11:00 a. m.	135		70,400	9,020		56		84		96	98	99	100		SPWCM
Aug. 14.....	11:00 a. m.	135		70,400	11,700		0		88		96	98	99	100		SPN
Aug. 14.....	1:30 p. m.	98		60,200	4,300		64		89		98	99	99	100		SPWCM
Aug. 14.....	4:00 p. m.	80		52,700	4,710		70		93		97	98	98	99		SPWCM
Aug. 14.....	6:30 p. m.	61		49,100	3,560		73		87		99	99	100		--	SPWCM
Aug. 15.....	8:30 a. m.	5		31,000	3,490		84		98		99	99	100		--	SPWCM

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 Pecos, and 17 miles north of McMillan Dam.

DRAINAGE AREA--15,300 square miles, approximately (contributing area).

RECORDS AVAILABLE--Chemical analyses: July 1937 to September 1952.

Water temperatures: April 1949 to September 1952.

Sediment records: January 1949 to September 1952.

EXTREMES, 1951-52.--Dissolved solids: Maximum, 8,950 ppm Aug. 21-29.

Hardness: Maximum, 2,990 ppm June 14-24; minimum, 1,390 ppm Aug. 21-29.

Specific conductance: Maximum observed, 14,800 micromhos June 15; minimum observed, 1,620 micromhos Aug. 26.

Water temperatures: Maximum observed, 86°F July 5; minimum, not determined.

Sediment concentrations: Maximum daily, 10,400 ppm Aug. 14; minimum daily, 16 ppm Jan. 30.

Sediment loads: Maximum daily, 43,700 tons July 16; minimum daily, less than 0.50 ton Aug. 1.

EXTREMES, 1937-52.--Dissolved solids: Maximum 10,900 ppm Aug. 11-13, 17-21, 1945; minimum, 326 ppm June 6, 1949.

Hardness: Maximum, 3,430 ppm Aug. 11-13, 17-21, 1945; minimum, 326 ppm June 6, 1949.

Specific conductance: Maximum observed, 17,200 micromhos Aug. 20, 1945; minimum observed, 898 micromhos Sept. 22, 1941.

Water temperatures: Maximum observed, 89°F June 28, 1949; minimum observed, 33°F Jan. 30-31, Feb. 1, 1951.

Sediment loads (1949-52): Maximum daily, 44,600 tons Oct. 6, 1950; minimum daily, 10 ppm Nov. 24, 30, Dec. 1, 1950.

Sediment loads (1949-52): Maximum daily, 116,000 tons July 23, 1950; minimum daily, less than 0.50 ton on several days.

REMARKS--Values reported for dissolved solids are sums of determined constituents. Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of discharge for water year October 1951 to September 1952 given in Water-Supply 1242.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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> )	Boiron (B)	Dissolved solids (sum)		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	Non-carbonate				
Oct. 1-10, 1951	22.6	15	677	287	1,600	142	0	2,310	2,740	2,740	2,740	2,740	2,740	2,740	7,700	10.5	470	2,760	55	13	11,000	7.2
Oct. 11-20	33.6	16	598	253	1,200	152	0	2,120	2,030	2,120	2,030	2,120	2,120	2,120	6,290	9.55	433	2,140	31	10	8,460	7.2
Oct. 21-29	47.6	17	556	211	975	116	0	1,950	1,820	1,950	1,820	1,950	1,950	1,950	3,730	5.33	403	2,140	10	9	8,570	7.2
Oct. 30-31, Nov. 1-10	111	17	534	186	859	106	0	1,460	1,460	1,460	1,460	1,460	1,460	1,460	4,840	6.53	1,120	1,780	47	8.0	5,260	7.3
Nov. 11-20	94.8	17	528	196	848	117	0	1,720	1,450	1,720	1,450	1,720	1,720	1,720	4,800	6.53	1,120	1,940	47	8.0	6,840	7.5
Nov. 21-30	94.8	18	528	196	848	117	0	1,720	1,450	1,720	1,450	1,720	1,720	1,720	4,800	6.53	1,120	1,970	46	7.8	7,070	7.8
Dec. 1-10	88.6	17	528	196	914	205	0	1,740	1,500	1,740	1,500	1,740	1,740	1,740	5,000	6.80	1,200	1,950	48	8.6	7,130	7.7
Dec. 11-20	99.3	18	528	196	914	218	0	1,710	1,520	1,710	1,520	1,710	1,710	1,710	4,980	6.79	1,340	1,940	49	8.5	7,130	7.7
Dec. 21-31	103.3	17	522	191	920	209	0	1,710	1,510	1,710	1,510	1,710	1,710	1,710	4,980	6.77	1,380	2,090	49	8.8	7,110	7.5
Jan. 1-10, 1952	93.2	16	518	199	906	206	0	1,720	1,500	1,720	1,500	1,720	1,720	1,720	4,970	6.76	1,250	2,110	48	8.6	7,100	7.5
Jan. 11-20	77.8	13	546	212	965	181	0	1,880	1,610	1,880	1,610	1,880	1,880	1,880	5,320	7.23	1,120	2,230	49	8.9	7,530	7.6
Jan. 21-31	62.0	14	564	232	1,050	170	0	1,970	1,750	1,970	1,750	1,970	1,970	1,970	5,670	7.71	949	2,220	49	9.4	8,050	7.6
Feb. 1-10	45.1	13	580	238	1,090	157	0	2,060	1,810	2,060	1,810	2,060	2,060	2,060	5,870	7.98	715	2,430	50	9.6	8,250	7.6
Feb. 11-20	46.5	11	568	238	1,140	144	0	2,030	1,830	2,030	1,830	2,030	2,030	2,030	5,890	8.01	739	2,390	51	10	8,250	7.5
Feb. 21-29	65.7	13	568	222	950	156	0	1,990	1,900	1,990	1,900	1,990	1,990	1,990	5,320	7.24	944	2,330	47	8.6	7,330	7.5
Mar. 1-10	55.5	12	584	240	1,100	149	0	2,070	1,810	2,070	1,810	2,070	2,070	2,070	5,890	8.01	983	2,400	49	9.7	8,230	7.6
Mar. 11-20	56.0	14	596	221	1,130	138	0	2,140	1,790	2,140	1,790	2,140	2,140	2,140	5,980	8.11	901	2,440	51	10	8,020	7.3
Mar. 21-31	61.7	15	602	212	1,200	160	0	2,160	1,790	2,160	1,790	2,160	2,160	2,160	6,060	8.24	1,010	2,370	52	11	8,250	7.3

## WESTERN GULF OF MEXICO BASINS

RIO GRANDE BASIN--Continued  
 PECOS RIVER NEAR ARTESIA, N. MEX.--Continued

Chemical analyses. in parts per million, water year October 1951 to September 1952--Continued

Date of collection	Mean dis-charge (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 (sum)		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./l.	Non-carbonate, mg./l.			
Apr. 1, 1952 .....	345	24		610	170	702		181	0	2,110	970		1.2		4,680	6.38	2,220	2,070	41	5,960	7.3
Apr. 2-10 .....	506	20		608	112	348		168	0	1,840	455		1.6		3,470	4.72	1,980	1,840	28	4,130	7.5
Apr. 11-19 .....	551	17		602	96	264		152	0	1,740	352		1.2		3,150	4.28	1,900	1,770	23	3,710	7.5
Apr. 20-22 .....	238	18		522	82	260		129	0	1,540	364		3.5		2,870	3.90	1,640	1,530	27	3,480	7.6
Apr. 23-30 .....	97.4	19		566	149	660		146	0	1,800	1,010		2.4		4,280	5.82	1,130	1,900	41	5,630	7.4
May 1-10 .....	49.3	22		618	215	1,130		142	0	2,160	1,730		2.1		5,950	8.09	2,430	2,310	50	7,940	7.3
May 11-20 .....	33.1	20		680	259	1,430		165	0	2,320	2,260		--		7,030	9.56	2,710	2,580	53	9,640	7.2
May 21-31 .....	36.8	18		604	246	1,290		150	0	2,130	2,080		--		6,440	8.76	2,520	2,400	53	8,910	7.3
June 1-13 .....	25.2	19		630	253	1,350		144	0	2,280	2,160		--		6,760	9.19	2,610	2,490	53	9,330	7.3
June 14-24 .....	19.7	20		703	301	1,990		147	0	2,580	3,280		--		8,950	12.2	2,980	2,870	59	12,400	7.4
June 25-30 .....	731	16		498	70	261		137	0	1,410	355		4.0		2,680	3.64	1,530	1,420	27	3,350	7.4
July 1-10 .....	393	16		428	63	182		145	0	1,160	268		3.6		2,190	2.98	1,320	1,200	23	2,270	7.5
July 11-19 .....	63.8	17		490	112	540		108	0	1,510	824		2.5		3,550	4.53	1,680	1,590	41	4,810	7.5
July 18-29 .....	494	16		420	60	173		119	0	1,180	244		3.4		2,160	2.94	2,880	1,200	23	2,690	7.3
July 28-31, Aug. 1-2	43.6	16		432	106	544		114	0	1,520	790		5.7		3,320	4.79	1,640	1,540	42	4,670	7.3
Aug. 3-12 .....	250	14		374	62	220		124	0	1,080	314		4.9		2,110	2.97	1,420	1,090	29	2,800	7.3
Aug. 13-20 .....	222	15		398	46	138		128	0	877	188		3.8		1,660	2.26	1,080	998	23	2,180	7.6
Aug. 21-29 .....	659	15		283	38	101		130	0	761	130		2.8		1,380	1.89	1,082	756	20	1,810	7.7
Aug. 30-31, Sept. 1-4	45.8	15		369	83	390		101	0	1,140	580		3.1		2,630	3.59	1,260	1,180	40	3,530	7.3
Sept. 5-9 .....	11.0	16		476	135	830		98	0	1,600	1,260		2.1		4,370	5.94	1,740	1,680	51	5,780	7.3
Sept. 10-20 .....	9.78	17		672	252	1,910		123	0	2,360	3,050		--		6,320	11.3	2,710	2,610	60	10,700	7.4
Sept. 21-30 .....	27.1	16		620	261	1,640		148	0	2,260	2,620		--		7,490	10.2	2,620	2,500	58	9,590	7.4
Weighted average	152	16		473	108	438		158	0	1,430	675		3.6		3,220	4.38	1,620	1,490	37	4,250	--



## RIO GRANDE BASIN--Continued

## PECOS RIVER NEAR ARTESIA, N. MEX.--Continued

Temperature (°F) of water, water year October 1951 to September 1952

/Once-daily temperature 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	--	--				--	65		--	a 78	--	82
2	78	48				--	64			81	--	76
3	75	b 50				--	63			79	--	a 75
4	75	60				--	63			81	--	a 75
5	72	--				--	63			86	a 82	a 76
6	a 67	--				--	a 59			a 78	a 80	78
7	--	--				--	65			a 79	a 81	78
8	66	--				--	65			a 66	a 84	77
9	67	--				--	58			a 72	80	a 73
10	68	--				59	54			78	a 79	a 72
11	68	--				a 53	52		--	a 78	a 78	a 69
12	a 60	--				a 50	55			a 74	a 72	78
13	b 69	--				54	57		--	85	82	a 75
14	67	--				a 50	62		--	83	83	a 70
15	a 66	--				54	68		--	82	84	78
16	70	--				57	64		--	78	83	a 76
17	67	--				53	a 62		--	79	83	79
18	68	--				a 52	a 62		--	80	83	a 71
19	65	--				60	a 60		--	a 78	84	77
20	65	--				a 55	a 63		--	79	83	a 71
21	64	--				a 52	--		--	80	a 77	a 68
22	64	--				46	--		--	a 77	80	a 65
23	62	--				46	--		--	--	82	a 62
24	59	--				55	--		--	--	81	a 64
25	a 63	--				58	--		--	--	80	a 64
26	a 61	--				58	--		76	--	82	a 65
27	a 59	--				48	--		a 76	--	80	a 69
28	a 59	--				54	--		74	--	a 77	74
29	62	--				60	--		80	--	a 78	a 70
30	62	--				a 61	--		80	--	a 77	a 66
31	65	--				65	--		--	--	a 79	--
Average	66	--				--	--		--	--	81	72

a Observations made before 11:00 a. m.

b Observations made after 6:00 p. m.

## WESTERN GULF OF MEXICO BASINS

## RIO GRANDE BASIN--Continued

## PECOS RIVER NEAR ARTESIA, N. MEX.--Continued

Suspended sediment, water year October 1951 to September 1952

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-----	11	70	a 2	110	219	65	90		
2-----	14			98	109	29	91		
3-----	20	66	4	91	123	30	89	83	20
4-----	25			108			87		
5-----	27	144	10	123			87		
6-----	21			120			83		
7-----	21	71	4	121	190	58	83		
8-----	24			113			90	76	18
9-----	31			103			92		
10-----	32	91	8	98			94		
11-----	35			95			92		
12-----	35			94			91		
13-----	32	83	7	90	94	23	94	68	17
14-----	28			90			92		
15-----	30			90			95		
16-----	35	82	7	92			95		
17-----	35			91			103		
18-----	34			89	106	26	110	63	18
19-----	39	83	8	87			109		
20-----	33			90			112		
21-----	33	95	8	92			112		
22-----	46	210	26	94			110		
23-----	43	107	12	98	67	17	107		
24-----	41			99			105		
25-----	43	69	9	98			104		
26-----	53			96			101	105	29
27-----	51	207	28	94			100		
28-----	56	126	19	94	70	17	98		
29-----	62	200	a 33	91			99		
30-----	124	422	141	87			101		
31-----	123	212	70	--	--	--	101		
Total-	1,237	--	490	2,936	--	945	3,017	--	685
	January			February			March		
1-----	101			44			56		
2-----	96			47			52		
3-----	98			48			55		
4-----	100			54			58	36	5
5-----	101			51	37	5	56		
6-----	101	92	23	39			56		
7-----	94			43			54		
8-----	84			42			57		
9-----	80			42			54		
10-----	77			41			57		
11-----	76			47			54		
12-----	81			49			58		
13-----	81			47			64	40	a 6
14-----	83			52			58		
15-----	80			47			62		
16-----	74	49	10	43	27	3	58		
17-----	74			42			58		
18-----	76			44			56		
19-----	75			51			51		
20-----	78			43			41		
21-----	81			50			39		
22-----	74			68			43		
23-----	68			69			47		
24-----	63			72			52		
25-----	58	57	10	77	36	6	55	52	7
26-----	59			76			43		
27-----	60			70			52		
28-----	64			58			52		
29-----	60			51			60		
30-----	49	16	2	--	--	--	57		
31-----	46	44	5	--	--	--	179	328	s 253
Total-	2,392	--	427	1,507	--	134	1,794	--	437

s Computed by subdividing day.

a Computed from estimated concentration graph.

## RIO GRANDE BASIN--Continued

## PECOS RIVER NEAR ARTESIA, N. MEX.--Continued

Suspended sediment, water year October 1951 to September 1952--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-----	345	2,500	2,330	72			37		
2-----	365	3,350	3,300	64			40		
3-----	402	3,350	3,640	58			33		
4-----	428	3,220	3,720	53	92	14	29	78	6
5-----	428	3,220	3,720	52			25		
6-----	452	2,850	3,480	46			30		
7-----	502	3,080	4,170	38			19		
8-----	615	4,000	6,640	41	65	6	27		
9-----	675	4,250	7,750	38			25		
10-----	690	3,650	6,800	31			25		
11-----	750	3,320	6,720	22			13		
12-----	795	3,020	6,480	30	72	7	12		
13-----	812	2,960	6,490	36			12		
14-----	750	2,740	5,550	31			13		
15-----	675	2,620	4,770	24	72	7	11	43	1
16-----	414	1,960	s 2,230	25			11		
17-----	218	1,410	830	30			9.9		
18-----	152	967	397	39			6.0		
19-----	393	6,280	s 9,290	50	72	7	4.5		
20-----	336	9,350	s 8,630	44			7.8		
21-----	220	5,300	3,150	37			5.2		
22-----	157	1,700	721	31			3.8	62	1
23-----	123	932	310	32	72	7	3.6		
24-----	113	708	216	33			141		
25-----	109	440	129	28			415	1,530	s 1,170
26-----	106	350	100	33	72	7	515	4,000	5,560
27-----	94	202	51	33			602	4,400	7,150
28-----	91	150	a 32	51			945	5,410	13,800
29-----	72			51			1,060	5,410	s 15,400
30-----	71			41			851	5,700	13,100
31-----	--	--	--	33			--	--	--
Total--	11,353	--	101,710	1,229	--	259	4,931.8	--	60,753

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-----	820	4,950	11,000	2.1	82	(t)	59	293	47
2-----	750	4,220	8,550	250	2,090	s 3,360	48	114	15
3-----	780	4,060	8,550	590	6,400	10,200	27		
4-----	736	3,520	s 7,070	565	4,800	7,320	19		
5-----	304	2,680	s 2,160	556	4,500	s 6,990	11		
6-----	126	2,950	1,000	138	3,050	s 1,190	9.2		
7-----	98	1,800	476	59	750	119	12		
8-----	92	898	223	37	185	15	9.6	63	2
9-----	127	884	303	24			13		
10-----	96	300	78	52			9.9		
11-----	83	200	45	252	2,140	s 1,220	9.2		
12-----	59	93	15	229	2,550	s 2,250	8.1		
13-----	64	109	19	1,640	9,400	s 41,000	5.5		
14-----	55	97	14	932	10,400	s 25,800	3.9		
15-----	58	72	11	440	7,900	9,390	9.2	68	2
16-----	1,330	9,160	s 43,700	285	3,460	s 2,600	18		
17-----	930	9,850	s 27,500	735	6,000	11,900	13		
18-----	900	6,400	6,740	848	5,800	13,300	11		
19-----	237	3,000	1,920	830	4,600	10,300	11	154	11
20-----	1,220	8,560	s 36,300	865	4,500	10,500	8.8		
21-----	431	6,200	s 7,600	830	3,960	8,870	9.9		
22-----	192	3,400	1,760	795	3,800	8,160	18		
23-----	98	1,510	400	812	4,100	8,990	31		
24-----	63	629	107	1,150	5,200	s 17,300	31		
25-----	48			935	7,150	s 18,300	31		
26-----	36			750	5,600	11,300	28		
27-----	24	217	18	382	3,150	s 3,330	30		
28-----	18			171	1,700	785	28		
29-----	9	54	1	103	983	273	28		
30-----	6	43	1	66	413	74	36		
31-----	4	90	1	56	165	25	--	--	--
Total--	9,284	--	165,616	15,379.1	--	234,991	566.3	--	217

Total discharge for year (cfs-days) ..... 55,646.2  
 Total load for year (tons) ..... 566,664

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. April to August 1952

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

Date of collection	Time	Water discharge (cfs)	Water temperature per- saur (° 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
April 20, 1952 ..	10:00 a. m.	335		9,750	2,590		11		96		98	99	100	--	SPN
June 26 .....	8:20 a. m.	490		4,800	3,440		54		76		93	97	100	--	SPWCM
June 30 .....	4:45 p. m.	765		7,620	4,000		64		84		96	99	100	--	SPWCM
July 2 .....	8:30 a. m.	765		3,950	3,500		55		72		85	93	100	--	SPWCM
July 3 .....	5:00 p. m.	765		4,250	3,830		61		80		93	99	100	--	SPWCM
July 5 .....	4:15 p. m.	245		2,700	3,040		66		80		89	95	100	--	SPWCM
July 16 .....	1:00 p. m.	1,990		10,400	3,550		69		74		95	99	100	--	SPWCM
July 19 .....	9:50 a. m.	241		3,350	2,480		7		89		91	96	100	--	SPN
July 20 .....	11:00 a. m.	1,990		11,000	3,520		3		81		97	100	--	SPN	
July 20 .....	11:40 a. m.	2,130		12,300	4,180		1		80		99	--	100	--	SPN
Aug. 5 .....	10:00 a. m.	645		4,820	3,260		56		78		94	98	100	--	SPWCM
Aug. 13 .....	6:50 a. m.	2,060		6,660	4,130		45		72		92	99	100	--	SPWCM
Aug. 13 .....	2:25 p. m.	1,990		10,300	4,590		57		81		94	99	100	--	SPWCM
Aug. 15 .....	5:10 p. m.	3,378		6,810	3,310		68		88		93	99	100	--	SPWCM
Aug. 17 .....	5:45 p. m.	750		8,300	4,000		46		83		93	98	100	--	SPWCM
Aug. 19 .....	8:30 a. m.	848		4,280	3,660		59		81		94	99	100	--	SPWCM
Aug. 22 .....	9:10 a. m.	812		3,760	2,710		48		70		87	96	99	100	SPWCM
Aug. 24 .....	10:30 a. m.	830		3,710	2,190		45		73		83	95	99	100	SPWCM
Aug. 25 .....	4:40 p. m.	780		5,970	3,090		58		74		93	98	100	--	SPWCM
Aug. 26 .....	4:35 p. m.	765		5,310	4,020		68		74		94	99	100	--	SPWCM

## RIO GRANDE BASIN--Continued

## RIO PENASCO NEAR DAYTON, N. MEX.

LOCATION.-- At gaging station 3 feet upstream from crest of abandoned diversion dam, 1 mile northeast of old Dayton railway station,  $3\frac{1}{2}$  miles upstream from mouth, and 7 miles south-east of Artesia, Eddy County.

DRAINAGE AREA.--1,070 square miles, approximately.

RECORDS AVAILABLE.--Water temperatures: September 1951 to September 1952.

Sediment records: September 1951 to September 1952.

EXTREMES, September 1951 to September 1952.--Water temperatures: Maximum observed, 84°F July 18; minimum observed, 78°F July 17, 19.

Sediment concentrations: Maximum daily, 9,120 ppm July 17; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 2,680 tons July 19; minimum daily, 0 ton on many days.

REMARKS.--Records of discharge for water year October 1951 to September 1952 given in Water-Supply Paper 1242. Records of discharge for September 1951 given in Water-Supply Paper 1212.

Suspended sediment and temperature (°F) of water, July 1952  
/Once-daily temperature measurement at approximately 1:00 p. m./

Day	Mean discharge (cfs)	Suspended Sediment		Temperature (°F)
		Mean Concentration (ppm)	Tons per day	
July 17, 1952 ....	36	9,120	s 1,870	78
July 18 .....	13	4,500	158	84
July 19 .....	85	4,560	s 2,680	78
July 20 .....	14	1,200	45	81
Total .....	148	--	4,753	--
Total discharge for September 1951 (cfs-days) .....				0
Total load for September 1951 (tons) .....				0
Total discharge for water year October 1951 to September 1952 (cfs-days) .....				148
Total load for water year October 1951 to September 1952 (tons) .....				4,753

s Computed by subdividing day.

Flow occurred only on days indicated.

RIO GRANDE BASIN--Continued  
RIO PENASCO NEAR DAYTON, N. MEX.--Continued

Particle-size analyses of suspended sediment, July 1952

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

Date of collection	Time	Water 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
July 17, 1952	12:45 p. m.	72		37,800	3,970		69		88		100	--	--		--		SPWCM
July 17	4:15 p. m.	115		21,300	3,690		59		73		84	87	91		97		SPWCM
July 17	6:15 p. m.	90		13,700	4,020		83		90		100	--	--		--		SPWCM
July 17	8:15 p. m.	66		14,100	3,430		79		93		100	--	--		--		SPN
July 17	8:15 p. m.	66		14,100	3,540		79		98		100	--	--		--		SPWCM
July 17	10:15 p. m.	57		11,000	4,360		82		95		100	--	--		--		SPWCM
July 18	12:15 a. m.	54		9,220	6,540		85		100		--	--	--		--		SPWCM
July 18	2:30 a. m.	43		8,560	5,760		68		75		100	--	--		--		SPWCM
July 18	4:30 a. m.	33		6,640	4,030		88		97		100	--	--		--		SPWCM
July 18	7:30 a. m.	21		6,050	4,230		13		93		100	--	--		--		SPN
July 18	7:30 a. m.	21		6,050	3,720		84		94		100	--	--		--		SPWCM
July 18	11:00 a. m.	14		4,050	4,630		91		97		99	100	--		--		SPWCM
July 18	3:00 p. m.	8.0		1,680	4,900		78		94		100	--	--		--		SPWCM
July 19	1:00 p. m.	360		14,500	4,510		11		83		98	100	--		--		SPN
July 19	1:00 p. m.	360		14,500-	3,900		63		93		98	100	--		--		SPWCM
July 19	3:00 p. m.	207		13,600	4,250		73		96		99	100	--		--		SPWCM
July 19	5:00 p. m.	134		7,110	3,700		78		94		100	--	--		--		SPWCM
July 19	7:00 p. m.	97		5,820	5,080		22		98		99	100	--		--		SPN
July 19	7:00 p. m.	97		5,820	4,680		76		94		99	100	--		--		SPWCM
July 19	9:00 p. m.	86		3,570	3,840		82		92		95	100	--		--		SPWCM
July 19	11:30 p. m.	69		2,550	3,630		71		81		100	--	--		--		SPWCM
July 20	1:30 a. m.	57		1,570	4,600		73		83		99	100	--		--		SPWCM
July 20	3:30 a. m.	43		1,580	2,300		61		83		100	--	--		--		SPWCM
July 20	6:00 a. m.	26		1,090	1,070		0		58		97	98	99		100		SPN
July 20	6:00 a. m.	26		1,090	2,060		7		83		97	98	99		100		SPWCM
July 20	9:00 a. m.	15		1,150	3,380		65		77		100	--	--		--		SPWCM

RIO GRANDE BASIN--Continued

**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 1952.  
REMARKS.--Samples collected at approximately weekly intervals. Records of discharge for water year October 1951 to September 1952 given in Water-Supply Paper 1242.

Chemical analyses, in parts per million, water year October 1951 to September 1952																								
Date of collection	Mean discharge (cfs)	Temperature (°F)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonates (CO <sub>3</sub> )	Sulfates (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	Tons per acre-day	Non-carbonate						
Oct. 4, 1951	27	--						136	0		740											4,960		
Oct. 10	24	--						131	0		735											4,960		
Oct. 11	23	--						135	0		730											4,940		
Oct. 16	21	--						133	0		735											4,940		
Oct. 17	21	--						131	0		730											4,960		
Oct. 25	23	--						131	0		730											4,940		
Oct. 31	24	--						135	0		730											4,880		
Nov. 7	37	--						134	0		720											4,900		
Nov. 14	71	--						130	0		720											4,940		
Nov. 21	68	--						133	0		710											4,880		
Nov. 28	73	--						142	0		690											4,830		
Dec. 5	73	--						143	0		710											4,840		
Dec. 9	64	--						137	0		690											4,790		
Dec. 12	71	--						139	0		690											4,800		
Dec. 27	80	--						140	0		670											4,760		
Dec. 27	85	--						144	0		670											4,740		
Jan. 2, 1952																								
Jan. 3	83	--						148	0		670											4,730		
Jan. 10	400	--						115	0		1,560											7,200		
Jan. 16	51	--						131	0		1,700											4,770		
Jan. 23	51	--						143	0		885											4,720		
Jan. 30	56	--						143	0		670											4,680		
Feb. 6	57	--						141	0		670											4,680		
Feb. 10	51	--						141	0		665											4,680		
Feb. 11	50	--						127	0		665											4,720		
Feb. 13	57	--						138	0		680											4,700		
Feb. 13	138	--						131	0		675											4,690		
Feb. 28	60	--						141	0		675											4,690		





RIO GRANDE BASIN--Continued

CARLEBAD MAIN CANAL AT HEAD, NEAR CARLEBAD, N. MEX.

LOCATION --At gaging station 220 feet downstream from head gates in Avalon Dam and 5.0 miles north of Carlsbad, Eddy County.

RECORDS AVAILABLE --Chemical analyses, February 1939 to September 1952.

EXTREMES, 1951-52 --Dissolved solids: Maximum, 3,340 ppm Apr. 1-4; minimum, 1,820 ppm July 1-4.

Hardness: Maximum, 2,500 ppm Apr. 1-4; minimum, 957 ppm July 1-4.

Specific conductance: Maximum observed, 7,560 microhos Apr. 2-3; minimum observed, 2,080 microhos July 3.

EXTREMES, 1939-52 --Dissolved solids: Maximum, 6,310 ppm Apr. 11-12, 1949; minimum, 1,340 ppm Sept. 2-4, 1946.

Hardness: Maximum, 2,810 ppm June 1-10, 1945; minimum, 744 ppm Sept. 2-4, 1946.

Specific conductance: Maximum observed, 9,730 microhos June 5, 1945; minimum observed, 401 microhos June 3, 1948.

REMARKS --Values reported for dissolved solids are sums of determined constituents. Values shown as extremes relate to canal samples only. Samples collected from canal when there was flow, otherwise from Lake Avalon at the head gates and are those for which specific conductance values only are given. 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 1951 to September 1952. Monthly diversions to Canal below Lake Avalon for water year October 1951 to September 1952 given in Water-Supply Paper 1242.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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			Hardness as CaCO <sub>3</sub>		Per-cent so-dium	So-dium ad-sorp-tion ratio	Specific conduct-ance (micro-mhos at 25°C)
															Parts per million	Tons per acre-foot	Tons per day	Calcium, mag-nesium	Non-carbon-ate			
Oct. 1-10, 1951	10.8	14		676	162	494		110	0	2,080	830		1.6	4,310	5.86	126	2,350	2,260	31	4.4	5,480	7.6
Oct. 11-20	9.75	14		674	154	503		109	0	2,070	825		1.5	4,300	5.85	113	2,310	2,220	32	4.5	5,470	7.6
Oct. 21-31																						
Nov. 1-10																						
Nov. 11-20																						
Nov. 21-30																						
Dec. 1-10																						
Dec. 11-20																						
Dec. 21-31																						
Jan. 1-10, 1952	212	15		618	139	461		135	0	1,910	720		2.8	3,930	5.34	2,250	2,110	2,000	32	4.4	4,980	7.5
Jan. 11-16	120	13		596	170	650		127	0	1,920	1,060		2.7	4,470	6.08	1,570	2,190	2,080	39	6.0	5,960	7.8
Jan. 17-20																						
Jan. 21-31																						
Feb. 1-10																						
Feb. 11-20																						
Feb. 21-29																						
Mar. 1-10																						
Mar. 11-20																						
Mar. 21-23																						
Mar. 24-31	218	14		648	165	520		124	0	2,060	835		2.5	4,310	5.86	2,540	2,300	2,190	33	4.7	5,480	7.6
Apr. 1-4	335	11		664	206	825		135	0	2,260	1,300		2.5	5,340	7.26	4,830	2,500	2,390	42	7.2	6,980	7.4
Apr. 5-10	348	11		618	136	377		113	0	1,950	565		3.0	3,720	5.06	3,500	2,100	2,010	28	3.6	4,520	7.7
Apr. 11-20	302	13		596	118	259		112	0	1,810	395		2.6	3,250	4.42	2,650	1,970	1,880	22	2.5	3,900	7.8
Apr. 21-23	117	11		594	114	255		105	0	1,820	370		1.9	3,220	4.38	1,020	1,950	1,860	22	2.5	3,800	7.9

RIO GRANDE BASIN--Continued  
CARLSBAD MAIN CANAL AT HEAD, NEAR CARLSBAD, N. MEX.--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 (sum)			Hardness as CaCO <sub>3</sub>		Per-cent so-dium	So-adorp-tion ratio	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
Apr. 24-30, 1952....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4,180	--
May 1-10.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4,510	--
May 11-13.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4,680	--
May 14-20.....	100	15	638	139	136	402	--	136	0	1,970	620	--	2.4	--	3,650	5.24	1,040	2,160	2,050	29	3.8	4,740	7.4
May 21-31, June 1... 124	124	16	646	144	137	442	--	137	0	2,050	665	--	2.5	--	4,010	5.45	1,340	2,200	2,090	30	4.1	4,900	7.7
June 2-10.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5,170	--
June 11-20.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5,470	--
June 21-30.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5,510	--
June 31-20.....	140	14	628	161	104	570	--	104	0	2,050	885	--	2.4	--	4,360	5.93	1,650	2,230	2,140	36	5.3	5,510	7.8
July 1-10.....	222	12	283	81	98	224	--	98	0	850	346	--	2.4	--	1,820	2.48	1,590	1,957	1,878	34	3.2	3,560	7.5
July 11-15.....	270	13	484	93	110	304	--	110	0	1,470	446	--	2.8	--	2,790	3.90	2,090	1,590	1,500	29	3.3	3,560	7.7
July 16-17.....	170	15	480	96	114	277	--	114	--	1,440	425	--	2.5	--	2,790	3.79	1,280	1,590	1,500	27	3.0	3,560	7.6
July 18-17.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3,460	--
July 21-31.....	303	15	566	122	130	386	--	130	0	1,710	595	--	3.4	--	3,450	4.69	2,820	1,890	1,780	31	3.9	4,370	7.2
Aug. 1-10.....	336	15	496	100	109	329	--	109	0	1,520	490	--	2.7	--	3,010	4.09	2,730	1,650	1,560	30	3.5	3,840	7.2
Aug. 11-12.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4,760	--
Aug. 13-15.....	214	13	560	128	115	440	--	115	0	1,740	690	--	2.6	--	3,630	4.94	2,100	1,920	1,830	33	4.4	4,660	7.3
Aug. 16-20.....	391	13	384	75	97	261	--	97	0	1,150	415	--	2.3	--	2,350	3.20	2,480	1,270	1,190	31	3.2	3,170	7.3
Aug. 21-31.....	439	14	406	75	116	220	--	116	0	1,190	330	--	1.9	--	2,290	3.11	2,710	1,320	1,230	27	2.6	2,960	7.4
Sept. 1-8.....	326	15	424	85	252	252	--	118	0	1,250	395	--	1.6	--	2,480	3.37	2,180	1,410	1,310	28	2.9	3,220	7.5
Sept. 9-10.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5,100	--
Sept. 11-14.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5,150	--
Sept. 15-20, 30.....	112	14	602	149	134	493	--	134	0	1,890	785	--	1.8	--	4,000	5.44	1,210	2,110	2,000	34	4.7	5,100	7.5
Sept. 21-29.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5,100	--
Weighted average a	98.8	14	524	114	118	358	--	118	0	1,610	553	--	2.5	--	3,230	4.39	862	1,780	1,680	30	3.1	4,120	--

a Average for 163 days of flow.

# RIO GRANDE BASIN--Continued

PECOS RIVER AT CARLSBAD, N. MEX.

LOCATION.--At gaging station at Green 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 1952. Water temperatures: July 1951 to September 1952.

EXTREMES, 1951-52.--Dissolved solids: Maximum, 2,360 ppm Aug. 21-31; minimum, 2,130 ppm Nov. 21-30.

Hardness: Maximum, 1,500 ppm Sept. 1-10; minimum, 1,220 ppm Nov. 21-30, Dec. 11-20.

Specific conductance: Maximum observed, 3,600 micromhos Sept. 3; minimum observed, 2,880 micromhos Dec. 14.

Water temperatures: Maximum observed, 91° F Aug. 8; minimum observed, 53° F Jan. 3, Feb. 7.

EXTREMES, 1937-46, 1951-52.--Dissolved solids: Maximum 3,590 ppm May 31, 1941; minimum, 360 ppm May 22, 1941.

Hardness: Maximum, 1,970 ppm May 1, 1941; minimum 290 ppm May 22, 1941.

Specific conductance: Maximum observed, 5,870 micromhos Apr. 25, 1942; minimum observed, 649 micromhos May 22, 1941.

Water temperatures: Maximum observed, 91° F Aug. 8, 1952; minimum observed, 53° F Jan. 3, 1952.

REMARKS.--Records reported for dissolved solids are sums of determined constituents. Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of discharge for water year October 1951 to September 1952 given in Water-Supply Paper 1242.

Chemical analyses, in parts per million, water year October 1951 to September 1952

RIO GRANDE BASIN															467							
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			Hardness as CaCO <sub>3</sub>		Per- cent so- lidum	So- lidum adorp- tion ratio	Specific conduct-ance (micro- mhos at 25°C)
															Parts per million	Tons per acre- foot	Tons per day	Calcium	Non-carbon- atum			
Oct. 1-10, 1951...	41.6	20	342	113	279	232	0	1,080	430	4.0	2,380	3.24	267	1,320	1,130	31	3.3	3,220	7.5	3.3	3,220	7.5
Oct. 11-20, 1951...	43.5	19	340	113	240	197	0	1,050	410	4.0	2,270	3.09	267	1,310	1,130	28	2.9	3,160	7.7	2.9	3,160	7.7
Oct. 21-31, 1951...	47.1	20	338	109	257	215	0	1,050	410	3.8	2,280	3.11	291	1,290	1,120	30	3.1	3,140	7.6	3.1	3,140	7.6
Nov. 1-10, 1951...	43.1	17	328	107	253	215	0	1,010	410	3.9	2,230	3.03	260	1,260	1,080	30	3.1	3,080	7.6	3.1	3,080	7.6
Nov. 11-20, 1951...	41.9	18	330	108	238	219	0	998	400	2.5	2,200	2.99	249	1,270	1,080	29	2.9	3,050	7.4	2.9	3,050	7.4
Nov. 21-30, 1951...	40.1	18	324	99	233	210	0	964	385	4.0	2,130	2.90	231	1,220	1,040	29	2.9	2,950	7.7	2.9	2,950	7.7
Dec. 1-10, 1951...	40.2	18	328	99	236	224	0	969	385	4.3	2,150	2.92	233	1,230	1,040	30	2.9	2,970	7.7	2.9	2,970	7.7
Dec. 11-20, 1951...	42.0	18	328	98	237	224	0	967	385	4.2	2,160	2.92	244	1,220	1,040	30	2.9	2,970	7.7	2.9	2,970	7.7
Dec. 21-31, 1951...	40.9	18	332	101	233	222	0	974	390	4.2	2,180	2.94	239	1,240	1,060	29	2.9	2,990	7.6	2.9	2,990	7.6
Jan. 1-10, 1952...	41.4	20	344	108	215	214	0	998	392	2.9	2,180	2.96	244	1,300	1,130	26	2.6	3,030	7.9	2.6	3,030	7.9
Jan. 11-20, 1952...	42.6	20	352	110	225	220	0	1,030	400	2.9	2,250	3.06	259	1,330	1,150	27	2.7	3,080	7.9	2.7	3,080	7.9
Jan. 21-31, 1952...	41.8	19	364	109	232	219	0	1,050	414	4.9	2,300	3.13	260	1,360	1,180	27	2.7	3,130	7.9	2.7	3,130	7.9
Feb. 1-10, 1952...	40.0	18	354	122	228	216	0	1,060	425	1.4	2,310	3.14	249	1,380	1,210	26	2.7	3,190	7.8	2.7	3,190	7.8
Feb. 11-20, 1952...	42.7	17	358	118	228	216	0	1,050	415	1.4	2,290	3.11	264	1,380	1,200	26	2.6	3,160	7.7	2.6	3,160	7.7
Feb. 21-29, 1952...	38.0	17	356	114	230	220	0	1,040	420	1.8	2,290	3.11	265	1,360	1,180	27	2.7	3,160	7.7	2.7	3,160	7.7
Mar. 1-10, 1952...	42.8	18	352	116	237	212	0	1,060	420	1.7	2,310	3.14	267	1,360	1,180	28	2.8	3,130	7.7	2.8	3,130	7.7
Mar. 11-20, 1952...	50.3	18	352	116	225	210	0	1,050	410	1.8	2,310	3.10	310	1,360	1,180	27	2.7	3,130	7.7	2.7	3,130	7.7
Mar. 21-31, 1952...	46.6	19	344	114	239	212	0	1,050	410	2.8	2,280	3.10	287	1,330	1,150	28	2.9	3,120	7.5	2.9	3,120	7.5
Apr. 1-10, 1952...	43.8	21	354	114	248	210	0	1,080	420	3.5	2,340	3.18	277	1,350	1,180	29	2.9	3,180	7.6	2.9	3,180	7.6
Apr. 11-20, 1952...	44.6	20	352	109	252	192	0	1,070	425	4.0	2,350	3.17	281	1,330	1,170	29	3.0	3,180	7.6	3.0	3,180	7.6
Apr. 21-30, 1952...	40.8	20	352	109	268	192	0	1,090	435	3.1	2,370	3.22	261	1,330	1,170	31	3.2	3,160	7.6	3.2	3,160	7.6

RIO GRANDE BASIN--Continued  
PECOS RIVER AT CARLSBAD, N. MEX.--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 (sum)			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 mil- lion	Tons per acre- foot	Tons per day	Calcium, mag- nesium	Non-carbon- ate				
May 1-10, 1952 ...	36.8	19		354	111	264		202	0	1,080	440		3.0		2,370	3.22	235	1,340	1,170	30	3.1	3,180	7.5
May 11-20 .....	33.1	20		356	109	256		174	0	1,400	430		4.2		2,360	3.21	224	1,340	1,190	30	3.1	3,240	7.5
May 21-31 .....	37.0	18		364	113	258		195	0	1,110	435		4.2		2,400	3.26	240	1,370	1,210	29	3.0	3,240	7.6
June 1-10 .....	40.5	18		380	113	250		214	0	1,110	440		4.7		2,420	3.29	265	1,410	1,240	28	2.9	3,300	7.7
June 11-20 .....	36.2	18		382	114	289		202	0	1,130	450		4.5		2,460	3.32	240	1,420	1,250	28	3.0	3,330	7.6
June 21-30 .....	39.0	19		374	114	268		204	0	1,140	445		4.4		2,460	3.32	239	1,400	1,230	29	3.1	3,330	7.6
July 1-10 .....	42.4	19		350	108	225		200	0	1,060	380		3.9		2,340	3.05	256	1,320	1,150	27	2.7	3,160	7.4
July 11-20 .....	49.6	20		362	108	246		215	0	1,070	418		3.9		2,330	3.17	312	1,350	1,170	28	2.9	3,170	7.4
July 21-31 .....	46.0	20		368	113	255		217	0	1,100	434		3.1		2,400	3.26	298	1,380	1,210	29	3.0	3,250	7.5
Aug. 1-10 .....	39.5	21		376	120	276		222	0	1,160	454		2.6		2,520	3.43	269	1,430	1,250	30	3.2	3,390	7.5
Aug. 11-20 .....	32.4	20		382	121	278		213	0	1,180	460		3.0		2,550	3.47	223	1,450	1,280	29	3.2	3,420	7.5
Aug. 21-31 .....	36.4	19		380	121	287		221	0	1,180	466		2.9		2,560	3.48	252	1,450	1,260	30	3.3	3,460	7.5
Sept. 1-10 .....	38.3	23		390	128	259		208	0	1,180	470		2.1		2,550	3.47	264	1,500	1,330	27	2.9	3,480	7.6
Sept. 11-20 .....	38.1	23		394	121	244		221	0	1,150	448		1.9		2,490	3.39	256	1,480	1,300	26	2.8	3,370	7.6
Sept. 21-30 .....	45.7	22		376	121	231		215	0	1,110	428		2.2		2,400	3.26	296	1,440	1,260	26	2.6	3,300	7.5
Weighted average	41.4	19		355	112	246		212	0	1,070	421		3.2		2,330	3.17	260	1,350	1,170	29	2.9	3,180	--

## RIO GRANDE BASIN--Continued

## PECOS RIVER AT CARLSBAD, N. MEX.--Continued

Temperature (°F) of water, water year October 1951 to September 1952  
 /Once-daily temperature measurement, generally between 4:00 p.m. and 9:00 p.m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	83	66	65	--	65	65	76	79	80	86	85	89
2	80	65	63	58	62	63	74	80	80	86	89	78
3	81	--	68	a 53	57	66	76	76	81	85	87	80
4	80	65	65	67	60	64	72	75	82	85	88	a 79
5	80	63	66	55	64	66	75	82	86	85	87	82
6	78	63	60	58	65	66	75	86	85	85	88	82
7	75	65	55	59	53	68	76	84	85	--	90	78
8	76	64	58	59	65	87	76	79	85	77	91	78
9	76	70	59	58	65	65	73	77	85	80	87	76
10	75	67	55	57	65	66	68	73	85	81	86	78
11	a 74	65	--	60	--	67	65	73	85	77	88	79
12	77	66	56	60	65	67	67	77	a 86	84	88	80
13	75	70	60	60	65	66	78	77	86	82	88	--
14	74	68	61	63	65	66	71	78	87	82	87	79
15	75	69	67	63	65	62	75	77	86	83	a 86	74
16	75	65	58	63	65	64	74	78	86	83	a 86	81
17	75	60	60	62	60	63	75	73	87	83	82	81
18	--	63	60	65	65	64	75	65	88	82	88	82
19	76	65	68	63	65	67	72	73	87	84	86	79
20	74	a 65	67	62	63	66	75	74	86	84	89	--
21	75	66	68	63	65	63	75	75	87	85	86	79
22	75	65	58	62	65	61	76	75	86	a 89	84	73
23	72	66	60	62	66	59	75	77	87	86	85	74
24	71	70	59	64	--	65	76	79	86	87	84	75
25	72	66	62	65	--	--	76	76	85	87	87	75
26	73	65	60	63	60	75	75	77	82	84	--	85
27	73	66	56	63	64	66	75	75	83	88	83	78
28	69	68	59	65	65	68	75	77	82	--	86	74
29	71	65	61	65	65	67	75	77	84	87	83	75
30	73	67	62	68	--	69	--	78	85	85	85	75
31	70	--	62	65	--	75	--	80	--	87	--	--
Average	75	66	61	62	63	66	74	77	85	84	87	79

a Observations made between 8:00 a.m. and 3:00 p.m.

## RIO GRANDE BASIN--Continued

## PECOS RIVER EAST OF MALAGA, N. MEX.

LOCATION. --One and one-half miles upstream from gaging station near Malaga, which is 3 miles southeast of Malaga, Eddy County, and 3 miles downstream from Black River. --19, 190 square miles, approximately (contributing area above gaging station).

DRAINAGE AREA. --19, 190 square miles, approximately (contributing area above gaging station).

PRECIPITATION. --Chemical analyses: July 1957. --Dissolved solids: 1,220 ppm Sept. 11-20, minimum, 2,930 ppm July 15.

EXTREMES. 1951-52. --Dissolved solids: 1,220 ppm Sept. 11-20, minimum, 2,930 ppm July 15.

Hardness: Maximum, 2,500 ppm Sept. 11-20, minimum, 400 ppm July 15.

Specific conductance: Maximum, 8,590 microhos Sept. 20, 21; minimum observed, 4,000 microhos July 15.

EXTREMES. 1957-52. --Dissolved solids: Maximum, 6,090 ppm Sept. 11-20, 1952; minimum, 384 ppm Sept. 21-22, 1941.

Hardness: Maximum, 2,500 ppm Sept. 11-20, 1952; minimum, 254 ppm Sept. 21-22, 1941.

Specific conductance: Maximum observed, 450 microhos Sept. 21, 1941.

REMARKS. --Values reported for dissolved solids are sums of determined constituents. Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of discharge for gaging station near Malaga. Records for this station prior to 1951 published as "Near Malaga."

Chemical analyses, in parts per million, water year October 1951 to September 1952

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> )	Boiron (B)	Dissolved solids (sum)			Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (microhos at 25°C)
															Parts per million	Tons per acre-foot	Tons per day	Calcium	Non-magnesium			
Oct. 1-10, 1951	68.5	20		520	201	699		179	0	1,740	1,190		8.1		4,470	8.08	827	2,120	1,980	42	6.6	6,000
Oct. 11-20	67.2	16		514	193	647		179	0	1,750	1,070		5.5		4,280	5.82	777	2,080	1,930	40	6.2	5,970
Oct. 21-31	68.2	17		518	192	637		199	0	1,730	1,060		8.8		4,260	5.79	784	2,080	1,920	40	6.1	5,840
Nov. 1-10	68.4	20		522	189	639		218	0	1,720	1,060		7.0		4,260	5.79	787	2,010	1,900	40	6.1	5,810
Nov. 11-20	73.7	18		496	187	621		193	0	1,700	1,010		6.3		4,130	5.62	822	2,010	1,850	40	6.0	5,660
Nov. 21-30	77.5	19		508	177	579		212	0	1,640	970		7.0		4,000	5.44	837	2,000	1,820	39	5.6	5,520
Dec. 1-10	74.6	18		510	177	558		211	0	1,620	955		8.7		3,950	5.37	796	2,000	1,830	38	5.4	5,430
Dec. 11-20	77.5	17		500	173	562		203	0	1,610	945		7.2		3,910	5.32	818	1,960	1,790	39	5.5	5,350
Dec. 21-31	74.9	17		494	170	559		201	0	1,600	930		6.9		3,880	5.28	785	1,930	1,770	39	5.5	5,320
Jan. 1-10, 1952	81.1	17		508	169	554		215	0	1,620	920		7.4		3,900	5.30	854	1,960	1,790	38	5.4	5,320
Jan. 11-20	82.6	18		506	173	563		219	0	1,620	940		8.0		3,940	5.36	879	1,970	1,790	38	5.5	5,420
Jan. 21-31	77.0	17		504	176	551		214	0	1,620	930		7.2		3,910	5.32	813	1,960	1,810	38	5.4	5,370
Feb. 1-10	76.5	15		504	174	554		203	0	1,640	920		7.2		3,910	5.32	808	1,970	1,810	38	5.4	5,350
Feb. 11-20	75.2	17		498	183	529		191	0	1,620	905		1.4		3,840	5.22	760	1,970	1,810	37	5.2	5,220
Feb. 21-29	72.0	17		494	179	540		191	0	1,600	900		2.0		3,810	5.18	737	1,940	1,780	37	5.2	5,180
Mar. 1-10	59.4	15		488	179	546		174	0	1,630	940		2.2		3,810	5.22	737	1,940	1,780	37	5.2	5,210
Mar. 11-20	49.8	13		500	193	575		171	0	1,670	1,000		2.7		4,040	5.43	543	2,040	1,800	38	5.3	5,400
Mar. 21-31	33.1	20		528	204	731		168	0	1,830	1,200		15		4,610	6.27	412	2,160	2,020	42	6.3	6,280
Apr. 1-10	16.3	21		564	211	903		176	0	1,980	1,450		9.4		5,210	7.09	229	2,270	2,130	46	8.2	7,180
Apr. 11-20	26.3	22		572	213	889		173	0	1,980	1,430		13		5,220	7.10	371	2,370	2,170	46	8.0	7,060
Apr. 21-30	28.5	22		572	212	877		175	0	1,980	1,430		7.1		5,170	7.03	398	2,300	2,160	45	8.0	7,090

May 1-10, 1952....	38.6	18	548	206	793	178	0	1,890	1,290	5.9	4,840	6.58	504	2,210	2,070	44	7.3	6,600	7.4
May 11-20 .....	33.1	18	536	201	796	168	0	1,870	1,280	5.8	4,790	6.51	428	2,160	2,030	44	7.4	6,520	7.5
May 21-31 .....	51.2	21	488	194	641	154	0	1,740	1,040	5.9	4,210	5.73	582	2,020	1,890	41	6.2	5,670	7.7
June 1-10 .....	27.2	23	522	203	783	156	0	1,840	1,270	5.4	4,720	6.42	347	2,140	2,010	44	7.4	6,490	7.3
June 11-20 .....	45.9	24	508	201	691	151	0	1,780	1,130	4.7	4,400	5.98	545	2,090	1,970	41	6.5	6,000	7.3
June 21-30 .....	30.5	20	508	197	750	146	0	1,830	1,190	5.4	4,570	6.22	376	2,080	1,960	44	7.1	6,120	7.2
July 1-10 .....	22.6	24	562	197	879	163	0	1,930	1,400	8.4	5,080	6.91	310	2,210	2,080	46	8.1	6,790	7.3
July 11-14, 16-20	55.6	20	482	189	714	145	0	1,730	1,140	4.3	4,350	5.92	663	1,980	1,860	44	7.0	5,860	7.3
July 15 .....	148	18	390	125	400	132	0	1,290	640	5.2	2,930	3.98	1,170	1,490	1,380	37	4.5	4,000	7.3
July 21-31 .....	21.3	23	514	189	806	154	0	1,790	1,290	2.9	4,690	6.38	270	2,060	1,930	46	7.7	6,490	7.6
Aug. 1-10 .....	15.0	28	560	212	1,060	153	0	1,960	1,680	3.1	5,610	7.63	227	2,270	2,140	50	9.7	7,710	7.7
Aug. 11-20 .....	20.4	28	586	212	1,020	150	0	2,030	1,640	2.5	5,590	7.60	308	2,330	2,210	49	9.2	7,660	7.5
Aug. 21-31 .....	20.4	28	604	213	1,030	147	0	2,090	1,650	3.2	5,690	7.74	313	2,360	2,260	48	9.2	7,660	7.6
Sept. 1-10 .....	21.6	28	612	234	1,100	150	0	2,160	1,730	3.6	5,860	8.15	349	2,400	2,300	50	9.4	8,130	7.4
Sept. 11-20 .....	19.8	28	588	227	1,130	167	0	2,180	1,820	3.8	5,860	8.26	353	2,400	2,300	50	9.9	8,280	7.5
Sept. 21-30 .....	44.4	25	560	221	937	167	0	2,040	1,540	3.8	5,450	7.41	553	2,360	2,220	47	8.6	7,410	7.5
Weighted average	50.1	19	515	188	659	187	0	1,730	1,090	6.2	4,300	5.85	582	2,060	1,900	41	6.3	5,860	--

RIO GRANDE BASIN--Continued  
PECOS RIVER AT PIERCE CANYON CROSSING, NEAR MALAGA, N. MEX.

LOCATION --At Pierce Canyon Crossing, one quarter mile downstream from gaging station which is 6 miles southeast of Malaga, Eddy County.

DRAINAGE AREA --19,260 square miles approximately, at gaging station (contributing area).

RECORDS AVAILABLE --Chemical analyses: March 1938 to September 1941, October 1951 to September 1952.

EXTREMES, 1951-52. --Dissolved solids: Maximum, 13,100 ppm Aug. 1-10; minimum 5,270 ppm July 16-21.

Hardness: Maximum 2,790 ppm Sept. 1-10; minimum 1,880 ppm July 16-21.

Specific conductance: Maximum observed, 19,700 micromhos Aug. 4; minimum observed, 6,360 micromhos July 16.

EXTREMES, 1938-41, 1951-52. --Dissolved solids: Maximum 13,100 ppm Aug. 1-10, 1952; minimum 202 ppm Sept. 21, 1941.

Hardness: Maximum, 2,790 ppm Sept. 1-10, 1952; minimum 202 ppm Sept. 21, 1941.

Specific conductance: Maximum observed, 19,700 micromhos Aug. 4, 1952; minimum observed 433 micromhos Sept. 21, 1941.

REMARKS. --Values reported for dissolved solids are sums of determined constituents. Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of discharge for water year October 1951 to September 1952 given in Water-Supply Paper 1242. 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 1951 to September 1952

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> )	Boiron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium sulfate	Specific conductance (micro-mhos at 25°C)	pH	
															Parts per million	Tons per acre-foot	Tons per day	Calcium	Non-carbonate				
Oct. 1-10, 1951	71.8	13		526	221	1,470	153	0	1,900	2,350					6,580	8.92	1,270	2,220	2,100	59	14	9,560	7.5
Oct. 11-31	70.6	19		512	219	1,460	187	0	1,880	2,300					6,490	8.81	1,240	2,180	2,020	59	14	9,380	7.6
Nov. 1-10	70.9	18		516	219	1,380	217	0	1,850	2,150					6,220	8.46	1,190	2,190	2,010	57	13	8,990	7.7
Nov. 11-20	74.8	15		504	210	1,260	194	0	1,780	2,020					5,880	8.00	1,190	2,120	1,960	56	12	8,590	7.7
Nov. 21-30	79.8	18		512	205	1,240	208	0	1,760	1,990		7.4			5,840	7.94	1,260	2,120	1,950	56	12	8,540	7.4
Dec. 1-10	77.8	17		516	205	1,230	214	0	1,740	2,000					5,820	7.92	1,220	2,130	1,960	56	12	8,470	7.3
Dec. 11-20	76.1	16		502	199	1,180	200	0	1,700	1,920			7.5		5,620	7.64	1,150	2,070	1,910	55	11	8,240	7.6
Dec. 21-31	78.6	16		502	199	1,210	203	0	1,710	1,950		7.7			5,690	7.74	1,210	2,070	1,900	56	12	8,260	7.5
Jan. 1-10, 1952	83.8	15		504	193	1,110	206	0	1,710	1,780		9.2			5,420	7.37	1,230	2,050	1,880	54	11	7,950	7.1
Jan. 11-20	84.1	16		508	197	1,090	214	0	1,730	1,740		8.6			5,390	7.33	1,220	2,080	1,900	53	10	7,930	7.2
Jan. 21-31	76.3	15		504	198	1,100	208	0	1,740	1,760		8.5			5,430	7.38	1,120	2,070	1,900	54	11	7,950	7.4
Feb. 1-10	78.1	15		502	197	1,110	191	0	1,740	1,780		6.8			5,440	7.40	1,150	2,060	1,910	54	11	7,920	7.4
Feb. 11-20	81.2	15		498	213	1,180	194	0	1,760	1,900		6.9			5,670	7.71	1,240	2,120	1,980	55	11	8,290	7.6
Feb. 21-29	79.9	14		480	200	1,080	190	0	1,670	1,760		8.0			5,320	7.24	1,150	2,040	1,890	53	10	7,810	7.6
Mar. 1-10	67.8	13		480	203	1,170	178	0	1,710	1,890		7.1			5,570	7.58	1,020	2,060	1,910	55	11	8,180	7.5
Mar. 11-20	67.9	11		502	207	1,230	167	0	1,740	2,000		6.5			5,760	7.86	1,060	2,100	1,970	56	12	8,610	7.7
Mar. 21-31	53.9	15		492	209	1,470	160	0	1,820	2,310		--			6,400	8.70	931	2,090	1,960	60	14	9,190	7.5
Apr. 1-10	22.4	18		538	255	2,340	165	0	2,030	3,710		--			8,970	12.2	543	2,390	2,280	68	21	12,800	7.3
Apr. 11-20	45.5	17		553	250	2,040	173	0	2,040	3,240		--			8,220	11.2	1,010	2,410	2,270	65	18	11,800	7.5
Apr. 21-30	40.3	16		563	242	1,930	169	0	3,010	3,090		--			7,930	10.8	863	2,400	2,260	64	17	11,200	7.3
May 1-10	40.5	19		568	242	1,950	172	0	2,060	3,090		--			8,010	10.9	876	2,410	2,270	64	17	11,200	7.4
May 11-20	45.8	18		560	231	1,900	170	0	2,030	2,840		--			7,560	10.3	935	2,350	2,210	62	16	11,200	7.3
May 21-31	56.0	18		536	217	1,460	160	0	1,490	2,350		--			6,550	8.91	990	2,230	2,100	59	13	9,280	7.2



June 1-10, 1952.....	29.0	20	556	229	2,050	168	0	3,000	3,240	--	8,180	11.1	640	2,330	2,190	66	18	12,000	7.3
June 11-20.....	39.6	24	556	229	1,770	149	0	2,030	2,790	--	7,470	10.2	799	2,330	2,210	62	16	10,900	7.5
June 21-30.....	30.6	17	518	220	1,930	138	0	1,910	3,040	--	7,700	10.5	636	2,190	2,080	66	18	11,200	7.4
July 1-10.....	27.8	22	532	250	2,390	151	0	1,980	3,810	--	9,060	12.3	690	2,360	2,230	69	21	13,300	7.2
July 11-15.....	66.2	20	518	235	1,940	142	0	1,960	3,060	--	7,800	10.6	1,390	2,260	2,140	65	18	11,400	7.3
July 16-21.....	72.8	17	452	183	1,130	135	0	1,650	1,770	3.4	5,270	7.17	1,040	1,880	1,770	57	11	7,640	7.4
July 22-31.....	21.9	21	507	237	2,270	144	0	1,950	3,560	--	8,620	11.7	510	2,240	2,120	69	21	12,600	7.2
Aug. 1-10.....	16.6	23	570	289	3,860	137	0	2,330	6,000	--	13,100	17.8	587	2,710	2,500	76	33	19,000	7.2
Aug. 11-20.....	20.9	24	591	304	3,580	129	0	2,400	5,610	--	12,600	17.1	711	2,720	2,620	74	30	17,600	7.1
Aug. 21-31.....	18.5	23	615	287	3,640	130	0	2,460	5,580	--	12,600	17.1	629	2,630	2,530	75	31	17,500	7.2
Sept. 1-10.....	20.2	29	644	287	3,350	154	0	2,430	5,280	--	12,100	16.5	660	2,780	2,660	72	28	17,900	7.4
Sept. 11-20.....	24.1	26	640	286	3,130	153	0	2,410	4,920	--	11,500	15.6	748	2,770	2,650	71	28	17,000	7.4
Sept. 21-30.....	51.4	27	621	269	2,410	171	0	2,270	3,890	--	9,510	12.9	1,320	2,660	2,520	66	20	14,200	7.4
Weighted average...	54.6	17	521	218	1,530	182	0	1,860	2,440	--	6,680	9.08	985	2,200	2,050	80	14	9,700	--

## 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 (contributing area), (above gaging station).

RECORDS AVAILABLE.--Chemical analyses: July 1937 to September 1952.

EXTREMES, 1951-52.--Dissolved solids: Maximum, 14,700 ppm Aug. 21-31; minimum, 5,260 ppm Feb. 1-10.

Hardness: Maximum, 3,080 ppm Aug. 21-31; minimum, 1,960 ppm July 15-20.

Specific conductance: Maximum observed, 21,300 micromhos Aug. 23; minimum observed, 6,610 micromhos July 16.

EXTREMES, 1937-52.--Dissolved solids: Maximum 14,700 ppm Aug. 21-31, 1952; minimum, 456 ppm June 3, 1948.

Hardness: Maximum, 3,080 ppm Aug. 21-31, 1952; minimum, 256 ppm June 3, 1948.

Specific conductance: Maximum observed, 21,300 micromhos Aug. 23, 1952; minimum observed 268 micromhos Sept. 19, 1946.

REMARKS.--Values reported for dissolved solids are sums of determined constituents. Value for dissolved solids for period December 21-31, 1946, in Water-Supply Paper 1102, should read 4,940 ppm. 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 1951 to September 1952 given in Water-Supply Paper 1242. 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 1951 to September 1952

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal-cium (Ca)	Mag-nes-ium (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 (sum)			Hardness as CaCO <sub>3</sub>		Per-cent so-lidum	So-lidum adsorp-tion ratio	Specific conduct-ance (micro-mhos at 25°C)
															Parts per million	Tons per acre-foot	Tons per day	Calcium, mag-nesium	Non-carbonate			
Oct. 1-10, 1951....	73.9	18		584	255	1,580	175	0	2,020	2,620			--		7,180	9.74	1,430	2,510	2,360	58	14	10,300
Oct. 11-20.....	75.5	17		540	227	1,520	169	0	1,980	2,400			--		6,770	9.21	1,380	2,280	2,140	59	14	9,910
Oct. 21-31.....	72.8	15		534	221	1,440	174	0	1,900	2,300			--		6,500	8.84	1,280	2,240	2,100	58	13	9,480
Nov. 1-10.....	72.6	17		534	219	1,430	195	0	1,880	2,280			--		6,460	8.79	1,270	2,230	2,070	58	13	9,450
Nov. 11-20.....	77.7	17		520	216	1,390	196	0	1,850	2,220			--		6,310	8.58	1,320	2,190	2,020	58	13	9,050
Nov. 21-30.....	82.2	18		518	207	1,330	193	0	1,810	2,130			--		6,110	8.31	1,360	2,140	1,990	58	13	8,930
Dec. 1-10.....	79.6	18		522	207	1,300	204	0	1,810	2,070			--		6,080	8.20	1,300	2,150	1,990	57	12	8,770
Dec. 11-20.....	82.5	13		514	201	1,280	198	0	1,770	2,040			--		5,920	8.05	1,320	2,110	1,950	57	12	8,640
Dec. 21-31.....	81.2	16		498	201	1,240	187	0	1,750	1,980			8.4		5,780	7.87	1,270	2,070	1,920	57	12	8,460
Jan. 1-10, 1952....	86.3	16		500	198	1,160	196	0	1,730	1,860			8.1		5,970	7.58	1,330	2,060	1,900	55	11	8,110
Jan. 11-20.....	87.0	16		512	198	1,160	217	0	1,740	1,860			8.3		5,470	7.44	1,350	2,060	1,810	54	11	7,890
Jan. 21-31.....	87.0	18		504	208	1,050	212	0	1,650	1,770			10		5,310	7.22	1,250	2,110	1,940	52	9	7,910
Feb. 1-10.....	88.4	16		508	171	1,080	199	0	1,680	1,720			8.5		5,280	7.15	1,260	1,970	1,810	54	11	7,750
Feb. 11-20.....	87.7	13		500	204	1,130	176	0	1,690	1,860			7.8		5,490	7.47	1,300	2,090	1,840	54	11	8,110
Feb. 21-29.....	80.0	11		498	201	1,140	172	0	1,700	1,870			6.3		5,570	7.49	1,200	2,080	1,820	55	11	8,180
Mar. 1-10.....	88.7	9.5		486	202	1,220	163	0	1,740	1,940			7.4		5,680	7.72	1,050	2,040	1,910	56	12	8,290
Mar. 11-20.....	82.5	8.2		512	215	1,370	147	0	1,820	2,210					6,210	8.45	1,050	2,160	2,040	58	13	9,200
Mar. 21-31.....	46.9	10		502	211	1,310	145	0	1,840	2,420					6,580	8.95	833	2,120	2,000	61	14	9,720
Apr. 1-10.....	23.2	9.0		534	231	1,900	147	0	2,000	2,990					7,740	10.5	485	2,280	2,160	64	17	11,400
Apr. 11-20.....	40.8	14		549	250	2,490	156	0	2,090	3,460					9,380	12.8	1,030	2,400	2,270	69	22	14,000
Apr. 21-30.....	37.3	13		563	263	2,170	162	0	2,110	3,460					8,660	11.8	872	2,490	2,350	66	19	12,700

May 1-10, 1952	37.6	15	583	252	2,100	170	0	2,140	3,320	--	8,490	11.5	862	2,490	2,350	65	18	12,300	7.2
May 11-20	40.5	19	603	274	2,190	180	0	2,210	3,510	--	8,900	12.1	973	2,630	2,480	64	19	12,700	7.4
May 21-31	54.5	18	560	241	1,560	170	0	2,060	2,490	--	7,000	9.52	1,030	2,390	2,250	59	14	10,600	7.4
June 1-10	29.0	18	540	235	1,660	156	0	2,000	2,640	--	7,170	9.75	561	2,310	2,190	61	15	10,400	7.5
June 11-20	39.7	22	588	262	2,320	154	0	2,240	3,640	--	8,150	12.4	981	2,540	2,420	66	20	13,100	7.2
June 21-30	35.8	20	564	251	1,960	142	0	2,140	3,440	--	8,180	11.1	791	2,440	2,320	64	18	11,800	7.3
July 1-10	30.5	17	528	241	2,360	133	0	2,040	3,690	--	8,560	12.3	1,156	2,750	2,630	69	21	13,100	7.2
July 11-20	18.7	15	483	231	2,180	134	0	1,960	2,780	--	8,360	10.3	1,136	2,560	2,440	68	21	13,100	7.2
July 15-30	37.8	17	477	198	1,180	134	0	1,700	1,800	2.3	5,380	7.32	1,280	1,960	1,850	56	11	7,750	7.5
July 21-31	26.6	16	500	214	1,550	125	0	1,650	2,460	--	6,650	9.04	478	2,130	2,020	61	15	9,640	7.1
Aug. 1-10	16.2	17	562	265	2,440	122	0	2,070	3,930	--	9,340	12.7	409	2,490	2,350	68	21	13,600	7.1
Aug. 11-20	20.8	18	581	286	3,770	102	0	2,900	5,910	--	12,900	17.5	724	2,630	2,540	78	32	18,600	7.1
Aug. 21-31	14.6	20	675	340	4,220	93	0	2,760	6,600	--	14,700	20.0	579	3,080	3,010	75	33	20,700	7.1
Sept. 1-10	19.7	22	673	332	4,160	77	0	2,770	6,480	--	14,500	19.7	771	3,040	2,980	75	33	19,700	7.4
Sept. 11-20	25.2	22	658	320	3,910	86	0	2,710	6,070	--	13,700	18.6	932	2,960	2,890	74	31	18,200	7.3
Sept. 21-30	40.5	19	594	291	3,040	111	0	2,400	4,750	--	11,100	15.1	1,210	2,680	2,590	71	26	15,200	7.5
Weighted average	36.5	16	530	223	1,600	173	0	1,900	2,550	--	6,900	9.38	1,050	2,240	2,100	61	15	10,000	--

## RIO GRANDE BASIN--Continued

## PECOS RIVER NEAR ORLA, TEX.

LOCATION.-- At gaging station 600 feet upstream from Pasotex pipeline crossing, 6 miles southeast of Orla, Reeves County, 11 miles downstream from Salt (Screw bean) Draw and 1 1/2 miles downstream from Red Bluff Dam.

DRAINAGE AREA--21,500 square miles, approximately (contributing area).

RECORDS AVAILABLE.--Chemical analyses: July 1952.

EXTREMES, 1951-52.--Dissolved solids: Maximum, 7,980 ppm June 1-30; minimum, 3,810 ppm Apr. 16-19.

Hardness: Maximum, 2,600 ppm June 1-30; minimum, 1,850 ppm Apr. 6-19.

Specific conductance: Maximum daily, 13,600 micromhos Sept. 21-27; minimum daily, 4,470 micromhos Apr. 19.

EXTREMES, 1937-52 and 1950-52.--Dissolved solids: Maximum daily, 13,600 micromhos Sept. 21-27; minimum, 1,990 ppm June 1-2, 1948.

Hardness: Maximum daily, 2,600 ppm June 1-30; minimum, 1,850 ppm Apr. 6-19.

Specific conductance: Maximum daily, 13,600 micromhos Sept. 21-27; minimum daily, 2,500 micromhos Oct. 2, 1950.

REMARKS.--Values reported for dissolved solids are sums of determined constituents. Records of specific conductance of daily samples from November 1941 to September 1952 available in district office at Austin, Tex. Records of discharge for water year October 1951 to September 1952 given in Water-Supply Paper 1242.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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 (sum)			Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	Color
													Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
Oct. 1-31, 1951..	6.63	22	614	614	231	1,470	1,470	102	2,200	2,350		--	6,940	9.44	124	2,480	2,400	56	13	10,000	7.4
Nov. 1-30.....	8.13	22	628	628	232	1,410	1,410	121	2,190	2,280		--	6,820	9.28	150	2,520	2,420	55	12	9,390	7.6
Dec. 1-31.....	28.1	26	624	624	232	1,450	1,450	120	2,170	2,350		--	6,910	9.40	524	2,510	2,410	56	13	9,790	7.7
Jan. 1-31, 1952..	11.0	22	610	610	244	1,480	1,480	124	2,200	2,380		--	7,000	9.52	208	2,530	2,420	56	13	10,000	7.6
Feb. 1-29.....	10.5	16	584	584	232	1,550	1,550	119	2,190	2,420		--	7,050	9.59	200	2,410	2,310	58	14	10,000	7.4
Mar. 1-31.....	75.7	16	614	614	246	1,540	1,540	117	2,260	2,440		--	7,170	9.75	1,470	2,540	2,450	57	13	10,200	7.6
Apr. 1-15, 20-30.	192	20	584	584	236	1,510	1,510	124	2,140	2,400		--	6,950	9.45	3,600	2,430	2,330	58	13	9,940	8.1
Apr. 16-19.....	386	16	510	510	101	637	122	1,430	1,050	1,050	5.5	5.5	3,810	5.18	3,970	1,690	1,590	45	6.6	5,440	7.8
May 1-31.....	43.5	36	612	612	242	1,670	1,670	89	2,290	2,620		--	7,510	10.2	882	2,520	2,450	59	15	10,700	7.6
June 1-30.....	71.5	28	629	629	251	1,820	1,820	106	2,360	2,840		--	7,980	10.9	1,540	2,600	2,510	60	16	11,300	7.0
July 1-31.....	127	21	618	618	226	1,610	1,610	100	2,240	2,520		--	7,280	9.90	2,500	2,470	2,390	59	14	10,500	7.3
Aug. 1-30.....	177	19	594	594	168	1,240	1,240	86	1,970	1,960	3.5	3.5	5,980	8.15	2,860	2,170	2,100	55	11	8,570	7.2
Sept. 1-30.....	37.6	17	665	665	212	1,840	1,840	102	2,190	2,960		--	7,930	10.8	805	2,530	2,460	61	16	11,500	7.4
Weighted average	68.0	21	601	601	212	1,460	1,460	106	2,120	2,310		--	6,780	9.22	1,240	2,370	2,280	57	13	9,690	--

## RIO GRANDE BASIN--Continued

## PECOS RIVER BELOW GRANDFALLS, TEX.

LOCATION--At gaging station at bridge on State Farm-to-Market Road 11 between Grandfalls and Imperial, 7.1 miles southeast of Grandfalls, Ward County, and 10 miles upstream from Chacatori Draw.

DRAINAGE AREA--27,820 square miles, approximately (contributing area).

RECORDS AVAILABLE--Chemical analyses: April 1939 to June 1942, October 1946 to September 1952.

EXTREMES AVAILABLE--Dissolved solids: 12,500 ppm Mar. 1-2; minimum, 984 ppm Apr. 2-4.

Hardness: Maximum 3,710 ppm Mar. 1-2; minimum, 316 ppm Apr. 2-4.

Specific conductance: Maximum 3,710 ppm Mar. 1-2; minimum, 316 ppm Apr. 2-4.

EXTREMES: 1939-42: 1946-52: Maximum dissolved solids: 12,500 ppm Mar. 1-2; minimum, 984 ppm Apr. 2-4.

Hardness: Maximum 3,710 ppm Mar. 1-2; minimum, 316 ppm Apr. 2-4.

Specific conductance: Maximum 3,710 ppm Mar. 1-2; minimum, 316 ppm Apr. 2-4.

Specific conductance (1950-52): Maximum daily, 20,000 micromhos Apr. 2, 1952; minimum daily, 1,520 micromhos Apr. 2, 1952.

REMARKS--Records of specific conductance of daily samples available from district office at Austin, Tex. Values reported for dissolved solids are sums of determined constituents. Records of discharge for water year October 1951 to September 1952 given in Water-Supply Paper 1242.

Chemical analyses, in parts per million, water year October 1951 to September 1952

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 (sum)			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	Calcium, mg./l.	Non-carbonate, mg./l.					
Oct. 1-31, 1951..	17.3	22	710	357	2,270	161	2,810	3,630	2,810	3,630	--	--	--	9,380	13.4	461	3,240	3,110	60	17	14,000	7.4	
Nov. 1-30.....	16.1	22	734	364	2,400	182	2,810	3,880	2,810	3,880	--	--	--	10,300	14.0	448	3,330	3,180	61	18	14,100	7.8	
Dec. 1-31.....	18.0	22	742	371	2,430	196	2,840	3,930	2,840	3,930	--	--	--	10,400	14.1	505	3,380	3,220	61	18	14,600	7.9	
Jan. 1-31, 1952 .	24.7	20	730	369	2,604	186	2,900	4,130	2,900	4,130	--	--	--	10,800	14.7	720	3,340	3,190	63	20	15,200	7.5	
Feb. 1-29.....	21.3	21	728	373	2,530	170	2,910	4,030	2,910	4,030	--	--	--	10,700	14.6	815	3,350	3,210	62	19	15,100	7.8	
Mar. 1-31.....	25.5	13	816	408	2,950	138	3,280	4,670	3,280	4,670	--	--	--	12,200	16.6	840	3,710	3,590	63	21	16,800	7.6	
Apr. 1-30.....	16.0	--	264	138	968	122	1,170	1,420	1,170	1,420	12	12	12	4,090	5.48	174	1,230	1,130	63	12	6,210	8.1	
Apr. 2-4.....	15.3	44	82	27	213	219	303	195	303	195	--	--	--	984	1.34	40.6	316	136	60	5.2	1,590	8.1	
Apr. 5-30.....	19.8	16	741	387	2,700	152	3,070	4,250	3,070	4,250	--	--	--	11,200	15.2	599	3,440	3,320	63	20	15,700	7.2	
May 1-29.....	28.0	20	732	382	2,680	100	3,060	4,200	3,060	4,200	--	--	--	11,100	15.1	839	3,400	3,320	63	20	15,600	7.7	
May 30-31.....	72.5	12	185	78	570	92	661	880	661	880	7.3	7.3	7.3	2,450	3.33	480	782	706	61	8.9	3,980	7.9	
June 1-4.....	24.5	19	398	177	1,220	100	1,540	1,900	1,540	1,900	5.0	5.0	5.0	5,310	7.22	351	1,720	1,640	61	13	9,970	7.8	
June 5-30.....	17.4	16	797	387	2,710	101	3,250	4,250	3,250	4,250	--	--	--	11,500	15.6	540	3,580	3,500	62	20	16,000	7.6	
July 1-31.....	16.0	18	817	393	2,650	146	3,180	4,250	3,180	4,250	--	--	--	11,400	15.5	492	3,650	3,530	61	19	16,000	7.4	
Aug. 1-31.....	12.6	20	813	407	2,680	113	3,340	4,200	3,340	4,200	--	--	--	11,500	15.6	390	3,700	3,610	61	19	16,300	7.6	
Sept. 1-30.....	12.4	18	799	381	2,550	109	3,180	4,050	3,180	4,050	--	--	--	11,000	15.0	368	3,560	3,470	61	19	15,500	7.3	
Weighted average	19.4	19	738	369	2,530	146	2,950	4,010	2,950	4,010	--	--	--	10,700	14.6	560	3,360	3,240	62	19	15,000	--	--

## RIO GRANDE BASIN--Continued

## MISCELLANEOUS ANALYSES OF STREAMS IN RIO GRANDE BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1951 to September 1952

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 or Col- or	
														Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate				
RIO GRANDE AT LANGTRY																					
June 17, 1952 .....	a 1,180	20	0.01	168	24	108	2.4	188	537	19	0.7	2.5	0.25	1,010	1.37	518	364	31	2.1	1,280	7.3
PECOS RIVER NEAR COMSTOCK																					
June 17, 1952 .....	a 114	9.0	0.02	165	103	583	2.4	138	627	930	0.9	1.0	0.39	b 2,490	3.39	835	722	60	8.8	4,110	7.6
LAKE WALK NEAR DEL RIO																					
June 17, 1952 .....		13	0.04	46	10	6.0	0.4	180	6.6	9.5	0.3	5.0	0.36	203	0.28	156	8	8	0.2	340	7.6
RIO GRANDE AT LAREDO																					
Apr. 21, 1952 .....	a 554	13	0.00	75	33	165	0.4	144	248	215	0.9	0.8	0.60	849	1.15	322	204	53	4.0	1,380	8.0
LAKE HARLINGEN NEAR HARLINGEN																					
Feb. 14, 1952 .....		11	0.00	92	33	202	2.8	149	274	284	0.8	0.5	0.57	1,000	1.36	365	243	54	4.6	1,640	8.0
Sept. 16 .....		17	.03	130	37	304	304	154	386	430	.7	.2	--	b 1,380	1.88	476	350	58	6.1	2,350	7.7

a Records furnished by International Boundary and Water Commission.

a Sum of determined constituents.

a Records furnished by International Boundary and Water Commission.

b Sum of determined constituents.







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