

# Quality of Surface Waters of the United States 1948

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# QUALITY OF SURFACE WATERS OF THE UNITED STATES, 1948

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## 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 water temperature for surface waters given in this volume serve as a basis for determining the suitability of the waters examined for industrial, agricultural, and for 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 heretofore have been published in a single volume for the entire country. Beginning this year, the records are being published in two volumes, covering the drainage basins shown in figure 1. The samples for which data are given were collected from October 1, 1947, to September 30, 1948. 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, total 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.

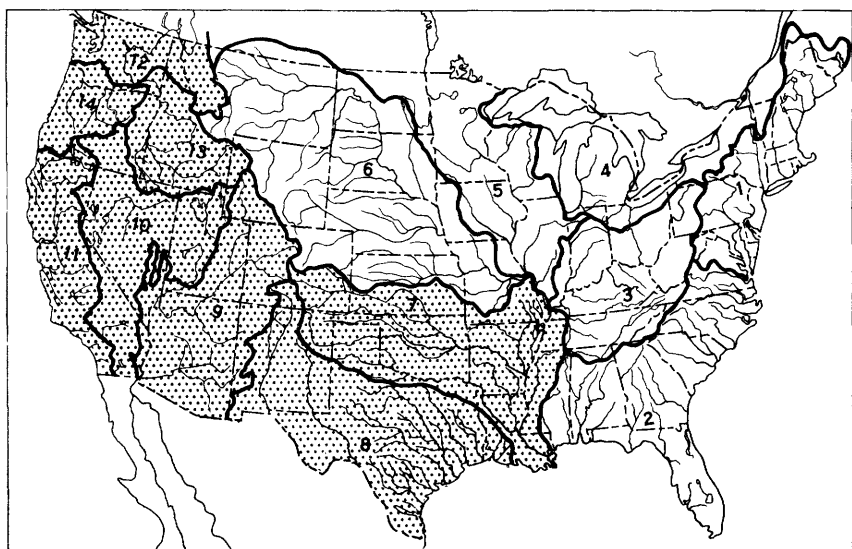


Figure 1. Map of the United States showing basins covered by the two Water-Supply Papers on quality of surface water in 1948. The shaded portion represents the section of the country covered by this volume.

During the year ended September 30, 1948, 105 daily sampling stations 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 43 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 35 stations during the year ended September 30, 1948. The sediment samples were collected from one to five times daily at most stations, depending on the rate of flow and changes in stage. Sediment samples were collected less frequently during the year at many other points. In connection with measurements of sediment discharge, sizes of the sediment particles were determined at 17 of the stations. As noted under "Remarks" in the table headings, suspended-sediment concentrations were also determined from the samples collected for chemical analysis in some parts of the country. Records of these determinations are available for reference in the

district offices listed. 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.

Material which is transported essentially in continuous contact with the stream bed is termed bed load and is not considered in this report. 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 quantities 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, 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. Pub. 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 180C 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. Interagency, 1948, pp. 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. At intervals throughout the year, suspended-sediment

samples, consisting of depth-integrated samples at three or more verticals in the cross section were made 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 regularly taken 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 gage-height chart. The plotted concentrations adjusted, if necessary, for cross-sectional distribution with respect to that at the daily sampling vertical, were connected or averaged by continuous curves to obtain a concentration graph. This graph represented the estimated concentration at any time and, for most periods, 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 periods when no samples were taken, some daily sediment loads were estimated on the basis of water discharge, sediment concentrations or loads for adjacent days and similar periods, weather records, and comparison with records 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. Estimated sediment loads for missing periods 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 also are included. 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, pp. 82-90) was used in most of the analyses. Generally sieves were used in the determination of sizes in excess of 0.062 millimeter. 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 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 10,000 parts per million, where necessary, by means of a sample splitter, in order to meet the limits recommended for the bottom-withdrawal tube method. The concentration of suspended sediment used in the bottom-withdrawal tube was often different from the concentration in the original suspension. The weight of sediment used is indicated in the tables of analyses.

### 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 had a limit of accuracy of plus or minus 1 F. Consequently water temperatures of 31 F have been included in this report.

### 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 though 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 are given in the following table:

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

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

The total hardness, as calcium carbonate ( $\text{CaCO}_3$ ), 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 includes the equivalent quantity of potassium. In most waters of moderate to high concentration, the proportion of potassium is much smaller than that of sodium.

Specific conductance values are expressed in reciprocal ohms (micromhos at 25 C). The discharge of the streams is reported in second-feet (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, pp. 427-428). Hydrogen-ion concentration (pH) is given as the negative logarithm of the number of moles of ionized hydrogen per liter of water.

Average analyses (arithmetical or weighted) for the water year are given for most daily sampling stations. An arithmetical-average analysis 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 analysis 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 analysis is com-

puted 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. The weighted-average analysis shows less concentrated water 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 except for streams in the Colorado River and Rio Grande Basins which are expressed in percent by weight because of the frequency of concentrations in excess of 10 percent. One percent is equivalent to 10,000 parts per million. Daily sediment loads are expressed in tons per day, usually obtained by multiplying mean daily sediment concentration in parts per million by the mean daily discharge and the conversion factor 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, and oxygen consumed 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 scales; 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 in fabrics and on 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 fer-



ric 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 wa-

ters 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 ( $\text{Cl}$ )

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. Large quantities of chloride may affect the industrial use of water by increasing the corrosiveness of waters that contain large quantities of calcium and magnesium.

#### Fluoride ( $\text{F}$ )

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. 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. This condition becomes noticeable as the quantity of fluoride in water increases above 1 part per million. 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.

#### 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 analyses of surface waters in arid and semi-arid 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 a rough indication 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. Values progressively lower than 7.0 denote increasing acidity, whereas values progressively higher than 7.0 denote increasing alkalinity. The pH of water indicates its activity towards metal surfaces. As the pH increases the corrosive activity of the water decreases. 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 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 following changes in concentration of the total quantity of dissolved minerals in surface waters.

### Hardness

Hardness is the characteristic of water that receives the most attention in industrial and domestic use. It is usually recognized by the increased quantity of soap required to produce lather. Hard water is also objectionable because of 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 are considered hard, and in the upper ranges laundries and industries may profitably soften the supply. 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 hydrolize 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. Besides the trouble caused by iron in water, 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. 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, pp. 8-9; Wilcox, 1948, p. 6).

## 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 (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 upon 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 upon 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, and 1947, for many of the stations listed in this report are given in Water-Supply Papers 942, 950, 970, 1022, 1030, 1050, and 1102.

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 in the following list 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 I, 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 waters of Georgia, 1944.
- 998. Suspended sediment in the Colorado River, 1925-41, 1947.

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 AND DIVISION OF WORK

The quality-of-water investigations in the States in the different drainage basins included in this volume were made under cooperative agreements with the organizations listed below. The work 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 the supervision of the district chemists and engineers as follows: In Arkansas, G. A. Billingsley; in Missouri, P. C. Benedict; in New Mexico, C. S. Howard; in Oklahoma, I. W. Walling; in Texas, W. W. Hastings and B. Ireland. Any additional analytical data for the sampling stations can be obtained by writing the responsible Survey district office shown.

State	Cooperating agency	Drainage basin	District office
Arkansas	Arkansas Bureau of Research, C. O. Brannen, director.	Lower Mississippi River	c/o Institute of Science and Technology, University of Arkansas, Fayetteville, Ark.
New Mexico	New Mexico Interstate Stream Commission, John H. Bliss, secretary, and Colfax County Board of Commissioners, J. Dudley Hickman, chairman.	Lower Mississippi River, Western Gulf of Mexico.	918 West Park Avenue, P. O. Box 443, Albuquerque, N. Mex.
Oklahoma	Oklahoma Planning and and Resources Board, Clarence Burch, chairman, and Oklahoma A. & M. College Engineering Experiment Station, C. A. Dunn, Executive Director.	Lower Mississippi River	1203 West Sixth St., Stillwater, Okla.

State	Cooperating agency	Drainage basin	District office
Texas	<p>Texas State Board of Water Engineers, consisting of E. V. Spence, chairman, J. W. Pritchett, and H. A. Beckwith; Texas Red Bluff Water Power Control District. Lower Colorado River Authority, Brazos River Conservation and Reclamation District, and other local groups.</p>	<p>Lower Mississippi River and Western Gulf of Mexico.</p>	<p>302 W. 15th Street, Austin, Tex.</p>

Investigations of the quality of water and of suspended-sediment loads in the Colorado River Basin in Arizona, Colorado, Nevada, New Mexico, and Utah have been carried on as a continuing Federal project since 1925. Studies of suspended-sediment loads in the middle Rio Grande in New Mexico were initiated as a Federal project in 1948. These investigations were under the direction of C. S. Howard, district chemist, Albuquerque, N. Mex.

Financial assistance was furnished by the Bureau of Reclamation for quality-of-water studies in the Rio Grande Basin in New Mexico, the Lower Rio Grande Basin in Texas, and at Lake Mead, Ariz. -Nev., and by the Corps of Engineers, U. S. Army, for the investigations in the vicinity of Conchas Dam, N. Mex., on Arkansas River near John Martin Dam, Colo., on the Mississippi River at St. Louis, and on the Trinity River in Texas.

## 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

## 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 (authority, Mississippi River Commission).

RECORDS AVAILABLE.--Sediment records: April to September 1948.

EXTREMES, 1947-48.--Sediment loads: Maximum, 3,860,000 tons per day June 26; minimum 82,400 tons per day Sept. 28.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1117.

## Suspended sediment, water year October 1947 to September 1948

Day	April			May			June		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	--	--	--	232,000	--	1,030,000	108,000	--	180,000
2-----	--	--	--	234,000	--	1,060,000	108,000	--	170,000
3-----	--	--	--	223,000	--	820,000	112,000	--	170,000
4-----	--	--	--	206,000	--	628,000	112,000	--	180,000
5-----	--	--	--	201,000	--	631,000	112,000	--	190,000
6-----	--	--	--	221,000	--	752,000	103,000	--	190,000
7-----	--	--	--	228,000	1,370	843,000	94,200	--	220,000
8-----	--	--	--	219,000	--	812,000	104,000	1,030	289,000
9-----	--	--	--	213,000	--	760,000	112,000	--	300,000
10-----	--	--	--	217,000	--	650,000	110,000	--	290,000
11-----	--	--	--	220,000	958	569,000	108,000	957	279,000
12-----	--	--	--	219,000	--	540,000	104,000	--	264,000
13-----	--	--	--	217,000	--	598,000	102,000	--	263,000
14-----	325,000	1,350	1,180,000	221,000	1,310	782,000	102,000	--	300,000
15-----	308,000	--	960,000	230,000	--	878,000	104,000	1,110	312,000
16-----	288,000	1,050	816,000	237,000	--	1,000,000	116,000	--	360,000
17-----	276,000	--	718,000	243,000	--	1,240,000	125,000	--	632,000
18-----	270,000	--	655,000	237,000	--	1,180,000	138,000	2,030	756,000
19-----	254,000	--	572,000	223,000	--	624,000	145,000	--	1,000,000
20-----	239,000	--	494,000	219,000	728	430,000	159,000	--	1,480,000
21-----	227,000	702	430,000	214,000	--	396,000	189,000	--	1,860,000
22-----	217,000	--	382,000	203,000	--	347,000	214,000	3,630	2,100,000
23-----	209,000	625	353,000	189,000	--	298,000	260,000	--	2,500,000
24-----	202,000	--	328,000	175,000	570	269,000	314,000	--	3,120,000
25-----	196,000	--	302,000	169,000	--	274,000	340,000	3,760	3,450,000
26-----	188,000	--	284,000	158,000	658	281,000	378,000	--	3,860,000
27-----	189,000	--	284,000	143,000	--	290,000	397,000	--	3,350,000
28-----	194,000	--	304,000	146,000	--	300,000	358,000	--	2,520,000
29-----	202,000	--	502,000	149,000	--	300,000	338,000	--	2,180,000
30-----	216,000	--	885,000	138,000	--	260,000	322,000	2,370	2,060,000
31-----	--	--	--	121,000	--	220,000	--	--	--
Total	4,000,000	--	9,449,000	6,265,000	--	19,060,000	5,388,200	--	34,820,000

## MISSISSIPPI RIVER MAIN STEM--Continued

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

## Suspended sediment, water year October 1947 to September 1948--Continued

Day	July			August			September		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	326,000	--	2,250,000	223,000	--	1,140,000	89,400	1,200	290,000
2-----	328,000	3,010	2,670,000	237,000	1,850	1,180,000	94,200	--	281,000
3-----	322,000	--	2,700,000	255,000	--	1,700,000	94,200	986	251,000
4-----	288,000	--	2,380,000	242,000	3,400	2,220,000	85,400	--	219,000
5-----	248,000	--	1,770,000	220,000	--	2,160,000	83,800	--	210,000
6-----	266,000	--	1,600,000	210,000	4,090	2,320,000	88,600	--	227,000
7-----	249,000	2,010	1,350,000	206,000	--	2,150,000	85,400	--	245,000
8-----	194,000	2,850	1,490,000	188,000	--	1,720,000	84,600	1,080	247,000
9-----	194,000	2,970	1,560,000	168,000	3,160	1,430,000	82,200	--	234,000
10-----	172,000	--	1,380,000	147,000	--	1,060,000	82,200	1,040	231,000
11-----	166,000	--	1,310,000	128,000	2,430	840,000	83,800	--	232,000
12-----	151,000	--	1,180,000	113,000	--	630,000	80,600	--	234,000
13-----	135,000	2,950	1,080,000	110,000	1,930	573,000	77,400	1,370	286,000
14-----	142,000	3,030	1,160,000	120,000	--	568,000	75,000	--	238,000
15-----	155,000	--	1,230,000	120,000	--	525,000	75,800	840	172,000
16-----	158,000	2,390	1,020,000	119,000	1,500	482,000	76,200	--	192,000
17-----	157,000	--	904,000	119,000	--	600,000	79,000	1,380	294,000
18-----	157,000	--	818,000	120,000	2,370	768,000	73,600	--	263,000
19-----	162,000	1,800	787,000	120,000	--	821,000	67,300	--	172,000
20-----	166,000	--	956,000	121,000	2,740	895,000	65,200	736	130,000
21-----	180,000	2,690	1,310,000	123,000	--	862,000	68,700	--	116,000
22-----	200,000	--	1,460,000	122,000	--	715,000	78,200	498	105,000
23-----	249,000	2,600	1,750,000	110,000	1,810	538,000	91,000	--	112,000
24-----	285,000	--	2,070,000	99,900	--	482,000	90,200	440	107,000
25-----	283,000	--	2,290,000	97,400	2,150	565,000	80,600	--	98,700
26-----	347,000	3,380	3,170,000	98,200	--	641,000	73,600	--	95,200
27-----	407,000	2,630	2,910,000	99,000	2,500	668,000	68,000	526	96,600
28-----	356,000	2,310	2,220,000	99,900	--	626,000	64,500	--	87,200
29-----	305,000	2,380	1,960,000	99,000	--	459,000	64,500	473	82,400
30-----	276,000	2,140	1,590,000	96,600	1,450	378,000	65,900	--	83,000
31-----	246,000	--	1,310,000	91,000	--	325,000	--	--	--
Total -	7,270,000	--	51,640,000	4,422,000	--	30,040,000	2,371,900	--	5,631,000

Total discharge for period Apr. 14 to Sept. 30 (second-foot-days) ----- 29,717,100  
 Total load for period Apr. 14 to Sept. 30 (tons) ----- 150,600,000

WHITE RIVER BASIN  
WHITE RIVER AT COTTER, ARK.

LOCATION:--At bridge on U. S. Highway 62 at Cotter, Baxter County, about 5 miles downstream from gaging station.  
DRAINAGE AREA:--6,115 square miles.

RECORDS AVAILABLE:--Chemical analysis: October 1947 to September 1948.  
Water temperatures: February to September 1948.

EXTREMES: 1947-48:--Dissolved solids: Maximum 152 parts per million Dec. 11-20; minimum, 117 parts per million Aug. 16-20.

Total hardness: Maximum, 171 parts per million Dec. 11-20; minimum, 66 parts per million Aug. 16-20.

Water temperatures: Maximum, 83° F. July 21, 30, Aug. 3.

REMARKS:--Discharge records reported for gaging station 3 miles northeast of Flippin and 11 miles upstream from mouth of Crooked Creek. No appreciable inflow between sampling site and gaging station. Records of water discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1117. Records of specific conductance of daily samples available in district office at Fayetteville, Ark.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>	
																	Total	Non-carbonate
Oct. 1-20, 1947 ----	858	--	--	331	--	--	27	16	16		1/190	4.0	4.5	--	1.0	174	133	0
Oct. 21-31 -----	342	--	--	315	--	--	34	17	7.8		2/196	4.3	4.5	--	.2	178	155	0
Nov. 1-10 -----	678	--	--	324	--	--	38	15	6.2		191	6.3	4.5	--	.8	172	156	0
Nov. 11-20 -----	832	--	--	311	--	--	40	14	5.2		189	5.6	5.0	--	1.0	172	157	3
Nov. 21-31 -----	915	--	--	324	--	--	43	15	6.1		3/203	6.8	5.5	--	1.2	185	169	3
Dec. 1-10 -----	997	--	--	323	--	--	42	15	5.2		196	7.2	6.5	--	.8	178	166	6
Dec. 11-20 -----	1,312	--	--	323	--	--	42	16	10		4/204	16	5.5	--	1.5	192	171	3
Dec. 21-31 -----	1,096	--	--	318	--	--	41	15	6.3		5/192	9.4	6.0	--	2.2	179	164	6
Jan. 1-10, 1948 -----	11,550	--	--	230	--	--	28	9.8	7.8		1/132	10	3.5	--	4.1	132	110	2
Jan. 11-20 -----	2,311	--	--	275	--	--	36	12	8.6		158	17	4.5	--	5.4	161	139	10
Jan. 21-31 -----	1,360	--	--	302	--	--	39	12	8.3		176	7.7	5.5	--	5.8	169	147	2
Feb. 1-10 -----	1,250	--	--	304	--	--	40	13	5.3		1/180	6.2	5.5	--	3.5	168	153	6
Feb. 11-20 -----	6,470	--	--	287	--	--	36	13	5.8		1/170	7.6	4.5	--	2.5	158	143	4
Feb. 21-29 -----	7,504	46	--	277	--	--	34	12	6.7		162	7.5	4.2	--	3.0	152	134	1
Mar. 1-10 -----	21,850	44	--	236	--	--	30	10	7.3		138	11	3.5	--	3.0	142	116	3
Mar. 11-20 -----	11,209	45	--	253	--	--	31	10	13		152	13	4.0	--	3.5	149	118	0
Mar. 21-31 -----	18,060	58	--	243	--	--	30	10	7.8		142	9.1	3.5	--	2.7	143	116	0

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

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

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

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

5/ Includes equivalent of 11 parts per million of carbonate (CO<sub>3</sub>).



Apr. 1-10	7,744	57	271	--	--	35	11	5.8	152	9.2	6.2	--	3.0	154	133	8
Apr. 11-20	3,693	62	296	--	--	38	13	3.5	168	6.4	6.8	--	2.5	163	140	11
Apr. 21-30	2,692	68	293	--	--	37	13	5.3	172	6.3	6.2	--	1.3	158	146	5
May 1-10	3,354	66	300	--	--	38	13	7.3	6/175	5.2	9.6	--	1.7	186	143	4
May 11-20	8,818	68	267	--	--	36	9.5	7.6	5/153	5.3	9.6	--	1.7	150	129	4
May 21-31	3,336	70	263	--	--	35	9.0	6.1	5/147	4.6	8.6	--	1.0	138	124	4
June 1-10	1,540	75	274	--	--	33	12	9.5	161	6.4	8.0	--	3.0	151	132	0
June 11-20	11,030	77	252	--	--	26	12	12	152	6.5	8.0	--	.8	142	114	0
June 21-30	14,630	--	248	--	--	29	9.9	14	146	7.9	8.0	--	5.2	137	113	0
July 1-10	7,802	76	276	--	--	33	10	9.9	160	6.9	3.2	--	2.7	163	123	0
July 11-20	4,676	80	286	--	--	36	11	6.5	164	6.7	3.6	--	3.3	160	135	1
July 21-31	4,309	82	293	9.6	.04	38	11	7.2	177	5.0	3.8	.0	1.9	168	140	0
Aug. 1-10	2,179	77	298	--	--	36	13	10	168	4.2	3.8	--	2.2	175	143	0
Aug. 11-15	5,662	79	297	--	--	40	13	7.5	190	4.8	4.5	--	2.5	175	153	0
Aug. 16-20	17,900	76	149	--	--	19	4.5	8.7	86	9.4	2.5	--	1.4	117	66	0
Aug. 21-31	2,406	80	228	--	--	32	8.8	4.5	8/139	5.3	3.5	--	1.4	135	116	2
Sept. 1-10	1,667	77	244	10	.01	24	10	15	1/152	4.2	3.8	.0	1.4	145	101	0
Sept. 11-20	1,322	74	257	--	--	36	10	7.1	160	7.6	4.5	--	1.2	155	131	0
Sept. 21-27	1,726	73	275	--	--	36	13	4.7	170	7.7	4.0	--	.6	161	143	4
Sept. 28-30	387	64	319	--	--	40	13	8.1	188	8.4	5.2	--	.8	179	153	0
Average	5,035	--	280	--	--	35	12	8.0	167	7.5	5.2	--	2.2	160	136	2

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

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

5/ Includes equivalent of 11 parts per million of carbonate (CO<sub>3</sub>).

6/ Includes equivalent of 18 parts per million of carbonate (CO<sub>3</sub>).

7/ Includes equivalent of 14 parts per million of carbonate (CO<sub>3</sub>).

8/ Includes equivalent of 12 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 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1					--	44	53	70	70	73	80	79
2					--	49	50	68	70		81	77
3					--	46	53	67	70	74	83	78
4					--	47	54	67	73	76	80	78
5					--	43	57	66	76	75	76	77
6					--	44	58	64	78	75	73	75
7					--	43	63	63	77	78	74	79
8					--	43	63	62	79	79	76	78
9					--	43	60	68	78	78	75	77
10					--	43	61	67	77	78	76	73
11					--	39	63	69	78	80	78	73
12					--	34	63	68	78	81	78	72
13					--	38	62	65	80	80	80	73
14					--	40	56	67	81	81	79	74
15					--	47	56	67	81	81	78	74
16					--	48	61	68	79	81	76	73
17					--	47	64	70	75	82	77	75
18					--	47	64	67	77	77	76	75
19					--	52	64	68	71	77	75	74
20					45	54	68	76	71	80	77	77
21					42	60	67	73	71	83	78	77
22					40	58	67	72	71	82	80	78
23					39	60	69	73	76	81	81	78
24					45	54	69	70	73	80	81	73
25					45	68	70	68	73	80	81	69
26					49	65	66	66	--	82	81	68
27					52	57	67	66	--	--	81	65
28					50	53	70	70	74	82	80	65
29					49	53	70	72	--	82	79	64
30					--	54	69	74	74	83	80	63
31					--	53	--	71	--	82	80	--
Average					--	49	62	68	75	79	78	74

## WHITE RIVER BASIN--Continued

## WHITE RIVER AT NEWPORT, ARK.

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

DRAINAGE AREA --19,812 square miles.

RECORDS AVAILABLE --Chemical analyses: October 1945 to September 1948.

Water temperatures: October 1945 to September 1948.

EXTREMES 1947-48 --Dissolved solids: Maximum, 192 parts per million Sept. 21-30; minimum, 129 parts per million Jan. 11-20.

Total hardness: Maximum, 180 parts per million Oct. 11-20; minimum, 100 parts per million Jan. 1-10.

Water temperatures: Maximum, 83° F. July 30; minimum, 39° F. Jan. 17.

EXTREMES 1945-48 --Dissolved solids: Maximum, 192 parts per million Oct. 11-20, 1946, Sept. 21-30, 1947; minimum, 122 parts per million May 21-31, 1946.

Total hardness: Maximum, 180 parts per million Oct. 11-20, 1947; minimum, 99 parts per million May 21-31, 1946.

Water temperatures: Maximum, 87° F. Aug. 4, 9, 1947; minimum, 37° F. Dec. 21, 1945.

REMARKS --Records of water discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1117. Records of specific conductance of daily samples available in district office at Fayetteville, Ark.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>	
																	Total	Non-carbonate
Oct. 1-10, 1947	5,390	69	8.3	334	12	0.08	36	20	3.9	2.6	1/210	3.7	4.0	0.0	2.0	188	172	0
Oct. 11-20	5,033	70	8.1	343	10	.18	39	20	4.5	2.6	2/216	4.1	4.5	.0	1.5	190	180	2
Oct. 21-31	5,363	68	8.3	331	9.4	.12	36	19	5.8	2.2	2/207	4.4	4.5	.1	2.5	187	178	0
Nov. 1-10	6,591	58	7.5	320	8.2	.02	34	19	6.9	3.1	204	6.6	4.5	.0	2.0	186	162	0
Nov. 11-20	8,111	51	8.3	323	7.4	.02	31	18	7.2	3.0	190	7.4	4.5	.0	1.5	174	151	0
Nov. 21-30	7,861	49	8.4	312	6.8	.10	36	18	6.4	1.4	204	5.0	4.5	.0	1.0	184	164	0
Dec. 1-10	9,709	48	8.4	310	6.9	.10	32	18	7.9	1.0	3/194	4.6	4.5	.1	2.0	178	154	0
Dec. 11-20	13,110	43	8.1	268	5.7	.15	32	15	2.1	1.6	162	4.9	4.0	.2	2.5	157	142	9
Dec. 21	10,060	44	8.1	297	5.8	.15	34	17	3.6	1.5	186	5.3	3.5	.1	1.8	164	155	2
Jan. 1-10, 1948	43,790	44	8.1	204	9.0	.10	24	9.7	7.2	1.6	116	14	4.0	.0	2.8	131	100	5
Jan. 11-20	26,900	42	8.2	198	9.5	.20	23	11	5.1	1.7	114	13	5.0	.0	2.5	129	103	9
Jan. 21-31	12,290	--	7.2	278	8.2	.10	34	15	7.2	1.5	168	15	6.0	.0	3.0	175	147	9
Feb. 1-10	11,590	--	8.2	276	7.5	.08	32	14	6.8	1.4	3/162	11	5.0	.0	3.0	162	137	4
Feb. 11-20	20,720	--	8.1	259	6.5	.05	31	14	5.0	1.0	152	13	4.5	.0	3.2	154	135	10
Feb. 21-30	27,510	48	8.3	246	6.6	.10	30	13	4.6	1.4	4/146	9.8	4.0	.1	3.0	147	126	7
Mar. 1-10	49,590	48	8.2	218	11	.01	26	9.7	3.1	1.3	120	7.2	3.5	.1	2.5	130	105	6
Mar. 11-20	30,930	48	8.2	247	8.8	.01	30	12	2.6	1.2	143	6.8	3.5	.1	2.5	140	124	7
Mar. 21-31	36,100	57	8.1	242	8.4	.01	28	12	3.2	1.0	140	5.3	3.5	.1	2.5	137	119	4

1/ Includes equivalent of 22 parts per million of carbonate (CO<sub>3</sub>).

2/ Includes equivalent of 19 parts per million of carbonate (CO<sub>3</sub>).

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

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

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

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>	
																	Total	Non-carbonate
Apr. 1-19, 1948	28,420	--	8.2	248	11	0.01	28	13	3.8	0.8	4/146	5.1	3.0	0.1	3.5	149	123	0
Apr. 20-30	21,250	50	8.1	250	7.6	.01	28	14	4.3	1.1	156	4.4	3.0	.1	1.5	144	127	0
May 1-10	14,940	55	8.4	293	7.6	.05	32	16	4.3	1.7	176	4.5	4.5	.0	2.0	168	146	1
May 11-20	24,410	70	8.3	276	7.0	.05	31	14	4.4	1.3	5/164	4.7	3.5	.1	1.5	159	135	0
May 21-31	16,870	71	8.2	288	8.0	.05	28	14	8.9	1.2	5/166	4.8	4.0	.0	1.5	163	127	0
June 1-10	10,600	76	8.0	293	8.7	.02	34	18	2.6	1.2	186	4.2	5.5	.0	2.0	168	159	6
June 11-20	14,800	77	8.1	312	7.9	.04	34	19	3.5	1.7	194	4.4	5.0	.1	2.3	180	163	4
June 21-30	43,010	76	8.2	217	12	.10	26	11	2.9	2.2	130	4.1	4.0	.1	3.1	131	110	4
July 1-10	27,500	77	8.4	260	13	.03	30	14	4.5	1.7	5/162	4.5	3.0	.0	2.7	154	132	0
July 11-20	15,940	81	8.5	278	12	.04	33	16	4.3	2.2	5/180	4.4	4.2	.1	2.0	167	148	0
July 21-31	12,940	81	8.4	295	9.4	.02	36	16	4.5	1.8	5/188	4.2	5.2	.1	1.6	173	156	1
Aug. 1-10	9,704	78	8.4	314	10	.06	38	16	7.3	.6	7/198	5.3	5.0	.0	2.4	183	161	0
Aug. 11-15	10,050	77	8.6	305	9.6	.06	35	18	5.7	.6	7/196	4.4	5.0	.1	1.6	177	161	0
Aug. 16-20	25,580	78	8.3	236	10	.06	28	9.1	8.5	.5	4/140	4.0	3.5	.0	3.2	141	107	0
Aug. 21-25	13,860	80	7.9	231	10	.08	27	10	5.9	.4	138	3.5	3.5	.1	1.8	133	108	0
Aug. 26-31	8,933	81	8.2	301	8.6	.06	34	16	7.6	.5	6/188	5.3	5.0	.0	1.1	172	151	0
Sept. 1-10	8,046	76	8.4	318	5.4	.06	32	17	15	1.2	5/208	4.5	5.5	.0	1.0	165	150	0
Sept. 11-20	7,360	74	8.3	331	6.8	.04	28	19	1.5	1.5	4/210	4.7	6.0	.0	1.0	169	144	0
Sept. 21-30	5,928	72	8.4	345	7.6	.04	28	20	16	1.5	4/214	5.2	5.5	.0	.5	192	132	0
Average	17,990	63	--	281	8.7	0.07	31	15	6.2	1.4	172	6.1	4.4	0.0	2.1	163	141	2

1/ Includes equivalent of 22 parts per million of carbonate (CO<sub>3</sub>).

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

3/ Includes equivalent of 14 parts per million of carbonate (CO<sub>3</sub>).

4/ Includes equivalent of 12 parts per million of carbonate (CO<sub>3</sub>).

5/ Includes equivalent of 18 parts per million of carbonate (CO<sub>3</sub>).

6/ Includes equivalent of 16 parts per million of carbonate (CO<sub>3</sub>).

## WHITE RIVER BASIN--Continued

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

Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	65	65	45	46	--	51	54	43	72	76	80	77
2	66	62	46	45	--	52	55	42	73	75	80	76
3	67	61	48	44	--	50	55	41	74	76	80	79
4	68	60	50	44	--	47	56	40	75	77	81	79
5	77	58	49	44	--	46	59	67	75	77	78	76
6	67	58	48	42	--	49	63	50	76	76	77	75
7	70	56	51	43	--	46	64	60	78	76	77	77
8	70	54	48	43	--	45	65	67	79	78	76	78
9	70	53	48	45	--	51	62	67	78	77	75	76
10	70	56	48	42	--	45	61	70	78	79	76	72
11	69	53	46	45	--	40	63	70	78	80	77	73
12	69	49	44	48	--	41	--	70	79	80	76	--
13	75	49	43	40	--	44	--	69	80	80	77	75
14	72	55	42	40	--	45	--	68	80	81	77	72
15	71	51	45	41	--	49	--	68	78	81	78	75
16	70	49	40	41	--	48	--	70	78	81	76	73
17	70	58	41	39	--	71	--	70	76	80	76	74
18	69	49	41	--	--	51	--	70	76	81	79	75
19	68	49	42	43	--	54	--	72	76	81	79	76
20	68	49	44	44	50	57	66	70	72	82	79	75
21	70	51	41	--	50	59	67	72	73	82	79	76
22	70	50	44	--	43	60	54	73	75	82	80	77
23	70	49	45	--	48	57	47	74	75	81	81	76
24	70	50	43	--	46	58	47	72	75	80	81	72
25	70	48	40	--	45	57	47	70	77	80	81	70
26	70	51	42	--	46	60	47	68	77	81	82	68
27	67	49	43	--	50	56	47	70	77	81	82	67
28	64	47	43	--	50	54	45	68	76	82	80	78
29	63	48	43	--	51	54	44	70	78	82	81	66
30	65	45	47	--	56	56	45	70	77	83	80	66
31	65	--	48	--	--	55	--	71	--	82	79	--
Average	69	53	45	--	--	51	--	65	76	80	79	74

## WHITE RIVER BASIN--Continued

## WHITE RIVER AT CLARENDON, ARK.

LOCATION.--At gaging station at railroad bridge at Clarendon, Monroe County, 500 feet downstream from bridge on U. S. Highway 79.

DRAINAGE AREA.--25,270 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1948.

EXTREMES 1947-48.--Dissolved solids: Maximum, 193 parts per million Oct. 1-10; minimum, 89 parts per million Mar. 1-10.

Total hardness: Maximum, 175 parts per million Oct. 11-20; minimum, 29 parts per million Mar. 1-10.

REMARKS.--Records of discharge for water year October 1947 to September 1948 furnished by Corps of Engineers. Records of specific conductance of daily samples available in district office at Fayetteville, Ark.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-foot)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>	
																	Total	Non-carbonate
Oct. 1-10, 1947----	5,846			342			31	20	12		214	3.5	5.0		2.0	193	161	0
Oct. 11-20-----	5,572			333			37	20	4.0		211	3.4	4.0		1.5	185	175	2
Oct. 21-31-----	6,405			331			33	20	7.2		1/203	3.3	6.5		1.2	187	165	0
Nov. 1-10-----	8,667			286			29	14	6.1		156	6.1	5.5		1.5	146	130	2
Nov. 11-20-----	13,450			208			20	11	6.9		116	6.7	5.0		1.5	122	95	0
Nov. 21-30-----	14,930			191			19	10	7.4		110	6.3	4.5		2.0	115	88	0
Dec. 1-10-----	12,790			239			25	13	8.0		141	8.6	5.0		2.0	138	116	0
Dec. 11-20-----	21,960			170			16	8.6	7.1		92	7.4	4.5		1.5	102	75	0
Dec. 21-31-----	20,310			178			18	9.7	6.2		103	6.6	4.0		1.8	111	84	0
Jan. 1-10, 1948----	35,520			153			12	7.3	10		78	10	3.8		2.5	102	60	0
Jan. 11-20-----	46,350			155			15	7.1	9.4		86	9.7	3.5		2.0	94	67	0
Jan. 21-31-----	26,030			156			15	7.4	9.8		90	8.5	3.5		2.0	97	68	0
Feb. 1-10-----	15,190			204			19	9.8	11		116	10	3.5		2.0	124	83	0
Feb. 11-20-----	33,130			140			11	6.2	13		76	13	2.5		1.7	99	53	0
Feb. 21-29-----	42,580			154			14	7.0	9.2		84	9.7	2.5		1.5	95	64	0
Mar. 1-10-----	67,230			112			9.4	1.2	16		46	10	10		2.5	89	29	0
Mar. 11-20-----	69,930			130			13	2.0	14		58	11	8.0		2.0	98	41	0
Mar. 21-31-----	56,130		8.1	151	6.0	0.10	15	5.4	18.7	1.6	76	4.7	8.0	0.0	2.0	91	59	0

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

Apr. 1-10 -----	55,480	173			20	7.1	8.3		96	4.4	8.8		2.0	108	75	0
Apr. 11-20 -----	50,380	163			18	6.9	5.7		83	4.1	9.0		1.0	97	73	5
Apr. 21-30 -----	38,570	184			17	8.7	9.5		160	3.8	8.0		2.0	113	78	0
May 1-10 -----	24,100	239			24	12	9.1		133	4.5	9.8		2.0	138	109	0
May 11-20 -----	22,930	251			25	12	13		146	4.9	9.8		1.0	138	112	0
May 21-31 -----	21,890	250			23	12	16		<u>2/148</u>	6.0	8.4		1.5	141	107	0
June 1-10 -----	14,970	281			30	14	12		169	7.4	8.0		1.2	156	132	0
June 11-20 -----	11,250	304			32	16	8.7		180	8.5	7.0		1.6	162	146	0
June 21-30 -----	30,660	203			18	8.2	13		111	5.8	7.0		1.4	124	183	0
July 1-10 -----	43,670	223			23	9.7	6.0		126	5.8	2.5		3.2	134	102	0
July 11-20 -----	30,230	232			26	11	4.6		132	6.2	2.8		1.9	135	110	2
July 21-31 -----	17,990	270			30	13	5.9		188	5.2	3.4		1.8	154	128	0
Aug. 1-10 -----	12,960	311			36	16	4.9		184	4.7	5.5		3.5	176	156	5
Aug. 11-15 -----	12,180	299			27	15	15		174	4.4	6.0		6.2	167	129	0
Aug. 16-20 -----	17,780	246			27	13	5.7		145	5.0	5.0		2.7	137	121	2
Aug. 21, 29-31 -----	15,330	247			31	12	8.6		155	4.9	5.8		6.2	149	127	0
Aug. 22-28 -----	22,570	200			22	8.7	8.6		117	6.4	4.2		1.3	122	91	0
Sept. 1-10 -----	9,667	314			31	15	15		<u>2/190</u>	4.9	6.5		.8	173	139	0
Sept. 11-20 -----	8,387	318			37	17	6.7		198	4.6	6.5		.8	176	162	0
Sept. 21-30 -----	7,310	328			30	19	13		203	4.3	7.2		.5	180	153	0
Average -----	25,900	228			23	11	9.4		132	6.5	5.8		2.0	133	104	0

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

## WHITE RIVER BASIN--Continued

## NORTH FORK RIVER AT NORFORK DAM NEAR NORFORK, ARK.

LOCATION.--At Norfork Dam, 4.3 miles northeast of Norfork, Baxter County.

DRAINAGE AREA.--1,806 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1946 to September 1948.

Water temperatures: October to December 1946.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1117. Records of specific conductance of daily samples available in district office at Fayetteville, Ark.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>	
																	Total	Non-carbonate
Oct. 30, 1947-----	1,430	--	8.0	321	3.0	0.00	34	21	21	3.4	207	4.1	2.0	0.1	2.0	178	171	2
Jan. 22, 1948-----	10	--	7.7	309	2.6	.01	29	22	2.1		194	4.7	2.5	.1	1.0	170	163	5
Feb. 25-----	1,330	--	7.8	318	3.2	.03	32	21	1.4		1.2 198	3.7	3.0	.0	.5	170	166	3
Mar. 23-----	4,730	--	8.3	315	3.2	.02	33	22	3.3		206	3.8	4.5	.0	1.5	176	173	4
Apr. 20-----	2,470	--	8.0	318	6.1	.02	33	22	1.4		1.2 204	3.9	3.8	.0	1.0	175	173	3
May 25-----	1,970	--	7.7	315	4.4	.03	29	22	2.8		196	4.6	4.0	.1	.9	177	162	2
June 26-----	1,690	--	8.1	318	3.2	.03	29	22	3.5		1.2 198	4.4	3.0	.0	1.0	176	163	2
July 14-----	1,500	--	7.9	320	4.0	.04	28	23	3.1		194	4.6	4.0	.0	1.2	178	160	1
Aug. 11-----	1,540	50	7.7	315	4.4	.02	33	20	6.0		.1 204	4.2	3.5	.0	1.5	179	165	0
Sept. 16-----	1,550	50	7.5	329	3.8	.04	31	22	5.9		.8 200	5.0	8.0	.0	1.7	173	168	4



WHITE RIVER BASIN--Continued  
MISCELLANEOUS ANALYSES OF STREAMS IN WHITE RIVER BASIN IN ARKANSAS  
Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-foot)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>	
																	Total	Non-carbonate
WHITE RIVER NEAR FLIPPIN																		
May 5, 1948 -----	2,770			206							1/166	3.0	6.0		0.0		57	0
Aug. 25 -----	2,180			259							159	3.0	2.8		1.8		95	0
WHITE RIVER AT CALICO ROCK																		
Apr. 21, 1948 -----	6,560			302							2/184	10	4.0		0.0		49	0
Sept. 8 -----	2,230			316							197	2.0	9.5		1.4		99	0
WHITE RIVER AT BATESVILLE																		
Apr. 23, 1948 -----	8,050			292							3/174	5.0	6.0		0.3		45	0
Sept. 22 -----	3,140			310							192	3.0	8.0		.8		102	0
WEST FORK WHITE RIVER AT GREENLAND																		
Apr. 5, 1948 -----	59			56.2							30	8.0	4.0		0.5		22	0
Apr. 11 -----	94	7.7		78.8	9.7	13	9.6	1.4	3.7	1.0	33	5.7	3.8	0.0	1.0	58	30	0
Aug. 25 -----	29			105							44	4.0	5.5		2.0		38	2
KINGS RIVER NEAR BERRYVILLE																		
Apr. 15, 1948 -----	228			194							4/266	5.0	6.0		0.4		57	0
Aug. 23 -----	178			241							146	3.0	7.0		1.1		99	0
BUFFALO RIVER NEAR ST. JOE																		
Apr. 16, 1948 -----	951			160							96	10	6.0		0.3		36	0
Aug. 24 -----	220			217							131	3.0	2.5		.2		99	0
BUFFALO RIVER NEAR RUSH																		
Apr. 20, 1948 -----	838			198							102	10	6.0		0.0		47	0
Aug. 24 -----	322			217							133	3.0	2.5		.5		97	0

1/ Includes equivalent of 16 parts per million of carbonate (CO<sub>3</sub>).2/ Includes equivalent of 10 parts per million of carbonate (CO<sub>3</sub>).3/ Includes equivalent of 8 parts per million of carbonate (CO<sub>3</sub>).4/ Includes equivalent of 16 parts per million of carbonate (CO<sub>3</sub>).

## WHITE RIVER BASIN--Continued

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

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Mean discharge (second-feet)	Temperature (' F.)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>	
																	Total	Non-carbonate
BLACK RIVER NEAR CORNING																		
Apr. 22, 1948-----	2,590			165							92	10	6.0		0.3		61	0
Sept. 9 -----	438			268							168	1.0	9.0		1.2		82	0
BLACK RIVER AT POCAHONTAS																		
Apr. 22, 1948-----	11,100			162							90	3.0	4.0		0.0		71	0
Sept. 9 -----	2,090			317							209	1.0	9.0		.9		41	0
BLACK RIVER AT BLACK ROCK																		
May 19, 1948 -----	8,100			311							195	2.0	4.0		2.9		162	2
June 23-----	9,900			274							174	2.0	4.0		2.5		91	0
Sept. 23-----	2,650			348							227	4.0	9.0		1.2		121	0
SPRING RIVER AT IMBODEN																		
Apr. 21, 1948-----	1,360			409							102	3.0	6.0		1.5		76	0
Sept. 8 -----	399			425							3/284	2.0	7.5		1.6		137	0
ELEVEN POINT RIVER NEAR ELEVENPOINT																		
Apr. 22, 1948-----	1,270			318							2/200	3.0	4.0		2.0		49	0
Sept. 9 -----	553			371							5/247	1.0	6.5		1.9		114	0
STRAWBERRY RIVER NEAR EVENING SHADE																		
June 14, 1948-----	22			420							277	3.0	3.8		0.5		128	0
Sept. 23-----	13			549							298	.6	27		.6		129	0
PINEY FORK STRAWBERRY RIVER AT EVENING SHADE																		
June 15, 1948 -----	9.8			337							220	2.0	3.5		0.8		103	0
Sept. 23-----	4.2			351							236	1.0	8.5		.3		92	0

2/ Includes equivalent of 10 parts per million of carbonate (CO<sub>3</sub>).3/ Includes equivalent of 8 parts per million of carbonate (CO<sub>3</sub>).5/ Includes equivalent of 9 parts per million of carbonate (CO<sub>3</sub>).



## ARKANSAS RIVER BASIN

## ARKANSAS RIVER AT FORT LYON, COLO.

LOCATION --Below mouth of Purgatoire River at Fort Lyon, Bent County, 5 miles east of Las Animas, Bent County.

DRAINAGE AREA --Approximately 14,500 square miles.

RECORDS AVAILABLE --Chemical analyses: January 1946 to October 1948 at Fort Lyon, January 1944 to December 1945 at Las Animas above mouth of Purgatoire River, and August 1942 to December 1943 (fragmentary, at various locations above John Martin Dam).

EXTREMES, 1947-48 --Dissolved solids: Maximum, 3,170 parts per million Sept. 21-30; minimum, 831 parts per million June 11-20, 1948.

Total hardness: Maximum, 1,650 parts per million Dec. 11, 15-19; minimum, 506 parts per million June 11-20.

EXTREMES, 1946-48 --Dissolved solids: Maximum, 3,380 parts per million May 21-31, 1946; minimum, 831 parts per million June 11-20, 1946.

Total hardness: Maximum, Dec. 11, 15-19, 1947; minimum, 465 parts per million, July 17-20, 1946.

REMARKS --Records of discharge for gaging station at Las Animas (above Purgatoire River) for water year October 1947 to September 1948 given in Water-Supply Paper 1117. Records of specific conductance of daily samples available in district office at Stillwater, Okla.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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> )	Bo-ron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Per-cent so-dium
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
Oct. 1-10, 1947	7.6		2,920	28		292	114	282			282	1,400	81		9.2		2,350	3.20		1,200	966	34
Oct. 11-20	7.5		2,320	22		240	91	206			268	1,070	57		9.2		1,830	2.49		973	754	33
Oct. 21-25, 30	7.6		2,170	20		220	84	195			268	976	55		6.9		1,690	2.30		894	675	32
Nov. 3, 5, 8-9	7.6		3,050	17		280	112	343			335	1,440	89		8.3		2,450	3.33		1,160	884	39
Nov. 18	7.7		3,150	25		316	123	333			319	1,560	88		10		2,610	3.55		1,290	1,030	36
Nov. 21, 24	7.6		2,940	20		295	116	298			313	1,430	77		9.2		2,400	3.26		1,210	956	35
Dec. 3, 6, 8-9	7.3		2,890	20		291	114	290			365	1,350	82		5.6		2,330	3.17		1,190	896	35
Dec. 11, 15-19	7.5		3,660	12		414	160	344			369	1,920	92		9.2		3,130	4.26		1,690	1,390	31
Dec. 22-28	7.5		3,500	14		389	153	341			364	1,830	92		8.9		3,010	4.09		1,600	1,300	32
Jan. 10-20, 1948	7.6		3,400	18		347	147	351			316	1,760	95		9.4		2,880	3.92		1,470	1,210	34
Jan. 21-31	7.6		3,160	19		324	135	323			315	1,610	88		9.7		2,660	3.62		1,360	1,110	34
Feb. 1-3	7.7		3,020	16		305	129	289			305	1,490	78		9.9		2,470	3.36		1,290	1,040	33
Feb. 14-17, 19-20	7.6		3,120	14		324	132	284			329	1,520	78		8.5		2,520	3.43		1,350	1,080	31
Feb. 21-29	7.6		2,760	13		286	122	250			295	1,360	70		8.2		2,260	3.07		1,220	978	31
Mar. 1-9	7.6		2,600	14		271	113	231			287	1,260	65		8.6		2,100	2.86		1,140	908	31
Mar. 11-12, 15-20	8.0		2,190	17		226	90	182			246	1,010	49		10		1,710	2.33		934	732	30
Mar. 21-31	8.0		1,960	15		195	81	162			227	881	42		11		1,500	2.04		820	634	30
Apr. 1-10	7.7		2,250	15		226	92	198			244	1,050	52		9.6		1,760	2.39		942	742	31
Apr. 11-14	7.7		2,380	13		244	99	216			280	1,130	53		5.7		1,900	2.58		1,020	786	32
Apr. 15-20	7.8		3,700	14		364	167	375			309	1,940	94		5.1		3,110	4.23		1,590	1,340	34
Apr. 21-29	7.9		3,470	18		332	140	366			278	1,780	78		9.8		2,860	3.89		1,400	1,180	36
May 1-2, 4-10	7.9		3,410	18		326	135	362			290	1,740	100		9.7		2,650	3.88		1,370	1,130	38
May 11-20	7.9		3,450	16		331	136	384			288	1,760	102		9.8		2,880	3.92		1,380	1,150	38
May 21-24	7.9		3,150	22		286	124	348			255	1,570	93		6.9		2,580	3.51		1,220	1,010	38

June 11-20 -----	7.8	1,170	16	132	43	71	198	445	22	4.7	831	1.13	506	344	23
June 21-30 -----	7.8	1,420	18	153	54	99	195	589	28	6.6	1,040	1.41	604	444	26
July 1-10 -----	7.9	2,580	20	253	104	239	248	1,230	64	5.1	2,040	2.77	1,060	856	33
July 11-16, 18-20 -----	8.0	2,940	20	284	120	268	264	1,460	78	4.4	2,390	3.25	1,200	886	35
July 21-26, 28-Aug. 2 -----	8.0	3,080	15	296	122	319	235	1,560	82	3.1	2,510	3.41	1,240	1,050	36
Aug. 4-10 -----	8.0	1,830	15	189	70	157	225	824	38	6.7	1,410	1.92	760	575	31
Aug. 11-15, 18-20 -----	7.6	2,820	17	282	114	274	254	1,400	70	4.6	2,280	3.11	1,170	894	34
Aug. 16-17 -----	7.7	1,750	19	196	65	132	239	772	59	7.2	1,340	1.82	762	566	27
Aug. 21-31 -----	7.7	2,920	18	288	121	279	272	1,430	74	7.7	2,380	3.20	1,220	893	33
Sept. 1-9 -----	7.7	3,510	22	352	143	373	307	1,600	103	8.1	2,980	4.01	1,470	1,210	36
Sept. 10-11 -----	7.9	1,670	16	169	69	135	202	752	34	2.4	1,280	1.74	705	540	29
Sept. 12-20 -----	7.8	3,440	19	345	144	352	302	1,760	95	5.7	2,870	3.90	1,450	1,210	34
Sept. 21-30 -----	7.6	3,740	18	374	158	397	317	1,950	106	8.1	3,170	4.31	1,580	1,320	35

ARKANSAS RIVER BASIN--Continued  
ARKANSAS RIVER AT CADDOA, COLO.

(Monthly composites of samples collected two to six times a month at gaging station just upstream from Caddoa Creek and 2 miles east of Caddoa, Bent County. Drainage area, 19,000 square miles.)

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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		
																	Parts per million	Tons per acre-foot	Total	Non-carbonate			
Oct. 6, 15, 22, 27, 1947-----																		2,100	2.86	1,020	876	36	
Nov. 7, 18-----		7.5		2,620	18		236	106	271		181	1,300	74		8.9			2,980	4.05	1,360	1,160	40	
Dec. 4, 8-----		7.4		3,570	13		305	146	426		240	1,850	115		2.6			2,750	3.74	1,320	1,050	38	
Jan. 8, 20, 1948---		7.6		3,410	13		295	142	376		332	1,660	95		2.8			3,880	5.28	1,800	1,580	39	
Feb. 9, 19-----		7.7		4,570	19		435	175	535		270	2,420	158		5.5			3,750	5.10	1,750	1,510	39	
Mar. 15, 19, 24, 31, Apr. 5, 8, 12-13, 22, 29-----		7.8		4,430	20		409	177	519		296	2,310	145		4.6			3,570	4.86	1,640	1,390	40	
May 3, 18-----		7.6		4,200	33		344	189	508		305	2,210	131		4.9			2,810	3.82	1,340	1,080	38	
June 20-----		7.8		3,400	23		298	146	382		325	1,700	94		6.5			1,940	2.64	1,010	814	33	
July 3, 12-----		7.9		2,400	19		224	109	231		235	1,180	59		5.8			1,430	1.94	772	624	31	
Aug. 4, 30-----		7.9		1,870	14		176	81	156		180	866	40		6.7			1,030	1.40	554	426	31	
Sept. 4, 9, 17-----		7.8		1,400	15		133	58	114		156	607	28		3.6			1,100	1.50	593	462	31	
		7.9		1,480	14		142	58	121		160	655	30		1.8			1,140	1.55	613	477	32	
		7.9		1,550	--		145	61	130		166	698	30		3.2								

## ARKANSAS RIVER BASIN--Continued

LOCATION.--At bridge on U. S. Highway 64 at Sand Springs, Tulsa County, 10 miles upstream from gaging station at Tulsa, Tulsa County. DRAINAGE AREA.--74,440 square miles (revised) above gaging station.

RECORDS AVAILABLE.--Chemical analyses: October 1946 to September 1948.

Water temperatures: October 1946 to September 1948.

EXTREMES, 1947-48.--Dissolved solids: Maximum, 4,000 parts per million Feb. 1-4; minimum, 556 parts per million Aug. 12-13.

TOTAL hardness: Maximum, 796 parts per million Feb. 1-4; minimum, 180 parts per million June 11-21, Aug. 12-13.

Water temperatures: Maximum, 88° F. Oct. 11, Aug. 2; minimum, freezing point Feb. 6, 14-15.

EXTREMES, 1946-48.--Dissolved solids: Maximum, 5,360 parts per million Oct. 12-17, 1946; minimum, 511 parts per million May 18-19, 1947.

TOTAL hardness: Maximum, 1,280 parts per million Oct. 11, 1946; minimum, 106 parts per million July 2, 1947.

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

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1117. Records of specific conductance of daily samples available in district office at Stillwater, Okla.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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>		Per cent sodium carbonate
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
Oct. 1-5, 1947	588	55	--	5,020	--	--	177	53	897		140	267	1,570	--	3.0		3,040	4.13	4,830	660	545	75
Oct. 6-10	562	58	--	6,020	--	--	217	61	1,060		140	254	1,920	--	4.0		3,590	4.88	5,450	792	670	74
Oct. 11-20	553	80	--	5,580	--	--	208	54	975		140	240	1,760	--	1.5		3,310	4.50	4,940	741	614	74
Oct. 21-31	599	69	--	5,510	--	--	190	49	980		160	240	1,720	--	1.5		3,260	4.43	5,270	676	544	76
Nov. 1-10	636	62	--	5,450	--	--	204	51	976		186	195	1,760	--	4.0		3,280	4.46	5,630	718	566	75
Nov. 11-20	653	51	--	5,330	--	--	201	49	1,020		194	202	1,800	--	4.0		3,370	4.58	5,940	703	544	76
Nov. 21-30	734	51	--	5,190	--	--	200	46	941		190	199	1,680	--	3.0		3,160	4.30	6,260	688	532	73
Dec. 1-10	1,174	53	--	5,150	--	--	190	56	865		220	218	1,540	--	7.0		2,980	4.05	9,450	704	524	73
Dec. 11-20	2,068	48	7.4	5,090	30	0.00	187	50	995	14	228	229	1,720	0.2	3.0		3,340	4.54	18,100	672	485	76
Dec. 21-31	1,201	51	--	5,100	--	--	193	53	873		236	218	1,540	--	7.0		3,000	4.08	9,730	700	506	73
Jan. 1, 4, 6, 12, 15, 1948	1,226	46	--	5,390	--	--	172	48	950		140	226	1,660	--	2.0		3,130	4.26	10,400	626	512	77
Feb. 1-4	870	38	--	6,380	--	--	227	56	1,220		240	276	2,100	--	7.0		4,000	5.44	9,400	796	611	77
Feb. 5-10	1,038	37	--	4,310	--	--	128	26	785		235	179	1,240	--	1.5		2,470	3.36	6,920	422	229	80
Feb. 11-20	1,009	34	--	4,330	--	--	122	25	783		211	179	1,240	--	2.5		2,460	3.35	6,700	408	231	81
Feb. 21-29	2,096	41	--	4,330	--	--	120	24	788		216	178	1,240	--	1.5		2,460	3.35	13,900	398	224	81
Mar. 1-10	11,560	41	--	3,730	--	--	98	27	650		144	175	1,040	--	3.5		2,060	2.80	64,300	356	238	80
Mar. 11-20	5,464	46	--	3,740	--	--	96	28	651		145	176	1,040	--	2.2		2,060	2.80	30,400	354	236	80
Mar. 21-31	10,110	65	7.2	3,740	11	20	105	29	667	28	150	182	1,100	.1	5.0		2,200	2.99	60,100	381	258	78
Apr. 1-10	3,799	63	--	3,430	--	--	133	45	535		175	249	905	--	3.0		1,960	2.67	20,100	517	374	69
Apr. 11-20	2,254	60	--	3,420	--	--	129	39	544		179	244	895	--	3.0		1,940	2.64	11,800	482	336	71
Apr. 21-30	5,314	65	--	3,420	--	--	131	39	538		176	246	890	--	4.0		1,930	2.62	27,700	488	344	71
May 1-10	2,556	64	--	3,460	--	--	136	37	531		172	233	890	--	8.0		1,920	2.61	13,300	492	350	70
May 11-20	5,555	68	--	3,570	--	--	137	40	560		174	213	960	--	7.0		2,000	2.72	30,000	506	364	71
May 21-30	2,193	75	--	3,550	--	--	140	40	546		174	199	955	--	5.0		1,970	2.66	11,700	514	372	70

L/ Includes equivalent of 6 parts per million of carbonate (CO<sub>3</sub>). 2/ Includes equivalent of 12 parts per million of carbonate (CO<sub>3</sub>).

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

Date of collection	Mean discharge (second-feet)	Temperature (°F.)	pH	Specific conductance (micro-mhos at 25° C.)	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
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
June 1-10, 1948-----	1,915	56	--	1,180	--	--	58	10	169		117	72	270	--	0.0		694	0.94	3,590	186	90	66
June 11-21-----	1,078	63	--	1,180	--	--	56	10	173		112	71	275	--	2.5		700	.95	2,030	180	88	68
June 22-30-----	39,430	67	--	1,170	--	--	58	12	182		116	67	270	--	.0		708	.96	75,400	194	99	64
July 1-10-----	30,100	71	--	1,390	--	--	68	14	206		146	84	330	--	.0		950	1.16	69,100	227	106	66
July 11-20-----	40,590	70	--	1,440	--	--	80	19	207		152	89	335	--	12		848	1.15	92,900	278	153	82
July 21-31-----	31,850	75	8.2	1,440	13	0.05	72	17	216	11	156	87	360	0.4	6.0		860	1.17	74,000	230	120	64
Aug. 1-3, 9-10-----	11,870	83	--	1,660	--	--	72	16	264		158	102	410	--	8.0		962	1.31	30,800	246	116	70
Aug. 4-8-----	7,438	74	--	2,560	--	--	116	26	392		197	147	660	--	8.0		1,450	1.97	29,100	396	235	66
Aug. 11, 14-20-----	36,950	84	--	2,040	--	--	84	15	325		135	137	510	--	8.0		1,140	1.55	114,000	271	160	72
Aug. 12-13-----	17,000	83	--	927	--	--	56	10	135		91	88	215	--	7.0		556	.76	25,500	180	106	62
Aug. 21-31-----	12,190	85	--	2,530	--	--	115	25	339		179	193	625	--	8.0		1,440	1.96	47,400	390	244	66
Sept. 1-10-----	4,936	75	--	3,460	--	--	158	40	529		197	221	930	--	5.5		1,960	2.69	26,400	558	397	67
Sept. 11-20-----	3,252	77	--	3,450	--	--	160	39	525		199	222	925	--	4.0		1,970	2.68	17,300	560	396	67
Sept. 21-30-----	2,752	72	--	3,470	--	--	158	42	526		198	224	930	--	4.5		1,960	2.69	14,700	566	404	67



ARKANSAS RIVER BASIN--Continued  
 ARKANSAS RIVER AT SAND SPRINGS BRIDGE NEAR TULSA, OKLA.--Continued  
 Temperature (° F.) of water, water year October 1947 to September 1948

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

ARKANSAS RIVER BASIN--Continued  
ARKANSAS RIVER AT VAN BUREN, CRAWFORD COUNTY, 1½ MILES DOWNSTREAM FROM LEE CREEK.

LOCATION.--At gaging station at bridge on U. S. Highway 64 at Van Buren, Crawford County, 1½ miles downstream from Lee Creek.

DRAINAGE AREA.--150.218 square miles (revised).

RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1948.

Water temperatures: October 1945 to September 1948.

EXTREMES, 1947-48.--Dissolved solids: Maximum, 1,340 parts per million Nov. 22-23, 29-30; minimum, 243 parts per million July 21-23, 29-31.

Total hardness: Maximum, 360 parts per million Nov. 22-23, 29-30; minimum, 87 parts per million Jan. 4-9.

Water temperatures: Maximum, 84° F. June 16, 19-21, July 14, Aug. 23-24; minimum, freezing point Jan. 30.

EXTREMES, 1945-48.--Dissolved solids: Maximum, 1,610 parts per million Oct. 21-24, 1946; minimum, 217 parts per million May 21, 24-26, 28-30, 1946.

Total hardness: Maximum, 359 parts per million Dec. 21-31, 1946; minimum, 79 parts per million May 12-13, 16-18, 1946.

Water temperatures: Maximum, 87° F. Aug. 1, 1946; minimum, freezing point Jan. 30, 1947.

REMARKS.--Records of water discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1117. Records of specific conductance of daily samples available in district office at Fayetteville, Ark.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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 non-carbonate
																	Parts per million	Tons per acre-foot	Tons per day	Total		
Oct. 1-5, 1947 -----	4,538	68		2,100			65	24	337		130	57	588		2.8		1,110	1.51	13,600	260	154	73
Oct. 6-10 -----	4,000	72		1,360			48	16	191		134	57	305		2.0		754	1.03	8,140	186	76	69
Oct. 11-12, 17-19 --	4,882	74		1,630			74	22	217		150	65	392		2.8		942	1.28	12,400	275	152	59
Oct. 13-16, 20 -----	5,342	72		1,260			54	21	158		131	55	282		3.5		723	.98	10,400	222	114	61
Oct. 21-25, 31 -----	5,403	70		888			38	10	119		111	37	187		2.0		516	.70	7,530	136	45	66
Oct. 26-30 -----	6,016	66		1,300			46	16	184		1/130	47	300		3.8		778	1.06	12,600	181	75	69
Nov. 1-10 -----	4,474	60		2,050			61	22	310		1/151	63	515		2.5		1,050	1.43	12,700	242	119	73
Nov. 11-20 -----	5,263	52		1,580			68	19	215		2/178	56	360		3.0		882	1.20	12,500	248	102	65
Nov. 21, 24-28 -----	6,450	50		1,680			56	19	243		113	46	428		2.0		936	1.27	16,300	218	125	70
Nov. 22-23, 29-30 --	5,608	51		2,620			100	27	376		123	55	722		2.2		1,340	1.82	20,300	360	260	69
Dec. 1, 3, 5, 7 -----	3,940	52		1,340			84	20	188		212	47	335		5.5		894	1.22	9,510	292	118	62
Dec. 2, 4, 6 -----	3,247	52		2,130			100	24	342		144	53	650		2.5		1,240	1.69	10,900	348	230	68
Dec. 8-10 -----	17,370	51		704			30	8.3	94		64	29	162		2.5		401	.55	18,800	109	57	65
Dec. 11-13, 18-20 --	10,150	45		1,170			50	13	172		92	42	306		2.5		703	.96	19,300	178	103	68
Dec. 14-17, 28 -----	9,390	42		1,770			72	17	283		108	61	505		2.0		983	1.33	23,200	250	161	71
Dec. 21-27, 31 -----	5,286	44		1,170			68	17	157		3/160	55	276		3.2		722	.98	10,300	240	108	59
Dec. 28-30 -----	3,947	44		1,700			82	20	270		144	80	475		2.5		1,000	1.36	10,700	286	169	67
Jan. 1-3, 10, 1948 --	30,160	42		870			37	8.0	112		3/72	25	200		2.0		509	.69	41,500	126	66	66
Jan. 4-9 -----	23,020	45		581			25	6.0	73		4/48	17	132		2.0		358	.49	22,300	87	48	65
Jan. 11-13, 16-18 --	6,615	41		1,100			58	12	169		4/122	36	300		1.5		710	.97	12,700	194	94	65
Jan. 14-15, 19-20 --	6,113	39		1,860			81	18	277		4/122	62	505		2.0		1,000	1.37	16,600	276	176	69
Jan. 21-23, 28 -----	4,535	38		1,440			69	18	205		4/142	57	365		2.0		865	1.20	10,800	246	130	65
Jan. 24-27, 29-31 --	4,334	35	7.7	1,990	8.0	0.30	88	20	295	15	4/152	72	540	0.1	1.5		1,110	1.52	13,000	302	177	47

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

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

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

4/ Includes equivalent of 12 parts per million of carbonate (CO<sub>3</sub>).

Feb. 1-6-----	6,468	39	1,640	73	14	225	134	50	400	2.5	961	1.31	16,800	240	130	67
Feb. 7-10-----	18,750	38	1,100	42	12	153	68	34	275	3.0	624	.85	31,600	154	99	67
Feb. 11-15-----	13,830	45	1,020	41	9.6	144	70	32	270	2.0	601	.82	22,400	142	85	70
Feb. 12-14-----	14,380	39	1,380	49	12	208	78	35	370	2.0	806	1.10	30,700	172	106	73
Feb. 12-26-----	10,480	46	1,560	62	13	233	92	43	420	1.2	921	1.25	26,100	200	133	71
Feb. 27-29-----	65,170	55	814	36	6.1	111	78	25	188	1.5	488	.66	85,900	115	51	63
Mar. 1-5-----	73,000	50	770	37	7.6	99	3/80	26	174	2.5	441	.60	86,900	124	59	64
Mar. 6-10-----	52,460	47	1,290	54	11	193	108	62	315	2.5	747	1.02	106,000	131	92	70
Mar. 11-20-----	33,180	47	86	48	9.6	163	86	52	275	2.0	667	.91	59,800	160	79	69
Mar. 21-24, 26-----	62,240	60	1,120	48	10	171	5/114	55	235	2.5	660	.90	111,000	161	91	70
Mar. 25, 27-31-----	66,820	57	810	44	7.9	108	5/114	40	170	2.5	470	.64	84,800	143	49	62
Apr. 1-5-----	26,920	59	891	50	9.8	104	109	64	167	1.5	512	.70	37,200	166	76	58
Apr. 6-10-----	17,420	65	1,130	61	13	149	123	85	240	1.5	661	.90	31,100	206	105	61
Apr. 11-16-----	27,820	65	1,747	37	8.3	90	76	44	151	1.0	423	.58	31,800	127	64	61
Apr. 17-20-----	14,920	67	1,420	54	13	146	102	69	248	1.3	641	.87	25,800	189	105	63
Apr. 21, 27, 30-----	13,370	70	1,200	56	15	160	112	68	273	1.8	682	.93	35,700	201	109	63
Apr. 22-26, 28-29-----	13,530	71	1,480	70	18	205	126	90	352	1.0	855	1.16	31,200	249	145	64
May 1-2, 7-11-----	17,590	70	1,390	64	14	201	125	70	338	2.0	814	1.11	38,700	217	115	67
May 3-6-----	11,920	70	1,600	62	16	238	114	69	405	2.0	927	1.26	29,800	221	127	70
May 12-17-----	50,160	69	1,060	47	12	150	96	45	260	2.0	601	.82	81,400	167	89	66
May 18-20-----	35,770	74	605	31	6.7	82	79	30	131	2.0	362	.49	35,000	105	40	62
May 21-27-----	19,270	75	758	41	9.2	97	93	42	163	1.5	456	.62	23,700	141	65	60
May 28-31-----	19,950	72	1,220	55	14	175	98	41	318	3.5	728	.99	39,200	195	115	66
June 1-2, 6-10-----	10,110	80	1,170	44	13	176	118	53	279	1.3	676	.92	18,500	164	67	70
June 3-5-----	15,330	77	1,820	61	19	293	109	50	513	3.3	993	1.35	41,100	230	141	73
June 11, 19-20-----	7,767	83	1,460	53	17	232	120	73	375	3.5	859	1.17	18,000	203	104	71
June 12-18-----	6,500	82	1,220	57	14	168	112	65	286	1.5	725	.99	12,700	200	108	65
June 21-24-----	71,500	80	1,170	56	14	158	122	57	270	1.5	666	.91	129,000	197	97	63
June 25-30-----	273,200	76	414	37	8.6	34	108	28	59	1.5	256	.35	189,000	128	39	37

3/ Includes equivalent of 8 parts per million of carbonate (CO<sub>3</sub>).  
5/ Includes equivalent of 22 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 1947 to September 1948--Continued

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> ) (Fe)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (ft)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium
																Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
July 1-6, 1948-----	106,000	77		579			36	6.0		72	108	36	103		2.0	330	0.45	166,000	114	26	58
July 7-10-----	71,300	81		975			46	8.8		132	121	49	208		2.5	564	.77	109,000	158	59	65
July 11-13-----	66,300	83		1,080			46	10		162	113	48	258		2.1	641	.87	115,000	156	64	69
July 14-20-----	103,400	83		547			36	6.0		63	96	32	97		2.1	314	.43	87,600	114	36	54
July 21-23, 29-31-----	136,300	83		402			31	5.2		45	100	28	59		1.9	243	.33	89,400	99	17	50
July 24-28-----	141,800	83		555			41	6.3		59	104	34	95		2.0	324	.44	124,000	129	44	50
Aug. 1-8-----	77,690	79		427			36	6.6		42	106	30	63		2.3	253	.34	53,100	117	30	44
Aug. 9, 16-18-----	113,600	76		538			25	7.2		75	91	36	101		1.8	308	.42	94,500	92	18	64
Aug. 10-12, 14-15, 19-20-----	76,040	79		708			42	7.8		88	104	40	142		2.3	409	.56	84,000	137	52	58
Aug. 13, 21-22-----	59,033	81		873			48	10		114	117	60	177		.9	496	.67	79,100	161	65	61
Aug. 26-29-----	22,450	82		1,410			66	15		212	3/140	125	312		1.2	842	1.15	51,000	226	111	67
Aug. 23-25, 30-31-----	29,480	83		1,190			60	13		175	133	113	252		1.8	690	.94	54,900	203	94	65
Sept. 1-3, 8-----	14,120	82		1,370			74	16		189	2/164	98	300		2.5	732	1.08	30,200	250	116	62
Sept. 4-7, 9-10-----	11,890	80		1,610			88	17		225	170	111	370		2.0	884	1.27	30,000	290	150	63
Sept. 11-14, 20-----	9,992	75		1,540			77	18		218	163	105	350		3.0	934	1.20	23,800	266	132	64
Sept. 15-19-----	10,160	75		1,220			63	14		175	142	80	280		1.0	697	.95	19,100	214	98	64
Sept. 21-24, 26-27-----	7,333	76		1,590			76	18		230	141	93	388		3.5	891	1.21	17,600	264	148	65
Sept. 25, 28-30-----	6,678	69		1,900			79	19		288	146	98	478		1.5	1,030	1.40	18,600	275	156	69
Weighted average-----	34,910	--		795			43	9.1		104	105	42	170		2.0	463	0.63	43,600	145	59	57

2/ Includes equivalent of 9 parts per million of carbonate (CO<sub>3</sub>).3/ Includes equivalent of 8 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 1947 to September 1948

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

## ARKANSAS RIVER BASIN--Continued

## ARKANSAS RIVER AT LITTLE ROCK, ARK.

LOCATION.--At gaging station on Missouri Pacific Railroad bridge at Little Rock, Pulaski County.

DRAINAGE AREA.--57,933 square miles (revised). 1945 to September 1948.

RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1948.

Water temperatures: 1947-48.--Dissolved solids: Maximum 1,270 parts per million Nov. 29-30; minimum, 206 parts per million Jan. 11-14.

EXTREMES, 1947-48.--Dissolved solids: Maximum 314 parts per million Oct. 11-16; minimum, 48 parts per million Jan. 11-14.

Water temperatures: Maximum, 86° F. June 14; minimum, freezing point Jan. 28-29, 1946; minimum, 187 parts per million Dec. 11-20, 1946.

EXTREMES, 1945-48.--Dissolved solids: Maximum, 1,730 parts per million Oct. 24-29, 1946; minimum, 48 parts per million Jan. 11-14, 1948.

Total hardness: Maximum, 406 parts per million Aug. 3-5, 1947; minimum, freezing point Jan. 28, 1948.

Water temperatures: Maximum, 91° F. Aug. 6, 9, 1947; minimum, 48 parts per million Jan. 28, 1948.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1117. Records of specific conductance of daily samples available in district office at Fayetteville, Ark.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium carbonate	
																Parts per million	Tons per acre-foot	Tons per day	Total			
Oct. 1-5, 1947	6,346	72		1,110			56	19		139	116	56	258		2.2		646	0.88	11,100	218	123	58
Oct. 6-10	5,366	74		1,740			80	20	238		147	60	435		3.0		956	1.30	13,900	282	161	65
Oct. 11-16	4,538	74		1,850			88	23	247		158	58	465		3.0		962	1.31	11,800	314	185	63
Oct. 17-20	4,226	74		1,300			70	26	146		162	53	290		2.8		738	1.00	8,490	282	149	53
Oct. 21-28	6,826	72		1,340			69	18	176		1/151	56	315		3.8		773	1.05	13,800	246	122	61
Oct. 29-31	6,793	67		842			42	12	108		103	34	190		1.8		477	.65	8,750	154	70	60
Nov. 1-3, 6-7	6,658	61		1,120			58	16	137		2/129	44	252		.8		618	.84	11,100	210	105	58
Nov. 4-5, 8-10	6,250	57		1,470			64	18	201		124	42	372		2.2		821	1.12	13,900	234	132	65
Nov. 11-15	6,130	52		1,660			71	18	239		124	46	440		1.2		947	1.29	15,700	251	150	67
Nov. 16-20	7,756	50		1,190			50	14	160		114	37	282		1.0		658	.89	13,800	182	89	43
Nov. 21-22, 25-27	9,274	50		1,130			49	13	155		111	37	270		1.5		624	.85	15,600	176	85	55
Nov. 23-24, 28	8,693	49		1,540			66	18	198		119	23	388		1.5		831	1.13	19,500	238	141	64
Nov. 29-30	8,450	49		2,280			84	22	367		107	91	648		1.5		1,270	1.73	29,000	300	213	74
Dec. 1-6	6,097	50		1,420			55	16	133		102	35	355		1.0		780	1.06	12,800	203	120	67
Dec. 7-10	17,060	50		912			38	10	118		77	22	217		1.2		498	.68	22,900	136	73	64
Dec. 11-12, 19-21	30,940	43		827			27	8.3	122		59	25	206		1.5		454	.62	37,900	102	53	72
Dec. 13-18	26,300	42		510			20	5.6	69		49	16	118		1.0		297	.40	21,000	74	34	67
Dec. 22-31	12,720	45		654			26	8.0	86		66	27	146		1.0		374	.51	12,800	163	49	64

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

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

Jan. 1-2, 5-6-----	59,750	43	540	28	6.6	70	72	23	116	2.5	331	45	53,400	97	38	61
Jan. 3-4, 7-10-----	63,950	43	328	14	5.7	52	62	20	70	2.5	209	28	36,100	59	8	66
Jan. 11-14-----	29,880	43	21	12	4.3	53	62	17	309	2.2	206	28	16,600	48	0	71
Jan. 15-17-----	21,770	40	623	25	6.6	93	66	21	152	1.5	388	53	22,800	90	36	69
Jan. 18-20-----	13,400	36	1,090	22	9.8	165	80	32	280	2.0	641	87	23,200	145	72	72
Jan. 21-31-----	9,375	58	1,310	58	9.6	193	114	44	325	2.0	769	1.05	19,500	180	85	71
Feb. 1-7-----	10,380	38	1,150	54	14	154	112	44	275	1.5	695	95	19,500	193	101	63
Feb. 8-10-----	35,100	38	594	26	7.2	75	52	23	134	2.0	344	47	32,600	94	52	63
Feb. 11-13, 17-20---	35,590	42	648	22	7.2	86	40	23	152	1.5	369	50	35,500	84	52	60
Feb. 14-16-----	36,470	41	452	17	5.6	58	32	20	102	1.5	258	35	25,400	65	40	66
Feb. 21-25-----	24,740	42	606	22	6.8	79	42	21	140	2.0	358	49	23,900	83	49	67
Feb. 26-29-----	85,750	54	400	14	5.3	54	40	18	86	1.5	247	34	57,200	57	24	67
Mar. 1-7-----	125,000	48	471	18	6.1	62	62	20	94	1.5	281	36	94,800	70	19	66
Mar. 8-10-----	97,870	45	693	30	7.7	93	74	30	152	2.5	405	55	107,000	106	46	65
Mar. 11-20-----	61,430	49	796	34	9.1	104	74	41	178	1.5	445	61	73,800	129	63	64
Mar. 21, 24-26-----	71,920	61	900	35	9.3	130	82	42	210	1.5	597	72	102,000	125	59	69
Mar. 22-23, 27-31---	81,460	58	719	34	8.0	89	82	32	154	2.0	417	57	91,700	118	51	60
Apr. 1-10-----	37,820	64	748	40	8.9	93	96	52	145	2.6	480	58	43,900	137	58	60
Apr. 11-14-----	57,200	66	612	30	7.4	81	78	49	116	3.4	332	48	54,400	106	42	62
Apr. 15-20-----	56,520	68	403	29	5.8	53	51	33	79	1.9	235	32	33,900	74	32	61
Apr. 21-25-----	28,020	72	618	32	8.1	79	71	43	129	1.3	332	48	26,000	114	56	60
Apr. 26-30-----	19,220	74	923	46	11	116	92	60	134	.8	326	72	27,300	161	85	61
May 1-8, 10-----	27,520	73	1,110	58	12	156	105	57	273	2.5	665	93	50,900	194	108	64
May 9, 11-18-----	46,010	73	896	41	9.0	115	83	39	197	3.3	486	66	63,000	140	72	64
May 19-27-----	35,470	76	325	27	7.3	69	80	30	105	2.3	310	42	29,700	97	32	61
May 28-31-----	27,720	76	725	40	8.8	90	90	41	151	3.4	435	59	32,600	136	62	59
June 1-8-----	18,360	81	1,190	60	13	167	106	41	308	2.6	702	95	34,800	203	116	64
June 9-11-----	12,500	84	1,690	74	17	233	121	48	463	2.0	983	1.34	33,200	255	156	68
June 12-19-----	9,742	85	1,150	60	14	163	137	54	278	1.3	674	92	17,700	207	94	63
June 20-25-----	20,460	84	923	41	12	128	103	51	207	1.4	536	73	29,600	152	68	65
June 26-30-----	246,200	78	466	36	7.9	49	118	27	72	2.0	269	37	179,000	122	26	46

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

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1949--Continued																						
Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
July 1-3, 1948-----	245,300	79		411			30	5.6		47	116	25	54		3.5		238	0.32	158,000	98	3	51
July 4-10, -----	162,800	81		627			39	5.9		79	118	32	115		3.0		358	.49	157,000	122	26	59
July 11-16, -----	70,130	84		1,000			50	9.4		140	126	46	223		2.8		573	.78	108,000	164	60	65
July 17-20, -----	94,880	85		567			32	5.7		75	108	30	102		3.0		326	.44	83,500	104	15	61
July 21-25, 31-----	137,200	84		435			30	5.2		51	110	24	64		3.0		260	.35	96,300	96	6	53
July 26-30, -----	140,000	85		552			26	5.8		80	113	30	96		3.5		318	.43	120,000	89	0	60
Aug. 1-10, -----	87,680	82		425			32	5.5		47	114	25	59		2.8		253	.34	59,900	102	9	50
Aug. 11-12, 18, 20-----	56,180	81		506			32	5.1		68	114	26	90		2.2		289	.39	67,200	101	8	60
Aug. 13-17, 19, -----	79,670	82		642			31	6.3		90	106	33	125		2.0		370	.50	79,600	104	16	65
Aug. 21-24, -----	86,450	85		665			34	6.3		92	111	39	126		2.5		379	.52	88,500	111	20	64
Aug. 25-28, -----	40,380	84		984			34	9.2		131	121	71	200		2.5		576	.78	82,800	173	74	82
Aug. 29-31, -----	30,270	84		1,240			61	11		173	132	85	265		3.0		701	.95	57,300	197	89	66
Sept. 1-2, 8-10-----	20,360	82		1,320			72	14		184	156	94	290		1.5		766	1.04	42,100	237	109	63
Sept. 3-7, -----	21,120	83		1,190			72	13		165	156	91	260		2.5		692	.94	39,500	233	105	61
Sept. 11-12, 15-16, -----																						
Sept. 19-20, -----	12,030	80		1,430			72	16		209	178	97	320		2.5		816	1.11	26,500	246	100	65
Sept. 13-14, 17-18-----	11,980	80		1,590			94	18		217	188	105	365		2.0		912	1.24	29,500	308	154	60
Sept. 21, 28-30-----	9,538	72		1,430			67	17		209	167	86	335		1.2		800	1.09	20,600	237	108	66
Sept. 22-27, -----	9,085	78		1,170			62	14		167	156	77	260		.5		662	.90	16,200	212	84	63
Weighted average----	44,710	--		658			34	7.6		87	97	34	134		2.4		382	0.52	46,100	117	38	60



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

Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	71	63	47	43	35	51	59	75	77	79	84	84
2	72	63	48	44	37	51	60	76	78	79	85	84
3	72	63	49	45	38	51	60	72	79	78	84	83
4	72	62	52	44	39	48	63	73	80	79	83	83
5	72	60	52	43	40	46	64	73	82	76	82	82
6	73	60	52	42	39	46	66	71	82	78	85	82
7	74	54	53	43	39	46	68	72	84	82	80	84
8	75	55	51	40	38	45	69	72	83	82	78	82
9	75	55	49	41	38	46	66	72	84	83	79	79
10	74	55	48	45	39	45	64	73	84	84	78	83
11	74	52	45	44	38	42	67	74	85	84	79	79
12	75	52	44	44	38	43	68	72	86	84	80	79
13	74	51	44	42	37	45	63	72	85	85	81	78
14	75	51	43	42	40	46	65	72	88	86	83	83
15	74	52	42	43	41	48	65	72	97	95	81	80
16	74	52	41	39	43	50	67	73	83	82	82	80
17	74	50	42	37	43	49	68	73	84	83	83	80
18	74	49	42	35	46	51	69	76	84	83	82	80
19	74	48	42	37	48	56	70	76	82	86	82	80
20	74	50	43	37	45	59	70	77	85	85	83	81
21	74	50	43	39	42	60	72	78	85	85	84	82
22	74	51	42	39	41	59	72	79	86	83	85	83
23	74	48	43	34	41	60	71	76	83	83	84	81
24	74	49	42	43	43	61	73	77	83	83	85	80
25	--	--	42	35	45	62	72	74	83	84	85	76
26	70	50	43	33	55	62	73	73	77	83	85	74
27	70	49	45	33	53	58	75	73	77	84	83	72
28	70	49	45	--	54	57	75	74	77	85	84	69
29	68	50	47	31	54	58	75	77	78	86	84	68
30	68	48	45	33	--	57	74	77	79	86	85	70
31	67	--	52	36	--	59	--	78	--	85	84	--
Average	73	53	46	39	42	52	68	74	82	83	83	79

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

LOCATION.--At gaging station at bridge on county highway, 6½ miles northeast of Mokane, Beaver County, and 13 miles upstream from Crooked Creek.  
DRAINAGE AREA.--8,743 square miles (revised).

RECORDS AVAILABLE.--Chemical analyses: October 1946 to September 1948.

Water temperatures: October 1946 to September 1948.

EXTREMES, 1947-48.--Dissolved solids: Maximum 2,010 parts per million Jan. 1-3; minimum, 496 parts per million Aug. 11-12, 14-16.  
Total hardness: Maximum 580 parts per million Jan. 1-3; minimum, 207 parts per million Aug. 11-12, 14-16.

Water temperatures: Maximum 78° F. Aug. 3, 29; minimum, freezing point on many days in winter months.  
EXTREMES, 1946-48.--Dissolved solids: Maximum 2,010 parts per million Jan. 1-3, 1948; minimum, 435 parts per million Oct. 6, 8-11, 17, 1946.

Total hardness: Maximum 580 parts per million Jan. 1-3, 1948; minimum, 162 parts per million Nov. 5, 1946.  
Water temperatures: Maximum 78° F. Aug. 3, 29, 1948; minimum, freezing point on many days in winter months.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1117. Records of specific conductance of daily samples available in district office at Stillwater, Okla.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Tem- per- ature (° F.)	pH	Specific conduct- ance (micro- mhos at 25° C.)	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> )	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	
																	Tons per million	Tons per acre- foot	Tons per day	Total		Non-carbon- ate
Oct. 1-10, 1947----	32.7	59		2,610		75	41	444			1,215	198	665		2.0		1,530	2.08	135	356	179	73
Oct. 11-20-----	48.7	57		2,520		80	41	429			1,222	199	645		2.0		1,510	2.05	199	368	186	72
Oct. 21-31-----	46.9	49		2,460		80	41	408			2,231	181	620		3.0		1,450	1.97	184	368	178	71
Nov. 1-10-----	54.2	39		2,330		83	42	356			1,238	174	550		3.0		1,330	1.81	195	380	184	67
Nov. 11-20-----	77.9	37		2,450		92	40	360			2,257	180	550		3.5		1,350	1.84	284	394	184	67
Nov. 21-30-----	86.0	34		2,380		103	41	350			3,274	176	550		4.0		1,360	1.85	316	425	201	64
Dec. 1-10-----	119	36		2,450		90	39	380			251	178	580		4.0		1,390	1.89	447	385	180	58
Dec. 11-20-----	68.3	32		2,590		96	42	407			274	186	620		5.0		1,490	2.03	275	412	188	68
Dec. 21-31-----	90.5	33		2,330		90	38	378			258	202	550		5.0		1,390	1.89	340	380	169	68
Jan. 1-3, 1948----	55.3	32		3,460		137	58	536			360	251	840		7.0		2,010	2.73	300	560	286	77
Jan. 4-10-----	116	33		2,280		92	38	371			258	219	530		6.0		1,380	1.88	432	386	174	68
Jan. 11-20-----	47.3	33		2,590		104	41	408			286	207	610		7.0		1,520	2.07	194	428	194	67
Jan. 21-25-----	19.4	32		2,580		108	42	404			306	195	610		7.0		1,520	2.07	80	442	191	67
Jan. 26-31-----	34.8	32		3,180		127	52	506			360	242	765		6.0		1,880	2.56	177	531	236	67
Feb. 1-10-----	82.0	32		2,570		95	40	397			260	186	605		5.0		1,460	1.99	323	402	188	68
Feb. 11-20-----	91.3	33		2,450		92	38	371			248	175	570		5.0		1,370	1.86	338	366	182	68
Feb. 21-23, 26-----	53.0	36		2,420		97	37	366			4,263	173	560		5.0		1,370	1.86	196	394	178	67
Feb. 24-25, 27-29----	221	39		2,080		85	31	310			234	156	465		5.0		1,170	1.59	698	340	148	67
Mar. 1-12-----	60.8	32		2,250		60	39	359			174	176	540		3.0		1,260	1.71	207	310	168	72
Mar. 13-20-----	128	45		2,000		45	37	321			113	163	495		3.0		1,120	1.52	387	264	172	73
Mar. 21-31-----	62.3	42		2,110		53	36	342			144	177	510		2.0		1,190	1.62	200	280	162	73

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

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

4/Includes equivalent of 14 parts per million of carbonate (CO<sub>3</sub>).



## LOWER MISSISSIPPI RIVER BASIN

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

Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	56	42	38	32	32	32	36	62	66	68	68	74
2	55	50	45	32	32	32	42	60	67	71	73	70
3	60	44	38	32	32	32	45	53	65	69	78	68
4	54	42	32	32	32	32	53	54	64	71	65	68
5	62	38	32	32	32	32	48	54	68	72	65	68
6	62	41	38	32	32	32	51	49	70	68	66	69
7	61	32	38	32	32	32	48	57	69	72	72	67
8	60	34	32	35	32	32	44	57	69	72	72	58
9	56	38	32	36	32	32	47	55	77	70	68	59
10	60	32	32	33	32	32	60	50	69	75	75	60
11	62	32	32	36	32	--	50	48	68	69	75	64
12	58	32	32	38	32	--	46	50	71	74	70	63
13	54	34	32	32	32	34	43	54	67	69	71	61
14	60	40	32	32	32	33	52	67	68	73	69	61
15	56	34	32	32	32	37	52	61	68	68	74	63
16	58	34	32	32	33	38	59	56	68	69	72	63
17	59	39	32	32	34	37	60	65	74	69	71	62
18	57	40	32	32	36	43	55	66	89	72	70	70
19	56	41	32	32	36	43	57	60	60	74	68	71
20	54	43	32	32	32	45	63	63	71	67	67	70
21	54	33	34	32	32	43	54	64	70	72	69	69
22	56	32	34	34	32	43	60	67	66	74	72	67
23	46	34	32	32	36	41	58	71	64	68	70	66
24	48	32	32	32	36	45	63	65	68	75	68	64
25	47	34	32	32	37	53	48	61	66	74	69	61
26	46	33	34	32	44	42	54	58	68	74	70	55
27	44	42	33	32	33	42	55	64	64	75	70	51
28	--	34	32	32	39	36	54	61	64	76	--	50
29	53	35	32	--	38	41	54	64	66	72	78	50
30	50	32	36	--	32	49	55	69	66	71	71	50
31	48	--	32	32	--	38	--	64	--	68	72	--
Average	55	37	34	33	34	38	52	60	67	71	70	63

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

LOCATION.--At gaging station at bridge on county highway, 2½ miles northeast of Drummond, Garfield County, 2½ miles downstream from Clear Creek, and 9 miles southeast of Enid, Garfield County.

DRAINAGE AREA.--248 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1948.

Water temperatures: October 1947 to September 1948.

EXTREMES 1947-48.--Dissolved solids: Maximum, 3,390 parts per million Feb. 17-23; minimum, 79 parts per million Aug. 9-10.

Total hardness: Maximum, 938 parts per million Feb. 17-23; minimum, 36 parts per million Aug. 9-10;

Water temperatures: Maximum, 92° F July 26; minimum, 34° F Jan. 14.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1117. Records of specific conductance of daily samples available in district office at Stillwater, Okla.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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 non-carbonate	
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate		
Oct. 28-31, 1947	0.20	66	--	3,820	--	--	104	100	581		249	212	1,070	--	0.5			2,190	2.98	1.2	642	466	65
Nov. 1-10	.06	49	--	3,320	--	--	90	85	505		1/312	194	860	--	2.5			1,890	2.57	.3	574	318	66
Nov. 11-20	.25	44	--	2,700	--	--	97	69	390		2/353	154	665	--	2.5			1,550	2.11	1.0	526	236	61
Nov. 21-30	.10	46	8.2	2,530	6.0	0.10	96	60	378	12	3/382	136	615	0.3	1.0			1,490	2.03	.4	486	172	62
Dec. 1-4	11.2	48	--	2,410	--	--	85	55	357		335	141	560	--	3.5			1,370	1.86	41	438	164	64
Dec. 5	227	41	--	187	--	--	--	--	--	--	47	7.8		--	3.0			--	--	--	38	--	--
Dec. 6	32.0	43	--	374	--	--	--	--	--	--	43	17	70	--	3.0			432	.59	7.1	147	85	61
Dec. 7-8	6.05	43	--	761	--	--	34	15	106		75	57	180	--	3.0			810	1.10	3.8	269	136	62
Dec. 9-14	1.75	38	--	1,420	--	--	60	29	198		162	95	330	--	2.0			1,060	1.44	.9	372	172	60
Dec. 15-20	.32	38	--	1,880	--	--	80	42	260		244	116	435	--	4.0			1,280	1.74	.3	441	194	59
Dec. 21-31	.08	40	7.9	2,160	16	.05	96	49	306	11	301	128	525	.1	1.5			1,300	1.77	1.3	420	187	64
Jan 4-10, 1948	.37	40	--	2,310	--	--	86	50	336		4/284	156	535	--	1.0			1,680	2.28	1.1	500	256	66
Jan. 11-15, 20-22	.24	40	--	2,890	--	--	98	62	448		298	211	715	--	.5			2,010	2.73	6.0	597	332	66
Feb. 1, 7, 15-16	1.10	36	--	3,380	--	--	114	76	533		324	273	855	--	.5			3,390	4.61	23	938	710	68
Feb. 17-23	2.53	40	--	5,350	--	--	167	127	911		278	526	1,520	--	.5			1,920	2.61	13	542	328	67
Feb. 24, 26-28	2.56	47	--	3,260	--	--	102	70	518		261	272	830	--	4.0			--	--	--	238	--	--
Feb. 25	13.0	41	--	1,480	--	--	--	--	--	--	237	240	295	--	--			--	--	--	--	--	--
Mar. 1	15.0	45	--	2,900	--	--	--	--	--	--	244	120	730	--	3.0			--	--	--	343	--	--
Mar. 2-4	69.7	37	--	352	--	--	20	9.5	33		76	24	50	--	4.0			252	.34	47	89	27	45
Mar. 5-6	11.8	35	--	685	--	--	33	16	78		115	47	122	--	4.0			381	.52	12	148	54	53
Mar. 7-8	3.60	36	--	1,100	--	--	48	24	121		165	45	210	--	5.0			599	.81	5.8	218	83	55
Mar. 9, 13-14	6.03	40	--	1,760	--	--	64	30	220		199	77	365	--	4.0			958	1.30	16	283	120	63

1/ Includes equivalent of 14 parts per million of carbonate (CO<sub>3</sub>).

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

3/ Includes equivalent of 12 parts per million of carbonate (CO<sub>3</sub>).

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

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

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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	
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate		
Mar. 15-18, 1948	17.1	44	--	749	--	--	35	17	90		141	55	125	--	4.0			406	0.55	19	157	42	55
Mar. 19, 22	27.5	50	--	488	--	--	31	15	45		103	37	77	--	6.0			293	40	22	139	55	41
Mar. 20-21, 26	58.7	52	--	299	--	--	21	10	18		78	19	31	--	6.0			218	30	35	94	30	29
Mar. 23-24, 27	5.03	46	--	869	--	--	44	22	93		157	59	148	--	3.5			479	65	6.5	200	72	50
Mar. 28-31	2.18	49	--	1,270	--	--	63	31	155		242	88	232	--	5.0			720	98	4.2	284	86	54
Apr. 1-10	78	56	--	1,650	--	--	57	36	242		5/299	121	355	--	2.0			926	1.26	2.0	290	102	65
Apr. 11-20	24	60	--	2,060	--	--	52	46	327		5/240	141	485	--	3.0			1,170	1.59	8	319	122	69
Apr. 21-24	6.80	66	--	2,030	--	--	52	45	328		7/251	125	490	--	2.0			1,170	1.59	21	314	108	69
Apr. 25-27	14.5	58	--	973	--	--	39	17	135		8/138	56	192	--	3.0			563	1.77	22	167	37	64
Apr. 28-30	27	61	--	1,440	--	--	62	30	214		9/267	82	310	--	1.0			847	1.15	2.0	278	58	63
May 1-5	24	63	--	1,860	--	--	56	40	292		262	111	430	--	4.0			1,060	1.44	7	304	90	68
May 6-9	2.42	60	--	2,360	--	--	62	54	365		250	139	580	--	4.0			1,330	1.81	8.7	376	172	66
May 10-11	616	56	--	248	--	--	13	47	28		61	16	26	--	12			162	2.22	269	52	2	54
May 12-13	21.0	60	--	639	--	--	32	11	85		141	42	105	--	2.6			360	.49	20	125	10	60
May 14-16	6.00	68	--	1,010	--	--	48	19	135		10/213	65	175	--	2.8			587	.80	9.5	198	23	60
May 17-20	1.62	69	--	1,350	--	--	62	26	189		11/258	87	260	--	4.3			788	1.07	3.4	261	50	61
May 21-23	63	72	--	1,610	--	--	67	33	225		253	102	338	--	2.5			925	1.26	1.6	302	95	62
May 24	190	66	--	1,187	--	--	--	--	--		56	15	10	--	15			--	--	--	39	--	--
May 25, 27	16.0	66	--	730	--	--	40	13	92		148	49	128	--	1.5			413	.56	18	154	32	57
May 28	8.30	61	--	484	--	--	--	--	--		118	35	70	--	7.5			--	--	--	97	--	--
May 28-31	1.10	69	--	994	--	--	54	21	124		3/244	57	164	--	1.3			571	.78	1.7	222	22	55
June 1-7	33	69	--	1,420	--	--	60	30	193		251	90	278	--	3.0			811	1.10	.7	273	68	61
June 8-16	1.11	72	--	2,230	--	--	79	50	321		277	136	515	--	6.5			1,240	1.69	4	402	176	63
June 17-22	52	73	--	3,230	--	--	80	72	505		236	211	835	--	4.0			1,820	2.48	2.6	496	302	69
June 23-27	3.98	71	--	1,940	--	--	70	40	273		290	96	420	--	3.5			1,050	1.43	11	339	102	64
June 28, July 1-2	223	71	--	415	--	--	22	8.7	53		98	20	73	--	3.0			259	.35	156	91	10	56
June 29-30	173	71	--	205	--	--	19	3.6	17		69	16	18	--	.0			213	.29	99	62	6	37

3/ Includes equivalent of 12 parts per million of carbonate (CO<sub>3</sub>).

4/ Includes equivalent of 13 parts per million of carbonate (CO<sub>3</sub>).

5/ Includes equivalent of 26 parts per million of carbonate (CO<sub>3</sub>).

6/ Includes equivalent of 18 parts per million of carbonate (CO<sub>3</sub>).

7/ Includes equivalent of 11 parts per million of carbonate (CO<sub>3</sub>).

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

9/ Includes equivalent of 26 parts per million of carbonate (CO<sub>3</sub>).

10/ Includes equivalent of 11 parts per million of carbonate (CO<sub>3</sub>).

11/ Includes equivalent of 20 parts per million of carbonate (CO<sub>3</sub>).

12/ Includes equivalent of 19 parts per million of carbonate (CO<sub>3</sub>).

July 3-7-----	1.14	76	--	822	--	--	55	15	86	168	46	140	--	3.0	460	.63	1.4	198	61	49
July 8-15-----	4.46	75	--	1,230	--	--	42	25	180	3/203	67	285	--	3.0	672	.91	.8	208	42	85
July 16, 21-22-----	3.83	75	--	560	--	--	35	13	66	7/187	48	184	--	3.0	317	.43	3.3	141	28	50
July 17, 23-31-----	8.61	77	--	902	--	--	47	20	124	2/178	66	175	--	4.0	529	.72	12	199	52	57
July 18-20-----	30.6	76	--	294	--	--	20	6.1	29	87	17	32	--	4.0	196	.27	16	75	4	45
Aug. 1-2-----	8.55	76	--	261	--	--	16	6.6	24	83	2.1	32	--	4.5	172	.23	4.0	67	0	43
Aug. 3-4-----	.40	72	--	459	--	--	29	8.5	49	57	16	78	--	50	287	.39	.3	108	61	50
Aug. 5-8-----	.80	71	--	804	--	--	29	16	94	124	37	143	--	1.5	387	.53	.8	138	37	60
Aug. 9-10-----	218	74	--	160	--	--	8.0	3.9	17	52	10	13	--	1.5	79	.11	46	36	0	50
Aug. 11-12, 17-18-----	21.0	75	--	310	--	--	14	9.2	37	90	19	39	--	5.0	204	.28	12	73	0	52
Aug. 13, 19-20-----	6.60	73	--	462	--	--	26	11	52	122	27	66	--	3.5	270	.37	4.8	110	10	51
Aug. 14-16-----	158	74	--	155	--	--	13	8.5	11	51	26	11	--	8.0	183	.26	82	68	26	26
Aug. 21-23-----	.73	74	--	709	--	--	45	16	77	163	40	119	--	4.0	412	.56	.8	178	45	48
Aug. 24-27-----	.40	74	--	1,030	--	--	61	23	113	208	53	188	--	2.0	579	.79	.6	246	76	50
Aug. 28-31-----	8.20	76	--	416	--	--	23	9.4	51	102	28	63	--	7.5	258	.35	5.7	96	12	54
Sept. 1-3-----	.50	72	--	801	--	--	48	16	99	169	41	155	--	2.5	458	.62	.6	186	48	54
Sept. 4-6-----	.10	71	--	1,150	--	--	71	25	137	210	60	240	--	5.0	664	.90	.2	280	106	51
Sept. 7-10-----	.10	68	--	1,530	--	--	82	34	204	238	76	362	--	3.0	883	1.20	.2	314	150	55

2/ Includes equivalent of 14 parts per million of carbonate (CO<sub>3</sub>).3/ Includes equivalent of 12 parts per million of carbonate (CO<sub>3</sub>).7/ Includes equivalent of 19 parts per million of carbonate (CO<sub>3</sub>).

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

Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	--	53	49	--	--	45	44	70	71	73	76	74
2	--	55	52	--	--	38	47	66	68	73	75	71
3	--	55	46	--	36	38	54	58	66	72	74	70
4	--	54	44	39	--	35	57	58	67	74	69	72
5	--	56	41	35	--	35	65	60	70	74	68	73
6	--	52	43	39	--	35	59	52	73	83	67	69
7	--	38	48	36	35	36	59	53	69	75	70	70
8	--	43	38	43	--	37	50	58	73	76	78	66
9	--	43	38	44	--	39	62	75	70	72	72	73
10	--	44	37	42	--	--	62	53	71	72	77	61
11	--	39	38	44	--	--	62	58	69	75	77	--
12	--	42	37	44	--	--	56	57	69	74	75	--
13	--	41	36	36	--	38	51	63	78	75	74	--
14	--	46	40	34	--	42	54	64	71	78	73	--
15	--	42	35	40	36	43	72	72	71	74	74	--
16	--	47	36	--	38	47	62	69	72	73	74	--
17	--	46	37	--	39	42	63	70	76	75	76	--
18	--	45	37	--	43	46	60	70	75	78	72	--
19	--	45	37	--	43	51	61	70	66	76	73	--
20	--	46	47	45	38	53	60	67	76	74	73	--
21	--	45	39	38	41	51	66	69	70	75	74	--
22	--	43	42	38	38	48	67	70	73	76	75	--
23	--	45	38	--	38	45	64	76	70	70	72	--
24	--	47	35	--	45	51	66	66	70	76	74	--
25	--	46	37	--	41	--	59	65	74	79	72	--
26	--	52	41	--	45	52	59	61	70	92	75	--
27	--	49	38	--	53	43	57	66	72	78	75	--
28	74	48	45	--	46	42	59	68	67	78	75	--
29	64	49	41	--	44	46	61	69	69	73	77	--
30	40	39	--	--	--	58	64	69	73	73	78	--
31	58	--	--	--	--	49	--	70	--	72	75	--
Average	--	47	40	--	--	44	59	65	71	76	74	--



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

LOCATION.--At gaging station at bridge on State Highway 20, 2½ 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 (revised).  
 RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1948.

Water temperatures: October 1947 to September 1948.  
 EXTREMES, 1947-48.--Dissolved solids: Maximum, 548 parts per million Feb. 11-20; minimum, 126 parts per million June 22-30.

Total hardness: Maximum, 294 parts per million Mar. 1-10; minimum, 50 parts per million June 22-30.  
 Water temperatures: Maximum, 89° F. July 26; minimum, freezing point on several days in December and January.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1117. Records of specific conductance of daily samples available in district office at Stillwater, Okla.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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>	
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate
Oct. 1-10, 1947-----	53.1	74	8.0	556	2.4	0.10	56	12	42	5.4	194	27	75	0.2	2.0		321	0.44	46	187	38
Oct. 11-20-----	12.2	75	8.0	531	1.0	.10	56	12	38	5.0	187	26	69	.2	1.0		302	.41	9.9	189	38
Oct. 21-31-----	17.5	73	8.0	530	1.0	.05	58	12	35	4.2	188	27	68	.2	1.0		307	.42	15	184	40
Nov. 1-10-----	77.9	61	--	519	--	--	56	11	--	--	170	23	69	--	1.0		303	.41	64	185	46
Nov. 11-20-----	32.1	50	--	624	--	--	64	12	47	--	184	24	93	--	.5		361	.49	31	209	58
Nov. 21-30-----	30.9	48	8.0	759	5.4	.02	78	13	86	3.0	204	34	137	.1	.2		437	.59	36	248	81
Dec. 1-10-----	379	51	8.0	683	7.0	.05	68	12	57	5.8	199	30	110	--	1.5		389	.53	398	219	56
Dec. 11-20-----	164	43	--	763	--	--	72	17	60	--	220	32	118	--	.2		426	.58	189	250	69
Dec. 21-31-----	71.1	34	7.8	705	7.2	.05	69	15	48	5.1	197	26	110	--	1.5		440	.60	84	234	72
Jan. 1-10, 1948-----	91.8	38	--	651	--	--	64	15	--	--	184	27	100	--	1.5		380	.52	94	221	71
Jan. 11-20-----	134	36	7.7	657	8.8	.15	64	11	49	3.4	170	28	102	.1	3.0		375	.51	136	205	66
Jan. 21-31-----	83.3	35	--	741	--	--	66	14	--	--	182	29	123	--	3.5		440	.60	99	222	73
Feb. 1-10-----	70.4	37	8.1	821	4.4	--	75	16	63	4.5	1/195	43	133	.2	4.0		460	.63	87	253	83
Feb. 11-20-----	74.1	41	--	939	--	--	82	20	78	--	206	46	168	--	4.0		548	.75	110	286	118
Feb. 21-28-----	24.5	44	--	840	--	--	76	16	74	--	193	51	144	--	2.0		458	.62	303	255	97
Mar. 1-10-----	1,483	43	8.7	919	2.5	--	80	17	77	3.8	2/181	58	182	.2	3.0		526	.72	2,110	294	146
Mar. 11-20-----	1,076	45	7.7	752	6.4	.02	87	12	63	2.6	154	35	136	--	4.0		433	.59	1,260	216	90
Mar. 21-22-----	5,700	55	--	862	--	--	80	19	--	--	1/207	49	150	--	2.0		511	.69	7,860	278	108
Mar. 23-27-----	12,980	53	--	389	--	--	40	94	--	--	1/207	49	150	--	3.0		228	.31	7,990	138	61
Mar. 28-31-----	1,902	53	--	436	--	--	44	31	37	--	110	31	73	--	4.0		289	.39	1,480	147	57

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

2/Includes equivalent of 17 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 1947 to September 1948--Continued

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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> )	Bo-ron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Per-cent non-carbon-dium
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbon-dium	
Apr. 1-10, 1948 ---	326	52	8.0	535	9.6	0.08	56	5.2	42	1.6	148	33	80	0.0	2.0		326	0.44	551	178	56	33
Apr. 11-20 -----	276	66	7.9	691	7.0	--	72	13	46	3.3	186	30	109	0.0	1.0		403	.55	300	233	81	30
Apr. 21-25 -----	209	70	--	711	--	--	66	13	--	--	184	41	120	--	5		446	.61	252	218	67	40
Apr. 26-30 -----	11,220	67	--	401	--	--	38	5.6	30	3.0	102	21	63	--	2.0		245	.33	7,420	118	34	40
May 1-6 -----	1,173	63	--	454	--	--	47	8.2	31	--	120	30	60	--	4.0		281	.38	890	151	53	31
May 7-11 -----	2,058	67	--	364	--	--	59	12	30	--	139	31	110	--	4.0		393	.53	2,180	197	83	35
May 12-17 -----	6,265	55	--	423	--	--	31	6.3	45	--	106	26	60	--	4.1		254	.35	4,320	103	16	49
May 18-31 -----	350	75	8.2	550	11	.00	53	9.0	40	3.0	3,413	29	78	0	4.0		331	.45	313	169	52	34
June 1-10 -----	105	79	--	599	--	--	55	8.7	54	--	4,165	31	87	--	1.5		364	.50	103	174	38	40
June 11-16 -----	116	78	--	641	--	--	53	9	84	--	173	32	95	--	1.0		377	.51	118	171	29	45
June 17-21 -----	3,994	77	--	353	--	--	37	3.1	32	--	96	18	50	--	4.5		215	.26	2,320	102	24	40
June 22-30 -----	44,710	73	--	154	--	--	17	1.8	24	--	54	8.2	34	--	2.2		126	.17	15,200	160	6	51
July 1-2 -----	23,700	76	--	259	--	--	25	5.5	17	--	87	15	23	--	3.0		150	.20	9,600	95	14	30
July 3-4 -----	5,655	76	--	356	--	--	44	7.9	17	--	122	19	40	--	3.0		209	.26	3,790	135	42	20
July 5-11 -----	1,733	80	--	516	--	--	31	9.0	31	--	169	31	59	--	3.0		318	.43	1,480	168	50	26
July 12-18 -----	21,400	81	--	349	--	--	33	6.2	28	--	113	17	39	--	2.5		214	.29	12,400	106	15	36
July 19-20 -----	33,350	76	--	206	--	--	20	5.2	14	--	78	14	18	--	4.0		146	.20	13,100	71	53	30
July 21-22 -----	46,800	81	--	189	--	--	24	4.4	12	--	10	17	17	--	1.5		133	.18	16,800	76	10	43
July 23-28 -----	41,900	82	--	254	--	--	31	5.0	15	--	112	9.5	17	--	5.0		164	.22	18,600	98	3	25
July 30-Aug. 10 ---	3,118	78	7.8	604	1.0	.00	51	11	33	3.2	185	27	64	2	3.0		320	.44	2,690	197	46	26
Aug. 11-12 -----	4,775	76	--	466	--	--	54	9.4	27	--	155	23	56	--	4.0		285	.39	3,370	173	46	26
Aug. 13-16 -----	22,920	78	--	298	--	--	16	5.9	18	--	71	13	22	--	2.0		142	.19	8,790	64	6	38
Aug. 17-20 -----	11,020	79	--	286	--	--	24	5.7	30	--	101	15	34	--	2.0		194	.26	5,770	83	1	44
Aug. 21-25 -----	1,147	84	--	305	--	--	66	11	36	--	190	30	71	--	1.5		337	.46	1,040	54	27	40
Aug. 26-31 -----	800	81	--	721	--	--	60	12	57	--	194	33	91	--	2.0		388	.53	838	155	40	38
Sept. 1-10 -----	294	79	8.1	696	3.6	.02	65	15	33	3.2	172	34	87	1.1	1.0		355	.48	282	254	73	24
Sept. 11-20 -----	160	76	--	760	--	--	60	16	56	--	166	36	115	--	1.0		412	.56	173	216	89	36
Sept. 21-30 -----	102	71	--	863	--	--	74	18	37	--	212	39	134	--	1.0		486	.66	134	259	85	36
Weighted average	4,368	--	--	279	--	--	29	5.3	24	--	93	15	36	--	3.1		182	0.25	2,150	94	18	36

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

4/Includes equivalent of 8 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 1947 to September 1948

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

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

LOCATION --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 1948.

EXTREMES 1947-48 --Dissolved solids: Maximum, 1,630 parts per million Feb. 20-22; minimum, 91 parts per million June 22-30, July 1-2.

TOTAL HARDNESS: Maximum, 500 parts per million Feb. 20-22; minimum, 60 parts per million June 22-30, July 1-2.

REMARKS --Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1117. Records of specific conductance of daily samples available in district office at Stillwater, Okla.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-foot)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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	
																	Parts per million	Tons per acre-foot	Tons per day	Total			
Oct. 1-6, 1947	94.3	--	--	1,200	--	--	81	23	154	211	31	302	--	--	1.0	--	--	697	0.95	177	286	124	53
Oct. 7-13	45.3	--	--	1,680	--	--	86	22	221	1/192	30	422	--	--	3.0	--	--	910	1.24	111	305	148	91
Oct. 14-18	33.0	--	--	2,350	--	--	100	28	352	1/204	53	642	--	--	3.0	--	--	1,280	1.74	114	364	197	62
Oct. 19-21	157	--	--	1,550	--	--	82	22	198	181	27	388	--	--	3.0	--	--	850	1.16	360	295	146	59
Oct. 22-31	23.9	7.6	--	2,690	3.0	0.10	100	29	398	14	148	27	780	0.1	3.0	--	--	1,430	1.94	92	368	247	69
Nov. 1-10	90.3	--	--	1,440	--	--	80	21	194	190	17	375	--	--	6.0	--	--	794	1.08	194	266	130	60
Nov. 11-20	53.5	7.6	--	1,710	7.5	1.10	87	21	241	6.4	187	28	462	.0	2.5	--	--	948	1.29	137	304	150	63
Nov. 21-30	53.2	--	--	2,380	--	--	106	31	354	172	28	700	--	--	6.5	--	--	1,310	1.78	188	394	251	66
Dec. 1-7	36.1	--	--	2,330	--	--	96	27	346	162	25	665	--	--	7.0	--	--	1,250	1.70	122	350	216	66
Dec. 8-15	612	--	--	862	--	--	66	13	96	196	36	160	--	--	5.0	--	--	488	.66	806	218	57	49
Dec. 16-20	137	--	--	1,310	--	--	90	20	167	248	32	305	--	--	5.0	--	--	770	1.05	285	306	104	54
Dec. 21-31	84.3	7.9	--	1,780	1.0	.00	103	26	226	6.2	245	34	442	1	5.0	--	--	1,010	1.37	230	364	163	57
Jan. 1-3, 9-10, 1948	148	--	--	1,550	--	--	87	23	209	200	27	405	--	--	2.5	--	--	908	1.23	353	312	148	59
Jan. 4-8	160	--	--	2,220	--	--	107	30	324	192	26	640	--	--	10	--	--	1,230	1.67	531	390	233	64
Jan. 11-20	161	--	--	1,650	--	--	87	24	216	180	28	430	--	--	4.0	--	--	878	1.19	382	316	168	60
Jan. 21-31	105	--	--	1,770	--	--	90	24	230	177	26	460	--	--	4.0	--	--	921	1.25	261	323	176	61
Feb. 1-10	95.2	7.1	--	2,020	5.4	.00	98	24	276	4.9	178	32	540	1	10	--	--	1,080	1.47	278	343	197	63
Feb. 11-19	137	8.0	--	1,960	6.8	--	99	26	253	5.3	1/180	41	505	2	10	--	--	1,040	1.41	385	354	206	60
Feb. 20-22	153	--	--	3,040	--	--	133	41	436	190	45	880	--	--	5.0	--	--	1,630	2.22	673	500	345	63
Feb. 23-28, Mar. 1	377	--	--	1,390	--	--	88	22	166	195	41	330	--	--	2.5	--	--	823	1.12	838	310	150	54
Mar. 2-10	2,219	--	--	1,060	--	--	79	15	104	167	51	207	--	--	3.0	--	--	590	.80	3,530	259	122	47
Mar. 11-20	1,451	7.6	--	899	4.8	.02	70	14	90	2.7	150	36	190	.0	4.5	--	--	539	.73	2,110	232	112	45
Mar. 21-23	6,043	--	--	738	--	--	62	13	69	155	40	132	--	--	3.0	--	--	429	.58	7,000	208	81	42
Mar. 24-27	16,800	--	--	356	--	--	31	5	29	79	24	51	--	--	1.0	--	--	205	.28	9,300	100	35	38
Mar. 28-31	2,845	--	--	493	--	--	42	7.7	42	97	33	78	--	--	4.5	--	--	297	.40	2,280	136	57	40

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

Apr. 1-10-----	809	7.9	643	9.8	.02	60	10	57	4.2	146	33	116	.1	2.5	376	.51	821	192	71	39
Apr. 11-20-----	343	7.3	845	8.8	.10	66	19	74	3.5	163	39	166	.2	2.0	503	.68	466	248	114	39
Apr. 21-30-----	282	--	947	--	--	52	13	109	42	124	41	185	--	1.5	500	.68	361	163	82	56
Apr. 26-30-----	14,110	--	402	--	--	54	5.0	--	42	86	22	73	--	1.0	236	.35	9,730	105	35	47
May 1, 5-7-----	1,718	--	554	--	--	48	9.2	--	44	123	29	84	--	3.0	320	.44	1,460	158	57	38
May 2-4, 8-10-----	1,120	--	743	--	--	52	11	83	83	124	30	156	--	3.0	442	.60	1,340	175	73	51
May 11, 15-20-----	2,585	--	593	--	--	48	9.7	--	51	116	30	101	--	2.0	353	.48	2,470	160	65	41
May 12-14-----	13,170	--	434	--	--	38	8.1	--	34	99	27	64	--	2.0	256	.35	9,100	128	47	36
May 21-31-----	353	8.0	813	9.2	.00	60	11	79	4.8	144	29	158	.0	3.0	504	.69	480	195	77	46
June 1-10-----	147	7.6	1,020	12	.05	87	13	115	5.0	159	30	222	.1	2.5	602	.82	239	221	90	52
June 11-16-----	94.7	--	1,290	--	--	74	15	165	--	164	30	310	--	3.0	716	.97	183	246	112	59
June 17-18-----	2,100	--	738	--	--	49	9.6	--	84	2,155	43	121	--	3.4	416	.57	2,360	162	34	53
June 19-21-----	4,423	--	355	--	--	33	4.5	30	30	95	19	47	--	3.0	205	.28	2,450	101	23	39
June 22-30, July 1-2	46,200	--	173	--	--	17	4.4	11	11	48	9.7	22	--	3.0	91	.12	11,400	60	21	28
July 3-11-----	7,276	7.7	568	1.0	.00	59	9.7	22	5.9	162	27	91	.0	3.0	353	.48	6,930	187	54	16
July 12-20-----	31,060	--	245	--	--	28	4.7	16	16	90	9.5	28	--	2.0	151	.21	12,700	90	16	28
July 21-29-----	45,420	--	269	--	--	34	5.2	14	--	103	8.3	30	--	1.0	170	.23	20,800	106	22	22
July 30-31, Aug. 1-10	6,181	7.6	654	4.8	.00	66	11	46	3.4	200	26	84	.3	3.0	369	.50	6,160	210	46	32
Aug. 11-12, 20-----	5,407	--	532	--	--	56	9.7	41	--	157	21	82	--	2.5	312	.42	4,550	180	51	33
Aug. 13-19-----	23,000	--	278	--	--	28	5.5	24	--	83	11	45	--	2.0	173	.24	10,700	92	24	36
Aug. 21-31-----	1,517	--	708	--	--	73	12	58	--	210	29	109	--	1.0	416	.57	1,700	232	60	35
Sept. 1-10-----	428	8.1	845	1.0	.02	65	14	69	5.3	178	33	138	.1	2.0	442	.60	511	220	74	40
Sept. 11-20-----	194	--	1,040	--	--	90	17	--	--	248	33	215	--	.5	614	.84	322	295	92	46
Sept. 21-25-----	151	--	1,210	--	--	91	18	143	--	255	34	260	--	.5	724	.98	295	301	92	51
Sept. 26-30-----	113	--	1,410	--	--	102	21	171	--	253	36	330	--	2.5	848	1.15	259	341	134	52
Weighted average--	5,102	--	333	--	--	33	6.1	25	--	94	15	49	--	2.2	197	0.27	2,710	107	30	34

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

ARKANSAS RIVER BASIN--Continued  
NEOSHO RIVER NEAR COMMERCE, OKLA.

LOCATION --At bridge on county highway, 14 miles upstream from Mud Creek, 1 1/2 miles downstream from Four Mile Creek, and 4 1/2 miles west of Commerce, Ottawa County, 5 876 square miles (revised).

DRAINAGE AREA --5 876 square miles (revised).

RECORDS AVAILABLE. Chemical analyses: October 1947 to September 1948.

Water temperatures: November 1947 to September 1948.

EXTREMES, 1947-48. Dissolved solids: Maximum, 548 parts per million Jan. 21-31; minimum, 128 parts per million June 22-28.

Total hardness: Maximum, 362 parts per million Jan. 21-31; minimum, 51 parts per million Aug. 11-12.

Water temperatures: Maximum, 90° F. Aug. 26; minimum, freezing point on several days in January and February.

REMARKS. --Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1117. Records of specific conductance of daily samples available in district office at Stillwater, Okla.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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> )	Bo-ron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Per-cent so-dium
																	Parts per mil-lion	Tons per acre-foot	Tons per day	Total	Non-carbon-ate	
Oct. 21-31, 1947 ---	118	--	--	451	--	--	45	12	27	143	52	33	--	--	3.5	--	266	0.36	85	162	44	27
Nov. 1-10, -----	107	54	7.7	464	19	0.08	51	13	25	3.9	159	56	35	0.2	2.5	--	284	.39	82	181	55	23
Nov. 11-20, -----	62.8	46	7.8	524	8.6	.04	54	14	38	3.8	176	57	53	.3	1.0	--	323	.44	55	192	48	30
Nov. 21-30, -----	73.2	44	--	514	--	--	52	13	39	--	175	56	46	--	1.0	--	298	.41	59	183	40	31
Dec. 1-10, -----	1,162	47	--	576	--	--	58	16	38	--	179	67	54	--	2.0	--	335	.46	1,050	210	64	28
Dec. 11-20, -----	290	39	7.5	333	17	.80	34	5.9	19	7.4	79	44	32	.3	3.5	--	218	.30	171	109	44	26
Dec. 21-31, 1948 ---	135	40	--	349	--	--	35	9.1	29	--	100	46	39	--	4.0	--	211	.29	177	125	43	34
Jan. 1-10, 1948 ---	149	38	--	537	--	--	53	14	41	--	138	84	54	--	3.0	--	329	.45	132	190	77	32
Jan. 11-20, -----	558	35	7.8	733	4.4	.05	79	20	50	4.8	180	120	84	.1	3.0	--	454	.62	684	279	132	28
Jan. 21-31, -----	141	32	--	919	--	--	102	26	50	--	206	154	99	--	1.0	--	546	.75	209	362	192	23
Feb. 1-10, -----	119	34	--	750	--	--	76	20	54	--	180	121	80	--	5.0	--	462	.63	148	272	124	30
Feb. 11-20, -----	240	37	8.0	736	2.4	--	78	20	41	4.5	165	123	70	.4	12	--	448	.61	290	277	142	24
Feb. 21-26, -----	860	42	--	690	--	--	77	22	36	--	190	105	65	--	4.0	--	418	.57	971	282	126	22
Feb. 27-29, Mar. 1-	678	42	--	351	--	--	37	11	29	--	123	62	20	--	8.0	--	228	.31	417	136	37	31
Mar. 10-20, -----	2,038	44	7.4	370	11	.30	46	12	8.3	3.4	125	46	22	.0	6.5	--	218	.30	1,200	164	62	10
Mar. 21-31, -----	10,310	51	--	243	--	--	30	7.1	6.9	--	74	40	9.6	--	4.0	--	169	.23	4,700	104	43	13
Apr. 1-10, -----	1,217	56	7.3	375	11	.10	44	11	15	2.7	133	52	16	.3	5.0	--	238	.32	782	178	46	17
Apr. 11-20, -----	399	60	--	477	--	--	64	13	18	--	181	67	22	--	3.0	--	296	.40	319	213	65	15
Apr. 21-25, -----	337	66	--	499	--	--	59	14	30	--	218	75	30	--	2.0	--	318	.43	289	205	56	24
Apr. 26-30, -----	3,402	63	--	412	--	--	47	10	20	--	129	57	23	--	4.0	--	245	.33	2,250	158	53	21

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

2/ Includes equivalent of 14 parts per million of carbonate (CO<sub>3</sub>).

May 1-4, 9-10	2,297	68	--	--	438	--	--	51	12	20	142	56	30	--	5.0	267	30	1,660	17	60	20
May 5-8	5,795	62	--	--	315	--	--	39	8.2	9.8	116	37	11	--	4.0	191	26	2,990	131	36	14
May 11-16	8,140	67	--	--	199	--	--	21	5.8	16	68	34	12	--	3.0	161	22	3,540	76	21	27
May 17-21	727	74	--	--	268	--	--	27	5.5	24	96	37	15	--	4.1	186	25	365	90	11	36
May 21-26	625	73	--	--	321	--	--	30	10	23	121	40	14	--	7.0	207	28	349	116	17	30
May 27-31	1,089	72	--	--	436	--	--	60	15	10	161	66	20	--	6.0	285	39	838	211	79	10
June 1-10	268	78	7.8	10	500	--	--	62	14	24	205	55	29	.3	3.5	302	41	219	212	0	20
June 11-14	174	84	--	--	473	--	--	62	14	20	195	58	23	--	5.0	300	41	141	212	52	17
June 15-21	2,840	75	--	--	251	--	--	34	7.2	4.3	71	43	11	--	6.5	160	22	1,230	114	55	7
June 15, 19-20	599	76	--	--	350	--	--	40	12	14	66	85	12	--	25	230	31	372	149	95	17
June 22-28	46,570	76	--	--	162	--	--	16	5.2	5.8	34	34	4.2	--	6.0	128	17	16,080	61	33	17
June 29-30, July 1-5	7,913	77	--	--	243	--	--	31	6.2	10	90	35	8.0	--	4.0	173	24	3,700	103	29	16
July 6-11	1,737	80	--	--	305	--	--	38	8.7	12	110	46	9.5	--	6.5	202	27	947	131	40	17
July 12-20	13,120	78	7.6	22	168	--	--	20	2.7	8.4	56	22	6.5	.2	5.0	133	18	6,510	61	15	22
July 21-31	51,980	85	--	--	143	--	--	16	6.9	4.2	58	20	3.5	--	5.0	131	18	13,400	68	24	12
AUG. 1-2	32,200	82	--	--	291	--	--	40	8.1	12	127	36	11	--	2.0	214	29	13,600	134	30	16
AUG. 3-6	3,325	78	--	--	428	--	--	64	13	11	186	54	18	--	4.0	262	36	2,350	213	60	10
AUG. 7-10	1,552	80	--	--	595	--	--	74	17	14	219	74	18	--	3.5	360	49	1,510	254	75	11
AUG. 11-12	9,400	77	--	--	208	--	--	44	11	--	133	50	4.2	--	5.5	--	--	--	51	--	--
AUG. 13-17	2,920	79	--	--	241	--	--	44	11	12	131	54	12	--	1.0	216	29	1,710	155	48	15
AUG. 18-20	1,333	78	--	--	806	--	--	42	19	20	133	77	26	--	1.0	269	37	983	183	74	19
AUG. 21-31	641	83	6.1	1.4	647	--	--	66	20	30	234	99	32	.3	1.5	374	51	647	247	80	20
Sept. 1-9	599	80	--	--	665	--	--	78	23	31	226	134	36	--	1.0	409	56	661	289	104	19
Sept. 10	10,700	72	--	--	461	--	--	--	--	--	190	25	22	--	10	--	--	--	142	--	--
Sept. 21-30	290	71	--	--	378	--	--	50	20	15	157	46	15	--	6.0	246	33	193	166	41	16

ARKANSAS RIVER BASIN--Continued  
NEOSHO RIVER NEAR COMMERCE, OKLA.--Continued

Temperature (° F.) of water, water year October 1947 to September 1948

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



## ARKANSAS RIVER BASIN--Continued

## NEOSHO RIVER NEAR WAGONER, OKLA.

LOCATION.--At gaging station at bridge on State Highway 51, 5 miles southeast of Wagoner, Wagoner County, and 6 miles upstream from Fourteen Mile Creek.

DRAINAGE AREA.--12 307 square miles (revised).

RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1948.

Water temperatures: October 1947 to September 1948.

EXTREMES 1947-48.--Dissolved solids: Maximum 208 parts per million Apr. 21-30; minimum 91 parts per million Aug. 13-15.

Total hardness: Maximum 153 parts per million Apr. 21-30; minimum 54 parts per million Aug. 13-15.

Freezing point: Jan. 17, 27, 29, Feb. 13.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1117. Records of specific conductance of daily samples available in district office at Stillwater, Okla.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium
																Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
Oct. 1-10, 1947	2,792	72	7.3	282	9.4	0.00	38	6.4	14	3.0	106	51	9.2	0.1	3.5	187	0.25	1,410	121	34	20
Oct. 11-20	2,091	72	--	280	--	--	42	8.2	1.7	--	108	35	10	--	4.0	172	.23	1,971	138	50	3
Oct. 21-31	2,649	68	--	287	--	--	41	7.2	6.8	--	110	35	12	--	4.0	177	.24	1,270	132	42	10
Nov. 1-10	2,020	59	--	283	--	--	41	7.1	7.3	--	115	36	10	--	2.0	171	.23	933	132	37	11
Nov. 11-20	2,168	53	--	286	--	--	40	7.3	11	--	114	37	14	--	1.5	171	.23	1,000	130	36	15
Nov. 21-30	1,365	49	7.6	286	5.2	.04	42	6.0	12	2.6	114	36	19	.1	1.5	181	.25	667	129	36	17
Dec. 1-10	1,244	50	--	288	--	--	40	7.9	11	--	116	38	15	--	1.0	172	.23	578	132	37	15
Dec. 11-20	1,286	42	--	301	--	--	42	7.8	9.5	--	118	40	13	--	1.0	176	.24	611	137	40	13
Dec. 21-31	1,044	43	8.1	302	4.4	.04	42	5.9	15	3.0	116	39	20	.2	1.0	188	.26	530	129	34	20
Jan. 1-10, 1948	1,781	42	7.8	300	7.0	.04	41	6.5	15	2.7	115	40	20	.1	1.5	202	.27	971	129	35	20
Jan. 11-20	1,923	38	--	294	--	--	42	7.5	7.4	--	116	37	12	--	1.5	181	.25	940	136	41	11
Jan. 21-31	2,095	34	--	296	--	--	42	7.8	7.1	--	116	38	12	--	1.0	181	.25	1,020	137	42	10
Feb. 1-10	2,409	37	7.7	305	5.0	.05	44	7.0	7.4	2.5	116	41	13	.1	2.0	186	.25	1,210	139	44	10
Feb. 11-20	2,394	40	7.8	301	5.8	.15	44	8.0	3.5	3.1	114	39	13	.1	2.0	184	.25	1,190	143	49	5
Feb. 21-29	1,984	44	7.9	304	6.0	.02	43	7.2	9.4	2.6	115	37	18	.3	2.0	183	.25	980	137	43	13
Mar. 1-10	4,123	42	7.6	273	8.2	.15	41	7.0	2.5	1.3	107	29	13	.0	2.5	180	.22	1,780	131	43	4
Mar. 11-21	4,236	49	--	296	--	--	42	5.8	12	--	116	36	14	--	2.0	180	.24	2,060	129	34	16
Mar. 22-25, 27	17,650	50	--	189	--	--	24	4.0	3.7	5.7	62	23	8.2	--	.5	114	.16	5,440	76	26	14
Mar. 26, 28-31	11,080	51	--	280	--	--	30	6.1	8.5	--	81	36	9.8	--	1.0	139	.19	4,160	100	34	16
Apr. 1-10	7,085	54	--	323	--	--	37	6.7	12	--	97	46	12	--	1.0	166	.23	3,180	120	40	17
Apr. 11-20	5,615	59	--	336	--	--	47	7.3	12	--	123	49	14	--	3.0	206	.28	3,230	147	46	15
Apr. 21-30	4,109	64	--	343	--	--	49	7.5	9.2	--	117	50	16	--	3.0	208	.28	2,310	153	57	11
May 1-10	3,485	67	7.0	323	8.2	.10	44	7.6	7.9	2.4	112	45	14	.2	3.0	203	.28	1,910	141	49	11
May 11-20	7,196	71	--	263	--	--	34	6.1	11	--	97	34	11	--	3.0	187	.23	3,240	110	30	17
May 21-23, 27-31	4,168	71	--	311	--	--	33	5.5	16	--	88	42	16	--	2.8	180	.24	2,030	105	33	25
May 24-26	7,170	68	--	190	--	--	22	5.0	8.3	--	62	27	8.0	--	4.0	122	.17	2,360	75	25	19



ARKANSAS RIVER BASIN--Continued  
NEOSHO RIVER NEAR WAGONER, OKLA.--Continued

Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	69	64	47	38	35	50	50	68	74	74	79	80
2	68	62	48	38	37	47	47	68	74	74	78	79
3	70	61	51	40	38	42	52	69	72	74	80	80
4	71	61	55	40	40	41	52	66	72	73	79	80
5	71	60	52	44	38	43	54	66	72	76	79	80
6	76	60	50	41	35	42	57	65	76	74	78	82
7	78	58	52	42	38	40	39	64	77	75	75	80
8	70	55	50	44	35	42	56	65	76	76	75	79
9	74	55	49	49	36	41	54	68	74	76	74	75
10	74	55	45	47	36	35	55	69	72	76	76	74
11	74	--	44	45	37	--	61	--	75	74	79	73
12	74	50	42	45	34	--	62	--	75	76	79	74
13	71	51	40	41	32	40	55	--	78	75	77	76
14	73	55	40	39	33	41	53	--	78	77	77	76
15	72	54	42	38	36	52	57	--	79	77	75	76
16	72	53	41	36	40	51	58	70	76	75	75	76
17	73	54	40	32	43	47	60	70	74	77	77	77
18	71	51	42	34	47	47	61	71	78	77	78	77
19	72	53	44	35	50	52	62	71	76	77	80	78
20	67	54	45	37	45	53	62	70	74	78	80	78
21	71	54	44	38	41	56	58	71	--	--	76	79
22	71	52	46	40	39	41	61	72	71	75	79	79
23	72	51	46	35	40	47	64	72	72	77	80	77
24	70	48	42	33	43	50	65	70	--	78	82	75
25	69	48	40	33	45	52	64	69	74	79	80	73
26	67	46	40	35	45	54	64	66	72	78	79	70
27	66	49	42	32	46	49	68	69	72	79	78	68
28	64	48	42	32	50	45	65	70	72	79	80	67
29	64	49	44	32	49	48	64	70	73	79	79	68
30	65	47	46	34	--	51	66	73	75	78	80	71
31	67	--	44	35	--	51	--	71	--	78	83	--
Average	71	54	45	38	40	47	59	69	74	76	78	76

## ARKANSAS RIVER BASIN--Continued

## SPRING RIVER NEAR QUAPAW, OKLA.

LOCATION.--At gaging station at bridge on county highway, an eighth of a mile upstream from Rock Creek, and 3 miles southeast of Quapaw, Ottawa County. DRAINAGE AREA.--2,510 square miles (revised).

RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1948.

Water temperatures: October 1947 to September 1948.

EXTREMES, 1947-48.--Dissolved solids: Maximum, 383 parts per million May 11-12; minimum, 93 parts per million July 26-28.

Total hardness: Maximum, 262 parts per million Jan. 1-10; minimum, 48 parts per million July 26-28.

Water temperatures: Maximum, 83° F. Aug. 28; minimum, freezing point Jan. 27-28, Mar. 11.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1117. Records of specific conductance of daily samples available in district office at Stillwater, Okla.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
Oct. 1-10, 1947-----	225	74	7.7	447	9.4	0.01	68	8.2	24	3.0	118	137	9.8	0.7	6.0		324	0.44	197	203	106	20
Oct. 11-20-----	170	74	--	451	--	--	72	7.9	10		134	100	10	--	8.0		292	40	134	212	102	10
Oct. 21-31-----	283	66	--	480	--	--	79	6.9	15		141	107	13	--	15		317	43	242	225	110	12
Nov. 1-10-----	323	57	7.6	477	6.0	.04	76	8.0	17	3.7	145	106	16	1.3	12		317	43	276	222	104	14
Nov. 11-20-----	230	51	7.7	427	6.8	.04	66	7.3	18	2.5	130	92	18	6	10		285	39	177	195	88	17
Nov. 21-30-----	238	47	--	476	--	--	74	8.3	14		135	108	10	--	15		309	.42	199	218	108	12
Dec. 1-10-----	211	48	--	505	--	--	87	9.6	6.0		140	121	12	--	15		328	.45	187	257	142	5
Dec. 11-20-----	178	40	--	534	--	--	84	10	15		145	131	12	--	15		352	.48	169	251	132	12
Dec. 21-31-----	187	41	7.3	548	7.8	.05	88	9.4	15	2.6	149	130	15	1.0	15		368	.50	186	258	136	11
Jan. 1-10, 1948-----	373	41	7.3	553	3.8	.75	90	9.0	13	5.1	138	138	12	2.4	20		370	.50	373	262	148	10
Jan. 11-20-----	223	39	7.3	509	5.2	.10	79	9.4	17	3.1	143	118	15	1.2	15		333	.45	206	236	119	13
Jan. 21-31-----	190	34	--	491	--	--	78	13	4.0		137	107	12	--	20		326	.44	167	248	136	3
Feb. 1-10-----	215	36	7.5	492	3.4	--	78	8.8	6.7	3.2	126	107	12	.7	20		313	.43	182	231	132	6
Feb. 11-20-----	476	40	--	510	--	--	80	9.6	13		131	126	12	--	15		330	.45	424	239	132	11
Feb. 21-29-----	505	46	7.8	360	4.4	.02	56	5.9	5.5	4.0	104	65	8.2	.2	20		227	.31	310	164	79	7
Mar. 1-10-----	2,197	43	--	255	--	--	36	4.9	6.9		76	45	5.5	--	10		174	.24	1,030	110	48	12
Mar. 11-20-----	1,177	44	--	334	--	--	48	6.9	9.4		96	66	6.5	--	15		214	.29	680	148	69	12
Mar. 21, 26-31-----	2,029	54	--	325	--	--	31	5.7	11		44	67	9.6	--	6.5		179	.24	981	101	65	19
Mar. 22-25-----	8,128	54	--	216	--	--	22	3.0	16		41	52	7.0	--	5.7		146	.20	3,200	67	34	34
Apr. 1-10-----	964	59	7.4	354	7.8	.04	54	7.1	5.4	1.8	111	67	5.8	.4	10		222	.30	590	164	73	7
Apr. 11-20-----	643	61	--	390	--	--	60	10	4.3		126	77	6.1	--	10		240	.33	417	191	88	5
Apr. 21-30-----	538	69	--	408	--	--	61	10	8.0		132	81	7.2	--	10		270	.37	392	193	85	8
May 1-10-----	954	68	--	435	--	--	44	10	6.6		86	80	5.2	--	5.0		224	.30	577	151	80	9
May 11-12-----	2,130	64	--	560	--	--	69	19	17		86	188	9.5	--	10		383	.52	2,200	250	180	13
May 13-15-----	1,223	68	--	329	--	--	68	14	16		125	135	8.5	--	7.5		338	.46	1,120	227	135	13
May 16-20-----	2,462	70	--	226	--	--	31	4.7	7.4		67	40	5.8	--	10		148	.20	994	97	42	14
May 21-31-----	825	71	8.5	361	12	.00	56	9.4	3.2	3.6	114	76	5.5	.0	12		243	.33	541	178	85	4

June 1-10-----	420	76	--	444	--	--	64	11	9.5	123	102	7.5	--	10	289	.39	328	205	104	9
June 11-20-----	1,194	77	--	445	--	--	66	16	5.5	111	129	6.5	--	10	312	.42	1,010	230	140	5
June 21-29-30-----	7,360	72	--	260	--	--	23	7.1	14	58	59	3.8	--	2.5	166	.23	3,300	87	39	26
June 22-27-----	42,430	70	--	143	--	--	14	5.5	5.2	26	41	2.0	--	2.5	112	.15	12,800	58	36	16
July 1-10-----	2,408	77	7.7	355	16	--	54	8.4	6.9	104	79	5.2	.2	15	238	.32	1,550	169	84	8
July 11, 13-17-----	2,988	75	--	330	--	--	46	9.0	7.0	80	86	4.2	--	7.5	226	.31	1,820	152	86	9
July 12, 18-20-----	7,500	77	--	222	--	--	25	5.2	13	65	49	3.5	--	2.5	156	.21	3,160	84	31	25
July 21-23-----	1,946	76	--	318	--	--	48	6.6	5.0	85	71	5.8	--	7.5	224	.30	1,180	147	77	7
July 26-28-----	25,970	76	--	137	--	--	8.0	6.3	1.9	18	29	2.5	--	5.0	93	.13	6,520	48	34	8
July 29-31-----	5,173	79	--	231	--	--	19	8.1	10	47	54	3.2	--	5.0	151	.21	2,110	81	42	22
Aug. 1-10-----	2,383	74	7.6	341	11	.05	52	8.1	5.1	101	74	6.0	.2	10	219	.30	1,410	163	80	6
Aug. 11-20-----	1,760	77	--	357	--	--	32	7.8	6.7	104	75	5.0	--	7.5	237	.32	1,130	182	77	8
Aug. 21-31-----	1,044	81	--	416	--	--	60	10	6.9	118	83	5.8	--	5.0	273	.37	770	191	94	7
Sept. 1-10-----	754	76	7.1	376	8.2	.02	56	6.5	11	126	77	6.2	.2	12	274	.36	497	175	71	12
Sept. 11-20-----	486	74	--	430	--	--	68	10	4.2	118	103	7.0	--	3.0	268	.39	386	210	114	4
Sept. 21-30-----	388	70	7.8	462	1.2	.02	72	9.9	9.2	129	113	7.6	.4	8.0	309	.42	324	220	115	8
Weighted average --	1,983	--	--	246	--	--	31	6.8	7.4	59	56	4.4	--	6.1	166	0.23	900	105	57	13

ARKANSAS RIVER BASIN--Continued  
 SPRING RIVER NEAR QUAPAW, OKLA.--Continued

Temperature (° F.) of water, water year October 1947 to September 1948

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

ARKANSAS RIVER BASIN--Continued  
ELK RIVER NEAR TIFF CITY, MO.

LOCATION--At gaging station at bridge on State Highway 43, 2½ miles upstream from Buffalo Creek, and 3 miles southeast of Tiff City, McDonald County.  
DRAINAGE AREA--872 square miles (revised).  
RECORDS AVAILABLE--Chemical analyses: October 1947 to September 1948.  
Water temperatures: October 1947 to September 1948.  
EXTREMES, 1947-48.--Dissolved solids: Maximum, 160 parts per million Sept. 21-30; minimum, 123 parts per million Sept. 1-10.  
Total hardness: Maximum, 134 parts per million Sept. 21-30; minimum, 94 parts per million Sept. 1-10.  
Water temperatures: Maximum, 86° F. June 7; minimum, freezing point Jan. 21.

REMARKS--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1117. Records of specific conductance of daily samples available in district office at Stillwater, Okla.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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
																	Parts per million	Tons per acre-foot	Tons per day	Total		
Oct. 1-10, 1947	68.4	73	7.8	239	14	0.00	42	2.9	4.3	2.1	134	7.7	5.5	0.0	4.0		149	0.20	28	117	7	
Oct. 11-20	61.0	72	--	237	--	--	43	2.8	4.2	--	141	3.7	5.5	--	1.0		146	.20	24	119	3	
Oct. 21-31	66.5	66	--	250	--	--	44	3.1	4.6	--	142	3.8	7.0	--	3.0		151	.21	27	122	6	
Nov. 1-10	95.6	59	7.9	247	12	.02	44	3.0	6.8	3.9	149	6.3	8.5	.0	1.5		159	.22	41	122	0	
Nov. 11-20	92.3	53	--	243	--	--	45	2.6	8.1	--	148	4.8	9.0	--	2.0		149	.20	37	123	2	
Nov. 21-30	105	50	8.2	249	12	.01	45	2.8	7.8	1.8	152	4.4	9.0	.0	1.5		159	.22	45	124	0	
Dec. 1-10	90.7	51	--	248	--	--	44	3.0	4.0	--	141	5.8	5.5	--	2.0		153	.21	37	122	7	
Dec. 11-20	83.4	45	--	243	--	--	44	2.7	6.6	2.8	142	5.3	5.5	--	2.0		142	.19	32	125	9	
Dec. 21-31	80.7	43	8.3	243	7.1	.02	44	2.7	6.6	1.2	141	3.3	10	.0	2.0		146	.20	32	121	5	
Jan. 1-10, 1948	257	43	7.6	255	8.6	.02	46	3.0	1.7	1.6	141	6.0	5.8	.0	4.0		148	.20	103	126	3	
Jan. 11-20	158	40	--	256	--	--	46	3.5	1.7	--	143	4.8	5.8	--	4.0		153	.21	65	131	12	
Jan. 21-31	109	35	--	258	--	--	46	3.9	1.6	--	138	6.5	8.5	--	3.0		152	.21	45	133	18	
Feb. 1-10	112	37	7.6	244	6.5	.02	44	2.8	1.4	1.3	135	4.0	6.8	.0	2.0		138	.19	42	121	11	
Feb. 11-20	366	42	8.0	244	8.8	--	44	2.8	5.6	1.6	137	6.4	5.8	.0	5.0		148	.20	146	121	9	
Feb. 21-29	456	48	--	256	--	--	44	3.9	3.4	--	137	4.8	6.8	--	8.0		147	.20	181	126	14	
Mar. 1-10	1,333	47	--	237	--	--	42	3.4	2.4	--	128	6.6	4.2	--	8.0		142	.19	511	119	14	
Mar. 11-20	811	50	7.9	240	10	.02	42	3.4	1.4	--	126	6.0	4.5	.0	7.5		146	.20	320	119	16	
Mar. 21-31	2,684	56	7.7	222	13	.00	39	3.0	3.9	1.2	121	7.0	4.8	.0	8.0		142	.19	1,030	110	7	
Apr. 1-10	687	62	7.7	227	9.2	.02	41	3.3	1.8	1.8	124	6.8	5.5	.0	7.0		140	.19	260	116	14	
Apr. 11-20	387	63	--	236	--	--	39	2.2	4.3	--	123	5.6	3.8	--	4.5		134	.18	140	106	6	
Apr. 21-30	267	68	7.9	241	11	.02	45	2.4	2.5	1.0	136	7.1	4.5	.0	4.5		145	.20	105	122	11	
May 1-10	414	66	--	245	--	--	42	2.3	3.4	--	131	4.8	4.0	--	4.6		141	.19	154	114	7	
May 11-20	1,607	66	8.1	231	13	.03	42	3.1	4.5	1.8	138	5.5	4.8	.0	5.0		146	.20	642	118	5	
May 21-31	482	70	--	241	--	--	41	2.5	6.3	--	129	6.1	8.0	--	3.7		142	.19	185	113	7	

ARKANSAS RIVER BASIN--Continued  
ELK RIVER NEAR TIFF CITY, MO.--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
June 1-10, 1948----	212	83	8.2	250	12	0.03	47	3.0	2.0		141	5.4	5.2	0.0	6.5		151	0.21	86	130	14	3
June 11-21 -----	223	81	7.8	240	15	.03	45	2.9	1.6		138	4.7	5.0	.1	3.0		146	.20	86	124	11	3
June 22-30 -----	3,338	71	--	223	--	--	40	3.2	1.8		119	5.9	6.0	--	6.0		141	.19	1,270	113	16	3
July 1-10 -----	903	75	--	244	--	--	45	3.0	2.1		134	4.7	6.8	--	6.0		151	.21	368	125	15	3
July 11-20 -----	1,732	77	8.0	237	14	.10	43	3.0	2.5	1.0	136	4.2	4.0	.0	6.0		150	.20	701	120	8	4
July 21-31 -----	1,201	79	--	248	--	--	40	3.3	4.9		128	4.5	6.8	--	6.0		143	.19	464	113	8	8
Aug. 1-11 -----	525	76	--	253	--	--	43	2.9	3.4		133	4.2	6.0	--	6.0		148	.20	210	119	10	6
Aug. 12-20 -----	3,137	75	7.9	250	14	.02	38	3.5	2.7	2.1	124	4.6	4.0	.0	7.0		137	.19	1,160	109	8	5
Aug. 21-31 -----	841	79	--	260	--	--	38	2.9	3.5		120	4.2	6.0	--	4.0		133	.18	302	107	8	7
Sept. 1-10 -----	470	77	7.6	259	6.1	.01	34	2.3	5.1	1.4	114	4.3	4.0	.0	4.5		123	.17	156	94	1	10
Sept. 11-20 -----	262	78	7.8	254	8.2	.02	46	3.0	4.1	1.8	149	4.0	6.2	.0	4.0		154	.21	109	127	5	6
Sept. 21-30 -----	181	72	--	261	--	--	46	3.4	2.8		151	3.7	7.0	--	3.0		160	.22	78	134	10	5
Weighted average --	644	--	--	239	--	--	41	3.1	3.6		128	5.4	5.3	--	6.0		143	0.19	249	115	10	6



ARKANSAS RIVER BASIN--Continued  
 ELK RIVER NEAR TIFF CITY, MO.--Continued  
 Temperature (° F.) of water, water year October 1947 to September 1948

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

ARKANSAS RIVER BASIN--Continued  
ILLINOIS RIVER NEAR GORE, OKLA.

LOCATION --At gaging station at bridge, 5½ miles northeast of Gore, Sequoyah County, and 10 miles upstream from mouth.  
DRAINAGE AREA 622 square miles (revised).  
RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1948.  
Water temperatures: October 1947 to September 1948.  
EXTREMES, 1947-48.--Dissolved solids: Maximum, 214 parts per million Nov. 23-24, 26; minimum, 40 parts per million Aug. 13-17.  
Total hardness: Maximum, 120 parts per million Nov. 23-24, 26; minimum, 33 parts per million Aug. 13-17.  
Water temperatures: Maximum, 89 F. July 27; minimum, 34 F. Jan. 24, 26, 28-29.  
REMARKS --Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1117. Records of specific conductance of daily samples available in district office at Stillwater, Okla.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-foot)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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
																	Parts per million	Tons per acre-foot	Total	Non-carbonate	
Oct. 1-10, 1947	203	73	7.9	220	6.6	0.01	34	2.4	7.2	2.0	108	5.7	12	0.0	2.0		130	0.18	96	6	14
Oct. 11-20	166	75	--	230	--	--	35	2.4	9.1	--	110	5.5	13	--	3.5		135	.18	97	7	17
Oct. 21-31	175	70	7.4	235	7.4	--	36	2.1	12	1.9	113	5.3	20	1.1	.8		141	.19	98	6	21
Nov. 1-10	276	61	--	240	--	--	34	3.3	11	--	110	5.3	18	--	.5		133	.18	99	8	19
Nov. 11-20	373	52	7.8	217	6.4	.04	34	2.3	13	2.1	107	7.0	21	.0	1.0		140	.19	141	94	7
Nov. 21-22, 25, 27-30	423	49	--	222	--	--	34	4.6	6.1	--	104	6.7	17	--	1.0		131	.18	150	104	11
Nov. 23-24, 26	476	51	--	386	--	--	39	5.6	30	--	100	6.9	68	--	1.0		214	.29	275	120	35
Dec. 1-10	394	52	--	308	--	--	36	2.8	23	--	102	7.7	42	--	.2		179	.24	190	101	18
Dec. 11-14	459	45	--	219	--	--	36	2.6	6.5	--	104	7.6	15	--	.5		126	.17	156	100	15
Dec. 15-20	399	45	--	309	--	--	36	4.3	24	--	100	7.2	49	--	1.0		173	.24	186	108	26
Dec. 21-31	338	47	7.6	224	5.8	.04	37	2.7	8.8	1.4	110	9.0	17	.0	1.0		137	.19	125	103	13
Jan. 1-10, 1948	1,519	46	--	192	--	--	32	3.5	3.3	--	95	8.9	8.5	--	3.0		116	.16	476	94	16
Jan. 11-20	602	42	7.6	232	6.2	--	34	2.7	8.3	2.0	94	10	18	.2	4.0		134	.18	218	96	19
Jan. 21-31	374	36	--	229	--	--	36	2.1	6.9	--	100	7.7	15	--	3.0		132	.18	133	98	16
Feb. 1-8	436	40	--	214	--	--	35	2.0	6.5	--	100	8.1	12	--	3.0		120	.16	141	96	14
Feb. 9-15	1,118	39	--	98	--	--	15	2.4	1.6	--	40	11	4.2	--	.8		55	.07	166	47	7
Feb. 16-20	1,394	45	--	193	--	--	32	1.9	5.5	--	92	9.9	7.8	--	3.5		115	.16	433	88	12
Feb. 21-29	2,576	50	--	180	--	--	30	2.7	2.6	--	85	10	6.5	--	3.0		110	.15	765	86	6
Mar. 1-10	5,476	47	--	148	--	--	23	2.2	2.9	--	66	7.5	4.8	--	5.0		78	.11	1,150	66	12
Mar. 11-20	2,996	50	--	152	--	--	23	1.8	5.0	--	69	8.7	4.8	--	4.0		97	.13	785	65	8
Mar. 21-31	5,504	59	7.5	145	11	.04	18	1.6	4.8	1.0	55	8.3	5.0	.2	2.5		81	.11	1,200	52	0
Apr. 1-10	1,942	64	--	175	--	--	27	1.2	6.3	--	71	11	8.8	--	4.9		110	.15	517	72	14
Apr. 11-20	2,421	68	8.4	166	17	.02	15	1.3	4.5	1.2	151	3.5	6.0	.0	2.0		79	.11	576	43	1
Apr. 21-30	1,871	71	--	180	--	--	26	1.9	8.0	--	98	8.3	7.6	--	3.5		93	.13	235	69	5
May 1-10	648	71	7.5	185	8.1	.02	31	1.7	7.5	1.3	76	6.6	9.2	.0	2.5		116	.16	203	84	4
May 11-20	2,317	74	--	165	--	--	22	1.4	12	--	76	11	8.6	--	2.0		96	.13	601	61	0
May 21-31	1,198	75	7.5	184	9.7	.02	30	2.1	4.4	2.0	95	6.4	6.2	.0	3.0		115	.16	372	84	6

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

June 1-10	595	81	--	199	--	--	28	1.7	12	95	7.4	11	--	1.8	115	.16	182	77	0	25
June 11-22	447	83	--	213	--	--	30	1.6	11	96	8.7	12	--	1.5	123	.17	148	81	3	23
June 23-30	6,918	75	--	152	--	--	20	2.3	8.6	76	7.0	4.0	--	3.5	83	.11	1,550	59	0	24
July 1-10	2,353	79	10	177	10	10	30	1.8	4.2	93	6.5	4.5	.0	5.0	110	.15	699	82	6	10
July 11-20	1,217	84	--	187	--	--	28	1.0	8.0	94	5.3	4.5	--	3.0	113	.15	371	74	0	19
July 21-31	945	84	12	192	12	.02	34	1.8	3.9	102	5.3	6.8	.0	4.0	120	.16	306	92	9	8
Aug. 1-7	544	81	--	202	--	--	27	2.1	11	99	4.9	8.0	--	3.5	127	.17	187	76	0	24
Aug. 8-12	5,406	78	--	145	--	--	19	.7	8.4	70	4.8	2.5	--	3.5	73	.10	1,070	50	0	27
Aug. 13-17	22,200	76	--	85.5	--	--	11	1.3	2.1	36	3.6	1.2	--	3.0	40	.05	2,400	33	3	12
Aug. 21-31	1,996	80	12	171	12	.06	30	1.9	2.9	92	5.6	4.2	.2	4.0	108	.15	582	83	7	7
Sept. 1-10	1,013	74	3.3	190	3.3	.04	32	1.8	4.6	98	6.7	7.0	.0	3.0	112	.15	306	87	7	10
Sept. 11-20	554	72	--	201	--	--	32	1.4	5.5	95	5.6	8.2	--	3.0	119	.16	178	86	8	12
Sept. 21-30	389	68	--	198	--	--	34	1.6	3.9	101	5.1	7.8	--	1.2	119	.16	125	91	9	9
Weighted average---	1,772	--	--	155	--	--	22	1.8	5.7	70	6.8	5.9	--	3.1	88	0.12	421	62	5	17

ARKANSAS RIVER BASIN--Continued  
ILLINOIS RIVER NEAR GORE, OKLA.--Continued

Temperature ( $^{\circ}$  F.) of water, water year October 1947 to September 1948

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

ARKANSAS RIVER BASIN--Continued  
CANADIAN RIVER NEAR SANCHEZ, N. MEX.

LOCATION.--At Sabinoso, San Miguel County, about 5 miles upstream from State Highway 65, 1 mile upstream from Lagartija Creek, 3 miles northeast of Sanchez, San Miguel County, 10 miles downstream from Mora River, and 24 miles southwest of Mosquero, San Miguel County.

DRAINAGE AREA.--5,925 square miles (revised).

RECORDS AVAILABLE.--Chemical analyses: October 1940 to September 1948.

EXTREMES 1947-48.--Dissolved solids: Maximum, 1,540 parts per million Nov. 21-30; minimum, 288 parts per million Aug. 5-7.

Total hardness: Maximum, 842 parts per million Nov. 21-30; minimum, 193 parts per million Aug. 5-7.

EXTREMES 1940-48.--Dissolved solids: Maximum, 2,320 parts per million June 10-11, 1943; minimum, 264 parts per million May 11-20, 1941.

Total hardness: Maximum, 1,260 parts per million June 10-11, 1943; minimum, 104 parts per million Sept. 22, 28-29, 1941.

REMARKS.--Records of water discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1117. Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-foot)	Temp-erature (° F.)	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Per-cent sodium
																Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
Oct. 1-10, 1947	3.9	7.3	1,420	12	0.03	135	59	111		216	574	32	0.3	1.0	0.1	1,030	1.40	11	580	402	30
Oct. 11-13, 15-18	27.1	7.6	1,370	12	.02	129	58	104		189	562	32	.3	1.4	.2	992	1.35	73	560	406	29
Oct. 14	57	--	585	--	--	--	--	--	--	162	153										
Nov. 1-10	10.1	7.6	1,870	9.0	.03	170	86	160		192	872	42	.4	.6	.3	1,430	1.94	39	776	630	31
Nov. 11-20	17.3	7.7	1,920	8.9	.02	178	88	158		196	890	44	.3	.7	.3	1,460	1.99	68	806	646	30
Nov. 21-30	26.7	7.8	1,980	8.6	.02	184	93	168		193	940	47	.3	.4	.4	1,540	2.09	111	842	684	30
Dec. 1-10	34.4	7.8	1,840	9.4	.02	168	88	150		196	854	40	.3	.3	.3	1,410	1.92	131	781	620	29
Dec. 11-20	34.7	7.7	1,900	9.7	.02	178	90	156		226	872	42	.2	.4	.3	1,460	1.99	137	814	629	29
Dec. 21-31	27.7	7.9	1,510	12	.03	138	70	119		230	628	34	.3	.5	.3	1,120	1.52	82	632	444	29
Jan. 1-10, 1948	38.5	7.9	1,590	12	.02	150	74	124		216	693	35	.3	.4	.1	1,200	1.63	128	679	502	28
Jan. 11-20	30.8	7.8	1,720	7.8	.02	167	83	131		210	786	37	.3	.6	.1	1,320	1.80	181	758	586	27
Jan. 21-31	40.8	7.9	1,660	9.0	.03	176	94	168		212	875	40	.2	.5	.1	1,470	2.00	162	826	652	31
Feb. 1-10	41.6	7.9	1,720	9.7	.02	163	84	133		217	778	37	.2	.4	.1	1,310	1.78	147	752	574	28
Feb. 11-23	92.3	7.9	1,630	9.8	.03	157	78	123		214	725	34	.3	1.0	.1	1,230	1.67	307	712	536	27
Feb. 24-26	1,056	8.0	760	9.4	.03	79	29	48		165	256	11	.3	3.9	.1	517	1.70	1,470	316	182	25
Feb. 27-29	358	7.9	1,490	12	.03	112	53	84		183	495	20	.2	2.4	.1	860	1.17	831	498	382	27
Mar. 1-10	179	7.7	1,300	9.6	.02	120	59	96		191	534	28	.3	1.5	.1	941	1.28	455	542	386	28
Mar. 11-20	301	7.8	1,360	10	.02	134	63	100		192	562	26	.3	2.3	.1	984	1.34	800	568	411	28
Mar. 21-31	135	7.8	1,350	8.2	.02	122	63	102		197	557	29	.3	1.8	.1	980	1.33	357	564	402	28
Apr. 1-10	106	7.8	1,130	9.9	.02	106	51	76		195	428	22	.4	1.2	.1	791	1.08	226	474	314	26
Apr. 11-20	163	7.8	955	11	.02	92	43	58		176	348	17	.3	2.6	.1	659	.90	290	406	262	24
Apr. 21-30	172	7.8	838	12	.02	88	35	46		166	292	15	.3	2.2	.1	572	.78	266	364	228	22
May 1-10	53.7	7.7	925	15	.04	88	38	62		197	318	14	.2	1.0	.1	634	.86	95	378	216	26
May 11-20	80.9	7.9	1,250	15	.05	110	55	98		182	505	24	.2	6.1	.1	903	1.23	197	500	352	30
May 21-26, 28-31	756	7.9	729	17	.04	76	28	44		177	229	10	.3	2.7	.1	494	.67	1,010	304	160	24
May 27	1,400	--	1,480	25	--	153	63	104		213	632	20	--	5.9	--	1,110	1.51	4,200	640	466	26

1/ Includes discharge for Oct. 14.

2/ Discharge for Feb. 23 included in discharge for Feb. 24-26.

ARKANSAS RIVER BASIN--Continued  
CANADIAN RIVER NEAR SANCHEZ, N. MEX.--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
June 1-11, 1948 3/ -	1,760		7.4	704	17	0.02	79	26	38		197	202	9.0	0.4	1.9	0.1	470	0.64	2,230	304	142	21
June 12-20 4/ -----	979		7.5	640	14	.10	70	22	39		161	194	10	.3	1.7	.1	430	.56	1,140	265	133	24
June 21-28 -----	429		7.4	942	14	.06	98	34	66		177	345	15	.3	3.0	.1	663	.90	768	384	240	27
June 29-30, July 1-5	122		7.5	948	14	.04	91	39	64		165	351	17	.3	2.1	.1	660	.90	217	398	252	26
July 6-13 -----	230		7.6	780	12	.07	109	29	16		157	263	15	.3	1.1	.1	523	.71	325	391	262	8
July 14-20 -----	46.4		7.5	1,680	11	.05	156	78	137		167	785	37	.4	.1	.1	1,290	1.75	162	710	572	30
July 21-31 -----	45.2		7.5	1,530	12	.06	137	70	122		153	691	34	.4	.5	.1	1,140	1.55	139	630	504	30
Aug. 1-4, 8-10 5/ --	70.2		7.9	1,430	17	.01	126	63	117		157	630	29	.5	1.4	--	1,060	1.44	201	574	445	31
Aug. 5-7 -----	398		8.2	420	20	.03	56	13	22		173	84	6.0	1.2	.4	--	238	.39	309	193	51	20
Aug. 11-20 -----	110		7.9	1,260	19	.01	119	51	95		163	523	22	.5	3.0	--	913	1.24	271	506	373	29
Aug. 21-26 -----	93.2		8.0	747	14	.02	77	27	51		158	245	18	.4	2.9	--	513	.70	129	303	174	27
Aug. 27-31 -----	20.0		7.8	1,270	15	.02	121	52	98		178	520	26	.5	2.9	--	923	1.26	50	516	370	29
Sept. 1-10 -----	6.2		7.8	1,530	13	.02	137	64	126		197	640	35	.4	2.0	.1	1,110	1.51	19	605	444	31
Sept. 11, 13-20 -----	2.1		7.8	1,330	12	.02	116	55	110		206	518	32	.4	1.7	.1	947	1.29	54	516	340	32
Sept. 21-30 -----	1.0		7.8	1,320	13	.02	114	54	110		211	507	30	.4	1.5	.1	934	1.27	25	506	334	32
Weighted average --	191		--	906	14	0.04	93	37	59		179	326	15	0.3	2.1	--	635	0.96	327	364	238	25

3/ Discharge of June 11 included in discharge for June 13-20.

4/ Includes discharge for June 21.

5/ Discharge for Aug. 8 included in discharge for Aug. 5-7.

## ARKANSAS RIVER BASIN--Continued

## RESERVOIR BEHIND CONCHAS DAM, N. MEX.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Sampling point	Specific conductance (micromhos at 25° C.)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)
MONTHLY COMPOSITE SAMPLES					
Oct. 4, 9, 16, 21, 1947 ---	Station 1 <u>1</u> /	1,040	--	390	--
Nov. 7, 15, 20, 25 -----		1,040	--	393	--
Dec. 4, 10, 16, 25, 31 ----		1,040	--	394	--
Jan. 14, 21, 28, 1948 ----		1,060	156	401	23
Feb. 5, 12, 20, 26 -----		1,050	158	404	23
Mar. 3, 11, 27 -----		1,060	159	416	23
Apr. 1, 7, 12, 20 -----		1,060	161	409	24
May 5, 11, 28 -----		1,070	161	410	24
June 2, 8, 18, 25, 28 -----		1,060	160	407	24
July 6, 13, 27 -----		1,030	--	396	--
Aug. 3, 9, 16, 24, 30 -----		1,010	--	387	--
Sept. 6, 14, 20, 27 -----		1,010	--	387	--
Oct. 4, 9, 16, 21, 1947 ---	Station 2 <u>2</u> /	1,040	--	390	--
Nov. 7, 15, 20, 25 -----		1,040	--	397	--
Dec. 4, 10, 16, 25, 31 ----		1,050	--	393	--
Jan. 14, 21, 28, 1948 ----		1,050	159	400	22
Feb. 5, 12, 20, 26 -----		1,050	160	401	23
Mar. 3, 11, 17, 27 -----		1,050	162	404	25
Apr. 1, 7, 12, 20 -----		1,060	160	410	25
May 5, 11, 21, 28 -----		1,060	165	412	25
June 2, 8, 18, 25, 28 -----		1,050	157	402	24
July 6, 13, 27 -----		1,030	--	391	24
Aug. 3, 9, 16, 24, 30 -----		1,010	--	388	--
Sept. 6, 14, 20, 27 -----		1,010	--	383	--
Oct. 4, 9, 16, 21, 1947 ---	Station 3 <u>3</u> /	1,030	--	391	--
Nov. 7, 15, 20, 25 -----		1,040	--	393	--
Dec. 4, 10, 16, 25, 31 ----		1,050	--	399	--
Jan. 14, 21, 38, 1948 ----		1,060	162	401	23
Feb. 5, 12, 20, 26 -----		1,050	160	402	24
Mar. 3, 11, 17, 27 -----		1,060	158	402	23
Apr. 1, 7, 12, 20 -----		1,060	160	404	23
May 5, 11, 21, 28 -----		1,070	163	409	23
June 2, 8, 18, 25, 28 -----		1,050	158	407	24
July 6, 13, 27 -----		1,020	--	389	--
Aug. 3, 9, 16, 24, 30 -----		1,000	--	380	--
Sept. 6, 14, 20, 27 -----		988	--	379	--

1/ Station 1: Conchas River arm of reservoir, approximately 3,000 feet above dam.2/ Station 2: 400 feet above dam.3/ Station 3: Canadian River arm of reservoir, 800 feet above dam.

## ARKANSAS RIVER BASIN--Continued

## RESERVOIR BEHIND CONCHAS DAM, N. MEX.--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Sampling point	Depth (feet)	Specific conductance (micromhos at 25° C.)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)
SAMPLES FROM DIFFERENT DEPTHS						
Oct. 30, 1947-----	Station 1 <u>1</u> /	Surface	1,040	158	390	--
		25	1,030	--	--	--
		50	1,030	--	--	--
		75	1,030	--	--	--
		100	1,030	--	--	--
		105	1,040	--	--	--
		110	1,030	--	--	--
		115	1,030	--	--	--
		120	1,110	230	392	--
Jan. 6, 1948-----	Station 1 <u>1</u> /	Surface	1,040	--	--	--
		25	1,040	159	398	--
		50	1,050	--	--	--
		75	1,050	--	--	--
		100	1,050	--	--	--
		105	1,050	--	--	--
		110	1,040	--	--	--
		115	1,040	--	--	--
		119	1,040	--	--	--
Apr. 27-----		Surface	1,070	161	406	27
		25	1,060	--	--	--
		50	1,060	--	--	--
		75	1,060	160	412	25
		102	1,070	--	--	--
		107	1,070	--	--	--
		112	1,070	--	--	--
		117	1,080	--	--	--
		122	1,090	175	415	30
July 2-----	Station 1 <u>1</u> /	120	1,110	401	206	--
		115	1,060	--	--	--
		110	1,070	--	--	--
		105	1,070	--	--	--
		100	1,070	409	164	--
July 20-----	Station 1 <u>1</u> /	Surface	1,040	151	409	--
		25	1,040	--	--	--
		50	1,040	--	--	--
		75	1,040	--	--	--
		100	1,060	--	--	--
		105	1,050	--	--	--
		110	1,050	--	--	--
		115	1,060	--	--	--
		120	1,060	--	--	--
Oct. 30, 1947-----	Station 2 <u>2</u> /	125	1,060	166	403	--
		Surface	1,030	158	387	--
		25	1,040	--	--	--
		50	1,030	--	--	--
		75	1,030	--	--	--
		100	1,040	--	--	--
		115	1,030	--	--	--
		120	1,030	--	--	--
		125	1,040	--	--	--
Jan. 6, 1948-----	Station 2 <u>2</u> /	130	1,040	158	390	--
		135	1,310	850	--	--
		Surface	1,050	159	394	--
		25	1,040	--	--	--
		50	1,040	--	--	--
		75	1,040	--	--	--
		100	1,040	--	--	--
		110	1,050	--	--	--
		115	1,040	--	--	--
		120	1,040	--	--	--
		125	1,040	--	--	--
		132	1,050	162	398	--

1/ Station 1: Conchas River arm of reservoir, approximately 3,000 feet above dam.2/ Station 2: 400 feet above dam.



## ARKANSAS RIVER BASIN--Continued

## RESERVOIR BEHIND CONCHAS DAM, N. MEX.--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Sampling point	Depth (feet)	Specific conductance (micromhos at 25° C.)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)
SAMPLES FROM DIFFERENT DEPTHS--Continued						
Apr. 27, 1948 -----	Station 2 <u>2</u> /	Surface	1,060	164	408	25
		25	1,070	--	--	--
		50	1,060	--	--	--
		75	1,070	--	--	--
		100	1,070	--	--	--
		115	1,070	--	--	--
		120	1,070	--	--	--
		125	1,070	--	--	--
		130	1,070	--	--	--
		135	1,140	266	369	23
July 20-----	Station 2 <u>2</u> /	Surface	1,030	148	399	--
		25	1,030	--	--	--
		50	1,030	--	--	--
		75	1,060	--	--	--
		100	1,060	--	--	--
		115	1,060	--	--	--
		120	1,050	--	--	--
		125	1,060	--	--	--
		130	1,060	167	400	--
		135	1,080	179	435	--
Oct. 30, 1947-----	Station 3 <u>3</u> /	Surface	1,030	158	387	--
		25	1,030	--	--	--
		50	1,030	--	--	--
		75	1,030	--	--	--
		100	1,030	--	--	--
		105	1,030	--	--	--
		110	1,030	--	--	--
		115	1,030	--	--	--
		120	1,110	218	387	--
Jan. 6, 1948-----	Station 3 <u>3</u> /	Surface	1,050	153	400	--
		25	1,050	--	--	--
		50	1,050	--	--	--
		75	1,050	--	--	--
		100	1,050	--	--	--
		105	1,040	--	--	--
		110	1,040	--	--	--
		115	1,040	--	--	--
		119	1,130	248	--	--
Apr. 27 -----	Station 3 <u>3</u> /	Surface	1,070	161	409	34
		25	1,070	--	--	--
		50	1,060	--	--	--
		75	1,070	--	--	--
		105	1,070	--	--	--
		110	1,070	--	--	--
		115	1,070	--	--	--
		120	1,070	--	--	--
		125	1,180	367	326	23
July 20-----	Station 3 <u>3</u> /	Surface	1,030	149	402	--
		25	1,030	--	--	--
		50	1,030	--	--	--
		75	1,040	--	--	--
		100	1,050	--	--	--
		105	1,060	--	--	--
		110	1,060	167	410	--
		115	1,070	--	--	--
		120	1,080	183	405	--
Oct. 30, 1947-----	Station 6 <u>4</u> /	Surface	1,040	131	386	--
		25	1,040	--	--	--
		50	1,040	--	--	--
		70	1,040	--	--	--
		75	1,030	--	--	--
		80	1,030	--	--	--
		85	1,040	--	--	--
		90	1,070	182	386	--

2/ Station 2: 400 feet above dam.3/ Station 3: Canadian River arm of reservoir, 800 feet above dam.4/ Station 6: Conchas River arm of reservoir, 5 miles above dam.

## ARKANSAS RIVER BASIN--Continued

## RESERVOIR BEHIND CONCHAS DAM, N. MEX.--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Sampling point	Depth (feet)	Specific conductance (micromhos at 25 °C.)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)
SAMPLES FROM DIFFERENT DEPTHS--Continued						
Jan. 6, 1948-----	Station 6 <u>4</u> /	Surface	1,050	160	388	--
		25	1,050	--	--	--
		50	1,040	--	--	--
		65	1,050	--	--	--
		70	1,040	--	--	--
		75	1,050	--	--	--
		80	1,060	--	--	--
		87	1,100	194	394	--
Apr. 27 -----	Station 6 <u>4</u> /	Surface	1,070	164	408	25
		25	1,070	--	--	--
		50	1,060	--	--	--
		70	1,070	--	--	--
		75	1,060	--	--	--
		80	1,070	--	--	--
		85	1,070	--	--	--
		90	1,080	173	414	23
July 20-----	Station 6 <u>4</u> /	Surface	1,040	153	406	--
		25	1,040	--	--	--
		50	1,050	--	--	--
		70	1,070	--	--	--
		75	1,070	--	--	--
		80	1,060	--	--	--
		85	1,070	--	--	--
		90	1,070	167	406	--
Nov. 1, 1947 -----	Station 7 <u>5</u> /	Surface	1,040	154	378	--
		25	1,030	--	--	--
		50	1,030	--	--	--
		75	1,030	--	--	--
		95	1,030	--	--	--
		100	1,030	--	--	--
		105	1,030	--	--	--
		110	1,030	--	--	--
Jan. 1, 1948-----	Station 7 <u>5</u> /	115	1,020	420	321	--
		Surface	1,050	159	391	--
		25	1,050	--	--	--
		50	1,050	--	--	--
		75	1,050	--	--	--
		100	1,050	--	--	--
		105	1,040	--	--	--
		110	1,040	--	--	--
Apr. 27 -----	Station 7 <u>5</u> /	115	1,040	--	--	--
		120	1,100	208	391	--
		Surface	1,070	163	409	25
		25	1,070	--	--	--
		50	1,070	--	--	--
		80	1,090	--	--	--
		85	1,090	--	--	--
		90	1,090	--	--	--
July 20-----	Station 7 <u>5</u> /	95	1,100	166	424	24
		100	1,230	277	437	21
		Surface	981	143	384	--
		25	997	--	--	--
		50	981	--	--	--
		75	1,040	--	--	--
		95	1,040	164	404	--
		100	1,050	--	--	--
		105	1,050	--	--	--
		110	1,040	--	--	--
		115	1,050	170	104	--

4/ Station 6: Conchas River arm of reservoir, 5 miles above dam.5/ Station 7: Canadian River arm of reservoir, 5 miles above dam.

## ARKANSAS RIVER BASIN--Continued

## RESERVOIR BEHIND CONCHAS DAM, N. MEX.--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Sampling point	Depth (feet)	Specific conductance (micromhos at 25° C.)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)
SAMPLES FROM DIFFERENT DEPTHS--Continued						
June 2, 1948-----	Range 12	30	1,050	126	391	--
		30	1,100	--	413	--
June 2-----	Range 16	75	1,110	--	415	--
		70	1,090	164	409	--
	<u>6/</u>	Surface	994	155	363	--
		6	992	152	359	--
	<u>7/</u>	40	1,120	--	389	--
		35	1,090	--	402	--

6/ 500 feet up Trementina Creek.7/ Half a mile below confluence with Cuervo Creek.

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

LOCATION--At Boys' Ranch near Tascosa, Oldham County, 20 miles upstream from gaging station near Amarillo, Potter County.  
DRAINAGE AREA--19,200 square miles (revised)  
RECORDS AVAILABLE--Chemical analyses, June to September 1948.  
EXTREMES 1948--Dissolved solids: Maximum 1,220 parts per million Sept. 17, 19-20; minimum 570 parts per million July 8, 13-14, 20, 22.  
Total hardness: Maximum 441 parts per million Sept. 17, 19-20; minimum 198 parts per million Aug. 5-12.  
REMARKS--Records of discharge for gaging station near Amarillo, Tex., for water year October 1947 to September 1948 given in Water-Supply Paper 1117. No appreciable inflow between sampling point and gaging station except during periods of heavy local rains. Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	Specific conductance (micro-mhos at 25° C.)	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
																Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
June 3-10, 1948----	1,726	70	1,390	14		88	36		167	186	403	110		3.2		942	1.28	4,390	368	215	50
June 11-19 -----	376	70	1,550	13		94	40		187	174	452	135		2.8		1,010	1.37	1,030	399	256	50
June 20-30 -----	3,207	69	1,050	13		64	27		123	174	280	73		.8		697	.95	6,040	270	128	50
July 1-5, 9-11, 15-16																					
July 17-19, 21, 23-29	147	71	1,470	15		80	33		159	167	336	135		2.8		855	1.16	339	335	198	51
July 8, 13-14, 20, 22	290	70	930	17		50	20		114	147	203	85		2.2		570	.78	446	207	86	54
July 6-7, 12, 17-18, 30-----	74.8	69	1,760	16		101	42		218	179	428	215		2.8		1,110	1.51	224	424	278	53
Aug. 1-2, 4, 13-20--	1,283	69	1,530	19		80	35		183	174	354	178		1.2		985	1.34	3,410	343	200	55
Aug. 5-12 -----	860	69	927	21		48	19		117	162	194	81		5.0		579	.79	1,340	198	65	56
Aug. 21-25 -----	97.5	69	1,550	22		83	35		203	180	358	182		2.2		1,384	1.34	259	351	204	56
Sept. 17, 19-20-----	6.16	--	1,920	18		92	52		251	192	469	240		3.2		1,220	1.66	240	441	284	55
Sept. 21-30-----	25.0	--	1,900	15		90	49		251	190	465	235		1.2		1,200	1.63	81	426	270	56

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

LOCATION.--At bridge on State Highway 10, three-quarters of a mile north of Whitefield, Haskell County, 5½ miles upstream from Snake Creek, and 2 miles above gaging station.

DRAINAGE AREA.--47,486 square miles above gaging station.

RECORDS AVAILABLE.--Chemical analyses: September 1944 to February 1945, September 1946 to September 1948.

Water temperatures: September 1944 to February 1945, September 1946 to September 1948.

EXTREMES, 1947-48.--Dissolved solids: Maximum, 5,500 parts per million Nov. 18, 20; minimum, 89 parts per million Jan. 2, 5-7.

Total hardness: Maximum, 1,160 parts per million Oct. 1; minimum, 18 parts per million Feb. 17.

Water temperatures: Maximum, 82° F. June 16, 18, 20, July 26, Aug. 23; minimum, freezing point on several days in January and March.

EXTREMES, 1944-48.--Dissolved solids: Maximum, 5,520 parts per million Sept. 3-6, 1944; minimum, 89 parts per million Jan. 2, 5-7, 1948.

Total hardness: Maximum, 1,250 parts per million Sept. 3-6, 1944; minimum, 18 parts per million Feb. 17, 1948.

Water temperatures: Maximum, 88° F. Sept. 4, 1944; minimum, freezing point on many days in winter months.

REMARKS.--Records of water discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1117. Records of specific conductance of daily samples available in district office at Stillwater, Okla.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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> )	Bo-ron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Per- cent so- dium
																	Parts per mil- lion	Tons per acre- foot	Tons per day	Total	Non-carbon- ate	
Oct. 1, 1947	303	62	--	9,670	--	--	--	--	--	--	118	77	3,660	--	7.0	--	--	--	--	1,160	--	--
Oct. 2	274	62	--	8,280	--	--	--	--	--	--	144	72	3,060	--	6.0	--	--	--	--	1,130	--	--
Oct. 8-10	208	68	--	6,470	--	230	59	1,160	1,160	--	150	27	2,260	--	6.0	--	3,820	5.20	2,150	818	694	76
Oct. 11-17	166	66	--	6,280	--	230	58	1,130	1,130	--	150	36	2,200	--	5.0	--	3,730	5.07	1,670	812	690	75
Oct. 18	2,260	69	--	2,533	--	--	--	--	--	--	40	10	18	--	2.5	--	--	--	--	39	--	--
Oct. 19-22, 24	805	65	--	1,290	--	66	17	176	--	--	142	26	335	--	2.5	--	1,720	1.00	1,590	235	118	62
Oct. 23, 25, 27	761	63	--	3,060	--	123	31	495	--	--	152	42	850	--	5.0	--	732	2.34	3,530	434	310	71
Oct. 26, 28-30	1,036	62	--	5,710	--	202	55	1,020	1,020	--	130	49	1,960	--	7.0	--	3,380	4.60	9,450	730	624	75
Oct. 31, Nov. 1-5	434	60	--	7,740	--	281	81	1,420	1,420	--	134	44	2,800	--	15	--	4,710	6.41	5,520	1,034	924	75
Nov. 6-14	277	51	7.9	5,760	12	0.10	214	30	1,130	25	164	34	2,050	0.0	4.0	--	3,560	4.84	2,660	575	440	80
Nov. 15-16	1,830	48	--	2,860	--	106	32	465	--	--	100	49	900	--	5.0	--	1,610	2.19	7,960	396	314	72
Nov. 17, 19, 21	1,377	52	--	4,810	--	179	57	822	--	--	130	30	1,650	--	5.0	--	2,810	3.82	10,400	681	574	72
Nov. 18, 20	1,257	49	--	8,820	--	321	84	1,680	--	--	97	40	3,320	--	7.0	--	5,500	7.48	18,700	1,150	1,070	76
Nov. 22	1,900	49	--	258	--	--	--	--	--	--	46	9.0	22	--	1.5	--	--	--	--	41	--	--
Nov. 23-24	1,735	44	--	117	--	--	--	--	--	--	26	7.0	26	--	2.5	--	--	--	--	32	--	--
Nov. 25	3,400	49	--	3,400	--	--	--	--	--	--	102	29	1,130	--	6.0	--	--	--	--	422	--	--
Nov. 26-30	1,500	46	--	7,050	--	260	73	1,310	1,310	--	128	33	2,580	--	15	--	4,330	5.89	8,460	948	844	75
Dec. 1-6	412	50	--	5,930	--	248	62	975	--	--	184	58	1,970	--	6.0	--	3,410	4.64	3,790	874	723	71
Dec. 7-8, 10	3,043	52	--	1,850	--	83	24	254	--	--	120	25	535	--	4.5	--	970	1.32	7,970	306	232	64
Dec. 9, 12-15	1,371	41	--	4,060	--	154	42	628	--	--	92	40	1,260	--	5.0	--	2,190	2.96	8,110	556	456	71
Dec. 11, 16-20	1,036	44	--	3,030	--	114	34	453	--	--	104	85	910	--	6.0	--	1,600	2.18	4,480	424	340	70
Dec. 21-23	592	46	--	4,140	--	163	45	644	--	--	154	40	1,290	--	5.0	--	2,270	3.09	3,630	592	466	80
Dec. 24-25, 27-31	494	46	--	6,760	--	272	73	1,140	--	--	188	43	2,300	--	6.0	--	3,930	5.34	5,240	978	824	72
Dec. 26	435	40	--	94.9	--	--	--	--	--	--	28	17	9.5	--	3.0	--	--	--	--	20	--	--

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

Chemical analyses, in parts per million, water year October 1947 to September 1948.—Continued																							
Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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 carbonate	
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate		
Jan. 1, 1948	12,700	38	--	649	--	--	--	--	--	--	34	12	138	--	2.0	--	--	--	--	73	--	--	
Jan. 2, 5-7	4,725	40	--	77.4	--	--	6.4	2.8	10	--	16	13	14	--	4.0	--	--	89	1.21	1,140	27	14	15
Jan. 3-4	8,570	39	--	338	--	--	--	--	--	--	21	7.0	--	--	3.0	--	--	--	--	46	--	--	
Jan. 8, 12, 14	2,900	46	--	2,900	--	--	110	31	431	--	84	23	880	--	7.5	--	--	1,520	2.07	4,170	402	333	70
Jan. 9	1,015	46	--	804	--	--	--	--	--	--	38	12	215	--	4.0	--	--	--	--	94	--	--	
Jan. 10, 13, 16	868	40	--	1,710	--	--	64	19	247	--	72	19	490	--	6.0	--	--	997	1.36	2,340	238	179	69
Jan. 11	920	50	--	4,670	--	--	--	--	--	--	97	15	1,680	--	5.0	--	--	--	--	605	--	--	
Jan. 17	560	32	--	535	--	--	--	--	--	--	46	13	128	--	7.0	--	--	--	--	32	--	--	
Jan. 15, 19-22	586	39	--	5,630	--	--	219	56	941	--	153	39	1,880	--	7.5	--	--	3,220	4.38	5,090	777	651	73
Jan. 18	630	33	--	118	--	--	--	--	--	--	20	12	14	--	7.0	--	--	--	--	28	--	--	
Jan. 23	484	35	--	256	--	--	--	--	--	--	33	13	15	--	3.0	--	--	--	--	37	--	--	
Jan. 24, 27	350	32	--	2,840	--	--	113	30	426	--	115	26	855	--	6.0	--	--	1,510	2.05	1,430	406	312	70
Jan. 25	390	32	--	894	--	--	--	--	--	--	58	5.0	228	--	4.0	--	--	--	--	119	--	--	
Jan. 26	320	32	--	4,920	--	--	--	--	--	--	153	7.0	1,650	--	10	--	--	--	--	646	--	--	
Jan. 28, 30	260	32	--	8,260	--	--	276	75	1,310	--	117	45	2,620	--	10	--	--	4,390	5.97	3,080	997	901	74
Jan. 29, 31	265	39	--	305	--	--	--	--	--	--	32	10	15	--	4.0	--	--	--	--	37	--	--	
Feb. 1	280	43	--	7,850	--	--	--	--	--	--	153	12	2,700	--	10	--	--	--	--	1,100	--	--	
Feb. 2	340	40	--	292	--	--	--	--	--	--	39	15	15	--	4.0	--	--	--	--	38	--	--	
Feb. 3-5	585	44	--	130	--	--	10	4.4	12	--	40	18	10	--	3.0	--	--	99	.13	156	43	10	37
Feb. 6, 10-11	1,820	41	--	96.7	--	--	--	--	--	--	15	10	7.0	--	3.0	--	--	--	--	20	--	--	
Feb. 9	2,470	37	--	1,470	--	--	--	--	--	--	36	15	345	--	3.0	--	--	--	--	135	--	--	
Feb. 12-15	2,062	38	--	2,236	--	--	11	3.4	31	--	19	14	49	--	12	--	--	161	.22	896	41	26	62
Feb. 16, 18-20	3,322	50	--	1,680	--	--	64	16	248	--	60	20	490	--	4.0	--	--	962	1.31	8,630	226	176	70
Feb. 17	5,920	45	--	101	--	--	--	--	--	--	13	10	8.0	--	5.0	--	--	--	--	18	--	--	
Feb. 21-25	1,262	46	--	3,640	--	--	132	35	561	--	98	33	1,120	--	5.0	--	--	1,930	2.62	6,580	474	396	72
Feb. 26-27, 29	25,970	54	--	833	--	--	46	11	119	--	78	23	232	--	5.0	--	--	535	.73	37,500	160	96	62
Feb. 28	30,400	52	--	1,430	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mar. 1-2	38,950	51	--	714	--	--	36	--	98	--	92	20	172	--	4.0	--	--	405	.55	42,500	128	53	62
Mar. 3-10	10,460	44	--	1,340	--	--	69	18	174	--	126	49	390	--	5.0	--	--	758	1.03	21,400	246	143	31
Mar. 11, 13, 15-18	8,742	45	--	1,820	--	--	74	22	269	--	101	41	520	--	2.0	--	--	978	1.33	23,100	275	192	68
Mar. 12, 14, 19-20	6,048	47	--	1,380	--	--	68	19	185	--	112/128	46	352	--	.0	--	--	790	1.07	22,900	246	143	82
Mar. 21-28	11,050	57	--	1,430	--	--	64	18	197	--	106	45	375	--	.5	--	--	819	1.11	24,400	284	147	35
Mar. 29-31, Apr. 1-4	5,366	56	--	1,130	--	--	52	14	154	--	105	26	290	--	1.0	--	--	650	.88	9,450	187	101	64

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

Apr. 5-10-----	1,703	64	--	--	2,450	--	--	80	31	362	79	46	710	--	2.0	1,270	1.73	5,840	327	262	71	
Apr. 11-12-----	3,790	67	--	--	2,010	--	--	83	23	281	102	35	560	--	4.0	1,040	1.41	10,600	302	218	67	
Apr. 13-----	2,340	57	--	--	162	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Apr. 14-16-----	1,550	61	--	--	3,270	--	--	34	499	96	37	1,000	--	4.0	1,740	2.37	7,280	444	366	71		
Apr. 17-20-----	905	68	--	--	5,850	--	--	208	60	1,040	110	45	2,050	--	4.0	3,460	4.71	8,450	766	676	75	
Apr. 21-30, May 1----	12,040	71	--	--	6,000	--	--	199	66	1,050	132	55	2,050	--	3.0	3,490	4.75	113,000	768	660	75	
May 2-6-----	2,010	67	--	--	3,160	--	--	118	36	479	132	37	945	--	6.0	1,690	2.30	9,170	442	334	70	
May 7-9-----	3,407	65	--	--	3,820	--	--	147	36	586	114	28	1,180	--	4.0	2,040	2.77	18,800	515	422	71	
May 10-11-----	5,230	65	--	--	1,710	--	--	78	20	230	138	23	452	--	3.0	874	1.19	12,300	276	164	64	
May 12-13-----	18,500	63	--	--	2,470	--	--	100	26	354	108	25	715	--	4.0	1,280	1.74	63,900	356	268	68	
May 14-16, 20-----	8,658	70	--	--	1,040	--	--	44	11	138	78	16	265	--	5	1,608	.83	14,200	155	91	66	
May 17-19-----	11,980	69	--	--	536	--	--	30	8.5	164	58	13	132	--	1.0	349	.47	11,200	110	62	56	
May 21-23-----	4,010	72	--	--	942	--	--	38	9.9	130	84	13	236	--	3.7	540	.73	5,850	136	66	68	
May 24-25, 28-----	3,930	69	--	--	1,590	--	--	66	16	232	109	25	438	--	3.3	931	1.27	9,880	231	141	69	
May 26-27, 29-31----	7,750	69	--	--	2,220	--	--	94	24	333	122	25	660	--	.2	1,200	1.63	25,100	333	233	68	
June 1-2, 9-10-----	6,168	74	--	--	2,610	--	--	100	25	345	130	24	685	--	6.0	1,250	1.70	20,800	352	246	66	
June 3-8-----	3,585	76	--	--	1,800	--	--	88	19	253	122	22	510	--	8.0	960	1.31	9,280	289	196	65	
June 11-13, 16-----	1,968	79	--	--	2,690	--	--	102	30	399	129	22	788	--	6.0	1,410	1.92	3,680	378	272	70	
June 14, 17-21-----	1,975	80	--	--	3,730	--	--	184	48	547	166	174	1,080	--	6.0	2,120	2.88	11,300	656	520	64	
June 15, 22-23-----	36,750	76	--	--	1,060	--	--	56	11	146	114	14	275	--	7.0	612	.83	60,700	184	91	53	
June 24-30-----	105,200	73	--	--	586	--	--	44	6.1	53	96	25	103	--	2.0	338	.46	96,000	135	56	46	
July 1-5-----	26,260	75	--	--	739	--	--	53	9.8	67	122	39	125	--	3.0	396	.54	28,100	172	72	46	
July 6-10-----	16,360	77	--	--	1,360	--	--	72	16	154	122	22	320	--	6.0	692	.94	30,600	246	146	58	
July 12-14-----	24,530	80	--	--	1,130	--	--	54	10	139	94	15	272	--	3.0	617	.84	40,800	176	99	63	
July 11, 15-20-----	11,990	79	--	--	765	--	--	44	9.2	80	90	17	163	--	1.0	428	.58	13,900	148	74	54	
July 21-24-----	11,510	79	--	--	885	--	--	54	13	101	98	15	220	--	1.0	508	.69	15,800	188	108	54	
July 25-31-----	5,894	80	--	--	1,960	--	--	91	22	282	122	17	575	--	4.0	1,050	1.43	16,700	318	218	66	
Aug. 1-----	1,800	78	--	--	1,930	--	--	--	--	--	--	--	--	--	4.5	--	--	--	164	--	--	--
Aug. 5-7, 10-----	1,367	76	--	--	2,820	--	--	122	34	420	164	27	845	--	4.0	1,530	2.08	5,650	444	310	67	
Aug. 8-----	2,820	78	--	--	528	--	--	--	--	--	127	5.0	80	--	7.5	--	--	--	64	--	--	--
Aug. 9-----	2,000	71	--	--	1,100	--	--	--	--	--	85	10	288	--	3.5	--	--	--	80	--	--	--
Aug. 11-13, 17-18, 20	2,107	78	--	--	3,500	--	--	143	44	544	182	110	1,030	--	5.0	1,960	2.67	11,200	538	389	69	
Aug. 14-16, 19-----	1,718	78	--	--	4,440	--	--	159	53	713	124	80	1,400	--	7.0	2,470	3.36	11,500	614	513	72	

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

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium
																Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
Aug. 22-26, 1948 ---	2,578	80	--	3,240	--	--	141	47	721		112	105	1,350	--	8.0	2,430	3.30	16,900	545	453	74
Aug. 21, 27-31 ----	1,925	79	--	2,670	--	--	112	36	410		149	164	725	--	5.0	1,520	2.07	7,900	428	306	68
Sept. 1-10 -----	721	73	--	4,080	--	--	147	43	504		167	200	915	--	5.0	1,900	2.58	3,700	544	407	67
Sept. 11-20 -----	405	70	7.6	4,940	6.0	0.10	214	64	759	27	184	68	1,600	0.5	5	2,830	3.85	3,090	797	646	66
Sept. 21-23 -----	322	75	--	4,780	--	--	189	59	886		181	57	1,720	--	8.0	3,010	4.09	2,620	714	566	73
Sept. 24-30 -----	296	63	--	6,350	--	--	248	72	1,220		176	58	2,380	--	4.0	4,070	5.54	3,250	915	771	74
Weighted average --	--	--	--	1,250	--	--	--	--	--	--	102	29	329	--	3.1	--	--	--	--	--	--



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

Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	62	62	45	38	43	52	54	75	71	75	78	--
2	62	60	50	40	40	50	55	70	71	74	79	--
3	64	59	56	39	45	45	56	70	72	75	80	75
4	59	52	52	39	45	44	55	63	72	75	80	75
5	70	57	49	40	43	45	65	71	75	76	72	75
6	70	57	49	40	42	44	69	63	80	75	76	74
7	70	52	59	40	--	44	69	60	77	76	72	77
8	62	49	49	50	--	43	65	65	80	77	--	75
9	64	50	47	48	37	42	60	70	78	79	71	70
10	62	59	47	47	40	43	58	65	75	78	70	65
11	65	48	--	50	40	32	67	64	74	75	81	65
12	68	45	39	50	38	36	67	63	80	--	76	67
13	69	--	40	32	35	35	57	82	81	79	80	87
14	64	48	39	37	37	46	57	65	76	80	80	70
15	66	49	39	40	40	52	63	69	79	79	79	70
16	66	46	41	40	44	50	64	74	82	80	75	71
17	63	48	40	32	45	50	64	70	78	80	76	72
18	69	48	50	33	49	50	72	69	82	81	78	72
19	52	46	52	32	59	--	67	69	83	80	80	74
20	61	50	42	40	50	58	67	70	82	81	80	--
21	64	55	43	38	44	65	69	70	77	81	80	74
22	65	49	50	44	47	52	69	72	76	81	81	75
23	66	47	45	35	41	59	72	75	74	76	82	77
24	68	42	45	32	47	55	72	72	71	77	79	69
25	65	49	38	32	53	56	64	66	71	80	78	65
26	64	47	40	32	58	65	72	67	73	82	78	61
27	59	49	45	32	53	52	74	66	74	81	--	60
28	64	45	47	33	52	50	75	67	72	80	78	64
29	60	45	46	38	52	53	68	70	--	80	76	61
30	45	50	32	32	58	70	72	75	75	80	79	62
31	62	--	48	40	--	60	--	72	--	77	80	--
Average	65	51	46	39	45	50	67	68	76	78	78	70

ARKANSAS RIVER BASIN--Continued  
CIMARRON RIVER AT UTE PARK, N. Mex.

LOCATION--At gaging station half a mile downstream from Ute Creek and 1 mile east of post office at Ute Park, Colfax County.  
DRAINAGE AREA--297 square miles (revised).

RECORDS AVAILABLE--Chemical analyses: June 1945 to September 1947.

EXTREMES, 1947-48.--Dissolved solids: Maximum, 202 parts per million Oct. 21-31; minimum, 105 parts per million June 1-10.  
Total hardness: Maximum, 132 parts per million Oct. 11-20; minimum, 72 parts per million June 1-10.

EXTREMES, 1945-46.--Dissolved solids: Maximum, 202 parts per million Oct. 21-31, 1947; minimum, 100 parts per million May 11-19, 1947.

Total hardness: Maximum, 152 parts per million Oct. 11-20, 1947; minimum, 72 parts per million May 11-19, 1947, June 1-10, 1948.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1117. Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	Chemical analyses, in parts per million, water year October 1947 to September 1948										Dissolved solids		Hardness as CaCO <sub>3</sub>		Percent non-carbonate
					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)	Parts per million	Tons per acre-foot	Tons per day
Oct. 1-10, 1947	45.2	8.1		331	16	0.02	44	9.5	12	2.6	184	18	5.5	0.5	1.0	0.1	200	0.27	24
Oct. 11-20	25.1	8.2		328	15	.02	45	9.7	12	2.2	183	19	5.0	0.5	.5	.1	199	.27	13
Oct. 21-31	23.3	8.1		325	15	.03	44	9.8	12	2.8	184	18	5.0	0.5	4.1	.1	202	.27	13
Nov. 1-10	17.5	7.4		319	15	.01	44	9.7	12	3.8	182	19	5.0	0.4	.5	.1	199	.27	9.4
Nov. 11-20	10.2	7.6		313	14	.02	43	9.6	11	2.8	179	19	4.0	0.4	.5	.1	193	.26	5.3
Nov. 21-25, 27	9.42	7.5		313	14	.01	43	9.4	12	2.0	176	18	5.0	0.4	.6	.1	191	.26	4.9
Dec. 3, 9-10	9.09	7.4		321	13	.01	44	9.7	12	2.2	180	20	5.0	0.6	.8	.1	196	.27	4.8
Dec. 13-20	7.02	7.4		321	14	.02	42	9.6	12	2.8	177	18	4.5	0.4	.8	.1	191	.26	3.6
Dec. 21-31	7.23	7.4		320	14	.01	41	9.7	12	3.0	173	19	5.0	0.4	.9	.1	190	.26	3.7
Jan. 1-10, 1948	6.53	7.6		309	15	.02	40	9.0	11	2.6	163	19	4.3	0.7	.7	.1	183	.25	3.2
Jan. 11-20	6.28	7.8		303	12	.01	41	9.2	12	2.4	166	17	6.8	0.7	1.0	.1	184	.23	3.1
Jan. 21-31	5.77	7.8		301	13	.01	41	8.8	12	2.2	165	18	6.5	0.6	.8	.1	184	.23	2.9
Feb. 2-10	7.0	7.7		283	13	.02	41	8.3	11	2.8	163	17	6.0	0.5	.6	.1	181	.25	3.4
Feb. 11-20	7.30	7.7		298	12	.02	41	8.3	11	2.6	161	18	6.0	0.6	1.3	.1	180	.24	3.5
Feb. 21-29	8.21	7.7		294	14	.04	40	8.5	10	2.9	160	19	4.8	0.4	1.1	.1	180	.24	4.0
Mar. 1-10	8.36	7.6		292	16	.02	40	8.5	11	2.7	160	18	4.5	0.4	1.1	.1	181	.25	4.1
Mar. 11-20	9.30	7.6		283	14	.03	38	8.0	10	2.7	153	17	4.2	0.4	1.2	.1	171	.23	4.3
Mar. 21-31	12.3	7.2		288	15	.02	37	7.7	10	1.6	149	18	5.2	0.4	.9	.1	169	.23	5.6
Apr. 1-10	16.9	7.0		256	15	.04	33	7.6	8.9	1.4	134	15	3.8	0.4	.7	.1	152	.21	6.9
Apr. 11-20	26.2	7.1		206	14	.08	25	6.0	7.4	1.6	102	13	4.0	0.4	1.0	.1	123	.17	8.7
Apr. 21-30	32.8	7.5		178	14	.14	22	5.2	6.3	1.6	91	11	3.5	0.4	1.0	.1	110	.15	9.7
May 1-10	45.4	7.2		223	15	.13	29	6.4	8.0	2.6	118	12	4.2	0.4	.9	.1	137	.19	17
May 11-20	58.7	7.3		245	16	.01	32	6.8	9.2	2.4	129	13	4.8	0.4	1.0	.1	149	.20	24
May 21-31	10.6	7.3		195	15	.02	24	5.0	7.1	4.8	91	12	6.8	0.4	.6	.1	121	.16	35

June 1-10 -----	30.7	7.3	170	14	.02	21	7.1	6.4	2.2	86	10	3.2	.4	.6	.1	105	.14	17	72	2	16
June 11-20 -----	36.0	7.0	256	16	.02	33	7.1	9.4	2.7	136	15	4.2	.5	.7	.1	156	.21	15	112	0	15
June 21-30 -----	54.2	7.0	295	15	.03	36	7.8	11	2.9	161	16	5.0	.4	.9	.1	176	.24	25	127	0	16
July 1-10 -----	59.3	7.2	311	15	.02	42	8.3	12	2.2	139	16	5.5	.4	1.0	.1	183	.25	29	139	0	16
July 11-20 -----	63.9	7.5	321	16	.01	41	9.4	12	2.2	170	19	5.0	.4	1.2	.1	190	.26	33	141	2	15
July 21-31 -----	77.2	7.6	319	16	.02	43	9.0	12	3.6	176	19	4.5	.5	.8	.1	195	.27	41	144	0	15
Aug. 1-10 -----	55.7	7.5	317	16	.02	42	8.6	12	3.4	173	18	4.5	.4	1.1	.1	191	.26	29	140	0	15
Aug. 11-20 -----	42.4	7.9	320	16	.03	44	9.1	11	2.2	177	19	6.0	.6	1.0	.1	196	.27	22	146	2	14
Aug. 21-31 -----	39.5	7.5	316	16	.01	43	9.4	11	2.4	175	17	6.0	.6	.6	.1	192	.26	21	148	2	14
Sept. 1-7, 9-10 -----	40.4	7.2	320	21	.01	43	9.3	12	2.6	177	17	4.5	.5	1.2	.1	192	.27	22	146	0	15
Sept. 11-20 -----	42.0	7.5	322	18	.01	44	10	10	2.2	179	16	5.0	.6	1.1	.1	195	.27	22	151	4	12
Sept. 21-30 -----	42.1	7.7	318	16	.01	42	9.4	13	2.0	180	15	4.5	.6	.8	.1	192	.26	22	144	0	15
Weighted average	31.5	--	279	16	0.03	37	7.9	13	2.8	150	16	5.0	0.5	0.9	--	170	0.7	1	125	2	14

ARKANSAS RIVER BASIN--Continued  
CONCHAS RIVER NEAR VARIADERO, N. MEX.

(Composites of daily samples collected at Quintana Ranch approximately 4 miles upstream from gaging station on State Highway 104 at Variadero, San Miguel County, approximately 14 miles upstream from Conchas Dam. Samples obtained at this point only when rainfall is sufficient to cause the river to flow.)

Date of collection	Mean discharge (second-foot)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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
																	Parts per million	Tons per acre-foot	Total	Non-carbonate	
Oct. 14-16, 1947 ---				546							191	99	17								
May 29-June 2, 1948 -----				945							258	223	40								
June 10, 1948 -----				446							196	52	14								
July 23 -----				873							220	216	36								
Aug. 3-8, 15-18, 20				475			44	12	39		168	79	16		2.1		275	0.37	160	22	34

Chemical analyses, in parts per million, water year October 1947 to September 1948

ARKANSAS RIVER BASIN--Continued  
 POTEAU RIVER NEAR WISTER, OKLA.

LOCATION.--At gaging station 1 1/4 miles downstream from Wister Dam, 1 1/4 miles upstream from Caston Creek, and 2 miles southeast of Wister, Le Flore County. DRAINAGE AREA.--1,012 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1948.

Water temperatures: October 1947 to September 1948.

EXTREMES, 1947-48.--Dissolved solids: Maximum, 108 parts per million July 1-10; minimum, 56 parts per million May 1-10.

Total hardness: Maximum, 39 parts per million Aug. 1-10; minimum, 14 parts per million May 11-14.

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

REMARKS.--Records of water discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1117. Records of specific conductance of daily samples available in district office at Stillwater, Okla.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	Specific conductance (micro-mhos at 25° C.)	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 so-called
																Parts per million	Tons per acre-foot	Total	Non-carbonate	
																Tons per day				
Oct. 1-10, 1947 ----	71.4	67	65.4	8.3	0.40	4.5	3.4	4.0		16	13	4.0	0.0	2.0		60	0.08	12	25	12
Oct. 11-20 -----	49.9	67	80.2	9.3	.80	5.0	3.4	5.5	2.0	19	13	6.2	.0	4.0		67	.09	9.0	26	11
Oct. 21-31 -----	88.1	65	80.2	12	.80	5.3	3.4	6.0	2.0	23	13	5.5	.0	3.0		78	.11	19	27	8
Nov. 1-10 -----	46.6	58	80.1	--	--	5.0	3.7	5.7		22	13	5.1	--	1.5		77	.10	9.7	28	10
Nov. 11-20 -----	155	48	79.4	--	--	5.0	4.4	4.9		22	13	5.8	--	1.8		70	.10	29	31	13
Nov. 21-30 -----	275	47	75.7	14	.60	4.3	2.3	7.8	2.9	20	15	6.0	.0	.5		65	.09	48	20	4
Dec. 1-7 -----	675	48	--	--	--	5.2	3.1	4.8		16	15	4.8	--	1.0		72	.10	131	26	13
Dec. 8-11, 18 -----	407	46	50.8	--	--	3.8	2.2	3.6		13	8.8	3.8	--	1.5		64	.09	70	19	8
Dec. 22, 25-26, 29-30 -----	371	41	--	--	--	5.7	2.8	2.5		14	12	4.5	--	1.0		59	.08	59	26	14
Jan. 17-31, 1948 ---	253	37	83.8	12	.55	5.0	3.4	5.5	1.9	16	18	5.2	.0	2.0		61	.08	42	26	13
Feb. 1-5 -----	364	36	96.7	--	--	6.1	4.4	6.9		16	23	7.5	--	1.2		73	.10	72	34	21
Feb. 6-10 -----	3,556	40	56.4	--	--	3.9	2.9	3.4		9	13	5.0	--	1.5		72	.10	691	22	14
Feb. 11-20 -----	1,780	42	7.6	12	.50	3.2	1.9	7.9	1.3	13	12	7.5	.0	1.0		69	.09	332	16	5
Feb. 21-26 -----	2,507	46	63.7	--	--	4.2	2.9	6.9		12	17	6.2	--	1.5		64	.09	43	22	13
Feb. 27-29, Mar. 2-3, 6-7 -----	10,060	48	44.2	--	--	3.7	2.3	2.7		10	9.5	4.0	--	1.0		63	.09	1,710	19	10
Mar. 1, 4-5, 8-10 -----	3,303	46	55.7	--	--	3.6	2.7	3.3		14	10	3.0	--	1.5		63	.09	562	20	9
Mar. 11-20 -----	1,090	49	65.5	10	.90	4.6	2.6	2.9	2.4	12	13	4.5	.0	1.5		61	.08	180	21	11
Mar. 21-31 -----	1,545	58	73.3	--	--	3.9	2.5	6.3		15	13	4.5	--	2.0		69	.09	288	20	8
Apr. 1-10 -----	504	63	73.0	9.2	.25	4.6	2.7	6.2	1.0	16	15	5.0	.0	3.0		58	.08	79	23	10
Apr. 11-17, 19 -----	2,859	63	61.8	--	--	2.2	2.4	6.9		7	16	4.0	--	2.0		68	.09	525	15	10
Apr. 20-30 -----	328	70	76.1	8.7	.32	4.9	3.0	6.6	1.1	18	15	6.0	.0	2.0		64	.09	57	25	10
May 1-10 -----	159	72	81.4	--	--	4.1	2.9	7.4		16	15	6.2	--	1.0		56	.08	24	22	9
May 11-14 -----	6,438	65	54.9	--	--	2.2	2.6	7.8		10	16	4.0	--	.8		68	.09	1,180	14	6
May 15-20 -----	1,264	71	63.4	--	--	1.4	2.6	8.0		12	15	5.2	--	1.0		75	.10	256	16	6
May 21-27 -----	348	72	76.8	--	--	7.7	3.7	1.6		20	14	3.2	--	3.0		69	.09	65	34	18
May 28-31 -----	282	74	96.3	--	--	4.5	6.1	4.4		19	21	3.5	--	4.5		79	.11	60	36	21

ARKANSAS RIVER BASIN--Continued  
 POTEAU RIVER NEAR WISTER, OKLA.--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948.--Continued

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	Chemical analyses, in parts per million, water year October 1947 to September 1949—Continued														Hardness as CaCO <sub>3</sub>		Percent sodium	
					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					
																	Parts per million	Tons per acre-foot	Tons per day	Total		Non-carbonate
June 1-10, 1948	93.6	78	8.0	94.1	10	0.32	5.1	3.8	7.6	1.5	26	18	4.2	0.0	1.0		68	0.09	17	28	7	35
June 11-20	33.9	81	7.8	111	6.6	.40	6.1	4.0	7.4	1.4	30	16	4.5	.1	2.0		94	.09	3.9	32	7	32
June 21-30	129	79	--	90.0	--	--	5.7	5.2	3.2	--	22	15	4.0	--	4.0		108	.13	34	36	18	16
July 1-10	57.4	78	7.7	90.7	23	1.2	5.7	2.6	14	2.7	36	15	7.0	.3	5.0		108	.15	17	25	0	53
July 11-20	66.6	81	--	99.7	--	--	5.8	5.1	5.4	--	27	13	5.2	--	5.0		81	.11	15	35	13	25
July 21-31	89.3	84	7.2	99.7	9.7	.40	6.5	4.4	6.1	2.3	32	13	5.2	.4	3.0		73	.10	18	34	8	26
Aug. 1-10	323	78	--	114	--	--	5.5	6.2	7.6	--	27	21	5.5	--	5.0		90	.12	78	39	17	30
Aug. 11-20	355	79	--	75.6	--	--	4.4	4.5	2.2	--	13	15	2.5	--	5.5		81	.11	78	30	19	14
Aug. 21-31	90.8	80	7.8	89.4	11	.60	5.4	3.8	7.8	2.0	17	18	4.5	.2	5.0		81	.11	20	29	15	39
Sept. 1-10	40.1	--	--	84.7	--	--	5.3	3.3	6.8	--	20	13	6.8	--	2.5		71	.10	7.7	27	10	36
Sept. 11-20	8.93	71	7.9	88.2	2.5	.40	5.5	3.9	4.7	3.1	25	12	5.8	.1	3.0		69	.09	1.7	30	9	23
Sept. 21-30	3.26	68	--	106	--	--	5.9	4.1	8.9	--	23	14	8.2	--	1.2		70	.10	.6	32	8	38

ARKANSAS RIVER BASIN

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ARKANSAS RIVER BASIN--Continued

POTEAU RIVER NEAR WISTER, OKLA.--Continued

Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	69	61	46	--	36	50	57	74	75	77	82	80
2	85	46	46	--	35	48	59	72	76	76	80	--
3	69	59	48	--	36	47	59	73	74	77	80	--
4	69	60	50	--	37	48	61	72	77	77	79	78
5	87	--	48	--	38	45	63	72	77	80	--	77
6	69	61	48	--	40	42	65	70	78	78	78	--
7	67	55	48	--	40	42	67	70	81	80	78	80
8	68	55	50	--	40	43	68	71	80	78	74	78
9	67	53	50	--	39	47	68	73	80	81	76	76
10	64	54	47	--	40	45	59	71	79	79	75	--
11	68	50	45	--	41	39	64	68	76	77	77	70
12	67	46	--	--	41	38	65	64	79	78	76	--
13	69	49	--	--	38	39	62	65	80	81	78	71
14	66	50	--	--	39	46	59	64	80	81	79	72
15	65	49	--	--	40	50	63	69	85	81	79	70
16	67	48	--	--	42	55	62	67	81	--	79	70
17	67	48	--	40	42	53	63	72	80	82	80	71
18	68	48	39	40	43	53	63	72	86	83	80	72
19	66	48	--	39	52	56	66	74	85	82	80	73
20	65	49	--	41	47	60	69	72	82	84	81	73
21	65	50	--	39	47	62	69	73	83	83	81	72
22	68	49	43	40	46	59	70	74	84	86	81	74
23	66	47	--	38	44	55	70	74	84	83	82	72
24	65	48	--	36	45	55	70	--	74	82	80	71
25	66	45	41	34	46	59	70	74	77	83	80	69
26	66	45	39	35	50	63	67	71	80	82	79	64
27	64	46	--	35	51	56	69	69	78	86	80	66
28	68	49	--	35	51	52	70	70	78	84	80	66
29	63	45	40	34	55	56	70	71	76	83	79	64
30	62	45	43	34	--	57	71	72	78	84	80	66
31	64	--	--	36	--	59	--	85	--	86	81	--
Average	66	51	--	--	43	51	65	71	79	81	79	72

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

Chemical analyses, in parts per million, water year October 1947 to September 1948																					
Date of collection	Mean discharge (second-foot)/	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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>	
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate
CANADIAN RIVER NEAR TAYLOR SPRINGS																					
Oct. 18, 1947	15.4			2,700			267	141	220		220	1,400	61			0.5		2,200	2.99	1,250	1,070
Nov. 4	11.6			2,790							231	1,420									
Nov. 18	18.0			2,820							247	1,440									
Mar. 28, 1948	39.6			2,690							244	1,370									
Apr. 17	68.2			2,900			294	170	207		228	1,540	66		.6			2,390	3.25	1,430	1,250
May 8	15.6			2,790							234	1,440									
June 10	143			1,230							162	824									
June 28	59.2			1,790							222	812	34								
July 17	35.4			2,590			245	129	231		221	1,330	55		1.4			2,100	2.86	1,140	961
Aug. 1	41.7			2,270							226	1,130	41								
Aug. 26	16.7			1,870							204	878	36								
Sept. 10	4.46			2,650							217	1,330	64								
Sept. 24	3.81			2,580							225	1,300	66								

1/ Samples collected at gaging station at time of discharge measurements.



## VERMEJO RIVER NEAR DAWSON

Oct. 20, 1947	6.83			63	16	22	192	105	3	0.5	304	0.41	223	66	18
Nov. 6	7.27			--	--	--	199	110	--	--	--	--	--	--	--
Nov. 22	5.20			--	--	--	206	116	--	--	--	--	--	--	--
Dec. 9	7.84			--	--	--	204	120	--	--	--	--	--	--	--
Mar. 30, 1948	21.0			--	--	--	172	80	--	--	--	--	--	--	--
Apr. 11	57.5			43	9.5	13	148	46	2	2.4	189	.26	146	25	16
May 4	44.8			--	--	--	127	40	--	--	--	--	--	--	--
June 3	136			--	--	--	140	62	--	--	--	--	--	--	--
June 28	22.7			--	--	--	188	77	--	--	--	--	--	--	--
July 19	29.8			50	13	23	179	74	3	1.0	252	.34	178	32	22
Aug. 3	17.7			--	--	--	173	73	4	--	--	--	--	--	--
Aug. 29	7.29			--	--	--	186	77	4	--	--	--	--	--	--
Sept. 12	4.34			--	--	--	193	90	6	--	--	--	--	--	--
Sept. 23	.34			--	--	--	179	83	7	--	--	--	--	--	--





## ARKANSAS RIVER BASIN--Continued

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

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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	
																	Parts per million	Tons per acre-foot	Total	Non-carbonate		
RAYADO RIVER AT SAUBLE RANCH NEAR CIMARRON																						
Oct. 19, 1947	3.49			141			15	5.4	7.1		83	5.3	1.0		0.2			75	0.10	60	0	21
Nov. 5	3.48			145				--	--	--	88	--	--		--			--	--	--	--	--
Nov. 20	2.73			145				--	--	--	85	--	--		--			--	--	--	--	--
Dec. 12	3.91			147				--	--	--	85	--	--		--			--	--	--	--	--
Mar. 29, 1948	9.61			133				--	--	--	84	--	--		--			--	--	--	--	--
May 9	9.61			71.5				--	--	--	38	--	--		--			--	--	--	--	--
June 4	45.4			85.0				--	--	--	49	--	--		--			--	--	--	--	--
July 18	6.31			123			14	5.2	4.6		73	4.3	1.0		.7			66	.09	56	0	15
Aug. 2	6.62			125			--	--	--	--	72	--	--		--			--	--	--	--	--
Aug. 27	5.67			129			--	--	--	--	75	--	--		--			--	--	--	--	--
Sept. 11	4.14			128			--	--	--	--	74	--	--		--			--	--	--	--	--
Sept. 25	2.75			135			--	--	--	--	79	--	--		--			--	--	--	--	--
RAYADO RIVER NEAR MIAMI																						
May 9, 1948	7.11			103			--	--	--	--	52	--	--		--			--	--	--	--	--
June 4	35.1			110			--	--	--	--	65	--	--		--			--	--	--	--	--
July 18	3.25			194			24	6.4	8.0		111	12	0		0.5			106	0.14	86	0	17
Aug. 2	--			180			--	--	--	--	80	--	--		--			--	--	--	--	--

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

Chemical analyses, in parts per million, water year October 1947 to September 1948

Chemical analyses, in parts per million, water year October 1947 to September 1949																		
Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>	
																	Total	Non-carbonate
ARKANSAS RIVER AT DARDANELLE																		
Oct. 31, 1947-----	5,950																178	71
Apr. 19, 1948-----	20,200			1,440	--	--	--	--	--	--	130	25	358	--	1.2	--	66	0
Aug. 31-----	22,500			1,928	--	--	--	--	--	--	112	28	178	--	1.8	--	223	104
Sept. 3-----	16,600			1,367	--	--	68	13	--	203	146	105	307	--	2.0	820	196	45
Sept. 24-----	7,420		7.3	1,506	6.0	0.05	71	17	210	4.4	146	79	360	0.1	1.0	855	247	127
FROG BAYOU NEAR MOUNTAINBURG																		
May 6, 1948-----	58			39.9	--	--	--	--	--	--	12	10	4.0	--	0.3	--	11	1
Sept. 24-----	.0		7.5	45.8	10	0.13	3.0	1.3	7.9	0.4	22	8.4	2.5	0.0	.2	43	13	0
MULBERRY RIVER NEAR MULBERRY																		
Apr. 16, 1948-----	475			25.9	--	--	--	--	--	--	10	5.0	2.0	--	0.3	--	10	2
Sept. 24-----	6.4		7.6	51.9	5.4	0.01	3.1	1.5	7.8	0.7	24	6.8	3.5	0.0	.2	42	14	0
ILLINOIS BAYOU NEAR SCOTTSVILLE																		
Apr. 30, 1948-----	209			35.4	--	--	--	--	--	--	12	3.0	4.0	--	0.0	--	16	6
Aug. 31-----	7.5		6.5	77.8	7.6	0.02	3.9	2.4	7.1	1.2	18	11	6.0	0.1	2.1	51	20	5
Sept. 17-----	2.5			49.4	--	--	--	--	--	--	25	1.0	3.5	--	.6	--	16	0
PETIT JEAN CREEK NEAR BOONEVILLE																		
Oct. 8, 1947-----				82.6	--	--	--	--	--	--	34	15	3.0	--	1.5	--	28	0
May 18, 1948-----	132			68.7	--	--	--	--	--	--	14	23	6.0	--	.3	--	13	2
Sept. 14-----	.2			93.2	--	--	--	--	--	--	39	5.0	6.2	--	1.0	--	20	0
Sept. 24-----	.0		7.2	103	8.3	0.15	3.7	4.5	9.2	0.9	42	6.7	5.0	0.0	.6	69	28	0
PETIT JEAN CREEK NEAR WAVELAND																		
May 18, 1948-----	1,720			60.5	--	--	--	--	--	--	14	28	6.0	--	0.0	--	17	6
Sept. 14-----	19			84.5	--	--	--	--	--	--	34	5.0	5.2	--	.9	--	26	0

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

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued																		
Date of collection	Mean discharge (second-foot)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>	
																	Total	Non-carbonate
PETIT JEAN CREEK AT DANVILLE																		
May 4, 1948-----	384		--	58.8	--	--	--	--	--	--	18	28	6.0	--	0.0	--	16	1
Sept. 24-----	19		7.3	93.2	4.4	0.04	4.1	3.3	8.4	1.3	36	5.8	5.5	0.0	.5	52	24	0
DUTCH CREEK AT WALTREAK																		
Sept. 15, 1948-----	1.0		--	79.1	--	--	--	--	--	--	38	2.0	6.5	--	1.1	--	17	0
Sept. 24-----	.4		7.8	77.6	7.9	0.16	3.2	3.2	6.9	1.0	34	2.1	5.0	0.0	.4	50	21	0
SOUTH FOURCHE LA FAVE RIVER NEAR HOLLIS																		
May 20, 1948-----	271		--	27.6	--	--	--	--	--	--	6	5.0	6.0	--	0.0	--	9	4
June 8-----	16		--	42.3	--	--	--	--	--	--	18	2.0	3.4	--	.6	--	11	0
BAYOU METO NEAR STUTTGART																		
Oct. 29, 1947-----	425		--	118	--	--	--	--	--	--	42	10	9.2	--	0.2	--	27	0
Apr. 19, 1948-----	1,670		--	51.2	--	--	--	--	--	--	22	8.0	4.0	--	1.0	--	13	0
Sept. 7-----	38		--	159	--	--	--	--	--	--	88	2.0	10	--	.8	--	38	0
CROOKED CREEK NEAR HUMPHREY																		
Apr. 19, 1948-----	1,200		--	54.6	--	--	--	--	--	--	30	10	6.0	--	1.0	--	16	0
July 8-----	.1		--	282	--	--	--	--	--	--	126	3.0	28	--	2.4	--	58	0

## RED RIVER BASIN

## RED RIVER AT DENISON DAM NEAR DENISON, TEX.

LOCATION.--Immediately below dam on Red River, 1.7 miles upstream from Sand Creek, 5 miles north of Denison, Grayson County and 3 miles upstream from gaging station near Colbert, Bryan County, Okla.

DRAINAGE AREA.--38,291 square miles above dam, 38,700 square miles above gaging station.

RECORDS AVAILABLE.--Chemical analyses: May 1944 to September 1948.

Water temperatures: October 1945 to September 1948.

EXTREMES, 1947-48.--Dissolved solids: Maximum, 905 parts per million Sept. 1-30; minimum, 754 parts per million May 1-31.

Total hardness: Maximum, 340 parts per million Sept. 1-30; minimum, 289 parts per million Dec. 1-31.

Water temperatures: Maximum, 80° F. Aug. 31; minimum, 41° F. Feb. 6, 9-10, 12-15.

EXTREMES, 1944-48.--Dissolved solids: Maximum, 1,430 parts per million Aug. 11-20, 1944, Sept. 1-10, 1944; minimum, 464 parts per million Oct. 21-31, 1945.

Total hardness: Maximum, 522 parts per million Aug. 11-20, 1944, Sept. 1-10, 1944; minimum, 233 parts per million Dec. 21-31, 1945, Jan. 11-20, 1946.

Water temperatures: Maximum, 82° F. Sept. 5, 1947; minimum, 41° F. Feb. 6, 9-10, 12-15, 1948.

REMARKS.--Discharge records for gaging station near Colbert, Okla., for water year October 1947 to September 1948 given in Water-Supply Paper 1117.

No appreciable inflow between sampling point and gaging station except during periods of heavy local rains. Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
Oct. 1-31, 1947	2,197	75	7.9	1,200	9.0	0.00	79	24	130	15	132	181	212	0.2	0.8		777	1.06	4,610	296	188	47
Nov. 1-30	1,341	63	8.3	1,230	---	---	80	22	138	---	134	163	220	---	1.8		764	1.04	2,770	290	180	51
Dec. 1-31	2,351	54	8.0	1,230	---	---	78	23	141	---	134	176	215	---	5		762	1.04	4,840	289	179	52
Jan. 1-31, 1948	2,434	47	8.1	1,240	9.9	---	80	24	147	---	136	177	228	---	1.5		763	1.04	5,010	298	186	52
Feb. 1-29	2,604	43	7.9	1,290	9.8	---	82	24	149	---	136	175	235	---	1.8		765	1.04	5,380	303	192	52
Mar. 1-31	2,689	48	--	1,280	8.6	---	88	22	140	---	138	179	222	---	1.2		788	1.07	5,720	310	197	49
Apr. 1-30	2,436	56	--	1,270	6.6	---	89	24	137	---	142	177	225	---	8		789	1.07	7,380	320	204	48
May 1-31	2,839	66	7.9	1,280	4.5	---	83	22	153	---	144	178	232	---	8		784	1.03	5,780	298	180	53
June 1-30	5,995	71	7.9	1,330	6.0	---	86	22	160	---	148	178	245	---	8		795	1.08	12,900	305	184	53
July 1-31	11,650	76	--	1,360	8.6	---	88	26	151	---	141	177	250	---	2.2	0.48	817	1.11	25,700	326	211	50
Aug. 1-31	2,549	77	8.1	1,360	9.4	.00	84	23	150	8.0	143	172	242	.1	3.2		820	1.12	5,640	304	187	51
Sept. 1-30	2,124	77	7.9	1,300	10	---	92	27	170	---	137	184	288	---	8		905	1.23	5,190	340	228	52
Weighted average	3,528	--	--	1,310	---	---	85	24	150	---	140	175	239	--	1.5		797	1.08	7,590	310	196	51

RED RIVER BASIN--Continued  
 RED RIVER AT DENISON DAM NEAR DENISON, TEX.--Continued  
 Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	75	69	57	52	44	--	52	65	69	75	73	79
2	76	70	58	50	42	--	51	63	68	75	76	79
3	75	70	57	50	43	--	51	65	69	71	77	74
4	75	71	57	49	43	--	52	65	70	--	79	76
5	76	69	57	50	43	--	52	65	70	74	78	--
6	76	69	57	--	41	--	55	64	70	75	--	--
7	76	68	58	50	45	--	56	64	71	76	77	78
8	75	66	--	50	42	45	56	64	72	76	77	79
9	76	65	56	50	41	46	55	65	--	76	73	78
10	76	66	55	50	41	45	--	--	70	76	78	78
11	76	64	55	49	47	43	58	66	70	76	79	--
12	75	64	54	50	41	--	58	67	70	--	78	--
13	75	64	54	48	41	--	57	67	69	76	78	77
14	75	64	53	48	41	45	58	67	70	78	78	77
15	76	61	52	48	41	46	58	67	71	--	74	77
16	76	61	52	48	42	48	59	66	72	--	76	78
17	76	61	53	48	45	46	58	67	70	--	79	79
18	75	61	53	46	45	47	57	67	72	76	78	79
19	74	61	53	45	45	47	57	67	72	76	79	77
20	75	59	53	46	45	47	58	67	72	76	79	78
21	76	60	56	47	45	--	60	67	72	77	--	78
22	76	59	52	46	43	49	--	67	72	76	74	78
23	75	59	51	45	42	50	--	66	71	--	78	--
24	74	57	52	44	43	48	--	68	72	--	78	78
25	--	59	53	43	44	50	60	--	73	73	79	75
26	74	59	53	43	44	52	--	68	--	77	78	74
27	71	59	53	43	45	52	--	68	--	78	78	75
28	72	57	52	43	47	49	--	69	--	76	79	75
29	71	58	51	43	45	50	60	69	74	76	74	75
30	72	--	53	43	--	50	60	68	75	79	79	74
31	71	--	51	43	--	51	--	68	--	79	80	--
Average	75	63	54	47	43	--	--	66	71	--	77	77



## RED RIVER BASIN--Continued

## SALT FORK RED RIVER AT MANGUM, OKLA.

LOCATION --At bridge on State Highway 34, half a mile south of Mangum, Greer County, and 13 miles downstream from Fish Creek.

DRAINAGE AREA --1,390 square miles.

RECORDS AVAILABLE --Chemical analyses: October 1946 to September 1948.

Water temperatures: December 1946 to September 1948.

EXTREMS, 1947-48. --Dissolved solids: Maximum, 3,080 parts per million Apr. 21-30; minimum, 1,200 parts per million June 21-22, 29-30.

Total hardness: Maximum, 1,970 parts per million Apr. 21-30; minimum, 658 parts per million Feb. 26.

Water temperatures: Maximum, 90 F. Aug. 18; minimum, freezing point on several days in winter months.

EXTREMS, 1946-48. --Dissolved solids: Maximum, 3,300 parts per million Aug. 11-20, 1947; minimum, 630 parts per million May 12-13, 16-18, 20, 1947.

Total hardness: Maximum, 1,970 parts per million Apr. 21-30, 1948; minimum, 366 parts per million May 12-13, 16-18, 20, 1947.

Water temperatures: Maximum, 98 F. July 28, 1947; minimum, freezing point on many days in winter months.

REMARKS. --Records of water discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1117. Records of specific conductance of daily samples available in district office at Stillwater, Okla.

## Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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 carbonate
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
Nov. 20-30, 1947----	5.87	42	--	2,910	--	--	492	108	119	--	138	1,460	208	--	4.0	--	2,460	3.35	39	1,670	1,560	13
Dec. 1-10 -----	9.98	48	--	2,680	--	--	442	99	110	--	133	1,310	195	--	3.0	--	2,220	3.02	60	1,510	1,400	14
Dec. 11-20 -----	3.38	35	--	2,800	--	--	448	108	131	--	140	1,370	215	--	5.0	--	2,350	3.20	21	1,560	1,450	15
Dec. 21-31 -----	2.79	37	--	2,850	--	--	468	88	210	--	139	1,470	240	--	4.0	--	2,550	3.47	19	1,530	1,420	23
Jan. 1-7, 1948 -----	16.8	34	--	2,990	--	--	492	107	161	--	157	1,520	215	--	4.0	--	2,580	3.51	117	1,670	1,540	17
Jan. 11-20 -----	4.36	33	--	3,040	--	--	498	110	194	--	166	1,600	222	--	2.0	--	2,710	3.69	32	1,700	1,560	20
Jan. 21-22, 26-30 ----	2.46	33	--	3,230	--	--	534	128	147	--	120	1,670	240	--	5.0	--	2,780	3.78	16	1,860	1,760	15
Feb. 1-3, 5-10 -----	17.1	35	--	2,500	--	--	386	90	102	--	155	1,100	198	--	5.0	--	1,960	2.67	90	1,330	1,210	14
Feb. 11-20 -----	13.7	38	--	2,670	--	--	410	97	121	--	156	1,210	208	--	4.0	--	2,130	2.90	79	1,420	1,290	16
Feb. 21-24, 27-29 ----	268	52	--	2,320	--	--	394	97	86	--	140	1,130	195	--	4.0	--	1,980	2.69	1,430	1,380	1,270	12
Feb. 26 -----	64.0	52	--	1,530	--	--	--	--	--	--	113	500	95	--	4.0	--	--	--	--	658	--	--
Mar. 1-10 -----	172	46	7.5	2,220	318	0.20	304	69	129	19	85	937	212	0.5	1.0	--	2,030	2.76	943	1,040	972	21
Mar. 11-19 -----	54.1	--	--	2,420	--	--	332	80	159	--	102	1,080	208	--	2.0	--	1,910	2.60	279	1,160	1,070	23
Mar. 20-31 -----	108	55	--	2,350	--	--	324	86	136	--	83	1,060	202	--	.5	--	1,850	2.52	539	1,160	1,090	20
Apr. 1-10 -----	3.65	64	--	2,950	--	--	490	114	153	--	114	1,570	208	--	2.0	--	2,590	3.52	26	1,690	1,600	16
Apr. 11-18 -----	19	56	--	3,240	--	--	552	129	160	--	107	1,800	208	--	1.0	--	2,900	3.94	1.5	1,910	1,820	15
Apr. 21-30 -----	6.68	68	--	3,500	--	--	568	135	198	--	123	1,940	272	--	2.0	--	3,080	4.19	56	1,970	1,870	18
May 24, 27-31 -----	263	75	--	2,560	--	--	368	75	138	--	63	1,170	182	--	1.5	--	1,970	2.68	1,400	1,230	1,180	20
May 25-28 -----	572	60	--	1,860	--	--	249	48	120	--	71	822	112	--	9.7	--	1,400	1.90	2,160	818	760	24
June 1-7, 11-12 -----	17.8	76	--	2,580	--	--	456	87	131	--	103	1,400	168	--	2.8	--	2,300	3.13	111	1,500	1,410	16
June 11-12, 29-30 ----	1,783	78	--	1,520	--	--	243	36	83	--	108	687	93	--	1.9	--	1,200	1.63	5,780	754	666	19
June 21-28 -----	202	76	--	2,450	--	--	370	67	145	--	129	1,100	179	--	2.7	--	1,930	2.62	1,050	1,200	1,090	21

RED RIVER BASIN--Continued  
SALT FORK RED RIVER AT MANGUM, OKLA.--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
July 1-10, 1948	8.16	72	--	2,640	--	--	414	85	143	106	1,270	199	199	--	5.0	--	2,170	2.95	48	1,380	1,300	18
July 11-20	2.62	74	--	2,900	--	--	472	101	146	108	1,470	204	204	--	4.5	--	2,450	3.33	17	1,590	1,504	17
July 21-30	2.97	73	7.3	2,980	14	6.00	492	98	149	111	1,460	265	265	6.8	21.0	--	2,520	3.43	20	1,630	1,549	17
July 31	11.0	73	--	1,920	--	--	--	--	--	87	48	80	80	--	15	--	--	--	--	855	--	--
Aug. 1, 7-10	4.36	76	--	2,220	--	--	336	73	134	87	1,070	171	171	--	3.5	--	1,830	2.49	22	1,140	1,070	20
Aug. 2-6	3.90	74	--	3,050	--	--	512	102	136	70	1,620	206	206	--	1.8	--	2,630	3.58	28	1,700	1,630	17
Aug. 11-12, 14-15, 18-20	--	75	--	3,000	--	--	514	107	161	83	1,640	211	211	--	.8	--	2,670	3.63	--	1,720	1,650	17

## RED RIVER BASIN--Continued

## SALT FORK RED RIVER AT MANGUM, OKLA.--Continued

Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	--	--	58	32	33	51	64	--	69	72	75	
2	--	--	51	35	32	50	67	--	68	72	74	
3	--	--	46	34	36	52	56	--	83	71	72	
4	--	--	45	36	--	56	70	--	80	73	72	
5	--	--	42	32	36	42	68	--	68	71	83	
6	--	--	54	35	36	40	76	--	82	71	67	
7	--	--	55	32	39	40	56	--	83	73	68	
8	--	--	40	--	34	40	56	--	--	73	86	
9	--	--	40	--	34	40	62	--	--	75	73	
10	--	--	45	--	33	--	62	--	--	72	78	
11	--	--	38	37	33	47	54	--	69	76	76	
12	--	--	34	--	32	--	56	--	83	73	73	
13	--	--	33	33	34	--	51	--	--	71	--	
14	--	--	35	32	36	--	48	--	--	76	74	
15	--	--	39	32	32	55	60	--	--	74	73	
16	--	--	33	32	34	59	59	--	--	75	--	
17	--	--	33	36	42	51	60	--	--	72	--	
18	--	--	32	32	46	49	58	--	--	75	90	
19	--	--	33	32	49	51	--	--	--	74	69	
20	49	--	40	32	42	60	--	--	--	74	69	
21	--	40	42	32	59	56	83	--	75	76	--	
22	--	34	35	34	43	51	71	--	79	73	--	
23	--	42	38	--	43	66	63	--	73	72	--	
24	--	42	37	--	50	59	59	65	74	74	--	
25	--	41	34	--	--	--	70	60	79	74	--	
26	--	--	--	--	--	--	--	--	--	--	--	
27	44	--	33	32	52	58	62	60	86	77	--	
28	44	37	37	32	54	--	65	79	70	78	--	
29	37	45	45	32	57	45	75	75	74	75	--	
30	44	38	38	36	56	--	68	88	73	71	--	
31	40	40	32	32	--	53	63	70	85	76	--	
32	--	--	32	--	--	49	--	72	--	73	--	
Average	--	--	40	--	41	--	63	--	--	74	--	

## RED RIVER BASIN--Continued

## NORTH FORK RED RIVER NEAR CARTER, OKLA.

LOCATION.--At bridge on State Highway 34, 3 miles south of Carter, Beckham County, and 12 miles downstream from Timber Creek.

DRAINAGE AREA.--2,380 square miles.

RECORDS AVAILABLE.--Sediment analyses: March 1948 to September 1948.

EXTREMES, 1948.--Sediment loads: Maximum, 140,000 tons per day June 21; minimum, no flow on many days.

REMARKS.--Computation of sediment loads made by Surface Water Branch office at Oklahoma City, Okla. Records of water discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1117.

Suspended sediment, water year October 1947 to September 1948

Day	March			April			May		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	1,570	1/14,400	60,800	18	196	9.5	8.6	60	1.4
2-----	1,010	8,440	23,000	19	164	8.4	7.1	62	1.2
3-----	482	3,400	4,440	18	161	7.8	5.4	68	1.0
4-----	370	1/1,800	1,800	18	183	8.9	3.9	66	.7
5-----	300	1/1,200	972	18	172	8.4	3.0	97	.8
6-----	290	908	711	18	82	4.0	2.5	87	.6
7-----	399	1/1,500	1,620	18	58	2.8	2.0	57	.3
8-----	526	1/4,900	6,960	16	101	4.4	1.4	70	.3
9-----	474	1,800	2,300	14	84	3.2	.6	48	.1
10-----	328	1,010	894	14	106	4.0	.3	79	.1
11-----	100	2,130	575	14	82	3.1	.6	103	.2
12-----	50	301	41	13	74	2.6	.4	198	.2
13-----	37	414	41	13	94	3.3	.1	86	--
14-----	45	2,840	345	12	102	3.3	--	102	--
15-----	46	1,210	150	12	93	3.0	--	138	--
16-----	29	764	60	11	65	1.9	--	166	--
17-----	26	498	35	11	70	2.1	--	191	--
18-----	26	452	32	10	98	2.6	--	--	--
19-----	842	14,400	32,800	9.6	50	1.3	--	--	--
20-----	86	2,150	500	9.1	53	1.3	--	--	--
21-----	52	1,100	154	9.1	62	1.5	--	--	--
22-----	37	570	57	9.6	59	1.5	--	--	--
23-----	31	466	39	13	100	3.5	--	--	--
24-----	27	402	29	18	63	3.1	--	--	--
25-----	26	374	26	31	259	22	2,530	7,120	48,600
26-----	21	334	19	25	120	8.1	219	5,030	2,970
27-----	19	276	14	21	66	3.7	87	2,800	658
28-----	19	222	11	17	71	3.3	99	1,500	401
29-----	20	209	11	15	109	4.4	232	6,360	3,980
30-----	18	276	13	11	76	2.3	460	7,330	9,100
31-----	18	222	11	--	--	--	373	9,710	9,790
Total -	7,324	--	138,500	455.4	--	139.3	4,035.9	--	75,510

1/ Estimated

RED RIVER BASIN--Continued  
NORTH FORK RED RIVER NEAR CARTER, OKLA.--Continued  
Suspended sediment, water year October 1947 to September 1948--Continued

Day	June			July			August		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	87	2,700	634	33	1/400	36	12	1,000	32
2-----	79	1,810	386	37	1/400	40	2.2	1/500	3.0
3-----	65	545	96	26	1/400	28	.1	1/100	--
4-----	55	534	79	18	200	9.7	--	--	--
5-----	45	161	20	14	1/200	7.6	--	--	--
6-----	40	136	15	107	12,000	3,470	--	--	--
7-----	30	42	3.4	121	7,800	2,550	--	--	--
8-----	25	43	2.9	28	1,900	144	--	--	--
9-----	21	102	5.8	28	1,000	76	.1	--	--
10-----	21	46	2.6	21	221	13	--	--	--
11-----	20	26	1.4	17	1/150	6.9	--	--	--
12-----	18	16	.8	14	1/100	3.8	--	--	--
13-----	18	16	.8	13	92	3.2	--	--	--
14-----	17	15	.7	12	94	3.0	--	--	--
15-----	17	15	.7	11	98	2.9	179	18,300	8,820
16-----	17	1/15	.7	6.6	84	1.5	945	14,000	35,700
17-----	16	15	.6	2.0	96	.5	241	6,740	4,380
18-----	16	15	.6	.6	98	.2	69	1,660	308
19-----	16	15	.6	.2	90	--	33	1/500	45
20-----	41	3,350	371	--	--	--	18	1/200	9.7
21-----	3,440	15,100	140,000	--	--	--	9.6	1/100	2.6
22-----	2,200	10,300	61,100	--	--	--	3.9	1/100	1.1
23-----	131	1,200	424	18	1/1,000	49	.7	1/100	.2
24-----	63	1,500	255	16	1/500	22	--	--	--
25-----	39	1/1,300	137	4.6	1/200	2.5	--	--	--
26-----	1,020	17,000	46,900	.8	1/100	.2	--	--	--
27-----	68	1/3,400	624	--	--	--	--	--	--
28-----	275	6,240	4,640	--	--	--	14	1/1,000	38
29-----	35	1/1,200	113	--	--	--	24	1/500	32
30-----	27	1/500	36	--	--	--	11	1/200	5.9
31-----	--	--	--	73	7,360	1,450	3.1	1/100	.8
Total -	7,962	--	255,900	621.8	--	7,920	1,565.7	--	49,390
September									
1-----	--	--	--						
2-----	--	--	--						
3-----	--	--	--						
4-----	--	--	--						
5-----	--	--	--						
6-----	--	--	--						
7-----	--	--	--						
8-----	255	8,950	6,160						
9-----	62	2,710	454						
10-----	8.2	900	20						
11-----	1	1/100	.3						
12-----	--	--	--						
13-----	--	--	--						
14-----	--	--	--						
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28-----	--	--	--						
29-----	--	--	--						
30-----	--	--	--						
31-----	--	--	--						
Total -	326.2	--	6,634						

Total discharge for period Mar. 1 to Sept. 11 (second-foot-days) ----- 22,291.3

Total load for period Mar. 1 to Sept. 11 (tons) ----- 533,900

1/Estimated.

## RED RIVER BASIN--Continued

## WASHITA RIVER NEAR CLINTON, OKLA.

LOCATION.--At gaging station at bridge on U. S. Highway 183, half a mile north of Clinton, Custer County, three-quarters of a mile upstream from Beaver Creek and 3 miles downstream from Barnitz Creek

DRAINAGE AREA.--1,990 square miles.

RECORDS AVAILABLE.--Sediment records: May 1947 to September 1948.

EXTREMES, 1947-48.--Sediment loads: Maximum, 216,000 tons per day Aug. 16; minimum, 0.4 ton per day June 15-17, 19, Sept. 30.

EXTREMES, May 1947-September 1948.--Sediment loads: Maximum, 253,000 tons per day May 12, 1947; minimum, 0.4 ton per day June 15-17, 19, Sept. 30, 1948.

REMARKS.--Computation of sediment loads made by Surface Water Branch office at Oklahoma City, Okla. Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1117.

Suspended sediment, water year October 1947 to September 1948

Day	October			November			December		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	2.9	1/100	0.8	4.7	117	1.5	8.3	180	4.0
2-----	3.1	1/100	.9	4.2	118	1.3	8.9	211	5.1
3-----	3.1		.9	4.2	114	1.3	15	963	39
4-----	3.3		1.0	5.6	159	2.4	82	3,080	681
5-----	3.3		1.0	8.9	156	3.7	31	299	25
6-----	3.3	1/109	1.0	8.3	115	2.6	20	132	7.1
7-----	3.3		1.0	5.6	68	1.0	17	188	8.6
8-----	2.9		.9	4.9	62	.8	15	200	8.1
9-----	2.9		.9	4.2	74	.8	14	210	7.9
10-----	3.1		.9	4.2	118	1.3	14	212	8.0
11-----	3.1		.9	4.2	170	1.9	14	204	7.7
12-----	2.9		.9	4.7	167	2.1	13	244	8.6
13-----	2.7	1/200	.8	4.9	188	2.5	12	230	7.4
14-----	2.7		.8	6.1	258	4.2	12	200	6.5
15-----	2.9		.9	7.7	142	3.0	12	216	7.0
16-----	36		4,260	6.9	1/214	4.0	11	228	6.8
17-----	12	1/300	9.7	6.6	285	5.1	11	200	5.9
18-----	8.3	1/200	4.5	7.4	118	2.4	11	242	7.2
19-----	6.9		3.7	8.0	118	2.6	11	254	7.5
20-----	6.4		3.4	7.4	156	3.1	10	212	5.7
21-----	5.6		3.0	7.1	164	3.1	10	198	5.3
22-----	5.6	1/180	3.0	7.1	186	3.6	10	173	4.7
23-----	5.1		2.8	7.1	206	4.0	9.5	140	3.6
24-----	3.8		1.6	6.9	164	3.0	8.3	166	3.7
25-----	3.6		1.6	6.9	193	3.6	8.0	180	3.9
26-----	3.6	170	1.6	7.4	156	3.1	8.9	154	3.7
27-----	3.6	144	1.4	7.7	172	3.6	9.5	166	4.3
28-----	3.6	139	1.4	7.4	178	3.6	9.5	110	2.8
29-----	3.6	137	1.3	8.0	165	3.6	10	142	3.8
30-----	5.1	230	3.2	8.0	140	3.0	10	122	3.3
31-----	5.4	119	1.7	--	--	--	10	1/180	4.9
Total	163.7	--	472.5	192.3	--	81.8	445.9	--	908.1

1/ Estimated.

RED RIVER BASIN--Continued  
 WASHITA RIVER NEAR CLINTON, OKLA.--Continued

Suspended sediment, water year October 1947 to September 1948--Continued

Day	January			February			March		
	Mean dis-charge (second-feet)	Suspended sediment		Mean dis-charge (second-feet)	Suspended sediment		Mean dis-charge (second-feet)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	11	1/180	5.3	11	196	5.8	515	1/26,000	36,100
2-----	12	180	5.8	10	130	3.5	1,580	1/28,800	123,000
3-----	14	198	7.5	11	132	3.9	328	18,000	15,900
4-----	16	182	7.9	13	144	5.1	138	7,460	2,780
5-----	16	181	7.8	10	136	3.7	91	3,050	749
6-----	17	156	7.2	10	132	3.6	81	1,720	376
7-----	15	143	5.8	12	132	4.3	63	910	155
8-----	12	148	4.8	9	124	3.0	77	904	188
9-----	11	144	4.3	9	148	3.6	84	900	204
10-----	10	150	4.0	10	141	3.8	90	1/620	151
11-----	9.8	122	3.2	10	148	4.0	60	460	74
12-----	9.5	144	3.7	5	138	1.9	50	680	92
13-----	8.9	203	4.9	5	121	1.6	60	400	65
14-----	8.6	84	2.0	5	126	1.7	70	400	76
15-----	8.9	104	2.5	8	138	3.0	79	400	85
16-----	8	97	2.1	16	88	3.8	91	1/400	98
17-----	6	134	2.2	14	92	3.5	67	400	72
18-----	6	112	1.8	11	108	3.2	86	8,720	2,020
19-----	7	116	2.2	11	80	2.4	942	28,900	73,600
20-----	8	172	3.7	9.5	84	2.2	277	15,500	11,600
21-----	7	160	3.0	11	102	3.0	148	13,900	5,560
22-----	18	200	9.7	11	96	2.9	94	8,160	2,070
23-----	8	168	3.6	12	82	2.7	76	2,600	533
24-----	6	197	3.2	11	62	1.8	68	980	180
25-----	5	168	2.3	11	128	3.8	61	680	112
26-----	10	212	5.7	13	110	3.9	54	580	85
27-----	7	185	3.5	878	28,100	66,500	48	460	60
28-----	7	151	2.9	1,240	30,500	102,000	47	380	48
29-----	8	220	4.8	191	1/12,700	6,530	43	340	39
30-----	8	136	2.9	--	--	--	37	325	33
31-----	9	188	4.6	--	--	--	35	260	25
Total -	299.7	--	134.9	2,577.5	--	175,100	5,540	--	276,100
	April			May			June		
1-----	34	200	18	19	1/123	6.3	24	126	8.2
2-----	34	227	21	17	112	5.1	67	1,290	233
3-----	32	1/180	16	16	145	6.3	28	3,680	278
4-----	30	154	12	16	113	4.9	18	473	23
5-----	30	172	14	15	110	4.5	10	233	6.3
6-----	29	166	13	14	1/110	4.2	8.0	212	4.6
7-----	27	151	11	13	110	3.9	7.1	150	2.9
8-----	27	160	12	12	110	3.6	6.4	156	2.7
9-----	25	154	10	12	110	3.6	5.6	146	2.2
10-----	25	164	11	458	21,800	27,000	7.1	180	3.5
11-----	24	178	12	518	15,100	21,100	4.7	146	1.9
12-----	22	230	14	87	4,240	997	3.6	226	2.2
13-----	22	148	8.8	43	1,510	177	2.6	1/150	1.1
14-----	21	170	9.6	29	400	31	1.7	100	.5
15-----	21	168	9.5	25	240	16	1.3	128	.4
16-----	20	146	7.9	25	1/245	17	1.2	123	.4
17-----	19	155	8.0	16	1/129	5.6	1.2	119	.4
18-----	18	122	5.9	13	1/129	4.6	1.1	176	.5
19-----	16	104	4.5	10	373	10	1.1	1/150	.4
20-----	16	114	4.9	9.2	1/373	9.3	1.2	150	.5
21-----	15	106	4.3	8.6	373	8.7	5.6	1/900	14
22-----	16	213	9.2	7.7	185	3.8	136	14,100	5,170
23-----	16	200	8.6	7.4	1/185	3.7	54	9,260	1,350
24-----	18	212	10	6.9	185	3.4	13	826	29
25-----	22	181	11	8.3	202	4.5	6.9	196	3.7
26-----	28	222	17	27	398	29	862	18,200	42,400
27-----	27	106	7.7	59	1,290	206	508	15,900	21,800
28-----	27	117	8.5	25	740	50	733	20,400	40,400
29-----	24	126	8.2	19	295	15	1,570	18,800	79,900
30-----	22	134	8.0	16	1/210	9.1	235	11,300	7,140
31-----	--	--	--	12	1/170	5.5	--	--	--
Total -	707	--	315.6	1,564.1	--	49,750	4,324.4	--	198,800

1/ Estimated.

## LOWER MISSISSIPPI RIVER BASIN

## RED RIVER BASIN--Continued

## WASHITA RIVER NEAR CLINTON, OKLA.--Continued

Suspended sediment, water year October 1947 to September 1948--Continued

Day	July			August			September		
	Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	113	6,300	1,920	73	14,300	2,820	16	116	5.0
2-----	88	2,800	866	40	4,570	494	12	102	3.3
3-----	62	1/1,750	293	19	560	27	9.5	58	1.5
4-----	46	1/1,000	124	11	350	10	9.5	90	2.3
5-----	36	1/600	58	7.4	190	3.8	9.2	94	2.3
6-----	30	185	13	5.6	1/170	2.6	9.2	110	2.7
7-----	38	1,580	182	4.9	187	2.5	8.3	1/100	2.2
8-----	24	571	37	84	14,200	3,230	7.4	100	2.0
9-----	25	345	23	94	12,000	3,040	57	2,120	326
10-----	21	250	14	73	10,000	1,470	56	5,250	794
11-----	14	190	7.2	31	1,400	620	20	1,600	86
12-----	13	210	7.4	17	1,400	64	12	1/350	11
13-----	13	160	5.6	10	335	9.0	8.3	1/220	4.9
14-----	12	140	4.6	7	260	4.9	6.4	190	3.3
15-----	10	145	3.9	1,580	28,600	122,000	5.4	81	1.2
16-----	9.5	131	3.4	2,880	27,800	216,000	4.9	175	2.3
17-----	8.6	1/125	2.9	663	13,500	24,100	4.0	180	1.9
18-----	28	3,230	244	233	7,700	4,850	3.8	168	1.7
19-----	12	617	20	154	4,950	2,060	3.3	152	1.4
20-----	8.3	140	3.2	102	2,950	813	3.1	176	1.5
21-----	7.1	135	2.6	73	1,300	256	2.7	164	1.2
22-----	117	18,500	5,580	55	1/900	134	2.4	165	1.1
23-----	245	13,100	8,650	43	1/600	70	2.2	152	.9
24-----	340	15,400	14,100	33	215	19	2.1	153	.9
25-----	88	2,970	706	23	150	9.3	2.1	156	.9
26-----	40	620	67	20	278	15	2.6	142	1.0
27-----	25	150	10	38	720	74	2.2	150	.9
28-----	18	116	5.6	26	290	20	1.8	149	.7
29-----	13	1/130	4.6	23	1/180	11	1.4	134	.5
30-----	12	128	4.1	25	1/170	11	1.3	126	.4
31-----	11	100	3.0	21	150	8.5	--	--	--
Total -	1,527.5	--	33,020	6,468.9	--	382,200	386.1	--	1,265

Total discharge for year (second-foot-days)----- 24,097.1

Total load for year (tons)----- 1,118,000

1/ Estimated.



RED RIVER BASIN--Continued  
WASHITA RIVER AT FOSS DAM SITE NEAR FOSS, OKLA.

LOCATION.--At bridge on correction line, 7 miles north and three-quarters of a mile west of Foss, Washita County.  
RECORDS AVAILABLE.--Chemical analyses: June 1946 to September 1948.  
Water temperatures: October 1946 to September 1948.  
EXTREMES, 1947-48.--Dissolved solids: Maximum, 1,740 parts per million Dec. 11-20, Jan. 21-31, Feb. 11-20; minimum, 155 parts per million June 26.  
Total hardness: Maximum, 1,360 parts per million Dec. 11-20, Jan. 21-31, Feb. 11-20; minimum, 155 parts per million June 26.  
Water temperatures: Maximum, 95° F. Aug. 10-11; minimum, freezing point Feb. 12, Mar. 10-11.  
EXTREMES, 1946-48.--Dissolved solids: Maximum, 1,740 parts per million Dec. 11-20, 1947; minimum, 236 parts per million Apr. 15, 1947.  
Total hardness: Maximum, 1,360 parts per million Dec. 11-20, 1947; Jan. 21-31, Feb. 11-20, 1948; minimum, 155 parts per million June 26, 1948.  
Water temperatures: Maximum, 95° F. Aug. 10-11, 1948; minimum, freezing point Feb. 12, Mar. 10-11, 1948.  
REMARKS.--No discharge records available for this station. Records of specific conductance of daily samples available in district office at Stillwater, Okla.

Chemical analyses, in parts per million, water year October 1947 to September 1948																					
Date of collection	Mean discharge (second-foot)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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
																	Parts per million	Tons per acre-foot	Total	Non-carbonate	
Oct. 1-10, 1947	---	67		1,900			276	117	54		172	1,070	21		2.0		1,620		1,170	1,030	9
Oct. 11-20	---	66		1,910			280	118	43		186	1,050	22		2.0		1,610		1,180	1,030	7
Oct. 21-31	---	67		1,900			282	116	47		206	1,040	22		1.5		1,610		1,180	1,010	8
Nov. 1-10	---	56		1,960			300	125	32		260	1,050	18		2.0		1,660		1,260	1,050	5
Nov. 11-20	---	47		1,890			294	112	45		276	999	18		1.0		1,600		1,190	968	8
Nov. 21-30	---	49		1,960			306	120	55		288	1,070	18		1.5		1,710		1,260	1,020	9
Dec. 1-3, 5-10	---	47		1,880			304	128	13		301	1,000	18		1.0		1,610		1,280	1,040	2
Dec. 4	---	50		1,160			--	--	--		187	265	10		4.0		--		665	--	--
Dec. 11-20	---	45	7.5	1,950		0.20	318	128	23	11	296	1,060	24		3.5		1,740		1,360	1,060	4
Dec. 21-31	---	44		1,950			302	128	28		257	1,060	18		2.0		1,660		1,250	1,070	4
Jan. 1-10, 1948	---	41		1,900			300	121	8.0		242	998	17		2.5		1,570		1,250	1,050	1
Jan. 11-20	---	42		2,030			320	134	4.6		251	1,080	20		2.0		1,680		1,350	1,140	1
Jan. 21-31	---	36		2,000			328	132	3.4		276	1,070	18		4.0		1,690		1,360	1,140	1
Feb. 1-2, 4-6, 9-10	---	36		1,890			286	130	5.3		233	998	19		3.0		1,550		1,250	1,060	1
Feb. 11-20	---	42		2,000			314	141	9.4		265	1,090	21		3.0		1,710		1,360	1,150	1
Feb. 21-25	---	43		1,800			272	119	23		228	951	28		0.5		1,510		1,170	961	4
Feb. 26-29	---	48		765			115	38	6.9		150	302	10		8.0		615		443	320	4
Mar. 1-4	---	40		744			103	28	23		175	240	18		5.0		534		372	229	12
Mar. 5-10	---	35		1,170			138	49	64		201	452	34		4.0		903		546	362	20
Mar. 11-20	---	50		1,300			158	60	29		222	450	37		2.0		845		640	458	9
Mar. 21-31	---	59		1,450			177	70	24		223	516	43		1.0		941		730	546	7

RED RIVER BASIN--Continued  
WASHITA RIVER AT FOSS DAM SITE NEAR FOSS, OKLA.--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948.--Continued

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids		Hardness as CaCO <sub>3</sub>		Percent sodium
																Parts per million	Tons per acre-foot	Total	Non-carbonate	
Apr. 1-10, 1948	---	66	---	1,670	---	196	91	81	---	---	185	794	42	---	2.0	1,300	---	863	712	17
Apr. 11-20	---	72	---	1,800	---	222	104	84	---	---	182	920	40	---	2.0	1,460	---	962	832	16
Apr. 21-30	---	75	---	1,830	---	227	104	97	---	---	197	940	44	---	3.0	1,510	---	994	832	17
May 1-9	---	73	---	1,880	---	242	117	49	---	---	160	972	33	---	3.2	1,500	---	1,090	950	9
May 10	---	56	---	448	---	---	---	---	---	---	141	92	3.0	28	---	---	---	176	---	---
May 11-15	---	69	---	827	---	105	37	24	---	---	1/151	311	9.2	---	5.3	636	---	414	290	11
May 16-20	---	81	---	1,270	---	169	66	37	---	---	2/174	586	13	---	3.3	960	---	683	550	10
May 21-31	---	77	---	1,340	---	190	68	33	---	---	170	582	19	---	7.5	983	---	706	586	9
June 1-10	---	82	---	1,510	---	228	96	4.4	---	---	177	765	21	---	3.0	1,210	---	964	819	1
June 11-20	---	83	---	1,840	---	288	128	7.8	---	---	168	1,040	25	---	4.0	1,570	---	1,240	1,100	1
June 21-25	---	81	---	1,410	---	181	80	40	---	---	3/171	672	16	---	4.7	1,080	---	730	640	10
June 26	---	77	---	353	---	---	---	---	---	---	144	75	3.0	10	---	---	---	153	---	---
June 27-28	---	72	---	597	---	70	19	46	---	---	3/200	172	5.5	---	8	434	---	252	88	28
June 29-30	---	75	---	848	---	119	27	29	---	---	4/138	326	12	---	3.4	641	---	403	295	14
July 1-6, 9-11	---	78	---	870	---	119	37	20	---	---	156	328	15	---	4.0	674	---	449	321	9
July 7-8, 12-22	---	79	---	1,420	---	213	82	15	---	---	158	716	18	---	2.0	1,120	---	866	739	4
July 23-25	---	77	---	526	---	58	15	40	---	---	116	182	4.5	---	3.0	366	---	206	111	30
July 26-31	---	80	---	803	---	117	37	9.4	---	---	133	328	9.0	---	2.0	624	---	444	335	4
Aug. 1-3, 9-10	---	88	---	759	---	110	28	19	---	---	118	303	12	---	2.0	568	---	390	293	10
Aug. 4-8	---	79	---	1,090	---	156	52	25	---	---	140	451	20	---	4.0	817	---	603	486	8
Aug. 11-13	---	89	---	1,020	---	142	46	24	---	---	128	450	14	---	2.0	934	---	544	434	6
Aug. 14-15	---	80	---	359	---	50	16	29	---	---	104	17	17	---	2.0	291	---	191	70	25
Aug. 16-18, 20	---	81	---	751	---	102	24	30	---	---	151	260	16	---	1.0	562	---	353	229	16
Aug. 21-31	---	85	---	1,160	---	156	54	39	---	---	144	523	22	---	2.0	867	---	611	493	12
Sept. 1-8	---	80	---	1,330	---	184	66	44	---	---	160	634	23	---	2.5	1,080	---	730	600	12
Sept. 9-12	---	78	---	837	---	121	36	15	---	---	163	312	15	---	3.0	638	---	450	316	7
Sept. 13-20	---	77	---	1,400	---	204	75	32	---	---	163	696	20	---	2.5	1,110	---	838	684	1
Sept. 21-30	---	70	---	1,670	---	250	105	22	---	---	147	912	22	---	2.0	1,360	---	1,660	995	4

1/ Includes equivalent of 23 parts per million of carbonate (CO<sub>3</sub>).

2/ Includes equivalent of 13 parts per million of carbonate (CO<sub>3</sub>).

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

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

## RED RIVER BASIN--Continued

WASHITA RIVER AT FOSS DAM SITE NEAR FOSS, OKLA.--Continued

Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	69	63	47	33	33	41	58	80	78	77	85	86
2	68	60	48	35	35	42	61	77	73	75	86	85
3	69	58	50	33	42	43	59	69	74	74	87	84
4	67	56	50	41	42	33	65	66	80	80	77	81
5	65	57	47	45	37	33	72	66	92	80	80	82
6	67	55	51	44	38	34	69	72	93	76	87	76
7	66	56	47	46	--	35	65	71	73	74	75	76
8	66	51	45	46	--	35	65	76	73	76	75	70
9	67	56	44	45	36	39	67	78	94	76	85	75
10	64	50	43	40	34	32	74	56	82	78	95	71
11	66	47	43	40	33	32	76	62	84	84	95	80
12	67	47	43	45	32	35	62	62	80	72	83	85
13	67	49	47	44	33	37	68	66	82	74	85	79
14	67	43	46	41	38	50	69	76	84	76	83	77
15	65	48	44	44	42	55	74	78	85	78	77	75
16	67	46	--	44	48	58	75	80	86	81	--	79
17	68	48	44	40	45	53	74	82	87	80	80	75
18	67	50	44	41	55	57	73	80	88	78	82	76
19	63	48	47	43	50	60	73	80	80	80	--	76
20	67	48	46	36	44	60	74	85	78	82	81	78
21	66	47	47	44	45	57	74	83	78	84	81	84
22	66	48	45	45	36	58	74	84	82	86	86	77
23	68	48	46	44	43	64	75	85	84	72	84	72
24	67	49	47	36	44	64	68	78	85	78	88	72
25	67	48	48	33	46	70	72	68	85	80	85	66
26	68	50	47	33	48	58	75	65	77	78	86	70
27	52	43	43	33	47	56	79	68	73	80	84	--
28	66	50	45	33	48	62	78	75	70	82	86	72
29	65	52	45	33	48	58	78	78	73	82	84	58
30	68	48	40	33	--	54	79	82	77	79	85	57
31	66	--	36	33	--	48	--	82	--	78	86	--
Average	67	51	46	40	41	49	71	75	81	78	84	76

## RED RIVER BASIN--Continued

## WASHITA RIVER AT CARNEGIE, OKLA.

LOCATION.--At gaging station at bridge on State Highway 9, 1,300 feet upstream from Running Creek, and 2.7 miles east of Carnegie, Caddo County.

DRAINAGE AREA.--3,230 square miles, including that of Running Creek.

RECORDS AVAILABLE.--Sediment records: May 1947 to September 1948.

EXTREMES, 1947-48.--Sediment loads: Maximum, 81,700 tons per day Aug. 17; minimum, 7.4 tons per day Sept. 27.

EXTREMES, May 1947-September 1948.--Sediment loads: Maximum, 116,000 tons per day May 13, 1947; minimum, 7.4 tons per day Sept. 27, 1948.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1117.

## Suspended sediment, water year October 1947 to September 1948

Day	October			November			December		
	Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppr)	Tons per day
1-----	22	}	12	43	208	24	28	302	23
2-----	21		11	36	202	20	34	1/300	28
3-----	21		11	30	260	21	275	1/7,390	5,490
4-----	21		11	24	314	20	982	8,210	21,800
5-----	21		11	22	190	11	1,280	8,300	28,700
6-----	21	}	11	21	180	10	589	4,340	6,900
7-----	38		20	19	430	22	182	814	400
8-----	30		16	19	240	12	106	110	32
9-----	26		14	21	340	19	81	115	25
10-----	23		12	23	216	13	67	1/175	32
11-----	22	} 1/200	12	23	376	23	60	235	38
12-----	22		12	22	307	18	52	266	37
13-----	21		11	21	180	10	58	290	45
14-----	21		11	21	196	11	58	218	34
15-----	21		11	27	200	15	53	226	32
16-----	25	}	14	28	214	16	48	218	28
17-----	39		21	27	198	14	46	224	28
18-----	49		26	30	185	15	46	245	30
19-----	51		28	32	194	17	45	358	43
20-----	46		25	32	179	15	45	306	37
21-----	38	} 177	20	30	186	15	45	329	40
22-----	34		18	28	210	16	44	329	39
23-----	33		16	29	214	17	43	314	37
24-----	32		16	28	220	17	42	304	34
25-----	32		16	27	210	15	41	292	32
26-----	32	} 1/182	16	26	224	16	41	286	32
27-----	32		16	26	222	16	40	293	32
28-----	32		16	26	221	16	39	1/308	32
29-----	59		60	26	232	16	39	324	34
30-----	62		47	26	310	22	37	308	31
31-----	52		29	--	--	--	36	292	28
Total-	999	--	570	793	--	492	4,582	--	64,153

1/Estimated.

## RED RIVER BASIN--Continued

## WASHITA RIVER AT CARNEGIE, OKLA.--Continued

Suspended sediment, water year October 1947 to September 1948--Continued

Day	January			February			March		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	38	254	26	39	166	17	950	11,600	29,800
2-----	38	224	23	43	180	21	400	8,900	9,610
3-----	36	229	22	46	168	21	1,130	16,900	51,600
4-----	36	230	22	46	122	15	1,250	10,200	34,400
5-----	38	226	23	54	143	21	526	9,300	13,200
6-----	40	228	25	57	138	21	304	4,150	3,410
7-----	47	234	30	54	140	20	152	3,820	1,570
8-----	49	218	29	48	127	16	116	2,260	708
9-----	51	222	31	37	128	13	103	1,250	348
10-----	50	201	27	34	129	12	139	810	304
11-----	48	264	34	43	139	16	86	826	198
12-----	46	1/304	36	44	157	19	71	324	62
13-----	44	344	41	39	157	17	81	593	130
14-----	43	215	25	46	155	19	106	532	152
15-----	42	217	25	49	174	23	127	786	270
16-----	40	210	23	58	146	23	146	781	308
17-----	39	189	20	61	139	23	145	562	220
18-----	36	196	19	66	126	22	112	520	157
19-----	35	198	19	65	135	24	127	1,090	374
20-----	35	208	20	66	152	27	595	15,400	24,700
21-----	33	194	17	60	176	29	1,280	18,000	62,200
22-----	39	201	21	60	141	23	955	10,500	27,000
23-----	38	189	19	59	116	18	314	5,210	4,420
24-----	40	306	33	63	127	22	146	2,620	1,040
25-----	37	200	20	82	127	28	159	3,910	1,680
26-----	36	170	17	94	171	43	237	5,800	3,710
27-----	36	170	17	133	252	90	169	1,920	875
28-----	34	170	16	214	257	148	119	513	165
29-----	34	170	16	1,130	11,100	33,800	106	265	76
30-----	37	133	13	--	--	--	96	242	63
31-----	38	114	12	--	--	--	91	256	63
Total -	1,233	--	723	2,890	--	34,591	10,338	--	272,813
Day	April			May			June		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	85	286	66	56	434	66	53	179	26
2-----	88	222	53	51	369	51	48	140	18
3-----	85	169	39	49	230	30	42	191	22
4-----	81	150	33	48	212	27	42	208	24
5-----	84	140	32	46	235	29	66	183	33
6-----	82	150	33	42	182	21	48	120	16
7-----	80	133	29	40	324	35	40	240	26
8-----	76	182	37	39	275	29	35	170	16
9-----	71	142	27	38	175	18	33	162	14
10-----	71	154	30	51	275	38	30	1/145	12
11-----	73	214	42	46	244	30	30	1/145	12
12-----	70	210	40	308	4,580	3,810	34	130	12
13-----	68	178	33	286	5,000	3,860	32	136	12
14-----	65	192	34	138	2,320	864	33	200	18
15-----	63	204	35	92	325	81	34	193	18
16-----	61	199	33	73	102	20	34	150	14
17-----	58	167	26	67	94	17	32	159	14
18-----	56	184	28	58	88	14	31	154	13
19-----	53	154	22	54	92	13	30	182	15
20-----	52	160	22	51	102	14	30	156	13
21-----	51	180	25	51	149	21	54	770	112
22-----	51	168	23	51	158	22	236	5,210	3,320
23-----	62	200	33	52	157	22	1,130	7,380	22,500
24-----	104	705	198	53	166	24	2,260	4,700	28,700
25-----	267	1,310	945	49	173	23	2,110	3,540	20,200
26-----	135	404	147	48	188	24	322	1,940	1,690
27-----	86	126	29	58	250	39	247	3,570	2,380
28-----	71	154	30	56	200	30	860	18,100	42,000
29-----	67	287	52	68	228	42	494	15,900	21,200
30-----	60	240	39	72	213	41	957	17,100	44,200
31-----	--	--	--	58	171	27	--	--	--
Total -	2,376	--	2,215	2,249	--	9,382	9,427	--	186,650

1/ Estimated.

## LOWER MISSISSIPPI RIVER BASIN

## RED RIVER BASIN--Continued

## WASHITA RIVER AT CARNEGIE, OKLA.--Continued

Suspended sediment, water year October 1947 to September 1948--Continued

Day	July			August			September		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	800	13,900	30,100	54	1/400	58	49	190	25
2-----	276	6,390	4,760	48	1/400	52	45	182	22
3-----	162	3,700	1,620	41	354	39	56	190	29
4-----	116	2,200	689	67	234	42	43	213	25
5-----	104	600	169	56	232	35	40	188	20
6-----	95	236	60	45	202	25	36	182	18
7-----	88	248	59	39	176	19	34	199	18
8-----	84	242	55	76	614	126	33	179	16
9-----	80	194	42	280	10,500	7,970	33	176	16
10-----	77	180	37	204	8,460	4,660	33	188	17
11-----	73	230	45	129	2,060	719	32	196	17
12-----	73	246	49	81	320	70	44	218	26
13-----	71	182	35	59	172	27	56	246	37
14-----	68	173	32	43	118	14	43	188	22
15-----	65	176	31	37	160	16	36	225	22
16-----	60	217	35	234	9,300	5,880	33	220	20
17-----	54	240	35	1,930	15,700	81,700	31	226	19
18-----	59	991	158	2,150	9,560	55,500	30	252	20
19-----	120	799	259	608	8,050	13,200	28	180	14
20-----	67	145	26	286	6,070	4,690	26	210	15
21-----	66	133	24	199	3,650	1,960	24	227	15
22-----	49	194	26	148	1,470	587	22	164	9.7
23-----	310	5,630	4,710	117	610	193	21	181	10
24-----	1,010	13,900	38,000	97	300	79	20	160	8.6
25-----	512	7,920	11,000	82	194	43	19	187	9.6
26-----	281	1/4,700	3,570	74	130	26	19	176	9.0
27-----	132	1/2,800	997	100	397	107	18	152	7.4
28-----	102	1/1,700	468	82	913	202	18	180	8.7
29-----	85	1/1,000	230	69	228	42	18	192	9.3
30-----	85	483	111	65	274	48	18	184	8.9
31-----	69	1/400	74	56	224	34	--	--	--
Total -	5,293	--	97,506	7,556	--	178,163	958	--	514.2

Total discharge for year (second-foot-days)----- 48,694

Total load for year (tons)----- 847,800

1/Estimated.

## 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, 5 miles south of Tabler, Gady County, and 7½ miles upstream from Water Creek.

DRAINAGE AREA.--4,760 square miles.

RECORDS AVAILABLE.--Chemical analyses: September 1946 to September 1948.

Water temperatures: September 1946 to September 1948.

EXTREMES, 1947-48.--Dissolved solids: Maximum 1,390 parts per million Nov. 5-10; minimum, 326 parts per million Aug. 19-21.

Total hardness: Maximum, 851 parts per million Jan. 1-10; minimum, 138 parts per million June 22.

Water temperatures: Maximum, 88° F. Aug. 18; minimum, freezing point on several days in winter months.

EXTREMES, 1946-48.--Dissolved solids: Maximum, 1,390 parts per million Nov. 5-10, 1947; minimum, 326 parts per million Aug. 19-21, 1948.

Total hardness: Maximum, 851 parts per million Jan. 1-10, 1948; minimum, 138 parts per million June 22, 1948.

Water temperatures: Maximum, 88° F. Aug. 18, 1948; minimum, freezing point on many days in winter months.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1117. Records of specific conductance of daily samples available in district office at Stillwater, Okla.

## Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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 non-carbonate
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
Oct. 1-10, 1947-----	108	68	--	1,600	--	--	190	60	110	236	537	144	--	--	5.0	--	1,160	1.58	338	720	527	25
Oct. 11-20-----	96.4	67	--	1,580	--	--	178	52	120	232	454	180	--	--	4.0	--	1,100	1.50	286	656	468	28
Oct. 21-24, 29-----	293	63	--	1,550	--	--	174	58	107	269	439	159	--	--	5.0	--	1,070	1.46	846	672	452	26
Oct. 25-28, 30-31-----	404	58	--	925	--	--	135	24	40	146	285	73	--	--	4.0	--	684	1.93	746	436	316	17
Nov. 1-4-----	110	55	--	1,600	--	--	195	42	111	214	412	207	--	--	4.0	--	1,080	1.47	321	659	484	27
Nov. 5-10-----	82.2	51	--	2,030	--	--	236	56	161	283	509	288	--	--	2.5	--	1,390	1.89	308	819	587	30
Nov. 11-20-----	126	45	--	1,740	--	--	207	48	130	276	449	214	--	--	2.0	--	1,190	1.62	405	714	488	28
Nov. 21-30-----	112	42	--	1,760	--	--	225	55	126	324	505	191	--	--	2.0	--	1,260	1.71	381	788	522	26
Dec. 1-3-----	87.7	--	--	1,690	--	--	229	43	85	258	467	164	--	--	5.0	--	1,120	1.52	265	748	537	20
Dec. 4-8-----	1,288	48	--	669	--	--	93	22	12	145	176	31	--	--	4.0	--	445	.61	1,550	322	204	8
Dec. 9-10-----	710	42	--	863	--	--	112	21	37	140	221	71	--	--	2.0	--	564	.77	1,080	366	251	18
Dec. 11-20-----	162	38	--	1,530	--	--	197	36	86	253	369	165	--	--	3.0	--	981	1.33	429	640	432	23
Dec. 21-31-----	131	38	8.0	1,790	1.0	0.00	230	47	122	337	469	195	0.2	3.0	4.0	--	1,240	1.69	439	767	491	26
Jan. 1-10, 1948-----	150	40	--	1,790	--	--	249	56	98	343	500	177	--	--	4.0	--	1,250	1.70	506	851	560	20
Jan. 11-15-----	169	46	--	1,730	--	--	227	53	91	324	455	170	--	--	3.0	--	1,160	1.58	529	784	519	20
Jan. 30-Feb. 10-----	188	34	--	1,590	--	--	210	59	71	253	490	142	--	--	4.0	--	1,100	1.50	558	766	559	17
Feb. 11-20-----	175	38	--	1,500	--	--	198	51	88	247	486	130	--	--	3.0	--	1,080	1.47	510	704	501	21
Feb. 21-25, 29-----	239	42	--	1,520	--	--	212	53	67	259	486	122	--	--	3.0	--	1,070	1.46	690	747	535	16
Feb. 26-28-----	738	47	--	808	--	--	110	28	23	163	238	39	--	--	3.0	--	558	.76	1,110	390	286	11
Mar. 1-10-----	1,407	41	--	888	--	--	121	31	29	103	333	42	--	--	4.0	--	669	.91	2,540	430	345	13
Mar. 11, 13-16, 19 -	936	43	--	890	--	--	93	26	29	68	274	42	--	--	3.0	--	532	.72	1,340	339	284	16
Mar. 12-14, 17-18, 20-----	571	41	--	1,160	--	--	131	32	54	113	374	66	--	--	2.0	--	762	1.04	1,170	456	366	20
Mar. 21-22, 28-31-----	1,381	54	--	937	--	--	128	32	31	165	300	49	--	--	2.0	--	652	.89	2,430	451	316	13
Mar. 23-27-----	1,742	55	--	648	--	--	84	20	25	126	191	29	--	--	3.0	--	436	.59	2,050	292	188	16

RED RIVER BASIN--Continued  
WASHITA RIVER NEAR TABLER, OKLA.--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Mean discharge (second-foot)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
Apr. 5-10, 1948----	332	62	--	1,320	--	--	162	52	71	165	485	91	--	--	4.0	--	946	1.29	848	618	483	20
Apr. 11-20-----	239	64	--	1,510	--	--	182	57	87	173	536	125	--	--	2.0	--	1,070	1.46	690	688	546	22
Apr. 21-30-----	686	69	--	1,280	--	--	164	40	71	195	420	91	--	--	2.0	--	884	1.20	1,640	574	414	21
May 14-15, 19-20----	290	73	--	1,160	--	--	150	32	61	144	390	75	--	--	3.3	--	855	1.16	669	506	388	21
May 16, 18-----	1,003	74	--	890	--	--	106	19	73	145	295	49	--	--	6.8	--	636	.86	1,720	342	224	32
May 17-----	781	71	--	546	--	--	--	--	--	127	151	13	--	--	12	--	--	--	--	178	--	--
May 21-24, 27-31----	248	74	--	1,400	--	--	158	45	92	166	450	123	--	--	2.5	--	952	1.29	637	579	443	26
May 25-26-----	664	68	--	848	--	--	106	22	58	153	283	41	--	--	4.9	--	609	.83	1,090	355	229	26
June 1-10-----	219	76	7.8	1,420	18	0.20	134	46	127	2.4	193	407	155	0.4	2.0	--	987	1.34	584	524	356	34
June 11-20-----	197	78	--	1,120	--	--	144	36	60	204	317	98	--	--	3.0	--	798	1.09	424	508	340	20
June 21, 23-30-----	2,154	74	--	670	--	--	98	20	18	142	199	28	--	--	4.0	--	470	.64	2,730	326	210	11
June 22-----	5,820	72	--	315	--	--	--	--	--	153	30	6.0	--	--	10	--	--	--	--	138	--	--
July 10-20-----	222	81	--	1,290	--	--	138	41	62	164	354	101	--	--	2.0	--	833	1.13	499	513	378	21
July 21-23, 25-26, 31----	432	80	--	1,320	--	--	162	40	76	171	398	125	--	--	3.0	--	939	1.28	1,100	568	428	22
July 24, 27-30-----	386	80	--	742	--	--	100	19	37	137	209	53	--	--	4.0	--	490	.67	511	328	216	20
Aug. 5-10-----	156	78	--	1,240	--	--	143	38	72	147	345	133	--	--	4.0	--	854	1.16	360	513	392	23
Aug. 11-18-----	227	82	8.1	1,140	7.0	.05	144	35	56	169	343	97	--	3	8.0	--	892	1.12	504	504	365	19
Aug. 19-21-----	1,170	78	--	500	--	--	72	16	11	128	125	22	--	--	3.5	--	326	.44	1,030	246	140	9
Aug. 22-31-----	283	78	--	840	--	--	118	27	28	135	260	43	--	--	4.0	--	609	.83	465	406	285	13
Sept. 1-10-----	92.2	75	--	1,050	--	--	135	34	51	199	300	78	--	--	3.0	--	743	1.01	185	477	314	19
Sept. 11-20-----	74.3	71	8.4	1,350	2.0	.10	162	51	64	250	379	118	--	4	2.5	--	985	1.34	198	614	408	18
Sept. 21-22, 24, 30----	59.5	71	--	1,470	--	--	172	55	92	247	445	132	--	--	3.0	--	1,020	1.39	164	655	452	24
Sept. 23, 25-29-----	49.8	67	--	1,680	--	--	185	63	121	254	509	172	--	--	4.0	--	1,180	1.60	159	720	512	27



RED RIVER BASIN--Continued  
WASHITA RIVER NEAR TABLER, OKLA.--Continued

Day	Temperature (° F.) of water, water year October 1947 to September 1948											
	October	November	December	January	February	March	April	May	June	July	August	September
1	68	55	--	32	35	--	--	--	72	--	--	79
2	67	55	50	39	34	49	--	--	71	--	--	76
3	67	56	--	32	34	45	--	--	72	--	--	77
4	68	53	52	36	36	43	--	--	81	--	--	75
5	70	53	45	38	33	41	64	--	71	--	84	77
6	70	55	47	37	34	38	63	--	78	--	76	75
7	70	47	47	50	37	38	63	--	79	--	73	76
8	67	50	47	50	32	38	62	--	87	--	78	75
9	67	46	44	42	32	40	59	--	74	--	76	71
10	67	54	41	42	33	34	62	--	76	82	78	67
11	67	38	39	44	33	32	65	--	78	80	81	63
12	69	43	34	49	32	33	68	--	72	79	82	67
13	68	44	35	44	32	33	59	--	79	82	82	67
14	68	47	38	45	32	36	58	73	76	87	85	70
15	68	46	37	47	40	43	67	73	79	81	80	68
16	67	50	35	--	36	44	61	74	76	82	77	71
17	67	48	36	--	35	42	65	71	79	81	77	71
18	68	44	38	--	52	49	65	74	79	82	88	72
19	65	46	47	--	47	54	64	75	79	81	80	85
20	63	46	40	--	41	55	65	72	78	79	77	73
21	64	49	40	--	39	59	66	83	74	83	78	74
22	65	43	41	--	39	56	70	75	72	82	78	78
23	66	43	37	--	39	52	73	74	74	75	78	71
24	66	40	39	--	42	51	73	75	--	77	78	72
25	60	38	41	--	43	59	63	70	74	79	78	71
26	58	43	36	--	44	58	61	65	73	82	78	67
27	54	45	35	--	49	53	73	68	74	83	83	70
28	57	40	35	--	49	52	68	74	75	81	77	62
29	56	41	38	--	49	51	67	75	74	81	77	61
30	61	43	43	32	--	51	76	71	76	81	78	61
31	61	--	34	32	--	57	--	72	--	79	79	--
Average	65	47	40	--	38	46	65	--	76	--	79	71

## RED RIVER BASIN--Continued

## WASHITA RIVER NEAR DURWOOD, OKLA.

LOCATION.--At gaging station at Mulkey Bridge, on State Highway 18, 1½ miles downstream from Caddo Creek, and 4 miles north of Durwood, Carter County.

DRAINAGE AREA.--7,310 square miles.

RECORDS AVAILABLE.--Chemical analyses: May 1944 to September 1948.

Water temperatures: April 1947 to September 1948.

EXTREMES, 1944-47.--Dissolved solids: Maximum, 936 parts per million July 21-25, 30-31, 1944; minimum, 140 parts per million Oct. 1-3, 1945.

Total hardness: Maximum, 574 parts per million July 21-25, 30-31; minimum, 114 parts per million Oct. 1-3, 1945.

Water temperatures, 1947-48: Maximum, 85° F. July 24, 1948; minimum, freezing point on several days in winter months.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1117. Records of specific conductance of daily samples available in district office at Stillwater, Okla.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Day	October		November		December		January	
	Specific conductance (micromhos at 25° C.)	Chloride (Cl)	Specific conductance (micromhos at 25° C.)	Chloride (Cl)	Specific conductance (micromhos at 25° C.)	Chloride (Cl)	Specific conductance (micromhos at 25° C.)	Chloride (Cl)
1 -----	991	--	751	--	1,160	--	562	48
2 -----	1,140	--	783	--	1,210	--	904	--
3 -----	1,140	--	618	51	1,260	125	919	--
4 -----	1,120	--	682	--	1,160	--	921	--
5 -----	1,140	--	892	--	1,140	--	953	--
6 -----	1,200	--	971	65	1,060	--	951	--
7 -----	1,210	--	949	--	774	--	1,060	--
8 -----	1,130	--	796	--	739	--	1,140	94
9 -----	1,160	--	764	--	630	--	1,080	--
10 -----	1,140	--	791	--	600	33	1,120	--
11 -----	1,180	--	829	--	710	47	1,110	--
12 -----	1,300	--	856	--	746	--	1,120	--
13 -----	1,210	--	922	--	805	--	1,120	--
14 -----	1,420	148	1,160	140	745	--	1,170	--
15 -----	1,420	--	1,060	--	800	--	1,170	--
16 -----	1,300	--	1,050	--	820	--	1,180	--
17 -----	1,260	--	801	--	852	--	1,210	--
18 -----	1,210	--	783	--	924	--	1,230	--
19 -----	812	--	805	--	1,090	--	1,260	--
20 -----	683	55	782	75	1,100	97	1,290	--
21 -----	959	--	969	--	1,160	--	1,320	--
22 -----	973	--	989	--	1,110	--	1,290	--
23 -----	947	--	1,030	--	1,150	--	1,230	--
24 -----	875	--	754	49	1,180	--	1,280	--
25 -----	945	--	1,070	--	1,210	--	1,230	--
26 -----	1,110	--	949	--	1,180	--	1,250	--
27 -----	1,260	170	1,050	--	1,090	--	1,120	--
28 -----	797	--	1,300	146	1,110	--	1,310	--
29 -----	658	64	1,100	--	1,050	--	1,290	--
30 -----	756	--	1,220	--	1,060	--	1,210	--
31 -----	751	--	--	--	1,150	--	1,150	--

## RED RIVER BASIN--Continued

## WASHITA RIVER NEAR DURWOOD, OKLA.--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Day	February		March		April		May	
	Specific conductance (micromhos at 25° C.)	Chloride (Cl)	Specific conductance (micromhos at 25° C.)	Chloride (Cl)	Specific conductance (micromhos at 25° C.)	Chloride (Cl)	Specific conductance (micromhos at 25° C.)	Chloride (Cl)
1-----	1,260	--	872	--	822	--	794	--
2-----	1,200	--	368	25	952	--	1,130	53
3-----	1,150	--	571	--	850	--	1,100	--
4-----	1,280	--	568	--	860	--	925	--
5-----	1,160	--	501	--	882	--	950	--
6-----	1,180	--	571	--	938	--	870	--
7-----	1,030	--	826	--	910	--	1,060	--
8-----	1,020	--	781	--	945	--	1,110	--
9-----	1,110	--	888	49	990	--	1,020	--
10-----	1,200	--	844	--	1,000	--	794	69
11-----	1,140	--	829	--	1,000	--	423	--
12-----	1,150	--	725	--	1,060	--	396	32
13-----	1,140	--	757	--	1,130	--	478	--
14-----	1,140	--	763	--	1,090	--	565	--
15-----	1,050	--	579	63	1,140	--	892	--
16-----	960	--	607	--	1,130	--	685	--
17-----	948	--	775	--	1,190	90	775	--
18-----	1,140	--	864	61	1,130	--	953	53
19-----	1,080	--	802	--	1,170	--	821	--
20-----	958	--	746	--	1,120	--	917	--
21-----	1,110	--	845	--	1,220	--	821	58
22-----	1,200	52	644	--	1,210	--	578	--
23-----	1,190	--	650	--	1,160	--	699	--
24-----	1,130	--	959	51	1,160	--	703	--
25-----	350	18	878	--	1,140	--	546	--
26-----	828	--	800	--	1,080	--	743	--
27-----	375	--	719	--	1,100	--	397	31
28-----	372	--	578	34	815	--	529	--
29-----	517	--	746	--	1,140	--	429	--
30-----	--	--	595	--	824	--	496	--
31-----	--	--	650	--	--	--	641	--
Day	June		July		August		September	
	Specific conductance (micromhos at 25° C.)	Chloride (Cl)	Specific conductance (micromhos at 25° C.)	Chloride (Cl)	Specific conductance (micromhos at 25° C.)	Chloride (Cl)	Specific conductance (micromhos at 25° C.)	Chloride (Cl)
1-----	529	--	664	--	826	--	741	--
2-----	440	34	650	--	979	--	769	--
3-----	504	--	738	40	758	--	812	--
4-----	441	--	592	--	715	--	1,250	126
5-----	481	--	536	--	674	--	962	--
6-----	665	--	502	28	684	--	793	--
7-----	842	--	547	--	688	--	729	34
8-----	943	--	621	--	837	--	799	--
9-----	956	82	643	--	795	--	772	--
10-----	907	--	737	--	865	--	888	--
11-----	944	--	519	--	--	--	806	--
12-----	1,010	--	371	31	744	--	821	--
13-----	923	--	527	--	862	--	870	--
14-----	1,020	--	583	--	868	--	834	--
15-----	1,050	--	503	33	636	45	796	--
16-----	1,070	--	616	--	853	--	801	--
17-----	1,120	--	754	43	935	--	839	68
18-----	1,070	--	823	--	1,040	--	790	--
19-----	1,060	--	909	--	1,200	110	869	--
20-----	949	--	904	75	928	--	842	--
21-----	889	--	892	--	1,030	87	891	69
22-----	1,070	124	928	82	997	--	950	--
23-----	404	--	967	--	955	--	920	--
24-----	432	--	956	69	509	17	1,040	--
25-----	289	9.6	788	--	522	--	960	--
26-----	372	--	459	26	576	--	1,030	--
27-----	514	--	835	--	691	--	1,040	--
28-----	543	--	918	--	692	--	1,080	--
29-----	387	--	894	--	728	--	1,110	100
30-----	452	--	939	--	1,010	--	1,080	--
31-----	--	--	1,200	66	562	--	--	--

RED RIVER BASIN--Continued  
WASHITA RIVER NEAR DURWOOD, OKLA.--Continued

Temperature (° F) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	74	61	51	35	32	54	56	78	71	74	84	81
2	68	59	51	34	36	50	56	77	69	76	83	79
3	68	59	47	35	37	48	57	72	70	76	83	78
4	72	60	55	39	39	47	59	74	73	78	83	78
5	72	57	71	41	39	46	62	75	75	76	77	78
6	---	---	---	---	---	---	---	---	---	---	---	---
7	71	58	55	44	38	43	66	71	80	75	79	78
8	73	53	51	42	41	44	69	71	79	79	77	77
9	73	50	47	45	37	44	62	72	84	79	81	77
10	72	58	42	46	36	42	63	65	80	80	76	74
11	71	49	42	48	40	32	68	62	81	81	--	67
12	---	---	---	---	---	---	---	---	---	---	---	---
13	72	49	39	39	32	35	69	70	82	80	83	68
14	70	50	43	40	32	41	69	72	84	81	84	70
15	72	48	40	40	36	50	68	74	83	81	83	72
16	---	---	---	---	---	---	---	---	---	---	---	---
17	72	47	41	38	40	48	70	74	83	82	80	74
18	71	50	45	32	44	50	68	75	82	82	79	74
19	73	49	43	32	38	51	65	76	83	83	80	74
20	70	49	46	32	32	54	65	74	81	81	79	76
21	65	49	52	36	48	57	66	74	83	81	80	76
22	---	---	---	---	---	---	---	---	---	---	---	---
23	67	51	44	37	44	62	72	74	80	81	81	76
24	67	48	44	28	43	59	74	75	77	80	82	74
25	68	47	46	35	42	59	74	75	75	82	81	75
26	70	44	43	34	42	57	76	76	72	85	80	78
27	67	44	39	32	51	59	65	73	70	79	80	73
28	---	---	---	---	---	---	---	---	---	---	---	---
29	65	46	41	32	32	63	66	69	72	81	79	68
30	62	46	41	27	54	56	76	73	73	82	79	64
31	60	44	42	32	54	52	76	66	73	83	80	64
32	62	44	44	33	54	54	76	69	73	84	81	63
33	60	44	44	33	54	54	76	69	73	84	81	63
34	62	44	44	33	54	54	76	69	73	84	81	63
35	60	44	44	33	54	54	76	69	73	84	81	63
36	60	44	44	33	54	54	76	69	73	84	81	63
37	60	44	44	33	54	54	76	69	73	84	81	63
38	60	44	44	33	54	54	76	69	73	84	81	63
39	60	44	44	33	54	54	76	69	73	84	81	63
40	60	44	44	33	54	54	76	69	73	84	81	63
41	60	44	44	33	54	54	76	69	73	84	81	63
42	60	44	44	33	54	54	76	69	73	84	81	63
43	60	44	44	33	54	54	76	69	73	84	81	63
44	60	44	44	33	54	54	76	69	73	84	81	63
45	60	44	44	33	54	54	76	69	73	84	81	63
46	60	44	44	33	54	54	76	69	73	84	81	63
47	60	44	44	33	54	54	76	69	73	84	81	63
48	60	44	44	33	54	54	76	69	73	84	81	63
49	60	44	44	33	54	54	76	69	73	84	81	63
50	60	44	44	33	54	54	76	69	73	84	81	63
51	60	44	44	33	54	54	76	69	73	84	81	63
52	60	44	44	33	54	54	76	69	73	84	81	63
53	60	44	44	33	54	54	76	69	73	84	81	63
54	60	44	44	33	54	54	76	69	73	84	81	63
55	60	44	44	33	54	54	76	69	73	84	81	63
56	60	44	44	33	54	54	76	69	73	84	81	63
57	60	44	44	33	54	54	76	69	73	84	81	63
58	60	44	44	33	54	54	76	69	73	84	81	63
59	60	44	44	33	54	54	76	69	73	84	81	63
60	60	44	44	33	54	54	76	69	73	84	81	63
61	60	44	44	33	54	54	76	69	73	84	81	63
62	60	44	44	33	54	54	76	69	73	84	81	63
63	60	44	44	33	54	54	76	69	73	84	81	63
64	60	44	44	33	54	54	76	69	73	84	81	63
65	60	44	44	33	54	54	76	69	73	84	81	63
66	60	44	44	33	54	54	76	69	73	84	81	63
67	60	44	44	33	54	54	76	69	73	84	81	63
68	60	44	44	33	54	54	76	69	73	84	81	63
69	60	44	44	33	54	54	76	69	73	84	81	63
70	60	44	44	33	54	54	76	69	73	84	81	63
71	60	44	44	33	54	54	76	69	73	84	81	63
72	60	44	44	33	54	54	76	69	73	84	81	63
73	60	44	44	33	54	54	76	69	73	84	81	63
74	60	44	44	33	54	54	76	69	73	84	81	63
75	60	44	44	33	54	54	76	69	73	84	81	63
76	60	44	44	33	54	54	76	69	73	84	81	63
77	60	44	44	33	54	54	76	69	73	84	81	63
78	60	44	44	33	54	54	76	69	73	84	81	63
79	60	44	44	33	54	54	76	69	73	84	81	63
80	60	44	44	33	54	54	76	69	73	84	81	63
81	60	44	44	33	54	54	76	69	73	84	81	63
82	60	44	44	33	54	54	76	69	73	84	81	63
83	60	44	44	33	54	54	76	69	73	84	81	63
84	60	44	44	33	54	54	76	69	73	84	81	63
85	60	44	44	33	54	54	76	69	73	84	81	63
86	60	44	44	33	54	54	76	69	73	84	81	63
87	60	44	44	33	54	54	76	69	73	84	81	63
88	60	44	44	33	54	54	76	69	73	84	81	63
89	60	44	44	33	54	54	76	69	73	84	81	63
90	60	44	44	33	54	54	76	69	73	84	81	63
91	60	44	44	33	54	54	76	69	73	84	81	63
92	60	44	44	33	54	54	76	69	73	84	81	63
93	60	44	44	33	54	54	76	69	73	84	81	63
94	60	44	44	33	54	54	76	69	73	84	81	63
95	60	44	44	33	54	54	76	69	73	84	81	63
96	60	44	44	33	54	54	76	69	73	84	81	63
97	60	44	44	33	54	54	76	69	73	84	81	63
98	60	44	44	33	54	54	76	69	73	84	81	63
99	60	44	44	33	54	54	76	69	73	84	81	63
100	60	44	44	33	54	54	76	69	73	84	81	63
Average	69	50	45	38	42	50	67	72	77	80	81	73

## RED RIVER BASIN--Continued

## BARNITZ CREEK NEAR ARAPAHO, OKLA.

LOCATION.--At gaging station at bridge on county road, half a mile downstream from junction of East and West Barnitz Creeks, 4½ miles west of Arapaho, Custer County, and 6 miles upstream from mouth.

DRAINAGE AREA.--247 square miles.

RECORDS AVAILABLE.--Sediment records: May 1947 to September 1948.

EXTREMES, 1947-48.--Sediment loads: Maximum, 15,400 tons per day May 10; minimum, no flow on many days.

EXTREMES, May 1947-September 1948.--Sediment loads: Maximum, 47,100 tons per day May 12, 1947; minimum, no flow on many days.

REMARKS.--No flow during months not shown on table. Computation of sediment loads made by Surface Water Branch office at Oklahoma City. Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1117.

Suspended sediment, water year October 1947 to September 1948

Day	February			March			May		
	Mean discharge (second-feet)	Mean concentration (ppm)	Tons per day	Mean discharge (second-feet)	Mean concentration (ppm)	Tons per day	Mean discharge (second-feet)	Mean concentration (ppm)	Tons per day
1-----	--	--	--	244	17,900	11,800	--	--	--
2-----	--	--	--	192	14,800	7,700	--	--	--
3-----	--	--	--	4	2,040	22	--	--	--
4-----	--	--	--	1	124	.3	--	--	--
5-----	--	--	--	--	--	--	--	--	--
6-----	--	--	--	--	--	--	--	--	--
7-----	--	--	--	--	--	--	--	--	--
8-----	--	--	--	--	--	--	--	--	--
9-----	--	--	--	--	--	--	--	--	--
10-----	--	--	--	--	--	--	436	13,100	15,400
11-----	--	--	--	--	--	--	32	4,310	373
12-----	--	--	--	--	--	--	2	164	.9
13-----	--	--	--	--	--	--	1	58	.2
14-----	--	--	--	1	40	.1	--	--	--
15-----	--	--	--	1	186	.5	--	--	--
16-----	--	--	--	--	--	--	--	--	--
17-----	--	--	--	--	--	--	--	--	--
18-----	--	--	--	59	18,600	2,960	--	--	--
19-----	--	--	--	50	14,000	1,890	--	--	--
20-----	--	--	--	24	16,400	1,030	--	--	--
21-----	--	--	--	1	630	1.7	--	--	--
22-----	--	--	--	--	--	--	--	--	--
23-----	--	--	--	--	--	--	--	--	--
24-----	--	--	--	--	--	--	--	--	--
25-----	--	--	--	--	--	--	5	24	.3
26-----	--	--	--	--	--	--	10	16	.4
27-----	373	13,200	13,300	--	--	--	9	22	.5
28-----	54	9,740	1,420	--	--	--	6	24	.4
29-----	1	1,400	3.8	--	--	--	4	22	.2
30-----	--	--	--	--	--	--	3	1/20	.2
31-----	--	--	--	--	--	--	2	1/20	.1
Total-	428	--	14,723.8	577	--	25,434.6	510	--	15,776.2

1/Estimated.



RED RIVER BASIN--Continued  
RUSH CREEK AT PURDY, OKLA.

LOCATION.--At bridge on State Highway 76, three-quarters of a mile south of Purdy, Garvin County, and 8½ miles south of Lindsay, Garvin County.  
DRAINAGE AREA.--139 square miles.

RECORDS AVAILABLE.--Chemical analyses: August 1946 to September 1948.

Water temperatures: October 1946 to September 1948.  
EXTREMES, 1947-48.--Dissolved solids: Maximum, 1,290 parts per million Apr. 1-8; minimum, 355 parts per million Feb. 27-29.

Total hardness: Maximum, 600 parts per million Sept. 11-20; minimum, 194 parts per million June 24-30.

Water temperatures: Maximum, 55° F. Aug. 30; minimum, freezing point Jan. 27, 31, Feb. 2, 7.

EXTREMES, 1946-48.--Dissolved solids: Maximum, 1,600 parts per million Oct. 6, 10-13, 1946; minimum, 242 parts per million Apr. 12-15, 1-47.

Total hardness: Maximum, 660 parts per million Aug. 21-31, 1947; minimum, 182 parts per million Apr. 12-15, 1947.

Water temperatures: Maximum, 100° F. Sept. 2, 1947; minimum, freezing point Jan. 27, 31, Feb. 2, 7, 1948.

REMARKS.--Records of water discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1117. Records of specific conductance of daily samples available in district office at Stillwater, Okla.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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	
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate		
Oct. 1-10, 1947----	7.12	82		2,070			80	88	252		1/256	183	500		4.0			1,230	1.67	24	562	351	49
Oct. 11-15, 17-20--	5.82	80		1,870			86	74	201		2/265	138	418		6.0			1,050	1.43	16	519	302	46
Oct. 16-----	46.0	78		1,734			--	--	--		1/164	50	110		10			--	--	--	289	--	--
Oct. 21-31-----	34.3	81		1,350			100	59	159		1/315	128	315		3.0			939	1.28	87	492	234	41
Nov. 1-10-----	11.6	77		1,770			102	75	154		287	140	365		3.0			981	1.33	31	563	328	37
Nov. 11-14-----	65.0	72		904			62	26	84		175	64	165		2.5			519	1.71	91	262	118	41
Nov. 15-20-----	17.2	70		1,860			117	60	185		324	119	390		1.0			1,030	1.40	48	538	273	43
Nov. 21-30-----	16.9	71		1,630			117	62	140		352	140	295		.5			928	1.26	42	547	256	36
Dec. 1-10-----	24.1	70		1,900			82	66	200		239	156	390		4.0			1,020	1.39	66	476	280	48
Dec. 11-20-----	13.4	--		1,840			87	67	196		255	157	385		3.0			1,020	1.39	37	492	284	46
Dec. 21-31-----	14.1	66		1,990			104	67	210		285	178	405		3.0			1,110	1.51	42	535	302	46
Jan. 1-10, 1948----	25.4	58		1,740			118	69	159		318	163	318		3.0			970	1.32	67	536	273	39
Jan. 11-20-----	13.2	45		1,680			101	75	120		320	176	265		5.0			958	1.30	34	560	298	32
Jan. 21-30-----	5.00	38		1,690			101	71	136		317	174	280		5.5			990	1.35	13	544	284	35
Feb. 1-10-----	40.8	38		1,700			80	64	177		3/180	187	355		6.0			992	1.35	109	462	315	43
Feb. 11-16-----	29.8	51		1,640			74	59	173		4/154	170	352		5.0			937	1.27	75	427	301	47
Feb. 17-26-----	21.6	50		892			77	34	51		2/174	139	108		4.0			522	1.71	30	332	189	25
Feb. 27-29-----	24.0	51		574			69	22	24		5/160	100	55		3.0			355	.48	23	262	131	17
Mar. 1, 6-7-----	123	73		2,010			97	58	217		220	181	410		6.0			1,080	1.47	359	480	300	50
Mar. 2-5, 8-10----	31.7	74		1,220			95	47	88		254	165	168		5.0			724	.98	62	430	222	31
Mar. 11-20-----	70.4	--		1,360			107	53	101		290	178	198		4.0			842	1.15	160	485	248	31
Mar. 21-31-----	18.2	82		1,360			102	58	100		280	188	200		5.0			860	1.17	42	493	264	31

1/ Includes equivalent of 14 parts per million of carbonate (CO<sub>3</sub>).

2/ Includes equivalent of 12 parts per million of carbonate (CO<sub>3</sub>).

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

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

5/ Includes equivalent of 19 parts per million of carbonate (CO<sub>3</sub>).

## RED RIVER BASIN--Continued

## RUSH CREEK AT PURDY, OKLA.--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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	
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate		
Apr. 1-8, 1948	14.2	71		2,290			100	75	269		186	203	550		4.0			1,290	1.75	49	558	406	51
Apr. 9-20	12.3	70		1,530			82	68	137		210	209	278		.5			1,964	1.31	32	484	312	38
Apr. 21-30	13.3	70		1,600			88	71	147		229	225	290		.5			934	1.27	34	512	324	38
May 1-10	58.0	76		1,040			64	50	80		178	170	160		2.0			645	.86	101	365	219	32
May 11-20	18.0	82		1,080			74	50	83		203	173	165		2.0			676	.92	33	390	224	32
May 21-31	167	79		1,180			62	51	92		199	154	168		3.0			664	.90	299	364	201	35
June 1-12	12.2	86		1,500			83	69	128		205	185	288		2.0			950	1.29	31	490	322	36
June 13-23	77.3	85		993			74	44	68		258	82	152		2.0			593	.81	124	366	154	29
June 24-30	240	87		626			48	18	53		144	30	112		3.0			360	.49	233	194	71	37
July 1-10	43.6	91		884			89	69	165		225	166	358		1.0			959	1.30	113	506	321	41
July 11-20	11.8	88		1,320			88	70	158		224	165	350		1.0			942	1.28	30	508	324	40
July 21-31	90.8	87		1,320			68	57	112		191	115	262		1.0			780	1.06	191	404	248	38
Aug. 1-10	25.3	86		1,690			64	38	61		194	84	142		2.0			528	.72	36	316	156	30
Aug. 11-20	7.63	87		1,680			74	39	139		204	107	260		2.0			792	1.08	16	345	178	47
Aug. 21-31	9.14	88	7.6	1,700	7.0	0.10	88	67	164	3.2	230	165	350	0.4	1.0			959	1.30	24	495	306	42
Sept. 1-10	2.62	82		2,060			66	102	222		231	169	495		3.5			1,170	1.59	8.3	584	394	43
Sept. 11-20	2.66	77		2,100			71	103	231		244	188	500		2.5			1,220	1.66	8.8	600	400	46
Sept. 21-24	4.12	75		1,610			60	84	143		238	159	315		1.0			901	1.23	10	495	300	39
Sept. 25-30	2.38	79		2,060			65	102	210		251	161	470		3.0			1,140	1.55	7.3	581	376	44
Weighted average	33.5	--		1,270			76	51	113		217	131	230		3.0			744	1.01	67	399	221	38



RED RIVER BASIN-Continued  
RUSH CREEK AT PURDY, OKIA.--Continued

Temperature (° F) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	89	81	68	56	36	76	71	70	88	90	85	85
2	86	83	70	59	32	78	74	74	86	91	88	83
3	87	80	71	61	34	79	70	73	82	92	89	86
4	85	79	70	65	35	75	72	64	90	88	82	80
5	85	80	70	59	34	75	68	82	87	94	84	81
6	83	78	71	56	34	74	70	82	90	89	88	80
7	81	74	71	57	32	68	72	79	85	92	90	79
8	78	71	69	54	33	72	69	82	--	94	83	82
9	84	74	71	58	57	65	68	80	82	--	85	80
10	78	71	70	60	52	--	70	74	86	88	84	81
11	82	70	--	45	56	--	72	85	88	90	88	83
12	83	72	58	48	49	--	70	80	85	88	82	--
13	80	73	60	49	54	62	68	82	88	91	84	78
14	81	75	67	44	48	71	70	80	82	90	86	79
15	82	70	61	40	51	75	70	84	85	87	87	80
16	78	69	63	42	49	--	74	82	89	89	84	--
17	86	72	--	42	50	80	68	78	84	84	84	77
18	80	70	64	58	52	81	72	80	82	90	90	75
19	82	70	60	38	55	83	72	81	88	82	90	73
20	60	71	--	41	47	79	70	83	90	84	94	74
21	84	71	65	38	48	80	70	78	84	89	85	70
22	81	74	61	43	48	82	68	80	88	86	88	74
23	84	70	67	39	51	82	72	82	78	84	89	79
24	80	72	60	41	50	84	68	72	89	90	84	78
25	82	70	64	34	54	80	70	76	86	88	86	81
26	80	73	73	34	50	82	70	80	84	90	89	76
27	78	70	71	32	49	82	72	78	86	87	88	80
28	76	73	70	33	45	80	70	80	89	80	84	75
29	76	68	59	35	56	83	70	82	86	86	90	75
30	81	71	63	--	--	80	70	80	86	88	95	85
31	80	--	70	32	--	83	--	78	--	89	88	--
Average	81	73	66	46	46	78	70	79	86	88	87	79

RED RIVER BASIN--Continued\*  
MUDDY BOGGY CREEK NEAR FARRIS, OKLA.

LOCATION.--At bridge on State Highway 3, 1½ miles downstream from McGee Creek, and 2½ miles northwest of Farris, Atoka County.

DRAINAGE AREA.--1,120 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1948.

Water temperatures: October 1947 to September 1948.

EXTREMES, 1947-48.--Dissolved solids: Maximum 297 parts per million Sept. 1-10; minimum 35 parts per million May 25-26.

Total hardness: Maximum 180 parts per million Sept. 1-10; minimum 16 parts per million May 16-19.

Water temperatures: Maximum 86° F. June 20, July 18, Aug. 11, 15; minimum, freezing point on several days in January and February.

REMARKS.--Records of water discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1117. Records of specific conductance of daily samples available in district office at Stillwater, Okla.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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 carbonate
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
Oct. 1-10, 1947	2.01	68	7.4	130	1.4	1.2	12	3.5	13	5.4	57	13	12	0.3	3.0		115	0.16	0.6	44	0	36
Oct. 11-20	1.06	67	7.4	176	1.4	.40	15	4.9	13	4.1	76	11	14	.2	2.0		114	.16	.3	58	0	34
Oct. 21-31	4.21	63	7.5	192	1.0	.08	20	6.5	13	4.1	85	15	16	.2	1.0		123	.17	1.4	77	7	25
Nov. 1-10	4.86	56	7.3	176	12	.06	17	6.0	13	3.0	72	14	17	.1	1.0		128	.17	1.7	67	8	2
Nov. 11-20	32.9	46	--	171	--	--	14	5.4	15		69	12	14	--	1.0		116	.16	1.0	57	1	30
Nov. 21-30	66.0	44	--	196	--	--	16	7.0	15		72	21	14	--	1.5		130	.18	23	69	10	33
Dec. 1-6	32.5	48	--	205	--	--	17	8.2	14		70	24	17	--	1.5		116	.16	10	76	19	29
Dec. 7-20	727	43	7.5	101	41	1.6	7.6	2.9	8.3	4.9	27	17	9.2	.7	.5		143	.19	28.1	31	9	33
Dec. 21-31	168	43	--	117	--	--	9.1	6.0	7.1		34	20	10	--	1.0		69	.09	31	47	20	25
Jan. 1-10, 1948	1,878	41	--	96.3	--	--	8.8	4.2	4.2		25	12	10	--	1.5		53	.07	269	39	19	19
Jan. 11-20	53.6	39	--	111	--	--	8.2	4.6	7.5		29	16	10	--	1.5		62	.08	9.0	39	16	29
Jan. 21-31	26.7	34	7.1	143	16	1.4	11	4.3	7.6	2.6	34	18	12	.1	1.5		104	.14	7.5	45	17	25
Feb. 1-5	27.0	38	--	155	--	--	13	6.6	7.0		36	22	15	--	1.5		108	.15	7.9	60	30	20
Feb. 6-20	1,189	38	7.7	92.6	33	.80	7.2	4.1	4.1	3.3	21	15	9.5	.2	1.5		89	.12	286	35	13	19
Feb. 21-25	365	45	--	100	--	--	9.6	2.7	7.0		20	17	10	--	2.5		59	.08	58	35	19	30
Feb. 26-29	7,290	54	--	69.6	--	--	6.8	3.7	3.2		13	16	7.0	--	2.5		46	.06	905	32	22	18
Mar. 1-7	3,601	50	--	77.9	--	--	8.8	4.1	1.2	1.2	23	12	6.0	--	2.0		45	.06	438	39	20	6
Mar. 8-20	616	44	7.1	137	22	.12	11	4.2	9.9	1.6	29	21	11	.0	2.0		127	.17	211	45	21	32
Mar. 21-26	436	58	--	130	--	--	10	5.8		6.5	33	18	11	--	2.0		70	.10	82	49	22	22
Mar. 27-31	141	55	--	191	--	--	14	7.5	12		44	19	25	--	1.0		159	.22	61	66	30	25

Apr. 1-10	62.2	7.6	18	60	17	2.1	57	24	24	0	1.0	155	21	26	66	20	35
Apr. 11-20	33.8	65	---	---	---	---	73	25	35	---	---	159	22	15	70	11	43
Apr. 21-30	23.3	70	---	---	30	30	92	28	30	---	1.0	173	24	11	83	7	44
May 1-2, 6-9	25.3	68	---	---	31	31	91	25	31	---	1.0	175	24	12	78	4	46
May 3-5, 10	25.4	70	---	---	22	22	50	17	16	---	1.8	142	19	97	34	0	59
May 11-15	1,598	66	---	---	17	17	40	22	20	---	1.3	151	21	652	48	15	43
May 16-19	3,078	69	---	---	8.0	8.0	15	13	4.3	---	1.5	79	05	324	16	3	53
May 20-24	2,268	72	---	---	12	12	26	26	9.0	---	1.0	75	10	34	37	16	42
May 25-26	6,820	72	---	---	3.0	3.0	12	11	2.5	---	5.0	35	05	644	22	12	23
May 27-31	2,449	67	---	---	11	11	17	22	15	---	7.6	77	10	509	40	26	37
June 1-10	899	75	---	---	---	---	40	11	9.5	---	2.5	67	09	163	36	4	39
June 11-20	21.5	80	22	1.2	14	2.5	67	17	23	2	2.0	144	20	8.4	45	0	53
June 21-23, 30	248	80	---	---	18	18	66	16	20	---	1.0	136	18	91	61	7	39
June 24-29	4,893	74	---	---	15	10	21	7.6	14	---	1.5	132	07	657	24	7	46
July 1-10	1,159	78	20	---	15	3.8	49	15	20	.4	7.0	144	20	62	53	13	37
July 11-20	2,348	79	---	---	7.9	7.9	26	9.1	8.5	---	1.2	49	07	311	26	5	39
July 21-31	42.9	82	---	---	14	4.7	57	15	15	---	1.0	92	13	11	54	8	36
Aug. 1-10	17.3	78	14	.06	31	11	127	22	26	.3	1.0	193	26	9.0	123	19	23
Aug. 11-20	7.65	82	---	---	37	13	159	25	42	---	1.5	248	34	5.1	146	16	33
Aug. 21-31	4.31	79	---	---	38	16	189	26	53	---	1.0	292	40	3.4	176	21	32
Sept. 1-10	5.24	74	---	---	39	17	188	27	58	---	1.0	297	40	4.2	180	26	32
Sept. 11-20	1.72	71	.2	.02	43	15	185	28	52	.2	2.0	283	.38	1.3	169	17	32
Sept. 21-26	35.4	74	---	---	42	42	172	24	58	---	1.0	278	.38	27	158	16	37
Sept. 27-30	15.6	64	---	---	35	8.0	130	17	36	---	.8	196	.27	8.3	100	0	43
Weighted average	640	75	---	---	7.4	3.4	24	14	9.9	---	2.2	67	0.09	116	33	14	32

RED RIVER BASIN--Continued  
MUDDY BOGGY CREEK NEAR FARRIS, OKLA.--Continued

Temperature (° F.) of water, water year October 1947 to September 1948

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

## RED RIVER BASIN--Continued

## POND CREEK NEAR FORT COBB, OKLA.

LOCATION.--In vicinity of old C. C. Camp, 2 miles downstream from gaging station, and 3 miles upstream from mouth. Sediment station located at gage. DRAINAGE AREA.--320 square miles above gaging station.

RECORDS AVAILABLE.--Chemical analyses: May 1946 to July 1948.

Water temperatures: October 1946 to July 1948.

Sediment records: May 1947 to September 1948.

EXTREMES, 1947-48.--Dissolved solids: Maximum, 626 parts per million July 11-20; minimum, 160 parts per million Dec. 4-5.

Total hardness: Maximum, 427 parts per million July 11-20; minimum, 138 parts per million Dec. 4-5.

Water temperatures: Maximum, 89° F. June 29; minimum, freezing point Jan. 1-2.

Sediment loads: Maximum, 28,900 tons per day June 23; minimum, 1.6 tons per day Oct. 1-6.

EXTREMES, 1946-48.--Dissolved solids: Maximum, 626 parts per million July 11-20, 1948; minimum, 149 parts per million May 15, 24, 1947.

Total hardness: Maximum, 432 parts per million July 11-20, 1947; minimum, 69 parts per million June 1, 1947.

Water temperatures: Maximum, 89° F. July 4, 6-7, 9, 1947; June 29, 1948; minimum, freezing point Jan. 3-5, 1947, Jan. 1-2, 1948.

Sediment loads: Maximum, 48,200 tons per day May 16, 1947; minimum, 1.4 tons per day Sept. 9, 14, 24, 1947.

REMARKS.--Records of discharge for gaging station for water year October 1947 to September 1948 given in Water-Supply Paper 1117. Records of specific conductance of daily samples available in district office at Stillwater, Okla.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Per-cent sodium
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
Oct. 1-10, 1947-----	7.67	72	--	731	--	--	96	24	34	--	230	181	22	--	3.5	--	521	0.71	11	338	150	18
Oct. 11-20-----	9.50	71	8.0	747	15	0.02	101	23	34	4.2	252	180	21	0.0	3.5	--	526	.72	13	346	140	17
Oct. 21-31-----	10.6	68	--	756	--	--	102	23	34	--	261	173	19	--	4.0	--	530	.72	15	349	135	18
Nov. 1-10-----	12.7	54	--	760	--	--	104	28	31	--	266	175	18	--	2.0	--	532	.72	18	374	156	15
Nov. 11-20-----	15.9	50	--	753	--	--	108	27	22	--	282	163	18	--	3.0	--	484	.66	21	380	150	11
Nov. 21-30-----	18.0	48	--	751	--	--	110	26	24	--	296	156	19	--	3.0	--	542	.74	26	382	139	12
Dec. 1-2, 8-10-----	28.6	46	--	723	--	--	100	21	33	--	300	131	16	--	3.0	--	482	.66	37	336	90	18
Dec. 3, 6-7-----	52.3	50	--	499	--	--	66	15	17	--	184	91	10	--	4.0	--	312	.42	44	226	76	14
Dec. 4-5-----	390	45	--	282	--	--	41	8.7	3.4	--	135	25	4.0	--	4.0	--	160	.22	168	138	28	51
Dec. 11-20-----	31.6	43	--	727	--	--	101	23	26	--	310	124	12	--	3.0	--	482	.66	41	346	92	14
Dec. 21-31-----	32.3	44	--	729	--	--	102	22	28	--	312	125	13	--	3.0	--	476	.65	42	345	90	15
Jan. 1-10, 1948-----	35.9	41	--	705	--	--	94	23	25	--	294	115	15	--	3.0	--	456	.62	44	329	88	14
Jan. 11-20-----	28.4	41	--	722	--	--	96	23	26	--	293	122	14	--	3.5	--	463	.63	36	334	94	14
Jan. 21-31-----	26.4	37	--	723	--	--	102	24	18	--	304	125	14	--	4.0	--	476	.65	36	353	104	10
Feb. 1-10-----	43.1	40	--	690	--	--	89	23	37	--	308	114	16	--	3.0	--	456	.62	53	316	64	20
Feb. 11-20-----	36.6	40	--	705	--	--	100	24	29	--	306	126	16	--	8.0	--	472	.64	49	348	97	15
Feb. 21-29-----	36.7	46	--	695	--	--	96	23	25	--	1/ 296	118	14	--	3.0	--	432	.61	68	334	91	14
Mar. 1-10-----	58.7	44	--	582	--	--	42	21	32	--	135	105	16	--	3.0	--	328	.45	52	191	64	27
Mar. 11-20-----	67.5	52	--	578	--	--	32	21	26	--	167	108	14	--	3.5	--	344	.47	63	216	79	21
Mar. 21-31-----	62.2	62	--	610	--	--	60	22	31	--	200	118	13	--	4.0	--	379	.52	64	240	76	22

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

RED RIVER BASIN--Continued  
POND CREEK NEAR FORT COBB, OKLA.--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948.--Continued

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
Apr. 1-10, 1948----	28.1	67	--	549	--	--	42	22	34	34	2/ 118	140	16	--	4.0	--	382	0.52	29	195	98	27
Apr. 11-20 -----	29.5	71	--	572	--	--	47	22	34	34	3/ 128	144	16	--	4.0	--	399	.54	32	208	103	26
Apr. 21-25 -----	58.0	69	--	492	--	--	52	17	30	30	4/ 161	106	13	--	5.0	--	338	.46	53	200	67	25
Apr. 26-30 -----	36.6	70	--	609	--	--	58	22	34	34	5/ 176	134	15	--	5.0	--	410	.56	41	235	90	24
May 1-10 -----	21.5	69	--	620	--	--	74	23	27	27	210	131	18	--	4.0	--	444	.60	26	279	107	17
May 11-20 -----	19.8	70	--	741	--	--	85	24	27	27	220	147	23	--	3.5	--	477	.65	26	310	130	16
May 21-31 -----	24.3	73	7.9	661	30	0.10	82	23	27	4.3	220	145	19	0.3	5.5	--	451	.61	30	299	119	16
June 1-10 -----	84.0	75	--	525	--	--	63	17	22	22	159	109	15	--	12	--	361	.49	82	227	96	17
June 11-20 -----	28.5	77	--	544	--	--	87	13	7.4	7.4	101	178	7.0	--	10	--	400	.54	31	270	188	9
June 22-24 -----	1,073	78	--	544	--	--	88	12	6.0	6.0	75	195	6.8	--	10	--	392	.53	1,140	269	208	5
June 21, 25-30 -----	87.6	80	--	806	--	--	95	31	28	28	137	263	21	--	12	--	594	.81	140	364	252	14
July 1-10 -----	35.8	77	--	940	--	--	110	31	30	30	206	250	25	--	5.0	--	612	.83	59	402	233	14
July 11-20 -----	40.7	77	--	923	--	--	120	31	31	31	232	256	22	--	8.0	--	626	.85	69	427	237	14
July 21-31 -----	14.0	78	--	935	--	--	108	29	37	37	202	251	23	--	12	--	611	.83	23	388	223	17
Weighted average --	46.98	59	--	623	--	--	80	20	22	22	181	150	13	--	5.4	--	419	0.57	53	482	133	15

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

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

4/ Includes equivalent of 22 parts per million of carbonate (CO<sub>3</sub>).

5/ Includes equivalent of 16 parts per million of carbonate (CO<sub>3</sub>).

RED RIVER BASIN--Continued  
POND CREEK NEAR FORT COBB, OKLA.--Continued

Temperatures (° F) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	--	--	48	32	40	54	57	69	68	77		
2	--	--	46	32	39	45	61	67	75	77		
3	--	61	44	39	42	46	67	68	74	75		
4	--	58	45	42	43	43	68	70	75	78		
5	72	49	--	40	38	39	68	70	75	76		
6	--	58	49	43	40	44	70	69	76	76		
7	72	51	51	44	39	49	70	70	76	78		
8	71	51	--	45	36	44	71	71	77	75		
9	72	51	--	45	40	45	64	70	78	78		
10	72	50	44	47	40	35	72	67	77	79		
11	74	51	43	49	35	--	72	71	76	79		
12	--	51	42	48	35	35	68	70	75	75		
13	--	51	42	43	35	43	72	68	78	78		
14	71	59	43	44	37	45	70	69	77	76		
15	73	49	--	40	40	60	71	69	78	78		
16	--	49	42	37	41	55	74	69	76	78		
17	71	49	41	36	47	54	72	69	78	78		
18	73	48	43	36	49	59	70	68	76	75		
19	69	47	43	38	40	60	68	75	75	75		
20	70	48	47	42	45	60	72	74	78	77		
21	69	55	46	43	39	65	73	75	78	80		
22	68	48	47	46	44	59	69	74	78	78		
23	68	47	45	37	40	60	69	75	78	78		
24	67	48	--	35	47	68	65	71	78	77		
25	68	49	47	37	47	65	70	69	79	75		
26	--	48	46	35	40	62	71	71	78	78		
27	65	42	46	34	53	56	66	72	79	78		
28	--	49	46	35	56	61	69	74	78	80		
29	--	48	47	36	45	63	71	75	89	78		
30	68	46	39	37	--	69	70	75	76	76		
31	68	--	35	37	--	56	--	72	--	77		
Average	70	50	44	40	42	53	69	71	77	77		

## RED RIVER BASIN--Continued

## POND CREEK NEAR FORT COBB, OKLA.--Continued

Suspended sediment, water year October 1947 to September 1948

Day	October			November			December		
	Mean dis-charge (second-foot)	Suspended sediment Mean concentration (ppm)	Tons per day	Mean dis-charge (second-foot)	Suspended sediment Mean concentration (ppm)	Tons per day	Mean dis-charge (second-foot)	Suspended sediment Mean concentration (ppm)	Tons per day
1-----	6.8	85	1.6	12	247	8.0	19	122	6.2
2-----	6.9	88	1.6	11	102	3.0	20	168	9.1
3-----	6.8	92	1.7	12	120	3.9	65	6,610	1,160
4-----	6.8	90	1.6	13	104	3.6	614	8,090	13,400
5-----	6.8	1/ 90	1.6	13	86	3.0	166	3,680	1,650
6-----	6.7	90	1.6	13	95	3.3	50	866	117
7-----	8.8	158	3.8	13	156	5.5	42	1,040	118
8-----	9.7	100	2.6	13	94	3.3	1/ 500	500	50
9-----	8.7	100	2.4	13	146	5.1	34	324	30
10-----	8.7	100	2.4	14	169	6.4	33	210	19
11-----	8.6	100	2.3	14	123	4.7	32	197	17
12-----	8.3	1/ 100	2.2	11	99	2.9	32	178	15
13-----	8.1	100	2.2	10	124	3.4	31	164	14
14-----	8.3	100	2.2	18	101	4.9	31	151	13
15-----	8.5	100	2.3	20	150	8.1	32	170	15
16-----	10	100	2.7	18	1/ 155	7.5	31	111	9.3
17-----	13	132	4.6	16	160	6.9	31	168	14
18-----	11	120	3.6	17	148	6.8	32	178	15
19-----	9.8	120	3.2	18	157	7.6	32	154	13
20-----	9.4	120	3.0	17	158	7.2	32	1/ 160	14
21-----	9.3	1/ 120	3.0	17	184	8.5	32	164	14
22-----	9.2	120	3.0	18	258	13	32	147	13
23-----	9.2	120	3.0	18	247	12	33	140	12
24-----	9.4	120	3.0	18	118	5.7	32	162	14
25-----	10	120	3.2	17	117	5.4	31	152	13
26-----	10	113	3.0	18	118	5.8	31	139	12
27-----	11	104	3.1	1/ 120	120	5.8	32	128	11
28-----	12	94	3.0	1/ 120	120	5.8	33	155	14
29-----	12	202	6.6	19	122	6.3	33	156	14
30-----	12	99	3.2	19	132	6.8	33	166	15
31-----	12	92	3.0	--	--	--	33	155	14
Total -	287.8	--	86.3	466	--	180.2	1,751	--	16,844.6
Day	January			February			March		
	Mean dis-charge (second-foot)	Suspended sediment Mean concentration (ppm)	Tons per day	Mean dis-charge (second-foot)	Suspended sediment Mean concentration (ppm)	Tons per day	Mean dis-charge (second-foot)	Suspended sediment Mean concentration (ppm)	Tons per day
1-----	26	279	20	37	1/ 100	10	87	936	220
2-----	33	1/ 250	22	4	76	8.2	104	552	155
3-----	32	250	22	46	94	12	58	218	34
4-----	41	232	26	49	196	26	47	145	18
5-----	45	281	34	48	163	21	45	138	17
6-----	43	220	26	51	155	21	47	147	19
7-----	38	220	23	49	122	16	51	185	25
8-----	35	220	21	44	161	19	46	295	37
9-----	34	220	20	30	166	13	55	170	25
10-----	32	220	19	37	117	12	47	1/ 140	18
11-----	30	192	16	40	119	13	29	113	8.8
12-----	32	177	15	25	118	8.0	41	217	24
13-----	31	175	15	32	136	12	64	260	45
14-----	29	178	14	37	169	17	112	1/3,500	1,060
15-----	29	157	12	51	156	21	70	402	76
16-----	30	163	13	50	176	24	53	250	36
17-----	23	154	10	42	102	12	45	213	26
18-----	22	196	12	38	112	12	45	188	23
19-----	28	185	14	37	136	14	133	1/2,810	1,010
20-----	30	168	14	34	108	10	83	1,780	399
21-----	31	181	15	31	153	13	108	1,230	360
22-----	32	176	15	32	109	9.4	81	640	140
23-----	31	178	15	33	100	8.9	66	420	75
24-----	23	91	5.6	36	122	12	50	310	42
25-----	28	98	7.4	56	248	38	114	6,460	1,990
26-----	30	110	8.9	87	715	168	102	2,560	704
27-----	26	68	4.8	103	2,300	641	41	410	45
28-----	25	70	4.7	76	1,470	302	33	284	25
29-----	27	92	6.7	47	252	32	33	226	20
30-----	28	122	9.2	--	--	--	33	210	19
31-----	31	88	7.4	--	--	--	31	218	18
Total -	955	--	467.7	1,318	--	1,525.5	1,946	--	6,713.8

1/Estimated.



## RED RIVER BASIN--Continued

## POND CREEK NEAR FORT COBB, OKLA.--Continued

## Suspended sediment, water year October 1947 to September 1948--Continued

Day	April			May			June		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	29	205	16	28	310	23	89	2,860	686
2-----	28	198	15	25	222	15	35	910	86
3-----	28	170	13	23	350	22	24	370	24
4-----	26	196	14	22	268	16	20	299	16
5-----	26	162	11	21	175	10	19	299	15
6-----	27	160	12	19	226	12	18	244	12
7-----	26	132	9.3	17	282	13	16	244	11
8-----	28	212	16	17	215	9.9	46	2,140	266
9-----	31	170	14	16	194	8.4	493	13,000	17,300
10-----	32	162	14	27	1,030	75	80	2,290	495
11-----	32	139	12	21	265	15	44	750	89
12-----	31	134	11	22	194	12	34	353	32
13-----	33	162	14	21	291	16	31	353	30
14-----	32	364	31	20	244	13	30	353	29
15-----	29	376	29	20	240	13	30	353	29
16-----	29	331	26	20	234	13	28	353	27
17-----	29	584	46	20	234	13	25	339	23
18-----	28	538	41	20	234	13	22	339	20
19-----	26	595	42	18	234	11	21	339	19
20-----	26	502	35	16	234	10	20	339	18
21-----	26	412	29	15	234	9.5	45	1,320	160
22-----	26	340	24	14	234	8.9	350	10,600	9,970
23-----	33	379	34	13	234	8.2	1,650	6,490	28,900
24-----	38	877	90	12	234	7.6	1,220	3,370	11,100
25-----	167	4,940	2,230	12	234	7.6	131	1,580	557
26-----	54	1,430	208	27	370	28	152	2,980	1,220
27-----	36	880	86	42	450	51	74	550	110
28-----	30	790	64	35	261	25	97	825	216
29-----	31	728	61	28	261	20	60	700	113
30-----	32	473	41	25	274	18	54	648	94
31-----	--	--	--	44	1,400	167	--	--	--
Total -	1,049	--	3,288.3	680	--	684.1	4,958	--	71,667
	July			August			September		
1-----	39	376	40	11	232	6.9	11	187	5.6
2-----	39	376	40	11	231	6.8	11	152	4.5
3-----	39	376	40	10	213	5.8	10	169	4.6
4-----	37	350	35	9.7	206	5.4	10	258	7.0
5-----	36	303	30	9.6	154	4.0	10	206	5.6
6-----	32	303	26	9.6	166	4.3	10	167	4.5
7-----	34	303	28	9.6	166	4.3	10	149	4.0
8-----	33	222	20	27	236	17	10	140	3.8
9-----	33	222	20	68	1,700	312	11	131	3.9
10-----	36	222	22	18	300	15	11	140	4.2
11-----	30	322	18	14	217	8.2	11	126	3.7
12-----	28	314	24	12	326	11	10	151	4.1
13-----	27	306	22	11	294	8.8	10	138	3.7
14-----	26	296	21	11	258	7.7	9.8	136	3.6
15-----	24	283	18	7.9	202	4.3	9.7	139	3.6
16-----	22	266	16	10	234	6.3	9.6	134	3.5
17-----	21	275	16	15	305	12	9.4	138	3.5
18-----	165	5,700	2,540	12	222	7.2	9.8	136	3.6
19-----	44	610	72	11	198	5.9	10	120	3.2
20-----	20	290	16	11	185	5.5	10	172	4.6
21-----	17	280	13	9.8	188	5.0	10	159	4.3
22-----	15	254	10	9.7	144	4.3	10	141	3.8
23-----	16	280	12	9.8	144	3.8	11	148	4.4
24-----	16	254	11	9.7	165	4.3	11	136	4.0
25-----	15	244	10	10	198	5.4	11	130	3.9
26-----	14	245	9.3	12	162	5.2	10	117	3.2
27-----	13	240	8.4	12	200	6.5	10	120	3.2
28-----	13	266	9.4	13	476	17	9.7	108	2.8
29-----	11	228	6.8	12	154	5.0	9.6	106	2.8
30-----	12	300	9.8	12	111	3.6	10	104	2.8
31-----	12	220	7.1	11	150	4.5	--	--	--
Total -	919	--	3,170.8	419.4	--	523.0	305.6	--	120.0

Total discharge for year (second-foot days) ----- 15,054.8 Total load for year (tons) ----- 105,300

1/ Estimated.

## RED RIVER BASIN--Continued

## KIAMICHI RIVER NEAR BELZONI, OKLA.

LOCATION.--At gaging station at bridge, 1½ miles northwest of Belzoni, Pushmataha County, and 6 miles downstream from Cedar Creek. DRAINAGE AREA.--1,420 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1948.

Water temperatures: October 1947 to September 1948.

EXTREMES, 1947-48.--Dissolved solids: Maximum, 98 parts per million May 21-25, 27-28, 31; minimum, 44 parts per million Apr. 21-30.

Total hardness: Maximum, 46 parts per million May 21-25, 27-28, 31; minimum, 12 parts per million Dec. 7-20.

Water temperatures: Maximum, 91° F. June 19; minimum, freezing point Jan. 27-29.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1117. Records of specific conductance of daily samples available in district office at Stillwater, Okla.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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	
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate		
Oct. 1-10, 1947 ---	43.5	80	6.6		8.4	0.70	3.4	2.2	2.3		11	4.6	4.8	0.0	2.5			67	0.09	7.9	18	9	22
Oct. 11-20 -----	15.2	76	--		--	--	2.8	2.5	3.2		14	4.7	4.5	--	2.0			56	.08	2.3	17	6	29
Oct. 21-31 -----	112	70	--		--	--	3.1	2.3	3.3		14	4.5	4.8	--	2.0			49	.07	15	17	6	30
Nov. 1-10 -----	83.7	61	7.3		13	.70	2.9	1.8	5.0	1.5	14	8.1	4.5	.0	1.5			50	.07	11	15	3	40
Nov. 11-20 -----	246	51	7.1		14	.12	4.1	1.4	6.0	1.7	17	6.5	6.0	.3	1.5			63	.09	42	16	2	42
Nov. 21-30 -----	363	49	7.1		19	1.5	2.9	1.5	5.2	2.0	16	4.7	5.8	.2	.5			68	.09	67	13	0	41
Dec. 1-6 -----	252	52	--		--	--	4.0	2.9	2.1		16	5.6	5.2	--	.2			64	.09	44	22	9	17
Dec. 7-20 -----	4,317	47	7.1		14	.60	3.2	.9	6.0	1.9	10	5.8	7.5	.4	1.5			60	.08	699	12	4	48
Dec. 21-31 -----	2,799	44	--		--	--	3.4	2.8	4.0		17	6.3	5.0	--	1.5			52	.07	87	20	6	30
Jan. 1-4, 1948 ---	11,200	44	--		--	--	2.6	2.8	2.2	13	13	5.1	4.0	--	1.5			63	.09	1,910	18	7	21
Jan. 5-10 -----	1,436	47	--		--	--	3.0	2.4	2.2	10	10	6.0	4.0	--	2.5			51	.07	198	17	9	21
Jan. 11-20 -----	1,525	41	--		--	--	3.7	2.4	3.1		13	6.0	5.2	--	2.0			54	.07	77	17	8	26
Jan. 21-31 -----	269	36	7.2		15	.20	4.4	2.4	2.9	1.8	16	7.0	5.8	.0	1.0			55	.07	40	21	8	21
Feb. 1-10 -----	1,559	40	--		--	--	4.8	2.3	2.8		14	7.0	6.0	--	.5			73	.10	307	21	10	22
Feb. 11-20 -----	2,799	43	7.1		15	.35	3.2	1.9	3.0	9.0		7.1	5.5	.2	1.0			66	.09	499	16	8	29
Feb. 21-29 -----	6,881	51	--		--	--	3.2	2.5	1.4		11	5.7	4.0	--	1.0			63	.09	1,170	18	9	14
Mar. 1-10 -----	5,341	48	7.2		10	.56	4.0	1.9	3.0	1.5	12	5.5	7.0	.0	1.0			53	.07	764	18	8	25
Mar. 11-20 -----	1,365	48	--		--	--	3.7	2.4	3.4		16	6.1	4.5	--	1.0			54	.07	199	19	6	28
Mar. 21-31 -----	1,743	59	7.3		10	.40	4.3	1.6	3.7	1.1	14	7.0	5.2	.0	1.0			59	.08	278	17	6	30

Apr 1-10	435	66	--	58.4	--	1.1	--	3.3	1.6	5.1	14	6.0	5.4	--	1.0	47	.06	55	15	3	43
Apr 11-20	1,339	85	7.4	41.2	16	--	--	3.5	1.3	2.1	12	4.0	3.5	.3	1.0	61	.08	221	14	4	22
Apr 21-30	316	73	--	55.2	--	--	--	3.2	1.3	5.8	16	5.1	4.8	--	1.0	44	.06	38	13	0	49
May 1-10	571	73	7.3	37.8	10	.03	--	4.9	1.1	5.1	17	3.4	6.5	.0	1.0	66	.09	102	16	3	38
May 11-20	15,800	69	--	34.5	--	--	--	3.3	1.6	2.8	15	3.8	2.8	--	1.0	57	.08	2,320	15	3	28
May 13, 13-16, 18-20	7,233	72	--	50.8	--	--	--	2.4	2.1	6.9	12	3.5	5.9	--	2.3	69	.09	1,350	15	5	51
May 21-22, 27-28, 31	1,330	76	--	184	--	--	--	11	4.6	3.0	17	8.6	41	--	4.0	98	.13	352	46	9	46
May 23-26, 29-30	2,954	76	--	50.5	--	--	--	2.9	1.9	7.8	13	13	5.0	--	1.0	68	.09	542	15	4	53
June 1-2, 5-10	243	83	--	63.6	--	--	--	3.6	1.9	9.7	20	12	5.8	--	1.0	62	.08	41	17	0	56
June 3-4	310	80	--	128	--	--	--	8.4	1.9	3.9	27	7.6	29	--	5.0	78	.11	65	29	29	16
June 11-20	87.9	88	7.1	68.2	12	.24	--	5.6	2.5	9.0	39	6.0	5.0	.0	1.0	69	.09	13	24	0	43
June 21-24	166	87	--	89.0	--	--	--	6.2	2.2	8.2	19	5.4	11	--	7.0	64	.09	29	24	9	42
June 25-30	510	80	--	57.2	--	--	--	4.4	2.0	4.4	20	3.8	4.8	--	2.0	70	.10	96	19	3	33
July 1-11	127	81	7.1	66.1	11	.60	--	5.1	2.0	5.8	27	5.1	5.2	.0	1.0	62	.08	21	0	35	35
July 12-20	729	82	7.4	47.4	19	.20	--	3.6	2.1	2.4	13	4.0	4.5	1.0	2.0	69	.09	136	18	7	21
July 21-31	68.9	84	7.4	64.2	18	.80	--	4.8	1.6	5.1	19	4.1	6.2	.3	3.0	69	.09	13	19	3	35
Aug 1-10	21.2	82	--	68.0	--	--	--	5.4	2.9	12	44	4.5	6.0	--	2.0	78	.11	4.5	25	0	50
Aug 11-20	151	82	7.6	62.6	11	.60	--	4.3	2.6	4.5	24	3.7	6.0	.0	2.0	58	.08	24	21	2	29
Aug 21-31	29.5	86	--	64.6	--	--	--	4.0	2.0	6.0	22	3.3	5.8	--	2.0	47	.06	3.7	18	0	42
Sept 1-10	8.84	81	--	62.7	--	--	--	4.1	1.9	6.3	23	3.5	6.0	--	1.0	48	.07	1.1	18	0	43
Sept 11-20	7.44	83	8.2	62.4	3.1	.32	--	5.0	2.8	2.7	23	4.3	5.8	.1	2.0	51	.07	1.0	24	5	17
Sept 21-30	1.52	78	--	65.2	--	--	--	4.7	2.1	5.2	25	3.5	4.8	--	1.0	48	.07	.2	20	0	36
Weighted average	1,376	---	--	46.3	--	--	--	3.5	2.0	4.1	13	6.1	5.7	--	1.3	61	0.08	227	17	6	34

1/ Sample contains 0.34 part per million of hydrogen (Hr).

2/ Sample contains 0.31 part per million of hydrogen (Hr).

## RED RIVER BASIN--Continued

## KIAMIHI RIVER NEAR BELZONI, OKLA.--Continued

Temperature (° F.) of water, water year October 1947 to September 1948

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

RED RIVER BASIN--Continued  
LITTLE RIVER NEAR IDABEL, OKLA.

LOCATION--At bridge on State Highway 21, 3 miles north of Idabel, McCurtain County, and 13 miles downstream from Glover Creek. DRAINAGE AREA.--1,100 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1948.

Water temperatures: October 1947 to September 1948. Total hardness: Maximum, 275 parts per million Sept. 21-30; minimum, 44 parts per million, Nov. 16-20, Jan. 1-6, Apr. 14-20.

EXTREMES 1947-48.--Dissolved solids: Maximum, 275 parts per million Sept. 21-30; minimum, 9 parts per million Apr. 21-30.

Total hardness: Maximum, 58 parts per million Sept. 21-30; minimum, 9 parts per million Apr. 21-30.

Water temperatures: Maximum, 88° F. July 26; minimum, freezing point Feb. 26.

REMARKS.--Records of discharge for gaging station below Lakfata Creek near Idabel for water year October 1947 to September 1948 given in Water-Supply Paper 1117. Records of specific conductance of daily samples available in district office at Stillwater, Okla.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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 non-carbonate
																	Parts per million	Tons per acre-foot	Tons per day	Total	
Oct. 1-10, 1947	31.8	70	7.0	184	5.1	0.02	8.8	2.9	20	2.0	25	6.7	36	0.0	3.0		104	0.14	8.9	34	13
Oct. 11-19	30.2	71	7.3	230	5.0	.02	9.6	3.1	33	1.6	33	6.0	54		2.0		129	.18	11	37	10
Oct. 20-23, 28-31	240	67	--	85.4	--	--	6.3	2.0	15	9.3	24	3.8	14	--	1.0		57	.08	37	24	4
Oct. 24-27	78.0	69	--	125	--	--	7.8	2.4	15	9.5	24	4.9	26	--	1.2		71	.10	15	29	10
Nov. 1-5	191	61	--	82.7	--	--	4.9	2.1	15	9.5	18	4.5	14	--	3.0		54	.07	28	21	6
Nov. 6-10	185	55	--	127	--	--	7.2	2.1	11	11	25	5.4	25	--	.8		78	.11	39	29	9
Nov. 11-15	203	51	--	88.6	--	--	6.2	2.1	11	11	24	4.8	16	--	.5		62	.08	34	24	4
Nov. 16-20	858	49	--	56.0	--	--	4.6	1.7	7.0	1.4	19	3.9	9.5	--	.8		44	.06	102	18	3
Nov. 21-30	640	48	7.1	58.7	11	.20	5.0	1.4	5.0	1.4	21	4.0	6.5	.1	.2		50	.07	86	18	1
Dec. 1-7	611	49	--	72.9	--	--	6.1	1.7	6.9	1.4	24	4.4	9.0	--	.2		62	.08	102	22	3
Dec. 8-11	8,942	50	--	32.4	--	--	2.9	1.5	3.9	1.7	11	5.5	5.0	--	.2		46	.06	110	13	4
Dec. 12-16	2,222	43	--	49.4	--	--	4.3	1.5	3.7	3.7	12	4.8	6.0	--	2.0		48	.07	288	17	7
Dec. 17-21	3,236	42	--	38.6	--	--	3.2	1.5	3.8	3.8	12	4.9	5.0	--	1.5		45	.06	393	14	4
Dec. 22-31	847	43	6.8	57.0	12	.80	5.7	1.6	4.3	1.4	16	5.8	8.2	.0	1.5		49	.07	112	21	8
Jan. 1-6, 1948	12,860	44	--	30.8	--	--	3.2	1.4	4.2	4.2	17	4.1	3.2	--	1.5		50	.06	1,530	14	0
Jan. 7-10	1,605	45	--	47.2	--	--	4.0	2.1	3.3	3.3	12	4.8	7.0	--	1.5		44	.07	217	19	9
Jan. 11-17	733	43	--	59.8	--	--	4.5	2.5	6.7	6.7	17	3.8	7.0	--	.5		53	.07	105	22	8
Jan. 18-31	379	36	--	81.1	--	--	5.8	1.7	3.0	3.0	19	4.4	11	--	.5		59	.08	60	21	6
Feb. 1-6	818	38	--	87.1	--	--	4.0	2.2	11	11	27	5.1	10	--	1.0		69	.09	152	19	0
Feb. 7-20	3,424	42	7.1	41.1	13	1.4	4.5	1.5	2.3	2.3	12	5.2	4.0	.2	.5		50	.07	462	17	8
Feb. 21-25	1,652	47	--	46.9	--	--	4.4	1.8	5.0	5.0	24	4.0	4.0	--	.5		51	.07	227	18	0
Feb. 26-29	9,865	48	--	30.9	--	--	3.0	1.5	2.1	2.1	14	3.6	2.5	--	.5		48	.07	1,280	14	2
Mar. 1-10	7,397	49	--	39.7	--	--	4.6	1.9	2.5	2.5	19	3.5	3.0	--	.5		45	.06	899	19	4
Mar. 11-20	4,492	49	7.6	52.7	10	.30	4.7	1.6	3.4	1.4	16	5.9	5.5	.0	.5		45	.06	170	18	5
Mar. 21-23, 27, 31	1,326	57	--	68.5	--	--	6.1	1.6	5.8	5.8	23	4.2	6.8	--	2.0		55	.07	197	22	3
Mar. 24-26, 28-30	1,683	58	--	49.8	--	--	4.4	1.7	5.0	5.0	21	4.0	5.0	--	.5		48	.07	215	18	1

RED RIVER BASIN--Continued  
LITTLE RIVER NEAR IDABEL, OKLA.--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
Apr. 1-10, 1948----	524	64	7.5	78.4	8.6	0.30	6.6	2.1	5.2	1.4	22	5.5	10	0.0	0.5		58	0.08	82	25	7	30
Apr. 11-13-----	781	69	--	90.4	--	--	7.8	2.3	9.7		25	9.7	12	--	3.0		64	.09	135	29	8	42
Apr. 14-20-----	2,705	66	--	49.3	--	--	2.6	1.3	4.7		11	4.4	5.2	--	1.5		44	.06	321	12	3	47
Apr. 21-30-----	790	70	7.5	64.7	12	.06	2.6	.7	9.4	1.0	21	3.7	7.2	.0	.0		54	.07	115	9	0	66
May 1-10-----	828	73	7.8	66.4	11	.14	3.8	9.8	8.2	1.0	21	3.4	8.2	.0	.0		56	.08	125	13	0	55
May 11-20-----	10,390	70	--	87.4	--	--	9.0	2.6	16		11	33	17	--	1.0		84	.11	2,300	33	2 1/2	51
May 21-25, 26-29----	1,616	73	--	83.3	--	--	4.6	2.0	6.5		18	10	5.9	--	.4		67	.09	292	20	5	42
May 26-27, 30-31----	2,725	71	--	139	--	--	11	5.7	6.2		8	7.7	33	--	4.0		102	.14	750	51	4 1/2	21
June 1-4-----	495	75	--	75.6	--	--	7.2	2.4	5.6		26	4.3	10	--	.2		63	.06	84	28	6	31
June 5-10-----	244	--	--	110	--	--	8.0	2.7	11		27	7.0	18	--	1.5		72	.10	47	31	9	45
June 11-20-----	111	--	--	158	--	--	9.0	2.8	19		35	9.9	25	--	.5		95	.13	28	34	5	55
June 21-30-----	80.7	82	7.5	205	12	.03	11	2.9	24	2.6	39	6.3	39	.0	1.0		119	.16	26	39	7	55
July 1-10-----	86.7	81	7.1	199	9.9	.03	10	3.1	24	1.1	39	5.2	38	.2	1.0		115	.16	27	38	6	58
July 11-20-----	127	82	7.2	172	9.6	.02	9.8	2.7	20	1.0	36	4.8	31	.3	1.0		102	.14	35	36	6	54
July 21-31-----	46.2	86	7.4	178	11	.02	9.4	2.8	21	1.0	33	4.3	34	.2	2.0		106	.14	13	35	8	53
Aug. 1-8-----	26.2	81	--	251	--	--	11	5.0	29		41	7.2	50	--	.2		142	.19	10	48	14	57
Aug 9-20-----	108	82	--	155	--	--	8.3	3.0	17		35	5.3	22	--	1.0		93	.13	27	33	4	53
Aug. 21-31-----	22.1	83	--	222	--	--	10	2.7	31		34	4.6	49	--	2.0		124	.17	7.4	36	8	65
Sept. 1-10-----	16.7	80	--	341	--	--	13	3.5	49		39	5.1	81	--	2.0		186	.25	8.4	47	15	69
Sept. 11-20-----	12.7	77	7.4	447	6.4	.02	15	4.7	64	3.8	45	7.9	109	.1	1.0		246	.33	8.4	57	20	39
Sept. 21-30-----	8.82	73	--	509	--	--	46	4.5	78		49	7.9	127	--	.5		275	.37	6.5	58	18	71
Weighted average ---	1,558	--	--	55.9	--	--	5.1	1.9	6.5		15	9.8	8.0	--	0.7		57	0.08	240	20	8	31

RED RIVER BASIN--Continued  
 LITTLE RIVER NEAR IDABEL, OKLA.--Continued  
 Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	70	63	44	44	33	54	59	74	74	80	84	81
2	68	47	43	43	36	51	61	76	75	79	84	80
3	68	53	49	45	38	51	53	76	75	80	84	86
4	67	50	46	46	39	49	61	73	76	80	80	80
5	70	60	50	43	42	49	63	69	77	81	81	80
6	71	60	50	44	42	48	63	69	--	81	80	80
7	74	56	54	41	43	47	66	71	--	81	79	80
8	73	54	52	45	43	46	77	71	80	83	78	--
9	71	53	50	49	42	47	65	73	--	84	76	79
10	71	54	52	46	40	47	66	74	79	84	80	76
11	71	53	47	47	41	42	70	--	78	82	80	--
12	70	51	41	48	41	42	70	72	--	82	82	74
13	80	51	44	44	39	42	68	66	81	83	84	75
14	70	51	43	42	42	44	64	66	82	84	85	76
15	70	51	43	41	42	50	63	68	83	85	85	76
16	69	50	42	42	41	51	64	70	84	56	83	77
17	70	50	41	38	42	52	67	70	--	86	83	82
18	70	49	42	42	43	54	65	72	--	86	83	77
19	70	49	42	38	49	56	68	73	86	86	84	78
20	70	49	42	42	48	58	69	73	86	86	83	78
21	69	50	43	38	48	61	70	73	84	87	84	78
22	50	43	38	46	46	50	70	74	84	87	84	80
23	69	50	44	34	45	58	71	76	84	86	84	75
24	49	44	36	46	46	63	70	75	81	86	84	75
25	70	47	41	34	48	60	69	72	82	86	82	74
26	68	48	41	36	32	54	69	70	83	88	81	72
27	67	48	41	35	52	58	70	69	81	86	81	70
28	65	46	42	33	54	57	71	70	82	85	82	70
29	65	45	42	33	54	56	70	71	79	85	82	68
30	64	46	45	33	--	60	72	--	81	85	82	68
31	66	--	50	34	--	60	--	74	--	85	83	--
Average	70	52	45	40	43	52	67	72	--	83	82	77

**RED RIVER BASIN--Continued**  
**MOUNTAIN FORK RIVER NEAR EAGLETOWN, OKLA.**  
 LOCATION --At gaging station 1 mile west of Eagletown, McCurtain County, and 8½ miles from mouth.  
 DRAINAGE AREA --784 square miles.  
 RECORDS AVAILABLE --Chemical analyses: October 1947 to September 1948.  
 Water temperatures: October 1947 to September 1948.

EXTREMES 1947-48 --Dissolved solids: Maximum, 55 parts per million Mar. 1-10; minimum, 31 parts per million Apr. 1-10.

Total hardness: Maximum, 27 parts per million July 11-20; minimum, 6 parts per million May 11-15.

Water temperatures: Maximum, 92° F Aug. 19, 22; minimum, freezing point on several days in January.

REMARKS --Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1117. Records of specific conductance of daily samples available in district office at Stillwater, Okla.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-foot)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	Chemical analyses										Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent non-carbonate
					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)	Parts per million	Tons per acre-foot	Tons per day	Total
Oct. 1-10, 1947	119	74	7.0	51.9	2.9	0.01	4.6	1.5	2.0	1.9	15	3.3	4.5	--	2.8		40	0.05	13	13
Oct. 11-17	53.3	73	7.1	58.2	4.8	.01	4.8	1.7	2.7	2.6	21	3.2	5.8	0.0	.5		41	.06	5.9	19
Oct. 18-22	1,133	70	--	45.0	--	--	4.6	1.7	3.0		17	4.5	4.0	--	1.0		38	.05	116	18
Oct. 23-31	405	67	7.2	49.9	6.2	.06	5.3	1.6	5.1	2.8	28	4.1	5.0	--	0.2		44	.06	46	20
Nov. 1-10	1,112	57	7.2	40.0	10	.80	3.4	1.6	2.3		14	3.9	3.0	--	.5		43	.06	129	15
Nov. 11-20	1,661	51	--	37.3	--	--	3.6	1.5	3.2		16	4.0	3.2	--	.5		38	.05	170	15
Nov. 21-30	1,180	49	7.2	40.1	12	.16	3.2	.9	3.8	1.2	15	3.7	3.5	.1	.2		42	.06	135	12
Dec. 1-10	5,206	49	7.1	37.9	8.1	.18	2.8	.5	7.2	1.4	17	5.0	4.8	--	.8		39	.05	546	9
Dec. 11-20	2,795	44	--	30.2	--	--	2.2	1.5	3.0		12	3.0	3.5	--	.4		36	.05	272	12
Dec. 21-31	1,546	45	7.2	31.7	7.6	.04	3.3	1.4	3.7	1.2	14	4.9	4.8	--	.5		37	.05	154	14
Jan. 1-10, 1948	7,720	45	--	28.9	--	--	2.3	1.6	3.5		15	2.9	2.8	--	.8		38	.05	792	12
Jan. 11-20	558	37	--	38.4	--	--	2.9	1.8	2.7		14	3.4	3.5	--	.4		34	.05	51	15
Jan. 21-31	326	33	--	38.6	--	--	3.2	1.7	2.1		15	2.6	3.0	--	.4		39	.05	34	15
Feb. 1-10	1,844	37	--	38.2	--	--	2.3	1.2	4.1		14	3.7	3.0	--	.2		39	.05	194	11
Feb. 11-20	2,805	42	--	33.8	--	--	2.2	1.2	3.7		13	3.7	2.8	--	.2		36	.05	273	10
Feb. 21-29	5,239	45	--	31.6	--	--	2.2	1.4	3.7		14	3.2	2.5	--	1.2		36	.05	509	11
Mar. 1-10	4,969	44	7.4	26.6	9.9	.00	2.2	1.6	3.1	2.3	10	7.9	3.2	--	1.0		55	.07	738	12
Mar. 11-20	925	45	--	36.4	--	--	2.3	1.2	2.8		11	3.3	2.5	--	1.0		33	.04	82	11
Mar. 21-31	1,322	51	7.5	33.9	8.1	.07	3.0	1.5	3.6	1.0	14	5.5	4.0	--	.0		37	.05	132	14
Apr. 1-10	500	58	--	40.5	--	--	2.4	.9	3.5		10	2.7	3.8	--	1.2		31	.04	42	10
Apr. 11-20	1,958	62	8.2	40.2	7.7	.03	2.0	.5	5.0	.9	15	1.8	3.5	--	.0		37	.05	196	7
Apr. 21-25	447	66	--	42.7	--	--	2.6	.6	7.2		13	7.7	4.2	--	.2		34	.05	41	9
Apr. 26-30	547	68	--	55.6	--	--	3.0	.9	8.4		15	6.9	7.0	--	.2		39	.05	53	11
May 1-10	401	68	--	46.7	--	--	3.2	1.3	5.8		17	5.2	4.3	--	1.0		42	.06	45	13
May 11-15	9,490	61	--	30.4	--	--	1.1	.8	7.0		12	7.0	2.8	--	.2		40	.05	1,020	6
May 16-20	2,028	70	--	42.1	--	--	1.9	.7	7.9		11	7.2	5.0	--	1.5		40	.05	219	8
May 21-31	703	73	7.0	42.8	10	.04	2.4	.7	5.7	1.2	17	4.0	2.8	--	1.0		38	.06	72	9



June 1-10 -----	174	80	7.4	50.6	9.0	.02	4.6	1.2	4.2	1.0	20	2.7	4.5	.2	1.0	.06	19	16	0	34
June 11-20 -----	59.0	83	7.8	55.8	8.1	.02	3.0	1.6	5.1	1.4	23	2.4	2.0	.0	1.2	.06	14	14	1	50
June 21-30 -----	37.7	83	--	62.7	--	--	4.7	1.8	3.3	--	20	2.9	4.0	--	1.5	.06	6.5	18	3	27
July 1-10 -----	50.7	82	--	73.8	--	--	6.7	2.0	2.4	--	20	3.7	5.8	--	2.0	.07	4.3	23	8	17
July 11-20 -----	150	87	7.9	66.0	7.0	.02	7.0	2.3	3.2	1.5	30	3.4	4.2	.3	1.0	.06	18	27	2	19
July 21-31 -----	90.0	89	--	63.0	--	--	4.8	1.6	3.3	--	20	2.1	4.2	--	1.5	.06	10	19	2	28
Aug. 1-10 -----	105	86	--	69.5	--	--	5.2	1.8	4.4	--	21	4.0	5.2	--	1.5	.06	12	20	3	32
Aug. 11-20 -----	194	88	7.7	45.4	6.2	.03	4.1	1.7	1.7	2.2	15	2.1	4.2	.2	3.5	.05	19	17	5	16
Aug. 21-31 -----	37.6	88	--	48.7	--	--	3.6	1.2	1.8	--	13	2.4	2.8	--	1.0	.05	3.6	14	3	22
Sept. 1-10 -----	19.0	76	7.4	57.0	2.8	.03	5.3	1.7	2.5	2.0	20	3.5	4.5	.1	2.0	.05	2.1	20	4	19
Sept. 11-20 -----	15.8	82	--	52.9	--	--	3.1	1.7	4.0	--	19	2.8	3.0	--	1.0	.05	1.6	15	0	37
Sept. 21-30 -----	5.72	78	7.6	66.6	3.9	.04	7.0	2.1	2.4	2.0	24	3.7	6.8	.0	1.0	.06	.6	26	6	15
Weighted average --	1,392	--	--	34.4	--	--	2.5	1.2	4.7	--	14	4.5	3.4	--	0.7	0.05	150	11	0	48

RED RIVER BASIN--Continued  
MOUNTAIN FORK RIVER NEAR EAGLETOWN, OKLA.--Continued

		Temperature (° F.) of water, water year October 1947 to September 1948										
Day	October	November	December	January	February	March	April	May	June	July	August	September
1	74	61	48	46	33	48	45	71	75	83	89	88
2	70	62	48	43	34	45	47	--	75	80	89	88
3	70	63	50	44	35	47	57	--	76	80	88	85
4	76	60	52	44	37	42	58	70	80	82	85	83
5	72	60	52	44	38	58	59	68	78	80	86	84
6	74	62	48	45	38	42	60	66	75	81	87	--
7	75	55	49	45	38	40	62	65	85	84	--	--
8	78	44	50	49	38	39	64	68	85	85	79	86
9	73	52	48	45	38	42	63	67	83	85	84	79
10	78	55	46	44	--	41	63	65	83	85	84	79
11	72	53	49	44	37	34	65	49	83	85	84	79
12	76	53	44	48	--	38	65	58	85	85	86	80
13	78	51	45	42	37	40	55	63	83	84	89	78
14	71	45	43	39	38	42	56	68	83	88	89	80
15	71	52	42	39	40	45	58	69	85	89	88	84
16	73	55	43	38	40	48	60	69	88	89	88	84
17	71	53	43	34	42	44	63	70	86	89	88	82
18	71	50	44	34	45	50	63	70	85	88	91	83
19	71	50	43	33	47	54	65	70	89	92	83	83
20	68	50	43	33	48	55	66	70	84	88	88	83
21	69	50	45	35	41	55	68	70	84	88	91	85
22	69	51	44	36	41	50	65	75	84	89	92	83
23	69	50	43	34	38	53	66	73	95	89	91	85
24	72	50	42	32	40	54	68	76	84	91	88	78
25	72	48	42	32	48	45	64	76	83	90	86	78
26	70	48	42	32	46	46	66	68	82	89	88	75
27	68	48	43	32	50	49	68	70	82	88	86	73
28	65	49	45	32	50	51	69	72	80	88	--	72
29	64	48	49	32	48	51	69	73	80	87	85	75
30	48	48	48	32	--	56	70	73	83	88	85	76
31	60	--	52	33	--	56	--	75	--	88	88	--
Average		52	46	39	41	47	62	69	82	86	87	79

RED RIVER BASIN--Continued  
SULPHUR RIVER NEAR DARDEN, TEX.

LOCATION.--At gaging station at bridge on U. S. Highway 67, 0.6 mile upstream from St. Louis Southwestern Railway bridge and 1 mile southwest of Darden, Bowie County.

DRAINAGE AREA.--2,754 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1948.

Water temperatures: October 1947 to September 1948.

EXTREMES, 1947-48.--Dissolved solids: Maximum, 3,490 parts per million Aug. 1; minimum, 107 parts per million Dec. 16-27.

Total hardness: Maximum, 486 parts per million Nov. 1-2, 5; minimum, 45 parts per million Nov. 7-10.

Water temperatures: Maximum, 90° F. June 18, Aug. 13; minimum, freezing point Mar. 10.

REMARKS.--Records of water discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1117. Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	Specific conductance (micro-mhos at 25° C.)	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 non-sodium
																Parts per million	Tons per acre-foot	Tons per day	Total	
Oct. 1-2, 1947	30.0	63	1,140	--	--	35	9.0	172	89	85	238	--	--	3.2	605	0.82	49.0	124	52	75
Oct. 3-10	13.1	70	2,610	--	--	62	16	454	103	179	662	--	--	2.5	1,430	1.94	50.6	220	136	42
Oct. 11-20	5.22	72	2,570	--	--	65	15	441	114	177	640	--	--	2.5	1,400	1.90	19.7	224	130	81
Oct. 21-31	6.35	68	2,800	5.0	0.08	68	17	502	120	203	742	0.2	0.2	3.0	1,630	2.22	27.9	240	141	80
Nov. 1-2, 5	205	61	2,620	--	--	58	83	312	75	184	645	--	--	2.0	1,320	1.80	731	486	424	58
Nov. 3-4, 6	312	62	672	--	--	34	7.2	75	88	61	100	--	--	.8	322	.44	271	114	42	59
Nov. 7-10	685	56	314	--	--	11	4.3	42	32	32	54	--	--	.5	277	.38	490	45	19	67
Nov. 11-15	426	52	762	--	--	41	11	91	34	74	169	--	--	1.0	34	436	60	504	140	57
Nov. 16-20	136	50	354	--	--	20	4.9	42	69	33	50	--	--	1.2	213	.29	76.2	70	14	57
Nov. 21-30	2,753	50	248	--	--	17	4.5	22	56	24	26	--	--	2.2	178	.24	1,320	61	15	44
Dec. 1-10	2,455	54	236	--	--	19	4.2	25	60	33	25	--	--	.8	146	.20	968	65	16	46
Dec. 11-15, 28-30	5,502	50	252	--	--	20	3.9	23	73	33	22	--	--	1.0	151	.21	2,240	76	16	40
Dec. 16-27	11,940	47	160	--	--	24	4.1	13	64	30	7.0	--	--	1.2	107	.15	3,450	67	14	29
Jan. 1-10, 1948	9,621	52	183	7.6	--	25	3.8	8.0	80	15	6.0	--	--	1.2	132	.18	3,430	73	8	19
Jan. 11-15	3,774	47	270	12	--	25	3.6	28	76	32	31	--	--	.5	185	.25	1,690	76	16	44
Jan. 16-20	892	39	519	10	--	27	6.2	68	71	53	91	--	--	.2	314	.43	748	93	35	62
Jan. 21, 31	820	40	873	11	--	34	8.1	132	67	86	185	--	--	.0	519	.71	1,290	118	64	71
Jan. 22-30	916	35	473	10	--	23	6.6	62	59	57	79	--	--	.2	296	.40	732	85	36	61
Feb. 1, 3	1,715	40	457	10	--	30	5.5	54	78	56	66	--	--	.0	282	.38	1,310	97	34	55
Feb. 2, 4-10	4,351	43	285	8.2	--	28	3.9	23	78	35	24	--	--	1.2	196	.27	2,330	66	22	36
Feb. 11-20	8,055	46	230	7.4	--	29	2.4	16	90	25	11	--	--	2.5	157	.21	3,410	62	30	30
Feb. 21-25	3,696	53	231	7.5	--	23	3.5	32	77	32	35	--	--	.8	193	.26	1,930	77	14	48
Mar. 1-10	10,660	52	238	8.4	--	32	3.1	9.9	96	21	8.0	--	--	2.8	165	.22	4,650	92	14	19
Mar. 11-15	3,918	49	245	7.8	--	30	3.4	13	92	23	12	--	--	2.0	180	.24	2,860	89	13	25
Mar. 16-20	1,020	61	383	8.6	--	32	5.1	37	89	43	43	--	--	3.8	240	.33	661	101	26	44
Mar. 21-31	3,097	63	316	3.3	--	28	5.5	31	90	41	31	--	--	.5	186	.25	1,560	92	19	42

RED RIVER BASIN--Continued  
SULPHUR RIVER NEAR DARDEN, TEX.--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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	
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate		
Apr. 1-2, 17-18, 20, 1948-----	2,864	68		373	8.2	--	30	4.7			87	34	48	--	1.2			232	0.32	1,790	94	23	40
Apr. 3-7, 13-16-----	1,007	66		551	17	--	41	5.8	61		112	53	79	--	.5			322	.44	875	126	34	51
Apr. 8-12, 19-----	864	72		819	12	--	54	9.2	94		127	75	139	--	.2			474	.64	1,110	173	69	54
Apr. 25-30-----	434	72		565	9.0	--	47	6.0	63		115	66	81	--	2.2			355	.48	416	--	--	49
Apr. 21-24-----	1,452	72		368	8.4	--	38	5.2	32		92	45	44	--	2.2			225	.31	882	116	41	30
May 1-4-----	440	76		909	10	--	40	8.5	125		99	83	170	--	.8			516	.70	613	135	54	67
May 5-8-----	1,314	75		545	9.0	--	42	5.9	57		115	50	76	--	1.2			320	.44	1,140	130	36	49
May 9-10, 15-19-----	18,880	74		233	7.4	--	30	2.6	17		90	16	20	--	4.0			170	.23	8,670	86	12	30
May 11-14-----	13,580	70		111	5.8	--	13	5.3	10		52	18	10	--	1.2			126	.17	4,620	54	12	29
May 20-31-----	8,212	74		252	10	--	29	3.3	16		91	17	18	--	3.8			168	.23	3,720	66	11	29
June 1-11-----	9,232	79		397	12	--	33	5.1	39		102	33	48	--	2.8			243	.33	6,060	103	20	45
June 12-16, 27-30-----	243	83		580	11	--	50	6.4	56		134	60	72	--	1.5			336	.46	220	152	42	45
June 17-26-----	41.7	87		1,150	11	--	51	11	163		137	80	232	--	3.5			636	.66	71.6	172	60	61
July 1-10-----	230	83		551	9.8	--	46	4.9	56		123	55	68	--	2.2			321	.44	200	135	34	47
July 11-12, 15-18-----	594	83		634	10	--	42	4.3	77		113	53	99	--	3.8			357	.49	573	122	30	58
July 19-22-----	145	87		1,900	8.4	--	56	10	315		119	134	445	--	1.8			1,030	1.40	403	151	84	79
July 13-14, 23-31---	79.7	86		1,100	7.5	--	46	8.3	166		125	80	228	--	2.2			612	.33	132	149	46	71
Aug. 1-----	152	82		5,910	10	--	111	33	1,150		76	477	1,670	--	4.0			3,490	4.75	1,430	412	350	86
Aug. 2, 7-10-----	126	82		1,110	8.5	--	28	11	182		73	82	258	--	2.2			657	.68	224	115	42	76
Aug. 3-6-----	220	82		738	10	--	28	6.0	112		82	61	146	--	.8			442	.60	263	134	26	72
Aug. 11-20-----	22.5	87		678	10	--	48	5.6	86		135	57	105	--	.5			392	.53	23	123	12	56
Aug. 21-31-----	7.56	83		760	14	--	48	7.5	102		157	65	124	--	1.2			444	.60	9.1	151	22	59
Sept. 1-10-----	9.22	82		736	14	--	30	7.5	106		105	50	140	--	1.0			410	.57	10.4	106	20	60
Sept. 11-14-----	7.85	78		742	13	--	26	7.6	112		101	50	144	--	1.5			422	.57	6.9	96	13	72
Sept. 15-20-----	9.10	83		396	12	--	16	6.1	53		69	27	67	--	1.2			252	.34	6.2	65	6	64
Sept. 21-26-----	6.22	79		365	11	--	20	4.7	49		92	22	54	--	1.5			242	.33	4.1	69	0	61
Sept. 27-30-----	2.00	73		477	11	--	27	4.4	62		103	30	72	--	3.8			290	.39	1.6	65	1	61
Weighted average -	2,905	--		253	--	--	27	3.8	21		81	26	22	--	1.9			171	0.23	1,340	93	17	35



## RED RIVER BASIN--Continued

## OUACHITA RIVER NEAR MALVERN, ARK.

LOCATION. --At gaging station at Rockport Bridge on State Highway 84, 2 miles northwest of Malvern, Hot Spring County, and 6 miles downstream from Remmel Dam. Flow regulated by operation at Remmel Dam.

DRAINAGE AREA. --1,570 square miles.

RECORDS AVAILABLE. --Chemical analyses: October 1946 to September 1948.

EXTREMES, 1947-48. --Dissolved solids: Maximum, 71 parts per million Feb. 21-29; minimum, 37 parts per million Jan. 11-20.

TOTAL HARDNESS: Maximum, 37 parts per million Sept. 11-20; minimum, 8 parts per million Jan. 11-20.

EXTREMES, 1946-48. --Dissolved solids: Maximum, 71 parts per million Feb. 21-29, 1948; minimum, 37 parts per million Jan. 11-20, 1948.

TOTAL HARDNESS: Maximum, 37 parts per million Sept. 11-20, 1948; minimum, 8 parts per million Jan. 11-20, 1948.

REMARKS. --Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1117. Records of specific conductance of daily samples available in district office at Fayetteville, Ark.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-foot)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>	
																	Total	Non-carbonate
Oct. 1-10, 1947	352	--	--	83.8	--	--	8.2	1.9	7.8		36	9.0	3.0	--	2.5	58	28	0
Oct. 11-20	414	7.7	0.01	84.9	8.3	0.01	9.1	2.1	5.6	1.3	39	4.0	4.5	0.1	3.0	58	31	0
Oct. 21-31	486	--	--	82.8	--	--	6.6	2.0			36	9.9	2.5	--	2.0	53	25	0
Nov. 1-10	637	7.6	.07	81.0	5.7	.07	8.5	2.0	3.7	1.5	28	8.3	3.5	.1	3.2	53	29	6
Nov. 11-20	1,637	--	--	78.0	--	--	8.6	1.7	2.7		28	5.3	2.5	--	3.0	50	28	6
Nov. 21-30	1,629	--	--	82.5	--	--	3.8	1.7	11		32	8.9	3.0	--	2.0	56	17	0
Dec. 1-10	4,731	--	--	82.0	--	--	7.6	1.6			30	6.7	4.5	--	2.5	57	26	1
Dec. 11-20	5,971	--	--	86.9	--	--	7.2	1.7	5.4		24	4.8	6.5	--	3.5	68	25	5
Dec. 21-31	2,132	7.9	.07	60.2	6.4	.07	6.0	1.8	6.5	1.6	24	11	4.0	.1	2.0	45	22	3
Jan. 1-10, 1948	9,724	--	--	53.3	--	--	4.7	1.5	4.6		14	5.3	6.0	--	3.0	43	18	6
Jan. 11-20	2,117	--	--	42.0	--	--	1.6	1.0	5.1		12	4.4	2.5	--	1.5	37	8	0
Jan. 21-31	1,656	7.6	.06	48.6	6.5	.06	4.8	1.2	3.2	1.1	18	4.0	3.5	.1	1.5	42	17	2
Feb. 1-10	2,072	--	--	47.8	--	--	3.6	2.2	2.5		14	6.3	3.0	--	1.5	43	18	7
Feb. 11-20	5,085	--	--	58.8	--	--	5.0	1.7	3.9		18	5.8	3.0	--	2.0	50	18	4
Feb. 21-29	9,856	8.0	.08	65.0	7.6	.08	5.6	1.7	12	1.0	8.0	32	5.0	.1	1.8	71	21	14
Mar. 1-31	5,509	7.6	.06	50.0	7.7	.06	4.5	1.0	3.3	1.0	16	4.1	3.5	.1	1.5	40	15	2
Apr. 1-30	3,009	7.5	.06	57.5	7.9	.06	5.6	1.5	2.2	1.4	20	4.7	3.0	.1	1.0	45	20	0
May 1-10	1,069	--	--	65.0	--	--	5.9	1.6	5.9		21	10	4.1	--	1.0	45	21	4
May 11-20	3,505	--	--	64.0	--	--	5.8	1.6	5.9		25	3.8	4.6	--	1.0	46	21	1
May 21-31	602	--	--	66.0	--	--	6.7	1.8	4.5		25	6.0	4.6	--	.8	48	24	4



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.  
DRAINAGE AREA.--5,380 square miles.  
RECORDS AVAILABLE.--Chemical analyses: October 1946 to September 1948.

Water temperatures: October 1946 to September 1948.

EXTREMES.--At gaging station at bridge on U. S. Highway 79, half a mile northeast of Camden, Ouachita County.

Water temperatures: October 1946 to September 1948.

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Water temperatures: October 1946 to September 1948.

EXTREMES.--At gaging station at bridge on U. S. Highway 79, half a mile northeast of Camden, Ouachita County.

Water temperatures: October 1946 to September 1948.

REMARKS.--Records of discharge for water year October 1947 to September 1948 furnished by the Corps of Engineers. Records of specific conductance of daily samples available in district office at Fayetteville, Ark.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>	
																	Total	Non-carbonate
Oct. 1-10, 1947 -----	451	72	7.5	139	10	0.11	7.5	3.0	12	3.0	29	7.0	21	0.0	1.2	86	31	7
Oct. 11-20 -----	603	72	7.2	136	7.8	.04	8.6	3.3	11	2.3	33	6.0	20	.0	1.5	83	35	8
Oct. 21-31 -----	1,486	70	7.4	139	8.7	.11	9.4	2.9	12	2.3	34	5.6	20	.0	1.8	90	35	8
Nov. 1-10 -----	3,537	59	7.3	113	14	.08	6.4	.8	17	2.0	35	6.0	16	.1	1.0	93	19	0
Nov. 11-20 -----	7,229	50	7.7	104	10	.20	7.8	.8	12	2.2	26	7.6	14	.1	2.2	75	22	1
Nov. 21-30 -----	9,147	52	7.1	92.6	7.5	.18	6.4	1.0	5.1	3.7	24	8.4	4.5	.0	1.5	68	20	0
Dec. 1-10 -----	6,917	54	8.2	104	9.9	.10	8.3	1.5	7.7	2.7	29	6.5	12	.0	.5	73	28	4
Dec. 11-20 -----	20,060	51	7.4	78.8	7.6	.11	6.6	1.4	5.1	2.3	22	5.3	8.0	.2	1.0	60	22	4
Dec. 21-31 -----	9,482	50	8.3	85.6	9.3	.10	6.7	1.4	6.3	2.2	21	5.6	.0	.2	1.5	61	24	1
Jan. 1-10, 1948 -----	22,840	50	8.5	64.5	1.4	.04	5.7	1.5	4.7	2.2	21	4.9	6.8	.1	1.5	60	20	3
Jan. 11-20 -----	5,509	46	8.0	79.6	11	.12	5.9	1.3	8.4	2.1	21	6.3	11	.2	1.5	61	20	3
Jan. 21-31 -----	5,338	47	7.6	91.2	12	.12	6.3	1.5	9.0	2.6	22	5.9	14	.1	1.0	69	22	4
Feb. 1-10 -----	11,930	45	8.0	81.2	11	.16	6.6	1.1	5.9	2.5	18	6.7	9.8	.2	1.0	66	21	6
Feb. 11-20 -----	29,630	48	7.9	60.3	8.7	.12	4.5	1.1	4.0	2.1	16	5.8	5.2	.1	1.5	52	16	8
Feb. 21-29 -----	17,140	50	7.7	62.0	9.4	.14	5.6	1.2	5.1	2.3	20	5.6	6.8	.1	1.0	56	19	2
Mar. 1-10 -----	43,070	52	7.3	53.8	10	.12	5.0	1.3	4.1	1.5	1	10	4.0	.1	1.5	54	18	8
Mar. 11-20 -----	12,220	52	7.3	66.4	11	.12	5.4	1.8	3.7	1.5	16	5.5	7.5	.1	1.5	58	11	8
Mar. 21-31 -----	27,270	50	7.6	46.2	11	.20	4.8	1.5	4.1	.9	18	5.1	5.5	.1	1.5	54	19	3
Apr. 1-10 -----	8,279	61	7.1	74.5	11	.12	5.7	1.4	5.2	1.2	18	4.8	8.0	.1	2.0	60	20	5
Apr. 11-20 -----	11,830	62	6.8	75.6	10	.18	5.8	1.4	5.0	2.4	14	8.3	9.0	.2	1.0	58	20	9
Apr. 21-30 -----	5,650	64	7.2	83.6	11	.18	6.5	1.6	7.1	1.2	22	4.8	11	.1	1.2	65	23	5
May 1-10 -----	5,461	65	7.1	91.8	13	.20	7.7	1.4	6.9	1.6	24	5.8	11	.0	1.0	71	25	5
May 11-20 -----	14,920	66	7.2	75.6	11	.09	7.0	1.2	4.7	4.7	20	6.3	8.0	.1	2.0	71	22	7
May 21-31 -----	3,269	72	7.2	108	10	.38	6.4	1.7	11	1.7	22	7.1	16	.0	2.2	81	23	5



June 1-10 -----	1,377	80	7.3	136	7.8	.20	8.0	1.9	16	1.6	26	6.4	26	.0	1.0	87	28	6
June 11-20 -----	1,312	85	7.3	103	9.0	.09	8.0	1.8	10	1.5	26	6.1	16	.0	1.0	68	27	6
June 21-30 -----	589	85	7.3	101	8.0	.04	7.9	1.8	6.3	2.4	24	6.1	12	.1	1.0	60	27	7
July 1-13 -----	502	84	7.3	115	9.5	.05	8.6	1.5	14	2.8	30	7.2	18	.1	1.9	76	28	3
July 14-31 -----	678	83	7.4	118	8.5	.06	7.6	1.7	13	1.5	28	6.6	18	.0	1.2	77	26	3
Aug. 1-10 -----	320	86	8.1	127	5.8	.02	7.2	2.3	16	1.4	36	9.7	16	.1	1.5	78	27	0
Aug. 11-15 -----	2,186	82	7.8	152	8.6	.21	6.4	2.3	20	2.5	32	9.3	25	.1	.5	94	23	0
Aug. 16-20 -----	841	89	7.8	106	8.0	.37	7.2	2.3	14	1.8	34	12	13	.1	1.0	77	27	0
Aug. 21-23, 29-31 -	475	87	7.8	114	6.4	.32	8.0	2.6	11	1.8	30	10	13	.1	.3	72	31	6
Aug. 24-26 -----	610	86	7.7	142	5.6	.27	8.4	2.4	14	1.7	28	8.0	22	.1	1.0	82	31	8
Sept. 1-10 -----	364	86	7.9	110	10	.06	6.8	2.0	7.9	.6	34	6.7	15	.1	.8	72	25	0
Sept. 11-20 -----	312	85	7.9	119	8.8	.04	7.0	2.0	8.1	.6	30	7.5	17	.1	1.2	74	26	1
Sept. 21-30 -----	316	74	8.0	119	9.0	.05	7.4	1.7	10	1.4	34	9.4	17	.1	.7	75	25	0
Average -----	8,056	67	7.6	99.1	9.2	0.14	6.9	1.7	9.1	1.9	25	6.9	13	0.1	1.2	71	24	4

RED RIVER BASIN--Continued  
OQUACHITA RIVER AT CAMDEN, ARK.--Continued  
Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	64	65	51	51	48	54	61	66	82	83	--	87
2	68	65	53	52	46	52	59	66	80	84	--	87
3	70	66	53	51	46	54	60	66	80	85	--	86
4	72	64	54	52	44	54	61	64	75	84	--	86
5	--	58	55	52	42	54	60	64	75	85	86	86
6	69	56	57	49	44	52	62	83	80	--	86	86
7	72	56	60	48	44	51	60	66	82	83	85	86
8	74	56	58	52	44	51	62	66	--	82	85	86
9	76	54	55	48	45	50	62	64	83	84	85	86
10	80	54	50	46	45	52	62	65	83	86	86	81
11	70	50	52	52	44	52	62	63	82	86	82	86
12	76	50	50	53	44	52	62	64	83	84	79	81
13	72	50	50	48	44	50	61	66	85	86	84	81
14	74	49	50	48	44	50	61	65	85	86	81	81
15	68	48	53	48	55	51	62	64	83	85	84	81
16	78	48	50	42	48	52	62	64	85	86	89	81
17	74	49	50	45	45	52	62	66	85	88	88	79
18	70	45	50	41	35	54	63	66	87	88	89	78
19	70	57	50	40	53	55	64	70	87	87	89	79
20	--	51	51	40	49	56	65	70	85	88	89	78
21	70	50	50	49	50	60	64	71	85	89	89	80
22	69	51	50	48	48	60	60	70	86	88	86	79
23	70	52	49	48	50	60	66	--	83	89	86	79
24	74	52	49	48	50	59	61	70	84	89	86	72
25	72	51	49	48	50	60	63	77	88	88	86	72
26	65	52	50	48	50	60	62	75	88	89	86	72
27	76	53	49	44	52	60	64	75	86	--	86	73
28	72	52	50	42	45	60	64	70	84	--	85	74
29	74	52	50	46	52	60	66	75	84	--	86	72
30	66	50	50	--	--	--	65	65	83	--	86	72
31	67	--	52	49	--	61	--	75	--	--	87	--
Average	71	54	52	48	47	55	62	68	83	86	86	80

RED RIVER BASIN--Continued  
LITTLE MISSOURI RIVER NEAR BOUGHTON, ARK.

LOCATION ---At gaging station on U. S. Highway 67, 2.5 miles northeast of Boughton, Nevada County, and 8.7 miles downstream from Antoine Creek.

DRAINAGE AREA ---1,068 square miles.

RECORDS AVAILABLE ---Chemical analyses: October 1947 to September 1948.

Water temperatures: October 1947 to September 1948.

EXTREMES, 1947-48. Dissolved solids: Maximum, 99 parts per million July 21-31; minimum, 47 parts per million Mar. 11-20.

Total hardness: Maximum, 64 parts per million Oct. 27, 30-31; minimum, 16 parts per million Dec. 1-3, 9-10.

Water temperatures: Maximum, 94° F.; July 29; minimum, 41° F.; Dec. 16-18.

REMARKS ---Records of discharge for water year October 1947 to September 1948 furnished by Corps of Engineers. Records of specific conductance of daily samples available in district office at Fayetteville, Ark.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 23° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>	
																	Total	Non-carbonate
Oct. 1-10, 1947 -----	70.3	76	7.6	78.3	--	--	7.9	2.6	2.9	--	30	5.6	3.8	--	1.2	60	30	6
Oct. 11-20 -----	60.3	76	7.5	88.4	--	--	9.1	3.1	3.4	--	37	5.3	4.2	--	1.5	60	35	5
Oct. 21-26, 28-29 -----	613	70	7.4	60.5	--	--	5.3	2.2	3.4	--	24	4.7	2.8	--	1.5	48	22	3
Oct. 27, 30-31 -----	1,200	68	7.8	126.8	--	--	16	5.9	2.4	--	64	12	2.0	--	2.0	88	64	12
Nov. 1-10 -----	1,704	60	--	62.8	--	--	6.4	2.4	2.0	--	21	7.9	2.8	--	1.0	56	26	9
Nov. 11-20 -----	3,275	53	--	56.6	--	--	5.8	2.1	3.2	--	21	7.7	2.8	--	1.0	55	23	6
Nov. 21-30 -----	2,751	53	--	60.9	--	--	5.7	1.7	3.7	--	21	7.0	2.5	--	1.5	51	21	4
Dec. 1-3, 9-10 -----	2,892	53	--	61.8	--	--	4.2	1.4	8.7	--	24	8.6	3.5	--	2.0	50	16	0
Dec. 4-8 -----	2,542	54	--	99.6	--	--	12	1.4	8.6	--	45	11	4.0	--	.5	74	36	0
Dec. 11-20 -----	4,898	44	--	61.2	--	--	6.4	1.2	6.9	--	23	9.7	3.5	--	.5	54	21	0
Dec. 21-31 -----	1,255	49	--	85.0	--	--	6.0	1.1	7.3	--	25	8.3	4.0	--	.8	52	19	0
Jan. 1-10, 1948 -----	3,611	--	--	89.1	--	--	8.4	1.1	6.9	--	30	8.4	6.0	--	2.0	70	28	4
Jan. 11-20 -----	1,052	--	--	115	--	--	8.4	1.4	12	--	28	10	12	--	3.5	81	27	4
Jan. 21-31 -----	998	--	--	96.0	--	--	10	2.4	5.2	--	34	10	5.0	--	1.0	69	35	7
Feb. 1-20 -----	5,147	--	--	88.4	--	--	8.8	1.3	5.2	--	30	7.7	4.0	--	.5	58	27	3
Feb. 21-29 -----	5,059	52	--	69.0	--	--	8.0	1.7	2.9	--	24	8.9	2.5	--	1.0	85	27	7
Mar. 1-10 -----	7,844	53	--	63.2	--	--	6.2	.9	4.1	--	21	5.7	3.3	--	.3	53	19	2
Mar. 11-20 -----	1,288	57	--	61.1	--	--	6.4	1.3	3.3	--	20	5.4	4.3	--	.5	47	21	5
Mar. 21-31 -----	4,617	63	--	74.4	--	--	8.4	.9	4.5	--	28	5.4	3.9	--	.5	57	25	2

RED RIVER BASIN--Continued  
LITTLE MISSOURI RIVER NEAR BOUGHTON, ARK.--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>	
																	Total	Non-carbonate
Apr. 1-10, 1948 -----	1,012	69	--	67.3	--	--	7.0	1.1	6.8		27	8.0	4.5	--	0.0	53	22	0
Apr. 11-20 -----	1,671	68	--	61.1	--	--	5.8	1.1	5.4		20	8.1	3.9	--	.3	54	19	3
Apr. 21-30 -----	1,662	70	--	66.7	--	--	8.4	1.2	3.2		26	5.5	4.1	--	.0	53	26	5
May 1-10 -----	1,127	71	--	112	--	--	17	.8	4.6		52	5.5	4.7	--	1.0	92	46	3
May 11-20 -----	4,818	70	--	72.6	--	--	10	.7	5.2		30	7.2	4.7	--	.5	80	28	3
May 21-31 -----	445	71	--	88.0	--	--	11	1.1	6.0		35	6.3	6.6	--	.5	71	32	3
June 1-10 -----	206	80	--	90.0	--	--	13	1.6	5.1		39	9.2	5.5	--	1.0	67	39	2
June 11-20 -----	88.2	88	--	116	--	--	10	1.5	13		52	8.0	6.0	--	.8	71	31	0
June 21-30 -----	45.6	87	--	119	--	--	12	1.8	7.5		50	6.7	3.8	--	.5	70	37	0
July 1-10 -----	47.2	86	--	114	--	--	11	1.5	9.9		48	6.4	5.8	--	1.2	79	34	0
July 11-20 -----	98.9	84	--	105	--	--	11	1.3	7.8		43	6.3	4.8	--	1.4	67	33	0
July 21-31 -----	77.7	92	--	163	7.2	0.05	23	1.4	7.6	1.2	77	8.3	5.8	0.1	1.2	99	63	0
Aug. 1-5 -----	19.8	92	--	141	--	--	18	1.7	11		74	7.2	5.8	--	.3	91	52	0
Aug. 6-10 -----	884	85	--	56.2	--	--	5.5	1.6	4.7		22	7.2	7.2	--	.9	60	20	2
Aug. 11-20 -----	360	83	--	73.1	--	--	8.7	2.0	5.8		35	8.4	3.2	--	.6	68	30	1
Aug. 21-31 -----	54.7	85	--	92.1	--	--	10	1.9	17		45	25	4.2	--	.3	61	33	0
Sept. 1-10 -----	18.4	87	--	110	--	--	11	1.7	9.9		45	6.5	8.0	--	1.3	67	34	0
Sept. 11-20 -----	20.5	82	--	110	--	--	10	2.2	10		44	6.4	8.5	--	1.9	62	34	0
Sept. 21-30 -----	18.0	74	8.5	111	7.4	.06	11	2.0	8.0	2.2	46	5.5	7.5	.0	2.2	72	36	0
Average -----	1,750	--	--	88.1	--	--	9.6	1.7	6.5		36	7.9	4.7	--	1.0	68	31	3

RED RIVER BASIN--Continued  
LITTLE MISSOURI RIVER NEAR BOUGHTON, ARK.--Continued

Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	68	63	54		--	54	68	74	75	86	92	--
2	69	62	53		--	56	69	72	77	87	93	--
3	79	62	55		--	55	70	69	78	85	92	--
4	79	65	55		--	55	69	70	79	86	91	--
5	79	63	53		--	54	69	71	78	87	91	87
6	79	62	56		--	51	68	73	77	86	89	87
7	80	56	55		--	47	69	72	80	86	87	87
8	76	54	53		--	47	70	70	83	85	85	87
9	78	55	52		--	51	69	69	85	85	82	86
10	76	54	49		--	57	67	68	86	83	81	85
11	74	53	45		--	51	66	68	87	81	80	84
12	76	58	49		--	49	69	67	89	80	82	83
13	79	57	46		--	49	85	67	84	82	83	84
14	76	53	47		--	55	67	68	87	82	83	83
15	79	51	42		--	56	65	69	86	83	85	83
16		50	41		--	58	66	69	89	82	84	84
17	72	51	41		--	59	70	74	89	81	84	82
18	76	50	41		--	62	72	73	89	87	83	79
19	76	54	42		--	65	71	72	88	89	82	78
20	77	51	47		--	67	72	73	87	88	85	77
21	72	52	48		47	68	70	72	86	87	86	76
22	73	--	45		48	62	69	71	89	88	84	76
23	71	--	47		55	60	68	71	89	90	83	74
24	69	51	48		54	61	68	70	88	92	84	73
25	74	54	43		54	61	69	72	87	93	84	74
26	69	52	47		53	63	70	72	85	92	85	75
27	67	54	46		56	65	69	70	84	93	86	74
28	64	55	48		55	68	71	70	85	93	87	73
29	65	52	56		45	65	72	71	86	94	88	72
30	30	52	55		--	61	73	72	87	93	86	73
31	67	--	52		--	63	--	71	--	--	87	--
Average	73	55	49		--	58	69	71	85	87	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 1947 to September 1948

Date of collection	Mean discharge (second-foot)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Hardness as CaCO <sub>3</sub>	
																	Total	Non-carbonate
RED RIVER AT GARLAND																		
Apr. 15, 1948	15,400		--	429	--	--	--	--	--	--	108	261	86	--	0.0	--	55	0
Sept. 30	3,730	--	--	1,400	--	--	--	--	--	--	214	154	260	--	.4	--	246	71
LITTLE RIVER NEAR HORATIO																		
Apr. 13, 1948	3,500		--	78.6	--	--	--	--	--	--	22	10	12	--	0.3	--	17	0
Sept. 22	27	7.3	--	276	5.6	0.04	8.4	3.1	42	1.8	30	5.6	68	0.1	.2	151	34	9
Sept. 29	16	--	--	381	--	--	--	--	--	--	40	13	90	--	.5	--	47	14
COSSATOT RIVER NEAR DE QUEEN																		
June 2, 1948	59	--	--	43.1	--	--	--	--	--	--	15	3.0	5.0	--	1.0	--	11	0
Aug. 31	24	--	--	47.8	--	--	--	--	--	--	22	1.0	3.5	--	.2	--	14	0
Sept. 22	10	6.9	--	59.2	5.1	0.10	3.3	1.7	4.8	0.0	20	3.3	4.0	0.0	.1	33	15	0
SALINE RIVER NEAR DIERKS																		
Apr. 20, 1948	81	--	--	49.2	--	--	--	--	--	--	14	5.0	6.0	--	0.3	--	8	0
Sept. 22	.8	6.8	--	53.3	4.0	0.11	3.1	1.7	5.5	0.1	22	2.8	4.0	0.1	.0	35	15	0
OUAUCHITA RIVER NEAR MOUNTAIN PINE																		
Apr. 16, 1948	2,860		--	67.2	--	--	--	--	--	--	30	5.0	4.0	--	0.0	--	24	0
Sept. 2	81	--	--	126	--	--	--	--	--	--	68	3.0	8.5	--	1.2	--	46	0
Sept. 23	50	7.7	--	121	5.0	0.02	12	2.8	7.8	0.5	60	3.7	4.0	0.0	.4	66	41	0
LITTLE MISSOURI RIVER NEAR MURFREESBORO																		
Apr. 14, 1948	1,560		--	34.3	--	--	--	--	--	--	10	5.0	6.0	--	0.0	--	10	2
Sept. 1	15	--	--	72.5	--	--	--	--	--	--	37	10	4.0	--	1.3	--	22	0
SALINE RIVER NEAR RYE																		
Apr. 19, 1948	--		--	62.5	--	--	--	--	--	--	18	8.0	6.0	--	0.5	--	18	3
Aug. 30	--	7.6	--	133	5.3	0.09	9.6	2.9	11	3.8	42	17	8.0	0.1	.2	79	36	1
Sept. 7	--	--	--	121	--	--	--	--	--	--	50	12	9.5	--	.5	--	39	0

OUACHITA RIVER BETWEEN STRONG AND CROSSETT

Oct. 8-10, 1947	---	7.0	4,700	2.0	0.20	138	36	743	25	16	8.7	1,500	0.1	2.8	2,460	492	480
Oct. 21-31	---	6.9	4,840	4.0	.20	137	35	763	19	16	9.2	1,520	.1	2.8	2,500	486	473
Nov. 1-3	---	6.5	5,090	11	.06	151	47	811	8.3	18	9.9	1,640	.0	6.0	2,700	570	555
Nov. 4-10	---	7.0	816	9.6	.15	13	5.9	134	8.3	33	7.4	228	.0	2.8	446	57	30
Nov. 12-18	---	8.0	906	12	.05	31	7.0	131	9.9	22	12	263	.2	1.5	575	106	88
Nov. 19-21	---	8.1	285	9.4	.15	12	2.7	32	14	22	7.6	72	.0	1.5	166	41	23
Dec. 1-9	---	7.4	822	9.6	.08	28	7.0	115	11	26	8.9	234	.1	1.5	520	99	78
Dec. 10-24	---	7.5	155	9.3	.14	7.7	1.9	16	2.3	20	6.8	28	.1	1.2	102	27	11
Aug. 30, 1948	---	6.9	821	7.6	.16	24	6.3	124	7.7	28	15	232	.0	4	485	86	64
Sept. 1-10	---	6.9	827	5.6	.04	26	6.3	114	2.2	40	11	228	.1	.8	478	91	58
Sept. 11-20	---	6.8	876	4.4	.06	22	6.8	137	3.4	38	9.2	244	.1	1.2	497	83	54
Sept. 21-24	---	6.8	1,060	5.5	.09	35	9.4	154	5.0	30	10	305	.1	2.5	609	126	102

## WESTERN GULF OF MEXICO BASINS

## SABINE RIVER BASIN

## SABINE RIVER NEAR RULIFF, TEX.

LOCATION.--At gaging station at bridge on State Highway 235, 2.4 miles north of Ruliff, Newton County, and 4.5 miles downstream from Cypress Creek. DRAINAGE AREA.--9,440 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1946, October 1947 to September 1948.

Water temperatures: October 1947 to September 1948.

EXTREMES, 1947-48.--Dissolved solids: Maximum, 364 parts per million Oct. 1, 7-10; minimum, 100 parts per million Feb. 11, 20.

Total hardness: Maximum, 64 parts per million Aug. 1, 11, 16-19, 21-23; minimum, 21 parts per million Mar. 25, 27.

Water temperatures: Maximum, 89° F. July 25-27; minimum, 34° F. Jan. 24.

EXTREMES, 1945-46, 1947-48.--Dissolved solids: Maximum, 364 parts per million Oct. 1, 7-10, 1947; minimum, 76 parts per million Feb. 14-19, 1946.

Total hardness: Maximum, 64 parts per million Aug. 1, 11, 16-19, 21-23, 1948; minimum, 18 parts per million Jan. 11-20, 1946.

REMARKS.--Records of water discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1118. Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Per-cent non-carbonate
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
Oct. 1, 7-10, 1947 --	1,104	77		647	--	--	13	5.4		106	44	16	164		0.8		364	0.50	1,090	54		2
Oct. 2-6, 1947 --	1,320	75		345	--	--	11	4.7	49		45	13	72		1.5		206	28	734	47	10	69
Oct. 11-20, 1947 --	1,720	78		349	--	--	8.9	4.1	55		41	10	81		.8		213	29	414	39	5	75
Oct. 21-31, 1947 --	627	77	7.0	333	28	0.4	10.9	5.3	57	6.0	44	13	88	1.0	1.2		232	32	393	47	11	75
Nov. 1-10, 1947 --	1,192	67		304	--	--	9.6	3.1	45		31	9.6	69		1.2		189	26	603	37	11	72
Nov. 11-20, 1947 --	2,894	60		339	--	--	8.0	4.5	48		18	9.9	85		1.0		212	29	1,660	41	26	72
Nov. 21-30, 1947 --	5,007	62		399	--	--	10	4.9	58		18	15	100		1.0		260	35	3,510	45	30	74
Dec. 1-3, 1947 --	3,850	66		442	--	--	13	5.9	57		42	17	90		1.2		280	38	2,910	57	22	68
Dec. 4-10, 1947 --	6,322	67		186	--	--	6.2	2.8	26		14	12	42		.8		158	21	2,700	27	16	68
Dec. 11-20, 1947 --	18,310	51		124	--	--	3.9	2.2	12		13	6.4			.5		119	16	5,660	24	13	53
Dec. 21-31, 1947 --	12,640	47		174	--	--	7.0	4.0	19		20	16	30		.8		124	17	4,230	34	10	55
Jan. 1-9, 1948 --	12,760	51		142	--	--	7.2	2.9	17		18	15	25		.2		106	14	3,650	30	15	55
Jan. 10-20, 1948 --	15,170	48		174	--	--	8.8	3.2	21		23	17	31		.2		122	17	5,000	35	16	56
Jan. 21-31, 1948 --	13,560	38		197	--	--	8.8	4.0	23		24	18	35		.2		140	19	5,130	38	19	56
Feb. 1-10, 1948 --	16,450	43		195	--	--	7.0	3.6	24		12	23	36		.2		128	17	5,690	32	22	62
Feb. 11-20, 1948 --	22,910	46		141	12		6.9	2.9	17		15	19	24		.5		100	14	6,190	29	17	56
Feb. 21-29, 1948 --	27,200	53		130	11		5.0	2.8	16		12	20	20		.2		102	14	7,490	24	14	59
Mar. 1-10, 1948 --	22,120	57		178	16		9.2	2.8	23		22	24	29		.8		128	17	7,640	34	16	60
Mar. 11-20, 1948 --	17,030	56		174	12		7.0	3.4	21		16	22	28		.8		125	17	5,750	31	18	59
Mar. 21-24, 1948 --	13,660	62		210	16		10	5.6	23		38	20	32		.8		168	23	6,200	48	17	51
Mar. 25, 27, 1948 --	13,450	64		90	14		4.8	2.1	13		20	12	13		.8		108	15	3,920	21	4	57



Aug. 1-10	13,130	68	233	17	10	5.9	25	35	21	38	.5	176	.24	6,240	49	20	53
Aug. 16-18, 21-24	19,200	71	116	10	4.7	3.0	113	20	10	18	.2	176	.15	5,700	24	8	54
Aug. 11-15, 19-20, 25-30	10,530	73	240	16	9.6	4.7	30	33	19	43	.0	170	.23	4,830	43	16	60
May 1-10	5,012	77	276	17	10	4.4	38	39	20	52	.0	176	.24	2,380	43	1	66
May 11-20	5,713	78	277	16	10	4.6	35	31	18	54	.8	172	.23	2,650	44	18	64
May 21-31	10,680	78	160	10	6.2	4.6	16	26	12	25	1.2	145	.20	4,180	34	13	51
June 1-10	12,660	79	186	14	10	5.0	19	46	13	25	.8	143	.19	4,890	46	8	48
June 11-20	4,987	83	258	17	11	4.4	37	50	14	50	.4	166	.23	2,240	46	5	64
June 21-30	1,796	86	317	22	14	5.6	40	64	17	53	.8	191	.26	926	58	60	60
July 1-10	1,490	85	360	26	15	4.8	48	64	13	68	.0	210	.29	845	57	5	65
July 11-20	1,595	86	365	21	14	4.6	53	64	12	74	.0	211	.29	909	54	1	68
July 21-31	1,303	88	455	24	16	5.5	65	62	12	100	.0	260	.35	915	63	12	69
Aug. 1, 11, 16-19, 21-23	696	88	529	27	15	6.6	74	59	12	116	.8	280	.38	526	64	16	71
Aug. 2-10	758	88	380	27	13	4.9	53	57	11	77	.2	216	.29	442	52	6	68
Aug. 12-15, 20	761	88	381	26	13	4.6	55	58	15	76	.5	220	.30	464	51	4	70
Aug. 24-31	579	83	336	25	12	4.5	40	60	10	65	.8	195	.27	305	48	0	68
Sept. 1-10	510	84	285	16	12	4.1	37	54	9.5	52	.8	165	.22	227	47	3	63
Sept. 11-20	696	79	324	17	11	3.8	67	51	9.1	67	1.8	141	.33	344	43	9	69
Sept. 21-30	450	79	359	18	11	3.9	52	51	9.6	74	1.8	199	.27	242	44	2	72
Weighted average	8,193	--	191	--	8.0	3.7	23	24	17	34	0.2	139	0.19	3,070	35	16	59

SABINE RIVER BASIN--Continued  
SABINE RIVER NEAR RULIFF, TEX--Continued

Temperature (° F.) of water, water year October 1947 to September 1948												
Day	October	November	December	January	February	March	April	May	June	July	August	September
1	74	68	66	50	37	60	65	77	78	86	88	84
2	74	68	67	50	40	--	65	78	78	86	88	84
3	75	68	65	50	40	60	66	78	78	--	88	84
4	77	69	66	52	40	60	66	78	--	--	88	84
5	74	--	67	--	45	58	--	76	78	85	88	84
6	76	67	67	51	47	57	68	--	78	85	88	84
7	79	67	--	52	47	58	67	76	78	--	88	84
8	78	68	--	52	--	58	70	76	80	85	88	84
9	76	64	--	--	46	57	--	78	80	85	88	83
10	76	65	--	51	44	49	73	78	80	86	88	80
11	76	62	--	50	46	50	--	77	80	85	88	78
12	--	--	57	50	46	52	74	78	--	85	88	80
13	77	62	56	50	48	54	--	78	81	85	--	79
14	78	59	54	50	48	55	71	79	83	86	88	79
15	79	68	--	49	46	56	70	78	--	86	88	78
16	76	--	52	49	47	57	71	80	--	87	88	78
17	79	60	48	47	45	58	70	80	83	86	88	78
18	78	57	50	44	--	59	70	79	84	--	88	80
19	--	58	47	44	47	58	70	77	86	86	88	79
20	--	57	47	--	48	59	70	77	86	86	88	80
21	80	56	47	--	50	59	70	77	86	86	88	80
22	74	--	--	--	48	60	71	77	86	87	88	81
23	78	--	46	--	48	62	72	--	86	87	87	81
24	77	--	46	34	49	--	72	78	86	88	--	80
25	77	57	--	38	53	63	73	--	87	89	86	80
26	77	57	45	41	54	63	--	--	87	89	84	--
27	76	66	47	40	56	64	75	--	--	89	82	78
28	74	67	47	40	58	64	75	--	--	88	82	78
29	76	66	48	38	59	64	76	--	87	88	83	77
30	78	67	49	37	--	64	--	78	86	88	83	76
31	76	--	49	--	--	--	--	78	--	86	84	--
Average	77	63	--	--	47	60	71	--	83	86	87	81

## NECHES RIVER BASIN

## NECHES RIVER AT EVADALE, TEX.

LOCATION --At gaging station at bridge on U. S. Highway 96, 200 feet upstream from Gulf, Colorado and Santa Fe Railway bridge at Evadale, Jasper County, and 15 miles upstream from village Creek.

DRAINAGE AREA --7,908 square miles.

RECORDS AVAILABLE --Chemical analyses: October 1947 to September 1948.

447 water temperatures October 1947 to September 1948.

EXTREMES, 1947-48 --Dissolved solids: Maximum, 212 parts per million Nov. 1-10; minimum, 115 parts per million Feb. 14-20.

Total hardness: Maximum, 70 parts per million Nov. 1-10; minimum, 24 parts per million Dec. 11-20.

Water temperatures: Maximum, 86° F. June 19-21, 23-25; July 25-31, Aug. 16; minimum, 37° F. Jan. 30-31.

REMARKS --Records of water discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1118. Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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 carbonate
									Parts per million	Tons per acre-foot								Tons per day	Total	Non-carbonate			
Oct. 1-10, 1947	600	--	--	260	--	--	9.8	4.4	40	40	54	11	51	--	--	1.2	--	178	0.24	288	43	0	67
Oct. 11-20	481	75	--	280	--	--	9.2	4.8	41	44	44	16	56	--	--	.8	--	188	.26	244	43	7	63
Oct. 21-31	471	74	--	326	--	--	9.2	6.6	44	37	37	18	69	--	--	.5	--	204	.28	259	50	20	66
Nov. 1-10	572	65	6.9	337	18	0.30	18	6.2	40	39	39	14	78	1.2	1.5	212	.29	327	.29	327	70	36	59
Nov. 11-20	1,225	60	--	260	--	--	10	4.2	32	28	28	13	54	--	--	.8	--	189	.26	625	42	20	62
Nov. 21-30	2,764	57	--	192	--	--	9.2	3.2	17	16	16	9.0	36	--	--	1.0	--	155	.21	1,160	36	23	51
Dec. 1-10	3,372	58	--	185	--	--	8.9	3.0	15	18	18	7.8	31	--	--	.5	--	149	.20	1,360	35	20	48
Dec. 11-20	7,572	50	--	149	--	--	5.9	2.2	16	23	23	7.1	23	--	--	1.0	--	134	.18	2,740	24	5	66
Dec. 21-31	4,782	49	--	221	--	--	8.6	4.7	26	14	14	26	41	--	--	.2	--	145	.20	1,870	41	29	58
Jan. 1-10, 1948	4,308	51	--	233	--	--	9.3	4.4	32	18	18	28	47	--	--	.2	--	161	.22	1,870	41	27	63
Jan. 11-20	4,866	51	--	213	--	--	8.5	3.9	26	14	14	26	39	--	--	.2	--	153	.21	2,080	37	26	60
Jan. 21-31	5,285	41	--	213	--	--	9.1	4.0	27	15	15	28	40	--	--	.2	--	153	.21	2,250	39	27	60
Feb. 1-10	7,536	47	--	201	--	--	8.7	5.5	22	15	15	32	33	--	--	.2	--	142	.19	2,890	44	32	52
Feb. 11-13	11,390	51	--	161	13	--	9.2	3.9	21	16	16	28	30	--	--	.2	--	136	.19	4,240	39	26	54
Feb. 14-20	15,610	52	--	110	11	--	5.8	3.6	15	8	8	15	28	--	--	.2	--	115	.16	5,780	29	23	53
Feb. 21-29	21,530	55	5.4	124	11	--	4.9	4.4	12	3.0	3.0	21	21	--	--	.2	--	125	.17	7,270	30	26	46
Mar. 1-10	16,640	59	--	164	14	--	6.5	5.3	12	8	8	27	21	--	--	.0	--	146	.20	6,560	38	31	41
Mar. 11-20	11,460	56	--	191	16	--	8.0	3.8	21	13	13	30	28	--	--	.2	--	136	.18	4,210	36	25	36
Mar. 21-31	8,109	66	--	221	14	--	8.9	4.9	23	13	13	30	35	--	--	.8	--	152	.21	3,330	42	32	54
Apr. 1-10	7,473	67	--	219	12	--	9.1	4.7	23	17	17	28	34	--	--	.8	--	150	.20	3,030	42	28	54
Apr. 11-16	6,120	73	--	127	15	--	11	5.6	26	24	24	27	41	--	--	.8	--	168	.23	2,760	50	31	52
Apr. 17-20	14,200	68	--	121	11	--	6.1	2.6	12	16	16	16	16	--	--	.5	--	122	.17	4,680	26	13	51
Apr. 21-25	14,040	71	--	124	6	6	7.4	7.3	19	17	21	19	18	--	--	1.0	--	119	.16	4,510	26	9	55
Apr. 26-30	8,044	72	--	179	14	.66	10	1.9	22	25	24	27	17	--	--	.8	--	139	.19	3,020	36	16	57
May 1-10	6,661	74	--	182	14	--	8.3	3.9	23	28	19	32	19	--	--	.8	--	123	.17	2,210	37	14	58
May 11-20	4,296	77	--	213	16	--	8.9	4.9	27	32	18	39	31	--	--	.5	--	140	.19	1,620	42	16	58
May 21-31	4,849	76	--	189	14	--	8.2	3.7	22	25	25	20	29	--	--	.5	--	144	.20	1,890	36	15	57

NECHES RIVER BASIN--Continued  
NECHES RIVER AT EVADALE, TEX.--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
June 1-10, 1948	6,047	76	--	164	12	--	7.3	4.0	16		20	15	26	--	1.2		127	0.17	2,070	35	18	50
June 11-20	2,196	84	--	211	17	--	10	4.9	23		37	15	34	--	1.2		146	.20	866	45	15	52
June 21-30	960	85	--	266	24	--	11	4.5	36		53	15	46	--	.8		178	.24	461	46	2	63
July 1-10	806	84	--	266	25	--	11	5.6	33		54	13	45	--	.2		182	.25	396	50	6	53
July 11-20	1,068	84	--	249	22	--	10	6.1	29		50	13	41	--	.8		188	.26	542	50	9	56
July 21-31	731	85	--	260	23	1.6	10	4.4	31	8.0	49	18	42	0.3	.5	0.46	176	.24	347	43	3	56
Aug. 1-10	410	84	--	315	21	--	13	5.5	39		52	13	59	--	1.2		200	.27	221	55	12	61
Aug. 11-20	312	84	--	323	20	--	12	5.7	41		55	9.6	62	--	.8		197	.27	166	53	8	63
Aug. 21-31	274	81	--	291	22	--	12	5.1	38		66	10	48	--	1.8		173	.24	128	51	0	62
Sept. 1-10	276	80	--	265	21	--	11	4.5	36		66	9.3	43	--	.8		159	.22	118	46	0	63
Sept. 11-20	377	76	--	290	20	--	10	5.0	40		62	9.8	50	--	.8		170	.23	173	46	0	66
Sept. 21-30	283	74	--	298	18	--	10	5.8	42		65	13	51	--	1.8		176	.24	134	49	0	65
Weighted average	4,802	--	--	179	--	--	7.8	4.1	20		17	22	30	--	0.5		140	0.19	1,820	36	22	55

NECHES RIVER BASIN--Continued  
NECHES RIVER AT EVADALE, TEX.--Continued

Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	--	71	54	51	40	62	63	74	76	83	84	81
2	--	68	55	49	41	63	64	76	73	85	82	82
3	--	68	55	50	41	63	63	75	70	84	82	81
4	--	68	58	50	--	62	63	76	74	83	84	79
5	--	--	60	50	52	58	68	75	76	84	84	80
6	--	--	59	--	50	55	--	72	78	83	84	81
7	75	64	63	51	55	55	58	69	71	78	85	84
8	75	59	--	53	51	58	71	73	80	84	83	81
9	--	61	62	56	47	58	72	75	80	84	84	80
10	75	63	59	--	44	54	72	76	80	85	84	78
11	75	62	58	53	57	56	73	--	81	83	84	77
12	75	61	54	55	50	46	73	--	81	84	85	78
13	--	60	50	59	47	49	75	75	81	83	85	76
14	75	63	50	52	47	59	--	76	84	85	85	75
15	75	59	58	51	57	58	70	75	84	84	85	74
16	75	--	48	52	58	60	--	78	85	85	86	71
17	75	60	47	46	49	60	--	79	84	85	83	75
18	75	58	46	50	50	61	68	79	85	85	84	78
19	76	58	46	46	--	48	68	77	86	84	84	79
20	75	57	48	44	--	61	69	78	86	85	84	79
21	75	58	48	44	55	67	69	70	86	84	83	76
22	74	58	55	45	50	69	70	75	85	84	83	75
23	--	--	50	45	49	65	--	75	86	84	84	78
24	--	58	48	--	51	65	72	77	86	83	82	78
25	--	57	57	--	54	69	73	78	86	86	81	76
26	75	--	46	41	55	69	71	77	85	86	81	73
27	75	56	46	40	59	61	70	--	85	86	80	72
28	73	55	45	--	60	67	72	--	84	86	79	69
29	73	55	48	41	61	60	73	--	84	86	80	69
30	73	--	51	37	--	65	74	78	84	86	80	--
31	74	--	54	37	--	66	--	--	--	86	81	--
Average	--	61	52	48	51	60	70	76	82	84	83	77

TRINITY RIVER BASIN  
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 and 6 miles northeast of Oakwood, Leon County.

DRAINAGE AREA.--12,840 square miles.  
RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1948.

Water temperatures: October 1947 to September 1948.  
EXTREMES, 1947-48.--Dissolved solids: Maximum, 1,260 parts per million Aug. 29-31; minimum, 179 parts per million May 13-20.

Total hardness: Maximum, 271 parts per million Oct. 28, 30-31; minimum, 93 parts per million May 13-20.  
Water temperatures: Maximum, 89° F. July 31; minimum, 35° F. Feb. 1.

REMARKS.--Records of water discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1118. Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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>		Per cent sodium
																	Parts per million	Tons per acre-foot	Tons per day	Total		
Oct. 1-7, 1947-----	567	74	--	710	--	--	55	7.2	77	--	173	54	94	--	4.6	--	423	0.58	648	167	25	50
Oct. 8-----	509	75	--	1,180	--	--	64	13	155	--	176	62	240	--	5.2	--	669	.91	919	213	69	61
Oct. 9, 17, 19-20-----	773	75	--	1,160	--	--	60	10	160	--	180	72	216	--	13	--	671	.91	1,400	190	43	65
Oct. 10-16, 18-----	708	74	--	809	--	--	53	8.3	100	--	181	57	121	--	6.1	--	468	.64	895	166	18	57
Oct. 21-27, 29-----	733	72	8.0	716	9.5	0.05	49	8.3	81	8.0	159	52	104	0.4	11	--	420	.57	831	156	26	34
Oct. 28, 30-31-----	637	70	--	1,330	--	--	84	15	160	--	165	52	300	--	9.0	--	756	1.03	1,300	271	136	56
Nov. 1, 3, 5-10-----	760	61	--	756	--	--	48	6.8	99	--	156	53	121	--	11	--	448	.61	919	148	20	59
Nov. 2, 4-----	1,085	66	--	1,540	--	--	60	11	246	--	183	66	352	--	18	--	832	1.20	2,580	194	44	73
Nov. 11-20-----	1,146	54	--	696	--	--	44	6.0	90	--	140	42	118	--	7.0	--	412	.56	1,270	134	20	59
Nov. 21-30-----	2,283	52	--	678	--	--	50	6.1	82	--	146	56	101	--	8.6	--	406	.55	2,500	150	30	54
Dec. 1-5, 8-10-----	2,626	55	--	751	--	--	54	5.5	96	--	161	63	108	--	5.2	--	432	.59	3,080	153	26	56
Dec. 6-7-----	1,800	59	--	1,750	--	--	66	7.4	285	--	159	59	435	--	11	--	984	1.34	4,730	195	64	76
Dec. 11-20-----	13,180	50	--	325	--	--	37	4.4	20	--	108	36	19	--	3.2	--	200	.27	7,120	110	22	28
Dec. 21-26-----	14,680	44	--	210	--	--	40	4.1	19	--	117	34	17	--	2.8	--	186	.27	7,770	117	21	26
Dec. 27-31-----	3,862	46	--	538	--	--	60	6.6	43	--	172	47	52	--	6.3	--	353	.43	3,470	176	36	35
Jan. 1-3, 1948-----	4,513	50	--	644	--	--	64	4.9	61	--	181	47	78	--	5.9	--	383	.52	4,670	180	31	43
Jan. 4-10-----	12,290	48	--	369	--	--	48	3.1	25	--	136	38	23	--	4.0	--	243	.33	8,060	133	21	29
Jan. 11-20-----	3,822	--	--	563	--	--	61	6.2	48	--	171	50	60	--	6.7	--	340	.46	3,510	176	33	37
Jan. 21-24-----	3,105	42	--	782	--	--	63	7.1	88	--	168	57	124	--	6.8	--	459	.62	3,850	186	48	51
Jan. 25-31-----	4,241	38	--	501	--	--	44	5.3	47	--	121	56	52	--	4.1	--	286	.39	3,270	132	32	44
Feb. 1-10-----	6,107	42	--	503	11	--	49	5.5	47	--	130	59	53	--	3.8	--	308	.42	5,080	145	36	41
Feb. 11-20-----	7,554	48	--	484	12	--	52	5.1	41	--	138	59	44	--	4.0	--	304	.41	6,200	151	38	37
Feb. 21-29-----	3,210	55	--	645	11	--	70	6.8	60	--	179	83	67	--	6.2	--	396	.54	3,430	203	56	39

Mar. 1-10	20,950	53	--	329	9.5	--	38	3.8	24	113	36	22	--	2.8	220	30	12,400	110	18	32
Mar. 15-16, 18-20	9,784	57	--	506	12	--	60	4.6	40	165	55	43	--	4.0	301	.41	7,950	169	33	34
Mar. 11-14, 17-----	24,380	46	--	320	14	--	49	2.5	31	145	50	19	--	1.8	33	33	15,700	133	34	33
Mar. 21-25-----	3,984	62	--	688	14	--	72	7.2	59	191	66	76	--	5.4	415	.56	4,460	209	52	38
Mar. 26-31-----	4,933	63	--	528	12	--	61	6.4	41	159	63	49	--	2.8	338	.46	4,500	178	48	33
Apr. 1-10-----	1,800	66	--	722	13	--	70	7.4	68	188	75	81	--	7.7	428	.58	2,080	205	51	42
Apr. 11-15-----	2,838	68	--	772	10	--	61	5.6	86	156	59	118	--	6.4	446	.61	3,480	175	47	52
Apr. 16-20-----	4,086	66	--	537	12	--	51	4.8	91	133	59	80	--	4.6	319	.43	3,500	147	38	43
Apr. 21-30-----	1,526	72	--	742	12	--	63	7.5	80	173	77	94	--	19.4	442	.60	1,860	183	46	46
May 1-10-----	5,499	75	--	781	12	--	61	7.5	86	170	79	101	--	8.4	464	.63	1,860	183	44	51
May 11-12-----	5,623	70	--	471	11	--	36	4.1	96	116	23	76	--	2.8	268	.36	4,070	107	12	53
May 13-20-----	30,280	71	--	273	9.0	--	32	3.1	21	104	24	19	--	2.8	179	.24	14,600	93	7	34
May 21-25-----	14,060	75	--	370	13	--	47	3.3	23	132	37	23	--	1.8	225	.31	5,540	110	23	26
May 26-31-----	3,513	74	--	562	11	--	56	4.8	55	135	56	66	--	2.2	342	.47	3,240	160	32	43
June 1-10-----	2,370	78	--	608	13	--	55	5.5	61	166	47	74	--	4.0	360	.49	2,300	160	24	45
June 11-20-----	1,126	82	--	746	14	--	59	5.1	86	164	63	105	--	7.5	438	.60	1,330	168	34	53
June 21-30-----	1,004	82	--	936	15	--	61	6.6	118	175	68	150	--	13	538	.73	1,460	179	36	59
July 1-10-----	4,403	81	--	587	15	--	56	5.6	55	136	78	61	--	6.5	352	.48	4,180	163	52	43
July 11-19-----	2,410	84	--	583	14	--	56	5.8	55	138	71	66	--	5.7	348	.47	2,260	164	51	42
July 20-31-----	825	77	8.1	760	13	.02	58	6.4	81	175	68	100	.6	4.2	440	.60	980	171	28	49
Aug. 1-6, 9-----	923	85	--	738	12	--	50	5.8	92	151	60	109	--	11	432	.59	1,080	149	25	57
Aug. 7-8, 10-----	605	84	--	1,210	9.4	--	63	7.0	171	159	50	282	--	8.0	671	.91	1,100	186	56	67
Aug. 11-20-----	509	84	--	868	8.2	--	56	6.1	109	169	73	126	--	12	494	.67	679	165	26	59
Aug. 21-28-----	566	83	--	1,966	11	--	58	7.2	127	179	67	161	--	10	546	.74	834	174	28	61
Aug. 29-31-----	612	82	--	2,290	11	--	72	11	385	160	97	572	--	29	1,260	1.71	2,080	224	94	79
Sept. 1-10-----	666	81	--	941	14	--	52	8.0	123	164	69	151	--	13	530	.72	953	163	28	62
Sept. 11-20-----	539	76	--	867	12	--	53	8.2	108	162	65	133	--	15	488	.66	710	166	33	58
Sept. 21-30-----	466	75	--	867	8.4	--	50	8.0	115	162	68	136	--	12	483	.66	608	158	25	61
W.ights average	4,612	--	--	458	--	--	47	4.6	41	134	46	46	--	4.2	282	0.38	3,510	136	26	39

TRINITY RIVER BASIN--Continued  
 TRINITY RIVER NEAR OAKWOOD, TEX.--Continued

Day		October	November	December	January	February	March	April	May	June	July	August	September
Temperature (° F.) of water, water year October 1947 to September 1948													
1	---	73	68	50	55	35	60	62	76	76	81	86	80
2	---	72	65	57	50	45	57	57	78	75	80	83	82
3	---	72	65	53	46	42	56	62	78	76	80	86	81
4	---	75	66	56	47	42	57	63	75	76	79	86	82
5	---	75	61	56	45	45	48	65	75	76	81	86	82
6	---	76	63	57	56	45	47	68	73	79	81	82	82
7	---	77	60	61	47	45	49	69	73	78	82	82	81
8	---	75	56	56	45	41	53	71	70	81	82	84	83
9	---	77	55	58	45	41	52	72	75	79	81	84	81
10	---	75	60	55	49	44	54	71	74	82	83	86	78
11	---	75	56	55	--	45	45	72	73	80	82	84	76
12	---	74	--	52	--	40	43	74	67	82	83	85	75
13	---	75	56	50	--	41	42	64	66	83	84	--	76
14	---	74	56	48	--	40	46	65	67	83	83	86	77
15	---	74	54	45	--	39	52	64	--	82	84	84	76
16	---	74	55	44	--	55	52	64	72	83	84	85	75
17	---	74	54	52	--	54	54	63	73	83	86	83	77
18	---	75	53	55	--	55	61	65	74	83	85	83	79
19	---	74	53	57	--	54	60	66	72	85	85	84	79
20	---	74	53	45	--	53	60	70	72	73	--	84	77
21	---	75	53	45	49	49	65	72	72	84	--	84	78
22	---	72	54	45	40	45	55	71	78	84	85	84	78
23	---	72	51	46	38	50	56	74	74	83	85	83	77
24	---	73	52	46	39	52	68	75	76	83	86	84	78
25	---	73	50	42	36	61	63	73	76	82	86	83	76
26	---	73	51	40	37	57	65	68	75	84	65	81	74
27	---	70	--	43	39	58	61	71	73	--	65	82	74
28	---	70	50	43	38	57	55	--	74	--	66	82	69
29	---	70	50	45	38	68	62	73	73	78	65	82	69
30	---	70	53	43	40	--	65	72	74	80	82	82	--
31	---	71	--	56	40	--	69	--	74	--	89	81	--
Average -----		73	58	51	--	48	56	68	73	81	81	84	77



TRINITY RIVER BASIN--Continued  
TRINITY RIVER AT ROMAYOR, TEX.

LOCATION.--At bridge of Gulf, Colorado and Santa Fe Railway, a quarter of a mile west of Romayor and 2½ miles downstream from Big Creek. DRAINAGE AREA.--17,200 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1948.

EXTREMES, 1947-48.--Dissolved solids: Maximum, 642 parts per million Nov. 1-4, 8-13; minimum, 207 parts per million Dec. 5-9. Total hardness: Maximum, 192 parts per million July 21-31; minimum, 63 parts per million Dec. 5-9.

EXTREMES, 1945-48.--Dissolved solids: Maximum, 642 parts per million Nov. 1-4, 8-13, 1947; minimum, 137 parts per million May 14-19, 1947. Total hardness: Maximum, 198 parts per million Apr. 11-16, 1947, Aug. 1-10, 1947; minimum, 51 parts per million May 14-19, 1947.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1118. Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
Oct. 1-10, 1947-----	1,178			653	--		50	6.2	78		156	49	97		4.7		404	0.55	1,220	150	22	53
Oct. 11-20 -----	840			685	--		44	7.2	87		198	47	112		1.2		410	.56	930	140	18	58
Oct. 21-31 -----	1,002	7.2		808	4	0.12	34	7.9	113	12	141	57	150	0.2			468	.64	1,270	118	4	69
Nov. 1-4, 8-13 -----	940			1,150	--		50	8.2	78		176	61	238		4.6		642	.87	1,630	158	14	71
Nov. 5-7, 14-20 -----	1,551			849	--		43	7.6	121		185	43	145		5.2		486	.66	2,040	138	0	65
Nov. 21-28 -----	2,931			655	--		39	6.2	93		131	46	117		5.4		385	.52	3,050	123	16	62
Nov. 29-30, Dec. 1-4, 10 -----	3,701			549	--		38	4.0	67		139	37	69		9.4		310	.42	3,100	112	0	57
Dec. 5-9 -----	5,268			293	--		19	3.8	40		83	31	33		4.0		207	.28	2,940	63	0	58
Dec. 11-20 -----	12,220			389	--		39	3.7	37		140	33	29		4.0		247	.34	8,150	113	0	42
Dec. 21-31 -----	13,180			424	--		45	4.2	37		140	41	35		3.4		272	.37	9,680	130	15	38
Jan. 1-10, 1948-----	7,251			501	--		56	4.1	43		168	46	44		3.2		309	.42	6,050	157	19	37
Jan. 11-20 -----	8,517			415	--		49	4.0	32		147	37	33		4.0		277	.38	6,370	139	18	34
Jan. 21-31 -----	5,170			678	--		54	5.8	80		149	51	110		3.2		422	.57	5,890	159	37	52
Feb. 1-8 -----	6,068			565	--		38	6.7	54		77	53	70		28		329	.45	5,390	122	59	49
Feb. 9-17 -----	18,920			335	11		27	3.9	45		112	35	36		4.0		219	.30	11,200	83	0	54
Feb. 18-29 -----	8,068			552	11		44	6.7	56		117	72	58		3.4		332	.45	7,230	138	42	47
Mar. 1-10 -----	13,400			469	14		37	5.9	50		127	45	51		3.0		296	.40	10,700	117	12	48
Mar. 11-20 -----	25,130			439	12		39	4.5	51		146	53	34		4.0		269	.37	17,300	116	0	49
Mar. 21-31 -----	10,760			556	12		56	6.0	53		155	71	53		5.2		333	.45	9,670	164	38	41

TRINITY RIVER BASIN--Continued  
TRINITY RIVER AT ROMAVOR, TEX.--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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 carbonate	
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate		
Apr. 1-10, 1948	4,302			575	13		60	6.8		47	161	58	59		5.5			347	0.47	4,030	178	46	37
Apr. 11-20	9,045			561	12		41	7.4	59		128	45	74		5.6			348	.47	8,500	133	28	49
Apr. 21-30	6,950			494	11		36	5.4	50		112	35	63		5.6			379	.52	7,110	112	20	49
May 1-4	3,845			512	12		37	6.4	48		120	31	65		5			302	.41	3,140	119	20	47
May 5-13	3,140			895	13		54	7.6	117		142	57	172		3.2			510	.69	4,320	166	50	61
May 14-20	14,510			385	10		33	4.4	38		119	22	43		1.8			230	.31	9,010	100	3	45
May 21-31	23,820			374	12		41	3.2	29		123	34	29		1.8			228	.31	14,700	115	15	35
June 1-10	5,112			574	14		54	5.6	50		160	48	60		1.8			339	.46	4,680	158	27	41
June 11-20	1,908			665	12		54	6.6	69		164	48	88		3.8			370	.50	1,910	162	28	43
June 21-30	1,013			705	12		55	6.2	90		169	64	92		3.0			410	.56	1,120	163	24	52
July 1-10	3,747			711	13		53	6.2	79		164	55	99		3.2			414	.56	4,190	163	26	51
July 11-20	3,687			634	14		58	6.4	63		180	54	73		3.0			370	.50	3,680	171	24	45
July 21-31	1,137			669	14		49	7.0	72		135	61	93		5.0			367	.53	1,190	192	41	51
Aug. 1-4, 17-20	825			775	16		44	5.5	103		152	50	123		6.7			449	.61	1,000	132	8	63
Aug. 5-16	919			1,100	6.6		57	9.1	154		195	70	200		2.2			619	.84	1,540	180	20	65
Aug. 21-31	700			853	9.4		48	8.2	113		162	62	142		2.5			475	.65	989	154	20	62
Sept. 1-10	789			965	5.1		48	6.2	134		163	48	175		7.3			544	.74	1,160	146	12	67
Sept. 11-20	747			1,050	2.4		40	5.7	162		138	56	212		6.8			594	.81	1,200	124	10	74
Sept. 21-30	639			1,010	4.7		43	6.1	151		140	65	195		5.6			576	.78	994	132	18	71
Weighted average	6,167			493	--		42	5.0	51		136	45	55		4.4			303	0.41	5,050	126	14	46

TRINITY RIVER BASIN--Continued  
CLEAR FORK TRINITY RIVER AT FORT WORTH, TEX.

LOCATION.--Thermograph at gaging station at bridge on Vickery Boulevard, Fort Worth, Tarrant County, 348 feet downstream from Texas and Pacific Railway bridge, and 3 miles upstream from mouth.

DRAINAGE AREA.--522 square miles.

RECORDS AVAILABLE.--Water temperatures: November 1947 to September 1948.

EXTREMES, 1947-48.--Water temperatures: Maximum, 90° F. June 18-19, July 14-22; minimum, freezing point Jan. 28-31.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1118.

Mean daily temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	--	--	50	38	31	60	--	78	75	76	1/	
2	--	--	52	35	32	60	--	78	74	78		
3	--	--	54	36	34	55	--	79	75	74		
4	--	--	55	39	39	52	--	76	76	74		
5	--	--	54	41	43	48	--	76	80	76		
6	--	--	54	43	44	44	67	74	82	74	1/	
7	--	--	60	44	44	46	71	74	82	76		
8	--	--	60	46	42	49	72	72	84	73		
9	--	--	55	48	39	46	71	74	82	82		
10	--	--	52	49	47	47	72	73	82	82		
11	--	--	50	51	38	43	74	78	82	84	1/	
12	--	--	48	52	36	38	76	64	82	86		
13	--	--	46	48	36	40	72	66	84	86		
14	--	--	44	46	34	46	69	70	84	88		
15	--	--	43	45	36	52	69	74	85	88		
16	--	--	42	43	31	56	68	78	86	88	1/	
17	--	--	40	40	46	59	70	80	86	88		
18	--	--	42	38	50	59	71	78	88	88		
19	--	--	43	36	54	62	70	74	88	88		
20	--	--	44	35	56	64	71	72	88	88		
21	--	--	44	35	53	65	72	73	86	88	1/	
22	--	--	45	37	50	60	73	76	1/	88		
23	--	--	46	38	46	60	72	79	1/	87		
24	--	--	44	36	46	62	72	79	82	87		
25	--	--	44	34	54	63	72	77	82	87		
26	--	--	43	33	63	--	71	71	80	80	1/	
27	50	50	43	32	64	--	73	68	76	76		
28	49	49	44	30	60	--	74	66	74	74		
29	48	48	45	30	60	--	75	69	70	70		
30	49	49	46	30	--	--	76	73	74	74		
31	44	44	48	30	--	--	--	74	--	--	1/	
Average	--	--	48	39	45	54	72	74	81	--		

1/No flow in stream; thermograph unit out of water.

TRINITY RIVER BASIN--Continued  
MISCELLANEOUS ANALYSES OF STREAMS IN TRINITY RIVER BASIN IN TEXAS  
Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Specific conductance (micromhos at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicar-bonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Total hardness as CaCO <sub>3</sub>
TRINITY RIVER AT DEVERS PUMPING PLANT NEAR MOSS BLUFF											
June 18-20, 1948	583	66	6.1	43		185	36	65	4.0	341	190
June 21-29	697	55	6.6	76		163	44	105	1.8	392	164
Aug. 21-31	790	46	7.3	104		154	52	135	1.2	439	145
Sept. 1-10	868	53	7.6	111		168	46	154	1.8	475	164
Sept. 11-20	927	50	8.2	126		161	56	170	2.8	515	156
Sept. 21, 24-25	1,230	48	6.1	192		145	56	270	4.2	681	145
Sept. 28	1,650	56	6.6	268		130	65	405	5.5	908	167
Sept. 26-30	959	40	5.6	144		140	49	191	1.8	534	123
TRINITY RIVER AT BARBER HILL PUMPING PLANT NEAR COVE											
Oct. 11-20, 1947	3,790	103	68	600		150	183	1,080	5.5	2,100	536
June 1-10, 1948	385	39	4.4	34		123	32	38	2.2	237	115
June 11-20	487	47	5.3	46		152	39	52	1.2	294	139
June 21-23	671	48	6.8	78		150	52	99	.8	380	148
June 24-30	1,280	62	20	166		155	74	278	.5	739	236
June 21-28	559	57	5.9	48		162	46	61	6.5	337	167
July 23-31	1,150	58	17	133		136	81	215	6.1	643	214
Aug. 1-6	1,480	55	22	207		129	91	338	3.2	372	228
Aug. 7-10	2,630	70	43	401		133	137	688	1.8	1,420	352
Aug. 11-17, 19-20	2,500	74	45	356		147	130	628	3.2	1,340	370
Aug. 21, 24-26, 29, 31	3,440	79	64	504		149	166	892	2.2	1,790	460
Aug. 22-23, 27-28, 30	4,190	91	68	667		150	203	1,150	1.2	2,260	506
Sept. 2-10	948	54	10	121		150	45	170	1.8	521	176
Sept. 11-15	940	52	8.5	126		157	63	172	1.8	530	165
Sept. 16-20	1,530	72	19	200		161	76	340	1.2	845	258
Sept. 21-30	1,150	555	11	164		163	58	243	2.0	648	192



## 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 at Beaumont, Sour Lake, and Western Railway bridge, 3.4 miles southwest of Huffman, Harris County.

DRAINAGE AREA.--2,791 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1945 to July 1948.

EXTREMES 1947-48.--Dissolved solids: Maximum, 2,210 parts per million Oct. 12; minimum, 167 parts per million Apr. 24-25, 27-30.

Total hardness: Maximum, 488 parts per million Oct. 12; minimum, 45 parts per million Dec. 3-7.

EXTREMES 1945-48.--Dissolved solids: Maximum, 2,210 parts per million Oct. 12, 1947; minimum, 113 parts per million Feb. 17-18, 20-23, 1946.

Total hardness: Maximum, 488 parts per million Oct. 12, 1947; minimum, 36 parts per million Feb. 17-18, 20-23, 1946. Oct. 13-17, 1946.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1118. Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-foot)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate
Oct. 1-2, 5, 1947----	118			910	--		23	9.6	143		74	18	232		1.5		490	0.67	156	97	36
Oct. 3, 6-7, 10-----	124			2,920	--		38	52	483		80	105	838		2.5		1,560	2.12	522	309	244
Oct. 12-----	125			4,120	--		54	86	665		80	154	1,210		3.0		2,210	3.01	746	488	423
Oct. 11, 13-19-----	123			2,920	--		42	54	461		73	109	818		2.2		1,520	2.07	505	327	267
Oct. 20-24, 26-29, 31	142	7.4		943	14	0.05	32	15	111	25	73	25	232	0.0	1.8		536	.73	206	92	82
Nov. 1-6-----	144			925	--		36	9.8	128		75	17	232		2.2		503	.68	196	130	69
Nov. 7-10-----	143			669	--		20	4.1	105		63	9.1	167		.8		370	.50	143	69	18
Nov. 11-15, 17, 19-20-----	190			612	--		18	5.2	93		58	6.6	152		1.0		350	.48	180	68	20
Nov. 16, 18, 26-----	262			1,120	--		25	11	191		76	120	310		3.5		650	.88	460	108	45
Nov. 21, 23-24, 27-30-----	328			623	--		18	4.2	98		53	7.4	156		1.0		370	.50	328	62	19
Dec. 1-2, 8-10-----	889			499	--		18	3.8	73		46	7.2	122		1.8		301	.41	722	60	23
Dec. 3-7-----	1,443			317	--		13	3.1	46		38	6.4	91		1.5		223	.30	869	45	14
Dec. 11-12, 25-31----	1,517			415	--		19	4.1	54		54	8.0	91		.5		257	.35	359	64	20
Dec. 13-24-----	1,670			278	--		13	3.5	34		43	7.3	55		.8		194	.26	875	47	12
Jan. 1, 3-10, 1948----	1,505			462	--		20	3.7	65		64	6.9	104		.8		271	.37	223	65	13
Jan. 12-21-----	645			510	--		21	4.0	76		59	7.5	125		.8		313	.43	545	69	20
Jan. 22-30-----	1,105			388	--		15	3.5	57		55	9.1	86		.8		221	.30	659	52	7

Feb. 1-10	951	417	--	20	3.7	57	61	11	90	1.0	242	.33	621	65	15	66
Feb. 11-13, 15-20	2,059	268	12	18	3.3	31	47	12	53	1.0	204	.28	1,140	58	20	34
Feb. 21-29	2,901	293	12	17	3.0	35	48	9.3	58	.8	197	.27	1,540	55	15	55
Mar. 1-10	3,633	256	12	19	2.7	28	55	8.3	45	1.8	210	.29	2,060	58	13	51
Mar. 11-15, 18-19	1,686	326	16	22	2.3	46	67	22	58	1.0	202	.27	909	64	9	61
Mar. 20-23, 25-30	969	399	15	27	3.1	50	77	22	72	1.8	235	.32	615	80	17	58
Apr. 1-10	390	453	19	28	3.6	55	84	9.5	89	.5	266	.36	280	85	16	59
Apr. 12-18, 20	884	354	16	23	3.4	39	63	6.2	69	.8	223	.30	532	71	20	54
Apr. 21-22, 26	951	459	14	22	2.0	87	66	1.8	99	2.5	264	.36	678	63	9	68
Apr. 24-25, 27-30	2,902	238	9, 9	16	2.8	30	63	4.1	42	1.2	167	.23	1,310	51	0	56
May 1-4	280	280	16	19	3.4	30	70	4.6	46	.8	176	.24	454	61	4	52
May 5-10	526	459	18	24	4.0	50	76	4.4	98	.8	270	.37	383	76	14	63
May 11-20	529	503	19	27	4.4	64	77	5.9	110	.8	282	.38	403	86	22	62
May 21-31	341	497	17	23	3.9	66	71	5.7	108	1.8	289	.39	266	73	15	66
June 1-3, 5-10	180	505	18	26	4.3	64	79	4.7	107	1.2	265	.39	139	83	18	63
June 11-19	147	511	18	27	4.1	68	91	5.4	106	2.2	318	.43	126	84	10	64
June 21-30	125	622	18	30	6.5	80	98	7.5	132	1.8	340	.46	115	102	21	63
July 1-4, 6-10	198	697	17	25	5.1	99	74	4.7	164	2.0	353	.52	205	84	23	72
July 11-19	172	566	17	22	5.0	78	71	4.9	128	1.8	308	.42	143	76	18	59

SAN JACINTO RIVER BASIN--Continued  
MISCELLANEOUS ANALYSES OF STREAMS IN SAN JACINTO RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1947 to September 1948																	
Date of collection	Mean discharge (second-foot)	Tem- perature (° F.)	pH	Specific conduct- ance (micro- mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (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	Total hardness as CaCO <sub>3</sub>
SAN JACINTO RIVER AT MAGNOLIA GARDEN NEAR CROSBY																	
July 20, 22-23, 1948 -				2,140			40	35	328	80	68	580			3.2	1,110	244
July 21, 24-25 -				3,340			53	59	531	81	119	945			6.8	1,770	375
July 26-31 -				4,770			62	88	762	98	179	1,380			4.5	2,560	516
Aug. 1-10 -				6,590			78	139	1,110	113	265	1,990			5	3,660	765
Aug. 12-14, 16-20 -				7,660			88	158	1,320	114	326	2,350			--	4,310	869
Aug. 21-31 -				8,600			102	179	1,490	112	360	2,670			--	4,870	990
Sept. 1-5, 9-10 -				10,300			96	218	1,820	114	441	3,220			--	5,860	1,140
Sept. 12, 20-21, 25 -				8,970			88	186	1,570	111	375	2,780			--	5,070	984
Sept. 15-18, 26-30 -				14,400			131	320	2,640	125	653	4,680			--	8,500	1,640



## BRAZOS RIVER BASIN

## BRAZOS RIVER NEAR SOUTH BEND, TEX.

LOCATION --At gaging station at bridge on State Highway 67, 0.3 mile upstream from Wichita Falls and Southern Railroad bridge, 1.6 miles downstream from Clear Fork of Brazos River, and 2.0 miles northeast of South Bend, Young County.

DRAINAGE AREA --21,600 square miles, of which 9,240 square miles is probably noncontributing.

RECORDS AVAILABLE --Chemical analyses: January 1942 to February 1948.

EXTREMES, 1947-48. --Dissolved solids: Maximum, 5,070 parts per million Feb. 21-26, 29; minimum, 352 parts per million Dec. 6-7.

Total hardness: Maximum, 1,250 parts per million Feb. 21-26, 29; minimum, 352 parts per million Dec. 6-7.

EXTREMES, 1942-48. --Dissolved solids: Maximum, 13,800 parts per million Dec. 11, 1944; minimum, 237 parts per million July 8, 1945.

Total hardness: Maximum, 1,950 parts per million Dec. 11-20, 1943; minimum, 123 parts per million Apr. 8-10, 1942.

REMARKS --Records of water discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1118. Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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 non-carbonate
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
Oct. 1-10, 1947	1.58			4,570			264	63		652	122	602	1,140		2.5		2,780	3.78	12	918		818
Oct. 11-14	101.45			4,200			232	59		560	84	440	1,070		2.5		2,400	3.26	2.9	822		732
Nov. 2-10		7.5		2,120	5	0.00	158	34	225	26	96	446	402	1.4	2.0		1,380	1.88	376	534		456
Nov. 11-20	99.5			3,800			233	44	523		117	602	835		.5		2,300	3.13	574	762		666
Nov. 21-23	471			1,810			117	21	236		102	275	370		.0		1,070	1.46	1,360	378		295
Nov. 24-30	204			4,270			169	31	702		98	399	1,120		.8		2,470	3.36	1,360	550		469
Dec. 1-5, 8-10	754			4,230			187	30	693		107	451	1,090		3.5		2,510	3.41	5,110	590		502
Dec. 6-7	2,425			2,250			108	20	328		115	498	1,115		3.5		1,270	1.73	8,320	352		258
Dec. 11-20	222			3,860			209	32	582		121	517	905		6.6		2,310	3.14	1,380	653		554
Dec. 21-31	62.9			6,270			292	56	1,050		160	765	1,640		2.0		3,880	5.28	659	959		828
Jan. 1, 7, 9-10, 1948				6,000			289	60	997		146	713	1,610		2.5		3,740	5.09	651	968		848
Jan. 2, 6	184			4,060			196	40	641		123	457	1,040		2.5		2,440	3.32	1,210	654		552
Jan. 3-5	97.7			2,580			111	23	346		107	221	570		2.8		1,330	1.81	351	372		284
Jan. 11-20	42.5			6,500			302	67	1,040		152	754	1,690		2.0		3,930	5.34	451	1,030		904
Jan. 21-23, 25-31	48.9			7,290			352	79	1,210		173	862	1,960		1.5		4,570	6.22	663	1,200		1,060
Feb. 1-10	35.7			7,420			348	80	1,240		169	889	2,000		2.5		4,640	6.31	447	1,200		1,060
Feb. 11-20	43.9			7,450			344	81	1,230		152	853	2,020		--		4,600	6.26	545	1,180		1,070
Feb. 21-26, 29	420			8,190			364	84	1,360		131	932	2,250		--		5,070	6.90	5,750	1,250		1,150
Feb. 27-28	918			2,980			130	29	426		104	156	795		2.0		1,590	2.16	3,940	444		1,386
Mar. 1-8	694			3,590			264	31	484		99	691	735		2.2		2,260	3.07	4,230	786		706

## BRAZOS RIVER BASIN--Continued

## BRAZOS RIVER AT POSSUM KINGDOM DAM NEAR GRAFORD, TEX.

LOCATION.--At gaging station immediately below dam on Brazos River, 2.6 miles upstream from Loving Creek, and 11.3 miles southwest of Graford, Palo Pinto County.

DRAINAGE AREA.--22,500 square miles (22,760 square miles above gaging station near Palo Pinto, Tex.).

RECORDS AVAILABLE.--Chemical analyses: January 1942 to September 1948.

EXTREMES 1947-48.--Dissolved solids: Maximum, 1,530 parts per million Aug. 1-31, minimum, 1,300 parts per million Oct. 1-31.

Total hardness: Maximum, 544 parts per million Sept. 2-9, 1942, minimum, 463 parts per million Oct. 1-31.

EXTREMES, 1942-48.--Dissolved solids: Maximum, 2,131 parts per million Feb. 2-9, 1942, minimum, 829 parts per million Sept. 1-10, 1942.

Total hardness: Maximum, 661 parts per million Feb. 2-9, 1942, minimum, 318 parts per million Dec. 21-31, 1942.

REMARKS.--Discharge records for gaging station near Palo Pinto, Tex., for water year October 1947 to September 1948 given in Water-Supply Paper 1118.

No appreciable inflow between sampling point and gaging station near Palo Pinto, Tex., except during periods of heavy local rains. Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (°F.)	pH	Specific conductance (micro-mhos at 25° C.)	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 non-carbonate
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
Oct. 1-31, 1947-----	304	--	--	2,160	--	--	150	22	281		120	344	432	--	2.0		1,300	1.77	1,070	465	366	57
Nov. 1-30-----	213	7.6	--	2,260	6.0	0.02	152	28	287	29	114	405	450	1.6	1.5		1,420	1.93	1,917	484	401	57
Dec. 1-31-----	416	--	--	2,260	--	--	155	25	250		112	363	460	--	3.8		1,350	1.84	1,520	490	398	56
Jan. 1-31, 1948-----	435	--	--	2,300	--	--	158	24	306		113	356	492	--	1.2		1,390	1.89	1,830	493	400	57
Feb. 1-29-----	461	--	--	2,300	9.1	--	157	24	301		113	366	475	--	2.0		1,390	1.89	1,730	490	398	57
Mar. 1-31-----	322	--	--	2,430	9.9	--	164	25	320		119	375		--	1.2		1,460	1.99	1,270	512	415	58
Apr. 1-30-----	500	--	--	2,600	9.8	--	173	24	333		70	389	560	--	1.0		1,520	2.07	2,050	530	472	58
May 1-31-----	283	--	--	2,520	9.6	--	164	26	327		121	379	535	--	1.0		1,510	2.05	1,130	516	418	59
June 1-30-----	590	--	--	2,520	9.0	--	166	28	327		135	367	520	--	1.8		1,460	2.01	2,360	518	407	58
July 1-31-----	735	--	--	2,520	11	--	163	26	329		125	376	520	--	1.0		1,490	2.03	2,960	514	412	58
Aug. 1-31-----	926	7.6	--	2,550	12	--	166	28	330	12	131	379	538	.5	.5		1,530	2.06	3,830	530	422	57
Sept. 1-30-----	453	--	--	2,570	12	--	165	32	321		123	367	522	--	1.8		1,500	2.04	1,830	544	442	56
Weighted average--	470	--	--	2,450	--	--	162	26	321		116	374	510	--	1.5		1,460	1.99	1,850	512	415	58

BRAZOS RIVER BASIN--Continued  
BRAZOS RIVER NEAR WHITNEY, TEX.

LOCATION.--At gaging station at bridge on State Highway 22, 1.8 miles upstream from Towash Creek and 5 miles southwest of Whitney, Hill County. DRAINAGE AREA.--26,090 square miles, of which 9,240 square miles is probably noncontributing. RECORDS AVAILABLE.--Chemical analyses: October 1947 to May 1948. EXTREMES, 1947-48.--Dissolved solids: Maximum, 1,390 parts per million May 1-10; minimum, 256 parts per million Dec. 8, 12-18. Total hardness: Maximum, 478 parts per million May 1-10; minimum, 124 parts per million Dec. 8, 12-18. REMARKS.--Records of water discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1118. Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-foot)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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
									Parts per million	Tons per acre-foot								Tons per day	Total	Non-carbonate			
Oct. 1-10, 1947-----	328	73		2,090	--		138	25	283		148	333	420		2.5		1,270	1.73	1,120	448	326	53	
Oct. 11-20-----	415	73		2,110	--		137	25	275		104	340	428		1.5		1,260	1.71	1,420	445	360	57	
Oct. 21-22, 25-27----	427	69		2,020	--		130	22	252		113	304	392		1.8		1,160	1.58	1,340	415	322	57	
Oct. 23-24, 29-31----	714	59		1,860	--		92	16	160		107	195	250		1.2		927	1.32	1,590	296	208	54	
Nov. 1-10-----	244	59		1,963	--		69	14	110		119	134	163		1.2		398	.81	394	230	132	51	
Nov. 11-20-----	295	52	7.2	1,400	6	0.00	112	16	162	23	152	262	238	1.4	1.0		898	1.22	715	361	221	52	
Nov. 21-30-----	502	49		1,700	--		118	22	222		134	281	328		2.2		1,040	1.41	1,410	385	275	36	
Dec. 1-7, 9-----	1,478	57		1,720	--		120	19	213		143	249	328		2.2		1,000	1.36	3,990	378	260	55	
Dec. 8, 12-18-----	1,748	46		420	--		40	5.9	36		103	44	50		1.2		256	.35	1,210	124	40	38	
Dec. 1-11, 19-20----	2,240	48		793	--		62	10	83		104	102	131		1.2		483	.66	2,920	196	110	48	
Dec. 21-31-----	615	47		931	--		76	12	103		140	118	159		1.8		558	.76	927	239	124	48	
Jan. 1, 3, 6-10, 1948	1,025	48		1,050	--		84	13	47		138	143	72		2.2		646	.88	1,790	263	150	28	
Jan. 2, 4-5-----	1,983	43		1,484	--		43	6.0	48		116	48	63		2.5		282	.38	1,510	132	37	44	
Jan. 11-20-----	528	43		1,430	--		111	16	175		169	194	272		.5		915	1.24	1,300	343	204	53	
Jan. 21-26, 28-31----	675	36		2,020	11		135	24	254		153	283	402		1.2		1,190	1.62	2,170	436	310	56	
Feb. 1-10-----	762	42		1,830	9.0		125	23	237		155	269	365		1.0		1,110	1.51	2,280	406	280	56	
Feb. 11-20-----	717	46		1,910	8.2		132	24	245		146	267	385		.2		1,150	1.56	2,220	428	308	53	
Feb. 21-25-----	2,433	48		1,690	11		114	22	201		109	252	325		2.8		882	1.34	6,530	375	286	54	
Mar. 17-20-----	675	62		1,390	8.7		104	17	135		163	174	218		1.8		783	1.06	1,280	330	196	47	
Mar. 21-31-----	675	63		1,390	6.8		108	19	148		160	189	242		.8		864	1.18	1,570	348	216	48	
Apr. 1-10-----	433	66		1,830	5.5		119	21	234		154	255	355		.5		1,070	1.46	1,340	384	258	57	
Apr. 11-20-----	551	68		2,210	8.2		137	24	290		123	319	452		1.2		1,290	1.75	1,920	440	340	59	
Apr. 21-30-----	552	72		2,210	9.1		140	24	282		140	309	442		.8		1,280	1.74	1,910	448	334	58	
May 1-10-----	815	73		2,400	9.0		152	24	312		130	341	492		.8		1,390	1.89	3,060	478	372	59	
May 11, 17-18, 20----	2,002	76		1,590	7.4		106	18	199		133	215	310		.8		1,979	1.33	3,290	338	230	56	
May 12-16-----	2,078	71		1,532	7.2		46	6.6	51		109	54	75		1.2		316	.43	1,770	142	53	44	

BRAZOS RIVER BASIN--Continued  
BRAZOS RIVER AT RICHMOND, TEX.

LOCATION.--At gaging station at bridge on U. S. Highway 59 in Richmond, Fort Bend County, about 925 feet downstream from Texas and New Orleans Railroad bridge. AREA--44,050 square miles, of which 9,240 square miles is probably noncontributing.

RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1948. 1,240 parts per million Sept. 1-10; minimum, 245 parts per million Nov. 21-26.

EXTREMES, 1947-48.--Dissolved solids: Maximum, 446 parts per million Sept. 1-10; minimum, 122 parts per million Nov. 21-26.

EXTREMES, 1945-48.--Dissolved solids: Maximum, 1,240 parts per million Sept. 1-10, 1948; minimum, 133 parts per million Aug. 27-31, 1947.

TOTAL HARDNESS: Maximum, 446 parts per million Sept. 1-10, 1948; minimum, 97 parts per million Aug. 27-31, 1947.

REMARKS.--Records of water discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1118. Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-foot)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>	Percent sodium
																Parts per million	Tons per acre-foot	Tons per day		
Oct. 1-10, 1947	939			1,320	--	--	92	22	141		212	147	212		0.8	767	1.07	2,000	320	146
Oct. 11-20	865			1,360	--	--	96	24	150		226	162	220		.8	812	1.10	1,900	338	153
Oct. 21-31	1,015			1,360	--	--	94	25	152		226	162	222		.8	820	1.12	2,250	338	152
Nov. 1-10	1,164			1,430	--	--	99	29	172		227	184	255		3.2	898	1.22	2,870	366	150
Nov. 11-20	1,376	7.4		1,320	8.0	0.00	100	16	143	15	204	164	215	1.5	1.0	791	1.08	2,940	316	148
Nov. 21-26	2,538			1,400	--	--	37	7.1	38		130	31	45		1.2	245	.33	1,680	122	15
Nov. 27-30	1,358			685	--	--	64	13	65		220	60	78		1.0	418	.57	1,530	213	40
Dec. 1-10	2,417			808	--	--	69	13	86		222	80	104		1.2	492	.67	3,210	226	44
Dec. 11-20	5,349			633	--	--	56	9.0	63		140	71	89		1.5	394	.54	5,690	177	62
Dec. 21-31	2,745			581	--	--	54	10	53		157	54	75		1.8	356	.48	2,640	176	4
Jan. 1-10, 1948	1,846			907	--	--	80	13	90		217	82	131		1.2	546	.74	2,720	253	75
Jan. 11-20	1,925			829	--	--	69	12	86		183	80	124		1.2	498	.68	2,590	222	72
Jan. 21-31	2,077			817	--	--	73	12	80		201	78	113		1.2	500	.68	2,800	232	67
Feb. 1-10	2,445			971	--	--	79	13	108		177	105	151		4.0	647	.86	4,270	250	106
Feb. 11-13, 19-20	5,652			803	--	--	65	11	88		146	95	127		1.5	497	.68	7,560	207	68
Feb. 14-18	5,204			508	--	--	125	52	52		125	52	72		1.5	336	.46	4,720	146	44
Feb. 21-29	5,668			910	--	--	58	9.5	122		138	81	184		.5	556	.76	8,510	154	78
Mar. 1-10	10,810			470	10	--	46	6.6	39		128	38	51		3.0	300	.41	8,760	142	29
Mar. 11-20	4,059			608	13	--	55	7.5	55		157	54	73		1.8	358	.49	3,920	164	40
Mar. 21-31	2,522			748	6,6	--	66	11	69		178	74	96		.5	430	.56	2,930	210	64
Apr. 1-10	1,753			962	12	--	82	16	91		215	101	133		.5	576	.78	2,730	270	94
Apr. 11-18	2,671			1,040	--	--	79	18	109		201	113	160		.2	657	.89	5,090	271	106
Apr. 19-24	4,492			505	13	--	46	5.8	40		128	46	61		2.8	442	.60	3,100	139	34
Apr. 25-30	2,665			709	12	--	55	8.5	73		130	70	107		.5	442	.60	3,100	172	66
May 1-10	2,414			681	13	--	58	8.2	67		150	74	86		1.8	414	.56	2,700	175	55
May 11-15	6,695			1,110	14	--	87	15	121		194	120	182		2.2	656	.89	11,900	27	120
May 16-20	8,828			471	14	--	52	6.5	35		159	45	38		2.2	279	.38	6,650	156	33
May 21-31	3,679			511	14	--	51	6.7	43		146	43	58		2.2	300	.41	2,840	155	34

BRAZOS RIVER BASIN--Continued  
BRAZOS RIVER AT RICHMOND, TEX.--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948.--Continued

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium
																Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
June 1-10, 1943	4,399			592	13		56	7.4		54	152	57	72		2.2	349	0.47	4,150	170	43	41
June 11-20	966			711	15		69	12		59	210	58	82		1.2	402	.55	1,050	222	50	37
June 21-30	870			872	12		72	17		82	220	84	113		.8	502	.68	1,180	250	69	42
July 1-3	3,030			1,840	13		123	28		220	154	258	358		1.2	1,080	1.47	8,840	422	269	53
July 4-10	4,637			767	14		64	9.7		75	142	85	110		2.2	450	.61	5,630	200	83	45
July 11-20	3,799			498	13		49	7.3		41	134	48	56		2.2	292	.40	3,000	152	42	37
July 21-27	1,366			675	17		63	10		59	173	63	84		1.2	402	.55	1,480	198	50	39
July 28-31	1,022			945	13		82	16		85	192	98	139		.5	558	.76	1,540	270	113	41
Aug. 1-10	766			1,770	14		122	23		215	178	234	338		.8	1,030	1.40	2,130	396	253	54
Aug. 11-20	480			1,980	14		131	27		245	187	266	382		1.0	1,160	1.58	1,500	436	24	53
Aug. 21-31	469			1,770	14		118	26		216	203	226	332		1.0	1,030	1.40	1,300	402	235	34
Sept. 1-10	1,334			2,120	11		134	27		271	147	294	432		.2	1,240	1.69	4,470	446	325	57
Sept. 11-21	1,337			2,040	13		132	25		256	146	283	408		.8	1,190	1.62	4,300	432	313	56
Sept. 22-30	719			1,070	16		81	17		115	191	117	172		.6	635	.86	1,230	272	113	48
Weighted average	2,687			791	--		65	11		82	162	84	118		1.7	479	0.65	3,450	74	74	46

## BRAZOS RIVER BASIN--Continued

## MISCELLANEOUS ANALYSES OF STREAMS IN BRAZOS RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Specific conductance (micro-mhos at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Total hardness as CaCO <sub>3</sub>
CLEAR FORK BRAZOS RIVER AT NUGENT											
Aug. 21-29, 1948-----	1,190	114	34	82		179	258	132	1.2	784	434
Aug. 30-31-----	430	39	8.0	36		98	69	42	2.2	272	130
Sept. 1-10-----	780	90	22	40		123	216	52	2.5	526	315
Sept. 11-21-----	987	94	31	67		175	202	106	2.5	649	362
Sept. 22-30-----	1,430	115	52	106		230	233	211	4.4	933	501
BRAZOS RIVER NEAR MARLIN											
Oct. 23, 1947-----	2,010	134	24	268		119	323	412	1.8	1,220	433
Jan. 7, 1948-----	504	45	9.8	46		112	63	66	2.5	304	133
Feb. 6-----	1,770	126	21	220		164	259	335	3.8	1,050	401
Mar. 15-----	997	92	18	82		200	118	138	1.5	600	304
Apr. 14-----	776	68	12	73		148	90	113	3.0	492	219
May 18-----	487	52	6.8	40		128	55	57	1.8	342	158
June 23-----	2,500	153	28	308		114	318	525	1.2	1,400	497
July 27-----	2,560	158	27	331		110	374	528	2.2	1,480	506
Sept. 1-----	2,480	163	28	289		118	314	515	1.8	1,380	522
BRAZOS RIVER NEAR BRYAN											
Oct. 23, 1947-----	1,790	122	25	223		168	270	335	1.5	1,060	403
Jan. 6, 1948-----	787	68	16	49		166	95	109	3.8	496	236
Feb. 5-----	1,560	116	22	188		194	220	282	3.2	983	380
Apr. 13-----	914	72	17	85		132	92	134	1.2	536	250
May 18-----	479	51	9.2	32		132	50	52	1.8	333	165
June 22-----	2,230	138	26	316		140	373	450	.8	1,380	452
July 28-----	2,130	140	25	269		152	307	420	1.2	1,250	452
Sept. 1-----	2,030	132	28	257		126	305	412	2.2	1,210	444

COLORADO RIVER BASIN

COLORADO RIVER AT COLORADO CITY, TEX.

LOCATION.--At gaging station 3,517 feet upstream from bridge on U. S. Highway 80, 4,100 feet upstream from Texas and Pacific Railway bridge, and 1.6 miles upstream from Lone Wolf Creek.

DRAINAGE AREA.--4,082 square miles (revised) of which 2,590 square miles (revised) is probably noncontributing.

RECORDS AVAILABLE.--Chemical analyses: May 1946 to September 1948.

EXTREMES, 1947-48.--Dissolved solids: Maximum, 11,500 parts per million Apr. 23-May 15; minimum, 176 parts per million Oct. 26.

Total hardness: Maximum, 1,660 parts per million Apr. 23-May 15; minimum, 77 parts per million Dec. 4-7.

EXTREMES, 1946-48.--Dissolved solids: Maximum, 27,800 parts per million Aug. 9-12, 1946; minimum, 176 parts per million Oct. 26, 1947.

Total hardness: Maximum, 4,500 parts per million Aug. 9-12, 1946; minimum, 77 parts per million Dec. 4-7, 1947.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1118. Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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	
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate		
Oct. 1-7, 1947-----	1/2 19			6,200	--		128	48	1,100		80	347	1,760		3.5			3,430	4.66	20	517	452	82
Oct. 8-10-----	3.70			11,400	--		224	91	2,270		107	663	3,590		3.0			6,910	9.40	69	933	846	84
Oct. 11-24-----	2/ 38			11,600	--		228	93	2,310		103	663	3,670		3.0			7,040	9.57	7.2	952	867	84
Oct. 25-----	3/348	8.0		4,770	6.0	0.10	103	38	847	21	110	326	1,310	0.2	3.5			2,710	3.69	2,550	413	350	81
Oct. 25-----	4/348			2,950	--		91	27	478		96	188	780		2.8			1,610	2.19	1,510	338	260	75
Oct. 25-26-----	5/252			1,400	--		55	11	205		122	82	312		2.2			742	1.01	505	182	82	71
Oct. 26-----	5/156			274	--		26	5.9	23		113	30	110		2.0			176	.24	74	89	0	36
Oct. 27-----	44.0			1,840	--		58	14	308		97	130	465		2.5			1,030	1.40	122	202	122	77
Oct. 28-29-----	13.4			2,950	--		72	21	507		95	182	780		2.0			1,610	2.19	58	266	188	81
Oct. 30-31-----	5.10			4,950	--		113	36	896		105	305	1,400		1.5			2,800	3.81	39	430	344	82
Nov. 1-5-----	2.14			8,640	--		216	75	1,560		102	520	2,570		--			4,990	6.79	29	847	764	80
Nov. 6-10-----	1.06			12,300	--		269	102	2,340		104	696	3,840		--			7,300	9.93	21	1,140	1,060	82
Nov. 11-18-----	9.12			13,000	--		295	106	2,570		127	804	4,120		--			7,960	10.83	196	1,170	1,070	83
Nov. 19-----	62.0			7,300	--		186	59	1,340		123	459	2,160		--			4,260	5.79	713	706	606	81
Nov. 20-25-----	14.0			5,180	--		111	40	923		123	302	1,440	1.0	--			2,880	3.92	109	442	340	82
Nov. 26-30-----	3.26			7,980	--		160	59	1,510		131	441	2,380	1.2	--			4,610	6.27	41	642	534	84
Dec. 1-4-----	7/34.6			9,800	--		168	68	1,890		135	528	2,940		--			5,660	7.70	539	699	588	85
Dec. 4-7-----	9/218			991	--		19	7.2	1,171		96	70	210		2.0			1,526	.72	310	77	0	83
Dec. 4, 8-10-----	3.050			3,050	--		63	18	1,541		120	167	803		2.5			1,650	2.24	579	231	132	84
Dec. 11-14-----	5.52			4,710	--		112	35	1,328		130	272	1,300	1.5	--			2,610	3.55	39	424	317	81
Dec. 15-20-----	3.23			7,450	--		170	59	1,390		148	418	2,220		--			4,330	5.89	38	667	546	82
Dec. 21-31-----	2.11			9,220	--		196	76	1,790		130	556	2,840		--			5,520	7.51	31	802	695	83

1/No flow Oct. 1-5.

2/No flow Oct. 18-24.

3/Includes 2/5 discharge Oct. 25.

4/Includes 7/20 discharge Oct. 25.

5/Includes 1/4 discharge Oct. 25, 1/4 discharge Oct. 26.

6/Includes 3/4 discharge Oct. 26.

7/Includes 3/25 discharge Dec. 4.

8/Includes 4/25 discharge Dec. 4.

9/Includes 18/25 discharge Dec. 4.

## COLORADO RIVER BASIN--Continued

## COLORADO RIVER AT COLORADO CITY, TEX.--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Mean discharge (second-feet)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium
															Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
Jan. 1-10, 1948----	2.03		11,200	5.4	236	99	99	2,180	139	691	691	3,470		--	6,750	9.18	37	996	882	83
Jan. 11-20 -----	1.63		12,400	4.7	263	108	138	2,490	138	821	821	3,940		--	7,690	10.46	34	1,100	968	83
Jan. 21-31 -----	2.16		14,500	--	311	138	163	2,940	163	980	980	4,660		--	9,110	12.39	53	1,340	1,216	83
Feb. 1-10 -----	2.93		14,000	--	313	130	165	2,730	165	899	899	4,390		--	8,540	11.61	68	1,320	1,180	82
Feb. 11-20 -----	2.01		15,500	--	332	142	163	3,080	163	996	996	4,930		--	9,510	12.93	52	1,410	1,280	83
Feb. 21-26 -----	11/12.4		16,500	3.4	342	144	127	3,350	127	1,110	5,300			--	10,300	14.01	345	1,450	1,346	83
Feb. 26-27 -----	11/1, 419		724	7.0	33	6	92	3,550	90	6,8				2.2	402	55	1,540	116	36	65
Feb. 28 -----	83.0		1,120	7.2	40	8.5	166	76	48	270				3.2	613	83	1,37	135	72	73
Feb. 29 -----	31.0		2,010	7.3	63	15	340	81	123	540				2.8	1,130	1.54	95	218	152	77
Mar. 1-4 -----	10.4		3,950	7.7	102	28	677	95	227	1,080				4.5	2,170	2.95	61	370	292	80
Mar. 5-10 -----	4.02		6,760	3.7	184	55	1,210	121	412	1,940				1.5	3,850	5.24	42	636	536	81
Mar. 11-20 -----	2.40		9,130	6.4	212	73	1,680	130	550	2,690				--	5,280	7.18	34	829	722	81
Mar. 21-31 -----	94		12,400	26	279	103	132	2,410	132	796	3,850			0.43	7,530	10.24	19	1,120	1,016	82
Apr. 1-21 -----	12/02		14,500	12	333	125	148	2,810	148	926	4,320			--	8,800	11.97	51	1,346	1,220	82
Apr. 22 -----	3.90		12,600	2.5	329	101	95	2,430	95	902	3,880			--	7,680	10.44	81	1,240	1,160	81
Apr. 23-30, May 1-15	13/35		18,300	3.9	425	145	108	3,720	108	1,220	5,940			--	11,500	15.64	29	1,660	1,570	83
May 16-17 -----	14/560		1,450	20	70	7.9	207	155	80	315				1.5	799	1.09	1,210	207	86	68
May 18, 20 -----	13/348		3,550	11	110	26	386	161	135	935				--	1,940	2.64	1,820	362	230	77
May 18-19 -----	40.0		2,410	10	117	15	1,680	117	135	605				1.8	1,280	1.75	139	246	150	77
May 21-25 -----	15/125		5,740	9.0	136	41	1,010	107	325	1,610				1.5	3,180	4.32	1,076	568	420	81
May 25-28 -----	16/1,003		1,830	10	58	8.3	121	147	71	138				1.8	467	.64	1,260	126	6	68
May 29-31 -----	43.0		1,830	10	58	15	287	119	117	432				1.5	979	1.33	1,14	206	108	75
June 1 -----	1,620		1,200	12	54	10	177	150	72	255				2.8	671	.91	2,930	176	53	69
June 2-4 -----	1,561		454	13	31	5.4	57	143	31	51				2.8	262	.36	1,100	100	0	55
June 5-7 -----	65.7		1,390	14	48	11	213	120	88	308				4.2	759	1.03	1,135	165	66	74
June 8-10 -----	10.0		2,920	13	78	22	482	130	176	738				3.8	1,580	2.15	43	285	178	79
June 11-20 -----	11/1.86		6,000	14	138	46	1,070	140	352	1,680				1.5	3,370	4.58	15	534	419	81
June 21-27 -----	18/1.00		7,490	13	170	52	1,380	122	463	2,170				--	4,310	5.86	.0	638	538	82
June 28 -----	13/741		1,890	26	70	19	301	242	123	420				1.0	1,090	1.48	2,80	252	54	73
June 29 -----	19/741		10,400	20	265	79	1,910	198	614	3,080				2.8	6,070	8.26	1,160	986	824	81
June 29-30 -----	733		687	15	33	8.3	93	140	48	107				--	378	.51	748	116	2	63

18/Includes 7/10 discharge June 28.

19/Includes 3/10 discharge June 28.

14/Includes 1/2 discharge May 16.

15/Includes 1/4 discharge May 25.

16/Includes 3/4 discharge May 25.

17/No flow June 18-20.

10/Includes 2/5 discharge Feb. 26.

11/Includes 3/5 discharge Feb. 26.

12/No flow Apr. 3-21.

13/No flow Apr. 30-May 15.



July 1-5 -----	20/293	1,340	14	50	15	190	136	84	282	3.2	721	.98	570	186	75	69
July 5-8 -----	21/8,685	380	13	27	5.2	42	117	27	38	2.2	216	.29	5,070	89	0	50
July 9-10 -----	232	718	11	36	7.4	99	136	55	122	4.0	400	.54	251	120	17	64
July 11-13 -----	61 7	1,410	13	50	14	214	122	100	122	3.8	770	1.05	128	182	82	72
July 14-15 -----	21.5	2,110	8.4	66	19	335	126	144	508	1.8	1,140	1.55	66	242	139	75
July 16-20 -----	8.08	2,930	18	87	26	487	150	207	740	2.0	1,640	2.23	36	324	201	77
July 21-23 -----	153	3,450	15	104	29	569	146	236	885	1.8	1,910	2.60	789	378	254	77
July 24-27 -----	735	767	15	36	9.5	107	154	64	119	2.2	429	.58	851	129	3	64
July 28-31 -----	29.5	1,970	16	53	18	320	124	142	462	3.2	1,080	1.47	86	206	105	77
Aug. 1-4-5 -----	108	1,600	12	47	15	252	126	119	352	2.8	883	1.20	257	179	76	75
Aug. 2-3 -----	252	697	13	32	7.2	97	117	59	114	3.2	390	.53	265	110	14	66
Aug. 6-7 -----	13.5	1,970	13	54	15	327	119	129	475	5.7	1,080	1.47	39	196	99	78
Aug. 8-10 -----	6.13	2,850	14	72	21	492	128	179	738	4.2	1,580	2.15	26	266	161	80
Aug. 11-17 -----	1.83	4,590	16	109	38	800	149	281	1,240	4.5	2,560	3.48	13	428	306	80
Aug. 18-22 31-----	14.0	5,340	16	128	44	942	154	333	1,470	2.5	3,010	4.09	114	500	374	80
Aug. 23-30 -----	22/14.6	7,120	13	160	63	1,280	135	453	2,030	--	4,070	5.54	160	658	548	81
Sept. 1-3 -----	15.7	3,030	14	92	26	524	129	196	825	1.8	1,740	2.37	74	336	230	77
Sept. 4-10 -----	4.34	4,980	12	136	38	850	113	304	1,370	2.0	2,770	3.77	32	496	402	79
Sept. 11-20 -----	2.84	6,770	11	154	55	1,220	118	395	1,950	3.5	3,850	5.24	30	610	514	81
Sept. 21-30 -----	13.4	7,820	12	182	70	1,420	118	477	2,290	--	4,510	6.13	163	742	646	81
Weighted average -	163	916	--	37	8.6	131	118	55	182	2.2	518	0.70	228	128	32	69

20/Includes 1/7 discharge July 5.

21/Includes 6/7 discharge July 5.

22/No flow Aug. 23-29.

## COLORADO RIVER BASIN--Continued

## COLORADO RIVER AT ROBERT LEE, TEX.

LOCATION.--At gaging station at bridge on State Highway 208 in Robert Lee, Coke County, half a mile upstream from Mountain Creek.

DRAINAGE AREA.--15,770 square miles, of which 11,600 square miles (revised) is probably noncontributing.

RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1948.

WATER TEMPERATURES: October 1947 to September 1948.

EXTREMES, 1947-48.--Dissolved solids: Maximum, 2,590 parts per million Feb. 21-25; minimum, 230 parts per million July 6-10.

Total hardness: Maximum, 778 parts per million Feb. 21-25; minimum, 100 parts per million July 6-10.

Water temperatures: Maximum, 93° F. Aug. 23-27; minimum, freezing point Jan. 28.

REMARKS.--Records of water discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1118. Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
Oct. 1-10, 1947-----	5.92	81	--	2,390	--	--	121	30	342		135	317	515	--	2.0		1,390	1.89	22	426	315	64
Oct. 11-15-----	9.14	80	--	1,840	--	--	93	24	242		110	241	365	--	2.2		1,020	1.39	25	330	240	61
Oct. 16-24-----	1.66	77	--	2,580	--	--	122	33	372		119	339	565	--	1.2		1,490	2.03	2.7	440	342	65
Oct. 25-31-----	1.126	67	--	787	--	--	46	8.6	100		112	77	137	--	2.8		454	.62	1,380	150	58	59
Nov. 1-10-----	21.9	62	7.4	1,200	16	0.00	70	15	153	14	123	151	225	1.4	1.8		711	.97	42	236	135	60
Nov. 11-20-----	35.2	54	--	1,790	--	--	92	19	209		133	151	350	--	4.0		957	1.30	91	308	198	60
Nov. 23-30, Dec. 1-2	26.2	56	--	3,650	--	--	139	38	567		119	352	900	--	2.2		2,060	2.80	146	503	406	71
Dec. 3, 4, 6-----	316	57	--	1,860	--	--	62	15	292		111	145	430	--	3.5		1,000	1.36	853	216	125	29
Dec. 5, 7-10-----	285	54	--	974	--	--	40	9.0	140		119	81	182	--	3.8		514	.70	396	137	40	69
Dec. 11-20-----	24.8	49	--	1,400	--	--	58	14	206		129	153	272	--	1.0		805	1.09	54	202	96	22
Dec. 21-31-----	12.9	53	--	2,030	--	--	103	26	291		142	270	425	--	.2		1,190	1.62	41	364	246	63
Jan. 1-10, 1948-----	11.2	54	--	2,510	--	--	141	31	362		162	350	545	--	.2		1,510	2.05	46	480	346	62
Jan. 11-20-----	9.87	45	--	2,680	--	--	169	36	479		174	426	650	--	.8		1,800	2.45	46	570	428	62
Jan. 21-31-----	5.84	39	--	3,230	12	--	174	50	464		178	475	715	--	.2		1,960	2.69	31	640	494	61
Feb. 1-10-----	4.80	46	--	3,390	12	--	188	52	498		169	514	775	--	.2		2,120	2.66	27	683	544	51
Feb. 11-20-----	6.81	41	--	3,630	9.7	--	201	55	577		160	579	885	--	.2		2,380	3.25	44	727	596	63
Feb. 21-25-----	4.68	--	--	4,210	7.6	--	218	57	630		129	628	985	--	.2		2,590	3.52	33	776	673	64
Feb. 26, Mar. 10-----	480	--	--	1,250	8.4	--	59	14	172		100	131	255	--	.8		715	.97	927	204	122	65
Mar. 11-20-----	11.0	--	--	1,900	8.1	--	102	26	256		120	252	395	--	.8		1,100	1.50	33	362	263	61
Mar. 21-25-----	191	67	--	737	9.0	--	52	11	74		104	94	107	--	1.2		1,418	.57	218	175	90	48
Mar. 26-31-----	15.8	65	--	1,100	7.7	--	72	17	175		114	160	185	--	.8		856	.69	26	250	156	52

Apr. 1-10	3.53	74	--	1,640	5.9	--	100	25	198	131	251	292	--	1.2	938	1.28	8.9	352	245	55
Apr. 11-20	1.08	77	--	2,210	4.8	--	130	35	282	149	342	428	--	.8	1,300	1.77	3.8	468	346	57
Apr. 21-30	.77	78	--	2,330	7.4	--	136	36	302	132	370	462	--	.8	1,880	1.88	2.9	488	380	57
May 1-10	.03	78	--	3,140	9.2	--	161	46	448	128	467	690	--	.8	1,890	2.57	2	591	427	62
May 11-17	.00	--	--	2,890	6.6	--	138	44	412	120	413	632	--	2.0	1,710	2.33	.0	526	427	63
May 18-20	284	80	--	4,010	18	--	116	33	681	145	277	680	--	3.5	2,260	3.07	1,730	425	306	75
May 21-27	779	81	--	2,760	11	--	88	25	451	140	202	690	--	5.5	1,540	2.09	3,240	323	208	75
May 28-31	688	--	--	985	18	--	42	9.2	139	180	77	152	--	4.2	530	.72	985	143	0	68
June 1, 4-7	593	80	--	432	14	--	32	6.8	46	128	35	44	--	4.5	264	.36	423	108	3	48
June 2-3, 8-10	1,124	81	--	657	17	--	42	8.1	79	134	81	95	--	3.5	380	.52	1,150	138	28	55
June 11-18	33.4	87	--	1,190	12	--	64	14	164	136	139	275	--	1.0	693	.94	62	217	106	62
June 19-25	43.5	80	--	1,840	12	--	90	21	262	139	233	372	--	.0	1,060	1.44	124	311	197	85
June 26-30	404	81	--	434	16	--	43	6.9	34	104	58	44	--	2.0	263	.36	287	136	50	35
July 1-5	229	80	--	791	19	--	37	9.0	110	135	68	131	--	2.2	450	.61	278	130	19	65
July 6-10	11,510	78	--	382	21	--	50	6.2	39	111	42	34	--	2.8	230	.31	7,130	100	9	46
July 11-14	308	84	--	737	16	--	51	11	86	133	96	104	--	2.8	444	.60	369	172	64	52
July 15-20	85.7	86	--	1,280	16	--	76	16	162	141	165	232	--	1.2	740	1.01	181	264	146	57
July 21-25	581	87	--	1,620	15	--	94	21	211	139	203	310	--	1.8	965	1.31	1,360	321	190	59
July 26-31	397	85	--	823	13	--	44	11	101	120	86	130	--	2.8	468	.64	502	155	56	59
Aug. 1-4	336	84	--	975	15	--	51	11	127	127	107	164	--	3.2	572	.78	519	172	66	62
Aug. 5-10	128	86	--	1,800	14	--	78	20	262	135	165	398	--	2.2	1,010	1.37	349	276	166	67
Aug. 11-20	30.8	87	7.7	1,820	16	--	.00	94	24	149	230	350	.6	4.2	1,040	1.41	86	333	211	60
Aug. 21-31	31.1	87	--	2,290	14	--	126	31	313	147	328	468	--	1.8	1,350	1.84	113	442	322	61
Sept. 1-3	50.7	86	--	3,320	16	--	174	41	490	166	514	705	--	2.8	2,020	2.75	277	602	466	64
Sept. 4-10	26.9	81	--	1,590	11	--	98	22	199	130	243	288	--	1.8	964	1.31	70	335	228	56
Sept. 11-22	36.0	83	--	1,820	11	--	112	26	228	147	273	338	--	2.2	1,060	1.44	103	386	266	56
Sept. 23-30	250	76	--	690	8.1	--	44	9.5	78	105	76	107	--	1.8	392	.53	265	149	63	53
Weighted average	304	--	--	796	--	--	44	9.8	104	119	80	138	--	2.8	461	0.36	378	150	53	60

COLORADO RIVER BASIN--Continued  
 COLORADO RIVER AT ROBERT LEE, TEX--Continued  
 Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	79	60	62	43	43	--	68	80	79	81	82	--
2	71	65	58	47	45	--	66	--	76	80	85	86
3	84	65	59	56	--	--	73	77	76	80	85	86
4	85	58	58	53	--	--	73	--	77	80	--	91
5	86	63	54	57	--	--	--	--	78	79	85	--
6	--	59	55	56	47	--	73	75	82	75	--	82
7	--	57	53	59	48	--	78	78	85	74	89	--
8	79	60	53	61	39	--	74	80	87	78	83	78
9	79	64	55	55	50	--	80	80	86	83	85	74
10	--	65	54	52	49	--	82	79	82	82	88	77
11	84	64	47	--	33	--	74	--	83	84	86	80
12	77	57	45	52	33	--	76	73	90	82	85	84
13	80	49	50	51	43	--	71	--	82	84	--	87
14	79	59	44	46	49	--	79	--	92	86	80	81
15	81	62	47	40	42	--	87	85	86	84	90	88
16	--	55	51	41	45	--	78	82	85	86	88	85
17	75	52	49	41	--	--	70	85	83	83	90	79
18	80	50	52	44	--	--	78	80	90	87	90	85
19	48	52	38	36	--	--	81	78	83	85	90	87
20	79	50	56	48	--	--	81	81	76	89	81	82
21	--	55	--	50	--	--	76	83	82	90	--	78
22	--	48	58	55	--	60	63	87	83	83	--	82
23	79	53	51	42	--	63	79	80	79	87	93	76
24	--	50	50	44	--	68	--	78	73	90	87	87
25	61	50	53	34	--	73	75	--	78	84	80	76
26	63	56	54	32	--	--	82	75	80	85	85	72
27	62	54	--	32	--	68	81	--	84	84	93	72
28	66	56	56	60	--	67	79	73	79	89	86	72
29	77	60	55	35	--	71	82	70	84	88	88	72
30	72	56	37	--	--	60	--	--	--	85	84	77
31	66	--	44	--	--	59	--	--	--	83	--	--
Average	76	57	53	46	--	--	76	--	82	83	86	82

COLORADO RIVER BASIN--Continued  
COLORADO RIVER NEAR SAN SABA, TEX.

LOCATION.--At gaging station at bridge on State 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, of which 11,900 square miles (revised) is probably noncontributing.

RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1948.

Water temperatures: October 1947 to September 1948.

EXTREMES, 1947-48.--Dissolved solids: Maximum, 1,530 parts per million Oct. 15-19; minimum, 176 parts per million Sept. 10-15.

Total hardness: Maximum, 522 parts per million Oct. 15-19; minimum, 112 parts per million Sept. 10-15.

Water temperatures: Maximum, 92° F. Aug. 15; minimum, freezing point Jan. 20.

REMARKS.--Records of water discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1118. Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	Chemical analyses, in parts per million, water year October 1947 to September 1948										Dissolved solids		Hardness as CaCO <sub>3</sub>		Per-cent sodium		
					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> )	Bo-ron (B)	Parts per million			Tons per acre-foot	
																	Parts per million	Tons per acre-foot		Tons per acre-foot	Tons per day
Oct. 1-10, 1947	43.6	75	--	1,480	--	90	37	161	218	191	245	--	3.0	--	923	1.26	109	376	198	48	
Oct. 11-14, 20	125	--	--	1,260	--	80	34	145	224	156	218	218	--	1.5	--	832	1.13	281	340	156	48
Oct. 15-19	302	77	--	2,570	--	138	43	356	169	394	558	558	--	1.5	--	1,530	2.08	1,250	522	383	60
Oct. 21-27	321	72	7.9	1,040	10	0.02	54	24	131	192	182	182	0.0	1.0	1,530	2.08	1,250	522	383	60	
Oct. 28	7,560	66	--	716	--	78	17	47	174	90	93	93	--	.8	476	.65	9,720	264	122	28	
Oct. 29-31	2,053	69	--	384	--	41	7.6	28	124	35	38	38	--	3.6	248	.34	1,370	134	32	31	
Nov. 1-10	292	63	--	422	--	37	11	34	140	31	43	43	--	3.5	264	.36	208	138	23	35	
Nov. 11-20	106	55	--	629	--	51	20	53	221	40	71	71	--	2.2	375	.51	107	210	28	35	
Nov. 21-30	131	54	--	709	--	72	16	73	222	88	91	91	--	3.0	488	.68	176	248	64	39	
Dec. 1-8	1,198	60	--	833	--	56	19	88	207	58	127	127	--	1.5	486	.68	1,610	218	48	47	
Dec. 9-19	693	50	--	593	--	49	13	51	149	48	80	80	--	1.8	347	.47	649	176	54	39	
Dec. 20-31	171	52	--	1,140	--	72	22	127	218	86	197	197	--	1.0	660	.90	305	270	92	51	
Jan. 1-10	153	53	--	863	--	62	23	81	237	50	126	126	--	1.2	487	.66	201	249	55	41	
Jan. 11-20	112	46	--	932	--	67	26	91	259	45	150	150	--	1.5	560	.76	169	274	62	42	
Jan. 21-31	109	41	--	978	--	66	27	101	270	45	160	160	--	1.2	558	.76	164	276	54	44	
Feb. 1-10	116	44	--	848	--	60	28	77	273	36	120	120	--	1.2	480	.65	150	264	41	39	
Feb. 11-20	114	48	--	758	--	53	25	69	256	34	98	98	--	2.2	430	.58	132	236	26	39	
Feb. 21-29	615	56	--	647	--	51	20	55	223	28	82	82	--	2.0	376	.51	624	210	26	36	
Mar. 1, 3-10	852	54	--	1,220	9.3	72	19	150	160	128	225	225	--	3.2	692	.94	1,590	258	126	56	
Mar. 2	1,680	55	--	596	12	56	16	42	158	74	63	63	--	2.0	365	.50	1,660	206	76	31	
Mar. 11-20	146	55	--	1,120	11	70	25	122	228	79	192	192	--	2.8	669	.91	264	278	90	49	
Mar. 21, 23, 28-31	200	64	--	1,010	9.5	61	17	123	195	79	175	175	--	.8	594	.81	321	222	62	55	
Mar. 22, 24-27	155	66	--	766	10	56	20	72	219	47	105	105	--	1.5	428	.58	179	222	42	41	
Apr. 1-10	107	69	--	985	9.3	62	24	104	230	71	152	152	--	1.2	556	.76	161	253	64	47	
Apr. 11-12, 18-23, 26, 29-30	277	74	--	952	8.7	64	21	94	215	71	142	142	--	1.2	539	.73	403	246	70	45	
Apr. 13-17, 24-25, 27-28	396	68	--	590	8.5	48	14	49	173	37	72	72	--	1.2	334	.45	357	178	36	37	



COLORADO RIVER BASIN--Continued  
COLORADO RIVER NEAR SAN SABA, TEX.--Continued

Temperature (° F.) of water, water year October 1947 to September 1948

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

## COLORADO RIVER BASIN

## COLORADO RIVER AT AUSTIN, TEX.

LOCATION --At raw water intake of Austin City Water Plant, 5 miles upstream from gaging station, at southeast edge of Austin, Travis County, at Montopolis Bridge on U. S. Highway 290, 2.8 miles upstream from Walnut Creek, 3.8 miles downstream from Waller Creek, and 5 miles downstream from Barton Creek.

DRAINAGE AREA --38,160 square miles, of which 11,900 square miles (revised) is probably noncontributing.

RECORDS AVAILABLE --Chemical analyses: October 1947 to September 1948.

EXTREMES 1947-48 --Dissolved solids: Maximum, 322 parts per million Oct. 1-31; minimum, 254 parts per million Sept. 1-30.

Total hardness: Maximum, 197 parts per million Jan. 1-31; minimum, 155 parts per million Sept. 1-30.

Water temperatures: Maximum, 87° F., Aug. 12-13; minimum, 43° F., Jan. 26.

REMARKS --Records of water discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1118. No appreciable inflow between sampling point and gaging station except during periods of heavy local rains. Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
Oct. 1-31, 1947----	1,136	76	8.4	493	8.0	0.02	35	21	36	4.0	186	33	50	0.0	0.8	--	322	0.44	988	174	22	32
Nov. 1-30-----	1,150	65	--	507	--	--	36	21	39	--	184	33	53	--	.8	--	297	.40	922	176	26	32
Dec. 1-31-----	947	60	--	533	--	--	44	20	37	--	191	36	55	--	1.0	--	311	.42	795	192	36	30
Jan. 1-31, 1948----	917	54	--	537	--	--	46	20	36	--	188	36	60	--	.2	--	312	.42	772	197	43	29
Feb. 1-29-----	1,026	56	--	541	--	--	42	19	43	--	185	37	61	--	1.0	--	320	.44	886	183	32	34
Mar. 1-31-----	1,007	61	--	566	8.0	--	41	20	44	--	182	39	64	--	1.0	--	319	.43	867	185	35	34
Apr. 1-30-----	1,056	70	--	560	6.3	--	40	20	43	--	179	38	63	--	.5	--	316	.43	901	182	36	34
May 1-31-----	1,304	75	--	563	6.6	--	40	20	43	--	180	37	64	--	.2	--	303	.41	1,070	182	34	34
June 1-30-----	1,918	79	--	563	7.4	--	40	20	45	--	175	40	66	--	1.2	--	312	.42	1,620	182	38	35
July 1-31-----	2,125	81	--	537	7.5	--	42	18	30	--	150	37	59	--	.8	--	300	.41	1,720	179	56	27
Aug. 1-31-----	2,036	83	8.0	475	11	.02	39	15	31	9.6	167	32	49	.2	.8	0.45	266	.36	1,460	159	22	28
Sept. 1-30-----	1,193	78	--	450	10	--	39	14	27	--	149	27	45	--	1.2	--	254	.35	818	155	33	28
Weighted average--	1,319	--	--	526	--	--	40	19	39	--	174	35	57	--	0.8	--	300	0.41	1,070	178	36	32



COLORADO RIVER BASIN--Continued  
COLORADO RIVER AT AUSTIN, TEX.--Continued

Temperature (° F.) of water, water year October 1947 to September 1948												
Day	October	November	December	January	February	March	April	May	June	July	August	September
1	77	73	64	53	52	65	65	72	79	77	--	82
2	76	71	63	57	53	60	67	75	80	81	84	80
3	75	70	64	57	52	60	67	75	75	78	82	81
4	77	72	63	57	60	59	67	74	72	78	82	81
5	78	69	65	57	56	58	63	75	--	78	81	81
6												
7	77	70	65	57	55	56	69	75	--	79	81	82
8	77	68	65	59	55	57	70	71	75	78	81	82
9	78	65	65	60	50	59	71	71	80	80	82	81
10	78	69	62	61	51	59	71	74	79	80	82	79
11												
12	77	66	62	61	51	50	73	74	83	79	83	75
13	76	65	60	61	47	51	73	71	80	80	87	79
14	77	65	57	52	51	51	69	76	78	80	87	79
15	77	64	56	56	52	60	68	73	78	80	84	78
16	77	63	57	57	55	62	69	73	76	81	84	77
17												
18	77	63	58	57	55	61	68	76	78	82	84	77
19	77	63	56	51	57	61	69	76	78	80	84	79
20	79	62	58	51	61	61	69	74	78	81	84	78
21	76	62	58	51	62	63	70	77	80	81	83	79
22												
23	74	63	59	53	56	61	71	76	81	81	85	79
24	75	63	59	53	58	63	72	76	80	81	85	79
25	74	63	60	54	60	65	70	76	80	84	85	80
26	75	64	56	50	61	65	70	76	80	84	83	79
27	75	62	56	49	65	66	72	76	79	84	81	79
28												
29	77	64	56	49	64	67	74	75	79	86	82	74
30	74	64	58	48	60	64	70	74	79	82	81	74
31	78	63	57	43	62	64	71	69	80	83	83	73
32	75	60	55	44	65	64	71	75	78	83	84	75
33	75	60	55	44	65	64	71	75	78	83	84	75
34	75	64	56	46	--	65	71	80	78	83	83	73
35	76	--	62	49	--	67	--	82	--	--	81	--
Average	76	65	60	54	56	61	70	75	79	81	83	78

COLORADO RIVER BASIN--Continued  
COLORADO RIVER AT WHARTON, TEX.

LOCATION.--At gaging station at bridge on U. S. Highway 59 in Wharton, Wharton County, 1,000 feet downstream from Texas and New Orleans Railroad bridge and 12 miles upstream from Jones Creek.

DRAINAGE AREA.--41,150 square miles of which 11,900 square miles (revised) is probably noncontributing.

RECORDS AVAILABLE.--Chemical analyses: April 1944 to September 1948.

Water temperatures: October 1945 to September 1946, October 1947 to July 1948.

EXTREMES, 1947-48.--Dissolved solids: Maximum, 386 parts per million Apr. 1-10; minimum, 215 parts per million May 26-31.

Total hardness: Maximum, 223 parts per million Oct. 1-10; minimum, 122 parts per million May 26-31.

Water temperatures: Maximum, 94° F. July 31; minimum, 45° F. Dec. 12.

EXTREMES, 1944-48.--Dissolved solids: Maximum, 386 parts per million Apr. 1-10, 1948; minimum, 164 parts per million June 2, 1946.

Total hardness: Maximum, 231 parts per million Feb. 1-10, 1947; minimum, 114 parts per million Apr. 1-4, 1945.

Water temperatures, 1945-46, 1947-48: Maximum, 94° F. July 31, 1948; minimum, 45° F. Jan. 15-16, 1946, Dec. 12, 1947.

REMARKS.--Records of water discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1118. Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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	
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate		
Oct. 1-10, 1947	1,024	81	--	538	--	--	53	22	30	218	36	50	50	--	1.8	--		341	0.46	943	223	44	23
Oct. 11-20	1,306	80	--	538	--	--	47	21	35	204	34	54	54	--	1.8	--		345	.47	1,220	204	37	27
Oct. 21-31	1,367	78	7.7	524	8.8	0.05	35	21	34	191	33	524	48	0.0	2.0		318	.43	1,170	174	18	32	
Nov. 1-10	1,011	68	--	565	--	--	47	21	40	215	32	57	57	--	2.0		316	.43	863	204	28	30	
Nov. 11-20	1,460	62	--	525	--	--	45	19	36	198	30	52	52	--	1.8		294	.40	1,160	190	28	29	
Nov. 21-30	1,707	59	--	506	--	--	44	18	34	188	31	50	50	--	1.5		284	.39	1,310	184	30	29	
Dec. 1-10	1,269	65	--	530	--	--	46	18	41	210	32	50	50	--	2.2		324	.44	1,110	189	17	32	
Dec. 11-20	1,626	51	--	458	--	--	41	15	30	173	27	41	41	--	2.2		283	.38	1,240	164	22	29	
Dec. 21-31	1,106	58	--	556	--	--	49	19	43	221	35	53	53	--	1.8		346	.47	1,030	200	20	32	
Jan. 1-10, 1948	1,119	61	--	564	--	--	48	19	40	209	36	54	54	--	2		318	.43	961	198	26	31	
Jan. 11-31	1,408	55	--	551	--	--	50	20	38	207	36	58	58	--	2.0		324	.44	1,230	207	38	29	
Feb. 1-10	1,555	--	--	541	--	--	48	18	40	196	40	56	56	--	.5		326	.44	1,370	194	34	31	
Feb. 11-20	1,850	--	--	568	8.3	--	48	17	46	193	42	62	62	--	1.2		339	.46	1,690	190	32	34	
Feb. 21-29	1,621	67	--	544	7.6	--	44	15	35	175	34	49	49	--	.8		300	.41	1,310	172	28	31	
Mar. 1-10	1,600	68	--	535	10	--	46	16	41	192	33	54	54	--	1.8		304	.41	1,310	181	23	33	
Mar. 11-20	1,243	74	--	600	9.3	--	49	19	45	206	38	63	63	--	.8		336	.46	1,130	200	32	33	
Mar. 21-31	1,062	76	--	595	7.0	--	50	19	43	210	38	60	60	--	.8		334	.45	958	203	31	32	
Apr. 1-10	976	82	--	602	9.4	--	48	19	48	208	40	64	64	--	.8		386	.52	1,020	198	28	35	
Apr. 11-20	1,119	81	--	588	11	--	46	18	48	197	40	63	63	--	1.2		353	.48	1,070	189	28	35	
Apr. 21-30	919	81	--	577	10	--	46	18	45	195	38	61	61	--	.8		350	.48	968	189	29	34	
May 1-10	1,034	86	--	585	9.8	--	43	19	47	180	39	62	62	--	.8		320	.44	893	185	30	35	
May 11-20	906	86	--	566	9.4	--	45	19	41	188	37	64	64	--	.0		308	.42	753	190	30	32	
May 21-25	721	87	--	530	9.0	--	41	16	41	173	37	55	55	--	.5		290	.39	565	168	26	35	
May 26-31	3,563	86	--	365	11	--	36	7.8	27	131	24	34	34	--	1.2		215	.29	2,070	122	45	33	

June 1-10	661	--	531	12	--	44	16	40	176	37	--	1.2	302	.41	539	176	32	33
June 11-20	940	--	580	8.0	--	40	19	50	178	41	--	.8	324	.44	822	178	32	38
June 21-30	914	--	588	8.0	--	40	19	51	178	40	--	.8	330	.45	814	178	32	38
July 1-10	1,425	--	529	12	--	39	17	42	163	36	--	2.2	309	.42	1,190	168	34	35
July 11-20	1,115	--	554	12	--	39	17	49	170	40	--	2.2	326	.44	981	168	28	39
July 21-31	1,019	--	541	11	--	38	18	43	166	38	--	.8	293	.40	806	169	33	36
Aug. 1-31	1,197	--	492	14	.00	37	16	36	166	32	.1	1.0	282	.36	911	158	22	37
Sept. 1-10	1,021	--	486	14	--	39	16	36	168	30	--	1.2	278	.38	766	163	25	33
Sept. 11-20	1,150	--	490	14	--	43	16	31	176	28	--	1.1	277	.38	860	173	29	28
Sept. 21-30	1,036	--	502	15	--	43	16	35	183	31	--	.8	291	.40	814	174	24	31
Weighted average	1,246	--	530	--	--	44	18	40	187	35	--	1.3	310	0.42	1,040	184	30	32

COLORADO RIVER BASIN--Continued  
COLORADO RIVER AT WHARTON, TEX.--Continued

Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	78	69	59	58	--	74	81	83	88	90		
2	79	71	63	55	--	68	80	83	88	85		
3	79	70	66	58	--	70	82	87	89	80		
4	86	74	66	60	62	--	83	83	88	88		
5	81	71	67	60	63	66	82	--	90	90		
6												
7	81	74	70	63	60	62	81	88	88	87		
8	82	60	71	61	65	--	82	90	89	86		
9	81	62	66	66	--	65	86	89	89	88		
10	81	63	65	68	--	67	81	87	88	90		
11	81	70	59	65	51	68	80	85	90	91		
12	80	64	58	66	60	76	82	86	88	90		
13	81	61	45	70	--	--	82	88	88	--		
14	80	62	50	58	--	--	83	84	91	89		
15	81	64	50	58	--	--	82	83	89	91		
16						69	83	86	86	90		
17	81	59	51	--	61	71	--	87	90	91		
18	80	59	50	49	65	74	81	86	90	92		
19	81	56	52	48	68	72	81	89	87	85		
20	79	66	51	46	70	78	80	89	90	83		
21	78	59	57	46	69	80	79	84	88	86		
22												
23	79	61	57	50	--	72	80	90	90	81		
24	78	61	--	--	56	77	--	90	87	83		
25	80	57	52	--	58	--	78	86	89	84		
26	79	52	--	--	63	--	75	85	90	88		
27					69	78	82	86	86	88		
28	80	59	52	--	71	89	83	82	88	92		
29	77	61	54	--	71	71	83	86	86	80		
30	79	59	56	--	74	71	83	85	87	82		
31	76	60	60	--	72	71	84	89	88	89		
	78	60	63	--	--	75	83	88	87	83		
	77	--	68	--	--	79	--	89	--	94		
Average	80	63	58	--	--	--	81	86	89	88		

COLORADO RIVER BASIN--Continued  
MORGAN CREEK NEAR COLORADO CITY, TEX.

LOCATION.--At gaging station 227 feet downstream from bridge on U. S. Highway 80, about 1.1 mile upstream from Texas and Pacific Railway bridge, 5 miles west of Colorado City, Mitchell County, and 5½ miles downstream from Cherry Creek.

DRAINAGE AREA.--236 square miles (contributing area).

RECORDS AVAILABLE.--Chemical analyses: May 1947 to September 1948.

EXTREMES, 1947-48.--Dissolved solids: Maximum, 5,030 parts per million May 25; minimum, 72 parts per million July 6.

TOTAL HARDNESS: Maximum, 1,080 parts per million May 25; minimum, 36 parts per million July 6.

EXTRACTABLES, May 1947-September 1948.--Dissolved solids: Maximum, 5,030 parts per million May 25; minimum, 72 parts per million July 6, 1948.

Total hardness: Maximum, 1,090 parts per million Sept. 10, (8:10 a.m.) 1947; minimum, 36 parts per million July 6, 1948.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1118. Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (Second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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	
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate		
Oct. 1-6, 1947	0.00			3,990	--	--	141	47	674		134	523	960		3.0			2,410	3.28	0.0	546	436	73
Oct. 7-8	1/1.60			1,000	--	--	42	11	141		86	179	139		5.0			559	.76	2.4	150	80	67
Oct. 9-24	435			1,630	--	--	54	21	262		133	265	285		3.5			960	1.31	.0	209	112	72
Oct. 25	70.2			345	--	--	30	6.5	29		108	44	21		2.2			209	.28	245	102	13	39
Oct. 26-29	70.2			329	--	--	30	6.7	28		102	45	22		2.5			214	.29	41	102	19	37
Oct. 30-31	.65			478	--	--	34	9.2	53		105	70	55		1.8			297	.40	.5	123	37	48
Nov. 1-16	2/.01			607	19	0.02	35	11	63	8.8	110	87	68	1.4	3.2			352	.48	.0	132	42	53
Nov. 17-18	30.2			1,180	--	--	60	16	168		121	175	210		3.6			713	.97	58	216	116	63
Nov. 19-20	26.5			245	--	--	21	5.2	24		94	28	12		2.5			163	.22	12	74	0	41
Nov. 21-25	1.38			436	--	--	26	7.0	52		95	52	51		2.5			276	.38	1.0	94	16	54
Nov. 26-30	.24			638	--	--	38	9.7	79		106	85	92		2.8			380	.52	.2	135	48	56
Dec. 1-3	3/.47			707	--	--	39	9.6	98		114	95	111		2.0			416	.57	.5	137	44	61
Dec. 4-7	118			308	--	--	29	5.4	25		112	30	17		2.0			187	.25	60	95	3	30
Dec. 8-11	.65			552	--	--	34	8.0	71		108	78	72		1.0			322	.44	.6	118	30	57
Dec. 12-20	890			890	--	--	50	12	120		125	127	142		1.0			536	.73	.2	174	72	60
Dec. 21-Jan. 26, 1948	4/.03			1,200	--	--	65	16	173		135	171	222		3.8			750	1.02	.1	228	118	62
Jan. 29-Feb. 25	5/.02			2,620	8.8	--	112	35	409		176	372	555		.0			1,580	2.15	.1	424	280	68
Feb. 26-29	6/205			--	--	--	--	--	--	--	--	--	--	--	--	--		--	--	--	--	--	--

1/No flow Oct. 8.

2/No flow Nov. 3-16.

3/No flow Dec. 1-2.

4/No flow Dec. 23-Jan. 1, 11-28.

5/No flow Jan. 29-Feb. 2, 9-25.

6/No samples collected, values estimated in computing weighted average.

COLORADO RIVER BASIN--Continued  
MORGAN CREEK NEAR COLORADO CITY, TEX.--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Mean discharge (second-foot)	Temperature (° F.)	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids		Hardness as CaCO <sub>3</sub>	
															Parts per million	Tons per acre-foot	Total	Non-carbonate
Mar. 1-7, 1948 ---	0.33		1,140	9.3	--	60	5.5	173		106	169	200		2.8	685	0.93	172	85
Mar. 8-19 -----	7/07		2,070	10	--	90	27	299		129	280	418		.2	1,190	1.62	336	230
Mar. 20-31 -----	9/02		3,210	9.0	--	116	45	518		179	445	700		5.5	1,930	2.62	1,474	328
Apr. 1-10 -----	.00		3,290	8.7	--	110	48	518		216	466	660		6.4	1,920	2.61	472	295
Apr. 11-21 -----	.00		4,400	3.4	--	186	61	664		186	709	930		.2	2,670	3.63	715	562
Apr. 22 -----	8.10		669	10	1.20	59	8.1	83		160	100	88		1.2	455	.62	180	50
Apr. 23-30 -----	9/01		4,280	7.0	--	157	51	678		103	572	990		.8	2,510	3.41	602	517
May 1-22 -----	.00		4,820	6.4	--	175	57	760		115	652	1,100		.5	2,810	3.82	671	577
May 23, 29-31 -----	10/6/78		1,190	11	--	57	14	170		111	172	210		4.8	699	.95	200	109
May 24-25, 31 -----	11/9/96		456	10	--	31	5.2	52		84	55	55		9.2	267	.36	99	30
May 26 -----	12/7/50		8,100	13	--	265	101	1,410		136	1,170	2,000		--	5,030	6.84	1,080	966
May 26-28 -----	13/07		2,000	8.0	--	74	24	308		90	283	405		3.5	1,160	1.58	283	209
June 1-3 -----	33.1		395	14	--	33	6.4	39		124	48	28		2.2	234	.32	21	7
June 4-10, 14-30, -----																		
July 1-4 -----	14/08		548	12	--	34	9.4	61		115	86	52		3.8	328	.45	124	34
July 11-13 -----	1.57		1,160	12	--	56	16	162		133	189	178		3.2	694	.94	206	97
July 5-8 -----	15/2,052		338	12	--	33	5.7	29		124	37	19		2.8	206	.28	106	4
July 6 -----	16/6,043		100	4.0	--	14	.3	32		32	20	3.0		8.2	72	1.170	36	10
July 9-10 -----	11.8		882	17	--	54	14	105		122	129	130		2.2	516	.70	192	92
July 11-13 -----	1.37		2,600	18	--	123	38	378		180	391	515		1.8	1,550	2.11	460	313
July 14-20 -----	34		5,120	21	--	196	73	851		172	810	1,180		4.5	2,320	4.38	802	660
July 21-22 -----	3.00		4,360	19	--	178	63	708		185	665	900		2.2	2,720	3.70	703	582
July 23, 26, 30-31 -----	8.12		743	15	--	42	9.4	91		112	91	108		2.2	426	.38	144	32
July 24-25, 27-29 -----	18.5		483	17	--	32	6.4	59		118	52	57		3.5	287	.39	106	9

7/ No flow Mar. 15-18.

8/ No flow Mar. 23-31.

9/ No flow Apr. 24-30.

10/ Includes 1/5 discharge May 31.

11/ Includes 23/25 discharge May 25 and 4/5 discharge May 31.

12/ Includes 2/25 discharge May 25.

13/ No flow May 26.

14/ No flow June 6-10, 16-20, 23-30, July 1-4.

15/ Includes 4/7 discharge July 6.

16/ Includes 3/7 discharge July 6.



COLORADO RIVER BASIN--Continued  
MISCELLANEOUS ANALYSES OF STREAMS IN COLORADO RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Specific conductance (micromhos at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicar-bonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Total hardness as CaCO <sub>3</sub>
BULL CREEK NEAR IRA											
Nov. 17, 1947	952	58	111	112	184	53	159	3.0	574	190	
Nov. 18-21	316	29	4.6	28	97	23	30	8.7	181	91	
Nov. 22, 24-25	420	31	6.0	47	111	31	56	1.5	236	102	
Nov. 26, 28, 30	613	37	7.6	75	128	45	95	1.2	328	124	
Apr. 5, 1948	3,220	118	68	458	209	537	595	5.5	1,890	574	
May 16-18, 25-26	344	33	5.0	31	133	26	20	5.8	232	103	
June 1-4	286	29	4.5	25	130	18	10	6.0	201	91	
Aug. 3, Sept. 28	322	24	4.3	46	129	33	23	5.8	223	76	
BLUFF CREEK NEAR IRA											
Oct. 25, 1947	1,770	135	39	168	179	168	382	3.8	984	496	
Nov. 13, 17	2,270	169	54	210	226	328	408	.0	1,280	644	
Nov. 18-20	2,380	184	55	232	264	274	488	.0	1,360	685	
Nov. 22, 24-26, 28, 30	2,450	198	61	243	296	351	472	.0	1,470	745	
Apr. 5, 1948	3,150	183	76	322	148	346	700	.8	1,710	769	
COLORADO RIVER NEAR IRA											
Oct. 30-31, Nov. 1, 4, 1947	12,000	210	85	2,400	88	643	3,790	--	7,170	874	
Nov. 11, 13	20,000	340	129	4,080	117	928	6,500	--	12,000	1,380	
Nov. 17	5,400	95	33	896	58	215	1,450	4.5	2,720	372	
Nov. 19-21	6,330	114	39	1,220	111	425	1,820	5.0	3,680	445	
Nov. 22, 24-26, 28	10,500	186	67	2,110	131	540	3,300	1.0	6,270	740	
Apr. 5, 1948	40,600	762	309	9,480	119	2,170	15,200	--	28,000	3,170	
Apr. 22	52,300	931	932	12,700	65	2,830	20,300	--	37,200	4,080	



## COLORADO RIVER NEAR BALLINGER

Apr. 28, 1948	530	78	42	12	46	124	64	59	5.6	302	154
July 27	406	--	38	7.1	45	129	34	57	1.0	278	124
Sept. 21	2,580	--	141	47	339	140	426	512	2.8	1,540	546

## CONCHO RIVER NEAR PAINT ROCK

Apr. 28, 1948	717	76	53	24	48	127	88	99	1.2	401	231
July 27	568	--	44	19	39	123	67	68	2.8	352	188
Sept. 21	868	--	58	29	71	144	110	132	.0	558	266

## PECAN BAYOU NEAR BROWNWOOD

Apr. 28, 1948	431	76	46	8.9	25	152	22	41	0.0	258	151
July 27	697	--	88	15	37	293	51	49	.8	415	281
Sept. 21	548	--	70	11	23	230	29	37	.2	312	220

## SAN SABA RIVER NEAR SAN SABA

Apr. 28, 1948	516	76	53	29	11	294	10	15	2.2	310	252
July 27	443	--	51	20	13	252	12	13	1.2	256	210
Sept. 21	552	--	61	24	17	256	21	38	2.2	318	250

## LLANO RIVER NEAR LLANO

Apr. 28, 1948	353	72	33	17	14	177	9.5	19	0.8	214	152
July 27	355	--	40	16	9.3	182	11	16	3.5	215	166
Sept. 21	311	--	37	14	8.5	176	8.2	10	1.8	184	150

## PEDERNALES RIVER NEAR JOHNSON CITY

Apr. 28, 1948	443	70	41	20	20	210	13	29	1.2	285	185
July 27	522	--	38	29	25	235	15	42	1.2	294	214
Sept. 21	764	--	38	42	53	246	30	106	.8	429	268

NUECES RIVER BASIN  
NUECES RIVER NEAR MATHIS, TEX.

LOCATION.--At gaging station at bridge on U. S. Highway 59 (renumbered) 200 feet downstream from Texas and New Orleans Railroad bridge, 0.8 mile downstream from Lake Corpus Christi Dam, and 4 miles southwest of Mathis, San Patricio County.

DRAINAGE AREA.--16,660 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1948.

Water temperatures: October 1947 to September 1948.

EXTREMES, 1947-48.--Dissolved solids: Maximum, 548 parts per million, June 1-30; minimum, 244 parts per million July 7-31.

Total hardness: Maximum, 194 parts per million July 1-6; minimum, 128 parts per million Oct. 1-31.

Water temperatures: Maximum, 94° F. July 27; minimum, 38° F. Jan. 31.

REMARKS.--Records of water discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1118. Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Per-cent sodium
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
Oct. 1-31, 1947-----	83.0	79	8.1	510	17	0.05	40	6.7	56	9.6	168	41	56	0.4	0.8		322	0.44	72	128	0	52
Nov. 1-30-----	65.2	67	--	531	--	--	48	6.1	59		177	36	60	--	2.0		334	.45	59	140	0	48
Dec. 1-31-----	32.6	60	--	616	--	--	52	6.2	68		188	40	76	--	5		378	.51	33	156	2	49
Jan. 1-31, 1948-----	39.7	52	--	663	--	--	50	6.9	80		193	42	90	--	2		403	.55	43	154	0	53
Feb. 1-29-----	30.3	55	--	685	16	--	51	6.6	83		188	44	96	--	2		412	.56	34	154	0	54
Mar. 1-31-----	31.0	64	--	686	20	--	53	6.4	80		192	44	92	--	5		412	.56	34	159	1	52
Apr. 1-30-----	37.3	75	--	764	18	--	57	7.2	88		201	49	105	--	5		438	.60	44	172	8	53
May 1-31-----	39.3	--	--	818	23	--	59	7.1	101		212	54	117	--	5		484	.66	51	176	2	55
June 1-30-----	43.7	83	--	940	20	--	61	8.1	122		218	61	147	--	8		548	.75	65	186	7	59
July 1-31-----	1,349	87	--	913	22	--	56	13	113		194	63	152	--	8		526	.72	1,920	194	34	56
Aug. 1-31-----	1,132	86	--	429	22	--	41	3.2	43		162	29	38	--	1.2		246	.33	746	174	41	43
Sept 1-30-----	135	81	--	420	29	00	44	4.9	35	12	180	28	28	.1	0.44		272	.37	34	150	0	41
Weighted average -	148	--	--	554	--	--	46	6.8	62		174	38	66	--	1.0		325	0.44	130	143	0	49

## NUECES RIVER BASIN--Continued

## NUECES RIVER NEAR MATHIS, TEX.--Continued

Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	--	76	63	--	43	67	67	76	84	82	83	--
2	--	73	65	--	--	67	--	77	84	82	85	--
3	--	74	68	55	45	63	64	82	--	82	85	84
4	79	75	69	58	46	65	78	81	84	82	85	86
5	--	75	--	56	--	67	75	83	84	84	--	86
6	--	75	67	57	51	57	75	--	83	83	85	85
7	80	83	69	58	51	76	76	80	85	83	86	85
8	80	70	69	--	50	63	--	81	86	83	87	83
9	--	69	65	--	47	64	76	81	87	85	86	--
10	79	72	63	60	49	64	78	81	--	85	88	79
11	--	68	--	60	58	--	80	--	84	84	87	79
12	--	67	--	63	--	50	80	--	84	85	--	81
13	78	65	54	59	49	53	76	--	84	85	86	80
14	--	68	54	59	51	53	75	--	--	86	86	79
15	80	69	54	60	55	66	76	--	81	--	86	82
16	--	69	58	55	58	63	77	--	83	85	--	--
17	80	65	55	52	62	62	76	--	--	84	84	80
18	--	63	56	50	64	--	76	--	--	86	83	--
19	80	62	55	48	--	69	--	--	84	--	--	79
20	--	62	64	50	57	74	74	--	84	84	86	80
21	--	65	57	52	54	74	77	--	83	83	82	79
22	79	62	55	--	55	65	--	67	82	--	82	78
23	78	60	58	48	59	66	--	77	82	85	--	--
24	--	60	57	49	57	71	75	77	82	84	82	81
25	78	61	--	47	65	--	75	78	82	93	81	79
26	--	62	56	--	65	--	73	77	82	93	--	76
27	79	61	55	42	--	66	73	--	82	94	--	77
28	--	63	56	39	62	67	75	--	82	83	81	78
29	78	63	--	--	65	--	--	79	82	86	--	77
30	--	62	55	43	--	66	--	80	80	--	80	--
31	80	--	60	38	--	72	--	80	--	84	84	--
Average	79	67	60	--	55	64	--	--	83	84	--	--

RIO GRANDE BASIN  
RIO GRANDE NEAR LOBATOS, COLO.

LOCATION.--Two and one-half miles south of La Sauses, Conejos County, 7 miles downstream from Conejos River and 11 miles upstream from gaging station which is 7 miles downstream from Culebra Creek and 10 miles east of Lobatos, Conejos County.

DRAINAGE AREA.--7,700 square miles above gaging station, including 2,940 square miles in closed basin.

RECORDS AVAILABLE.--October 1946 to September 1948.

EXTREMES, 1947-48.--Dissolved solids: Maximum, 691 parts per million July 21-31; minimum, 134 parts per million June 11-20.

Total hardness: Maximum, 306 parts per million July 21-31; minimum, 60 parts per million June 11-20.

EXTREMES, 1946-48.--Dissolved solids: Maximum, 691 parts per million July 21-31, 1948; minimum, 104 parts per million May 2-10, 1947.

Total hardness: Maximum, 306 parts per million July 21-31, 1948; minimum, 56 parts per million May 2-10, 1947.

REMARKS.--Discharge records for gaging station near Lobatos, Colo., for water year October 1947 to September 1948 given in Water-Supply Paper 1118.

No appreciable inflow between sampling point and gaging station except during periods of heavy local rains. Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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>	
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate
Oct. 1-10, 1947 ----	130	7.9		464	30	0.04	44	9.8	39	5.2	142	100	13	0.6	2.0	0.1	314	0.43	110	150	34
Oct. 11-20 ----	175	7.9		438	31	.11	40	8.8	41	5.2	141	90	13	.6	2.3	.1	302	.41	143	136	20
Oct. 21-26, 28-31 --	179	7.9		413	31	.06	40	9.1	34	4.4	138	83	12	.6	1	.1	282	.38	136	138	24
Nov. 1-4, 7-10 ----	254	8.0		357	32	.04	34	8.2	26	5.2	118	69	8.5	.4	1.9	.1	243	.33	167	118	27
Nov. 11-20 ----	439	7.9		264	31	.04	28	6.1	17	3.8	103	40	6.0	.2	1.9	.1	185	.25	219	95	10
Nov. 21-30 ----	342	7.9		277	33	.03	29	6.0	19	4.0	108	42	6.0	.4	1.6	.1	194	.26	179	97	8
Dec. 1-10 ----	302	8.0		286	36	.03	30	6.9	19	4.2	114	42	6.0	.4	1.6	.1	202	.27	165	104	10
Dec. 11-20 ----	302	7.9		273	38	.03	30	5.9	16	4.0	110	39	5.5	.4	1.7	.1	195	.27	159	100	10
Dec. 21-31 ----	331	7.8		255	36	.03	27	4.7	16	4.0	101	34	5.5	.4	1.7	.1	179	.24	160	87	4
Jan. 1-10, 1948 ----	320	7.7		229	33	.02	24	5.4	14	3.2	91	30	5.2	.3	1.9	.1	162	.22	140	82	8
Jan. 11-20 ----	317	7.7		229	36	.02	26	5.2	14	3.6	97	29	5.5	.3	1.6	.1	169	.23	145	86	7
Jan. 21-31 ----	270	7.7		222	35	.02	24	5.0	13	3.4	90	28	4.8	.3	1.5	.1	159	.22	116	80	7
Feb. 1-10 ----	244	7.7		209	34	.02	22	4.7	13	3.4	93	24	4.5	.3	1.4	.1	153	.21	101	74	0
Feb. 11-20 ----	308	7.7		207	33	.03	22	4.5	13	3.4	88	25	4.2	.5	1.5	.1	150	.20	125	74	2
Feb. 21-29 ----	361	7.5		303	32	.04	29	6.6	22	5.3	110	48	7.5	.4	1.6	.1	207	.28	202	100	10
Mar. 1-10 ----	370	7.7		294	29	.03	30	6.6	21	5.3	110	46	6.5	.4	1.4	.1	200	.27	200	102	12
Mar. 11-20 ----	518	7.7		314	28	.07	31	6.7	23	5.1	114	51	8.8	.5	1.3	.1	212	.29	297	105	12
Mar. 21-31 ----	778	7.7		341	26	.06	32	7.0	28	6.5	119	59	10	.5	1.2	.1	229	.31	461	109	12
Apr. 2-10 ----	810	7.7		276	25	.04	30	6.5	20	3.8	104	46	8.5	.5	1.4	.1	193	.26	422	102	16
Apr. 11-20 ----	1,317	7.5		220	23	.02	22	5.1	13	3.4	82	32	6.0	.3	1.4	.1	147	.20	523	76	9
Apr. 21-30 ----	2,102	7.3		209	23	.02	20	4.6	12	3.5	76	32	8.5	.3	1.3	.1	135	.18	766	69	26
May 1-10 ----	2,053	7.0		224	21	.04	22	3.6	14	3.4	76	36	7.2	.3	.9	.1	146	.20	820	72	16
May 11-20 ----	699	7.0		266	23	.04	28	6.8	20	3.5	89	37	7.8	.3	.9	.1	191	.26	871	98	25
May 21-31 ----	5,974	7.0		224	20	.03	21	4.6	16	2.9	70	41	6.0	.4	.7	.1	147	.20	2,370	72	14

June 1-10 -----	6,834	7.3	209	26	.03	19	4.2	16	4.6	72	32	7.2	.4	1.1	.1	146	-20	2,690	65	6	33
June 11-20 -----	4,560	7.3	195	24	.03	17	4.1	15	4.5	66	29	6.2	.4	1.1	.1	134	-18	1,650	60	6	33
June 21-29 -----	1,162	7.2	266	23	.02	24	5.4	21	6.1	90	45	7.8	.4	.8	.1	178	-24	558	82	8	34
July 2-7 -----	1,583	8.0	257	24	.09	24	5.4	21	5.8	94	44	6.2	.4	.7	.1	178	-24	280	82	5	34
July 8-10 -----	379	7.8	624	28	.02	62	10	53	9.0	150	163	20	.5	.8	.1	420	-57	430	196	72	36
July 11-20 -----	117	7.7	809	30	.02	76	13	75	9.8	171	237	26	.8	.4	.1	552	-75	174	243	103	39
July 21-31 -----	76.5	7.4	1,010	36	.02	90	20	97	5.8	181	318	33	.9	1.1	.1	691	-94	143	306	158	40
Aug. 1-10 -----	69.1	7.4	793	39	.02	72	16	72	6.0	169	218	26	.7	1.2	.1	534	-73	100	246	107	38
Aug. 11-20 -----	60.6	7.5	590	39	.02	53	12	52	5.6	150	141	18	.6	1.2	.1	396	-54	165	182	58	37
Aug. 21-31 -----	49.1	7.4	589	41	.02	52	12	52	7.8	152	144	18	.7	.5	.1	403	-55	53	179	54	37
Sept. 1-10 -----	38.0	7.8	571	38	.01	50	12	52	7.4	158	132	19	.7	.8	.1	390	-53	40	174	45	38
Sept. 11-20 -----	34.8	7.9	523	38	.01	48	11	48	7.2	153	117	17	.7	.9	.1	360	-49	34	158	32	39
Sept. 21-30 -----	43.2	7.9	523	39	.03	48	11	46	7.8	157	112	18	.7	.6	.1	360	-49	42	165	36	36
Weighted average -	934	--	243	25	0.03	23	5.2	18	4.1	82	41	6.9	0.4	1.1	0.1	165	0.22	416	79	12	32

## 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 (includes 2,940 square miles in closed basin in northern part of San Luis Valley, Colo.).

RECORDS AVAILABLE.--Sediment records: January to September 1948.

EXTREMES, 1947-48.--Sediment loads: Maximum, 51,000 tons per day May 25; minimum, no flow on many days.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1118.

Suspended sediment, water year October 1947 to September 1948

Day	January			February			March		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day
1-----	540	--	1/0	545	0	0	872	0.01	189
2-----	520	--		530			764		
3-----	535	--		550			734		
4-----	535	--		560			716		
5-----	545	--		570			600		
6-----	555	--	1/0	565	0	0	620	0.01	189
7-----	555	--		575			660		
8-----	565	--		570			690		
9-----	575	--		535			670		
10-----	575	--		575			656		
11-----	585	--	0	565	.01	150	635	.02	431
12-----	580	--		530			625		
13-----	560	--		488			660		
14-----	550	0		530			710		
15-----	555	0		560			720		
16-----	560	0	0	550	.01	150	750	.02	431
17-----	550			560			830		
18-----	570			560			1,040		
19-----	550			590			970		
20-----	520			640			1,040		
21-----	525	.01	145	662	.01	179	1,040	.03	927
22-----	555			692	.02	374	1,000		
23-----	565			782	.02	422	1,000		
24-----	570			800	.01	216	1,160		
25-----	565			740	.01	200	1,420		
26-----	570	.01	145	686	.01	119	1,240	.03	927
27-----	535			716			1,200		
28-----	452			776			1,160		
29-----	444			770			1,160		
30-----	550			--	--	--	1,120		
31-----	550			--	--	--	1,080		
Total -	16,961	--	1,450	17,772	--	3,690	27,562	--	16,400

1/Estimated or interpolated.

RIO GRANDE BASIN--Continued  
 RIO GRANDE AT EMBUDO, N. MEX.--Continued  
 Suspended sediment, water year October 1947 to September 1948--Continued

Day	April			May			June		
	Mean discharge (second-foot)	Mean concentration (percent)	Tons per day	Mean discharge (second-foot)	Mean concentration (percent)	Tons per day	Mean discharge (second-foot)	Mean concentration (percent)	Tons per day
1-----	1,089	0.02	616	2,740	0.06	4,440	6,270	0.05	8,460
2-----	1,120			3,120	.06	5,050	6,720	.05	10,900
3-----	1,080			3,360	.06	5,440	7,340	.06	11,900
4-----	1,080			3,240	.04	3,500	7,960	.06	12,900
5-----	1,120			3,010	.02	1,530	8,140	.07	15,400
6-----	1,160	0.02	616	2,790	.03	2,260	8,820	.08	19,100
7-----	1,190			2,790	.03	2,260	9,870	.09	24,000
8-----	1,100			3,010	.02	1,630	9,870	.07	16,700
9-----	1,200			3,120	.04	3,370	9,160	.06	14,600
10-----	1,240			3,120	.03	2,530	8,310	.05	11,200
11-----	1,280	.04	1,380	2,740	.02	1,480	7,630	.05	10,300
12-----	1,370	.04	1,480	2,190	.02	1,180	7,020	.04	7,560
13-----	1,550	.02	2,930	1,740	.01	470	6,670	.05	9,270
14-----	1,600	.06	2,590	1,460	.01	394	6,870	.04	7,420
15-----	1,600	.06	2,590	1,320	.01	356	6,720	.04	7,260
16-----	1,500	.04	1,620	1,500	.02	810	6,120	.04	6,610
17-----	1,600	.05	2,160	1,990	.02	1,070	5,560	.03	4,500
18-----	1,840	.10	4,970	2,790	.02	1,510	4,500	.04	4,860
19-----	2,350	.14	8,860	3,360	.04	3,630	3,320	.03	2,690
20-----	2,900	.15	11,700	4,200	.08	9,070	3,210	.02	2,730
21-----	3,240	.11	9,620	4,970	.13	17,400	3,100	.02	1,670
22-----	3,600	.14	13,600	5,660	.18	27,500	2,880	.02	1,560
23-----	3,960	.12	12,800	5,260	.12	20,300	2,530	.01	458
24-----	3,960	.08	8,550	7,190	.15	29,100	2,230		
25-----	3,480	.06	5,640	8,990	.21	51,000	2,000		
26-----	2,900	.04	3,130	9,690	.12	31,400	1,730	.01	458
27-----	2,400	.04	2,590	10,000	.11	29,700	1,480		
28-----	2,140	.03	1,730	9,330	.07	17,600	1,320		
29-----	2,090	.03	1,690	8,310	.06	13,500	1,160	.01	458
30-----	2,300	.03	1,860	7,180	.05	9,690	1,120		
31-----	--	--	--	6,420	.05	8,670	--	--	--
Total -	59,060	--	107,700	137,590	--	307,900	159,880	--	217,500
Day	July			August			September		
	Mean discharge (second-foot)	Mean concentration (percent)	Tons per day	Mean discharge (second-foot)	Mean concentration (percent)	Tons per day	Mean discharge (second-foot)	Mean concentration (percent)	Tons per day
1-----	1,160	0.01	255	303	0.02	164	277	0.01	73
2-----	1,020			330	.01	89	265	.01	69
3-----	950			344	.04	372	257		
4-----	985			316	.01	85	241	.01	64
5-----	1,020			538	1.02	13,400	241		
6-----	985	0.01	255	450	.16	1,940	241	.01	64
7-----	915			398	.14	1,500	237		
8-----	859			380	.04	410	237		
9-----	810			370	.01	100	237	.01	64
10-----	726			348	.01	94	237		
11-----	666	0	0	348	.01	94	241	0	0
12-----	588			348	.01	94	241		
13-----	520			348	.01	94	241		
14-----	470			326	.01	88	241	0	0
15-----	420			312	.01	84	241		
16-----	406	.20	2,880	298	0	0	245	0	0
17-----	384			285	0	0	245		
18-----	370			281	.01	76	245		
19-----	393			290	.08	626	245	0	0
20-----	534			290	.01	78	249		
21-----	388	.07	733	294	0	0	249	0	0
22-----	384	.01	104	285	0	0	249		
23-----	375	.01	101	285	0	0	249		
24-----	388	.02	210	290	.01	75	249	0	0
25-----	375	.01	101	294			261		
26-----	384	.01	104	290	.01	75	294		
27-----	366	.01	99	285			294		
28-----	339	.01	92	269			294	0	0
29-----	321	--	1/87	265	.01	75	294		
30-----	312	.01	84	261			265	0	0
31-----	303	.01	82	265			--		
Total -	18,116	--	7,230	9,986	--	22,990	7,602	--	666

Total discharge for period Jan. 1 to Sept. 30 (second-foot-days) ----- 454,529  
 Total load for period Jan. 1 to Sept. 30 (tons) ----- 685,500

1/ Estimated or interpolated.

## RIO GRANDE BASIN--Continued

## RIO GRANDE AT EMBUDO, N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948

(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	Time	Mean discharge (second-foot)	Mean daily concentration (percent)	Weight of material in tube (grams)	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	0.500	1.000	2.000	
Mar. 20, 1948	8:25 a.m.	1,040	0.02	0.1988	--	--	--	--	--	59	78	92	97		S	
Apr. 1	8:00 a.m.	1,080	.02	.0664	--	--	--	--	--	52	68	82	92		S	
Apr. 11	6:40 p.m.	1,280	.04	.1463	--	--	--	--	--	60	75	87	96		S	
Apr. 30	4:00 p.m.	2,300	.03	.0938	--	--	--	--	--	65	82	95	100		S	
May 20	8:30 a.m.	4,200	.08	.2293	--	--	--	--	--	52	71	89	99		S	
May 24	8:00 a.m.	7,190	.15	.4076	--	--	--	--	--	46	61	76	95		S	
May 24	4:05 p.m.	7,190	.15	.5132	--	--	--	--	--	46	66	86	98		S	
May 30	7:180	7,180	.05	.1663	--	--	--	--	--	37	56	79	95		S	
June 10	12:45 p.m.	8,310	.05	.2574	--	--	--	--	--	15	23	35	67		S	
June 20	1:00 p.m.	8,310	.05	.2574	--	--	--	--	--	15	23	35	67		S	
June 20	8:05 a.m.	3,210	.02	.0661	--	--	--	--	--	74	88	96	99		S	
July 1	8:30 a.m.	1,160	.01	.0190	--	--	--	--	--	69	89	95	98		S	
July 20	8:05 a.m.	534	.20	.0453	10	12	31	41	--	--	--	--	--		DN	
Aug. 3	8:15 p.m.	344	.04	.3559	2	12	45	71	--	--	--	--	--		DN	
Aug. 5	8:30 a.m.	538	1.02	4.9489	26	41	59	76	91	93	99	100	--		BSWCM	
Aug. 6	8:30 p.m.	450	.16	.3629	2	10	54	81	--	--	--	--	--		DN	
Aug. 10	9:15 a.m.	380	.01	.0360	5	9	32	68	--	--	--	--	--		DN	



RIO GRAND BASIN--Continued  
RIO GRANDE AT OTOWI BRIDGE NEAR SAN ILDEFONSO, N. MEX.

LOCATION.--At gaging station 250 feet downstream from new bridge on State Highway 4, 13 miles southwest of San Ildefonso Pueblo, Santa Fe County, 2.2 miles downstream from Rio Pojoaque and 7 miles west of Pojoaque, Santa Fe County.  
DRAINAGE AREA, 14,300 square miles, including 2,940 square miles in closed basin in northern part of San Luis Valley, Colo.  
RECORDS AVAILABLE.--Chemical analyses: October 1946 to September 1948.

Sediment records: October 1947 to September 1948.

EXTREMES, 1947-48.--Dissolved solids: Maximum, 300 parts per million Oct. 11-20; minimum, 149 parts per million May 1-10.

Total hardness: Maximum, 171 parts per million Oct. 11-20; minimum, 88 parts per million May 1-10.

Sediment loads: Maximum, 86,000 tons per day May 27; minimum, 65 tons per day Sept. 21-22.

EXTREMES, 1946-48.--Dissolved solids: Maximum, 462 parts per million Aug. 15, 18-20, 1947; minimum, 149 parts per million May 1-10, 1948.

Total hardness: Maximum, 274 parts per million Aug. 15, 18-20, 1947; minimum, 88 parts per million May 1-10, 1948.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1118. Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-foot)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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 non-carbonate
																	Parts per million	Tons per acre-foot	Tons per day	Total		
Oct. 1-10, 1947	603	8.0	8.0	409	27	0.04	50	9.2	26	2.0	144	81	13	0.5	1.1	0.1	281	0.38	457	163	45	35
Oct. 11-20	678	8.0	8.0	449	31	0.05	53	9.5	30	2.6	169	79	10	.5	.9	.1	300	.41	549	171	32	27
Oct. 21-31	770	8.0	8.0	382	26	0.04	45	8.6	22	2.6	141	70	8.0	.4	.8	.1	251	.34	522	148	32	24
Nov. 1-10	1,554	8.0	8.0	365	22	0.05	47	8.5	18	2.4	129	73	6.0	.4	.8	.1	244	.33	1,020	152	47	20
Nov. 11-20	2,030	8.0	8.0	302	26	0.08	38	8.6	16	1.6	112	59	7.0	.4	.8	.1	213	.29	1,170	130	38	21
Nov. 21-30	1,956	8.0	8.0	308	21	0.08	37	9.1	16	2.6	114	62	4.0	.4	.8	.1	209	.28	1,100	136	36	21
Dec. 1-10	1,843	7.6	7.6	333	23	0.02	38	9.3	17	2.0	113	67	4.5	.4	.9	.1	218	.30	1,080	133	40	21
Dec. 11-20	1,176	7.7	7.7	370	30	0.02	42	10	23	2.6	131	70	5.5	.4	1.0	.1	247	.34	784	146	38	23
Dec. 21-31	653	7.8	7.8	340	32	0.02	38	7.5	23	2.6	142	47	7.0	.4	.8	.1	228	.31	402	126	10	28
Jan. 1-10, 1948	656	7.8	7.8	328	30	0.03	36	6.6	21	2.0	137	43	6.5	.4	.8	.1	214	.29	379	117	4	38
Jan. 11-18	643	7.7	7.7	323	34	0.02	36	8.1	21	3.2	136	44	8.0	.6	1.0	.1	223	.30	387	134	12	26
Jan. 21-31	604	7.8	7.8	367	33	0.02	36	8.1	22	2.8	136	46	8.2	.5	1.1	.1	225	.31	367	124	12	27
Feb. 1-6, 9-10	632	7.9	7.9	326	33	0.02	35	7.9	22	2.6	136	45	7.8	.5	.9	.1	222	.30	379	120	8	28
Feb. 12-19	693	7.8	7.8	322	34	0.03	35	8.3	22	2.8	136	44	7.8	.5	1.0	.1	222	.30	379	122	10	28
Feb. 21-23, 26-29	1,076	7.8	7.8	387	24	0.03	42	9.6	27	4.2	143	69	10	.7	1.6	.1	259	.35	752	144	28	28
Mar. 1-10	855	7.8	7.8	360	26	0.04	40	9.1	27	3.6	139	60	13	.6	1.2	.1	249	.34	575	138	24	29
Mar. 11-15, 17-20	924	8.0	8.0	371	31	0.02	40	9.1	22	3.4	140	62	7.0	.5	1.2	.1	245	.33	611	138	23	25
Mar. 21-31	1,363	7.9	7.9	358	26	0.02	38	8.0	24	3.4	129	62	8.0	.5	1.6	.1	235	.32	865	128	22	28
Apr. 1-10	1,551	7.9	7.9	364	26	0.02	39	7.8	25	3.8	134	63	9.0	.5	1.3	.1	241	.33	1,010	130	20	29
Apr. 11-20	2,993	8.0	8.0	317	21	0.03	38	7.3	16	3.0	116	57	5.5	.5	1.4	.1	207	.28	1,670	125	30	22
Apr. 21-30	4,066	7.9	7.9	270	22	0.04	36	4.7	11	1.4	118	30	3.8	.2	2.2	--	169	.23	1,860	110	13	18
May 1-10	3,718	8.0	8.0	224	22	0.06	28	4.5	11	1.8	97	28	4.2	.2	1.0	--	149	.20	1,500	88	9	21
May 11-20	2,777	7.9	7.9	254	23	0.06	30	5.3	14	1.8	103	37	5.5	.2	1.2	--	169	.23	1,870	97	12	23
May 21-31	8,477	7.9	7.9	254	23	0.12	33	3.9	15	2.2	110	32	4.5	.2	1.7	--	170	.23	3,890	98	8	24

RIO GRANDE BASIN--Continued  
RIO GRANDE AT OTOWI BRIDGE NEAR SAN ILDEFONSO, N. MEX.--Continued

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued												Dissolved solids		Hardness as CaCO <sub>3</sub>		Per-cent so-dium	
					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> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> ) (B)	Bo-ron (B)	Parts per million	Tons per acre-foot	Tons per day	Total		Non-carbonate
June 1-10, 1948-----	9,522	7.9		251	19	0.05	32	4.4	13	2.2	100	38	4.0	0.2	1.2	0.1	163	0.22	4,190	98	16	22
June 11-20-----	6,620	7.5		237	20	.02	29	4.4	13	4.6	99	34	3.5	.3	.8	.1	156	.21	2,820	90	10	23
June 21-30-----	2,465	7.7		296	23	.01	34	5.6	19	4.8	115	48	5.8	.4	.9	.1	198	.27	1,320	108	14	27
July 1-10-----	1,080	8.0		353	29	.00	36	7.7	25	6.2	132	61	8.0	.5	.7	.1	239	.33	697	122	14	30
July 11-16, 16-20-----	1,777	8.0		374	32	.01	40	8.6	28	3.8	141	67	8.5	.5	.8	.1	259	.35	543	136	20	30
July 21-31-----	845	7.7		336	26	.01	38	7.5	20	3.2	126	56	5.5	.5	.8	.1	220	.30	502	126	23	25
Aug. 1-10-----	938	7.7		378	23	.02	45	7.9	22	3.2	143	66	5.0	.5	1.0	.1	244	.33	618	145	28	24
Aug. 11-20-----	660	7.8		347	22	.02	39	7.5	22	3.2	126	59	6.5	.5	.9	.1	224	.30	399	126	24	27
Aug. 21-31-----	835	7.8		311	19	.03	37	7.3	17	2.4	114	57	4.0	.5	.7	.1	201	.27	453	122	29	23
Sept. 1-10-----	863	8.0		333	20	.01	36	8.1	18	3.0	120	55	6.0	.5	.7	.1	206	.28	480	124	25	23
Sept. 11-20-----	298	8.0		402	30	.01	44	9.3	26	3.8	156	65	11	.8	.6	.1	269	.37	216	148	20	49
Sept. 21-30-----	278	8.0		421	33	.01	44	9.1	32	4.2	164	66	11	.8	.6	.1	262	.38	212	148	13	31
Weighted average----	1,876	--		293	23	0.05	35	6.2	17	2.8	116	46	5.5	0.3	1.2	0.1	194	0.26	983	113	18	18

## RIO GRANDE BASIN

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## RIO GRANDE BASIN--Continued

## RIO GRANDE AT OTOWI BRIDGE NEAR SAN ILDEFONSO, N. MEX.--Continued

Suspended sediment, water year October 1947 to September 1948

Day	October			November			December		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	333	--	--	810	0.34	7,440	1,940	0.30	15,700
2-----	330	--	--	830	.33	7,400	1,940	.30	15,200
3-----	326	--	--	950	.60	19,700	2,060	.32	17,800
4-----	316	--	--	1,780	1.36	65,400	4,940	.27	14,100
5-----	319	--	--	1,780	.92	44,200	1,890	.29	14,800
6-----	830	--	--	1,780	.86	41,300	1,840	.26	12,900
7-----	879	--	--	1,890	.70	35,700	1,780	.28	13,500
8-----	907	--	--	1,940	.66	34,600	1,730	.28	13,100
9-----	900	--	--	1,890	.61	31,100	1,680	.18	8,160
10-----	893	--	--	1,890	.64	32,700	1,630	.12	5,280
11-----	724	--	--	1,940	.62	32,500	1,630	.18	7,920
12-----	476	--	--	2,000	.58	31,300	1,580	.32	13,700
13-----	432	--	--	2,000	.53	28,600	1,480	.28	11,200
14-----	1,530	--	--	2,000	.53	28,600	1,480	.26	10,400
15-----	942	--	--	2,060	.44	24,500	1,300	.22	7,720
16-----	623	--	--	2,060	.49	27,300	1,130	.22	6,710
17-----	505	--	--	2,060	.45	25,000	1,030	.19	5,280
18-----	476	--	--	2,060	.47	26,100	747	.14	2,820
19-----	525	--	--	2,060	.47	26,100	700	.15	2,840
20-----	550	--	--	2,060	.46	22,800	680	.15	2,750
21-----	510	--	--	2,060	.38	21,100	660	.14	2,490
22-----	647	--	--	1,940	.45	23,600	640	.14	2,420
23-----	798	0.56	12,100	1,940	.46	24,100	638	.14	2,370
24-----	817	--	11,700	1,840	.43	21,400	601	.11	1,780
25-----	817	--	10,600	1,890	.43	21,900	623	.11	1,850
26-----	817	--	9,490	1,890	.42	21,400	645	.12	2,090
27-----	810	--	8,310	1,940	.41	21,500	645	.09	1,570
28-----	810	.32	7,000	2,000	.36	19,400	645	.09	1,570
29-----	810	.37	8,100	2,060	.28	15,600	663	.10	1,790
30-----	824	.36	8,010	2,000	.36	19,400	699	.10	1,890
31-----	810	.34	7,440	--	--	--	735	.13	2,580
Total -	21,286	--	305,000	55,400	--	801,800	37,371	--	224,800
Day	January			February			March		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	693	0.12	2,250	590	0.14	2,230	1,130	0.23	7,020
2-----	612	.12	1,980	570	.08	1,230	1,000	.14	3,780
3-----	628	.18	3,050	601	.07	1,140	893	.12	2,890
4-----	628	.12	2,030	645	.11	1,920	914	.12	2,960
5-----	630	.13	2,210	663	.10	1,790	772	.10	2,080
6-----	634	.10	1,710	645	.08	1,390	645	.07	1,220
7-----	675	.10	1,820	687	--	1,670	772	.09	1,880
8-----	675	.09	1,640	669	--	1,810	810	.10	2,190
9-----	687	.11	2,040	618	.11	1,840	804	.10	2,170
10-----	693	--	2,250	634	.09	1,540	810	.11	2,410
11-----	693	.12	2,250	657	--	1,600	753	.12	2,440
12-----	693	.13	2,430	550	.09	1,340	759	.09	1,840
13-----	663	.17	3,040	515	.06	834	747	.09	1,820
14-----	640	.13	2,250	560	.06	907	791	.10	2,140
15-----	640	.14	2,420	601	.08	1,300	844	.11	2,510
16-----	628	.12	2,030	618	.11	1,840	872	.08	1,880
17-----	628	.13	2,200	640	.19	3,280	886	.09	2,150
18-----	623	.12	2,020	663	.08	1,430	1,170	.20	6,320
19-----	645	--	2,090	729	.10	1,970	1,210	.30	9,800
20-----	580	--	1,720	798	.17	3,660	1,210	.23	7,510
21-----	565	.10	1,530	956	.19	4,900	1,170	.16	5,050
22-----	623	.13	2,190	1,090	--	6,470	1,130	.10	3,050
23-----	651	.11	1,930	1,170	.25	7,900	1,130	.10	3,050
24-----	663	.15	2,690	1,260	--	7,480	1,300	.14	4,910
25-----	663	.13	2,330	1,050	--	5,670	1,580	.23	9,810
26-----	663	.11	1,970	1,030	.16	4,450	1,530	.30	12,400
27-----	618	.12	2,000	1,040	.20	5,620	1,440	.20	7,780
28-----	500	.08	1,080	1,040	.18	5,050	1,390	.16	6,000
29-----	486	.05	656	1,050	.23	6,520	1,440	.16	6,220
30-----	575	.10	1,550	--	--	--	1,440	.14	5,440
31-----	634	.11	1,880	--	--	--	1,440	.13	5,050
Total -	19,629	--	63,230	22,339	--	88,780	32,782	--	135,800

## WESTERN GULF OF MEXICO BASINS

## RIO GRANDE BASIN--Continued

## RIO GRANDE AT OTOWI BRIDGE NEAR SAN ILDEPONSO, N. MEX.--Continued

Suspended sediment, water year October 1947 to September 1948--Continued

Day	April			May			June		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	1,390	0.16	6,000	3,690	0.31	30,900	7,260	0.14	27,400
2-----	1,340	.14	5,070	3,850	.22	22,900	7,730	.19	39,700
3-----	1,390	.13	4,880	4,090	.26	28,700	8,460	.21	48,000
4-----	1,440	.14	5,440	3,930	.26	27,600	8,970	.18	43,600
5-----	1,440	.16	6,220	3,850	.25	26,000	9,490	.16	41,000
6-----	1,580	.21	8,960	3,540	.24	22,900	9,760	.17	44,800
7-----	1,630	.18	7,920	3,540	.16	15,300	10,900	.18	53,000
8-----	1,630	.20	8,800	3,540	.18	17,200	11,800	.25	79,600
9-----	1,730	.24	11,200	3,610	.13	12,700	10,900	.15	44,100
10-----	1,940	.28	14,700	3,540	.18	17,200	9,950	.14	37,600
11-----	2,230	.48	28,900	3,310	.14	12,500	8,980	.15	36,400
12-----	2,290	.33	20,400	2,740	.16	11,800	8,290	.15	33,600
13-----	2,290	.24	14,800	2,230	.14	8,430	7,630	.15	30,900
14-----	2,290	.24	14,800	2,000	.13	7,020	7,630	.15	30,900
15-----	2,940	.67	49,600	1,840	.12	5,960	7,420	.14	28,000
16-----	2,950	.44	35,000	2,000	.12	6,480	7,000	.14	26,500
17-----	3,160	.46	39,200	2,350	.13	8,250	6,200	.12	20,100
18-----	3,540	.50	47,800	3,090	.16	13,300	5,260	.13	18,500
19-----	4,010	.50	54,100	3,690	.19	18,900	4,130	.16	17,800
20-----	4,430	.45	53,800	4,520	.23	28,100	3,660	.20	19,800
21-----	4,790	.42	54,300	5,160	.26	36,200	3,500	.14	13,200
22-----	4,880	.41	54,000	5,750	.26	40,400	3,360	.12	10,900
23-----	5,160	.36	50,200	6,370	.28	48,200	3,210	.14	12,100
24-----	4,970	.28	37,600	6,810	.27	49,600	3,000	.15	12,200
25-----	4,930	.26	31,100	8,460	.29	66,200	2,730	.10	7,370
26-----	3,770	.30	30,500	10,600	.28	80,100	2,240	.08	4,840
27-----	3,310	.24	21,400	11,800	.27	86,000	1,960	.06	3,180
28-----	2,950	.18	14,300	11,800	.22	70,100	1,760	.06	2,850
29-----	3,020	.21	17,100	10,300	.20	55,600	1,510	.04	1,630
30-----	3,380	.24	21,900	8,710	.20	47,000	1,380	.04	1,490
31-----	--	--	--	7,490	.17	34,400	--	--	--
Total -	86,100	--	770,000	158,200	--	955,900	186,070	--	791,100
Day	July			August			September		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1-----	1,420	0.04	1,530	1,120	0.07	2,120	756	0.02	408
2-----	1,240	.04	1,340	1,080	.08	2,330	750	.02	405
3-----	1,080	.04	1,170	953	.03	772	738	.02	399
4-----	1,120	.05	1,510	686	.02	370	805	.04	869
5-----	1,120	.02	605	1,030	.62	16,500	1,240	.10	3,350
6-----	1,120	.04	1,210	1,170	.80	27,000	1,240	.10	3,350
7-----	1,010	.03	818	883	.43	10,300	1,160	.08	2,510
8-----	981	.02	530	877	.19	4,500	680	.04	734
9-----	890	.03	721	844	.75	17,100	652	.02	352
10-----	818	.01	221	738	.28	5,580	609	.02	329
11-----	744	.01	201	721	.06	1,170	469	.15	1,900
12-----	674	.02	364	726	.04	784	370	.02	200
13-----	553	.01	149	738	.03	598	310	.01	84
14-----	483	.01	130	726	.02	392	271	.01	73
15-----	419	.01	113	680	.04	734	271	.02	146
16-----	365	.01	99	660	.02	356	274	.01	74
17-----	1,210	.13	4,250	630	.02	340	274	.01	74
18-----	960	.05	1,300	600	.02	324	256	.01	69
19-----	1,120	.04	1,210	570	.02	308	244	.01	66
20-----	1,240	.12	4,020	544	.03	441	244	.01	66
21-----	1,120	.10	3,020	544	.02	294	240	.01	65
22-----	974	.07	1,840	544	.01	147	240	.01	65
23-----	793	.03	642	1,280	.38	13,100	250	.01	68
24-----	781	.02	422	1,080	.16	4,670	259	.01	70
25-----	805	.02	435	877	.07	1,660	262	.04	283
26-----	844	.06	1,370	850	.05	1,150	284	.01	77
27-----	793	.05	1,070	837	.04	904	303	.01	82
28-----	744	.06	1,210	812	.02	438	344	.07	650
29-----	726	.02	392	799	.04	863	306	.10	826
30-----	686	.02	370	781	.03	633	293	.05	396
31-----	1,030	.08	2,220	781	.04	843	--	--	--
Total -	27,863	--	34,500	25,161	--	116,700	14,394	--	18,040

Total discharge for year (second-foot days) ----- 686,595

Total load for year (tons) ----- 4,306,000

RIO GRANDE BASIN--Continued  
RIO GRANDE AT OTOMI BRIDGE NEAR SAN ILDEFONSO, N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948  
(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	Time	Mean discharge (second-feet)	Suspended sediment										Methods of analysis			
			Mean daily concentration (percent)	Weight of material in tube (grams)	Percent finer than indicated size, in millimeters											
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250		0.500	1.000	2.000
Nov. 1, 1947	4:55 p. m.	810	0.34	1.5405							28	51	81	99		S
Nov. 10	4:35 p. m.	1,890	.64	2.3425							25	54	91	100	100	S
Nov. 20	9:10 a. m.	2,060	.41	2.1239							14	38	83	100	100	S
Dec. 1	5:20 p. m.	1,940	.30	1.3007							12	34	83	100	100	S
Dec. 10	8:30 a. m.	1,630	.12	.4836							19	36	68	99	99	S
Dec. 20	5:00 p. m.	680	.15	.7480							15	35	73	99	99	S
Jan. 1, 1948	3:00 p. m.	693	.12	.6978							8	28	79	100	100	S
Jan. 11	5:10 p. m.	693	.12	.5460							9	21	68	100	100	S
Jan. 21	2:05 p. m.	565	.10	.4806							6	18	73	100	100	S
Feb. 1	5:25 p. m.	590	.14	.5832							12	28	75	99	99	S
Feb. 10	9:40 a. m.	634	.09	.4445							6	21	80	100	100	S
Feb. 20	9:10 a. m.	798	.17	.5653							30	49	83	99	99	S
Mar. 1	8:50 a. m.	1,130	.23	.7019							35	53	83	96	99	S
Mar. 20	8:25 a. m.	1,210	.23	.8438							29	47	68	92	99	S
Mar. 30	8:10 a. m.	1,440	.14	.5112							29	47	76	96	99	S
Apr. 10	7:55 a. m.	1,940	.28	1.0715							37	60	81	99	99	S
Apr. 20	11:10 a. m.	4,430	.45	1.8532							52	76	93	99	99	S
Apr. 30	11:25 a. m.	3,380	.24	.7595							34	54	89	100	100	S
May 10	11:05 a. m.	3,540	.18	.5657							17	29	75	99	99	S
May 20	11:35 a. m.	4,520	.23	.7069							31	53	86	99	99	S
May 26	7:20 p. m.	10,600	.28	.5504							36	55	85	99	99	S
May 27	6:55 p. m.	11,800	.28	1.0945							52	68	91	99	99	S
May 28	1:35 p. m.	11,800	.22	.9043							44	60	87	99	99	S
May 29	12:40 p. m.	10,300	.20	.7742							35	51	77	96	99	S
May 30	9:30 a. m.	8,710	.20	.8662							26	40	68	96	99	S

RIO GRANDE BASIN--Continued  
RIO GRANDE AT OTOWI BRIDGE NEAR SAN ILDEFONSO, N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948.--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	Time	Mean discharge (second-foot)	Suspended sediment										Methods of analysis	
			Mean daily concentration (percent)	Weight of material in tube (grams)	Percent finer than indicated size, in millimeters									
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250		0.500
June 10, 1948--	1:45 a. m.	9,950	0.14	0.5818	--	--	--	--	--	27	49	80	S	
June 20--	8:35 a. m.	3,660	.20	.8002	--	--	--	--	--	20	59	91	S	
July 1--	8:10 a. m.	1,420	.04	.1537	--	--	--	--	--	19	36	84	S	
July 10--	2:50 p. m.	818	.01	.0287	--	--	--	--	--	32	62	72	S	
July 17--	12:00 m.	1,210	.13	.4370	3	9	20	37	63	75	88	99	DS	
July 20--	8:50 a. m.	1,240	.12	.3554	4	14	27	39	67	--	--	--	DN	
July 26--	4:00 p. m.	844	.06	.1937	6	22	47	67	--	--	--	--	DN	
Aug. 1--	7:55 a. m.	1,120	.07	.1636	--	--	--	--	--	58	85	89	S	
Aug. 6--	7:50 a. m.	1,170	.85	.2189	1	16	68	87	--	--	--	--	D	
Aug. 9--	7:05 p. m.	1,844	.68	.3844	0	4	62	96	--	--	--	--	D	
Aug. 10--	7:30 a. m.	738	.28	1.0477	1	1	70	84	--	--	--	--	DN	
Aug. 20--	8:35 a. m.	544	.03	.0855	0	28	52	65	81	--	--	--	DS	
Aug. 23--	4:30 p. m.	1,280	.38	1.3292	0	3	19	28	54	86	--	--	DS	
Aug. 24--	7:05 p. m.	1,080	.16	.8013	2	11	28	54	85	--	--	--	DS	
Sept. 11--	12:10 p. m.	469	.15	.5863	2	6	20	86	--	--	--	--	D	

## RIO GRANDE BASIN--Continued

## RIO GRANDE NEAR BERNALILLO, N. MEX.

LOCATION.--At gaging station in Alameda Grant, 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 Creek.

RECORDS AVAILABLE.--Sediment records: November 1947 to September 1948.

Water temperatures: June to September 1948.

EXTREMES, 1947-48.--Sediment loads: Maximum, 280,000 tons per day June 20; minimum, 0 tons per day Sept. 23.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1118.

## Suspended sediment, water year October 1947 to September 1948

Day	Mean discharge (second-foot)	Suspended sediment		November			December		
		Mean concentration (percent)	Tons per day	Mean discharge (second-foot)	Mean concentration (percent)	Tons per day	Mean discharge (second-foot)	Mean concentration (percent)	Tons per day
1-----				.54	0.49	8,650	1,750	0.26	12,400
2-----				.646	.35	8,100	1,250	.30	15,000
3-----				.750	.40	8,100	1,250	.31	15,500
4-----				1,120	.78	25,700	2,090	.30	16,900
5-----				1,660	1.23	55,100	1,960	.26	13,900
6-----				1,410	.76	28,900	1,960	.46	24,600
7-----				1,000	.74	32,000	2,020	.30	13,400
8-----				1,920	.70	36,300	1,850	.28	14,200
9-----				1,880	.62	31,500	1,760	.27	12,600
10-----				1,880	.58	29,400	1,660	.29	13,000
11-----				1,950	.76	40,000	1,520	.44	19,100
12-----				1,980	.52	27,800	1,410	.25	9,520
13-----				2,090	.64	36,100	1,490	.22	8,850
14-----				1,820	.53	26,000	1,410	.26	9,900
15-----				1,760	.69	32,800	1,380	.33	12,300
16-----				2,020	1.08	58,900	1,160	.22	6,190
17-----				2,060	.37	20,600	1,120	.23	6,960
18-----				1,920	.41	21,300	884	.25	5,970
19-----				2,230	.42	25,300	720	.24	4,670
20-----				2,230	.36	21,700	730	.20	3,940
21-----				1,760	.37	17,600	690	.19	3,540
22-----				1,630	.78	21,100	646	.17	2,970
23-----				1,760	.64	39,900	660	.15	2,750
24-----				1,920	.37	24,400	672	.13	2,360
25-----				1,790	.38	18,400	710	--	1/2,860
26-----				1,850	.28	14,000	700	.18	3,400
27-----				1,950	.59	31,100	654	.15	2,650
28-----				1,950	.42	22,100	620	.12	2,010
29-----				2,090	.33	20,300	638	--	1/1,690
30-----				1,790	.32	15,500	690	.10	1,860
31-----				--	--	--	683	.14	2,510
Total -				52,070	--	796,500	38,017	--	276,600

1/Estimated or interpolated.

## WESTERN GULF OF MEXICO BASINS

## RIO GRANDE BASIN--Continued

## RIO GRANDE NEAR BERNALILLO, N. MEX.--Continued

Suspended sediment, water year October 1947 to September 1948--Continued

Day	January			February			March		
	Mean dis-charge (second-feet)	Suspended sediment		Mean dis-charge (second-feet)	Suspended sediment		Mean dis-charge (second-feet)	Suspended sediment	
		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day
1-----	620	--	1,3,010	654	0.11	1,940	1,050	0.23	6,520
2-----	580	0.22	3,450	710	.19	3,640	1,250	.32	10,800
3-----	600	.23	3,730	750	.24	4,860	1,180	.26	8,260
4-----	660	.15	2,670	760	.22	4,510	990	.27	7,220
5-----	710	.17	3,260	780	.16	3,370	632	.23	5,170
6-----	720	.11	2,140	793	.18	3,850	760	.16	3,280
7-----	690	.10	1,860	672	.14	2,540	690	.13	2,420
8-----	663	.15	2,690	720	.14	2,720	793	.14	3,000
9-----	654	.14	2,470	750	.12	2,430	793	.16	3,430
10-----	750	.09	1,820	646	.11	1,920	974	.20	5,260
11-----	720	.04	778	572	.24	3,710	819	.22	4,660
12-----	720	.07	1,360	378	--	1/3,160	700	.20	3,780
13-----	663	.06	1,070	401	.35	3,790	638	.13	2,240
14-----	629	.13	2,210	378	.22	2,250	638	.11	1,890
15-----	646	.12	2,090	557	.25	3,760	663	.13	2,330
16-----	629	.22	3,740	672	.23	4,170	646	.15	2,620
17-----	549	.28	4,150	806	.30	6,530	700	.13	2,460
18-----	638	.15	2,580	942	.30	7,630	806	.15	3,260
19-----	638	.11	1,890	780	.24	5,050	1,090	.24	7,060
20-----	580	.07	1,100	871	.18	4,230	1,440	.39	15,200
21-----	612	.11	1,820	990	.14	3,740	1,300	.34	11,900
22-----	612	.23	3,800	1,160	.22	6,890	1,040	.24	6,740
23-----	604	.17	2,770	1,090	--	1/8,830	958	.24	6,210
24-----	629	.17	2,890	1,410	.39	14,800	1,020	.19	5,230
25-----	565	.12	1,830	1,300	.44	15,400	1,230	.22	7,310
26-----	426	.14	1,610	1,160	.30	9,400	1,160	.32	10,000
27-----	338	.18	1,640	1,230	.37	12,300	1,120	.35	10,600
28-----	311	.12	1,010	1,210	--	1/9,150	1,250	.26	8,780
29-----	372	.14	1,410	1,280	.23	7,950	1,210	.25	8,170
30-----	322	.11	956	--	--	--	1,300	.22	7,720
31-----	534	.10	1,440	--	--	--	1,300	.25	8,760
Total -	18,384	--	69,240	24,422	--	164,500	30,340	--	192,500
Day	April			May			June		
	Mean dis-charge (second-feet)	Suspended sediment		Mean dis-charge (second-feet)	Suspended sediment		Mean dis-charge (second-feet)	Suspended sediment	
		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day
1-----	1,350	0.26	9,480	3,410	0.26	23,900	6,670	0.32	59,400
2-----	1,440	.19	7,390	4,100	.39	43,200	7,650	.37	76,400
3-----	1,410	.26	9,900	4,050	.37	40,500	8,370	.35	79,100
4-----	1,690	.23	10,500	3,800	.32	32,800	9,150	.34	84,000
5-----	1,660	.18	8,070	3,900	.34	35,800	8,850	.36	86,000
6-----	1,690	.20	9,130	3,320	.26	23,300	9,150	.31	76,600
7-----	1,720	.20	9,290	3,500	.26	24,600	9,750	.27	71,100
8-----	1,520	.20	8,210	3,600	.30	29,200	11,000	.36	107,000
9-----	1,600	.21	9,070	4,300	.26	30,200	10,400	.41	115,000
10-----	2,060	.35	19,500	3,650	.25	24,600	9,450	.30	76,500
11-----	2,750	.66	49,000	3,410	.24	22,100	8,310	.30	67,300
12-----	2,870	.76	58,900	2,420	.21	13,700	8,130	.35	76,800
13-----	2,390	.51	32,900	2,060	.22	12,200	7,770	.27	56,600
14-----	2,620	.40	28,300	1,660	.17	7,630	7,290	.32	63,000
15-----	2,660	.42	30,200	1,720	.14	6,500	7,530	.26	52,900
16-----	3,040	.65	53,400	2,060	.26	14,500	7,110	.24	46,100
17-----	3,130	.46	38,900	1,880	.21	10,700	6,270	.20	33,900
18-----	3,750	.52	52,600	2,620	.23	16,300	5,320	.23	33,000
19-----	3,800	.59	60,500	2,960	.23	18,400	4,780	.45	69,700
20-----	4,350	.62	72,800	4,560	.49	60,300	4,940	1.86	280,000
21-----	4,450	.50	60,100	4,720	.27	34,400	3,270	.25	22,100
22-----	5,220	.48	67,700	5,000	.28	37,800	3,090	.17	14,200
23-----	4,830	.56	73,000	6,510	.41	72,100	3,090	.18	15,000
24-----	5,270	.41	58,300	6,390	.31	53,500	2,830	.18	13,800
25-----	5,380	.36	52,300	7,470	.40	80,700	2,540	.19	13,000
26-----	3,800	.34	34,900	10,100	.50	136,000	1,950	.11	5,790
27-----	3,500	.29	27,400	11,000	.60	178,000	2,460	.11	7,310
28-----	3,000	.23	18,600	12,400	.54	181,000	1,440	.09	3,500
29-----	3,040	.25	20,500	11,000	.41	122,000	1,490	.07	2,820
30-----	3,130	.31	26,200	9,150	.30	74,100	974	.05	1,310
31-----	--	--	--	7,590	.32	65,600	--	--	--
Total -	89,120	--	1,017,000	154,310	--	1,526,000	181,224	--	1,709,000

1/Estimated or interpolated.



## RIO GRANDE BASIN- Continued

## RIO GRANDE NEAR BERNALILLO, N. MEX.--Continued

Suspended sediment, water year October 1947 to September 1948--Continued

Day	July			August			September		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day
1-----	760	0.05	1,030	828	0.06	1,340	261	0.03	211
2-----	910	.04	983	819	.08	1,770	261	.03	211
3-----	595	.06	964	432	.08	933	372	.04	402
4-----	942	.03	763	376	.04	406	327	.05	441
5-----	636	.06	1,030	842	1.27	39,300	620	.10	1,670
6-----	595	.04	643	720	2.04	37,700	1,010	.14	3,820
7-----	572	.02	309	654	1.01	17,600	595	.09	1,450
8-----	499	.03	404	819	.66	14,600	527	.05	711
9-----	439	.04	474	760	.36	7,390	265	.02	154
10-----	378	.02	204	420	.26	2,950	290	.02	157
11-----	772	.04	834	355	.38	3,640	256	.02	138
12-----	638	.03	517	338	.25	2,280	491	.07	928
13-----	271	.02	146	389	.11	1,160	306	.06	661
14-----	242	.01	65	395	.07	747	103	.04	111
15-----	156	.01	43	710	.15	2,680	71	.02	38
16-----	156	.01	43	595	.12	1,930	67	.01	18
17-----	141	.01	38	242	.06	392	77	.01	21
18-----	805	.10	2,170	191	.04	206	91	.01	25
19-----	770	.06	1,250	195	.03	158	220	.02	119
20-----	595	.27	4,340	238	.05	321	161	.01	43
21-----	690	.16	2,980	233	.05	315	56	.01	15
22-----	595	.12	1,930	465	.17	2,130	49	.01	13
23-----	549	.11	1,630	465	.49	6,150	48	0	0
24-----	372	.05	502	633	.25	4,270	52	.01	14
25-----	622	.06	1,010	519	.16	2,240	75	.01	20
26-----	646	.16	2,790	296	.07	559	915	4.29	128,000
27-----	327	.04	353	360	.05	486	252	1.22	8,300
28-----	285	.09	693	372	.04	402	135	.33	1,200
29-----	252	.06	408	672	.12	2,180	111	.13	390
30-----	290	.10	783	567	.06	951	110	.12	356
31-----	280	.02	151	266	.04	287	--	--	--
Total -	15,786	--	29,460	15,188	--	157,900	8,194	--	149,600

Total discharge for year (second-foot-days)---- 627,055

Total load for year (tons)-----6,089,600

RIO GRANDE BASIN--Continued  
RIO GRANDE NEAR BERNALILLO, N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948

(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	Time	Mean discharge (second feet)	Suspended sediment										Methods of analysis			
			Mean daily concentration (percent)	Weight of material in tube (grams)	Percent finer than indicated size, in millimeters											
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250		0.500	1.000	2.000
Dec. 10, 1947	10:15 a.m.	1,660	0.29	1 1558	--	--	--	--	--	21	62	97	100			S
Dec. 20	2:20 p.m.	730	.20	.5836	--	--	--	--	--	29	66	98	100			S
Jan. 10, 1948	1:35 p.m.	730	.09	.2883	--	--	--	--	--	43	78	97	100			S
Jan. 20	1:35 p.m.	580	.07	.1552	--	--	--	--	--	72	92	99	100			S
Feb. 1	12:30 p.m.	694	.11	.2866	--	--	--	--	--	32	70	97	100			S
Feb. 10	4:50 p.m.	646	.11	.2497	--	--	--	--	--	35	76	99	100			S
Feb. 20	2:05 p.m.	871	.18	.3903	--	16	28	34	42	53	83	99	100			BSWCM
Mar. 10	9:30 a.m.	974	.20	.7189	--	--	--	--	--	22	51	91	98			S
Mar. 20	6:40 p.m.	1,440	.39	1.0805	--	--	--	--	--	47	67	94	99			S
Apr. 10	7:00 p.m.	2,060	.35	2.2101	--	--	--	--	--	53	77	99	100			S
Apr. 20	7:45 a.m.	4,350	.62	2.3684	--	--	--	--	--	38	63	94	100			S
Apr. 27	--	3,500	.29	.5427	--	--	--	--	--	61	89	97	100			S
May 1	6:45 a.m.	3,410	.26	.8361	--	--	--	--	--	29	59	89	96			S
May 10	10:20 a.m.	3,650	.25	.7762	--	--	--	--	--	20	47	90	100			S
May 14	11:40 a.m.	1,660	.17	.3205	--	--	--	--	--	33	64	98	99			S
May 20	8:50 a.m.	4,560	.49	1.5459	--	--	--	--	--	71	85	97	100			S
May 25	7:15 p.m.	7,470	.40	1.1570	--	--	--	--	--	45	66	91	100			S
May 26	3:10 a.m.	10,100	.50	1.3833	--	--	--	--	--	42	69	95	100			S
May 26	11:00 a.m.	10,100	.50	.7835	--	--	8	14	22	36	58	90	100			BSN
May 27	3:35 a.m.	11,000	.60	2.2830	--	--	--	--	--	23	45	80	99			S
May 27	11:10 a.m.	11,000	.60	1.5214	--	--	--	--	--	29	48	84	100			S
May 28	11:35 p.m.	12,400	.54	1.9561	--	--	--	--	--	41	62	95	100			S
May 29	7:05 a.m.	11,000	.41	1.4260	--	--	--	--	--	33	57	95	100			S
May 29	3:15 p.m.	11,000	.41	1.1831	--	--	13	18	26	50	73	96	99			BSN
May 30	8:15 a.m.	9,150	.30	.3247	--	--	17	21	30	45	71	97	100			BSN
May 31	3:00 p.m.	7,590	.32	.6762	--	--	--	--	--	41	62	92	99			S



## RIO GRANDE BASIN--Continued

## RIO GRANDE NEAR BERNARDO, N. MEX.

LOCATION.--At gaging station at bridge on U. S. Highway 60, 2½ miles east of Bernardo, Socorro County, and 3½ miles upstream from Rio Puerco.

DRAINAGE AREA.--19,230 square miles (includes 2,940 square miles in closed basin in northern part of San Luis Valley, Colo.).

RECORDS AVAILABLE.--Sediment records: October 1947 to September 1948.

EXTREMES, 1947-48.--Sediment loads: Maximum, 149,000 tons per day May 27; minimum, 0 tons per day Oct. 4-5.

REMARKS.--Sediment concentrations for period Oct. 1 to Jan. 31, furnished by Corps of Engineers, U. S. Army, Albuquerque district except those for Jan. 23, 26, and 30. Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1118.

## Suspended sediment, water year October 1947 to September 1948

Day	October			November			December		
	Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment	
		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day
1-----	71	0.03	58	192	0.10	518	1,870	--	1/11,600
2-----	59	.03	48	705	.58	11,000	2,040	--	1/17,100
3-----	50	.01	14	840	.48	10,900	2,010	--	1/20,600
4-----	43	0	0	855	.34	7,850	2,080	--	1/24,700
5-----	41	0	0	1,450	.35	13,700	2,010	--	1/27,100
6-----	44	.02	24	2,010	.86	46,700	2,010	.56	1/30,400
7-----	57	.01	15	1,650	.66	29,400	1,940	.61	32,000
8-----	56	.01	15	1,740	.50	23,500	1,900	.22	11,300
9-----	74	.01	20	1,840	.45	22,400	1,650	.24	10,700
10-----	122	.12	395	1,940	.59	30,900	1,480	.20	7,990
11-----	136	.31	1,140	1,840	.40	19,900	1,480	.23	9,190
12-----	160	.21	907	1,870	.43	21,700	1,560	.20	8,420
13-----	210	.24	1,360	2,190	.34	20,100	1,350	.28	10,200
14-----	220	.48	2,850	1,900	.32	16,400	1,300	.33	11,600
15-----	371	.18	1,800	1,980	.33	17,600	1,500	.26	10,500
16-----	1,100	1.90	56,400	1,900	.31	15,900	1,590	.26	11,200
17-----	421	1.79	20,300	2,120	.31	17,700	1,230	.21	6,970
18-----	348	1.03	9,680	2,150	.27	15,700	1,140	.25	7,700
19-----	268	.37	2,680	1,800	.26	12,600	855	.20	4,620
20-----	286	.46	3,550	2,040	.27	14,900	705	.72	13,700
21-----	215	.29	1,680	1,870	.27	13,600	705	.30	5,710
22-----	172	.13	604	2,150	.26	15,100	892	.10	2,410
23-----	172	.16	743	2,150	.26	15,100	825	.11	2,450
24-----	156	.13	548	2,080	.26	14,600	735	.22	4,370
25-----	172	.07	325	2,040	.22	12,100	765	.16	3,310
26-----	286	.18	1,390	2,010	.31	16,800	705	.11	2,090
27-----	245	.20	1,320	2,040	.26	14,300	765	.13	2,690
28-----	180	.16	778	1,980	.22	11,800	750	.12	2,430
29-----	160	.12	518	2,040	.23	12,700	692	.21	3,920
30-----	146	.08	315	2,120	.19	10,900	795	.18	3,860
31-----	96	.08	207	--	--	--	825	.09	2,000
Total -	6,137	--	109,700	53,492	--	506,400	40,154	--	322,800

1/Estimated or interpolated.

## RIO GRANDE BASIN--Continued

## RIO GRANDE NEAR BERNARDO, N. MEX.--Continued

Suspended sediment, water year October 1947 to September 1948--Continued

Day	January			February			March		
	Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment	
		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day
1-----	780	0.10	2,110	500	0.06	810	1,190	0.26	8,350
2-----	750	.15	3,040	795	.10	2,150	1,120	.22	6,650
3-----	692	.11	2,060	1,000	.22	5,940	1,400	--	1/7,940
4-----	655	.14	2,480	929	.13	3,260	1,140	--	1/6,460
5-----	668	.14	2,530	892	.21	5,060	1,120	.20	6,050
6-----	720	.10	1,940	840	.20	4,540	1,020	.22	6,060
7-----	668	.10	1,800	840	.13	2,950	874	.14	3,300
8-----	692	.11	2,060	795	.14	3,010	692	.12	2,240
9-----	705	.09	1,710	825	--	1/2,670	810	.15	3,280
10-----	705	.07	1,330	840	.09	2,040	984	.11	2,920
11-----	735	.12	2,380	800	--	1/2,590	1,060	.12	3,430
12-----	780	.08	1,690	700	.14	2,650	640	.19	4,310
13-----	810	.07	1,530	500	--	1/2,020	825	.28	6,240
14-----	825	.09	2,000	430	--	1/1,860	780	.21	4,420
15-----	692	.11	2,060	517	.17	2,370	780	.23	4,840
16-----	668	.08	1,440	605	.15	2,450	720	.19	3,690
17-----	642	.07	1,210	655	--	1/2,650	720	.24	4,670
18-----	720	.10	1,940	855	--	1/3,460	692	.25	4,670
19-----	735	.11	2,180	948	.15	3,840	855	.20	4,620
20-----	720	.10	1,940	810	.18	3,940	1,120	.30	9,070
21-----	735	.12	2,380	825	.26	5,790	1,280	.28	9,680
22-----	680	.12	2,200	948	.18	4,610	1,250	.29	9,790
23-----	630	.13	2,210	929	.15	3,760	874	.29	6,840
24-----	668	1/1.11	1,980	1,710	.23	10,600	874	.20	4,720
25-----	705	.08	1,520	2,010	--	1/15,200	855	.18	4,160
26-----	668	.15	2,710	2,010	--	1/18,500	1,170	.32	10,100
27-----	600	.29	4,700	1,560	.40	16,800	1,480	.39	15,600
28-----	310	.38	3,180	1,560	.44	18,500	1,530	.28	11,600
29-----	310	.18	1,510	1,020	.39	10,700	1,350	.20	7,290
30-----	350	.18	1,700	--	--	--	948	.18	4,610
31-----	400	.11	1,190	--	--	--	1,470	.25	7,900
Total -	20,418	--	64,710	27,648	--	164,700	31,523	--	195,500
	April			May			June		
	Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment	
		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day
1-----	1,480	0.35	14,000	2,510	0.45	30,500	7,560	0.45	91,900
2-----	1,280	.18	6,220	3,500	.58	54,800	7,380	.41	81,700
3-----	1,080	.18	5,250	3,450	.57	53,100	8,330	.47	106,000
4-----	1,280	.21	7,260	3,500	.45	42,500	8,570	.41	94,900
5-----	1,210	.28	9,150	3,600	.28	27,200	8,110	.41	89,800
6-----	984	.24	6,380	3,450	.30	27,900	8,350	.43	96,900
7-----	1,170	.25	7,900	3,080	.32	26,600	9,140	.32	79,000
8-----	1,350	.27	9,840	2,950	.32	25,500	9,830	.35	92,900
9-----	1,380	.23	8,570	3,450	.40	37,300	11,600	.30	94,000
10-----	1,400	.35	13,200	3,220	.34	29,600	11,200	.28	84,700
11-----	1,620	.64	28,000	2,830	.38	29,000	9,670	.30	78,300
12-----	2,350	.56	35,500	2,950	.30	23,900	8,020	.29	62,800
13-----	2,550	.65	44,800	2,230	.30	18,100	8,040	.35	76,000
14-----	2,120	.49	28,000	1,500	.12	4,860	6,880	.40	74,300
15-----	2,100	.45	25,500	1,230	.10	3,320	6,560	.33	58,400
16-----	2,000	.38	20,500	1,530	.18	7,440	6,800	.38	69,800
17-----	2,270	.58	35,500	1,280	.15	5,180	6,530	.39	68,800
18-----	3,080	.55	45,700	966	.12	3,130	5,850	.27	42,600
19-----	3,260	.54	47,500	1,770	.23	11,000	4,910	.18	23,900
20-----	2,910	.39	30,600	2,590	.30	21,000	4,720	.16	20,400
21-----	3,260	.41	36,100	3,310	.50	44,700	3,520	.58	55,100
22-----	4,320	.50	58,300	3,850	.42	43,700	2,600	.20	14,000
23-----	4,260	.43	49,500	4,980	.44	59,200	2,480	.28	18,700
24-----	4,920	.54	71,700	4,860	.38	49,900	2,340	.12	7,580
25-----	5,800	.78	122,000	5,450	.46	67,700	2,100	.22	12,500
26-----	4,560	.59	72,600	6,980	.56	106,000	1,860	.19	9,540
27-----	3,450	.46	42,800	10,200	.54	149,000	2,100	.22	12,500
28-----	3,360	.38	34,500	10,600	.38	109,000	1,670	.21	9,470
29-----	2,390	.36	23,200	11,700	.40	126,000	900	.27	6,560
30-----	2,230	.25	15,100	10,500	.30	85,000	600	.15	2,430
31-----	--	--	--	8,260	.30	66,900	--	--	--
Total -	75,424	--	955,200	132,276	--	1,389,000	178,220	--	1,635,000

1/ Estimated or interpolated.

## WESTERN GULF OF MEXICO BASINS

## RIO GRANDE BASIN--Continued

## RIO GRANDE NEAR BERNARDO, N. MEX.--Continued

## Suspended sediment, water year October 1947 to September 1948--Continued

Suspended sediment, water year October 1947 to September 1948--Continued									
Day	July			August			September		
	Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment		Mean dis-charge (second-foot)	Suspended sediment	
		Mean concen-tration (percent)	Tons per day		Mean concen-tration (percent)	Tons per day		Mean concen-tration (percent)	Tons per day
1-----	550	0.13	1,930	50	0.01	14	90	0.02	49
2-----	516	.27	2,930	44	.03	36	55	.01	15
3-----	457	.09	1,110	44	.02	24	36	.01	10
4-----	446	.34	4,090	67	.02	36	39	.01	11
5-----	480	.20	2,590	82	.02	44	42	.02	23
6-----	422	.14	1,600	73	.03	59	69	.03	56
7-----	325	.08	702	159	.10	429	65	.01	12
8-----	268	.08	579	201	.18	977	47	.01	13
9-----	240	.06	389	255	.39	2,690	154	.05	208
10-----	220	.10	594	240	.32	2,070	84	.02	45
11-----	200	.08	432	192	.15	778	56	.02	31
12-----	182	.03	147	173	.10	467	59	.02	32
13-----	195	.04	211	187	.06	303	36	.01	10
14-----	204	.04	220	151	.11	448	29	.02	16
15-----	190	.03	154	148	.07	280	30	.01	8
16-----	133	.02	72	144	.07	272	50	.01	14
17-----	106	.03	86	163	.10	440	56	.01	15
18-----	126	.06	204	133	.11	395	52	.01	14
19-----	122	.02	66	120	.04	130	31	.01	8
20-----	104	.02	56	91	.03	74	34	.01	9
21-----	187	.07	353	75	.03	61	32	.01	9
22-----	173	.04	187	80	.04	86	31	.02	17
23-----	185	.03	150	65	.01	18	55	.01	15
24-----	198	.04	214	57	.03	46	59	.01	16
25-----	217	.04	234	41	.02	22	34	.01	9
26-----	157	.04	170	35	.02	19	46	.01	12
27-----	112	.05	151	39	.02	21	84	.35	794
28-----	160	.04	173	56	.03	45	220	2.30	13,700
29-----	109	.05	147	79	.02	43	104	.69	2,500
30-----	68	.02	37	110	.03	89	95	.19	487
31-----	57	.01	15	170	.08	367	--	--	--
Total -	7,109	--	19,990	3,524	--	10,780	1,878	--	18,160
Total discharge for year (second-foot-days) ----- 577,803      Total load for year (tons)-----5,392,000									

RIO GRANDE BASIN--Continued  
RIO GRANDE NEAR BERNARDO, N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948  
(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	Time	Mean discharge (second-foot)	Mean daily concentration (percent)	Weight of material in tube (grams)	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	0.500	1.000		2.000
Jan. 23, 1948	4:05 p.m.	630	0.13	0.5172	--	--	--	--	--	--	43	61	94	99		S
Feb. 1	1:25 p.m.	500	.06	.2065	--	--	--	--	--	--	85	92	97	99		S
Feb. 2	11:15 a.m.	795	.10	.4539	--	--	--	--	--	--	29	45	90	100		S
Feb. 10	8:40 a.m.	840	.09	.3125	22	23	41	52	70	78	92	98	99			BSWCM
Feb. 20	8:50 a.m.	810	.18	.4887	20	21	33	42	54	70	92	100		--		BSWCM
Mar. 10	8:35 a.m.	984	.11	.3989	--	--	--	--	--	--	58	75	92	100		S
Mar. 20	3:35 p.m.	1,120	.30	1.0034	--	--	--	--	--	--	67	89	97	100		S
Apr. 1	8:35 a.m.	1,480	.35	.7630	2	6	14	20	--	39	61	95	99			SDN
Apr. 10	7:50 a.m.	1,400	.35	.7137	21	27	39	48	64	83	97	100	--			BSWCM
Apr. 20	7:30 a.m.	2,910	.39	.6793	1	7	28	41	--	85	97	99	100			SDN
May 10	2:15 p.m.	3,220	.34	1.0387	--	--	--	--	--	27	41	64	96			S
May 20	5:30 p.m.	2,590	.30	.9869	--	--	--	--	--	42	72	97	100			S
May 28	10:00 a.m.	6,980	.56	2.2183	--	--	--	--	--	42	70	97	100			S
May 26	6:00 p.m.	6,980	.56	2.1050	--	--	--	--	--	53	85	99	100			S
May 26	6:00 p.m.	6,980	.56	2.1050	--	--	--	--	--	53	85	99	100			S
May 27	2:00 a.m.	10,200	.54	2.9984	--	--	--	--	--	31	65	95	99			S
May 27	2:00 a.m.	10,200	.54	2.9984	--	--	--	--	--	45	80	97	100			S
May 27	10:00 a.m.	10,200	.54	1.1554	--	--	--	--	--	45	80	97	100			S
June 1	1:00 p.m.	7,560	.45	1.4453	--	--	--	--	--	50	79	96	100			S
June 1	1:00 p.m.	11,200	.28	1.1819	--	--	--	--	--	46	66	86	97			S
June 20	8:30 a.m.	4,720	.16	.6781	--	--	--	--	--	43	71	94	99			S
July 1	8:00 a.m.	550	.13	.2380	--	--	--	--	--	35	64	95	99			S
July 10	5:30 p.m.	220	.10	.1791	0	2	8	14	--	32	53	90	100			SDN
July 20	5:30 p.m.	104	.02	.0833	4	6	11	15	--	32	58	93	95			SDN
Aug. 20	4:00 p.m.	91	.03	.1143	4	13	36	54	--	--	--	--	--			DN
Sept. 1	4:30 p.m.	80	.02	.0988	3	13	38	60	--	68	--	--	--			SDN
Sept. 10	4:00 p.m.	84	.02	.0779	7	16	43	69	--	93	--	--	--			SDN
Sept. 20	5:00 p.m.	34	.01	.0207	12	28	72	72	--	79	--	--	--			SDN

## RIO GRANDE BASIN--Continued

## RIO GRANDE AT SAN ACACIA, N. MEX.

LOCATION.--At San Acacia diversion dam, 0.2 mile above San Acacia gaging station, half a mile east of San Acacia, Socorro County, and 2 miles downstream from Rio Salado.

DRAINAGE AREA.--26,770 square miles, including 2,940 square miles in closed basin in northern part of San Luis Valley, Colo.

RECORDS AVAILABLE.--Chemical analyses: July 1937 to December 1937, March 1939 to September 1948.

Sediment records: July 1946 to September 1948.

Water temperatures: October 1947 to September 1948.

EXTREMES, 1947-48.--Dissolved solids: Maximum, 1,660 parts per million July 20; minimum, 243 parts per million May 21-30.

Total hardness: Maximum, 694 parts per million July 20; minimum, 137 parts per million June 1-2, 4, 6-10.

Water temperatures: Maximum, 87° F. July 11; minimum, freezing point Dec. 12, Jan. 29-Feb. 1.

Sediment loads: Maximum, 322,000 tons per day June 13; minimum, 1 ton per day on several days in September.

EXTREMES, 1937, 1938-48.--Dissolved solids: Maximum, 2,470 parts per million July 18, 1946; minimum, 183 parts per million June 1-10, 1942.

Total hardness: Maximum, 1,190 parts per million Aug. 13-14, 1945; minimum, 101 parts per million June 11-20, 1942.

Sediment loads, 1946-48: Maximum, 1,970,000 tons per day Aug. 17, 1947; minimum, 0 ton per day on several days in 1946.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1118. Socorro Main Canal North heads at San Acacia diversion dam and by-passes gaging station. Discharges reported do not include flow in canal. Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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-carbonate
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
Oct. 1-10, 1947-----	7.9	67	7.4	934	31	0.02	77	19	99	4.6	200	246	49	0.7	0.8	0.2	626	0.85	13	270	106	44
Oct. 11-20-----	353	60	8.0	922	27	.02	88	17	92	3.6	205	261	39	7	3.7	.2	633	.86	603	280	122	40
Oct. 21-31-----	170	52	8.1	815	28	.02	79	15	81	5.2	222	197	37	7	1.2	.2	554	.75	254	258	76	40
Nov. 1-10-----	1,262	47	8.0	693	26	.03	66	12	54	4.2	187	145	24	.5	2.1	.1	426	.58	1,450	214	61	35
Nov. 11-20-----	1,885	44	8.0	487	24	.02	54	10	36	2.8	155	103	16	.5	1.1	.1	324	.44	1,680	176	48	30
Nov. 21-22, 24-30----	1,832	41	8.0	466	25	.03	53	9.8	36	3.0	133	93	22	.5	1.0	.1	319	.43	1,560	172	47	31
Dec. 1-10-----	1,789	43	8.0	486	27	.02	53	12	34	3.6	158	100	15	.4	1.7	.1	325	.44	1,570	182	52	28
Dec. 11-20-----	1,298	35	8.0	519	25	.02	55	13	38	5.4	163	109	18	.4	1.1	.1	345	.47	1,210	190	57	29
Dec. 21-31-----	735	38	8.0	609	29	.02	60	15	52	5.8	189	122	29	.4	1.0	.1	407	.55	808	211	56	34
Jan. 1-10, 1948-----	768	39	8.0	614	30	.02	58	11	56	4.2	186	112	34	.4	1.8	.1	399	.54	849	190	37	38
Jan. 11-19-----	768	39	8.0	622	31	.03	58	12	58	5.2	185	119	35	.4	1.1	.1	411	.56	852	194	42	39
Jan. 21-31-----	569	36	8.1	677	29	.03	62	12	67	4.0	193	134	41	.5	1.1	.1	446	.61	685	204	46	41
Feb. 1-10-----	835	37	8.1	636	28	.05	58	11	62	4.0	183	119	38	.5	1.4	.1	412	.56	929	190	40	41
Feb. 11-20-----	750	37	8.1	664	29	.04	60	12	67	3.4	187	129	41	.5	1.1	.1	435	.59	881	199	46	42
Feb. 21-29-----	1,258	--	7.8	785	23	.02	66	14	86	4.2	169	190	51	.8	2.0	.1	520	.71	1,770	222	84	45
Mar. 1-6, 8-10-----	1,074	41	7.7	663	31	.03	59	12	65	4.5	180	134	34	.5	1.8	.1	431	.59	1,250	196	49	41
Mar. 11-17, 19-20----	782	46	7.9	608	31	.02	56	11	55	4.3	175	120	30	.5	1.1	.1	395	.54	834	184	41	39
Mar. 21-31-----	1,100	52	7.9	565	31	.03	55	11	49	3.8	168	114	22	.5	1.7	.1	371	.50	1,110	182	44	36



Apr. 1-6, 9-10 -----	1,145	52	7.9	562	30	0.03	54	10	49	4.6	166	112	25	.5	1.3	.1	368	.50	1,140	176	40	37
Apr. 11-15, 17-20----	2,294	58	7.9	487	28	.03	49	8.9	38	5.3	150	94	20	.6	1.4	.1	319	.43	1,980	159	36	33
Apr. 22-26, 30-----	3,543	57	7.9	466	27	.06	56	8.4	30	4.0	180	69	14	.4	2.8	.4	300	.41	2,870	174	26	27
May 1-7, 9-10-----	3,049	62	7.9	433	24	.10	52	7.9	29	2.9	168	66	14	.4	2.9	.3	282	.38	2,320	162	24	28
May 11-20-----	1,716	64	8.0	464	29	.03	53	7.9	32	3.7	167	76	16	.4	2.3	.3	303	.41	1,400	164	28	29
May 21-30-----	7,000	66	8.1	371	23	.05	46	6.3	23	3.5	142	56	12	.4	2.6	.1	243	.33	4,590	141	24	26
June 1-2, 4, 6-10----	8,670	68	8.0	381	23	.05	44	6.6	25	3.8	139	59	12	.4	3.7	.1	246	.33	5,760	137	23	28
June 11, 13-17-----	6,623	73	7.5	464	23	.04	55	8.1	29	5.4	170	77	12	.4	2.7	.1	296	.40	5,290	170	31	26
June 21-30-----	2,041	73	7.8	480	30	.04	54	8.9	36	5.2	166	88	15	.4	2.0	.1	321	.44	1,770	171	35	31
July 1-10-----	302	78	7.8	699	34	.03	68	13	64	5.0	206	144	31	.4	2.5	.1	463	.63	378	223	54	38
July 11-18 1/2-----	48.1	78	7.7	834	35	.04	78	16	84	6.6	226	188	42	.5	1.6	.1	563	.77	73	260	76	40
July 20-----	52	7.3	2,400	--	--	--	196	50	303	355	701	234	234	--	2.9	--	1,660	2.26	233	694	404	49
July 21-24, 26-30----	74.5	--	7.7	922	30	.02	88	17	98	5.4	221	234	44	.6	2.5	.1	623	.85	125	290	108	41
Aug. 1-3, 5-6, 10 2/2-	38.1	--	7.7	974	33	.01	86	18	105	7.4	249	229	52	.6	1.8	.1	656	.89	67	288	84	41
Aug. 4, 7-9, 10-----	53.7	--	7.8	1,740	24	.01	174	37	189	8.2	350	580	72	.4	4.4	.1	1,260	1.71	1,880	586	299	41
Aug. 11-13, 15-20----	75.7	73	7.7	940	31	.01	87	17	100	8.4	238	229	46	.6	2.7	.1	637	.87	130	287	92	42
Aug. 21-31-----	5.6	72	7.7	1,020	29	.01	94	19	114	6.6	242	243	61	.5	1.2	.1	698	.94	10	288	89	46
Sept. 1-5, 7, 10-----	2.9	70	7.9	974	41	.01	73	16	95	5.4	217	206	47	.6	1.7	.1	593	.81	4.6	248	70	45
Sept. 11-18, 20-----	3.2	69	7.8	1,971	37	.02	82	18	107	5.4	244	216	61	.7	1.0	.2	948	.88	16	278	78	45
Sept. 21-25, 29-30----	13.3	68	7.6	1,940	35	.03	88	20	117	4.0	228	269	57	.6	1.8	.1	705	.93	37	302	114	45
Sept. 27-28-----	550	--	7.6	1,680	21	.04	196	38	201	6.4	201	764	86	--	3.7	.2	1,420	1.93	2,110	645	460	40
Weighted average --	1,505	--	--	492	26	0.04	54	9.1	38	4.2	162	91	19	0.4	2.3	0.1	324	0.44	1,320	172	40	32

1/ Discharge for July 19 included in discharge reported for July 11-18.

2/ Discharge for Aug. 4 included in discharge reported for Aug. 1-3, 5-6, 10.

RIO GRANDE BASIN--Continued  
RIO GRANDE AT SAN ACACIA, N. MEX.--Continued

Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	1/68	1/52	49	1/38	1/32	1/46	1/50	1/60	1/62	1/76	--	1/72
2	1/67	3/43	1/48	1/38	1/33	1/44	1/50	66	1/64	1/76	--	1/73
3	1/72	1/51	1/42	1/37	1/34	1/42	3/52	1/61	3/69	1/78	--	1/73
4	1/72	1/48	1/42	1/37	1/35	37	41	1/63	3/70	67	1/78	1/72
5	1/60	1/50	1/42	44	1/38	1/36	4/54	1/61	3/67	--	1/73	1/72
6	1/65	45	1/43	1/40	1/40	1/41	1/50	1/60	1/67	1/78	1/74	65
7	1/66	3/43	1/44	1/39	1/42	36	1/50	1/62	3/69	85	4/71	1/72
8	1/68	3/43	37	1/40	1/42	1/44	1/54	67	4/73	1/79	1/72	1/70
9	1/65	42	1/40	1/39	1/38	1/42	1/56	1/60	--	--	1/74	1/68
10	1/66	3/47	1/40	1/40	1/38	38	1/58	1/59	--	1/82	1/74	1/68
11	1/64	40	1/36	1/40	33	36	1/56	1/58	3/75	87	1/74	1/68
12	54	--	32	1/34	1/34	37	1/52	1/60	3/70	1/75	1/74	1/69
13	1/62	3/43	1/35	1/41	1/36	52	1/60	1/61	3/72	79	1/74	1/70
14	1/62	48	33	1/40	1/36	40	1/57	1/61	3/74	1/80	1/74	1/69
15	1/58	1/44	1/36	1/42	1/37	1/50	1/62	1/66	3/74	1/80	1/74	1/69
16	2/59	1/44	1/36	1/39	1/38	1/46	--	1/74	3/74	1/80	1/73	1/68
17	--	3/46	1/36	1/40	1/38	1/51	1/62	62	1/76	1/81	1/73	1/69
18	--	1/44	34	1/41	1/40	1/46	3/58	1/67	3/75	1/73	1/74	1/69
19	1/60	1/45	1/38	1/35	37	1/50	3/58	1/66	1/74	67	69	--
20	1/58	1/42	--	1/34	40	56	1/60	1/66	65	4/70	--	2/66
21	1/60	1/40	1/36	1/38	--	1/52	1/58	1/65	1/72	1/72	1/72	1/70
22	1/56	1/40	1/40	1/39	37	58	1/58	1/70	1/72	1/72	66	1/70
23	--	1/37	1/37	1/40	1/38	1/52	53	1/68	1/70	1/71	1/72	1/68
24	1/48	45	1/38	1/44	--	58	48	1/66	66	1/74	78	1/68
25	1/54	1/41	41	37	1/40	1/53	1/56	1/65	1/74	68	1/72	1/66
26	--	1/42	1/38	1/38	41	1/52	1/58	5/63	1/72	--	1/70	4/62
27	1/52	1/41	1/38	33	1/44	41	1/60	5/62	78	--	1/73	1/68
28	1/53	36	1/39	--	1/44	1/52	1/60	1/62	1/74	--	1/72	3/68
29	1/53	1/42	34	1/32	1/42	1/50	1/60	1/67	1/74	--	1/71	1/68
30	--	1/44	1/40	1/40	--	3/52	1/61	3/70	1/74	--	1/71	1/68
31	1/44	--	1/36	1/32	--	1/50	--	1/64	--	--	1/72	--
Average	59	44	39	38	38	46	56	64	71	--	73	69

1/ Average of two observations made during daylight hours.  
 2/ Average of five observations made during daylight hours.  
 3/ Average of three observations made during daylight hours.  
 4/ Average of four observations made during daylight hours.

5/ Average of eleven observations.  
 6/ Average of 24 hourly observations.  
 7/ Average of six observations.

## RIO GRANDE BASIN--Continued

## RIO GRANDE AT SAN ACACIA, N. MEX --Continued

Suspended sediment, water year October 1947 to September 1948

Day	October			November			December		
	Mean dis-charge (second-feet)	Suspended sediment		Mean dis-charge (second-feet)	Suspended sediment		Mean dis-charge (second-feet)	Suspended sediment	
		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day
1-----	8	0.18	39	180	0.46	2,240	1,810	0.95	46,400
2-----	9	.28	68	545	1.17	17,200	1,810	.67	42,500
3-----	8	.24	52	884	1.18	28,200	1,930	1.03	53,700
4-----	9	.16	39	815	1.02	22,400	1,820	1.03	50,600
5-----	8	.17	37	981	1.22	33,600	1,960	.85	45,000
6-----	8	.30	65	1,660	2.55	114,000	1,640	1.30	64,600
7-----	7	.20	38	1,770	2.12	101,000	1,770	1.02	48,700
8-----	7	.18	34	1,910	1.93	99,500	1,760	1.35	63,800
9-----	4	.14	15	1,950	1.78	94,200	1,510	.76	33,300
10-----	11	.24	71	1,910	1.99	103,000	1,610	1.64	72,300
11-----	60	.38	616	1,770	1.79	85,500	1,510	1.15	46,900
12-----	77	.51	1,030	1,840	1.57	78,000	1,470	.69	27,400
13-----	123	1.66	6,330	1,860	1.18	59,300	1,300	.92	32,300
14-----	244	1.91	12,700	1,950	1.11	56,400	1,200	.73	23,700
15-----	221	1.03	7,220	1,880	1.44	73,100	1,410	1.21	46,100
16-----	1,320	4.49	167,000	1,950	1.07	56,300	1,540	1.06	44,900
17-----	571	3.52	56,300	1,950	1.47	77,400	1,450	.40	15,700
18-----	383	2.34	24,200	1,860	.79	39,700	1,260	.69	23,500
19-----	289	1.47	11,500	1,810	1.25	61,100	1,060	.35	10,000
20-----	244	.92	6,060	1,980	1.43	76,400	781	.34	7,170
21-----	244	.66	4,350	2,020	1.16	63,300	747	.26	5,240
22-----	186	.59	2,980	1,930	.66	34,400	736	--	1/ 5,370
23-----	170	.42	1,930	1,890	--	1 39,300	736	.26	5,560
24-----	165	.38	1,690	1,860	.88	44,200	726	.52	10,200
25-----	151	.32	1,300	1,820	.87	42,600	716	.36	7,350
26-----	214	.36	2,080	1,660	.72	32,300	747	.44	8,870
27-----	226	.46	2,810	1,720	.78	36,200	726	.26	5,490
28-----	175	.35	1,650	1,740	.64	30,100	747	.26	5,240
29-----	131	.28	990	1,860	.44	22,100	736	.44	8,740
30-----	94	.28	711	1,820	1.05	51,600	694	.97	8,810
31-----	119	.32	1,030	--	--	--	770	.42	8,730
Total -	5,486	--	315,000	49,785	--	1,677,000	38,952	--	878,200
	January			February			March		
1-----	884	0.38	9,070	350	0.06	567	1,060	1.63	46,500
2-----	884	.39	9,310	1,100	.43	12,800	1,330	.73	26,200
3-----	826	.44	9,810	896	.77	19,000	1,160	.98	30,700
4-----	716	.53	10,200	981	.90	23,400	1,300	.64	22,500
5-----	684	.42	7,760	1,110	.90	27,200	1,160	.62	19,400
6-----	781	.40	8,430	884	.92	22,000	1,150	.75	23,300
7-----	815	.35	7,700	884	1.18	26,200	1,010	.82	22,400
8-----	770	.51	10,600	694	.94	17,600	872	.55	12,900
9-----	781	.44	9,280	716	.54	10,400	604	.48	10,400
10-----	736	.26	5,170	736	.32	6,360	896	.57	13,800
11-----	726	.48	9,410	705	.43	8,190	837	.50	11,300
12-----	792	.32	6,840	674	.50	9,100	957	.63	16,300
13-----	781	.49	10,300	674	.52	9,460	884	.44	10,500
14-----	770	.25	5,200	527	.20	2,850	860	.22	5,110
15-----	781	.27	5,690	603	.31	5,050	642	.30	5,200
16-----	781	.32	6,750	613	.22	3,640	705	.30	5,710
17-----	792	.87	18,000	804	.14	3,040	694	.31	5,810
18-----	747	1.40	27,700	920	.28	6,960	674	.22	4,000
19-----	736	.69	13,700	1,060	.32	9,160	726	.33	6,470
20-----	770	.32	6,550	920	.46	11,400	837	.37	8,360
21-----	684	.15	2,770	826	.60	13,400	1,260	.43	14,600
22-----	726	.14	2,740	908	.90	22,100	1,220	.59	19,400
23-----	663	.21	3,760	994	1.05	28,200	1,180	.43	13,700
24-----	684	.20	3,690	1,360	.93	34,100	920	.34	8,450
25-----	642	.41	7,110	1,510	1.22	49,700	736	.28	5,560
26-----	694	.45	8,430	1,710	1.55	71,600	860	.32	7,430
27-----	736	.59	11,200	1,440	1.44	56,000	1,230	.32	10,600
28-----	600	.13	2,110	1,350	1.36	49,600	1,350	.16	6,560
29-----	250	.11	742	1,220	1.56	51,400	1,300	.21	7,370
30-----	280	.07	529	--	--	--	1,020	.29	7,990
31-----	300	.14	1,130	--	--	--	1,120	.25	7,560
Total -	21,812	--	292,300	27,169	--	612,500	30,754	--	416,100

1/Estimated or interpolated.

## Suspended sediment, water year October 1947 to September 1948--Continued

Total income for year (second last day)	880,112	Total loan for year (1915)	10,880,000
1/Estimated or interpolated.			

RIO GRANDE BASIN--Continued  
RIO GRANDE AT SAN ACACIA, N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948

(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	Time	Mean discharge (second-foot)	Suspended sediment														Methods of analysis
			Mean daily concentration (percent)	Weight of material in tube (grams)	Percent finer than indicated size, in millimeters												
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000		
Oct. 20, 1947-----	7:30 a. m.	244	0.92	0.6456	42	51	70	77	85	96	100	--	--	--	--	BWCM	
Nov. 1-----	5:00 p. m.	160	.46	1.4060	--	--	23	28	36	55	90	99	100	--	--	BSWCM	
Nov. 10-----	5:00 p. m.	1,910	1.99	1.7922	12	13	23	25	33	52	89	99	100	100	100	BSWCM	
Nov. 20-----	7:15 a. m.	1,980	1.43	1.4439	2	4	12	14	20	27	58	88	99	100	100	BSWCM	
Dec. 1-----	8:00 a. m.	1,810	.95	1.8413	2	4	15	16	22	29	59	86	99	100	100	BSWCM	
Dec. 10-----	8:30 a. m.	1,610	1.64	1.4865	8	10	16	19	24	35	63	94	100	100	100	BSWCM	
Dec. 20-----	7:00 a. m.	781	.34	.4994	6	11	21	27	36	53	86	99	100	100	100	BSWCM	
Jan. 1, 1948-----	4:00 p. m.	884	.38	2.2731	6	8	12	14	19	30	68	98	100	100	100	BSWCM	
Jan. 10-----	4:00 p. m.	736	.26	1.4181	--	--	--	--	--	68	93	100	--	--	--	S	
Jan. 20-----	8:00 a. m.	770	.32	1.4232	--	--	--	--	--	31	64	90	99	100	100	S	
Feb. 1-----	5:00 p. m.	350	.06	1.1802	--	--	--	--	--	59	85	97	100	100	100	S	
Feb. 10-----	5:15 p. m.	736	.32	1.1060	--	--	--	--	--	59	87	98	100	100	100	S	
Feb. 20-----	7:10 a. m.	920	.46	1.7768	--	--	--	--	--	37	73	96	100	100	100	S	
Mar. 1-----	9:45 a. m.	1,060	1.63	.4744	49	67	80	90	96	100	--	--	--	--	--	BWCM	
Mar. 10-----	7:15 a. m.	896	.57	2.1358	--	--	--	--	--	26	43	77	99	100	100	S	
Mar. 20-----	6:15 p. m.	837	.37	1.0459	--	--	--	--	--	70	89	97	99	100	100	S	
Mar. 27-----	11:10 p. m.	1,230	.32	1.4187	3	13	22	30	--	63	89	99	100	100	100	DSN	
Apr. 1-----	5:20 p. m.	1,250	.21	.5266	--	--	--	--	--	88	96	98	99	100	100	S	
Apr. 10-----	7:00 p. m.	1,180	.22	1.2052	--	26	34	41	48	72	92	98	99	100	100	DSWCM	
Apr. 20-----	7:05 a. m.	2,990	.38	.3678	4	16	30	40	--	79	96	--	--	--	--	DSN	
May 1-----	8:00 a. m.	2,350	.28	.5247	2	13	34	43	--	75	97	100	--	--	--	DSN	
May 10-----	7:00 a. m.	3,240	.38	.8512	0	4	35	51	--	89	99	100	--	--	--	DSN	
May 20-----	6:00 p. m.	2,180	.26	1.1110	1	6	14	20	--	67	91	98	100	100	100	DSN	
May 26-----	4:00 p. m.	6,980	.67	.5568	3	8	13	18	--	--	--	--	--	--	--	DN	
May 27-----	9:140	7,5430	.70	.5430	3	8	14	19	--	45	74	96	99	100	100	DSN	
May 28 1/2-----	12:10 a. m.	9,530	.80	1.3901	14	15	27	32	41	60	88	99	100	100	100	BSWCM	

1/Sample obtained from cable 0.2 mile downstream from regular sampling section.

RIO GRANDE BASIN--Continued  
RIO GRANDE AT SAN ACACIA, N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948--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	Time	Mean discharge (second-feet)	Suspended sediment												Methods of analysis
			Mean daily concentration (percent)	Weight of material in tube (grams)	Percent finer than indicated size, in millimeters										
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	
June 1, 1948	6:00 a. m.	8,760	0.90	0.5459	3	10	24	32	--	68	94	99	100		DSN
June 10	2:00 p. m.	10,300	.67	.5319	2	11	36	47	--	79	98	100	--		DSN
June 20	6:00 a. m.	3,900	.36	.9616	1	4	8	13	--	55	94	99	100		DSN
July 1	6:00 a. m.	555	.12	.3756	--	--	--	--	--	44	86	99	100		S
July 10	6:30 p. m.	102	.20	.4330	--	--	--	--	--	57	97	100	--		S
July 20	12:00 m	52	1.88	1.7415	49	76	92	98	100	--	--	--	--		BWCM
Aug. 1	9:00 a. m.	30	3.12	1.0638	4	5	15	87	--	--	--	--	--		DN
Aug. 10	7:15 a. m.	231	2.49	3.4467	52	75	86	94	97	99	100	--	--		BSWCM
Aug. 20	8:00 a. m.	71	.30	.5561	3	6	29	95	--	--	--	--	--		DN
Sept. 1	6:00 p. m.	6	.06	1.1770	1	21	60	74	--	100	--	--	--		DSN
Sept. 10	6:00 p. m.	2	.07	.2016	8	19	49	72	--	91	--	--	--		DSN
Sept. 20	8:00 a. m.	66	3.50	1.3130	0	1	45	87	--	--	--	--	--		DN
Sept. 26	7:00 a. m.	432	6.06	.6756	1	4	38	80	--	--	--	--	--		DN

RIO GRANDE BASIN--Continued

RIO GRANDE AT SAN MARCIAL, N. MEX.

LOCATION.--At gaging station at Atchison, Topeka & Santa Fe Railway bridge, 1.1 miles downstream from San Marcial, Socorro County. DRAINAGE AREA.--27,700 square miles (including 2,940 square miles in closed basin in northern part of San Luis Valley, Colo.). RECORDS AVAILABLE.--Chemical analyses: July 1946 to September 1948.

Sediment records: July 1946 to September 1948.

EXTREMES, 1947-48.--Dissolved solids: Maximum, 1,630 parts per million Sept. 28, 30; minimum, 262 parts per million June 11-14, 16, 18-20. Total hardness: Maximum, 804 parts per million Sept. 28, 30; minimum, 141 parts per million May 1-10.

Sediment loads: Maximum, 143,000 tons per day June 1; minimum, 0 tons per day Oct. 8-10. EXTREMES, 1946-48.--Dissolved solids: Maximum, 1,670 parts per million Aug. 11-16, 19-22, 1946; minimum, 262 parts per million June 11-14, 16, 18-20, 1948. Total hardness: Maximum, 820 parts per million Aug. 11-16, 19-22, 1946; minimum, 141 parts per million May 1-10, 1948.

Sediment loads: Maximum, 151,000 tons per day Aug. 12, 1946; minimum, 0 tons per day on several days.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1118. Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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 non-carbonate
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
Oct. 12, 14-18, 20, 1947	181	7.7	7.7	1,100	20		100	21	117		213	313	63		2.0		741	1.01	362	336	162	43
Oct. 21-31	123	7.9	7.9	942	23		85	18	100		211	235	59		2.4		626	.85	208	286	113	43
Nov. 1-5, 7-10	707	7.8	7.8	767	23		76	16	70		187	194	35		2.9		509	.69	972	256	102	37
Nov. 11-20	1,685	7.9	7.9	577	19		60	12	50		158	140	22		1.4		382	.52	1,740	189	70	35
Nov. 21-22	1,742	7.7	7.7	528	21		54	13	25		115	115	19		1.1		305	.41	1,430	188	94	22
Nov. 23-27	1,840	7.9	7.9	506	21		54	12			152	116	18		1.3		337	.46	1,670	184	60	32
Dec. 1-10	1,792	7.9	7.9	544	21		53	13	63		211	114	21		1.1		380	.53	1,890	186	12	42
Dec. 11-13, 17-20	1,147	8.0	8.0	591	23		58	14	94		289	128	25		.9		485	.66	1,500	202	0	50
Dec. 21-24, 26-31	747	8.0	8.0	670	24		64	12	62		188	140	36		.8		433	.59	873	217	63	38
Jan. 1-10, 1948	698	7.8	7.8	688	26		63	14	72		191	141	41		.5		450	.61	848	206	50	43
Jan. 11-20	664	8.0	8.0	696	29		62	13	71		187	141	44		.4		452	.61	810	208	55	43
Jan. 21-26, 31	457	8.0	8.0	724	26		64	13	75		192	146	47		.1		466	.63	575	213	56	43
Feb. 2-10	872	8.1	8.1	765	23		65	13	84		192	156	56		.1		492	.67	1,160	216	58	46
Feb. 12-20	618	8.2	8.2	766	24		65	13	84		191	155	57		.5		483	.67	823	216	59	46
Feb. 21-29	1,208	7.6	7.6	745	22	0.02	63	13	80	4.4	172	169	49	0.8	.9	0.1	487	.66	1,590	210	70	45
Mar. 1-7, 9-10	1,055	7.8	7.8	762	33		59	14	82		169	164	52		.6		488	.66	1,390	204	66	47
Mar. 11-20	721	7.9	7.9	699	33		58	14	73		188	137	45		.5		453	.62	882	202	48	44
Mar. 21-31	986	7.7	7.7	651	30		57	12	67		178	135	35		.9		425	.58	1,130	182	46	43
Apr. 1-7, 9-10	981	7.6	7.6	627	29		55	12	60		175	125	31		.9		399	.54	1,060	186	43	41
Apr. 11-20	1,859	7.6	7.6	580	30		53	11	56		166	113	32		1.1		378	.51	1,900	177	41	41
Apr. 21-30	3,856	7.8	7.8	476	25		49	9.1	39		155	85	20		1.4		305	.41	3,175	160	33	35
May 1-10	2,806	7.7	7.7	436	25		42	8.7	37		135	80	19		1.2		279	.38	2,110	141	30	36
May 11-20	1,757	7.6	7.6	478	26		46	9.1	41		146	88	21		.8		304	.41	1,440	152	33	37
May 21-27, 29-31	5,920	7.8	7.8	465	26		48	9.3	37		157	81	18		.9		288	.41	4,760	158	30	34

RIO GRANDE BASIN--Continued  
RIO GRANDE AT SAN MARCIAL, N. MEX.--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	Specific conductance (micro-mhos at 25° C.)	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
																Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
June 1-8, 1948 -----	8,579		424	26		44	8.3	34		136	81	16		0.9		277	0.38	6,420	144	32	34
June 11-14, 16, 18-20 -----	7,417	7.7	402	23		44	8.0	30		134	77	13		.9		262	.36	5,250	143	33	32
June 22, 24-30 -----	2,215	7.9	464	26		48	9.1	37		146	90	18		.8		301	.41	1,800	158	38	34
July 1-10 -----	290	7.7	709	27		65	12	74		191	148	43		.5		464	.63	363	212	55	43
July 11-12, 14-20 -----	45.6	7.5	1,040	33		80	19	121		234	208	93		.6		670	.91	82	278	86	49
July 22-27, 29-31 -----	66.6	7.7	1,040	31		80	19	122		231	220	87		1.3		674	.92	121	278	88	49
Aug. 1-10 -----	82.0	7.8	1,250	30		102	24	143		227	325	98		1.4		835	1.14	185	353	157	47
Aug. 11-20 -----	111	7.4	1,140	33		107	24	104		253	285	62		1.5		741	1.01	222	366	158	38
Aug. 21-31 -----	23.5	7.6	1,130	37		80	20	141		240	227	107		3.9		734	1.00	47	282	85	52
Sept. 1-6, 8-10 -----	6.1	7.7	1,120	34		75	21	139		230	220	110		3.5		716	.97	12	274	85	52
Sept. 11-18, 20 -----	3.9	7.7	1,180	34		77	19	154		232	230	124		1.5		754	1.03	7.9	270	80	55
Sept. 21-27 -----	9.1	7.7	1,120	32		77	17	138		206	226	112		.9		704	.96	17	262	93	53
Sept. 28, 30 -----	185	7.6	2,180	23		243	48	208		244	908	79		.5		1,630	2.22	814	804	604	36
Weighted average --	1,427	--	521	25		51	10	47		158	104	24		1.0		340	0.46	1,310	168	38	38



## RIO GRANDE BASIN--Continued

## RIO GRANDE AT SAN MARCIAL, N. MEX.--Continued

Suspended sediment, water year October 1947 to September 1948

Day	October			November			December		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day
1-----	23	--	1/25	57	0.24	369	1,720	0.09	4,180
2-----	24	--	1/26	70	.19	359	1,900	.08	4,100
3-----	21	--	1/23	392	1.52	16,100	1,810	.10	4,890
4-----	18	--	1/15	487	1.33	17,500	1,840	.07	3,480
5-----	14	--	1/11	495	1.11	14,800	1,860	.08	4,020
6-----	10	--	1/5	592	--	1/18,100	1,860	.07	3,520
7-----	5	--	1/3	986	1.58	42,100	1,860	.07	3,520
8-----	0	--	0	1,080	1.29	37,600	1,790	.07	3,380
9-----	0	--	0	1,420	.82	31,400	1,660	.06	2,690
10-----	0	--	0	1,490	.85	34,200	1,620	.05	2,190
11-----	1	--	1/1	1,490	--	1/31,400	1,590	.05	2,150
12-----	3	0.02	2	1,640	.60	26,600	1,450	.05	1,960
13-----	4	.15	16	1,680	.66	29,900	1,100	.03	891
14-----	38	.65	667	1,640	.59	26,100	718	--	1/582
15-----	158	1.30	5,550	1,740	.46	21,600	620	--	1/502
16-----	180	1.73	12,100	1,740	.48	22,600	674	--	1/728
17-----	652	4.80	84,500	1,770	.36	17,200	1,180	.05	1,590
18-----	309	3.80	31,700	1,770	.34	16,200	1,420	.04	1,530
19-----	245	--	1/20,200	1,660	.22	9,860	1,300	.03	1,050
20-----	220	2.05	12,200	1,720	.19	8,820	1,420	.03	1,150
21-----	222	1.30	7,790	1,700	.27	12,400	1,300	.04	1,400
22-----	147	.86	3,410	1,860	.24	12,100	958	.02	517
23-----	140	.72	2,720	1,900	.15	7,700	776	.02	419
24-----	134	.35	1,270	1,950	.09	4,740	685	.02	370
25-----	114	.37	1,140	1,840	.14	6,960	696	--	1/376
26-----	87	.32	752	1,770	.14	6,690	685	.02	370
27-----	123	.44	1,460	1,740	.12	5,640	620	.02	335
28-----	128	.62	2,140	1,620	.12	5,250	630	.02	340
29-----	89	.54	1,300	1,790	.09	4,350	620	.02	335
30-----	97	.38	995	1,740	.09	4,230	602	.02	325
31-----	76	.28	575	--	--	--	641	.02	346
Total-	3,282	--	190,600	41,829	--	492,900	37,605	--	53,240
January			February			March			
1-----	650	0.01	176	154	0.01	42	1,200	0.07	2,270
2-----	670	.01	181	216	.02	117	1,180	.06	1,910
3-----	710	.01	192	340	.02	184	1,180	.09	2,870
4-----	828	.01	224	886	.04	957	1,260	.09	3,060
5-----	720	.01	194	1,890	.10	5,100	1,180	.07	2,230
6-----	622	.01	168	1,450	.04	1,570	1,130	.06	1,830
7-----	700	.01	189	1,100	.03	891	1,050	.05	1,420
8-----	680	.01	184	910	.03	737	910	.03	737
9-----	710	.01	192	970	.03	786	784	.04	847
10-----	690	.01	186	806	.03	653	680	.04	734
11-----	670	.01	181	762	--	1/411	773	.03	626
12-----	670	.01	181	478	.02	258	817	.03	662
13-----	660	.01	178	275	.02	148	828	.03	671
14-----	660	.01	178	305	.02	165	720	.04	778
15-----	680	.01	184	526	.02	284	700	.03	567
16-----	700	.01	189	862	.03	698	660	.02	356
17-----	680	.01	184	700	.02	378	631	.03	511
18-----	640	.01	173	650	.02	351	640	.03	518
19-----	640	.01	173	773	.02	417	730	.03	591
20-----	640	.01	173	850	.02	459	710	.03	575
21-----	670	.01	181	874	.02	472	740	.04	799
22-----	690	.02	373	720	.02	389	1,010	.04	1,080
23-----	650	.01	176	690	.04	745	1,170	.06	1,900
24-----	622	.01	168	785	.03	644	1,100	.05	1,480
25-----	550	.02	297	1,100	.07	2,080	828	.07	1,560
26-----	550	.02	297	1,680	.12	5,440	751	.05	1,010
27-----	442	--	1/239	1,930	.14	7,300	795	.05	1,070
28-----	414	--	1/224	1,660	.11	4,930	1,060	.05	1,430
29-----	168	--	1/91	1,420	.07	2,680	1,200	.05	1,620
30-----	139	--	1/75	--	--	--	1,100	.05	1,480
31-----	130	.02	70	--	--	--	1,090	.05	1,470
Total-	18,645	--	5,870	25,772	--	39,290	28,607	--	38,670

1/Estimated or interpolated.



## RIO GRANDE BASIN--Continued

## RIO GRANDE AT SAN MARCIAL, N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948

(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	Time	Mean discharge (second-foot)	Suspended sediment										Methods of analysis					
			Mean daily concentration (percent)	Weight of material in tube (grams)	Percent finer than indicated size, in millimeters													
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250		0.500	1.000	2.000		
Oct. 13, 1947-----	12:00 m.	4	0.15	0.0327														S
Oct. 17-----	2:00 p.m.	652	4.80	.4901	61	67	86	97	99	100	93	100	--	--	--	--	--	BWCM
Nov. 10-----	12:35 p.m.	1,490	.85	.2974	19	28	54	65	76	81	93	98	99	99	99	99	99	BSWCM
Nov. 20-----	3:35 p.m.	1,720	.09	.3709	--	--	--	--	--	--	33	84	100	--	--	--	--	S
Dec. 1-----	1:05 p.m.	1,720	.19	.3676	--	--	--	--	--	--	29	51	97	100	97	100	97	S
Dec. 10-----	1:34 p.m.	1,620	.05	.0981	--	--	--	--	--	--	56	69	96	99	96	99	99	S
Dec. 20-----	12:10 p.m.	1,420	.03	.1175	--	--	--	--	--	--	58	75	96	99	96	99	99	S
Jan. 1, 1948-----	12:05 p.m.	650	.01	.0624	--	--	--	--	--	--	54	77	88	95	88	95	95	S
Jan. 10-----	12:10 p.m.	690	.01	.0327	--	--	--	--	--	--	100	--	--	--	--	--	--	S
Jan. 20-----	3:35 p.m.	640	.01	.0283	--	--	--	--	--	--	100	--	--	--	--	--	--	S
Feb. 1-----	12:45 p.m.	184	.01	.0312	--	--	--	--	--	--	97	98	100	--	--	--	--	S
Feb. 10-----	3:13 p.m.	806	.03	.0868	--	--	--	--	--	--	51	64	79	91	64	79	91	S
Feb. 20-----	2:30 p.m.	850	.02	.0702	--	--	--	--	--	--	60	74	85	93	74	85	93	S
Mar. 1-----	3:19 p.m.	1,200	.07	.2822	--	--	--	--	--	--	93	95	99	100	93	95	99	S
Mar. 11-----	3:34 p.m.	1,773	.03	.1023	--	--	--	--	--	--	90	95	99	100	90	95	99	S
Apr. 1-----	3:40 p.m.	993	.04	.1386	--	61	72	82	89	--	--	--	--	--	--	--	--	DWCM
Apr. 10-----	12:14 p.m.	1,010	.05	.2300	--	62	76	84	90	--	--	--	--	--	--	--	--	DWCM
Apr. 20-----	11:20 a.m.	2,870	.21	.3369	4	15	46	54	--	--	--	--	--	--	--	--	--	DN
May 1-----	7:46 a.m.	2,250	.12	.3652	2	13	65	79	--	--	--	--	--	--	--	--	--	DN
May 10-----	1:45 p.m.	2,820	.14	.6138	1	6	37	84	--	--	--	--	--	--	--	--	--	DN
May 20-----	1:52 p.m.	886	.06	.2066	5	20	72	91	--	--	59	89	99	99	99	99	99	DN
May 27-----	6:30 p.m.	6,380	.24	.5953	0	4	12	40	--	--	56	81	99	100	56	81	99	DSN
May 28-----	6:00 p.m.	7,720	.31	.7525	2	11	29	40	--	--	--	--	--	--	--	--	--	DSN
June 1-----	8:40 a.m.	11,000	.48	.5798	2	7	19	24	--	--	38	73	99	100	38	73	99	DSN
June 10-----	11:20 a.m.	9,230	.51	.5907	5	9	19	24	--	--	42	77	98	99	42	77	98	DSN
June 20-----	6:37 a.m.	4,110	.46	.4070	3	9	15	25	--	--	60	90	98	99	60	90	98	DSN
July 1-----	7:37 a.m.	660	.15	.3469	6	13	31	39	--	--	--	--	--	--	--	--	--	DN
July 10-----	7:53 a.m.	114	.03	.1104	0	17	67	85	--	--	--	--	--	--	--	--	--	DN
July 20-----	7:55 a.m.	36	.04	.1603	16	39	69	82	--	--	--	--	--	--	--	--	--	DN

## RIO GRANDE BASIN--Continued

## RIO GRANDE AT SAN MARCIAL, N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948--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	Time	Mean discharge (second-foot)	Suspended sediment										Methods of analysis				
			Mean daily concentration (percent)	Weight of material in tube (grams)	Percent finer than indicated size, in millimeters												
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250		0.500	1.000	2.000	
Aug. 1, 1948 -----																	
Aug. 9 -----	8:02 a. m.	37	0.04	0.1901	16	32	74	83	--	--	--	--	--	--	--	--	DN
Aug. 9 -----	4:00 a. m.	208	6.88	.4880	0	3	13	82	--	--	--	--	--	--	--	--	DN
Aug. 11 -----	8:48 a. m.	200	3.45	.3186	0	8	31	82	--	--	--	--	--	--	--	--	DN
Aug. 20 -----	8:30 a. m.	34	.05	.2323	0	7	44	78	--	--	--	--	--	--	--	--	DN
Sept. 1 -----																	
Sept. 1 -----	10:05 a. m.	11	.04	.1170	22	51	94	98	--	--	--	--	--	--	--	--	DN
Sept. 20 -----	11:50 a. m.	1	.02	.0692	0	39	76	91	--	--	--	--	--	--	--	--	DN
Sept. 28 -----	8:00 a. m.	245	7.40	.2510	0	9	36	78	--	--	--	--	--	--	--	--	DN
Sept. 29 -----	1:35 p. m.	220	6.14	.3410	0	6	28	77	--	--	--	--	--	--	--	--	DN

RIO GRANDE BASIN--Continued  
RIO GRANDE AT MISSION PUMPING PLANT NEAR MISSION, TEX.

LOCATION.--At Mission pumping plant, 3 miles south of Mission, Hidalgo County.  
DRAINAGE AREA.--171,800 square miles (estimated).  
RECORDS AVAILABLE.--Chemical analyses: July 1945 to September 1948.  
EXTREMES, 1947-48.--Dissolved solids: Maximum, 964 parts per million May 1-10; minimum, 209 parts per million June 28-30.  
Total hardness: Maximum, 380 parts per million Mar. 11-20; minimum, 95 parts per million June 28-30.  
EXTREMES, 1945-48.--Dissolved solids: Maximum, 1,440 parts per million May 9-11, 1947; minimum, 209 parts per million June 28-30, 1948.  
Total hardness: Maximum, 672 parts per million May 9-11, 1947; minimum, 95 parts per million June 28-30, 1948.  
REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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	
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate		
Oct. 1-10, 1947-----				696	--		64	12	64		159	119	64		3.2	--		462	0.63		209	78	40
Oct. 11-20-----				754	--		60	15	75		141	140	80		1.5	--		498	.68		211	95	44
Oct. 21-24-----				891	--		52	9	66		125	114	65		3.0	--		376	.51		171	68	46
Oct. 25-31-----				638	--		65	18	98		150	167	107		1.0	--		577	.78		235	113	47
Nov. 1-10-----				852	--		66	15	88		145	157	94		2.5	--		545	.74		226	107	46
Nov. 11-20-----				997	--		73	20	105		163	195	109		2.2	--		642	.77		264	130	46
Nov. 21-30-----				898	--		68	15	100		157	166	102		2.5	--		576	.73		231	102	43
Dec. 1-10-----				1,000	--		74	20	134		219	203	117		1.8	--		655	.89		266	147	52
Dec. 11-20-----				1,040	--		73	26	115		171	197	135		2.8	--		657	.69		259	149	45
Dec. 21-31-----				1,160	--		82	24	128		176	208	155		3.5	--		711	.97		303	159	43
Jan. 1-10, 1948-----				1,260	--		84	29	148		177	233	185		1.5	0.14		829	1.13		328	164	49
Jan. 11-20-----				1,250	--		82	28	145		168	239	180		2.0	.21		830	1.13		320	162	50
Jan. 21-31-----				1,310	--		88	31	154		185	243	195		2.5	.25		855	1.16		347	196	49
Feb. 1-10-----				1,370	27		78	27	172		152	246	210		2.5	--		858	1.17		306	161	53
Feb. 11-20-----				1,450	30		80	30	178		157	271	210		2.8	--		922	1.25		323	164	54
Feb. 21-29-----				1,440	26		84	28	175		168	242	222		3.8	--		901	1.23		324	167	54
Mar. 1-8, 10-----				1,420	25		92	30	161		157	286	195		4.0	--		923	1.26		353	224	50
Mar. 11-20-----				1,550	31		96	34	181		165	304	225		4.0	--		956	1.30		360	244	51
Mar. 21-31-----				1,300	25		81	29	147		160	252	175		1.5	--		829	1.13		321	190	50
Apr. 1-10-----				1,170	20		69	26	131		140	220	155		1.0	--		727	.99		279	164	50
Apr. 11-20-----				1,030	16		67	23	111		145	195	128		1.0	--		632	.86		262	142	48
Apr. 21-30-----				1,120	15		72	23	122		143	213	142		1.2	--		700	.95		274	157	49
May 1-10-----				1,580	19		84	38	193		133	322	240		2.2	--		964	1.31		366	236	53
May 11-20-----				1,120	17		70	27	119		127	206	160		1.2	--		691	.94		265	142	48
May 21-31-----				956	15		64	18	104		119	186	118		1.2	--		594	.81		234	136	49

RIO GRANDE BASIN--Continued  
RIO GRANDE AT MISSION PUMPING PLANT NEAR MISSION, TEX.--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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	
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate		
June 1-10, 1948-----																		640	0.87		255	148	31
June 11-20-----				1,060	16		66	22	120	131	176	158			2.8	--	--	658	.89		266	150	46
June 21-27-----				1,060	18		67	24	117	141	194	142			1.8	--	--	568	.77		234	114	48
June 28-30-----				932	15		64	18	101	146	168	111			1.8	--	--	209	.28		135	33	44
July 1-2, 8-14-----				319	20		33	3.1	35	134	29	19			4.2	--	--	248	.34		207	92	37
July 15-22-----				388	20		43	6.7	24	124	44	26			4.5	.53	.48	427	.56		271	140	45
July 23-31-----				673	19		65	11	57	140	112	68			4.5	.53	.48	632	.86		278	153	46
Aug. 1-10-----				1,010	22		79	18	45	152	161	140			3.2	--	--	655	.89		264	129	46
Aug. 11-20-----				1,010	27		80	19	107	152	198	125			5.4	.24	.24	638	.87		282	140	47
Aug. 21-31-----				974	32		76	18	104	164	189	109			5.0	.21	.21	695	.95		231	116	48
Sept. 1-10-----				1,070	29		80	20	117	172	202	128			2.8	.19	.19	568	.77		118	28	36
Sept. 11-15, 19-----				903	18		68	15	97	141	159	112			2.8	.08	.08	242	.33		186	86	33
Sept. 16-18, 20-----				380	10		38	5.6	31	110	56	24			3.2	.25	.25	355	.48		192	60	43
Sept. 19-21, 20-----				562	9.8		60	9.0	42	122	105	47			2.5	.25	.25	421	.57		278	153	46
Sept. 21-30-----				677	11		59	11	66	136	117	71			2.5	.25	.25	421	.57		264	129	46

## 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, 1½ miles upstream from El Rito Creek, 5 miles downstream from Abiquiu, Rio Arriba County, and 13.5 miles downstream from Abiquiu dam site.

RECORDS AVAILABLE.--Sediment records: January to September 1948.

EXTREMES, 1947-48.--Sediment loads: Maximum 58,400 tons per day May 27; minimum, 0 tons per day Jan. 15-18, Feb. 5-20.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1118.

## Suspended sediment, water year October 1947 to September 1948

Day	January			February			March		
	Mean dis-charge (second-feet)	Suspended sediment		Mean dis-charge (second-feet)	Suspended sediment		Mean dis-charge (second-feet)	Suspended sediment	
		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day
1-----	30	--	--	30	0.01	8	84	0.12	272
2-----	25	--	--	35	.01	9	62	.07	117
3-----	25	--	--	35	.01	9	55	.05	74
4-----	30	--	--	36	--	10	40	.04	43
5-----	35	--	--	32			34	.03	28
6-----	35	--	--	29			29	.02	16
7-----	36	--	--	34			31	--	1/17
8-----	27	--	--	30			30	--	1/16
9-----	29	--	--	28			31	--	1/17
10-----	31	--	--	30			32	.02	17
11-----	28	--	--	32			31	.02	17
12-----	26	--	--	26	0	0	35	.02	19
13-----	24	--	--	25			36	.02	19
14-----	25	--	--	25			40	.02	22
15-----	28	0	0	26			50	.08	108
16-----	25	0	0	28			70	.22	416
17-----	29	0	0	30			80	.17	367
18-----	25	0	0	32			150	.61	2,470
19-----	25	.01	7	37			130	.71	2,490
20-----	25	.01	7	46			100	.44	1,190
21-----	25	.01	7	256	.18	1,240	90	.26	632
22-----	25	.01	7	271	.25	1,830	70	.47	888
23-----	22	.01	6	305	.54	4,450	80	.39	842
24-----	21	.01	6	189	.50	2,550	90	.38	923
25-----	18	.01	5	180	.33	1,600	100	1.34	3,620
26-----	19	.01	5	170	.25	1,150	85	1.83	4,200
27-----	15	.01	4	160	.25	1,080	90	.81	1,970
28-----	10	.01	3	148	.67	2,680	100	.49	1,320
29-----	15	.01	4	112	.50	1,510	120	--	1/1,100
30-----	20	.01	5	--	--	--	130	.20	702
31-----	25	.01	7	--	--	--	100	.49	1,320
Total -	778	--	73	2,417	--	18,130	2,205	--	25,250

1/Estimated or interpolated.

RIO GRANDE BASIN--Continued  
 RIO CHAMA NEAR ABIQUIU, N. MEX.--Continued  
 Suspended sediment, water year October 1947 to September 1948--Continued

Day	April			May			June		
	Mean dis-charge (second-foot)	Mean concen-tration (percent)	Tons per day	Mean dis-charge (second-foot)	Mean concen-tration (percent)	Tons per day	Mean dis-charge (second-foot)	Mean concen-tration (percent)	Tons per day
1-----	65	0.36	632	234	0.10	632	1,080	0.64	18,700
2-----	55	.26	386	230	.16	994	1,380	.38	14,200
3-----	49	.09	119	208	.12	674	1,420	--	14,200
4-----	56	.06	91	204	.12	661	1,380	.28	10,400
5-----	78	.15	316	197	.11	585	1,400	.25	9,450
6-----	90	.17	413	204	.10	551	1,480	.34	13,600
7-----	102	.22	606	230	.12	745	1,540	.43	17,900
8-----	102	.18	496	225	.16	972	1,490	.71	28,600
9-----	114	.18	554	204	.15	826	1,460	.20	7,880
10-----	158	.30	1,280	174	.14	658	992	.12	3,210
11-----	238	.68	4,370	152	.10	410	852	.17	3,910
12-----	256	.42	2,900	122	.08	264	841	.09	2,040
13-----	216	.17	991	100	.06	162	852	.07	1,610
14-----	388	.60	9,320	84	.05	113	1,090	.17	4,820
15-----	632	.60	10,200	92	.04	99	1,060	.08	2,290
16-----	721	.93	18,100	221	.19	1,130	733	.04	792
17-----	841	.71	16,100	261	.13	916	553	.04	597
18-----	976	--	1/16,100	247	.11	734	539	.03	437
19-----	863	--	1/12,100	168	.08	363	420	.02	227
20-----	863	--	1/9,790	171	.07	323	390	.02	211
21-----	677	.36	6,580	161	.08	348	378	.01	102
22-----	441	.26	3,100	136	.07	257	402	.02	217
23-----	434	.26	3,050	117	.05	158	657	.45	7,980
24-----	360	.20	1,940	102	.06	165	721	.14	2,730
25-----	316	.21	1,790	114	.04	123	584	.06	946
26-----	305	.18	1,480	694	1.00	33,200	511	.04	552
27-----	327	.22	1,940	1,590	1.35	58,400	511	.02	276
28-----	266	.09	646	1,460	1.36	53,600	427	.04	461
29-----	230	.06	373	964	.42	10,900	322	.03	261
30-----	238	.06	386	703	.26	4,940	327	.01	88
31-----	--	--	--	712	.21	4,040	--	--	--
Total -	10,457	--	126,100	10,481	--	177,900	25,752	--	168,700
Day	July			August			September		
	Mean dis-charge (second-foot)	Mean concen-tration (percent)	Tons per day	Mean dis-charge (second-foot)	Mean concen-tration (percent)	Tons per day	Mean dis-charge (second-foot)	Mean concen-tration (percent)	Tons per day
1-----	261	0.01	70	810	0.02	437	600	0.01	162
2-----	158	--	1/43	810	.02	437	592	.02	320
3-----	145	--	1/78	407	.02	220	592	.01	160
4-----	136	.02	73	372	.01	100	760	.09	1,850
5-----	128	.01	35	462	.36	4,490	1,070	.08	2,310
6-----	122	.01	33	434	.82	9,610	1,050	.09	2,550
7-----	117	.01	32	366	.35	3,460	734	.06	1,190
8-----	104	.01	28	497	.38	5,100	448	.02	242
9-----	97	.01	25	372	.52	5,220	390	.01	105
10-----	90	.01	24	354	.08	765	392	.75	8,570
11-----	88	.02	48	354	.04	382	134	.11	398
12-----	82	.01	22	360	.04	389	86	.02	46
13-----	74	.01	20	354	.03	287	65	.04	70
14-----	67	.01	18	344	.04	372	70	.05	94
15-----	65	.01	18	338	.06	548	47	.01	13
16-----	481	.08	1,040	338	.02	183	31	.01	8
17-----	931	.08	2,010	332	.01	90	26	0	0
18-----	730	.04	788	322	.02	174	25	0	0
19-----	730	.07	1,380	327	.06	530	25	0	0
20-----	685	.04	740	310	.02	167	24	0	0
21-----	658	.04	711	310	.01	84	20	0	0
22-----	462	.04	499	643	.27	7,470	17	0	0
23-----	414	.02	224	1,100	.23	6,830	17	0	0
24-----	414	.02	224	667	.11	1,980	17	--	1/5
25-----	427	.02	231	658	.08	1,420	17	.01	5
26-----	441	.11	1,310	640	.04	691	42	.11	125
27-----	408	.14	1,540	632	.04	683	115	.87	2,700
28-----	402	.02	217	632	.03	512	55	.46	683
29-----	390	.02	211	632	.02	341	34	.06	55
30-----	552	.05	745	632	.02	341	26	.04	28
31-----	800	.10	2,160	608	.02	328	--	--	--
Total -	10,659	--	14,600	15,417	--	53,640	7,521	--	21,690
Total discharge for period Jan. 15 to Sept. 30 (second-foot days) -----									
Total load for year Jan. 15 to Sept. 30 (tons) -----									
1/ Estimated or interpolated.									



RIO GRANDE BASIN--Continued  
RIO CHAMA NEAR ABIQUIU, N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948

(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	Time	Mean discharge (second- feet)	Suspended sediment											Methods of analysis	
			Mean daily concentration (percent)	Weight of material in tube (grams)	Percent finer than indicated size, in millimeters										
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500		1.000
Mar. 1, 1948	9:00 a. m.	84	0.12	0.5398	58	82	95	--	--	--	--	--	--	--	BWCM
Mar. 20	4:30 p. m.	100	.44	.7178	65	82	94	99	--	--	--	--	--	--	BWCM
Mar. 10	9:00 a. m.	158	.30	.0372	61	85	96	100	--	--	--	--	--	--	DWCM
Apr. 21	12:00 m.	677	.36	1.1068	--	--	--	--	--	85	96	100	--	--	S
Apr. 30	8:00 a. m.	238	.06	1.1538	--	--	--	--	--	68	76	99	100	--	S
May 10	6:30 p. m.	174	.14	.4525	--	--	--	--	--	92	95	98	100	--	S
May 20	12:30 p. m.	171	.07	.2759	--	--	--	--	--	79	87	98	100	--	S
May 30	6:20 a. m.	703	.26	.6795	--	--	--	--	--	60	80	94	99	--	S
June 10	8:00 a. m.	992	.12	.4495	--	--	--	--	--	47	71	93	100	--	S
June 20	8:00 a. m.	390	.02	.0823	--	--	--	--	--	69	91	98	100	--	S
July 1	8:00 a. m.	261	.01	.0310	--	--	--	--	--	67	83	95	100	--	S
July 10	9:00 a. m.	80	.01	.0324	25	38	57	75	--	44	66	93	100	--	DN
July 20	9:00 a. m.	685	.04	.2200	--	--	--	--	--	55	70	90	96	--	S
July 26	10:20 a. m.	441	.11	.1694	2	6	13	18	--	55	70	90	96	--	DSN
Aug. 5	12:55 p. m.	462	.36	1.5653	1	3	22	66	--	--	--	--	--	--	DN
Aug. 6	9:30 a. m.	434	.82	2.3892	1	2	80	91	--	--	--	--	--	--	DN
Aug. 8 1/2	9:30 a. m.	497	.38	.9480	1	4	32	77	--	--	--	--	--	--	DN
Aug. 8 1/2	4:30 p. m.	497	.38	1.6443	0	3	18	39	--	61	65	74	87	--	DSN
Aug. 9	9:30 a. m.	372	.52	2.2726	1	2	81	87	--	--	--	--	--	--	DN
Aug. 10	9:30 a. m.	354	.08	.2661	3	20	40	60	--	--	--	--	--	--	DN
Aug. 20	9:30 a. m.	310	.02	.0379	12	34	48	64	--	--	--	--	--	--	DN
Aug. 23	12:30 p. m.	1,100	.23	.7996	5	10	16	27	--	--	--	--	--	--	DN
Sept. 1	9:30 a. m.	600	.01	.0461	10	23	30	37	--	76	92	99	100	--	DSN
Sept. 10	4:30 p. m.	392	.75	2.0165	0	1	2	87	--	--	--	--	--	--	DN
Sept. 27	8:30 a. m.	115	.87	2.0210	--	--	70	100	--	--	--	--	--	--	DN

1/Sediment concentration of size samples for Aug. 8: 9:30 a. m., 0.27; 4:30 p. m., 0.48.

1/Sediment concentration of size samples for Aug. 8: 9:30 a. m., 0.27; 4:30 p. m., 0.48.

## 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.

RECORDS AVAILABLE.--Sediment records: October 1947 to September 1948.

EXTREMES, 1947-48.--Sediment loads: Maximum, 83,700 tons per day May 27; minimum, 0 tons per day Sept. 18-25.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1118. Sediment concentrations Oct. 1-Jan. 14 provided by Corps of Engineers.

## Suspended sediment, water year October 1947 to September 1948

Day	October			November			December		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day
1-----	7	0.04	8	418	0.44	4,970	1,300	0.29	9,400
2-----	6	1.95	316	418	.62	7,000	1,130	.34	10,400
3-----	4.7	1.56	198	650	.50	8,780	1,140	.34	10,500
4-----	6.5	1.72	302	1,240	.97	32,500	1,130	--	1/8,850
5-----	35	1.52	1,440	1,270	1.08	37,000	1.090	--	1/6,770
6-----	490	.84	11,100	1,330	.67	24,100	1,070	.18	5,200
7-----	472	1.17	14,900	1,320	.96	34,200	1,050	.18	5,100
8-----	481	.94	12,200	1,330	.83	29,800	1,040	.19	5,340
9-----	481	1.06	13,800	1,320	.55	19,600	1,050	.17	4,820
10-----	490	.09	1,190	1,340	.80	28,900	994	--	1/5,900
11-----	246	1.88	12,500	1,340	.65	23,500	958	.27	6,980
12-----	97	2.39	6,260	1,340	.65	23,500	910	.86	21,100
13-----	79	1.90	4,050	1,340	.90	32,600	880	.56	13,300
14-----	835	3.06	69,000	1,360	.78	28,600	860	.02	464
15-----	336	3.92	35,600	1,320	.72	25,700	600	.03	486
16-----	110	3.65	10,800	1,320	.59	21,000	500	.29	3,920
17-----	90	3.68	8,940	1,340	.70	25,300	320	.03	259
18-----	80	.82	1,770	1,330	.78	28,000	128	.02	69
19-----	75	.75	1,520	1,320	.30	10,700	97	.04	105
20-----	70	.09	170	1,320	.21	7,480	76	.03	62
21-----	70	.10	189	1,280	.24	8,290	79	--	1/171
22-----	320	.09	778	1,240	.63	21,100	68	.13	239
23-----	392	1.24	13,100	1,230	.75	24,900	70	1.55	2,930
24-----	409	.74	8,170	1,250	.99	33,400	65	.38	667
25-----	400	.93	10,000	1,250	.77	26,000	65	.84	1,470
26-----	409	.92	10,200	1,230	.47	15,600	73	.06	118
27-----	409	.92	10,200	1,200	.46	14,900	79	.08	171
28-----	409	.50	5,520	1,160	.04	1,250	82	--	1/133
29-----	409	.56	6,180	1,140	.04	1,230	82	.05	111
30-----	427	.61	7,030	1,150	.02	621	91	--	1/147
31-----	409	.72	7,950	--	--	--	88	--	1/190
Total-	8,554.2	--	285,400	36,096	--	600,500	17,065	--	125,400

1/Estimated or interpolated.

## RIO GRANDE BASIN--Continued

## RIO CHAMA NEAR CHAMITA, N. MEX.--Continued

Suspended sediment, water year October 1947 to September 1948--Continued

Day	January			February			March		
	Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment	
		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day
1-----	73	0.10	197	40	0.01	11	165	0.44	1,960
2-----	55	.07	104	45	.02	24	150	.20	810
3-----	55	.15	223	50	.02	27	132	.16	570
4-----	60	.07	113	55	.05	74	120	.17	551
5-----	70	.06	113	60	.10	162	112	.11	333
6-----	80	.13	281	75	.13	263	97	.12	314
7-----	90	.06	146	85	.07	161	85	.11	252
8-----	90	.09	219	88	.06	143	82	.08	177
9-----	91	.05	123	85	.04	92	73	.08	158
10-----	79	.05	107	88	.04	95	70	.13	246
11-----	91	.10	246	108	.02	58	73	.18	355
12-----	73	.05	99	50	.02	27	82	.17	376
13-----	70	.05	94	60	.04	65	85	.18	413
14-----	76	.07	144	70	.03	57	85	.20	459
15-----	68	.03	55	80	.02	43	88	.25	594
16-----	76	.07	144	100	.04	108	104	.30	842
17-----	76	.04	62	120	.02	65	112	.29	877
18-----	60	.05	81	170	.04	184	160	.70	3,020
19-----	55	.04	59	155	.13	544	175	.86	4,060
20-----	55	.01	15	214	.12	693	136	.56	2,060
21-----	70	.07	132	336	.31	2,810	128	.36	1,240
22-----	95	.08	205	384	.42	4,350	116	.29	908
23-----	94	.06	152	392	.52	5,500	128	.26	899
24-----	91	.05	123	463	.60	7,500	150	.32	1,300
25-----	85	.04	92	299	.43	3,470	202	.88	4,800
26-----	94	.03	76	238	.20	1,290	214	1.02	5,890
27-----	88	.01	24	226	.30	1,830	185	1.00	5,000
28-----	50	.01	14	208	.47	2,640	196	.34	1,800
29-----	40	.01	11	180	.39	1,900	226	.45	2,750
30-----	40	.02	22	--	--	--	257	.36	2,500
31-----	38	.01	10	--	--	--	271	.31	2,270
Total -	2,228	--	3,510	4,524	--	34,190	4,259	--	47,780
	April			May			June		
1-----	214	0.39	2,250	1,160	0.24	7,520	1,160	--	9,710
2-----	185	.27	1,350	1,020	.31	8,540	1,510	--	15,100
3-----	202	.42	2,290	1,010	.18	4,910	1,660	0.44	19,700
4-----	292	.36	2,840	833	.19	4,270	1,650	.44	19,600
5-----	271	.38	2,780	855	.32	7,390	1,620	.38	16,600
6-----	328	.40	3,540	800	.30	6,480	1,620	.32	14,000
7-----	328	.42	3,720	800	.34	7,340	1,580	.34	14,500
8-----	356	.36	3,270	756	.36	7,350	1,680	.51	23,100
9-----	436	.31	3,650	620	.32	5,360	1,550	.38	15,900
10-----	620	.39	6,530	500	.22	2,970	1,180	.20	6,370
11-----	855	.68	15,700	472	.26	3,310	982	.38	10,100
12-----	789	.36	7,670	376	.14	1,420	946	.38	9,700
13-----	580	.24	3,760	328	.16	1,420	899	.26	6,310
14-----	550	.22	3,270	344	.14	1,300	1,050	.23	6,520
15-----	1,810	.92	45,000	384	.21	2,180	1,070	.24	6,930
16-----	1,310	.74	26,100	500	.24	3,240	778	.22	4,620
17-----	1,490	.68	27,400	500	.26	3,510	500	.16	2,160
18-----	1,760	.84	39,900	510	.29	3,990	400	.16	1,730
19-----	1,740	.80	37,600	454	.21	2,570	320	.14	1,210
20-----	1,740	.78	36,600	427	.16	1,840	271	.12	878
21-----	1,690	.61	27,800	400	.15	1,620	244	.18	1,190
22-----	1,500	.63	25,500	344	.12	1,110	278	.14	1,050
23-----	1,400	.60	22,700	292	.10	788	445	.36	4,330
24-----	1,300	.50	17,600	278	.11	826	580	.46	7,200
25-----	1,250	.42	14,200	360	.11	1,070	454	.23	2,820
26-----	1,250	.41	13,800	868	.72	16,900	292	.18	1,420
27-----	1,250	.21	7,090	1,950	1.59	83,700	299	.19	1,530
28-----	1,200	.22	7,130	1,940	.73	38,200	278	.14	1,050
29-----	1,180	.24	7,650	1,400	.52	19,700	175	.06	284
30-----	1,160	.30	9,400	1,080	.43	12,500	165	.06	267
31-----	--	--	--	922	.32	7,970	--	--	--
Total -	29,016	--	428,100	22,483	--	271,300	25,636	--	225,900

1/ Estimated or interpolated.

## WESTERN GULF OF MEXICO BASINS

## RIO GRANDE BASIN--Continued

## RIO CHAMA NEAR CHAMITA, N. MEX.--Continued

Suspended sediment, water year October 1947 to September 1948--Continued

Day	July			August			September		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day
1-----	150	0.07	284	855	0.04	923	500	0.02	270
2-----	94	.06	152	811	.08	1,750	500	.07	945
3-----	91	.05	123	540	.08	1,170	490	.08	1,060
4-----	94	.04	102	392	.04	423	621	.11	1,840
5-----	76	.07	144	520	.47	6,600	1,100	.09	2,670
6-----	58	.04	63	481	.58	7,530	1,070	.06	1,730
7-----	54	.05	73	360	.45	4,370	905	.04	977
8-----	45	.02	24	463	1.51	18,900	445	.02	240
9-----	37	.02	20	360	2.50	24,300	376	.02	203
10-----	29	.01	8	306	.22	1,820	530	.35	5,010
11-----	42	.03	34	299	.09	727	244	.19	1,250
12-----	29	.03	23	320	.07	605	128	.02	69
13-----	23	.01	6	299	.04	323	73	.03	59
14-----	18	.01	5	285	.04	308	75	.04	81
15-----	15	.01	4	299	.04	323	50	.02	27
16-----	124	.01	33	299	.03	242	35	.02	19
17-----	910	.16	3,930	306	.06	496	26	.01	7
18-----	660	.22	3,920	271	.02	146	19	0	0
19-----	723	.28	5,470	278	.02	150	14	0	0
20-----	712	.17	3,270	285	.02	154	12	0	0
21-----	690	.14	2,610	285	.02	154	6.0	0	0
22-----	510	.09	1,240	443	.23	2,750	6.5	0	0
23-----	392	.08	847	1,080	.37	10,800	11	0	0
24-----	384	.08	829	696	.13	2,440	8.5	0	0
25-----	418	.26	2,930	570	.06	923	9.0	0	0
26-----	418	.27	3,050	580	.06	940	13	.01	4
27-----	384	.12	1,240	560	.04	605	49	.15	198
28-----	368	.08	795	560	.04	605	58	.30	470
29-----	376	.07	711	540	.02	292	32	.18	156
30-----	443	.12	1,440	530	.03	429	26	.04	28
31-----	855	.04	923	530	.02	286	--	--	--
Total -	9,222	--	34,300	14,403	--	91,480	7,432	--	17,310

Total discharge for year (second-foot days) ----- 180,918.2

Total load for year (tons) ----- 2,165,000

RIO GRANDE BASIN--Continued  
RIO CHAMA NEAR CHAMITA, N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948

(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	Time	Mean discharge (second-foot)	Suspended sediment										Methods of analysis			
			Mean daily concentration (percent)	Weight of material in tube (grams)	Percent finer than indicated size, in millimeters											
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250		0.500	1.000	2.000
Jan. 15, 1948-----	1:45 p.m.	68	0.03	0.0737	--	--	--	--	--	--	40	65	98	100		S
Jan. 20-----	1:45 p.m.	55	.01	.0851	--	--	--	--	--	--	36	61	96	100		S
Feb. 1-----	1:00 p.m.	40	.01	.0408	--	--	--	--	--	--	59	80	100	--		S
Mar. 20-----	8:00 a.m.	136	.56	.3546	--	--	26	32	38	50	77	98	100	100		BSWCM
Mar. 30-----	7:30 a.m.	257	.36	1.8397	--	--	--	--	--	--	37	65	98	100		S
Mar. 30-----	6:00 p.m.	257	.36	1.0513	--	--	--	--	--	--	45	74	98	100		S
Apr. 10-----	6:30 a.m.	620	.39	.6231	14	16	24	29	35	41	72	98	100	100		BSWCM
Apr. 20-----	7:00 a.m.	1,740	.78	1.9380	--	--	--	--	--	53	77	97	100	100		S
Apr. 30-----	7:30 a.m.	1,160	.30	1.0895	--	--	--	--	--	41	71	99	100	100		S
May 10-----	6:30 a.m.	500	.22	.7177	--	--	--	--	--	34	62	98	100	100		S
May 20-----	7:00 a.m.	427	.16	.8013	2	5	9	12	--	--	--	--	--	--		DN
May 24-----	8:00 a.m.	278	.11	.3958	4	11	19	25	--	--	--	--	--	--		DN
May 24-----	4:00 p.m.	278	.11	.6345	--	--	--	--	--	14	43	97	100	100		S
May 31-----	6:00 p.m.	922	.32	1.0304	--	--	--	--	--	48	80	97	99	99		S
June 10-----	6:00 p.m.	1,180	.20	.8408	--	--	--	--	--	39	68	87	96	96		S
June 20-----	6:30 a.m.	271	.12	.3763	--	--	--	--	--	30	70	98	100	100		S
July 1-----	6:00 a.m.	150	.07	.3172	--	--	--	--	--	18	46	80	100	100		S
July 20-----	6:30 a.m.	712	.17	.8172	--	--	--	--	--	22	35	87	99	99		S
July 25-----	6:00 a.m.	418	.26	1.5921	0	1	2	71	--	--	--	--	--	--		DN
July 29-----	12:40 p.m.	376	.07	.1687	0	3	10	18	--	35	59	95	95	--		DSN
Aug. 1-----	6:30 a.m.	855	.04	.1763	--	--	--	--	--	32	60	81	95	95		S
Aug. 5-----	6:30 p.m.	520	.47	4.3424	--	--	85	91	--	--	--	--	--	--		DN
Aug. 6-----	5:00 p.m.	481	.58	2.5785	0	1	84	90	--	--	--	--	--	--		DN
Aug. 7-----	7:00 a.m.	390	.45	2.7618	0	1	82	88	--	--	--	--	--	--		DN
Aug. 8-----	6:00 p.m.	463	1.51	6.0400	0	1	13	70	--	--	--	--	--	--		DN
Aug. 9-----	6:30 a.m.	360	2.50	.6724	0	1	26	66	--	--	--	--	--	--		DN

RIO GRANDE BASIN--Continued  
RIO CHAMA NEAR CHAMITA, N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948--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	Time	Mean discharge (second-foot)	Suspended sediment										Methods of analysis		
			Mean daily concentration (percent)	Weight of material in tube (grams)	Percent finer than indicated size, in millimeters										
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250		0.500	1.000
Aug. 10, 1948 -----	6:30 a. m.	306	0.22	0.8842	0	2	26	69	--	--	--	--	--	--	DN
Aug. 20 -----	6:30 a. m.	285	.02	.0638	0	14	34	58	--	--	--	--	--	--	DN
Aug. 22 -----	6:30 p. m.	443	.23	1.6811	0	3	22	44	--	99	100	--	--	--	DSN
Sept. 10 -----	8:30 p. m.	530	.35	2.0753	0	1	49	76	--	--	--	--	--	--	DN
Sept. 11 -----	6:30 a. m.	244	.19	.8024	1	3	10	82	--	--	--	--	--	--	DN
Sept. 27 -----	6:00 p. m.	49	.15	.6028	1	4	7	88	--	--	--	--	--	--	DN

## RIO GRANDE BASIN--Continued

## GALISTEO CREEK AT DOMINGO, N. MEX.

LOCATION.--At gaging station in Santo Domingo Pueblo Grant, Sandoval County, at highway bridge, 0.3 mile northeast of Domingo, Sandoval County, and 4 miles upstream from mouth.

RECORDS AVAILABLE.--Sediment records: January to September 1948.

EXTREMES, 1947-48.--Sediment loads: Maximum, 126,000 tons per day Sept. 25; minimum, no flow on many days.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1148.

Suspended sediment, water year October 1947 to September 1948

Day	January			February			March		
	Mean discharge (second-foot)	Suspended sediment		• Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day
1-----	1	--	1/14	0	--	0	2	0.58	31
2-----	1	--	1/5	0	--	0	0	--	0
3-----	0	--	0	0	--	0	1	.70	19
4-----	0	--	0	0	--	0	0	--	0
5-----	0	--	0	1	0.36	10	0	--	0
6-----	0	--	0	0	--	0	0	--	0
7-----	0	--	0	0	--	0	0	--	0
8-----	0	--	0	0	--	0	0	--	0
9-----	0	--	0	0	--	0	0	--	0
10-----	0	--	0	0	--	0	0	--	0
11-----	0	--	0	0	--	0	1	.39	11
12-----	0	--	0	0	--	0	1	.48	13
13-----	0	--	0	0	--	0	1	.21	6
14-----	0	--	0	0	--	0	1	.26	7
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	0	--	0	0	--	0
22-----	0	--	0	0	--	0	0	--	0
23-----	0	--	0	1	.28	8	0	--	0
24-----	0	--	0	2	.37	20	0	--	0
25-----	0	--	0	4	.46	50	0	--	0
26-----	0	--	0	6	.97	157	0	--	0
27-----	0	--	0	4	.83	90	0	--	0
28-----	1	0.17	5	2	.68	37	0	--	0
29-----	1	.06	2	1	.66	18	0	--	0
30-----	0	--	0	--	--	--	0	--	0
31-----	0	--	0	--	--	--	0	--	0
Total -	4	--	26	21	--	390	7	--	87

1/Estimated or interpolated.

## RIO GRANDE BASIN--Continued

## GALISTEO CREEK AT DOMINGO, N. MEX.--Continued

Suspended sediment, water year October 1947 to September 1948--Continued

Day	June			August			September		
	Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment	
		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day		Mean concentration (percent)	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	17	1.60	4,180	0	--	0
5-----	0	--	0	268	8.83	73,000	0	--	0
6-----	0	--	0	15	4.79	1,940	0	--	0
7-----	0	--	0	5	.98	132	0	--	0
8-----	0	--	0	1	2.53	68	0	--	0
9-----	0	--	0	0	--	0	0	--	0
10-----	0	--	0	0	--	0	0	--	0
11-----	4	0.62	425	0	--	0	0	--	0
12-----	0	--	0	0	--	0	0	--	0
13-----	0	--	0	0	--	0	0	--	0
14-----	0	--	0	0	--	0	0	--	0
15-----	0	--	0	0	--	0	0	--	0
16-----	0	--	0	0	--	0	0	--	0
17-----	0	--	0	0	--	0	0	--	0
18-----	0	--	0	0	--	0	0	--	0
19-----	34	--	1/9,870	0	--	0	0	--	0
20-----	8	7.00	1,510	0	--	0	0	--	0
21-----	3	1.02	83	0	--	0	0	--	0
22-----	1	.62	17	0	--	0	0	--	0
23-----	0	--	0	1	1.62	44	0	--	0
24-----	0	--	0	0	--	0	0	--	0
25-----	0	--	0	0	--	0	325	3.18	123,000
26-----	0	--	0	0	--	0	50	2.97	4,010
27-----	0	--	0	0	--	0	5	2.75	371
28-----	0	--	0	0	--	0	1	.81	22
29-----	0	--	0	0	--	0	1	--	1/12
30-----	0	--	0	0	--	0	0	--	0
31-----	--	--	--	0	--	0	--	--	--
Total -	50	--	11,900	307	--	79,360	382	--	127,400

Total discharge for period Jan. 1-Sept. 30 (second-foot days) ----- 771

Total load for period Jan. 1-Sept. 30 (tons) ----- 219,200

1/ Estimated or interpolated.



## RIO GRANDE BASIN--Continued

## JEMEZ RIVER NEAR BERNALILLO, N. MEX.

LOCATION.--At gaging station about 2 miles upstream from mouth and 6.2 miles north of Bernalillo, Sandoval County.

RECORDS AVAILABLE.--Sediment records: April to September 1948.

EXTREMES, 1947-48.--Sediment loads: Maximum, 43,700 tons per day (partly estimated). Sept. 26; minimum, no flow on many days.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1118.

## Suspended sediment, water year October 1947 to September 1948

Month	Discharge (second-foot-days)	Suspended sediment (tons)
April	11,449	1/211,600
May	4,623	43,990
June	1,067	38,880
July	0	0
August	87	14,870
September	459	45,010
Total for period	17,685	1/354,400

1/Includes loads estimated for missing days.

## RIO GRANDE BASIN--Continued

## JEMEZ RIVER NEAR BERNALILLO, N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948

(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	Time	Mean discharge (second-foot)	Suspended sediment												Methods of analysis
			Mean daily concentration (percent)	Weight of material in tube (grams)	Percent finer than indicated size, in millimeters										
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	
Feb. 6, 1948	11:15 a. m.	11	0.56	0.8859	--	21	34	41	50	66	90	100	--	--	BSWCM
Feb. 27	1:30 p. m.	80	1.40	.7069	65	66	77	86	89	96	99	100	--	--	BSWCM
Mar. 10	4:30 p. m.	24	.83	2.9439	22	24	32	38	44	54	79	98	100	100	BSWCM
Apr. 15	2:45 p. m.	798	.98	1.8049	19	20	28	35	46	61	84	98	100	100	BSWCM
Apr. 20	10:25 a. m.	610	.63	3.5732	--	9	11	14	17	36	76	99	100	100	DSWCM
May 1	2:32 p. m.	286	.54	1.7692	--	--	--	--	--	54	88	100	--	--	S
May 10	2:17 p. m.	138	.35	1.2155	--	--	--	--	--	45	73	95	100	100	S
May 20	9:30 a. m.	60	.29	.4394	0	6	19	25	--	46	67	92	99	99	DSN
May 25 1/	7:00 a. m.	108	.18	.6659	0	3	17	26	--	--	--	--	--	--	DN
May 25 1/	2:00 p. m.	108	.18	.4985	0	3	12	38	--	--	--	--	--	--	DN
May 25 1/	7:00 p. m.	108	.18	.8930	--	--	--	--	--	50	83	100	--	--	S
June 1	11:55 p. m.	309	2.04	1.0110	0	3	18	78	--	--	--	--	--	--	DN
June 10	3:00 p. m.	18	.40	1.1182	0	2	7	52	--	--	--	--	--	--	DN
Aug. 6	11:50 a. m.	65	6.80	.8039	60	83	94	--	96	--	97	--	--	--	BSWCM
Sept. 26	4:45 p. m.	395	4.10	.4783	0	6	17	76	--	--	--	--	--	--	DN
/Discharges at the time samples were taken on May 25 are as follows: 7:00 a. m., 910 second-foot; 2:00 p. m., 1020 second-foot; 7:00 p. m., 1190 second-foot.															

1/Discharges at the time samples were taken on May 25 are as follows: 7:00 a. m., 910 second-foot; 2:00 p. m., 1020 second-foot; 7:00 p. m., 1190 second-foot.

## RIO GRANDE BASIN--Continued

## RIO PUERCO AT CABEZON, N. MEX.

LOCATION.--A quarter of a mile upstream from mouth of Chico Arroyo and 5½ miles downstream from gaging station which is 0.7 mile southwest of Cabezon, Sandoval County.

RECORDS AVAILABLE.--Sediment records: April to September 1948.

EXTREMES, 1947-48.--Sediment loads: Maximum, 42,900 tons per day Sept. 26; minimum, no flow on many days.

REMARKS.--Discharge records for gaging station at Cabezon, N. Mex., for water year October 1947 to September 1948 given in Water-Supply Paper 1118. No appreciable inflow between gaging station and sampling point except during periods of heavy local rain.

## Suspended sediment, water year October 1947 to September 1948

Month	Discharge (second-foot-days)	Suspended sediment (tons)
April	1,289.6	<u>1</u> /167,700
May	1,318.0	136,400
June	184.2	25,770
July	0	0
August	0	0
September	277.3	79,520
Total for period	3,069.1	<u>1</u> /409,400

1/Partly estimated.

RIO GRANDE BASIN--Continued  
RIO PUERCO AT CABEZON, N. MEX. --Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948  
(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	Time	Mean discharge (second-feet)	Suspended sediment											Methods of analysis			
			Mean daily concentration (percent)	Weight of material in tube (grams)	Percent finer than indicated size, in millimeters												
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500		1.000	2.000	
Feb. 28, 1948																	
Feb. 28, 1948	2:50 p. m.	29	5.21	0.7185	43	54	68	81	89	95	99	--	--			BWCM	
Mar. 2	1:00 p. m.	6	.93	.4562	48	70	82	88	92	96	97	--	--			BWCM	
Apr. 14	4:00 p. m.	14	3.56	1.3974	46	48	69	79	89	96	98	--	--			BWCM	
Apr. 20	8:45 a. m.	65	5.32	1.3898	38	46	58	68	79	95	100	--	--			BSWCM	
May 1																	
May 1	5:30 p. m.	52	5.62	1.8597	28	33	39	44	55	75	93	98	100			BSWCM	
May 20	6:20 p. m.	39	2.78	2.3819	0	1	3	62	--	--	--	--	--			DN	
Sept. 26	8:00 p. m.	159	10.0	.609	0	4	12	35	73	--	89	95	99			BSWCM	
Sept. 27	1:45 p. m.	7.3	6.14	.7094	67	74	94	99	100	--	--	--	--			BWCM	

## RIO GRANDE BASIN--Continued

## RIO PUERCO AT RIO PUERCO, N. MEX.

LOCATION.--At gaging station in San Clemente Grant, Valencia County, at Atchinson, Topeka, and Santa Fe Railway bridge, 7 miles downstream from San Jose River.

RECORDS AVAILABLE.--Sediment records: February to September 1948.

EXTREMES, 1947-48.--Sediment loads: Maximum, 216,000 tons per day Aug. 6; minimum, no flow on many days.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1118.

## Suspended sediment, water year October 1947 to September 1948

Day	July			August			September		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day		Mean concentration (percent)	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	13	3.70	5,120	0	--	0
6-----	0	--	0	516	13.0	216,000	0	--	0
7-----	0	--	0	176	11.6	56,500	0	--	0
8-----	0	--	0	193	10.0	61,500	0	--	0
9-----	0	--	0	91	10.1	24,800	0	--	0
10-----	0	--	0	17	7.92	3,640	0	--	0
11-----	0	--	0	12	5.63	1,820	0	--	0
12-----	0	--	0	10	3.66	988	0	--	0
13-----	0	--	0	7.3	1.75	345	0	--	0
14-----	0	--	0	28	6.87	5,190	0	--	0
15-----	0	--	0	13	7.40	2,600	0	--	0
16-----	0	--	0	8.0	5.76	1,240	0	--	0
17-----	0	--	0	3.5	4.20	397	0	--	0
18-----	0	--	0	1.6	6.85	296	0	--	0
19-----	0	--	0	.2	3.86	21	0	--	0
20-----	34	5.38	10,800	.1	.02	0	0	--	0
21-----	4	9.98	1,080	0	--	0	0	--	0
22-----	6	8.80	1,430	0	--	0	0	--	0
23-----	2	--	1/437	8.4	1.58	1,420	0	--	0
24-----	1	--	1/162	6.6	1.50	267	0	--	0
25-----	.1	--	1/8	1.4	.10	4	0	--	0
26-----	.1	--	1/8	.2	.01	0	736	7.54	186,000
27-----	17	8.40	5,880	0	--	0	343	10.9	101,000
28-----	5.4	10.6	1,550	0	--	0	58	5.05	7,910
29-----	1.6	9.58	414	0	--	0	18	3.86	1,880
30-----	.1	3.93	11	0	--	0	13	3.22	1,130
31-----	0	--	0	0	--	0	--	--	--
Total -	71.3	--	21,780	1,106.3	--	382,100	1,168	--	297,900

1/Estimated or interpolated.

RIO GRANDE BASIN--Continued  
RIO PUERCO AT RIO PUERCO, N. MEX.--Continued

Particle size analyses of suspended sediment, water year October 1947 to September 1948

(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	Time	Mean discharge (second- feet)	Suspended sediment										Methods of analysis				
			Mean daily concentration (percent)	Weight of material in tube (grams)	Percent finer than indicated size, in millimeters												
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250		0.500	1.000	2.000	
Feb. 18, 1948																	
Feb. 25	11:00 a. m.	11	3.00	--	--	--	--	--	87	97	100					S	
Feb. 25	10:25 a. m.	45	5.89	0.4073	60	77	91	98		--	--	--				BWCM	
Mar. 2	4:30 p. m.	42	4.56	.3282	71	78	88	93		--	--	--				BWCM	
Mar. 7	--	1.4	2.00	1.3143	12	15	17	97		--	--	--				DN	
Apr. 7	12:00 m.	36	7.64	1.3709	37	54	66	80		--	--	--				DWCM	
May 10	--		3.33	1.2154	0	3	6	71		--	--	--				DN	
June 9	10:05 a. m.	77	3.33	.5357	0	3	15	39		89	--	--				DNS	
Aug. 6	9:40 p. m.	516	14.2	.9527	--	--	18	72	78	89	96	100				BNS	
Aug. 7	12:05 a. m.	176	12.0	.4725	0	5	16	73		86	--	--				DNS	
Aug. 9	4:30 p. m.	91	10.1	.3014	14	18	38	92		--	--	--				DN	
Aug. 11	8:25 p. m.	12	5.63	.3462	0	5	21	63		88	--	--				DNS	
Sept. 26	7:00 p. m.	736	9.36														

## RIO GRANDE BASIN--Continued

## RIO PUERCO NEAR BERNARDO, N. MEX.

LOCATION.--At gaging station in Seville Grant, at bridge on U. S. Highway 85, 1.2 miles southwest of Bernardo, Socorro County, and 3 miles upstream from mouth.

RECORDS AVAILABLE.--Sediment records: October 1947 to September 1948.

EXTREMES, 1947-48.--Sediment loads: Maximum 195,000 tons per day Aug. 7; minimum, no flow on many days.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1118.

## Suspended sediment, water year October 1947 to September 1948

Day	October			February			March		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day
1-----	0	--	--	0	--	0	52	8.59	12,100
2-----	0	--	--	0	--	0	32	7.03	6,070
3-----	0	--	--	0	--	0	20	6.39	3,450
4-----	0	--	--	0	--	0	16	5.76	2,480
5-----	0	--	--	0	--	0	8	--	1/1,140
6-----	0	--	--	0	--	0	6	4.77	772
7-----	0	--	--	0	--	0	2	--	1/232
8-----	0	--	--	0	--	0	2	4.28	231
9-----	0	--	--	0	--	0	4	--	1/486
10-----	0	--	--	0	--	0	2	--	1/232
11-----	0	--	--	0	--	0	0	--	0
12-----	0	--	--	0	--	0	0	--	0
13-----	0	--	--	0	--	0	0	--	0
14-----	0	--	--	0	--	0	0	--	0
15-----	246	--	--	0	--	0	0	--	0
16-----	215	11.8	68,500	0	--	0	0	--	0
17-----	35	--	--	0	--	0	0	--	0
18-----	15	10.3	4,170	0	--	0	15	--	1/3,240
19-----	8	--	--	0	--	0	15	--	1/3,240
20-----	3	--	--	0	--	0	9	--	1/1,770
21-----	0	--	--	0	--	0	61	--	1/16,500
22-----	0	--	--	5	--	1/1,080	22	--	1/4,750
23-----	0	--	--	40	--	1/8,640	20	7.76	4,190
24-----	0	--	--	30	7.94	6,430	15	9.47	3,840
25-----	0	--	--	25	8.06	5,440	6	8.48	1,370
26-----	0	--	--	49	--	1/9,530	3	8.60	697
27-----	0	--	--	52	6.43	9,030	0	--	0
28-----	0	--	--	78	--	1/13,900	0	--	0
29-----	0	--	--	63	6.83	11,600	0	--	0
30-----	0	--	--	--	--	--	1	--	1/216
31-----	0	--	--	--	--	--	2	7.66	414
Total -	522	--	168,800	344	--	65,650	313	--	67,430

1/Estimated or interpolated.





## RIO GRANDE BASIN--Continued

## RIO PUERCO NEAR BERNARDO, N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948  
 (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	Time	Mean discharge (second-foot)	Mean daily concentration (percent)	Weight of material in tube (grams)	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	0.500	1.000	2.000	
Oct. 18, 1947	8:50 a.m.	15	10.3	0.5990	66	69	95	--	99	--	100				BWCM	
Feb. 25, 1948	2:25 p.m.	25	8.06	.1086	10	41	65	93	99	100	--				BN	
Mar. 1	10:05 a.m.	52	8.59	.4961	49	66	79	93	--	--	--				BWCM	
Mar. 31	5:45 p.m.	2	7.66	.4566	60	82	92	97	--	--	--				DWCM	
Apr. 10	5:45 p.m.	7	9.85	.5198	60	82	92	98	--	--	--				DWCM	
May 1	5:50 p.m.	6	8.56	.6712	0	1	74	98	--	--	--				DN	
May 10	5:45 p.m.	35	8.14	1.9196	--	12	14	67	100	--	--				BN	
June 1	6:00 p.m.	7	9.00	.4747	0	4	71	95	--	--	--				DN	
June 10	2:30 p.m.	79	15.8	.7431	0	3	53	77	--	--	--				DN	
July 31	12:15 p.m.	1	1.94	.9902	63	88	98	--	--	--	--				BWCM	
Aug. 7	4:00 a.m.	476	15.2	1.1545	--	--	20	66	86	93	97				BN	
Aug. 8	8:30 a.m.	173	11.5	1.0516	--	--	26	78	86	92	97				BN	
Aug. 9	4:00 a.m.	171	12.4	1.5449	1	4	47	68	--	95	--				DNS	
Aug. 10	3:30 p.m.	50	10.3	1.0545	--	0	68	93	--	--	--				DN	
Sept. 20	5:30 p.m.	287	3.40	1.6108	35	50	66	79	87	94	98				BWCM	
Sept. 27	10:00 a.m.	503	10.7	1.1687	0	2	6	37	--	87	97	100			DNS	

## RIO GRANDE BASIN--Continued

## CHICO ARROYO NEAR GUADALUPE, N. MEX.

LOCATION.--At gaging station a quarter of a mile upstream from mouth, 5 miles northwest of Guadalupe, Sandoval County, and 8.1 miles by road west of Cabezón, Sandoval County.

DRAINAGE AREA.--1,390 square miles.

RECORDS AVAILABLE.--Sediment records: July to September 1948.

EXTREMES, 1947-48.--Sediment loads: Maximum, 95,800 tons per day Aug. 5; minimum, no flow on many days.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1118.

## Suspended sediment, water year October 1947 to September 1948

Day	July			August			September		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day		Mean concentration (percent)	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	300	2.68	95,800	0	--	0
6-----	0	--	0	13	6.01	2,110	0	--	0
7-----	0	--	0	67	9.17	16,600	0	--	0
8-----	0	--	0	28	5.12	3,870	0	--	0
9-----	0	--	0	4.8	3.55	460	0	--	0
10-----	0	--	0	1.4	2.28	86	0	--	0
11-----	0	--	0	.6	--	1/24	0	--	0
12-----	0	--	0	42	8.01	9,080	0	--	0
13-----	0	--	0	8.8	3.71	881	0	--	0
14-----	0	--	0	6.0	3.97	643	0	--	0
15-----	0	--	0	6.7	5.60	1,010	0	--	0
16-----	0	--	0	2	--	1/108	0	--	0
17-----	0	--	0	1	--	1/40	.1	5.51	15
18-----	0	--	0	0	--	0	0	--	0
19-----	17	--	1/3,630	0	--	0	0	--	0
20-----	51	5.72	9,240	0	--	0	0	--	0
21-----	4	3.68	397	0	--	0	0	--	0
22-----	1	--	1/54	1	.36	232	0	--	0
23-----	.3	--	1/0	3.2	5.20	449	0	--	0
24-----	.3	--	1/0	0	--	0	0	--	0
25-----	13	3.07	1,080	0	--	0	.1	1.13	3
26-----	24	--	1/2,590	0	--	0	14	3.13	1,990
27-----	3	--	1/389	0	--	0	.3	1.74	14
28-----	0	--	0	0	--	0	0	--	0
29-----	0	--	0	0	--	0	0	--	0
30-----	0	--	0	0	--	0	0	--	0
31-----	0	--	0	0	--	0	--	--	--
Total -	113.6	--	17,380	485.5	--	131,400	14.5	--	2,020

Total discharge for period July 1 to Sept. 30 (second-foot-days)-----613.6

Total load for period July 1 to Sept. 30 (tons)-----150,800

1/Estimated or interpolated.

## RIO GRANDE BASIN--Continued

## CHICO ARROYO NEAR GUADALUPE, N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948

(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	Time	Mean discharge (second-foot)	Suspended sediment											Methods of analysis		
			Mean daily concentration (percent)	Weight of material in tube (grams)	Percent finer than indicated size, in millimeters											
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500		1.000	2.000
Feb. 25, 1948-----	12:55 p. m.	5.6	1.27	0.2926	81	88	97	100	--	--	--	--	--	--	--	BWCM
June 8-----	11:50 a. m.	49	5.39	.7519	0	4	14	66	--	--	--	--	--	--	--	DN
July 20-----	11:30 p. m.	51	5.72	.4509	0	5	21	86	--	--	--	--	--	--	--	DN
Aug. 5-----	6:10 p. m.	300	2.68	.5329	0	7	35	48	--	--	--	--	--	--	--	DN
Aug. 5-----	10:15 p. m.	300	2.68	.7338	0	9	35	49	--	--	--	--	--	--	--	DN
Aug. 6-----	5:50 a. m.	13	6.01	.4733	0	12	56	73	--	--	--	--	--	--	--	DN
Aug. 7-----	9:35 a. m.	67	9.17	.2894	0	8	45	62	85	--	--	--	--	--	--	DNS
Aug. 12-----	1:15 a. m.	42	8.01	.5924	0	4	23	40	62	69	87	100	--	--	--	DNS
Aug. 15-----	12:15 a. m.	6.7	5.60	.5853	0	1	7	73	92	--	--	--	--	--	--	DNS
Sept. 26-----	9:30 a. m.	14	--	.8180	0	19	70	86	93	--	96	98	99	--	--	DNS

## 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.

RECORDS AVAILABLE.--Sediment records: October 1947 to September 1948.

EXTREMES, 1947-48.--Sediment loads: Maximum, 79,400 tons per day Sept. 26; minimum, no flow on many days.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1118.

Suspended sediment, water year October 1947 to September 1948

Day	July			August			September		
	Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment	
		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day		Mean concentration (percent)	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	8.1	2.48	761	0	--	0
5-----	0	--	0	25	2.61	1,760	0	--	0
6-----	0	--	0	319	3.96	64,500	0	--	0
7-----	0	--	0	42	1.64	1,890	0	--	0
8-----	0	--	0	15	.40	162	0	--	0
9-----	0	--	0	4.4	.25	30	0	--	0
10-----	0	--	0	0	--	0	0	--	0
11-----	0	--	0	0	--	0	0	--	0
12-----	0	--	0	6.7	.83	327	0	--	0
13-----	0	--	0	5.8	1.47	230	0	--	0
14-----	0	--	0	4.7	.92	117	0	--	0
15-----	0	--	0	7.6	1.41	289	0	--	0
16-----	0	--	0	3.1	.44	37	0	--	0
17-----	0	--	0	.8	.36	8	0	--	0
18-----	0	--	0	0	--	0	0	--	0
19-----	0	--	0	0	--	0	0	--	0
20-----	0	--	0	0	--	0	0	--	0
21-----	5.4	--	1/7	0	--	0	0	--	0
22-----	8.0	0.08	17	0	--	0	0	--	0
23-----	4.4	.03	4	34	.78	716	0	--	0
24-----	.9	.04	1	13	.39	137	0	--	0
25-----	0	--	0	4.6	.05	6	163	--	1/40,500
26-----	0	--	0	.3	--	0	501	4.63	79,400
27-----	0	--	0	0	--	0	112	1.67	5,050
28-----	0	--	0	0	--	0	58	1.40	2,190
29-----	0	--	0	0	--	0	28	.76	575
30-----	0	--	0	0	--	0	19	.32	164
31-----	0	--	0	0	--	0	--	--	--
Total -	18.7	--	29	494.1	--	70,970	881	--	127,900
Total discharge for period July 1-Sept. 30 (second-foot-days) -----									1,393.8
Total load for period July 1-Sept. 30 (tons) -----									198,900

1/Estimated or interpolated.

## RIO GRANDE BASIN--Continued

## SAN JOSE RIVER AT CORREO, N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948

(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	Time	Mean discharge (second-foot)	Suspended sediment											Methods of analysis		
			Mean daily concentration (percent)	Weight of material in tube (grams)	Percent finer than indicated size, in millimeters											
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500		1.000	2.000
Feb. 16, 1948-----	12:20 p.m.	15	0.72	0.5354	21	30	48	58	66	80	95	100				BWCM
Feb. 27-----	10:15 a.m.	33	.56	.7906	45	58	68	75	79	88	96	--				BWCM
Mar. 2-----	2:40 p.m.	8.4	.42	.4683	86	--	92	93	97	98	99	--				BWCM
Mar. 3-----	1:00 p.m.	6.4	.23	.3310	81	88	97	--	--	--	--	--				BWCM
Mar. 10-----	2:04 p.m.	3.4	.11	.2451	75	79	100	--	--	--	--	--				BWCM
June 21-----	9:05 p.m.	1	.03	.0254	--	--	--	--	--	73	84	94	100			S
Aug. 7-----	3:30 p.m.	42	1.67	.2238	0	9	48	84	--	--	--	--				DN

## RIO GRANDE BASIN--Continued

## RIO SALADO NEAR SAN ACACIA, N. MEX.

LOCATION.--At gaging station 1 mile upstream from mouth, 1.7 miles downstream from bridge on U. S. Highway 85, and 2 miles northeast of San Acacia, Socorro County.

RECORDS AVAILABLE.--Sediment records: July to September 1948.

EXTREMES, 1947-48.--Sediment loads: Maximum, 144,000 tons per day Sept. 26; minimum, no flow on many days.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1118.

## Suspended sediment, water year October 1947 to September 1948

Day	July			August			September		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day
1-----	0	--	0	3.8	9.22	946	0	--	0
2-----	0	--	0	0	--	0	0	--	0
3-----	0	--	0	1.1	9.85	293	0	--	0
4-----	0	--	0	9.2	13.2	3,280	0	--	0
5-----	0	--	0	1	7.06	191	0	--	0
6-----	0	--	0	.8	10.5	227	0	--	0
7-----	0	--	0	1.3	11.8	414	0	--	0
8-----	0	--	0	1.8	5.69	277	0	--	0
9-----	0	--	0	1	--	1/135	0	--	0
10-----	0	--	0	.5	--	54	0	--	0
11-----	0	--	0	0	--	0	0	--	0
12-----	0	--	0	0	--	0	0	--	0
13-----	0	--	0	12	12.9	4,180	0	--	0
14-----	0	--	0	17	13.5	6,200	0	--	0
15-----	0	--	0	1	--	1/135	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	3.6	9.46	920
20-----	0	--	0	0	--	0	4.5	9.03	1,100
21-----	20	--	1/3,780	0	--	0	1.6	--	1/346
22-----	.6	--	1/97	0	--	0	1.2	--	1/194
23-----	0	--	0	0	--	0	0	--	0
24-----	.6	5.05	82	0	--	0	0	--	0
25-----	.4	7.18	78	0	--	0	0	--	0
26-----	160	16.2	70,000	0	--	0	351	15.2	144,000
27-----	10	10.9	2,940	0	--	0	47	6.90	8,760
28-----	35	--	1/11,300	0	--	0	10	--	1/2,700
29-----	5	9.19	1,240	0	--	0	2	8.35	451
30-----	0	--	0	0	--	0	0	--	0
31-----	37	12.2	12,200	0	--	0	--	--	--
Total -	268.6	--	101,700	50.5	--	16,330	420.9	--	158,500

Total discharge for period July 21 to Sept. 29 (second-foot-days) ----- 740

Total load for period July 21 to Sept. 29 (tons) ----- 276,500

1/Estimated or interpolated.



## WESTERN GULF OF MEXICO BASINS

## RIO GRANDE BASIN--Continued

## SOCORRO MAIN CANAL NORTH AT SAN ACACIA, N. MEX.

LOCATION.--At diversion dam half a mile upstream from gaging station and half a mile northeast of San Acacia, Socorro County.

RECORDS AVAILABLE.--Sediment records: October 1946 to September 1948.

EXTREMES, 1947-48.--Sediment loads: Maximum, 29,900 tons per day Aug. 1; minimum, no flow on many days.

EXTREMES, 1946-48.--Sediment loads: Maximum, 61,000 tons per day Aug. 10, 1947; minimum, no flow on many days.

REMARKS.--Total flow past sampling station on Rio Grande at San Acacia Diversion dam is load in Rio Grande at San Acacia gaging station plus load in Socorro Main Canal North, or 11,401,000 tons. Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1118.

## Suspended sediment, water year October 1947 to September 1948

Month	Discharge (second-foot-days)	Suspended sediment (tons)
October	2,499	52,370
November	23	286
December	0	0
January	26	113
February	0	0
March	1,637	14,270
April	3,065	36,040
May	3,368	31,740
June	3,305	44,050
July	4,138	72,700
August	2,863	133,100
September	2,014	36,330
Total for year	22,938	421,060



RIO GRANDE BASIN--Continued  
PECOS RIVER NEAR PUERTO DE LUNA, N. MEX.

LOCATION--At bridge at Puerto de Luna, Guadalupe County, 17 miles upstream from gaging station which is 14 miles upstream from Alamogordo Dam. DRAINAGE AREA--3,970 square miles above gaging station (contributing area).

RECORDS AVAILABLE--July 1939 to September 1941, November 1946 to September 1948.

EXTREMES, 1947-48.--Dissolved solids: Maximum, 2,460 parts per million Jan. 11-20; minimum, 728 parts per million May 21-31.

Total hardness: Maximum, 1,760 parts per million Feb. 11-20; minimum, 527 parts per million July 1-10, 1947; minimum, 287 parts per million May 11-16, 18-20, 1941.

EXTREMES, 1939-41, 1946-48.--Dissolved solids: Maximum, 2,530 parts per million July 1-10, 1947; minimum, 200 parts per million May 11-16, 18-20, 1941.

Total hardness: Maximum, 1,760 parts per million Feb. 11-20, 1948; minimum, 200 parts per million May 11-16, 18-20, 1941.

REMARKS--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1118. Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-foot)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
Oct. 1-10, 1947	83.1	7.7	7.7	2,760	21	528	78	78	80	147	1,440	136			0.2		2,360	3.21	530	1,840	1,526	10
Oct. 11-20	117	7.7	7.7	2,840	20	504	75	68	68	160	1,350	128			.6		2,230	3.03	704	1,570	1,440	9
Oct. 21-31	102	7.6	7.6	2,770	22	536	78	55	55	165	1,380	140			.4		2,290	3.11	631	1,650	1,526	7
Nov. 1-10	96.1	7.5	7.5	2,770	20	540	75	69	69	171	1,420	133			.4		2,340	3.16	617	1,660	1,526	8
Nov. 12-20	116	7.5	7.5	2,740	19	536	79	86	86	170	1,450	141			.4		2,400	3.26	752	1,860	1,526	16
Nov. 21-30	108	7.7	7.7	2,730	19	536	77	68	68	163	1,420	135			.4		2,340	3.18	682	1,850	1,526	8
Dec. 1-10	116	7.7	7.7	2,710	19	532	78	53	53	164	1,380	136			.3		2,280	3.10	714	1,650	1,516	7
Dec. 11-20	98.2	7.7	7.7	2,780	19	544	73	89	89	167	1,460	138			.4		2,410	3.28	639	1,860	1,520	11
Dec. 21-31	97.5	7.7	7.7	2,760	16	546	73	80	80	168	1,420	141			.3		2,330	3.20	619	1,860	1,520	8
Jan. 1-10, 1948	105	7.9	7.9	2,780	18	546	78	88	88	158	1,460	145			.6		2,410	3.28	683	1,860	1,520	88
Jan. 11-20	106	7.9	7.9	2,780	18	535	74	95	95	171	1,490	145			.4		2,460	3.35	704	1,690	1,530	11
Jan. 21-31	102	7.9	7.9	2,780	18	541	75	95	95	168	1,470	140			.6		2,400	3.29	666	1,960	1,520	11
Feb. 1-10	126	7.3	7.3	2,680	17	548	82	73	73	166	1,460	146			.5		2,410	3.28	820	1,760	1,570	8
Feb. 11-20	101	7.5	7.5	2,730	16	572	82	60	60	171	1,490	144			.8		2,450	3.33	668	1,760	1,620	7
Feb. 21-29	113	7.3	7.3	2,800	16	542	78	85	85	168	1,460	142			.6		2,410	3.28	735	1,670	1,540	10
Mar. 1-10	112	7.3	7.3	2,770	16	552	75	80	80	160	1,460	148			.4		2,410	3.28	729	1,690	1,550	9
Mar. 11-20	107	7.3	7.3	2,780	15	561	74	74	74	151	1,480	142			.4		2,420	3.29	699	1,700	1,580	9
Mar. 21-31	89.1	7.3	7.3	2,800	16	572	74	67	67	158	1,500	132			.3		2,440	3.32	587	1,730	1,600	8
Apr. 1-10	96.7	7.4	7.4	2,540	15	508	66	66	66	157	1,330	120			.4		2,180	2.96	569	1,540	1,410	9
Apr. 11-20	210	7.5	7.5	1,540	15	470	36	40	40	145	674	62			.4		1,170	1.59	663	822	702	10
Apr. 21-30	260	7.6	7.6	1,290	15	225	31	30	30	110	574	46			1.9		977	1.33	686	689	599	9
May 1-10	220	7.3	7.3	1,250	15	215	30	22	22	125	540	30			1.0		915	1.24	544	660	558	7
May 11-20	238	7.4	7.4	1,450	15	255	35	35	35	135	657	57			.9		1,120	1.52	720	792	690	9
May 21-31	456	7.4	7.4	1,010	12	170	25	21	21	126	401	36			1.2		728	.99	896	527	424	8

RIO GRANDE BASIN--Continued  
PECOS RIVER NEAR PUERTO DE LUNA, N. MEX.--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
June 1-10, 1948	703		7.7	1,090	16		185	24		33	129	454	38				814	1.11	1,550	566	454	11
June 11-15	492		7.6	1,170	16		208	23	35	35	134	502	40		.8		891	1.21	1,180	614	504	11
June 16-20	206		7.5	1,980	21		370	50	64	64	140	986	89		.6		1,650	2.24	918	1,130	1,010	11
June 21-22	50.0		7.7	1,070	18		180	24	30	30	151	424	33		2.1		786	1.07	1,065	548	424	11
June 23-30	134		7.7	2,180	18		429	55	97	97	156	1,200	92		.8		1,970	2.68	713	1,300	1,170	14
July 1-10	270		7.6	2,320	21		432	57	88	88	127	1,200	107		.7		1,970	2.68	1,440	1,310	1,210	13
July 11-20	115		7.6	2,170	23		408	52	81	81	133	1,120	93		1.9		1,840	2.50	571	1,230	1,120	12
July 21-31	223		7.6	2,270	20		422	54	86	86	141	1,150	106		1.3		1,910	2.60	1,150	1,280	1,160	13
Aug. 1-5, 7-10	215		7.4	1,940	20		364	43	70	70	164	953	77		2.0		1,610	2.19	935	1,080	950	12
Aug. 11-20	115		7.4	2,460	18		486	57	86	86	163	1,300	104		1.8		2,130	2.90	661	1,450	1,310	11
Aug. 21-31	74.2		7.7	2,560	16		507	63	80	80	135	1,370	114		.0		2,220	3.02	445	1,520	1,410	10
Sept. 1-10	84.3		7.7	2,600	17		507	66	75	75	132	1,370	117		.0		2,220	3.02	505	1,540	1,430	10
Sept. 11-20	91.3		7.8	2,590	16		507	65	75	75	146	1,350	120		2.4		2,210	3.01	545	1,530	1,410	10
Sept. 21-30	90.4		7.8	2,590	16		507	65	87	87	147	1,380	117		.0		2,240	3.05	547	1,530	1,410	11
Weighted average---	164		--	1,980	17		376	51	58	58	144	989	89		0.9		1,650	2.24	731	1,150	1,030	10

# RIO GRANDE BASIN--Continued

## PECOS RIVER BELOW ALAMOGORDO DAM, N. MEX.

LOCATION.--Approximately 600 feet upstream from gaging station which is 1,200 feet downstream from Alamogordo Dam, 1½ miles downstream from Alamogordo Creek, and 4½ miles northeast of Guadalupe, De Baca County.

DRAINAGE AREA.--4,390 square miles.

RECORDS AVAILABLE.--Chemical analyses: June 1937 to September 1948.

EXTREMES, 1947-48.--Dissolved Solids: Maximum, 2,550 parts per million Jan. 11-16, 18-20; minimum, 687 parts per million June 11-20.

Total hardness: Maximum, 1,800 parts per million Jan. 11-16, 18-20; minimum, 463 parts per million June 11-20.

EXTREMES, 1937-48.--Dissolved Solids: Maximum, 2,590 parts per million Apr. 21-30, 1938; minimum, 435 parts per million Oct. 1-8, 1941.

Total hardness: Maximum, 1,800 parts per million Jan. 11-16, 18-20, 1947; minimum, 294 parts per million Oct. 1-8, 12-20, 1941.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1118. Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> ) (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>	
														Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate
Oct. 1-10, 1947	86.4	7.7	2,390	21	444	68	59	125	1,220	101	0.5			1,980	2.69	462	1,390	1,280
Oct. 11-20	80.0	7.7	2,460	16	452	67	71	123	1,250	109	.6			2,030	2.76	438	1,400	1,300
Oct. 21-31	84.5	7.6	2,480	17	464	68	60	125	1,260	108	.5			2,040	2.77	465	1,440	1,330
Nov. 1-10	41.7	7.5	2,480	16	456	72	65	132	1,260	110	.9			2,040	2.77	230	1,430	1,330
Nov. 11-20	1.31	7.7	2,480	17	460	75	74	138	1,290	116	.4			2,100	2.86	7.4	1,460	1,350
Nov. 21-30	1.70	7.8	2,520	18	472	78	51	139	1,280	115	.3			2,080	2.83	9.5	1,500	1,380
Dec. 1-10	1.62	7.9	2,530	17	480	73	68	139	1,310	119	.3			2,140	2.91	9.4	1,500	1,380
Dec. 11-20	1.72	7.7	2,540	19	472	81	64	147	1,310	117	.3			2,140	2.91	9.9	1,510	1,390
Dec. 21-31	1.64	7.7	2,590	17	488	72	86	145	1,350	125	.5			2,210	3.01	9.8	1,510	1,390
Jan. 1-10, 1948	1.61	7.6	2,570	21	516	83	60	147	1,400	128	1.2			2,280	3.10	9.9	1,630	1,510
Jan. 11-16, 18-20	1.31	7.8	2,800	20	576	88	77	166	1,560	146	.8			2,550	3.47	9.0	1,800	1,660
Jan. 21-24, 26-28, 30-31	1.40	7.6	2,400	22	460	81	74	147	1,300	118	.6			2,130	2.90	8.1	1,480	1,360
Feb. 1-2, 4-10	1.42	7.6	2,450	21	460	81	63	147	1,320	122	.7			2,160	2.94	8.3	1,530	1,410
Feb. 11-20	1.71	7.5	2,610	17	518	81	80	134	1,430	132	.2			2,330	3.17	11	1,630	1,500
Feb. 21-29	2.22	7.4	2,560	15	476	76	78	127	1,330	128	.4			2,170	2.95	13	1,500	1,400
Mar. 1-10	2.23	7.4	2,630	15	489	78	77	146	1,370	132	.6			2,240	3.05	14	1,570	1,430
Mar. 11-20	2.46	7.4	2,650	15	506	77	83	143	1,400	130	.5			2,280	3.10	15	1,580	1,460
Mar. 21-31	1.46	7.4	2,650	16	508	79	78	148	1,400	130	.4			2,280	3.10	9.1	1,590	1,470
Apr. 1-10	742	7.8	2,720	11	536	86	73	146	1,480	135	.3			2,390	3.25	4,790	1,690	1,570
Apr. 11-20	1,141	7.8	2,690	12	536	78	62	112	1,460	128	.3			2,330	3.17	7,180	1,660	1,570
Apr. 21-23, 25-30	333	7.3	1,340	13	228	33	43	132	591	52	2.2			1,030	1.40	926	704	596
May 1-10	94.9	7.3	1,510	13	270	40	40	141	695	61	1.5			1,190	1.62	305	838	722
May 11-20	105	7.4	1,410	13	242	35	50	126	650	55	.9			1,110	1.51	315	748	645
May 21-22, 24-31	89.7	7.6	1,360	13	235	34	38	114	615	53	1.0			1,050	1.43	254	726	633

RIO GRANDE BASIN--Continued  
 PECOS RIVER BELOW ALAMOGORDO DAM, N. MEX.--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Mean discharge (second-foot)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
June 1-10, 1948 ----	62.0	7.8		1,030	13		157	24		44	144	403	34		0.9		747	1.02	125	490	372	16
June 11-20 ----	95.6	7.8		959	12		151	21	33		110	384	31		1.0		687	.93	177	463	373	13
June 21-27, 30 ----	99.8	7.8		1,000	13		160	23	33		116	407	33		1.1		727	.99	196	494	398	13
July 1-10 ----	92.9	7.5		1,250	18		209	25	46		129	534	44		1.7		941	1.28	236	624	519	14
July 11-20 ----	296	7.5		1,210	16		201	25	43		122	518	41		1.6		906	1.23	724	604	504	13
July 21-31 ----	1,255	7.6		1,260	15		209	27	43		122	542	44		.7		941	1.28	3,190	632	532	13
Aug. 1-10 ----	543	7.5		1,470	12		253	34	48		144	654	53		2.1		1,130	1.54	1,660	771	653	12
Aug. 11-20 ----	88.6	--		1,400	15		224	31	44		134	575	50		2.9		1,010	1.37	242	686	576	12
Aug. 21-31 ----	100	7.6		1,810	14		319	42	71		133	893	67		1.4		1,460	1.90	304	968	860	14
Sept. 1-10 ----	88.2	7.7		2,050	15		372	51	72		131	1,030	81		1.0		1,690	2.30	402	1,140	1,030	12
Sept. 11-20 ----	83.5	7.7		2,290	15		430	59	77		128	1,180	98		.8		1,980	2.62	435	1,320	1,210	11
Sept. 21-30 ----	83.6	7.7		2,430	16		458	62	86		123	1,260	106		.4		2,070	2.82	467	1,400	1,300	12
Weighted average--	160	--		1,860	14		344	50	54		127	924	79		0.9		1,530	2.08	661	1,060	960	10

# RIO GRANDE BASIN--Continued

## PECOS RIVER NEAR ACME, N. MEX.

LOCATION.--At bridge on U. S. Highway 70, approximately 3 miles above gaging station which is 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, Chaves County.

DRAINAGE AREA.--11,380 square miles (contributing area).

RECORDS AVAILABLE.--Chemical analyses: July 1937 to September 1948.

EXTREMES, 1947-48.--Dissolved solids: Maximum, 16,700 parts per million Apr. 1-6; minimum, 1,500 parts per million Aug. 1-10.

Total hardness: Maximum, 4,150 parts per million Apr. 1-6; minimum, 878 parts per million June 2-3.

EXTREMES, 1937-48.--Dissolved solids: Maximum, 19,870 parts per million May 23-June 2, 1938; minimum, 806 parts per million May 24, 1941.

Total hardness: Maximum, 5,320 parts per million May 23-June 2, 1938; minimum, 528 parts per million May 24, 1941.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1118. Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-foot)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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	
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate		
Oct. 1-10, 1947	1/---	7.2	7.2	10,200	17		868	167		1,450	163	2,570	2,270		--	--		7,420	10.1	--	2,850	2,720	53
Oct. 11-20	1/---	7.2	7.2	9,160	23		776	166		1,340	164	2,470	2,010		--	--		6,870	9.34	--	2,620	2,480	53
Oct. 21-31	1/---	7.4	7.4	9,160	20		812	157		1,350	156	2,540	2,010		--	--		6,970	9.40	--	2,670	2,540	52
Nov. 1-3	1/---	7.6	7.6	5,230	23		576	107		631	156	1,830	850		22			4,120	5.60	--	1,880	1,750	42
Nov. 4-10	1/---	7.5	7.5	11,200	17		908	218		1,750	163	3,030	2,610		--	--		8,610	11.7	--	3,160	3,030	55
Nov. 11-20	1/---	7.4	7.4	9,690	17		796	174		1,470	141	2,570	2,210		--	--		7,310	9.94	--	2,700	2,590	54
Nov. 21-29, Dec. 2-3	1/---	7.4	7.4	8,480	22		722	190		1,220	206	2,500	1,740		--	--		6,500	8.84	--	2,580	2,410	51
Nov. 30, Dec. 1, 3-10	1/---	7.3	7.3	18,900	18		937	283		3,570	117	3,110	5,630		--	--		13,600	18.5	--	3,500	3,410	69
Dec. 11-20	1/---	7.4	7.4	18,200	19		913	281		3,420	123	3,010	5,420		--	--		13,100	17.8	--	3,430	3,330	68
Dec. 21-31	1/---	7.4	7.4	18,400	17		946	290		3,430	130	3,070	5,460		--	--		13,300	18.1	--	3,550	3,450	68
Jan. 1-10, 1948	1/---	7.5	7.5	19,300	18		858	308		3,610	144	2,890	5,770		--	--		13,500	18.4	--	3,410	3,290	70
Jan. 11-20	1/---	7.6	7.6	19,700	17		918	308		3,640	141	3,030	5,810		--	--		13,800	18.8	--	3,560	3,440	69
Jan. 21-31	1/---	7.6	7.6	17,900	24		894	286		3,230	134	2,940	5,140		--	--		12,600	17.1	--	3,410	3,280	67
Feb. 1-7	1-2/7.3	7.6	7.6	13,500	24		766	237		2,240	141	2,500	3,570		--	--		9,410	12.8	185	2,890	2,770	63
Feb. 8-12, 14-20	2/14.9	7.7	7.7	5,840	16		536	128		713	151	1,680	1,090		4.5			4,240	5.77	171	1,860	1,740	45
Feb. 21-24	3/8	7.5	7.5	5,700	13		604	140		648	157	1,880	995		2.9			4,360	5.93	9.4	2,080	1,950	40
Feb. 25-29	3/4	7.3	7.3	14,300	18		835	254		2,390	127	2,630	3,880					10,100	13.7	11	3,130	3,020	62
Mar. 1-2, 4, 6-10	3/2	7.3	7.3	12,600	21		817	228		2,050	122	2,590	3,290					9,060	12.3	4.9	2,980	2,880	60
Mar. 3, 5	3/	7.6	7.6	6,220	29		772	159		627	101	2,370	985		5.8			5,000	6.80	--	2,580	2,500	55
Mar. 11-13	1/1	7.6	7.6	11,100	24		797	231		1,650	116	2,470	7,230					7,960	10.8	21	2,940	2,840	55
Mar. 14-20	4/1	7.5	7.5	22,800	12		960	378		4,450	175	3,300	7,130					16,300	22.2	4.4	3,950	3,810	71
Mar. 21-31	4/1	7.4	7.4	23,300	8.8		984	396		4,450	173	3,400	7,150					16,500	22.4		4,080	3,940	70

1/ No flow at gaging station Oct. 1-Feb. 4.

2/ Discharge for Feb. 7 included in discharge reported for Feb. 8-12, 14-20.

3/ No flow at gaging station Feb. 23-25, 28-29, Mar. 1-5, 7-9.

4/ No flow at gaging station Mar. 13-Apr. 6.

RIO GRANDE BASIN--Continued  
PECOS RIVER NEAR ACME, N. MEX.--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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>		Percentage sodium	
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate		
Apr. 1-6, 1948 -----	4/-	7.4		23,500	9.2		994	405	4,520		169	3,350	7,330		--		16,700	22.7		4,150	4,010	70	
Apr. 7-10 -----	769	7.5		4,400	17		614	128	336		139	1,850	530				3,550	4.83	7,370	2,060	1,940	26	
Apr. 11-20 -----	994	7.8		3,760	13		604	105	234		132	1,730	380				3,130	4.26	8,400	1,940	1,830	21	
Apr. 21-22 -----	900	7.5		4,910	21		603	128	470		134	1,880	705				3,880	5.28	9,430	2,040	1,930	33	
Apr. 23-May 1 -----	253	7.4		8,350	22		680	163	1,170		134	2,090	1,850				6,050	8.23	4,130	2,370	2,260	52	
May 2-3 -----	22	7.9		2,640	19		368	60	178		125	1,040	258				1,990	2.71	118	1,160	1,060	25	
May 4-10 -----	5/5.4	7.5		4,940	17		662	132	442		116	1,990	700				4,000	5.44	58	2,190	2,100	30	
May 11-18 -----	5/-	7.6		5,860	20		712	153	576		123	2,140	940				4,610	6.27	--	2,410	2,300	34	
May 19-22 -----	5/-	7.4		12,800	27		910	276	1,260		114	2,920	2,140				7,590	10.3	--	3,410	3,110	45	
May 23-25 -----	5/-	7.7		6,210	21		746	187	1,639		138	2,290	1,020				4,950	6.73	--	2,550	2,440	35	
May 26-31 -----	5/14.8	7.7		3,350	18		526	101	203		117	1,590	295				2,790	3.79	111	1,730	1,630	20	
June 1, 8-9 -----	169	7.7		5,870	20		564	101	724		101	1,620	1,150				4,240	5.77	1,930	1,820	1,740	46	
June 2-3 -----	610	7.8		2,660	13		268	51	270		127	718	430				1,820	2.48	3,000	878	774	40	
June 4-7, 10 -----	47.8	7.4		9,310	21		608	167	1,420		119	1,920	270				6,460	8.79	834	2,200	2,110	58	
June 11-14 -----	6/-	7.7		3,910	18		490	98	351		101	1,490	530				3,030	4.12	--	1,630	1,540	32	
June 15-21 -----	6/-	7.5		7,150	18		630	140	928		111	1,870	1,500				5,150	7.00	--	2,150	2,060	48	
June 22-25 -----	6/-	7.8		3,950	19		514	109	845		102	1,620	500				3,170	4.31	--	1,730	1,650	30	
June 26-30 -----	6/-	7.0		10,600	23		796	198	1,620		140	2,510	2,550				7,770	10.6	--	2,600	2,690	56	
July 1-3 -----	6/-	7.3		14,100	19		811	241	2,370		136	2,650	3,760				9,920	13.49	--	3,010	2,900	63	
July 4-6 -----	6/-	7.5		6,940	23		676	161	836		114	2,060	1,360				5,160	7.04	--	2,350	2,260	44	
July 7-10 -----	6/49.8	7.7		3,490	22		506	94	247		130	1,490	370				2,800	3.81	376	1,650	1,540	25	
July 11-20 -----	7/1.2	7.7		3,230	20		472	90	221		99	1,410	335				2,600	3.54	8.4	1,550	1,470	24	
July 21 -----	7/-	7.6		6,940	--		--	--	--		128	--	1,170				--	--	--	--	--	--	--
July 22-31 -----	966	7.6		2,120	20		340	54	108		143	962	128				1,690	2.30	4,410	1,070	954	18	
Aug. 1-10 -----	748	7.7		1,960	18		295	48	106		124	821	144				1,500	2.04	3,030	934	832	20	
Aug. 11-20 -----	70.2	7.6		2,470	18		366	62	149		112	1,070	198				1,930	2.62	3,660	1,170	1,080	22	
Aug. 21-31 -----	8/8	7.6		2,510	20		332	73	164		108	1,010	242				1,900	2.58	4.1	1,300	1,040	24	
Sept. 1-6 -----	8/-	7.8		2,310	17		300	70	145		107	942	200				1,730	2.35	--	1,040	949	23	
Weighted average ---	103	--		3,390	17		463	85	272		113	1,340	414				2,660	3.62	740	1,500	1,400	28	

4/ No flow at gaging station Mar. 15-Apr. 6.

5/ No flow at gaging station May 10-26.

6/ No flow at gaging station June 11-July 7.

7/ No flow at gaging station July 12-21.

8/ No flow at gaging station Aug. 23-Sept. 30.

RIO GRANDE BASIN--Continued  
PECOS RIVER NEAR ARTESIA, N. MEX.

LOCATION.--At gaging station at bridge on Artesia-Lovington highway, 4.2 miles east of Artesia, Eddy County, 6.5 miles north of mouth of Rio Penasco, and 16.5 miles north of McMillan Dam.

DRAINAGE AREA.--15,300 square miles (contributing area).

RECORDS AVAILABLE.--Chemical analyses: July 1937 to September 1948.

EXTREMES, 1947-48.--Dissolved solids: Maximum, 6,990 parts per million Aug. 31, Sept. 1-10; minimum, 1,620 parts per million June 2-6.

Total hardness: Maximum, 2,630 parts per million Aug. 31, Sept. 1-10; minimum, 872 parts per million June 2-6.

EXTREMES, 1937-48.--Dissolved solids: Maximum, 10,900 parts per million Aug. 11-13, 17-21, 1945; minimum, 681 parts per million Sept. 6, 1938.

Total hardness: Maximum, 3,430 parts per million Aug. 11-13, 17-21, 1945; minimum, 404 parts per million Sept. 6, 1938.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1118. Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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 carbonate
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
Oct. 1-9, 1947	17.8	71.1	7.1	8,400	29		572	237	1,170		135	2,050	1,920		4.3		6,050	8.23	291	2,400	2,290	52
Oct. 11-20	38.8		7.3	7,180	28		494	222	821		140	1,820	1,360		4.1		4,820	6.56	505	2,150	2,030	45
Oct. 21-31	40.6		7.7	6,860	21		484	212	894		150	1,780	1,450		3.6		4,920	6.69	539	2,080	1,960	48
Nov. 1-10	44.7		7.8	6,710	25		492	210	851		167	1,780	1,380		6.0		4,830	6.57	583	2,060	1,950	47
Nov. 11-20	76.2		7.9	6,370	18		468	191	801		170	1,660	1,280		9.5		4,520	6.15	930	1,950	1,810	47
Nov. 21-30	101		7.9	6,150	24		454	176	802		179	1,550	1,300		9.3		4,400	5.98	1,200	1,860	1,710	48
Dec. 1-10	114		7.9	6,130	20		456	170	799		202	1,520	1,280		8.3		4,360	5.93	1,340	1,840	1,670	49
Dec. 11-12, 14-20	106		7.9	6,320	19		462	175	805		212	1,530	1,310		8.9		4,410	6.00	1,260	1,870	1,700	48
Dec. 21-31	79.5		7.9	6,600	17		486	188	828		201	1,580	1,380		8.2		4,610	6.27	990	1,990	1,820	48
Jan. 1-10, 1948	80.9		7.9	6,750	19		498	192	874		209	1,670	1,430		7.0		4,790	6.51	1,050	2,030	1,860	48
Jan. 11-20	80.3		7.9	6,690	18		504	192	855		212	1,710	1,380		6.6		4,770	6.49	1,030	2,050	1,870	48
Jan. 21-31	80.9		7.9	6,830	21		504	199	881		223	1,730	1,420		6.9		4,870	6.62	1,060	2,080	1,890	48
Feb. 1-10	116		7.5	6,610	19		456	181	869		193	1,570	1,400		5.2		4,600	6.26	1,440	1,880	1,720	50
Feb. 11-20	96.2		7.6	6,560	21		496	195	825		200	1,680	1,350		6.1		4,680	6.36	1,220	2,040	1,880	47
Feb. 21-27, 29	82.4		7.5	6,950	20		516	202	884		182	1,760	1,460		--		4,930	6.70	1,100	2,120	1,970	48
Mar. 1-10	76.9		7.5	7,050	21		512	203	920		190	1,770	1,500		--		5,020	6.83	1,040	2,110	1,960	49
Mar. 11-20	65.0		7.1	7,270	24		522	208	965		188	1,850	1,540		5.0		5,210	7.09	914	2,160	2,000	49
Mar. 21-31	31.5		7.2	7,730	22		554	229	1,020		173	1,990	1,650		3.1		5,550	7.55	472	2,320	2,180	49
Apr. 1-9 1/2	39.5		7.2	9,160	20		590	246	1,320		170	2,190	2,080		--		6,530	8.88	696	2,480	2,340	54
Apr. 11-20	95.5		7.3	5,520	23		566	103	200		138	1,760	262		2.4		2,030	4.12	7,810	1,910	1,800	19
Apr. 21-May 2	433		7.8	5,460	20		538	100	226		132	1,560	340		2.9		2,840	3.86	3,410	1,120	1,820	22
May 3-7, 9-10	68.6		7.2	5,840	21		536	173	652		120	1,810	1,060		3.4		4,300	5.65	796	2,050	1,950	41
May 11-20	39.9		7.5	7,460	19		562	230	962		148	2,060	1,540		2.6		5,450	7.41	587	2,550	2,320	47
May 21-30	26.2		7.6	6,260	18		530	245	1,130		136	2,120	1,790		3.4		5,920	8.05	419	2,360	2,270	51

1/ Discharge for Apr. 10 included in discharge reported for Apr. 11-20.

RIO GRANDE BASIN--Continued  
 PECOS RIVER NEAR ARTESIA, N. MEX.--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948.--Continued

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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	
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate		
June 1, 7-10, 1948 2/-	354	7.4		4,530	21		388	132	465		151	1,280	750		9.1			3,120	4.24	2,980	1,510	1,390	40
June 2-6 -----	2,255	7.6		2,310	19		264	52	194		149	686	320		8.7			1,620	2.20	9,860	872	750	33
June 11-20 -----	125	7.5		6,770	23		514	204	874		159	1,850	1,390		6.8			4,940	6.72	1,670	2,120	1,980	47
June 21-30 -----	55.9	7.5		7,770	18		580	237	1,010		148	2,070	1,650		6.8			5,640	7.67	851	2,420	2,300	47
July 1-10 -----	50.5	7.3		7,930	22		542	225	1,070		126	1,950	1,750		9.7			5,630	7.66	768	2,280	2,170	51
July 11-20 -----	27.6	7.2		8,230	22		582	224	1,130		119	2,150	1,770		8.3			5,940	8.08	443	2,370	2,280	51
July 21-23 -----	37.3	7.2		9,370	36		618	239	1,370		148	2,250	2,150		--			6,740	9.17	679	2,520	2,400	54
July 24-31 -----	894	7.4		2,570	21		352	66	184		127	1,070	230		8.1			1,990	2.71	4,800	1,150	1,050	26
Aug. 1-10 -----	814	7.6		2,220	18		328	57	125		127	922	182		6.4			1,700	2.31	3,740	1,050	949	21
Aug. 11-16 -----	53.8	7.4		4,280	18		436	117	437		106	1,390	695		5.9			3,150	4.28	458	1,570	1,480	38
Aug. 17 -----	170	--		8,810	19		568	190	1,290		139	1,870	2,090		--			6,100	8.30	2,800	2,200	2,080	56
Aug. 18-20 -----	138	7.4		2,980	18		340	86	255		138	1,090	358		5.8			2,220	3.02	827	1,400	1,090	32
Aug. 21-30 -----	18.3	7.5		5,870	20		460	170	718		112	1,650	1,130		6.4			4,210	5.73	208	1,850	1,750	46
Aug. 31-Sept. 10 -----	10.2	7.5		9,780	21		616	265	1,430		136	2,320	2,270		--			6,990	9.51	193	2,630	2,520	54
Sept. 11-20 -----	26.0	7.5		7,920	20		544	245	1,050		136	2,060	1,690		5.5			5,680	7.72	399	2,360	2,250	49
Sept. 21-30 -----	20.0	7.5		8,420	18		546	232	1,160		132	2,120	1,850		4.4			6,020	8.19	325	2,400	2,290	51
Weighted average-----	175	--		4,050	20		434	113	403		149	1,350	634		6.2			3,030	4.12	1,430	1,550	1,430	36

2/ Includes discharge for May 31.



## RIO GRANDE BASIN--Continued

## PECOS RIVER NEAR MALAGA, N. MEX.

LOCATION.--Two and one-half miles upstream from gaging station which is 3 miles southeast of Malaga, Eddy County, and 3 miles downstream from Black River. DRAINAGE AREA.--19,190 square miles (contributing area).

RECORDS AVAILABLE.--Chemical analyses: July 1937 to September 1948.

EXTREMES, 1947-48.--Dissolved solids: Maximum, 5,230 parts per million Apr. 11-16, 18-20; minimum, 927 parts per million June 1-4, 1948. Total hardness: Maximum, 2,250 parts per million Sept. 11-20, 21-30; minimum, 482 parts per million June 1-4.

EXTREMES, 1937-48.--Dissolved solids: Maximum, 5,290 parts per million Aug. 2-10, 1946; minimum, 384 parts per million Sept. 21-22, 1941. Total hardness: Maximum, 2,290 parts per million Aug. 1-10, 11-20, 1947; minimum, 234 parts per million Sept. 21-22, 1941.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1118. Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
Oct. 1-10, 1947----	34.8	6.9		6,590	26		510	191	831		174	1,810	1,300		5.9		4,760	6.47	447	2,160	1,926	47
Oct. 11-20-----	28.3	7.2		7,090	26		530	199	923		174	1,880	1,450		5.6		5,100	6.94	390	2,140	2,004	48
Oct. 21-31-----	47.7	7.5		6,510	26		512	198	797		172	1,800	1,280		4.8		4,700	6.39	605	2,190	1,950	45
Nov. 1-10-----	61.7	7.6		3,710	23		482	181	694		185	1,690	1,060		6.2		4,150	5.64	691	1,950	1,800	42
Nov. 11-20-----	81.3	7.6		3,300	20		460	171	585		199	1,590	950		8.7		3,840	5.22	843	1,830	1,700	41
Nov. 21-23, 25-30---	79.1	7.4		5,160	18		448	166	565		196	1,510	915		6.4		3,720	5.06	794	1,800	1,640	41
Dec. 1-10-----	76.1	--		5,100	18		450	164	559		206	1,500	905		8.0		3,710	5.05	762	1,800	1,630	40
Dec. 11-20-----	78.8	7.5		4,990	23		440	158	540		209	1,450	875		8.3		3,600	4.90	766	1,750	1,580	40
Dec. 21-31-----	78.7	7.6		4,970	24		436	160	541		210	1,470	860		8.9		3,600	4.90	785	1,750	1,570	40
Jan. 1-10, 1948----	80.0	7.8		4,890	17		438	161	528		196	1,460	860		5.0		3,560	4.84	769	1,730	1,590	40
Jan. 11-20-----	77.8	7.9		4,860	16		438	158	505		195	1,440	835		4.1		3,490	4.75	733	1,740	1,580	39
Jan. 21-31-----	91.6	7.9		4,540	17		440	153	442		191	1,420	745		4.6		3,320	4.52	821	1,730	1,570	36
Feb. 1-10-----	83.7	7.9		4,640	16		430	156	473		200	1,410	785		4.9		3,370	4.58	762	1,710	1,550	37
Feb. 11-20-----	90.8	7.9		4,380	14		426	146	415		189	1,350	710		4.2		3,160	4.30	775	1,660	1,510	35
Feb. 21-28-----	85.9	7.5		4,450	17		424	146	436		184	1,380	720		4.3		3,220	4.38	747	1,660	1,510	36
Mar. 2-4, 6-10-----	77.3	7.6		4,750	14		432	156	494		183	1,460	795		3.0		3,440	4.68	718	1,720	1,570	38
Mar. 11-20-----	73.4	7.5		4,750	16		428	155	498		176	1,440	810		4.1		3,440	4.68	682	1,710	1,560	39
Mar. 21-31-----	27.3	7.5		5,840	18		476	170	711		178	1,650	1,110		5.2		4,230	5.75	312	1,890	1,740	45
Apr. 1-10-----	18.4	7.2		6,680	24		518	189	870		177	1,860	1,330		5.8		4,880	6.64	242	2,070	1,920	48
Apr. 11-16, 18-20---	16.0	7.2		7,190	21		544	202	948		170	1,980	1,450		5.1		5,230	7.11	226	2,190	2,050	49
Apr. 21-30-----	34.9	7.4		6,780	18		546	209	812		169	1,920	1,310		3.6		4,900	6.66	462	2,220	2,080	44
May 1-10-----	71.7	7.4		5,540	17		500	184	601		172	1,720	975		3.7		4,090	5.56	792	2,000	1,860	39
May 11-20-----	78.4	7.7		5,280	20		486	176	571		167	1,670	920		4.9		3,930	5.34	832	1,940	1,800	39
May 21-25-----	76.4	7.7		5,530	20		482	175	626		164	1,690	980		8.1		4,060	5.52	837	1,920	1,790	41
May 26-31-----	281	7.7		3,690	16		330	112	374		132	1,090	600		9.7		2,600	3.54	1,970	1,280	1,180	39

RIO GRANDE BASIN--Continued  
PECOS RIVER NEAR MALAGA, N. MEX.--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Mean discharge (second-foot)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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	
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate		
June 1-4, 1948	4,322	7.6		1,430	13		139	33		123	121	365	190		4.6			927	1.26	10,800	482	384	36
June 5-10	138	7.4		2,960	16		226	83	334		132	741	530		5.7			2,000	2.72	745	906	798	44
June 11-20	176	7.5		3,770	19		334	124	382		164	1,100	630		5.9			2,680	3.64	1,270	1,340	1,210	38
June 21-30	120	7.5		4,430	20		408	137	469		166	1,360	740		8.0			3,220	4.38	1,040	1,580	1,450	39
July 1-10	81.9	7.3		5,570	23		488	177	626		160	1,650	1,030		6.3			4,080	5.55	902	1,950	1,810	41
July 11-20	51.5	7.4		5,970	25		508	191	686		148	1,780	1,110		5.2			4,380	5.96	609	2,050	1,930	42
July 21-31	63.5	7.4		6,000	26		504	198	695		148	1,790	1,130		5.5			4,420	6.01	758	2,070	1,950	42
Aug. 1-10	54.1	7.5		5,870	23		516	187	671		146	1,780	1,090		6.1			4,340	5.90	634	2,060	1,940	41
Aug. 11-20	35.4	7.4		6,390	25		528	202	753		162	1,850	1,220		5.9			4,660	6.34	445	2,150	2,020	43
Aug. 21-31	74.6	7.3		5,760	22		492	211	602		160	1,730	1,040		6.3			4,180	5.68	842	2,100	1,960	38
Sept. 1-10	42.7	7.4		6,270	28		518	219	703		167	1,840	1,180		6.9			4,580	6.23	528	2,190	2,060	41
Sept. 11-20	40.5	7.6		6,550	24		538	223	739		177	1,870	1,250		8.1			4,740	6.45	518	2,250	2,110	42
Sept. 21-30	49.6	7.6		6,480	22		536	221	737		178	1,870	1,240		8.5			4,720	6.42	632	2,250	2,100	42
Weighted average	118	--	--	3,600	17		320	111	380		153	1,040	614		5.5			2,560	3.48	816	1,260	1,130	40

RIO GRANDE BASIN--Continued  
PECOS RIVER AT RED BLUFF, N. MEX.

LOCATION.--One mile upstream from gaging station which is just downstream from Red Bluff Creek, and 5½ miles upstream from Delaware River. DRAINAGE AREA.--19,540 square miles above gaging station (contributing area). RECORDS AVAILABLE.--Chemical analyses: October 1937 to September 1948.

EXTREMES, 1947-48.--Dissolved solids: Maximum, 10,700 parts per million Apr. 21-30; minimum, 456 parts per million June 3.

Total hardness: Maximum, 2,600 parts per million Apr. 21-30; minimum, 256 parts per million June 3.

EXTREMES, 1937-48.--Dissolved solids: Maximum, 11,900 parts per million Aug. 11-20, 1947; minimum, 456 parts per million June 3, 1948.

Total hardness: Maximum, 2,810 parts per million Aug. 11-20, 1947; minimum, 256 parts per million June 3, 1948.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1118. Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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>		Per-sodium
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
Oct. 1-10, 1947----	49.7	7.4		10,600	29		486	216	1,760		146	1,860	2,750		--		7,170	9.75	962	2,100	1,980	65
Oct. 11-20 -----	46.1	7.0		11,500	24		498	242	1,740		135	1,820	2,770		--		7,260	9.87	904	2,240	2,130	63
Oct. 21-31 -----	55.9	7.0		11,000	21		518	247	1,800		144	2,000	2,650		--		7,510	10.2	1,130	2,310	2,190	63
Nov. 1-10 -----	57.7	7.5		9,880	21		496	222	1,560		153	1,840	2,480		--		6,680	9.10	1,040	2,150	2,020	61
Nov. 11-20 -----	77.4	7.6		9,010	17		474	210	1,380		170	1,740	2,190		--		6,080	8.28	1,270	2,050	1,910	59
Nov. 21-30 -----	81.7	7.6		8,280	17		456	196	1,250		174	1,660	1,980		8.0		5,650	7.68	1,250	1,940	1,800	58
Dec. 1-10 -----	85.2	7.5		8,040	16		452	193	1,300		178	1,610	2,080		--		5,740	7.81	1,320	1,920	1,780	60
Dec. 11-20 -----	84.6	7.5		7,740	16		446	191	1,110		187	1,570	1,780		7.8		5,220	7.10	1,190	1,900	1,750	56
Dec. 21-31 -----	81.5	7.5		7,780	16		462	191	1,130		180	1,620	1,810		9.1		5,330	7.25	1,170	1,940	1,780	56
Jan. 1-10, 1948----	82.6	7.4		7,790	14		456	188	1,150		188	1,600	1,830		5.9		5,340	7.26	1,190	1,910	1,760	57
Jan. 11-20 -----	82.2	7.5		7,630	12		446	182	1,110		180	1,590	1,750		5.0		5,180	7.04	1,150	1,860	1,710	56
Jan. 21-30, 28-31--	95.2	7.7		6,770	12		458	174	916		172	1,620	1,430		5.4		4,700	6.39	1,210	1,860	1,720	52
Feb. 1-10 -----	91.4	7.7		7,220	14		436	168	1,030		184	1,490	1,640		5.6		4,870	6.62	1,200	1,780	1,630	56
Feb. 11-20 -----	95.1	7.7		6,780	13		446	170	909		178	1,490	1,480		5.3		4,600	6.26	1,180	1,810	1,670	52
Feb. 21-23, 25-29--	89.2	7.2		6,800	13		424	163	946		162	1,460	1,510		5.3		4,600	6.26	1,110	1,730	1,600	54
Mar. 1-10 -----	78.5	7.3		7,420	14		442	178	1,070		166	1,580	1,680		5.3		5,060	6.88	1,070	1,840	1,700	56
Mar. 11-20 -----	70.0	7.4		7,680	11		444	177	1,150		159	1,610	1,780		4.9		5,270	7.17	986	1,870	1,710	58
Mar. 21-31 -----	37.5	7.4		9,440	8.4		456	197	1,520		129	1,700	2,380		--		6,330	8.61	641	1,950	1,840	63
Apr. 1-2 7-10 ----	31.0	7.3		12,900	9.4		508	235	2,310		130	2,010	3,580		--		8,720	11.9	730	2,230	2,130	69
Apr. 3-6 -----	33.8	7.5		6,500	18		612	214	752		170	2,340	1,940		--		5,060	6.88	462	2,410	2,270	40
Apr. 7-10 -----	25.5	7.2		14,000	10		557	252	2,530		128	2,120	3,980		--		9,510	12.9	655	2,430	2,320	69
Apr. 11-20 -----	34.2	7.1		15,300	9.7		584	278	2,900		142	2,270	4,560		--		10,700	14.6	988	2,600	2,480	71
Apr. 21-30 -----	36.1	7.3		13,000	8.3		569	268	2,260		140	2,150	3,610		--		8,930	12.1	1,590	2,520	2,410	66
May 1-10 -----	74.9	7.5		6,770	13		322	212	1,340		151	1,900	2,110		--		6,170	8.39	1,250	2,170	2,050	57

## RIO GRANDE BASIN--Continued

## PECOS RIVER AT RED BLUFF, N. MEX.--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	Specific conductance (micro-mhos at 25° C.)	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
																Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
June 3, 1948 1/----	6, 133	8.0	744	12		78	15		54	103	160	86		0.2		456	0.62	7, 550	256	172	32
June 7, 9 2/-----	221	7.5	7, 930	14		284	124	1, 380		147	953	2, 210		--		5, 040	6.85	3, 010	1, 220	1, 100	71
June 14, 17 -----	188	7.8	6, 660	14		322	142	1, 050		151	1, 120	1, 680	9.0	--		4, 410	6.00	2, 240	1, 390	1, 260	62
June 21, 23, 28-29 -	146	7.8	7, 380	14		416	167	1, 100		144	1, 430	1, 780	5.7	--		4, 980	6.77	1, 960	1, 720	1, 610	58
July 1-10 -----	80.7	7.3	11, 500	21		508	213	1, 940		145	1, 850	3, 060		--		7, 660	10.4	1, 670	2, 140	2, 020	66
July 11-20 -----	64.7	7.2	11, 400	21		528	227	1, 930		138	1, 990	3, 030		--		7, 790	10.6	1, 360	2, 250	2, 140	65
July 21-31 -----	62.9	7.2	12, 600	20		543	244	2, 170		135	2, 050	3, 430		--		8, 520	11.6	1, 400	2, 360	2, 250	67
Aug. 1-10 -----	65.5	7.3	10, 300	27		522	226	1, 650		131	1, 960	2, 600		--		7, 050	9.59	1, 250	2, 230	2, 120	62
Aug. 11-20 -----	49.0	7.3	12, 400	22		518	236	2, 170		125	1, 990	3, 410		--		8, 410	11.4	1, 110	2, 260	2, 160	68
Aug. 21-31 -----	80.1	7.1	12, 700	19		533	257	2, 190		142	2, 100	3, 430		--		8, 600	11.7	1, 860	2, 390	2, 270	67
Sept. 1-10 -----	51.9	7.2	10, 100	18		502	222	1, 600		146	1, 900	2, 510		--		6, 820	9.28	956	2, 170	2, 050	62
Sept. 11-20 -----	47.3	7.3	12, 600	18		553	252	2, 140		149	2, 100	3, 380	4.1	--		8, 520	11.6	1, 090	2, 420	2, 290	66
Sept. 21-30 -----	52.3	7.4	12, 400	18		558	246	2, 110		143	2, 100	3, 330		--		8, 430	11.5	1, 190	2, 400	2, 290	66
Weighted average -	128	--	5, 660	14		303	125	873		135	1, 050	1, 380		2.7		3, 810	5.18	1, 320	1, 270	1, 160	60

1/ Includes discharge for June 1-2.

2/ Includes discharge for June 4-6, 8, 10.

RIO GRANDE BASIN--Continued  
PECOS RIVER NEAR ORLA, TEX.

LOCATION:--At gaging station 600 feet upstream from Pasotex pipe-line crossing, 6 miles southeast of Orla, Reeves County, 11 miles downstream from Salt (Screwbean) Draw, and 14 miles downstream from Red Bluff Dam.

DRAINAGE AREA:--21,500 square miles (contributing area).

RECORDS AVAILABLE:--Chemical analyses: July 1937 to September 1948.

EXTREMES, 1947-48:--Dissolved solids: Maximum, 9,640 parts per million Oct. 21-31; minimum, 1,090 parts per million June 1-2.

Total hardness: Maximum, 3,010 parts per million Oct. 21-31; minimum, 602 parts per million June 1-2.

EXTREMES, 1937-48:--Dissolved solids: Maximum, 9,640 parts per million Oct. 21-31, 1947; minimum, 1,090 parts per million June 1-2, 1948.

Total hardness: Maximum, 3,240 parts per million Feb. 11, 13, 16-19, 1946; minimum, 602 parts per million June 1-2, 1948.

REMARKS:--Records of water discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1118. Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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 (H)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium carbonate
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
Oct. 1-10, 1947----	4.16	--	--	12,500	--	--	726	260	1,980	--	96	2,500	3,200	--	--	--	8,710	11.85	98	2,880	2,880	60
Oct. 11-20 -----	64	7.6	7.6	13,200	--	--	744	275	2,060	--	86	2,560	3,350	--	--	--	9,030	12.28	16	2,980	2,920	60
Oct. 21-31 -----	65	7.2	7.2	13,500	14	0.02	688	315	2,240	44	78	2,800	3,530	2.2	2.2	--	9,640	13.11	17	3,010	3,950	82
Nov. 1-10 -----	19.7	7.8	7.8	12,800	--	--	692	266	2,020	--	96	2,510	3,210	--	--	--	8,750	11.90	465	2,830	2,740	61
Nov. 11-20 -----	2.76	7.9	7.9	12,300	--	--	650	260	2,030	--	95	2,460	3,160	--	--	--	8,610	11.71	64	2,690	2,610	62
Nov. 21-30 -----	4.24	7.9	7.9	11,800	--	--	623	245	1,930	--	110	2,370	2,880	--	--	--	8,200	11.15	94	2,560	2,470	62
Dec. 1-10 -----	3.06	8.2	8.2	11,800	--	--	680	270	1,860	--	130	2,350	3,040	--	--	--	8,260	11.23	68	2,800	2,700	59
Dec. 11-20 -----	3.94	8.1	8.1	11,300	--	--	731	264	1,690	--	133	2,280	2,910	--	--	--	7,940	10.80	84	2,910	2,800	56
Dec. 21-31 -----	8.26	8.2	8.2	11,100	--	--	624	254	1,700	--	140	2,170	2,780	--	--	--	7,610	10.35	170	2,600	2,490	59
Jan. 1-10, 1948----	6.27	7.6	7.6	10,500	--	--	593	239	1,690	--	128	2,190	2,650	--	--	--	7,430	10.09	126	2,450	2,340	60
Jan. 11-20 -----	6.72	7.7	7.7	10,600	--	--	586	240	1,680	--	127	2,140	2,700	--	--	--	7,430	10.10	135	2,470	2,370	60
Jan. 21-31 -----	6.15	7.6	7.6	10,600	--	--	586	243	1,700	--	133	2,190	2,700	--	--	--	7,500	10.20	125	2,490	2,360	60
Feb. 1-10 -----	3.60	8.0	8.0	10,700	30	--	564	245	1,640	--	117	2,120	2,850	--	--	0.79	7,330	9.97	71	2,460	2,370	59
Feb. 11-20 -----	3.03	7.8	7.8	10,600	22	--	564	245	1,620	--	114	2,130	2,600	--	--	.67	7,260	9.87	59	2,460	2,370	59
Feb. 21-29 -----	3.71	7.8	7.8	11,000	18	--	564	254	1,680	--	106	2,230	2,700	--	--	.72	7,540	10.25	75	2,570	2,460	59
Mar. 1-10 -----	6.25	7.4	7.4	10,700	19	--	594	252	1,610	--	116	2,190	2,980	--	--	.78	7,300	9.93	144	2,520	2,420	58
Mar. 11-20 -----	6.30	7.8	7.8	10,400	18	--	574	241	1,570	--	120	2,090	2,860	--	--	.78	7,070	9.62	119	2,420	2,320	58
Mar. 21-31 -----	6.45	7.6	7.6	10,600	22	--	600	251	1,610	--	112	2,190	2,800	--	--	.74	7,330	9.97	128	2,530	2,440	58
Apr. 1-10 -----	37.8	--	--	10,900	12	--	626	245	1,670	--	97	2,270	2,670	--	--	--	7,540	10.25	770	2,570	2,460	59
Apr. 11-20 -----	514	--	--	9,680	5.9	--	546	218	1,470	--	117	1,980	2,340	--	--	--	6,620	9.00	9,190	2,260	2,160	59
Apr. 21-30 -----	407	--	--	9,910	5.7	--	553	222	1,490	--	120	2,000	2,990	--	--	--	6,720	9.14	7,380	2,310	2,210	58
May 1-10 -----	195	7.8	7.8	11,500	8.0	--	583	241	1,890	--	135	2,140	2,990	--	--	--	7,920	10.77	4,170	2,450	2,340	63
May 11-20 -----	61.7	7.8	7.8	11,200	7.0	--	612	245	1,780	--	127	2,140	2,860	--	--	--	7,690	10.46	1,280	2,540	2,430	60
May 21-22, 30-31----	33.0	8.1	8.1	11,100	5.5	--	615	248	1,750	--	119	2,160	2,840	--	--	--	7,680	10.44	684	2,550	2,460	60
May 23-29 -----	52.3	7.9	7.9	6,190	6.0	--	396	100	909	--	73	1,190	1,470	--	5.5	--	4,110	5.59	580	1,400	1,340	59

RIO GRANDE BASIN--Continued  
 PECOS RIVER NEAR ORLA, TEX.--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948.--Continued

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
June 1-2, 1948-----	187		--	1,640	19		215	16	108		56	547	155		2.8	--	1,090	1.48	550	602	556	28
June 3, 5-8-----	344		--	2,810	17		219	36	338		78	591	522		1.2	--	1,750	2.38	1,630	702	638	50
June 4, 9-20-----	603		--	5,020	17		317	103	658		112	1,030	1,030		2.5	--	3,230	4.39	5,280	1,210	1,120	54
June 21-July 15-----	432		--	3,690	17		219	69	467		112	695	760		2.2	--	2,300	3.13	2,680	630	738	56
July 16-Aug. 10-----	131		--	6,690	22		366	131	962		124	1,230	1,530		3.5	--	4,310	5.86	1,520	1,450	1,350	59
Aug. 11-14, 17-20-----	274		--	6,400	22		364	126	916		118	1,210	1,460		3.5	--	4,160	5.66	3,080	1,430	1,330	58
Aug. 15-16-----	283		--	3,710	19		224	67	475		47	697	780		3.2	--	2,290	3.11	1,750	834	796	55
Aug. 21-27-----	85.1		--	7,110	19		404	139	1,040		114	1,330	1,670		3.5	--	4,660	6.34	1,070	1,580	1,430	59
Aug. 28-31-----	56.2		--	8,760	18		446	164	1,360		125	1,520	2,170		--	--	5,740	7.81	871	1,790	1,680	82
Sept. 1-10-----	27.9	7.6	--	9,650	19		482	189	1,530		112	1,690	2,450		--	--	6,420	8.73	484	1,960	1,890	83
Sept. 11-18-----	6.08	7.7	--	9,220	26		472	182	1,450		104	1,630	2,340		--	--	6,150	8.36	101	1,930	1,840	82
Sept. 19-30-----	5.44		--	12,500	18		606	249	2,050		98	2,180	3,290		--	--	8,440	11.48	124	2,540	2,460	64
Weighted average--	114		--	6,520	--		376	135	946		113	1,280	1,510		--	--	4,310	5.86	1,330	1,490	1,400	56

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 downstream from Chacatori Draw.

DRAINAGE AREA--27,820 square miles (contributing area).

RECORDS AVAILABLE--Chemical analyses: April 1939 to June 1942. October 1946 to September 1948.

EXTREMES, 1947-48.--Dissolved solids: Maximum, 11,400 parts per million Mar. 21-31; minimum, 9,740 parts per million Sept. 21-30.

Total hardness: Maximum, 3,610 parts per million Mar. 21-31; minimum, 3,100 parts per million Jan. 11-20.

EXTREMES, 1939-42.--Dissolved solids: Maximum, 12,000 parts per million Feb. 1-10, 1941; minimum, 776 parts per million June 5, 1947.

Total hardness: Maximum, 3,630 parts per million July 21-31, 1947; minimum, 339 parts per million June 3, 1947.

REMARKS--Records of water discharge for water year October 1946 to September 1948 given in Water-Supply Paper 1118. Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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> )	Bo-ron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>			
																	Parts per mil-lion	Tons per acre-foot	Tons per day	Total	Non-carbonate		
Oct. 1-10, 1947-----	14.7			14,800	--		750	379	2,410		122	3,080	3,800					10,500	14.28	417	3,430	3,330	60
Oct. 11-20-----	15.0			14,600	--		750	368	2,290		130	2,950	3,680					10,100	13.74	409	3,360	3,260	60
Oct. 21-31-----	14.5			14,300	--		742	361	2,330		135	2,990	3,680					10,200	13.87	399	3,340	3,230	60
Nov. 1-10-----	13.2			13,700	--		674	373	2,330		135	2,860	3,680					9,960	13.57	356	3,220	3,100	61
Nov. 11-20-----	12.0			14,500	--		704	374	2,360		146	2,920	3,730					10,200	13.87	330	3,300	3,160	61
Nov. 21-30-----	12.0			14,500	--		716	387	2,550		158	2,920	4,080					10,700	14.55	347	3,360	3,250	62
Dec. 1-10-----	30.8			15,300	--		698	369	2,640		151	2,880	4,170					10,800	14.69	898	3,260	3,140	64
Dec. 11-20-----	34.2			15,300	--		686	369	2,650		139	2,830	4,200					10,800	14.69	997	3,230	3,120	64
Dec. 21-31-----	34.9			15,300	--		662	375	2,620		153	2,790	4,150					10,700	14.55	1,010	3,190	3,070	64
Jan. 1-10, 1948-----	34.7			15,300	--		692	363	2,680		173	2,790	4,250					10,900	14.82	1,420	3,220	3,060	64
Jan. 11-20-----	22.7			14,800	--		658	354	2,540		175	2,750	3,980					10,400	14.14	637	3,100	2,950	64
Jan. 21-31-----	21.4			14,500	--		698	357	2,430		189	2,870	3,800					10,200	13.87	589	3,210	3,060	62
Feb. 1-10-----	21.0			15,000	6.2		727	371	2,440		100	2,990	3,860					10,400	14.14	590	3,340	3,260	61
Feb. 11-20-----	20.3			14,900	7.2		737	373	2,480		94	3,030	3,920					10,600	14.42	581	3,370	3,300	61
Feb. 21-29-----	20.4			14,900	6.0		737	372	2,480		96	3,050	3,910					10,600	14.42	584	3,370	3,290	62
Mar. 1-10-----	20.6			15,000	4.6		706	382	2,460		72	3,030	3,910					10,500	14.28	584	3,330	3,270	62
Mar. 11-20-----	20.4			15,000	4.3		723	386	2,470		88	3,050	3,910					10,600	14.42	584	3,390	3,320	61
Mar. 21-31-----	18.0			15,800	3.0		785	401	2,680		97	3,260	4,230					11,400	15.50	554	3,610	3,530	62
Apr. 1-10-----	17.4			15,500	4.1		752	398	2,590		77	3,170	4,100					11,100	15.10	521	3,510	3,450	62
Apr. 11-20-----	22.3			15,100	2.5		758	385	2,510		84	3,180	3,920					10,800	14.69	650	3,470	3,410	61
Apr. 21-30-----	21.1			14,900	4.4		727	375	2,410		72	3,030	3,920					10,400	14.14	592	3,360	3,300	61
May 1-10-----	17.1			15,200	4.0		758	381	2,530		93	3,120	4,000					10,900	14.82	503	3,460	3,360	61
May 11-20-----	14.9			15,200	3.1		768	378	2,620		100	3,160	4,100					11,100	15.10	447	3,470	3,390	62
May 21-31-----	15.5			15,600	3.0		778	385	2,530		84	3,240	3,960					11,000	14.96	460	3,520	3,460	61

RIO GRANDE BASIN--Continued  
PECOS RIVER BELOW GRANDEFALLS, TEX.--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948.--Continued

Date of collection	Mean discharge (second-foot)	Temp-erature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> )	Bo-ton per acre-foot	Dissolved solids		Hardness as CaCO <sub>3</sub>		Per-cent so-dium	
																	Parts per million	Tons per acre-foot	Tons per day	Total		Non-carbonate
June 1-10, 1948----	16.0			15,300	39		788	377	2,530		104	3,210	3,960				11,000	14.96	475	3,520	3,430	61
June 11-20-----	16.1			14,700	31		768	360	2,420		107	3,130	3,760				10,500	14.28	456	3,400	3,310	61
June 21-30-----	20.1			14,400	24		767	358	2,350		125	3,100	3,560				10,300	14.01	559	3,390	3,260	60
July 1-10-----	21.7			14,300	32		733	348	2,390		90	3,020	3,710				10,300	14.01	603	3,260	3,190	61
July 11-20-----	24.8			14,200	35		737	350	2,340		104	3,020	3,650				10,200	13.87	683	3,280	3,190	61
July 21-31-----	19.5			14,600	34		761	364	2,410		102	3,100	3,780				10,500	14.28	553	3,400	3,310	61
Aug. 1-10-----	15.2			14,600	35		765	369	2,410		104	3,130	3,780				10,500	14.28	431	3,430	3,340	60
Aug. 11-31-----	15.0			14,500	26		765	363	2,380		131	3,100	3,710				10,400	14.14	421	3,400	3,290	60
Sept. 1-20-----	19.2			14,100	24		759	347	2,290		153	2,990	3,590				10,100	13.74	524	3,320	3,200	60
Sept. 21-30-----	15.3			13,600	37		733	341	2,200		143	2,900	3,460				9,740	13.25	402	3,230	3,110	60
Weighted average--	19.6			14,900	--		730	369	2,470		122	3,000	3,900				10,500	14.28	556	3,340	3,240	62



RIO GRANDE BASIN--Continued  
CARLSBAD PROJECT MAIN CANAL NEAR CARLSBAD, N. MEX.

LOCATION.--At head of Carlsbad project main canal at Avalon Dam, 5 miles north of Carlsbad, Eddy County.  
RECORDS AVAILABLE.--Chemical analyses: February 1939 to September 1948.

EXTREMES, 1947-48.--Dissolved solids: Maximum, 5,760 parts per million Apr. 11-13; minimum, 3,010 parts per million June 21-30.  
Total hardness: Maximum, 2,720 parts per million Apr. 11-13; minimum, 1,650 parts per million June 21-30.

EXTREMES, 1939-48.--Dissolved solids: Maximum, 5,760 parts per million Apr. 11-13, 1948; minimum, 1,340 parts per million Sept. 2-4, 1946.  
Total hardness: Maximum, 2,810 parts per million June 1-10, 1945; minimum, 744 parts per million Sept. 2-4, 1946.

REMARKS.--Samples collected from canal whenever there was flow in canal; otherwise samples were collected from Lake Avalon at 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.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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
																	Parts per million	Tons per acre-day	Total	Non-carbonate	
Oct. 1-10, 1947 -----		7.3		6,190	21		676	190	608		111	2,140	1,040		3.7		4,730	6.43	2,470	2,380	35
Oct. 11-14, 16-20 ----		7.5		6,010	20		656	179	599		106	2,090	1,000		3.1		4,600	6.26	2,370	2,290	35
Oct. 21-31 -----		7.5		5,800	17		656	177	546		107	2,030	955		5.1		4,440	6.05	2,360	2,280	33
Nov. 1-9 -----		---		5,760	---		---	---	---		---	---	---		---		---	---	---	---	---
Nov. 10 -----		7.6		5,750	14		660	182	547		111	2,040	970		3.0		4,470	6.08	2,400	2,300	33
Nov. 11 -----		7.3		5,700	19		664	179	558		115	2,050	975		2.9		4,500	6.12	2,390	2,300	34
Nov. 12-20 -----		---		5,180	---		---	---	---		---	---	---		---		---	---	---	---	---
Nov. 21-30 -----		---		5,660	---		---	---	---		---	---	---		---		---	---	---	---	---
Dec. 1-10 -----		---		5,560	---		---	---	---		---	---	---		---		---	---	---	---	---
Dec. 11-20 -----		---		5,550	---		---	---	---		---	---	---		---		---	---	---	---	---
Dec. 21-31 -----		---		5,500	---		---	---	---		---	---	---		---		---	---	---	---	---
Jan. 1-6, 1948 -----		---		5,460	---		---	---	---		---	---	---		---		---	---	---	---	---
Jan. 7-10 -----		---		5,380	---		---	---	---		---	---	---		---		---	---	---	---	---
Jan. 11-20 -----		---		5,400	---		---	---	---		---	---	---		---		---	---	---	---	---
Jan. 21-31 -----		---		5,440	---		---	---	---		---	---	---		---		---	---	---	---	---
Feb. 1-10 -----		---		5,430	---		---	---	---		---	---	---		---		---	---	---	---	---
Feb. 11-20 -----		---		5,330	---		---	---	---		---	---	---		---		---	---	---	---	---
Feb. 21-29 -----		---		5,370	---		---	---	---		---	---	---		---		---	---	---	---	---
Mar. 1-10 -----		---		5,420	---		---	---	---		---	---	---		---		---	---	---	---	---
Mar. 11-20 -----		---		5,480	---		---	---	---		---	---	---		---		---	---	---	---	---
Mar. 21-31 -----		---		5,570	---		---	---	---		---	---	---		---		---	---	---	---	---
Apr. 1-3 -----		---		5,610	---		---	---	---		---	---	---		---		---	---	---	---	---
Apr. 4-10 -----		7.3		5,700	12		658	171	568		133	2,050	945		4.6		4,470	6.08	2,340	2,240	34
Apr. 11-13 -----		7.2		889	13		712	230			142	2,400	1,440		11		5,760	7.83	2,720	2,610	42
Apr. 14-20 -----		7.2		4,160	9.7		616	133	290		118	1,910	445		3.3		3,470	4.72	2,080	1,990	23
Apr. 21-30 -----		7.8		4,060	14		610	128	299		131	1,870	455		3.3		3,440	4.68	2,050	1,940	24

RIO GRANDE BASIN--Continued  
CARLSBAD PROJECT MAIN CANAL NEAR CARLSBAD, N. MEX.--Continued  
Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Mean discharge (second-foot)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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	
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate		
May 1-10, 1948 ---			7.6	4,500	16		626	142	352		133	1,910	575		3.3			3,690	5.02		2,150	2,040	26
May 11-20 -----			7.6	4,950	14		644	153	443		138	2,000	710		4.0			4,040	5.49		2,240	2,120	30
May 21-24, 26 ----			7.5	5,980	14		730	187	600		137	2,330	960		3.5			4,900	6.66		2,590	2,480	34
May 26-31 -----				1,710																			
June 1-10 -----			--	577																			
June 11-20 -----			--	2,030																			
June 21-30 -----			7.7	4,000	13		458	124	350		137	1,370	620		2.9			3,010	4.09		1,650	1,540	32
July 1-10 -----			7.5	4,840	19		536	142	464		148	1,650	770		5.4			3,660	4.98		1,920	1,800	34
July 11-20 -----			7.4	4,830	20		512	143	473		152	1,600	780		5.5			3,610	4.91		1,870	1,740	36
July 21-31 -----			7.4	5,180	18		542	155	504		143	1,730	825		5.4			3,850	5.24		1,990	1,870	35
Aug. 1-10 -----			7.3	4,810	17		536	142	460		140	1,690	740		4.3			3,660	4.98		1,920	1,810	34
Aug. 11-20 -----			7.4	4,320	17		496	128	390		140	1,550	625		2.8			3,280	4.46		1,760	1,650	32
Aug. 22-31 -----			7.4	4,430	20		512	128	397		130	1,600	630		8.6			3,360	4.57		1,800	1,700	32
Sept. 1-10 -----			7.5	4,560	17		528	129	434		126	1,670	670		6.7			3,320	4.79		1,850	1,740	34
Sept. 11-20 -----			7.1	4,660	15		542	136	373		123	1,740	570		6.4			3,440	4.68		1,910	1,810	30
Sept. 21-30 -----			7.2	4,980	13		574	147	480		125	1,840	750		6.7			3,870	5.26		2,040	1,930	34

## RIO GRANDE BASIN--Continued

## REFINERY INTAKE CANAL NEAR LOVING, N. MEX.

(Weekly samples taken from canal in sec. 13, T. 23 S., R. 28 E., representing water in Harroun Canal diverted from Pecos River at dam in sec. 11, T. 23 S., R. 28 E.)

Date of collection	Specific conductance (micromhos at 25° C.)	Chloride (Cl) ppm	Date of collection	Specific conductance (micromhos at 25° C.)	Chloride (Cl) ppm
Oct. 2, 1947-----	4,110	615	Apr. 1, 1948-----	3,950	585
Oct. 11-----	4,130	620	Apr. 8-----	4,030	595
Oct. 16-----	4,150	630	Apr. 15-----	4,110	615
Oct. 23-----	4,020	610	Apr. 22-----	4,200	625
Oct. 30-----	4,010	610	Apr. 29-----	4,210	615
Nov. 6-----	4,010	600	May 6-----	4,250	620
Nov. 13-----	4,060	610	May 13-----	4,300	645
Nov. 20-----	3,910	590	May 20-----	4,310	655
Nov. 28-----	3,910	590	May 27-----	2,800	405
Dec. 5-----	3,900	585	June 7-----	1,860	265
Dec. 11-----	3,880	585	June 10-----	2,570	385
Dec. 18-----	3,850	570	June 17-----	3,620	530
Dec. 24-----	3,910	580	June 24-----	3,650	530
Jan. 1, 1948-----	3,840	580	July 1-----	4,380	670
Jan. 8-----	3,820	570	July 8-----	4,510	700
Jan. 15-----	3,790	565	July 15-----	4,410	670
Jan. 23-----	3,770	560	July 23-----	4,570	700
Jan. 29-----	3,760	565	July 29-----	4,520	700
Feb. 5-----	3,700	560	Aug. 5-----	4,420	670
Feb. 12-----	3,730	560	Aug. 12-----	4,460	690
Feb. 19-----	3,750	555	Aug. 19-----	4,450	700
Feb. 26-----	3,790	570	Aug. 26-----	4,610	720
Mar. 4-----	3,800	575	Sept. 2-----	4,610	700
Mar. 11-----	3,760	555	Sept. 9-----	4,570	710
Mar. 18-----	3,790	600	Sept. 16-----	4,540	700
Mar. 25-----	3,960	560	Sept. 23-----	4,220	640
			Sept. 30-----	4,530	700

## RIO GRANDE BASIN--Continued

## MISCELLANEOUS ANALYSES OF STREAMS IN RIO GRANDE BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	Specific conductance (micro-mhos at 25° C.)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Total hardness as CaCO <sub>3</sub>
TOYAH LAKE OUTLET NEAR PECOS													
July 24-27, 1948 -----			6,900	628	86	1,000		43	2,370	1,130	2.0	5,250	1,920
July 28-30-----			9,320	754	116	1,520		51	3,050	1,740	1.5	7,210	2,360
July 31-Aug. 1-----			2,780	408	37	218		38	1,190	265	2.0	2,130	1,170
Aug. 2-4 -----			6,020	632	80	808		38	2,160	980	2.0	4,690	1,910

RIO GRANDE BASIN--Continued  
MISCELLANEOUS ANALYSES OF STREAMS IN RIO GRANDE BASIN IN NEW MEXICO  
Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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
																	Parts per million	Tons per acre-foot	Total	Non-carbonate	
PECOS RIVER AT SANTA ROSA																					
Nov. 12, 1947-----	22	--	--	1,640	--	--	--	--	--	--	--	--	30	--	--	--	--	--	--	--	--
Apr. 19, 1948-----	312	--	--	510	--	--	--	--	--	--	162	125	3	--	--	--	--	--	--	--	--
Aug. 19-----	31	--	--	1,130	--	--	--	--	--	--	--	--	19	--	--	--	--	--	--	--	--
MCMILLAN RESERVOIR NEAR LAKEWOOD																					
Nov. 13, 1947-----		--	--	8,220	--	--	506	191	863	--	--	--	1,770	--	--	--	--	4,780	6.50	--	--
Jan. 6, 1948-----		--	--	6,680	--	--	--	--	--	--	147	1,730	1,420	--	--	0.9	--	--	--	2,050	1,930
Feb. 25-----		--	--	6,960	--	--	--	--	--	--	129	1,750	1,460	--	--	--	--	--	--	--	48
Apr. 20-----		--	--	3,710	--	--	--	--	--	--	126	1,830	305	--	--	--	--	--	--	--	--
June 30-----		--	--	3,240	--	--	--	--	--	--	138	--	490	--	--	--	--	--	--	--	--
Aug. 19-----		--	--	2,620	--	--	--	--	--	--	--	--	245	--	--	--	--	--	--	--	--
PECOS RIVER AT FORD CROSSING IN MAJOR JOHNSON SPRING AREA NEAR LAKEWOOD																					
Jan. 6, 1948-----		--	--	4,730	--	--	620	162	378	--	171	1,880	665	--	0	--	3,790	5.15	--	2,210	2,070
Feb. 25-----		--	--	4,910	--	--	--	--	--	--	203	1,990	645	--	--	--	--	--	--	--	27
Apr. 20-----		--	--	3,740	--	--	--	--	--	--	112	1,860	265	--	--	--	--	--	--	--	--
June 30-----		--	--	5,150	--	--	--	--	--	--	169	--	790	--	--	--	--	--	--	--	--
Aug. 19-----		--	--	3,040	--	--	--	--	--	--	--	--	334	--	--	--	--	--	--	--	--
PECOS RIVER AT DAMSITE 3 NEAR CARLSBAD																					
Nov. 13, 1947-----	22	--	--	5,400	--	--	612	164	523	--	138	1,900	885	--	0.5	--	4,150	5.64	--	2,200	2,080
Jan. 6, 1948-----	56	--	--	5,230	--	--	616	156	508	--	154	1,860	865	--	1.4	--	4,080	5.55	--	2,180	2,050
Feb. 25-----	87	--	--	5,210	--	--	--	--	--	--	129	1,810	835	--	--	--	--	--	--	--	34
Apr. 20-----	686	--	--	3,830	--	--	--	--	--	--	116	1,840	345	--	--	--	--	--	--	--	34
June 3-----	140	7.7	--	517	--	--	66	14	21	--	105	129	32	--	2.8	--	316	.44	--	222	136
July 1-----	190	--	--	5,310	--	--	--	--	--	--	163	--	865	--	--	--	--	--	--	--	17
Aug. 19-----	374	--	--	4,010	--	--	472	108	378	--	134	1,480	560	--	4.2	--	3,070	4.18	--	1,620	1,510

RIO GRANDE BASIN--Continued  
MISCELLANEOUS ANALYSES OF STREAMS IN RIO GRANDE BASIN IN NEW MEXICO--Continued  
Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium carbonate
																Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
PECOS RIVER AT CARLSBAD																					
Nov. 13, 1947	59	59	--	2,900	--	--	--	--	--	--	--	--	385	--	--	--	--	--	--	--	--
Jan. 6, 1948	44	--	--	2,720	--	--	--	--	--	--	--	--	355	--	--	--	--	--	--	--	--
Feb. 25	50	--	--	2,890	--	--	--	--	--	--	204	943	375	--	--	--	--	--	--	--	--
Apr. 20	56	--	--	3,400	--	--	--	--	--	--	197	1,170	460	--	--	--	--	--	--	--	--
June 2	5,530	8.1	--	3,362	54	6.3	54	14	110	74	14	74	14	4.1	--	221	0.30	160	70	16	--
July 1	64	--	--	3,480	--	--	--	--	--	--	219	--	485	--	--	--	--	--	--	--	--
Aug. 20	56	--	--	3,620	--	--	--	--	--	--	--	--	505	--	--	--	--	--	--	--	--
HAGERMAN CANAL AT DEXTER																					
Nov. 12, 1947	--	--	--	5,240	--	--	--	--	--	--	--	--	1,100	--	--	--	--	--	--	--	--
Jan. 5, 1948	--	--	--	4,830	384	133	--	562	--	--	216	1,150	955	--	7.7	3,300	4.49	1,500	1,330	45	--
Feb. 24	--	--	--	4,640	--	--	--	--	--	--	242	993	940	--	--	--	--	--	--	--	--
Apr. 19	--	--	--	5,180	--	--	--	--	--	--	238	1,200	1,020	--	--	--	--	--	--	--	--
June 1	--	--	--	4,190	--	--	--	--	--	--	196	--	820	--	--	--	--	--	--	--	--
June 30	--	--	--	5,170	--	--	--	--	--	--	242	--	1,070	--	--	--	--	--	--	--	--
Aug. 19	--	--	--	5,660	--	--	--	--	--	--	--	--	1,210	--	--	--	--	--	--	--	--
RIO FELIX AT OLD HIGHWAY BRIDGE NEAR HAGERMAN																					
Jan. 7, 1948	0.4	--	--	5,940	594	233	530	248	1,610	1,210	7.5	4,310	5.86	2,440	2,240	32	7	12			
June 3	200	--	--	498	75	13	15	285	13	18	1.6	276	.38	240							
BLACK RIVER AT FOREHAND CROSSING NEAR MALAGA																					
Nov. 13, 1947	--	--	--	2,080	--	--	--	--	--	--	--	--	22	--	--	--	--	--	--	--	--
Jan. 6, 1948	--	--	--	1,950	392	70	13	190	1,070	17	1.2	1,660	2.26	1,270	1,110	2					
Feb. 25	--	--	--	1,920	--	--	--	--	--	--	189	1,040	19	--	--	--	--	--	--	--	--
Apr. 20	--	--	--	2,170	--	--	--	--	--	--	184	1,260	21	--	--	--	--	--	--	--	--
June 2	7.6	--	--	957	212	6.6	--	7.1	65	494	4.1	756	1.03	556	502	3					
July 1	--	--	--	2,120	--	--	--	--	--	--	206	--	21	--	--	--	--	--	--	--	--
Aug. 20	--	--	--	2,120	430	77	20	176	1,210	20	1.1	1,840	2.50	1,390	1,250	3					

COLORADO RIVER BASIN

COLORADO RIVER MAIN STEM

COLORADO RIVER AT HOT SULPHUR SPRINGS, COLO.

LOCATION --At bridge at Hot Sulphur Springs, Grand County, 1 mile downstream from gaging station which is 3 miles upstream from Beaver Creek.

DRAINAGE AREA --782 square miles above gaging station.

RECORDS AVAILABLE --Chemical analyses: April 1947 to September 1948.

EXTREMES 1947-48 --Dissolved solids: Maximum, 92 parts per million June 1-6, 8-10.

Total hardness: Maximum, 58 parts per million July 21-Aug. 10; minimum, 24 parts per million June 1-6, 8-10.

EXTREMES 1947-48 --Dissolved solids: Maximum, 92 parts per million Dec. 11-20, 1947; minimum, 38 parts per million June 21-30, 1947.

Total hardness: Maximum, 58 parts per million July 21-Aug. 10, 1948; minimum, 20 parts per million June 21-30, 1947.

REMARKS --Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1119. Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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 carbonate	
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate		
Oct. 1-10, 1947 ---	172		7.3	102	9.7	0.09	13	2.4	7.1	1.0	62	3.5	2.8	0.2	0.2	0.1		70	0.10	33	42	0	26
Oct. 11-18 -----	268		7.1	110	11	.08	14	3.1	4.4	4.2	64	5.3	2.4	.4	.3	.00		77	.10	96	48	0	15
Oct. 19-31 -----	711		7.0	75	5.6	.07	9.4	2.4	2.4	2.9	44	3.6	.4	.4	.7	.00		50	.07	56	33	0	12
Nov. 1-10 -----	225		7.1	109	13	.08	13	3.0	5.0	3.7	60	6.3	2.4	.4	.4	.02		77	.10	47	45	0	18
Nov. 11-20 -----	230		7.2	108	13	.11	14	3.1	4.3	3.8	62	6.3	2.2	.4	.4	.00		78	.11	48	48	0	15
Nov. 21-24, 26-30 -	220		7.3	117	15	.21	15	3.3	6.3	3.4	72	6.0	1.8	.4	.4	.02		87	.12	52	51	0	20
Dec. 1-10 -----	220		7.1	106	13	.57	13	2.7	3.6	3.7	56	6.7	1.7	.2	.4	.00		73	.10	43	44	0	14
Dec. 11-20 -----	211		7.1	131	14	1.2	15	3.0	7.0	5.8	76	6.4	1.5	.3	.8	.00		92	.13	52	50	0	21
Dec. 21-31 -----	198		7.3	117	14	.14	14	2.9	3.2	5.9	62	7.0	1.6	.1	.9	.00		80	.11	43	47	0	11
Jan. 1-10, 1948 ---	147		7.5	116	15	.16	14	2.9	4.4	5.1	64	6.6	1.6	.3	.6	.00		82	.11	33	47	0	15
Jan. 11-13, 15-17, 19-20 -----	112		7.7	118	15	.18	15	2.9	3.1	5.0	64	6.8	1.6	.1	.6	.00		82	.11	25	49	0	11
Jan. 21-31 -----	99.8		7.7	117	14	.21	15	3.0	4.0	4.2	66	6.4	1.4	.3	.4	.00		81	.11	22	50	0	14
Feb. 1-10 -----	106		7.6	120	15	.24	15	3.1	4.2	4.5	66	6.8	1.8	.4	.4	.00		84	.11	24	50	0	14
Feb. 11-20 -----	114		7.6	119	14	.28	15	3.1	3.3	5.2	66	6.3	1.4	.4	.4	.00		82	.11	25	50	0	11
Feb. 21-29 -----	124		7.2	119	15	.20	14	3.2	5.2	3.6	66	6.4	1.1	.4	.7	.00		82	.11	27	48	0	18
Mar. 1-10 -----	114		7.4	120	15	.18	15	3.0	4.7	4.2	68	6.4	1.1	.4	.6	.00		84	.11	26	50	0	16
Mar. 11-20 -----	110		7.2	121	16	.20	14	3.0	6.8	4.0	70	6.5	1.2	.3	.6	.00		87	.12	26	47	0	22
Mar. 21-31 -----	125		6.8	125	15	.11	16	3.4	3.3	2.2	66	6.5	1.4	.2	.7	.00		81	.11	27	54	0	11
Apr. 1-10 -----	197		6.8	125	14	.17	16	3.4	3.7	2.1	67	6.3	1.4	.2	.8	.00		81	.11	43	54	0	12
Apr. 11-20 -----	539		6.7	125	12	.22	15	3.3	5.7	1.9	68	6.7	1.4	.2	.8	.00		81	.11	118	51	0	19
Apr. 21-30 -----	887		6.6	126	12	.31	13	3.0	4.3	.8	55	6.1	1.5	.3	1.1	.00		70	.10	168	45	0	17
May 1-10 -----	1,066		6.5	83	11	.29	10	2.7	2.9	1.3	43	5.4	1.1	.4	.6	.00		57	.08	164	36	1	14
May 11-20 -----	1,680		6.5	75	11	.19	9.4	2.2	3.0	1.1	40	4.9	1.7	.4	.5	.00		53	.07	240	32	0	16
May 21-31 -----	3,294		6.5	71	9.9	.14	8.6	2.0	3.1	1.0	36	4.4	1.1	.4	.5	.00		49	.07	436	30	0	18

## COLORADO RIVER MAIN STEM--Continued

## COLORADO RIVER AT HOT SULPHUR SPRINGS, COLO.--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948.--Continued

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
June 1-6, 8-10, 1948	2,696																					
June 11-20	1,496	6.9	6.9	64	8.5	0.13	7.0	1.6	2.4	2.6	30	4.2	1.5	0.4	0.6	0.00	44	0.06	320	24	0	16
June 21-30	890	6.8	6.8	64	9.1	.12	7.2	1.7	4.0	2.2	35	4.2	.7	.4	.6	.00	48	.07	194	25	0	24
July 1-10	647	6.7	6.7	80	11	.09	9.6	2.1	4.7	2.6	48	5.3	1.1	.4	.5	.00	60	.08	144	33	0	23
July 11-20	267	7.2	6.9	85	10	.09	11	2.3	3.6	2.2	46	5.9	1.6	.4	.5	.00	60	.08	105	37	0	17
July 21-31	236	7.2	7.2	112	13	.07	14	2.8	6.3	1.6	68	5.3	.9	.4	.4	.00	77	.10	56	46	0	23
Aug. 1-10	214	7.3	7.3	133	15	.08	18	3.2	5.3	2.2	78	5.0	1.4	.4	.4	.00	89	.12	57	58	0	16
Aug. 11-20	160	7.3	7.3	133	14	.11	18	3.3	5.6	2.4	80	5.0	1.2	.4	.3	.01	90	.12	52	58	0	17
Aug. 21-31	194	7.2	7.2	126	12	.06	16	2.8	9.6	2.1	74	4.6	.6	.3	.3	.00	85	.12	37	51	0	28
Sept. 1-10	116	7.3	7.3	127	12	.04	16	2.8	10	2.6	76	4.9	.6	.4	.4	.00	87	.12	36	51	0	29
Sept. 11-20	98.8	7.4	7.4	124	10	.05	16	2.7	13	1.9	72	4.6	1.2	.4	.3	.00	85	.12	27	51	0	35
Sept. 21-30	90.9	7.3	7.3	122	10	--	16	2.7	12	3.2	70	4.8	1.3	.4	.4	.00	85	.12	23	51	0	33
Weighted average	514	--	--	86	11	0.17	10	2.3	3.9	2.1	46	5.0	1.2	0.4	0.6	0.00	59	0.08	82	34	0	19



COLORADO RIVER MAIN STEM--Continued  
COLORADO RIVER NEAR GLENWOOD SPRINGS, COLO.

LOCATION --At Shoshone power plant, 6 miles upstream from gaging station at Glenwood Springs, Garfield County, which is half a mile upstream from Roaring Fork, DRAINAGE AREA --Approximately 4,360 square miles.  
RECORDS AVAILABLE --Chemical analyses: October 1941 to September 1948.  
EXTREMES, 1947-48. --Dissolved solids: Maximum, 643 parts per million Sept. 21, 26-30; minimum, 113 parts per million June 1-10.  
Total hardness: Maximum, 362 parts per million Sept. 21, 26-30; minimum, 75 parts per million May 21-31.  
EXTREMES, 1941-48. --Dissolved solids: Maximum, 2,030 parts per million Aug. 10, 1947; minimum, 105 parts per million June 1-10, 1942.  
Total hardness: Maximum, 1,480 parts per million Aug. 10, 1947; minimum, 72 parts per million June 1-20, 1942.  
REMARKS --Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1119. Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
Oct. 1-10, 1947	1,139	7.4		656	11	0.01	58	13	59		126	100	84	0.1	0.4	0.00	388	0.53	1,190	198	95	39
Oct. 11-20	1,223	7.7		695	12	.01	61	15	63		136	110	88	.1	.5	.00	417	.57	1,380	214	102	39
Oct. 21-31	1,955	7.8		479	9.2	.02	42	9.8			102	69	58	.2	.5	.00	292	.38	1,490	146	62	39
Nov. 1-10	1,494	7.7		557	11	.02	48	12	50		114	83	68	.4	.4	.00	329	.45	1,330	170	76	39
Nov. 11-20	1,397	7.8		570	12	.02	50	12	53		122	84	72	.4	.2	.00	344	.47	1,300	174	74	40
Nov. 21-30	1,160	7.8		662	13	.00	53	13	66		124	94	92	.2	.6	.01	393	.53	1,230	186	84	44
Dec. 1-10	1,217	7.7		645	13	.01	52	12	65		124	90	89	.2	.2	.02	383	.52	1,260	179	78	44
Dec. 11-20	1,177	7.7		567	14	.00	46	10	58		116	78	74	.2	.5	.01	338	.46	1,070	156	61	45
Dec. 21-31	1,252	7.8		574	13	.01	47	10	60		118	78	78	.2	.4	.01	345	.47	1,170	158	62	45
Jan. 1-10, 1948	1,273	8.0		538	14	.01	43	9.4		65	108	73	86	.2	.6	.01	344	.47	1,180	146	58	49
Jan. 11-20	1,204	8.1		562	12	.01	44	9.6		60	112	76	77	.2	.1	.01	334	.45	1,090	150	58	47
Jan. 21-31	1,244	8.0		536	14	.02	44	9.5		53	110	73	69	.2	.5	.01	317	.43	1,060	149	59	44
Feb. 1-10	1,175	7.9		622	12	.00	49	9.8		63	114	78	88	.2	.5	.00	357	.49	1,130	163	70	46
Feb. 11-20	1,293	8.1		527	13	.01	44	7.9		46	110	70	56	.2	.7	.00	282	.40	1,020	142	52	41
Feb. 21-29	1,292	7.8		532	13	.02	44	8.4		56	110	70	73	.2	.5	.00	319	.43	1,110	144	54	46
Mar. 1-6, 10	1,168	7.9		518	12	.01	45	10		49	108	71	68	.4	.9	.00	310	.42	1,078	154	65	41
Mar. 11-20	1,968	8.1		651	13	.02	52	12	68		120	89	95	.4	.3	.00	389	.53	1,640	179	80	45
Mar. 21-31	1,177	8.0		636	12	.02	58	12	59		122	107	77	.3	.9	.00	386	.52	1,230	194	94	40
Apr. 1-10	1,537	7.4		537	13	.02	53	12	49		134	88	60	.4	1.1	.00	343	.47	1,420	182	72	37
Apr. 11-20	2,396	7.5		486	13	.03	51	10	41		134	78	46	.4	1.3	.00	307	.42	1,980	168	58	35
Apr. 21-30	4,231	7.5		363	12	.13	43	8.1	25		120	53	28	.4	1.2	.00	280	.31	2,630	141	42	28
May 1-10	5,019	7.6		310	12	.15	37	7.0	20		110	41	22	.4	1.1	.00	195	.27	2,640	122	32	27
May 11-20	7,192	7.7		276	13	.33	33	6.5	19		108	33	18	.4	1.0	.00	177	.24	3,440	109	20	28
May 21-31	13,764	7.7		177	11	.12	23	4.2	11		80	19	9	.4	.8	.00	118	.16	4,390	75	10	23

COLORADO RIVER MAIN STEM--Continued  
 COLORADO RIVER NEAR GLENWOOD SPRINGS, COLO.--Continued  
 Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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 carbonate
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
June 1-10, 1948	11,598		7.4	192	11	0.03	23	4.7		7.8	68	21	11	0.2	0.6	0.00	113	0.15	3,540	77	22	18
June 11-20	7,500		7.5	227	8.8	.02	25	5.2	12		77	29	11	.2	.6	.00	130	.18	2,650	84	21	23
June 21-30	4,387		7.5	327	10	.02	33	7.5	23		91	48	26	.4	.8	.00	194	.26	2,400	114	39	30
July 1-10	3,720		7.5	364	9.7	.02	35	8.0	27		90	54	34	.2	.4	.00	213	.29	2,140	120	46	33
July 11-20	2,081		7.6	498	9.9	.01	44	9.8	42		106	72	56	.2	.5	.01	287	.39	1,610	150	64	36
July 21-31	2,069		7.7	528	10	.02	50	11	43		114	86	56	.4	.5	.00	313	.43	1,750	170	76	35
Aug. 1-10	1,606		7.2	582	12	.01	54	9.3	55		122	97	64	.1	.5	.02	352	.48	1,530	172	72	41
Aug. 11-20	1,530		7.4	606	10	.01	55	10	60		128	99	71	.1	.8	.02	369	.50	1,520	178	73	42
Aug. 21-31	1,294		7.5	678	12	.01	58	11	68		128	106	85	.2	.7	.02	404	.55	1,410	190	84	44
Sept. 1-6, 8-10	1,024		7.6	736	12	.01	65	15	68		136	124	92	.3	.8	.02	444	.60	1,230	224	112	40
Sept. 11-20	896		7.5	923	11	.02	78	17	92		150	147	132	.3	.9	.01	552	.75	1,340	264	142	43
Sept. 21, 26-30	749		--	1,080	12	.02	90	19	109		162	172	160	.3	.8	.01	643	.87	1,300	302	170	44
Sept. 22-25	1,208		7.2	577	11	.02	54	12	46		116	94	64	.3	.7	.01	339	.46	1,110	184	89	35
Weighted average	2,670	--	--	382	11	0.05	38	7.8	31		100	55	39	0.3	0.7	0.00	232	0.32	1,670	127	45	35









## COLORADO RIVER MAIN STEM--Continued

## COLORADO RIVER NEAR CISCO, UTAH--Continued

Suspended sediment, water year October 1947 to September 1948

Day	October			November			December		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day
1-----	3,050	0.03	2,470	6,100	0.04	6,590	3,700	0.02	2,000
2-----	3,170	.02	1,710	5,780	.05	7,800	3,910	.04	4,220
3-----	3,260	.03	2,640	5,520	.05	7,450	4,370	.10	11,800
4-----	3,230	.02	1,740	5,430	.04	5,860	4,310	.04	4,650
5-----	2,920	.02	1,580	5,120	.05	6,910	4,410	.04	4,760
6-----	2,850	.02	1,540	4,950	.06	8,020	4,390	.04	4,740
7-----	2,890	.02	1,560	4,910	.06	7,950	4,250	.06	6,880
8-----	2,800	.02	1,510	4,780	.05	6,450	4,130	.06	6,690
9-----	2,520	.02	1,360	4,530	.04	4,890	4,010	.03	3,250
10-----	2,830	.01	764	4,640	.03	3,920	3,580	.02	1,930
11-----	3,660	.01	988	4,620	.03	3,740	3,170	.03	2,570
12-----	4,130	.93	104,000	4,620	.04	4,990	3,050	.03	2,470
13-----	4,810	.62	80,500	4,510	.03	3,650	2,710	.03	2,200
14-----	10,100	1.06	289,000	4,470	.04	4,830	2,680	.04	2,890
15-----	9,750	2.68	706,000	4,640	.04	5,010	2,980	.03	2,410
16-----	8,560	1.78	411,000	4,620	.04	4,990	3,140	.03	2,540
17-----	6,980	1.41	266,000	4,600	.03	3,730	3,580	.05	4,830
18-----	6,550	.67	118,000	4,530	.03	3,670	3,340	.06	5,410
19-----	6,170	.23	38,300	4,580	.03	3,710	3,700	.04	4,000
20-----	6,080	.12	19,700	4,470	.03	3,620	3,470	.06	5,620
21-----	6,060	.11	18,000	4,620	.03	3,740	3,550	.04	3,830
22-----	6,930	.22	41,200	4,740	.03	3,840	3,640	.04	3,930
23-----	6,740	.58	106,000	4,410	.02	2,380	3,470	.05	4,680
24-----	6,550	.18	31,800	4,070	.04	4,400	3,680	.06	5,960
25-----	6,570	.13	23,100	3,720	.03	3,010	3,810	.06	6,170
26-----	6,430	.09	15,600	3,830	.02	2,070	3,830	.06	6,200
27-----	6,360	.07	12,000	4,030	.02	2,180	3,810	.05	5,140
28-----	6,050	.08	13,100	4,270	.02	2,310	3,740	.03	3,030
29-----	5,900	.06	9,560	4,330	.02	2,340	3,280	.03	2,660
30-----	5,750	.06	9,320	3,990	.02	2,150	3,030	.04	3,270
31-----	5,900	.05	7,960	--	--	--	3,580	.03	2,900
Total -	165,550	--	2,338,000	139,430	--	136,200	112,300	--	133,600
Day	January			February			March		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day
1-----	3,760	0.04	4,060	2,800	0.05	3,780	4,530	0.25	30,600
2-----	3,600	.03	2,920	2,800	.05	3,780	4,070	.18	19,800
3-----	3,100	.03	2,510	2,900	.04	3,130	3,570	.13	12,500
4-----	2,990	.03	2,420	2,900	.02	1,570	3,430	.09	8,330
5-----	2,900	.02	1,570	2,900	.06	4,700	3,790	.13	13,300
6-----	3,680	.06	5,960	3,000	.05	4,050	3,790	.10	10,200
7-----	3,680	.07	6,960	3,000	.04	3,240	3,790	.05	5,120
8-----	3,250	.05	4,390	3,000	.04	3,240	3,570	.05	4,820
9-----	3,430	.05	4,630	2,900	.04	3,130	3,430	.05	4,630
10-----	3,550	.04	3,830	2,800	.05	3,780	3,400	.04	3,670
11-----	3,430	.04	3,700	2,700	.03	2,190	3,260	.03	2,640
12-----	3,550	.05	4,790	2,600	.03	2,110	3,450	.04	3,730
13-----	3,510	.04	3,790	2,600	.02	1,400	3,230	.03	2,620
14-----	3,280	.04	3,540	2,700	.03	2,190	3,450	.04	3,730
15-----	2,680	.03	2,170	2,800	.03	2,270	3,810	.04	4,110
16-----	2,900	.03	2,350	3,300	.08	7,130	3,990	.06	6,460
17-----	3,070	.03	2,490	3,500	.05	4,720	3,360	.09	8,160
18-----	2,760	.03	2,240	3,300	.05	4,460	3,360	.06	5,440
19-----	3,080	.03	2,490	4,300	.17	19,700	4,190	.11	12,400
20-----	2,850	.03	2,310	4,600	.30	38,900	4,330	.11	12,900
21-----	2,900	.03	2,350	5,000	.52	70,200	4,070	.18	19,800
22-----	2,690	.04	2,910	5,100	.36	49,600	3,700	.23	23,000
23-----	3,080	.04	3,330	5,200	.71	99,700	3,510	.10	9,480
24-----	3,170	.05	4,280	5,200	.41	57,600	3,720	.10	10,000
25-----	3,280	.04	3,540	4,700	.40	50,800	4,620	.29	36,200
26-----	2,870	.01	775	4,300	.32	37,200	5,320	.26	37,300
27-----	2,800	.01	756	4,800	.32	41,500	4,930	.27	35,900
28-----	2,600	.02	1,400	5,170	.27	37,700	4,620	.19	23,700
29-----	2,400	.02	1,300	5,000	.34	45,900	4,680	.22	27,800
30-----	2,600	.03	2,110	--	--	--	4,970	.15	20,100
31-----	2,700	.03	2,190	--	--	--	5,340	.21	30,200
Total -	96,140	--	94,060	106,070	--	609,700	123,280	--	448,600

COLORADO RIVER MAIN STEM--Continued  
COLORADO RIVER NEAR CISCO, UTAH--Continued

Suspended sediment, water year October 1947 to September 1948--Continued

Day	April			May			June		
	Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment	
		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day
1-----	5,320	1/0.18	25,900	30,000	0.37	300,000	33,900	0.08	73,200
2-----	4,870	1/.18	23,700	31,800	.32	275,000	35,600	.06	57,700
3-----	4,470	.17	20,500	27,300	.20	147,000	35,600	.07	67,300
4-----	5,140	.13	18,000	23,300	.17	107,000	39,800	.08	86,000
5-----	6,270	.36	60,900	23,000	.17	106,000	40,500	.06	65,600
6-----	6,930	.46	86,100	23,700	.15	96,000	37,900	.06	61,400
7-----	6,960	.51	95,800	24,800	.20	134,000	36,200	.06	58,600
8-----	6,830	1/.53	97,700	27,200	.23	169,000	35,400	.06	57,300
9-----	7,160	1/.56	108,000	29,100	.19	149,000	33,300	.06	53,900
10-----	8,030	1/.59	128,000	26,200	.14	99,000	32,300	.08	69,800
11-----	10,800	.66	192,000	21,600	.13	75,800	31,700	.06	51,400
12-----	11,900	.75	241,000	19,200	.10	51,800	32,400	.07	61,200
13-----	9,510	.28	71,900	17,500	.10	47,200	31,500	.07	59,500
14-----	7,950	.39	86,200	16,600	1/.10	44,800	30,000	.06	48,600
15-----	8,250	.37	82,400	19,900	.15	80,600	27,500	.08	59,400
16-----	10,400	1/.50	140,000	25,800	.23	160,000	24,800	.07	46,900
17-----	13,900	.69	259,000	30,200	.24	196,000	23,300	.06	37,700
18-----	17,600	.79	375,000	34,000	.22	202,000	21,400	.07	40,400
19-----	20,600	.74	412,000	37,400	.18	182,000	19,600	.04	21,200
20-----	21,800	.62	365,000	42,600	.21	242,000	17,900	.24	116,000
21-----	23,000	1/.55	342,000	48,900	.22	290,000	16,400	.08	35,400
22-----	25,500	.50	344,000	49,400	.15	200,000	15,800	.03	12,800
23-----	28,800	1/.40	311,000	50,800	.13	178,000	15,600	.03	12,600
24-----	27,000	.32	233,000	48,900	.10	132,000	14,300	.02	7,720
25-----	22,600	.19	116,000	45,100	.08	97,400	12,600	.03	10,200
26-----	19,000	.18	92,300	40,100	.09	97,400	11,400	.02	6,160
27-----	17,200	.18	83,600	36,600	.08	79,100	11,000	.04	11,900
28-----	16,300	.20	90,700	34,500	.09	83,800	12,800	.20	69,100
29-----	19,500	.25	132,000	34,400	.08	74,300	13,000	.02	7,020
30-----	24,500	.30	198,000	34,100	.06	55,200	12,100	.02	6,530
31-----	--	--	--	33,900	.07	64,100	--	--	--
Total -	418,590	--	4,832,000	987,900	--	4,216,000	755,600	--	1,373,000
	July			August			September		
	Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment	
		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day
1-----	12,400	0.01	3,350	4,780	0.04	5,160	2,170	0.02	1,170
2-----	12,500	.01	3,380	4,270	.00	--	1,960	.01	529
3-----	12,200	.01	3,290	3,680	.00	--	2,170	.01	586
4-----	12,100	.01	3,270	3,940	.96	102,000	2,120	.01	572
5-----	11,800	.01	3,190	3,990	.90	97,000	2,010	.01	543
6-----	11,500	.01	3,100	5,650	.56	85,400	1,990	.00	--
7-----	11,000	.00	--	5,830	.41	64,500	1,860	.00	--
8-----	10,600	.01	2,860	5,650	1/.32	48,800	1,640	.01	443
9-----	9,930	.01	2,680	5,360	1/.23	33,300	1,500	.00	--
10-----	9,330	.01	2,520	4,700	1/.14	17,800	1,510	.00	--
11-----	8,390	.02	4,530	4,400	.04	4,750	1,640	.01	443
12-----	7,770	.02	4,200	4,300	.03	3,480	1,700	.00	--
13-----	6,860	.01	1,850	4,400	.03	3,560	1,700	.01	459
14-----	5,850	.01	1,580	3,830	.08	8,270	1,720	.01	464
15-----	5,920	.01	1,600	3,570	.02	1,930	1,650	.01	446
16-----	5,520	.01	1,490	3,410	.02	1,840	1,650	.01	446
17-----	5,080	.01	1,370	2,960	.01	799	1,670	.01	451
18-----	4,580	.01	1,240	2,490	.01	672	1,880	.01	508
19-----	4,310	.14	16,300	2,120	.02	1,140	1,990	1/.01	537
20-----	4,270	.26	30,000	2,270	.02	1,230	2,140	1/.01	578
21-----	4,950	.01	1,340	2,400	.20	13,000	2,190	1/.01	591
22-----	4,810	.01	1,300	2,830	.68	52,000	2,170	.01	586
23-----	4,640	1/.02	2,510	3,070	.57	47,200	2,300	1/.02	1,240
24-----	4,600	.02	2,480	2,710	.11	8,050	2,450	.02	1,320
25-----	4,620	.02	2,490	2,570	.05	3,470	2,660	1/.02	1,440
26-----	4,640	1/.02	2,510	2,990	.06	4,840	2,610	1/.04	2,820
27-----	4,890	.08	10,600	3,510	.03	2,840	2,640	.07	4,990
28-----	4,640	.01	1,250	3,320	.03	2,690	2,370	.07	4,480
29-----	4,620	.04	4,990	3,080	1/.02	1,660	2,520	.28	19,100
30-----	5,020	.04	5,420	2,830	.01	764	2,610	.10	7,050
31-----	5,540	.04	5,980	2,490	.01	672	--	--	--
Total -	224,880	--	132,700	113,400	--	618,800	61,190	--	51,790

Total discharge for year (second-foot days)----- 3,304,330

Total load for year (tons) ----- 14,980,000

1/Estimated.



COLORADO RIVER MAIN STEM--Continued  
COLORADO RIVER AT LEES FERRY, ARIZ.

LOCATION --At gaging station at head of Marble Gorge at Lees Ferry, Coconino County, just upstream from Paria River, 28 miles downstream from Utah-Arizona State line, 61.5 miles upstream from Little Colorado River, and 79 miles downstream from San Juan River.

DRAINAGE AREA --107,900 square miles.

RECORDS AVAILABLE --Chemical analyses: July 1926, October 1926 to September 1927, October 1928 to September 1930, October 1942 to October 1945, October 1947 to September 1948.

Sediment records: October 1948 to December 1933, November 1945, October 1947 to September 1948.

EXTREMES, 1947-48. --Dissolved solids: Maximum, 1,220 parts per million Sept. 21-24, 26-30; minimum, 233 parts per million June 1-10.

Total hardness: Maximum, 580 parts per million Sept. 21-24, 26-30; minimum, 148 parts per million June 1-20.

Sediment loads: Maximum, 4,600,000 tons per day Oct. 16; minimum, 3,460 tons per day Sept. 17.

EXTREMES, 1942-43, 1947-48. --Dissolved solids: Maximum, 1,410 parts per million Oct. 11-20, 1928; minimum, 209 parts per million June 11-20, 1929.

Total hardness: Maximum, 720 parts per million Oct. 11-20, 1928; minimum, 132 parts per day Sept. 27, 1944.

Sediment loads: Maximum, 9,450,000 tons per day Aug. 7, 1929; minimum, 3,500 tons per day Sept. 27, 1944.

REMARKS --Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1119. Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Potassium (K)		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 (Na)	Total						Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate		
Oct. 1, 1947 -----	6,933	--	--	1,140	15	--	118	41	80		173	380	68	--	3.8	--	751	1.08	14,800	463	321	27
Oct. 12-15, 17-20 --	20,890	7.7	7.7	1,260	14	0.03	127	35	117	4.2	210	423	64	0.5	3.1	0.1	891	1.21	50,300	461	289	35
Oct. 21-31 -----	12,210	7.8	7.8	1,210	16	0.03	118	35	108	5.0	179	418	58	.5	4.6	.1	851	1.16	28,100	438	292	35
Nov. 1, 3-10 -----	11,280	7.8	7.8	1,090	12	0.03	96	34	102	3.0	189	335	65	.5	3.2	.1	744	1.01	22,700	380	224	37
Nov. 11-20 -----	9,321	7.8	7.8	1,190	13	0.03	99	38	114	3.2	203	357	78	.5	3.5	.1	806	1.10	20,300	403	236	38
Nov. 21-30 -----	8,908	7.8	7.8	1,230	12	0.03	101	40	118	4.8	203	365	84	.5	3.3	.1	829	1.13	19,900	416	250	38
Dec. 1-10 -----	9,473	7.9	7.9	1,260	12	0.03	100	39	125	2.8	201	373	89	.4	3.8	.1	844	1.15	21,600	410	246	40
Dec. 11-20 -----	6,970	7.9	7.9	1,270	14	0.04	99	41	129	3.0	212	378	88	.3	3.2	.1	858	1.17	16,100	416	242	40
Dec. 21-24, 26-31 --	6,397	7.9	7.9	1,430	12	0.04	110	46	147	6.6	225	412	119	.4	4.0	.1	970	1.32	16,800	464	279	40
Jan. 1-10, 1948 -----	6,345	7.9	7.9	1,340	15	0.03	104	44	133	4.2	224	366	108	.2	3.7	.1	888	1.21	15,200	440	257	39
Jan. 11-20 -----	7,186	7.9	7.9	1,290	12	0.04	99	40	129	4.4	214	344	104	.2	3.9	.1	842	1.15	16,300	412	236	40
Jan. 21-31 -----	6,316	7.9	7.9	1,310	14	0.02	101	41	130	3.0	214	352	106	.3	4.0	.1	857	1.17	14,600	420	245	40
Feb. 1-10 -----	6,388	7.9	7.9	1,340	14	0.08	101	41	137	4.2	218	350	116	.3	4.0	.1	875	1.19	15,100	420	242	41
Feb. 11-14, 16-20 --	6,207	7.9	7.9	1,320	13	0.03	98	40	136	3.6	215	339	117	.4	4.0	.1	857	1.17	14,400	409	233	42
Feb. 21, 23-29 -----	11,650	7.9	7.9	1,230	12	0.11	100	35	119	3.4	189	348	92	.3	4.0	.1	807	1.10	25,400	394	238	39
Mar. 1-10 -----	10,220	7.6	7.6	1,240	11	0.02	104	35	117	6.0	198	383	72	.3	5.3	.1	831	1.13	22,900	404	242	38
Mar. 11-20 -----	7,750	7.6	7.6	1,280	12	0.02	96	37	132	5.4	203	366	94	.3	4.7	.1	847	1.15	17,700	392	225	42
Mar. 21-31 -----	13,230	7.5	7.5	1,270	11	0.02	95	37	129	5.0	210	363	85	.4	4.7	.1	834	1.13	29,800	389	217	41

COLORADO RIVER MAIN STEM--Continued  
COLORADO RIVER AT LEES FERRY, ARIZ.--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948.--Continued

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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 non-sodium
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
Apr. 1-10, 1948----	19,060		7.5	957	11	0.02	76	27	92	4.8	190	263	51	0.5	4.4	0.1	623	0.85	32,100	300	145	39
Apr. 12-20-----	24,100		7.6	791	11	.03	66	23	72	4.8	167	207	42	.4	2.8	.1	511	.69	33,300	239	122	37
Apr. 21-30-----	42,680		7.6	591	11	.02	60	18	42	4.6	164	139	26	.3	2.4	.1	384	.52	44,300	224	89	29
May 1-10-----	44,940		7.6	516	18	.02	56	15	30	1.6	178	95	17	.3	1.1	.1	322	.44	39,100	201	55	24
May 11-20-----	43,060		7.8	483	15	.01	52	14	29	.8	167	87	16	.4	1.9	.1	298	.41	34,600	187	50	25
May 21-29, 31-----	80,730		8.0	392	15	.02	45	11	22	.0	147	67	11	.4	1.5	.1	245	.33	53,400	158	37	23
June 1-10-----	77,560		7.9	379	12	.01	43	10	21	.2	129	70	11	.4	1.4	.1	233	.32	48,800	148	43	23
June 11-20-----	59,340		7.9	382	12	.02	43	10	21	1.0	127	72	11	.4	1.2	.1	234	.32	37,500	148	44	23
June 21-30-----	31,460		7.8	528	14	.03	56	14	33	5.2	146	117	20	.2	1.3	.1	333	.45	28,300	197	78	26
July 1-4, 6-10-----	24,360		7.7	656	15	.02	63	20	49	4.8	160	163	30	.3	2.5	.1	426	.58	28,000	239	108	30
July 11-17, 19-----	14,200		7.7	673	13	.03	62	20	51	4.2	151	165	35	.2	1.7	.1	427	.58	16,400	236	113	31
July 21-31-----	9,841		7.7	953	13	.02	84	28	84	4.8	174	264	61	.3	2.4	.1	627	.85	16,700	324	182	36
Aug. 1-10-----	11,900		8.0	1,210	17	.04	114	35	107	4.4	200	388	72	.4	1.2	.3	838	1.14	26,900	428	264	35
Aug. 11-20-----	8,520		7.9	1,360	17	.11	132	39	120	5.0	196	477	72	.4	3.0	.3	962	1.31	22,100	490	330	34
Aug. 21-31-----	5,791		7.9	1,310	16	.03	124	39	122	4.8	197	442	84	.4	3.2	.3	932	1.27	14,600	470	308	36
Sept. 1-4, 7-10-----	4,428		7.8	1,570	13	.01	127	48	159	7.4	203	493	119	.4	4.3	.1	1,070	1.46	12,800	514	348	40
Sept. 13-17, 19-20-----	3,282		7.8	1,600	14	.01	125	52	161	8.4	185	529	116	.4	3.8	.1	1,100	1.50	9,750	526	374	39
Sept. 21-24, 26-30-----	3,884		7.8	1,750	12	.02	140	56	178	7.8	188	600	124	.4	5.4	.1	1,220	1.66	12,800	580	426	40
Weighted average -	18,830	--	--	744	14	0.02	70	22	61	2.8	167	194	40	0.4	2.4	0.1	489	0.67	24,900	265	128	33

## COLORADO RIVER MAIN STEM--Continued

## COLORADO RIVER NEAR LEES FERRY, ARIZ.--Continued

Suspended sediment, water year October 1947 to September 1948

Day	October			November			December		
	Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment	
		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day
1-----	7,520	0.20	40,600	11,800	0.34	108,000	7,350	0.22	43,700
2-----	7,490	.20	40,400	11,700	.40	126,000	7,660	.27	55,800
3-----	7,350	.20	39,700	11,900	.41	132,000	9,240	.41	102,000
4-----	6,910	.18	33,600	12,000	.42	136,000	10,700	.57	165,000
5-----	6,600	.17	30,300	11,600	.37	116,000	9,640	.42	109,000
6-----	6,640	.16	28,700	11,500	.33	102,000	9,890	.46	123,000
7-----	6,670	.17	30,600	11,100	.43	129,000	9,850	.53	141,000
8-----	6,910	.18	33,400	10,800	.41	120,000	9,600	.39	101,000
9-----	6,700	.15	27,100	10,300	.20	55,600	10,100	.43	117,000
10-----	6,540	.15	26,500	10,100	.31	84,500	10,700	.42	121,000
11-----	6,440	.23	40,000	9,970	.32	86,100	10,100	.40	109,000
12-----	6,770	.30	54,800	9,480	.29	74,200	9,360	.33	83,400
13-----	15,200	1.70	697,000	9,240	.30	74,800	8,700	.40	94,000
14-----	35,900	3.14	3,040,000	9,400	.28	71,100	7,880	.31	66,000
15-----	34,100	4.07	3,750,000	9,320	.28	70,500	7,080	.23	44,000
16-----	37,400	4.60	4,640,000	9,240	.33	82,300	6,310	.18	30,700
17-----	26,500	3.97	2,840,000	9,120	.28	68,900	5,580	.17	25,600
18-----	19,100	2.35	1,210,000	9,120	.26	64,000	5,070	.15	20,500
19-----	14,700	1.83	726,000	9,200	.28	69,600	4,760	.27	34,700
20-----	12,800	1.45	501,000	9,120	.26	64,000	4,860	.13	17,600
21-----	12,100	1.19	389,000	9,400	.25	63,400	5,490	.25	37,100
22-----	11,400	1.02	314,000	9,480	.26	66,500	5,660	.30	45,800
23-----	11,300	.70	214,000	9,640	.24	62,500	5,810	.31	48,600
24-----	11,700	.53	167,000	9,520	.24	61,700	5,870	.34	53,900
25-----	13,000	.72	253,000	9,360	.23	58,100	6,470	.34	59,400
26-----	13,200	.45	160,000	9,280	.27	67,700	6,940	.34	63,700
27-----	12,600	.48	183,000	9,040	.22	53,700	6,770	.33	60,300
28-----	12,600	.71	242,000	8,280	.23	51,400	6,770	.31	56,700
29-----	12,400	.45	151,000	7,660	.20	41,400	6,840	.31	57,300
30-----	12,200	.45	148,000	7,420	.21	42,100	6,910	.26	48,500
31-----	11,800	.36	115,000	--	--	--	6,840	.36	66,500
Total -	412,540	--	20,150,000	295,090	--	2,403,000	234,800	--	2,202,000
Day	January			February			March		
	Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment	
		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day
1-----	6,910	0.22	41,000	4,860	0.16	21,000	11,600	0.83	260,000
2-----	6,770	.18	32,900	5,350	.20	28,900	12,000	.83	269,000
3-----	6,810	.20	36,800	5,230	.13	18,400	12,400	.71	238,000
4-----	6,500	.21	36,900	5,900	.15	23,900	11,800	.59	188,000
5-----	6,150	.22	36,500	7,250	.25	48,900	10,300	.49	136,000
6-----	6,080	.22	36,100	7,520	.29	58,900	9,480	.42	108,000
7-----	5,720	.16	24,700	7,150	.24	46,300	9,040	.36	87,900
8-----	5,660	.14	21,400	7,080	.24	46,900	8,580	.37	85,700
9-----	6,280	.18	30,500	6,870	.21	39,000	8,540	.29	66,900
10-----	6,570	.27	47,900	6,670	.22	39,600	8,430	.29	66,000
11-----	7,180	.22	42,600	6,980	.23	43,300	8,430	.25	56,900
12-----	7,080	.25	47,800	7,080	.22	42,100	8,360	.27	60,900
13-----	7,150	.22	42,500	7,010	.27	51,100	7,680	.27	55,800
14-----	7,560	.25	51,000	6,210	.19	31,900	7,250	.23	45,000
15-----	7,740	.21	43,900	5,400	.20	29,200	7,010	.25	47,300
16-----	7,740	.20	41,800	5,520	.21	31,300	7,520	.25	50,800
17-----	7,420	.25	50,100	5,230	.17	24,000	7,320	.22	43,500
18-----	6,980	.17	32,000	5,400	.17	24,900	7,380	.22	43,800
19-----	6,640	.14	25,100	5,990	.22	35,600	8,210	.26	57,600
20-----	6,370	.14	24,100	7,250	.36	70,500	8,360	.24	54,200
21-----	6,810	.15	27,600	8,470	.33	75,500	8,240	.26	57,800
22-----	6,310	.17	29,000	9,600	.38	98,500	6,890	.39	93,600
23-----	6,440	.17	29,600	11,000	.44	131,000	9,680	.47	123,000
24-----	6,410	.24	41,500	14,300	.76	293,000	10,800	.46	134,000
25-----	6,410	.19	32,900	14,200	.80	307,000	10,900	.44	129,000
26-----	6,670	.20	36,000	13,300	.84	302,000	10,800	.40	117,000
27-----	7,380	.27	53,800	11,800	.83	264,000	11,000	.42	125,000
28-----	7,770	.28	58,700	10,800	.66	192,000	11,800	.57	182,000
29-----	6,470	.20	34,900	11,400	.75	231,000	20,100	1.04	564,000
30-----	4,820	.14	18,200	--	--	--	22,200	1.06	635,000
31-----	3,990	.18	19,400	--	--	--	21,100	1.22	695,000
Total -	204,790	--	1,127,000	230,820	--	2,649,000	325,180	--	4,877,000

COLORADO RIVER MAIN STEM--Continued  
COLORADO RIVER NEAR LEES FERRY, ARIZ.--Continued

Suspended sediment, water year October 1947 to September 1948--Continued

Day	April			May			June		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day
1-----	19,800	1.03	551,000	34,400	0.70	650,000	70,500	0.48	914,000
2-----	19,400	1.07	560,000	41,700	.77	867,000	73,200	.46	909,000
3-----	19,400	1.04	545,000	47,800	.75	968,000	77,000	.55	1,140,000
4-----	18,300	.93	460,000	48,800	.62	817,000	77,800	.50	1,050,000
5-----	17,700	.91	435,000	48,000	.57	739,000	78,700	.49	1,040,000
6-----	17,800	.85	409,000	46,100	.60	747,000	84,800	.60	1,370,000
7-----	18,500	.92	460,000	45,000	.55	668,000	82,900	.37	828,000
8-----	18,900	.88	449,000	44,700	.52	628,000	78,800	.43	915,000
9-----	20,200	.81	442,000	45,000	.58	705,000	77,400	.38	794,000
10-----	20,600	.70	389,000	47,900	.58	750,000	74,500	.42	845,000
11-----	20,800	.88	494,000	49,200	.52	691,000	70,400	.34	646,000
12-----	22,200	.96	575,000	45,000	.52	632,000	67,700	.40	731,000
13-----	22,500	.74	450,000	41,300	.48	535,000	65,700	.34	603,000
14-----	25,100	.77	522,000	38,400	.46	477,000	66,500	.46	826,000
15-----	24,100	.88	573,000	34,800	.41	385,000	62,800	.34	577,000
16-----	21,000	.71	403,000	32,400	.37	324,000	59,800	.34	549,000
17-----	20,100	.65	353,000	35,200	.44	418,000	55,900	.34	513,000
18-----	22,300	.62	373,000	43,800	.44	520,000	51,600	.28	390,000
19-----	27,600	.93	693,000	51,400	.44	611,000	48,200	.32	416,000
20-----	35,300	1.05	1,000,000	59,100	.65	1,040,000	44,800	.35	423,000
21-----	38,600	1.12	1,170,000	68,100	.64	1,180,000	41,700	.28	315,000
22-----	39,500	1.04	1,110,000	79,300	.80	1,710,000	38,800	.29	304,000
23-----	44,100	1.12	1,330,000	87,100	.69	1,620,000	36,200	.27	264,000
24-----	52,400	1.18	1,670,000	90,000	.65	1,580,000	33,800	.30	274,000
25-----	53,000	1.16	1,660,000	91,800	.64	1,590,000	31,700	.27	231,000
26-----	48,300	1.04	1,360,000	89,700	.58	1,400,000	29,400	.44	349,000
27-----	43,000	.89	1,030,000	85,800	.46	1,070,000	27,100	.24	176,000
28-----	38,900	.79	830,000	79,700	.44	947,000	25,000	.19	128,000
29-----	35,800	.69	667,000	74,900	.39	789,000	24,400	.19	125,000
30-----	33,200	.68	610,000	71,700	.42	813,000	26,500	.25	179,000
31-----	--	--	--	69,900	.46	868,000	--	--	--
Total -	858,400	--	21,510,000	1,768,000	--	26,740,000	1,683,600	--	17,820,000
Day	July			August			September		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day
1-----	29,000	0.25	196,000	9,080	0.41	101,000	5,690	0.35	53,800
2-----	27,200	.22	162,000	8,730	.32	75,400	5,600	.30	45,400
3-----	26,400	.25	178,000	9,280	.28	70,200	5,150	.20	27,800
4-----	26,400	.22	157,000	10,000	.33	89,100	4,740	.17	21,800
5-----	25,500	.20	139,000	14,200	.60	230,000	4,390	1/.15	17,800
6-----	23,900	.19	123,000	12,500	1.27	429,000	4,040	1/.12	13,100
7-----	22,800	.18	111,000	13,000	1.33	467,000	3,740	.09	9,090
8-----	21,700	.17	99,600	15,500	2.26	946,000	3,680	.09	8,940
9-----	20,900	.16	90,300	13,600	2.23	819,000	3,680	.09	8,940
10-----	19,700	.16	85,100	13,100	1.68	594,000	3,570	.10	9,640
11-----	18,600	.15	75,300	12,400	1.57	526,000	3,470	.11	10,300
12-----	17,600	.13	61,800	10,400	1.55	435,000	3,410	1/.10	9,210
13-----	16,600	.11	49,300	9,930	1.10	295,000	3,220	.10	8,690
14-----	15,500	.11	46,000	8,810	.71	169,000	3,000	.09	7,290
15-----	14,400	.10	38,900	8,060	.81	176,000	2,820	.10	7,610
16-----	13,400	.10	36,200	7,560	.58	118,000	2,780	.09	6,760
17-----	12,200	.10	32,900	7,490	.46	93,000	2,890	.07	5,460
18-----	11,600	.10	31,300	7,210	.31	60,300	3,240	1/.20	17,500
19-----	11,200	.09	27,200	6,840	.31	57,200	3,770	.33	33,600
20-----	10,900	.13	38,300	6,500	.34	59,800	4,220	.37	42,200
21-----	11,500	.10	31,000	6,150	.25	41,500	3,720	.45	45,200
22-----	10,900	.36	106,000	5,690	.30	46,100	3,430	.34	31,500
23-----	9,440	.18	45,900	5,840	1.04	164,000	3,300	.34	30,300
24-----	9,360	.15	37,900	5,460	.39	57,500	3,340	.31	28,000
25-----	9,560	.39	101,000	5,780	.53	82,700	3,410	1/.22	20,300
26-----	9,320	.20	50,300	6,870	.54	100,000	3,490	.16	15,100
27-----	9,600	.15	38,900	6,440	.42	73,000	3,510	.15	14,200
28-----	9,480	.19	48,600	5,870	.56	88,800	3,570	.12	11,600
29-----	9,480	.21	53,800	5,290	.51	72,800	4,920	.68	90,300
30-----	9,640	.28	72,900	5,050	.48	65,400	6,150	.94	156,000
31-----	9,970	.28	75,800	5,260	.30	42,600	--	--	--
Total -	493,850	--	2,439,000	267,890	--	6,644,000	115,940	--	807,400

Total discharge for year (second-foot days) ----- 6,890,900

Total load for year (tons) ----- 109,400,000

1/ Estimated.

COLORADO RIVER MAIN STEM--Continued  
COLORADO RIVER NEAR GRAND CANYON, ARIZ.

LOCATION.--At gaging station at Kaibab Bridge, a quarter of a mile upstream from Bright Angel Creek, 11 miles by trail northeast of Grand Canyon Village, and 267 miles upstream from Hoover Dam.

DRAINAGE AREA.--137,800 square miles.

RECORDS AVAILABLE.--Chemical analyses: August 1925 to November 1942, September 1943 to September 1948.

Water temperatures: October 1941 to September 1942, October 1943 to September 1948.

Sediment records: October 1925 to November 1942, September 1943 to September 1948.

EXTREMES, 1947-48.--Dissolved solids: Maximum, 1,300 parts per million Sept. 21-30; minimum, 276 parts per million June 11-20.

Total hardness: Maximum, 596 parts per million Sept. 21-30; minimum, 182 parts per million June 11-20.

Sediment loads: Maximum, 6,830,000 tons per day Oct. 15; minimum, 1,620 tons per day Sept. 18.

EXTREMES, 1925-48.--Dissolved solids: Maximum, 1,890 parts per million Sept. 21-30, 1934; minimum, 225 parts per million June 11-20, 1942.

Total hardness: Maximum, 792 parts per million Sept. 1-10, 1940; minimum, 127 parts per million June 11-17, 1926.

Sediment loads: Maximum, 27,600,000 tons per day Sept. 13, 1927; minimum, 863 tons per day Dec. 27, 1928.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1119. Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-foot)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
Oct. 1-3, 6-10, 1947	7,321	7.4		1,370	12	0.07	112	38	132	5.6	231	366	114	0.4	3.6	0.2	897	1.22	17,700	436	246	39
Oct. 11-20	23,490	7.5		1,410	15	.20	123	34	144	4.6	255	410	95	.4	1.4	.2	953	1.30	60,400	447	238	41
Oct. 21-31	12,970	7.9		1,360	14	.18	131	35	124	4.6	233	423	88	.4	1.8	.2	937	1.27	32,800	471	280	36
Nov. 1-5, 10	11,570	8.1		1,290	12	.04	104	33	111	5.2	226	327	87	.4	2.9	.2	794	1.08	24,800	395	210	38
Nov. 11-20	9,770	8.1		1,300	12	.02	102	37	132	3.6	228	342	106	.4	3.8	.2	851	1.16	22,400	406	220	41
Nov. 21-30	9,331	8.0		1,340	13	.01	103	39	134	4.4	221	356	116	.3	4.0	.1	881	1.20	22,200	418	236	41
Dec. 1-10	9,675	7.9		1,370	13	.05	106	38	142	4.0	233	358	121	.4	4.7	.1	902	1.23	23,600	420	230	42
Dec. 11-20	7,856	7.7		1,430	12	.03	107	40	151	4.0	241	375	127	.4	4.4	.1	940	1.26	19,900	432	234	43
Dec. 21-31, 26-31	6,543	7.7		1,510	13	.03	109	44	163	6.4	247	381	148	.4	7.3	.1	994	1.35	17,600	453	250	43
Jan. 1, 4-7, 9-10, 1948	6,608	7.7		1,490	13	.03	106	43	160	5.4	243	362	151	.4	4.1	.1	965	1.31	17,200	442	242	44
Jan. 11-20	7,526	7.9		1,480	15	.04	108	43	155	5.0	243	349	149	.3	4.1	.1	948	1.29	19,300	446	248	43
Jan. 21-31	6,740	7.8		1,410	13	.04	102	41	146	3.8	240	329	142	.3	3.9	.1	899	1.22	16,400	423	226	43
Feb. 1-10	6,266	7.8		1,510	16	.05	107	42	159	6.0	242	349	159	.4	4.0	.1	962	1.31	16,300	440	241	44
Feb. 11-20	6,316	7.8		1,490	17	.11	102	42	162	5.6	235	336	164	.4	3.8	.1	949	1.29	16,200	427	234	45
Feb. 21-29	11,690	7.7		1,430	12	.28	117	38	146	7.2	265	345	130	.4	2.9	.1	929	1.26	29,300	448	231	41
Mar. 1-3, 7-10	10,960	7.8		1,350	12	.03	112	36	134	7.6	241	364	104	.4	4.9	.1	894	1.22	26,500	428	230	40
Mar. 11-20	8,381	7.9		1,400	13	.04	106	37	150	5.8	235	351	126	.4	4.7	.1	910	1.24	20,600	416	224	43
Mar. 21-31	13,050	7.9		1,400	12	.03	108	39	152	6.0	250	370	118	.4	4.4	.1	933	1.27	32,900	430	225	43

COLORADO RIVER MAIN STEM--Continued  
COLORADO RIVER NEAR GRAND CANYON, ARIZ.--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
Apr. 1-2, 4-10, 1948	20,410		7.5	1,060	13	0.14	88	28	101	4.0	245	253	67	0.5	2.2	0.2	678	0.92	37,360	334	134	39
Apr. 11-20	24,550		7.5	944	14	.06	82	25	84	4.2	232	210	60	.5	1.7	.2	596	.81	39,600	308	118	37
Apr. 21-25, 27-30	42,380		7.5	725	12	.28	76	21	50	4.0	223	142	36	.1	1.5	.2	453	.62	51,800	276	94	28
May 1-5, 7-10	42,850		7.9	601	16	.02	68	17	37	3.8	219	101	29	.4	.2	.1	380	.52	44,000	240	60	25
May 11-20	41,650		7.9	554	15	.02	63	15	34	2.7	204	85	26	.4	1.0	.1	343	.47	38,600	218	52	25
May 21-31	78,660		7.9	481	16	.06	60	13	26	2.7	200	66	17	.4	.9	.1	301	.41	63,900	203	39	21
June 1-2, 4-10	76,570	8.0		463	15	.07	57	12	24	2.9	185	68	17	.4	.7	.1	288	.39	59,500	192	40	21
June 11-20	60,520	7.9		455	13	.06	55	11	23	2.4	167	69	19	.4	.7	.1	276	.38	45,100	182	45	21
June 21-30	32,190	7.9		552	12	.02	57	14	35	2.9	154	105	30	.3	1.7	.1	334	.45	29,000	200	74	27
July 1-10	24,650	7.8		771	16	.04	73	20	59	6.0	199	161	51	.4	1.6	.1	486	.66	32,300	264	101	32
July 11-20	15,170	7.8		798	14	.03	71	21	66	6.8	185	166	62	.5	1.5	.1	500	.68	20,500	264	112	35
July 21-31	10,060	7.6		1,060	15	.02	95	28	99	5.8	225	252	94	.5	.8	.3	701	.95	19,000	352	168	37
Aug. 1-4, 6-10	12,980	7.6		1,350	19	.02	122	35	128	6.4	250	378	96	.4	.9	.3	909	1.24	31,900	448	244	38
Aug. 11-20	9,667	7.7		1,500	18	.12	141	40	140	6.8	238	470	106	.4	1.7	.3	1,040	1.41	27,100	516	322	37
Aug. 21-30	6,314	7.8		1,490	16	.03	130	40	145	5.4	229	436	124	.4	3.4	.3	1,010	1.37	17,200	489	302	39
Sept. 1-4, 6-10	4,906	7.7		1,720	16	.02	139	50	181	11	246	466	163	.6	5.3	.1	1,170	1.59	15,500	552	351	41
Sept. 11-20	3,408	7.7		1,780	14	.02	130	52	196	9.0	241	467	190	.6	5.3	.1	1,180	1.60	10,900	538	341	44
Sept. 21-31	3,905	7.8		1,880	14	.02	145	57	206	9.4	241	548	190	.5	7.3	.1	1,300	1.77	13,700	596	399	42
Weighted average	19,100		--	862	14	0.07	81	23	73	4.1	212	195	59	0.4	1.8	0.1	556	0.76	28,700	296	123	34

COLORADO RIVER MAIN STEM--Continued  
COLORADO RIVER NEAR GRAND CANYON, ARIZ.--Continued

Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	71	56	44	--	32	44	48	58	66	77	79	81
2	70	56	44	--	33	44	48	58	67	76	79	78
3	70	53	--	--	35	43	--	59	--	73	78	79
4	--	52	44	35	35	--	51	60	67	75	78	79
5	--	52	44	35	37	--	52	60	68	76	--	--
6	--	--	--	--	--	--	--	--	--	--	--	--
7	69	41	44	35	37	--	51	--	67	77	77	77
8	69	49	44	35	37	47	52	61	67	77	75	76
9	66	46	44	--	37	43	52	61	68	77	75	76
10	68	--	43	37	38	44	54	59	74	78	75	75
11	68	46	41	37	39	44	56	60	69	78	76	76
12	65	46	39	38	37	44	56	60	72	79	76	75
13	63	46	38	38	36	44	55	61	71	79	77	76
14	61	46	38	37	36	44	53	61	72	80	77	75
15	60	46	37	37	35	46	55	62	71	80	77	75
16	59	46	36	36	35	46	56	65	72	81	77	73
17	59	45	36	36	37	48	59	66	72	81	77	73
18	60	45	36	36	39	47	60	67	72	81	78	74
19	61	45	35	35	40	48	59	64	71	80	79	73
20	61	44	37	35	42	49	59	62	71	80	78	73
21	62	43	--	35	44	47	58	63	68	79	79	72
22	59	43	--	35	46	47	59	64	69	79	76	73
23	59	42	--	35	47	48	58	65	69	79	76	70
24	57	41	35	35	45	49	56	64	70	78	75	71
25	56	41	--	38	44	49	56	65	72	79	74	70
26	57	40	35	40	43	49	--	65	73	79	74	69
27	56	41	35	35	44	49	57	65	73	79	74	68
28	55	41	35	35	44	49	57	65	73	79	76	69
29	56	43	35	32	44	50	59	66	74	79	76	68
30	56	43	35	32	--	51	58	67	75	80	77	68
31	56	--	35	32	--	49	--	66	--	80	--	--
Average	62	46	39	36	39	47	55	63	70	79	77	74

## COLORADO RIVER BASIN

## COLORADO RIVER MAIN STEM--Continued

## COLORADO RIVER NEAR GRAND CANYON, ARIZ.--Continued

Suspended sediment, water year October 1947 to September 1948

Day	October			November			December		
	Suspended sediment			Suspended sediment			Suspended sediment		
	Mean dis-charge (second-feet)	Mean concen-tration (percent)	Tons per day	Mean dis-charge (second-feet)	Mean concen-tration (percent)	Tons per day	Mean dis-charge (second-feet)	Mean concen-tration (percent)	Tons per day
1-----	7,850	0.13	27,000	12,100	0.24	78,400	7,700	0.06	12,500
2-----	7,800	.11	23,200	11,900	.24	77,100	7,720	.06	12,500
3-----	7,760	.10	21,000	12,000	.27	87,500	8,330	.08	18,000
4-----	7,580	1/.10	20,500	12,300	.24	79,700	10,600	.11	31,500
5-----	7,180	1/.09	17,400	12,100	.27	88,200	10,700	.22	63,600
6-----	7,000	.09	17,000	11,600	.24	75,200	10,200	.24	66,100
7-----	7,070	.09	17,200	11,300	.19	58,000	10,400	.28	78,600
8-----	7,020	.08	15,200	11,100	.17	50,900	10,200	.32	88,100
9-----	7,130	.07	13,500	10,900	1/.16	47,100	10,100	.32	87,300
10-----	6,820	.07	12,900	10,400	.15	42,100	10,800	1/.30	87,500
11-----	6,610	.07	12,500	10,300	.14	38,900	11,000	.27	80,200
12-----	6,570	.06	10,600	10,100	.14	38,200	10,300	.28	77,900
13-----	7,490	.17	34,400	9,730	.13	34,200	9,680	.20	52,300
14-----	32,200	3.42	2,970,000	9,680	.13	34,000	8,910	1/.17	40,900
15-----	45,800	5.52	6,830,000	9,680	.13	34,000	8,250	.14	31,200
16-----	42,300	5.54	6,330,000	9,770	.12	31,700	7,490	.10	20,200
17-----	36,000	6.14	5,970,000	9,580	.12	31,000	6,680	.09	16,200
18-----	23,500	4.72	2,990,000	9,580	.10	25,900	5,910	.05	7,980
19-----	18,900	2.58	1,320,000	9,580	.11	28,500	5,280	.04	5,700
20-----	15,500	1.90	795,000	9,700	.12	31,400	5,060	.04	5,460
21-----	14,000	1.70	643,000	9,610	.10	25,900	5,250	.03	4,250
22-----	13,000	1.16	407,000	9,650	.12	31,300	5,670	.05	7,650
23-----	12,400	1.03	345,000	9,770	.11	29,000	5,820	.08	12,800
24-----	12,200	.80	264,000	9,870	.11	29,300	6,120	.09	14,900
25-----	12,500	.58	196,000	9,660	.11	28,700	6,370	.09	15,500
26-----	13,400	.41	148,000	9,610	.10	25,900	6,780	1/.10	18,300
27-----	13,400	.38	137,000	9,460	.10	25,500	7,120	1/.10	19,200
28-----	13,100	.34	120,000	9,160	.08	19,800	7,020	1/.11	20,800
29-----	13,200	.44	157,000	8,510	.08	18,400	7,220	.11	21,400
30-----	12,900	.39	136,000	8,010	.07	15,100	7,300	.12	23,700
31-----	12,600	.28	95,300	--	--	--	7,300	.14	27,600
Total -	450,780	--	30,100,000	306,710	--	1,261,000	247,280	--	1,070,000
Day	January			February			March		
	Suspended sediment			Suspended sediment			Suspended sediment		
	Mean dis-charge (second-feet)	Mean concen-tration (percent)	Tons per day	Mean dis-charge (second-feet)	Mean concen-tration (percent)	Tons per day	Mean dis-charge (second-feet)	Mean concen-tration (percent)	Tons per day
1-----	7,240	1/0.10	19,500	4,370	0.05	5,900	12,300	0.85	282,000
2-----	7,200	.05	9,720	4,830	.04	5,220	12,200	.78	257,000
3-----	6,920	.04	7,470	5,360	.04	5,790	12,800	.76	263,000
4-----	6,820	.04	7,370	5,590	.04	6,040	12,700	1/.67	230,000
5-----	6,650	.04	7,180	6,330	.06	10,300	11,700	1/.58	183,000
6-----	6,400	.04	6,910	7,260	.07	13,700	10,600	1/.49	140,000
7-----	6,290	.04	6,790	7,440	.09	18,100	9,900	.41	110,000
8-----	5,950	1/.04	6,430	7,160	.08	15,500	9,430	.34	86,600
9-----	6,060	.03	4,910	7,180	.06	11,600	9,150	.40	98,800
10-----	6,550	.04	7,070	7,140	.06	11,600	9,030	.27	65,800
11-----	6,940	.05	9,370	6,830	.06	11,100	8,840	.24	57,300
12-----	7,420	.06	12,000	7,130	.06	11,600	8,970	.20	48,400
13-----	7,400	.07	14,000	7,130	.06	11,600	8,830	.18	42,900
14-----	7,580	.07	14,300	6,820	.08	14,700	8,390	.19	43,000
15-----	7,880	.09	19,100	6,010	.04	6,490	8,190	.20	44,200
16-----	8,010	.08	17,300	5,570	.03	4,510	7,990	.21	45,300
17-----	7,900	.08	17,100	5,840	.03	4,730	8,060	.20	48,500
18-----	7,780	.07	14,700	5,520	.03	4,470	7,800	.14	29,500
19-----	7,400	.07	14,000	5,840	.03	4,730	7,960	.14	30,100
20-----	6,950	.06	11,300	6,470	.04	6,990	8,780	.20	47,400
21-----	6,900	.06	11,200	7,780	.11	23,100	8,620	.16	37,200
22-----	6,980	.05	9,420	8,780	.22	52,200	8,810	.17	40,400
23-----	6,540	.05	8,830	9,870	.29	77,300	9,700	.29	76,000
24-----	6,650	.05	8,980	11,900	.42	135,000	10,400	.54	152,000
25-----	6,590	.04	7,120	14,600	.90	355,000	11,300	.56	171,000
26-----	6,700	.06	10,900	14,600	.70	276,000	11,000	.47	140,000
27-----	6,960	.05	9,260	13,900	.83	311,000	11,200	.47	142,000
28-----	7,740	.06	12,500	12,300	.85	282,000	11,900	.51	164,000
29-----	7,870	.10	21,200	11,500	.73	227,000	14,000	.86	325,000
30-----	6,310	.05	8,520	--	--	--	24,100	1.56	1,020,000
31-----	4,900	.05	6,620	--	--	--	22,500	1.32	802,000
Total -	215,480	--	341,100	231,050	--	1,923,000	337,150	--	5,217,000

1/ Estimated or interpolated



COLORADO RIVER MAIN STEM--Continued  
 COLORADO RIVER NEAR GRAND CANYON, ARIZ.--Continued  
 Suspended sediment, water year October 1947 to September 1948--Continued

Day	April			May			June		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day
1-----	21,700	1.52	891,000	32,700	0.77	680,000	69,500	0.56	1,050,000
2-----	20,900	1.34	756,000	36,900	.89	887,000	71,000	.75	1,440,000
3-----	20,900	1/1.20	677,000	45,000	1.21	1,470,000	74,800	1/ .74	1,490,000
4-----	20,200	1.19	649,000	47,600	1.50	1,930,000	77,700	.72	1,510,000
5-----	19,000	1.09	559,000	46,600	2.08	2,620,000	76,200	.77	1,580,000
6-----	19,200	1.04	539,000	45,300	1.18	1,440,000	81,400	.75	1,650,000
7-----	19,600	1.08	572,000	43,400	.80	937,000	83,300	.63	1,420,000
8-----	20,200	1.18	644,000	42,800	.88	1,020,000	79,200	.60	1,280,000
9-----	20,900	1.07	604,000	43,000	.86	998,000	77,500	.48	1,000,000
10-----	21,500	1.00	580,000	45,200	.91	1,110,000	75,100	.46	933,000
11-----	21,700	.99	580,000	47,700	.80	1,030,000	71,100	.46	883,000
12-----	22,800	1.12	669,000	45,500	.73	897,000	68,300	.40	738,000
13-----	23,500	1.23	780,000	41,100	.53	588,000	66,000	.44	784,000
14-----	25,500	1.21	833,000	38,800	.54	566,000	66,200	.39	697,000
15-----	27,200	1.26	925,000	36,200	.49	479,000	64,500	.46	801,000
16-----	24,100	1.00	651,000	33,400	.37	334,000	61,500	.40	664,000
17-----	21,600	.88	513,000	33,100	.38	340,000	58,000	.32	501,000
18-----	21,800	.75	441,000	39,400	.49	521,000	53,500	.28	404,000
19-----	25,100	.87	590,000	47,200	.69	879,000	49,800	.28	376,000
20-----	32,200	1.30	1,130,000	54,100	.78	1,140,000	46,300	.33	413,000
21-----	38,100	1.62	1,670,000	62,600	.90	1,520,000	43,100	.26	303,000
22-----	38,800	1.53	1,600,000	73,500	.99	1,960,000	40,300	.27	294,000
23-----	39,900	1.43	1,540,000	81,800	1.09	2,410,000	37,500	.24	243,000
24-----	47,400	1.76	2,250,000	85,000	1.45	3,330,000	35,400	.22	210,000
25-----	53,600	1.52	2,200,000	88,300	1.15	2,740,000	32,800	.20	177,000
26-----	50,900	1.48	2,030,000	88,400	.86	2,050,000	30,400	.21	172,000
27-----	44,600	1.48	1,780,000	86,300	.86	2,000,000	27,900	.17	128,000
28-----	40,200	1.32	1,430,000	81,200	.70	1,530,000	25,600	.27	187,000
29-----	36,700	1.12	1,110,000	76,100	.76	1,560,000	24,300	.14	91,900
30-----	33,600	.88	798,000	72,300	.65	1,270,000	24,600	.11	73,100
31-----	--	--	--	69,800	.51	961,000	--	--	--
Total -	873,400	--	30,010,000	1,710,300	--	41,200,000	1,692,800	--	21,490,000
	July			August			September		
	Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment		Mean discharge (second-foot)	Suspended sediment	
		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day
1-----	27,900	0.18	136,000	9,950	0.71	191,000	5,630	0.36	55,000
2-----	27,900	.19	143,000	8,990	.45	109,000	6,050	.35	57,200
3-----	26,300	.14	99,400	8,860	.18	115,000	5,890	.20	31,600
4-----	26,300	.19	135,000	10,100	.55	150,000	5,430	.23	33,700
5-----	25,700	.16	111,000	11,600	.64	200,000	5,040	.12	16,300
6-----	24,600	.19	126,000	16,000	1.17	505,000	4,690	.11	13,900
7-----	23,400	.14	88,500	16,500	2.24	998,000	4,340	.09	10,500
8-----	22,400	.12	72,600	16,600	2.60	1,170,000	4,050	.06	6,560
9-----	21,500	.10	58,000	16,400	2.45	1,080,000	3,950	.06	6,400
10-----	20,500	.11	60,900	14,800	2.40	959,000	3,960	.05	5,350
11-----	19,600	.09	47,600	13,700	2.02	747,000	3,830	.04	4,140
12-----	18,800	.09	45,700	12,300	1.55	515,000	3,730	.04	4,030
13-----	17,800	.08	38,400	11,000	1.42	422,000	3,650	.03	2,960
14-----	16,600	.06	26,900	10,300	1.24	345,000	3,460	.03	2,800
15-----	15,500	.05	20,900	9,380	.99	251,000	3,100	.03	2,510
16-----	14,400	.04	15,600	8,630	.60	140,000	3,030	.03	2,450
17-----	13,500	.04	14,600	8,230	.59	131,000	2,960	.03	2,400
18-----	12,300	.04	13,300	7,980	.52	112,000	3,000	.02	1,620
19-----	11,800	.03	9,560	7,730	.40	83,500	3,250	.02	1,760
20-----	11,400	.03	9,230	7,420	.29	58,100	4,070	.03	3,300
21-----	11,200	.03	9,070	7,000	.23	43,500	4,520	.08	9,760
22-----	11,300	.04	12,200	6,640	.20	35,900	3,990	.04	4,310
23-----	10,800	.05	14,600	6,140	.23	40,000	3,620	.15	14,700
24-----	9,510	.47	121,000	6,360	.23	39,500	3,460	.19	17,700
25-----	9,480	.14	35,800	5,910	.15	23,900	3,500	.32	30,200
26-----	9,530	.09	23,200	6,260	.85	144,000	5,570	.22	21,200
27-----	9,390	.49	124,000	7,240	.73	143,000	3,650	.25	24,600
28-----	9,830	.38	101,000	6,620	.70	125,000	3,660	.20	19,600
29-----	9,410	.19	48,300	6,060	.24	39,300	3,730	.16	16,100
30-----	9,560	.16	41,300	5,570	.36	54,100	5,350	.10	14,400
31-----	10,600	.67	192,000	5,350	1/ .36	52,000	--	--	--
Total -	508,810	--	1,995,000	295,920	--	9,022,000	122,190	--	437,400
Total discharge for year -----				6,991,870		Total load for year -----			
						144,100,000			

1/ Estimated or interpolated

COLORADO RIVER MAIN STEM--Continued  
COLORADO RIVER NEAR GRAND CANYON, ARIZ.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948

(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	Time	Mean discharge (second- feet)	Suspended sediment											Methods of analysis		
			Mean daily concentration (percent)	Weight of material in tube (grams)	Percent finer than indicated size, in millimeters											
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500		1.000	2.000
Oct. 3, 1947-----		7,760	0.10	0.3608	40	43	72	85	92	98	100	--	--	--	--	BW
Oct. 7 -----		7,070	.09	.3133	41	44	70	84	90	98	100	--	--	--	--	BW
Oct. 11 -----		6,610	.07	.1839	27	37	66	85	93	98	100	--	--	--	--	BW
Oct. 14 -----		32,200	3.42	1.3158	19	24	35	48	57	68	87	96	100	100	100	BW
Oct. 18 -----		23,500	4.72	.7815	31	35	54	62	70	78	92	99	100	100	100	S
Oct. 21 -----		14,000	1.70	.9413	54	58	80	89	94	99	100	--	--	--	--	BW
Oct. 25 -----		12,500	.58	.5827	40	53	72	82	87	96	100	--	--	--	--	BW
Oct. 28 -----		13,100	.34	.3320	44	46	66	76	87	97	100	--	--	--	--	BW
Nov. 1 -----		12,100	.24	.4527	35	37	53	64	74	85	95	99	100	100	100	S
Nov. 4 -----		12,300	.24	.4260	38	43	58	66	76	85	93	98	100	100	100	S
Nov. 11 -----		10,300	.14	.6923	34	36	48	58	70	85	96	100	--	--	--	S
Nov. 11 -----		10,300	.14	.4451	--	--	--	--	--	84	94	99	100	100	100	S
Nov. 13 -----		9,680	.13	.3769	--	--	--	--	--	89	97	99	100	100	100	S
Nov. 18 -----		9,580	.10	.3379	--	--	--	--	--	88	97	99	100	100	100	S
Nov. 22 -----		9,650	.12	.3985	--	--	--	--	--	89	97	99	100	100	100	S
Nov. 25 -----		9,660	.11	.2852	--	--	--	--	--	94	99	100	100	100	100	S
Nov. 29 -----		8,510	.08	.2947	--	--	--	--	--	92	99	100	--	--	--	S
Dec. 2 -----		7,720	.06	.2406	--	--	--	--	--	86	96	100	--	--	--	S
Dec. 6 -----		10,200	.24	.4893	31	33	44	52	62	79	95	99	--	--	--	S
Dec. 9 -----		10,100	.32	.1520	--	--	--	--	--	89	97	100	--	--	--	S
Dec. 13 -----		9,680	.20	.1172	--	--	--	--	--	95	100	--	--	--	--	S
Dec. 16 -----		7,490	.10	.1223	--	--	--	--	--	93	100	--	--	--	--	S
Dec. 23 -----		5,820	.08	.1302	--	--	--	--	--	94	100	--	--	--	--	S
Dec. 30 -----		7,300	.12	.1612	--	--	--	--	--	88	98	100	--	--	--	S
Jan. 6, 1948-----		6,400	.04	.1792	--	--	--	--	--	74	85	91	96	96	96	S
Jan. 10 -----		6,550	.04	.1655	--	--	--	--	--	72	85	90	95	95	95	S
Jan. 13 -----		7,400	.07	.2033	--	--	--	--	--	85	96	99	100	100	100	S
Jan. 17 -----		7,900	.08	.2999	--	--	--	--	--	79	94	97	98	97	98	S
Jan. 20 -----		6,950	.06	.1796	--	--	--	--	--	90	99	100	--	--	--	S
Jan. 24 -----		6,650	.05	.1422	--	--	--	--	--	91	98	99	100	100	100	S
Jan. 27 -----		6,960	.05	.1279	--	--	--	--	--	91	98	99	100	100	100	S
Jan. 31 -----		4,900	.05	.2182	--	--	--	--	--	97	100	--	--	--	--	S

Feb. 3	5,360	.04	.1618	--	--	--	--	78	89	92	95	S
Feb. 7	7,440	.09	.3130	--	--	--	--	78	93	96	97	S
Feb. 10	7,140	.06	.2073	--	--	--	--	80	91	96	96	S
Feb. 14	6,820	.08	.2790	--	--	--	--	66	91	95	97	S
Feb. 17	5,840	.03	.1478	--	--	--	--	75	85	90	95	S
Feb. 21	7,780	.11	.2907	--	--	--	--	74	92	95	97	S
Feb. 24	11,900	.42	.9028	--	8	14	20	59	94	99	100	S
Feb. 28	12,300	.85	.8378	--	41	54	64	82	96	98	99	S
Mar. 9	9,150	.40	.7468	31	38	49	55	77	96	98	99	S
Mar. 16	7,990	.21	.3623	55	56	72	80	94	100	--	--	BW
Mar. 20	8,780	.20	.7950	--	--	--	--	66	94	98	99	S
Mar. 23	9,700	.29	1.1157	28	30	36	41	63	96	99	100	S
Mar. 27	11,200	.47	1.6157	--	--	--	--	70	96	99	100	BW
Mar. 30	24,100	1.56	1.6086	20	20	28	31	58	93	99	100	S
Apr. 5	19,000	1.09	.4689	30	37	49	57	67	90	97	99	S
Apr. 7	19,600	1.08	.5681	37	39	50	60	71	99	98	99	S
Apr. 10	21,500	1.00	.5572	34	36	46	50	63	90	98	99	S
Apr. 13	23,500	1.23	.8311	--	31	41	47	58	84	98	99	S
Apr. 17	21,600	.88	.5349	--	29	41	49	56	88	99	100	S
Apr. 20	32,200	1.30	.5835	--	19	26	30	39	86	99	100	S
Apr. 24	47,400	1.76	.9220	--	16	24	29	38	74	83	100	S
Apr. 27	44,600	1.48	.8027	13	--	20	26	35	48	91	100	S
May 1	32,700	.77	1.1307	--	2	13	26	50	75	95	100	SDN
May 4	47,600	1.50	2.0041	--	--	10	12	31	66	94	--	S
May 8	42,800	.88	1.9394	--	1	6	12	33	60	90	99	SDN
May 11	47,700	.60	1.7127	--	1	6	10	30	59	89	100	SDN
May 13	36,200	.49	2.0069	--	--	--	--	33	59	85	99	S
May 22	73,500	.99	1.9967	--	1	7	12	35	61	91	99	SDN
May 25	88,300	1.15	1.9628	--	2	7	11	25	50	87	98	SDN
May 29	76,100	.76	1.6089	--	1	8	14	32	60	91	99	SDN

COLORADO RIVER MAIN STEM--Continued  
COLORADO RIVER NEAR GRAND CANYON, ARIZ.--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948--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	Time	Mean discharge (second- feet)	Suspended sediment											Methods of analysis	
			Mean daily concentration (percent)	Weight of material in tube (grams)	Percent finer than indicated size, in millimeters										
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500		1.000
June 1, 1948		69,500	0.56	1.1712	--	--	16	21	29	41	65	91	100		S
June 5		76,200	.77	1.5616	--	--	--	--	35	62	89	99	100		S
June 9		77,500	.48	.8690	3	3	10	16	--	41	64	91	99		SDN
June 12		68,300	.40	1.7526	--	--	--	--	--	32	56	85	99		S
June 19		49,800	.28	1.3327	--	--	--	--	--	42	71	92	99		S
June 22		40,300	.27	.5924	--	4	9	15	--	39	69	92	100		SDN
June 26		30,400	.21	.7862	--	--	--	--	--	57	84	96	99		S
July 3		26,300	.14	.6085	11	17	24	32	--	63	83	95	99		SD
July 10		20,500	.11	.4214	16	23	30	40	--	74	88	96	99		SD
July 13		17,800	.08	1.944	25	32	40	58	--	64	80	95	99		SD
July 17		13,500	.04	1.1555	24	33	41	54	--	88	--	--	--		SD
July 24		9,510	.47	.5729	52	70	90	98	99	100	--	--	--		BW
July 27		9,390	.49	.2675	34	52	69	89	--	--	--	--	--		D
July 29		9,410	.19	.2984	15	21	28	40	--	71	87	97	100		SD
July 31		10,600	.67	.3285	35	50	63	83	--	--	--	--	--		D
Aug. 5		11,600	.64	.3827	25	36	50	63	--	90	--	--	--		SD
Aug. 7		16,500	2.24	.7623	37	50	64	75	86	96	99	100	--		BW
Aug. 10		14,800	2.40	.6716	54	65	85	92	98	99	99	100	--		BW
Aug. 15		9,380	.99	.4210	29	46	62	80	--	--	--	--	--		D
Aug. 17		8,230	.59	.4796	33	48	65	81	--	--	--	--	--		D
Aug. 21		7,000	.23	.4493	32	48	63	79	--	--	--	--	--		D
Aug. 24		6,360	.23	.3057	33	51	79	80	--	--	--	--	--		D
Aug. 28		6,620	.70	.8647	52	71	90	99	100	--	--	--	--		BW
Sept. 1		5,660	.36	.2812	60	80	97	--	--	--	--	--	--		BW
Sept. 2		6,050	.35	.3535	33	49	65	80	--	--	--	--	--		D
Sept. 4		5,430	.23	.2656	33	52	68	82	--	--	--	--	--		D
Sept. 11		3,830	.04	.2288	34	58	61	76	--	--	--	--	--		D
Sept. 14		3,460	.03	1.1635	38	56	69	82	--	--	--	--	--		D
Sept. 18		3,000	.02	.1238	39	55	67	82	--	--	--	--	--		D
Sept. 25		3,500	.32	.3003	34	54	72	87	--	--	--	--	--		D
Sept. 28		3,660	.20	.8743	62	79	94	98	100	--	--	--	--		BW

COLORADO RIVER MAIN STEM--Continued  
LAKE MEAD NEAR BOULDER CITY, NEV.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Depth (feet)	Elevation (feet)	Temper- ature (° F.)	Specific conductance (micromhos at 25° C.)	Silica (SiO <sub>2</sub> )	Calcium (Ca)	Magnesium (Mg)	Sod- ium (Na)	Po- tas- sium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Total hardness as CaCO <sub>3</sub>
LINE OF DEMARCATION BETWEEN TURBIN AND CLEAR WATER															
EMERY FALLS, MILE 275.8															
Oct. 8, 1947-----	0		75	1,260	14	101	37	120	174	344		108	14	824	404
Oct. 8, 1947-----	5		72.4	1,210	15	100	35	117	190	330		104	3.3	798	394
Oct. 8-----	20		73.3	1,450	25	131	51	141	402	369		91	1.6	1,010	536
PIERCE FERRY BAY, MILE 279															
Oct. 20, 1947-----	5		70	920	8.8	76	28	84	144	264		66	2.1	600	304
Nov. 20-----	-		64	961	11	88	25	91	153	288		43	2.2	646	322
Dec. 18-----	5		59	939	12	85	26	81	162	284		46	2.3	616	319
Feb. 15, 1948-----	5		52	967	12	86	23	92	166	275		46	2.9	641	318
Mar. 28-----	5		54	1,030	13	91	31	103	178	302		92	3.0	713	354
Apr. 28-----	5		50	974	12	53	17	50	140	140		35	2.1	378	203
May 28-----	5		62	597	12	40	12	20	117	68		17	1.9	238	150
June 29-----	5		78.0	418	25	44	11	32	115	90		25	1.0	265	155
Aug. 1-----	7		81	778	12	64	26	53	134	179		60	1.2	460	266
Sept. 29-----	5		--	1,180	9.3	95	33	118	164	336		101	2.6	776	372
ICEBERG CANYON, MILE 287.5															
Oct. 8, 1947-----	0		76.5	749	12	65	21	64	136	201		46	1.7	478	248
Oct. 8-----	50		76.3	786	--	--	--	--	142	--		--	--	--	--
Oct. 8-----	100		74.0	1,160	--	--	--	--	176	--		--	--	--	--
Oct. 8-----	150		64.2	1,090	14	98	28	100	166	319		76	3.0	720	360
Oct. 8-----	200		58.3	1,090	--	--	--	--	174	--		--	--	--	--
Oct. 8-----	220		57.3	1,100	--	--	--	--	172	--		--	--	--	--
Oct. 8-----	221		58.1	1,160	19	109	32	105	220	319		80	8.3	761	404
Apr. 21, 1948-----	5		60.1	937	15	76	25	92	170	246		67	2.7	607	292
Apr. 21-----	50		57.4	958	--	--	--	--	172	--		--	--	--	--
Apr. 21-----	100		55.9	1,000	--	--	--	--	172	--		--	--	--	--
Apr. 21-----	150		54.7	1,040	--	--	--	--	172	--		--	--	--	--
Apr. 21-----	193.5		53.5	1,050	12	89	28	101	176	287		79	2.9	686	337

COLORADO RIVER MAIN STEM--Continued  
LAKE HEAD NEAR BOULDER CITY, NEV.--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Depth (feet)	Elevation (feet)	Temperature (° F.)	Specific conductance (micromhos at 25° C.)	Silica (SiO <sub>2</sub> )	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Total hardness as CaCO <sub>3</sub>
VIRGIN CANYON, MILE 305.3															
Oct. 7, 1947-----	5		75.3	662	11	60	17	59		132	174	41	1.4	428	220
Oct. 7 -----	50		75.4	947	13	87	23	88		154	281	58	2.6	628	312
Oct. 7 -----	100		71.8	1,040	--	--	--	--		176	--	--	--	--	--
Oct. 7 -----	150		65.2	1,060	--	--	--	--		172	--	--	--	--	--
Oct. 7 -----	200		59.5	1,090	14	97	28	106		172	316	82	2.9	731	357
Oct. 7 -----	250		56.7	1,090	--	--	--	--		175	--	--	--	--	--
Oct. 7 -----	300		56.3	1,090	--	--	--	--		171	--	--	--	--	--
Oct. 7 -----	337		56.7	1,080	--	--	--	--		174	--	--	--	--	--
Oct. 7 -----	338		57.1	1,160	17	110	31	105		218	320	82	4.3	777	402
Apr. 20, 1948-----	5		61.0	987	12	92	26	89		164	281	72	2.0	655	336
Apr. 20 -----	50		56.6	1,010	--	--	--	--		166	--	--	--	--	--
Apr. 20 -----	100		54.8	1,030	--	--	--	--		174	--	--	--	--	--
Apr. 20 -----	150		53.6	1,070	--	--	--	--		176	--	--	--	--	--
Apr. 20 -----	200		53.1	1,080	--	--	--	--		178	--	--	--	--	--
Apr. 20 -----	250		53.1	1,100	--	--	--	--		178	--	--	--	--	--
Apr. 20 -----	300		53.1	1,100	12	92	30	105		178	303	84	2.5	716	353
Apr. 20 -----	313		53.1	1,090	--	--	--	--		180	--	--	--	--	--
VIRGIN RIVER ARM OF LAKE 29 MILES ABOVE MOUTH OF RIVER (AT LINE OF DEMARCATION BETWEEN TURBID AND CLEAR WATER)															
Oct. 9, 1947-----	10		76	1,120	19	111	31	96		328	215	82	5.8	721	404
VIRGIN RIVER ARM OF LAKE OPPOSITE SALT MINE 22 MILES ABOVE MOUTH OF RIVER															
Oct. 9, 1947-----	0		77	818	12	74	24	68		142	227	54	1.7	551	283
Apr. 22, 1948-----	0		61	1,050	19	100	27	89		154	310	73	2.5	686	360
VIRGIN RIVER ARM OF LAKE 9.3 MILES ABOVE MOUTH OF RIVER (LOWER VIRGIN NARROWS)															
Oct. 9, 1947-----	5		75.8	683	15	64	19	58		136	184	43	1.0	451	238
Oct. 9 -----	50		74.8	725	--	--	--	--		140	--	--	--	--	--
Oct. 9 -----	100		71.0	815	57	72	23	78		168	222	53	1.4	589	274
Oct. 9 -----	150		65.3	945	--	--	--	--		160	--	--	--	--	--
Oct. 9 -----	200		58.5	1,060	--	--	--	--		170	--	--	--	--	--
Oct. 9 -----	250		55.8	1,080	13	96	29	105		168	315	84	2.3	727	358
Oct. 9 -----	275.8		55.6	1,070	--	--	--	--		172	--	--	--	--	--
Oct. 9 -----	276		55.6	1,050	--	--	--	--		190	--	--	--	--	--
Oct. 9 -----	276.5		55.6	1,060	24	100	27	100		206	290	74	4.0	720	360

VIRGIN RIVER ARM OF LAKE 9.3 MILES ABOVE MOUTH OF RIVER--Continued  
(LOWER VIRGIN NARROWS)

Apr. 22, 1948	5	60.8	983	13	89	26	91	160	285	70	1.7	654	329
Apr. 22	50	60.2	983	--	--	--	--	160	--	--	--	--	--
Apr. 22	100	54.8	977	--	--	--	--	158	--	--	--	--	--
Apr. 22	150	54.3	980	17	90	26	89	160	282	70	1.5	654	332
Apr. 22	200	53.5	987	--	--	--	--	160	--	--	--	--	--
Apr. 22	256	52.7	987	--	--	--	--	160	--	--	--	--	--
Apr. 22	257	52.8	1,140	58	111	32	102	272	288	76	.4	801	408

BOULDER CANYON, MILE 334.9

Oct. 6, 1947	5	78.1	771	12	69	21	71	140	214	52	1.1	509	258
Oct. 6	50	76.3	694	--	--	--	--	136	--	--	--	--	--
Oct. 6	100	71.2	671	14	62	18	59	136	177	42	1.6	441	228
Oct. 6	150	65.3	961	14	84	24	94	160	274	67	2.2	638	308
Oct. 6	200	58.9	1,060	--	--	--	--	168	--	--	--	--	--
Oct. 6	250	56.7	1,080	--	--	--	--	172	--	--	--	--	--
Oct. 6	300	55.7	1,050	--	--	--	--	166	--	--	--	--	--
Oct. 6	350	55.6	1,070	26	95	29	105	176	311	81	2.2	736	356
Oct. 6	400	55.6	1,090	--	--	--	--	176	--	--	--	--	--
Oct. 6	413	55.6	1,080	--	--	--	--	176	--	--	--	--	--
Oct. 6	415	58.3	1,300	22	137	35	117	316	370	68	1.4	906	486
Apr. 19, 1948	5	60.3	1,010	9.5	90	28	91	158	295	72	1.5	684	340
Apr. 19	50	56.2	997	--	--	--	--	158	--	--	--	--	--
Apr. 19	100	55.0	997	--	--	--	--	158	--	--	--	--	--
Apr. 19	150	54.0	987	10	92	26	89	159	287	71	1.5	655	336
Apr. 19	200	53.4	1,000	--	--	--	--	161	--	--	--	--	--
Apr. 19	250	52.6	1,030	--	--	--	--	165	--	--	--	--	--
Apr. 19	300	52.6	1,040	--	--	--	--	171	--	--	--	--	--
Apr. 19	350	52.3	1,040	--	--	--	--	168	--	--	--	--	--
Apr. 19	393	52.3	1,040	11	92	27	102	168	299	79	1.5	694	340

COLORADO RIVER BASIN--Continued  
LAKE MEAD NEAR BOULDER CITY, NEV.--Continued  
Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Depth (feet)	Elevation (feet)	Temperature (° F.)	Specific conductance (microhmhos at 25° C.)	Silica (SiO <sub>2</sub> )	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Total hardness as CaCO <sub>3</sub>
NEAR INTAKE TOWERS, MILE 353.5															
Oct. 1, 1947-----	5	1,173.0	76	888	14	75	29	74		144	244	66	1.3	574	306
Oct. 1-----	50	1,128.0	75.6	888	--	--	--	--	--	140	--	--	--	--	--
Oct. 1-----	100	1,073.0	72.3	875	--	--	--	--	--	148	--	--	--	--	--
Oct. 1-----	150	1,028.0	65.0	1,010	12	88	31	91		158	294	76	2.3	672	347
Oct. 1-----	200	978.0	58.3	1,040	--	--	--	--	--	162	--	--	--	--	--
Oct. 1-----	250	928.0	55.2	1,080	--	--	--	--	--	176	--	--	--	--	--
Oct. 1-----	300	878.0	54.9	1,080	12	96	26	109		172	310	84	2.7	724	346
Oct. 1-----	350	828.0	54.9	1,080	--	--	--	--	--	172	--	--	--	--	--
Oct. 1-----	400	778.0	54.9	1,080	--	--	--	--	--	174	--	--	--	--	--
Oct. 1-----	434.5	743.5	57.5	1,080	--	--	--	--	--	178	--	--	--	--	--
Oct. 1-----	435.5	742.5	60.3	1,120	19	103	29	107		204	313	80	2.8	754	376
Oct. 30-----	5	1,173.0	70.4	868	10	75	27	77		144	245	64	1.8	571	298
Oct. 30-----	50	1,128.0	69.6	868	--	--	--	--	--	144	--	--	--	--	--
Oct. 30-----	100	1,078.0	69.3	870	--	--	--	--	--	146	--	--	--	--	--
Oct. 30-----	150	1,028.0	62.7	990	11	87	30	87		156	284	74	2.0	652	340
Oct. 30-----	200	978.0	57.4	1,040	--	--	--	--	--	162	--	--	--	--	--
Oct. 30-----	250	928.0	56.0	1,060	11	93	32	95		166	307	80	2.1	702	364
Oct. 30-----	300	878.0	55.4	1,070	--	--	--	--	--	170	--	--	--	--	--
Oct. 30-----	350	828.0	54.9	1,070	--	--	--	--	--	170	--	--	--	--	--
Oct. 30-----	400	778.0	54.9	1,070	--	--	--	--	--	172	--	--	--	--	--
Oct. 30-----	422	756.0	55.0	1,060	13	96	32	91		172	301	80	2.1	700	371
Oct. 30-----	423	755.0	56.4	1,090	13	94	29	106		176	313	80	1.5	723	354
Dec. 2-----	5	1,170.1	62.4	888	13	77	23	85		146	251	63	1.9	586	286
Dec. 2-----	50	1,125.1	62.2	891	--	--	--	--	--	146	--	--	--	--	--
Dec. 2-----	100	1,075.1	61.9	894	--	--	--	--	--	146	--	--	--	--	--
Dec. 2-----	150	1,025.1	61.0	984	14	87	24	95		156	278	72	2.2	649	316
Dec. 2-----	200	975.1	57.2	1,050	--	--	--	--	--	162	--	--	--	--	--
Dec. 2-----	250	925.1	55.6	1,050	--	--	--	--	--	164	--	--	--	--	--
Dec. 2-----	300	875.1	55.1	1,070	15	95	27	106		169	309	82	2.2	720	348
Dec. 2-----	350	825.1	54.8	1,070	--	--	--	--	--	171	--	--	--	--	--
Dec. 2-----	400	775.1	54.8	1,070	--	--	--	--	--	170	--	--	--	--	--
Dec. 2-----	428	747.1	55.0	1,090	--	--	--	--	--	178	--	--	--	--	--
Dec. 2-----	429	746.1	57.2	1,120	18	102	29	107		192	318	82	2.7	753	374





COLORADO RIVER MAIN STEM--Continued  
LAKE MEAD NEAR BOULDER CITY, NEW --Continued  
Chemical analyses, in parts per million, water year October 1947 to September 1948.--Continued

Date of collection	Depth (feet)	Elevation (feet)	Temperature (° F.)	Specific conductance (microhms at 25° C.)	Silica (SiO <sub>2</sub> )	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Nitrate (NO <sub>3</sub> )	Dissolved solids	Total hardness as CaCO <sub>3</sub>
NEAR INTAKE TOWERS, MILE 353.5--Continued															
Apr. 29, 1948	5	1,153.4	55.3	1,020	10	91	28	93		160	294	76	1.5	672	342
Apr. 29	50	1,108.4	54.1	1,010	--	--	--	--	--	138	--	--	--	--	--
Apr. 29	100	1,084.4	53.5	1,010	--	--	--	--	--	138	--	--	--	--	--
Apr. 29	150	1,084.4	52.0	1,010	--	--	--	--	--	161	--	--	--	--	--
Apr. 29	200	998.4	51.3	1,010	--	--	--	--	--	163	--	--	--	--	--
Apr. 29	280	908.4	51.0	1,020	--	--	--	--	--	165	--	--	--	--	--
Apr. 29	300	898.4	51.0	1,020	--	--	--	--	--	168	--	--	--	--	--
Apr. 29	330	808.4	51.0	1,020	--	--	--	--	--	167	--	--	--	--	--
Apr. 29	350	808.4	51.0	1,030	--	--	--	--	--	169	--	--	--	--	--
Apr. 29	400	788.4	51.0	1,040	40	97	25	102		178	294	79	3.8	728	345
Apr. 29	418	740.4	51.0	1,120	25	104	29	103		224	296	78	1.6	747	378
Apr. 29	419	739.4	51.4												
May 27	5	1,166.6	67.6	1,010	10	92	27	94		164	293	73	1.8	672	340
May 27	50	1,121.6	63.7	1,020	--	--	--	--	--	162	--	--	--	--	--
May 27	100	1,071.6	58.6	1,010	--	--	--	--	--	162	--	--	--	--	--
May 27	150	1,021.6	54.9	1,010	--	--	--	--	--	162	--	--	--	--	--
May 27	200	971.6	53.7	1,010	--	--	--	--	--	162	--	--	--	--	--
May 27	250	921.6	52.6	1,010	--	--	--	--	--	164	--	--	--	--	--
May 27	300	871.6	51.7	1,010	--	--	--	--	--	164	--	--	--	--	--
May 27	350	821.6	52.1	1,020	--	--	--	--	--	169	--	--	--	--	--
May 27	400	771.6	51.8	1,030	--	--	--	--	--	167	--	--	--	--	--
May 27	431	740.6	51.8	1,030	--	--	--	--	--	167	--	--	--	--	--
May 27	432	739.6	51.8	1,020	27	91	27	96		170	288	74	3.2	690	338
June 29	5	1,187.2	80.7	928	13	80	28	79		134	263	65	1.2	601	314
June 29	50	1,142.2	73.8	931	--	--	--	--	--	148	--	--	--	--	--
June 29	100	1,092.2	65.4	979	11	90	29	76		159	280	60	1.9	626	344
June 29	150	1,042.2	57.1	1,010	--	--	--	--	--	162	--	--	--	--	--
June 29	200	992.2	53.5	992	--	--	--	--	--	166	--	--	--	--	--
June 29	250	942.2	52.8	1,010	--	--	--	--	--	168	--	--	--	--	--
June 29	300	892.2	52.6	1,010	12	90	27	95		172	291	68	2.0	670	336
June 29	350	842.2	52.0	1,020	--	--	--	--	--	171	--	--	--	--	--
June 29	400	792.2	52.0	1,020	--	--	--	--	--	161	--	--	--	--	--
June 29	450	742.2	52.0	1,020	--	--	--	--	--	170	--	--	--	--	--
June 29	453	739.2	52.1	1,040	14	95	23	105		185	292	72	2.3	694	332
June 29	454	738.2	52.3	1,040	--	--	--	--	--	176	--	--	--	--	--

## NEAR INTAKE TOWERS, MILE 353.5--Continued

July 29, 1948	5	1,185.6	74.2	705	11	72	22	69	143	216	55	1.6	517	270
July 29	50	1,140.6	73.0	795	--	--	--	--	145	--	--	--	--	--
July 29	100	1,080.6	65.0	895	11	78	28	78	154	254	62	1.6	588	310
July 29	150	1,040.6	61.2	990	--	--	--	--	164	--	--	--	--	--
July 29	200	990.6	57.2	1,000	12	89	30	86	166	284	70	1.6	654	346
July 29	250	940.6	56.0	1,000	--	--	--	--	167	--	--	--	--	--
July 29	300	890.6	55.1	1,010	--	--	--	--	168	--	--	--	--	--
July 29	350	840.6	53.0	1,010	--	--	--	--	171	--	--	--	--	--
July 29	400	790.6	53.0	1,010	12	91	30	92	171	291	76	1.9	678	350
July 29	450	740.6	53.2	1,010	--	--	--	--	171	--	--	--	--	--
July 29	452	738.6	53.2	1,010	--	--	--	--	172	--	--	--	--	--
July 29	453	737.6	53.2	1,080	16	97	32	100	218	293	74	3.5	723	374
Sept. 23	5	1,177.6	72.2	782	11	72	23	60	121	223	52	1.3	502	274
Sept. 23	50	1,132.6	77.4	781	--	--	--	--	125	--	--	--	--	--
Sept. 23	100	1,082.6	67.2	790	--	--	--	--	127	--	--	--	--	--
Sept. 23	150	1,032.6	56.7	987	11	90	23	99	150	288	70	2.4	667	319
Sept. 23	200	982.6	53.4	913	11	82	22	90	145	269	64	2.1	612	295
Sept. 23	250	932.6	53.2	994	13	90	27	89	153	292	69	2.7	658	336
Sept. 23	300	882.6	52.7	1,020	--	--	--	--	159	--	--	--	--	--
Sept. 23	350	832.6	52.5	1,030	--	--	--	--	158	--	--	--	--	--
Sept. 23	400	782.6	52.5	1,030	--	--	--	--	161	--	--	--	--	--
Sept. 23	440	742.6	53.5	1,030	12	94	26	96	167	297	72	2.9	682	342
Sept. 23	444	738.6	53.5	1,140	--	--	--	--	258	--	--	--	--	--

COLORADO RIVER MAIN STEM--Continued  
COLORADO RIVER BELOW HOOVER DAM, ARIZ.--NEV.

LOCATION.--At Hoover Dam, about 1 mile upstream from gaging station.

DRAINAGE AREA.--167,800 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1939 to September 1944.

Specific conductance: October 1939 to September 1948.

Water temperatures: October 1941 to September 1948.

EXTREMES, 1947-48.--Specific conductance: Maximum, 1,070 on several days; minimum, 888 Nov. 14. Water temperatures: Maximum, 69° F. on several days; minimum, 54° F. on several days.

EXTREMES, 1939-48.--Dissolved solids (1939-44): Maximum, 824 parts per million Mar. 1-10, 1941; minimum, 621 parts per million Dec. 21-31, 1942.

Total hardness (1939-44): Maximum, 426 parts per million Jan. 21-31, 1941; minimum, 307 parts per million Jan. 2-3, 6-10, 1947.

Water temperatures (1941-48): Maximum, 69° F. Sept. 27, 1945, and on several days in 1947 and 1948; minimum, 53° F. on several days in 1944 and 1945.

Specific conductance (micromhos at 25° C.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	963	--	914	--	--	1,010	1,010	--	1,010	991	--	983
2	954	--	906	1,020	1,010	1,000	1,010	--	1,010	991	979	944
3	948	909	917	--	990	1,000	--	1,010	1,010	--	979	930
4	--	928	957	--	997	997	--	1,010	1,010	--	982	--
5	--	937	928	1,030	1,020	1,000	1,010	1,010	--	--	964	--
6	948	899	--	1,030	1,040	--	1,010	1,010	--	997	961	--
7	945	912	--	1,020	--	--	1,000	1,010	1,010	994	--	950
8	948	--	920	1,040	--	1,000	997	--	1,010	988	--	942
9	960	--	1,070	1,020	1,010	1,000	1,010	--	1,010	991	976	944
10	--	904	1,070	--	1,010	1,000	--	1,020	1,010	--	967	939
11	969	--	1,070	--	--	1,000	--	1,020	1,010	--	967	--
12	--	898	1,060	1,010	1,000	1,000	1,010	1,020	--	988	973	--
13	960	901	--	1,010	1,000	--	1,010	1,010	--	985	958	933
14	937	888	--	1,020	--	--	1,010	1,000	1,000	991	--	942
15	934	--	1,060	1,030	--	1,000	1,010	--	1,010	982	--	942
16	925	--	--	1,010	1,000	1,000	1,010	--	1,000	985	958	942
17	--	904	1,060	--	1,000	1,000	--	1,010	1,000	961	952	--
18	--	909	1,050	--	1,000	1,000	--	1,010	997	--	958	--
19	--	--	1,050	990	1,000	--	1,010	1,010	--	991	964	--
20	940	903	--	1,010	1,000	--	1,010	1,010	--	982	953	931
21	--	901	--	1,010	--	--	1,010	1,010	997	988	--	942
22	954	--	1,030	1,020	--	1,000	1,010	--	993	958	--	937
23	937	--	1,050	1,030	--	1,000	1,010	--	1,000	976	953	948
24	--	895	1,040	--	1,000	1,000	--	1,010	1,000	961	--	951
25	--	906	--	--	1,000	1,000	--	1,010	--	--	950	--
26	--	903	1,050	984	1,000	1,000	1,000	1,000	--	982	--	--
27	942	--	972	972	1,020	--	1,010	1,000	--	976	950	936
28	931	912	--	890	--	--	1,010	1,000	1,000	979	--	939
29	951	--	997	984	--	1,000	1,010	--	1,000	982	--	931
30	929	--	1,000	972	--	1,000	1,010	--	1,000	967	955	925
31	921	--	--	--	--	1,000	--	--	--	--	953	--



DIVERSIONS AND RETURN FLOWS AT AND BELOW IMPERIAL DAM  
YUMA MAIN CANAL BELOW COLORADO RIVER SIPHON AT YUMA, ARIZ.

LOCATION. --Oct. 1, 1942 to Jan. 31, 1943, at gaging station on Colorado River 1,800 feet downstream from bridge on U. S. Highway 80 at Yuma, Yuma County, 5 miles downstream from Gila River, 19 miles downstream from Imperial Dam, and 7 and 29 miles upstream from international boundaries of California and Arizona, respectively. Feb. 1, 1943 to Sept. 30, 1948 at gaging station on Yuma Main Canal below Colorado River siphon at Yuma, on Arizona side of river, 3 miles downstream from siphon drop power plant.

DRAINAGE AREA. --242,900 square miles, including all closed basins entirely within drainage boundary.

RECORDS AVAILABLE. --Chemical analyses: September 1926 to September 1928, October 1942 to September 1948.

EXTREMES, 1947-48. --Dissolved solids: Maximum, 721 parts per million Oct. 1-3, 6-10; minimum, 627 parts per million Dec. 12, 14-19.

Total hardness: Maximum, 357 parts per million Oct. 1-3, 6-10; minimum, 309 parts per million Dec. 12, 14-19.

EXTREMES, 1926-28. 1942-48. --Dissolved solids: Maximum, 1,300 parts per million Jan. 11-20, 1927; minimum, 285 parts per million June 11-20, 1928.

Total hardness: Maximum, 567 parts per million Oct. 21-31, 1926; minimum, 163 parts per million June 11-20, 1928.

REMARKS. --Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1119. Records of specific conductance of daily samples available in district office at Salt Lake City, Utah.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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 non-carbonate
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
Oct. 1-3, 6-10, 1947	642	7.7		1,080	12	0.01	92	31	105	2.6	156	312	88	0.2	1.4	0.1	721	0.98	1,250	357	229	39
Oct. 13-17, 20 ----	669	7.7		1,050	13	0.06	90	28	103	2.8	161	295	86	2	3	1	698	95	1,260	340	208	40
Oct. 21-24, 27-31 ----	709	7.8		1,040	14	0.02	90	29	99	2.2	159	291	82	2	1.7	1	687	93	1,320	344	213	38
Nov. 3-7, 10 ----	681	7.9		1,020	12	0.01	87	28	98	1.6	160	282	82	0	1.7	1	672	91	1,240	332	201	39
Nov. 12-14, 18-20 ----	590	8.0		1,010	13	0.01	88	27	96	1.8	161	275	79	0	1.7	1	661	90	1,050	330	198	39
Nov. 21, 24-25, 28 ----	431	7.9		1,010	12	0.02	86	28	90	3.0	158	272	78	0	1.7	1	649	88	843	330	200	37
Dec. 1-5, 8-10 ----	444	7.6		973	13	0.02	82	26	91	1.4	159	264	73	2	1.3	1	630	86	755	312	181	39
Dec. 12, 14-19 ----	401	7.7		966	14	0.03	81	26	89	1.8	158	263	72	3	1.7	1	637	85	679	309	180	38
Dec. 22-23, 29-31 ----	360	7.8		1,000	13	0.03	86	26	95	3.0	160	282	76	2	1.4	1	661	90	642	322	190	39
Jan. 2-5-9, 1948 ----	479	7.9		1,090	13	0.03	94	28	99	2.2	171	305	84	2	1.5	1	711	97	920	350	210	38
Jan. 12-16, 19-20 ----	576	7.9		1,080	12	0.04	94	28	102	2.0	172	308	85	2	1.6	1	720	98	1,120	350	208	39
Jan. 21-23, 26-30 ----	504	7.9		1,080	12	0.04	92	28	104	1.8	171	303	84	1	1.7	1	709	96	965	344	204	39
Feb. 2-6, 9-10 ----	556	8.0		1,070	12	0.03	91	28	100	1.8	168	297	82	3	1.5	1	696	95	1,040	342	204	39
Feb. 11-13, 16-20 ----	540	8.0		1,050	13	0.04	90	28	99	2.0	168	290	80	2	1.5	1	687	93	1,000	340	202	39
Feb. 23-27 ----	560	7.8		1,060	12	0.02	93	28	98	6.0	168	295	80	2	1.6	--	697	95	1,050	347	210	38
Mar. 1-5, 8-10 ----	557	7.7		1,060	11	0.02	93	29	97	6.0	165	295	82	2	2.5	1	697	95	1,050	351	216	37
Mar. 11-12, 15-19 ----	592	7.7		1,070	12	0.02	93	30	97	6.6	170	296	82	2	2.3	1	703	96	1,120	356	216	37
Mar. 22-26, 29-31 ----	549	7.7		1,070	10	0.02	92	28	100	6.2	167	291	83	2	1.6	1	697	95	1,030	344	208	38
Apr. 1-2, 5-9 ----	579	7.9		1,080	11	0.02	90	29	99	2.6	167	295	84	2	1.7	--	695	95	1,090	344	206	38
Apr. 12-16, 19-20 ----	625	7.8		1,080	8.6	0.02	88	29	100	2.8	169	292	84	2	1.8	--	690	94	1,160	338	200	39
Apr. 21-23, 26-30 ----	618	7.7		1,070	12	0.02	88	30	98	3.6	169	291	84	2	1.5	--	692	94	1,150	343	204	38

May 3-7, 10	567	7.7	1,080	9.1	.03	90	28	101	3.8	173	291	83	.2	1.8	--	693	.94	1,060	340	201	39
May 12-14, 17-20	585	7.7	1,090	13	.03	90	29	98	2.8	173	293	84	.2	1.4	--	697	.95	1,100	344	202	38
May 21, 24-28, 31	536	7.7	1,080	12	.01	89	28	103	1.8	176	295	81	.2	1.5	.1	698	.95	1,010	337	193	40
June 1-4, 7-10	528	7.8	1,070	16	.01	89	28	103	2.8	172	294	81	.2	1.5	.1	700	.95	958	337	196	40
June 11, 14-18	519	7.9	1,080	15	.01	89	28	101	2.2	171	297	81	.1	1.5	.1	699	.95	980	337	197	39
June 21-25, 28-30	537	8.0	1,080	15	.01	88	29	103	1.8	171	297	81	.4	1.5	.1	701	.95	1,020	338	198	40
July 1-2, 5-9	527	8.0	1,070	15	.01	86	28	102	2.4	165	296	81	.3	1.1	.1	693	.94	986	330	194	40
July 12-16, 19-20	388	7.9	1,070	18	.02	88	29	103	3.0	180	303	84	.2	1.5	.3	709	.96	743	338	208	40
July 21-23, 26-30	568	8.0	1,060	16	.03	87	28	108	3.6	162	302	84	.3	1.1	.3	710	.97	1,090	332	200	41
Aug. 2-6, 9-10	619	8.0	1,060	16	.02	85	29	102	3.0	162	297	84	.3	1.1	.3	697	.95	1,160	331	198	40
Aug. 11-13, 16-20	615	8.0	1,050	19	.03	84	28	102	3.4	158	295	84	.2	1.3	.3	695	.95	1,150	324	195	40
Aug. 23-27, 30-31	660	7.8	1,050	17	.02	86	28	100	3.4	161	289	80	.1	1.3	.1	687	.93	1,220	334	202	39
Sept. 1-3, 6-10	647	7.9	1,040	17	.02	86	28	98	4.8	158	285	81	.2	1.1	.1	679	.92	1,190	330	200	38
Sept. 13-17, 20	634	8.0	1,030	12	.02	84	27	98	5.2	157	282	81	.2	1.1	.1	669	.91	1,180	324	196	39
Sept. 21-24, 27-30	642	8.0	1,030	13	.02	84	27	99	5.8	160	280	80	.2	.9	.1	669	.91	1,160	320	190	40
Weighted average	564	--	1,080	13	0.02	89	28	100	3.3	165	292	82	0.2	1.5	0.1	690	0.94	1,050	337	202	39

## TRIBUTARIES ABOVE GUNNISON RIVER

## EAGLE RIVER BELOW GYPSUM, COLO.

LOCATION. --At bridge on U. S. Highway 6 at Gypsum, Eagle County, just above Gypsum Creek about 150 feet upstream from gaging station which is below Gypsum Creek.

DRAINAGE AREA. --844 square miles.

RECORDS AVAILABLE. --Chemical analyses: April 1947 to September 1948.

EXTREMES, 1947-48. --Dissolved solids: Maximum, 874 parts per million Sept. 21-30; minimum, 108 parts per million May 21-31. Total hardness: Maximum, 511 parts per million Sept. 21-30; minimum, 78 parts per million June 1-10.

EXTREMES, 1947-48. --Dissolved solids: Maximum, 874 parts per million Sept. 21-30, 1948; minimum, 108 parts per million May 21-31, 1948.

Total hardness: Maximum, 511 parts per million Sept. 21-30, 1948; minimum, 78 parts per million June 1-10, 1948.

REMARKS. --Records of discharge for gaging station for water year October 1947 to September 1948 given in Water-Supply Paper 1119. Records of specific conductance of daily samples available in district office at Salt Lake City, Utah.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	Specific conductance (micro-mhos at 25° C.)	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
																Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
Oct. 1-10, 1947	388	7.6	991	11	0.03	109	24	72	4.6	174	228	108	0.1	1.0	0.00	643	0.87	500	370	288	29
Oct. 11-20	379	7.6	846	12	.03	94	21	55	3.8	158	182	88	.1	1.4	.01	535	.73	547	321	192	27
Oct. 21-31	387	7.7	812	9.6	.03	88	20	53	2.4	146	174	64	.1	1.2	.00	504	.69	527	301	182	26
Nov. 1-10	334	7.9	864	11	.03	90	21	65	4.6	154	185	98	.1	1.2	.01	532	.75	498	311	183	31
Nov. 11-20	291	8.0	942	10	.03	94	22	74	4.5	158	198	110	.1	1.4	.01	592	.81	465	325	196	33
Nov. 21-30	252	7.8	1,040	10	.03	104	23	87	3.5	166	214	132	.1	1.7	.01	637	.89	447	334	218	34
Dec. 1-10	240	7.8	1,110	11	.03	107	25	95	5.4	174	224	146	.1	1.8	.01	701	.95	454	370	228	35
Dec. 11-20	187	7.8	1,320	14	.02	124	27	131	5.3	196	278	184	.1	1.7	.00	862	1.17	435	420	260	40
Dec. 21-31	205	7.8	1,190	12	.01	110	24	115	5.4	182	240	162	.1	2.3	.00	761	1.03	421	373	224	40
Jan. 1-10, 1948	198	7.9	1,180	12	.01	108	23	115	4.6	174	237	162	.1	2.2	.00	750	1.02	401	364	222	40
Jan. 11-20	179	7.9	1,240	11	.02	114	25	118	5.9	178	251	172	.1	2.2	.00	767	1.07	380	388	242	39
Jan. 21-31	173	7.9	1,190	12	.02	113	25	112	5.4	184	249	158	.1	3.1	.00	768	1.04	359	385	234	38
Feb. 1-10	200	7.9	1,110	11	.03	107	23	100	4.0	174	232	140	.1	2.3	.00	705	.96	381	362	219	37
Feb. 11-20	208	8.0	1,030	10	.04	98	21	94	4.6	162	219	126	.1	3.2	.00	656	.89	368	331	198	38
Feb. 21-29	195	8.0	1,030	10	.03	102	22	89	4.6	162	226	134	.1	2.1	.00	660	.90	347	345	212	36
Mar. 1-10	175	7.9	1,070	12	.04	107	25	89	3.4	170	239	126	.1	1.6	.00	697	.93	325	370	230	34
Mar. 11-20	192	7.9	991	11	.06	100	23	79	4.8	164	219	111	.1	1.9	.00	631	.86	327	344	209	33
Mar. 21-31	276	7.8	853	10	.07	94	21	59	5.3	158	206	77	.3	2.4	.00	553	.75	412	321	192	28
Apr. 1-10	283	7.9	824	10	.04	88	21	58	4.2	154	195	76	.1	1.7	.00	530	.72	405	306	180	29
Apr. 11-20	435	7.9	558	9.4	.19	63	16	29	3.7	132	121	39	.1	1.6	.02	348	.47	409	223	115	22
Apr. 21-30	866	8.0	370	8.5	.43	44	11	17	2.4	108	75	20	.2	1.4	.02	233	.32	545	155	66	19
May 1-10	1,160	--	325	9.0	.08	40	10	12	3.0	110	55	16	.2	.9	.01	200	.27	626	141	51	15
May 11-20	2,168	--	255	8.2	.06	36	6.6	7.6	1.9	102	37	8.5	.4	1.0	.00	157	.21	919	117	34	12
May 21-31	3,375	--	173	6.7	.08	25	4.8	4.1	1.8	78	23	3.0	.4	.7	.00	108	.15	1,070	82	18	10



June 1-10	3,451	175	5.6	.02	23	5.1	6.7	1.4	70	27	5.5	.4	.8	.00	110	.15	1,020	78	21	15
June 11-20	2,190	232	5.7	.02	27	5.9	12	2.7	78	38	12	.4	.8	.00	143	.19	846	92	28	22
June 21-30	1,108	364	6.7	.02	43	9.8	17	1.4	98	70	23	.4	.6	.01	220	.30	636	148	68	20
July 1-10	1,079	406	7.0	.06	46	11	20	1.6	98	78	31	.3	.6	.00	244	.33	711	160	80	22
July 11-20	627	328	7.6	.03	60	13	31	2.1	118	108	44	.2	.9	.00	325	.44	550	203	106	24
July 21-29, 31	525	623	7.5	.04	70	15	38	2.9	130	133	54	.2	1.1	.00	386	.52	547	236	130	26
Aug. 1-10	397	747	8.0	.04	86	18	40	2.9	150	166	58	.2	1.2	.00	494	.62	487	288	166	23
Aug. 11-20	280	940	8.6	.03	108	22	66	3.0	176	237	82	.2	1.4	.00	615	.84	465	360	216	28
Aug. 21-31	250	997	8.3	.05	114	23	68	3.4	178	238	96	.2	1.4	.01	640	.87	432	379	233	28
Sept. 1-10	211	1,200	10	.02	140	28	79	4.5	186	310	117	.1	2.2	.01	782	1.06	446	464	312	27
Sept. 11-20	195	1,300	11	.03	152	30	92	5.3	200	342	134	.0	1.7	.01	867	1.18	456	502	338	28
Sept. 21-30	197	1,320	12	.02	154	31	91	5.3	204	345	134	.1	1.5	.01	874	1.19	465	511	344	28
Weighted average	655	465	7.9	0.06	53	12	49	2.6	110	94	39	0.3	1.1	0.00	293	0.40	518	182	92	25



[illegible]

## DOLORES RIVER BASIN

## DOLORES RIVER AT GATEWAY, COLO.

LOCATION.--At bridge on State Highway 141, 500 feet upstream from gaging station, which is 0.3 mile northwest of Gateway, Mesa County, 0.3 mile downstream from West Creek, and 8 miles upstream from Colo.-Utah State line.

DRAINAGE AREA.--4,350 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1948.

EXTREMES, 1947-48.--Dissolved solids: Maximum, 3,390 parts per million Sept. 21-29; minimum, 198 parts per million June 1-10.

TOTAL HARDNESS: Maximum, 691 parts per million Sept. 21-29; minimum, 130 parts per million June 11-15, 17-20.

REMARKS.--Records of discharge for water year October, 1947 to September 1948 given in Water-Supply Paper 1119. Records of specific conductance of daily samples available in district office at Salt Lake City, Utah.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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 (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium carbonate
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
Oct. 1-10, 1947	170	7.2	7.2	2,370	9.2	0.04	97	43	344	12	150	304	525	0.4	0.9	0.02	1,410	1.92	4,510	419	296	63
Oct. 11-12, 14, 16-17	1,236	7.5	7.5	2,150	11	.43	135	42	273	11	180	386	400	.3	1.8	.02	1,350	1.84	4,510	510	362	53
Oct. 18-19, 21-31	612	7.5	7.5	1,080	8.5	.05	82	24	105	5.2	154	199	144	.3	1.5	.02	645	.88	1,070	303	177	42
Nov. 1-10	387	7.6	7.6	1,780	7.7	.05	80	31	244	9.0	142	221	368	.3	1.7	.02	1,030	1.40	893	327	210	61
Nov. 11-12, 14-20	308	7.8	7.8	2,320	6.8	.07	84	39	358	12	182	245	532	.4	1.0	.02	1,370	1.86	1,140	370	212	67
Nov. 21-30	298	7.8	7.8	2,770	9.0	.02	93	42	430	13	182	271	655	.1	1.0	.01	1,600	2.18	1,290	404	256	69
Dec. 1-10	320	7.6	7.6	2,410	9.6	.02	91	40	361	8.0	184	269	535	.2	.8	.01	1,410	1.92	1,220	392	240	66
Dec. 11-20	205	7.8	7.8	3,820	11	.02	112	51	642	9.8	208	330	980	.1	1.4	.01	2,240	3.05	1,240	489	318	74
Dec. 21-31	245	7.9	7.9	3,070	11	.02	98	42	494	15	208	271	750	.1	.9	.01	1,780	2.42	1,180	417	246	71
Jan. 1-7, 9-10, 1948	249	7.8	7.8	3,150	12	.02	100	42	509	12	200	267	780	.1	1.2	.01	1,820	2.48	1,220	422	258	72
Jan. 11-20	249	7.7	7.7	3,350	10	.03	102	45	556	22	200	280	865	.1	.8	.01	1,980	2.69	1,330	440	276	72
Jan. 21-31	213	8.0	8.0	3,610	10	.03	107	47	608	21	208	312	930	.1	1.0	.02	2,140	2.91	1,230	460	290	73
Feb. 1-9	236	8.2	8.2	3,840	11	.03	108	48	641	25	208	312	990	.3	.8	.02	2,240	3.05	1,430	467	296	74
Feb. 12-20	323	8.1	8.1	3,430	9.7	.03	107	45	557	22	202	299	860	.3	.9	.01	2,000	2.72	1,740	452	286	72
Feb. 21-29	305	7.7	7.7	1,810	10	.05	152	41	189	14	184	495	238	.3	.4	.01	1,210	1.65	2,650	548	413	42
Mar. 1-10	311	7.8	7.8	2,830	11	.04	138	53	401	23	190	489	565	.3	1.8	.01	1,780	2.42	1,470	562	407	60
Mar. 11-20	370	7.8	7.8	2,640	9.4	.05	118	50	386	22	174	425	542	.3	1.5	.01	1,650	2.24	1,650	500	341	61
Mar. 21-23, 25-31	559	7.9	7.9	1,930	9.6	.06	131	48	224	15	178	480	272	.3	1.9	.00	1,370	1.73	1,920	524	378	47
Apr. 2-10	1,418	7.8	7.8	1,090	9.0	.14	80	26	112	12	168	226	137	.3	1.3	.00	686	.93	2,630	306	170	43
Apr. 11-20	5,307	7.9	7.9	511	9.6	.11	53	13	37	4.3	140	100	37	.2	.4	.02	324	.44	4,640	186	71	30
Apr. 21-30	5,898	8.1	8.1	371	11	.17	41	10	19	3.7	120	65	16	.4	.7	.00	226	.31	3,600	144	45	22
May 1-8-10	5,286	7.3	7.3	383	11	.08	48	9.9	16	2.7	142	54	18	.3	.8	.01	231	.31	3,300	160	44	18
May 11-20	3,500	7.5	7.5	399	9.4	.07	48	8.5	22	2.2	142	56	22	.2	.6	.01	242	.33	2,310	159	42	22
May 21-31	4,400	7.7	7.7	356	9.2	.30	44	8.5	16	2.1	132	45	21	.3	.5	.01	214	.29	2,940	144	36	21

June 1-10 -----	3,438	7.7	331	8.1	.25	41	7.0	17	1.6	116	46	19	.4	.8	.00	198	.27	1,840	132	36	22
June 11-15, 17-20----	2,234	7.8	351	7.2	.10	39	8.0	21	1.8	102	53	27	.3	.4	.00	208	.28	1,250	130	47	25
June 21-30 -----	1,014	7.7	767	9.4	.05	56	18	75	2.7	128	131	97	.2	.5	.00	453	.62	1,240	214	108	43
July 1-10 -----	791	7.6	849	8.5	.05	52	16	96	4.0	113	121	134	.3	.2	.02	488	.66	1,040	196	103	51
July 11-20 -----	418	7.4	1,290	6.7	.04	60	20	169	8.8	114	148	256	.4	.4	.02	726	.99	819	232	138	60
July 21-24, 26 -----	414	7.7	2,050	9.3	.04	90	38	283	13	148	274	428	.4	1.2	.02	1,210	1.65	1,350	380	259	61
July 25, 27-31 -----	376	7.8	1,290	9.9	.09	76	28	148	8.4	146	218	205	.3	.7	.02	766	1.04	1,778	304	185	51
Aug. 1-4, 6-7, 9-10 -	490	7.7	1,560	11	.13	84	31	199	9.4	164	239	282	.4	.6	.02	937	1.27	1,240	337	202	55
Aug. 11, 13-20 -----	222	7.7	2,330	8.0	.05	106	43	329	13	155	350	482	.4	.7	.03	1,410	1.92	1,845	442	314	61
Aug. 21-27, 29-31 ---	198	7.8	2,330	8.6	.07	94	39	338	14	149	291	512	.4	.4	.03	1,370	1.86	782	395	273	64
Sept. 1-10 -----	82.2	7.9	3,520	6.1	.08	114	52	566	24	155	374	880	.4	.4	.04	2,090	2.84	464	498	372	70
Sept. 11-16, 18-20 ---	71.4	7.3	5,070	6.1	.07	135	66	896	3.3	176	461	1,400	.2	.4	.02	3,080	4.19	584	608	464	75
Sept. 21-29 -----	93.6	7.7	5,670	5.4	.09	145	80	970	36	178	561	1,500	.4	.4	.02	3,390	4.61	857	691	545	74
Weighted average	1,168	--	837	9.6	0.14	60	17	92	5.4	140	125	128	0.3	0.9	0.01	507	0.69	1,600	220	105	47

DOLORES RIVER BASIN--Continued  
MISCELLANEOUS ANALYSES OF STREAMS IN DOLORES RIVER BASIN IN COLORADO

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-foot)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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	
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate		
DOLORES RIVER ABOVE SAN MIGUEL RIVER NEAR URUVAN																							
May 9, 1948				373	7.0		37	8.3	32		126	48	30			0.5		225	0.31		126	24	35
Oct. 1				5,740	7.4		99	49	1,080		172	211	1,720			--		3,250	4.42		448	308	84
SAN MIGUEL RIVER AT URUVAN																							
May 9, 1948				311	9.4		40	10	13		114	68	2			1.0		200	0.27		141	48	16
Oct. 1				1,180	9.4		128	67	53		168	535	11			1.3		888	1.21		595	458	16
SAN MIGUEL RIVER AT MOUTH BELOW URUVAN																							
May 9, 1948				308	9.4		40	9.5	12		114	65	2			1.3		195	0.27		139	46	16
Oct. 1				1,280	9.4		128	66	74		168	563	19			1.0		943	1.28		591	454	21
WEST CREEK AT GATEWAY																							
May 9, 1948				148	7.7		24	2.7	6.4		84	11	2			1.8		97	0.13		71	2	16
Oct. 1				428	20		66	11	11		251	19	5			1.2		257	35		210	4	10

## GREEN RIVER BASIN

## GREEN RIVER AT JENSEN, UTAH

LOCATION --Samples collected at bridge on U. S. Highway 40 at Jensen, Uintah County, 13 miles below gaging station.  
 RECORDS AVAILABLE --Chemical analyses: October 1947 to September 1948.

Sediment records: May to September 1948.  
 EXTREMES 1947-48 --Dissolved solids: Maximum, 610 parts per million Dec. 21-31; minimum, 161 parts per million June 1-10.

Total hardness: Maximum, 350 parts per million Dec. 11-17, 19-20; minimum, 111 parts per million June 1-10.

REMARKS --Records of discharge for gaging station for water year October 1947 to September 1948 given in Water-Supply Paper 1119. Records of specific conductance of daily samples available in district office at Salt Lake City, Utah.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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	
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate		
Oct. 1, 3-10, 1947--	1,584	7.9	7.9	759	9.8	0.04	60	25	60	7.4	184	205	20	0.1	0.9	0.02	479	0.65	2,050	252	102	33	
Oct 11-20-----	1,774	7.9	7.9	840	10	.08	71	30	69	6.4	204	247	23	.2	1.4	.02	559	.76	2,680	300	134	33	
Oct 21-27, 29-31--	2,303	7.9	7.9	740	12	.02	60	22	67	7.2	194	188	27	.2	1.2	.02	480	.65	3,010	240	81	37	
Nov. 1-10-----	2,039	8.0	7.9	760	13	.02	61	25	66	6.4	194	200	28	.1	.9	.02	496	.67	2,730	255	96	35	
Nov. 11-20-----	1,701	7.9	7.9	844	10	.02	72	30	73	7.0	218	237	32	.1	.9	.01	569	.77	2,610	303	124	34	
Nov. 21-23, 25-26, 28-30-----	1,315	7.9	7.9	865	8.6	.03	76	31	75	5.2	230	240	32	.5	.5	.02	582	.79	2,070	317	128	33	
Dec. 1-10-----	1,921	7.9	7.9	907	13	.05	83	33	73	3.6	240	246	36	.3	1.0	.02	607	.83	3,150	342	146	31	
Dec. 11-17, 19-20--	1,090	7.9	9.13	913	13	.04	84	34	67	7.6	236	251	34	.2	1.3	.03	608	.83	1,790	350	156	29	
Dec. 21-31-----	1,327	8.0	9.10	911	11	.04	82	33	73	6.8	242	248	35	.3	1.2	.03	610	.83	2,190	340	142	31	
Jan. 1-10, 1948-----	1,395	8.0	9.02	902	10	.02	80	32	74	6.9	238	246	35	.2	.4	.01	602	.82	2,270	331	136	32	
Jan. 11-13, 15, 17, 19-20-----	1,450	8.3	8.64	864	12	.03	77	30	72	3.5	232	230	33	.1	.9	.01	573	.78	2,240	316	126	33	
Jan. 21-31-----	1,177	8.1	8.1	869	10	.02	79	30	70	5.8	214	248	33	.1	.9	.01	582	.79	1,850	320	145	32	
Feb. 1-6, 8-10-----	1,046	8.1	8.1	842	11	.03	76	28	67	3.7	204	237	29	.2	.8	.01	553	.75	1,560	304	138	32	
Feb. 11-20-----	1,115	8.2	6.79	10	.04	56	20	64	64	3.8	166	182	27	.4	.9	.02	446	.61	1,340	222	86	38	
Feb. 22-25, 27, 29--	2,356	8.2	6.58	10	.04	52	18	64	68	4.5	162	169	27	.5	.9	.02	426	.58	2,710	204	71	40	
Mar. 1-10-----	1,955	7.4	7.4	673	11	.04	56	19	63	5.0	172	170	28	.3	2.7	.01	440	.60	2,360	218	76	38	
Mar. 11-20-----	1,825	7.5	7.5	719	11	.11	62	19	67	5.6	172	197	27	.4	1.4	.01	475	.65	2,340	232	92	38	
Mar. 21-28, 30-----	5,578	7.7	7.44	9.9	9.9	.14	64	18	74	5.6	156	227	25	.4	1.0	.01	502	.68	7,560	234	106	40	
Apr. 1-10-----	5,731	8.0	7.16	12	.04	55	22	68	68	3.4	174	190	26	.3	2.0	.10	464	.63	7,180	228	85	39	
Apr. 11-20-----	5,822	8.0	6.77	14	.06	58	23	60	67	3.5	182	180	24	.4	1.9	.01	455	.62	7,150	239	90	35	
Apr. 21-30-----	10,010	8.1	3.97	13	.12	38	14	26	32	3.2	136	62	10	.3	2.0	.01	256	.35	6,920	152	41	27	
May 1-10-----	10,680	7.3	3.49	13	.16	40	12	16	34	1.4	140	57	6	.7	4	2.2	.00	218	.30	6,290	149	55	19
May 11-20-----	11,880	7.5	3.08	12	.26	37	10	14	14	1.6	132	44	3	.2	3.2	.00	193	.26	6,190	133	26	18	
May 21-31-----	20,240	7.6	2.61	11	.25	31	8.9	11	11	1.4	112	38	4.7	.2	1.0	.00	163	.22	8,910	114	22	17	

GREEN RIVER BASIN--Continued  
 GREEN RIVER AT JENSEN, UTAH--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Mean discharge (second-foot)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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
																	Parts per million	Tons per acre-foot	Total	Non-carbonate	
June 1-10, 1948-----	18,850		7.6	261	8.8	0.23	30	8.8	12	1.3	109	40	5.3	0.2	0.6	0.00	161	0.22	111	22	19
June 11-16 -----	11,920	--	--	307	9.9	.06	35	10	16	2.2	128	48	6.5	.4	.5	.01	192	.26	128	24	21
June 21-25, 27-30----	8,019	--	--	479	11	.07	47	17	29	4.3	188	97	12	.3	.8	.01	301	.41	188	50	25
July 1-3-----	5,513	--	--	461	11	--	42	16	36		162	93	14	--	.6	--	292	.40	171	38	31
July 4-10-----	3,971	--	--	709	11	.06	69	25	52	3.0	193	192	23	.3	1.8	.01	472	.64	275	117	29
July 11-20-----	2,578	7.4	--	509	11	.04	48	18	37	2.9	188	92	18	.4	.7	.01	321	.44	194	40	29
July 21-31-----	2,030	7.7	--	538	10	.14	54	19	36	2.7	176	116	19	.3	.9	.02	345	.47	212	68	26
Aug. 1-10-----	1,759	7.5	--	537	7.8	.09	49	19	39	3.5	176	117	16	.4	.3	.02	339	.46	200	56	29
Aug. 11-15, 17-19----	1,413	8.1	--	610	7.2	.05	51	20	52	3.4	176	134	29	.4	.4	.02	384	.52	209	65	35
Aug. 21-31-----	1,063	7.9	--	584	7.7	.02	48	19	50	5.2	170	132	25	.3	.4	.01	371	.50	198	58	35
Sept. 11, 14-20-----	656	8.2	--	673	5.8	.02	48	23	62	5.2	170	163	33	.3	.2	.02	424	.58	214	75	38
Sept. 20-24-----	648	--	--	835	--	--	63	27	82		197	222	38	--	.5	--	530	.72	268	106	40
Weighted average--	4,250	--	--	475	11	0.14	46	16	34	3.0	151	106	14	0.3	1.3	0.01	306	0.42	181	58	29



GREEN RIVER BASIN--Continued  
GREEN RIVER NEAR JENSEN, UTAH--Continued

Suspended sediment, water year October 1947 to September 1948

Day	May			June			July		
	Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment	
		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day
1-----	--	--	--	19,400	0.22	115,000	6,200	0.06	10,000
2-----	--	--	--	19,500	.21	111,000	5,450	.05	7,360
3-----	--	--	--	19,100	.19	98,000	4,890	.04	5,280
4-----	--	--	--	18,900	.16	81,600	4,420	.03	3,580
5-----	--	--	--	19,300	.16	83,400	4,230	.03	3,430
6-----	--	--	--	19,300	.18	93,800	4,250	.03	3,440
7-----	--	--	--	18,800	.21	107,000	3,980	.02	2,150
8-----	--	--	--	17,800	.23	111,000	3,810	.02	2,060
9-----	--	--	--	16,200	.17	74,400	3,640	.01	983
10-----	--	--	--	15,200	.14	57,500	3,470	.01	937
11-----	--	--	--	14,800	.12	48,000	3,230	.02	1,740
12-----	9,990	0.12	32,400	14,500	.12	47,000	3,040	.02	1,640
13-----	9,790	.08	21,100	14,400	.14	54,400	2,870	.01	775
14-----	9,170	.10	24,800	13,800	.11	41,000	2,740	.01	740
15-----	9,170	.10	24,800	12,900	.10	34,800	2,600	1/.01	702
16-----	11,300	.17	51,900	11,800	.11	35,000	2,450	.01	662
17-----	13,200	.21	74,800	10,800	.10	29,200	2,350	.01	634
18-----	14,000	.18	68,000	9,730	.09	23,600	2,230	.01	602
19-----	15,200	.26	107,000	8,700	.08	16,800	2,160	.01	583
20-----	16,400	.27	120,000	7,740	.08	16,700	2,100	.01	567
21-----	17,900	.30	145,000	7,080	1/.07	13,400	2,110	.01	570
22-----	19,400	.29	152,000	6,660	.06	10,800	2,100	.01	567
23-----	21,100	.33	188,000	6,510	.06	10,500	2,080	.01	562
24-----	22,100	.34	203,000	7,030	.06	11,400	2,060	.01	556
25-----	22,100	.32	191,000	9,080	.15	36,800	2,070	.00	--
26-----	21,500	.30	174,000	10,300	1/.16	44,500	2,250	.17	10,300
27-----	20,200	.26	142,000	9,650	.17	44,300	2,040	.17	9,360
28-----	19,700	.24	128,000	8,650	.10	23,400	1,970	.22	11,700
29-----	19,200	.22	114,000	8,000	.07	15,100	1,970	.07	3,720
30-----	19,600	.26	138,000	7,230	.06	11,700	1,870	1/.04	2,020
31-----	19,800	.21	112,000	--	--	--	1,800	1/.02	972
Total -	331,820	--	2,212,000	382,860	--	1,503,000	92,450	--	88,190
	August			September					
	Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment		Mean discharge (second-feet)	Suspended sediment	
		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day
1-----	1,930	1/0.01	521	1,010	1/0.01	273			
2-----	2,010	1/.03	1,630	956	1/.01	258			
3-----	1,590	1/.02	1,020	908	.01	245			
4-----	1,780	.01	481	860	1/.01	232			
5-----	1,680	.01	454	815	1/.01	220			
6-----	1,670	.01	451	778	1/.01	210			
7-----	1,660	.02	896	750	1/.01	202			
8-----	1,670	.01	451	730	1/.01	197			
9-----	1,610	.02	869	720	1/.01	194			
10-----	1,690	.02	913	700	.01	189			
11-----	1,650	.02	891	720	.00	--			
12-----	1,550	.03	1,260	710	1/.00	--			
13-----	1,510	.01	408	680	1/.00	--			
14-----	1,510	.01	408	656	.00	--			
15-----	1,470	.01	397	656	.01	177			
16-----	1,400	.01	378	650	.01	176			
17-----	1,320	.01	356	632	.01	171			
18-----	1,280	.01	346	614	.01	166			
19-----	1,240	.01	335	620	.01	167			
20-----	1,200	.01	324	620	.01	167			
21-----	1,140	.01	309	638	.00	--			
22-----	1,110	.02	599	638	.01	172			
23-----	1,080	.02	583	626	.08	1,350			
24-----	1,110	.03	899	756	1/.05	1,020			
25-----	1,010	.03	818	729	1/.01	197			
26-----	1,000	.03	810	722	.01	195			
27-----	1,030	.02	556	743	.01	201			
28-----	1,030	.01	278	743	.01	201			
29-----	1,050	.01	283	736	.01	199			
30-----	1,040	.01	281	729	1/.01	197			
31-----	1,040	.01	281	--	--	--			
Total -	43,360	--	18,490	21,778	--	6,980			

Total discharge for period May 12 to Sept. 30 (second-foot days) -----372,268

Total load for period May 12 to Sept. 30 (tons) -----3,829,000

1/Estimated.





GREEN RIVER BASIN--Continued  
 GREEN RIVER AT GREEN RIVER, UTAH--Continued  
 Suspended sediment, water year October 1947 to September 1948

Day	October			November			December		
	Mean dis-charge (second-feet)	Suspended sediment		Mean dis-charge (second-feet)	Suspended sediment		Mean dis-charge (second-feet)	Suspended sediment	
		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day
1-----	2,420	0.05	3,270	3,820	0.10	10,300	2,560	0.03	2,070
2-----	2,370	.04	2,560	3,770	.10	10,200	2,860	.06	4,630
3-----	2,300	.04	2,480	3,710	.09	9,020	2,920	.04	3,150
4-----	2,300	.04	2,480	3,570	.14	13,500	3,260	.04	3,520
5-----	2,300	.04	2,480	3,400	.11	10,100	3,850	.05	5,200
6-----	2,210	.04	2,390	3,350	.09	8,140	4,110	.06	6,660
7-----	2,240	.03	1,810	3,320	.07	6,270	4,020	.06	6,510
8-----	2,210	.03	1,790	3,320	.07	6,270	3,850	.06	6,240
9-----	2,190	.02	1,180	3,290	.06	5,330	3,770	.05	5,090
10-----	2,170	.02	1,170	3,240	.04	3,500	3,510	.04	3,790
11-----	2,240	.02	1,210	3,160	.04	3,410	3,370	.03	2,730
12-----	2,280	.02	1,230	3,130	.04	3,380	2,710	.03	2,200
13-----	2,510	.12	8,130	3,100	.04	3,350	1,910	.03	1,550
14-----	2,970	.24	19,200	3,070	.04	3,320	1,680	.02	907
15-----	3,290	.38	33,800	3,070	.03	2,490	1,290	.02	697
16-----	3,070	1/.27	22,400	3,020	.03	2,450	1,240	.02	670
17-----	3,320	.16	14,300	3,020	.04	3,260	1,130	.02	610
18-----	2,940	.39	31,000	3,130	.03	2,540	1,140	.02	616
19-----	2,890	.51	39,800	3,210	.02	1,730	1,320	.02	713
20-----	2,940	.30	23,800	3,210	.03	2,600	1,850	.03	1,500
21-----	2,970	.21	16,800	3,160	.03	2,560	2,080	.03	1,680
22-----	3,320	.11	9,660	3,210	.03	2,600	2,260	.03	1,830
23-----	3,350	.12	10,900	3,240	.03	2,620	2,300	.02	1,240
24-----	4,000	.16	17,300	2,890	.04	3,120	2,300	.03	1,860
25-----	3,970	.81	86,800	2,560	.03	2,070	2,300	.03	1,860
26-----	3,630	.24	23,500	1,810	.03	1,470	2,210	.02	1,190
27-----	3,600	.27	26,200	1,590	.04	1,720	2,190	.02	1,180
28-----	3,710	.19	19,000	1,570	.04	1,700	2,260	.02	1,220
29-----	3,770	.12	12,200	1,850	.02	999	2,280	.01	616
30-----	3,850	.10	10,400	2,400	.03	1,940	2,060	.02	1,110
31-----	3,910	.11	11,600	--	--	--	2,240	.02	1,210
Total -	91,240	--	461,000	90,190	--	132,000	76,830	--	74,050
Day	January			February			March		
	Mean dis-charge (second-feet)	Suspended sediment		Mean dis-charge (second-feet)	Suspended sediment		Mean dis-charge (second-feet)	Suspended sediment	
		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day
1-----	2,150	0.02	1,160	1,830	0.02	988	3,910	0.07	7,390
2-----	2,100	.02	1,130	1,770	.01	478	3,680	.04	3,970
3-----	2,170	.02	1,170	1,720	.02	929	3,630	.04	3,920
4-----	2,240	.03	1,810	1,890	.02	1,020	3,510	1/.04	3,790
5-----	2,000	.02	1,080	1,960	.02	1,060	3,350	.04	3,620
6-----	1,790	.02	967	1,910	.01	516	3,240	.03	2,620
7-----	1,850	.02	999	2,060	.02	1,110	3,130	.03	2,540
8-----	2,000	.02	1,080	2,100	.02	1,130	3,020	.02	1,630
9-----	2,260	.03	1,830	2,080	.02	1,120	2,970	.03	2,410
10-----	2,490	.03	2,020	2,100	.02	1,130	2,890	.03	2,340
11-----	2,580	.04	2,710	2,100	.02	1,130	2,860	.03	2,320
12-----	2,680	.03	2,170	2,190	.03	1,770	2,860	.02	1,540
13-----	2,740	.03	2,220	2,210	.02	1,190	2,790	.02	1,510
14-----	2,760	.02	1,490	2,190	.02	1,180	2,680	.02	1,450
15-----	2,760	.02	1,490	2,150	.02	1,160	2,610	.02	1,410
16-----	2,740	.02	1,480	2,150	.02	1,160	2,540	.02	1,370
17-----	2,740	.02	1,480	2,100	.02	1,130	2,610	.03	2,110
18-----	2,560	.02	1,380	2,030	.02	1,100	2,840	.02	1,530
19-----	2,420	.02	1,310	1,930	.02	1,040	3,350	.03	2,710
20-----	2,280	.02	1,230	2,080	.02	1,120	4,410	.07	8,330
21-----	2,280	.02	1,230	2,210	.02	1,190	5,320	.16	23,000
22-----	2,280	.02	1,230	2,260	.02	1,220	5,220	.14	19,700
23-----	2,130	.02	1,150	2,440	.14	9,220	5,000	.02	2,700
24-----	1,870	.02	1,010	2,560	.11	7,600	4,940	.04	5,340
25-----	1,870	1/.02	1,010	2,810	.28	21,200	5,380	.04	5,810
26-----	1,910	.02	1,030	3,180	.33	28,300	6,580	.06	10,700
27-----	2,170	.02	1,170	3,880	.08	8,380	16,400	1.14	505,000
28-----	2,400	.03	1,940	4,560	1/.08	9,850	13,200	1.32	470,000
29-----	2,490	.03	2,020	4,380	.09	10,600	12,400	1.05	352,000
30-----	2,280	.02	1,230	--	--	--	11,000	.95	282,000
31-----	2,020	.02	1,090	--	--	--	9,700	.99	259,000
Total -	71,010	--	44,320	68,830	--	--	158,020	--	1,994,000

1/ Estimated.

GREEN RIVER BASIN--Continued  
 GREEN RIVER AT GREEN RIVER, UTAH--Continued  
 Suspended sediment, water year October 1947 to September 1948--Continued

Day	April			May			June		
	Mean dis-charge (second-foot)	Suspended sediment Mean concen-tration (percent)	Tons per day	Mean dis-charge (second-foot)	Suspended sediment Mean concen-tration (percent)	Tons per day	Mean dis-charge (second-foot)	Suspended sediment Mean concen-tration (percent)	Tons per day
1-----	10,200	1.01	279,000	8,860	0.24	57,400	23,600	0.36	229,000
2-----	9,490	.72	184,000	10,200	.24	66,100	23,600	.34	217,000
3-----	9,530	.68	175,000	14,500	.47	184,000	23,600	.32	204,000
4-----	9,200	.69	171,000	15,600	.44	185,000	24,200	.32	209,000
5-----	8,700	.78	183,000	14,400	.37	144,000	23,900	.29	187,000
6-----	8,460	1.02	233,000	12,800	.32	111,000	23,500	.28	178,000
7-----	8,780	.84	199,000	11,700	.25	79,000	23,400	.27	171,000
8-----	9,070	.72	176,000	11,400	.25	77,000	22,800	.25	154,000
9-----	8,180	.67	148,000	11,200	.24	72,600	22,100	.23	137,000
10-----	7,530	.58	118,000	11,600	.22	68,900	20,400	.24	132,000
11-----	7,050	.53	101,000	13,600	.32	118,000	18,800	.16	81,200
12-----	6,720	.47	85,300	14,400	.36	140,000	17,800	.24	115,000
13-----	6,400	.44	76,000	12,800	.32	111,000	17,200	.19	88,200
14-----	6,650	.38	68,200	12,000	.20	64,800	16,800	.20	90,700
15-----	7,050	.40	76,100	11,600	.21	65,800	16,300	.18	79,200
16-----	6,400	.30	51,800	11,200	.20	60,500	15,600	.21	88,500
17-----	5,910	.25	39,900	11,300	.19	58,000	14,400	.15	58,300
18-----	5,680	.27	41,400	14,400	.31	121,000	13,200	.15	53,500
19-----	5,810	.25	39,200	17,400	.44	207,000	12,100	.13	42,500
20-----	6,900	.37	68,900	19,200	.50	259,000	11,100	.08	24,000
21-----	10,400	.52	146,000	21,400	.47	272,000	10,300	.24	66,700
22-----	13,400	.85	308,000	23,400	.47	297,000	9,320	.11	27,700
23-----	13,900	.87	327,000	24,800	.47	315,000	8,820	.08	19,100
24-----	13,400	.70	253,000	26,100	.49	345,000	8,460	.08	18,300
25-----	14,300	.62	239,000	27,200	.45	330,000	8,180	.10	22,100
26-----	15,400	.56	233,000	27,600	.42	313,000	8,340	.07	15,800
27-----	14,300	.45	174,000	26,900	.42	305,000	9,700	.17	44,500
28-----	12,500	.39	132,000	25,500	.42	289,000	11,500	.22	68,300
29-----	10,600	.33	94,400	24,300	.41	269,000	11,000	.15	44,600
30-----	9,320	.26	65,400	23,800	.36	231,000	10,000	.17	45,900
31-----	--	--	--	23,600	.34	217,000	--	--	--
Total -	281,230	--	4,486,000	534,760	--	5,433,000	480,020	--	2,912,000
Day	July			August			September		
	Mean dis-charge (second-foot)	Suspended sediment Mean concen-tration (percent)	Tons per day	Mean dis-charge (second-foot)	Suspended sediment Mean concen-tration (percent)	Tons per day	Mean dis-charge (second-foot)	Suspended sediment Mean concen-tration (percent)	Tons per day
1-----	9,360	0.14	35,400	2,660	0.19	13,600	1,500	0.04	1,620
2-----	8,820	.10	23,800	2,490	.91	61,200	1,460	.03	1,180
3-----	8,060	.08	17,400	2,370	.66	42,200	1,450	.02	783
4-----	7,120	.06	11,500	2,400	<u>1.43</u>	27,900	1,420	.02	767
5-----	6,330	.07	12,000	2,610	.20	14,100	1,380	.02	745
6-----	5,850	.04	6,530	3,290	.56	49,700	1,340	.02	724
7-----	5,410	.05	7,300	3,240	1.46	128,000	1,280	.01	346
8-----	5,320	.04	5,750	3,070	.58	48,100	1,220	.02	659
9-----	5,220	.04	5,640	3,070	.28	23,200	1,170	.02	632
10-----	5,060	.03	4,100	2,710	.49	35,900	1,140	.01	308
11-----	4,810	.02	2,600	2,490	.46	30,900	1,130	.01	315
12-----	4,560	.02	2,460	2,370	1.22	78,100	1,140	.01	308
13-----	4,380	.01	1,180	2,300	.17	10,600	1,100	.01	297
14-----	4,020	.02	2,170	2,330	.16	10,100	1,080	.01	292
15-----	3,790	.02	2,050	2,210	.07	4,180	1,070	.01	289
16-----	3,570	.02	1,930	2,100	.05	2,840	1,070	.01	289
17-----	3,400	.02	1,840	2,040	.04	2,200	1,050	.00	--
18-----	3,210	.02	1,730	2,020	.03	1,640	1,030	.00	--
19-----	2,990	.02	1,610	2,020	.05	2,730	1,030	.00	--
20-----	2,810	.00	--	1,910	.03	1,550	1,030	.00	--
21-----	2,710	.01	732	1,870	.02	1,010	1,050	.00	--
22-----	2,760	.00	--	1,870	.80	40,400	1,080	.00	--
23-----	2,610	.01	705	2,020	.14	7,640	1,090	.00	--
24-----	2,840	.01	767	1,790	.22	10,600	1,040	.02	562
25-----	2,740	.06	4,440	1,810	.08	3,910	1,050	.10	2,840
26-----	2,970	.86	69,000	1,890	.09	4,590	1,040	.02	562
27-----	2,890	.83	64,800	1,930	.04	2,080	1,020	.02	551
28-----	2,840	.28	21,500	1,660	.06	2,690	1,030	.02	556
29-----	2,940	.24	19,100	1,550	.08	3,350	1,120	.01	302
30-----	2,760	.42	31,300	1,530	.09	3,720	1,160	.01	313
31-----	2,940	.33	26,200	1,520	.05	2,050	--	--	--
Total -	135,090	--	385,500	69,140	--	670,800	34,770	--	15,230

Total discharge for year (second-foot days) ----- 2,091,130

Total load for year (tons) ----- 16,730,000

1/ Estimated.

## GREEN RIVER BASIN--Continued

## SAN RAFAEL RIVER NEAR GREEN RIVER, UTAH

LOCATION.--Samples collected from bridge on State Highway 24, 15 miles south of Green River, Emery County, and 35 miles upstream from mouth. DRAINAGE AREA.--1,690 square miles.

RECORDS AVAILABLE.--Chemical analyses: November 1946 to September 1948.

Sediment records: March to September 1948.

EXTREMES, 1947-48.--Dissolved solids: Maximum, 4,310 parts per million Oct. 8, 15, 25, 30; minimum, 720 parts per million May 21-26, 28-29, 31. Total hardness: Maximum, 1,840 parts per million Sept. 1-4; minimum, 416 parts per million May 21-26, 28-29, 31.

EXTREMES, 1946-48.--Dissolved solids: Maximum, 4,310 parts per million Oct. 8, 15, 25, 30, 1947; minimum, 695 parts per million May 9, 23, 29, 1947.

Total hardness: Maximum, 1,840 parts per million Sept. 1-4, 1948; minimum, 386 parts per million May 9, 23, 29, 1947.

Sediment loads: Maximum, not determined; minimum, no load on many days.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1119. Records of specific conductance of daily samples available in district office at Salt Lake City, Utah.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	1/ dis- charge (second- feet)	Tem- pera- ture (° F.)	pH	Specific conduc- tance (micro- mhos at 25° C.)	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> )	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	
																	Parts per mil- lion	Tons per acre- foot	Tons per day	Total	Non- carbon- ate		
Oct. 8, 15, 25, 30, 1947	36	--	--	4,950	7.0	--	334	230		897	316	2,800	84	--	2.8	--		4,310	5.86	419	1,780	1,520	46
Nov. 7, 14, 24	48	--	--	4,490	9.2	--	280	212		854	316	2,530	68	--	4.3	--		3,910	5.32	507	1,570	1,310	48
Dec. 10, 18, 23, 31	44	--	--	3,730	11	--	260	172		507	390	1,970	60	--	4.3	--		3,180	4.32	378	1,360	1,040	45
Jan. 9, 16, 23, 30, 1948	50	7.7	7.7	3,100	11	--	230	133		385	368	1,530	42	--	5.2	0.02		2,520	3.43	340	1,120	820	43
Feb. 3, 13	50	8.1	8.1	3,110	12	--	238	146		398	404	1,590	50	--	3.8	--		2,640	3.59	356	1,190	864	42
Feb. 21, 23, 25-29	235	8.0	8.0	2,300	8.5	0.05	216	78	261	6.0	226	1,130	34	0.4	3.8			1,870	2.54	1,190	860	674	40
Mar. 1-3, 5-6, 8-10	121	8.0	8.0	2,820	9.2	.06	220	116	381	6.8	286	1,490	47	.4	3.1	.03		2,420	3.29	791	1,030	764	44
Mar. 11-13, 15-20	140	7.8	7.8	3,080	10	.44	232	121	393	14	282	1,570	50	.3	4.5	.01		2,540	3.45	960	1,080	837	44
Mar. 21, 23-31	96	7.8	7.8	3,430	9.2	.10	236	145	465	15	286	1,810	60	.2	4.3	.01		2,890	3.93	749	1,160	942	46
Apr. 1-10	57	7.9	7.9	3,480	8.6	.20	226	156	467	16	288	1,840	61	.2	2.8	.01		2,920	3.97	449	1,210	970	45
Apr. 11-20	67	8.0	8.0	3,440	8.1	.34	218	155	464	14	280	1,820	58	.2	2.3	.01		2,880	3.92	521	1,180	952	46
Apr. 21, 23-24, 26- 30	68	8.1	8.1	2,860	8.8	.07	184	129	379	15	274	1,480	45	.3	2.2	.00		2,380	3.24	437	990	765	45
May 1-9	60	7.8	7.8	3,220	11	.08	208	142	422	12	280	1,660	52	.2	5.0	.00		2,650	3.60	429	1,100	874	45
May 11-17	100	7.7	7.7	3,220	11	.08	204	143	429	11	270	1,680	51	.2	1.3	.00		2,680	3.62	718	1,100	876	46
May 18-20	457	8.0	8.0	1,070	13	--	103	43	84		242	386	11	--	1.6	.00		761	1.03	939	434	236	30
May 21-26, 28-29, 31	514	7.9	7.9	1,030	8.9	.08	94	44	73	12	250	349	13	.3	2.4	.02		720	.98	999	416	210	27

1/Daily samples since Feb. 21, 1948.

June 1-4, 6-7, 9-10	417	7.7	1,470	9.7	.07	112	64	138	--	13	256	599	16	.2	1.7	.02	1,080	1.47	1,220	542	332	35
June 8	478	--	3,340	13	--	--	--	--	--	--	194	2,140	26	--	--	--	--	--	--	--	--	
June 11-18, 20	159	7.8	1,970	12	.09	136	89	231	12	12	260	933	27	.2	1.1	.02	1,570	2.14	674	706	492	41
June 21-30	97	8.0	3,180	12	.19	208	156	395	4.0	4.0	256	1,680	45	.2	2.0	.01	2,630	3.56	689	1,160	950	42
July 2-3, 5-10	47	7.9	3,490	12	.11	220	174	452	2.8	2.8	252	1,880	55	.1	2.4	.01	2,930	3.98	372	1,260	1,050	44
July 11-16, 19-20	12	7.8	4,400	9.2	.15	286	218	576	4.8	4.8	252	2,440	85	.2	1.2	.01	3,740	5.09	121	1,610	1,400	44
July 23-24, 26-28, 30	29	7.8	4,140	10	.11	306	169	564	9.6	9.6	224	2,310	75	.2	2.2	.01	3,560	4.24	279	1,460	1,280	45
Aug. 1-4, 7, 9-10	99	8.0	3,360	13	.08	420	119	333	5.6	5.6	190	1,940	65	.1	1.1	.01	2,990	4.07	799	1,540	1,380	32
Aug. 11-14, 17-20	10	7.7	4,080	13	.06	430	161	482	12	12	216	2,410	76	.4	.5	.02	3,680	5.02	100	1,740	1,560	37
Aug. 21-23-31	24	7.7	3,660	14	.18	490	132	329	22	22	219	2,130	78	.3	.7	.02	3,900	4.49	214	1,770	1,590	29
Sept. 1-4	1.0	7.3	3,880	12	.05	492	130	366	18	18	192	2,250	115	.2	1.5	.02	3,500	4.70	84	1,640	1,690	30

## COLORADO RIVER BASIN

## GREEN RIVER BASIN--Continued

## SAN RAFAEL RIVER NEAR GREEN RIVER, UTAH--Continued

Suspended sediment, water year October 1947 to September 1948

Month	Discharge (second-foot-days)	Suspended sediment (tons)
March	3,594	34,200
April	1,928	7,880
May	8,344	119,600
June	6,687	106,800
July	925.6	3,140
August	2,755.5	334,500
September	3.8	1
Total for period	24,237.9	606,100



GREEN RIVER BASIN--Continued  
MISCELLANEOUS ANALYSES OF STREAMS IN GREEN RIVER BASIN IN UTAH

Chemical analyses, in parts per million, water year October 1947 to September 1948

Circuminal analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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	
																	Parts per million	Tons per acre-foot	Tons per day	Total		Non-carbonate
GREEN RIVER ABOVE WHITE RIVER AT OURAY																						
June 9, 1948-----	--	--	--	295	11		32	9.6	17		118	48	7	--	0.5		183	0.25	--	120	23	24
Sept. 22-----	--	--	--	749	4.3		58	24	78		172	209	37	--	1.0		496	.67	--	243	102	41
Sept. 29-----	--	--	--	809	4.6		60	31	74		176	234	35	--	.5		526	.72	--	277	133	37
BRUSH CREEK NEAR JENSEN																						
June 8, 1948-----	48	--	--	436	8.6		54	14	22		140	116	2.0	--	0.8		286	0.39	37	192	78	20
Sept. 30-----	.2	--	--	2,910	7.4		262	136	313		378	1,450	37	--	.27		2,420	3.29	1.3	1,210	903	36
ASHLEY CREEK NEAR JENSEN																						
June 8, 1948-----	75	--	--	1,680	15		181	100	89		277	771	17	--	4.3		1,310	1.78	265	862	636	18
Sept. 30-----	5.1	--	--	3,240	18		319	232	264		299	1,930	44	--	.11		2,970	4.04	41	1,750	1,500	25
DUCESNE RIVER AT DUCESNE																						
June 9, 1948-----	992	--	--	192	6.0		23	7.1	11		96	24	4	--	0.6		123	0.17	329	86	8	21
Sept. 29-----	94	--	--	589	9.8		61	28	32		248	115	9	--	1.0		378	.51	96	267	64	21
DUCESNE RIVER AT BRIDGELAND																						
June 9, 1948-----	--	--	--	291	8.3		28	12	19		132	44	4	--	0.6		181	0.25	--	120	12	25
Sept. 29-----	--	--	--	1,340	12		89	57	146		319	440	39	--	.1		940	1.28	--	456	195	41
DUCESNE RIVER NEAR MYTON																						
June 9, 1948-----	944	--	--	462	9.9		37	17	37		150	101	10	--	0.6		286	0.39	--	162	40	33
Sept. 29-----	14	--	--	2,170	13		126	79	296		340	834	96	--	.3		1,610	2.19	61	640	361	50
DUCESNE RIVER AT MOUTH NEAR OURAY																						
June 9, 1948-----	1,150	--	--	664	9.4		50	25	60		168	174	27	--	1.1		429	0.59	1,330	228	90	36
Sept. 22-----	24	--	--	3,680	8.9		156	126	513		277	1,230	370	--	1.5		2,540	3.45	165	907	668	55
Sept. 29-----	36	--	--	2,610	13		132	99	397		271	974	294	--	1.2		2,010	2.75	195	736	510	54

## GREEN RIVER BASIN--Continued

## MISCELLANEOUS ANALYSES OF STREAMS IN GREEN RIVER BASIN IN UTAH--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Chemical analyses, in parts per million, water year October 1941 to September 1946—Continued

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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 carbonate
																	Parts per million	Tons per acre-foot	Tons per day	Total	
ROCK CREEK AT MOUTH NEAR DUCHESSNE																					
June 9, 1948-----	574	--	--	72	3.0		--	--	--	--	32	8.2	1.2	--	0.2	--	--	--	--	--	--
Sept. 24-----	5.3	--	--	606	27		51	33	43		310	92	4	--	.5	--	403	0.55	5.8	262	8
STRAWBERRY RIVER NEAR DUCHESSNE																					
June 9, 1948-----	151	--	--	652	23		51	29	61		344	69	17	--	0.5	--	420	0.57	171	246	0
Sept. 29-----	38	--	--	812	21		51	39	86		401	110	22	--	.6	--	527	.72	56	268	0
UINTA RIVER NEAR FORT DUCHESSNE																					
June 9, 1948-----	16	--	--	928	13		62	45	81		264	241	34	--	0.4	--	606	0.82	27	340	123
Sept. 29-----	.9	--	--	1,770	14		112	135	120		320	732	50	--	.2	--	1,320	1.80	3.2	834	572
WHITE RIVER NEAR WATSON																					
June 8, 1948-----	--	--	--	358	14		40	11	22		134	57	14	--	5.1	--	229	0.31	--	145	35
Sept. 30-----	--	--	--	953	14		76	31	97		235	229	68	--	1.9	--	633	.86	--	317	124
WHITE RIVER AT OURAY																					
June 9, 1948-----	--	--	--	414	14		43	14	42		150	76	36	--	5.1	--	304	0.41	--	165	42
Sept. 22-----	340	--	--	976	16		74	30	101		222	236	70	--	1.4	--	638	.87	566	308	126
Sept. 29-----	--	--	--	982	17		76	33	94		220	246	69	--	1.1	--	638	.87	--	325	144
EVACUATION CREEK AT WATSON																					
June 8, 1948-----	--	--	--	4,880	18		184	239	794		430	2,560	62	--	76	--	4,140	5.63	--	1,440	1,090
Sept. 30-----	--	--	--	4,810	12		--	--	--		408	2,580	69	--	94	--	--	--	--	--	--
PRICE RIVER BELOW CASTLEGATE																					
Mar. 23, 1948-----	188	--	--	265	6.5		24	7.8	23		116	37	6	--	1.3	--	163	0.22	83	92	0
May 14-----	237	--	--	440	13		54	22	12		260	33	2.0	--	1.9	--	266	.36	170	225	12
Aug. 7-----	126	--	--	473	--		--	--	--		250	48	8.0	--	--	--	--	--	--	--	--
Oct. 2-----	50	--	--	334	--		37	19	4.8		179	26	4	--	.3	--	183	.25	25	170	24

PRICE RIVER AT WOODSIDE

Oct. 3, 23, 29, 1947	69	--	4,910	5.7	238	235	747	292	2,700	94	--	2.3	--	4,170	5.87	777	1,560	1,320	51
Nov. 5, 12, 25-----	52	--	5,660	8.0	278	263	911	360	3,230	112	--	6.7	--	5,020	6.93	434	1,880	1,550	52
Dec. 3, 8, 15, 29----	52	--	5,690	9.7	282	301	999	410	3,430	126	--	8.5	--	5,360	7.32	755	1,940	1,600	53
Jan. 5, 12, 19, 28, 1948-----	27	8.0	5,100	12	272	252	782	418	2,810	98	--	10	0.02	4,440	6.04	324	1,710	1,370	50
Feb. 3, 9, 18, 25-----	48	8.1	4,910	11	260	241	728	406	2,630	100	--	14	.02	4,180	5.68	542	1,640	1,310	49
Mar. 5, 11, 17, 23----	42	7.9	5,300	10	260	256	869	372	3,010	102	--	9.4	--	4,700	6.39	533	1,700	1,400	53
Apr. 2, 14, 21, 29-----	53	7.9	3,160	7.9	160	141	453	284	1,580	59	--	3.7	.04	2,540	3.45	363	979	746	50
May 10, 17, 19, 26-----	70	7.8	3,400	11	174	153	494	300	1,730	62	0.2	3.9	.04	2,780	3.78	525	1,060	817	50
June 9, 16, 22, 28-----	63	--	4,470	5.7	208	213	697	283	2,460	82	--	1.6	--	3,810	5.18	648	1,400	1,160	52
July 7, 16-----	15	--	5,020	6.1	238	242	801	260	2,860	98	--	3.3	--	4,380	5.96	177	1,580	1,380	52
Aug. 5, 12, 24-----	110	--	3,790	15	272	156	524	284	2,050	65	--	2.6	--	3,220	4.38	956	1,320	1,090	46
Sept. 1, 9, 20-----	12	--	5,890	3.8	290	288	955	268	3,450	120	--	4.8	--	5,240	7.13	170	1,910	1,690	52



# DIRTY DEVIL RIVER BASIN

DIRTY DEVIL RIVER NEAR HITE, UTAH

**LOCATION** --Near mouth or from a cable about 1 mile above mouth, sampling points reached by boat ride of about 10 miles from Hite.  
**RECORDS AVAILABLE** --October 1947 to September 1948.

RECORDS AVAILABLE, --OCTOBER 1946.

EXAKREMES, 1947-48, 2-DISSOLVED SOLIDS: maximum, 3,240 parts per million July 11-16, 18-21; minimum, 454 parts per million Mar. 21-24, 26-31. Total hardness: Maximum, 2,410 parts per million July 11-16, 18-21; minimum, 454 parts per million Mar. 21-24, 26-31.

REMARKS: --Daily sampling begun Dec. 22, 1947 at gaging station near Hanksville. Samples collected at new gaging station near Hite after July 8, 1948.

REMARKS:--Daily sampling begun Dec. 22, 1947 at gaging station near Hannsylville. samples collected at new gaging station.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean dis-charge (second-feet)	Tem-perature (° F.)	pH	Specific conduct-ance (micro-mhos at 25° C.)	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> )	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>		
																	Parts per mil-lion	Tons per acre-foot	Tons per day	Total	Non-carbon-ate	
Oct. 1-3, 8, 1947----	49	7.8		1,790	29	0.05	217	48	147	7.2	170	753	100	0.4	2.5	0.02	1,300	1.89	184	739	600	30
Oct. 15, 26, 30, 1947----	148	7.7		1,930	25	--	292	47	129		178	890	90	.3	3.0	--	1,560	2.12	623	922	776	23
Nov. 7, 9, 14, 24, 26-27, 30-----	86	7.9		1,890	32	.06	224	52	146	8.0	210	709	132	.3	3.5	.00	1,410	1.92	327	773	601	29
Dec. 1-2, 10-----	123	8.0		2,230	27	--	237	54		235	216	814	182	.4	4.1	--	1,700	2.31	565	814	636	39
Dec. 22-31-----	80	8.1		1,650	35	.06	178	46	142	7.2	200	563	135	.3	2.9	.01	1,210	1.65	285	633	464	32
Jan. 1-2, 4-9, 1948-	120	8.1		1,360	37	.06	156	40	102	6.0	200	465	95	.4	2.9	.01	1,000	1.36	324	554	390	28
Jan. 11-20, 24-----	120	8.1		1,570	34	.06	166	44	141	6.4	174	527	135	.4	3.3	.01	1,160	1.58	376	595	428	34
Jan. 21-23, 25-31--	120	8.1		1,590	32	.03	200	36	118	10	174	621	88	.3	4.3	.01	1,200	1.63	389	647	504	28
Feb. 1-10-----	100	8.0		1,430	33	.02	160	36	111	9.6	184	488	98	.4	2.6	.01	1,030	1.40	278	547	396	30
Feb. 11-20-----	79	7.9		1,570	31	.05	176	35	92	5.2	168	535	80	.3	4.6	.02	1,050	1.43	573	583	446	27
Feb. 21-29-----	441	7.8		1,380	23	.04	263	29	100	5.6	144	772	25	.4	6.4	.02	1,300	1.77	1,550	775	654	20
Mar. 1-2, 4-6, 8-10	214	7.9		1,140	30	.04	169	28	60	5.2	170	486	30	.5	3.2	.02	878	1.19	507	536	397	19
Mar. 11-20-----	176	7.9		1,120	32	.11	156	30	58	11	170	443	35	.3	2.9	.00	800	1.23	473	512	373	19
Mar. 21-24, 26-31--	189	7.7		956	29	.08	136	28	37	10	172	361	20	.3	2.2	.00	708	.96	361	454	314	15
Apr. 1-3, 5, 8-10--	144	7.7		2,400	22	.40	216	65	264	11	194	876	227	.2	3.8	.02	1,760	2.42	692	806	648	41
Apr. 12-16, 19-20--	272	7.6		1,590	30	.18	182	47	117	9.6	166	604	93	.3	1.2	.02	1,180	1.60	887	648	495	28
Apr. 17-----	150	--		3,400	19	--	--	--	--	--	165	1,390	317	--	--	--	--	--	--	--	--	--
Apr. 21-24, 27-30--	376	7.6		2,360	21	.06	234	61	250	7.6	164	905	208	.3	1.9	.02	1,760	2.42	1,810	835	684	39
May 1, 3-8-----	123	7.8		2,420	24	.05	218	66	259	6.8	179	894	217	.3	2.8	.02	1,780	2.42	591	816	669	41
May 11-15, 17-20--	82	7.6		2,150	21	.07	226	60	206	8.8	195	854	155	.3	2.7	.02	1,630	2.22	361	810	650	35
May 21-22, 24-26, 28-29-----	39	7.5		2,660	22	.09	266	63	301	10	186	1,100	206	.3	2.1	.02	2,060	2.80	217	922	770	41
May 27-----	150	--		4,820	20	--	--	--	--	--	263	2,060	490	--	--	--	--	--	--	--	--	--

DIRTY DEVIL RIVER BASIN--Continued  
DIRTY DEVIL RIVER NEAR HITE, UTAH--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids		Hardness as CaCO <sub>3</sub>		Percent sodium
															Parts per million	Tons per acre-foot	Total	Non-carbonate	
June 1-6, 8-12, 1948	49	7.7	2,610	25	0.08	286	69	278	7.6	158	1,090	208	0.3	2.8	2,020	2.75	947	818	39
June 14-18	4	7.6	1,850	32	.08	238	60	132	7.2	180	892	43	.3	.2	1,490	2.03	840	683	25
June 21-23	10	7.9	2,140	31	.26	246	74	172	4.8	168	968	108	.3	.8	1,690	2.30	918	781	29
June 24-25	5	8.0	4,030	33	--	336	124	520	--	146	1,760	370	--	4.9	3,220	4.38	1,350	1,230	46
July 1-2	--	7.8	2,080	33	--	250	74	161	--	190	945	98	--	.3	1,630	2.24	--	--	27
July 6-10	--	7.8	4,980	25	--	518	149	586	--	326	1,970	610	--	.5	4,020	5.47	--	--	40
July 11-16, 18-21	--	7.6	6,680	28	.22	644	196	808	38	506	2,230	1,050	.5	.1	3,240	7.13	--	--	42
July 22-24	--	7.7	3,730	26	--	464	117	368	--	234	1,840	235	--	.6	3,170	4.31	--	--	33
July 25-27	--	7.8	2,100	21	--	246	62	177	--	226	863	121	--	.2	1,600	2.18	--	--	31
July 28-31	--	7.7	5,770	28	--	648	142	706	--	248	2,500	660	--	.5	4,810	6.54	--	--	41
Aug. 1-6, 10	--	7.8	4,130	24	.16	578	143	321	15	228	2,050	300	.3	2.0	3,550	4.83	--	--	25
Aug. 11-20	--	7.7	3,510	23	--	628	97	211	20	168	1,990	170	.7	.5	3,220	4.38	--	--	19
Aug. 22-24, 26-27, 29-31	--	7.7	3,680	23	.43	612	84	261	14	192	1,930	205	.4	.9	3,230	4.39	--	--	23
Sept. 2-10	--	7.7	3,800	26	.05	672	90	242	16	190	2,000	250	.5	.4	3,390	4.61	--	--	20
Sept. 11, 13-20	--	7.7	3,710	28	.05	620	91	245	14	193	1,870	260	.4	.2	3,220	4.38	--	--	22
Sept. 21-22, 26-30	--	7.8	3,060	23	.04	536	69	179	10	164	1,630	135	.2	1.2	2,660	3.62	--	--	19

## SAN JUAN RIVER BASIN

## SAN JUAN RIVER NEAR BLANCO, N. MEX.

LOCATION.--At bridge on State Highway 17, half a mile downstream from gaging station which is 1 mile upstream from Canyon Largo and 1½ miles east of Blanco, San Juan County.

DRAINAGE AREA.--3,320 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1948.

EXTREMES, 1947-48.--Dissolved solids: Maximum, 297 parts per million Feb. 21-29; minimum, 49 parts per million June 11-20.

Total hardness: Maximum, 161 parts per million Aug. 16, 1947; minimum, 81 parts per million June 11-20, 1948.

EXTREMES, 1945-48.--Dissolved solids: Maximum, 1,030 parts per million Aug. 16, 1947; minimum, 49 parts per million June 11-20, 1948.

Total hardness: Maximum, 680 parts per million Aug. 16, 1947; minimum, 49 parts per million June 11-20, 1948.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1119. Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-foot)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
Oct. 1-3, 8-10, 1947- Oct. 11-15 ----- Oct. 16, 18-20 ----- Oct. 21-23, 25, 29-31 Nov. 1-10 ----- Nov. 11-15, 17-20 ----- Nov. 21-30 -----	493 1,839 1,498 1,300 731 500 438	7.6 7.2 7.5 7.7 7.6 7.5 7.6		288 362 207 185 233 270 290	9.1 13 15 15 15 15 13	0.03 .03 .04 .03 .03 .02 .02	30 41 24 22 26 33 31	5.9 7.3 5.3 4.5 4.9 5.6 5.9	22 24 12 11 16 13 23		105 136 86 82 90 98 103	52 63 31 26 41 50 57	4.5 4.2 2.0 2.0 2.5 3.5 4.5	0.2 4 4 4 2 2 2	0.0 .6 3 3 3 3 6	0.1 1 1 1 1 1 1	175 221 132 121 150 171 186	0.24 30 18 16 20 23 25	233 1,097 534 425 296 231 220	100 132 82 74 95 106 102	14 21 12 6 12 25 18	32 28 23 6 25 29 24 33
Dec. 1-5, 7-10 ----- Dec. 11-20 ----- Dec. 21-31 ----- Jan. 1-3, 8-10, 1948- Jan. 11-20 ----- Jan. 21-31 ----- Feb. 1-9 ----- Feb. 12-16, 19-20 ----- Feb. 21-28 ----- Mar. 1-10 ----- Mar. 11-20 ----- Mar. 21-31 -----	482 394 411 425 449 425 412 429 880 469 571 1,087	7.4 7.4 7.4 7.8 7.7 7.7 7.7 7.7 7.6 7.4 7.5 7.8		316 341 288 285 287 288 285 303 466 374 386 408	13 12 13 11 13 12 13 12 11 11 11 11	.03 .04 .02 .01 .01 .01 .01 .02 .13 .02 .02 .02 .03	32 36 31 31 32 31 32 33 48 39 44 44	6.2 6.6 5.8 5.9 5.3 5.2 5.5 5.7 10 9.4 9.5 12	27 28 21 22 22 25 25 22		112 122 103 102 101 104 102 106 106 118 111 118 124 120 134	61 66 54 45 56 56 56 56 56 54 55 57	5.0 5.5 3.8 4.2 4.5 4.5 5.8 5.0 4.5 5.5 6.0 7.0 6.8	2 3 2 3 3 3 3 3 3 3 3 3	.4 .7 4 1.0 1.1 1.1 1.1 1.1 1.1 1.1 1.1 1.1 1.5	1 1 1 1 1 1 1 1 1 1 1 1	200 215 180 181 184 187 185 185 194 297 240 255 266	.27 .29 .24 .25 .25 .25 25 25 26 26 33 35 36	249 205 200 208 223 195 206 206 706 706 304 393 160	106 118 17 18 102 99 102 102 106 136 142 160	14 34 31 32 32 14 19 19 42 40 43 58	35 34 31 32 32 35 32 33 34 31 32 27

SAN JUAN RIVER BASIN--Continued  
SAN JUAN RIVER NEAR BLANCO, N. MEX.--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Potassium		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 (Na)	Potassium (K)							Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
Apr. 1-5, 10, 1948 1/	240		7.6	314	11	0.14	39	9.2	16		116	66	3.0	0.4	2.1	0.1	204	0.28	132	136	40	20
Apr. 6-9 1/	3,694		7.9	316	11	.19	40	8.7	14		142	36	2.5	.4	8.9	.1	192	.26	1,910	136	20	18
Apr. 11-15, 17-20 ---	5,086		8.0	223	11	.07	30	5.7	10		103	29	2.8	.4	1.8	.1	141	.19	1,940	98	14	19
Apr. 22-30	4,977		8.0	176	12	.05	23	4.5	8.5		81	23	1.5	.3	1.0	.1	114	.16	1,530	76	10	20
May 1-3, 5-8, 10 2/	4,687		8.0	152	14	.04	20	3.6	9.4		75	18	3.0	.2	1.0	.1	106	.14	1,340	65	4	24
May 9 2/	--		--	368	--	--	--	--	--		76	--	--	--	--	--	--	--	--	--	--	--
May 11-13, 15-20 ---	4,508		8.0	170	15	.04	22	3.6	11		80	20	3.8	.2	.9	.1	116	.16	1,410	70	4	25
May 21-22, 24-30 ---	6,062		8.0	141	15	.04	18	2.8	8.0		68	15	1.0	.2	1.5	.1	95	.13	1,550	56	1	24
June 1, 5-10 3/	8,340		7.9	119	13	.04	16	2.4	7.4		61	11	2.2	.2	1.4	.1	84	.11	1,890	50	0	24
June 2 3/	--		--	219	--	--	--	--	--		96	--	--	--	--	--	--	--	--	--	--	--
June 11-20	6,090		7.9	119	15	.11	15	2.8	6.0		57	12	1.5	.1	.6	.1	81	.11	1,330	49	2	21
June 23-29	2,535		7.8	161	19	.03	18	4.2	12		74	23	2.0	.1	.4	.1	115	.16	787	62	2	29
July 1-10	1,750		7.7	172	9.7	.02	20	4.2	9.0		70	23	3.0	.3	.6	.1	104	.14	491	68	10	22
July 13-16, 18-19 ---	868		7.6	223	10	.01	24	5.5	15		87	36	3.0	.3	.6	.1	137	.19	321	82	11	28
July 21-31	688		7.7	262	8.5	.01	28	6.3	18		102	43	3.5	.3	1.1	.1	159	.22	295	96	12	29
Aug. 1-3, 5-7, 9 ---	914		7.6	284	8.3	.02	32	7.5	23		123	46	7.0	.4	.4	.1	185	.25	457	111	10	31
Aug. 11-20	629		7.7	268	7.1	.02	29	6.1	19		105	43	4.2	.4	.8	.1	161	.22	273	98	12	30
Aug. 21-22, 24-31 ---	421		7.7	314	5.8	.01	32	7.3	25		118	57	5.0	.4	.6	.1	191	.26	217	110	14	33
Sept. 1, 3-7, 9-10 ---	243		7.7	364	5.4	.01	36	8.2	30		132	68	6.8	.4	.3	.1	220	.30	144	124	16	35
Sept. 11-12, 14-20 ---	260		7.7	394	5.8	.01	38	8.3	33		134	76	6.8	.4	.9	.1	235	.32	165	126	19	36
Sept. 21-30 ---	350		7.8	361	11	.03	36	9.2	27		134	69	2.0	.5	1.4	.1	222	.30	210	128	18	32
Weighted average ---	1,745	--	--	199	13	0.05	24	4.7	12		85	30	2.8	0.2	1.3	0.1	130	0.18	612	80	10	25

1/ Discharge for Apr. 10 included in discharge reported for Apr. 6-9.

2/ Discharge for May 9 included in discharge reported for May 1-3, 5-8, 10.

3/ Discharge for June 2 included in discharge reported for June 1, 5-10.



SAN JUAN RIVER BASIN--Continued  
SAN JUAN RIVER NEAR BLUFF, UTAH

LOCATION --At bridge on State Highway 47, 2,000 feet downstream from gaging station and 20 miles southwest of Bluff, San Juan County.

DRAINAGE AREA --23,900 square miles.

RECORDS AVAILABLE --Chemical analyses: February to June 1927, October 1929 to September 1948.

Water temperatures: May 1944 to September 1948.

Sediment records: August to September 1928, July 1929 to September 1948.

EXTREMES, 1947-48. --Dissolved solids: Maximum, 922 parts per million Sept. 11-20; minimum, 182 parts per million June 11-20.

Total hardness: Maximum, 412 parts per million Sept. 11-20; minimum, 122 parts per million May 21-31.

Water temperatures: Maximum, 82° F. July 17; minimum, freezing point on several days in winter months.

Sediment loads: Maximum, 5,460,000 tons per day Oct. 15; minimum, 462 tons per day Sept. 10.

EXTREMES, 1929-48. --Dissolved solids: Maximum, 1,860 parts per million July 21-31, 1934; minimum, 167 parts per million June 11-20, 1944.

Total hardness: Maximum, 874 parts per million July 21-31, 1934; minimum, 109 parts per million July 1-10, 1935.

Water temperatures: Maximum, 85° F. July 21, 1945; minimum, freezing point on several days in winter months.

Sediment loads: Maximum, 11,450,000 tons per day Sept. 23, 1929; minimum, less than 50 tons per day on several days.

REMARKS. --Records of discharge for gaging station for water years October 1946 to September 1948 given in Water-Supply Paper 1119. Records of specific conductance of daily samples available in district office at Salt Lake City, Utah.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	Specific conductance (micro-mhos at 25° C.)	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> )	Barium (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium
																Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
Oct. 1-10, 1947-----	1,126	7.5	751	13	0.03	85	20	53	162	241	16	0.4	2.2	0.02	0.69	510	1,550	294	162	28	
Oct. 11-18-----	7,287	7.6	1,000	17	.02	112	20	90	228	333	16	.4	1.3	.02	702	.95	13,800	362	174	35	
Oct. 19-31-----	2,665	7.7	589	14	.01	71	20	28	150	170	12	.3	1.6	.02	391	.53	2,810	259	136	19	
Nov. 1, 4, 7-10-----	1,642	8.0	662	14	.03	70	18	49	136	213	13	.4	1.9	.02	446	.61	1,980	248	137	30	
Nov. 11-16, 18-20----	1,167	7.9	812	12	.01	86	23	62	152	279	18	.4	3.2	.02	559	.76	1,760	309	184	30	
Nov. 21-30-----	1,078	7.8	859	11	.01	86	17	84	156	296	20	.3	3.0	.02	594	.81	1,730	284	156	39	
Dec. 1-7, 9-10-----	1,489	7.9	876	11	.01	84	24	80	160	307	20	.2	3.1	.02	608	.83	2,440	308	177	36	
Dec. 11, 13-20-----	850	7.6	926	13	.01	97	27	79	186	325	22	.2	3.2	.02	658	.89	1,510	353	200	33	
Dec. 21-31-----	872	7.9	889	13	.01	93	27	67	172	305	20	.2	2.9	.02	613	.83	1,440	343	202	30	
Jan. 1-10, 1948-----	868	8.0	877	14	.01	93	27	67	164	307	22	.2	3.2	.02	614	.84	1,440	343	208	30	
Jan. 11-20-----	926	8.1	845	13	.01	85	26	70	164	291	22	.2	2.8	.02	591	.80	1,480	319	184	32	
Jan. 21-22, 24-31----	770	8.2	862	13	.00	92	26	70	178	295	24	.2	2.3	.02	610	.83	1,270	335	190	31	
Feb. 2-10-----	955	7.8	851	12	.00	89	23	69	158	287	24	.4	3.6	.01	586	.80	1,510	316	187	32	
Feb. 11-20-----	900	7.9	891	13	.00	90	23	78	172	301	22	.4	3.1	.01	615	.84	1,490	319	178	35	
Feb. 21-28, 24-29----	2,353	7.7	906	14	.01	86	22	92	188	305	20	.3	4.7	.01	637	.87	4,050	305	151	40	
Mar. 1-10-----	1,298	7.7	891	13	.06	82	22	90	176	304	19	.4	3.9	.01	621	.84	2,180	295	151	40	
Mar. 12-20-----	1,152	7.8	951	13	.02	89	27	90	174	339	21	.4	4.3	.01	669	.91	2,080	333	190	37	
Mar. 21-31-----	1,875	7.8	856	11	.01	80	24	80	168	292	20	.4	2.7	.01	593	.81	3,000	298	160	37	

SAN JUAN RIVER BASIN--Continued  
SAN JUAN RIVER NEAR BLUFF, UTAH--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Mean discharge (second-foot)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
Apr. 1-9, 1948 -----	3,913	7.5		560	12	0.02	70	16	35		176	149	9.8	0.3	3.0	0.01	382	0.52	4,040	240	96	24
Apr. 11-20 -----	6,902	7.7		416	13	.02	54	10	27		162	85	7.0	.4	1.6	.00	278	.38	5,180	176	43	25
Apr. 21-30 -----	7,254	7.8		326	14	.02	43	7.7	17		122	64	5.0	.4	1.1	.00	212	.29	4,150	139	39	21
May 1-10 -----	6,961	7.6		308	12	.02	43	6.9	16		124	56	6.0	.4	.9	.00	202	.27	3,808	136	34	20
May 11-20 -----	6,387	7.7		317	13	.04	41	7.3	10		116	68	5.5	.4	.8	.00	210	.29	3,628	132	38	23
May 21-31 -----	11,860	7.7		280	12	.11	39	5.8	15		112	52	5.0	.4	.9	.00	185	.25	5,820	122	30	21
June 1-2, 4-6, 8-10 -	14,570	7.8		335	14	.03	47	6.4	14		134	57	3.0	.2	1.2	.00	209	.28	8,220	144	34	18
June 11-20 -----	10,820	7.6		282	13	.03	41	5.2	13		122	45	3.0	.2	1.2	.01	182	.25	5,370	124	24	19
June 21-30 -----	4,916	7.7		401	14	.01	47	9.2	24		116	99	6.0	.1	1.2	.01	238	.35	3,420	156	60	25
July 1-10 -----	3,693	7.8		372	14	.02	43	8.7	23		110	90	5.8	.4	.8	.01	240	.33	2,390	144	94	26
July 11-20 -----	2,030	7.6		461	13	.02	51	10	32		116	124	9.2	.3	.7	.01	297	.40	1,630	168	73	30
July 22-31 -----	1,533	7.8		750	15	.01	80	19	43		156	210	15	.4	2.5	.02	462	.63	1,910	278	150	25
Aug. 1-10 -----	2,268	7.4		846	16	.01	94	20	72		190	279	17	.4	3.0	.04	595	.81	3,640	316	161	33
Aug. 11-20 -----	1,274	7.7		690	19	.01	76	14	60		156	215	15	.5	3.3	.01	480	.65	1,650	237	119	34
Aug. 21-31 -----	705	7.7		922	18	.01	90	17	99		184	312	22	.4	2.5	.02	652	.89	1,240	294	144	42
Sept. 1-10 -----	298	7.7		961	14	.01	86	20	104		156	342	26	.4	1.7	.02	671	.91	540	296	168	43
Sept. 11-20 -----	548	7.6		1,260	13	.01	124	25	138		174	499	34	.4	2.7	.02	922	1.25	1,360	412	270	42
Sept. 21-30 -----	944	7.7		1,120	14	.01	119	22	114		200	414	26	.5	2.2	.02	810	1.10	2,080	388	224	39
Weighted average --	3,194	--		503	13	0.03	59	12	36		143	137	9.2	0.3	1.6	0.01	339	0.46	2,920	156	80	29

SAN JUAN RIVER BASIN--Continued  
SAN JUAN RIVER NEAR BLUFF, UTAH--Continued

Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	64	--	41	32	--	42	45	55	63	73	74	75
2	70	--	43	32	33	33	40	48	--	74	74	74
3	66	--	43	32	34	38	52	55	70	71	73	77
4	66	44	42	32	32	35	57	54	64	70	70	74
5	62	--	40	32	36	39	49	56	66	73	71	71
6	64	--	41	34	36	40	47	57	70	76	76	69
7	64	40	37	32	38	43	47	59	70	77	77	60
8	62	38	38	33	34	41	49	54	66	73	75	65
9	66	40	35	37	34	46	52	53	69	71	74	65
10	61	40	35	40	36	41	--	53	70	72	74	--
11	59	39	33	37	33	--	50	56	69	74	74	69
12	57	40	--	37	32	39	52	64	67	72	76	59
13	55	41	32	36	--	44	49	59	67	76	70	70
14	56	45	32	34	--	44	51	63	66	73	72	61
15	58	39	32	33	35	43	54	66	67	75	74	73
16	58	45	34	32	34	48	54	65	68	78	76	68
17	59	42	33	--	34	--	59	64	66	82	74	68
18	59	41	32	--	37	--	57	64	61	74	74	69
19	59	42	32	36	45	--	52	61	67	75	76	68
20	60	38	33	33	42	--	51	59	63	71	73	68
21	59	38	32	35	55	44	56	60	62	--	74	62
22	53	37	32	38	45	47	56	70	58	77	75	63
23	51	37	33	--	--	48	52	67	64	76	73	60
24	51	35	32	--	43	47	50	67	66	76	70	60
25	49	35	33	36	42	46	55	61	68	76	69	60
26	--	37	33	36	45	--	50	67	71	80	66	67
27	50	39	32	32	46	46	55	63	66	81	68	63
28	54	39	32	32	45	46	57	64	68	76	71	62
29	53	37	32	32	42	49	58	61	73	75	73	63
30	53	42	33	32	--	47	55	61	73	72	74	63
31	50	--	37	32	--	42	--	61	--	75	74	--
Average	58	40	35	34	39	43	52	61	67	75	73	67

## SAN JUAN RIVER BASIN--Continued

## SAN JUAN RIVER NEAR BLUFF, UTAH--Continued

Suspended sediment, water year October 1947 to September 1948

Day	October			November			December		
	Mean dis-charge (second-feet)	Suspended sediment		Mean dis-charge (second-feet)	Suspended sediment		Mean dis-charge (second-feet)	Suspended sediment	
		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day
1-----	1,410	0.28	10,700	2,090	0.21	11,900	1,100	0.14	4,160
2-----	1,330	.21	7,540	2,030	1.24	13,200	2,180	1.30	80,000
3-----	1,200	.36	11,700	1,680	.28	12,700	2,170	1.43	83,800
4-----	1,150	.45	7,760	1,580	.21	8,960	1,770	1.52	72,700
5-----	1,120	.28	8,470	1,620	1.19	8,310	1,540	.81	33,700
6-----	1,090	.21	6,180	1,550	1/.18	7,530	1,280	.45	15,600
7-----	1,120	.21	6,350	1,520	.16	6,570	1,240	.34	11,400
8-----	1,090	.23	6,770	1,510	.14	5,710	1,180	.27	8,600
9-----	929	.23	5,770	1,510	.21	8,560	1,200	.22	7,130
10-----	824	.15	3,340	1,330	.14	5,030	1,130	.18	5,490
11-----	804	.27	5,860	1,140	.13	4,000	1,040	.15	4,210
12-----	1,410	1.20	45,700	1,130	.07	2,140	1,030	.26	7,230
13-----	3,050	4.40	362,000	1,140	.10	3,080	908	.09	2,210
14-----	13,700	10.3	3,810,000	1,160	.09	2,820	778	.10	2,100
15-----	23,000	8.80	5,460,000	1,170	.08	2,530	797	.10	2,150
16-----	8,830	4.73	1,130,000	1,170	.09	2,840	758	.10	2,050
17-----	4,240	2.45	280,000	1,120	.13	3,930	706	.12	2,290
18-----	3,260	1.31	115,000	1,120	.14	4,230	771	.09	1,870
19-----	3,000	.71	57,500	1,220	.15	4,940	815	.10	2,280
20-----	2,810	.46	34,900	1,300	.16	5,620	866	.12	2,810
21-----	2,820	.50	38,100	1,150	.16	4,970	936	.11	2,760
22-----	2,860	.39	30,100	1,150	.14	4,350	894	.14	3,380
23-----	2,890	.36	28,100	1,090	.13	3,830	859	.16	3,710
24-----	3,050	.36	29,600	1,060	.12	3,430	831	.11	2,470
25-----	2,890	.31	24,200	1,080	.10	2,920	929	.15	3,760
26-----	2,760	.30	22,400	1,030	.08	2,220	880	.13	3,090
27-----	2,590	.23	16,100	999	.09	2,430	824	.12	2,670
28-----	2,450	.28	18,700	1,050	.14	3,970	852	.12	2,760
29-----	2,250	.33	20,000	1,060	.13	3,720	845	.16	3,650
30-----	2,150	.29	16,800	1,110	.16	4,800	880	.20	4,750
31-----	2,130	.22	12,800	--	--	--	866	.17	3,970
Total -	104,207	--	11,630,000	38,969	--	161,200	32,985	--	--
Day	January			February			March		
	Mean dis-charge (second-feet)	Suspended sediment		Mean dis-charge (second-feet)	Suspended sediment		Mean dis-charge (second-feet)	Suspended sediment	
		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day
1-----	929	0.44	11,000	542	0.18	2,630	2,000	1.41	76,100
2-----	880	.40	9,500	650	.10	1,760	1,640	.87	38,500
3-----	771	.40	8,330	1,010	.14	3,820	1,390	.76	28,500
4-----	745	.38	7,640	1,170	.22	6,950	1,370	.56	20,700
5-----	700	.35	6,620	1,060	.19	5,440	1,250	.45	15,200
6-----	866	.58	13,600	1,120	.26	7,860	1,060	.44	12,600
7-----	950	.42	10,800	1,110	.16	4,800	999	.32	8,630
8-----	957	.56	14,500	1,050	.23	6,520	964	.26	6,770
9-----	915	.41	10,100	971	.22	5,770	1,010	.24	6,540
10-----	964	.32	8,330	866	.18	4,210	1,300	.50	17,600
11-----	1,010	.08	2,180	758	.24	4,910	1,040	.25	7,020
12-----	1,040	.21	5,900	570	.17	2,620	1,060	.21	6,010
13-----	1,010	.12	3,270	609	.19	3,120	964	.19	4,950
14-----	950	.08	2,050	712	.30	5,770	887	.17	4,070
15-----	929	.11	2,760	626	.19	3,210	894	.19	4,590
16-----	908	.09	2,210	564	.14	2,130	1,030	.21	5,840
17-----	859	.15	3,480	738	.28	5,580	1,330	.46	16,500
18-----	866	.09	2,100	1,150	.37	11,500	1,190	1.00	32,100
19-----	838	.06	1,360	1,370	.38	14,100	1,330	.94	33,800
20-----	852	.09	2,070	1,900	.78	40,000	1,790	.92	44,500
21-----	908	.12	2,940	1,740	.88	41,300	1,610	1.02	44,300
22-----	817	.05	1,100	2,060	.79	43,900	1,380	1.13	42,100
23-----	887	.10	2,390	2,890	1.43	112,000	1,220	.70	23,100
24-----	915	.14	3,460	2,680	2.10	152,000	1,180	.68	21,700
25-----	915	.13	3,210	2,340	1.76	111,000	1,650	1.64	73,100
26-----	943	.10	2,550	1,800	1.29	62,700	2,190	1.50	88,700
27-----	866	.06	1,400	2,280	.93	57,300	2,170	1.27	74,400
28-----	581	.04	627	3,070	1.68	139,000	1,770	.96	45,900
29-----	575	.04	621	2,320	2.07	130,000	1,800	1.08	52,500
30-----	553	.07	1,050	--	--	--	2,470	1.31	87,400
31-----	505	.08	1,090	--	--	--	3,190	1.16	99,900
Total -	26,404	--	148,200	39,726	--	991,900	45,128	--	--

1/ Estimated or interpolated.

SAN JUAN RIVER BASIN  
SAN JUAN RIVER BASIN--Continued

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SAN JUAN RIVER NEAR BLUFF, UTAH--Continued

Suspended sediment, water year October 1947 to September 1948--Continued

Day	April			May			June		
	Mean dis-charge (second-feet)	Suspended sediment		Mean dis-charge (second-feet)	Suspended sediment		Mean dis-charge (second-feet)	Suspended sediment	
		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day		Mean concentration (percent)	Tons per day
1-----	3,200	1.04	89,900	6,800	0.44	80,800	11,500	0.57	177,000
2-----	2,800	.77	58,200	7,500	.43	87,100	14,000	1.08	408,000
3-----	2,510	.60	41,300	7,360	.62	123,000	13,800	1.25	466,000
4-----	3,220	.69	60,000	6,530	.55	97,000	16,000	.97	419,000
5-----	4,140	.93	104,000	6,100	.46	75,800	18,100	.60	293,000
6-----	4,370	.99	117,000	6,280	.48	81,400	16,200	.74	324,000
7-----	4,540	1.25	153,000	6,910	.60	112,000	14,500	.68	266,000
8-----	4,830	.59	76,900	7,140	.58	112,000	15,700	1.03	437,000
9-----	4,690	.91	115,000	7,740	.56	117,000	13,300	.82	294,000
10-----	4,830	.65	84,800	7,250	.61	119,000	12,600	.63	214,000
11-----	5,540	.85	127,000	6,370	.40	68,800	12,900	.63	219,000
12-----	6,290	1.02	173,000	4,800	.32	41,500	13,200	.73	260,000
13-----	6,380	.86	148,000	4,290	.26	30,100	14,200	.84	322,000
14-----	5,530	.74	110,000	3,470	.27	25,300	12,900	.66	230,000
15-----	5,020	.54	73,200	3,270	.32	28,300	11,700	.65	205,000
16-----	5,700	.46	70,800	5,070	.48	65,700	10,500	.60	170,000
17-----	7,290	.83	163,000	7,250	.60	117,000	9,610	.57	148,000
18-----	8,790	1.23	292,000	8,590	.68	158,000	8,950	.46	111,000
19-----	9,710	1.34	351,000	9,460	.74	189,000	7,920	.47	101,000
20-----	8,770	1.15	272,000	11,300	.85	259,000	7,270	.49	96,200
21-----	8,930	.85	205,000	16,700	1.35	609,000	6,670	.41	73,800
22-----	9,860	.83	221,000	15,000	1.03	417,000	6,220	.34	57,100
23-----	9,900	.87	233,000	14,800	.93	372,000	6,330	.50	85,500
24-----	9,070	.60	147,000	13,900	.88	330,000	5,900	.57	90,800
25-----	7,900	.56	119,000	12,700	.74	254,000	4,770	.33	42,500
26-----	6,730	.60	109,000	10,800	.52	152,000	4,020	.33	35,800
27-----	5,610	.38	57,600	9,270	.44	110,000	3,880	.28	29,300
28-----	4,880	.35	46,100	8,590	.44	102,000	3,800	.29	29,800
29-----	4,510	.41	49,900	8,310	.50	112,000	3,880	.30	31,400
30-----	5,150	.37	51,500	8,290	.52	117,000	3,690	.29	28,900
31-----	--	--	--	9,860	.46	122,000	--	--	--
Total -	180,690	--	3,919,000	261,700	--	4,685,000	304,010	--	5,665,000
	July			August			September		
1-----	3,660	0.31	30,600	1,190	0.40	12,900	458	0.16	1,980
2-----	4,160	.35	39,300	1,060	.27	7,730	382	.18	1,860
3-----	4,180	.29	32,400	1,010	.22	6,000	386	.14	1,460
4-----	4,140	.35	39,100	1,140	.46	14,200	330	.12	1,070
5-----	3,840	.26	27,000	1,690	3.20	146,000	288	.12	933
6-----	3,680	.34	33,800	3,920	6.36	673,000	230	.25	931
7-----	3,620	.22	21,500	3,780	6.00	612,000	230	.34	2,110
8-----	3,360	.20	18,100	3,520	2.80	266,000	268	.16	1,160
9-----	3,190	.20	17,200	3,150	4.66	396,000	222	.12	719
10-----	3,100	.18	15,100	4,220	3.07	184,000	190	.09	462
11-----	2,730	.19	14,000	1,810	1.10	53,800	172	.20	929
12-----	2,530	.15	10,200	1,580	.81	34,600	178	.12	577
13-----	2,300	.16	9,940	1,370	.62	22,900	178	.15	721
14-----	2,060	.15	8,340	1,450	.54	21,100	151	.19	775
15-----	1,910	.15	7,740	1,410	.74	28,200	175	.19	898
16-----	1,810	.15	7,330	1,280	.65	22,500	353	.28	2,670
17-----	1,670	.14	6,310	1,130	.41	12,500	1,460	2.06	81,200
18-----	1,530	.12	4,960	1,060	.28	8,010	1,290	2.18	75,900
19-----	1,520	.12	4,920	880	.23	5,460	831	2.70	60,600
20-----	2,240	.80	48,400	771	.21	4,370	693	2.31	43,200
21-----	1,670	1.66	74,800	680	.18	3,300	632	.99	16,900
22-----	1,490	.92	37,000	693	.25	4,680	581	.53	8,310
23-----	1,530	.40	16,500	971	.68	17,800	644	.35	6,090
24-----	1,480	.21	8,390	992	1.14	30,500	526	.38	5,400
25-----	1,450	.61	23,900	778	1.72	36,100	542	.26	3,800
26-----	1,730	1.44	67,300	732	1.53	30,200	575	.45	6,990
27-----	1,590	.76	32,600	700	.93	17,600	1,490	2.20	88,500
28-----	1,810	1.08	52,800	603	.59	9,610	1,550	4.33	181,000
29-----	1,710	2.54	117,000	575	.32	4,970	1,650	3.93	175,000
30-----	1,240	1.01	33,800	537	.26	3,770	1,250	2.64	89,100
31-----	1,160	.49	15,300	489	.24	3,170	--	--	--
Total -	74,090	--	875,900	43,171	--	2,693,000	17,905	--	861,200

SAN JUAN RIVER BASIN--Continued  
SAN JUAN RIVER NEAR BLUFF, UTAH--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948  
(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	Time	Mean discharge (second-foot)	Suspended sediment											Methods of analysis		
			Mean daily concentration (percent)	Weight of material in tube (grams)	Percent finer than indicated size, in millimeters											
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500		1.000	2.000
Oct. 5, 1947		1,120	0.28	0.4841	--	--	--	--	--	--	58	85	99	100		S
Oct. 8		1,090	.23	.3150	--	--	--	--	--	--	49	83	100	--		S
Oct. 12		1,410	1.20	1.7455	39	44	58	70	80	88	97	100	--		S	
Oct. 14		13,700	10.30	2.2749	20	26	33	42	49	60	88	99	100		S	
Oct. 15		23,000	8.80	.5084	37	40	50	59	66	74	92	99	100		S	
Oct. 19		3,000	.71	.6695	45	53	64	71	79	89	95	--	--		BW	
Oct. 22		2,860	.39	.5023	29	31	36	39	48	57	77	96	100		S	
Oct. 29		2,250	.33	.6829	--	--	--	--	--	49	78	98	100		S	
Nov. 3		1,680	.28	.8265	--	--	--	--	--	32	47	82	100		S	
Nov. 12		1,130	.07	.3254	--	--	--	--	--	43	68	93	99		S	
Nov. 16		1,170	.09	.5644	--	--	--	--	--	33	52	72	96		S	
Nov. 19		1,220	.15	.3646	--	--	--	--	--	31	58	84	100		S	
Nov. 23		1,090	.13	.6199	--	--	--	--	--	20	39	74	99		S	
Nov. 26		1,030	.08	.4344	--	--	--	--	--	31	55	88	99		S	
Nov. 30		1,110	.16	.8249	--	--	--	--	--	23	47	81	99		S	
Dec. 3		2,170	1.43	.2881	50	55	66	72	76	81	92	99	100		S	
Dec. 7		1,240	.34	.7075	40	47	56	58	62	63	81	99	100		S	
Dec. 17		708	.12	.3547	--	--	--	--	--	24	45	84	100		S	
Dec. 25		929	.15	.7877	--	--	--	--	--	22	48	91	100		S	
Dec. 28		852	.12	.6973	--	--	--	--	--	17	34	65	97		S	
Dec. 31		866	.17	.3087	--	--	--	--	--	37	73	99	100		S	
Jan. 4, 1948		745	.38	.3596	--	--	--	--	--	18	51	88	97		S	
Jan. 8		957	.56	.3283	--	--	--	--	--	31	62	97	100		S	
Jan. 14		930	.08	.7847	--	--	--	--	--	23	52	94	100		S	
Jan. 24		915	.14	3.0377	--	--	--	--	--	9	19	72	99		S	
Jan. 29		575	.04	.1642	--	--	--	--	--	29	75	96	100		S	
Feb. 1		542	.18	.7535	--	--	--	--	--	12	37	85	100		S	
Feb. 4		1,170	.22	.8593	--	--	--	--	--	25	53	91	99		S	
Feb. 8		1,050	.23	1.0211	--	--	--	--	--	25	59	96	100		S	
Feb. 10		866	.18	1.6565	--	--	--	--	--	28	60	96	100		S	
Feb. 11		758	.24	.7547	--	--	--	--	--	21	51	96	100		S	
Feb. 16		564	.14	.4219	--	--	--	--	--	19	44	90	100		S	
Feb. 22		2,060	.79	.5555	--	41	53	61	66	90	86	97	99		S	
Feb. 26		1,800	1.29	.9950	50	59	80	86	88	91	97	--	--		BW	
Feb. 29		2,320	2.07	.5744	50	65	79	84	87	92	96	--	--		BW	

Mar. 3	1,390	.76	.4850	44	65	78	84	86	89	93	--	--	1BW
Mar. 7	999	.32	.8956	--	--	--	--	--	61	77	96	99	S
Mar. 10	1,300	.50	1.0869	26	34	43	50	55	61	77	97	100	S
Mar. 14	887	.17	.9316	--	--	--	--	--	38	58	93	99	S
Mar. 22	1,380	1.13	.6353	47	62	78	88	85	88	94	--	--	BW
Mar. 24	1,180	.68	.4227	47	59	74	--	79	82	91	--	--	BW
Mar. 29	1,800	1.08	.6421	40	52	65	70	74	76	85	97	99	S
Mar. 31	3,190	1.16	.9354	34	36	47	55	64	74	87	97	99	S
Apr. 7	1,120	.21	1.0349	29	36	46	52	58	68	81	93	99	S
Apr. 11	804	.27	1.9677	--	13	20	26	31	42	59	76	98	S
Apr. 14	5,830	.74	.3964	16	21	26	32	--	51	69	85	100	S
Apr. 19	8,710	1.34	.6080	27	35	47	55	66	76	91	98	100	S
Apr. 21	8,930	.85	.2299	--	16	22	29	39	59	77	89	98	S
Apr. 25	7,900	.56	1.0417	14	15	21	26	34	54	81	95	99	S
Apr. 28	4,880	.35	1.3672	--	12	16	21	27	42	69	91	100	S
May 2	7,500	.43	1.5179	--	--	--	--	--	54	85	94	99	S
May 5	6,100	.46	2.2146	--	--	--	--	--	26	53	77	98	S
May 9	7,740	.56	1.2715	0	2	6	10	--	29	55	82	99	S
May 12	4,800	.32	1.2563	--	--	--	--	--	30	60	84	98	S
May 18	8,590	.68	2.0344	--	--	--	--	--	29	45	89	99	S
May 23	14,800	.93	4.4876	--	--	--	--	--	31	53	70	88	S
May 27	9,270	.44	2.1836	--	--	--	--	--	26	51	77	97	S
June 8	15,700	1.03	1.7356	0	2	9	16	--	52	80	94	99	S
June 11	12,900	.63	1.2151	--	9	12	14	20	33	56	77	93	S
June 13	14,200	.84	2.8895	--	--	--	--	--	39	56	76	94	S
June 16	10,500	.60	1.8272	--	--	--	--	--	31	58	83	98	S
June 20	7,270	.49	1.5094	--	--	--	--	--	29	57	84	99	S
June 23	6,330	.50	1.1937	--	--	26	31	38	49	69	86	98	S
June 27	3,880	.28	1.2628	--	--	--	--	--	56	87	100	100	S
June 30	3,690	.29	1.1065	--	--	--	--	--	21	52	90	100	S

SAN JUAN RIVER BASIN--Continued  
SAN JUAN RIVER NEAR BLUFF, UTAH--Continued

Particle-size analyses of suspended sediment, water year October 1947 to September 1948--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	Time	Mean discharge (second-foot)	Suspended sediment												Methods of analysis	
			Mean daily concentration (percent)	Weight of material in tube (grams)	Percent finer than indicated size, in millimeters											
					0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000		2.000
July 4, 1948		4, 140	0.35	1, 0560	--	--	--	--	--	--	23	53	89	100		S
July 7		3, 620	.22	1, 1302	--	--	--	--	--	--	17	41	87	100		S
July 11		2, 730	.19	1, 6188	--	--	--	--	--	--	5	18	60	94		S
July 20		2, 240	.80	.9567	16	21	46	56	69	78	89	96	99			S
July 23		1, 530	.40	.3936	18	28	38	48	--	73	87	98	100			SD
July 25		1, 450	.61	.4415	20	30	42	49	--	65	85	100	100			SD
July 28		1, 810	1.08	.4499	22	31	42	57	--	89	--	--	--			SD
Aug. 1		1, 190	.40	.6217	16	21	27	33	--	57	87	98	100			SD
Aug. 4		1, 140	.46	.9025	5	7	8	11	--	27	78	99	100			SD
Aug. 8		3, 520	2.80	.8907	41	53	64	70	73	77	92	100	--			S
Aug. 12		1, 580	.81	.7018	18	24	31	37	--	51	86	99	100			SD
Aug. 15		1, 410	.74	.4604	20	27	34	40	--	52	86	100	--			SD
Aug. 18		1, 060	.28	1, 2520	7	10	13	16	--	30	72	99	100			SD
Aug. 22		693	.25	.8241	5	8	10	14	--	42	86	100	--			SD
Aug. 25		778	1.72	.7523	54	70	80	84	86	90	93	--	--			S
Aug. 29		575	.32	.6279	17	25	35	43	--	57	84	100	--			SD
Sept. 1		458	.16	1, 0464	7	11	14	18	--	36	77	100	--			SD
Sept. 6		230	.25	.6802	13	17	20	24	--	36	75	100	--			SD
Sept. 9		222	.12	.6422	--	--	--	--	--	18	70	99	100			S
Sept. 14		151	.19	.8903	--	--	--	--	--	13	52	93	99			S
Sept. 17		1, 460	2.06	.8636	28	35	47	54	60	66	86	99	100			S
Sept. 21		632	.99	.5411	57	68	83	88	89	91	96	--	--			BW
Sept. 27		1, 490	2.20	1, 2421	15	19	27	34	46	61	81	96	100			S



## SAN JUAN RIVER BASIN--Continued

## ANIMAS RIVER AT FARMINGTON, N. MEX.

LOCATION.--At gaging station at bridge on State Highway 17, 0.6 mile southeast of Farmington, San Juan County, and 1.1 miles upstream from mouth. DRAINAGE AREA.--1,360 square miles.

RECORDS AVAILABLE.--Chemical analyses: June 1940 to September 1948.

EXTREMES, 1947-48.--Dissolved solids: Maximum, 589 parts per million Sept. 11-20; minimum, 123 parts per million June 11-20.

Total hardness: Maximum, 355 parts per million Sept. 11-20; minimum, 90 parts per million June 11-20.

EXTREMES.--1940-48.--Dissolved solids: Maximum, 1,500 parts per million Aug. 19, 1944; minimum, 111 parts per million June 11-17, 19-20, 1944.

Total hardness: Maximum, 613 parts per million Aug. 19, 1944; minimum, 82 parts per million June 21-30, 1944.

REMARKS.--Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1119. Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
Oct. 1-9, 1947 ----	375	7.4		547	7.9	0.03	74	12	24		140	147	12	0.3	0.0	0.1	346	0.47	350	234	120	18
Oct. 11-20 -----	1,049	7.6		495	7.8	.03	67	10	24		138	128	9.0		.9		315	.43	892	208	95	20
Oct. 21-31 -----	927	7.7		398	7.2	.02	56	8.6	15		121	94	7.5		.5		249	.34	623	175	76	16
Nov. 1-10 -----	575	7.7		505	7.3	.03	69	11	20		140	126	10		.7		313	.43	486	217	102	17
Nov. 12-20 -----	459	7.7		574	7.4	.02	78	12	30		158	152	14		.8		372	.51	461	244	114	21
Nov. 21-30 -----	408	7.6		602	6.9	.03	83	13	25		160	160	14		1.3		382	.52	421	260	130	17
Dec. 1-10 -----	414	7.5		631	7.5	.02	84	13	34		167	171	15		1.5		409	.56	457	263	126	22
Dec. 11-20 -----	330	7.6		707	9.1	.03	99	15	35		202	186	16		1.8		462	.63	412	308	143	20
Dec. 21-31 -----	326	7.5		678	8.0	.03	94	15	34		183	184	16		1.6		445	.61	392	296	146	20
Jan. 1-10, 1948 -----	310	7.5		685	11	.01	95	14	34		178	191	16		1.5		451	.61	377	294	148	20
Jan. 11-20 -----	308	7.5		677	10	.01	95	14	32		179	185	16		1.4		442	.60	368	294	148	19
Jan. 21-31 -----	296	7.6		696	11	.02	98	14	35		185	192	18		1.5		461	.63	368	302	150	20
Feb. 1-10 -----	290	7.6		680	11	.01	97	14	31		176	189	16		1.6		447	.61	350	300	156	18
Feb. 11-20 -----	311	7.6		692	11	.03	97	15	31		176	193	17		1.5		453	.62	380	304	160	18
Feb. 21-29 -----	386	7.6		636	8.4	.03	84	15	34		167	177	15		1.1		417	.57	435	271	134	21
Mar. 1-10 -----	301	7.6		684	9.4	.01	98	15	32		178	189	22		1.1		455	.62	370	306	160	19
Mar. 11-20 -----	328	7.7		648	9.6	.00	92	15	32		172	185	17		1.1		437	.59	387	291	150	19
Mar. 21-31 -----	467	7.8		581	8.9	.01	82	16	24		166	156	16		1.1		386	.52	487	270	134	16
Apr. 1-10 -----	838	7.9		431	8.5	.02	64	11	14		154	92	7.8		.9		275	.37	622	204	78	13
Apr. 11-20 -----	1,779	7.7		343	8.8	.04	52	8.3	8.5		140	58	3.5		.2		209	.28	1,000	162	48	10
Apr. 21-30 -----	1,985	7.8		310	8.6	.04	46	7.3	8.7		127	51	4.0		.2		190	.26	1,020	145	41	12
May 1-10 -----	2,365	7.8		271	7.5	.05	40	6.3	7.8		113	43	3.0		1.2		165	.22	1,060	126	34	12
May 11-20 -----	3,543	8.0		293	9.1	.03	48	9.9	17		117	76	14		1.6		234	.32	2,240	160	64	19
May 21-31 -----	5,399	8.1		234	8.5	.03	36	5.2	7.6		94	43	3.0		1.2		151	.21	2,200	112	34	13

SAN JUAN RIVER BASIN--Continued  
ANIMAS RIVER AT FARMINGTON, N. MEX.--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	Specific conductance (micro-mhos at 25° C.)	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
																Parts per million	Tons per acre-foot	Total	Non-carbonate	
June 1-10, 1948	5,946	8.0	212	7.2	0.03	33	4.8	5.3		84	38	2.2	0.3	1.1	0.1	133	0.18	102	33	10
June 11-20	4,519	8.0	202	6.8	.02	29	4.2	6.7		73	36	4.2	.1	.5	.1	123	.17	90	30	14
June 21-30	1,668	7.8	309	8.8	.01	42	6.6	12		99	64	6.8	.3	.9	.1	190	.26	132	51	17
July 1-10	1,826	7.8	252	7.4	.03	35	4.9	8.7		74	55	5.2	.2	.5	.1	153	.21	108	47	15
July 11-14, 16-20	1,018	7.8	355	8.3	.02	47	6.7	17		94	85	9.8	.3	.5	.1	221	.30	607	145	20
July 22-31	690	7.8	430	8.1	.02	56	8.5	23		115	107	13	.3	.6	.1	273	.37	509	174	23
Aug. 1-10	660	7.8	499	7.9	.02	66	12	21		139	121	13	.4	.9	.1	311	.42	554	214	18
Aug. 11-20	353	7.8	582	9.5	.02	72	13	33		153	148	16	.4	1.0	.1	368	.50	351	233	23
Aug. 21-31	185	7.8	690	11	.03	88	16	35		166	189	19	.4	1.4	.1	442	.60	221	286	21
Sept. 1-10	185	7.6	831	9.5	.03	106	19	45		182	243	22	.4	1.1	.1	541	.74	121	342	22
Sept. 11-20	137	8.0	872	14	.05	111	19	56		197	263	26	.4	1.0	.1	589	.80	218	355	26
Sept. 21-30	228	7.9	781	12	.02	100	16	39		189	212	22	.4	1.1	.1	496	.68	307	324	21
Weighted average	1,142	--	339	8.0	0.03	50	7.8	14		113	76	7.3	0.3	1.0	0.1	220	0.30	157	64	16

PARIA RIVER BASIN

PARIA RIVER AT LEES FERRY, ARIZ.

LOCATION.--At gaging station, half a mile upstream from mouth and one mile northwest of Lees Ferry, Coconino County. DRAINAGE AREA.--1,570 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1948.

Sediment records: October 1947 to September 1948.

EXTREMES, 1947-48.--Dissolved solids: Maximum, 1,240 parts per million Aug. 15; minimum, 337 parts per million July 15.

Total hardness: Maximum, 677 parts per million Aug. 15; minimum, 212 parts per million July 15.

Sediment loads: Maximum, about 775,000 tons per day Aug. 5; minimum, no flow on many days.

REMARKS.--Samples for chemical analyses collected twice monthly. Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1119. Records of specific conductance of daily samples available in district office at Salt Lake City, Utah.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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> )	Bo-ron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Per-cent so-lu-dum
																	Parts per mil-lion	Tons per acre-foot	Tons per day	Total	Non-carbon-ate	
Oct. 1, 1947	4.4			702			66	31	38		146	224	12		5.5		448	0.61	5.3	282	172	22
Oct. 15	109			1,510			132	39	184		280	630	15		7		1,130	1.54	333	490	277	45
Nov. 1	18			1,320			103	61	110		160	563	20		3.2		939	1.28	46	508	377	32
Nov. 15	20			1,200			103	58	87		189	486	15		3.0		845	1.15	46	486	340	28
Dec. 1	26			1,320			107	63	106		183	546	25		3.2		940	1.28	66	526	376	30
Dec. 15	16			1,360			118	57	127		184	588	28		4.2		1,010	1.37	44	529	378	34
Dec. 31	24			1,460			123	64	131		209	620	23		3.2		1,070	1.46	69	570	398	33
Jan. 1, 1948	6.8			1,490			130	61	134		238	609	25		4.0		1,080	1.47	20	576	380	34
Jan. 15	14			1,310			98	56	119		142	567	22		3.3		937	1.27	35	463	366	35
Feb. 1	10			877			76	36	67		174	299	18		5.2		587	.80	16	338	195	30
Feb. 16	25			1,470			132	63	120		182	633	22		3.2		1,070	1.46	72	568	431	31
Mar. 1	31			1,400			115	53	133		168	596	23		4.2		1,010	1.37	85	505	368	36
Mar. 15	24			1,170			90	51	101		175	462	19		3.4		813	1.11	53	434	290	34
Apr. 1	25			1,380			124	52	124		221	555	21		5.6		990	1.35	67	554	342	34
Apr. 15	14			1,320			100	54	125		170	549	21		4.2		937	1.27	35	472	332	37
May 1	4.8			1,080			82	47	92		156	419	22		3.4		742	1.01	9.6	398	270	33
May 15	3.7			577			53	28	27		136	169	13		--		357	.49	3.6	247	136	19
June 1	8.0			1,400			142	45	127		188	606	18		5.4		1,040	1.41	22	540	386	34
July 1	4.6			560			50	23	42		160	148	13		9.0		364	.50	4.5	220	88	29
July 15	4.2			556			42	26	34		117	160	13		4.8		337	.46	3.8	212	116	26
Aug. 1	7.2			1,530			123	86	93		291	570	21		2.0		1,040	1.41	20	660	422	23
Aug. 15	8.2			1,610			161	67	135		161	769	24		4.4		1,240	1.69	27	677	545	30
Sept. 1	4.8			1,120			107	45	87		159	463	18		4.0		802	1.09	10	452	322	29
Sept. 15	3.4			683			59	27	52		134	230	12		5.0		451	.61	4.1	258	148	30

## COLORADO RIVER BASIN

## PARIA RIVER BASIN--Continued

## PARIA RIVER AT LEES FERRY, ARIZ.--Continued

Suspended sediment, water year October 1947 to September 1948

Month	Discharge (second-foot-days)	Suspended sediment (tons)
October	1,349.9	284,900
November	570	434
December	1,139	24,200
January	711.2	1,470
February	1,632.1	94,920
March	763	10,010
April	519.8	8,710
May	170.2	17,010
June	378.6	101,400
July	221.8	15,660
August	1,963.7	963,200
September	195.3	6,673
Total for year	9,634.6	1,529,000

## VIRGIN RIVER BASIN

LOCATION --At gaging station three-eighths of a mile downstream from Beaverdam, Wash., three-eighths of a mile upstream from Littlefield, Mohave County, and 36 miles upstream from water line of Lake Mead at elevation 1,221 feet above mean sea level.

DRAINAGE AREA --5,090 square miles.

RECORDS AVAILABLE --Water temperatures: October 1947 to September 1948.

REMARKS --October 1941 to September 1948.

EXTRIMES, 1947-48: Water temperatures: Maximum, 86° F. July 15; minimum, 38° F. Jan. 28.

Sediment loads: Maximum, about 45,500 tons per day Sept. 17; minimum, 36 tons per day Oct. 1, 3, 5.

REMARKS --Records of discharge for water year October 1947 to September 1948.

Temperature (° F.) of water, water year October 1947 to September 1948

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	--	56	56	44	45	49	54	58	77	69	70	85
2	--	56	54	50	47	49	56	58	76	68	73	89
3	--	56	46	46	44	48	58	60	69	74	63	98
4	--	52	48	48	43	50	58	60	68	67	72	71
5	--	56	--	46	48	49	65	62	65	68	75	67
6	--	50	50	48	44	52	57	62	70	69	71	66
7	--	50	46	50	45	52	56	63	81	68	73	67
8	--	50	48	50	44	52	57	56	70	67	75	66
9	--	50	42	50	46	57	--	56	82	67	68	65
10	--	52	44	52	48	50	60	60	67	68	68	65
11	--	50	44	--	42	50	58	59	76	67	69	66
12	--	52	44	48	42	48	50	59	65	67	76	65
13	--	50	44	46	44	52	56	63	66	68	68	65
14	--	46	44	46	46	56	58	63	67	68	69	64
15	58	50	48	46	47	58	59	60	71	86	70	67
16	60	52	44	46	49	55	60	63	79	69	70	74
17	60	52	44	46	50	55	63	76	65	82	75	70
18	60	50	44	46	51	53	63	65	70	70	71	73
19	62	58	44	43	54	54	57	61	65	72	70	67
20	62	50	44	49	55	50	59	60	67	85	68	65
21	60	48	44	52	56	55	60	60	68	72	69	65
22	64	44	48	46	54	50	60	61	75	72	70	65
23	62	44	50	48	52	52	57	64	84	74	71	67
24	64	48	44	50	48	55	54	64	79	74	67	65
25	64	48	48	48	51	50	57	65	81	72	67	66
26	58	50	46	48	60	49	60	65	68	85	66	59
27	56	52	46	40	63	50	61	84	67	72	69	62
28	56	52	46	38	57	54	60	71	66	71	72	80
29	60	54	48	44	51	61	60	67	67	71	67	70
30	60	54	44	41	--	55	55	78	66	70	69	65
31	58	--	42	42	--	52	--	66	--	68	69	--
Average	--	51	46	46	49	52	58	63	71	72	70	68

## COLORADO RIVER BASIN

## VIRGIN RIVER BASIN--Continued

## VIRGIN RIVER AT LITTLEFIELD, ARIZ.--Continued

Suspended sediment, water year October 1947 to September 1948

Month	Discharge (second-foot-days)	Suspended sediment (tons)
October,	4,068	70,130
November	4,664	21,110
December	6,968	72,740
January	5,342	30,650
February	6,145	47,000
March	6,390	56,660
April	10,076	153,700
May	5,133	34,790
June	2,058	5,702
July	2,138	4,312
August	2,711	47,490
September	2,995	107,800
Total for year	58,688	652,100

GILA RIVER BASIN  
GILA RIVER NEAR SOLOMONSVILLE, ARIZ.

LOCATION --Within a half mile of gage, 8 miles northeast of Solomonsville, Graham County, and 13 miles downstream from San Francisco River. DRAINAGE AREA --7,950 square miles.

RECORDS AVAILABLE --Chemical analyses: June 1943 to September 1948.

EXTREMES, 1947-48. --Dissolved solids: Maximum, 1,110 parts per million July 11-21; minimum, 263 parts per million Apr. 1-2, 4-10.

Total hardness: Maximum, 321 parts per million July 11-21; minimum, 134 parts per million Apr. 1-2, 4-10. Sept. 25, 27-30, 1944.

EXTREMES, 1943-48. --Dissolved solids: Maximum, 1,110 parts per million July 11-21, 1948; minimum, 263 parts per million Sept. 25, 27-30, 1944.

Total hardness: Maximum, 321 parts per million July 11-21, 1948; minimum, 118 parts per million Sept. 25, 27-30, 1944. Records of specific conductance of daily

REMARKS --Records of discharge for water year October 1947 to September 1948 given in Water-Supply Paper 1119. Records of specific conductance of daily

samples available in district office at Albuquerque, N. Mex.

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids			Hardness as CaCO <sub>3</sub>	
																Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate
Oct. 1, 3-10, 1947 --	56.3	8.0		1,490	57	0.03	89	18	208		233	55	345	1.8	0.7	889	1.21	140	286	105
Oct. 11-17, 19-20 --	75.0	8.1		1,370	55	.04	81	17	183		227	47	305	1.6	.4	802	1.09	162	272	86
Oct. 21, 26-31 --	73.9	7.6		1,380	62	.02	78	17	181		224	40	304	1.3	.4	794	1.08	158	264	131
Nov. 1-10 --	76.3	7.7		1,210	57	.01	70	15	160		223	38	254	1.3	.4	706	.96	145	236	54
Nov. 11-20 --	113	7.3		1,090	45	.02	64	14	141		218	36	216	1.4	.3	625	.85	191	217	38
Nov. 21-29 --	133	7.5		1,010	43	.03	64	14	128		220	35	194	1.6	1.1	589	.80	212	217	36
Dec. 1-10 --	139	7.6		982	46	.02	62	13	127		220	34	188	1.6	.3	580	.79	218	208	28
Dec. 11-20 --	121	7.6		1,070	44	.02	67	14	137		218	37	214	1.4	.2	622	.85	203	224	46
Dec. 21-24, 26-27, 29-31 --	95.6			1,150	43	.02	69	14	151		218	38	238	1.6	.2	662	.90	171	230	51
Jan. 1-7, 9-10, 1948	124	7.6		1,040	46	.02	68	14	138		218	45	210	1.6	.8	631	.86	211	227	48
Jan. 11-16, 18-20 --	129	7.6		1,060	44	.07	67	15	134		221	42	206	1.6	.3	619	.84	216	228	48
Jan. 21-31 --	129	7.5		1,060	46	.02	66	13	137		224	44	194	1.6	.6	618	.84	215	218	26
Feb. 1-10 --	152	7.6		950	44	.02	64	13	118		214	44	172	1.6	.6	563	.77	231	213	38
Feb. 11-13, 15-20 --	146	7.8		983	43	.03	63	13	122		220	40	176	1.8	1.2	568	.77	224	210	30
Feb. 21-28 --	174	7.6		1,050	43	.03	66	14	133		229	40	196	1.6	1.4	608	.83	286	222	34
Mar. 1-10 --	312	7.7		703	40	.04	52	12	78		196	33	105	1.6	1.3	420	.57	354	179	18
Mar. 11-20 --	360	7.6		615	43	.04	49	11	63		179	35	83	1.4	1.3	375	.51	364	168	21
Mar. 21-31 --	663	7.1		489	42	.08	45	10	44		179	24	53	.8	1.6	308	.42	551	154	7
Apr. 1-2, 4-10 --	730			428	38	.03	39	9.0	35		151	26	40	.8	1.0	263	.36	518	134	11
Apr. 11-20 --	580	7.8		497	44	.03	39	9.9	51		153	28	65	1.0	1.3	315	.43	493	138	12
Apr. 21-26 --	342	7.8		721	42	.02	51	12	80		188	32	113	1.2	1.0	425	.58	392	176	22
May 1-10 --	189	7.9		971	51	.02	63	14	120		209	50	176	1.4	.9	579	.79	295	214	43
May 11-20 --	114	7.9		1,160	43	.02	70	15	145		208	48	232	1.4	1.2	658	.89	203	236	66
May 21-24, 27-31 --	79.5	7.8		1,360	44	.02	76	17	180		201	58	298	1.6	1.2	775	1.05	166	260	95

GILA RIVER BASIN--Continued  
GILA RIVER NEAR SOLOMONSVILLE, ARIZ.--Continued

Chemical analyses, in parts per million, water year October 1947 to September 1948.--Continued

Date of collection	Mean discharge (second-foot)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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
																	Parts per million	Tons per acre-foot	Total	Non-carbonate	
June 1-10, 1948 ----	122	7.6		1,440	50	0.03	83	21	183		245	47	310	1.4	1.4	0.1	818	1.11	269	294	92
June 11-20 -----	62.4	7.6		1,350	53	.04	76	17	182		235	52	285	1.8	2.2	.1	785	1.07	132	260	67
June 21-22, 24-30 --	37.0	7.6		1,780	59	.07	92	21	242		212	56	430	1.6	1.5	.2	1,010	1.37	101	316	143
July 1, 3-10 -----	32.3	7.4		1,830	58	.05	86	20	262		194	63	450	2.0	.9	.1	1,040	1.41	91	296	138
July 11-21 -----	34.8	7.4		2,000	51	.06	94	21	282		179	59	512	1.6	.4	.1	1,110	1.51	104	321	174
July 22-24, 30-31 1/2	88.8	7.4		1,100	43	.09	65	17	137		199	44	225	1.2	.9	.1	631	.86	151	232	69
July 25-29 1/2 -----	344	7.4		618	43	.12	48	14	62		206	20	85	.8	.6	.1	375	.51	348	178	8
Aug. 1-10 -----	136	7.4		886	47	.07	60	15	104		221	36	152	1.2	1.1	.1	525	.71	193	211	30
Aug. 11-20 -----	204	7.8		811	38	.06	59	14	86		202	26	138	.7	1.0	.1	463	.63	255	204	39
Aug. 21-31 -----	102	7.8		1,430	60	.02	78	18	187		214	45	318	1.2	1.4	.1	814	1.11	224	268	93
Sept. 1-3 -----	46.3	7.9		1,490	46	.08	83	20	188		208	39	342	1.2	1.2	.1	823	1.12	103	289	118
Weighted average --	173	--		823	44	0.04	56	13	97		194	35	144	1.2	1.0	0.1	487	0.66	227	193	34

1/ Discharge for July 24 included in discharge reported for July 25-29.



COLORADO RIVER BASIN--Continued  
MISCELLANEOUS ANALYSES OF STREAMS IN COLORADO RIVER BASIN IN COLORADO

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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>		
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
COLORADO RIVER AT YUMA																						
Oct. 8, 1947	--	--	--	1,100	--	--	--	--	--	--	165	307	--	--	--	--	--	--	--	--	--	--
Nov. 11	4,540	--	--	1,040	--	--	--	--	--	--	170	288	--	--	--	--	--	--	--	316	181	39
Dec. 8	14,980	--	--	992	--	--	82	27	94	--	164	268	74	--	1.3	--	--	627	0.85	--	--	--
Dec. 24	--	--	--	970	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Jan. 8, 1948	--	--	--	1,100	--	--	95	30	105	--	175	309	86	--	1.8	--	--	713	.97	--	360	217
Feb. 9	11,270	--	--	1,070	--	--	--	--	--	--	172	295	81	--	--	--	--	--	--	--	--	--
Mar. 10	14,390	--	--	1,080	--	--	94	30	67	--	170	302	34	--	1.7	--	--	612	.83	--	358	218
Apr. 9	10,600	--	8.1	1,090	11	--	90	29	106	--	172	300	85	--	1.4	--	--	707	.96	--	344	202
May 10	7,060	--	8.1	1,090	14	--	90	29	108	--	176	299	85	--	2.2	--	--	714	.97	--	344	200
June 9	9,890	--	--	1,090	--	--	90	31	106	--	174	307	84	--	1.5	--	--	705	.96	--	352	210
July 13	6,260	--	--	1,060	--	--	83	33	98	--	150	300	84	--	1.7	--	--	674	.92	--	342	220
Aug. 9	5,680	--	--	1,060	--	--	93	31	90	--	158	296	83	--	1.7	--	--	672	.91	--	360	230
Sept. 10	6,620	--	--	1,060	--	--	84	29	103	--	155	293	85	--	1.1	--	--	672	.91	--	328	20
Sept. 10	4,380	--	--	1,060	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	41

BRIGHT ANGEL CREEK NEAR GRAND CANYON

Oct. 16, 1947	21	--	--	352	--	--	--	--	--	--	224	4.9	6	--	--	--	--	--	--	--	--	--
Nov. 16	22	--	--	368	--	--	--	--	--	--	226	6.2	4	--	--	--	--	--	--	--	--	--
Dec. 17	21	--	--	362	--	--	--	--	--	--	230	6.8	4	--	--	--	--	--	--	--	--	--
Jan. 15, 1948	21	--	--	365	--	--	--	--	--	--	233	6.2	3	--	--	--	--	--	--	--	--	--
Feb. 17	19	--	--	356	--	--	--	--	--	--	228	--	--	--	--	--	--	--	--	--	--	--
Mar. 14	21	--	--	372	--	--	--	--	--	--	236	--	4	--	--	--	--	--	--	--	--	--
Apr. 15	37	--	--	350	--	--	--	--	--	--	224	--	4	--	--	--	--	--	--	--	--	--
May 16	52	--	--	266	--	--	--	--	--	--	169	--	2	--	--	--	--	--	--	--	--	--
June 15	320	--	--	320	--	--	--	--	--	--	202	--	--	--	--	--	--	--	--	--	--	--
July 16	21	--	--	342	--	--	--	--	--	--	217	--	--	--	--	--	--	--	--	--	--	--
Sept. 15	18	--	--	376	--	--	--	--	--	--	203	--	--	--	--	--	--	--	--	--	--	--

## THE GREAT BASIN

## SALTON SEA BASIN

## MISCELLANEOUS ANALYSES OF STREAMS IN SALTON SEA BASIN

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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 non-carbonate
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
ALAMO RIVER ABOUT 4 MILES ABOVE MOUTH NEAR CALLIATURA, CALIF.																						
Nov. 18, 1947	884			2,300			131	61	271		187	468	370		5.8		1,400	1.90	3,340	578	425	50
Dec. 19	590			2,650			108	54	313		198	361	445		6.9		1,390	1.89	2,210	492	330	58
Jan. 16, 1948	702			2,590			147	68	320		189	319	455		--		1,610	2.19	3,050	646	492	52
Feb. 17	794			2,640			149	71	331		188	517	485		9.6		1,660	2.26	3,560	664	510	52
Mar. 18	830			2,540			154	73	292		190	523	435		7.6		1,580	2.15	3,540	684	528	48
May 20	774			2,590			140	71	299		206	505	422		3.1		1,550	2.11	3,240	642	472	50
June 17	674			2,560			135	73	326		195	525	450		6.7		1,610	2.19	2,930	637	477	53
July 19	828			2,760			146	75	320		196	480	500		4.6		1,620	2.20	3,620	673	512	51
Aug. 20	615			2,870			148	77	359		180	533	540		1.9		1,750	2.38	2,910	686	538	53
Sept. 23	645			2,640			137	72	338		178	530	475		5.9		1,650	2.24	2,870	638	492	54

## NEW RIVER ABOUT 7 MILES ABOVE MOUTH NEAR WESTMORELAND, CALIF.

Nov. 18, 1947	636			3,030			146	66	419		199	432	660		4.5		1,850	2.49	3,140	636	473	59
Dec. 19	597			3,130			146	65	440		217	422	685		5.4		1,870	2.54	3,010	632	454	60
Jan. 16, 1948	625			2,970			114	67	391		89	377	670		.2		1,860	2.26	2,800	560	487	60
Feb. 17	582			3,240			160	68	453		208	462	715		4.6		1,970	2.68	3,100	678	508	59
Mar. 18	468			3,690			171	80	519		210	498	845		3.1		2,220	3.02	2,810	756	584	60
June 17	429			3,490	20		158	76	501		217	491	780	0.6	6.9		2,140	2.91	2,480	706	528	61
July 19	516			2,670			131	57	362		195	426	525		6.9		1,600	2.18	2,230	562	402	58
Aug. 20	452			3,190			146	64	451		196	458	685		7.0		1,910	2.60	2,330	628	487	61
Sept. 23	532			2,580			128	56	390		188	495	515		4.8		1,680	2.28	2,410	550	398	61

/ Discharge measurements by Bureau of Reclamation.

## PACIFIC SLOPE BASINS IN WASHINGTON AND UPPER COLUMBIA RIVER BASIN

PACIFIC SLOPE BASINS NORTH OF COLUMBIA RIVER  
 MISCELLANEOUS ANALYSES OF STREAMS IN PACIFIC SLOPE BASINS NORTH OF COLUMBIA RIVER IN WASHINGTON

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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 non-carbonate
																	Parts per million	Tons per acre-foot	Tons per day	Total		
CHEHALIS RIVER NEAR GRAND MOUND																						
Sept. 29, 1947 -----	195		--	94	18	--	9.2	3.1	5.8	43	3.5	6.0	--	1.1	--		68	0.09	36	36	0	26
Jan. 10, 1948 -----	9,600	7.1		60	17	0.11	6.6	.9	5.5	24	5.8	3.5	0.1	1.0	0.01		52	.07	1,350	20	0	38
WYNOOCHEE RIVER AT OXBOW NEAR ABERDEEN																						
Sept. 4, 1947 -----	129		--	68	12	--	9.2	0.3	7.1	40	3.6	1.8	0.1	0.2	--		54	0.07	19	24	0	39
Mar. 22, 1948 -----	2,030	7.3		48	8.5	0.11	8.2	1.0	1.4	26	3.5	1.5	.1	.3	0.01		37	.05	203	24	3	11
QUINAULT RIVER AT QUINAULT LAKE																						
Sept. 13, 1947 -----	907		--	72	6.0	--	10	0.5	5.8	34	8.4	1.7	0.2	0.3	--		50	0.07	122	27	0	32
May 20, 1948 -----	3,800	7.2		76	7.7	0.03	14	1.8	5	32	9.7	1.2	.0	.3	0.01		51	.07	523	42	16	10
WHITE RIVER NEAR BUCKLEY																						
Aug. 26, 1947 -----	655		--	61	15	--	5.6	1.2	8.3	25	14	1.5	--	0.3	--		58	0.08	103	19	0	49
May 7, 1948 -----	3,130	7.2		46	17	0.05	7.2	1.0	3.7	26	7.1	.2	0.1	.2	0.01		49	.07	414	22	0	27
GREEN RIVER NEAR PALMER																						
Aug. 25, 1947 -----	156		--	50	16	--	6.4	1.0	3.7	28	3.1	1.5	--	0.3	--		46	0.06	19	20	0	29
May 7, 1948 -----	3,220	7.2		36	17	0.02	6.6	.9	1.6	22	3.8	.5	0.1	.4	0.01		42	.06	365	20	2	15

PACIFIC SLOPE BASINS NORTH OF COLUMBIA RIVER--Continued  
 MISCELLANEOUS ANALYSES OF STREAMS IN PACIFIC SLOPE BASINS NORTH OF COLUMBIA RIVER IN WASHINGTON--Continued  
 Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

1954-7

Chemical analyses, in parts per million, water year October 1947 to September 1948--Continued

Date of collection	Mean discharge (second-feet)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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 non-carbonate	
																	Parts per million	Tons per acre-foot	Total	Non-carbonate		
																						Tons per day
SKYKOMISH RIVER NEAR GOLD BAR																						
Aug. 25, 1947	748	--	--	46	6.8	--	4.8	0.7	5.5	25	3.1	2.5	--	--	0.2	--	36	0.05	73	15	0	44
May 21, 1948	10,400	7.2	--	26	5.6	0.03	5.2	1.1	5	13	4.0	.5	0.1	--	.6	0.01	24	.03	674	18	7	10
SNOQUALMIE RIVER NEAR TOLT																						
Sept. 5, 1947	880	--	--	59	10	--	7.2	1.0	3.7	29	3.8	1.0	--	--	0.5	--	42	0.06	100	22	0	27
Jan. 7, 1948	7,600	7.2	--	42	9.2	0.05	6.0	1.0	2.5	21	5.4	.8	0.2	.9	0.01	36	.05	739	19	2	22	
SKAGIT RIVER NEAR MOUNT VERNON																						
Sept. 15, 1947	6,360	--	--	60	8.2	--	7.6	1.7	4.4	30	8.6	1.0	--	--	0.5	--	47	0.06	807	26	2	27
June 27, 1948	38,900	--	--	45	5.4	--	7.8	1.7	10	24	4.1	1.5	--	--	.3	--	33	.04	3,470	26	7	--

## UPPER COLUMBIA RIVER BASIN

## MISCELLANEOUS ANALYSES OF STREAMS IN UPPER COLUMBIA RIVER BASIN

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-foot)	Temperature (° F.)	pH	Specific conductance (micro-mhos at 25° C.)	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 carbonate
																	Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate	
-----																						
COLUMBIA RIVER AT BIRCHBANK, B. C.																						
Dec. 9, 1947	25,200	--	--	136	5.1	--	20	3.3	4.8	72	12	1.0	1.0	0.2	0.6	--	82	0.11	5,580	64	4	14
May 28, 1948	256,000	--	--	145	6.3	--	20	5.4	2	69	12	1.1	1.1	.1	1.8	--	81	.11	56,000	72	16	1
June 3	314,000	--	--	141	6.8	--	20	4.8	2.3	73	12	.6	.6	.1	.6	--	83	.11	70,400	70	10	7
MOYIE RIVER AT EASTPORT, IDAHO																						
Oct. 20, 1947	2,700	6.8		35	10	0.03	4.0	0.5	4.8	20	2.5	1.1	1.1	0.4	1.0	0.00	34	0.05	248	12	0	46
Jan. 10, 1948	232	7.6		43	14	.04	4.8	1.4	5.5	28	3.6	1.2	1.2	.4	.2	0.0	45	.06	28	18	0	40
PEND OREILLE RIVER BELOW Z CANYON NEAR METALINE FALLS, WASH.																						
Dec. 13, 1947	18,900	--	--	178	8.7	--	23	4.9	8.7	98	13	1.5	1.5	0.1	0.2	--	108	0.15	5,510	78	0	20
June 13, 1948	168,000	--	--	142	10	--	19	4.9	3.4	77	9.5	.7	.7	.1	.4	--	86	.12	39,000	68	4	10
KETTLE RIVER NEAR FERRY, WASH.																						
Dec. 12, 1947	298	--	--	139	15	--	19	2.2	9.0	76	11	1.0	1.0	0.1	0.2	--	95	0.13	76	56	0	26
May 25, 1948	16,700	--	--	68	12	--	8.0	2.4	2.5	32	4.6	1.2	1.2	.4	2.7	--	50	.07	2,250	30	4	15
KETTLE RIVER NEAR LAURIER, WASH.																						
Dec. 11, 1947	860	--	--	123	18	--	17	1.9	7.1	66	9.5	1.0	1.0	0.2	0.2	--	87	0.12	202	50	0	23
May 25, 1948	28,000	--	--	57	12	--	6.8	1.5	3.4	29	3.8	.7	.7	.4	.8	--	44	.06	3,330	23	0	25
MYERS CREEK NEAR WYNCASTER, B. C.																						
April 12, 1948	8.82	--	--	519	22	--	68	21	17	272	63	2.0	2.0	--	1.0	0.00	328	0.45	7.8	256	33	12
May 24, 1948	90.5	--	--	247	24	--	34	8.0	7.4	128	25	.9	.9	0.4	.8	--	164	.22	40	118	13	12
OKANOGAN RIVER AT OROVILLE, WASH.																						
Dec. 13, 1947	421	--	--	289	10	--	35	9.8	12	148	29	1.5	1.5	--	0.3	0.00	170	0.23	19	128	6	17
June 1, 1948	3,250	7.8		274	11	0.02	36	8.9	10	140	29	1.8	1.8	0.3	.4	.01	166	.23	1,460	126	12	15
SIMILKAMEEN RIVER NEAR NIGHAWK, WASH.																						
Dec. 13, 1947	713	--	--	182	14	--	26	4.1	7.4	96	17	1.2	1.2	0.1	0.3	--	117	0.16	225	82	4	16
June 1, 1948	29,700	7.7		115	14	0.31	18	2.3	5.1	62	12	.5	.5	.3	.6	0.01	64	.11	6,740	54	4	17

## WENATCHEE RIVER AT PLAIN, WASH.

June 18, 1947 -----	5,370	--	33	7.7	--	5.8	1.3	10	18	3.1	0.2	--	0.2	--	27	0.04	391	20	6	--
Jan. 14, 1948 -----	567	--	48	11	--	6.7	1.8	1.8	26	4.4	1.5	--	.3	0.00	40	.05	61	24	2	14

## YAKIMA RIVER AT CLE ELUM, WASH.

May 28, 1947 -----	4,500	--	51	9.7	--	8.4	1.9	0.9	35	1.2	1.1	--	0.0	--	40	0.05	486	29	0	6
Oct. 23 -----	562	--	72	12	--	8.4	2.7	6.0	48	2.8	1.8	--	.3	--	56	.08	88	32	0	29

## YAKIMA RIVER AT KIONA, WASH.

June 5, 1947 -----	5,000	--	175	24	--	19	6.2	11	101	8.4	4.3	--	0.1	--	123	0.17	1,660	73	0	25
Jan. 22, 1948 -----	2,300	--	144	23	--	15	6.0	7.8	82	7.4	2.5	--	1.2	--	103	.14	640	62	0	22

## NACHES RIVER NEAR NACHES, WASH.

May 26, 1947 -----	4,320	--	47	13	--	6.8	0.5	3.9	28	3.3	0.8	--	0.1	--	42	0.06	490	19	0	31
Oct. 29 -----	188	--	71	17	--	9.6	1.7	3.9	40	4.0	1.7	--	.0	--	58	.08	29	31	0	22

Snake River Basin

Snake River Main Stem

Miscellaneous Analyses of Streams in Snake River Basin in Washington

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean discharge (second-feet)	Tem- per- ature (° F.)	pH	Specific conduct- ance (micro- mhos at 25° C.)	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> )	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
																	Parts per mil- lion	Tons per acre- foot	Tons per day	Total	Non-carbon- ate	
SNAKE RIVER NEAR CLARKSTON																						
June 10, 1947	128,000			92	13		10	2.3	6.9		43	8.9	3.5		0.3		66	0.09	22,800	34	0	30
Oct. 14-15	26,400			406	26		32	13	39		162	55	18		2.2		265	.36	18,900	134	1	39
SNAKE RIVER NEAR PASCO																						
June 6, 1947	130,000			114	12		11	2.5	9.7		50	12	4.0		0.2		76	0.10	26,700	38	0	36
Oct. 7	24,400			351	22		27	11	34		142	45	16		1.4		226	.31	14,900	112	0	40

TRIBUTARIES OF COLUMBIA RIVER BELOW MOUTH OF SNAKE RIVER  
MISCELLANEOUS ANALYSES OF STREAMS IN TRIBUTARIES OF COLUMBIA RIVER BELOW MOUTH OF SNAKE RIVER IN WASHINGTON

Chemical analyses, in parts per million, water year October 1947 to September 1948

Date of collection	Mean dis-charge (second-foot)	Tem-perature (° F.)	pH	Specific conduct-ance (micro-mhos at 25° C.)	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> )	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
																	Parts per mil-lion	Tons per acre-foot	Tons per day	Total	Non-carbon-ate	
CLICKITAT RIVER NEAR PITT																						
Sept. 22, 1947 -----	693		--	81	33	--	5.6	3.9	8.0		52	3.5	1.0	--	0.0	--	81	0.11	152	30	0	37
May 31, 1948 -----	4,100		7.2	47	24	0.13	6.8	1.9	3.7		32	4.1	.8	0.3	.4	0.01	58	.08	642	25	0	24
COWLITZ RIVER AT CASTLE ROCK																						
Sept. 30, 1947 -----	2,210		--	76	19	--	6.8	1.8	10		45	4.4	3.7	--	0.4	--	68	0.09	406	24	0	48
Jan. 7, 1948 -----	38,500		--	39	15	--	4.8	.9	4.4		20	4.4	1.9	0.1	1.0	--	42	.06	4,370	16	0	38



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