Quality of Surface Waters of the United States 1960

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

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

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PREFACE

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

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[*Symbols after station name designate type of data: c, chemical; t, water temperature; s, sediment*]

ILLUSTRATIONS

QUALITY OF SURFACE WATERS OF THE UNITED STATES, 1960

PARTS 7 and 8

INTRODUCTION

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

The records of chemical analysis, suspended sediment, and temperature for surface waters given in this volume serve as a basis for determining the suitability of the waters examined for all uses. 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 content in streams may vary over wide ranges.

In 1941, the Geological Survey began publishing annual records of chemical quality, suspended sediment, and water temperature. The records prior to 1948 were published each year in a single volume for the entire country, and in two volumes in 1948 and 1949. Beginning in 1950, the records were published in four volumes and beginning in 1959 in five volumes. The drainage basins covered in the five volumes are shown in Figure 1. The data given in this volume were collected during the water year October 1, 1959, to September 30, 1960. The records are arranged by drainage basins in downstream order according to the Geological Survey method of reporting streamflow. Stations on tributary streams are listed between stations on the main stem in the order in which those tributaries enter the main stem.

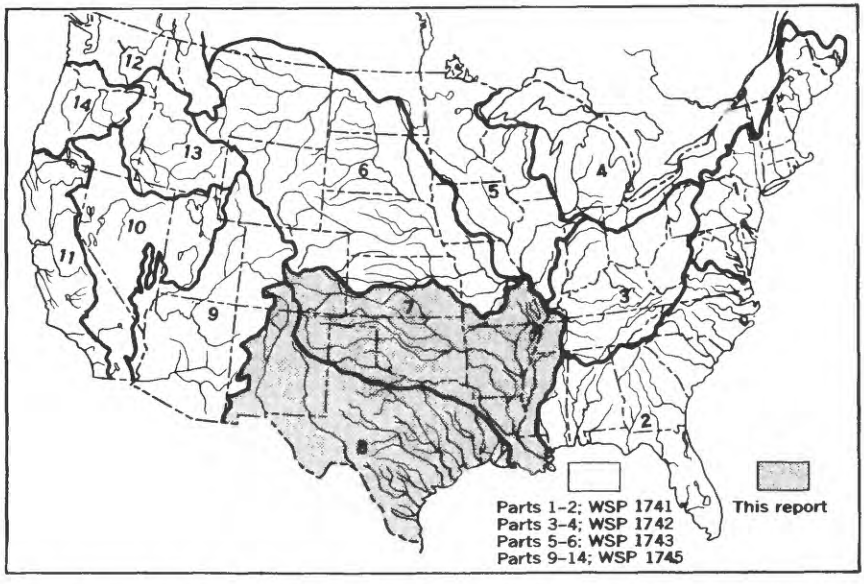

Figure 1.--Map of the conterminous United States showing basins covered by the five water-supply papers on quality of surface waters in 1960. The shaded part represents the section of the country covered by this volume; the unshaded part represents the section of the country covered by other water-supply papers.

A station number has been assigned as an added means of identification for each stream location where regular measurements of water quantity or quality have been made. The numbers have been assigned to conform with the standard downstream order of listing gaging stations. The numbering system consists of two digits followed by a hyphen and a six digit number. The notation to the left of the hyphen identifies the Part or hydrologic region used by the Geological Survey for reporting hydrologic data. The number to the right of the hyphen represents the position of the location in the standard downstream order listing measuring stations within each of the 14 parts. The assigned numbers are in numerical order but are not consecutive. They are so selected from the complete 6 digit number scale that intervening numbers will be available for future assignments to new locations. The identification number for each station in this report is printed to the left of the station name and contains only the essential digits. For example, the number is printed as 4-100 for a station whose complete identification number is 04-0100.00.

Descriptive statements are given for each sampling station where chemical analyses, temperature measurements, or sediment determinations have been made. These statements include the location of the station, drainage area, periods of records available, extremes of dissolved solids, hardness, specific conductance, temperature, sediment loads, and other pertinent data. Records of discharge of the streams at or near the sampling station are included in most tables of analyses.

During the water year ending September 30, 1960, the Geological Survey maintained 195 stations on 120 streams for the study of chemical and physical characteristics of surface water. Samples were collected daily and monthly at 178 of these locations for chemical-quality studies. Samples were also collected less frequently at many other points. Water temperatures were measured daily at 103 stations. Not all analyses of samples of surface water collected during the year have been included. Single analyses of an incomplete nature generally have been omitted. Also, analyses made of the daily samples before compositing have not been reported. The specific conductance of almost all daily samples was determined, and as noted in the table headings this information is available for reference at the district offices listed under Division of Work, on page 26.

Quantities of suspended sediment are reported for 22 stations during the year ending September 30, 1960. Sediment samples were collected one or more times daily at most stations, depending on the rate of flow and changes in stage of the stream. Particle-size distributions of sediments were determined at 21 of the stations.

COLLECTION AND EXAMINATION OF SAMPLES

Samples for analyses are usually collected at or near points on streams where gaging stations are maintained by Surface Water Branch of U. S. Geological Survey for measurement of water discharge. The concentration of solutes and sediments at different locations in the stream-cross section may vary widely with different rates of water discharge depending on the source of the material and the turbulence and mixing of the stream. In general, the distribution of sediment in a stream section is much more variable than the distribution of solutes. It is necessary to sample some streams at several verticals across the channel and especially for sediment, to uniformly traverse the depth of flow. These measurements require special sampling equipment to adequately integrate the vertical and lateral variability of the concentration in the section. These procedures yield a velocity-weighted mean con-

centration for the section in contrast to the average concentration that existed without regard to the variable velocities of the individual fluid elements.

The near uniformly dispersed ions of the solute load move with the velocity of the transporting water. Accordingly, the mean section concentration of solutes determined from samples is a precise measure of the total solute load. The mean section concentration obtained from suspended sediment samples is a less precise measure of the total sediment load, because the sediment samplers do not traverse the bottom 0.3 foot of the sampling vertical where the concentration of suspended sediment is greatest and because a significant part of the coarser particles in many streams move in essentially continuous contact with the bed and are not represented in the suspended sediment sample. Hence, the computed sediment loads presented in this report are usually less than the total sediment loads. For most streams the difference between the computed and total sediment loads will be small, in the order of a few percent.

CHEMICAL QUALITY

The methods of collecting and compositing water samples for chemical analysis are described in a manual by Rainwater and Thatcher (1960, 301 p.). No single method of compositing samples is applicable to all problems related to the study of water quality. Although generally holding to the principle of 10 day periods or equivalent to three composite samples per month modifications are usually made on the basis of dissolved-solids content as indicated by measurements of conductivity of daily samples, supplemented by other information such as chloride content, river stage, weather conditions and other background information of the stream.

TEMPERATURE

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

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

SEDIMENT

In general, suspended-sediment samples were collected daily with U. S. depth-integrating cable-suspended samplers (U. S. Interagency, 1963, p. 56-77 and U. S. Interagency, 1952, p. 86-90) from a fixed sampling point at one vertical in the cross section. The US DH-48 hand sampler was used at many stations during periods of low flow. Depth-integrated samples were collected periodically at three or more verticals in the cross section to determine the cross-sectional distribution of the concentration of suspended sediment with respect to that at the daily sampling vertical. In streams where transverse distribution of sediment concentration ranges widely, samples were taken at two or more verticals to define more accurately the average concentration of the cross section. During periods of high or rapidly changing flow, samples were taken two or more times throughout the day at most sampling stations.

Sediment concentrations were determined by filtration-evaporation method. At many stations the daily mean concentration for some days was obtained by plotting the velocity-weighted instantaneous concentrations on the gage-height chart. The plotted concentrations, adjusted, if necessary for cross-sectional distribution were connected or averaged by continuous curves to obtain a concentration graph. This graph represented the estimated velocity-weighted concentration at any time, and for most periods daily mean concentrations were determined from the graph. The days were divided into shorter intervals when the concentration and water discharge were changing rapidly. During some periods of minor variation in concentration, the average concentration of the samples was used as the daily mean concentration. During extended periods of relatively uniform concentration and flow, samples for a number of days were composited to obtain average concentrations and average daily loads for each period.

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

In many instances where there were no observations for several days, the suspended-sediment loads for individual days are

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not estimated, because numerous factors influencing the quantities of transported sediment made it very difficult to make accurate estimates for individual days. However, estimated loads of suspended sediment for missing days in otherwise continuous period of sampling have been included in monthly and annual totals in order to provide a complete record. For some streams, samples were collected weekly, monthly, or less frequently, and only rates of sediment discharge at the time of sampling are shown.

In addition to the records of quantities of suspended sediment transported, records of the particle sizes of sediment are included. The particle sizes of the suspended sediment for many of the stations, and the particle sizes of the bed material for some of the stations were determined periodically.

The size of particles in stream sediments commonly range from colloidal clay (finer than 0.001 mm) to coarse sand or gravel (coarser than 1.0 mm). The common methods of particle-size analyses cannot accommodate such a wide range in particle size. Hence, it was necessary to separate most samples into two parts, one coarser than 0.062 mm and one finer than 0.062 mm. The separations were made by sieve or by a tube containing a settling medium of water. The coarse fractions were classified by sieve separation or by the visual accumulation tube (U. S. Interagency, 1957). The fine fractions were classified by the pipet method (Kilmer and Alexander, 1949) or the bottom withdrawal tube method (U. S. Interagency, 1943, p. 82-90).

EXPRESSION OF RESULTS

Quantities of water for analysis are most conveniently measured in the laboratory by use of volumetric glassware. The analytical results thus obtained in this report are expressed in weights of solute in a given volume of water. To express the results in parts of solute per million (ppm) of water the data must be converted. For most waters this conversion is made by assuming that the liter of water sample weighs 1 kilogram; and thus milligrams per liter are equal to parts per million.

Equivalents per million are not reported, although the expression of analyses in equivalents per million is sometimes preferred. An equivalent per million (epm) is a unit chemical combining weight of a constituent in a million unit weights of water. Chemical equivalence in equivalents per million can be obtained by (a) dividing the concentration in parts per million by the combining weight of that ion, or (b) multiplying the concentration (in ppm) by the reciprocal of the combining weights. The following table lists the reciprocals of the combining weights of cations and anions generally reported in water analyses.

The conversion factors are computed from atomic weights based on carbon-12 (International Union of Pure and Applied Chemistry, 1961).

Conversion factors: Parts per million to equivalents per million

Ion	Multiply by	Ion	Multiply by
Aluminum (Al^{+3}).....	0.11119	Hydroxide (OH^{-1})...	0.05880
Arsenic (As^{+3})	.04004	Iodide (I^{-1}).....	.00788
Barium (Ba^{+2}).....	.01456	Iron (Fe^{+3}).....	.05372
Beryllium (Be^{+2})	.22192	Lead (Pb^{+2}).....	.00965
Bicarbonate (HCO_3^{-1})..	.01639	Lithium (Li^{+1}).....	.14411
Bromide (Br^{-1}).....	.01251	Magnesium (Mg^{+2})..	.08226
Cadmium (Cd^{+2}).....	.01779	Manganese (Mn^{+2}) ..	.03640
Calcium (Ca^{+2}).....	.04990	Nickel (Ni^{+2}).....	.03406
Carbonate (CO_3^{-2})....	.03333	Nitrate (NO_3^{-1}).....	.01613
Chloride (Cl^{-1}).....	.02821	Phosphate (PO_4^{-3})..	.03159
Chromium (Cr^{+6}).....	.11539	Potassium (K^{+1})....	.02557
Cobalt (Co^{+2}).....	.03394	Sodium (Na^{+1}).....	.04350
Copper (Cu^{+2}).....	.03148	Strontium (Sr^{+2})....	.02283
Fluoride (F^{-1}).....	.05264	Sulfate (SO_4^{-2})	.02083
Hydrogen (H^{+1}).....	.99209	Zinc (Zn^{+2})	.03060

Results given in parts per million can be converted to grains per United States gallon by dividing by 17.12.

The hardness of water is conventionally expressed in all water analyses in terms of an equivalent quantity of calcium carbonate. Such a procedure is required because hardness is caused by several different cations, present in variable proportions. It should be remembered that hardness is an expression in conventional terms of a property of water. The actual presence of calcium carbonate in the concentration given is not to be assumed. The hardness caused by calcium and magnesium (and other cations if significant) equivalent to the carbonate and bicarbonate is called carbonate hardness; the hardness in excess of this quantity is called noncarbonate hardness. Hardness or alkalinity values expressed in parts per million as calcium carbonate may be converted to equivalents per million by dividing by 50.

The value usually reported as dissolved solids is the residue on evaporation after drying at 180°C for 1 hour. For some waters, particularly those containing moderately large quantities of soluble salts, the value reported is calculated from the quantities of the various determined constituents using the carbonate equivalent of the reported bicarbonate. The calculated sum of the constituents may be given instead of or in addition to the residue. In the

analyses of most waters used for irrigation, the quantity of dissolved solids is given in tons per acre-foot as well as in parts per million.

Specific conductance is given for most analyses and was determined by means of a conductance bridge and using a standard potassium chloride solution as reference. Specific conductance values are expressed in micromhos per centimeter at 25°C. Specific conductance in micromhos is 1 million times the reciprocal of specific resistance at 25°C. Specific resistance is the resistance in ohms of a column of water 1 centimeter long and 1 square centimeter in cross section.

The discharge of the streams is reported in cubic feet per second (see Streamflow, p. 24) and the temperature in degrees Fahrenheit. Color is expressed in units of the platinum-cobalt scale proposed by Hazen (1892, p. 427-428). A unit of color is produced by one milligram per liter of platinum in the form of the chloroplatinate ion. Hydrogen-ion concentration is expressed in terms of pH units. By definition the pH value of a solution is the negative logarithm of the concentration of gram ions of hydrogen. However, the pH meter that is generally used in Survey laboratories determines the activity of the hydrogen ions as distinguished from concentration.

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

A program for computing these averages on an electronic digital computer was instituted in the 1962 water year. This program extended computations to include averages for pH values expressed in terms of hydrogen ion and averages for the concentration of individual constituents expressed in tons per day. Concentrations in tons per day are computed the same as daily sediment loads.

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

Particle-size analyses are expressed in percentages of material finer than indicated sizes in millimeters. The size classification used in this report is that recommended by the American Geophysical Union subcommittee on Terminology (Lane and others, 1947, p. 937). Other data included as pertinent to the size analyses for many streams are the date of collection, the stream discharge, sediment concentration when sample was collected, 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 mineral matter. The quantity of dissolved mineral matter in a natural water depends primarily on the type of rocks or soils with which the water has been in contact and the length of time of contact. Some streams are fed by both surface runoff and ground water from spring or seeps. Such streams reflect the chemical character of their concentrated underground sources during dry periods and are more dilute during periods of heavy rainfall. Ground water is generally more highly mineralized than surface runoff because it remains in contact with the rocks and soils for much longer periods. The dissolved-solids content in a river is frequently increased by drainage from mines or oil fields, by the addition of industrial or municipal wastes, or--in irrigated regions--by drainage from irrigated lands.

The mineral constituents and physical properties of natural waters reported in the tables of analyses include those that have a practical bearing on the value of the waters for most purposes. The analyses generally include results for silica, iron, calcium, magnesium, sodium, potassium (or sodium and potassium together calculated as sodium), alkalinity as carbonate and bicarbonate, sulfate, chloride, fluoride, nitrate, boron, pH, dissolved solids and specific conductance. Aluminum, manganese, color, acidity, oxygen consumed, and other dissolved constituents and physical properties are reported for certain streams. Phenolic material and minor elements including strontium, chromium, nickel, copper, lead, zinc, cobalt, arsenic, cadmium, and others are occasionally determined for a few streams in connection with specific

problems in local areas and the results are reported when appropriate. The source and significance of the different constituents and properties of natural waters are discussed in the following paragraphs. The constituents are arranged in the order that they appear on standard analytical statement cards which are used to process the chemical quality data in this report.

MINERAL CONSTITUENTS IN SOLUTION

Silica (SiO_2)

Silica is dissolved from practically all rocks. Some natural surface waters contain less than 5 parts per million of silica and few contain more than 50 parts, but the more common range is from 10 to 30 parts per million. Silica affects the usefulness of a water because it contributes to the formation of boiler scale; it usually is removed from feed water for high-pressure boilers. Silica also forms troublesome deposits on the blades of steam turbines.

Aluminum (Al)

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

Iron (Fe)

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

Manganese (Mn)

Manganese is dissolved in appreciable quantities from rocks in some sections of the country. It resembles iron in its chemical

behavior and in its occurrence in natural waters. However, manganese in rocks is less abundant than iron. As a result the concentration of manganese is much less than that of iron and is not regularly determined in many areas. 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. It is especially objectionable in water used in laundry work and in textile processing. Concentrations as low as 0.2 part per million may cause a dark-brown or black stain on fabrics and porcelain fixtures. Appreciable quantities of manganese are often found in waters containing objectionable quantities of iron.

Calcium (Ca)

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

Magnesium (Mg)

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

Strontium (Sr)

Strontium is a typical alkaline-earth element and is similar chemically to calcium. Strontium may be present in natural water in amounts up to a few parts per million much more frequently than the available data indicate. In most surface water the amount of strontium is small in proportion to calcium. However, in sea water the ratio of strontium to calcium is 1:30.

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.

Lithium (Li)

Data concerning the quantity of lithium in water are scarce. It is usually found in small amounts in thermal springs and saline waters. Lithium also occurs in streams where some industries dump their waste water. The scarcity of lithium in rocks is responsible more than other factors for relatively small amounts present in water.

Bicarbonate, carbonate and hydroxide (HCO_3, CO_3, OH)

Bicarbonate, carbonate, or hydroxide is sometimes reported as alkalinity. The alkalinity of a water is defined as its capacity to consume a strong acid to pH 4.5. Since the major causes of alkalinity in most natural waters are carbonate and bicarbonate ions dissolved from carbonate rocks, the results are usually reported in terms of these constituents. Although alkalinity may suggest the presence of definite amounts of carbonate, bicarbonate or hydroxide, it may not be true due to other ions that contribute to alkalinity such as silicates, phosphates, borates, possibly fluoride, and certain organic anions which may occur in colored waters. The significance of alkalinity to the domestic, agricultural, and industrial user is usually dependent upon the nature of the cations (Ca, Mg, Na, K) associated with it. However, moderate amounts of alkalinity does not adversely affect most users.

Hydroxide may occur in water that has been softened by the lime process. Its presence in streams usually can be taken as an indication of contamination and does not represent the natural chemical character of the water.

Sulfate (SO_4)

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

Chloride (Cl)

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

Fluoride (F)

Fluoride has been reported as being present in some rocks 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. Investigations have proved that fluoride concentrations of about 0.6 to 1.7 ppm reduced the incidence of dental caries and that concentrations greater than 1.7 ppm also protect the teeth from cavities but cause an undesirable black stain (Durfor and Becker, 1964, p. 20). Public Health Service, 1962 (p. 8), states, "When fluoride is naturally present in drinking water, the concentration should not average more than the appropriate upper control limit (0.6 to 1.7 ppm). Presence of fluoride in average concentration greater than two times the optimum values shall constitute grounds for rejection of the supply." Concentration higher than the stated limits may cause mottled enamel in teeth, endemic cumulative fluorosis, and skeletal effects.

Nitrate (NO_3)

Nitrate in water is considered a final oxidation product of nitrogenous material and may indicate contamination by sewage or

other organic matter. The quantities of nitrate present in surface waters are generally less than 5 parts per million (as 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 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 ppm (as NO_3) may cause methemoglobinemia (Waring, 1949). In a report published by the National Research Council, Maxcy (1950, p. 271) concludes that a nitrate content in excess of 44 parts per million (as NO_3) should be regarded as unsafe for infant feeding. U. S. Public Health Service (1962) sets 45 ppm as the upper limit.

Phosphate (PO_4)

Phosphorus is an essential element in the growth of plants and animals, and some sources that contribute nitrate, such as organic wastes and leaching of soils, may be important as sources for phosphate in water and its occurrence may add to the apparent alkalinity. The addition of phosphates in water treatment constitutes a possible source, although the dosage is usually small. In some areas, phosphate fertilizers may yield some phosphate to water. A more important source is the increasing use of phosphates in detergents. Domestic and industrial sewage effluents may therefore contain considerable amounts of phosphate.

Boron (B)

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

Dissolved solids

The reported quantity of dissolved solids--the residue on evaporation--consists mainly of the dissolved mineral constituents in the water. It may also contain some organic matter and water of crystallization. Waters with less than 500 parts per million of

dissolved solids are usually satisfactory for domestic and some industrial uses. Water containing several thousand parts per million of dissolved solids are sometimes successfully used for irrigation where practices permit the removal of soluble salts through the application of large volumes of water on well-drained lands, but generally water containing more than about 2,000 ppm is considered to be unsuitable for long-term irrigation under average conditions.

Chromium (Cr)

Few if any waters contain chromium from natural sources. Natural waters can probably contain only traces of chromium as a cation unless the pH is very low. When chromium is present in water, it is usually the result of pollution by industrial wastes. Fairly high concentrations of chromate anions are possible in waters having normal pH levels. Concentrations of more than 0.05 ppm of chromium in the hexavalent form constitute grounds for rejection of a water for domestic use on the basis of the standards of the U.S. Public Health Service (1962).

Nickel and cobalt (Ni, Co)

Nickel and cobalt are very similar in chemical behavior and also closely related to iron. Both are present in igneous rocks in small amounts and are more prevalent in silicic rocks. Any nickel in water is likely to be in small amounts and could be in a colloidal state. Cobalt may be taken into solution more readily than nickel. It may be taken into solution in small amounts through bacteriological activity similar to that causing solution of manganese. However, few data on the occurrence of either nickel or cobalt in natural water are available.

Copper (Cu)

Copper is a fairly common trace constituent of natural water. Small amounts may be introduced into water by solution of copper and brass water pipes and other copper-bearing equipment in contact with the water, or from copper salts added to control algae in open reservoirs. Copper salts such as the sulfate and chloride are highly soluble in waters with a low pH but in water of normal alkalinity these salts hydrolyze and the copper may be precipitated. In the normal pH range of natural water containing carbon dioxide, the copper might be precipitated as carbonate. The oxidized portions of sulfide-copper ore bodies contain other copper compounds. The presence of copper in mine water is common.

Copper imparts a disagreeable metallic taste to water. As little as 1.5 ppm can usually be detected, and 5 ppm can render the water unpalatable. Copper is not considered to be a cumulative systemic poison like lead and mercury; most copper ingested is excreted by the body and very little is retained. The pathological effects of copper are controversial, but it is generally believed very unlikely that humans could unknowingly ingest toxic quantities from palatable drinking water. The U.S. Public Health Service (1962) recommends that copper should not exceed 1.0 ppm in drinking and culinary water.

Lead (Pb)

Lead is only a minor element in most natural waters, but industrial or mine and smelter effluents may contain relatively large amounts of lead. Many of the commonly used lead salts are water soluble.

Traces of lead in water usually are the result of solution of lead pipe through which the water has passed. Amounts of lead of the order of 0.05 ppm are significant, as this concentration is the upper limit for drinking water in the standards adopted by the U.S. Public Health Service (1962). Higher concentrations may be added to water through industrial and mine-waste disposal. Lead in the form of sulfate is reported to be soluble in water to the extent of 31 ppm (Seidell, 1940, p. 1409) at 25°C. In natural water this concentration would not be approached, however, since a pH of less than 4.5 would probably be required to prevent formation of lead hydroxide and carbonate. It is reported (Pleissner, 1907) that at 18°C water free of carbon dioxide will dissolve the equivalent of 1.4 ppm of lead and the solubility is increased nearly four fold by the presence of 2.8 ppm of carbon dioxide in the solution. Presence of other ions may increase the solubility of lead.

Zinc (Zn)

Zinc is abundant in rocks and ores but is only a minor constituent in natural water because the free metal and its oxides are only sparingly soluble. In most alkaline surface waters it is present only in trace quantities, but more may be present in acid water. Chlorides and sulfates of zinc are highly soluble. Zinc is used in many commercial products, and industrial wastes may contain large amounts.

Zinc in water does not cause serious effects on health, but produces undesirable esthetic effects. The U. S. Public Health Service (1962, p. 55) recommends that the zinc content not exceed 5 ppm in drinking and culinary water.

Barium (Ba)

Barium may replace potassium in some of the igneous rock minerals, especially feldspar and barium sulfate (barite) is a common barium mineral of secondary origin. Only traces of barium are present in surface water and sea water. Because natural water contains sulfate, barium will dissolve only in trace amounts. Barium sometimes occurs in brines from oil-well wastes.

The U. S. Public Health Service (1962) states that water containing concentrations of barium in excess of 1 ppm is not suitable for drinking and culinary use because of the serious toxic effects of barium on heart, blood vessels, and nerves.

Bromide (Br)

Bromine is a very minor element in the earth's crust and is normally present in surface waters in only minute quantities. Measurable amounts may be found in some streams that receive industrial wastes, and some natural brines may contain rather high concentrations. It resembles chloride in that it tends to be concentrated in sea water.

Iodide (I)

Iodide is considerably less abundant both in rocks and water than bromine. Measurable amounts may be found in some streams that receive industrial wastes, and some natural brines may contain rather high concentrations. It occurs in sea water to the extent of less than 1 ppm. Rankama and Sahama (1950, p. 767) report iodide present in rainwater to the extent of 0.001 to 0.003 ppm and in river water in about the same amount. Few waters will contain over 2.0 ppm.

PROPERTIES AND CHARACTERISTICS OF WATER

Hardness

Hardness is the characteristic of water that receives the most attention in industrial and domestic use. It is commonly recognized by the increased quantity of soap required to produce lather. The use of hard water is also objectionable because it contributes to the formation of scale in boilers, water heaters, radiators, and pipes, with the resultant decrease in rate of heat transfer, possibility of boiler failure, and loss of flow.

Hardness is caused almost entirely by compounds of calcium and magnesium. Other constituents--such as iron, manganese, aluminum, barium, strontium, and free acid--also cause hardness, although they usually are not present in quantities large enough to have any appreciable effect.

Generally, bicarbonate and carbonate determine the proportions of "carbonate" hardness of water. Carbonate hardness is the amount of hardness chemically equivalent to the amount of bicarbonate and carbonate in solution. Carbonate hardness is approximately equal to the amount of hardness that is removed from water by boiling.

Noncarbonate hardness is the difference between the hardness calculated from the total amount of calcium and magnesium in solution and the carbonate hardness. If the carbonate hardness (expressed as calcium carbonate) equal the amount of calcium and magnesium hardness (also expressed as calcium carbonate) there is no noncarbonate hardness. Noncarbonate hardness is about equal to the amount of hardness remaining after water is boiled. The scale formed at high temperatures by the evaporation of water containing noncarbonate hardness commonly is tough, heat resistant, and difficult to remove.

Although many people talk about soft water and hard water, there has been no firm line of demarcation. Water that seems hard to an easterner may seem soft to a westerner. In this report hardness of water is classified as follows:

Hardness range (calcium carbonate in ppm)	Hardness description
0-60	Soft
61-120	Moderately hard
121-180	Hard
more than 180	Very hard

For public use, water with hardness above 200 parts per million generally requires softening treatment (Durfor and Becker, 1964, p. 23-27).

Acidity (H^{+1})

The use of the terms acidity and alkalinity is widespread in the literature of water analysis and is a cause of confusion to those who are more accustomed to seeing a pH of 7.0 used as a neutral point. Acidity of a natural water represents the content of free carbon dioxide and other uncombined gases, organic acids and salts of strong acids and weak bases that hydrolyze to give hydrogen ions. Sulfates of iron and aluminum in mine and industrial

wastes are common sources of acidity. The presence of acidity is reported in those waters which have a pH below 4.5.

Sodium-adsorption-ratio (SAR)

The term "sodium-adsorption-ratio (SAR)" was introduced by the U. S. Salinity Laboratory Staff (1954). It is a ratio expressing the relative activity of sodium ions in exchange reaction with soil and is an index of the sodium or alkali hazard to the soil. Sodium-adsorption-ratio is expressed by the equation:

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

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

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

Specific conductance (micromhos per centimeter at 25°C)

Specific conductance is a convenient, rapid determination used to estimate the amount of dissolved solids in water. It is a measure of the ability of water to transmit a small electrical current (see p. 8). The more dissolved solids in water that can transmit electricity the greater the specific conductance of the water. Commonly, the amount of dissolved solids (in parts per million) is about 65 percent of the specific conductance (in micromhos). This relation is not constant from stream to stream or from well to well and it may even vary in the same source with changes in the composition of the water (Durfor and Becker, 1964, p. 27-29).

Specific conductance of most waters in the eastern United States is less than 1,000 micromhos, but in the arid western parts of the country, a specific conductance of more than 1,000 micromhos is common.

Hydrogen-ion concentration (pH)

Hydrogen-ion concentration is expressed in terms of pH units (see p. 8). The values of pH often are used as a measure of the solvent power of water or as an indicator of the chemical behavior certain solutions may have toward rock minerals.

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 of 7.0 indicates that the water is neither acid nor alkaline. pH readings progressively lower than 7.0 denote increasing acidity and those progressively higher than 7.0 denote increasing alkalinity. The pH of most natural surface waters ranges between 6 and 8. Some alkaline surface waters have pH values greater than 8.0, and waters containing free mineral acid or organic matter usually have pH values less than 4.5.

The investigator who utilizes pH data in his interpretations of water analyses should be careful to place pH values in their proper perspective.

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 15 units generally passes unnoticed (U. S. Public Health Service, 1962). Some swamp waters have natural color in excess of 300 units.

The extent to which a water is colored by material in solution is commonly reported as a part of a water analysis because a significant color in water may indicate the presence of organic material that may have some bearing on the dissolved solids content. Color in water is expressed in terms of units between 0 and 500 or more based on the above standard (see p. 8).

Oxygen consumed

Oxygen consumed is a measure of the amount of oxygen required to oxidize unstable materials in water and may be correlated with natural-water color or with some carbonaceous organic pollution from sewage or industrial wastes.

Tolerances for oxygen consumed in feed water for low-and high-pressure boilers are 15 and 3 ppm, respectively (Northeast Water Works Association, 1940). Wash water containing more than 8 ppm has been reported to import a bad odor to textiles; concentrations for water used in beverages and brewing range from 0.5 to 5.0 ppm (California State Water Pollution Control Board, 1952, 1954).

Organics

Phenols.--Phenolic material in water resources is invariably the result of pollution. Phenols are widely used as disinfectants and in the synthesis of many organic compounds. Waste products from oil refineries, coke areas, and chemical plants may contain high concentrations. Fortunately, phenols decompose in the presence of oxygen and organic material, and their persistence downstream from point of entry is relatively short lived. The rate of decomposition is dependent on the environment.

Very low concentrations impart such a disagreeable taste to water that it is highly improbable that harmful amounts could be consumed unknowingly. Reported thresholds of detection of taste and odor range from 0.001 to 0.01 ppm.

Detergents (ABS).--The chief surfactant in commercial detergents is anionic alkylbenzenesulfonate (ABS). ABS and other anionic surfactants resist chemical oxidation and biological breakdown. Their persistence in water over long periods of time contributes to pollution of both ground water and surface water. Some of the effects produced from detergent pollution are unpleasant taste, odor, and foaming (Wayman, Robertson, and Page, 1962). Although the physiological implications of ABS to human beings is unknown, prolonged ingestion of this material by rats is believed to be nontoxic (Paynter, 1960). The U.S. Public Health Service (1962) recommends that ABS should not exceed 0.5 ppm in drinking and culinary waters.

Temperature

Temperature is an important factor in property determining the quality of water. This is very evident for such a direct use

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as an industrial coolant. Temperature is also important, but perhaps not so evident, for its indirect influence upon aquatic biota, concentrations of dissolved gases, and distribution of chemical solutes in lakes and reservoirs as a consequence of thermal stratification and variation.

Surface water temperatures tend to change seasonally and daily with air temperatures, except for the outflow of large springs. Superimposed upon the annual temperature cycle is a daily fluctuation of temperature which is greater in warm seasons than in cold and greater in sunny periods than with a cloud cover. Natural warming is due mainly to absorption of a solar radiation by the water and secondarily to transfer of heat from the air or from the bottom. Condensation of water vapor at the water surface is reported to furnish measurable quantities of heat. Heat loss takes place largely through radiation, with further losses through evaporation and conduction to the air and bottom. Thus the temperature of a small stream generally reaches a maximum in mid-to late afternoon due to solar heating and reaches a minimum from early to mid-morning after nocturnal radiation.

Temperature variations which commonly occur during summer in lakes and reservoirs of temperate regions results in a separation of the water volume into a circulating upper portion and a non-circulating lower portion. Separating the two is a stratum of water of variable vertical thickness in which the temperature decreases rapidly with increasing depth. This physical division of the water mass into a circulating and a stagnant portion is the result of density differences in the water column associated with the temperature distribution. Knowledge of the stratification in a body of water may result in increased utility by locating strata of more suitable characteristics. For example, the elevation of an intake pipe may be changed to obtain water of lower temperature, higher pH, less dissolved iron, or other desirable properties.

Temperature is a major factor in determining the effect of pollution on aquatic organisms. The resistance of fish to certain toxin substances has been shown to vary widely with temperature. The quantity of dissolved oxygen which the water can contain is also temperature dependent. Oxygen is more soluble in cold water than in warm water, hence the reduction of oxygen concentrations by pollution is especially serious during periods of high temperature when oxygen levels are already low. Increased temperatures also accelerate biological activity including that of the oxygen-utilizing bacteria which decompose organic wastes. These pollutional effects may be especially serious when low flow conditions coincide with high temperatures. Summary temperature data of water are essential for planning multiple uses of water resources.

Turbidity

Turbidity is the optical property of a suspension with reference to the extent to which the penetration of light is inhibited by the presence of insoluble material. Turbidity is a function on both the concentration and particle size of the suspended material. Although it is reported in terms of parts per million of silica, it is only partly synonymous with the weight of sediment per unit volume of water.

Turbid water is abrasive in pipes, pumps, and turbine blades. In process water, turbidities much more than 1 ppm are not tolerated by several industries, but others permit up to 50 ppm higher (Rainwater, Thatcher, 1960, p. 289). Although turbidity does not directly measure the safety of drinking water, it is related to the consumers acceptance of the water. A level of 5 units of turbidity becomes objectionable to a considerable number of people (U. S. Public Health, 1962).

Sediment

Fluvial sediment is generally regarded as that sediment which is transported by, suspended in, or deposited by water. Suspended sediment is that part of it which remains in suspension in water owing to the upward components of turbulent currents or by colloidal suspension. Much fluvial sediment results from the natural process of erosion, which in turn is part of the geologic cycle of rock transformation. This natural process may be accelerated by agricultural practices. Sediment is also contributed by a number of industrial and construction 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, character of the solid mantle, plant cover, topography, and land use. The mode and rate of sediment erosion, transport, and deposition is determined largely by the size distribution of the particles or more precisely by the fall velocities of the particles in water. Sediment particles in the sandsize (larger than 0. 062 mm) range do not appear to be affected by flocculation or dispersion resulting from the mineral constituents in solution. In contrast, the sedimentation diameter of clay and silt particles in suspension may vary considerably from point to point in a stream or reservoir, depending on the mineral matter in solution and in suspension and the degree of turbulence present. The size of sediment particles in transport at any point depends on the type of erodible and soluble material in the drainage area, the

degree of flocculation present, time in transport, and characteristics of the transporting flow. The flow characteristics include velocity of water, turbulence, and the depth, width, and roughness of the channel. As a result of these variable characteristics, the size of particles transported, as well as the total sediment load, is in constant adjustment with the characteristics and physical features of the stream and drainage area.

STREAMFLOW

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

PUBLICATIONS

Reports giving records of chemical quality and temperatures of surface waters and suspended-sediment loads of streams in the area covered by this volume for the water years 1941-60, are listed below:

Numbers of water-supply papers containing records for Parts 7 and 8, 1941-60

Year	WSP	Year	WSP	Year	WSP	Year	WSP
1941	942	1947	1102	1953	1292	1959	1654
1942	950	1948	1133	1954	1352	1960	1744
1943	970	1949	1163	1955	1402		
1944	1022	1950	1188	1956	1452		
1945	1030	1951	1199	1957	1522		
1946	1050	1952	1252	1958	1573		

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

PROFESSIONAL PAPER

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

BULLETINS

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

WATER-SUPPLY PAPERS

*108. Quality of water in the Susquehanna River drainage basin, with an introductory chapter on physiographic features, 1904.
*161. Quality of water in the upper Ohio River basin and at Erie, Pa., 1906.
*193. The quality of surface waters in Minnesota, 1907.
*236. The quality of surface waters in the United States, Part 1, Analyses of waters east of the one hundredth meridian, 1909.
*237. The quality of the surface waters of California, 1910.
*239. The quality of the surface waters of Illinois, 1910.
*273. Quality of the water supplies of Kansas, with a preliminary report on stream pollution by mine waters in southeastern Kansas, 1911.
*274. Some stream waters of the western United States, with chapters on sediment carried by the Rio Grande and the industrial application of water analyses, 1911.
*339. Quality of the surface waters of Washington, 1914.
*363. Quality of the surface waters of Oregon, 1914.
*418. Mineral springs of Alaska, with a chapter on the chemical character of some surface waters of Alaska, 1917.
*596-B. Quality of water of Colorado River in 1925-26, 1928.
*596-D. Quality of water of Pecos River in Texas, 1928.
*596-E. Quality of the surface waters of New Jersey, 1928.
*636-A. Quality of water of the Colorado River in 1926-28, 1930.
*636-B. Suspended matter in the Colorado River in 1925-28, 1930.
*638-D. Quality of water of the Colorado River in 1928-30, 1932.
*839. Quality of water of the Rio Grande basin above Fort Quitman, Tex., 1938.
*889-E. Chemical character of surface water of Georgia, 1944.
*998. Suspended sediment in the Colorado River, 1925-41, 1947.
1048. Discharge and sediment loads in the Boise River drainage basin, Idaho, 1939-40, 1948.
1110-C. Quality of water of Conchas Reservoir, New Mexico, 1939-49, 1952.

Many of the reports listed are available for consultation in the larger public and institutional libraries. Copies of Geological Survey publications still in print may be purchased at a nominal cost from the Superintendent of Documents, Government Printing Office, Washington, D.C. 20204, who will, upon request, furnish lists giving prices.

COOPERATION

Many municipal, State, and Federal agencies assisted in collecting records for water-quality investigations in the drainage basins included in this volume. Many of the investigations were supported by funds appropriated directly to the Geological Survey. Studies of suspended-sediment loads in the middle Rio Grande in New Mexico were started in 1948 as a Federal project.

Financial assistance was furnished by the Bureau of Reclamation, United States Department of the Interior, for some investigations in the Arkansas River basin in Kansas and Oklahoma. The Soil Conservation Service, United States Department of Agriculture, assisted with special sediment studies in the Rio Grande in New Mexico. The Corps of Engineers, United States Army, provided funds and determined the sediment concentration and particle size of bed material in connection with the sediment investigations of the Mississippi River at St. Louis, Mo., and gave assistance for investigations in Texas. The United States Public Health Service assisted in the operation of two chemical-quality stations in the Red River basin in Arkansas.

The table on page 27 lists the State and local agencies that cooperated in water-quality investigations in the area covered in this volume and also the locations of the quality-of-water district offices responsible for the data collected.

DIVISION OF WORK

The quality-of-water program was conducted by the Water Resources Division of the Geological Survey, L. B. Leopold, chief hydrologist, and S. K. Love, chief, Quality of Water Branch. The data were collected and prepared for publication under the supervision of the following district engineers or district chemists: In Missouri and the Arkansas River basin in Kansas, D. M. Culbertson; Lousiana and Texas, Burdge Ireland, succeeded by L. S. Hughes; Arkansas, M. E. Schroeder; Oklahoma, R. P. Orth; New Mexico and the Rio Grande and Arkansas River basins in Colorado, J. M. Stow. Any additional information on file can be obtained by writing or visiting the responsible Survey district office.

State	Cooperating agency	Drainage basin	District office
Arkansas	Engineering Experiment Station, University of Arkansas, Dean George F. Branigan, director.	Lower Mississippi River.	Room 2301 Federal Bldg. 700 West Capitol Avenue Little Rock, Ark. 72201
Kansas	Kansas Water Resources Resources Board, Robert L. Smith, executive secretary. City of Wichita, Robert H. Hess, director of water.		Cotner Terrace Bldg. 225 North Cotner Boulevard Lincoln, Nebr. 68505
Louisiana	Louisiana Department of Public Works, Lorris M. Wimberly, director, succeeded by Claude Kirkpatrick[a].	Lower Mississippi River, Western Gulf of Mexico.	Federal Bldg. 300 East 8th Avenue Austin, Tex. 78701
New Mexico	New Mexico Interstate Stream Commission, S. E. Reynolds, secretary. Pecos River Commission; George L. Reese, commissioner for New Mexico; J. C. Wilson, commissioner for Texas; and Robert T. Lingle, secretary-manager.	Western Gulf of Mexico.	Geology Bldg. P.O. Box 4217 University of New Mexico Albuquerque, N. Mex. 87106

a June 16, 1960.

State	Cooperating agency	Drainage basin	District office
Oklahoma	Oklahoma Water Resources Board, Frank Raab, executive director. Oklahoma State Department of Health, Division of Sanitary Engineering, Harold L. Malone, director.	Lower Mississippi River.	P.O. Box 95205 2300 South Eastern Avenue Oklahoma City, Okla. 73109
Texas	Texas Board of Water Engineers, consisting of Durwood Manford, chairman, R. M. Dixon, and O. F. Dent; the Brazos River Authority, the Canadian River Municipal Water Authority, the Chambers-Liberty Counties Navigation District, the cities of Dallas, Fort Worth, and Wichita Falls, the Colorado River Municipal Water District, the Greenbelt Municipal and Industrial Water Association, the Lower Colorado River Authority, the Lower Neches Valley Authority, the Red Bluff Water Power Control District, the Sabine River Authority, the Tarrant County Water Control and Improvement District No. 1,	Lower Mississippi River, Western Gulf of Mexico.	Federal Bldg. 300 East 8th Avenue Austin, Tex. 78701

State	Cooperating agency	Drainage basin	District office
Texas	the Texas Electric Service Company, the West Central Texas Municipal Water District, and the Wichita County Water Control and Improvement Districts.	Lower Mississippi River, Western Gulf of Mexico.	Federal Bldg. 300 East 8th Avenue Austin, Tex. 78701

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CHEMICAL ANALYSES, WATER TEMPERATURES, AND SEDIMENT

PART 7. LOWER MISSISSIPPI RIVER BASIN

MISSISSIPPI RIVER MAIN STEM

7-100. MISSISSIPPI RIVER AT ST. LOUIS, MO.

LOCATION (revised).--At MacArthur Bridge, 1.1 miles downstream from gaging station, 16.1 miles downstream from Missouri River, 18.1 miles upstream from Meramec River, and 178.9 miles upstream from Ohio River.
DRAINAGE AREA.--701,000 square miles, approximately, upstream from gaging station.
RECORDS AVAILABLE.--Water temperatures: October 1951 to September 1960.
Sediment records: April 1948 to September 1960.
EXTREMES, 1959-60.--Sediment concentrations: Maximum daily, 3,600 ppm Mar. 31; minimum daily, 113 ppm Aug. 9.
Sediment loads: Maximum daily, 5,000,000 tons Mar. 31; minimum daily, 26,800 tons Mar. 16.
EXTREMES, 1948-60.--Water temperatures: Maximum (1951-56, 1957-59), 89°F Aug. 2, 1955; minimum (1951-59), freezing point on many days during winter months.
Sediment concentrations: Maximum daily, 6,420 ppm June 7, 1951; minimum daily, 35 ppm Jan. 23, 25, 1956.
Sediment loads: Maximum daily, 7,010,000 tons May 5, 1951; minimum daily, 4,250 tons Jan. 25, 1956.
REMARKS.--Sediment loads for many days computed on basis of turbidity measurements. Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Temperature (°F) of water, water year October 1959 to September 1960

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

MISSISSIPPI RIVER MAIN STEM--Continued

7-100. MISSISSIPPI RIVER AT ST. LOUIS, MO.--Continued

Suspended sediment, water year October 1959 to September 1960

Day	OCTOBER			NOVEMBER			DECEMBER		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1..	234000	1200	760000	140000	550	210000	80500	192	41700
2..	209000	1180	666000	132000	380	140000	85000	190	43600
3..	197000	1300	690000	134000	342	124000	85800	175	40500
4..	192000	1100	570000	140000	360	136000	88800	172	41200
5..	193000	818	426000	139000	375	141000	92800	170	43000
6..	231000	900	560000	140000	365	138000	96000	180	47000
7..	297000	1200	960000	151000	300	120000	92000	177	44000
8..	342000	1600	1480000	165000	340	150000	92800	151	37800
9..	355000	1740	1670000	171000	385	178000	91200	130	32000
10..	355000	1600	1530000	176000	385	183000	87200	130	31000
11..	355000	1350	1290000	159000	340	150000	87200	146	34400
12..	351000	1300	1230000	148000	320	130000	92000	150	37000
13..	302000	1400	1100000	137000	308	114000	86500	140	33000
14..	248000	895	599000	139000	340	130000	83500	128	28900
15..	215000	750	440000	131000	320	110000	85800	120	28000
16..	178000	716	344000	122000	300	98800	85800	134	31000
17..	168000	700	320000	116000	240	75000	85800	170	39000
18..	164000	600	270000	107000	250	72200	86500	196	45800
19..	157000	432	183000	98400	240	64000	88000	220	52000
20..	147000	360	140000	86500	208	48600	91200	220	54000
21..	141000	450	171000	90400	190	46000	96000	262	67900
22..	128000	500	170000	90400	200	49000	100000	260	70000
23..	117000	400	126000	95200	255	65500	101000	209	57000
24..	121000	440	140000	98400	185	49200	96800	200	52000
25..	109000	500	150000	98400	185	49100	96800	150	39000
26..	119000	470	151000	93600	170	43000	93600	--	E 35000
27..	142000	500	190000	97600	158	41600	97600	120	32000
28..	140000	667	252000	98400	140	37000	101000	136	37100
29..	143000	1100	420000	100000	150	40000	116000	260	81000
30..	146000	762	300000	88800	160	38400	156000	276	116000
31..	145000	750	290000	--	--	--	176000	267	127000
Total	6341000	--	17588000	3683100	--	2971400	2995200	--	1498900
	JANUARY			FEBRUARY			MARCH		
1..	192000	320	170000	138000	359	134000	107000	276	79700
2..	199000	--	E 410000	132000	349	124000	102000	C 300	76000
3..	197000	800	430000	131000	400	141000	102000	C 300	76000
4..	182000	611	300000	133000	322	116000	100000	C 300	76000
5..	168000	500	230000	140000	427	161000	97600	C 300	76000
6..	136000	519	190000	150000	500	200000	93600	C 300	76000
7..	106000	470	135000	164000	550	240000	94400	C 300	76000
8..	104000	412	116000	175000	739	349000	91200	C 300	76000
9..	112000	340	100000	171000	815	376000	87200	C 300	76000
10..	117000	340	110000	165000	621	277000	84200	C 300	76000
11..	116000	299	93600	169000	600	270000	88000	C 300	76000
12..	114000	240	74000	166000	750	340000	92000	C 300	76000
13..	137000	303	112000	156000	650	270000	96000	C 300	76000
14..	172000	412	191000	147000	550	220000	96800	324	84700
15..	218000	558	328000	143000	553	214000	91200	160	39400
16..	262000	1020	722000	141000	550	210000	87200	114	26800
17..	309000	1820	1520000	139000	528	198000	93600	204	51600
18..	333000	2000	1800000	138000	550	200000	97600	260	69000
19..	340000	2090	1920000	132000	427	152000	102000	220	61000
20..	338000	1690	1540000	118000	360	110000	111000	240	72000
21..	312000	1800	1500000	120000	320	100000	108000	242	70600
22..	251000	2200	1500000	129000	300	100000	98400	170	45200
23..	177000	2000	960000	124000	293	98100	95200	242	62200
24..	140000	2100	790000	120000	332	108000	120000	400	130000
25..	122000	1200	400000	116000	289	90500	141000	750	290000
26..	118000	850	270000	114000	340	100000	151000	999	407000
27..	116000	601	188000	110000	340	100000	170000	611	280000
28..	125000	440	150000	111000	320	96000	216000	728	425000
29..	137000	393	145000	111000	300	90000	319000	1290	1110000
30..	153000	413	171000	--	--	--	431000	2750	3200000
31..	144000	380	150000	--	--	--	511000	3600	5000000
Total	5647000	--	16715600	4003000	--	5184600	4275200	--	12416200

E Estimated.
C Composite period.

MISSISSIPPI RIVER MAIN STEM--Continued

7-100. MISSISSIPPI RIVER AT ST. LOUIS, MO.--Continued

Suspended sediment, water year October 1959 to September 1960--Continued

Day	APRIL			MAY			JUNE		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1..	532000	3200	4600000	364000	500	490000	353000	715	681000
2..	554000	2880	4310000	386000	565	589000	338000	850	780000
3..	576000	2740	4260000	396000	600	640000	326000	658	579000
4..	596000	1900	3100000	388000	807	845000	311000	650	550000
5..	614000	1630	2700000	372000	900	900000	299000	600	480000
6..	631000	1500	2600000	372000	700	700000	289000	600	470000
7..	646000	1780	3100000	392000	650	690000	278000	480	360000
8..	659000	1500	2700000	423000	600	690000	271000	480	350000
9..	664000	1340	2400000	446000	1020	1230000	276000	625	466000
10..	667000	1200	2200000	461000	1000	1200000	281000	903	685000
11..	651000	1180	2070000	463000	1040	1300000	271000	950	700000
12..	621000	1100	1800000	468000	950	1200000	252000	750	510000
13..	601000	1040	1690000	468000	1160	1470000	240000	730	473000
14..	578000	750	1200000	446000	1500	1800000	237000	550	350000
15..	542000	900	1300000	416000	750	840000	246000	483	321000
16..	500000	850	1100000	390000	567	597000	278000	500	380000
17..	486000	1100	1400000	376000	558	566000	300000	1040	842000
18..	490000	1220	1610000	360000	555	539000	292000	950	750000
19..	495000	1400	1900000	358000	500	480000	268000	900	650000
20..	490000	1160	1530000	362000	451	441000	237000	850	540000
21..	481000	950	1200000	368000	600	600000	212000	900	520000
22..	463000	1040	1300000	362000	750	730000	218000	800	470000
23..	446000	950	1100000	360000	909	884000	227000	887	544000
24..	427000	850	980000	364000	1000	980000	242000	1070	699000
25..	404000	750	820000	378000	1100	1120000	286000	1500	1200000
26..	380000	587	602000	396000	1000	1070000	316000	2200	1900000
27..	357000	500	480000	398000	1010	1090000	297000	2160	1730000
28..	342000	470	434000	392000	1300	1400000	259000	1940	1360000
29..	333000	502	451000	394000	1000	1100000	265000	2440	1750000
30..	338000	500	460000	388000	1000	1000000	284000	2400	1800000
31..	--	--	--	370000	766	765000	--	--	--
Total	15564000	--	55397000	12277000	--	27946000	8249000	--	22890000
	JULY			AUGUST			SEPTEMBER		
1..	311000	1970	1650000	101000	200	55000	136000	750	280000
2..	317000	1730	1480000	100000	186	50200	152000	637	261000
3..	345000	1600	1500000	99200	170	46000	172000	1200	560000
4..	370000	1500	1500000	95200	153	39300	163000	900	400000
5..	370000	1660	1660000	96800	173	45200	151000	900	370000
6..	345000	1840	1710000	107000	160	46000	140000	800	300000
7..	304000	1700	1400000	115000	140	43000	133000	542	195000
8..	281000	1370	1040000	125000	124	41900	128000	360	120000
9..	257000	1000	690000	121000	113	36900	123000	230	76400
10..	228000	700	430000	116000	130	41000	119000	240	77000
11..	203000	515	282000	107000	150	43000	115000	300	93000
12..	196000	375	198000	117000	163	51500	107000	340	98200
13..	199000	359	193000	124000	180	60000	102000	280	77000
14..	243000	420	280000	115000	280	87000	98400	292	77600
15..	246000	750	500000	106000	610	175000	100000	260	70000
16..	210000	745	422000	96000	700	180000	100000	249	67200
17..	178000	750	360000	96800	651	170000	97600	240	63000
18..	166000	550	250000	96800	480	130000	91200	240	59000
19..	159000	373	160000	97600	308	81200	83500	198	44600
20..	154000	344	143000	99200	260	70000	85000	170	39000
21..	140000	440	170000	99200	220	59000	88000	130	31000
22..	125000	658	222000	118000	228	72600	102000	150	41000
23..	121000	600	200000	142000	489	187000	103000	148	41200
24..	124000	600	200000	140000	900	340000	96000	170	44000
25..	122000	450	148000	128000	1200	410000	94400	220	56000
26..	120000	380	120000	121000	643	210000	94400	225	57300
27..	119000	405	130000	110000	650	190000	102000	480	130000
28..	120000	360	120000	96800	550	140000	116000	340	106000
29..	120000	452	146000	94400	450	110000	124000	360	120000
30..	110000	380	110000	98400	298	79200	133000	526	189000
31..	100000	260	70000	114000	426	131000	--	--	--
Total	6403000	--	17484000	3393400	--	3421000	3449500	--	4143500

Total discharge for year (cfs-days)..... 76280400
Total load for year (tons)..... 187656200

7-100. MISSISSIPPI RIVER AT ST. LOUIS, MO.--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1959 to September 1960
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water;
P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Water temperature (°F)	Sampling point	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters											Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Dec. 8, 1959.....	1035	35		92800	146	36600	--	--	--	--	--	55	65	97	99	100		V
Jan. 13, 1960.....	0950	39		136000	273	100000	--	--	--	--	--	46	52	98	100	--		V
Apr. 26.....	1225	62		380000	542	556000	37	44	53	63	78	87	92	95	100	--		VPWC
May 18.....	1035	63		360000	536	521000	42	43	49	57	69	76	81	84	97	100		VPWC
June 3.....	1000	72		326000	632	556000	48	54	62	72	86	94	97	98	100	--		VPWC
Aug. 9.....	1040	83		121000	112	36600	--	40	50	62	82	91	98	100	--	--		SBWC
Sept. 7.....	1205	85		133000	518	186000	--	56	67	80	92	99	100	--	--	--		VBWC
Sept. 7.....	1205	85		133000	518	186000	--	9	20	58	92	99	100	--	--	--		VBN

Particle-size analyses of bed material, water year October 1959 to September 1960
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water;
P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Water temperature (°F)	Sampling point	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Bed material: Percent finer than size indicated, in millimeters											Method of analysis
							0.062	0.125	0.250	0.500	1.000	2.000	4.000	8.000	16.00	32.00	64.00	
Dec. 9, 1959.....	1045		20	92000			0	2	22	44	81	93	98	99	100	--		S
Jan. 13, 1960.....	1125		20	138000			0	3	51	76	93	98	99	100	--	--		SV
Mar. 24.....	--		20	119000			1	4	42	67	92	97	98	99	100	--		S
Apr. 13.....	1310		21	601000			--	0	13	48	80	89	94	97	99	100		SV
May 12.....	0945		19	468000			--	0	1	35	77	89	96	99	100	--		SV
June 8.....	1050		20	271000			0	1	6	36	71	82	90	95	99	100		SV
June 22.....	1045		20	216000			--	0	3	23	64	82	91	95	99	100		S
June 22.....	1045		20	216000			--	0	2	28	69	82	91	95	100	--		SV
July 20.....	--		20	156000			0	1	7	31	67	83	91	94	97	100		S
Aug. 10.....	--		19	119000			0	2	5	23	60	75	84	91	97	100		S
Sept. 9.....	1015		20	123000			1	4	6	36	69	81	92	97	100	--		SV

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WHITE RIVER BASIN

7-490. WAR EAGLE CREEK NEAR HINDSVILLE, ARK.

LOCATION.--At gaging station at bridge on State Highway 45, 3.8 miles downstream from Clear Creek, and 3.9 miles north of Hindsville, Madison County.
DRAINAGE AREA.--262 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1953 to September 1960.
REMARKS.--Records of discharge for water year October 1959 to September 1960 are given in WSP 1711.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$		Specific conductance (micromhos at 25°C)	pH	Color
														Calcium, magnesium	Noncarbonate			
Nov. 3, 1959.....	5,060			34	2.6	2.4	1.3	108	5.8	3.5		2.1	112	96	7	194	7.0	5
Dec. 15.....	140			16	2.0	1.6	.8	54	5.4	2.5		.5	66	48	4	104	7.2	5
Jan. 5, 1960.....	248			19	2.1	1.6	.8	56	5.0	5.0		1.4	70	56	10	115	7.4	5
Feb. 18.....	201			21	1.2	1.6	.7	64	5.8	2.8		7.4	80	58	5	127	7.4	5
Mar. 8.....	126			24	1.8	2.0	.8	77	5.8	3.0		1.1	85	68	4	137	7.1	5
Mar. 29.....	248			20	1.0	1.7	1.0	62	5.6	2.5		.4	74	54	3	114	7.3	5
Apr. 20.....	365			18	1.8	1.7	.5	56	6.0	2.5		.0	63	52	6	104	7.1	5
May 31.....	182			24	1.5	1.7	1.1	76	6.2	2.2		.9	81	66	4	130	7.4	5
July 11.....	69			19	2.6	1.5	.9	68	3.0	2.2		.9	71	58	2	115	7.1	3
Aug. 1.....	214			25	1.8	1.6	.8	82	4.4	2.0		1.8	84	70	3	135	7.3	3
Aug. 24.....	43			35	1.5	2.4	1.1	108	5.4	3.0		1.4	119	94	5	181	7.3	3
Sept. 13.....	18			40	1.7	2.6	1.1	126	5.0	4.0		1.7	134	107	4	208	7.5	1

WHITE RIVER BASIN--Continued

7-505. KINGS RIVER NEAR BERRYVILLE, ARK.

LOCATION.--At gaging station at bridge on county road, 1.2 miles downstream from Bee Creek, 2.2 miles upstream from Clabber Creek, and 5.2 miles northwest of Berryville, Carroll County.
DRAINAGE AREA.--532 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1953 to September 1960.
REMARKS.--Records of discharge for water year October 1959 to September 1960 are given in WSP 1711.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$		Specific conductance (micromhos at 25°C)	pH	Color
														Calcium, magnesium	Noncarbonate			
Nov. 4, 1959.....	7,760			25	10	1.3	2.5	118	5.4	2.5		4.0	118	104	7	195	7.2	23
Dec. 16.....	235			31	6.2	1.7	.8	120	5.6	3.0		1.1	116	103	4	197	7.7	5
Jan. 5, 1960.....	516			29	7.6	1.5	.8	120	4.6	2.0		1.9	122	104	6	195	7.7	12
Feb. 18.....	434			31	6.0	1.4	.5	118	5.2	2.0		1.7	118	102	6	194	7.6	5
Mar. 9.....	325			36	9.1	1.6	.9	146	6.4	2.5		.5	136	128	8	229	7.4	5
Mar. 29.....	782			26	6.2	1.4	.4	104	6.2	2.0		.9	91	90	6	173	7.3	5
Apr. 20.....	728			28	6.0	1.9	1.3	110	5.8	2.5		.4	105	94	4	181	7.5	5
May 31.....	384			32	6.3	1.6	1.0	120	4.6	2.5		.9	112	106	8	194	7.5	5
July 11.....	94			33	8.2	1.6	1.0	134	4.2	2.2		.2	121	116	6	208	7.7	5
Aug. 1.....	422			32	6.3	1.4	1.0	124	4.6	2.0		2.0	116	106	4	199	7.4	4
Aug. 24.....	74			35	8.3	1.7	.9	142	3.6	2.2		.3	128	122	5	223	7.4	3
Sept. 13.....	24			35	9.8	2.0	1.1	152	4.2	2.8		.1	130	128	4	244	7.3	3

7-545. WHITE RIVER AT BULL SHOALS DAM, ARK.

LOCATION.--At dam on White River, 6.3 miles northeast of Flippin, Marion County, 12.5 miles downstream from Little North Fork, and at mile 418.6.
DRAINAGE AREA.--6,036 square miles.
RECORDS AVAILABLE.--Chemical analyses: July 1954 to September 1957, October 1959 to September 1960.
Specific conductance and chloride: October 1957 to September 1959.
Water temperatures: July 1954 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 180 ppm Mar. 1-31; minimum, 152 ppm Jan. 1-31.
Hardness: Maximum, 148 ppm Dec. 1-31; minimum, 132 ppm May 1-31, June 1-30.
Specific conductance: Maximum daily, 291 micromhos June 30; minimum daily, 222 micromhos Apr. 13.
Water temperatures: Maximum, 50°F Nov. 5-21; minimum, 42°F on many days during March to June.
REMARKS.--Records of specific conductance of daily samples available in district office at Little Rock, Ark. Records of discharge for gaging station near Flippin for water year October 1959 to September 1960 given in WSP 1711. Flow regulated by Bull Shoals Reservoir since July 1951.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$		Specific conductance (micromhos at 25°C)	pH	Color
														Calcium, magnesium	Noncarbonate			
Oct. 1-31, 1959.....	2,395	4.7	0.03	36	13	2.7	1.5	166	6.2	3.2	0.0	0.8	158	144	8	264	8.1	5
Nov. 1-30.....	2,681	4.2	.05	38	12	3.0	1.6	170	6.8	3.0	.0	.9	158	144	5	269	8.2	5
Dec. 1-31.....	2,405	4.3	.01	36	14	2.8	1.6	172	7.2	2.5	.0	.5	154	148	6	265	8.2	5
Jan. 1-31, 1960.....	1,516	3.6	.03	35	14	2.6	1.4	a168	6.6	2.5	.0	.3	152	145	7	258	8.3	5
Feb. 1-29.....	3,699	1.8	.00	33	15	2.1	1.1	170	5.8	3.2	.2	.1	167	144	4	268	8.2	7
Mar. 1-31.....	4,555	1.4	.00	34	15	2.0	1.1	174	4.8	2.8	.1	.4	180	146	4	276	8.2	5
Apr. 1-30.....	2,076	6.3	.00	31	15	2.5	1.1	164	6.4	2.5	.2	1.4	157	139	4	259	7.4	5
May 1-31.....	10,500	11	.00	30	14	2.9	1.1	158	6.6	2.5	.1	1.7	154	132	3	244	8.1	5
June 1-30.....	9,420	9.0	.00	28	15	3.1	1.0	156	6.0	2.5	.1	2.3	158	132	3	249	7.8	5
July 1-31.....	3,386	6.7	.00	27	16	3.1	1.0	158	6.2	2.5	.2	2.6	162	134	4	248	8.1	5
Aug. 1-31.....	3,520	7.8	.00	37	12	2.3	1.2	168	5.8	2.5	.1	2.2	170	142	4	263	8.1	5
Sept. 1-30.....	2,568	6.4	.00	38	12	2.4	1.2	168	6.2	2.5	.1	2.0	170	144	7	267	7.6	5
Weighted average..	4,061	6.8	0.01	32	14	2.7	1.2	164	6.2	2.6	0.1	1.5	161	138	4	257	8.0	5
Time-weighted average.....	--	5.6	0.01	34	14	2.6	1.2	166	6.2	2.7	0.1	1.3	162	141	5	261	7.9	5
Tons per day.....	--	75	0.06	353	155	30	13	1,790	68	29	1.0	16	1,770	1,520	46	--	--	--

a Includes equivalent of 2 ppm carbonate (CO_3).

WHITE RIVER BASIN--Continued

7-545. WHITE RIVER AT BULL SHOALS DAM, ARK.--Continued

Temperature (°F) of water, water year October 1959 to September 1960

Month	Day																													Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
October	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	49	49	49	49	49	49	49	49	49	49	49	49	49	49	47
November	49	49	49	49	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	49	49	49	49	49	49	49	49	49	--	50
December	49	49	49	49	49	49	49	49	49	49	49	49	49	49	--	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49
January	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	48	48	48	48	48	48	48	48	48	49
February	48	49	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	47	47	47	47	47	47	47	47	47	47	47	47	--	--	48
March	46	46	46	46	46	46	46	46	44	44	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	43
April	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	--	42
May	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42
June	42	42	42	42	42	42	42	42	42	42	42	42	42	43	43	43	43	43	43	43	43	43	43	43	43	43	45	45	45	45	--	43
July	44	44	44	44	44	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
August	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	46	46	46	45	46	45	45	45	45	46	45	46	45
September	46	46	45	45	45	46	46	45	45	46	46	46	45	45	46	45	45	45	45	46	46	46	46	46	46	46	46	46	46	46	--	46

7-570. BUFFALO RIVER NEAR RUSH, ARK.

LOCATION.--At gaging station, 0.8 mile upstream from Rush Creek, 1.5 miles southeast of Rush, Marion County, and 24.3 miles upstream from mouth.
DRAINAGE AREA.--1,091 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1958 to September 1960.
Water temperatures: October 1958 to September 1959.
EXTREMES, 1958-59.--Dissolved solids: Maximum, 156 ppm Nov. 1-15; minimum, 68 ppm Nov. 17-19.
Hardness: Maximum, 138 ppm Nov. 1-15; minimum, 56 ppm Nov. 17-19.
Specific conductance: Maximum daily, 273 micromhos Nov. 11; minimum daily, 97 micromhos Nov. 17.
Water temperatures: Maximum, 88°F July 30; minimum, freezing point Jan. 5, 6.
REMARKS.--Records of specific conductance of daily samples for the 1959 water year are available in district office at Little Rock, Ark. Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$		Specific conductance (micromhos at 25°C)	pH	Color
														Calcium, magnesium	Noncarbonate			
Nov. 9, 1959.....	1,690			34	1.9	1.8	0.9	108	9.6	1.5		0.2	110	93	4	171	7.6	6
Dec. 8.....	226			40	5.1	1.8	.7	140	6.4	2.5		.7	129	121	6	221	8.1	10
Feb. 2, 1960.....	758			38	2.6	1.6	.7	122	5.8	2.5		.0	117	106	6	196	7.8	5
Mar. 29.....	1,480			33	2.3	1.4	.5	107	6.0	2.2		.0	103	92	4	174	7.5	5
Apr. 26.....	1,200			33	2.6	1.5	.8	110	6.0	2.0		.0	105	93	3	178	7.3	5
May 23.....	5,620			33	2.3	1.0	.6	108	4.6	1.2		.3	106	92	4	176	7.4	5
June 28.....	344			46	5.3	1.6	.8	158	4.8	2.5		.2	137	137	8	250	7.4	4
Aug. 22.....	118			38	4.5	1.6	.8	134	4.2	2.2		.4	105	114	4	210	7.5	2
Sept. 19.....	88			41	5.3	2.0	.8	144	4.6	2.8		.1	121	124	6	234	7.5	2

WHITE RIVER BASIN--Continued

7-600. NORTH FORK RIVER AT NORFORK DAM, NEAR NORFORK, ARK.

LOCATION.--At gaging station 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 1960.
REMARKS.--Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$		Specific conductance (micromhos at 25°C)	pH	Color
														Calcium, magnesium	Noncarbonate			
Oct. 15, 1959.....	1,630	4.9	0.02	40	23	2.1	1.2	228	6.6	2.0	0.0	1.7	201	194	8	332	8.2	5
Nov. 10.....	1,960	--	--	41	24	1.1	1.3	232	5.6	3.0	--	1.9	198	201	11	336	7.7	12
Nov. 23.....	1,900	5.2	.02	40	22	2.2	1.5	224	4.8	2.0	.0	2.2	201	190	7	341	8.0	5
Dec. 30.....	2,980	4.2	.04	34	22	1.7	1.3	206	4.6	2.5	.0	.9	174	176	6	301	8.0	5
Jan. 27, 1960.....	2,430	2.0	.01	35	21	2.4	1.8	206	4.8	3.0	.0	.9	184	174	5	313	8.2	5
Mar. 4.....	2,610	2.7	.02	36	20	2.0	1.5	206	5.4	2.0	.0	.5	176	172	3	306	7.9	5
Mar. 30.....	2,630	3.2	.04	36	20	1.9	1.9	208	4.8	2.2	.0	.3	178	172	2	306	8.2	5
Apr. 6.....	1,500	3.1	.00	36	21	1.9	1.5	208	4.8	2.0	.0	.8	180	176	6	306	8.1	5
June 29.....	714	3.5	.00	35	22	1.2	1.0	204	4.6	3.0	.1	2.4	190	178	11	307	7.1	3
Aug. 3.....	420	4.1	.00	37	22	1.6	1.4	216	6.8	1.5	.0	1.6	190	183	6	315	8.0	6
Sept. 30.....	1,160	3.2	.00	40	20	1.4	1.1	212	4.8	2.0	.1	3.0	191	182	8	320	6.8	3

7-640. BLACK RIVER NEAR CORNING, ARK.

LOCATION.--At gaging station at bridge on U.S. Highway 62, 2.2 miles east of Corning, Clay County, 13.9 miles downstream from Cane Creek, and at mile 152.2.
DRAINAGE AREA.--1,749 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1954 to September 1960.
Water temperatures: October 1956 to September 1959.
EXTREMES, 1956-59.--Dissolved solids: Maximum, 175 ppm Nov. 1-10, 1958; minimum, 38 ppm Jan. 24, 1957.
Hardness: Maximum, 154 ppm Nov. 11-20, 1956; minimum. 25 ppm Jan. 24, 1957.
Specific conductance: Maximum daily, 323 micromhos Oct. 23, 1956; minimum daily, 42 micromhos Mar. 28, 1958.
Water temperatures: Maximum, 86°F Aug. 3, 5, 1959; minimum, 33°F Jan. 16, 1957, Jan. 10, 1959.
REMARKS.--Records of specific conductance of daily samples for 1956-59 water years available in district office at Little Rock, Ark. Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$		Specific conductance (micromhos at 25°C)	pH	Color
														Calcium, magnesium	Noncarbonate			
Nov. 11, 1959.....	466			26	14	2.3	1.2	144	4.4	3.0		0.4	130	122	4	222	7.9	15
Dec. 10.....	556			29	16	2.0	.8	164	4.0	3.0		.4	134	138	4	243	8.1	10
Jan. 10, 1960.....	1,610			20	8.8	1.1	.8	98	5.2	1.5		.1	100	86	6	150	7.7	5
Feb. 4.....	1,380			20	9.8	1.9	.8	106	5.8	2.0		.0	106	90	4	170	7.4	5
Mar. 3.....	1,000			24	12	2.3	.5	126	5.0	2.8		.0	133	110	6	202	7.6	5
Mar. 31.....	2,720			20	10	1.3	.7	104	5.0	2.0		.0	110	91	4	171	7.6	5
Apr. 27.....	1,550			22	11	1.7	.7	114	5.6	2.0		.5	119	100	6	184	7.2	5
May 25.....	4,360			11	5.0	1.2	1.1	58	5.0	1.2		.0	75	48	0	99	7.0	15
June 29.....	814			19	14	2.4	.8	124	4.8	2.5		.4	114	105	4	206	7.1	6
July 28.....	576			27	15	4.6	.8	160	4.0	3.0		.2	146	129	0	245	7.3	5
Aug. 24.....	502			25	14	2.0	1.0	142	4.0	2.5		.3	126	120	4	221	7.3	3
Sept. 21.....	375			30	17	2.0	.6	172	4.0	2.5		.3	138	145	4	263	7.3	5

WHITE RIVER BASIN--Continued

7-695. SPRING RIVER AT IMBODEN, ARK.

LOCATION.--At gaging station at bridge on U.S. Highway 62 at Imboden, Lawrence County, 3.9 miles downstream from Janes Creek, 8.5 miles upstream from Eleven Point River, and 12.1 miles upstream from mouth.
DRAINAGE AREA.--1,162 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1953 to September 1960.
Water temperatures: December 1955 to April 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 261 ppm Feb. 21-29; minimum, 152 ppm Oct. 7-9.
Hardness: Maximum, 230 ppm Nov. 21-30; minimum, 88 ppm Dec. 29.
Specific conductance: Maximum daily, 536 micromhos June 10; minimum daily, 156 micromhos Dec. 29.
Water temperatures: Maximum, not determined; minimum, 35°F Mar. 5.
EXTREMES, 1955-60.--Dissolved solids: Maximum, 312 ppm Jan. 6, 1956; minimum, 81 ppm Apr. 5, 1957.
Hardness: Maximum, 252 ppm Oct. 21-31, 1958; minimum, 69 ppm Apr. 5, 1957.
Specific conductance: Maximum daily, 557 micromhos Jan. 6, 1956; minimum daily, 114 micromhos Nov. 18, 1958.
Water temperatures: Maximum, 82°F on several days during July and August 1956; minimum, 34°F Jan. 17-19, 1957.
REMARKS.--Records of specific conductance of daily samples available in district office at Little Rock, Ark. Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$		Specific conductance (micromhos at 25°C)	pH	Color
														Calcium, magnesium	Noncarbonate			
Oct. 1-6, 1959.....	804	--	--	43	27	1.8	1.6	264	3.6	2.2	--	4.2	219	218	2	379	7.4	3
Oct. 7-9.....	980	--	--	29	15	1.1	2.5	162	3.8	1.0	--	5.0	152	134	1	247	7.2	20
Oct. 10-20.....	644	6.3	0.00	45	26	1.9	1.3	262	4.0	2.5	0.1	2.6	218	220	5	384	7.8	5
Oct. 21-31.....	487	--	--	45	26	1.9	1.7	260	4.2	2.5	--	7.3	232	220	6	380	7.4	6
Nov. 1-10.....	911	5.5	.00	43	22	1.5	1.7	236	4.4	2.0	.0	2.4	206	198	6	353	7.5	7
Nov. 11-20.....	572	--	--	47	27	1.7	1.6	272	5.0	2.2	--	4.6	234	228	6	388	8.0	5
Nov. 21-30.....	469	--	--	46	28	1.6	1.4	276	4.2	2.2	--	4.9	232	230	4	404	7.4	2
Dec. 1-10.....	434	4.9	.04	39	28	2.5	1.6	a246	3.8	7.5	.0	.5	240	212	10	372	8.3	7
Dec. 11-15.....	2,052	--	--	34	20	1.8	2.6	198	4.4	.5	--	2.3	215	167	4	299	7.5	7
Dec. 16-28.....	1,596	--	--	43	26	2.2	1.2	252	4.4	2.2	--	2.1	255	214	8	369	8.0	5
Dec. 29.....	4,960	--	--	25	6.2	1.6	2.2	96	5.6	1.0	--	4.0	--	88	10	156	7.7	37
Dec. 30-31.....	1,975	--	--	33	18	2.1	1.5	184	4 4	2.8	--	2.9	204	156	6	373	7.2	37
Jan. 1-10, 1960.....	1,152	5.8	.02	35	23	1.9	1.4	b222	5.0	2.0	.0	1.4	192	182	0	329	8.3	3
Jan. 11-20.....	1,651	--	--	40	24	1.8	1.0	232	4.0	3.5	--	3.2	246	198	8	347	7.5	5
Jan. 21-31.....	1,134	--	--	28	24	2.0	.9	200	4.2	2.5	--	3.8	208	168	4	303	7.9	5
Feb. 1-10.....	1,597	6.3	.04	43	23	2.5	1.3	240	3.8	2.2	.0	1.0	206	202	6	351	8.2	3
Feb. 11-20.....	1,164	--	--	43	27	2.3	1.0	254	4.0	3.5	--	2.7	255	218	10	376	7.9	5
Feb. 21-29.....	874	--	--	44	29	1.8	1.4	272	3.6	2.0	--	2.6	261	229	6	384	8.0	5

Mar. 1-10, 1960.....	902	3.8	.00	36	27	1.5	.9	244	3.4	1.5	.1	.6	212	201	1	355	8.0	7
Mar. 11-20.....	1,778	--	--	37	27	1.9	.7	240	4.8	1.8	--	1.3	231	204	7	351	7.9	5
Mar. 21-31.....	1,905	--	--	30	25	2.1	.8	210	4.0	2.8	--	1.6	216	178	6	316	7.9	5
Apr. 1-10.....	1,072	4.5	.00	34	26	1.8	.6	222	3.4	2.0	.1	2.9	171	192	10	338	8.1	3
Apr. 11-20.....	905	--	--	25	28	1.9	.9	206	2.8	2.5	--	2.7	215	178	8	308	8.0	3
Apr. 21-30.....	878	--	--	29	29	2.1	.9	224	3.4	2.5	--	2.0	227	192	8	330	8.0	3
May 1-5.....	983	--	--	23	28	2.5	1.1	200	4.0	2.5	--	3.0	213	172	8	307	7.6	5
May 6-8.....	6,127	--	--	30	12	1.9	1.8	148	4.0	1.5	--	2.9	188	124	3	234	7.4	20
May 9-14.....	1,657	--	--	36	24	3.0	5.9	224	4.6	4.0	--	5.2	248	188	5	346	7.9	10
May 15-31.....	2,358	8.9	.00	27	22	3.1	1.0	185	3.6	3.5	.1	2.3	153	158	6	295	7.9	7
June 1-10.....	1,022	7.2	.00	30	27	2.2	.9	218	3.6	2.0	.1	2.9	170	186	8	330	8.0	3
June 11-20.....	802	--	--	32	28	2.0	.9	232	3.8	3.0	--	1.5	231	195	5	337	8.1	3
June 21-30.....	986	--	--	16	25	1.7	.8	c172	3.2	2.2	--	.0	165	143	2	247	8.5	3
July 1-10.....	640	8.4	.00	40	28	2.4	.8	253	2.0	2.0	.0	2.4	197	215	8	274	8.1	3
July 11-25.....	617	--	--	44	27	2.3	.9	262	3.2	2.2	--	1.4	253	221	6	373	8.1	5
July 26.....	1,850	--	--	29	14	2.7	1.8	162	2.4	2.0	--	2.8	156	130	0	239	7.0	3
July 27-31.....	886	--	--	47	24	1.9	1.2	264	2.8	2.5	--	1.2	212	216	0	361	7.3	3
Aug. 1-10.....	527	6.5	.00	36	28	2.4	1.3	246	4.0	3.2	.0	2.1	208	205	4	342	8.1	5
Aug. 11-20.....	508	--	--	40	27	1.9	1.2	252	2.8	2.0	--	2.4	212	211	4	358	7.3	3
Aug. 21-31.....	489	--	--	43	26	2.0	1.2	256	2.8	2.2	--	2.3	217	214	4	364	7.4	3
Sept. 1-10.....	452	7.3	.00	36	28	2.1	1.1	248	2.8	4.0	.1	2.5	213	205	2	351	7.3	3
Sept. 11-20.....	414	--	--	45	23	2.9	1.6	250	3.4	3.2	--	2.7	216	207	2	367	7.1	3
Sept. 21-30.....	407	--	--	44	27	1.9	1.2	264	3.2	1.8	--	3.3	226	221	4	382	7.3	3
Weighted average..	1,060	--	--	35	24	2.1	1.3	222	3.9	2.5	--	2.4	211	188	6	330	7.7	6
Time-weighted average.....	--	--	--	37	26	2.1	1.3	235	3.7	2.6	--	2.5	216	198	5	344	7.7	5
Tons per day.....	--	--	--	101	69	6.1	3.7	636	11	7.2	--	7.0	603	537	16	--	--	--

a Includes equivalent of 12 ppm carbonate (CO_3).
b Includes equivalent of 4 ppm carbonate (CO_3).
c Includes equivalent of 6 ppm carbonate (CO_3).

Temperature (°F) of water, October 1959 to April 1960

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

WHITE RIVER BASIN--Continued

7-745. WHITE RIVER AT NEWPORT, ARK.

LOCATION.--At gaging station at bridge on U.S. Highway 67 at Newport, Jackson County, 7.2 miles downstream from Black River, and at mile 257.6.
DRAINAGE AREA.--19,812 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1960.
Water temperatures: October 1945 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 182 ppm Nov. 1-4, Sept. 21-30; minimum, 133 ppm Nov. 5-8, May 21-31.
Hardness: Maximum, 170 ppm Sept. 21-30; minimum, 104 ppm Nov. 5-8.
Specific conductance: Maximum daily, 344 micromhos Aug. 4; minimum daily, 177 micromhos Nov. 7.
Water temperatures: Maximum, 82°F Aug. 16, 17; minimum, 38°F Mar. 3-5.
EXTREMES, 1945-60.--Dissolved solids: Maximum, 388 ppm Jan. 20-21, 23, 30, 1954; minimum, 96 ppm Nov. 19-30, 1957.
Hardness: Maximum, 193 ppm Oct. 4-7, 10, 1945; minimum, 51 ppm Jan. 25-31, 1949.
Specific conductance: Maximum daily, 695 micromhos Jan. 30, 1954; minimum daily, 103 micromhos Jan. 28, 1949.
Water temperatures: Maximum, 87°F Aug. 4, 9, 1947, Aug. 1, 1952; minimum, 34°F Feb. 2-4, 1951.
REMARKS.--Records of specific conductance of daily samples available in district office at Little Rock, Ark. Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$		Specific conductance (micromhos at 25°C)	pH	Color
														Calcium, magnesium	Noncarbonate			
Oct. 1-5, 1959	8,360	--	--	38	16	2.9	1.1	190	4.4	3.0	--	1.6	178	161	6	291	8.1	3
Oct. 6-10	17,160	--	--	33	12	2.1	1.1	156	4.6	2.5	--	2.2	151	132	4	246	8.0	3
Oct. 11-20	12,430	2.3	0.00	35	15	2.2	1.3	180	4.2	2.5	0.2	.5	175	149	2	285	8.1	5
Oct. 21-31	10,010	--	--	36	16	2.3	1.2	188	5.0	2.5	--	1.8	172	156	2	285	8.1	2
Nov. 1-4	11,640	--	--	36	17	2.8	1.1	188	5.0	3.5	--	1.7	182	160	6	292	8.0	1
Nov. 5-8	30,450	--	--	27	8.8	2.0	1.9	120	5.0	2.5	--	2.9	133	104	5	201	7.7	7
Nov. 9-12	15,320	--	--	33	14	2.1	1.3	162	5.0	2.5	--	1.6	158	140	7	253	7.9	3
Nov. 13-20	12,380	1.8	.00	37	16	2.2	1.3	a184	4.8	3.0	.1	.5	179	158	8	297	8.3	6
Nov. 21-30	10,430	--	--	35	18	2.6	1.2	188	4.6	3.0	--	1.4	174	162	8	294	8.0	4
Dec. 1-10	8,812	2.7	.00	33	18	2.9	.9	188	4.2	2.5	.2	.2	150	156	2	298	8.2	6
Dec. 11-20	20,800	--	--	29	13	2.9	1.3	148	6.0	3.0	--	1.9	155	126	4	239	7.7	7
Dec. 21-31	25,910	--	--	30	12	2.5	1.1	148	5.4	2.0	--	1.8	155	124	3	238	7.8	5
Jan. 1-10, 1960	25,090	7.8	.00	30	13	2.5	.9	148	9.0	2.8	.1	2.0	146	128	7	235	7.9	5
Jan. 11-20	26,560	--	--	30	13	2.3	1.0	144	5.4	4.5	--	2.9	151	128	10	247	7.6	4
Jan. 21-31	22,670	--	--	32	15	2.5	.9	166	4.8	3.0	--	2.0	158	142	6	259	7.8	3
Feb. 1-10	25,530	6.4	.00	32	12	2.8	.8	152	6.2	2.8	.3	1.8	142	130	5	248	7.9	5
Feb. 11-20	22,740	--	--	32	15	2.5	1.1	166	5.8	2.5	--	1.7	162	142	6	268	7.7	2
Feb. 21-29	19,220	--	--	30	17	2.6	.8	168	4.8	3.0	--	2.3	152	145	8	279	7.8	4
Mar. 1-10	19,680	5.7	.00	28	16	3.1	.8	158	5.2	3.0	.1	1.7	141	136	6	258	7.5	3
Mar. 11-20	28,010	--	--	32	14	2.4	1.2	158	6.6	2.8	--	1.5	160	138	8	261	7.9	2

Mar. 21-31.....	26,250	--	--	34	14	2.2	.8	166	6.0	2.8	--	1.4	162	142	6	261	7.9	4
Apr. 1-10.....	19,040	3.5	0.00	32	15	2.7	.7	169	5.2	1.2	0.1	2.0	150	142	3	267	8.2	5
Apr. 11-20.....	15,550	--	--	34	16	2.5	1.2	176	5.0	3.0	--	1.3	171	151	7	274	8.1	4
Apr. 21-30.....	15,260	--	--	34	16	3.4	1.2	176	6.6	2.8	--	2.3	159	151	7	254	8.0	8
May 1-10.....	25,340	6.6	.00	31	13	2.5	1.1	154	5.2	2.2	.1	2.2	151	131	5	248	8.1	8
May 11-20.....	39,630	--	--	33	13	2.8	1.4	160	5.4	2.8	--	2.3	148	136	5	246	7.7	5
May 21-31.....	53,770	--	--	30	11	2.6	1.3	136	7.4	2.5	--	2.2	133	120	8	220	7.5	10
June 1-10.....	39,020	5.6	.00	34	15	2.7	.9	170	5.2	2.5	.2	1.7	151	146	7	269	8.2	8
June 11-20.....	17,400	--	--	37	16	3.4	1.3	188	5.4	2.5	--	2.0	169	158	4	283	7.9	5
June 21-30.....	15,500	--	--	33	16	3.5	1.3	172	5.4	3.5	--	2.5	146	148	8	267	7.8	10
July 1-10.....	13,280	6.2	.00	35	16	3.2	.9	178	6.2	3.5	.1	2.2	163	154	8	284	8.1	5
July 11-20.....	10,170	--	--	36	19	4.0	1.5	198	5.4	4.5	--	2.6	173	168	6	304	7.4	5
July 21-31.....	12,240	--	--	36	17	3.4	1.3	188	4.8	3.2	--	2.1	156	160	6	291	7.7	5
Aug. 1-10.....	9,750	5.3	--	32	17	3.4	3.2	184	5.6	3.5	.2	.9	160	150	0	274	8.1	0
Aug. 11-20.....	9,402	--	--	38	18	4.1	1.5	198	5.4	4.2	--	2.9	176	169	6	301	7.9	5
Aug. 21-31.....	9,442	--	--	37	18	3.6	1.2	198	5.4	3.0	--	1.7	176	166	4	298	7.9	5
Sept. 1-10.....	8,778	7.8	--	33	18	3.2	1.1	188	5.6	3.0	.1	.8	167	156	2	281	8.1	0
Sept. 11-20.....	7,541	--	--	36	19	3.7	1.6	196	8.8	3.8	--	2.1	173	168	8	296	7.9	5
Sept. 21-30.....	7,508	--	--	37	19	3.7	1.4	200	8.4	3.5	--	1.8	182	170	6	303	8.0	5
Weighted average..	18,920	--	--	33	14	2.7	1.2	164	5.8	2.8	--	1.9	155	141	6	260	7.8	5
Time-weighted average.....	--	--	--	33	15	2.9	1.2	172	5.7	3.0	--	1.8	160	147	6	270	7.9	5
Tons per day.....	--	--	--	1,660	739	140	59	8,400	295	145	--	97	7,920	7,180	303	--	--	260

a Includes equivalent of 4 ppm carbonate (CO_3).

Temperature (°F) of water, water year October 1959 to September 1960

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

WHITE RIVER BASIN--Continued

7-760. LITTLE RED RIVER NEAR HEBER SPRINGS, ARK.

LOCATION.--At gaging station, 2.8 miles downstream from Peter Creek and 3 miles northeast of Heber Springs, Cleburne County.
DRAINAGE AREA.--1,141 square miles.
RECORDS AVAILABLE.--Chemical analyses: November 1949 to September 1952, October 1954 to September 1960.
Water temperatures: November 1949 to September 1952.
EXTREMES, 1949-52.--Dissolved solids: Maximum, 58 ppm Aug. 21-24, 1950; minimum, 21 ppm Mar. 17-20, 1951.
Hardness: Maximum, 31 ppm Nov. 11-16, 1950, Aug. 21-31, 1952; minimum, 10 ppm Jan. 2-6, 1952.
Specific conductance: Maximum daily, 126 micromhos Jan. 21, 1951; minimum daily, 25 micromhos Jan. 3, 1952.
Water temperatures: Maximum, 92°F July 25-28, 1952; minimum, freezing point Feb. 2, 1951.
REMARKS.--Records of specific conductance of daily samples for 1949-52 water years available in district office at Little Rock, Ark. Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$		Specific conductance (micromhos at 25°C)	pH	Color
														Calcium, magnesium	Noncarbonate			
Oct. 5, 1959.....	3,400			9.4	1.8	1.5	1.1	33	7.2	1.8		0.4	48	31	4	70	6.9	12
Nov. 2.....	125			8.6	1.8	1.8	.7	33	5.2	1.5		.8	39	29	2	66	6.8	5
Nov. 5.....	22,600			4.0	2.1	.8	2.0	24	1.6	1.0		1.4	56	18	0	65	6.6	8
Dec. 9.....	226			6.8	1.4	1.3	.3	26	4.0	2.0		.2	29	23	2	52	6.9	8
Jan. 13, 1960.....	2,280			5.8	1.3	1.1	.1	19	4.6	2.0		.3	25	20	4	47	6.9	5
Feb. 10.....	3,250			4.4	1.2	.9	.1	11	7.4	1.5		.3	21	16	7	39	6.6	8
Mar. 8.....	1,080			4.7	1.1	1.2	.1	16	3.8	2.0		.2	23	16	3	39	6.7	7
Apr. 12.....	472			6.2	1.0	1.4	.7	22	4.0	1.5		.2	32	20	2	45	6.4	3
May 10.....	2,620			5.2	1.0	1.1	.7	18	4.0	1.2		.2	37	17	2	44	6.4	6
June 8.....	490			5.8	1.2	1.6	1.4	21	4.4	2.0		2.0	32	20	2	50	6.4	4
July 11.....	410			5.8	1.1	1.7	1.2	20	3.4	2.0		.3	29	19	2	46	6.7	4
Aug. 31.....	45			5.6	1.6	2.3	1.2	24	3.6	2.2		.7	40	20	1	54	7.4	5

7-778. WHITE RIVER AT CLARENDON, ARK.

LOCATION.--At gaging station on Cottonbelt Railroad bridge at Clarendon, Monroe County.
DRAINAGE AREA.--25,497 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1960.
Water temperatures: October 1948 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 180 ppm Sept. 21-30; minimum, 77 ppm July 1.
Hardness: Maximum, 162 ppm Aug. 11-20, Sept. 11-20; minimum, 56 ppm July 1.
Specific conductance: Maximum daily, 321 micromhos Nov. 7, Sept. 13; minimum daily, 121 micromhos July 3.
Water temperatures: Maximum, 87°F Aug. 7; minimum, 40°F Jan. 5, Mar. 6, 7, 10.
EXTREMES, 1947-60.--Dissolved solids: Maximum, 349 ppm Nov. 12, 1955; minimum, 38 ppm Feb. 1-9, 1950.
Hardness: Maximum, 202 ppm Apr. 25, 1956; minimum, 28 ppm Dec. 1-10, 1957.
Specific conductance: Maximum daily, 544 micromhos Nov. 12, 1955; minimum daily, 61 micromhos Feb. 3, 1950.
Water temperatures (1948-60): Maximum, 90°F June 28, July 5, 6, 12, 13, 1954; minimum, 34°F on several days during winter months.
REMARKS.--Records of specific conductance of daily samples available in district office at Little Rock, Ark. Records of discharge for water year October 1959 to September 1960 furnished by District Office, Corps of Engineers, Memphis, Tenn.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$		Specific conductance (micromhos at 25°C)	pH	Color
														Calcium, magnesium	Noncarbonate			
Oct. 1-10, 1959.....	11,530	6.2	0.00	33	14	3.6	1.7	168	5.2	4.2	0.0	1.9	162	140	2	269	8.1	4
Oct. 11-20.....	16,160	--	--	29	12	3.3	1.6	144	5.4	3.5	--	4.6	144	122	4	234	7.6	5
Oct. 21-31.....	11,980	--	--	33	14	3.7	1.6	170	5.4	3.5	--	4.6	175	140	0	272	7.2	5
Nov. 1-7.....	12,310	6.4	.00	35	14	3.0	1.2	174	5.6	3.8	.0	1.7	168	145	2	275	7.9	5
Nov. 8-13.....	27,920	--	--	21	9.6	1.7	2.2	106	5.6	2.2	--	4.0	122	92	5	178	7.2	30
Nov. 14-20.....	17,740	--	--	29	12	3.0	2.0	144	5.8	4.5	--	4.2	153	122	4	233	7.0	7
Nov. 21-30.....	13,480	--	--	29	14	3.5	2.3	156	6.2	4.2	--	4.0	165	130	2	252	7.2	10
Dec. 1-13.....	12,190	3.8	.05	32	14	3.6	1.7	a166	5.8	4.5	.0	.2	152	138	2	260	8.5	5
Dec. 14-31.....	35,200	--	--	17	7.1	3.3	2.0	80	6.0	6.0	--	1.9	101	72	6	145	7.7	40
Jan. 1-10, 1960.....	36,490	4.7	.24	17	6.7	2.9	2.6	80	6.0	4.2	.0	1.3	120	70	4	148	7.8	70
Jan. 11-20.....	34,880	--	--	18	7.0	3.2	1.6	85	5.6	4.0	--	2.1	102	74	4	156	6.9	40
Jan. 21-31.....	38,670	--	--	18	6.6	3.6	1.6	84	5.2	4.0	--	2.9	106	72	3	155	7.6	45
Feb. 1-10.....	29,960	5.0	.16	20	9.0	3.1	1.9	100	6.6	3.2	.0	.8	119	87	5	171	7.2	40
Feb. 11-20.....	37,010	--	--	21	7.2	3.5	1.5	94	6.0	4.0	--	2.2	116	82	5	163	7.4	23
Feb. 21-29.....	29,740	--	--	22	12	3.5	1.2	120	5.6	3.5	--	1.5	124	104	6	199	7.5	15
Mar. 1-10.....	28,290	5.5	.00	24	12	3.4	.8	127	5.2	4.0	.2	2.0	124	110	6	219	7.9	8
Mar. 11-20.....	35,740	--	--	17	10	3.7	1.0	96	6.0	4.0	--	1.4	110	84	5	168	7.5	15
Mar. 21-31.....	40,870	--	--	17	8.1	3.3	1.1	86	7.6	3.0	--	1.8	110	76	6	154	7.4	23

a Includes equivalent of 6 ppm of carbonate (CO_3).

WHITE RIVER BASIN--Continued

7-778. WHITE RIVER AT CLARENDON, ARK.--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$		Specific conductance (micromhos at 25°C)	pH	Color
														Calcium, magnesium	Noncarbonate			
Apr. 1-10, 1960.....	30,430	4.9	0.00	24	10	3.6	1.0	118	5.4	3.2	0.1	2.1	110	101	4	205	7.9	6
Apr. 11-20.....	19,540	--	--	28	15	3.6	1.0	156	5.2	3.5	--	1.6	133	132	4	240	7.8	8
Apr. 21-30.....	17,770	--	--	34	14	3.3	.9	170	5.6	1.0	--	1.3	151	142	3	264	8.0	5
May 1-10.....	18,770	7.5	.00	30	14	3.6	.8	156	4.6	3.8	.1	2.9	139	132	4	257	7.9	5
May 11-20.....	37,160	--	--	24	11	3.9	1.2	124	5.4	2.8	--	2.8	123	105	4	204	7.7	5
May 21-31.....	50,510	--	--	21	9.3	3.2	1.2	106	5.0	3.8	--	1.2	109	90	4	180	7.7	15
June 1-10.....	59,310	7.1	.00	26	10	4.0	2.1	124	4.6	4.2	.1	3.0	120	106	4	218	7.8	18
June 11-20.....	41,250	--	--	16	12	4.1	1.3	a108	4.0	4.0	--	.0	94	90	1	173	8.8	15
June 21-28.....	21,050	--	--	27	14	4.4	1.2	b152	4.8	4.2	--	.3	136	125	0	227	8.5	10
June 29-30.....	33,900	--	--	14	9.0	4.1	1.2	84	5.6	6.0	--	1.1	114	72	3	151	7.4	40
July 1.....	37,700	--	--	15	4.6	6.7	1.6	60	5.2	8.0	--	5.9	c77	56	8	140	7.3	27
July 2-6.....	38,520	7.2	.00	15	5.5	3.4	1.3	69	3.4	3.8	.1	2.3	102	60	4	138	7.5	28
July 7-9.....	31,070	--	--	18	8.2	3.8	1.4	96	5.0	2.0	--	3.6	96	78	0	161	7.6	15
July 10-20.....	18,430	--	--	27	11	4.7	1.1	136	5.4	3.8	--	1.4	133	112	1	220	7.7	15
July 21-31.....	14,030	--	--	30	17	4.5	1.4	174	4.8	5.2	--	1.5	158	145	2	268	7.9	15
Aug. 1-10.....	14,670	5.2	.00	35	13	4.0	1.1	167	4.4	4.0	.1	1.8	152	138	2	273	7.7	5
Aug. 11-20.....	11,050	--	--	35	18	4.8	1.0	192	4.8	4.8	--	1.1	172	162	4	294	7.6	5
Aug. 21-31.....	11,520	--	--	34	17	5.0	1.0	182	5.4	5.2	--	1.7	164	155	6	288	7.7	5
Sept. 1-10.....	11,050	6.1	.00	36	15	4.0	1.2	178	5.0	3.5	.1	1.7	151	152	6	289	7.9	5
Sept. 11-20.....	10,040	--	--	35	18	5.4	1.2	192	5.4	5.5	--	1.9	167	162	4	300	7.7	5
Sept. 21-30.....	8,560	--	--	38	16	4.3	1.4	188	7.6	4.5	--	1.6	180	161	7	302	6.7	3
Weighted average..	25,400	--	--	23	10	3.6	1.5	118	5.5	5.7	--	2.0	123	101	4	199	7.5	21
Time-weighted average.....	--	--	--	26	12	3.7	1.4	134	5.5	5.1	--	2.0	134	114	4	221	7.5	16
Tons per day.....	--	--	--	1,588	719	248	101	8,100	374	392	--	136	8,440	6,920	272	--	--	--

a Includes equivalent of 6 ppm carbonate (CO_3).
b Includes equivalent of 8 ppm carbonate (CO_3).
c Calculated from determined constituents.

WHITE RIVER BASIN--Continued

7-778. WHITE RIVER AT CLARENDON, ARK.--Continued

Temperature (°F) of water, water year October 1959 to September 1960

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

ARKANSAS RIVER BASIN

7-1305. ARKANSAS RIVER BELOW JOHN MARTIN RESERVOIR, COLO.

LOCATION.--At gaging station on left bank, 1.1 miles upstream from Caddoa Creek, 1.7 miles downstream from John Martin Dam, Bent County, and 2.9 miles southeast of Hasty.
DRAINAGE AREA.--18,917 square miles, of which 785 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: August 1942 to August 1943, October 1945 to July 1949 (intermittent and weekly samples); January 1951 to September 1960 (daily samples).
Water temperatures: January 1951 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 4,140 ppm Jan. 19-25; minimum, 470 ppm July 6.
Hardness: Maximum, 1,830 ppm Jan. 19-25; minimum, 224 ppm July 6.
Specific conductance: Maximum daily, 4,800 micromhos Feb. 3, 10; minimum daily, 643 micromhos July 6.
Water temperatures: Maximum, 79°F Sept. 4; minimum, 33°F Mar. 2-4.
EXTREMES, 1951-60.--Dissolved solids: Maximum, 4,280 ppm Aug. 8, 1955; minimum, 470 ppm July 6, 1960.
Hardness: Maximum, 1,910 ppm Aug. 8, 1955; minimum, 224 ppm July 6, 1960.
Specific conductance: Maximum daily, 5,180 micromhos Apr. 21, 1955; minimum daily, 643 micromhos July 6, 1960.
Water temperatures: Maximum, 85°F Aug. 6, 1951; minimum, freezing point on several days during winter months.
REMARKS.--Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1-2,5-13,1959	142	--	--	204	78	231	--	168		--	--	--	--	--	1870	2.54	717	830	692	3.5	2240	7.9
Oct. 3-4	85.5	--	--	295	130	391	--	172		--	--	--	--	--	2980	4.05	688	1270	1130	4.8	3380	7.6
Oct. 14-31	70.6	10	0.00	255	108	345	7.0	124		1540	96	0.8	1.9	0.40	2590	3.52	494	1080	978	4.6	2980	7.5
Nov. 1-2	4.8	--	--	295	140	434	--	176		--	--	--	--	--	3130	4.26	40.1	1310	1170	5.2	3550	7.8
Nov. 3-30	3.5	--	--	418	165	532	--	306		--	--	--	--	--	3970	5.40	37.1	1720	1470	5.6	4260	7.5
Dec. 1-31	2.9	--	--	405	165	495	--	353		--	--	--	--	--	3880	5.28	30.7	1690	1400	5.2	4180	7.5
Jan. 1-18, 1960	2.8	22	.01	375	164	480	8.0	405		2060	134	.8	2.7	.46	3660	4.98	28.0	1610	1280	5.2	3980	7.7
Jan. 19-25	2.8	--	--	438	179	548	--	424		--	--	--	--	--	4140	5.63	31.3	1830	1480	5.6	4450	7.4
Jan. 26-31	2.8	--	--	348	168	450	--	431		--	--	--	--	--	3470	4.72	26.2	1560	1210	5.0	3810	7.7
Feb. 1-27	3.3	--	--	425	156	534	--	341		--	--	--	--	--	3960	5.39	35.7	1700	1420	5.6	4260	7.6
Feb. 28-Mar. 31	3.5	--	--	310	157	380	--	511		--	--	--	--	--	3050	4.15	28.6	1420	1000	4.4	3430	7.5
Apr. 1-4, 7-30	146	16	.02	280	124	310	7.3	355		1420	83	.7	3.0	.24	2570	3.50	1010	1210	919	3.9	2920	7.6
Apr. 5-6	4.2	--	--	420	154	516	--	324		--	--	--	--	--	3830	5.21	42.9	1680	1410	5.5	4170	7.6
May 1-28	920	--	--	270	101	277	--	208		--	--	--	--	--	2330	3.17	5790	1090	920	3.6	2700	7.8
May 29-June 1	128	--	--	356	139	402	--	216		--	--	--	--	--	3180	4.32	1100	1460	1280	4.6	3660	7.5

June 2-5	282	--	--	239	76	223	--	228	--	--	--	--	--	1970	2.68	1500	910	723	3.2	2310	7.6
June 6-8	431	--	--	186	65	187	--	187	--	--	--	--	--	1510	2.05	1760	730	577	3.0	1920	7.6
June 9-14	401	--	--	141	47	114	--	187	--	--	--	--	--	1060	1.44	1150	545	392	2.1	1410	7.7
June 15	363	--	--	276	76	274	--	222	--	--	--	--	--	2320	3.16	2270	1000	818	3.8	2610	7.5
June 16-21	342	--	--	183	59	168	--	192	--	--	--	--	--	1510	2.05	1390	700	542	2.8	1820	7.5
June 22-30	378	--	--	150	51	133	--	182	--	--	--	--	--	1140	1.55	1160	585	436	2.4	1530	7.6
July 1-2	455	--	--	161	54	146	--	175	--	--	--	--	--	1340	1.82	1650	625	482	2.5	1650	7.5
July 3-5	560	--	--	134	43	108	--	177	--	--	--	--	--	1020	1.39	1540	510	365	2.1	1330	7.6
July 6	1230	--	--	65	15	49	--	136	--	--	--	--	--	470	.64	1560	224	112	1.4	643	7.8
July 7	520	--	--	92	28	82	--	114	--	--	--	--	--	742	1.01	1040	344	250	1.9	983	7.5
July 8-11	570	--	--	162	58	147	--	144	--	--	--	--	--	1380	1.88	2120	644	526	2.5	1670	7.6
July 12-13	301	--	--	234	84	228	--	190	--	--	--	--	--	2030	2.76	1650	930	774	3.3	2360	7.4
July 14-16	730	--	--	199	52	124	--	170	--	--	--	--	--	1390	1.89	2740	710	570	2.0	1680	7.5
July 17	415	--	--	264	78	202	--	234	--	--	--	--	--	2010	2.73	2250	980	788	2.8	2310	7.5
July 18-22	461	--	--	160	44	106	--	193	--	--	--	--	--	1120	1.52	1390	580	422	1.9	1430	7.6
July 23-24	206	--	--	216	67	195	--	199	--	--	--	--	--	1730	2.35	962	816	653	3.0	2070	7.9
July 25-29	96.4	--	--	268	100	288	--	190	--	--	--	--	--	2410	3.28	627	1080	924	3.8	2760	7.5
July 30-31	34	--	--	300	124	360	--	178	--	--	--	--	--	2860	3.89	262	1260	1110	4.4	3210	7.4
Aug. 1-9	18.3	--	--	368	117	440	--	172	--	--	--	--	--	3400	4.62	168	1400	1260	5.1	3800	7.4
Aug. 10-11	105	--	--	218	53	220	--	133	--	--	--	--	--	1770	2.41	502	760	651	3.5	2160	7.4
Aug. 12-15	40.5	--	--	316	98	328	--	165	--	--	--	--	--	2780	3.78	304	1190	1060	4.1	3120	7.6
Aug. 16-31	10.3	12	0.00	376	144	460	8.8	195	2090	131	0.9	2.1	0.49	3550	4.83	98.7	1530	1370	5.1	3900	7.4
Sept. 1-10	11.1	--	--	388	139	485	--	200	--	--	--	--	--	3690	5.02	111	1540	1380	5.4	4020	7.6
Sept. 11-13	159	--	--	304	88	226	--	204	--	--	--	--	--	2260	3.07	970	1120	953	2.9	2560	7.5
Sept. 14-23	29.5	--	--	332	112	328	--	208	--	--	--	--	--	2830	3.85	225	1290	1120	4.0	3170	7.7
Sept. 24-30	18.9	--	--	352	132	417	--	203	--	--	--	--	--	3260	4.43	166	1420	1250	4.8	3660	7.6
Weighted average	--	--	--	231	84	230	--	205	--	--	--	--	--	1970	2.68	861	924	756	3.2	2320	7.6
Time-weighted average	162	--	--	318	126	374	--	282	--	--	--	--	--	2950	--	--	1310	1080	4.3	3290	7.5
Tons per day	--	--	--	101	37	101	--	90	--	--	--	--	--	--	--	--	--	--	--	--	--

ARKANSAS RIVER BASIN--Continued

7-1305. ARKANSAS RIVER BELOW JOHN MARTIN RESERVOIR, COLO.--Continued

Temperature (°F) of water, water year October 1959 to September 1960

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

7-1442. LITTLE ARKANSAS RIVER AT VALLEY CENTER, KANS.

LOCATION.--At gaging station at highway bridge, 0.5 mile west of Valley Center, Sedgwick County; Little Arkansas River floodway is 1.2 miles northwest.
DRAINAGE AREA.--1,327 square miles, of which about 77 square miles is probably noncontributing.
RECORDS AVAILABLE.--Water temperatures: October 1957 to September 1960.
Sediment records: October 1957 to September 1960.
EXTREMES, 1959-60.--Water temperatures: Maximum, 89°F Aug. 4, 7; minimum, freezing point Jan. 4.
Sediment concentrations: Maximum daily, 2,320 ppm Apr. 29 (at river gage), 2,300 ppm May 5 (at floodway gage), 3,460 ppm May 4 (combined flow); minimum daily, 1 ppm Nov. 29 (at river gage).
Sediment loads: Maximum daily, 19,300 tons (at river gage), 41,100 tons (at floodway gage), 60,400 tons (combined flow) May 5; minimum daily, 0.1 ton Nov. 29 (at river gage).
EXTREMES, 1957-60.--Water temperatures: Maximum, 90°F Aug. 4, 5, 1959; minimum, freezing point Dec. 11, 12, 1957, Feb. 9, 1958, Jan. 16, 1959, Jan. 4, 1960.
Sediment concentrations: Maximum daily, 2,960 ppm July 2, 1959 (at river gage), 2,300 ppm May 5, 1960 (at floodway gage), 3,460 ppm May 4, 1960 (combined flow); minimum daily, 1 ppm Dec. 7, 1958, Nov. 29, 1959 (at river gage).
Sediment loads: Maximum daily, 19,300 tons (at river gage), 41,100 tons (at floodway gage), 60,400 tons (combined flow) May 5, 1960; minimum daily (1959-60), 0.1 ton Nov. 29, 1959 (at river gage).
REMARKS.--Part of high waterflow bypasses river gage through floodway channel for which separate records are computed; sediment loads through floodway and for combined flow are given herein. Sediment loads through floodway and at river gage were published separately for 1957-59. Records of discharge for water year October 1959 to September 1960 given in WSP 1711. Flow affected by ice Jan. 20-24, Feb. 21 to Mar. 7.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Dec. 18, 1959...	47	14	0.00	103	20	91	4.7	303	0	89	144	0.2	1.4	0.08	635	0.86	80.6	340	92	2.1	1060	7.5	5
May 5, 1960.....	3340	8.1	.14	10	2.2	6.9	4.1	34	0	8.7	5.8	.2	3.2	.05	112	.15	1010	34	6	.5	111	7.1	--
Aug. 4.....	52	19	.00	95	17	100	4.1	287	0	56	170	.4	1.6	.13	622	.85	87.3	308	73	2.5	1070	7.2	8

ARKANSAS RIVER BASIN--Continued

7-1442. LITTLE ARKANSAS RIVER AT VALLEY CENTER, KANS.--Continued

Temperature (°F) of water, water year October 1959 to September 1960

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

ARKANSAS RIVER BASIN--Continued

7-1442. LITTLE ARKANSAS RIVER AT VALLEY CENTER, KANS.--Continued

Suspended sediment, water year October 1959 to September 1960
(Where no concentrations are reported, loads are estimated)

Day	OCTOBER			NOVEMBER			DECEMBER		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	35	290	27	146	279	110	43	4	0.5
2	439	1320 S	1930	118	186	59	43	--	.6
3	1590	1000	4290	96	158	41	43	8	.9
4	1120	1240	3750	85	149	34	43	--	.9
5	1980	1620	8660	73	106	21	43	--	.9
6	1800	946	4600	65	46	8.1	43	--	1
7	571	798	1230	60	39	6.3	43	9	1.0
8	323	768	670	57	41	6.3	43	--	1
9	290	783	613	56	42	6.4	43	--	1
10	260	726	510	57	39	6.0	43	--	1
11	232	884	554	57	38	5.8	44	--	1
12	184	868	431	58	30	4.7	43	--	1
13	354	1180 S	1230	58	--	4	43	--	1
14	468	898	1130	55	--	3	43	9	1.0
15	284	796	610	53	--	2	44	--	1
16	174	798	375	49	16	2.1	46	--	1
17	133	581	209	47	--	2	46	--	1
18	110	412	122	46	17	2.1	46	10	1.2
19	94	277	70	47	8	1.0	44	4	.5
20	84	173	39	48	--	1	43	3	.3
21	78	144	30	47	6	.8	42	9	1.0
22	73	118	23	47	--	1	42	5	.6
23	68	78	14	47	10	1.3	42	5	.6
24	61	46	7.6	46	10	1.2	42	4	.4
25	59	29	4.6	46	--	1	42	--	.7
26	56	42	6.4	45	--	.7	42	--	.8
27	53	29	4.1	45	--	.7	45	9	1.1
28	52	22	3.1	43	4	.5	62	--	6
29	51	28	3.9	42	1	.1	107	--	15
30	57	29	7.5	42	--	.2	84	--	12
31	111	--	80	--	--	--	93	--	14
Total	11244	--	31234.2	1781	--	333.3	1515	--	70.0
	JANUARY			FEBRUARY			MARCH		
1	79	--	13	269	--	220	85	--	2
2	68	--	10	392	602	637	95	--	3
3	66	38	6.8	444	801	960	110	--	3
4	60	59	9.6	359	--	380	90	--	2
5	62	--	7	477	--	500	70	--	2
6	65	--	5	1060	1210	3460	75	--	2
7	66	15	2.7	1280	1310	4530	70	10	1.9
8	58	--	4	1390	1280	4800	75	11	2.2
9	57	--	4	1330	1240	4450	76	10	2.1
10	54	--	5	1120	1410	4260	81	13	2.8
11	55	--	5	455	1360	1670	83	16	3.6
12	57	--	6	234	1290	815	86	22	5.1
13	61	38	6.2	182	902	443	93	27	6.8
14	96	--	32	164	278	123	102	33	9.1
15	265	414	296	151	173	71	122	--	13
16	688	--	1400	144	149	58	115	--	16
17	698	--	1300	136	139	51	105	44	12
18	395	--	650	133	88	32	104	47	13
19	168	550	240	144	58	22	200	218	118
20	100	501	135	157	73	31	497	501	672
21	80	506	109	145	85	33	1030	742	2060
22	55	--	60	110	--	18	2380	1300	8380
23	60	--	42	100	--	14	3240	798	6980
24	65	--	24	80	--	8	3970	893	9570
25	70	67	13	85	--	7	5130	1180	16400
26	72	53	10	90	--	6	5450	1090	16000
27	112	--	30	85	--	5	5740	1110	17200
28	202	181	99	80	--	5	5150	1260	17500
29	168	194	88	85	--	4	3120	1160	9760
30	169	181	82	--	--	--	1600	1080	4660
31	182	--	85	--	--	--	567	1180	1810
Total	4453	--	4779.3	10881	--	27613	39711	--	111211.6

S Computed by subdividing day.

ARKANSAS RIVER BASIN--Continued

7-1442. LITTLE ARKANSAS RIVER AT VALLEY CENTER, KANS.--Continued

Suspended sediment, water year October 1959 to September 1960--Continued
(Where no concentrations are reported, loads are estimated)

Day	APRIL			MAY			JUNE		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	465	998	1250	246	1430	950	258	788	549
2	612	--	3800	172	498	231	171	338	156
3	464	2020	2530	143	298	115	172	342	159
4	346	1110	1040	944	3460	S 8820	132	218	78
5	278	545	409	9840	2270	60400	130	--	120
6	248	411	275	8410	1460	33200	180	798	388
7	226	332	203	7450	1290	25900	210	708	401
8	204	253	139	4820	1040	13500	562	2180	S 4150
9	190	212	109	1980	875	4680	2160	1440	8430
10	180	187	91	662	855	1530	2690	1120	8140
11	169	181	83	399	745	803	2540	958	6570
12	162	192	84	292	499	393	1860	802	4030
13	157	186	79	251	383	260	1020	932	2570
14	182	306	150	231	281	175	940	983	2490
15	199	--	400	214	173	100	645	781	1360
16	178	423	203	198	161	86	336	599	543
17	281	--	700	184	148	74	363	569	558
18	345	393	366	176	131	62	699	1020	1920
19	143	298	115	174	121	57	798	1880	4050
20	130	261	92	154	109	45	538	1250	1820
21	120	208	67	150	103	42	1410	1980	7540
22	119	147	47	151	88	36	2020	1110	6050
23	114	121	37	147	84	33	2080	--	4500
24	111	151	45	147	116	46	1470	--	2000
25	110	159	47	147	281	112	353	--	240
26	105	143	40	143	212	82	.258	--	140
27	98	129	34	118	102	32	229	--	110
28	97	112	29	111	83	25	206	--	85
29	560	2320	S 4130	214	--	320	182	--	75
30	490	2280	S 3350	720	1440	2800	165	132	59
31	--	--	--	490	1360	1800	--	--	--
Total	7083	--	19944	39478	--	156709	24777	--	69281

Day	JULY			AUGUST			SEPTEMBER		
1	150	119	48	58	69	11	1180	2290	7300
2	140	108	41	51	81	11	742	--	3400
3	133	103	37	48	63	8.2	286	--	850
4	127	129	44	49	41	5.4	224	625	378
5	125	--	60	53	64	9.2	198	313	167
6	147	--	80	51	79	11	172	222	103
7	116	--	55	52	55	7.7	155	177	74
8	103	--	42	195	724	S 582	146	168	66
9	100	--	38	351	1080	1020	288	--	420
10	97	--	36	250	742	501	291	598	470
11	92	--	32	130	461	162	224	547	331
12	86	118	27	85	272	62	171	418	193
13	81	163	36	75	151	31	146	274	108
14	74	146	29	66	108	19	123	216	72
15	68	91	17	55	89	13	111	187	56
16	65	84	15	55	91	14	103	135	38
17	66	141	25	75	370	75	97	101	26
18	74	122	24	240	--	900	92	79	20
19	69	71	13	112	643	194	89	78	19
20	61	62	10	69	302	56	83	72	16
21	58	89	14	58	259	40	80	69	15
22	58	75	12	81	275	60	79	71	15
23	57	59	9.1	62	101	17	465	1450	S 3560
24	55	49	7.3	1180	1840	S 5880	3950	--	26000
25	53	48	6.9	3490	1070	10100	3680	1480	14700
26	52	47	6.6	6560	1680	29800	1780	1060	5080
27	50	33	4.5	9830	1090	28900	1160	1860	5830
28	49	33	4.4	5730	814	12600	563	1340	2040
29	49	42	5.6	3200	536	4630	223	695	418
30	57	--	12	1210	563	S 1840	178	394	189
31	78	128	27	961	2120	5500	--	--	--
Total	2590	--	818.4	34482	--	103059.5	17079	--	71954

Total discharge for year (cfs-days)..... 195074
Total load for year (tons)..... 597007.3

S Computed by subdividing day.

ARKANSAS RIVER BASIN--Continued

7-1442. *LITTLE ARKANSAS RIVER AT VALLEY CENTER, KANS.*--Continued

Suspended sediment through floodway, water year October 1959 to September 1960

Date	Mean discharge (cfs)	Suspended sediment		Date	Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day			Mean concentration (ppm)	Tons per day
Mar. 22, 1960...	388	948	S 1230	June 9, 1960....	175	--	E 360
Mar. 23.....	893	812	1960	June 10.....	331	--	E 1000
Mar. 24.....	1600	895	3870	June 11.....	205	--	E 500
Mar. 25.....	2420	1170	7640	June total....	711	--	1860
Mar. 26.....	2670	1120	8070	Aug. 24.....	242	338	S 1070
Mar. 27.....	2950	1160	9240	Aug. 25.....	969	1070	S 3120
Mar. 28.....	2470	1240	8270	Aug. 26.....	3720	1640	S 18500
Mar. 29.....	794	1210	2590	Aug. 27.....	6310	1080	18400
March total.....	14185	--	42870	Aug. 28.....	2740	845	6250
				Aug. 29.....	744	545	1090
May 4.....	369	809	S 3790	Aug. 30.....	7	152	3
May 5.....	6620	2300	41100	August total..	14732	--	48433
May 6.....	5290	1490	21300	Sept. 24.....	1460	--	E 9000
May 7.....	4430	1300	15500	Sept. 25.....	1150	1450	S 4860
May 8.....	2220	1020	6110	Sept. 26.....	46	638	79
May 9.....	182	656	322	September total.....	2656	--	13939
May total.....	19111	--	88122				
Total discharge for year (cfs-days).....							51395
Total load for year (tons).....							195224

E Estimated.
S Computed by subdividing day.

ARKANSAS RIVER BASIN--Continued

7-1442. LITTLE ARKANSAS RIVER AT VALLEY CENTER, KANS.--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1959 to September 1960
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water;
P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Water temperature (°F)	Sampling point	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Oct. 2, 1959.....	1935	56		775	1900	3980	72	87		99		99	100					SPWC
Oct. 2.....	2145	57		1000	1860	5020	74	89		96		100	--					SPWC
Oct. 3.....	0030	58		1300	1510	5300	76	90		97		99	100					SPWC
Oct. 3.....	1140	58		1710	977	4510	85	--		--		100	--					SPWC
Oct. 4.....	1550	57		916	1350	3340	84	94		98		100	--					SPWC
Mar. 22, 1960.....	1605	44		2310	1130	7050	79	89		96		100	--					SPWC
Mar. 22.....	2025	39		2340	939	5930	79	89		98		99	100					SPWC
Mar. 24.....	1700	36		2570	964	6690	74	84		94		100	--					SPWC
Mar. 26.....	1140	42		2770	1050	7850	63	90		--		100	--					SPWC
Apr. 29.....	1700	54		635	2140	3670	49	74		95		100	--					SPWC
May 4.....	2125	59		2060	4050	22500	65	80		99		100	--					SPWC
May 5.....	1545	64		3340	2010	18100	81	94		--		100	--					SPWC
May 5.....	1545	64		3340	2010	18100	52	82		95		100	--					SPN
Aug. 8.....	1625	80		307	1440	1190	57	81		93		99	100					SPWC
Aug. 24.....	1415	74		960	2830	7340	65	82		98		99	100					SPWC
Aug. 25.....	1110	77		2580	919	6400	91	96		--		100	--					SPWC
Aug. 26.....	1905	75		3410	1580	14500	77	92		100		--	--					PWC
Aug. 27.....	0045	74		3560	1340	12900	80	89		98		100	--					SPWC
Sept. 23.....	1650	70		560	2280	3450	61	74		92		99	100					SPWC

Periodic determinations of suspended-sediment discharge and particle size through floodway, water year October 1959 to September 1960
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water;
P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Water temperature (°F)	Sampling point	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
May 5, 1960.....	1035		--	7260	2450	48000	87	99		--		99	100					SPWC
Aug. 24.....	2040		--	1080	1780	5190	75	84		89		96	100					SPWC
Aug. 25.....	1105		77	1090	1430	4210	66	72		77		78	100					SPWC
Aug. 26.....	1855		74	6500	1730	30400	79	86		98		99	100					SPWC

ARKANSAS RIVER BASIN--Continued

7-1442. LITTLE ARKANSAS RIVER AT VALLEY CENTER, KANS.--Continued

Particle-size analyses of bed material, water year October 1959 to September 1960
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Water temperature (°F)	Sampling point	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Bed material: Percent finer than size indicated, in millimeters										Method of analysis
							0.062	0.125	0.250	0.500	1.000	2.000	4.000	8.000	16.00	32.00	64.00	
Aug. 18, 1959.....			12	29				0	7	36	63	64	74	88	97	100		SV
Mar. 9, 1960.....			8	76				0	5	32	49	62	81	96	100	--		SV
June 16.....			5	619				0	3	27	51	65	84	96	99	100		SV
Aug. 4.....			5	49				0	4	16	34	56	83	97	100	--		SV

ARKANSAS RIVER BASIN--Continued

7-1465. ARKANSAS RIVER AT ARKANSAS CITY, KANS.

LOCATION.--At gaging station at bridge on U.S. Highway 166, 0.1 mile downstream from St. Louis-San Francisco Railway bridge, 0.5 mile west of Arkansas City, Cowley County, and 5.4 miles upstream from Walnut River.
DRAINAGE AREA.--43,713 square miles, of which 7,607 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: October 1951 to September 1960.
Water temperatures: October 1951 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 1,530 ppm Jan. 1-10; minimum, 213 ppm Aug. 25-31.
Hardness: Maximum, 560 ppm Feb. 21-29; minimum, 94 ppm Sept. 25-27.
Specific conductance: Maximum daily, 3,240 micromhos Sept. 24; minimum daily, 227 micromhos Aug. 28.
Water temperatures: Maximum, 93°F Aug. 11; minimum, freezing point on several days during November, January to March.
EXTREMES, 1951-60.--Dissolved solids: Maximum, 3,380 ppm Jan. 16, 1957; minimum, 172 ppm Oct. 1-6, 1955.
Hardness: Maximum, 760 ppm Jan. 16, 1957; minimum, 84 ppm Oct. 1-6, 1955.
Specific conductance: Maximum daily, 5,770 micromhos Jan. 16, 1957; minimum daily, 227 micromhos Aug. 28, 1960.
Water temperatures: Maximum, 93°F Aug. 11, 1960; minimum, freezing point on many days during winter months.
REMARKS.--Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1-10, 1959...	15,640	--	--	32	8.3	30	--	100	0	30	45	--	4.5	--	227	0.31	9,590	114	32	1.2	378	7.7
Oct. 11-13.....	6,670	--	--	50	12	78	--	136	0	67	115	--	3.9	--	429	.58	7,730	176	64	2.6	733	7.8
Oct. 14-16.....	10,190	--	--	32	11	41	--	100	0	47	56	--	3.7	--	263	.36	7,240	124	42	1.6	447	7.6
Oct. 17-20.....	3,345	--	--	79	25	127	--	178	0	111	220	--	5.9	--	766	1.04	6,920	300	154	3.2	1,260	7.9
Oct. 21-31.....	1,790	--	--	115	40	230	--	246	0	267	330	--	6.4	--	1,190	1.62	5,750	450	248	4.7	1,900	8.0
Nov. 1-10.....	1,737	19	0.00	82	22	260	3.2	164	0	110	430	0.3	11	0.00	1,220	1.66	5,720	296	161	6.6	1,960	7.9
Nov. 11-20.....	1,321	--	--	138	40	300	--	272	0	355	400	--	7.8	--	1,430	1.94	5,100	510	287	5.8	2,230	7.8
Nov. 21-30.....	1,286	.0	.00	126	40	236	2.4	124	0	128	520	.0	3.9	.00	1,330	1.81	4,620	480	384	4.7	2,250	7.5
Dec. 1-10.....	1,118	8.8	.00	96	18	350	1.0	220	0	163	500	.0	8.0	.00	1,310	1.78	3,950	315	134	8.6	2,340	7.8
Dec. 11-31.....	1,278	9.6	.00	92	20	330	2.5	212	0	207	450	.0	6.0	.00	1,330	1.81	4,590	310	136	8.2	2,200	7.7
Jan. 1-10, 1960...	1,112	18	.00	142	43	325	11	248	2	396	435	.5	12	.31	1,530	2.08	4,590	530	324	6.1	2,390	8.3
Jan. 11-14.....	1,172	--	--	131	48	294	--	238	8	372	400	--	6.3	--	1,470	2.00	4,650	525	316	5.6	2,280	8.5
Jan. 15-20.....	1,983	--	--	103	34	208	--	202	4	264	278	--	10	--	1,040	1.41	5,570	395	223	4.5	1,680	8.3
Jan. 21-31.....	1,432	--	--	111	46	216	--	234	4	251	332	--	7.9	--	1,160	1.58	4,490	465	266	4.4	1,860	8.3
Feb. 1-4.....	2,188	--	--	108	34	240	--	210	8	261	332	--	7.8	--	1,150	1.56	6,790	410	224	5.2	1,870	8.4
Feb. 5.....	3,730	--	--	88	31	158	--	164	8	198	232	--	9.0	--	886	1.20	8,920	345	197	3.7	1,430	8.5
Feb. 6-10.....	5,380	--	--	62	20	109	--	146	0	137	145	--	6.5	--	584	.79	8,480	235	116	3.1	997	8.1
Feb. 11-20.....	2,767	--	--	104	39	195	--	222	0	263	270	--	8.3	--	1,040	1.41	7,770	420	238	4.1	1,700	7.9
Feb. 21-29.....	1,464	--	--	134	55	262	--	273	0	323	398	--	11	--	1,360	1.85	5,380	560	337	4.8	2,230	7.5
Mar. 1-10.....	1,609	22	.00	133	36	274	8.8	276	0	289	410	.4	14	.31	1,360	1.85	5,910	480	254	5.4	2,170	8.2

Mar. 11-12, 1960..	2,725	--	--	112	32	220	--	222	8	270	285	--	11	--	1,100	1.50	8,090	410	214	4.7	1,740	8.4
Mar. 13-20.....	5,594	--	--	78	23	132	--	162	6	180	170	--	9.9	--	708	.96	10,690	290	147	3.4	1,160	8.4
Mar. 21-23.....	8,283	--	--	66	18	121	--	148	0	164	145	--	7.1	--	626	.85	14,000	240	118	3.4	1,020	8.0
Mar. 24-31.....	13,380	--	--	46	9.0	56	--	106	6	79	64	--	6.5	--	328	.45	11,850	152	55	2.0	567	8.4
Apr. 1.....	6,470	--	--	62	16	92	--	136	0	154	105	--	.2	--	560	.76	9,780	220	108	2.7	838	7.8
Apr. 2-4.....	5,753	--	--	79	23	125	--	158	0	218	142	--	5.6	--	751	1.02	11,670	290	160	3.2	1,130	7.2
Apr. 5-10.....	3,753	--	--	107	30	192	--	214	0	306	218	--	7.1	--	1,060	1.44	10,740	390	214	4.2	1,560	8.2
Apr. 11-12.....	2,915	--	--	132	37	248	--	240	0	399	285	--	6.4	--	1,320	1.80	10,390	480	284	4.9	1,940	8.2
Apr. 13.....	2,760	--	--	77	21	136	--	168	0	206	155	--	7.3	--	751	1.02	5,600	280	142	3.5	1,160	8.2
Apr. 14-15.....	3,120	--	--	126	38	247	--	232	4	394	280	--	6.2	--	1,300	1.77	10,950	470	274	4.9	1,920	8.3
Apr. 16-20.....	3,772	--	--	98	29	172	--	206	0	256	212	--	5.1	--	974	1.32	9,920	365	196	3.9	1,470	8.2
Apr. 21-30.....	2,197	--	--	123	34	263	--	230	0	367	315	--	3.9	--	1,310	1.78	7,770	445	256	5.4	1,980	8.1
May 1-5.....	2,576	--	--	101	32	227	--	206	10	270	290	--	5.1	--	1,100	1.50	7,650	385	200	5.0	1,700	8.4
May 6.....	10,800	--	--	50	12	76	--	146	0	84	95	--	.1	--	420	.57	12,250	175	56	2.5	698	8.2
May 7-10.....	8,785	--	--	34	7.5	55	--	98	0	54	68	--	2.9	--	297	.40	7,040	116	36	2.2	501	8.0
May 11-20.....	2,671	--	--	88	28	182	--	212	4	193	245	--	4.8	--	937	1.27	6,760	335	155	4.3	1,500	8.3
May 21-26.....	2,142	--	--	96	31	211	--	236	0	212	290	--	.1	--	1,050	1.43	6,070	365	172	4.8	1,710	7.8
May 27-29.....	3,590	--	--	69	19	155	--	176	0	136	215	--	1.3	--	746	1.01	7,230	252	108	4.3	1,250	7.5
May 30-31.....	6,420	--	--	46	12	89	--	128	0	81	118	--	1.3	--	447	.61	7,750	164	59	3.0	765	8.1
June 1-2.....	3,080	--	--	65	13	123	--	164	0	112	165	--	.2	--	605	.82	5,030	216	82	3.6	980	7.0
June 3-10.....	1,930	--	--	87	20	185	--	204	0	170	250	--	3.6	--	850	1.16	4,430	298	131	4.6	1,420	8.0
June 11-20.....	4,150	--	--	56	9.4	103	--	142	0	79	142	--	4.2	--	505	.69	5,660	178	62	3.4	847	8.2
June 21-27.....	3,890	--	--	59	13	106	--	136	0	124	132	--	3.7	--	527	.72	5,540	200	88	3.2	881	8.2
June 28-30.....	1,747	--	--	101	26	207	--	186	8	255	265	--	5.5	--	986	1.34	4,650	360	194	4.7	1,590	8.4
July 1-13.....	1,370	--	--	107	32	253	--	208	4	283	338	--	3.7	--	1,190	1.62	4,400	400	223	5.5	1,190	8.4
July 14-15.....	1,825	--	--	51	15	102	--	132	0	104	138	--	.4	--	488	.66	2,400	190	82	3.2	848	7.7
July 16-20.....	1,364	--	--	78	24	199	--	172	0	188	275	--	3.7	--	890	1.21	3,280	295	154	5.0	1,480	7.1
July 21-24.....	1,608	--	--	75	21	205	--	164	0	158	298	--	2.0	--	870	1.18	3,780	275	140	5.4	1,470	8.1
July 25-27.....	1,380	--	--	38	10	64	--	112	0	57	88	--	.4	--	336	.46	1,250	136	44	2.4	569	7.4
July 28-30.....	1,580	--	--	70	18	182	--	152	0	148	260	--	.6	--	798	1.09	3,400	250	126	5.0	1,330	7.8
July 31.....	2,930	--	--	39	9.8	62	--	112	0	57	85	--	.4	--	321	.44	2,540	138	46	2.3	577	7.7
Aug. 1-2.....	1,430	--	--	67	20	178	--	148	0	144	258	--	2.9	--	790	1.07	3,050	250	128	4.9	1,290	7.2

ARKANSAS RIVER BASIN--Continued

7-1465. ARKANSAS RIVER AT ARKANSAS CITY, KANS.--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Aug. 3-10, 1960...	944	--	--	93	27	258	--	192	0	194	388	--	0.2	--	1,110	1.51	2,830	345	188	6.0	1,840	8.1
Aug. 11-14.....	797	--	--	86	29	230	--	190	0	170	355	--	4.0	--	1,030	1.40	2,220	335	180	5.5	1,730	8.1
Aug. 15.....	539	--	--	57	22	39	--	222	0	55	55	--	.7	--	382	.52	556	232	50	1.1	623	8.2
Aug. 16-17.....	484	--	--	76	34	314	--	130	0	204	492	--	.8	--	1,250	1.70	1,630	330	224	7.5	2,110	7.6
Aug. 18-20.....	1,029	--	--	71	31	192	--	174	0	144	302	--	3.7	--	881	1.20	2,450	305	162	4.8	1,500	8.1
Aug. 21-23.....	732	--	--	80	28	236	--	172	0	158	368	--	3.5	--	1,010	1.37	2,000	315	174	5.8	1,710	8.1
Aug. 24.....	3,830	--	--	39	13	105	--	100	0	58	165	--	4.8	--	478	.65	4,940	150	68	3.7	826	7.7
Aug. 25-31.....	13,050	--	--	27	7.9	29	--	84	0	25	47	--	2.3	--	213	.29	7,510	100	31	1.3	343	7.7
Sept. 1-5.....	2,756	--	--	62	12	120	--	144	0	79	185	--	3.8	--	576	.78	4,290	204	86	3.6	971	8.0
Sept. 6-9.....	1,142	--	--	93	26	210	--	206	0	134	345	--	3.3	--	978	1.33	3,020	340	171	5.0	1,630	8.1
Sept. 10-12.....	2,410	--	--	61	17	111	--	150	0	91	170	--	4.6	--	574	.78	3,740	220	97	3.2	968	8.0
Sept. 13-20.....	821	--	--	91	23	243	--	180	0	149	385	--	4.3	--	1,050	1.43	2,330	320	172	5.9	1,740	8.0
Sept. 21-24.....	516	--	--	95	27	320	--	176	0	186	500	--	4.2	--	1,280	1.74	1,780	350	206	7.4	2,140	7.9
Sept. 25-27.....	4,670	--	--	26	7.1	36	--	88	0	24	52	--	2.6	--	224	.30	2,820	94	22	1.6	385	7.7
Sept. 28-30.....	2,743	--	--	43	9.8	91	--	120	0	52	135	--	2.6	--	435	.59	3,220	148	50	3.2	726	7.9
Weighted average	3,228	--	--	68	19	131	--	156	--	140	181	--	5.2	--	671	0.91	5,850	248	120	3.6	1,090	--
Analyses of additional samples																						
Oct. 28, 1959.....	a 1,490	16	--	124	37	252		258	0	277	355	0.5	8.3	0.15	b 1,200	1.63	4,830	460	248	5.1	2,030	7.6
Feb. 17, 1960.....	a 2,260	10	0.00	117	30	258		240	0	315	312	.5	11	.23	1,190	1.62	7,260	415	218	5.5	1,870	8.2
Apr. 5.....	a 4,820	13	.00	106	26	155		214	0	271	175	.4	3.1	.19	893	1.21	11,620	370	194	3.5	1,370	7.4
July 26.....	a 1,250	10	.00	82	20	185		188	0	159	260	.3	.7	.12	824	1.12	2,780	286	132	4.8	1,410	7.3

a Discharge at time of sampling.
b Calculated from determined constituents.

ARKANSAS RIVER BASIN--Continued

7-1465. ARKANSAS RIVER AT ARKANSAS CITY, KANS.--Continued

Temperature (°F) of water, water year October 1959 to September 1960

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

ARKANSAS RIVER BASIN--Continued

7-1478. WALNUT RIVER AT WINFIELD, KANS.

LOCATION.--At gaging station at bridge on U.S. Highway 77, 1 mile south of Winfield, Cowley County, and 1 mile upstream from Black Crook Creek.
DRAINAGE AREA.--1,840 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1959 to September 1960.
REMARKS.--Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 28, 1959.....	440	14	--	139	29	112		350	0	90	225	0.3	12	0.17	a 793	1.08	942	465	178	2.3	1,400	7.8
Nov. 14.....	339	--	--	85	31	138		144	0	127	272	.3	8.3	--	a 733	1.00	671	340	222	3.3	1,300	8.2
Jan. 16, 1960.....	2,300	--	--	98	18	94		208	10	66	185	.3	9.0	--	a 582	.79	3,610	320	133	2.3	1,060	8.5
Feb. 15.....	559	--	--	68	24	75		172	8	69	143	--	5.5	--	562	.76	848	270	116	2.0	878	8.4
Feb. 17.....	538	6.5	0.00	110	21	77		268	0	75	158	.4	6.2	.16	632	.86	918	360	140	1.8	1,050	8.1
Mar. 15.....	3,800	--	--	61	12	57		144	2	50	102	.3	5.9	--	a 361	.49	3,700	200	78	1.7	622	8.3
Apr. 5.....	930	11	.00	86	20	47		220	0	60	107	.2	3.2	.07	509	.69	1,280	295	114	1.2	796	7.6
Apr. 18.....	1,240	--	--	90	24	78		196	10	96	152	--	4.8	--	648	.88	2,170	325	148	1.9	983	8.5
May 16.....	504	--	--	65	29	118		116	0	125	215	--	9.7	--	766	1.04	1,040	280	185	3.1	1,120	8.0
June 20.....	445	--	--	66	23	64		190	0	65	122	.3	4.4	--	557	.76	669	260	104	1.7	823	8.2
July 17.....	b 403	--	--	89	14	78		154	0	103	150	.5	3.3	--	598	.81	651	280	154	2.0	913	8.1
July 26.....	209	12	.00	74	19	56		220	0	51	106	.3	2.5	.04	452	.61	255	264	84	1.5	769	7.5
Aug. 16.....	265	--	--	62	9.8	45		176	0	37	74	.5	4.3	--	382	.52	273	195	51	1.4	592	8.2
Sept. 19.....	104	--	--	125	32	131		212	0	179	260	.3	1.7	--	1,020	1.39	286	445	272	2.7	1,470	8.2

a Calculated from determined constituents.
b Daily mean discharge.

7-1483.5. SALT FORK ARKANSAS RIVER NEAR WINCHESTER, OKLA.

LOCATION.--At gaging station on county highway bridge, 1 mile northeast of Winchester, Woods County, 2.5 miles upstream from Greenwood Creek, 4.9 miles downstream from Yellowstone Creek, 5 miles downstream from State line, and 19 miles northwest of Alva.
DRAINAGE AREA.--857 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1959 to September 1960.
Water temperature: June to September 1960.
REMARKS.--Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 26, 1959.....	--	12	--	312	47	175	--	190	0	734	305	0.3	0.0	0.24	a 1680	2.28	--	970	814	2.4	2370	7.5
Feb. 16, 1960.....	135	12	0.00	168	134	181	--	212	0	775	270	.8	1.1	.11	1760	2.39	642	970	796	2.5	2320	8.1
Feb. 17.....	144	--	--	212	32	106	--	130	0	--	108	--	--	--	--	--	--	660	554	1.8	1420	7.9
Mar. 10.....	360	--	--	324	51	138	--	188	0	--	135	--	--	--	--	--	--	1020	866	1.9	2050	7.8
Mar. 22.....	174	--	--	312	54	136	--	202	0	--	165	--	--	--	--	--	--	1000	834	1.9	2070	7.8
Apr. 4.....	83	18	.00	326	67	147	--	170	0	891	242	.5	.4	.29	1940	2.64	435	1090	950	1.9	2450	8.1
Apr. 6.....	b 78.0	--	--	288	83	174	--	166	0	--	235	--	--	--	--	--	--	1060	924	2.3	2430	7.3
Apr. 21.....	b 53.5	--	--	322	62	182	--	144	0	--	265	--	--	--	--	--	--	1060	942	2.4	2500	7.5
May 5.....	b 107	--	--	320	39	150	--	132	0	--	215	--	--	--	--	--	--	960	852	2.1	2260	7.3
May 26.....	b 411	--	--	128	15	48	--	254	0	--	66	--	--	--	--	--	--	380	172	1.1	927	7.0
June 1-10.....	104	21	.00	252	39	123	5.7	156	0	679	156	.4	1.7	.29	1410	1.92	396	790	622	1.9	1800	7.9
June 11-12.....	119	--	--	226	31	75	--	160	0	571	90	--	.2	--	1150	1.56	369	690	559	1.2	1450	8.2
June 13-24.....	21.3	--	--	266	55	155	--	116	0	776	230	--	.5	--	1680	2.28	96.6	890	795	2.3	2090	8.0
June 25.....	3.5	--	--	300	56	196	--	84	0	933	260	--	.2	--	1950	2.65	18.4	980	911	2.7	2330	8.0
June 26-30.....	2.5	--	--	316	64	191	--	100	0	983	255	--	.5	--	2030	2.76	13.7	1050	968	2.6	2400	8.0
July 1-3.....	2.8	--	--	318	77	126	--	118	0	965	200	--	.0	--	1900	2.58	14.4	1110	1010	1.6	2270	7.7
July 4-5.....	630	--	--	338	36	73	--	100	0	925	74	--	.0	--	1610	2.19	2740	990	908	1.0	1780	7.5
July 6.....	116	--	--	160	20	46	--	112	0	406	46	--	.5	--	786	1.07	246	480	388	0.9	922	7.6
July 7.....	60	--	--	224	25	84	--	134	0	557	108	--	.0	--	1140	1.55	185	660	550	1.4	1450	7.9
July 8-10.....	45.0	--	--	302	53	119	--	146	0	813	186	--	.0	--	1650	2.24	200	970	850	1.7	2030	7.7
July 11-20.....	5.0	24	.00	320	68	173	4.5	138	0	950	245	.5	.7	.79	1930	2.62	26.0	1080	967	2.3	2420	7.9
July 21-31.....	2.2	25	.00	344	88	130	2.5	132	0	1040	190	.5	.8	.82	1970	2.68	11.7	1220	1110	1.6	2300	7.9
Aug. 1-7.....	.2	--	--	348	59	160	--	130	0	1040	190	--	.8	--	1980	2.69	1.07	1110	1000	2.1	2310	7.8

a Calculated from determined constituents.
b Discharge at time of sampling.

ARKANSAS RIVER BASIN--Continued

7-1483.5. SALT FORK ARKANSAS RIVER NEAR WINCHESTER, OKLA.--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Aug. 8-10, 1960...	510	--	--	274	23	73	--	84	0	724	82	--	0.6	--	1280	1.74	1760	780	711	1.1	1530	7.4
Aug. 11.....	75	--	--	154	18	42	--	98	0	379	51	--	5.0	--	770	1.05	156	460	380	.8	997	7.8
Aug. 12.....	36	--	--	246	23	78	--	124	0	609	100	--	2.6	--	1210	1.65	118	710	608	1.3	1510	7.8
Aug. 13-20.....	24.0	--	--	380	47	131	--	124	0	1060	155	--	1.1	--	1930	2.62	125	1140	1040	1.7	2220	7.6
Aug. 21-23.....	2.1	--	--	412	49	157	--	122	0	1130	208	--	.7	--	2120	2.88	12.0	1230	1130	1.9	2440	7.8
Aug. 24-26.....	1969	--	--	328	25	37	--	82	0	838	43	--	.5	--	1410	1.92	7500	920	853	.5	1580	7.6
Aug. 27-28.....	386	--	--	222	18	38	--	94	0	569	31	--	.2	--	993	1.35	1030	630	553	.7	1180	7.7
Aug. 29-31.....	64.0	--	--	324	37	87	--	142	0	841	111	--	1.0	--	1560	2.12	270	960	844	1.2	1830	8.0
Sept. 1-10.....	21.4	22	0.00	368	54	161	7.8	136	0	1080	178	0.5	.6	0.73	2020	2.75	117	1140	1030	2.1	2170	8.0
Sept. 11-20.....	5.7	--	--	392	64	158	--	140	0	1150	192	--	.8	--	2110	2.87	32.5	1240	1130	1.9	2470	7.9
Sept. 21-23.....	3.4	--	--	344	59	139	--	96	0	1060	155	--	1.0	--	1880	2.56	17.2	1100	1020	1.8	2220	7.9
Sept. 24-30.....	5.9	--	--	392	64	178	--	134	0	1170	212	--	.7	--	2150	2.92	34.2	1240	1130	2.2	2550	7.9
Analyses of additional samples																						
June 3, 1960.....	b 81.1			244	49	112		164	0		145							810	676	1.7	1740	7.2
June 17.....	b 23.7			272	47	171		144	0		258							870	752	2.5	2300	7.5
July 20.....	b 1.7			354	67	141		160	0		210							1160	1030	1.8	2490	7.4
July 27.....	.5	22	0.00	360	64	150		184	0	1020	192	0.5	0.6	0.31	2080	2.83	2.81	1160	1010	1.9	2390	7.7

b Discharge at time of sampling.

Temperature (°F) of water, June to September 1960

Month	Day																													Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
April.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
May.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
June	82	84	74	73	82	69	65	73	77	74	80	76	68	67	73	72	76	70	74	70	75	75	72	--	76	72	68	71	86	83	--	74
July.....	84	75	85	68	73	72	71	70	75	89	87	79	79	77	84	80	79	85	83	77	77	77	75	77	91	95	77	80	80	80	80	79
August.....	--	--	91	91	92	91	91	--	70	75	80	77	73	88	84	76	77	69	80	80	90	84	84	76	75	72	79	79	75	80	81	81
September.....	74	80	85	--	75	75	71	72	67	67	67	70	66	65	64	64	65	87	84	80	78	67	68	64	79	78	80	65	63	57	--	72

7-1510. SALT FORK ARKANSAS RIVER AT TONKAWA, OKLA.

LOCATION.--At gaging station at bridge on U.S. Highway 177 in Tonkawa, Kay County, 4 miles downstream from Thompson Creek and 7.8 miles upstream from Chikaskia River.
DRAINAGE AREA.--4,528 square miles, of which 8 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: October 1959 to September 1960.
Water temperatures: November 1959 to September 1960.
EXTREMES, November 1959 to September 1960.--Dissolved solids: Maximum, 3,120 ppm May 11-20; minimum, 195 ppm Aug. 26-27.
Hardness: Maximum, 700 ppm Apr. 21-30; minimum, 64 ppm Aug. 26-27.
Specific conductance: Maximum daily, 5,620 micromhos June 1; minimum daily, 332 micromhos Aug. 26.
Water temperatures: Maximum, 88°F on several days during June, July, and August; minimum, freezing point Jan. 18-20, Mar. 3, 4.
REMARKS.--Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C): Parts per million	Dissolved solids: Tons per acre-foot	Dissolved solids: Tons per day	Hardness as $CaCO_3$: Calcium, Magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
Oct. 28, 1959.....	550	6.5	--	121	38	583	--	206	0	275	900	0.3	1.6	0.18	a 2030	2.76	3010	460	291	12	3490	7.7
Nov. 6-9.....	440	--	--	142	34	624	--	234	0	306	950	--	1.0	--	2260	3.07	2680	495	303	12	3820	8.2
Nov. 10-20.....	310	--	--	146	41	684	--	264	0	313	1050	--	--	--	2420	3.29	2030	534	318	13	4130	8.2
Nov. 21-30.....	258	16	0.00	160	37	667	8.0	276	0	319	1080	.1	--	.34	2490	3.39	1730	550	324	12	4190	8.2
Dec. 1-10.....	229	12	.00	150	50	672	6.0	268	6	333	1080	.1	--	.17	2520	3.43	1560	580	350	12	4220	8.3
Dec. 11-20.....	344	--	--	133	46	614	--	228	12	296	950	--	1.2	--	2200	2.99	2040	520	313	12	3730	8.4
Dec. 21-27.....	394	--	--	149	48	776	--	248	0	347	1200	--	--	--	2730	3.71	2900	570	367	14	4600	8.0
Dec. 28-31.....	748	--	--	114	40	555	--	192	10	270	850	--	2.6	--	1970	2.68	3980	450	276	11	3420	8.4
Jan. 1-10, 1960...	353	12	.01	152	46	809	4.0	256	0	361	1250	.3	--	.23	2840	3.86	2710	570	360	15	4830	8.2
Jan. 11-14.....	370	--	--	144	46	784	--	240	4	345	1200	--	--	--	2680	3.64	2680	550	347	15	4530	8.4
Jan. 15.....	1090	--	--	67	32	318	--	128	0	169	500	--	6.0	--	1220	1.66	3590	300	195	8.0	2100	8.2
Jan. 16-18.....	977	--	--	110	38	561	--	182	4	283	850	--	2.0	--	1990	2.71	5250	430	274	12	3400	8.3
Jan. 19-20.....	720	--	--	150	45	876	--	204	0	379	1350	--	--	--	2990	4.07	5810	560	393	16	4980	8.2
Jan. 21-31.....	566	--	--	152	51	848	--	252	0	379	1300	--	--	--	2920	3.97	4460	590	384	15	4900	8.1
Feb. 1-3.....	618	--	--	166	38	850	--	242	4	392	1280	--	--	--	2960	4.03	4940	570	365	15	4820	8.4
Feb. 4.....	1330	--	--	111	32	455	--	172	8	216	720	--	5.0	--	1770	2.41	6360	410	256	11	2900	8.5
Feb. 5-6.....	4120	--	--	54	13	203	--	108	2	121	290	--	2.9	--	786	1.07	8740	188	96	6.4	1350	8.3
Feb. 7-8.....	3220	--	--	98	40	426	--	144	4	241	680	--	2.4	--	1660	2.26	14430	410	286	9.2	2740	8.5
Feb. 9-10.....	2500	--	--	138	34	654	--	156	8	367	980	--	2.0	--	2360	3.21	15930	485	344	13	3820	8.4
Feb. 11-29.....	1059	12	.00	152	45	636	6.0	216	0	404	990	.3	2.4	.17	2440	3.32	6980	565	388	12	4040	7.7
Mar. 1-20.....	1185	13	.00	170	53	704	10	264	0	435	1080	.2	--	.23	2680	3.64	8570	640	424	12	4390	8.0
Mar. 21-31.....	1235	--	--	176	50	573	--	208	0	512	840	--	2.3	--	2380	3.24	7940	645	474	9.8	3690	8.2
Apr. 1-20.....	626	10	.00	170	51	560	8.0	194	8	510	840	.3	1.9	.29	2380	3.24	4020	635	462	9.7	3780	8.4
Apr. 21-30.....	328	--	--	176	63	722	--	226	0	539	1080	--	--	--	2700	3.67	2390	700	515	12	4420	8.2

a Calculated from determined constituents.

ARKANSAS RIVER BASIN--Continued

7-1510. SALT FORK ARKANSAS RIVER AT TONKAWA, OKLA.--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
May 1-10, 1960....	346	--	--	164	68	669	--	212	0	512	1020	--	--	--	2730	3.71	2550	690	516	11	4270	8.1
May 11-20.....	311	--	--	174	60	857	--	204	0	548	1280	--	--	--	3120	4.24	2620	680	513	14	4940	8.0
May 21-28.....	280	--	--	172	55	829	--	200	0	510	1250	--	--	--	3020	4.11	2280	655	491	14	4870	7.9
May 29.....	1750	--	--	66	21	296	--	100	0	183	440	--	0.4	--	1110	1.51	5240	250	168	8.1	1860	8.1
May 30-31.....	1395	--	--	162	43	731	--	140	0	484	1100	--	--	--	2720	3.70	10240	580	466	13	4400	7.6
June 1-6.....	1573	--	--	186	44	834	--	140	0	558	1250	--	--	--	3070	4.18	13040	645	530	14	4870	8.1
June 7-9.....	2880	--	--	74	22	335	--	106	0	202	500	--	.2	--	1230	1.67	9560	274	187	8.8	2120	7.9
June 10-20.....	2218	13	0.00	118	35	581	16	130	2	352	910	0.3	1.9	0.26	2190	2.98	13120	440	330	12	3650	8.3
June 21-30.....	374	--	--	142	35	767	--	160	4	392	1150	--	--	--	2650	3.60	2680	500	362	15	4380	8.3
July 1-4.....	222	--	--	129	43	828	--	196	6	367	1240	--	--	--	2800	3.81	1680	500	330	16	4560	8.3
July 5.....	8180	--	--	22	6.6	42	--	98	0	24	48	--	.2	--	210	.29	4640	82	2	2.0	349	8.0
July 6.....	3940	--	--	37	9.8	123	--	100	0	68	175	--	.4	--	a 462	.63	4910	133	51	4.7	869	7.9
July 7-10.....	1988	--	--	86	23	538	--	124	0	226	810	--	1.6	--	1780	2.42	9550	310	208	13	3010	8.0
July 11-18.....	839	--	--	117	34	629	--	156	0	316	950	--	.6	--	2190	2.98	4960	430	302	13	3640	8.1
July 19.....	410	--	--	115	38	648	--	182	0	316	975	--	--	--	2200	2.99	2440	445	296	13	3730	7.9
July 20-23.....	403	--	--	117	36	704	--	206	0	323	1040	--	--	--	2400	3.26	2610	440	271	15	3970	8.0
July 24-26.....	2257	--	--	61	18	281	--	104	0	152	420	--	1.6	--	1030	1.40	6280	226	141	8.1	1750	8.0
July 27-31.....	637	--	--	118	36	801	--	162	0	325	1220	--	--	--	2780	3.78	4780	450	317	16	4640	8.2
Aug. 1-3.....	559	--	--	91	25	509	--	172	0	228	750	--	.2	--	a 1690	2.30	2550	330	189	12	2840	7.4
Aug. 4-10.....	226	--	--	126	31	794	--	216	0	312	1180	--	--	--	2640	3.59	1610	440	263	16	4370	8.0
Aug. 11-20.....	408	--	--	125	32	806	--	168	0	353	1200	--	--	--	2660	3.62	2930	445	308	17	4390	8.0
Aug. 21-22.....	558	--	--	116	24	641	--	142	0	314	950	--	.2	--	2200	2.99	3310	390	274	14	3550	7.9
Aug. 23-24.....	614	--	--	77	24	423	--	128	0	179	650	--	.5	--	1480	2.01	2450	290	185	11	2500	7.5
Aug. 25.....	2540	--	--	40	10	197	--	76	0	87	295	--	2.4	--	718	.98	4920	142	80	7.2	1260	7.7
Aug. 26-27.....	6455	--	--	20	3.4	39	--	80	0	8.6	52	--	.5	--	195	.27	3400	64	0	2.1	335	7.5
Aug. 28.....	6120	--	--	30	7.1	105	--	78	0	49	152	--	2.2	--	411	.56	6790	104	40	4.5	725	7.8
Aug. 29.....	4710	--	--	86	20	532	--	96	0	233	800	--	3.3	--	1810	2.46	23020	295	216	13	3050	7.8
Aug. 30-31.....	7395	--	--	48	11	172	--	86	0	111	250	--	.2	--	665	.90	13280	164	94	5.8	1160	7.6
Sept. 1-9.....	1685	18	.00	108	23	510	9	132	0	287	775	.3	1.6	.54	1880	2.56	8550	365	257	12	3040	7.8
Sept. 10-12.....	3040	--	--	29	9.6	130	--	72	0	69	185	--	2.6	--	483	.66	3960	112	53	5.3	862	7.9

Sept. 13-20.....	769	--	--	99	40	587	--	184	0	254	900	--	1.3	--	2050	2.79	4260	410	259	13	3480	8.1
Sept. 21.....	380	--	--	109	36	677	--	214	6	285	1000	--	--	--	2320	3.16	2380	420	234	14	3860	8.4
Sept. 22-23.....	644	--	--	60	22	267	--	150	2	130	395	--	3.3	--	988	1.34	1720	240	114	7.5	1720	8.3
Sept. 24-30.....	491	--	--	102	43	550	--	194	4	249	850	--	2.3	--	1930	2.62	2560	430	264	12	3250	8.3
Weighted average	--	--	--	113	33	514	--	162	1	300	781	--	--	--	1910	2.60	4940	420	285	11	3150	7.9
Time-weighted average.....	b 1349	--	--	138	42	648	--	199	2	365	988	--	--	--	2370	--	--	516	350	12	3910	8.0
Tons per day....	--	--	--	294	87.0	1330	--	421	2	779	2030	--	--	--	--	--	--	--	--	--	--	--

Analyses of additional samples

Feb. 16, 1960.....	c 1230	7.5	0.00	148	41	661		192	0	391	1000	0.3	1.7	0.19	2400	3.26	7970	540	382	12	4010	7.7
Apr. 4.....	c 745	10	.00	162	59	544		214	0	490	324	.3	.2	.22	2300	3.13	4630	645	470	9.5	3650	7.8
July 26.....	c 1230	10	.00	75	21	377		116	0	200	560	.3	1.1	.15	1320	1.80	4380	275	180	9.9	2300	7.3

a Calculated from determined constituents.
b Mean discharge based on 365 days; mean discharge for 331 days of chemical analyses, 961 cfs.
c Discharge at time of sampling.

Temperature (°F) of water, November 1959 to September 1960

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

ARKANSAS RIVER BASIN--Continued

7-1515.5. CHIKASKIA RIVER NEAR DRURY, KANS.

LOCATION.--At bridge on U.S. Highway 81 west of Drury, Sumner County.
DRAINAGE AREA.--900 square miles.
RECORDS AVAILABLE.--Chemical analyses: November 1959 to September 1960.
REMARKS.--No discharge records available.

Chemical analyses, in parts per million, November 1959 to September 1960

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Nov. 5, 1959.....				56	21	36		222	0	67	35	0.5	0.1		a 325	0.44		224	42	1.0	556	8.2
Nov. 14.....				75	23	35		260	12	66	36	.3	3.2		a 378	.51		280	47	.9	640	8.5
Dec. 13.....				51	30	18		196	6	66	33	--	4.0		345	.47		250	80	.5	548	8.3
Jan. 16 1960.....				50	15	35		170	6	47	40	.4	8.4		a 285	.39		186	36	1.1	501	8.4
Feb. 4.....				44	19	34		172	6	60	32	--	7.0		295	.40		190	39	1.1	511	8.5
Mar. 13.....				34	11	26		126	0	36	23	1.8	9.6		a 203	.28		130	26	1.0	352	8.1
Apr. 17.....				64	21	29		232	6	59	31	--	4.8		357	.49		245	45	.8	580	8.4
May 15.....				52	13	39		182	0	62	36	.5	4.4		331	.45		184	35	1.3	522	8.2
June 18.....				62	7.4	35		212	0	43	28	.3	3.8		324	.44		185	12	1.1	494	8.2
July 16.....				48	6.8	42		190	0	37	30	.5	1.8		275	.37		148	0	1.5	453	8.2
Aug. 15.....				82	38	272		132	0	195	450	.5	4.8		1190	1.62		360	252	6.2	1990	8.0
Sept. 17.....				67	15	38		246	0	63	30	.3	1.8		361	.49		230	28	1.1	580	8.2

a Calculated from determined constituents.

7-1520. CHIKASKIA RIVER NEAR BLACKWELL, OKLA.

LOCATION.--At gaging station on St. Louis-San Francisco Railway Co. bridge at northeast edge of city of Blackwell, Kay County, 0.2 mile downstream from Bitter Creek.
DRAINAGE AREA.--1,859 square miles.
RECORDS AVAILABLE.--Chemical analyses: November 1959 to September 1960.
Water temperatures: November 1959 to September 1960.
EXTREMES, November 1959 to September 1960.--Dissolved solids: Maximum, 1,130 ppm Aug. 16-17; minimum, 172 ppm July 23-25.
Hardness: Maximum, 525 ppm Aug. 10; minimum, 102 ppm Aug. 24-31.
Specific conductance: Maximum daily, 1,990 micromhos July 3; minimum daily, 176 micromhos Aug. 27.
Water temperatures: Maximum, 90°F Aug. 4; minimum, freezing point Feb. 28, Mar. 6.
REMARKS.--Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, November 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Nov. 7-10, 1959...	349	--	--	113	36	96	--	292	0	130	185	--	3.3	--	761	1.03	717	430	190	2.0	1240	8.2
Nov. 11-20.....	312	22	0.00	132	41	106	3.2	324	8	134	208	0.1	3.5	0.42	842	1.15	709	500	221	2.1	1370	8.3
Nov. 21-30.....	290	20	.00	121	41	105	2.1	310	0	135	205	.3	4.5	.31	802	1.09	628	470	216	2.1	1320	8.2
Dec. 1-10.....	243	--	--	118	40	104	--	280	0	140	218	--	3.7	--	821	1.12	539	460	230	2.1	1330	8.1
Dec. 11-20.....	243	--	--	100	40	104	--	228	0	137	218	--	3.5	--	765	1.04	502	415	228	2.2	1270	8.0
Dec. 21-26.....	226	--	--	122	41	97	--	304	0	135	208	--	4.3	--	820	1.12	500	475	226	1.9	1330	8.2
Dec. 27-31.....	445	--	--	101	32	84	--	248	0	133	158	--	3.9	--	686	.93	824	385	182	1.9	1090	8.2
Jan. 1-14, 1960...	241	16	.01	118	34	103	2.4	296	0	126	195	.2	4.4	.10	817	1.11	532	435	192	2.1	1260	8.1
Jan. 15.....	829	--	--	78	39	66	--	210	10	147	108	--	5.7	--	628	.85	1410	355	166	1.5	973	8.5
Jan. 16.....	1020	--	--	78	35	84	--	176	10	141	150	--	5.2	--	662	.90	1820	340	180	2.0	1070	8.5
Jan. 17-20.....	417	--	--	68	22	61	--	184	0	88	104	--	3.9	--	480	.65	540	260	109	1.6	785	7.8
Jan. 21-31.....	316	--	--	102	35	77	--	282	6	114	145	--	5.2	--	709	.96	605	400	159	1.7	1100	8.4
Feb. 1-4.....	538	--	--	96	29	70	--	262	8	107	120	--	5.7	--	610	.83	886	360	132	1.6	975	8.4
Feb. 5-11.....	2156	--	--	42	13	33	--	126	0	53	49	--	5.2	--	286	.39	1660	160	56	1.1	470	7.6
Feb. 12-29.....	409	17	.00	110	33	75	5.0	296	0	112	152	.2	4.3	.11	747	1.02	825	410	168	1.6	1150	8.0
Mar. 1-10.....	367	18	.05	125	38	99	3.0	298	12	154	180	.2	8.6	.15	846	1.15	838	470	206	2.0	1290	8.5
Mar. 11-20.....	2211	--	--	44	17	35	--	132	0	67	53	--	5.9	--	356	.48	2130	180	72	1.1	554	8.0
Mar. 21-24.....	952	--	--	56	16	40	--	160	0	65	64	--	5.7	--	382	.52	982	206	75	1.2	592	8.2
Mar. 25-31.....	502	--	--	87	30	63	--	246	0	110	110	--	6.2	--	629	.86	853	340	138	1.5	950	8.2
Apr. 1.....	487	--	--	110	35	114	--	256	0	148	215	--	.8	--	823	1.12	1080	420	210	2.4	1310	8.1
Apr. 2-9.....	466	--	--	90	31	78	--	258	0	123	125	--	5.9	--	650	.88	818	350	138	1.8	1000	7.7
Apr. 10-13.....	300	--	--	110	35	97	--	282	4	133	178	--	4.8	--	801	1.09	649	420	182	2.1	1210	8.3
Apr. 14-15.....	369	--	--	136	39	154	--	220	0	205	310	--	4.8	--	1110	1.51	1110	500	320	3.0	1650	8.1

ARKANSAS RIVER BASIN--Continued

7-1520. CHIKASKIA RIVER NEAR BLACKWELL, OKLA.--Continued

Chemical analyses, in parts per million, November 1959 to September 1960--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Apr. 16-19, 1960..	403	--	--	87	36	66	--	248	8	109	125	--	3.8	--	626	0.85	681	365	148	1.5	979	8.4
Apr. 20-30.....	222	--	--	108	35	116	--	264	0	140	215	--	2.6	--	848	1.15	508	415	198	2.5	1310	8.1
May 1-4.....	208	--	--	77	35	108	--	180	0	133	200	--	2.2	--	730	.99	410	336	188	2.6	1130	8.2
May 5.....	340	--	--	70	24	80	--	188	12	92	125	--	3.8	--	554	.75	509	275	101	2.1	874	8.6
May 6-7.....	382	--	--	78	37	101	--	192	0	126	195	--	.6	--	717	.98	740	345	188	2.4	1120	8.2
May 8-10.....	396	--	--	74	27	73	--	198	8	96	125	--	1.8	--	582	.79	622	295	119	1.8	888	8.5
May 11-20.....	198	--	--	102	28	91	--	248	0	104	180	--	3.0	--	708	.96	378	370	167	2.1	1110	7.8
May 21-26.....	163	--	--	110	35	118	--	246	4	131	235	--	1.9	--	846	1.15	372	420	212	2.5	1320	8.3
May 27-31.....	1583	--	--	45	12	33	--	140	0	40	54	--	2.6	--	281	.38	1200	162	48	1.1	483	8.0
June 1-3.....	592	--	--	40	12	21	--	120	2	28	44	--	2.4	--	247	.34	395	150	48	.7	390	8.3
June 4-10.....	433	--	--	75	20	50	--	194	8	60	101	--	2.5	--	470	.64	549	270	98	1.3	736	8.5
June 11-15.....	1834	--	--	31	12	24	--	92	0	32	48	--	1.9	--	245	.33	1210	126	50	.9	377	8.1
June 16-20.....	283	--	--	74	18	64	--	176	6	63	127	--	1.9	--	504	.69	385	260	106	1.7	797	8.4
June 21-24.....	238	--	--	86	24	85	--	190	8	79	175	--	2.2	--	a 552	.75	355	315	146	2.1	1000	8.5
June 25-30.....	121	--	--	102	29	105	--	208	8	104	220	--	1.2	--	a 671	.91	219	375	191	2.4	1200	8.5
July 1-2.....	104	--	--	90	33	122	--	166	0	128	252	--	.0	--	762	1.04	214	360	224	2.8	1230	8.2
July 3-5.....	72.3	--	--	149	34	162	--	248	0	163	348	--	.1	--	1080	1.47	211	510	307	3.1	1680	8.1
July 6-10.....	137	--	--	115	37	109	--	242	0	133	240	--	.6	--	842	1.15	311	440	242	2.3	1330	8.2
July 11-22.....	118	--	--	115	37	124	--	226	0	131	275	--	.5	--	910	1.24	290	440	255	2.6	1390	8.2
July 23-25.....	1544	--	--	27	10	19	--	96	0	31	28	--	1.7	--	172	.23	717	110	32	.8	305	8.0
July 26-27.....	270	--	--	43	12	38	--	110	0	44	73	--	.1	--	293	.40	214	156	66	1.3	478	7.3
July 28-29.....	765	--	--	29	13	19	--	98	0	31	37	--	.0	--	195	.27	403	124	44	.7	322	8.0
July 30-31.....	348	--	--	66	17	58	--	110	0	74	138	--	.0	--	446	.61	419	235	145	1.8	731	7.2
Aug. 1-9.....	114	--	--	69	24	71	--	150	0	58	170	--	2.0	--	556	.76	171	270	147	1.9	877	8.2
Aug. 10.....	153	--	--	142	41	135	--	196	0	164	345	--	.5	--	1080	1.47	446	525	364	2.6	1600	8.1
Aug. 11.....	276	--	--	72	24	59	--	196	4	82	110	--	.1	--	498	.68	371	280	113	1.5	778	8.3
Aug. 12-15.....	81.5	--	--	107	34	108	--	216	12	100	240	--	1.2	--	771	1.05	170	405	208	2.3	1240	8.5
Aug. 16-17.....	48.0	--	--	149	36	176	--	248	0	123	405	--	.4	--	1130	1.54	146	520	317	3.4	1800	8.1
Aug. 18-20.....	69.7	--	--	123	37	128	--	198	4	134	305	--	.8	--	932	1.27	175	460	291	2.6	1480	8.3
Aug. 21-23.....	50.7	--	--	142	33	154	--	198	0	149	360	--	.7	--	1120	1.52	153	490	328	3.0	1750	8.1

Aug. 24-31.....	2802	--	--	26	9.0	16	--	72	0	24	36	--	2.0	--	192	.26	1450	102	43	.7	314	7.7
Sept. 1-4.....	226	--	--	64	18	53	--	164	0	61	105	--	2.4	--	410	.56	250	232	98	1.5	713	8.1
Sept. 5-9.....	138	--	--	105	24	108	--	254	0	102	198	--	2.3	--	718	.98	268	360	152	2.5	1130	8.2
Sept. 10-11.....	788	--	--	51	15	48	--	160	0	60	72	--	.2	--	333	.45	708	190	59	1.5	586	8.0
Sept. 12-24.....	108	--	--	107	26	117	--	150	0	104	280	--	3.2	--	796	1.08	232	375	252	2.6	1310	8.1
Sept. 25-30.....	443	--	--	50	10	45	--	118	0	44	85	--	3.3	--	320	.44	383	168	72	1.5	559	7.8
Weighted average	--	--	--	66	22	55	--	174	2	77	103	--	3.7	--	471	0.64	645	254	109	1.4	748	7.9
Time-weighted average.....	508	--	--	93	29	85	--	222	2	105	170	--	3.3	--	667	--	--	354	168	1.9	1060	8.1
Tons per day....	--	--	--	91.0	30.0	75.0	--	238	3	106	141	--	5.1	--	--	--	--	--	--	--	--	--

Analyses of additional samples

Jan. 19, 1960.....	b 362	7.5	0.00	67	26	60		194	0	78	113	0.3	3.7	0.41	a 451	0.61	441	274	115	1.6	815	7.8
May 12.....	b 220			37	9.6	38		92	0		65							132	56	1.4	429	8.1
June 28.....	b 115			106	34	98		216	0		230							405	228	2.1	1250	8.2
July 14.....	b 91.6			127	35	129		244	0		310							460	260	2.6	1590	7.9
Aug. 18.....	b 66			70	30	69		184	12		146							296	125	1.7	902	8.4

a Calculated from determined constituents.
b Discharge at time of sampling.

Temperature (°F) of water, November 1959 to September 1960

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

ARKANSAS RIVER BASIN--Continued

7-1520.5. CHIKASKIA RIVER NEAR TONKAWA, OKLA.

LOCATION.--At bridge on U.S. Highway 60, 3 miles east of Tonkawa, Kay County.
DRAINAGE AREA.--2,009 square miles.
RECORDS AVAILABLE.--Chemical analyses: June to September 1958, November 1959 to September 1960.
REMARKS.--No discharge records available.

Chemical analyses, in parts per million, November 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Nov. 16, 1959.....				64	38	109		140	0	139	205	0.3	5.4		a 630	0.86		316	202	2.7	1060	8.2
Jan. 14, 1960.....				82	33	86		186	4	104	178	.3	8.0		a 586	.80		340	181	2.0	1090	8.4
Feb. 15.....				51	30	67		132	6	112	111	--	5.5		503	.68		250	132	1.8	800	8.5
Mar. 15.....				36	12	19		102	0	26	41	.7	11		a 196	.27		138	54	.7	396	8.1
Apr. 15.....				56	35	104		126	0	145	178	.3	5.0		679	.92		285	182	2.7	1030	8.0
May 5.....				61	29	90		142	0	103	168	.3	4.2		637	.87		270	154	2.4	955	8.0
July 15.....				75	36	138		120	0	134	280	.3	1.4		876	1.19		335	236	3.3	1340	7.9
Aug. 14.....				91	25	89		212	0	95	175	.3	2.4		698	.95		330	156	2.1	1060	8.2
Sept. 15.....				94	20	83		166	0	91	185	.3	2.8		646	.88		315	179	2.0	1020	8.1

a Calculated from determined constituents.

7-1522. SALT FORK ARKANSAS RIVER NEAR MARLAND, OKLA.

LOCATION.--At bridge on U.S. Highway 77, 4 miles north of Marland, Noble County.
DRAINAGE AREA.--6,764 square miles.
RECORDS AVAILABLE.--Chemical analyses: November 1959 to September 1960.
REMARKS.--No discharge records available.

Chemical analyses, in parts per million, November 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Nov. 5, 1959.....				130	35	353		254	6	218	560	0.5	2.0		a 1430	1.94		470	252	7.1	2440	8.4
Dec. 7.....				80	49	403		120	0	230	665	.1	2.0		1640	2.23		400	302	8.8	2680	8.0
Feb. 3, 1960.....				115	40	491		196	6	258	760	.3	6.4		a 1770	2.41		450	280	10	3080	8.3
Apr. 21.....				127	45	433		200	0	338	655	.5	.5		1800	2.45		500	336	8.4	2880	8.0
May 19.....				139	46	514		226	0	326	800	--	.5		2040	2.77		535	350	9.7	3320	8.1
June 16.....				106	24	446		134	0	267	670	.6	.2		1670	2.27		365	255	10	2790	7.6
July 21.....				122	34	496		222	0	252	765	--	.2		1880	2.56		445	263	10	3150	7.9
Aug. 19.....				142	39	507		210	0	304	800	.3	.4		2010	2.73		515	343	9.7	3310	7.9
Sept. 15.....				79	20	337		154	0	147	520	--	.6		1310	1.78		280	154	8.8	2170	7.9

a Calculated from determined constituents.

ARKANSAS RIVER BASIN--Continued

7-1525. ARKANSAS RIVER AT RALSTON, OKLA.

LOCATION.--At gaging station at bridge on State Highway 18 at Ralston, Pawnee County, 2 miles downstream from Salt Creek and 2 miles upstream from Grayhorse Creek.
DRAINAGE AREA.--54,465 square miles, of which 7,615 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: January 1950 to September 1960.
Water temperatures: January 1950 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 1,330 ppm Dec. 1-17; minimum, 240 ppm Oct. 2-10.
Hardness: Maximum, 505 ppm Nov. 21 to Dec. 17; minimum, 128 ppm Aug. 26-31.
Specific conductance: Maximum daily, 2,310 micromhos July 15; minimum daily, 263 micromhos Oct. 5.
Water temperatures: Maximum, 91°F Aug. 4, 5; minimum, 33°F on several days during January to March.
EXTREMES, 1950-60.--Dissolved solids: Maximum, 3,390 ppm Sept. 11-16, 1955; minimum, 166 ppm Oct. 3-6, 1955.
Hardness: Maximum, 582 ppm Jan. 5, 1951; minimum, 76 ppm Oct. 3-6, 1955.
Specific conductance: Maximum daily, 7,510 micromhos Sept. 14, 1955; minimum daily, 251 micromhos Oct. 5, 1955.
Water temperatures: Maximum, 98°F July 28, 1956; minimum, freezing point on many days during winter months.
REMARKS.--Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1, 1959.....	12800	--	--	70	34	280	--	138	0	117	488	--	1.4	--	1120	1.52	38710	315	202	6.9	1940	7.7
Oct. 2-10.....	85290	--	--	34	11	29	--	108	0	22	57	--	3.0	--	240	.33	55270	132	44	1.1	416	7.7
Oct. 11-13.....	17070	--	--	68	20	107	--	168	0	74	188	--	4.6	--	586	.80	27010	250	112	2.9	1010	7.9
Oct. 14-20.....	22010	--	--	54	13	69	--	146	0	56	112	--	3.7	--	418	.57	24840	188	68	2.2	713	7.6
Oct. 21-31.....	6824	--	--	110	27	196	--	256	0	154	310	--	5.1	--	1000	1.36	18420	385	175	4.3	1640	8.1
Nov. 1-10.....	5205	17	0.00	77	16	240	3.2	144	0	92	400	0.3	10	0.04	1050	1.43	14760	258	100	6.5	1720	7.9
Nov. 11-20.....	3940	--	--	133	38	242	--	292	0	220	385	--	4.9	--	1210	1.65	12870	490	250	4.7	1980	8.1
Nov. 21-30.....	3380	--	--	135	41	255	--	300	0	242	395	--	5.8	--	1290	1.75	11770	505	259	4.9	2090	8.2
Dec. 1-17.....	2659	--	--	134	41	283	--	292	0	266	425	--	5.5	--	1330	1.81	9550	505	266	5.5	2160	8.2
Dec. 18-20.....	5670	--	--	96	29	167	--	218	0	162	265	--	4.4	--	855	1.16	13090	360	182	3.8	1450	8.0
Dec. 21-30.....	3577	--	--	126	35	247	--	268	0	235	375	--	5.1	--	1200	1.63	11590	460	240	5.0	1970	8.1
Dec. 31.....	5400	--	--	98	33	143	--	206	0	160	248	--	7.3	--	848	1.15	12360	380	211	3.2	1370	8.1
Jan. 1-20, 1960...	4088	17	.01	117	29	228	10	236	8	214	358	.3	5.8	.06	1160	1.58	12800	410	203	4.9	1850	8.4
Jan. 21-23.....	4250	--	--	100	37	193	--	210	8	174	318	--	4.5	--	994	1.35	11410	400	214	4.2	1670	8.4
Jan. 24-31.....	3779	--	--	117	37	251	--	258	6	195	398	--	6.6	--	1210	1.65	12350	445	224	5.2	1990	8.4
Feb. 1-5.....	4668	--	--	110	34	211	--	242	8	184	330	--	5.7	--	1070	1.46	13490	415	203	4.5	1760	8.4
Feb. 6-10.....	13560	--	--	70	20	124	--	162	0	119	185	--	6.6	--	643	.87	23540	255	122	3.4	1090	8.2
Feb. 11-13.....	8710	--	--	78	23	188	--	160	0	156	285	--	5.2	--	859	1.17	20200	290	159	4.8	1450	8.2
Feb. 14-29.....	4772	--	--	118	32	242	--	248	0	227	360	--	3.8	--	1190	1.62	15330	425	222	5.1	1930	8.2
Mar. 1-9.....	3244	--	--	136	34	269	--	294	0	230	410	--	7.8	--	1320	1.80	11560	480	239	5.3	2130	7.9

Mar. 10	5920	--	--	88	29	236	--	156	10	182	365	--	7.1	--	1080	1.47	17260	340	196	5.6	1790	8.6
Mar. 11-15	8900	--	--	101	29	202	--	216	8	163	315	--	7.3	--	981	1.33	23570	370	180	4.6	1650	8.5
Mar. 16-20	13640	--	--	74	16	111	--	158	8	114	160	--	6.4	--	622	.85	22910	250	107	3.1	1020	8.6
Mar. 21	14500	--	--	81	18	101	--	196	0	116	150	--	.8	--	a 563	.77	22040	275	114	2.6	1010	7.9
Mar. 22-31	18010	--	--	54	13	71	--	126	4	86	96	--	5.5	--	422	.57	20520	186	76	2.3	701	8.4
Apr. 1-3	13600	--	--	69	16	85	--	154	0	115	122	--	4.4	--	570	.78	20930	236	110	2.4	888	8.1
Apr. 4-10	8029	--	--	95	29	147	--	200	0	201	210	--	5.9	--	862	1.17	18690	355	191	3.4	1330	8.1
Apr. 11-15	5788	--	--	118	28	202	--	238	4	243	278	--	5.2	--	1070	1.46	16720	410	208	4.4	1660	8.3
Apr. 16-20	7556	--	--	98	23	151	--	212	0	187	210	--	5.9	--	843	1.15	17200	340	166	3.6	1320	8.1
Apr. 21-30	4614	--	--	117	31	213	--	246	0	246	300	--	2.5	--	1130	1.54	14080	420	218	4.5	1770	8.0
May 1-7	6089	--	--	101	29	171	--	208	8	205	242	--	3.5	--	946	1.29	15550	370	186	3.9	1500	8.5
May 8-10	19070	--	--	38	10	45	--	120	0	45	61	--	3.5	--	292	.40	15030	136	38	1.7	486	8.2
May 11-14	7900	--	--	67	20	113	--	152	8	118	185	--	3.3	--	634	.86	13520	250	112	3.1	1030	8.5
May 15-20	5110	--	--	98	23	197	--	216	8	165	285	--	5.2	--	933	1.27	12870	340	150	4.6	1510	8.5
May 21-28	3995	--	--	98	31	224	--	210	0	196	340	--	2.6	--	1060	1.44	11430	370	198	5.1	1740	8.2
May 29-31	14170	--	--	61	15	104	--	160	0	81	160	--	.1	--	540	.73	20660	215	84	3.1	901	8.1
June 1-2	11100	--	--	58	13	111	--	142	0	87	165	--	3.0	--	554	.75	16600	200	84	3.4	904	8.2
June 3-8	6147	--	--	94	28	257	--	176	0	198	395	--	3.2	--	1100	1.50	18260	350	206	6.0	1840	8.2
June 9-20	9268	--	--	70	16	165	--	148	0	120	248	--	4.5	--	777	1.06	19440	240	118	4.6	1260	7.9
June 21-30	5549	--	--	74	20	167	--	150	4	140	248	--	4.8	--	797	1.08	11940	265	136	4.5	1270	8.3
July 1-3	3003	--	--	98	23	228	--	210	0	203	320	--	2.0	--	1020	1.39	8270	340	168	5.4	1630	8.1
July 4-8	10730	--	--	54	13	111	--	126	2	100	155	--	2.3	--	523	.71	15150	190	83	3.5	879	8.3
July 9-17	6039	--	--	85	24	276	--	156	4	181	415	--	2.4	--	1120	1.52	18260	310	176	6.8	1850	8.4
July 18-24	4070	--	--	75	21	197	--	166	0	144	295	--	2.5	--	875	1.19	9620	275	139	5.2	1440	8.0
July 25-28	6115	--	--	62	15	162	--	144	0	110	235	--	4.2	--	707	.96	11670	215	97	4.8	1170	7.8
July 29-30	4550	--	--	77	19	269	--	154	0	143	410	--	1.4	--	1050	1.43	12900	270	144	7.1	1760	8.1
July 31	4780	--	--	61	12	132	--	158	0	79	195	--	.8	--	606	.82	7820	200	70	4.1	1020	8.2
Aug. 1-5	4850	--	--	66	24	145	--	148	0	107	245	--	3.3	--	726	.99	9510	265	144	3.9	1220	8.1
Aug. 6-10	2536	--	--	91	31	223	--	202	0	153	365	--	1.3	--	1020	1.39	6980	355	190	5.2	1720	8.2
Aug. 11-14	6012	--	--	52	12	91	--	132	0	62	144	--	3.7	--	478	.65	7760	180	72	3.0	801	7.9

a Calculated from determined constituents.

ARKANSAS RIVER BASIN--Continued

7-1525. ARKANSAS RIVER AT RALSTON, OKLA.--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Aug. 15, 1960.....	3100	--	--	62	26	148	--	160	0	92	250	--	3.8	--	715	0.97	5980	260	129	4.0	1230	8.0
Aug. 16-20.....	2336	--	--	85	26	264	--	178	0	155	415	--	1.7	--	1100	1.50	6940	320	174	6.4	1850	8.0
Aug. 21-25.....	3684	--	--	81	21	201	--	184	0	128	312	--	3.0	--	896	1.22	8910	290	139	5.1	1490	8.2
Aug. 26-31.....	31370	--	--	33	11	45	--	108	0	33	71	--	2.3	--	274	.37	23210	128	40	1.7	473	7.7
Sept. 1-2.....	14300	--	--	43	6.9	100	--	98	0	59	150	--	.4	--	440	.60	16990	136	56	3.7	765	7.5
Sept. 3-5.....	6850	--	--	60	15	177	--	124	0	107	270	--	.7	--	730	.99	13500	210	108	5.3	1250	7.7
Sept. 6-11.....	3658	--	--	80	20	260	--	160	0	148	395	--	3.5	--	1040	1.41	10270	280	149	6.8	1750	8.0
Sept. 12.....	6660	--	--	66	20	153	--	162	0	98	240	--	4.2	--	715	.97	12860	245	112	4.2	1220	8.1
Sept. 13-14.....	5970	--	--	48	11	125	--	124	0	76	180	--	.5	--	531	.72	8560	164	62	4.2	916	7.8
Sept. 15-17.....	3237	--	--	70	16	180	--	160	0	110	272	--	2.6	--	774	1.05	6760	240	109	5.0	1310	8.0
Sept. 18-20.....	2283	--	--	88	22	279	--	180	0	155	430	--	.5	--	1100	1.50	6780	310	162	6.9	1880	7.9
Sept. 21-22.....	2160	--	--	86	26	282	--	172	0	163	440	--	2.3	--	1140	1.55	6650	320	179	6.9	1930	8.1
Sept. 23.....	3150	--	--	67	21	189	--	148	0	114	300	--	3.6	--	812	1.10	6910	255	134	5.1	1410	8.0
Sept. 24-27.....	2980	--	--	86	26	260	--	176	0	148	415	--	3.3	--	1080	1.47	8690	320	176	6.3	1820	8.0
Sept. 28-30.....	6190	--	--	49	13	76	--	132	0	62	118	--	3.2	--	422	.57	7050	176	68	2.5	721	7.9
Weighted average	8833	--	--	68	19	126	--	163	--	107	194	--	4.0	--	647	0.88	15430	248	114	3.5	1070	--

Analyses of additional samples

Oct. 28, 1959.....	b 6060	12	--	112	34	214		272	0	172	340	0.3	4.5	0.18	a 1020	1.39	16690	420	197	4.5	1800	7.7
Feb. 17, 1960.....	b 5650	12	0.00	106	28	235		216	0	219	340	.5	5.1	.16	1080	1.47	16480	380	203	5.2	1780	7.9
Apr. 5.....	b 9900	12	.00	90	22	126		208	0	166	172	.3	2.8	.13	730	.99	19510	315	144	3.1	1170	7.5
July 26.....	b 7600	10	.00	80	15	139		146	0	101	202	.3	2.2	.18	628	.85	12890	210	90	4.2	1070	7.6

a Calculated from determined constituents.
b Discharge at time of sampling.

ARKANSAS RIVER BASIN--Continued

7-1525. ARKANSAS RIVER AT RALSTON, OKLA.--Continued

Temperature (°F) of water, water year October 1959 to September 1960

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

ARKANSAS RIVER BASIN--Continued

7-1545. CIMARRON RIVER NEAR KENTON, OKLA.

LOCATION.--At gaging station on highway bridge, 1.5 miles upstream from Carrizo Creek, 1.7 miles northeast of Kenton, Cimarron County, and 2.2 miles downstream from Carrizozo Creek.
DRAINAGE AREA.--1,106 square miles, of which 68 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: November 1953 to September 1958, October 1959 to September 1960 (discontinued).
REMARKS.--Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 12, 1959.....	1.1			76	100	318		304	0		66							600	351	5.6	2130	8.0
Oct. 30.....	2.8			88	100	298		376	0		68							630	322	5.2	2260	8.1
Nov. 12.....	1.1			72	107	302		332	0		70							620	348	5.3	2280	7.8
Nov. 25.....	2.3			96	100	272		376	0		62							650	342	4.6	2170	7.9
Dec. 10.....	1.6			88	102	287		380	0		66							640	328	4.9	2190	8.2
Jan. 7, 1960.....	1.9			56	97	288		268	0		66							540	320	5.4	2030	8.1
Jan. 22.....	1.8			100	105	304		420	0		72							680	336	5.1	2310	8.1
Feb. 15.....	2.3			54	60	157		228	0		40							380	193	3.5	1350	8.1
Mar. 16.....	1.6			88	93	269		352	0		62							600	312	4.8	2120	8.2
Apr. 5.....	.6			72	122	370		418	0		78							680	338	6.2	2390	7.6
Apr. 19.....	.3			80	112	310		396	0		84							660	336	5.2	2560	8.2
Apr. 28.....	1.2			72	122	340		388	0		80							680	362	5.7	2530	7.7
May 19.....	.1			96	100	347		388	0		88							650	332	5.9	2660	7.9
June 14.....	3.2			83	86	247		316	0		55							560	301	4.5	1730	7.7
July 18.....	a .2			96	100	338		336	0		75							650	374	5.8	2460	8.1
Sept. 13.....	3.0			72	43	142		246	0	397	34		0.0		852	1.16	6.90	355	154	3.3	1210	8.0

a Daily mean discharge.

7-1570. CIMARRON RIVER NEAR MOCANE, OKLA.

LOCATION.--At gaging station on county highway bridge, 6.5 miles northeast of Mocane, Beaver County, and 14.7 miles upstream from Crooked Creek.
DRAINAGE AREA.--8,670 square miles, of which 4,365 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: October 1946 to September 1948, October 1952 to September 1960.
Water temperatures: October 1946 to September 1948.
REMARKS.--Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 13, 1959	68.8	--		88	34	372		232	0	--	550	--	--	--	--	--	--	358	168	8.5	2340	8.1
Oct. 19	55.1	--		81	36	362		266	0	--	540	--	--	--	--	--	--	350	132	8.4	2280	8.1
Oct. 27:																						
At 0930	45	20		78	44	322		232	0	168	500	0.9	2.6	0.32	a 1250	1.70	15.2	375	185	7.2	2220	7.3
At 1155	45.4	--		76	38	358		228	0	--	490	--	--	--	--	--	--	344	157	8.4	2180	8.1
Nov. 3	72.2	--		77	37	378		222	0	--	550	--	--	--	--	--	--	346	164	8.9	2330	8.1
Nov. 9	78.0	--		86	38	404		248	0	--	570	--	--	--	--	--	--	370	167	9.1	2350	8.0
Nov. 18	70.3	--		95	41	386		270	0	--	560	--	--	--	--	--	--	404	182	8.3	2480	8.1
Nov. 23	65.3	--		88	38	292		260	0	--	480	--	--	--	--	--	--	374	161	6.6	2200	8.0
Nov. 30	77.8	--		66	49	304		246	0	--	490	--	--	--	--	--	--	364	162	6.9	2150	8.1
Dec. 7	78.6	--		73	47	354		264	0	--	510	--	--	--	--	--	--	376	160	8.0	2230	7.9
Dec. 28	92.9	--		95	50	432		286	0	--	640	--	--	--	--	--	--	444	210	8.9	2750	8.0
Jan. 11, 1960	87.0	--		96	29	321		268	0	--	510	--	--	--	--	--	--	360	140	7.4	2310	8.1
Jan. 25	120	--		84	49	357		224	0	--	560	--	--	--	--	--	--	410	226	7.7	2420	8.2
Feb. 1	80.4	--		83	40	336		252	0	--	520	--	--	--	--	--	--	370	164	7.6	2280	8.1
Feb. 9	110	--		96	56	365		256	0	--	560	--	--	--	--	--	--	470	260	7.3	2450	8.1
Feb. 17	87.5	--		56	22	187		168	0	--	275	--	--	--	--	--	--	230	92	5.4	1280	8.0
Mar. 7	268	--		96	34	383		268	0	--	590	--	--	--	--	--	--	380	160	6.9	2520	8.1
Mar. 22	75.7	--		78	40	349		256	0	--	520	--	--	--	--	--	--	360	150	8.0	2160	8.0
Mar. 31	65.1	--		64	49	357		232	0	--	500	--	--	--	--	--	--	360	170	8.2	2280	7.3
Apr. 6	60.7	--		72	39	350		204	0	--	540	--	--	--	--	--	--	340	173	8.2	2300	8.0
Apr. 15	99.1	--		77	36	273		244	0	--	400	--	--	--	--	--	--	340	140	6.4	1990	7.9
Apr. 20	56.7	--		85	38	397		240	0	--	590	--	--	--	--	--	--	370	174	9.0	2370	7.9
Apr. 26	57.4	--		77	34	355		216	0	--	530	--	--	--	--	--	--	330	153	8.5	2280	7.8
May 3	61.7	--		52	44	345		204	0	--	540	--	--	--	--	--	--	310	143	8.5	2280	7.4
May 24	45.8	--		66	43	376		184	0	--	570	--	--	--	--	--	--	340	189	8.9	2160	7.8

a Calculated from determined constituents.

ARKANSAS RIVER BASIN--Continued

7-1570. CIMARRON RIVER NEAR MOCANE, OKLA.--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
June 7, 1960.....	127	--		72	29	229		240	0	--	325	--	--	--	--	--	--	300	104	5.7	1640	8.0
June 22.....	44.6	--		80	27	390		200	0	--	550	--	--	--	--	--	--	310	146	9.6	2340	8.0
June 27.....	36.3	--		67	35	395		188	0	--	670	--	--	--	--	--	--	310	156	9.8	2360	7.5
July 20.....	37.2	--		66	38	387		192	0	--	610	--	--	--	--	--	--	320	162	9.4	2430	7.5
July 26.....	28.3	24	0.00	70	39	425		188	0	178	650	0.9	0.6	0.14	1500	2.04	115	335	181	10	2570	7.2
Aug. 3.....	13.2	--		75	40	509		178	0	209	775	--	.0	--	1830	2.49	65.2	350	204	12	3040	7.9
Sept. 8.....	7.2	--		78	40	529		190	0	198	815	--	.0	--	1940	2.64	37.7	360	204	12	3180	7.9
Sept. 14.....	20.0	--		70	38	449		184	0	176	690	--	.0	--	1630	2.22	88.0	330	179	11	2760	7.9
Sept. 29.....	52.6	--		75	35	397		196	0	165	610	--	.5	--	1490	2.03	212	330	170	9.5	2510	7.9

7-1579.5. CIMARRON RIVER NEAR BUFFALO, OKLA.

LOCATION.--At bridge on U.S. Highway 64, 17 miles east of Buffalo, Harper County.
DRAINAGE AREA.--11,930 square miles, of which 4,813 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: October 1959 to September 1960.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 27, 1959	--	7.5	--	172	37	1220		248	0	337	1900	0.7	1.3	0.24	a 3800	5.17		580	377	22	6390	7.7
Feb. 16, 1960	--	17	0.00	146	67	1980		260	0	352	3100	.7	1.7	.17	5820	7.92		640	427	34	9890	7.9
Apr. 4	--	16	.00	114	34	499		240	0	230	760	.7	.2	.16	1870	2.54		425	228	11	3070	7.7
June 1-5	--	--	--	108	28	401		208	0	251	585	--	.8	--	1570	2.14		385	214	8.9	2560	7.7
June 3	46.3	--	--	64	56	224		200	0	--	340	--	--	--	--	--		390	226	4.9	1770	8.1
June 6	--	--	--	244	91	9960		193	0	588	15500	--	--	--	26600	36.2		983	825	138	39800	8.1
June 7-8	--	--	--	116	33	1380		202	0	290	2100	--	--	--	4080	5.55		425	260	29	7020	7.8
June 9-10	--	--	--	64	17	718		124	0	133	1100	--	--	--	2180	2.96		230	128	21	3750	8.1
June 11	--	--	--	62	17	367		144	0	164	520	--	.8	--	1220	1.66		225	107	11	2060	8.1
June 12	--	--	--	130	35	1290		164	0	308	2000	--	--	--	3970	5.40		470	336	26	6590	8.2
June 13-20	--	--	--	96	33	407		184	8	225	610	--	1.0	--	1580	2.15		375	210	9.1	2520	8.5
June 21-27	--	--	--	124	45	727		184	6	350	1100	--	--	--	2540	3.45		495	334	14	4100	8.4
June 28-30	--	--	--	261	74	2730		159	0	690	4280	--	--	--	8360	11.4		956	826	38	13100	8.2
June 30	2.6	--	--	146	67	--		188	0	--	1950	--	--	--	--	--		640	486	--	6430	8.0
July 1-2	--	--	--	397	90	4050		199	0	875	6450	--	--	--	12400	16.9		1360	1200	48	19200	7.7
July 3-4	--	--	--	293	95	13800		113	0	707	21500	--	--	--	37200	50.6		1120	1030	179	54100	7.4
July 5	--	--	--	54	16	332		128	0	92	510	--	1.1	--	1100	1.50		200	95	10	1980	7.6
July 6-7	--	--	--	78	28	431		156	0	179	660	--	1.0	--	1530	2.08		310	182	11	2650	7.6
July 8-9	--	--	--	144	51	3130		181	0	314	4890	--	--	--	8860	12.0		568	420	57	14600	7.6
July 10-13	--	--	--	106	48	802		198	0	267	1250	--	--	--	2660	3.62		460	298	16	4520	8.2
July 14-16	--	--	--	180	61	1850		182	0	458	2900	--	--	--	5750	7.82		700	551	30	9380	7.8
July 17-18	--	--	--	283	91	3450		157	0	703	5470	--	--	--	10400	14.1		1080	952	46	16300	7.7
July 20	.1	--	--	426	111	--		158	0	--	12300	--	--	--	--	--		1520	1390	--	32400	7.6
July 26	--	21	.00	401	87	4650		133	0	1000	7320	.5	--	.04	14000	19.0		1360	1250	55	21600	7.2
Aug. 19	66.5	--	--	82	13	337		216	0	72	525	--	.1	--	1200	1.63	215	260	83	9.1	2110	7.5

a Calculated from determined constituents.

314-277 O - 68 - 7

ARKANSAS RIVER BASIN--Continued

7-1580. CIMARRON RIVER NEAR WAYNOKA, OKLA.

LOCATION.--At gaging station at bridge on U.S. Highway 281, 0.8 mile downstream from Main Creek and 5 miles south of Waynoka, Woods County.
DRAINAGE AREA.--13,334 square miles, of which 4,830 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: September 1951 to August 1958, October 1959 to September 1960.
REMARKS.--Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 9, 1959.....	305	--	--	247	63	--		203	0	--	5670	--		--	--	--	--	875	708	--	16200	7.6
Jan. 12, 1960.....	293	--	--	183	63	--		215	0	--	4380	--		--	--	--	--	717	541	--	13200	7.7
Feb. 2.....	297	--	--	159	92	--		239	0	--	4480	--		--	--	--	--	776	580	--	13200	7.5
Feb. 16.....	a 394	12	0.00	358	84	3340		257	0	900	5220	0.4		0.30	10200	13.9	10850	1240	1030	41	16100	8.1
Feb. 18.....	351	--	--	318	92	--		219	0	--	5170	--		--	--	--	--	1170	990	--	15900	7.6
Mar. 9.....	682	--	--	318	111	--		211	0	--	7150	--		--	--	--	--	1250	1080	--	19000	7.6
Mar. 23.....	390	--	--	271	84	--		227	0	--	3490	--		--	--	--	--	1020	834	--	10900	7.4
Apr. 4.....	206	14	.00	263	78	1940		223	0	759	2990	.6	1.2	.26	6420	8.73	3570	977	794	27	10100	7.5
Apr. 7.....	141	--	--	295	79	--		195	0	--	3590	--		--	--	--	--	1060	900	--	11800	7.6
Apr. 21.....	144	--	--	295	96	--		195	0	--	4480	--		--	--	--	--	1130	970	--	13300	7.5
May 5.....	1300	--	--	312	49	--		236	0	--	3100	--		--	--	--	--	980	786	--	10100	7.2
May 26.....	247	--	--	315	86	--		193	0	--	11800	--		--	--	--	--	1140	982	--	27400	7.2
June 3.....	135	--	--	278	68	--		191	0	--	4570	--		--	--	--	--	974	818	--	13800	7.5
June 9.....	9260	--	--	168	39	--		248	0	--	3000	--		--	--	--	--	579	376	--	10300	7.5
June 16.....	409	--	--	248	59	--		188	0	--	2500	--		--	--	--	--	860	706	--	9040	7.5
June 29.....	34.5	--	--	352	54	178		168	0	--	240	--		--	--	--	--	1100	962	--	2190	7.5
July 21.....	48.6	--	--	437	87	--		131	0	--	5470	--		--	--	--	--	1450	1340	--	16600	7.4
July 27.....	39.1	12	.00	476	127	6110		147	0	1370	9540	.3		.46	18000	24.5	1900	1710	1590	64	27200	7.2
Aug. 4.....	7.6	--	--	454	133	7100		126	0	1300	11100	--		--	21000	28.6	431	1680	1580	75	31000	7.8
Aug. 19.....	1540	--	--	208	29	1260		198	0	441	1950	--		--	4200	5.71	17460	640	478	22	7040	7.6
Aug. 24.....	58.3	--	--	381	75	3910		157	0	971	6110	--		--	12100	16.5	1900	1260	1130	48	18400	7.7
Sept. 15.....	32.6	--	--	494	109	6920		138	0	1330	10800	--		--	20800	28.3	1830	1680	1570	73	30800	7.8

a Daily mean discharge.

7-1600. CIMARRON RIVER NEAR GUTHRIE, OKLA.

LOCATION.--At gaging station, 125 feet upstream from The Atchison, Topeka and Santa Fe Railroad Co. bridge, 1.2 miles downstream from Cottonwood Creek, 2.5 miles north of Guthrie, Logan County, and 6.5 miles upstream from Skeleton Creek (Ephraim Creek).
DRAINAGE AREA.--16,892 square miles, of which 4,926 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: November 1953 to September 1957, September 1958 to September 1960.
REMARKS.--Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 29, 1959.....	503	--	--	172	70	--		76	0	--	3400	--	--	--	--	--	--	718	656	--	10900	8.0
Nov. 9.....	563	--	--	168	68	--		104	0	--	3400	--	--	--	--	--	--	699	614	--	11100	7.9
Dec. 1.....	383	--	--	152	68	--		88	0	--	3100	--	--	--	--	--	--	659	587	--	10200	8.1
Dec. 21.....	1070	--	--	164	46	--		176	0	--	2200	--	--	--	--	--	--	600	456	--	7280	8.2
Jan. 11, 1960.....	640	--	--	144	68	--		92	0	--	3100	--	--	--	--	--	--	640	564	--	9770	8.0
Feb. 17.....	1160	10	0.00	272	73	1640		290	4	734	2500	0.4	3.8	0.24	5400	7.34	16910	980	732	23	8060	8.3
Mar. 25.....	1070	--	--	208	78	--		9	0	--	2700	--	--	--	--	--	--	840	762	--	9140	8.0
Apr. 5.....	792	11	.00	299	84	1980		263	0	855	3040	.5	1.2	.37	6590	8.96	14090	1090	874	26	10300	7.3
Apr. 12.....	599	--	--	232	88	--		136	0	--	2500	--	--	--	--	--	--	940	828	--	9900	8.0
May 6.....	2280	--	--	172	61	--		188	12	--	1800	--	--	--	--	--	--	680	506	--	6660	8.4
May 10.....	935	--	--	240	63	--		164	6	--	3190	--	--	--	--	--	--	858	714	--	10600	8.3
May 31.....	7000	--	--	66	13	142		104	0	--	190	--	--	--	--	--	--	220	135	--	1110	8.1
June 9.....	11700	--	--	152	49	850		116	0	--	1300	--	--	--	--	--	--	580	485	--	4430	8.1
July 13.....	914	--	--	200	29	768		136	0	--	1200	--	--	--	--	--	--	620	508	--	4430	7.9
July 25.....	4350	10	.00	46	16	147		108	0	95	220	.3	2.0	.15	611	.83	7180	180	92	4.8	1080	7.3

7-1610. CIMARRON RIVER AT PERKINS, OKLA.

LOCATION.--At gaging station at bridge on State Highway 40, 1 mile south of Perkins, Payne County, 1.5 miles upstream from Dugout Creek, and 4 miles downstream from Wildhorse Creek.
DRAINAGE AREA.--17,852 square miles, of which 4,926 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: October 1952 to September 1960.
Water temperatures: October 1952 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 7,120 ppm Feb. 1-4; minimum, 301 ppm July 6.
Hardness: Maximum, 920 ppm Apr. 6-10, 21-22; minimum, 120 ppm July 6.
Specific conductance: Maximum daily, 12,500 micromhos Jan. 4; minimum daily, 557 micromhos July 6.
Water temperatures: Maximum, 84°F July 13, 26, 29, Aug. 5; minimum, freezing point on several days during January to March.
EXTREMES, 1952-60.--Dissolved solids: Maximum, 20,500 ppm Feb. 18, 20, 1955; minimum, 277 ppm May 17, 1957.
Hardness: Maximum, 1,880 ppm Aug. 27-29, 1954; minimum, 92 ppm May 20, 1955.
Specific conductance: Maximum daily, 32,400 micromhos Mar. 18, 1957; minimum daily, 438 micromhos Oct. 5, 1955.
Water temperatures: Maximum, 88°F Oct. 1, 1954; minimum, freezing point on many days during winter months.
REMARKS.--Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1, 1959.....	2860	--	--	97	27	792	--	128	0	201	1250	--	--	--	2440	3.32	18840	355	250	18	4340	7.3
Oct. 2.....	52400	--	--	44	13	190	--	104	0	53	310	--	0.8	--	721	.98	102000	165	80	6.4	1310	7.4
Oct. 3-10.....	33730	--	--	50	15	190	--	112	0	79	300	--	2.3	--	737	1.00	67120	185	93	6.1	1350	7.6
Oct. 11.....	2290	--	--	118	33	691	--	180	0	225	1100	--	--	--	2290	3.11	14160	430	282	14	3940	7.8
Oct. 12-17.....	2140	--	--	154	54	996	--	246	0	301	1600	--	--	--	3280	4.46	18950	605	404	18	5640	7.4
Oct. 18-20.....	1820	--	--	200	66	1450	--	232	0	466	2300	--	--	--	4760	6.47	23390	770	580	23	8030	7.9
Oct. 21-31.....	929	--	--	204	63	1390	--	310	0	422	2200	--	--	--	4530	6.16	11360	770	516	22	7620	7.9
Nov. 1-10.....	752	14	0.00	172	59	1680	--	220	0	388	2650	0.0	--	0.01	5160	7.02	10480	670	490	28	8890	8.0
Nov. 11-20.....	607	--	--	214	75	1940	--	309	0	492	3040	--	--	--	6060	8.24	9930	843	590	29	10100	8.0
Nov. 21-30.....	525	2.0	.00	224	54	1860	--	224	0	270	3100	.0	--	.01	5910	8.04	8380	780	596	29	9890	8.0
Dec. 1-10.....	468	--	--	216	76	1820	--	330	0	504	2850	--	--	--	5760	7.83	7280	850	580	27	9580	8.0
Dec. 11-17.....	503	--	--	212	76	1900	--	326	0	527	2950	--	--	--	5950	8.09	8080	840	573	29	9780	8.1
Dec. 18.....	3970	--	--	107	41	840	--	200	8	240	1300	--	--	--	2690	3.66	28830	435	258	18	4570	8.4
Dec. 19.....	7590	--	--	74	23	420	--	168	0	156	630	--	5.7	--	1390	1.89	28490	280	142	11	2480	8.2
Dec. 20.....	3420	--	--	58	27	240	--	128	2	127	378	--	3.5	--	920	1.25	8500	255	146	6.5	1610	8.3
Dec. 21-26.....	1352	--	--	156	53	1290	--	224	6	389	2000	--	--	--	4100	5.58	14970	605	412	23	6980	8.3
Dec. 27-31.....	1009	--	--	180	71	1480	--	306	0	449	2300	--	--	--	4630	6.30	12610	740	489	24	7750	8.2
Jan. 1-20, 1960...	925	16	.00	196	61	1600	10	312	0	457	2480	.3	--	.33	5020	6.83	12540	740	484	26	8410	8.0
Jan. 21-31.....	716	--	--	218	77	1790	--	328	0	510	2800	--	--	--	5850	7.96	11310	860	591	27	9540	8.2
Feb. 1-4.....	700	--	--	219	80	2340	--	271	0	590	3640	--	--	--	7120	9.68	13460	876	654	34	11700	8.0

Feb. 5	5400	--	--	112	50	1430	--	158	6	363	2180	--	--	--	4360	5.93	63570	485	346	28	7380	8.4
Feb. 6-10	7620	--	--	123	32	881	--	136	0	327	1350	--	--	--	2890	3.93	59460	440	328	18	4860	8.1
Feb. 11-29	1581	17	0.00	240	59	1150	9.0	272	0	420	1900	0.4	--	0.23	4330	5.89	18480	840	617	17	6990	8.1
Mar. 1-14	1779	--	--	224	83	1370	--	310	0	646	2100	--	--	--	4740	6.45	22770	900	646	20	7800	8.0
Mar. 15-16	2595	--	--	178	67	1950	--	96	0	630	3000	--	--	--	6220	8.46	43580	720	642	32	9940	7.9
Mar. 17-20	2155	--	--	182	74	1160	--	242	0	598	1750	--	--	--	4040	5.49	23510	760	562	18	6410	8.1
Mar. 21-31	1376	--	--	256	66	1440	--	294	0	680	2200	--	--	--	5020	6.83	18650	910	669	21	7940	8.0
Apr. 1-2	1705	--	--	140	46	636	--	194	10	406	940	--	5.5	--	2400	3.26	11050	540	364	12	3860	8.5
Apr. 3-5	1157	--	--	194	65	928	--	232	6	570	1400	--	--	--	3520	4.79	11000	750	550	15	5550	8.4
Apr. 6-10	754	--	--	228	85	1420	--	268	0	650	2200	--	--	--	5020	6.83	10220	920	700	20	7720	8.0
Apr. 11-16	728	--	--	200	78	1250	--	206	6	654	1900	--	--	--	4470	6.08	8790	820	641	19	6950	8.3
Apr. 17-19	2153	--	--	98	33	536	--	148	6	258	810	--	3.8	--	1930	2.62	11220	380	248	12	3190	8.4
Apr. 20	675	--	--	180	66	1150	--	180	6	571	1750	--	--	--	4030	5.48	9520	730	572	18	6420	8.4
Apr. 21-22	732	--	--	232	83	1880	--	240	0	683	2900	--	--	--	6200	8.43	12250	920	724	27	9850	8.2
Apr. 23-30	649	--	--	176	78	1280	--	206	4	594	1950	--	--	--	4490	6.11	7870	760	584	20	7140	8.3
May 1-2	1437	--	--	86	33	415	--	162	0	228	625	--	.7	--	1550	2.11	6010	350	217	9.6	2590	8.2
May 3-5	749	--	--	172	66	1140	--	202	0	526	1750	--	--	--	3930	5.34	7950	700	534	19	6290	7.9
May 6	2910	--	--	67	23	279	--	140	6	133	425	--	5.7	--	1070	1.46	8410	260	136	7.5	1880	8.5
May 7	3590	--	--	104	44	543	--	180	14	268	825	--	9.6	--	1970	2.68	19100	440	269	11	3240	8.5
May 8-10	1757	--	--	184	49	1150	--	144	6	540	1750	--	--	--	3960	5.39	18790	660	532	19	6240	8.4
May 11-14	852	--	--	192	54	1430	--	198	10	515	2200	--	--	--	4710	6.41	10830	700	521	24	7630	8.4
May 15-18	593	--	--	158	55	1050	--	202	6	446	1600	--	--	--	3570	4.86	5720	620	444	18	5870	8.4
May 19-20	1350	--	--	114	38	794	--	160	6	319	1200	--	--	--	2590	3.52	9440	440	299	16	4250	8.4
May 21-29	1217	--	--	146	50	989	--	188	4	426	1500	--	--	--	3400	4.62	11170	570	409	18	5510	8.3
May 30-31	18750	--	--	78	17	326	--	140	0	152	500	--	.8	--	1220	1.66	61760	265	150	8.8	2120	8.2
June 1-5	3472	--	--	86	24	301	--	116	0	208	465	--	2.2	--	1220	1.66	11440	315	220	7.4	2010	7.5
June 6-9	11860	--	--	58	13	200	--	124	0	116	292	--	1.4	--	804	1.09	25750	200	98	6.2	1360	8.1
June 10-13	8322	--	--	135	30	647	--	122	0	342	1000	--	--	--	2370	3.22	53250	460	360	13	3810	8.2
June 14-15	5815	--	--	96	20	306	--	120	0	240	452	--	.0	--	1250	1.70	19630	320	222	7.4	2050	7.7
June 16-18	2147	--	--	142	29	596	--	174	0	344	900	--	1.6	--	2160	2.94	12520	475	332	12	3460	8.2
June 19-20	1500	--	--	188	51	825	--	224	0	438	1300	--	--	--	3150	4.28	12760	680	496	14	5050	7.8
June 21-30	804	--	--	176	60	1020	--	200	2	464	1600	--	--	--	3520	4.79	7640	685	518	17	5720	8.3
July 1-4	658	--	--	180	63	1330	--	198	0	528	2050	--	--	--	4360	5.93	7750	710	548	22	7050	7.9

7-1610. CIMARRON RIVER AT PERKINS, OKLA.--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
July 5, 1960	9610	--	--	49	18	158	--	130	0	77	250	--	0.0	--	630	0.86	16350	195	88	4.9	1150	8.1
July 6	8700	--	--	24	15	65	--	90	0	41	102	--	.1	--	301	.41	7070	120	46	2.6	557	8.1
July 7	6260	--	--	63	21	309	--	120	0	147	472	--	.1	--	1100	1.50	18590	245	146	8.6	1890	8.1
July 8-10	3173	--	--	156	39	805	--	118	0	424	1250	--	--	--	2870	3.90	24590	550	454	15	4650	7.3
July 11-14	2808	--	--	112	29	490	--	120	0	295	750	--	3.6	--	1740	2.37	13190	400	302	11	2860	7.6
July 15-16	1705	--	--	166	38	1060	--	164	0	393	1650	--	--	--	3490	4.75	16070	570	436	19	5710	7.9
July 17-22	1057	--	--	113	34	678	--	174	0	260	1050	--	--	--	2290	3.11	6540	420	278	14	3840	8.1
July 23	3490	--	--	80	24	483	--	128	0	181	750	--	--	--	1670	2.27	15740	300	195	12	2930	7.3
July 24	10700	--	--	57	17	239	--	130	0	94	372	--	.4	--	881	1.20	25450	210	104	7.2	1580	7.5
July 25-27	4423	--	--	42	11	122	--	112	0	70	178	--	.0	--	489	.67	5840	150	58	4.3	884	7.7
July 28-31	1621	--	--	106	33	494	--	190	0	250	750	--	.6	--	1770	2.41	7750	400	244	11	2950	7.9
Aug. 1-2	2745	--	--	40	17	124	--	120	0	70	190	--	1.2	--	542	.74	4020	170	72	4.1	914	7.5
Aug. 3-5	704	11	--	80	29	407	--	184	0	165	625	0.3	.2	--	1500	2.04	2850	320	169	9.9	2470	7.2
Aug. 6-10	344	12	--	138	58	842	--	244	0	298	1350	.3	--	--	2900	3.94	2690	585	385	15	4780	8.1
Aug. 11-14	1140	14	--	180	37	1050	--	176	0	471	1600	.3	--	--	3650	4.96	11230	600	456	19	5840	8.0
Aug. 15-17	698	16	--	224	68	1640	--	152	0	584	2600	.3	--	--	5370	7.30	10120	840	716	25	8620	7.5
Aug. 18-20	452	14	--	174	45	1270	--	212	0	435	1950	.3	--	--	4100	5.58	5000	620	446	22	6700	8.2
Aug. 21-25	1757	17	--	184	54	1150	--	152	0	486	1800	.3	--	--	4020	5.47	19070	680	556	19	6520	7.9
Aug. 26	10800	--	--	61	17	260	--	132	0	107	398	--	5.0	--	969	1.32	28260	220	112	7.6	1660	7.9
Aug. 27-31	8800	11	--	37	12	116	--	108	0	60	168	.3	3.5	--	483	.66	11480	140	52	4.3	827	7.7
Sept. 1	3230	--	--	82	23	325	--	120	0	154	530	--	.2	--	1260	1.71	10990	300	202	8.2	2150	7.5
Sept. 2-4	1313	11	--	53	15	212	--	118	0	100	320	.3	3.1	--	807	1.10	2860	195	98	6.6	1410	7.9
Sept. 5-6	575	--	--	94	24	492	--	190	0	184	750	--	.5	--	1700	2.31	2640	335	180	12	2850	7.6
Sept. 7-10	402	12	--	130	38	767	--	244	0	271	1180	.3	--	--	2610	3.55	2830	480	280	15	4300	8.1
Sept. 11-14	676	24	--	148	54	1030	--	224	0	363	1600	.3	--	--	3430	4.66	6260	590	406	18	5550	8.1
Sept. 15	618	--	--	172	42	624	--	172	0	454	950	--	3.3	--	2460	3.35	4100	600	459	11	3900	8.1
8sept. 16-20	355	18	--	208	68	1450	--	216	0	508	2300	.3	--	--	4770	6.49	4570	800	623	22	7630	8.1
Sept. 21-23	331	15	--	178	67	1330	--	228	0	445	2100	.3	--	--	4400	5.98	3930	720	533	22	7140	8.2
Sept. 24-28	493	12	--	136	46	915	--	240	0	335	1400	.3	--	--	3080	4.19	4100	530	334	17	5150	8.2
Sept. 29-30	605	--	--	180	61	1370	--	190	0	472	2150	--	--	--	4400	5.98	7190	700	544	23	7190	7.9
Weighted average	2705	--	--	104	31	595	--	158	--	236	926	--	--	--	2070	2.82	15120	387	258	13	3460	--

ARKANSAS RIVER BASIN--Continued

7-1610. CIMARRON RIVER AT PERKINS, OKLA.--Continued

Temperature (°F) of water, water year October 1959 to September 1960

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

ARKANSAS RIVER BASIN--Continued

7-1644. ARKANSAS RIVER AT SAND SPRINGS BRIDGE, NEAR TULSA, OKLA.

LOCATION.--At bridge on State Highway 33 in Sand Springs, 7 miles downstream from Cimarron River and 10 miles upstream from gaging station at Tulsa, Tulsa County.
DRAINAGE AREA.--74,615 square miles upstream from gaging station, of which 12,541 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: October 1946 to September 1960.
Water temperatures: October 1946 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 3,050 ppm Aug. 24-25; minimum, 406 ppm Oct. 3-9.
Hardness: Maximum, 600 ppm Aug. 24-25; minimum, 130 ppm Aug. 27-31.
Specific conductance: Maximum daily, 5,060 micromhos Aug. 25; minimum daily, 573 micromhos Oct. 8.
Water temperatures: Maximum 90°F July 2; minimum, freezing point on several days during January to March.
EXTREMES, 1946-60.--Dissolved solids: Maximum, 13,500 ppm Oct. 19, 1956; minimum, 232 ppm July 18-20, 1950.
Hardness: Maximum, 2,600 ppm Oct. 19, 1956; minimum, 100 ppm July 23-31, 1959.
Specific conductance: Maximum daily, 21,200 micromhos Oct. 19, 1956; minimum daily, 379 micromhos July 19, 1950, July 26, 1959.
Water temperatures: Maximum, 96°F Aug. 7, 1947; minimum, freezing point on many days during winter months.
REMARKS.--Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of discharge for gaging station at Tulsa for water year October 1959 to September 1960 given in WSP 1711. No appreciable inflow between sampling point and gaging station except during periods of heavy local runoff.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1, 1959	24900	--	--	63	17	283	--	124	0	86	460	--	0.4	--	1050	1.43	70590	225	124	8.2	1820	7.7
Oct. 2	91200	--	--	45	10	151	--	102	0	45	250	--	.6	--	593	.81	146000	155	72	5.3	1060	7.5
Oct. 3-9	175800	--	--	36	10	92	--	100	0	38	148	--	2.6	--	406	.55	192700	132	50	3.5	733	7.6
Oct. 10-13	26150	--	--	72	23	227	--	154	0	103	378	--	3.7	--	930	1.26	65660	275	149	6.0	1620	7.8
Oct. 14	24000	--	--	94	32	348	--	176	0	126	600	--	.5	--	1390	1.89	90070	365	221	7.9	2390	7.8
Oct. 15	41100	--	--	70	26	182	--	154	0	90	322	--	2.8	--	812	1.10	90110	280	154	4.7	1440	7.8
Oct. 16-19	31550	--	--	74	32	280	--	162	0	107	480	--	3.5	--	1180	1.60	100500	315	182	6.9	1960	7.8
Oct. 20-31	9713	--	--	122	40	409	--	256	0	186	675	--	4.8	--	1670	2.27	43800	470	260	8.2	2790	8.0
Nov. 1-20	6492	0.0	0.00	104	44	444	24	130	0	148	825	0.6	.8	0.02	1860	2.53	32600	440	334	9.2	3130	7.8
Nov. 21-30	4511	--	--	154	46	532	--	320	0	257	850	--	3.3	--	2090	2.84	25460	575	313	9.6	3490	8.2
Dec. 1-10	3774	--	--	156	44	554	--	312	0	272	875	--	3.2	--	2160	2.94	22010	570	314	10	3580	8.1
Dec. 11-20	6266	--	--	139	42	588	--	274	0	256	925	--	2.9	--	2160	2.94	36540	520	296	11	3620	8.0
Dec. 21	13200	--	--	72	24	364	--	168	0	135	560	--	5.6	--	1250	1.70	44550	280	142	9.5	2230	8.2
Dec. 22-23	7530	--	--	69	21	230	--	156	0	128	352	--	4.0	--	902	1.23	18340	260	132	6.2	1610	8.2
Dec. 24-27	5248	--	--	115	35	401	--	230	0	220	625	--	3.2	--	1560	2.12	22100	430	242	8.4	2690	8.2
Dec. 28-31	5440	--	--	139	40	599	--	264	6	267	925	--	3.8	--	2160	2.94	31730	510	284	12	3690	8.3
Jan. 1-31, 1960	5973	15	.01	134	39	600	5.0	248	10	257	940	.3	3.2	.19	2230	3.03	35960	495	276	12	3680	8.4
Feb. 1-5	8110	--	--	122	37	580	--	240	0	204	925	--	3.5	--	2090	2.84	45760	455	258	12	3500	8.2

Feb. 6-7.....	21400	--	--	123	45	855	--	198	12	294	1320	--	--	--	2900	3.94	167600	490	308	17	4880	8.4
Feb. 8-10.....	22500	--	--	98	28	610	--	132	0	227	950	--	3.5	--	1990	2.71	120900	360	252	14	3420	8.1
Feb. 11-29.....	9376	--	--	132	45	557	--	222	0	261	900	--	5.0	--	2150	2.92	54430	515	333	11	3720	7.7
Mar. 1-5.....	5006	--	--	154	43	452	--	314	0	280	700	--	7.8	--	1900	2.58	25680	560	302	8.3	3040	8.0
Mar. 6-7.....	4920	--	--	86	44	541	--	90	4	311	825	--	4.9	--	1970	2.68	26170	395	314	12	3270	8.4
Mar. 8-10.....	7893	--	--	150	48	598	--	270	4	320	925	--	7.3	--	2210	3.01	47100	570	342	11	3680	8.3
Mar. 11-13.....	12500	--	--	126	39	537	--	226	14	256	825	--	4.3	--	1960	2.67	66150	475	266	11	3340	8.5
Mar. 14-15.....	13150	--	--	126	38	656	--	182	12	305	1000	--	--	--	2310	3.14	82020	470	301	13	3910	8.6
Mar. 16-17.....	17700	--	--	134	39	713	--	182	14	309	1100	--	--	--	2510	3.41	120000	495	322	14	4240	8.7
Mar. 18-20.....	18070	--	--	104	32	494	--	178	6	236	750	--	5.5	--	a 1710	2.33	83430	390	234	11	3060	8.5
Mar. 21-31.....	21100	--	--	93	26	313	--	162	0	204	475	--	5.9	--	1260	1.71	71780	340	207	7.4	2140	7.8
Apr. 1-2.....	20150	--	--	82	24	248	--	156	0	185	368	--	5.5	--	1060	1.44	57670	305	177	6.2	1740	8.1
Apr. 3.....	18600	--	--	99	31	399	--	160	0	254	600	--	.1	--	1520	2.07	76330	375	244	8.9	1520	8.0
Apr. 4-7.....	14280	--	--	100	33	258	--	198	0	226	385	--	4.8	--	1180	1.60	45500	385	222	5.7	1910	8.2
Apr. 8-10.....	9753	--	--	126	37	359	--	238	0	295	525	--	3.9	--	1580	2.15	41610	465	270	7.2	2490	8.2
Apr. 11-13.....	8143	--	--	130	38	371	--	240	0	297	550	--	5.8	--	1600	2.18	35180	480	284	7.4	2520	8.2
Apr. 14-22.....	12560	--	--	97	29	301	--	186	0	216	450	--	2.9	--	1270	1.73	43070	360	208	6.9	2090	8.0
Apr. 23-30.....	7478	--	--	119	37	398	--	230	0	268	600	--	1.9	--	1640	2.23	33110	450	262	8.2	2640	8.2
May 1-2.....	6540	--	--	99	42	340	--	184	0	277	510	--	.5	--	1400	1.90	24720	420	269	7.2	2270	8.2
May 3.....	7620	--	--	131	52	666	--	212	0	389	1000	--	--	--	2450	3.33	50410	540	366	12	3850	8.0
May 4-6.....	14080	--	--	86	33	258	--	174	6	197	390	--	3.0	--	1150	1.56	43720	350	198	6.0	1830	8.5
May 7-9.....	20600	--	--	67	20	207	--	156	6	117	310	--	3.5	--	836	1.14	46500	250	112	5.7	836	8.5
May 10-14.....	14540	--	--	88	22	348	--	136	8	190	525	--	3.5	--	1310	1.78	51430	310	185	8.6	2160	8.5
May 15-16.....	8180	--	--	106	37	429	--	196	0	226	675	--	.5	--	1640	2.23	36220	415	254	9.2	2730	7.7
May 17-19.....	10100	--	--	75	23	226	--	154	6	128	355	--	2.9	--	939	1.28	25610	280	144	5.9	1580	8.4
May 20-21.....	17500	--	--	38	15	101	--	116	0	52	160	--	.5	--	457	.62	21590	156	61	3.5	786	7.7
May 22-23.....	8760	--	--	74	29	259	--	188	0	138	405	--	.4	--	1060	1.44	25070	305	151	6.5	1770	7.7
May 24-27.....	6285	--	--	100	38	367	--	196	0	228	570	--	1.8	--	1480	2.01	25110	405	244	7.9	2440	8.2
May 28-30.....	15900	--	--	68	20	216	--	148	0	107	345	--	.4	--	906	1.23	38890	250	128	5.9	1490	8.2
May 31.....	36500	--	--	78	28	376	--	158	4	173	575	--	.4	--	1400	1.90	138000	310	174	9.3	2290	8.4

a Calculated from determined constituents.

ARKANSAS RIVER BASIN--Continued

7-1644. ARKANSAS RIVER AT SAND SPRINGS BRIDGE, NEAR TULSA, OKLA.--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
June 1, 1960.....	30500	--	--	58	15	232	--	128	0	121	338	--	2.6	--	884	1.20	72800	205	100	7.0	1480	8.2
June 2-3.....	20900	--	--	51	14	130	--	118	0	99	190	--	.8	--	602	.82	33970	185	88	4.2	989	7.9
June 4-11.....	16830	--	--	82	22	282	--	144	0	176	428	--	3.0	--	1140	1.55	51800	295	177	7.1	1870	8.0
June 12-15.....	18720	--	--	122	23	557	--	86	0	299	870	--	3.1	--	2100	2.86	106100	400	330	12	3360	8.1
June 16.....	18000	--	--	88	20	267	--	136	0	184	410	--	.7	--	1180	1.60	57350	300	188	6.7	1880	8.0
June 17-30.....	7669	--	--	96	27	328	--	168	0	209	500	--	3.5	--	1410	1.92	29200	350	212	7.6	2290	7.7
July 1-3.....	4243	--	--	98	28	340	--	174	10	210	510	--	2.9	--	1360	1.85	15580	360	201	7.8	2210	8.5
July 4-5.....	12400	--	--	50	17	166	--	102	0	84	272	--	2.4	--	725	.99	24270	195	112	5.2	1190	8.2
July 6.....	14700	--	--	74	18	265	--	130	0	117	430	--	2.0	--	1080	1.47	42870	260	154	7.2	1760	8.1
July 7-8.....	26700	--	--	38	12	101	--	114	0	48	155	--	2.3	--	453	.62	32660	145	52	3.6	771	8.1
July 9-10.....	12700	--	--	111	26	519	--	122	0	272	800	--	1.6	--	1910	2.60	65490	385	285	11	3040	8.1
July 11-12.....	13500	--	--	112	27	550	--	118	0	280	850	--	.1	--	1940	2.64	70710	390	294	12	3230	7.7
July 13.....	14000	--	--	90	24	445	--	124	0	229	675	--	.1	--	1570	2.14	59350	325	224	11	2630	8.1
July 14-18.....	7140	--	--	106	27	373	--	152	0	240	575	--	.1	--	1430	1.94	27570	375	250	8.4	2360	8.2
July 19.....	6120	--	--	119	30	654	--	170	0	254	1020	--	--	--	2220	3.02	36680	420	280	14	3720	8.2
July 20.....	8970	--	--	86	24	392	--	158	0	184	600	--	.0	--	1430	1.94	34630	315	186	9.6	2430	8.2
July 21-23.....	9460	--	--	61	18	230	--	132	0	105	360	--	.2	--	884	1.20	22580	225	117	6.7	1530	7.8
July 24-25.....	8265	--	--	78	23	388	--	150	0	157	600	--	.4	--	1380	1.88	30800	290	167	9.9	2340	7.8
July 26.....	16800	--	--	62	18	254	--	148	0	112	385	--	1.0	--	942	1.28	42730	230	108	7.3	1640	8.0
July 27-30.....	11700	--	--	45	14	119	--	124	0	69	180	--	2.2	--	513	.70	16210	170	68	4.0	897	8.2
July 31.....	8980	--	--	69	20	276	--	148	0	129	425	--	.1	--	1040	1.41	25220	255	134	7.5	1750	7.9
Aug. 1-2.....	9360	--	--	73	21	270	--	158	0	138	415	--	.1	--	1060	1.44	26790	270	140	7.2	1770	7.7
Aug. 3-10.....	7006	--	--	75	23	219	--	178	0	118	345	--	2.0	--	941	1.28	17800	280	134	5.7	1570	8.1
Aug. 11-12.....	4750	--	--	99	30	315	--	214	0	167	500	--	.4	--	1330	1.81	17060	370	194	7.1	2190	8.0
Aug. 13-20.....	5761	--	--	110	29	523	--	174	0	214	825	--	3.0	--	1860	2.53	28930	395	252	11	3080	8.1
Aug. 21-23.....	3850	--	--	108	28	456	--	182	0	197	725	--	1.4	--	1690	2.30	17570	385	236	10	2860	8.1
Aug. 24-25.....	5590	--	--	162	48	876	--	174	0	373	1400	--	--	--	3050	4.15	46030	600	458	16	5010	7.8
Aug. 26.....	6150	--	--	119	40	533	--	172	0	266	850	--	2.8	--	2000	2.72	33210	460	319	11	3320	8.0
Aug. 27-31.....	41400	--	--	37	9.1	91	--	112	0	42	135	--	2.6	--	408	.55	45610	130	38	3.5	716	7.8
Sept. 1-2.....	22500	--	--	43	11	119	--	112	0	68	175	--	.6	--	507	.69	30800	152	60	4.2	872	7.7

Sept. 3-7.....	10010	--	--	58	16	191	--	116	0	107	295	--	2.5	--	759	1.03	20510	210	115	5.7	1320	7.9
Sept. 8-10.....	5787	--	--	78	23	268	--	158	0	137	425	--	2.4	--	1060	1.44	16560	290	160	6.9	1830	8.0
Sept. 11-15.....	6180	--	--	86	23	300	--	180	0	144	470	--	2.3	--	1190	1.62	19860	310	162	7.4	2010	8.2
Sept. 16.....	6330	--	--	88	24	426	--	176	0	163	660	--	3.9	--	1520	2.07	25980	320	176	10	2580	8.1
Sept. 17-19.....	4350	--	--	96	24	314	--	184	0	185	480	--	1.9	--	1240	1.69	14560	340	189	7.4	2090	8.0
Sept. 20-29.....	3644	--	--	106	31	461	--	188	0	206	725	--	2.6	--	1720	2.34	16920	390	236	10	2840	8.2
Sept. 30.....	7620	--	--	70	22	281	--	152	0	125	438	--	4.8	--	1080	1.47	22220	265	140	7.5	1840	8.1
Weighted average	b14020	--	--	80	24	296	--	157	--	147	467	--	2.9	--	1160	1.58	43910	298	170	7.4	1960	--

b Represents 97 percent of flow for water year .

Temperature (°F) of water, water year October 1959 to September 1960

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

ARKANSAS RIVER BASIN--Continued

7-1710. VERDIGRIS RIVER NEAR LENAPAH, OKLA.

LOCATION.--At gaging station on county highway bridge, 2.8 miles east of Lenapah, Nowata County, and 4.5 miles upstream from Cedar Creek.
DRAINAGE AREA.--3,639 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1951 to September 1960.
Water temperatures: October 1951 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 548 ppm Nov. 21-30; minimum, 169 ppm Oct. 2-10.
Hardness: Maximum, 370 ppm Nov. 21-30; minimum, 88 ppm Aug. 28-31.
Specific conductance: Maximum daily, 1,110 micromhos Jan. 3; minimum daily, 176 micromhos Oct. 7.
Water temperatures: Maximum, 89°F Aug. 7; minimum 35°F Jan. 7, Feb. 15, Mar. 10.
EXTREMES, 1951-60.--Dissolved solids: Maximum, 937 ppm Feb. 25-28, 1956; minimum, 114 ppm July 14-20, 1959.
Hardness: Maximum, 370 ppm Nov. 21-30, 1959; minimum, 48 ppm Oct. 3-4, 1955.
Specific conductance: Maximum daily, 1,620 micromhos Feb. 27, 1957; minimum daily, 134 micromhos Oct. 3, 1955.
Water temperatures: Maximum, 94°F July 22, Aug. 15, 1957; minimum, freezing point on several days during winter months.
REMARKS.--Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1, 1959.....	1100	--	--	59	19	36	--	162	0	29	100	--	0.2	--	363	0.49	1080	225	92	1.1	603	8.1
Oct. 2-10.....	20850	--	--	31	4.0	14	--	92	0	17	21	--	4.0	--	169	.23	9510	94	18	.6	247	8.0
Oct. 11-20.....	12960	--	--	46	10	21	--	146	0	22	40	--	2.5	--	246	.33	8610	156	36	.7	393	8.0
Oct. 21-31.....	972	--	--	88	15	36	--	268	0	41	66	--	2.9	--	422	.57	1110	280	60	.9	683	7.9
Nov. 1-10.....	1022	15	0.00	68	12	60	2.8	154	0	68	105	0.0	7.7	0.03	452	.61	1250	218	92	1.8	817	8.0
Nov. 11-20.....	542	--	--	102	23	39	--	296	4	47	95	--	3.3	--	517	.70	757	350	101	.9	839	8.4
Nov. 21-30.....	395	--	--	110	23	47	--	326	0	53	105	--	3.1	--	548	.75	584	370	103	1.1	907	7.9
Dec. 1-10.....	302	--	--	88	21	55	--	262	0	56	105	--	4.0	--	512	.70	417	305	90	1.4	839	8.2
Dec. 11-20.....	690	--	--	100	20	60	--	270	6	56	118	--	4.4	--	543	.74	1010	330	98	1.4	889	8.3
Dec. 21-31.....	876	7.8	.00	47	16	96	2.0	132	0	32	172	.6	6.0	.01	472	.64	1120	184	76	3.1	850	7.7
Jan. 1-31, 1960...	1329	11	.00	94	17	64	1.8	248	0	58	122	.2	3.5	.01	541	.74	1940	305	102	1.6	881	7.9
Feb. 1-5.....	2431	--	--	86	18	55	--	228	12	59	98	--	3.6	--	490	.67	3220	290	83	1.4	753	8.3
Feb. 6-10.....	6060	--	--	58	11	37	--	160	0	49	58	--	4.3	--	349	.47	5710	188	57	1.2	515	7.7
Feb. 11-29.....	1296	--	--	78	16	54	--	256	0	55	76	--	3.6	--	437	.59	1530	260	50	1.5	659	8.2
Mar. 1-10.....	1272	--	--	82	18	55	--	228	0	64	102	--	3.3	--	504	.69	1730	280	93	1.4	793	8.0
Mar. 11-31.....	6486	--	--	55	10	29	--	148	0	44	50	--	6.4	--	323	.44	5660	180	58	.9	490	8.0
Apr. 1-12.....	2427	14	.00	67	12	31	1.8	184	4	40	60	.2	3.9	.21	365	.50	2390	216	58	.9	568	8.3
Apr. 13-20.....	8256	--	--	46	8.5	18	--	128	0	27	38	--	3.5	--	252	.34	5620	150	45	.6	389	8.1
Apr. 21-30.....	1509	--	--	74	13	31	--	220	0	47	54	--	2.8	--	395	.54	1610	240	60	.9	592	8.2
May 1-10.....	6595	10	.00	52	9.4	25	2.4	156	0	36	44	.2	3.2	.19	290	.39	5160	168	40	.8	450	8.0

May 11-20.....	2037	--	--	59	10	27	--	172	0	35	48	--	2.4	--	345	.47	1900	188	47	.9	494	8.2
May 21-27.....	758	--	--	72	9.8	32	--	210	0	41	50	--	4.5	--	342	.47	700	220	48	.9	546	8.0
May 28-31.....	6830	--	--	51	1.2	20	--	132	0	23	28	--	3.8	--	204	.28	3760	132	24	.7	342	8.2
June 1-10.....	4160	8.8	0.00	40	5.8	22	2.5	120	0	24	30	0.2	3.3	0.18	205	.28	2300	124	26	.9	330	7.6
June 11-20.....	3312	--	--	50	12	35	--	168	0	29	58	--	3.1	--	283	.38	2530	176	38	1.1	493	8.0
June 21-30.....	491	--	--	67	11	34	--	182	8	32	62	--	3.6	--	336	.46	445	212	50	1.0	550	8.5
July 1-31.....	190	10	.00	66	17	39	2.6	212	0	40	70	.3	2.2	.43	368	.50	189	235	62	1.1	605	7.9
Aug. 1-10.....	254	--	--	58	13	41	--	186	0	32	69	--	2.2	--	332	.45	228	196	44	1.3	596	8.0
Aug. 11-20.....	173	--	--	59	11	43	--	182	0	32	73	--	1.7	--	333	.45	156	194	45	1.3	583	8.0
Aug. 21.....	127	--	--	56	9.8	45	--	178	0	29	72	--	.4	--	329	.45	113	180	34	1.5	556	8.0
Aug. 22-27.....	3192	--	--	35	5.0	22	--	108	0	14	35	--	3.1	--	181	.25	1560	108	20	.9	318	7.8
Aug. 28-31.....	1517	--	--	29	3.8	20	--	90	0	10	32	--	2.9	--	170	.23	696	88	14	.9	277	7.7
Sept. 1-10.....	418	--	--	47	7.9	36	--	146	0	22	59	--	2.3	--	252	.34	284	150	30	1.3	469	8.0
Sept. 11-30.....	57.6	--	--	54	10	46	--	164	0	27	79	--	1.3	--	312	.42	48.5	176	42	1.5	568	8.0
Weighted average	2664	--	--	52	9.4	29	--	152	--	33	49	--	3.9	--	291	0.40	2090	168	44	1.0	457	--

Temperature (°F) of water, water year October 1959 to September 1960

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

ARKANSAS RIVER BASIN--Continued

7-1747. CANEY RIVER NEAR OCHELATA, OKLA.

LOCATION.--At gaging station at bridge on U.S. Highway 75, 3.5 miles upstream from Fish Creek, 4 miles northeast of Ochelata, Washington County, and 8 miles southeast of Bartlesville.
DRAINAGE AREA.--1,753 square miles.
RECORDS AVAILABLE.--Chemical analyses: December 1959 to September 1960.
REMARKS.--Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, December 1959 to September 1960

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Dec. 9, 1959.....	107			115	24	115		228	8	44	272		7.6		864	1.18	250	385	184	2.6	1290	8.4
Jan. 13, 1960.....	414			118	21	166		188	8	45	370	0.2	5.9		a 826	1.12	923	380	212	3.7	1570	8.5
Feb. 12.....	942			65	12	47		160	8	34	92		3.1		390	.53	992	210	66	1.4	631	8.6
Mar. 14.....	3470			59	12	33		158	6	33	64		2.5		310	.42	2900	195	56	1.0	533	8.5
Apr. 7.....	426			82	15	55		192	4	44	121		3.7		491	.67	565	265	101	1.5	786	8.4
May 13.....	366			--	--	--		134	8	--	146		--		--	--	--	198	74	--	749	8.3
June 14.....	265			--	--	--		178	12	--	161		--		--	--	--	294	128	--	852	8.5
July 14.....	24			102	21	140		174	6	67	295		8.0		831	1.13	53.8	340	188	3.3	1310	8.5
Aug. 22.....	289			106	11	137		132	0	64	300		12		821	1.12	641	310	202	3.4	1280	8.2
Sept. 17.....	15			85	17	74		176	6	58	158		4.9		557	.76	22.6	280	126	1.9	882	8.4

a Calculated from determined constituents.

7-1755. CANEY RIVER NEAR RAMONA, OKLA.

LOCATION.--At gaging station at county highway bridge, 1 mile upstream from Buck Creek, 2.2 miles downstream from Double Creek, and 4.5 miles southeast of Ramona, Washington County.
DRAINAGE AREA.--1,955 square miles.
RECORDS AVAILABLE.--Chemical analyses: November 1951 to August 1953, April 1959 to September 1960 (discontinued).
REMARKS.--Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Dec. 1, 1959.....	160			110	18	96		272	0	--	205	--	--		--	--	--	350	127	2.2	1120	7.5
Dec. 9.....	121			82	16	99		164	0	43	212	0.7	5.9		a 540	0.73	176	270	136	2.6	995	8.2
Jan. 12, 1960.....	419			96	20	144		208	0	--	265	--	--		--	--	--	320	150	3.5	1190	7.4
Jan. 13.....	760			86	18	128		148	2	43	280	.3	3.6		a 634	.86	1300	290	165	3.3	1190	8.4
Feb. 12.....	977			71	13	52		170	12	35	103	--	2.5		419	.57	1100	230	70	1.5	683	8.6
Mar. 14.....	4120			58	11	29		150	8	32	57	--	3.2		296	.40	3290	190	54	.9	507	8.6
Apr. 7.....	481			66	17	49		160	0	43	116	--	2.2		433	.59	562	235	104	1.4	716	8.1
May 13.....	574			--	--	--		150	6	--	134	--	--		--	--	--	240	107	--	728	8.3
June 14.....	419			--	--	--		162	4	--	172	--	--		--	--	--	192	52	--	854	8.4
July 14.....	23			70	16	108		110	0	56	230	--	1.3		735	1.00	45.6	240	150	3.0	1010	8.2
Aug. 22.....	145			64	10	46		166	8	30	84	--	3.6		364	.50	142	202	52	1.4	595	8.5
Sept. 17.....	19			62	20	37		176	6	30	91	--	1.3		375	.51	19.2	235	81	1.0	621	8.4

a Calculated from determined constituents.

ARKANSAS RIVER BASIN--Continued

7-1775. BIRD CREEK NEAR SPERRY, OKLA.

LOCATION.--At gaging station at highway bridge, 1.5 miles (revised) upstream from Delaware Creek, 2.4 miles downstream from Hominy Creek, and 2.5 miles southeast of Sperry, Tulsa County.
DRAINAGE AREA.--905 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1951 to September 1953, December 1959 to August 1960 (discontinued).
Water temperatures: October 1951 to September 1953.
REMARKS.--Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, December 1959 to August 1960

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Dec. 9, 1959.....	41			71	40	156		140	0	42	368		2.5		885	1.20	98.0	340	226	3.7	1460	8.1
Jan. 13, 1960.....	574			56	12	56		136	6	30	110	0.3	2.8		a 340	.46	527	190	68	1.8	636	8.4
Feb. 12.....	245			61	17	46		144	6	31	115		1.8		394	.54	261	220	92	1.4	671	8.6
Mar. 14.....	666			38	9.7	33		100	2	29	64		2.4		245	.33	440	135	50	1.2	437	8.3
Apr. 7.....	192			67	17	54		180	2	35	116		1.0		429	.58	222	235	84	1.5	723	8.3
May 13.....	155			--	--	--		154	6	--	172		--		--	--	--	226	90	--	830	8.5
June 14.....	178			--	--	--		146	2	--	100		--		--	--	--	170	47	--	572	8.4
July 14.....	18			80	20	137		166	8	18	290		1.8		788	1.07	38.3	280	130	3.6	1210	8.5
Aug. 17.....	10			91	27	233		162	4	20	485		1.0		1090	1.48	29.4	340	200	5.5	1800	8.3
Aug. 22.....	178			90	31	262		134	0	19	560		.8		1380	1.88	663	350	240	6.1	2020	8.2

a Calculated from determined constituents.

7-1786. VERDIGRIS RIVER NEAR INOLA, OKLA.

LOCATION.--At gaging station at bridge on State Highway 33, 6 miles downstream from Dog Creek and 6 miles west of Inola, Rogers County.
DRAINAGE AREA.--7,911 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1960.
Water temperatures: October 1950 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 683 ppm Aug. 12-15; minimum, 169 ppm Oct. 1-20.
Hardness: Maximum, 390 ppm Dec. 11-17; minimum, 98 ppm Oct. 1-20.
Specific conductance: Maximum daily, 1,260 micromhos Aug. 4; minimum daily, 127 micromhos Oct. 1, 2.
Water temperatures: Maximum, 87°F Aug. 2; minimum, freezing point on many days during January and March.
EXTREMES, 1947-60.--Dissolved solids: Maximum, 3,060 ppm Sept. 21-24, 1956; minimum, 91 ppm June 22-30, July 1-2, 1948.
Hardness: Maximum, 580 ppm Sept. 21-24, 1956; minimum, 48 ppm Oct. 4, 1953.
Specific conductance: Maximum daily, 6,030 micromhos Sept. 22, 1956; minimum daily, 127 micromhos Oct. 1, 2, 1959.
Water temperatures (1950-60): Maximum, 95°F on several days during July 1954; minimum, freezing point on many days during winter months.
REMARKS.--Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1-20, 1959...	45670	--	--	30	5.6	14	--	88	0	14	28	--	3.1	--	169	0.23	20840	98	26	0.6	272	7.5
Oct. 21-31.....	7197	--	--	58	8.1	25	--	174	0	24	45	--	1.9	--	271	.37	5270	178	36	.8	465	8.1
Nov. 1-10.....	3805	15	0.00	69	13	44	0.4	150	0	42	100	0.3	5.4	0.06	430	.58	4420	224	101	1.3	778	7.8
Nov. 11-20.....	1195	--	--	105	19	65	--	262	4	57	140	--	3.6	--	574	.78	1850	340	119	1.5	937	8.3
Nov. 21-30.....	912	9.0	.00	66	11	130	1.6	140	0	27	240	.5	7.3	.00	626	.85	1540	210	96	3.9	1050	7.5
Dec. 1-10.....	684	--	--	110	23	81	--	294	0	59	170	--	5.2	--	643	.87	1190	370	129	1.8	1080	8.2
Dec. 11-17.....	685	--	--	113	26	83	--	284	0	66	188	--	5.6	--	675	.92	1250	390	158	1.8	1130	8.2
Dec. 18.....	10900	--	--	78	22	65	--	160	6	52	160	--	5.9	--	522	.71	15360	285	144	1.7	864	8.4
Dec. 19-20.....	16250	--	--	42	11	31	--	106	0	28	70	--	4.6	--	266	.36	11670	150	63	1.1	452	8.0
Dec. 21-31.....	4260	12	.01	70	18	49	2.2	176	0	43	110	.3	3.2	.14	413	.56	4750	250	106	1.3	700	8.0
Jan. 1-31, 1960...	3258	11	.01	88	15	67	3.8	212	0	56	140	.2	4.2	.05	553	.75	4860	280	106	1.7	866	8.2
Feb. 1-5.....	3548	--	--	77	13	64	--	212	0	56	106	--	3.0	--	481	.65	4610	244	70	1.8	745	8.1
Feb. 6-8.....	15800	--	--	54	9.1	37	--	156	0	41	56	--	3.8	--	336	.46	14330	172	44	1.2	493	7.7
Feb. 9-10.....	9755	--	--	67	12	49	--	152	16	49	84	--	3.5	--	421	.57	11090	216	65	1.5	611	8.6
Feb. 11-20.....	3306	--	--	75	13	59	--	160	16	65	100	--	3.3	--	471	.64	4200	240	82	1.7	699	8.4
Feb. 21-29.....	2441	--	--	93	14	64	--	224	0	59	130	--	2.0	--	555	.75	3660	290	106	1.6	851	8.2
Mar. 1-10.....	2681	10	.00	93	15	81	3.6	216	0	65	155	.2	2.6	.03	577	.78	4180	295	118	2.0	940	8.1
Mar. 11-31.....	11930	--	--	54	8.6	33	--	136	0	42	60	--	3.8	--	342	.47	11020	170	58	1.1	504	7.8
Apr. 1-10.....	4297	9.6	.00	72	12	38	2.3	190	4	44	81	.2	4.8	.07	361	.49	4190	230	68	1.1	661	8.3
Apr. 11-14.....	3562	--	--	67	12	58	--	178	0	41	108	--	3.5	--	418	.57	4020	218	72	1.7	699	7.9

ARKANSAS RIVER BASIN--Continued

7-1786. VERDIGRIS RIVER NEAR INOLA, OKLA.--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Apr. 15-20, 1960..	21790	--	--	48	9.7	31	--	136	4	34	51	--	3.3	--	284	0.39	16710	160	42	1.1	455	8.3
Apr. 21-30.....	3368	--	--	70	12	45	--	188	2	42	82	--	3.2	--	397	.54	3610	222	64	1.3	629	8.3
May 1-5.....	4954	--	--	62	13	38	--	164	6	35	76	--	2.9	--	360	.49	4820	208	64	1.1	564	8.4
May 6-8.....	33600	--	--	32	5.8	22	--	88	0	24	38	--	2.0	--	200	.27	18140	104	32	.9	313	8.2
May 9-16.....	9144	--	--	69	13	43	--	182	8	40	78	--	2.9	--	381	.52	9410	224	62	1.2	605	8.5
May 17-20.....	10910	--	--	43	6.9	27	--	114	0	32	46	--	2.9	--	239	.33	7040	136	42	1.0	395	8.2
May 21-27.....	7524	--	--	55	8.5	39	--	144	0	35	71	--	2.3	--	312	.42	6340	172	54	1.3	513	8.2
May 28-31.....	14820	--	--	35	5.0	30	--	96	0	17	54	--	2.4	--	214	.29	8560	108	30	1.3	362	7.9
June 1-10.....	7716	9.6	0.00	48	7.8	38	2.9	140	0	30	57	0.2	3.1	0.02	272	.37	5670	152	38	1.3	448	7.7
June 11-20.....	5072	--	--	61	12	41	--	146	12	32	81	--	2.8	--	381	.52	5220	200	60	1.3	583	8.4
June 21-30.....	939	--	--	75	12	55	--	178	14	37	104	--	4.5	--	458	.62	1160	238	68	1.5	700	8.5
July 1-10.....	830	10	.00	56	16	60	3.4	154	0	38	123	.3	3.0	.50	405	.55	908	205	79	1.8	713	7.9
July 11-20.....	260	--	--	75	14	78	--	184	4	40	152	--	3.6	--	509	.69	357	246	88	2.2	840	8.3
July 21-31.....	2318	--	--	47	14	41	--	124	0	32	90	--	1.9	--	345	.47	2160	174	72	1.4	566	7.4
Aug. 1-10.....	639	8.0	.00	69	15	75	2.8	170	0	55	151	.3	3.3	.43	500	.68	863	235	96	2.1	825	7.7
Aug. 11.....	1690	--	--	69	9.7	82	--	144	0	24	175	--	1.3	--	523	.71	2390	212	94	2.5	838	8.0
Aug. 12-15.....	978	--	--	78	11	127	--	164	0	20	255	--	1.3	--	683	.93	1800	240	106	3.6	1110	8.1
Aug. 16-20.....	296	--	--	53	7.8	74	--	136	0	36	124	--	1.9	--	400	.54	320	164	52	2.5	665	7.9
Aug. 21-31.....	2843	--	--	51	6.6	56	--	136	0	42	84	--	2.2	--	331	.45	2540	154	42	2.0	537	7.9
Sept. 1-10.....	725	--	--	42	4.6	43	--	116	0	25	68	--	1.8	--	263	.36	515	124	29	1.7	439	8.0
Sept. 11-20.....	117	--	--	56	9.8	91	--	144	0	47	148	--	2.4	--	456	.62	144	180	62	2.9	751	8.0
Sept. 21-30.....	107	--	--	63	9.5	113	--	164	0	47	182	--	2.2	--	537	.73	155	196	62	3.5	906	7.8
Weighted average	6764	--	--	48	8.7	32	--	131	0	30	60	--	3.2	--	287	0.39	5240	156	48	1.1	459	--

Analyses of additional samples

Oct. 27, 1959.....	8880	8.0	--	51	7.5	15		160	0	16	29	0.1	1.3	0.11	a 207	0.28	4960	158	27	0.5	375	7.6
Feb. 15, 1960.....	b 2910	8.0	0.00	74	11	50		188	0	49	92	.4	3.0	.16	397	.54	3120	230	76	1.4	657	7.9
Apr. 4.....	b 6580	9.0	.00	63	15	25		180	0	35	62	.3	1.3	.09	328	.45	5830	220	72	.7	578	7.7
July 25.....	b 2630	8.0	.00	38	9.0	40		92	0	26	82	.3	.8	.10	308	.42	2190	132	56	1.5	521	7.0

a Calculated from determined constituents.
b Discharge at time of sampling.

ARKANSAS RIVER BASIN--Continued

7-1786. VERDIGRIS RIVER NEAR INOLA, OKLA.--Continued

Temperature (°F) of water, water year October 1959 to September 1960

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

ARKANSAS RIVER BASIN--Continued

7-1786.7. VERDIGRIS RIVER NEAR OKAY, OKLA.

LOCATION.--At bridge on State Highway 16, 0.5 mile southwest of Okay, Wagoner County, and 3.6 miles upstream from mouth.
DRAINAGE AREA.--8,296 square miles.
RECORDS AVAILABLE.--Chemical analyses: November 1959 to September 1960.
REMARKS.--No discharge records available.

Chemical analyses, in parts per million, November 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Nov. 12, 1959.....				64	16	66		158	2	54	127	--	0.0		464	0.63		224	91	1.9	750	8.3
Dec. 9.....				80	19	88		188	4	70	162	0.1	5.0		a 520	.71		276	116	2.3	910	8.3
Jan. 13, 1960.....				59	11	44		140	4	30	95	.3	3.9		a 316	.43		194	73	1.4	620	8.4
Feb. 12.....				70	11	43		166	8	47	80	--	3.1		386	.52		220	70	1.3	623	8.6
Mar. 14.....				58	11	37		140	6	44	69	--	3.5		339	.46		190	66	1.2	545	8.5
Apr. 7.....				66	18	33		164	12	45	76	--	3.0		390	.53		240	86	.9	602	8.6
Apr. 13.....				--	--	--		182	8	--	72	--	--		--	--		226	64	--	596	8.5
June 14.....				--	--	--		144	2	--	55	--	--		--	--		158	36	--	444	8.4
July 14.....				39	7.9	50		104	0	23	90	--	3.0		303	.41		130	45	1.9	491	8.0
Aug. 15.....				68	11	89		134	0	32	186	--	2.4		550	.75		214	104	2.6	849	8.2
Sept. 9.....				38	9.0	24		114	0	15	51	--	3.1		228	.31		132	38	.9	374	8.2

a Calculated from determined constituents.

7-1850. NEOSHO RIVER NEAR COMMERCE, OKLA.

LOCATION.--At gaging station at highway bridge, 1.2 miles upstream from Mud Creek, 1.8 miles downstream from Four Mile Creek, and 4.5 miles west of Commerce, Ottawa County.
DRAINAGE AREA.--5,876 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1954, December 1959 to September 1960 (discontinued).
Water temperatures: November 1947 to September 1954.
REMARKS.--Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, December 1959 to September 1960

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Dec. 9, 1959.....	437			50	27	24		154	0	106	35		1.3		370	0.50	436	235	109	0.7	553	8.1
Jan. 13, 1960.....	2040			53	12	18		126	2	77	21	0.3	5.1		a 250	.34	1380	182	75	.6	439	8.3
Feb. 12.....	4120			58	13	12		156	8	57	14		6.8		281	.38	3120	200	58	.4	429	8.6
Apr. 7.....	4190			67	12	12		172	16	51	12		5.5		295	.40	3340	216	48	.4	442	8.7
May 13.....	2140			--	--	--		164	8	--	20		--		--	--	--	248	100	--	490	8.4
June 14.....	b 4500			--	--	--		162	4	--	27		--		--	--	--	214	74	--	502	8.4
July 14.....	276			51	15	25		152	2	70	30		2.0		283	.38	211	190	62	.8	456	8.3
Aug. 14.....	2110			85	22	30		190	6	143	38		2.5		456	.63	2600	304	138	.8	667	8.4
Sept. 9.....	381			47	8.9	14		116	0	58	18		4.8		237	.32	244	154	59	.5	362	8.1

a Calculated from determined constituents.
b Daily mean discharge.

ARKANSAS RIVER BASIN--Continued

7-1880. SPRING RIVER NEAR QUAPAW, OKLA.

LOCATION.--At gaging station at highway bridge, 0.1 mile upstream from Rock Creek and 3 miles southeast of Quapaw, Ottawa County.
DRAINAGE AREA.--2,510 square miles, includes that of Rock Creek.
RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1949, September 1951 to August 1952, November 1959 to September 1960 (discontinued).
Water temperatures: October 1947 to September 1949.
REMARKS.--Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, November 1959 to September 1960

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Nov. 12, 1959.....	2540			--	--	--		120	0	--	5.5	0.7	5.5		--	--	--	158	60	--	330	7.4
Dec. 9.....	1950			74	8.6	8.5		110	0	116	11	--	15		--	--	--	220	130	0.2	470	8.2
Jan. 11, 1960.....	293			63	5.6	13		136	0	--	9.4	--	--		--	--	--	180	68	.4	372	8.0
Jan. 13.....	2640			59	7.1	9.4		108	0	77	9.5	1.0	15		a 231	0.31	1650	176	88	.3	392	8.3
Feb. 12.....	1520			61	9.2	9.0		96	2	101	9.5	--	11		273	.37	1120	190	108	.3	416	8.3
Apr. 7.....	1520			60	7.4	7.1		116	4	69	8.2	--	13		240	.33	985	180	78	.2	378	8.4
Apr. 21.....	467			52	7.4	5.3		108	0	72	5.8	--	.0		202	.27	255	160	72	.2	346	7.2
May 13.....	467			--	--	--		118	0	--	6.5	--	--		--	--	--	188	92	--	389	8.2
June 14.....	516			--	--	--		72	0	--	6.0	--	--		--	--	--	158	99	--	366	7.9
July 14.....	128			--	--	--		140	0	--	10	1.7	16		--	--	--	212	98	--	435	8.1
Aug. 14.....	810			66	5.7	12		82	0	120	10	--	9.7		279	.38	610	188	121	.4	413	7.8
Sept. 9.....	590			71	5.1	--		128	0	--	--	--	10		--	--	--	198	93	--	433	8.1

a Calculated from determined constituents.

7-1890. ELK RIVER NEAR TIFF CITY, MO.

LOCATION.--At gaging station at bridge on State Highway 43, 0.8 mile downstream from Blackfoot Branch, 2.8 miles upstream from Buffalo Creek, and 3 miles southeast of Tiff City, McDonald County.
DRAINAGE AREA.--872 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1949, September 1951 to September 1953, November 1959 to September 1960 (discontinued). Water temperatures: October 1947 to September 1949.
REMARKS.--Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, November 1959 to September 1960

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Nov. 12, 1959.....	688			--	--	--		150	0	--	2.6	0.0	5.5		--	--	--	132	9	--	--	7.9
Dec. 9.....	211			50	2.2	5.3		140	6	3.7	6.2	1.4	6.5		a 150	0.20	85.4	134	10	0.2	264	8.4
Feb. 12, 1960.....	672			44	1.5	2.3		126	0	7.0	4.2	--	5.1		135	.18	245	116	12	.1	247	7.9
Mar. 14.....	1290			43	3.0	2.8		124	4	8.2	3.7	--	5.6		135	.18	470	120	12	.1	246	8.4
Apr. 7.....	401			45	1.8	5.3		130	4	8.2	4.6	--	4.5		a 137	.19	148	120	7	.2	243	8.5
Apr. 18.....	2130			--	--	--		116	0	--	2.2	.0	.4		--	--	--	106	11	--	204	7.9
May 13.....	1240			--	--	--		122	0	--	3.7	--	--		--	--	--	108	8	--	211	8.2
June 14.....	610			--	--	--		136	4	--	4.4	--	--		--	--	--	130	12	--	244	8.4
July 14.....	163			49	2.3	6.2		144	4	2.9	11	--	3.1		178	.24	78.3	132	8	.2	277	8.4
Aug. 14.....	208			32	1.9	3.2		104	0	1.6	4.8	--	1.9		128	.17	71.9	88	3	.1	184	8.2
Sept. 9.....	97			50	1.2	3.7		140	8	1.6	5.0	--	1.8		167	.23	43.7	130	2	.1	254	8.4

a Calculated from determined constituents.

ARKANSAS RIVER BASIN--Continued

7-1912. SPAVINAW CREEK NEAR ROW, OKLA.

LOCATION.--At gaging station at county highway bridge, 2.2 miles upstream from Cherokee Creek, 5 miles northeast of Row, Delaware County, and 6 miles northeast of Colcord.
DRAINAGE AREA.--127 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1959 to August 1960 (discontinued).
REMARKS.--Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, October 1959 to August 1960

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 7, 1959.....	254			35	4.0	4.8		116	0	6.2	5.2	--	7.1	--	125	0.17	85.7	104	9	0.2	225	7.8
Oct. 14.....	97			40	3.4	1.4		124	0	2.9	5.1	--	7.0	--	127	.17	33.3	114	12	.1	234	7.8
Oct. 20.....	40			45	1.8	4.2		128	0	--	6.8	--	5.9	--	--	--	--	120	15	.2	238	7.9
Nov. 6.....	258			38	2.7	1.6		114	0	3.3	5.9	--	5.2	--	142	.19	98.9	106	12	.1	217	7.6
Nov. 12.....	67			--	--	--		120	0	--	5.3	0.0	1.2	--	--	--	--	104	6	--	211	7.9
Nov. 20.....	27			39	2.6	2.3		118	0	2.5	7.0	--	5.1	--	142	.19	10.4	108	12	.1	224	7.7
Nov. 25.....	16			41	1.3	3.7		118	0	4.1	7.8	--	5.2	--	144	.20	6.22	108	12	.2	232	7.7
Dec. 4.....	3.1			--	--	--		124	0	--	--	.0	--	0.00	--	--	--	114	12	--	235	8.1
Dec. 18.....	6.4			--	--	--		126	0	--	--	.0	--	.01	--	--	--	112	8	--	235	8.2
Dec. 23.....	6.9			--	--	--		126	0	--	--	.0	--	.01	--	--	--	112	8	--	237	8.2
Dec. 31.....	27			--	--	--		126	0	--	--	.0	--	.08	--	--	--	112	8	--	236	8.1
Jan. 8, 1960.....	14			45	1.3	5.0		126	0	--	8.7	--	5.0	--	--	--	--	118	14	.2	242	7.9
Jan. 13.....	9.6			46	2.2	5.4		124	0	--	9.4	--	5.0	--	--	--	--	124	22	.2	245	7.8
Jan. 21.....	43			44	1.0	3.9		118	0	--	6.5	--	4.8	--	--	--	--	114	18	.2	227	7.8
Jan. 28.....	a 23			44	1.5	3.8		118	0	--	6.8	--	4.3	--	--	--	--	116	20	.2	227	7.6
Feb. 4.....	11			43	.6	--		120	0	--	10	.0	4.9	.11	--	--	--	110	12	--	228	7.9
Feb. 12.....	39			42	.7	--		116	0	--	11	.0	5.7	--	--	--	--	108	13	--	230	7.9
Feb. 18.....	22			42	.7	--		118	0	--	9.3	.0	4.6	--	--	--	--	108	12	--	226	7.9
Feb. 25.....	10			43	1.1	--		116	0	--	11	.0	4.9	--	--	--	--	112	17	--	233	7.8
Mar. 3.....	6.9			42	1.7	--		118	0	--	10	.0	4.4	--	--	--	--	112	16	--	233	7.8
Mar. 14.....	278			37	.4	--		98	0	--	9.0	.0	5.9	--	--	--	--	94	14	--	203	7.7
Apr. 7.....	27			38	2.2	5.1		104	4	8.2	7.3	--	5.8	--	132	.18	9.62	104	12	.2	219	8.4
May 13.....	160			--	--	--		102	0	--	5.7	--	--	--	--	--	--	96	12	--	193	8.2
June 14.....	42			--	--	--		116	0	--	13	--	--	--	--	--	--	100	5	--	230	8.2
Aug. 14.....	11			35	1.1	4.6		104	0	2.5	8.1	--	3.9	--	122	.17	3.62	92	7	.2	193	8.1

a Daily mean discharge.

7-1935. NEOSHO RIVER BELOW FORT GIBSON RESERVOIR, NEAR FORT GIBSON, OKLA.
(Formerly published as 7-1935. Neosho (Grand) River at Fort Gibson Reservoir, near Fort Gibson, Okla.)

LOCATION (revised).--At Fort Gibson Dam, 1.1 miles upstream from gaging station and 4 miles northb of Fort Gibson, Wagoner County.
DRAINAGE AREA.--12,492 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1951 to September 1960.
Water temperatures: October 1951 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 228 ppm Apr. 1 to May 31; minimum, 147 ppm Jan. 1-31.
Hardness: Maximum, 150 ppm Apr. 1-30; minimum, 98 ppm Jan. 1-31.
Specific conductance: Maximum daily, 369 micromhos Apr. 16; minimum daily, 118 micromhos Oct. 8.
Water temperatures: Maximum, 83°F Sept. 2; minimum, 35°F on several days during March.
EXTREMES, 1951-60.--Dissolved solids: Maximum, 233 ppm Nov. 1-30, 1952; minimum, 128 ppm June 1-10, 1957.
Hardness: Maximum, 171 ppm Dec. 1-31, 1952; minimum, 82 ppm June 1-10, 1957.
Specific conductance: Maximum daily, 443 micromhos Apr. 2, 1959; minimum daily, 118 micromhos Oct. 8, 1959.
Water temperatures: Maximum, 89°F July 31, Aug. 1, 1955; minimum, 34°F Dec. 21, 1951.
REMARKS.--Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of discharge for water year October 1959 to September 1960 given in WSP 1711. No appreciable inflow between sampling point and gaging station except during periods of heavy local runoff.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1-31, 1959...	34180	8.4	0.00	34	7.0	7.0	3.0	76	0	36	14	0.3	8.7	0.01	170	0.23	15690	114	52	0.3	219	7.6
Nov. 1-30.....	12050	9.0	.00	28	9.7	7.0	3.0	72	0	35	14	.2	6.6	.05	170	.23	5530	112	51	.3	215	7.5
Dec. 1-31.....	6377	9.4	.00	36	3.4	8.2	1.9	76	0	33	14	.5	7.0	.04	180	.24	3100	110	48	.4	224	7.7
Jan. 1-31, 1960...	6779	9.6	--	28	6.8	11	2.4	88	0	31	7.6	.3	4.8	.16	147	.20	2690	98	26	.5	228	7.6
Feb. 1-29.....	6481	9.5	.12	37	4.3	10	2.4	96	0	36	10	.3	5.0	.07	167	.23	2920	110	32	.4	265	7.8
Mar. 1-31.....	8877	10	.00	41	5.5	7.5	2.4	104	0	43	10	.2	5.6	.03	189	.26	4530	125	40	.3	300	7.8
Apr. 1-30.....	11790	11	.01	48	7.3	9.7	1.7	114	4	52	14	.3	5.8	.01	228	.31	7260	150	50	.3	351	8.4
May 1-31.....	18030	11	.00	42	7.1	8.5	1.8	114	0	42	12	.2	6.6	.06	228	.31	11100	134	40	.3	316	7.6
June 1-30.....	6231	10	.00	42	4.6	12	2.0	108	4	31	12	.2	5.4	.03	203	.28	3420	124	29	.5	303	8.4
July 1-31.....	4133	9.6	.00	44	5.8	13	2.1	120	0	41	12	.3	3.7	.19	203	.28	2270	134	36	.5	309	7.5
Aug. 1-31.....	5462	10	.00	40	4.9	12	2.1	112	0	36	10	.4	3.3	.09	189	.26	2790	120	28	.5	276	8.0
Sept. 1-30.....	3297	9.0	.00	43	6.9	12	2.1	120	0	40	12	.4	2.8	.13	203	.28	1810	136	38	.4	303	8.0
Weighted average	10350	9.6	0.01	38	6.6	8.7	2.4	95	--	38	12	0.3	6.5	0.05	189	0.26	5280	122	44	0.3	266	--

ARKANSAS RIVER BASIN--Continued

7-1935. *NEOSHO RIVER BELOW FORT GIBSON RESERVOIR, NEAR FORT GIBSON, OKLA.--Continued*

Temperature (°F) of water, water year October 1959 to September 1960

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

7-1945.5. ARKANSAS RIVER AT WEBBERS FALLS, OKLA.

LOCATION.--At bridge on U.S. Highway 64 at Webbers Falls, Muskogee County.
DRAINAGE AREA.--97,049 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1948 to September 1949, October 1956 to September 1960.
Water temperatures: October 1948 to September 1949, October 1956 to September 1960.
EXTREMES, 1959-60.--Specific conductance: Maximum daily, 2,360 micromhos Mar. 1; minimum daily, 303 micromhos July 25.
Water temperatures: Maximum, 85°F July 3, Sept. 5; minimum, freezing point Jan. 19.
EXTREMES, 1948-49, 1956-60.--Dissolved solids (1948-49, 1956-59): Maximum, 3,500 ppm Nov. 2-3, 1956; minimum, 139 ppm Mar. 5-6, 1959.
Hardness (1948-49, 1956-59): Maximum, 650 ppm Nov. 2-3, 1956; minimum, 60 ppm Mar. 5-6, 1959.
Specific conductance: Maximum daily, 6,070 micromhos Nov. 2, 1956; minimum daily, 174 micromhos July 21, 1959.
Water temperatures: Maximum, 88°F July 18, 1957; minimum, freezing point Jan. 20, 1949, Jan. 4, 5, 7, 1959, Jan. 19, 1960.
REMARKS.--Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. No discharge records available.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1-3, 1959....								92	0		--	0.4		0.15				144	68		855	7.8
Oct. 4-5.....								88	0		--	.5		.12				104	32		554	7.1
Oct. 6-10.....								88	0		--	.4		.24				92	20		379	7.9
Oct. 11-31.....								122	0		--	.3		.18				160	60		649	7.5
Nov. 1-10.....								152	0		--	.3		.29				208	84		957	7.5
Nov. 11-20.....								172	0		--	.3		.25				248	107		1140	8.0
Nov. 21-24.....								186	0		--	.3		.16				272	120		1330	8.1
Nov. 25-27.....								212	0		--	.3		.15				318	144		1680	8.1
Nov. 28-30.....								244	0		--	.3		.09				380	180		1980	8.1
Dec. 1-7.....								186	0		--	.3		.15				276	124		1340	8.0
Dec. 8-10.....								212	0		--	.3		.16				332	158		1780	8.1
Dec. 11-17.....								212	0		--	.3		.21				330	156		1720	8.1
Dec. 18-20.....								110	0		--	.6		.08				170	80		836	7.8
Dec. 21-24.....								156	0		--	.4		.16				256	128		1530	8.0
Dec. 25-31.....								140	0		--	.5		.13				196	82		906	7.9
Jan. 1-10, 1960...								184	0		--	.3		.14				288	137		1580	7.8
Jan. 11-12.....								188	0		--	.4		.08				304	150		1820	8.0
Jan. 13-20.....								160	0		--	.5		.13				248	117		1280	8.0
Jan. 21-30.....								180	0		--	.4		.13				272	124		1450	8.0
Feb. 1-10.....								160	0		318	.3		.26				--	--		1540	8.2
Feb. 11-20.....								144	0		328	.3		.24				--	--		1570	8.1
Feb. 21-29.....								220	0		390	.3		.28				--	--		1890	8.1
Mar. 1.....								264	0		--	--		.18				--	--		2360	8.2

ARKANSAS RIVER BASIN--Continued

7-1945.5. ARKANSAS RIVER AT WEBBERS FALLS, OKLA.--Continued

Chemical analyses, in parts per million, water year, October 1959 to September 1960--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Mar. 2-3, 1960....								184	8		340	0.3		--				--	--		1720	8.5
Mar. 10.....								186	0		--	--		0.06				--	--		1270	8.2
Mar. 11.....								200	0		--	.4		.16				--	--		1750	8.2
Mar. 12-20.....								168	0		308	.3		.27				--	--		1510	7.8
Mar. 21-31.....								154	0		238	.3		.21				--	--		1270	8.1
Apr. 1-10.....								160	0		195	.3		.20				--	--		1140	8.1
Apr. 11-20.....								162	0		190	.3		.03				--	--		1110	8.1
Apr. 21-26.....								182	0		205	.3		.26				--	--		1190	8.2
Apr. 27-29.....								234	0		345	.4		.15				--	--		1790	8.1
Apr. 30.....								--	--		--	.6		.33				--	--		852	--
May 1-6.....								136	0		170	.3		.21				--	--		927	8.2
May 7-13.....								110	0		93	.2		.15				--	--		583	8.1
May 14-19.....								130	2		170	.3		.18				--	--		899	8.3
May 20-27.....								126	0		118	.2		.18				--	--		692	8.0
May 28-31.....								156	2		245	.3		.21				--	--		1220	8.3
June 1.....								122	0		108	.2		.04				--	--		615	8.1
June 2-9.....								122	0		170	.3		.12				--	--		892	7.9
June 10.....								152	0		320	.3		.03				--	--		1490	7.8
June 11-14.....								128	0		180	.3		.11				--	--		1100	8.2
June 15-20.....								130	4		342	.3		.11				--	--		1560	8.4
June 21-30.....								166	4		320	.4		.18				--	--		1520	8.4
July 1-6.....								168	2		335	.6		.10				--	--		1610	8.3
July 7-10.....								124	0		195	.4		.07				--	--		1000	8.2
July 11-12.....								112	0		159	.4		.03				--	--		820	8.2
July 13.....								138	0		300	.3		.07				--	--		1350	8.1
July 14-22.....								152	0		455	.4		.09				--	--		1960	7.9
July 23-27.....								94	0		128	.2		.03				--	--		660	7.9
July 28.....								124	0		252	.3		.03				--	--		1140	7.9
July 29-31.....								108	0		126	.3		.03				--	--		672	7.6
Aug. 1-2.....								146	0		154	.2		.04				--	--		834	7.7
Aug. 3-10.....								156	0		228	.3		.08				--	--		1120	8.1
Aug. 11-12.....								168	0		185	.3		.04				--	--		989	7.8
Aug. 13-15.....								192	0		272	.3		.09				--	--		1330	8.2

Aug. 16-17.....								142	0		161	.3		.04					--	--		858	8.1
Aug. 18-20.....								136	0		300	.3		.08					--	--		1380	8.2
Aug. 21-29.....								144	4		352	.3		.09					--	--		1550	8.4
Aug. 30-31.....								112	0		84	.3		.04					--	--		518	7.9
Sept. 1-2.....								104	0		82	.3		.38					--	--		497	7.5
Sept. 3-10.....								118	0		182	.5		.55					--	--		915	7.5
Sept. 11-18.....								174	0		282	.5		.41					--	--		1380	7.9
Sept. 19.....								156	0		228	.5		--					--	--		1090	8.1
Sept. 20.....								158	0		352	.3		--					--	--		1560	8.1
Sept. 21-30.....								172	0		272	.3		.41					--	--		1330	8.2
Time-weighted average.....								154	1		--	0.3		0.18					--	--		1230	7.9

Analyses of additional samples

Oct. 26, 1959.....		5.0	--	58	6.7	90		136	0	56	139	0.3	0.7	0.04	a 423	0.58		172	60	3.0	776	7.4
Feb. 15, 1960.....		6.5	0.00	75	15	221		160	0	135	325	.4	.8	.14	870	1.18		250	119	6.1	1500	7.5
Apr. 4.....		12	.00	74	20	125		172	0	116	192	.3	4.4	.18	701	.95		265	124	3.3	1120	7.7
July 26.....		5.5	.00	32	9.7	63		92	0	38	100	.3	.4	.16	319	.43		120	44	2.5	549	7.2

a Calculated from determined constituents.

Temperature (°F) of water, water year October 1959 to September 1960

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

ARKANSAS RIVER BASIN--Continued

7-1955. ILLINOIS RIVER NEAR WATTS, OKLA.

LOCATION.--At gaging station at bridge on U.S. Highway 59, 1.5 miles north of Watts, Adair County, and 4.5 miles downstream from Cincinnati Creek.
DRAINAGE AREA.--635 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1955 to August 1956, October 1959 to September 1960 (discontinued).
REMARKS.--Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 7, 1959	1600			23	4.5	6.8		78	0	--	3.1	--	6.0	--	--	--	--	76	12	0.3	163	7.8
Oct. 14	634			33	3.3	7.7		106	0	--	4.3	--	7.2	--	--	--	--	96	9	.3	210	7.9
Oct. 20	339			34	4.1	7.7		112	0	--	4.7	--	5.9	--	--	--	--	102	10	.3	218	7.9
Oct. 29	208			38	4.1	7.9		126	0	--	5.1	--	4.4	--	--	--	--	112	8	.3	233	8.0
Nov. 6	1900			30	1.2	6.2		90	0	44	7.0	--	6.2	--	127	0.17	652	80	6	.3	185	7.6
Nov. 12	652			--	--	--		100	0	--	4.2	0.0	5.7	--	--	--	--	92	10	--	190	7.9
Nov. 20	368			--	--	--		114	0	--	--	.0	--	0.13	--	--	--	112	18	--	216	8.1
Nov. 25	339			--	--	--		112	0	--	--	.0	--	.12	--	--	--	114	22	--	221	8.1
Dec. 2	230			43	.1	3.2		124	0	--	7.1	--	--	--	--	--	--	108	6	.1	202	7.9
Dec. 4	208			--	--	--		118	0	--	--	.0	--	.16	--	--	--	114	18	--	224	8.1
Dec. 9	204			38	2.7	3.9		118	0	4.9	5.6	--	6.2	--	a 152	.21	83.7	106	10	.2	227	8.1
Dec. 18	399			--	--	--		122	0	--	--	.0	--	.04	--	--	--	112	12	--	229	8.2
Dec. 23	256			--	--	--		112	0	--	--	.0	--	.14	--	--	--	100	8	--	216	8.2
Dec. 31	430			--	--	--		92	0	--	--	.1	--	.11	--	--	--	92	16	--	187	8.1
Jan. 8, 1960	310			34	3.6	8.0		102	0	--	5.8	--	4.8	--	--	--	--	100	16	.4	208	7.9
Jan. 13	1310			34	4.6	7.7		102	0	--	6.6	--	4.3	--	--	--	--	104	20	.3	206	8.0
Jan. 21	529			30	4.1	8.4		90	0	--	5.5	--	3.2	--	--	--	--	92	18	.4	185	7.3
Jan. 28	368			33	4.3	7.3		100	0	--	5.0	--	5.0	--	--	--	--	100	18	.3	204	7.7
Feb. 4	275			38	1.2	--		108	0	--	8.4	.0	5.4	.06	--	--	--	100	12	--	214	7.7
Feb. 12	399			34	1.2	--		94	0	--	8.0	.1	6.3	--	--	--	--	90	13	--	197	7.8
Feb. 18	339			37	.9	--		104	0	--	8.4	.0	6.4	--	--	--	--	96	11	--	212	7.8
Mar. 3	339			38	1.7	--		108	0	--	8.0	.0	5.1	--	--	--	--	102	14	--	218	7.6
Mar. 14	1420			29	.9	--		72	0	--	6.2	.1	6.2	--	--	--	--	76	17	--	167	7.5
Apr. 7	310			35	3.0	4.6		104	2	9.1	5.7	--	4.8	--	119	.16	99.6	100	12	.2	208	8.4
May 13	b 812			--	--	--		98	0	--	4.8	--	--	--	--	--	--	92	12	--	190	8.1
June 1	620			35	.1	3.2		100	0	--	4.7	--	--	--	--	--	--	88	6	.1	182	8.0
June 14	353			--	--	--		110	0	--	7.0	--	--	--	--	--	--	94	4	--	202	8.2
July 14	140			42	.7	6.4		128	0	4.1	7.0	--	2.8	--	141	0.19	53.3	108	3	.3	226	8.2
Aug. 14	262			37	.9	6.0		116	0	2.9	5.8	--	3.5	--	126	.17	89.1	96	1	.3	204	8.1
Sept. 9	112			42	.7	5.5		126	2	2.1	6.4	--	2.6	--	139	.19	42.0	108	1	.2	225	8.3

a Calculated from determined constituents.
b Daily mean discharge.

7-1960. FLINT CREEK NEAR KANSAS, OKLA.

LOCATION.--At gaging station at bridge on State Highway 33, 6 miles southeast of Kansas, Delaware County, and 6 miles downstream from Sager Creek.
DRAINAGE AREA.--110 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1959 to September 1960 (discontinued).
REMARKS.--Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 7, 1959.....	374			25	3.8	3.0		82	0	4.5	3.7	--	10	--	98	0.13	99.0	78	11	0.1	166	7.5
Nov. 4.....	2670			16	.5	5.0		50	0	3.4	--	--	--	--	--	--	--	42	1	.3	96	7.4
Nov. 6.....	460			26	1.7	4.6		78	0	5.8	4.6	--	6.6	--	107	.15	133	72	8	.2	166	7.5
Nov. 12.....	153			28	.5	6.4		88	0	5.7	--	--	--	--	--	--	--	72	0	.3	166	7.9
Nov. 20.....	82			--	--	--		88	0	--	--	0.0	--	0.15	--	--	--	80	8	--	176	8.0
Nov. 25.....	65			29	2.3	4.8		92	0	4.1	5.0	--	7.0	--	121	.16	21.2	82	6	.2	181	7.6
Dec. 2.....	54			31	.6	5.5		86	0	--	4.8	--	--	--	--	--	--	80	10	.3	216	7.7
Dec. 4.....	62			--	--	--		94	0	--	--	.0	--	.01	--	--	--	82	5	--	183	8.0
Dec. 9.....	55			--	--	--		92	0	--	--	.0	--	.01	--	--	--	82	6	--	186	8.0
Dec. 18.....	62			--	--	--		96	0	--	--	.0	--	.01	--	--	--	84	6	--	192	8.0
Dec. 23.....	60			--	--	--		98	0	--	--	.0	--	.00	--	--	--	88	8	--	192	8.1
Dec. 31.....	82			--	--	--		94	0	--	--	.0	--	.02	--	--	--	84	7	--	187	8.1
Jan. 8, 1960.....	54			35	1.1	3.5		94	0	--	5.6	--	6.2	--	--	--	--	92	15	.2	191	7.8
Jan. 13.....	98			35	1.6	3.8		94	0	--	5.2	--	7.1	--	--	--	--	94	17	.2	190	7.7
Jan. 21.....	115			32	1.5	2.9		88	0	--	5.0	--	6.2	--	--	--	--	86	14	.1	179	7.7
Jan. 28.....	83			34	.7	2.7		94	0	--	5.1	--	4.2	--	--	--	--	88	11	.1	183	7.6
Feb. 4.....	55			33	.9	--		94	0	--	7.9	.1	5.4	.08	--	--	--	86	9	--	187	7.7
Feb. 12.....	66			34	.7	--		96	0	--	8.4	.1	6.8	--	--	--	--	88	10	--	195	7.8
Feb. 18.....	55			34	.7	--		100	0	--	10	.1	6.8	--	--	--	--	88	6	--	195	7.7
Feb. 25.....	44			34	.2	--		96	0	--	7.6	.1	6.6	--	--	--	--	86	8	--	192	7.8
Mar. 3.....	56			34	.7	--		96	0	--	8.8	.0	5.9	--	--	--	--	88	10	--	196	7.7
Mar. 14.....	310			27	1.1	--		74	0	--	6.6	.1	7.3	--	--	--	--	72	12	--	157	7.6
Apr. 7.....	124			33	.9	5.3		92	0	--	6.1	--	5.5	--	108	.15	36.2	86	10	.2	188	8.2
May 13.....	155			--	--	--		80	0	--	4.4	--	--	--	--	--	--	72	6	--	157	8.0
May 26.....	233			16	6.3	5.5		76	0	--	4.4	--	--	--	--	--	--	66	4	.3	148	6.9
June 14.....	79			--	--	--		98	0	--	6.6	--	--	--	--	--	--	84	4	--	181	8.2
July 14.....	25			35	1.1	4.1		108	0	1.2	5.2	--	5.0	--	139	.19	9.38	92	4	.2	195	8.2
Aug. 14.....	43			34	1.2	4.4		108	0	1.2	5.2	--	3.1	--	128	.17	14.9	90	2	.2	191	8.2
Sept. 9.....	20			37	.9	4.1		112	0	2.1	5.9	--	2.8	--	136	.18	7.34	96	4	.2	197	8.2

ARKANSAS RIVER BASIN--Continued

7-1965. ILLINOIS RIVER NEAR TAHLEQUAH, OKLA.

LOCATION.--At gaging station at bridge on U.S. Highway 62, 2.2 miles northeast of Tahlequah, Cherokee County, and 6.5 miles upstream from Barren Fork.
DRAINAGE AREA.--959 square miles.
RECORDS AVAILABLE.--Chemical analyses: November 1959 to September 1960 (discontinued).
REMARKS.--Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, November 1959 to September 1960

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Nov. 6, 1959	4730			25	3.3	0.2		76	0	5.8	2.8	--	4.9		109	0.15	1390	76	14	0.0	157	7.2
Nov. 20	594			30	2.2	3.4		92	0	4.1	5.1	--	5.7		117	.16	188	84	8	.2	183	7.5
Nov. 25	471			33	1.3	2.8		96	0	2.9	5.3	--	6.0		a 98	.13	125	88	10	.1	189	7.8
Dec. 4	360			33	1.8	2.8		98	0	3.7	5.2	--	4.8		120	.16	117	90	10	.1	188	7.8
Dec. 9	331			32	2.4	2.8		100	0	2.5	5.8	--	4.2		a 99	.13	88.5	90	8	.1	189	7.8
Dec. 18	455			32	2.0	3.7		96	0	5.4	6.2	--	4.5		a 101	.14	124	88	10	.2	188	7.8
Dec. 23	606			32	2.0	2.5		96	0	4.5	4.9	--	4.2		a 97	.13	159	88	10	.1	185	7.7
Dec. 31	810			32	1.5	2.5		94	0	4.5	5.1	--	3.9		114	.16	249	86	9	.1	184	7.7
Jan. 8, 1960	494			30	2.7	3.4		92	0	7.0	5.3	--	3.7		110	.15	147	86	10	.2	184	7.7
Jan. 13	675			31	2.6	2.8		94	0	6.2	5.4	--	3.6		116	.16	211	88	11	.1	188	7.7
Jan. 21	901			30	1.2	3.0		84	0	8.2	4.6	--	3.0		104	.14	253	80	11	.1	170	7.6
Jan. 28	594			30	1.7	2.3		88	0	5.8	4.4	--	3.7		104	.14	167	82	10	.1	177	7.8
Feb. 4	471			32	1.0	--		92	0	--	7.2	0.3	3.2	0.09	--	--	--	84	8	--	184	7.2
Feb. 12	600			32	1.0	--		88	0	--	6.6	.3	3.9		--	--	--	84	12	--	181	7.7
Feb. 18	471			32	1.0	--		92	0	--	9.0	.0	3.7		--	--	--	84	8	--	193	7.5
Feb. 25	396			33	1.3	--		96	0	--	8.0	.0	4.8		--	--	--	88	10	--	192	7.8
Mar. 3	396			34	2.2	--		96	0	--	7.4	.0	4.3		--	--	--	94	16	--	195	7.6
Mar. 14	2220			28	1.5	--		74	0	--	6.6	.3	5.5		--	--	--	76	16	--	165	7.4
Apr. 7	483			30	1.7	7.8		92	2	10	4.8	--	3.0		a 104	.14	136	82	3	.4	181	8.3
May 13	1700			--	--	--		88	0	--	4.6	--	--		--	--	--	96	24	--	161	8.1
June 14	582			--	--	--		96	0	--	4.5	--	--		--	--	--	84	6	--	169	8.2
July 14	226			34	.7	3.4		104	0	2.9	4.5	--	1.2		113	.15	69.0	88	3	.2	184	8.1
Aug. 14	360			23	5.5	6.2		98	0	4.1	5.0	--	1.9		112	.15	109	80	0	.3	177	8.1
Sept. 9	162			34	1.2	6.2		108	0	4.1	7.0	--	.8		127	.17	55.6	90	2	.3	199	8.1

a Calculated from determined constituents.

7-1970. BARREN FORK AT ELDON, OKLA.

LOCATION.--At gaging station at bridge on State Highway 51, 0.4 mile southeast of Eldon, Cherokee County, and 6 miles downstream from Tyner Creek.
DRAINAGE AREA.--307 square miles.
RECORDS AVAILABLE.--Chemical analyses: May 1958 to March 1960 (discontinued).
REMARKS.--Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, October 1959 to March 1960

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 7, 1959.....	920			26	2.7	4.5		80	0	--	2.0	--	3.8	--	--	--	--	76	10	0.2	160	7.8
Oct. 14.....	280			29	1.8	5.1		84	0	--	2.3	--	3.1	--	--	--	--	80	11	.2	167	7.8
Oct. 20.....	95			27	4.0	6.0		86	0	--	3.2	--	2.4	--	--	--	--	84	14	.3	168	7.9
Oct. 29.....	60			27	3.5	5.3		88	0	--	3.2	--	1.6	--	--	--	--	82	10	.3	164	7.9
Nov. 6.....	1260			26	1.7	4.8		78	0	4.9	7.4	--	3.7	--	109	0.15	371	72	8	.2	164	7.7
Nov. 12.....	332			27	1.1	4.2		80	0	--	2.6	--	--	--	--	--	--	72	6	.2	148	7.1
Nov. 20.....	156			26	3.2	--		82	0	3.7	2.8	--	3.3	--	103	.14	43.4	78	11	--	160	7.5
Nov. 25.....	114			--	--	--		86	0	--	--	0.0	--	0.00	--	--	--	76	6	--	159	8.1
Dec. 4.....	76			--	--	--		86	0	--	--	.0	--	.07	--	--	--	80	10	--	163	8.1
Dec. 9.....	76			--	--	--		86	0	--	--	.0	--	.04	--	--	--	76	6	--	160	8.0
Dec. 18.....	775			--	--	--		88	0	--	--	.1	--	.04	--	--	--	84	12	--	172	8.1
Dec. 23.....	525			--	--	--		80	0	--	--	.0	--	.05	--	--	--	76	10	--	157	8.0
Dec. 31.....	24			--	--	--		86	0	--	--	.0	--	.08	--	--	--	80	10	--	160	8.1
Jan. 8, 1960.....	161			26	3.6	3.8		84	0	--	4.3	--	2.3	--	--	--	--	80	11	.2	164	7.9
Jan. 13.....	704			26	3.6	4.5		80	0	--	3.3	--	2.9	--	--	--	--	80	14	.2	160	7.8
Jan. 21.....	310			26	2.2	3.4		76	0	--	3.6	--	1.3	--	--	--	--	74	12	.2	151	7.7
Jan. 28.....	215			27	2.1	3.8		82	0	--	3.7	--	1.6	--	--	--	--	76	9	.2	155	7.6
Feb. 4.....	161			28	1.0	--		82	0	--	4.4	.1	2.3	.11	--	--	--	74	7	--	157	7.2
Feb. 12.....	212			30	1.2	--		84	0	--	6.4	.1	2.6	--	--	--	--	80	11	--	164	7.5
Feb. 18.....	166			28	1.5	--		84	0	--	5.7	.3	3.0	--	--	--	--	76	7	--	164	7.7
Feb. 25.....	138			29	1.3	--		84	0	--	6.0	.1	3.0	--	--	--	--	78	9	--	164	7.7
Mar. 3.....	138			30	3.2	--		84	0	--	6.3	.1	3.1	--	--	--	--	88	19	--	167	7.7

ARKANSAS RIVER BASIN--Continued

7-1980. ILLINOIS RIVER NEAR GORE, OKLA.
(Formerly published as 7-1980. Illinois River at Tenkiller Reservoir, near Gore, Okla.)

LOCATION (revised).--At Tenkiller Ferry Dam, 4.3 miles upstream from gaging station and 6 miles northeast of Gore, Sequoyah County.
DRAINAGE AREA.--1,610 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1953 to September 1960.
Water temperatures: October 1953 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 125 ppm Oct. 1-31; minimum, 97 ppm Nov. 1-30.
Hardness: Maximum, 98 ppm Oct. 1-31; minimum, 70 ppm July 1-31.
Specific conductance: Maximum daily, 267 micromhos Oct. 23; minimum daily, 143 micromhos July 10, 26.
Water temperatures: Maximum, 70°F Oct. 8-10, 19, 20; minimum, 40°F Mar. 8-10, 18.
EXTREMES, 1953-60.--Dissolved solids: Maximum, 158 ppm Aug. 1-31, 1956; minimum, 97 ppm Nov. 1-30, 1959.
Hardness: Maximum, 107 ppm Sept. 1-30, 1956; minimum, 61 ppm July 1-31, 1957.
Specific conductance: Maximum daily, 396 micromhos Aug. 12, 1956; minimum daily, 123 micromhos July 14, 1957.
Water temperatures: Maximum, 75°F Sept. 28-30, Oct. 1, 2, 1958; minimum, 40°F Mar. 8-10, 18, 1960.
REMARKS.--Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of discharge for water year October 1959 to September 1960 given in WSP 1711. No appreciable inflow between sampling point and gaging station except during periods of heavy local runoff.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1-31, 1959...	2398	6.1	0.00	30	5.6	4.5	1.0	100	0	16	6.2	0.0	3.3	0.00	125	0.17	809	98	16	0.2	193	7.7
Nov. 1-30.....	2825	4.5	.00	27	2.8	4.2	1.2	92	0	5.8	3.8	.0	2.4	.02	a 97	.13	740	79	4	.2	167	7.6
Dec. 1-31.....	736	5.2	.00	28	3.9	4.2	1.2	84	0	5.4	6.6	.0	3.3	.00	a 99	.13	197	77	8	.2	167	7.5
Jan. 1-31, 1960...	1742	7.2	.04	27	2.1	6.2	.9	86	0	6.6	4.8	.1	1.9	.10	a 99	.13	466	76	6	.3	165	7.7
Feb. 1-29.....	1869	6.8	.01	28	1.5	3.4	2.0	82	0	6.8	5.0	.1	2.4	.02	109	.15	550	76	9	1.7	170	7.8
Mar. 1-31.....	1404	6.4	.00	28	1.5	1.8	1.4	88	0	6.6	6.0	.1	2.5	.01	99	.13	375	76	4	.1	170	7.7
Apr. 1-30.....	1476	6.2	.00	29	1.6	1.6	1.0	90	0	8.2	5.2	.1	2.3	.06	a 99	.13	395	79	5	.1	170	8.2
May 1-31.....	5075	5.8	.00	30	1.2	4.2	1.2	90	0	8.8	5.9	.0	2.2	.01	106	.14	1450	80	6	.2	175	7.8
June 1-30.....	1387	9.0	.01	28	1.5	2.4	1.5	84	0	9.1	5.5	.0	2.4	.12	105	.14	393	76	7	.1	166	8.0
July 1-31.....	2276	14	.00	26	1.2	5.0	1.7	82	0	6.6	4.2	.3	2.3	.18	107	.15	658	70	3	.3	150	7.6
Aug. 1-31.....	1093	13	.00	27	2.6	2.5	1.7	84	0	6.2	3.8	.2	2.0	.13	116	.16	342	78	9	.1	159	7.8
Sept. 1-30.....	785	13	.00	29	2.3	3.7	1.7	94	0	4.3	4.6	.2	3.3	.10	119	.16	252	82	5	.2	178	7.6
Weighted average	1926	7.5	0.00	28	2.2	3.9	1.3	89	0	8.1	5.2	0.1	2.4	0.05	106	0.14	551	79	6	0.2	170	--

a Calculated from determined constituents.

ARKANSAS RIVER BASIN--Continued

7-1980. ILLINOIS RIVER NEAR GORE, OKLA.--Continued

Temperature (°F) of water, water year October 1959 to September 1960

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

ARKANSAS RIVER BASIN--Continued

7-2270. CANADIAN RIVER AT LOGAN, N. MEX.

LOCATION.--At bridge on U.S. Highway 54, 1,100 feet below gaging station, 0.5 mile south of Logan, Quay County, 1.5 miles upstream from Chicago, Rock Island and Pacific Railroad Co., bridge, 4.2 miles upstream from Revuelto Creek, and 5.5 miles downstream from Ute Creek.
DRAINAGE AREA.--11,141 square miles, of which 1,110 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: July 1957 to September 1960.
Water temperatures: July 1957 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 4,540 ppm Apr. 24-25; minimum, 311 ppm July 2, 5-9.
Hardness: Maximum, 770 ppm Apr. 24-25; minimum, 128 ppm Aug. 10-11.
Specific conductance: Maximum daily, 7,920 micromhos May 24; minimum daily, 423 micromhos July 6.
Water temperatures: Maximum, 94°F July 28; minimum, freezing point Jan. 19, Feb. 24.
EXTREMES, 1957-60.--Dissolved solids: Maximum, 6,980 ppm Mar. 23-25, 1959; minimum, 224 ppm July 6, 1958.
Hardness: Maximum, 1,010 ppm Mar. 23-25, 1959; minimum, 84 ppm Aug. 24-25, 1959.
Specific conductance: Maximum daily, 11,500 micromhos Mar. 25, 1959; minimum daily, 327 micromhos Sept. 5, 1958.
Water temperatures: Maximum, 94°F July 28, 1960; minimum, freezing point on several days during winter months.
REMARKS.--Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of discharge for water year October 1959 to September 1960 given in WSP 1711. Flow affected by ice Jan. 17-26, Feb. 20-23.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1, 1959.....	24.0	16		80	31	204		244	0	333	148		1.1	0.19	933	1.27	60.5	325	125	4.9	1430	7.9
Oct. 2-4.....	163	25		56	13	106		240	0	145	47		6.4	.21	517	.70	228	193	0	3.3	809	7.9
Oct. 5-6.....	50.0	20		58	15	168		224	0	219	108		2.9	.20	701	.95	94.6	208	24	5.1	1120	7.9
Oct. 7-8.....	18.0	19		77	25	311		280	0	326	280		2.7	.25	1180	1.60	57.4	296	66	7.9	1890	7.8
Oct. 9-10.....	9.0	21		96	37	438		322	0	420	450		2.9	.28	1620	2.20	39.4	390	126	9.6	2620	8.1
Oct. 11-14.....	6.2	15		106	45	580		334	0	529	625		.7	.30	2060	2.80	34.5	450	176	12	3310	8.1
Oct. 15-23.....	4.6	16		109	58	730		346	0	580	850		.5	.45	2510	3.41	31.2	510	226	14	4070	8.0
Oct. 24-29.....	2.8	15		119	64	852		380	0	629	1040		.6	.48	2910	3.96	22.0	560	248	16	4710	8.1
Oct. 30.....	12.0	14		113	54	704		360	0	570	790		1.1	.38	2420	3.29	78.4	505	210	14	3900	7.8
Oct. 31-Nov. 1-2..	16.7	10		94	43	480		346	0	594	395		.8	.37	1790	2.43	80.7	410	126	10	2790	7.9
Nov. 3-4.....	31.5	21		60	22	224		278	0	252	170		1.6	.28	888	1.21	75.5	242	14	6.3	1430	7.8
Nov. 5.....	10.0	18		66	27	354		258	0	291	385		3.0	.28	1270	1.73	34.3	275	63	9.3	2120	8.1
Nov. 6.....	6.0	20		84	38	510		294	0	394	590		2.8	.42	1780	2.42	28.8	365	124	12	2930	7.7
Nov. 7-13.....	5.4	13		110	52	712		359	0	612	780		1.3	.57	2460	3.35	35.9	490	196	14	3910	8.1
Nov. 14-30.....	5.2	14		111	63	788		376	0	659	910		1.4	.64	2730	3.71	38.3	535	227	15	4400	8.0

Dec. 31-Jan. 1, ...	27.5	15	96	50	518	305	0	553	525	2.4	.48	1910	2.60	142	445	195	11	3010	8.0
Jan. 2-7.....	16.5	21	129	57	608	392	0	602	670	3.9	.53	2280	3.10	102	555	233	11	3640	8.0
Jan. 8-10.....	21.7	21	104	46	463	353	0	592	400	6.4	.53	1810	2.46	106	450	160	9.5	2760	7.8
Jan. 11.....	20.0	21	128	56	778	360	0	594	965	5.6	.48	2730	3.71	147	550	255	14	4430	7.3
Jan. 12-13.....	17.0	9.5	66	49	463	228	6	590	410	1.9	.51	1710	2.33	78.5	366	169	11	2650	8.4
Jan. 14-15.....	52.0	20	84	34	310	288	0	442	240	4.5	.49	1280	1.74	180	348	112	7.2	1980	7.9
Jan. 16.....	90.0	20	68	22	214	248	0	303	142	4.3	.34	896	1.22	218	262	59	5.8	1400	8.0
Jan. 17-19.....	47.7	18	61	24	332	243	0	303	335	2.7	.36	1200	1.63	155	252	53	9.1	1970	7.9
Jan. 20-24.....	28.4	21	108	42	521	352	0	529	525	5.0	.46	1920	2.61	147	442	153	11	3040	7.8
Jan. 25-Feb. 1.....	34.0	21	85	42	382	305	0	489	335	2.9	.43	1510	2.05	139	386	136	8.5	2360	8.0
Feb. 2-4.....	25.7	29	101	43	452	333	0	503	440	3.9	.47	1740	2.37	121	430	157	9.5	2700	7.9
Feb. 5-6.....	35.0	22	71	41	372	267	0	521	290	2.3	.44	1450	1.97	137	344	125	8.7	2230	7.8
Feb. 7-8, 10-22...	13.1	22	110	56	572	366	0	671	545	3.0	.61	2160	2.94	76.4	504	204	11	3340	8.0
Feb. 9.....	17.0	35	119	59	706	384	0	644	770	4.3	.56	2530	3.44	116	540	225	13	3980	7.7
Feb. 23-27.....	10.0	13	121	58	720	358	0	650	810	1.5	.59	2550	3.47	68.9	540	246	19	4100	7.8
Feb. 28-Mar. 9....	12.5	13	112	52	607	350	0	705	575	2.2	.61	2240	3.05	75.6	495	208	12	3450	7.9
Mar. 10-22.....	5.5	15	107	65	751	360	0	775	785	.5	.49	2680	3.64	39.8	534	239	14	4220	7.6
Mar. 23-25, 27-30.	17.3	16	105	60	660	334	0	747	640	.8	.47	2390	3.25	112	510	236	13	3750	7.8
Mar. 26.....	22.0	7.9	86	52	517	291	27	727	360	1.2	.48	1920	2.61	114	430	146	11	2910	8.8
Mar. 31-Apr. 9....	3.8	13	123	73	891	384	0	825	985	.6	.51	3100	4.22	31.8	608	293	16	4910	7.9
Apr. 10-18.....	5.3	12	132	85	1140	401	0	950	1310	.9	.49	3830	5.21	54.8	680	351	19	6010	7.9
Apr. 19, 21-22....	1.7	11	110	70	729	345	0	805	755	1.4	.46	2650	3.60	12.2	562	279	13	4180	7.7
Apr. 20.....	2.0	7.3	96	54	471	282	0	603	455	.2	.37	1830	2.49	9.88	460	229	9.5	2870	8.0
Apr. 23.....	1.0	61	128	80	1040	356	0	769	1300	1.1	.49	3550	4.83	9.59	650	358	18	5640	7.7
Apr. 24-25.....	1.0	32	145	99	1390	356	0	802	1900	.9	.51	4540	6.17	12.3	770	478	22	7400	7.8
Apr. 26, 28.....	13.0	20	93	48	398	270	0	547	355	1.6	.36	1600	2.18	56.2	430	209	8.4	2500	7.8
Apr. 27.....	14.0	11	84	43	284	242	0	434	260	1.4	.42	1240	1.69	46.9	388	189	6.3	1950	7.5
Apr. 29-May 3.....	7.2	11	98	64	586	340	0	704	565	1.6	.49	2200	2.99	42.8	508	229	11	3410	7.8
May 4-9.....	8.5	11	86	51	425	284	0	597	365	1.8	.42	1680	2.28	38.6	424	191	9.0	2600	7.8
May 10-11.....	4.0	12	94	59	556	300	0	620	585	1.6	.36	2080	2.83	22.5	476	230	11	3300	7.7

ARKANSAS RIVER BASIN--Continued

7-2270. CANADIAN RIVER AT LOGAN, N. MEX.--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
May 12-14, 1960...	5.3	11		78	50	320		242	0	482	274		1.6	0.34	1340	1.82	19.2	400	201	7.0	2090	7.6
May 15-19.....	4.0	13		92	53	435		285	0	561	415		1.4	.39	1710	2.33	18.5	448	214	8.9	2720	7.8
May 20.....	2.0	14		114	62	652		308	0	619	770		1.3	.59	2380	3.24	12.9	540	287	12	3800	7.8
May 21-23.....	1.0	19		119	88	1000		320	0	787	1260		1.7	.43	3430	4.66	9.26	660	397	17	5500	7.7
May 24-26.....	1.0	14		138	96	1350		343	0	848	1810		2.1	.55	4430	6.02	12.0	740	459	22	7110	7.6
May 27-31.....	1.8	17		96	77	760		301	0	910	735		1.4	.52	2740	3.73	13.3	556	309	14	4150	7.8
June 1-5.....	5.2	18		88	64	606		294	0	935	445		1.3	.53	2300	3.13	32.3	484	243	12	3390	7.6
June 6-8, 11-13...	1619	20		47	13	79		249	0	79	42		.5	.18	403	.55	1760	171	0	2.6	663	7.7
June 9-10, 14.....	169	24		56	16	137		251	0	151	104		2.1	.18	613	.83	280	206	0	4.2	992	7.6
June 15-16, 29....	48.3	23		68	19	240		260	0	252	220		3.3	.22	954	1.30	124	248	35	6.6	1560	7.4
June 17-19.....	34.7	23		94	44	472		282	0	461	535		1.4	.42	1770	2.41	166	415	184	10	2840	7.5
June 20-22.....	8.0	28		126	60	720		317	0	576	915		1.8	.42	2580	3.51	55.7	560	300	13	4250	7.6
June 23-24.....	87.0	29		138	67	916		326	0	624	1220		1.7	.39	3160	4.30	742	620	353	16	5200	7.8
June 25-26.....	1290	18		36	9.7	77		220	0	60	42		.3	.15	351	.48	1220	130	0	2.9	588	7.8
June 27-28.....	43.5	24		37	11	147		228	0	137	92		1.4	.21	562	.76	66.0	136	0	5.5	934	7.7
June 30-July 1....	17.5	19		77	21	380		264	0	313	402		1.7	.25	1340	1.82	63.3	280	63	9.9	2230	7.9
July 2, 5-9.....	5186	21		40	7.5	60		224	0	50	21		1.4	.14	311	.42	4350	131	0	2.3	503	7.8
July 3-4, 10.....	704	21		52	7.4	89		232	0	93	55		1.7	.10	433	.59	823	160	0	3.1	705	7.7
July 11-12, 15, 20	256	20		64	15	190		224	0	189	180		2.4	.14	771	1.05	533	220	36	5.6	1270	7.8
July 13-14.....	472	19		60	12	136		221	0	161	108		1.9	.10	607	.83	774	200	19	4.2	992	7.8
July 16-17.....	202	20		80	23	302		250	0	286	330		1.5	.20	1170	1.59	638	296	91	7.7	1930	7.7
July 18-19.....	408	25		52	9.1	82		211	0	88	61		.2	.09	421	.57	464	167	0	2.8	679	7.7
July 21-23, 28....	85.8	19		91	27	354		252	0	324	398		.9	.22	1340	1.82	310	338	131	8.4	2230	8.1
July 24, 29-31....	43.5	21		107	38	525		292	0	437	625		1.0	.31	1900	2.58	223	425	185	11	3110	7.8
July 25-27.....	154	17		70	18	214		216	0	275	178		1.7	.20	880	1.20	366	248	71	5.9	1420	7.7
Aug. 1-5.....	14.2	26		124	51	730		324	0	594	865		.6	.56	2550	3.47	97.8	520	254	14	4100	7.8
Aug. 6-7.....	14.5	19		99	34	560		288	0	478	630		1.3	.38	1960	2.67	76.7	385	149	12	3200	7.7
Aug. 8.....	10.0	23		109	52	780		284	0	555	960		1.6	.43	2620	3.56	70.7	485	252	15	4300	7.6
Aug. 9.....	1750	22		82	34	435		312	0	462	395		2.8	.37	1590	2.16	7510	345	89	10	2550	7.8
Aug. 10-11.....	4244	20		39	7.4	68		200	0	74	28		.2	.12	335	.46	3840	128	0	2.6	535	7.7

Aug. 12-13........	288	19		40	9.5	116		222	0	129	58		.2	.19	481	.65	374	139	0	4.3	772	8.0
Aug. 14-16........	114	23		63	15	196		238	0	209	170		2.5	.20	796	1.08	245	220	25	5.8	1290	7.8
Aug. 17-18........	44.5	20		82	27	340		264	0	325	358		1.4	.28	1280	1.74	154	314	97	8.3	2110	7.7
Aug. 19-22........	25.2	22		99	38	515		290	0	450	580		1.0	.36	1850	2.52	126	405	167	11	3010	7.8
Aug. 23-28........	12.3	20		117	52	715		310	0	563	865		.8	.42	2490	3.39	82.7	505	251	14	4020	7.8
Aug. 29-Sept. 6...	14.9	16		97	49	575		278	0	566	630		.9	.40	2070	2.82	83.3	442	214	12	3320	7.8
Sept. 7-8.........	36.0	15		97	43	469		280	0	536	470		1.0	.43	1770	2.41	172	420	190	10	2830	7.6
Sept. 9-10........	172	14		46	13	100		180	0	120	80		.5	.18	463	.63	215	169	22	3.3	778	7.5
Sept. 11..........	93.0	18		51	12	161		265	0	226	63		.2	.32	662	.90	166.23	177	0	5.3	1040	7.6
Sept. 12-13.......	49.0	16		66	19	239		228	0	291	198		1.1	.30	942	1.28	125	241	54	6.7	1530	7.4
Sept. 14-15.......	19.0	15		87	31	406		251	0	390	444		1.4	.36	1500	2.04	77.0	343	137	9.5	2480	7.4
Sept. 16..........	20.0	15		96	40	531		278	0	468	610		1.0	.40	1900	2.58	103	406	178	12	3140	7.4
Sept. 17..........	60.0	14		77	29	348		268	0	462	276		1.8	.41	1340	1.82	217	310	90	8.6	2140	7.4
Sept. 18..........	61.0	11		43	12	128		164	0	143	112		2.1	.18	532	.72	87.6	158	23	4.4	908	7.5
Sept. 19..........	34.0	17		66	19	244		192	0	247	260		1.4	.15	949	1.29	87.1	242	84	6.8	1530	7.4
Sept. 20-21.......	27.5	14		84	31	316		246	0	386	316		.8	.32	1270	1.73	94.3	338	136	7.5	2060	7.6
Sept. 22..........	73.0	12		98	40	409		276	0	454	438		1.0	.38	1590	2.16	313	408	182	8.8	2600	7.6
Sept. 23..........	60.0	12		68	16	186		200	0	232	175		1.9	.23	789	1.07	128	236	72	5.3	1320	7.4
Sept. 24-25.......	88.0	11		52	13	138		210	0	198	81		1.2	.21	597	.81	142	183	11	4.4	964	7.5
Sept. 26-27.......	36.5	14		74	20	226		216	0	295	203		1.3	.26	940	1.28	92.6	268	91	6.0	1530	7.7
Sept. 28-30.......	18.7	13		92	36	390		267	0	426	418		.8	.34	1510	2.05	76.2	378	159	8.7	2450	7.9
Weighted average	--	20		48	12	114		232	0	113	81		1.2	0.17	504	0.69	271	169	16	3.4	814	7.7
Time-weighted average.......	199	18		94	47	541		309	0	534	575		1.7	0.42	1970	--	--	432	181	11	3140	7.7
Tons per day....	--	11		26	6.5	61		125	0	61	44		0.6	0.09	--	--	--	--	--	--	--	--

Temperature (°F) of water, water year October 1959 to September 1960

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

ARKANSAS RIVER BASIN--Continued

7-2271. REVUELTO CREEK NEAR LOGAN, N. MEX.

LOCATION.--At bridge on State Highway 39, 0.2 mile downstream from gaging station, 2 miles upstream from mouth, and 2 miles southeast of Logan, Quay County.
DRAINAGE AREA.--786 square miles.
RECORDS AVAILABLE.--Chemical analyses: July 1959 to September 1960.
Water temperatures: July 1959 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 1,760 ppm Nov. 13-17, 19-22; minimum, 250 ppm July 6, 9.
Hardness: Maximum, 400 ppm Apr. 16-24; minimum, 29 ppm Sept. 23.
Specific conductance: Maximum daily, 3,460 micromhos Nov. 16; minimum daily, 385 micromhos July 6.
Water temperatures: Maximum, 95°F June 18; minimum, freezing point Jan. 19, 20, 22.
REMARKS.--Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of discharge for water year October 1959 to September 1960 given in WSP 1711. No flow Oct. 20-27, Nov. 6-12, 18, Nov. 23 to Dec. 2, Mar. 12-23, Mar. 31 to Apr. 15. Flow affected by ice Jan. 17-18, 22-28.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1-2, 1959....	96.5	16		74	17	104		266	0	222	25		0.8	0.19	590	0.80	154	255	32	2.8	890	7.8
Oct. 3-4.....	25.0	19		38	7.8	107		255	0	118	17		4.5	.27	436	.59	29.3	127	0	4.1	679	7.9
Oct. 5-8.....	4.5	18		70	17	101		240	0	224	27		1.4	.21	576	.78	6.98	244	43	2.8	873	7.8
Oct. 9-16.....	1.2	17		60	21	174		230	0	304	79		.5	.24	769	1.05	2.48	236	47	4.9	1200	8.1
Oct. 17-19.....	1.3	20		60	21	312		304	0	271	276		.5	.28	1110	1.51	3.88	236	0	8.8	1820	7.8
Oct. 28-29.....	1.0	21		72	38	524	6.4	416	0	277	590		.5	.34	1730	2.35	4.66	334	0	12	2950	8.2
Oct. 30.....	9.0	14		60	23	420		344	0	245	445		.4	.37	1380	1.88	33.5	245	0	12	2320	8.2
Oct. 31-Nov. 2....	10.7	17		53	21	238	4.6	266	0	400	74		1.7	.31	940	1.28	27.1	218	0	7.0	1410	8.2
Nov. 3-5.....	5.0	20		64	27	321		300	0	451	178		.7	.37	1210	1.65	16.3	272	26	8.5	1840	8.1
Nov. 13-17, 19-22.	1.4	18		61	31	560		386	0	265	638		1.2	.39	1760	2.39	6.65	278	0	15	3030	8.1
Dec. 31-Jan. 4, 6-9, 11-12, 1960	16.0	17		77	24	254		266	0	222	25		2.1	.26	1060	1.44	45.7	289	52	6.5	1580	7.9
Jan. 5.....	6.0	17		70	27	300		290	0	418	189		2.5	.30	1170	1.59	19.0	286	47	7.7	1810	7.4
Jan. 10.....	32.0	16		62	17	204		285	0	333	61		2.2	.24	835	1.14	72.1	226	0	5.9	1270	7.4
Jan. 13.....	20.0	36		76	33	302		305	0	563	108		2.0	.39	1270	1.73	68.5	324	70	7.3	1830	7.9
Jan. 14.....	90.0	19		22	6.1	121		202	0	139	24		4.6	.29	435	.59	106	80	0	5.9	684	7.9

Jan. 15-18.....	33.5	20	60	20	230	251	0	397	80	2.4	.26	933	1.27	84.3	232	24	6.6	1400	8.0
Jan. 19-25.....	10.4	20	74	30	278	290	0	513	103	2.2	.33	1160	1.58	32.5	308	67	6.9	1730	7.7
Jan. 26-27.....	16.5	12	44	11	156	254	0	227	43	.3	.20	619	.84	27.5	157	0	5.5	972	7.9
Jan. 28-31.....	12.5	17	67	26	258	284	0	459	92	2.7	.30	1060	1.44	35.7	274	37	6.8	1570	7.8
Feb. 1-2.....	8.5	22	82	30	302	305	0	554	113	2.0	.42	1260	1.71	28.8	326	75	7.3	1840	8.0
Feb. 3.....	90.0	23	60	19	186	229	0	339	65	2.6	.24	808	1.10	196	228	37	5.4	1200	7.8
Feb. 4-7.....	142	27	42	8.0	121	233	0	162	33	2.3	.23	511	.69	196	138	0	4.5	789	7.8
Feb. 8.....	52.0	9.7	36	12	160	244	0	220	42	2.8	.11	603	.82	84.6	138	0	5.9	949	8.1
Feb. 9-10.....	25.0	23	58	17	209	318	0	316	62	3.8	.23	845	1.15	57.0	214	0	6.2	1280	7.7
Feb. 11-13.....	19.3	16	68	27	266	303	0	450	96	3.2	.25	1080	1.47	56.2	282	32	6.9	1620	7.9
Feb. 14-23.....	7.4	24	72	37	314	305	0	574	126	2.4	.32	1300	1.77	26.0	330	75	7.5	1930	8.0
Feb. 24-27.....	6.2	16	60	31	268	255	0	461	137	1.9	.20	1100	1.50	18.3	276	66	7.0	1660	8.2
Feb. 28-Mar. 5....	8.4	18	77	38	328	292	0	627	129	2.1	.28	1360	1.85	30.8	350	106	7.6	1980	7.9
Mar. 6-11.....	3.3	23	72	40	407	314	0	579	258	2.1	.30	1540	2.09	13.6	342	83	9.5	2290	7.8
Mar. 24-25.....	29.5	15	44	16	240	252	0	290	139	1.6	.22	870	1.18	69.2	174	0	7.9	1370	7.8
Mar. 26-30.....	4.6	17	68	41	402	292	0	666	210	1.8	.34	1550	2.11	19.2	340	96	9.5	2280	7.8
Apr. 16-24.....	7.4	13	86	45	271	250	0	629	104	1.6	.24	1270	1.73	25.3	400	190	5.9	1840	7.7
Apr. 25-May 31....	19.3	16	84	36	181	222	0	477	62	.8	.24	966	1.31	50.2	356	173	4.2	1420	7.8
June 1-4.....	37.2	15	88	33	155	226	0	430	48	1.2	.23	881	1.20	88.5	354	165	3.6	1290	7.3
June 5-6.....	1824	18	31	7.2	102	236	0	113	21	.2	.27	409	.56	2010	107	0	4.3	624	7.4
June 7-8.....	2878	18	27	4.7	84	207	0	79	17	.2	.21	332	.45	2580	87	0	3.9	521	7.6
June 9-10.....	850	19	48	9.0	118	237	0	172	30	1.5	.23	515	.70	1180	157	0	4.1	803	7.4
June 11-12.....	1246	18	36	6.8	86	231	0	89	18	.2	.19	368	.50	1240	118	0	3.4	584	7.5
June 13-14.....	112	22	52	12	147	235	0	248	44	2.0	.26	643	.87	194	178	0	4.8	963	7.4
June 15-22.....	12.0	20	55	21	229	232	0	396	89	.9	.33	925	1.26	30.0	223	30	6.7	1400	7.4
June 23.....	2.0	19	52	22	266	231	0	376	159	.7	.35	1010	1.37	5.44	219	26	7.8	1580	7.3
June 24-27.....	165	18	29	5.2	113	234	0	117	19	.4	.25	417	.57	186	94	0	5.1	652	7.5
June 28.....	24.0	16	37	7.2	142	236	0	187	30	3.1	.26	539	.73	34.8	122	0	5.6	838	7.5
June 29-30.....	10.0	26	50	15	180	230	0	314	52	1.0	.28	751	1.02	20.2	187	0	5.7	1120	7.3
July 1-3.....	7.0	20	60	22	205	232	0	392	72	.9	.28	886	1.20	16.7	240	45	5.8	1320	7.9
July 4-5, 7-8, 10.	3165	22	30	5.6	91	246	0	76	15	1.8	.20	363	.49	3100	98	0	4.0	565	8.0
July 6, 9.....	8890	18	22	3.6	62	180	0	45	8.4	1.5	.14	250	.34	6000	70	0	3.2	395	8.1
July 11-12.....	234	19	51	9.2	120	256	0	168	33	2.0	.21	528	.72	334	165	0	4.1	816	7.8
July 13.....	408	18	25	3.3	79	172	8	72	16	2.7	.18	305	.41	336	76	0	3.9	479	8.3
July 14-16.....	84.3	18	53	14	174	246	0	286	57	1.9	.28	725	.99	165	189	0	5.5	1100	7.9
July 17-20.....	34.2	18	56	17	220	248	0	375	75	1.7	.34	885	1.20	81.6	208	1	6.6	1330	7.9
July 21-23.....	30.0	17	56	24	265	252	0	454	101	.6	.36	1040	1.41	84.1	238	29	7.5	1560	7.7
July 24-26, 30....	545	17	28	5.6	112	234	0	114	23	.4	.25	415	.56	611	93	0	5.1	651	8.0
July 27-29, 31....	34.2	18	42	11	208	252	0	299	67	2.2	.33	772	1.05	71.2	150	0	7.4	1180	7.9
Aug. 1-8.....	15.6	19	52	27	240	228	0	430	86	.8	.40	967	1.32	40.6	240	48	6.7	1450	7.6
Aug. 9-11.....	3183	16	25	6.7	76	200	0	74	14	.7	.22	311	.42	2670	90	0	3.5	498	8.0
Aug. 12-13.....	137	17	46	14	106	200	0	183	30	1.7	.24	496	.67	183	173	6	3.5	764	7.8
Aug. 14-18, 23-31.	41.0	16	60	26	181	214	0	369	60	.6	.31	818	1.11	90.5	258	80	4.9	1220	7.7

ARKANSAS RIVER BASIN--Continued

7-2271. REVUELTO CREEK NEAR LOGAN, N. MEX.--Continued

Chemical analyses, in parts per million, water year October 1959 to Septmeber 1960--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Aug. 19-22.....	22.0	16		56	24	235		234	0	428	78		.6	.37	953	1.30	56.5	238	43	6.6	1430	7.6
Sept. 1-7, 12-22..	63.7	22		66	25	143		206	0	344	48		.5	.24	750	1.02	129	266	96	3.8	1120	7.7
Sept. 8-11.....	568	13		46	11	113		204	0	199	28		.8	.25	509	.69	781	162	0	3.9	794	7.8
Sept. 23.....	1090	12		7.5	2.6	93		176	8	66	12		.9	.30	284	.39	836	29	0	7.5	452	8.4
Sept. 24-25.....	218	15		32	11	131		241	0	167	31		3.0	.27	509	.69	300	126	0	5.1	793	8.0
Sept. 26-30.....	26.6	13		60	23	169		223	0	345	55		.7	.29	776	1.06	55.6	244	57	4.7	1180	7.7
Weighted average	--	18		31	7.1	92	--	214	--	104	19		1.2	0.20	378	0.51	253	106	0	3.9	589	7.8
Time-weighted average.....	248	18		62	25	220	--	251	--	377	102		1.3	0.27	929	--	--	257	64	6.0	1410	7.8
Tons per day....	--	12		21	4.7	62	--	143	--	69	13		0.8	0.13	--	--	--	--	--	--	--	--

Temperature (°F) of water, water year October 1959 to September 1960

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

7-2275. CANADIAN RIVER NEAR AMARILLO, TEX.

LOCATION.--At gaging station near left bank on downstream side of pier of bridge on U.S. Highways 87 and 287, 1,500 feet downstream from Pitcher Creek, 1.4 miles downstream from East Amarillo Creek, 1.7 miles downstream from Panhandle and Santa Fe Railway Co. bridge, 19 miles north of Amarillo, Potter County, and at mile 537.7.
DRAINAGE AREA.--19,445 square miles, of which 4,069 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: July 1948 to October 1949, February 1950 to September 1960.
Water temperatures: August 1949 to September 1960.
Sediment records: August 1949 to September 1952.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 2,210 ppm Mar. 25; minimum, 395 ppm June 8-14.
Hardness: Maximum, 685 ppm Mar. 25; minimum, 101 ppm Dec. 17, July 4-14.
Specific conductance: Maximum daily, 3,370 micromhos Mar. 25; minimum daily, 401 micromhos June 10.
Water temperatures: Maximum, 82°F Aug. 30; minimum, freezing point on many days during winter months.
EXTREMES, 1948-60.--Dissolved solids: Maximum, 3,000 ppm Mar. 21, 1957; minimum, 252 ppm Sept. 21-30, 1957.
Hardness: Maximum, 974 ppm Mar. 21, 1957; minimum, 69 ppm Sept. 6, 1957.
Specific conductance: Maximum daily, 4,490 micromhos Mar. 21, 1957; minimum daily, 359 micromhos July 6, 1958.
Water temperatures (1949-60): Maximum, 95°F June 29, 1951; minimum, freezing point on many days during winter months.
REMARKS.--Dashes omitted in potassium (K) column indicate sodium (Na) plus potassium (K) are calculated. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1, 3-11, 1959	194	24		54	22	168	6.6	201		186	170	1.0	9.3		754	1.03	395	225	55	4.9	1240	7.2
Oct. 2.....	50.0	--		--	--			215		--	90	--	--		--	--	--	143	0	--	876	8.0
Oct. 12-21.....	20.8	43		88	37	312		259		254	372	1.7	54		1290	1.75	72.5	372	158	7.0	1840	6.6
Oct. 22-31.....	14.8	51		72	33	227		307		186	212	2.2	71		1010	1.37	40.3	315	59	5.6	1600	6.8
Nov. 1-10.....	14.4	51		76	35	182	18	265		175	215	2.4	8.1		948	1.29	36.8	334	113	4.3	1580	6.9
Nov. 11-20.....	11.6	52		75	36	199		326		168	178	2.5	84		954	1.30	29.8	335	63	4.7	1530	7.0
Nov. 21-30.....	10.5	52		60	34	171		262		155	142	2.0	98		843	1.15	23.8	290	70	4.4	1400	6.8
Dec. 1-12.....	12.8	55		74	35	194		359		158	178	2.8	24		911	1.24	31.5	328	31	4.7	1490	6.8
Dec. 13-15.....	139	30		105	38	350		237		381	400	1.1	2.8		1450	1.97	544	418	221	7.4	2300	7.6
Dec. 16, 18-22....	1025	14		40	14	167		181		157	146	.5	2.5		630	.86	1740	158	6	5.8	1050	8.0
Dec. 17.....	4830	20		27	8.2	108		179		82	71	.5	4.0		409	.56	5330	101	0	4.7	642	8.0
Dec. 23-31.....	142	16		69	23	252		240		257	240	.7	11		987	1.34	378	266	68	6.7	1580	7.5
Jan. 1-10, 1960...	103	26		104	36	347		284		366	375	1.0	20		1420	1.93	395	408	172	7.5	2240	7.2
Jan. 11-21.....	117	22		100	33	339		277		336	378	1.0	13		1360	1.85	430	385	153	7.5	2200	7.2
Jan. 22-31.....	197	21		100	34	359		281		352	398	.9	12		1410	1.92	750	390	155	7.9	2280	7.7
Feb. 1-13.....	221	20		72	28	270		245		263	280	.8	12		1070	1.46	638	294	89	6.8	1800	7.1
Feb. 14-29.....	67.6	28		102	39	328		282		349	362	1.3	22		1370	1.86	250	415	179	7.0	2270	6.9
Mar. 1-10.....	95.3	30		114	42	363		266		385	420	1.5	38		1520	2.07	391	457	237	7.4	2480	6.8
Mar. 11-20.....	11.9	48		93	36	274		291		264	282	2.3	49		1210	1.65	38.8	380	137	6.1	1970	6.6
Mar. 21-24, 26-31.	101	41		73	32	228		249		221	222	2.2	69		1010	1.37	275	314	106	5.6	1680	6.7

ARKANSAS RIVER BASIN--Continued

7-2275. CANADIAN RIVER NEAR AMARILLO, TEX.--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Mar. 25, 1960.....	340	--		--	--			175		--	640	--	--		2210	3.01	2030	685	537	--	3370	7.9
Apr. 1-4.....	23.2	46		80	36	295		372		233	270	2.2	56		1210	1.65	75.7	348	40	6.9	1840	7.5
Apr. 5-14.....	15.1	53		56	33	187		472		101	110	2.6	.5		799	1.09	32.5	275	0	4.9	1230	7.6
Apr. 15-30.....	14.6	51		61	32	174		470		97	105	2.5	.2		773	1.05	30.5	284	0	4.5	1220	7.4
May 1-16.....	10.7	57		62	28	118	14	322		82	101	2.4	85		a718	.98	20.7	270	1	3.1	1180	6.4
May 17-31.....	9.6	57		63	30	120	19	485		81	102	2.4	.0		759	1.03	19.6	280	0	3.1	1190	7.0
June 1-7.....	1866	44		49	26	141		264		102	123	1.6	45		a689	.94	3470	230	8	4.1	1120	6.4
June 8-14.....	3070	52		27	9.1	90		174		69	60	.6	1.2		395	.54	3270	105	0	3.8	600	7.1
June 15-17, 27-30.	644	18		44	15	166		200		150	147	.7	2.8		a649	.88	1130	172	6	5.5	1070	7.2
June 18-26.....	74.0	24		86	33	259		224		279	300	1.2	17		1110	1.51	222	350	162	6.0	1830	6.9
July 1-3.....	19.5	24		57	19	216		221		205	202	.9	8.2		a849	1.15	44.6	220	34	6.3	1370	7.8
July 4-14.....	8392	14		26	8.8	105		170		85	69	.5	3.0		a403	.55	9130	101	0	4.5	660	7.4
July 15-31.....	569	15		58	20	221		189		219	225	.6	5.9		a871	1.18	1340	226	70	6.4	1410	7.4
Aug. 1-9, 16-23...	233	18		64	22	236		195		238	247	.7	5.6		a937	1.27	589	250	85	6.5	1570	7.2
Aug. 10-15.....	3553	13		29	9.1	114		164		102	80	.5	3.0		432	.59	4140	110	0	4.7	700	7.5
Aug. 24-31.....	72.6	20		90	34	395		205		360	478	.9	5.5		1480	2.01	290	364	192	9.0	2410	6.9
Sept. 1-8.....	40.1	27		96	43	469		186		455	565	1.1	14		1760	2.39	191	416	263	10	2880	7.8
Sept. 9-19.....	411	17		50	17	209		185		218	188	.7	4.2		795	1.08	882	195	38	6.5	1320	7.5
Sept. 20-22.....	136	21		71	25	293		216		278	312	.9	9.9		1120	1.52	411	280	98	7.6	1870	7.3
Sept. 23-25.....	1795	14		29	10	119		158		99	97	.6	1.0		448	.61	2170	114	0	4.9	764	7.7
Sept. 26-29.....	268	15		42	14	171		189		165	143	.7	4.8		a660	.90	478	162	5	5.8	1080	7.8
Sept. 30.....	149	--		--	--			212		--	192	--	--		--	--	--	228	51	--	1390	7.2
Weighted average	--	21		37	13	136		186		120	112	0.7	7.1		548	0.74	838	146	18	4.9	891	7.2
Time-weighted average	560	34		70	29	230		272		214	232	1.5	24		982	--	--	293	82	5.8	1590	7.0
Tons per day....	--	33		56	20	209		283		183	171	1.0	11		--	--	--	--	--	--	--	--

a Residue at 180°C.

ARKANSAS RIVER BASIN--Continued

7-2275. CANADIAN RIVER NEAR AMARILLO, TEX.--Continued

Temperature (°F) of water, water year October 1959 to September 1960

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

ARKANSAS RIVER BASIN--Continued

7-2285. CANADIAN RIVER AT BRIDGEPORT, OKLA.

LOCATION.--At gaging station at Chicago, Rock Island and Pacific Railroad Co. bridge, 1 mile north of Bridgeport, Caddo County, and 2.8 miles upstream from Lumpmouth Creek.
DRAINAGE AREA.--25,229 square miles, of which 4,801 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: October 1948 to September 1960 (discontinued).
Water temperatures: October 1948 to September 1960 (discontinued).
EXTREMES, 1959-60.--Dissolved solids: Maximum, 1,620 ppm June 10; minimum, 540 ppm Aug. 30-31.
Hardness: Maximum, 835 ppm May 22-24; minimum, 192 ppm Aug. 21-29.
Specific conductance: Maximum daily, 2,500 micromhos June 10; minimum daily, 687 micromhos Aug. 30.
Water temperatures: Maximum, 87°F July 18; minimum, freezing point on several days during December to March.
EXTREMES, 1948-60.--Dissolved solids: Maximum, 2,450 ppm Oct. 11, 1954; minimum, 172 ppm May 27, 1959.
Hardness: Maximum, 835 ppm May 22-24, 1960; minimum, 112 ppm May 27, 1959.
Specific conductance: Maximum daily, 4,000 micromhos Oct. 11, 1954; minimum daily, 226 micromhos May 23, 1952.
Water temperatures: Maximum, 97°F July 11, 1952; minimum, freezing point on many days during winter months.
REMARKS.--Records of specific conductance and chloride of daily samples available in district office at Oklahoma City, Okla. Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 5-6, 1959....	980	--	--	85	21	76	--	142	0	219	85	--	1.6	--	588	0.80	1560	300	184	1.9	900	7.8
Oct. 7.....	300	--	--	122	37	89	--	184	0	335	105	--	1.2	--	822	1.12	666	455	304	1.8	1200	7.8
Oct. 8.....	246	--	--	123	40	98	--	204	0	333	120	--	1.7	--	844	1.15	561	470	303	2.0	1220	7.8
Oct. 9-10.....	178	--	--	156	45	96	--	230	0	421	110	--	3.1	--	1020	1.39	490	575	386	1.7	1400	8.0
Oct. 11-13.....	156	--	--	184	54	93	--	250	0	506	105	--	3.0	--	1140	1.55	480	680	475	1.5	1530	8.0
Oct. 14-18.....	153	--	--	192	53	155	--	260	0	526	190	--	5.0	--	1290	1.75	533	695	482	2.6	1810	8.1
Oct. 19-31.....	71.6	--	--	196	62	73	--	256	0	569	70	--	3.7	--	1180	1.60	228	745	535	1.2	1500	8.0
Nov. 1-10.....	63.5	15	0.00	82	30	200	3.6	204	0	206	270	0.3	7.8	0.29	925	1.26	159	328	161	4.8	1520	7.6
Nov. 11-16.....	43.5	--	--	180	62	72	--	230	0	584	43	--	4.3	--	1080	1.47	127	705	516	1.2	1370	7.9
Nov. 17.....	45	--	--	94	55	123	--	138	0	393	145	--	1.6	--	953	1.30	116	460	347	2.5	1430	8.0
Nov. 18-30.....	54.4	--	--	186	61	55	--	226	0	565	40	--	5.4	--	1080	1.47	159	715	530	.9	1370	7.9
Dec. 1-16.....	54.8	14	.00	98	28	128	3.6	168	0	231	186	.3	3.7	.02	876	1.19	130	358	220	2.9	1310	7.8
Dec. 17-31.....	3328	--	--	98	35	229	--	228	0	264	300	--	3.3	--	1090	1.48	9790	390	203	5.0	1760	8.0
Jan. 1-10, 1960...	313	--	--	108	44	223	--	200	0	347	288	--	3.5	--	1160	1.58	980	450	286	4.6	1800	8.2
Jan. 11-13.....	210	--	--	124	52	194	--	206	0	390	262	--	3.5	--	1200	1.63	680	525	356	3.7	1800	8.1

Jan. 14.....	3140	--	--	73	25	90	--	144	6	168	120	--	9.8	--	611	.83	5180	285	157	2.3	953	8.4
Jan. 15-19.....	785	--	--	111	41	221	--	224	8	287	302	--	2.9	--	1140	1.55	2420	445	248	4.5	1800	8.4
Jan. 20.....	600	--	--	40	33	101	--	136	6	181	102	--	1.1	--	552	.75	894	235	114	2.9	906	8.4
Jan. 21-31.....	805	16	0.01	134	50	229	5.6	250	0	365	318	0.7	2.8	0.23	1290	1.75	2800	540	335	4.3	1970	8.2
Feb. 1-2.....	770	--	--	74	44	263	--	100	0	283	395	--	2.8	--	1180	1.60	2450	365	283	6.0	1930	8.0
Feb. 3-10.....	3239	--	--	96	35	175	--	194	0	252	242	--	2.6	--	939	1.28	8210	385	226	3.9	1520	7.8
Feb. 11-29.....	257	20	.00	164	49	235	10	274	0	448	288	.8	3.8	.17	1380	1.88	958	610	386	4.1	2030	8.1
Mar. 1-10.....	307	--	--	190	68	187	--	248	0	605	230	--	5.2	--	1520	2.07	1260	755	552	3.0	2070	7.8
Mar. 11-31.....	630	--	--	158	55	180	--	228	0	471	235	--	3.3	--	1300	1.77	2210	620	433	3.1	1860	8.0
Apr. 1-10.....	165	20	.00	174	57	139	4.5	166	0	597	165	.6	3.3	.32	1350	1.84	601	670	534	2.3	1770	8.1
Apr. 11-20.....	50.3	--	--	204	68	78	--	190	0	693	55	--	4.9	--	1310	1.78	178	790	634	1.2	1550	8.1
Apr. 21-28.....	42.6	--	--	178	70	67	--	130	0	684	38	--	4.6	--	1220	1.66	140	730	624	1.1	1420	8.0
Apr. 29.....	1080	--	--	91	30	93	--	160	0	268	100	--	.7	--	720	.98	2100	350	219	2.2	1050	8.2
Apr. 30.....	632	--	--	150	36	45	--	132	0	441	35	--	.7	--	848	1.15	1450	520	412	.9	1060	8.2
May 1-10.....	87.9	19	.00	180	59	50	4.0	196	4	565	40	.4	5.0	.38	1100	1.50	261	690	523	.8	1310	8.3
May 11-17.....	34.9	--	--	184	55	47	--	186	0	570	27	--	5.1	--	1080	1.47	102	685	532	.8	1290	8.0
May 18-20.....	111	--	--	164	46	64	--	156	0	515	51	--	3.5	--	993	1.35	298	600	472	1.1	1240	8.2
May 21.....	75	--	--	176	50	70	--	140	0	582	55	--	.1	--	1100	1.50	223	645	530	1.2	1330	8.2
May 22-24.....	74.0	--	--	232	62	122	--	170	6	752	118	--	1.6	--	1490	2.03	298	835	686	1.8	1790	8.4
May 25-28.....	35.5	--	--	184	50	49	--	174	4	566	22	--	3.0	--	1090	1.48	104	665	516	.8	1320	8.3
May 29-31.....	1199	--	--	144	43	87	--	118	0	467	100	--	.4	--	983	1.34	3180	535	438	1.6	1290	7.8
June 1.....	304	--	--	123	35	71	--	122	0	378	78	--	1.2	--	816	1.11	670	450	350	1.5	1110	8.2
June 2-8.....	291	--	--	130	32	51	--	152	0	363	44	--	2.4	--	772	1.05	607	455	330	1.0	1020	8.2
June 9.....	786	--	--	123	34	68	--	112	2	375	75	--	.1	--	810	1.10	1720	445	350	1.4	1080	8.3
June 10.....	15200	--	--	123	45	360	--	214	6	347	515	--	.1	--	1620	2.20	66480	490	304	7.1	2500	8.4
June 11-20.....	4022	--	--	69	25	202	--	190	0	202	245	--	2.6	--	878	1.19	9530	275	120	5.3	1450	8.0
June 21-30.....	124	--	--	96	32	187	--	186	0	305	215	--	2.9	--	1000	1.36	335	370	218	4.2	1520	8.0
July 1-3.....	32.0	--	--	147	46	100	--	178	0	468	98	--	.8	--	1030	1.40	89	555	409	1.8	1350	7.8
July 4-8.....	506	--	--	110	27	76	--	134	0	323	72	--	2.8	--	731	.99	999	385	275	1.7	1000	8.1
July 9-10.....	21250	--	--	67	26	207	--	194	0	212	245	--	.5	--	890	1.21	51060	275	116	5.4	1440	8.2
July 11-31.....	4333	--	--	64	20	174	--	178	0	187	195	--	2.4	--	763	1.04	8930	240	94	4.9	1240	8.2
Aug. 1-8.....	334	--	--	94	33	339	--	180	0	321	442	--	1.6	--	1380	1.88	1240	370	222	7.7	2240	8.2
Aug. 9-10.....	324	--	--	75	26	250	--	146	0	268	312	--	.0	--	1050	1.43	919	295	176	6.3	1720	8.0

ARKANSAS RIVER BASIN--Continued

7-2285. CANADIAN RIVER AT BRIDGEPORT, OKLA.--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C): Parts per million	Dissolved solids (residue at 180°C): Tons per acre-foot	Dissolved solids (residue at 180°C): Tons per day	Hardness as $CaCO_3$: Calcium, Magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
Aug. 11-20, 1960..	2463	17	0.00	63	25	176	6.0	162	0	216	195	0.9	3.6	0.64	a 783	1.06	5210	260	127	4.8	1220	8.1
Aug. 21-29.....	968	--	--	48	18	120	--	152	4	123	135	--	3.1	--	570	.78	1490	192	61	3.8	924	8.3
Aug. 30-31.....	162	--	--	83	20	57	--	122	0	217	61	--	2.9	--	540	.73	236	290	190	1.5	784	8.1
Sept. 1-10.....	56.4	25	.00	102	24	121	6.0	184	0	249	138	.5	1.8	.55	771	1.05	117	355	204	2.8	1160	8.2
Sept. 11-14.....	112	--	--	104	31	101	--	142	0	299	125	--	1.6	--	776	1.06	235	385	268	2.2	1150	8.2
Sept. 15.....	181	--	--	94	23	180	--	152	2	276	215	--	3.8	--	912	1.24	446	330	202	4.3	1400	8.3
Sept. 16-20.....	256	--	--	101	34	275	--	154	4	278	400	--	2.9	--	1230	1.67	850	390	258	6.1	1970	8.3
Sept. 21-25.....	283	--	--	91	32	273	--	162	0	312	350	--	2.3	--	1210	1.65	925	360	227	6.3	1910	8.1
Sept. 26-30.....	2171	--	--	66	23	211	--	166	2	209	255	--	3.9	--	895	1.22	5250	260	120	5.7	1450	8.3
Weighted average b	1060	--	--	87	30	194	--	193	--	253	240	--	2.5	--	950	1.29	2720	340	182	4.6	1500	--
Analyses of additional samples																						
Oct. 28, 1959.....	c 61	16	--	218	63	61		292	0	613	40	0.5	4.0	0.14	a 1160	1.58	191	805	566	0.9	1510	8.0
Feb. 16, 1960.....	c 470	10	0.00	138	43	220		266	0	356	288	1.0	2.3	.14	1220	1.66	1550	520	302	4.2	1880	8.2
Apr. 4.....	c 163	14	.00	168	56	157		238	0	505	190	.7	.4	.19	1310	1.78	576	650	455	2.7	1800	7.6
July 25.....	c 1000	16	.00	72	18	160		224	0	156	180	.8	.5	.18	732	1.00	1980	255	72	4.4	1200	7.7

a Calculated from determined constituents. b Represents 91 percent of flow for water year. c Discharge at time of sampling.

Temperature (°F) of water, water year October 1959 to September 1960

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

7-2300. LITTLE RIVER BELOW HOG CREEK, NEAR NORMAN, OKLA.

LOCATION.--At gaging station at bridge on county road just downstream from Hog Creek, 0.8 mile upstream from Prairie Creek and 13 miles east of Norman, Cleveland County.
DRAINAGE AREA.--257 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1953 to September 1960.
Water temperatures: October 1953 to September 1960.
Sediment records: May 1956 to September 1958.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 667 ppm July 20; minimum, 124 ppm Aug. 26-27.
Hardness: Maximum, 380 ppm Nov. 11-20; minimum, 100 ppm Oct. 2-5.
Specific conductance: Maximum daily, 1,170 micromhos July 20; minimum daily, 161 micromhos May 20.
Water temperatures: Maximum, 98°F July 12; minimum, 33°F Jan. 18.
EXTREMES, 1953-60.--Dissolved solids: Maximum, 1,460 ppm Nov. 1-3, 1956; minimum, 80 ppm May 24-25, 1957.
Hardness: Maximum, 394 ppm Nov. 22-30, Dec. 11-20, 1957; minimum, 52 ppm Sept. 21, 1957.
Specific conductance: Maximum daily, 2,770 micromhos Nov. 3, 1956; minimum daily, 100 micromhos May 25, 1957.
Water temperatures: Maximum, 98°F July 11, 12, 1954, July 12, 1960; minimum, freezing point Feb. 2, 1956, Jan. 29, 1957, Jan. 3, Feb. 11, 1959.
REMARKS.--Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C): Parts per million	Dissolved solids: Tons per acre-foot	Dissolved solids: Tons per day	Hardness as $CaCO_3$: Calcium, Magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
Oct. 1, 1959.....	180	--	--	50	24	41	--	236	0	31	60	--	0.0	--	350	0.48	170	222	28	1.2	552	8.2
Oct. 2-5.....	1864	--	--	26	8.5	14	--	120	0	16	10	--	1.4	--	135	.18	679	100	2	.6	229	7.9
Oct. 6-31.....	47.1	--	--	69	47	48	--	424	0	42	55	--	.7	--	a 470	.64	59.8	364	16	1.1	795	8.1
Nov. 1-10.....	60.4	18	0.00	40	43	40	0.4	328	0	21	52	0.4	.2	0.00	404	.55	65.9	276	7	1.0	676	8.1
Nov. 11-20.....	32.7	--	--	64	54	54	--	420	4	45	70	--	1.0	--	a 498	.68	44.0	380	30	1.2	852	8.3
Nov. 21-30.....	27.1	--	.00	44	46	67	.6	360	0	37	79	.0	1.2	.00	487	.66	35.6	300	5	1.7	847	8.2
Dec. 1-16.....	26.2	--	--	61	54	52	--	432	0	45	60	--	.6	--	a 485	.66	34.3	372	18	1.2	825	8.0
Dec. 17-20.....	403	--	--	40	22	32	--	226	0	37	26	--	1.2	--	a 269	.37	293	192	7	1.0	443	8.2
Dec. 21-31.....	70.5	8.4	.00	52	53	37	2.4	316	0	51	80	.2	.4	.01	450	.61	85.6	348	89	.9	754	8.1
Jan. 1-10, 1960...	72.6	18	.00	62	53	38	1.9	414	0	23	55	.3	1.6	.22	a 457	.62	89.6	372	32	.9	792	8.2
Jan. 11-20.....	155	--	--	59	38	27	--	336	4	19	41	--	1.7	--	373	.51	156	302	20	.7	667	8.3
Jan. 21-31.....	55.4	--	--	48	55	41	--	368	6	24	69	--	1.6	--	442	.60	66.1	346	34	1.0	791	8.3
Feb. 1-2.....	39.0	--	--	16	51	46	--	228	26	23	66	--	1.4	--	358	.49	37.7	248	18	1.3	642	8.7
Feb. 3.....	481	--	--	43	27	23	--	220	18	12	32	--	3.6	--	291	.40	378	220	10	.7	483	8.7
Feb. 4-10.....	358	--	--	60	36	33	--	322	10	18	48	--	1.7	--	380	.52	367	296	16	.8	654	8.4

a Calculated from determined constituents.

ARKANSAS RIVER BASIN--Continued

7-2300. LITTLE RIVER BELOW HOG CREEK, NEAR NORMAN, OKLA.--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Feb. 11-29, 1960..	55.4	--	--	43	57	33	--	354	0	26	68	--	0.7	--	453	0.62	67.8	342	52	0.8	779	8.2
Mar. 1-10.....	61.4	17	0.00	45	50	40	1.4	352	6	23	56	0.2	1.6	0.30	a 414	.56	68.6	320	22	1.0	738	8.3
Mar. 11-31.....	47.6	--	--	38	49	37	--	332	0	22	57	--	1.3	--	395	.54	50.8	296	24	.9	710	8.1
Apr. 1-13.....	51.5	13	.00	35	55	44	1.1	340	8	29	66	.2	1.6	.32	435	.59	60.5	312	20	1.1	778	8.4
Apr. 14-15.....	960	--	--	34	20	19	--	180	8	13	22	--	3.1	--	251	.34	651	166	5	.7	389	8.4
Apr. 16-20.....	67.6	--	--	42	43	42	--	314	8	19	55	--	3.3	--	402	.55	73.4	280	9	1.1	671	8.4
Apr. 21-28.....	34.1	--	--	32	51	49	--	324	10	22	64	--	1.3	--	423	.58	38.9	290	8	1.2	718	8.5
Apr. 29-30.....	367	--	--	32	18	20	--	182	0	8.6	26	--	1.0	--	202	.27	200	152	3	.7	356	8.1
May 1-3.....	48.7	--	--	40	37	39	--	268	14	12	58	--	1.9	--	371	.50	48.8	254	11	1.1	630	8.6
May 4-7.....	1294	--	--	32	17	15	--	158	8	4.9	22	--	2.3	--	200	.27	699	148	5	.5	343	8.5
May 8-10.....	101	--	--	42	34	31	--	270	12	11	40	--	2.0	--	337	.46	91.9	244	2	.9	568	8.6
May 11-17.....	54.4	--	--	60	41	37	--	364	6	15	52	--	1.9	--	427	.58	62.7	318	10	.9	719	8.4
May 18-19.....	930	--	--	34	19	14	--	194	0	4.5	22	--	.7	--	218	.30	547	164	5	.5	373	8.1
May 20-21.....	4027	--	--	26	16	7.8	--	156	0	3.3	12	--	.7	--	164	.22	1780	132	4	.3	290	8.1
May 22-31.....	93.8	--	--	46	43	32	--	314	14	12	48	--	1.8	--	376	.51	95.2	292	11	.8	657	8.5
June 1-5.....	56.6	--	--	50	48	39	--	380	0	19	52	--	1.2	--	437	.59	66.8	322	10	.9	729	8.0
June 6-12.....	92.3	--	--	46	28	24	--	282	0	11	29	--	1.6	--	314	.43	78.2	232	1	.7	511	8.2
June 13-14.....	232	--	--	31	18	29	--	184	0	13	36	--	.1	--	217	.30	136	152	1	1.0	348	8.0
June 15-20.....	31.8	--	--	46	39	40	--	334	0	21	45	--	1.4	--	389	.53	33.4	274	1	1.0	633	8.2
June 21-30.....	27.4	--	--	38	41	46	--	302	12	24	49	--	.6	--	388	.53	28.7	262	0	1.2	635	8.5
July 1-10.....	17.1	--	--	19	47	52	--	264	10	27	65	--	1.1	--	364	.50	16.8	240	7	1.5	637	8.5
July 11-17.....	7.6	--	--	38	53	77	--	342	14	35	98	--	.2	--	514	.70	10.5	312	8	1.9	847	8.5
July 18-19.....	55.0	--	--	34	25	24	--	210	0	14	37	--	.8	--	257	.35	38.2	186	14	.8	450	8.2
July 20.....	10.0	--	--	51	53	104	--	270	8	28	218	--	.1	--	667	.91	18.0	345	110	2.4	1170	8.4
July 21-22.....	18.8	--	--	37	42	64	--	278	8	28	94	--	.0	--	418	.57	21.2	264	22	1.7	731	8.4
July 23-31.....	877	--	--	43	25	20	--	240	0	13	30	--	1.7	--	267	.36	632	210	14	.6	465	8.2
Aug. 1-10.....	22.8	18	.00	42	41	47	2.4	340	0	27	48	.3	1.1	.76	a 395	.54	24.3	274	0	1.2	671	8.1
Aug. 11-20.....	21.5	--	--	48	37	50	--	320	8	26	56	--	1.1	--	404	.55	23.4	274	0	1.3	679	8.4
Aug. 21-22.....	166	--	--	30	11	18	--	142	0	7.2	24	--	1.7	--	183	.25	82.0	120	4	.7	302	8.0
Aug. 23-25.....	17.7	--	--	48	30	43	--	288	4	19	52	--	.7	--	367	.50	17.5	244	2	1.2	621	8.4

Aug. 26-27.....	184	--	--	18	8.5	11	--	98	0	5.4	11	--	1.9	--	124	.17	61.6	160	0	.5	208	7.7
Aug. 28-31.....	20.0	--	--	50	31	44	--	288	6	23	54	--	2.9	--	374	.51	20.2	252	6	1.2	629	8.4
Sept. 1-20.....	9.6	17	0.00	39	49	68	1.5	360	10	40	70	0.3	.8	0.78	a 473	.64	12.3	300	0	1.7	794	8.4
Sept. 21-30.....	8.8	--	--	43	47	73	--	362	10	38	77	--	.7	--	482	.66	11.4	302	0	1.8	827	8.5
Weighted average	147	--	--	38	26	20	--	234	--	15	31	--	1.4	--	269	0.37	107	202	10	0.7	462	--

Analyses of additional samples

Oct. 5, 1959.....	618			29	13	17		142	10	8.2	14		1.6		173	0.24	289	126	0	0.7	293	8.5
Oct. 12.....	51			14	44	34		218	16	14	48		2.9		a 280	.38	38.6	216	11	1.0	549	8.6

a Calculated from determined constituents.

Temperature (°F) of water, water year October 1959 to September 1960

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

ARKANSAS RIVER BASIN--Continued

7-2310. LITTLE RIVER NEAR SASAKWA, OKLA.

LOCATION.--At gaging station on county highway bridge, 2.8 miles northwest of Sasakwa, Seminole County, and 8.7 miles downstream from Salt Creek.
DRAINAGE AREA.--865 square miles.
RECORDS AVAILABLE.--Chemical analyses: September 1951 to September 1960.
Water temperatures: October 1955 to September 1960.
EXTREMES, 1959-60.--Specific conductance: Maximum daily, 6,090 micromhos Oct. 25; minimum daily, 272 micromhos Aug. 21.
Water temperatures: Maximum, 88°F July 8, 10-12, Aug. 3; minimum, 33°F Feb. 24, 26.
EXTREMES, 1955-60.--Dissolved solids (1955-57): Maximum, 129,000 ppm Oct. 30-31, 1956; minimum, 189 ppm June 11, 1957.
Hardness (1955-57): Maximum, 24,400 ppm Oct. 30-31, Nov. 1-2, 1956; minimum, 112 ppm June 11, 1957.
Specific conductance: Maximum daily, 138,000 micromhos Oct. 31, 1956; minimum daily, 272 micromhos Aug. 21, 1960.
Water temperatures: Maximum, 93°F July 27, Aug. 14, 1956; minimum, 33°F Dec. 16, 1955, Jan. 18, Feb. 3, 1956, Feb. 24, 26, 1960.
REMARKS.--Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chloride and specific conductance, water year October 1959 to September 1960

Day	OCTOBER		NOVEMBER		DECEMBER		JANUARY	
	Chloride (Cl) ppm	Specific conductance (micromhos at 25°C)	Chloride (Cl) ppm	Specific conductance (micromhos at 25°C)	Chloride (Cl) ppm	Specific conductance (micromhos at 25°C)	Chloride (Cl) ppm	Specific conductance (micromhos at 25°C)
1..	90	460	700	2380	1450	4820	780	2900
2..	600	2160	650	2400	1400	4650	790	2900
3..	580	2140	--	--	1380	4700	720	2600
4..	660	2430	1050	3580	1400	4700	740	2630
5..	680	2430	1020	3610	1250	4340	440	1790
6..	1120	3880	1080	3710	1280	4320	450	1780
7..	1130	3950	1080	3700	1400	4720	125	598
8..	1170	4040	1180	4190	1380	4700	265	1160
9..	1170	4010	1200	4070	1400	4700	310	1300
10..	1290	4390	1120	3910	1380	4650	300	1300
11..	1350	4510	1120	3920	1400	4530	415	1560
12..	1350	4580	1300	4510	1300	4440	395	1560
13..	1350	4600	1320	4390	1500	4930	450	1770
14..	1350	4570	1400	4760	1500	4880	700	2580
15..	1350	4630	1400	4710	1250	4400	690	2580
16..	1380	4580	1500	5080	265	1070	860	3100
17..	1420	4820	1500	5000	262	1070	870	3080
18..	1420	4800	1300	4480	262	1070	900	3290
19..	1600	5240	1300	4370	320	1330	905	3300
20..	1580	5270	1350	4630	195	889	905	3300
21..	1500	4970	1320	4560	365	1540	900	3260
22..	1500	5020	1320	4540	355	1360	1080	3750
23..	1620	5450	1350	4620	360	1570	875	3180
24..	1650	5420	1500	5110	350	1370	1020	3780
25..	1880	6090	1500	5110	340	1430	275	1100
26..	1900	5970	1450	4890	370	1540	300	1100
27..	1850	6050	1450	4860	450	1810	--	--
28..	1280	4380	1450	4880	1000	3670	450	1690
29..	1300	4380	1400	4860	1050	3700	550	2120
30..	255	997	1450	4920	1000	3640	--	--
31..	--	--	--	--	1100	3790	700	2680

ARKANSAS RIVER BASIN--Continued

7-2310. LITTLE RIVER NEAR SASAKWA, OKLA.--Continued

Chloride and specific conductance, water year October 1959 to September 1960--Continued

Day	FEBRUARY		MARCH		APRIL		MAY	
	Chloride (Cl) ppm	Specific conductance (micromhos at 25°C)	Chloride (Cl) ppm	Specific conductance (micromhos at 25°C)	Chloride (Cl) ppm	Specific conductance (micromhos at 25°C)	Chloride (Cl) ppm	Specific conductance (micromhos at 25°C)
1..	700	2660	900	3300	1200	4280	111	606
2..	800	2850	880	3150	1200	4240	110	599
3..	800	2890	870	3210	1550	4520	--	--
4..	850	3180	550	2200	1580	4660	395	1640
5..	850	3180	560	2200	1150	4010	580	2220
6..	950	3360	990	3520	1150	4000	580	2230
7..	950	3370	980	3510	138	721	580	2260
8..	1000	3520	810	2970	135	719	580	2160
9..	1020	3550	800	2920	132	724	710	2660
10..	675	2570	790	2910	132	720	700	2670
11..	700	2550	750	2610	440	1700	900	3250
12..	825	3070	725	2640	435	1710	925	3220
13..	850	3060	900	3180	690	2590	900	3250
14..	825	3100	950	3220	685	2590	900	3270
15..	850	3100	900	3100	895	2980	50	352
16..	900	3310	925	3250	800	2950	48	343
17..	925	3300	1150	3840	905	3270	46	325
18..	900	3300	1100	3840	900	3300	48	326
19..	925	3300	1150	3970	1150	4060	64	411
20..	875	3200	1150	4060	1150	4060	66	410
21..	850	3160	1350	4490	1200	4130	650	2430
22..	800	2950	640	2510	1220	4140	700	2610
23..	800	2910	660	2490	1200	4130	700	2610
24..	775	2940	1350	4560	1250	4130	1120	3830
25..	775	2940	800	2970	--	--	1100	3840
26..	750	2890	825	2970	--	--	925	3270
27..	800	2910	900	3300	188	844	900	3270
28..	750	2840	900	3270	189	850	650	2410
29..	800	3270	--	--	52	362	625	2410
30..	--	--	--	--	52	362	800	2870
31..	--	--	--	--	--	--	775	2840

	JUNE		JULY		AUGUST		SEPTEMBER	
1..	--	--	1250	4260	650	2540	442	1680
2..	810	3060	825	2900	550	2290	440	1680
3..	810	3060	775	2870	550	2260	512	1920
4..	400	1730	675	2520	650	2550	515	1940
5..	405	1730	650	2520	800	3160	720	2540
6..	395	1680	700	2590	800	3070	1200	3940
7..	385	1670	675	2580	800	3090	1200	3960
8..	570	2240	700	2670	800	3090	1040	3500
9..	550	2170	725	2680	800	3180	1050	3500
10..	310	1380	700	2630	825	3060	1750	4100
11..	310	1370	680	2570	880	3080	1240	4070
12..	315	1390	740	2660	850	3150	960	3330
13..	310	1370	730	2660	800	3160	980	3320
14..	490	1990	740	2700	820	3160	920	3170
15..	495	1990	730	2670	820	3230	940	3260
16..	850	3260	780	2880	820	3230	950	3300
17..	925	3270	630	2140	131	607	950	3300
18..	925	3300	620	2140	780	2690	1480	4670
19..	925	3270	112	547	130	609	1480	4660
20..	1150	3890	--	--	132	610	1330	4310
21..	1120	3900	--	--	42	272	1340	4230
22..	1650	5240	--	--	148	655	800	2790
23..	1680	5250	147	736	48	479	800	2810
24..	430	1790	145	727	99	484	790	2800
25..	430	1780	230	1030	520	1850	795	2790
26..	1250	4240	235	1040	72	408	710	2620
27..	1280	4270	210	1040	193	848	710	2610
28..	1220	4260	210	1040	141	666	795	2800
29..	1250	4270	270	1230	143	673	800	2780
30..	1250	4260	270	1220	240	1040	795	2810
31..	--	--	370	1520	250	1060	--	--

ARKANSAS RIVER BASIN--Continued

7-2310. LITTLE RIVER NEAR SASAKWA, OKLA.--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 6, 1959.....	10300	--	--	22	8.5	38		100	0	0.0	64	--	1.4	--	202	0.27	5620	90	8	1.7	369	8.2
Oct. 19.....	a 132	--	--	92	107	578		88	0	21	1300	--	--	--	b 2140	2.91	763	670	598	9.7	4230	8.1
Oct. 26.....	90	9.0	--	186	113	661		346	0	36	1450	0.1	.8	0.35	b 2630	3.58	639	930	646	9.4	4930	8.0
Feb. 16, 1960.....	289	10	0.00	184	78	511		372	0	33	1100	.0	.2	.16	2270	3.09	1770	780	475	8.0	3860	8.1
Apr. 6.....	104	9.0	.00	141	83	493		352	0	38	1020	.1	.2	.39	2260	3.07	635	695	406	8.1	3620	8.0
July 27.....	a 2060	6.5	.00	26	13	36		112	0	7.8	69	.3	.5	.09	235	.32	1310	120	28	1.4	403	7.3
Aug. 18.....	a 114	--	--	85	63	446		136	0	21	925	--	1.3	--	1870	2.54	576	470	358	8.9	3110	8.2

a Daily mean discharge.
b Calculated from determined constituents.

Temperature (°F) of water, water year October 1959 to September 1960

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

7-2320. GAINES CREEK NEAR KREBS, OKLA.

LOCATION.--At gaging station on abandoned bridge on county road, 0.8 mile upstream from Nutter Creek and 6.5 miles northeast of Krebs, Pittsburg County.
DRAINAGE AREA.--588 square miles.
RECORDS AVAILABLE.--Chemical analyses: September 1946 to September 1947, November 1959 to September 1960 (discontinued).
REMARKS.--Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, November 1959 to September 1960

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Nov. 13, 1959	61			10	5.6	13		46	0	25	8.1		1.3		122	0.17	20.1	48	10	0.8	155	7.5
Dec. 8	18			18	9.0	19		66	0	47	14		1.3		168	.23	8.16	82	28	.9	258	7.6
Jan. 9, 1960	2020			5.4	4.3	8.5		18	0	16	12		1.2		a 56	.08	305	31	16	.7	73	7.1
Feb. 10	333			7.2	3.9	9.2		26	0	24	5.1		.6		71	.10	63.8	34	12	.7	108	7.7
Mar. 10	270			8.8	4.9	13		28	0	32	9.2		.8		88	.12	64.2	42	19	.9	152	7.7
Apr. 9	73			13	7.7	14		46	0	42	9.6		.5		127	.17	25.0	64	26	.8	191	8.0
May 12	194			--	--	--		50	0	32	6.8		--		--	--	--	44	3	--	172	7.7
June 4	140			--	--	--		42	0	27	7.9		--		--	--	--	48	14	--	152	7.7
July 9	4.2			19	13	38		90	0	87	14		1.2		238	.32	2.70	102	28	1.6	365	7.3
Aug. 13	11			--	--	14		42	0	--	4.8		.2		--	--	--	48	14	.9	149	7.8
Sept. 14	2.0			10	9.0	3.0		40	0	27	4.7		1.3		a 75	.10	.40	62	29	.2	130	7.6

a Calculated from determined constituents.

ARKANSAS RIVER BASIN--Continued

7-2320.5. GAINES CREEK NEAR CANADIAN, OKLA.

LOCATION.--At bridge on State Highway 9, 5.5 miles northeast of Canadian, Pittsburg County.
RECORDS AVAILABLE.--Chemical analyses: November 1959 to September 1960 (discontinued).
REMARKS.--No discharge records available.

Chemical analyses, in parts per million, November 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Nov. 13, 1959.....				11	5.2	5.5		46	0	9.5	8.9		1.2		a 64	0.09		49	12	0.3	134	7.5
Dec. 8.....				27	12	38		102	0	31	58		1.3		260	.35		116	32	1.5	421	7.8
Jan. 9, 1960.....				6.1	2.4	7.6		22	0	12	6.4		2.4		a 48	.07		25	7	.7	126	7.6
Feb. 10.....				6.4	2.9	12		28	0	23	4.2		1.1		64	.09		28	5	1.0	97	7.8
Mar. 10.....				8.8	5.4	17		42	0	30	9.3		1.6		108	.15		44	10	1.1	162	7.9
Apr. 9.....				13	4.7	15		50	0	28	9.5		1.1		122	.17		52	11	.9	173	8.0
May 12.....				--	--	--		50	0	22	6.1		--		--	--		52	11	--	146	7.8
June 4.....				--	--	--		58	0	23	9.8		--		--	--		46	0	--	168	7.9
July 9.....				66	26	155		190	4	96	245		1.2		741	1.01		272	110	4.1	1230	8.4
Aug. 13.....				9.6	3.9	13		48	0	17	8.0		.2		85	.12		40	0	.9	132	7.3
Sept. 14.....				17	5.2	32		66	0	46	21		1.4		a 155	.21		64	10	1.7	216	7.8

a Calculated from determined constituents.

7-2325. NORTH CANADIAN RIVER NEAR GUYMON, OKLA.

LOCATION.--At gaging station at bridge on U.S. Highway 64 at Dry Sand Draw, 1.2 miles upstream from Gulf Creek and 2.5 miles north of Guymon, Texas County.
DRAINAGE AREA.--2,139 square miles, of which 964 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: November 1959 to September 1960.
Water temperatures: November 1959 to September 1960.
EXTREMES, November 1959 to September 1960.--Dissolved solids: Maximum, 409 ppm Jan. 1-10; minimum, 298 ppm Sept. 24-30.
Hardness: Maximum, 302 ppm Jan. 11-31; minimum, 184 ppm Sept. 24-30.
Specific conductance: Maximum daily, 678 micromhos Nov. 11; minimum daily, 323 micromhos July 22.
Water temperatures: Maximum, 100°F July 16, 24; minimum, freezing point on many days during November to March.
REMARKS.--Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, November 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Nov. 7-10, 1959...	7.5	--	--	50	27	38	--	270	0	70	15	--	1.9	--	347	0.47	7.03	234	12	1.1	545	8.2
Nov. 11-20.....	6.4	34	0.00	49	29	33	5.2	248	14	55	14	1.2	2.0	0.14	a 359	.49	6.20	242	16	.9	562	8.3
Nov. 21-30.....	8.2	28	.00	46	28	30	4.8	248	10	49	13	1.2	2.9	.13	a 335	.46	7.42	230	10	.9	524	8.4
Dec. 1-20.....	9.0	32	.01	53	29	32	6.1	286	0	57	15	1.2	2.5	.31	a 369	.50	8.97	250	16	.9	576	7.9
Dec. 21-31.....	9.0	32	.02	54	30	29	4.4	270	10	53	15	1.2	2.6	.28	a 364	.50	8.84	256	18	.8	565	8.3
Jan. 1-10, 1960...	8.5	37	.00	61	33	33	4.8	328	0	58	16	1.2	3.3	.35	a 409	.56	9.39	288	19	.8	625	8.2
Jan. 11-31.....	8.6	--	--	55	40	18	--	284	14	60	14	--	3.7	--	385	.52	8.94	302	46	.5	603	8.5
Feb. 1-20.....	17.0	32	.01	50	26	28	3.7	262	2	50	14	1.8	3.0	.22	355	.48	16.3	232	14	1.8	543	8.3
Feb. 21-29.....	6.1	--	--	50	32	25	--	282	0	54	15	--	2.2	--	339	.46	5.58	256	24	.7	552	8.2
Mar. 1-31.....	11.5	--	--	49	28	26	--	270	0	49	12	--	2.9	--	342	.47	10.6	236	14	.7	544	8.1
Apr. 1-20.....	6.9	27	.00	44	22	29	5.2	212	12	54	16	2.0	.5	.21	328	.45	6.11	202	8	.9	506	8.6
Apr. 21-30.....	8.3	--	--	39	30	32	--	238	10	54	15	--	1.4	--	327	.44	7.33	220	8	.9	526	8.4
May 1-10.....	4.8	--	--	42	28	34	--	262	0	53	16	--	1.7	--	345	.47	4.47	220	6	1.0	531	8.2
May 11-31.....	3.1	33	.00	38	29	33	6.2	232	12	65	17	2.0	1.2	.34	370	.50	3.10	216	6	1.0	531	8.5
June 1-10.....	3.8	31	.00	45	21	33	6.4	216	12	47	16	1.6	2.6	.23	333	.45	3.42	200	3	1.0	496	8.5
June 11-21.....	13.0	34	.00	42	22	38	7.9	214	10	55	17	2.0	3.3	.86	339	.46	11.9	196	4	1.2	491	8.5
July 4-17, 22-24..	2.5	28	.00	38	26	29	6.2	218	4	49	16	2.0	1.7	.63	a 308	.42	2.08	202	17	.9	474	8.3
Sept. 24-30.....	21.7	29	.00	46	17	28	7.2	208	4	47	12	1.4	4.3	.51	a 298	.41	17.5	184	7	.9	449	8.3

a Calculated from determined constituents.

ARKANSAS RIVER BASIN--Continued

7-2325. NORTH CANADIAN RIVER NEAR GUYMON, OKLA.--Continued

Temperature (°F) of water, November 1959 to September 1960

Month	Day																													Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
October	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
November	--	--	--	--	--	--	80	70	60	60	55	40	45	33	33	33	32	32	32	32	32	32	40	50	42	50	32	32	32	32	--	--
December	42	32	42	40	42	--	40	48	48	32	32	45	32	45	48	32	--	43	48	45	32	32	32	48	40	32	32	32	32	32	32	38
January	32	32	32	--	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	--	32	32	--	35	42	46	33
February	46	42	35	--	--	--	--	--	--	--	--	--	--	32	32	32	32	32	32	32	34	32	32	32	--	--	32	32	32	--	--	--
March	32	32	32	32	32	32	32	32	40	38	32	42	48	48	32	32	40	48	48	40	50	48	--	42	40	45	50	--	52	52	50	40
April	50	50	50	50	52	52	50	52	55	--	70	70	68	60	68	68	70	60	70	71	70	71	--	--	--	68	60	50	50	52	--	60
May	34	42	48	53	44	62	43	65	70	72	72	--	73	72	73	74	--	75	75	--	--	--	75	72	--	74	73	75	72	72	74	--
June	75	75	78	75	78	--	78	80	78	--	72	72	80	75	75	--	84	88	86	84	88	--	--	--	--	--	--	--	--	--	--	--
July	--	--	--	70	69	67	67	75	85	94	94	91	91	93	93	100	93	--	--	--	--	93	97	100	--	--	--	--	--	--	--	--
August	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
September	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	68	74	75	77	76	74	73	--	--

ARKANSAS RIVER BASIN--Continued

7-2330. COLDWATER CREEK NEAR HARDESTY, OKLA.

LOCATION.--At gaging station at bridge on State Highway 3, 2 miles northwest of Hardesty, Texas County, and 5.7 miles upstream from mouth.
DRAINAGE AREA.--1,967 square miles, of which 1,200 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: October 1957 to June 1960 (discontinued).

Chemical analyses, in parts per million, October 1959 to June 1960

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Nov. 19, 1959.....	4.5			35	59	44		224	0		26							330	146	1.1	763	8.0
Nov. 24.....	1.9			59	54	54		276	0		34							370	144	1.2	817	8.2
Feb. 16, 1960.....	6.4			48	49	42		212	0		33							320	146	1.0	712	8.1
Mar. 10.....	6.9			54	52	56		268	0		38							350	130	1.3	787	8.2
Mar. 17.....	7.7			46	57	50		268	0		33							350	130	1.2	784	8.1
Apr. 4.....	4.6			68	49	56		252	0		40							370	164	1.3	823	8.2
Apr. 18.....	4.0			75	47	55		268	0		42							380	160	1.2	722	8.2
Apr. 29.....	4.2			35	66	--		272	0		41							360	137	1.5	851	8.1
May 13.....	1.8			53	53	66		236	0		47							350	156	1.5	849	8.2
June 13.....	10.0			60	12	23		212	0		19							200	26	.7	581	8.3

ARKANSAS RIVER BASIN--Continued

7-2385. CANTON RESERVOIR NEAR CANTON, OKLA.
(Formerly published as 7-2385. North Canadian River at Canton Reservoir, near Canton, Okla.)

LOCATION (revised).--Just upstream from Canton Dam on North Canadian River, 2 miles northwest of Canton, Blaine County.
DRAINAGE AREA.--12,483 square miles, of which 4,883 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: October 1951 to September 1954, December 1955 to September 1960.
Water temperatures: October 1951 to September 1954.
REMARKS.--Records of reservoir storage for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Lake content (acre-feet)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 10, 1959.....	114500	4.8	0.55	77	22	90	2.4	200	0	130	123	0.8	0.5	0.03	626	0.85		284	120	2.3	894	7.8
November.....	--	4.6	.07	74	22	80	2.4	192	0	126	110	.8	1.1	.02	581	.79		276	118	2.1	885	7.7
Dec. 9.....	108100	9.4	.12	51	30	82	6.4	102	0	154	130	.9	6.2	.08	580	.79		250	166	2.3	951	7.8
Jan. 1, 1960.....	109800	9.4	.12	51	28	79	8.0	104	0	147	131	.7	4.9	.08	575	.78		244	159	2.2	951	7.8
Jan. 15.....	110000	11	.00	59	30	79	7.6	124	0	144	142	.9	3.3	.01	590	.80		272	170	2.1	964	8.0
Feb. 3.....	111300	9.6	.00	70	26	84	7.2	168	0	164	124	.6	1.6	.21	592	.81		280	142	2.2	939	7.5
Mar. 24.....	109200	13	.00	85	29	104	7.2	206	0	195	138	.6	.7	.51	691	.94		330	161	2.5	1070	7.4
April.....	--	11	.00	86	29	118	7.3	196	0	200	145	.6	1.0	.44	709	.96		332	172	2.8	1100	7.6
May 14.....	109400	2.2	.00	75	30	104	7.2	164	0	210	138	.6	1.0	.44	683	.93		310	176	2.6	1070	7.8
June 24.....	109300	6.8	.00	80	31	115	7.2	178	0	211	142	.6	1.2	.52	701	.95		325	179	2.8	1090	7.7
July.....	--	5.8	.00	78	31	116	7.2	168	0	212	145	.6	1.2	.45	698	.95		320	182	2.8	1090	7.7
Sept. 7.....	108500	8.8	.00	71	34	116	7.5	160	0	218	148	.6	1.1	.32	692	.94		315	184	2.8	1090	7.8

ARKANSAS RIVER BASIN--Continued

7-2420. NORTH CANADIAN RIVER NEAR WETUMKA, OKLA.

LOCATION.--At gaging station at bridge on U.S. Highway 75, 2.3 miles upstream from Wewoka Creek and 2.5 miles northeast of Wetumka, Hughes County.
DRAINAGE AREA.--14,290 square miles, of which 4,899 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: October 1953 to September 1960.
Water temperatures: October 1953 to September 1960.
EXTREMES, 1959-60.--Specific conductance: Maximum daily, 3,070 micromhos July 11; minimum daily, 317 micromhos May 6.
Water temperatures: Maximum, 98°F July 12; minimum, freezing point Mar. 3-5.
EXTREMES, 1953-60.--Dissolved solids (1953-57): Maximum, 25,800 ppm Feb. 8, 1955; minimum, 190 ppm May 26-27, 1957.
Hardness (1953-57): Maximum, 4,640 ppm Dec. 31, 1954; minimum, 108 ppm May 26-27, 1957.
Specific conductance: Maximum daily, 37,100 micromhos Dec. 31, 1954; minimum daily, 317 micromhos May 6, 1960.
Water temperature: Maximum, 98°F July 12, 1960; minimum, freezing point on many days during winter months.
REMARKS.--Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chloride and specific conductance, water year October 1959 to September 1960

Day	OCTOBER		NOVEMBER		DECEMBER		JANUARY	
	Chloride (Cl) ppm	Specific conductance (micromhos at 25°C)	Chloride (Cl) ppm	Specific conductance (micromhos at 25°C)	Chloride (Cl) ppm	Specific conductance (micromhos at 25°C)	Chloride (Cl) ppm	Specific conductance (micromhos at 25°C)
1..	121	650	540	2230	740	2880	355	1610
2..	104	556	570	2330	740	2860	340	1510
3..	49	355	490	2110	730	2860	375	1740
4..	50	364	74	440	750	2900	390	1820
5..	44	332	120	627	700	2720	370	1770
6..	48	374	126	672	700	2740	390	1810
7..	56	418	312	1390	720	2820	370	1730
8..	60	452	252	1160	740	2860	420	1840
9..	57	413	240	1100	720	2840	340	1530
10..	54	412	315	1470	720	2840	340	1520
11..	98	584	310	1490	720	2820	300	1350
12..	118	672	380	1710	720	2790	240	1090
13..	140	795	480	2020	740	2820	222	962
14..	178	973	520	2110	740	2840	155	795
15..	200	1070	530	2220	690	2730	240	1120
16..	202	1120	570	2340	600	2370	195	947
17..	222	1200	540	2320	380	1500	135	706
18..	238	1250	600	2470	265	1100	250	1180
19..	265	1330	590	2430	165	770	365	1530
20..	278	1370	620	2530	225	1030	255	1250
21..	295	1450	670	2650	162	787	250	1250
22..	350	1640	650	2620	162	781	355	1540
23..	355	1650	710	2760	225	1080	470	1950
24..	400	1810	730	2880	235	1140	420	1820
25..	450	2010	710	2790	300	1360	410	1760
26..	490	2150	720	2830	325	1460	480	1940
27..	505	2190	720	2810	115	593	510	2080
28..	542	2330	730	2890	225	951	550	2250
29..	535	2350	740	2890	180	869	485	2060
30..	500	2160	730	2860	215	1030	525	2140
31..	475	2130	--	--	280	1270	590	2360

ARKANSAS RIVER BASIN--Continued

7-2420. NORTH CANADIAN RIVER NEAR WETUMKA, OKLA.--Continued

Chloride and specific conductance, water year October 1959 to September 1960--Continued

Day	FEBRUARY		MARCH		APRIL		MAY	
	Chloride (Cl) ppm	Specific conductance (micromhos at 25°C)	Chloride (Cl) ppm	Specific conductance (micromhos at 25°C)	Chloride (Cl) ppm	Specific conductance (micromhos at 25°C)	Chloride (Cl) ppm	Specific conductance (micromhos at 25°C)
1..	525	2230	360	1660	280	1400	150	775
2..	570	2320	410	1880	350	1530	152	768
3..	540	2280	330	1660	380	1710	180	913
4..	490	2000	300	1510	370	1700	210	1080
5..	228	989	330	1620	380	1700	165	894
6..	225	1030	380	1790	390	1800	39	317
7..	198	924	400	1840	340	1630	44	336
8..	198	1040	390	1810	310	1560	74	503
9..	198	1000	405	1830	320	1600	98	580
10..	210	1060	330	1510	360	1660	132	708
11..	220	1080	220	1140	460	1960	155	816
12..	230	1100	230	1210	470	2060	175	921
13..	225	1250	300	1490	470	2050	215	1080
14..	230	1290	310	1500	360	1590	285	1370
15..	235	1280	290	1450	132	703	348	1580
16..	230	1290	270	1400	126	688	430	1870
17..	250	1330	260	1390	171	872	490	2060
18..	255	1370	270	1400	218	987	460	1930
19..	290	1450	260	1440	296	1320	370	1500
20..	260	1340	280	1510	280	1340	136	718
21..	270	1390	280	1470	355	1680	65	444
22..	285	1460	280	1500	400	1830	63	445
23..	305	1520	280	1530	410	1880	80	506
24..	370	1680	305	1580	520	2050	98	580
25..	370	1720	300	1580	580	2220	131	719
26..	380	1770	310	1600	585	2340	194	1040
27..	375	1700	350	1700	690	2600	335	1260
28..	415	1830	--	--	690	2630	300	1470
29..	385	1740	470	2110	236	1010	340	1580
30..	--	--	400	1900	94	510	385	1680
31..	--	--	320	1790	--	--	415	1750

Day	JUNE		JULY		AUGUST		SEPTEMBER	
	Chloride (Cl) ppm	Specific conductance (micromhos at 25°C)	Chloride (Cl) ppm	Specific conductance (micromhos at 25°C)	Chloride (Cl) ppm	Specific conductance (micromhos at 25°C)	Chloride (Cl) ppm	Specific conductance (micromhos at 25°C)
1..	470	1950	540	2160	200	1070	320	1730
2..	430	1770	360	1610	400	1640	325	1420
3..	360	1490	400	1720	455	1870	500	1950
4..	380	1640	500	2060	280	1230	550	1950
5..	320	1560	580	2330	220	997	550	2040
6..	360	1600	640	2470	205	1010	500	1960
7..	540	2150	710	2700	220	1110	600	2150
8..	330	1440	720	2770	268	1270	625	2260
9..	220	1180	760	2810	345	1530	575	2190
10..	210	1170	790	2870	410	1740	525	2040
11..	165	951	850	3070	510	2040	520	2050
12..	145	859	600	2330	525	2130	610	2300
13..	155	920	575	2260	550	2180	630	2370
14..	162	883	650	2470	590	2310	650	2480
15..	220	1070	700	2520	580	2260	690	2570
16..	192	1040	650	2600	635	2380	720	2630
17..	170	935	700	2670	660	2470	650	2430
18..	165	1010	675	2490	500	1940	660	2470
19..	190	1180	550	2150	500	1990	705	2570
20..	220	1320	650	2380	500	2120	640	2390
21..	220	1360	600	2250	478	1850	600	2280
22..	270	1500	400	1820	505	2060	555	2110
23..	270	1500	176	851	450	1790	560	2120
24..	275	1520	146	706	700	2590	495	1930
25..	310	1540	232	1090	335	1350	525	2060
26..	360	1760	134	707	362	1540	615	2350
27..	410	1880	126	669	472	1800	570	2230
28..	430	1960	85	500	432	1680	640	2400
29..	455	2040	160	807	222	1040	600	2240
30..	530	2280	170	949	195	893	550	2140
31..	--	--	200	1030	185	873	--	--

7-2420. NORTH CANADIAN RIVER NEAR WETUMKA, OKLA.--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 26, 1959.....	499	13	--	124	41	253		300	0	76	495	0.5	6.4	0.00	a 1160	1.58	1560	480	234	5.0	2100	7.8
Feb. 16, 1960.....	1410	8.0	0.00	95	27	141		220	0	140	232	.7	1.0	.19	800	1.09	3040	350	170	3.3	1330	7.9
Apr. 6.....	595	12	.00	102	38	223		236	0	151	385	.6	.2	.08	1140	1.55	1830	410	216	4.8	1820	7.2
July 27.....	875	10	.00	54	12	67		166	0	23	120	.3	.8	.09	422	.57	997	184	48	2.2	730	7.6

a Calculated from determined constituents.

Temperature (°F) of water, water year October 1959 to September 1960

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

ARKANSAS RIVER BASIN--Continued

7-2435. DEEP FORK NEAR BEGGS, OKLA.

LOCATION.--At gaging station at highway bridge, 3 miles upstream from Adams Creek, 4 miles south of Beggs, Okmulgee County, and 8 miles downstream from Flat Rock (Checkerboard) Creek.
DRAINAGE AREA.--2,018 square miles.
RECORDS AVAILABLE.--Chemical analyses: November 1951 to September 1960.
Water temperatures: November 1951 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 1,330 ppm July 19; minimum, 172 ppm Oct. 1-15.
Hardness: Maximum, 460 ppm July 19; minimum, 63 ppm May 6-10.
Specific conductance: Maximum daily, 2,210 micromhos July 19; minimum daily, 176 micromhos Oct. 6.
Water temperatures: Maximum, 93°F July 12; minimum, 33°F Jan. 22, Feb. 24.
EXTREMES, 1951-60.--Dissolved solids: Maximum, 5,340 ppm Mar. 26, 1954, Jan. 11-17, 1955; minimum, 87 ppm Sept. 27, 1955.
Hardness: Maximum, 1,310 ppm July 21, 1955; minimum, 16 ppm Sept. 27, 1955.
Specific conductance: Maximum daily, 10,500 micromhos Jan. 12, 1955; minimum daily, 113 micromhos May 27, 1957.
Water temperatures: Maximum, 97°F July 28, Aug. 6, 16, 18, 1956; minimum, freezing point on many days during winter months.
REMARKS.--Minimum observed during water year: Dissolved solids, 160 ppm July 25; hardness, 58 ppm July 25. Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1-15, 1959...	9197	--	--	18	11	18	--	72	0	12	40	--	1.6	--	172	0.23	4270	90	31	0.8	304	7.5
Oct. 16-17.....	1675	--	--	42	19	55	--	168	0	12	108	--	1.4	--	352	.48	1590	184	46	1.8	633	7.8
Oct. 18-23.....	590	--	--	57	28	79	--	238	0	20	151	--	1.8	--	494	.67	787	258	63	2.1	864	8.0
Oct. 24-31.....	273	--	--	78	35	124	--	288	0	26	245	--	1.9	--	706	.96	520	340	104	2.9	1260	8.0
Nov. 1-2.....	235	--	--	96	39	191	--	316	0	80	335	--	.0	--	970	1.32	615	400	141	4.2	1530	8.0
Nov. 3-10.....	2955	--	--	34	6.1	61	--	94	0	49	81	--	1.0	--	279	.38	2230	110	33	2.5	438	7.7
Nov. 11-14.....	913	--	--	63	16	98	--	186	0	47	167	--	.8	--	490	.67	1210	224	72	2.8	849	7.7
Nov. 15-20.....	387	--	--	75	31	150	--	236	0	77	260	--	1.2	--	780	1.06	815	315	122	3.7	1230	7.7
Nov. 21-30.....	251	12	0.00	105	38	222	1.0	356	0	97	360	0.5	15	0.00	1090	1.48	739	420	128	4.7	1770	8.2
Dec. 1-10.....	195	--	--	93	51	242	--	316	0	89	435	--	.8	--	1070	1.46	563	440	181	5.0	1860	8.2
Dec. 11-15.....	191	--	--	86	49	220	--	308	0	94	385	--	.6	--	988	1.34	509	415	162	4.7	1710	8.1
Dec. 16-17.....	872	--	--	46	19	133	--	110	0	54	238	--	1.4	--	578	.79	1360	194	104	4.1	976	7.8
Dec. 18-20.....	2977	--	--	27	8.9	64	--	72	0	44	97	--	1.0	--	330	.45	2650	104	45	2.7	466	7.6
Dec. 21-31.....	2206	10	.00	34	8.5	76	.6	104	0	40	115	.0	2.5	.00	338	.46	2010	120	35	3.0	597	7.6
Jan. 1-10, 1960...	771	--	--	59	34	94	--	206	0	35	200	--	2.6	--	593	.81	1230	285	116	2.4	1030	8.0
Jan. 11.....	956	--	--	53	35	81	--	168	10	33	185	--	2.4	--	553	.75	1430	275	121	2.1	930	8.6
Jan. 12-20.....	2271	--	--	36	21	61	--	142	0	26	118	--	1.6	--	391	.53	2400	178	62	2.0	641	8.1
Jan. 21-31.....	720	--	--	61	37	96	--	230	0	36	202	--	2.5	--	626	.85	1220	305	116	2.4	1060	8.1
Feb. 1-3.....	493	--	--	78	38	137	--	290	0	40	260	--	1.6	--	714	.97	950	350	112	3.2	1270	7.8

Feb. 4-7	3122	--	--	28	12	53	--	82	0	24	100	--	1.7	--	308	.42	2600	120	53	2.1	501	6.6
Feb. 8-20	1227	--	--	57	27	97	--	210	0	33	181	--	1.8	--	540	.73	1790	252	80	2.7	949	8.2
Feb. 21-29	549	--	--	67	40	123	--	248	0	47	245	--	1.1	--	671	.91	995	332	129	2.9	1240	7.9
Mar. 1-24	983	--	--	63	41	123	--	218	0	47	258	--	2.0	--	692	.94	1840	326	148	3.0	1240	8.1
Mar. 25-31	436	--	--	78	37	138	--	268	4	43	265	--	1.0	--	815	1.11	959	345	119	3.2	1340	8.4
Apr. 1-10	338	--	--	78	48	150	--	256	24	47	295	--	1.7	--	864	1.18	788	390	140	3.3	1410	8.6
Apr. 11-13	243	--	--	80	46	169	--	306	0	48	322	--	1.7	--	920	1.25	604	390	139	3.7	1540	8.2
Apr. 14-20	4723	--	--	22	9.5	40	--	82	0	20	65	--	2.4	--	212	.29	2700	94	27	1.8	386	7.2
Apr. 21-22	4220	--	--	34	15	44	--	132	6	18	74	--	.0	--	301	.41	3430	146	28	1.6	485	8.4
Apr. 23	2720	--	--	42	20	58	--	168	4	22	105	--	.2	--	399	.54	2930	188	44	1.9	642	8.5
Apr. 24-29	689	--	--	62	29	97	--	222	8	30	180	--	2.2	--	576	.78	1070	272	76	2.6	962	8.5
Apr. 30	1650	--	--	17	23	57	--	112	2	18	104	--	.2	--	329	.45	1470	136	40	2.1	543	8.3
May 1-3	999	--	--	53	31	71	--	212	12	28	135	--	2.2	--	492	.67	1330	260	66	1.9	820	8.6
May 4-5	2340	--	--	34	20	56	--	124	4	21	111	--	2.3	--	368	.50	2330	166	58	1.9	593	8.5
May 6-10	10150	--	--	14	6.8	22	--	56	0	10	38	--	1.4	--	174	.24	4770	63	17	1.2	234	7.1
May 11-15	6400	--	--	28	13	31	--	116	4	12	52	--	2.2	--	229	.31	3960	122	20	1.2	384	8.4
May 16-18	1119	--	--	50	22	70	--	180	10	19	130	--	2.0	--	452	.61	1370	216	52	2.1	744	8.5
May 19	2400	--	--	37	16	80	--	88	6	17	165	--	3.2	--	443	.60	2870	160	78	2.8	722	8.4
May 20-31	4032	--	--	25	13	38	--	108	0	17	64	--	2.6	--	240	.33	2610	116	28	1.5	399	8.0
June 1-6	1122	--	--	44	22	66	--	192	0	22	114	--	1.6	--	444	.60	1350	200	42	2.0	676	8.1
June 7-8	2075	--	--	22	8.5	49	--	84	0	14	80	--	.0	--	253	.34	1420	90	21	2.2	394	7.8
June 9-10	1278	--	--	40	18	68	--	152	0	19	124	--	.1	--	418	.57	1440	172	48	2.2	671	7.7
June 11-20	850	--	--	46	24	73	--	192	4	24	128	--	1.8	--	470	.64	1080	212	48	2.2	737	8.3
June 21-25	380	--	--	52	25	90	--	196	6	28	162	--	1.6	--	530	.72	544	234	64	2.6	834	8.4
June 26-30	211	--	--	63	31	119	--	220	12	32	220	--	2.0	--	672	.91	383	286	86	3.1	1080	8.5
July 1-10	141	13	0.00	72	44	146	2.8	288	0	44	270	0.5	2.2	0.68	769	1.05	293	360	124	3.3	1310	8.1
July 11-17	122	--	--	70	40	148	--	280	12	44	258	--	1.9	--	778	1.06	256	340	90	3.5	1290	8.6
July 18	84	--	--	67	40	144	--	276	0	44	265	--	.5	--	782	1.06	177	333	107	3.4	1310	8.2
July 19	168	--	--	98	52	272	--	214	0	29	600	--	.2	--	1330	1.81	603	460	284	5.5	2210	8.1
July 20-22	145	--	--	62	34	152	--	244	0	35	275	--	.0	--	744	1.01	291	295	95	3.8	1270	7.7
July 23	1530	--	--	32	17	96	--	94	0	18	185	--	.1	--	a 394	.54	1630	148	71	3.4	771	7.9
July 24-31	2586	--	--	19	9.4	27	--	76	0	11	49	--	1.4	--	186	.25	1300	86	24	1.3	305	7.8

a Calculated from determined constituents.

ARKANSAS RIVER BASIN--Continued

7-2435. DEEP FORK NEAR BEGGS, OKLA.--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Aug. 1-10, 1960...	885	13	0.00	34	17	42	3.3	158	0	20	65	0.3	2.2	0.55	a 275	0.37	657	156	26	1.5	484	8.1
Aug. 11-19.....	117	--	--	51	27	72	--	228	0	26	128	--	1.3	--	466	.63	147	240	53	2.0	766	8.0
Aug. 20-21.....	210	--	--	64	32	159	--	180	0	21	330	--	.1	--	804	1.09	456	290	142	4.1	1320	7.9
Aug. 22-31.....	184	--	--	46	29	99	--	200	0	30	180	--	1.4	--	545	.74	271	235	71	2.8	923	7.9
Sept. 1-10.....	133	12	.00	47	25	85	5.4	218	2	36	133	.3	1.9	.43	474	.64	170	222	40	2.5	812	8.3
Sept. 11-20.....	41.6	--	--	56	29	102	--	250	0	37	166	--	2.2	--	540	.73	60.6	258	53	2.7	962	8.2
Sept. 21-30.....	26.6	13	.00	65	36	126	3.9	274	0	41	230	.3	1.4	.54	698	.95	50.1	308	84	3.1	1180	8.2
Weighted average	1582	--	--	32	16	52	--	121	--	23	95	--	1.8	--	318	0.43	1360	146	47	1.9	535	--
Analyses of additional samples																						
Oct. 27, 1959.....	b 270	10	--	68	38	118		288	0	30	222	0.3	1.7	0.21	a 830	0.86	459	325	89	2.9	1190	7.8
Feb. 15, 1960.....	b 687	8.0	0.00	64	29	96		220	0	32	193	.3	1.8	.12	552	.75	1020	280	100	2.5	989	8.0
Apr. 4.....	b 337	5.5	.00	74	44	135		290	0	41	268	.3	.1	.30	794	1.08	722	365	128	3.1	1340	8.2
July 25.....	b 2910	12	.09	14	5.6	28		53	0	12	44	.3	.7	.05	180	.22	1260	58	18	1.6	254	7.0

a Calculated from determined constituents.
b Discharge at time of sampling.

Temperature (°F) of water, water year October 1959 to September 1960

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

7-2450. CANADIAN RIVER NEAR WHITEFIELD, OKLA.

LOCATION.--At gaging station at bridge on State Highway 2, 0.8 mile north of Whitefield, Haskell County, and 5.5 miles upstream from Snake Creek.
DRAINAGE AREA.--47,576 square miles, of which 9,700 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: September 1944 to February 1945, September 1946 to September 1960.
Water temperatures: September 1944 to February 1945, September 1946 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 1,390 ppm Dec. 1-10; minimum, 172 ppm May 21-26.
Hardness: Maximum, 485 ppm Dec. 11-15; minimum, 80 ppm Oct. 1-10.
Specific conductance: Maximum daily, 2,310 micromhos Dec. 6; minimum daily, 240 micromhos May 19.
Water temperatures: Maximum, 83°F July 13; minimum, freezing point Mar. 3.
EXTREMES, 1944-80.--Dissolved solids: Maximum, 15,000 ppm Nov. 10-11, 1957; minimum, 89 ppm Jan. 2, 5-7, 1948.
Hardness: Maximum, 3,080 ppm Nov. 10, 1956; minimum, 18 ppm Feb. 17, 1948.
Specific conductance: Maximum daily, 22,900 micromhos Nov. 11, 1958; minimum daily, 71.7 micromhos Jan. 2, 1948.
Water temperatures: Maximum, 88°F Sept. 4, 1944; minimum, freezing point on many days during winter months.
REMARKS.--Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1-10, 1959...	67790	11	0.00	21	6.7	38	0.3	72	0	17	52	0.5	7.8	0.00	223	0.30	40820	80	21	1.8	336	7.2
Oct. 11-16.....	16720	--	--	32	9.2	36	--	106	0	14	66	--	1.3	--	237	.32	10700	118	31	1.4	424	7.7
Oct. 17-18.....	11080	--	--	37	14	50	--	122	0	23	96	--	1.1	--	326	.44	9750	152	52	1.8	556	7.7
Oct. 19-20.....	7625	--	--	55	12	64	--	138	0	30	128	--	1.3	--	391	.53	8050	186	73	2.0	692	7.8
Oct. 21.....	3780	--	--	54	22	89	--	162	0	43	170	--	.2	--	498	.67	5060	225	92	2.6	882	7.5
Oct. 22-24.....	2550	--	--	75	34	122	--	204	0	63	252	--	2.0	--	699	.95	4810	325	158	2.9	1240	8.0
Oct. 25-31.....	1789	--	--	94	43	172	--	244	0	69	362	--	1.9	--	933	1.27	4510	410	210	3.7	1630	8.0
Nov. 1-3.....	1713	--	--	100	38	214	--	250	0	72	418	--	1.4	--	1060	1.44	4900	405	200	4.6	1830	7.9
Nov. 4-10.....	17660	--	--	38	11	57	--	108	0	20	110	--	1.1	--	302	.41	14400	142	54	2.1	564	7.8
Nov. 11-14.....	5835	--	--	47	24	65	--	136	0	28	153	--	1.0	--	410	.56	6240	215	104	1.9	765	7.8
Nov. 15-20.....	2572	--	--	87	41	147	--	230	0	47	330	--	1.6	--	841	1.14	5840	385	196	3.3	1480	8.0
Nov. 21-30.....	1632	7.4	.00	101	17	258	19	128	0	43	530	.1	2.2	.00	1110	1.51	4890	320	215	6.3	1980	8.0
Dec. 1-10.....	1205	2.0	.00	107	27	260	29	110	0	109	540	.0	2.3	.51	1390	1.89	4520	380	290	5.8	2240	8.1
Dec. 11-15.....	1222	--	--	118	46	270	--	278	8	64	540	--	3.1	--	1300	1.77	4290	485	244	5.3	2200	8.4
Dec. 16.....	5840	--	--	87	38	189	--	190	12	49	395	--	2.3	--	928	1.26	14630	375	200	4.2	1620	8.5
Dec. 17-20.....	30180	--	--	38	11	80	--	104	0	23	114	--	1.6	--	324	.44	26400	140	55	2.2	587	8.0
Dec. 21-24.....	13900	--	--	68	7.4	76	--	134	0	74	125	--	2.3	--	439	.60	16480	200	90	2.3	751	8.1
Dec. 25-27.....	11030	--	--	46	33	106	--	164	0	83	182	--	2.6	--	579	.79	17240	250	116	2.9	990	8.2
Dec. 28-31.....	17080	--	--	40	13	67	--	112	0	35	121	--	1.3	--	360	.49	16600	155	63	2.3	633	8.0
Jan. 1-9, 1960....	6411	--	--	58	24	106	--	154	2	57	202	--	2.0	--	588	.80	10180	245	116	2.9	1000	8.3

ARKANSAS RIVER BASIN--Continued

7-2450. CANADIAN RIVER NEAR WHITEFIELD, OKLA.--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Jan. 10-12, 1960..	11330	--	--	48	21	96	--	120	0	41	192	--	1.8	--	530	0.72	16210	205	106	2.9	898	8.2
Jan. 13-20.....	17690	--	--	40	14	67	--	12	0	38	115	--	1.6	--	372	.51	17770	156	58	2.3	622	7.7
Jan. 21-31.....	4875	--	--	75	29	135	--	204	0	58	262	--	2.3	--	762	1.04	10030	305	138	3.4	1270	8.1
Feb. 1-4.....	4040	--	--	101	38	187	--	252	0	93	362	--	2.6	--	969	1.32	10570	410	204	4.0	1660	8.2
Feb. 5.....	23800	--	--	69	24	127	--	170	0	90	220	--	4.6	--	673	.92	43250	270	130	3.4	1140	8.2
Feb. 6.....	23400	--	--	54	17	106	--	122	0	35	210	--	3.1	--	582	.79	36770	204	104	3.2	951	8.1
Feb. 7-10.....	14620	--	--	52	15	83	--	134	0	64	138	--	2.0	--	455	.62	17960	192	82	2.6	778	8.1
Feb. 11-29.....	5689	--	--	67	26	104	--	140	0	88	208	--	1.7	--	637	.87	9780	274	160	2.7	1110	8.1
Mar. 1-10.....	4319	--	--	65	30	125	--	176	0	63	245	--	1.7	--	733	1.00	8550	284	140	3.2	1170	8.0
Mar. 11-15.....	7630	--	--	69	27	124	--	170	0	75	238	--	2.5	--	735	1.00	15140	285	146	3.2	1160	7.8
Mar. 16-20.....	7648	--	--	61	24	104	--	150	0	77	192	--	1.8	--	659	.90	13610	250	127	2.8	1020	7.4
Mar. 21-26.....	3782	--	--	77	30	135	--	208	0	93	240	--	2.3	--	819	1.11	8360	315	144	3.3	1260	8.2
Mar. 27-28.....	7625	--	--	45	18	74	--	122	0	56	132	--	1.7	--	479	.65	9860	186	86	2.3	761	8.1
Mar. 29-31.....	3283	--	--	70	29	123	--	176	0	74	242	--	1.3	--	757	1.03	6710	295	151	3.1	1190	8.1
Apr. 1-14.....	2249	9.6	0.00	83	36	211	4.7	182	8	103	372	0.3	1.7	0.32	983	1.34	5970	356	194	4.9	1640	8.3
Apr. 15-20.....	11930	--	--	43	15	83	--	118	0	34	153	--	1.6	--	452	.61	14560	168	72	2.8	752	8.0
Apr. 21-27.....	6917	--	--	42	15	67	--	116	0	26	135	--	1.3	--	421	.57	7860	168	73	2.2	694	7.9
Apr. 28-30.....	6167	--	--	71	30	140	--	180	6	43	285	--	.8	--	778	1.06	12950	300	142	3.5	1290	8.3
May 1-5.....	15380	--	--	45	12	72	--	122	0	33	125	--	5.9	--	401	.55	16650	160	60	2.5	650	8.0
May 6-18.....	21920	--	--	34	10	32	--	106	0	17	65	--	1.6	--	260	.35	15390	128	41	1.2	409	8.2
May 19-20.....	129500	--	--	26	7.5	18	--	92	0	8.2	36	--	.7	--	184	.25	64340	96	20	.8	297	7.8
May 21-26.....	59630	--	--	26	8.0	20	--	92	2	10	36	--	1.4	--	172	.23	27690	98	19	.9	285	8.4
May 27-31.....	7950	--	--	43	13	64	--	142	0	22	113	--	1.6	--	380	.52	8160	162	46	2.2	605	8.0
June 1-12.....	5811	--	--	59	25	103	--	172	0	41	205	--	2.3	--	608	.83	9540	250	109	2.8	978	8.1
June 13-14.....	12800	--	--	99	35	191	--	200	0	224	288	--	1.7	--	1030	1.40	35600	390	226	4.2	1590	8.2
June 15-20.....	9023	--	--	74	33	154	--	182	0	146	248	--	5.2	--	833	1.13	20290	320	171	3.7	1340	8.1
June 21-28.....	2414	--	--	67	23	131	--	180	4	104	198	--	3.2	--	690	.94	4500	260	106	3.5	1090	8.4
June 29-30.....	1665	--	--	88	32	200	--	210	2	91	365	--	1.2	--	1010	1.37	4540	350	174	4.7	1600	8.3
July 1-22.....	4343	16	.00	74	35	194	4.8	206	0	119	310	.7	2.4	.69	897	1.22	10520	330	161	4.6	1490	8.2
July 23-31.....	21960	--	--	29	7.2	48	--	90	0	26	74	--	1.7	--	254	.35	15060	102	28	2.1	429	7.8
Aug. 1-4.....	5615	--	--	34	11	54	--	118	0	31	84	--	1.7	--	292	.40	4430	132	36	2.0	516	7.9
Aug. 5-10.....	2232	--	--	47	16	83	--	154	0	41	138	--	1.7	--	430	.58	2590	184	58	2.7	748	8.2
Aug. 11-13.....	1610	--	--	40	13	66	--	136	0	35	104	--	1.2	--	345	.47	1500	152	40	2.3	600	8.0

Aug. 14-20.....	3203	--	--	66	25	165	--	190	0	132	235	--	3.2	--	766	1.04	6620	268	112	4.4	1290	8.2
Aug. 21-31.....	4464	13	0.00	43	16	115	3.8	132	0	79	162	0.7	2.6	0.51	502	.68	6050	172	64	3.8	882	7.8
Sept. 1-10.....	950	--	--	56	21	121	--	176	0	57	200	--	1.7	--	580	.79	1490	225	81	3.5	1030	8.2
Sept. 11-30.....	579	14	.00	71	28	180	4.4	190	4	72	328	.3	1.6	.50	858	1.17	1340	294	132	4.6	1450	8.3
Weighted average	10370	--	--	41	14	69	--	118	--	38	122	--	2.9	--	394	0.54	11030	160	64	2.4	653	--

Analyses of additional samples

Oct. 26, 1959.....	a 1930	10	--	89	45	152		240	0	75	325	0.3	1.9	0.13	b 816	1.11	4250	405	208	3.3	1520	7.7
Feb. 16, 1960.....	a 5160	5.0	0.00	78	23	143		200	0	104	230	.3	2.4	.16	710	.97	9890	290	126	3.6	1220	8.1
Apr. 5.....	a 2880	8.0	.00	90	45	212		216	0	97	420	.3	.1	.18	1130	1.54	8790	410	233	4.6	1830	8.1
July 26.....	a 3810	6.5	.00	38	6.6	37		118	0	14	64	.3	.5	.02	253	.34	2600	122	26	1.5	412	7.7

a Discharge at time of sampling.
b Calculated from determined constituents.

Temperature (°F) of water, water year October 1959 to September 1960

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

ARKANSAS RIVER BASIN--Continued

7-2455. SALLISAW CREEK NEAR SALLISAW, OKLA.

LOCATION.--At gaging station on abandoned highway bridge, 400 feet downstream from water-supply dam of city of Sallisaw, 3.5 miles west of Sallisaw, Sequoyah County, 5 miles upstream from Little Sallisaw Creek, and 9 miles upstream from mouth.
DRAINAGE AREA.--182 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1951 to September 1953, October 1955 to September 1956, October 1957 to September 1960.
REMARKS.--Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 11, 1959.....	120			22	3.6	2.8		78	0	7.0	2.2	--	1.9	--	86	0.12	27.9	70	6	0.1	149	7.6
Oct. 18.....	62			29	1.8	4.4		84	0	--	4.0	--	1.7	--	--	--	--	80	11	.2	164	7.7
Oct. 25.....	30			29	1.8	4.5		90	0	--	4.4	--	.8	--	--	--	--	80	6	.2	170	7.7
Nov. 1.....	20			--	--	--		90	0	--	--	0.0	--	0.00	--	--	--	76	2	--	167	8.0
Nov. 8.....	a 162			24	3.4	2.3		80	0	6.2	4.1	--	1.0	--	100	.14	43.7	74	8	.1	155	7.5
Nov. 15.....	82			--	--	--		82	0	--	--	.0	--	.03	--	--	--	72	5	--	158	8.0
Nov. 22.....	50			--	--	--		84	0	--	--	.0	--	.00	--	--	--	76	7	--	160	8.0
Dec. 7.....	22			--	--	--		84	0	--	--	.0	--	.03	--	--	--	80	11	--	158	8.0
Dec. 12.....	27			--	--	--		78	0	--	--	.0	--	.04	--	--	--	70	6	--	156	8.0
Dec. 26.....	134			--	--	--		62	0	--	--	.0	--	.03	--	--	--	58	7	--	131	7.9
Jan. 4, 1960.....	92			25	3.3	2.9		70	0	--	4.0	--	.5	--	--	--	--	76	18	.1	141	7.6
Jan. 11.....	134			18	3.6	2.9		56	0	--	3.5	--	.6	--	--	--	--	60	14	.2	125	7.5
Jan. 16.....	406			22	1.2	1.9		58	0	--	2.6	--	.6	--	--	--	--	60	12	.1	117	7.4
Jan. 23.....	153			23	2.6	1.6		68	0	--	2.5	--	.2	--	--	--	--	68	12	.1	131	7.5
Jan. 31.....	86			23	2.1	--		68	0	--	5.0	.1	.8	--	--	--	--	66	10	--	143	7.5
Feb. 6.....	388			19	1.6	--		58	0	--	5.1	.3	.2	.09	--	--	--	54	6	--	118	7.5
Feb. 16.....	113			24	1.5	--		72	0	--	6.8	.0	.7	--	--	--	--	66	7	--	142	7.5
Feb. 23.....	91			23	1.6	--		68	0	--	6.7	.0	.5	--	--	--	--	64	8	--	142	7.6
Mar. 17.....	358			22	2.2	5.5		64	0	--	4.3	--	--	--	--	--	--	64	12	.3	132	7.9
Mar. 30.....	100			24	1.9	5.8		74	0	--	4.6	--	--	--	--	--	--	68	8	.3	161	8.0
Apr. 18.....	146			22	1.7	3.0		64	0	11	3.1	--	.2	--	74	.10	29.2	62	10	.2	135	7.9
Apr. 26.....	87			--	--	--		76	0	--	2.2	.0	.2	--	--	--	--	68	6	--	144	7.7
May 6.....	3680			16	1.0	2.1		44	0	--	2.1	--	--	--	--	--	--	44	8	.1	91	7.1
May 17.....	120			--	--	--		88	0	--	3.0	--	--	--	--	--	--	78	6	--	160	8.2
June 15.....	53			--	--	--		96	0	--	7.0	--	--	--	--	--	--	80	2	--	182	8.0
July 3.....	26			24	1.9	3.9		68	0	--	5.4	--	--	--	--	--	--	68	12	0.2	143	7.6
July 6.....	35			29	1.8	3.1		88	0	--	5.0	--	--	--	--	--	--	80	8	.1	164	7.7
Aug. 6.....	36			29	.9	2.5		90	0	3.3	2.5	--	0.5	--	107	0.15	10.4	76	2	.1	160	8.2
Aug. 29.....	16			--	--	--		92	0	--	2.6	0.0	.2	--	--	--	--	84	8	--	175	7.7
Sept. 9.....	4.5			32	.5	3.7		98	0	4.9	3.0	--	.6	--	123	.17	1.49	82	2	.2	176	8.2

a Daily mean discharge.

7-2460. SANS BOIS CREEK NEAR KEOTA, OKLA.

LOCATION.--At bridge on State Highway 9, 3 miles west of Keota, Haskell County.
DRAINAGE AREA.--346 square miles.
RECORDS AVAILABLE.--May 1958 to September 1960 (discontinued).
REMARKS.--No discharge records available.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 11, 1959.....				17	20	31		84	0	110	4.0	--	1.9	--	a 225	0.31		124	55	1.2	374	7.6
Dec. 8.....				--	--	--		122	0	--	--	0.1	--	0.20	--	--		146	46	--	511	8.2
Jan. 9, 1960.....				8.8	6.3	12		28	0	--	4.6	--	1.2	--	--	--		48	25	.7	131	7.1
Jan. 13.....				--	--	--		86	0	--	--	.1	--	.19	--	--		108	38	--	363	--
Feb. 10.....				10	7.1	19		46	0	49	4.3	--	.7	--	114	.16		54	16	1.1	199	8.0
Mar. 10.....				8.8	5.8	16		38	0	40	5.5	--	.7	--	105	.14		46	15	1.0	177	7.9
Apr. 9.....				14	9.5	27		68	0	63	7.9	--	.7	--	157	.21		74	18	1.4	268	8.2
May 12.....				--	--	--		112	0	--	5.1	--	--	--	--	--		140	48	--	465	8.1
June 4.....				--	--	--		150	6	--	5.0	--	--	--	--	--		180	47	--	602	8.4
July 9.....				38	34	128		196	8	323	2.6	--	--	--	a 630	.86		236	62	3.6	918	8.4
Sept. 14.....				50	33	116		210	12	302	3.0	--	1.6	--	625	.85		260	68	3.1	894	8.5

a Calculated from determined constituents.

ARKANSAS RIVER BASIN--Continued

7-2465. ARKANSAS RIVER NEAR SALLISAW, OKLA.

LOCATION.--At Kansas City Southern Railroad Co. bridge, 0.5 mile south of Redlands, 4 miles downstream from Cache Creek, 15 miles downstream from gaging station, and 14 miles southeast of Sallisaw, Sequoyah County.
DRAINAGE AREA.--147,898 square miles, of which 22,241 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: October 1958 to September 1960.
Water temperatures: June 1959 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 918 ppm July 9; minimum, 246 ppm July 25-31.
Hardness: Maximum, 335 ppm Nov. 20-30; minimum, 115 ppm July 25-31.
Specific conductance: Maximum daily, 2,010 micromhos Sept. 28; minimum daily, 333 micromhos Oct. 10.
Water temperatures: Maximum, 90°F Aug. 7; minimum, 38°F Mar. 1, 2, 8.
EXTREMES, 1958-60.--Dissolved solids: Maximum, 1,380 ppm Feb. 4, 1959; minimum, 208 ppm July 19-31, 1959.
Hardness: Maximum, 385 ppm Dec. 29-31, 1958, Jan. 6-7, 1959; minimum, 104 ppm July 19-31, 1959.
Specific conductance: Maximum daily, 2,500 micromhos Dec. 31, 1958; minimum daily, 302 micromhos July 28, 1959.
Water temperatures (June 1959 to September 1960): Maximum, 90°F Aug. 7, 1960; minimum, 38°F Mar. 1, 2, 8, 1960.
REMARKS.--Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1, 1959.....	82600	--	--	61	34	171	--	150	0	77	322	--	6.3	--	828	1.13	184700	290	167	4.4	1400	7.8
Oct. 2-31.....	160100	--	--	35	11	43	--	106	0	32	73	--	2.3	--	280	.38	121000	132	45	1.6	481	7.6
Nov. 1-19.....	43850	7.4	0.00	31	20	100	1.6	98	0	56	190	0.0	3.2	0.00	506	.69	59910	160	80	3.8	800	7.6
Nov. 20-30.....	16690	--	--	77	35	132	--	200	0	83	262	--	4.0	--	766	1.04	34520	335	171	3.1	1290	7.9
Dec. 1-10.....	15450	10	.00	67	17	188	1.6	136	0	102	288	.3	2.6	.02	751	1.02	31330	236	124	5.3	1260	7.8
Dec. 11-17.....	14080	--	--	80	29	168	--	194	0	100	298	--	3.5	--	854	1.16	32470	320	161	4.1	1450	7.9
Dec. 18-31.....	46950	--	--	54	20	90	--	134	0	63	165	--	3.7	--	511	.69	64780	215	105	2.7	878	7.6
Jan. 1-10, 1960...	25770	12	.02	60	17	114	4.6	156	0	71	180	.1	3.8	.18	537	.73	37360	220	92	3.3	964	7.8
Jan. 11-12.....	24100	--	--	62	28	141	--	140	6	73	265	--	2.6	--	708	.96	46070	270	146	3.7	1240	8.5
Jan. 13-15.....	57070	--	--	42	11	73	--	108	2	39	124	--	2.8	--	368	.50	56700	152	60	2.6	659	8.3
Jan. 16-31.....	30640	--	--	61	18	109	--	156	0	67	187	--	1.8	--	555	.75	45910	225	97	3.2	981	7.7
Feb. 1-2.....	17500	--	--	81	24	170	--	184	6	92	290	--	4.0	--	811	1.10	38320	300	139	4.3	1360	8.4
Feb. 3-10.....	52260	--	--	62	16	116	--	146	0	73	195	--	2.4	--	588	.80	82970	220	100	3.4	1010	7.4
Feb. 11-29.....	30310	12	.00	71	16	143	4.0	158	0	105	240	.3	3.8	.10	712	.97	58270	244	114	4.0	1230	8.1
Mar. 1-14.....	24710	14	.00	80	24	162	3.4	186	6	105	265	.2	3.0	.15	807	1.10	53840	298	136	4.1	1350	8.4
Mar. 15-20.....	59350	--	--	63	15	122	--	132	0	88	200	--	5.7	--	605	.82	96950	220	112	3.6	1020	8.0
Mar. 21-31.....	47930	--	--	65	12	105	--	144	0	92	158	--	5.0	--	547	.74	70790	212	94	3.2	922	8.0
Apr. 1-15.....	35780	12	.00	66	14	97	4.2	144	4	100	154	.2	4.2	.13	550	.75	53130	224	100	2.8	935	8.3
Apr. 16-21.....	69130	--	--	50	10	64	--	124	0	64	96	--	4.0	--	371	.50	69250	168	66	2.1	620	8.2
Apr. 22-27.....	30300	--	--	58	15	82	--	152	0	79	125	--	3.7	--	465	.63	38040	208	84	2.4	791	7.5

Apr. 28-30.....	22870	--	--	73	20	141	--	176	0	109	222	--	2.6	--	695	.95	42920	265	121	3.8	1170	8.2
May 1-5.....	44840	--	--	52	14	77	--	136	0	62	126	--	1.9	--	452	.61	54720	188	76	2.4	733	7.8
May 6-18.....	98080	--	--	37	8.6	36	--	110	0	33	57	--	1.9	--	259	.35	68590	128	38	1.4	420	7.7
May 19-31.....	101300	9.0	0.00	44	7.3	46	2.9	116	0	49	74	0.2	2.6	0.13	309	.42	84510	140	45	1.7	521	7.2
June 1-14.....	50720	11	.00	50	10	86	3.0	132	0	63	125	.2	2.9	.16	426	.58	58340	166	58	2.9	720	7.6
June 15-19.....	40880	--	--	69	19	183	--	142	0	126	282	--	3.6	--	803	1.09	88630	250	134	5.0	1360	8.1
June 20-25.....	21250	--	--	65	18	120	--	160	0	97	185	--	3.2	--	606	.82	34770	235	104	3.4	1020	8.2
June 26.....	16600	--	--	79	20	169	--	174	2	126	262	--	1.4	--	788	1.07	35320	280	134	4.4	1310	8.3
June 27-30.....	15750	--	--	69	17	136	--	144	8	103	210	--	2.6	--	669	.91	28450	240	108	3.8	1120	8.5
July 1-6.....	11540	--	--	79	23	165	--	170	2	126	265	--	2.6	--	805	1.09	25080	290	147	4.2	1310	8.3
July 7-8.....	18500	--	--	53	13	110	--	128	0	77	170	--	.5	--	528	.72	26370	185	80	3.5	874	7.8
July 9.....	29500	--	--	74	20	214	--	134	0	135	340	--	1.0	--	918	1.25	73120	265	155	5.7	1510	8.0
July 10-12.....	20830	--	--	45	9.1	93	--	120	0	61	135	--	.5	--	428	.58	24070	150	52	3.3	725	7.7
July 13-20.....	23020	--	--	66	21	192	--	168	0	147	265	--	2.8	--	829	1.13	51530	250	112	5.3	1360	8.1
July 21.....	13500	--	--	72	20	202	--	156	4	151	288	--	1.9	--	847	1.15	30870	260	126	5.4	1400	8.4
July 22-24.....	46100	--	--	38	9.7	83	--	110	0	54	119	--	2.2	--	378	.51	47050	135	45	3.1	657	8.2
July 25-31.....	79990	--	--	34	7.3	43	--	98	0	35	64	--	1.9	--	246	.33	53130	115	34	1.7	421	8.0
Aug. 1-16.....	16660	13	.00	50	14	92	4.3	146	0	60	134	.3	2.3	.38	a 442	.60	19880	184	64	2.9	751	8.0
Aug. 17-20.....	18820	--	--	53	14	110	--	144	0	81	158	--	3.6	--	520	.71	26420	190	72	3.5	878	8.1
Aug. 21-22.....	13500	--	--	58	23	165	--	160	0	116	245	--	.7	--	720	.98	26240	240	109	4.6	1210	7.9
Aug. 23-31.....	36360	--	--	58	13	77	--	128	0	61	140	--	2.5	--	454	.62	44570	200	95	2.6	779	8.1
Sept. 1-9.....	27590	13	.00	46	11	90	2.9	114	0	63	139	.3	2.9	.94	437	.59	32550	160	66	3.1	746	7.9
Sept. 10-14.....	9934	--	--	67	11	135	--	148	0	97	200	--	3.2	--	590	.80	15820	214	92	4.0	1090	8.0
Sept. 15-20.....	9573	--	--	54	11	116	--	140	0	71	170	--	2.9	--	500	.68	12920	178	64	3.8	905	7.7
Sept. 21-30.....	7416	--	--	71	14	164	--	166	0	98	250	--	2.6	--	699	.95	14000	236	100	4.7	1250	8.1
Weighted average	47540	--	--	48	13	82	--	126	--	59	131	--	2.8	--	433	0.59	55580	174	70	2.7	734	--

a Calculated from determined constituents.

Temperature (°F) of water, water year October 1959 to September 1960

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

ARKANSAS RIVER BASIN--Continued

7-2466. CACHE CREEK NEAR COWLINGTON, OKLA.

LOCATION.--At bridge on U.S. Highway 59, 2 miles southeast of Cowlington, Le Flore County.
RECORDS AVAILABLE.--Chemical analyses: November 1958 to September 1960 (discontinued).
REMARKS.--No discharge records available.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 11, 1959.....				7.2	5.4	4.4		26	0	20	3.9	--	1.8	--	70	0.10		40	18	0.3	98	7.0
Nov. 13.....				--	--	--		28	0	--	--	0.2	--	0.02	--	--		36	13	--	110	7.5
Dec. 8.....				--	--	--		36	0	--	--	.0	--	.02	--	--		59	14	--	145	7.6
Jan. 9, 1960.....				4.8	3.9	7.1		22	0	16	5.0	--	2.4	--	90	.12		28	10	.6	107	7.4
Feb. 10.....				5.6	1.9	--		20	0	--	7.0	.1	1.1	--	--	--		22	6	--	94	7.0
Mar. 10.....				7.2	2.9	11		20	0	26	6.1	--	1.4	--	77	.10		30	14	.8	119	7.6
Apr. 9.....				9.6	4.9	13		34	0	28	10	--	.6	--	a 83	.11		44	16	.8	160	7.6
May 12.....				--	--	--		30	0	--	6.0	--	--	--	--	--		50	26	--	127	7.6
June 4.....				--	--	--		46	0	--	8.1	--	--	--	--	--		44	6	--	200	7.8
July 9.....				16	1.5	43		58	0	78	6.8	--	1.7	--	199	.27		46	0	2.8	287	8.0
Aug. 13.....				17	8.1	32		64	0	81	6.2	--	.4	--	186	.25		76	24	1.6	307	7.7
Sept. 14.....				30	17	58		92	0	171	12	--	1.1	--	377	.51		146	70	2.1	520	8.2

a Calculated from determined constituents.

7-2470. POTEAU RIVER AT CAUTHRON, ARK.

LOCATION.--At gaging station at highway bridge at Cauthron, Scott County, and 8 miles downstream from Jones Creek.
DRAINAGE AREA.--200 square miles.
RECORDS AVAILABLE.--Chemical analyses: November 1959 to September 1960 (discontinued).
REMARKS.--Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (Calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Oct. 26, 1959...	7.7			3.1	2.8	4.0	1.5	20	0	8.0	3.8		0.4		33	0.04	0.66	17	0	--	61	7.2	15
Nov. 13.....	30			3.2	2.9	4.8	--	20	0	7.6	4.0		.7		a65	.09	5.26	20	4	0.5	63	6.9	--
Nov. 23.....	12			3.2	2.6	4.4	1.5	22	0	6.8	4.2		.6		34	.05	1.10	18	0	--	58	7.1	40
Dec. 8.....	6.2			--	--	--	--	28	0	--	--	0.1	--	0.02	--	--	--	20	0	--	71	7.4	--
Dec. 15.....	132			2.2	1.6	3.6	1.7	14	0	7.4	3.0		.8		27	.04	9.62	12	0	--	47	6.8	40
Jan. 9, 1960....	640			3.0	1.6	4.8	--	12	0	6.6	5.3		.2		27	.04	46.7	14	4	.6	60	7.4	--
Jan. 11.....	378			2.5	1.1	3.8	.8	11	0	7.8	2.8		.4		25	.03	25.5	10	2	--	44	6.6	33
Feb. 8.....	269			2.4	1.3	3.5	.6	12	0	6.2	2.8		.5		23	.03	16.7	12	2	--	43	6.6	50
Feb. 10.....	180			2.4	1.5	5.1	--	14	0	7.0	2.4		.6		a38	.05	18.5	12	0	.6	56	7.4	--
Mar. 10.....	258			2.4	1.9	6.4	--	14	0	10	3.8		.4		a38	.05	26.5	14	2	.7	62	7.5	--
Mar. 14.....	741			2.7	1.7	4.6	.6	11	0	9.4	4.0		.1		28	.04	56.0	14	4	--	54	6.5	27
Apr. 9.....	43			3.2	2.9	9.0	--	24	0	13	4.2		.5		a45	.06	5.22	20	0	.9	74	7.6	--
Apr. 11.....	39			4.0	1.8	5.1	1.0	17	0	10	3.2		.8		34	.05	3.58	18	4	--	62	6.5	6
May 9.....	186			3.6	.7	3.4	1.3	14	0	6.6	2.2		.3		25	.03	12.6	12	0	--	42	6.3	33
May 12.....	77			--	--	--	--	20	0	--	3.0		--		--	--	--	16	0	--	60	7.4	--
May 20.....	19,300			2.1	.5	1.0	1.3	8	0	2.0	1.0		1.2		13	.02	677	7	0	--	23	6.0	15
June 4.....	27			--	--	--	--	24	0	--	9.0		--		--	--	--	16	0	--	68	7.5	--
June 6.....	19			3.4	2.2	4.2	1.7	19	0	7.0	2.5		.9		31	.04	1.59	18	2	--	54	6.4	3
July 5.....	3.2			4.8	2.0	4.7	1.3	28	0	5.8	2.5		.4		36	.05	.31	20	0	--	64	6.4	5
July 9.....	1.6			5.6	1.9	7.1	--	32	0	5.8	2.7		1.9		a46	.06	.20	22	0	.7	76	7.6	--
Aug. 1.....	18			2.9	1.4	3.0	1.8	16	0	4.8	1.5		.8		24	.03	1.17	13	0	--	42	6.6	60
Aug. 29.....	1.9			3.6	2.1	3.2	1.5	23	0	4.2	2.5		.3		28	.04	.14	18	0	--	49	6.5	12
Sept. 14.....	.6			4.8	2.9	3.9	--	30	0	3.7	1.8		1.6		a36	.05	.06	24	0	.3	60	7.5	--

a Residue at 180°C.

ARKANSAS RIVER BASIN--Continued

7-2475. FOURCHE MALINE NEAR RED OAK, OKLA.

LOCATION.--At gaging station at highway bridge, 0.1 mile downstream from Little Fourche Maline and 5 miles southwest of Red Oak, Latimer County.
DRAINAGE AREA.--122 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1955 to September 1956, October 1957 to July 1960 (discontinued).
REMARKS.--Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, October 1959 to July 1960

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Dec. 9, 1959.....	5.3			10	6.1	16		44	0		10							50	14	1.0	161	7.6
Feb. 4, 1960.....	440			8.8	1.9	11		28	0		7.1							30	7	.9	112	7.4
Mar. 31.....	65			7.2	3.9	14		34	0		9.1							34	6	1.0	123	7.7
Apr. 25.....	9.2			12	5.8	23		52	0		12							54	12	1.4	215	6.4
May 5.....	2140			3.2	1.0	3.6		16	0		1.9							12	0	.5	47	6.9
May 6.....	6880			2.4	1.0	--		14	0		1.4							10	0	--	35	7.0
May 19.....	17800			2.4	.5	2.5		10	0		.9							8	0	.4	41	7.0
June 1.....	384			6.4	3.4	9.9		26	0		4.6							30	8	.8	95	7.1
June 27.....	3.9			13	7.2	21		62	0		10							62	11	1.2	230	7.0
July 19.....	.2			16	8.8	27		94	0		16							76	0	1.3	261	7.5

7-2480. WISTER RESERVOIR NEAR WISTER, OKLA.

LOCATION (revised).--Just upstream from release gate at Wister Dam on Poteau River, 2 miles south of Wister, Le Flore County, and 2.7 miles upstream from Caston Creek.
DRAINAGE AREA.--993 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1948, October 1956 to September 1960.
Water temperatures: October 1947 to September 1948.
REMARKS.--Records of reservoir storage for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Lake content (acre-feet)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
October 1959.....	--	1.0	0.05	6.8	1.7	3.5	0.4	28	0	8.4	4.5	0.1	0.1	0.00	50	0.07		24	1	0.3	73	6.8
Nov. 2.....	30380	5.6	--	2.6	2.1	6.6	.0	18	0	7.4	4.0	.1	.1	.00	39	.05		15	0	.7	63	6.7
December.....	--	7.4	.28	3.2	1.9	4.2	.5	12	0	4.9	5.0	.1	3.5	.02	40	.05		16	6	.5	66	6.6
Jan. 3, 1960.....	31530	7.8	.07	2.4	2.2	4.3	.7	12	0	11	4.3	.1	1.6	.00	48	.07		15	5	.5	57	6.2
Feb. 9.....	33200	6.8	.12	2.0	2.2	5.0	.2	12	0	9.9	4.8	.1	1.0	.04	54	.07		14	4	.6	56	6.2
Mar. 7.....	30230	6.4	.06	4.0	1.7	7.0	.4	13	0	13	5.2	.1	.7	.10	60	.08		17	6	.7	66	6.3
Apr. 11.....	29990	8.8	.09	3.2	1.9	5.5	.4	13	0	12	5.5	.1	.8	.06	56	.08		16	5	.6	66	6.0
May 4.....	31330	.6	.09	3.2	2.4	6.2	.3	15	0	12	5.4	.1	.6	.05	51	.07		18	6	.6	75	6.6
June.....	--	4.6	.27	5.2	1.2	2.4	1.6	25	0	3.3	1.6	.1	2.3	.06	54	.07		18	0	.2	55	6.7
July 5.....	30150	7.2	.89	6.0	5.1	2.7	1.5	41	0	4.9	2.8	.1	.4	.06	66	.09		36	2	.2	100	6.8
Aug. 8.....	29670	7.2	.00	3.2	1.5	5.0	1.7	18	0	7.0	2.9	.4	1.4	.14	a 39	.05		14	0	.6	52	6.6
Sept. 7.....	30110	7.4	.00	3.2	1.9	5.0	1.7	18	0	7.6	3.0	.3	1.3	.09	44	.06		16	0	.6	58	6.6

a Calculated from determined constituents.

ARKANSAS RIVER BASIN--Continued

7-2492. BRAZIL CREEK NEAR PANAMA, OKLA.

LOCATION.--At bridge on U.S. Highways 59 and 271 and 1.5 miles south of Panama, Le Flore County.
RECORDS AVAILABLE.--Chemical analyses: November 1959 to September 1960 (discontinued).
REMARKS.--No discharge records available.

Chemical analyses, in parts per million, November 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Nov. 13, 1959.....				8.0	7.3	19		38	0	47	8.2		0.5		129	0.18		50	19	1.2	181	7.2
Dec. 3.....				24	19	28		68	0	118	10		7.3		264	.36		138	82	1.0	400	7.7
Jan. 9, 1960.....				4.8	3.2	10		20	0	19	6.9		1.7		a 55	.07		25	8	.9	105	7.5
Feb. 10.....				6.4	4.4	10		22	0	29	5.2		1.0		81	.11		34	16	.8	127	7.5
Mar. 10.....				5.6	3.9	12		22	0	28	5.6		.8		79	.11		30	12	.9	120	7.7
Apr. 9.....				8.0	7.3	13		36	0	39	6.0		.4		94	.13		50	20	.8	172	7.6
May 12.....				--	--	--		44	0	--	5.9		--		--	--		48	12	--	166	7.7
June 4.....				--	--	--		44	0	--	5.8		--		--	--		50	14	--	169	7.7
July 9.....				10	7.5	12		60	0	25	4.3		1.3		118	.16		56	7	.7	182	8.0
Aug. 13.....				4.8	3.9	6.7		28	0	16	2.2		.2		60	.08		28	5	.5	80	7.1
Sept. 14.....				8.0	3.9	19		44	0	35	3.6		.8		109	.15		36	0	1.4	118	7.8

a Calculated from determined constituents.

7-2500. LEE CREEK NEAR VAN BUREN, ARK.

LOCATION.--At gaging station, 300 feet west of Arkansas-Oklahoma State line, 3.2 miles downstream from Webbers Creek, 6.8 miles northwest of Van Buren, Crawford County, and 7.9 miles upstream from mouth.
DRAINAGE AREA.--427 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1953 to September 1960.
REMARKS.--Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$		Specific conductance (micromhos at 25°C)	pH	Color
														Calcium, magnesium	Noncarbonate			
Oct. 13, 1959.....	372			8.8	1.8	2.3	0.9	30	6.4	3.5		0.8	50	28	3	72	6.5	17
Oct. 29.....	55			12	1.8	2.5	.8	39	5.4	3.5		.0	52	38	6	82	6.8	5
Nov. 19.....	154			10	1.5	2.9	.7	38	3.2	3.5		.5	50	31	0	72	7.2	8
Dec. 8.....	56			10	1.7	2.9	.6	37	4.8	3.5		.4	48	32	2	76	7.3	10
Dec. 29.....	1,540			7.3	1.0	1.6	.8	24	4.8	2.0		.0	44	22	2	53	7.1	6
Jan. 21, 1960.....	715			8.1	1.3	1.8	.6	28	4.6	2.8		.3	39	26	2	59	6.9	13
Feb. 12.....	496			9.6	1.3	2.1	.7	27	7.0	4.5		1.0	54	30	8	71	6.6	13
Mar. 7.....	263			9.1	1.4	2.0	.3	29	7.4	3.0		.3	34	28	4	67	7.0	5
Mar. 30.....	308			9.5	1.4	1.9	.5	31	4.8	2.8		.2	47	30	4	68	7.0	5
Apr. 20.....	538			11	1.0	2.1	.9	34	5.8	2.0		.3	50	32	4	71	6.7	3
May 31.....	333			10	1.3	2.0	1.0	36	4.8	2.5		.3	49	30	1	70	6.5	3
June 23.....	47			14	1.8	2.3	1.4	48	4.4	2.5		.4	56	42	3	90	7.0	2
Aug. 4.....	88			13	1.6	2.6	1.3	46	4.4	2.5		.2	52	39	2	90	6.8	8
Sept. 19.....	2.9			13	2.7	3.0	1.1	50	4.8	4.0		.1	49	44	2	101	7.2	1

ARKANSAS RIVER BASIN--Continued

7-2505. ARKANSAS RIVER AT VAN BUREN, ARK.

LOCATION.--At gaging station at bridge on U.S. Highways 64 and 71 at Van Buren, Crawford County, 1.3 miles downstream from Lee Creek, 8.6 miles downstream from Poteau River, and at mile 353.4.
DRAINAGE AREA.--150,483 square miles, of which 22,241 square miles probably are noncontributing.
RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1960.
Water temperatures: October 1945 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 907 ppm Feb. 9; minimum, 203 ppm July 22-25.
Hardness: Maximum, 288 ppm Feb. 9; minimum, 94 ppm July 22-25.
Specific conductance: Maximum daily, 1,550 micromhos Feb. 9; minimum daily, 297 micromhos May 23.
Water temperatures: Maximum, 85°F Aug. 5-9, 12, Sept. 3-6; minimum, freezing point Feb. 25, 26, Mar. 3-6.
EXTREMES, 1945-60.--Dissolved solids: Maximum, 5,830 ppm Apr. 1, 1954; minimum, 110 ppm Mar. 22, 1957.
Hardness: Maximum, 1,100 ppm Apr. 1, 1954; minimum, 40 ppm Mar. 20, 1955.
Specific conductance: Maximum daily, 8,980 micromhos Apr. 1, 1954; minimum daily, 132 micromhos May 11, 1948.
Water temperatures: Maximum, 92°F Aug. 6, 1956; minimum, freezing point on many days during winter months.
REMARKS.--Records of specific conductance of daily samples available in district office at Little Rock, Ark. Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Strontium (Sr)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-4, 1959.	144,500	6.0	0.09	44	5.4		65	3.9	112	38	98	0.3	3.7	0.00	356	0.48	138,900	132	40	2.5	614	7.2	5
Oct. 5-6.....	368,000	--	--	36	4.7		45	4.3	108	25	68	--	3.0	.03	275	.37	273,200	110	21	1.9	442	7.1	11
Oct. 7-15.....	248,100	5.2	.01	31	5.4		30	4.0	94	22	48	.1	2.7	.30	208	.28	139,300	100	22	1.3	366	7.1	6
Oct. 16-17.....	148,500	--	--	45	7.3		62	5.0	118	46	101	--	2.9	.04	380	52	152,400	142	46	2.3	603	7.2	9
Oct. 18-19.....	139,500	--	--	42	5.8		36	4.3	116	36	58	--	2.9	.04	280	.38	105,500	129	34	1.4	433	7.3	10
Oct. 20-22.....	128,700	--	--	35	6.9		30	3.4	96	40	46	--	2.5	.17	215	.29	74,710	116	38	1.2	357	7.1	5
Oct. 23-27....	86,080	6.0	.00	38	9.3		45	3.9	108	42	72	.2	2.5	.25	296	.40	68,800	133	44	1.7	499	7.1	7
Oct. 28-31.....	38,200	5.5	.05	16	11		82	5.1	145	57	130	.2	2.8	.05	471	.64	48,580	184	66	2.6	761	7.9	5
Nov. 1-3.....	26,800	--	--	67	13		112	6.0	190	73	172	--	4.0	.03	632	.86	45,730	220	65	3.3	969	7.0	8
Nov. 4-5.....	75,400	--	--	49	8.7		72	5.0	128	50	118	--	2.8	.03	425	.58	86,520	158	54	2.5	688	7.2	10
Nov. 6-11.....	77,850	6.8	.00	40	8.3		50	3.8	114	37	80	.1	2.5	.12	316	.43	66,420	134	40	1.9	523	7.4	6
Nov. 12-13.....	373,000	--	--	50	9.4		66	4.8	132	51	110	--	2.7	.03	449	.61	452,200	164	56	2.2	665	7.2	10
Nov. 14-18.....	28,200	5.9	.00	55	14		93	5.2	146	63	148	.2	2.7	.05	518	.70	39,440	194	75	2.9	845	7.6	6
Nov. 19-27.....	19,060	8.5	.00	63	17		120	5.8	166	73	195	.3	4.4	.05	641	.87	32,990	227	91	3.5	1,050	7.7	7
Nov. 28-30.....	14,030	5.5	.01	75	23		165	6.9	195	89	270	.3	4.8	.20	819	1.11	31,020	282	122	4.3	1,350	7.7	5
Dec. 1-10.....	14,750	8.0	.00	71	15		121	5.6	170	79	195	.3	5.9	.45	651	.88	25,930	238	99	3.4	1,070	8.1	6
Dec. 11-16.....	12,170	6.6	.00	68	19		147	6.0	173	93	235	.2	4.2	.05	737	1.00	24,220	248	106	4.0	1,220	7.1	6
Dec. 17-21.....	66,940	5.8	.05	37	9.7		56	4.3	98	38	95	.1	3.3	.25	347	.47	62,720	132	52	2.1	564	7.7	6
Dec. 22-23.....	58,350	--	--	51	11		102	11	133	72	162	--	2.9	.04	567	.77	89,330	172	63	3.4	874	6.8	10
Dec. 24-31.....	49,450	5.3	.00	43	9.0		60	3.2	109	47	92	.2	2.3	.40	369	.50	49,270	144	55	2.2	590	7.5	6

Jan. 1.....	42,600	--	--	45	7.6	66	4.4	108	52	108	--	3.1	.04	a339	.46	38,990	144	55	2.4	631	7.2	12
Jan. 2-12.....	30,010	6.2	0.01	55	14	111	5.1	133	68	175	0.1	3.2	.30	570	.78	46,320	194	86	3.5	936	7.5	5
Jan. 13-17.....	64,860	8.6	.00	35	9.5	57	3.7	94	39	95	.3	2.3	.17	355	.48	62,170	126	50	2.2	519	7.7	13
Jan. 18-25.....	43,950	9.1	.00	54	9.7	85	4.8	124	58	140	.4	2.6	.19	504	.68	59,810	174	73	2.8	735	7.5	10
Jan. 26-30.....	23,720	6.8	.00	63	16	116	5.4	156	74	190	.3	2.6	.04	636	.86	40,730	223	95	3.4	979	7.4	10
Jan. 31-Feb. 5.	24,130	10	.00	69	19	144	6.2	166	81	240	.4	5.1	.21	785	1.07	51,140	250	114	4.0	1,180	7.4	10
Feb. 6-8.....	71,470	--	--	47	15	91	3.9	124	81	130	--	3.7	.12	504	.68	97,260	179	78	3.0	763	7.8	10
Feb. 9.....	78,700	--	--	79	22	228	6.3	220	102	355	--	6.5	.07	a907	1.23	192,700	288	107	5.8	1,550	8.1	10
Feb. 10-18.....	46,340	11	.01	58	16	130	5.8	140	86	205	.3	6.0	.25	686	.93	85,830	210	96	3.9	1,030	7.9	7
Feb. 19-23.....	34,160	7.1	.01	61	13	112	5.4	132	86	175	.4	4.6	.14	628	.85	57,920	206	98	3.4	935	8.0	12
Feb. 24-29.....	24,080	9.5	.00	81	16	157	6.2	168	109	250	.3	4.7	.20	853	1.16	55,460	268	130	4.2	1,250	8.0	7
Mar. 1-7.....	22,040	6.7	.00	64	15	124	6.3	130	95	200	.4	4.0	.06	671	.91	39,930	226	120	3.6	1,050	6.8	7
Mar. 8-13.....	27,670	9.5	.01	78	21	144	6.1	176	102	240	.4	5.0	.20	816	1.11	60,960	281	137	3.7	1,230	8.2	5
Mar. 14-20.....	63,860	9.9	.00	52	14	99	4.4	124	74	155	.4	4.6	.04	553	.75	95,350	187	86	3.2	835	7.9	8
Mar. 21.....	58,300	--	--	55	17	120	3.6	136	86	190	--	5.3	.03	a544	.74	85,630	207	96	3.6	985	8.0	8
Mar. 22-29.....	51,210	8.6	.00	58	16	99	4.7	136	89	155	.4	5.8	.06	580	.79	80,190	210	99	3.0	889	7.6	10
Mar. 30-31.....	48,400	--	--	56	11	88	3.4	132	92	125	--	4.7	.08	a445	.60	58,150	184	76	2.8	767	7.8	10
Apr. 1-5.....	42,920	12	.00	59	13	81	5.1	132	79	135	.6	4.9	.30	502	.68	58,170	200	92	2.5	787	7.7	8
Apr. 6.....	38,600	--	--	65	15	88	3.0	b158	87	135	--	5.5	.02	a478	.65	49,820	224	91	2.6	970	8.4	10
Apr. 7-11.....	30,720	11	.00	72	14	96	5.6	158	104	145	.4	4.5	.27	644	.88	53,420	237	108	2.7	903	8.0	7
Apr. 12-15.....	29,650	7.9	.00	73	17	107	6.2	164	114	165	.4	5.6	.06	676	.92	54,120	252	118	2.9	982	7.8	7
Apr. 16-17.....	88,000	--	--	55	16	81	3.6	134	87	132	--	3.5	.07	472	.64	112,100	203	93	2.5	782	7.6	10
Apr. 18-21.....	64,050	7.9	.00	52	11	55	4.4	122	62	90	.4	4.3	.08	406	.55	59,030	174	74	1.8	616	7.5	13
Apr. 22-29.....	29,310	8.5	.00	60	15	78	5.2	148	79	125	.4	4.0	.08	532	.72	42,100	211	90	2.3	757	7.8	8
Apr. 30.....	24,200	--	--	81	20	173	5.3	188	120	270	--	5.2	.06	a768	1.04	50,180	284	130	4.4	1,310	8.2	10

a Calculated from determined constituents.
b Includes equivalent of 4 ppm carbonate (Co_3).

ARKANSAS RIVER BASIN--Continued

7-2505. ARKANSAS RIVER AT VAN BUREN, ARK.--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Mean discharge	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Strontium (Sr)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
May 1-3, 1960..	47,770	--	--	69	20		137	5.7	150	115	215	--	18	0.15	751	1.02	96,860	254	131	3.7	1,140	7.7	13
May 4-5.....	41,250	--	--	56	13		63	4.0	146	70	102	--	4.2	.22	437	.59	48,670	193	74	2.0	672	7.7	20
May 6-8.....	159,000	--	--	35	7.9		40	4.4	88	39	62	--	11	.13	260	.35	111,600	120	48	1.6	448	7.6	20
May 9-10.....	157,000	--	--	34	6.7		33	3.8	90	34	51	--	11	.05	277	.38	117,400	112	38	1.4	403	7.4	33
May 11.....	141,000	--	--	32	7.5		35	4.1	90	31	52	--	10	--	a216	.29	82,230	111	37	1.4	369	7.3	23
May 12-14.....	91,800	--	--	40	8.3		32	3.8	108	48	45	--	8.5	.11	279	.38	69,150	134	46	1.2	414	7.6	13
May 15-18.....	43,780	7.2	0.00	38	8.1		44	3.8	100	38	70	0.3	5.2	.10	298	.40	35,220	128	46	1.7	483	7.4	10
May 19-24.....	174,430	6.5	.00	30	5.7		26	3.0	90	20	42	.4	4.4	.08	208	.28	97,960	98	24	1.1	324	7.4	15
May 25-29.....	74,200	8.7	.00	37	6.0		29	3.1	102	35	45	.2	4.6	.11	247	.34	49,480	117	34	1.2	357	7.7	7
May 30-June 1..	57,330	--	--	49	14		73	3.2	130	67	115	--	7.8	.08	444	.60	68,730	180	74	2.4	689	7.8	15
June 2.....	94,000	--	--	33	6.7		33	3.0	94	31	50	--	6.1	.03	a209	.28	53,040	110	33	1.4	380	7.6	15
June 3-10.....	55,680	8.2	.05	44	10		65	4.2	116	54	100	.3	4.1	.26	389	.53	58,480	151	56	2.3	607	7.8	5
June 11-12.....	55,150	--	--	51	15		99	4.6	124	82	152	--	7.7	.10	496	.67	73,860	188	87	3.1	827	7.8	15
June 13-18.....	56,530	8.8	.00	67	13		130	8.0	128	108	200	.4	20	.07	682	.93	104,100	220	116	3.8	1,050	8.0	8
June 19-21.....	36,830	--	--	50	12		96	4.4	122	84	140	--	3.8	.06	502	.68	49,920	174	74	3.2	797	7.6	15
June 22-23.....	30,600	--	--	45	11		76	4.6	112	74	115	--	3.3	.10	390	.53	32,220	158	66	2.6	682	7.7	27
June 24-25.....	29,100	--	--	55	10		104	5.8	126	78	152	--	5.0	.14	531	.72	41,720	178	74	3.4	828	7.6	13
June 26-27.....	19,500	--	--	62	14		114	6.2	142	97	170	--	5.9	.19	644	.88	33,910	212	96	3.4	945	8.0	13
June 28.....	14,600	--	--	78	18		155	7.4	200	117	240	--	4.5	.06	a718	.98	28,300	268	104	4.1	1,180	8.2	15
June 29-July 1.	16,930	--	--	61	14		110	6.1	152	91	170	--	3.7	.13	620	.84	28,340	210	85	3.3	932	7.7	15
July 2-4.....	11,740	--	--	71	16		124	7.1	156	107	195	--	10	.12	733	1.00	23,230	243	115	3.4	1,070	8.0	15
July 5-8.....	13,980	6.2	.00	78	19		155	7.9	172	121	250	.6	5.0	.10	848	1.15	32,010	272	132	4.1	1,280	8.0	8
July 9-10.....	27,700	--	--	51	13		110	5.6	116	98	160	--	6.2	.15	580	.79	43,380	180	85	3.6	887	7.9	13
July 11-14.....	24,700	8.3	.00	44	11		88	6.2	116	66	135	.5	4.3	.06	451	.61	30,080	155	60	3.1	751	8.0	8
July 15-21.....	21,670	11	.00	66	20		193	9.2	166	149	265	.7	7.8	.27	861	1.17	50,380	246	110	5.4	1,380	8.1	10

July 22-25.....	59,380	7.9	.00	30	4.5		26	2.8	90	22	36	.2	4.0	.07	203	.28	32,550	94	20	1.2	337	7.8	10
July 26.....	121,000	--	--	73	18		186	9.0	202	134	255	--	11	--	a785	1.07	256,500	256	90	5.1	1,320	8.2	10
July 27-31.....	84,080	6.6	.03	31	6.5		38	3.8	88	32	58	.2	4.8	.04	261	.35	59,250	104	32	1.6	398	7.9	10
Aug. 1-8.....	26,540	7.5	.02	36	3.1		47	4.5	88	35	70	.2	5.8	.00	281	.38	20,140	102	30	2.0	450	7.5	10
Aug. 9-12.....	13,980	9.0	.03	57	12		93	5.3	144	64	150	.4	7.8	.04	531	.72	20,040	192	74	2.9	823	7.7	10
Aug. 13-16.....	13,620	4.7	.03	55	11		77	6.8	118	61	125	.3	21	.06	461	.63	16,950	182	86	2.5	748	7.4	10
Aug. 17-28.....	19,980	7.6	.03	54	17		123	6.9	138	83	195	.4	7.2	.09	650	.88	35,050	204	92	3.7	1,010	8.0	8
Aug. 29-31.....	55,930	--	--	50	11		90	5.2	130	62	138	--	6.6	.08	502	.68	75,810	170	64	3.0	777	7.5	10
Sept. 1.....	57,400	--	--	50	10		96	6.3	132	55	140	--	10	--	a432	.59	66,950	166	58	3.2	800	8.0	10
Sept. 2-3.....	41,750	--	--	37	7.0		46	4.8	108	37	65	--	5.3	.11	305	.41	34,380	122	33	1.8	473	7.4	10
Sept. 4-10.....	19,730	7.6	.02	50	6.6		77	5.9	114	58	120	.3	5.6	.09	437	.59	23,280	152	58	2.7	709	7.9	8
Sept. 11-16....	9,833	6.5	.02	62	13		128	7.6	146	88	200	.4	7.6	.06	659	.90	17,500	208	88	3.8	1,020	7.6	10
Sept. 17-20....	10,340	--	--	73	12		150	7.4	158	100	230	--	4.7	.14	753	1.02	21,020	232	102	4.3	1,150	7.7	10
Sept. 21-23....	8,847	--	--	54	12		99	5.4	142	68	150	--	3.8	.12	541	.74	12,920	184	68	3.2	848	7.9	13
Sept. 24-29....	6,930	6.6	.02	64	15		136	6.4	160	84	205	.3	6.1	.14	691	.94	12,930	221	90	4.0	1,080	8.2	10
Sept. 30.....	7,800	--	--	83	16		214	7.8	176	116	340	--	4.6	.09	a868	1.18	18,280	273	129	5.6	1,500	8.0	13
Weighted average.....	53,900	--	--	46	10		70	4.6	118	54	110	--	4.8	0.14	412	0.56	60,000	156	59	2.3	650	7.4	10
Time-weighted average.....	--	--	--	54	12		94	5.3	133	71	148	--	5.3	0.14	525	--	--	187	78	2.9	823	7.5	9
Tons per day..	--	--	--	6,699	1,453		10,180	670	17,230	7,910	16,000	--	703	20	--	--	--	22,680	8,570	--	--	--	50

a Calculated from determined constituents.

Temperature (°F) of water, water year October 1959 to September 1960

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

ARKANSAS RIVER BASIN--Continued

7-2520. MULBERRY RIVER NEAR MULBERRY, ARK.

LOCATION.--At gaging station, 0.2 mile upstream from Mill Creek, 5 miles northeast of Mulberry, Crawford County, and 11.3 miles upstream from mouth.
DRAINAGE AREA.--372 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1953 to September 1956 (daily), October 1956 to September 1960 (monthly).
Water temperatures: October 1955 to September 1956.
EXTREMES, 1955-56.--Dissolved solids: Maximum, 126 ppm July 6; minimum, 25 ppm Dec. 1-10, Jan. 23.
Hardness: Maximum, 44 ppm July 6; minimum, 10 ppm Jan. 11-20, 23, Feb. 1-10, Mar. 1-10, May 1-10.
Specific conductance: Maximum daily, 146 micromhos July 6; minimum daily, 24 micromhos Feb. 18.
Water temperatures: Maximum, 88°F July 15, 16; minimum, 34°F Dec. 16-19, Jan. 20, 21.
REMARKS.--Records of specific conductance of daily samples (1955-56) available in district office at Little Rock, Ark. Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (calculated	Hardness as $CaCO_3$		Specific conductance (micromhos at 25°C)	pH	Color
														Calcium, magnesium	Noncarbonate			
Oct. 22, 1959.....	178			3.4	1.3	0.9	0.6	16	2.0	1.5		0.4	18	14	1	33	6.4	5
Nov. 18.....	260			2.5	1.1	1.3	.7	13	2.0	1.2		.4	16	10	0	31	7.0	10
Dec. 17.....	1,200			2.7	.9	.7	.5	10	2.6	1.5		.0	14	10	2	25	6.8	5
Jan. 14, 1960.....	2,360			2.4	.4	.7	.5	10	2.0	1.0		.0	12	8	0	21	6.7	6
Feb. 24.....	290			2.9	.4	.9	.2	10	2.6	1.5		.3	14	8	0	26	6.8	17
Mar. 11.....	752			2.7	.8	1.1	.3	10	2.2	2.5		.5	15	10	2	30	6.0	23
Apr. 6.....	240			2.9	.4	1.0	.2	10	2.4	1.5		.2	14	8	0	27	6.6	5
May 4.....	768			2.0	.9	1.1	.7	11	2.4	1.0		.3	14	8	0	25	6.5	17
June 2.....	316			3.2	.7	1.1	1.0	13	2.4	1.2		.4	19	11	0	30	6.4	5
June 27.....	82			2.4	1.8	1.4	.5	18	1.6	1.5		.2	18	14	0	34	6.8	3
July 26.....	1,140			4.3	.9	1.5	.9	17	2.4	2.0		.3	20	14	0	36	6.7	25
Aug. 25.....	15			4.1	1.5	1.7	1.2	21	1.2	1.8		.2	24	16	0	41	6.6	2
Sept. 21.....	.9			4.6	1.5	2.0	1.1	24	2.0	1.5		.1	25	18	0	45	6.8	4

7-2570. PINEY CREEK NEAR DOVER, ARK.

LOCATION.--At gaging station, 7.2 miles downstream from Indian Creek and 10 miles north of Dover, Pope County.
DRAINAGE AREA.--274 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1953 to September 1960.
Water temperatures: October 1955 to September 1956.
EXTREMES, 1955-56.--Dissolved solids: Maximum, 72 ppm Aug. 16; minimum, 34 ppm June 21-30.
Hardness: Maximum, 44 ppm Sept. 21-30; minimum, 14 ppm Feb. 1-10.
Specific conductance: Maximum daily, 152 micromhos Sept. 23; minimum daily, 27 micromhos Feb. 17.
Water temperatures: Maximum, 92°F July 15, Aug. 16; minimum, 36°F Jan. 18.
REMARKS.--Records of specific conductance of daily samples (1955-56) available in district office at Little Rock, Ark. Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (calculated)	Hardness as $CaCO_3$		Specific conductance (micromhos at 25°C)	pH	Color
														Calcium, magnesium	Noncarbonate			
Oct. 21, 1959	92			7.4	1.2	1.3	0.6	29	2.4	1.0		0.2	28	24	0	53	6.6	6
Nov. 18	152			5.6	1.7	1.1	.5	25	2.4	1.5		.5	25	21	0	45	7.3	10
Dec. 6	70			4.3	.7	.6	.5	16	2.4	1.0		.0	17	14	0	34	6.8	8
Jan. 11, 1960	502			4.4	1.2	.8	.5	18	1.8	1.5		.2	19	16	1	35	6.8	5
Feb. 9	843			4.3	1.3	.6	.8	16	2.4	3.0		.0	20	16	3	31	7.0	5
Mar. 10	359			4.8	1.3	.9	.3	18	2.6	1.8		.2	21	18	2	38	6.8	5
Apr. 6	170			5.9	.9	.9	.4	21	2.0	1.8		.2	22	18	1	42	6.9	5
May 4	339			5.6	1.0	1.0	.6	20	2.4	1.0		.3	22	18	2	38	6.4	2
June 2	272			6.8	.8	.9	1.1	25	2.4	1.2		.3	26	20	0	45	6.8	3
June 27	228			7.6	1.7	1.0	.7	31	2.2	1.8		.1	30	26	0	57	7.2	4
July 26	1,080			9.1	1.1	1.0	1.2	32	2.4	1.0		.3	32	27	1	62	6.9	13
Aug. 24	16			10	1.5	1.3	1.2	38	2.0	1.5		.2	37	31	1	66	6.9	5
Sept. 20	2.9			11	1.8	1.6	1.2	42	1.8	1.5		.2	40	35	0	71	6.7	5

ARKANSAS RIVER BASIN--Continued

7-2575. ILLINOIS BAYOU NEAR SCOTTSVILLE, ARK.

LOCATION.--At gaging station at bridge on county road, 1.2 miles north of Scottsville, Pope County, and 3 miles downstream from North Fork Illinois Bayou.
DRAINAGE AREA.--242 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1953 to September 1960.
Water temperatures: October 1955 to September 1956.
EXTREMES, 1955-56.--Dissolved solids: Maximum, 86 ppm Oct. 22; minimum, 25 ppm Nov. 21-30, Jan. 11-20.
Hardness: Maximum, 22 ppm Oct. 22, Aug. 29; minimum, 8 ppm Jan. 1-10.
Specific conductance: Maximum daily, 98 micromhos Oct. 22; minimum daily, 22 micromhos Feb. 18.
Water temperatures: Maximum, 88°F July 4, Aug. 7; minimum, 34°F Jan. 19-21.
REMARKS.--Records of specific conductance of daily samples (1955-56) available in district office at Little Rock, Ark. Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (calculated)	Hardness as $CaCO_3$		Specific conductance (micromhos at 25°C)	pH	Color
														Calcium, magnesium	Noncarbonate			
Oct. 21, 1959.....	92			3.6	0.9	0.7	0.6	16	1.6	1.5		0.2	17	12	0	32	6.8	5
Nov. 18.....	136			3.0	1.0	1.9	.6	14	1.8	2.0		.6	18	12	0	30	7.0	23
Dec. 16.....	910			2.7	.8	.7	.6	9	3.6	1.2		.0	14	10	2	23	6.6	8
Jan. 13, 1960.....	945			2.5	.5	.8	.3	10	1.6	1.5		.2	12	8	0	23	6.6	27
Feb. 9.....	780			2.5	.6	.7	.5	8	2.2	1.0		.0	11	8	2	21	6.7	6
Mar. 10.....	470			2.2	.9	.8	.2	10	2.6	1.2		.2	13	9	1	23	6.6	18
Apr. 6.....	141			2.8	.6	.7	.2	10	2.0	1.5		.1	13	10	2	25	6.7	9
May 4.....	150			3.3	.8	1.2	.8	13	2.2	1.2		.1	16	12	1	27	6.3	3
June 2.....	226			2.9	1.0	1.0	.9	13	2.2	1.5		.1	16	11	0	29	6.5	2
June 28.....	101			2.4	1.6	1.2	.5	17	1.6	1.2		.1	17	12	0	30	6.8	5
July 26.....	420			3.3	1.0	.9	1.3	15	.8	1.0		.2	16	12	0	29	6.6	50
Aug. 24.....	18			3.7	1.3	1.5	1.0	20	2.0	1.5		.1	21	14	0	38	6.7	2
Sept. 21.....	2.5			4.0	1.6	1.5	1.2	21	2.2	1.5		.2	22	16	0	39	6.6	3

7-2580. ARKANSAS RIVER AT DARDANELLE, ARK.

LOCATION.--At gaging station at bridge on State Highway 7 at Dardanelle, Yell County, 1 mile upstream from Whig Creek, 4.7 miles downstream from Illinois Bayou, and at mile 255.8.
DRAINAGE AREA.--153,707 square miles, of which 22,241 square miles probably are noncontributing.
RECORDS AVAILABLE.--Chemical analyses: October 1948 to September 1960.
Water temperatures: October 1948 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 879 ppm Aug. 31; minimum, 189 ppm May 20-29.
Hardness: Maximum, 271 ppm Dec. 1-4; minimum, 84 ppm May 6.
Specific conductance: Maximum daily, 1,550 micromhos Dec. 3; minimum, 255 micromhos May 6.
Water temperatures: Maximum, 90°F Aug. 9; minimum, 35°F Mar. 2, 6-8.
EXTREMES, 1948-60.--Dissolved solids: Maximum, 3,140 ppm Apr. 4-6, 1954; minimum, 65 ppm Feb. 18, 1956.
Hardness: Maximum, 583 ppm Apr. 4-6, 1954; minimum, 32 ppm Feb. 18, 1956.
Specific conductance: Maximum daily, 5,310 micromhos Apr. 4, 1954; minimum daily, 107 micromhos Mar. 21, 1955.
Water temperatures: Maximum, 94°F Aug. 17, 1952; minimum, freezing point Jan. 30, 1949, Feb. 1-3, 1951, Jan. 6, 1959.
REMARKS.--Records of specific conductance of daily samples available in district office at Little Rock, Ark. Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Strontium (Sr)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1, 1959...	73,500	--	--	50	10		101	5.9	144	60	145	--	5.0		a448	0.61	88,900	166	48	3.4	801	8.2	5
Oct. 2-3.....	88,250	--	--	44	8.0		70	5.4	119	47	105	--	4.0		369	.50	87,920	143	46	2.5	620	8.2	6
Oct. 4-7.....	263,500	11	0.00	36	6.8		48	4.4	112	27	74	0.2	2.9		295	.40	209,900	118	26	1.9	472	7.9	5
Oct. 8-16.....	253,800	10	.00	32	5.2		29	4.3	100	22	46	.2	2.8		223	.30	152,800	102	20	1.3	356	7.9	5
Oct. 17-19.....	146,700	--	--	43	7.7		48	5.2	115	39	78	--	2.7		309	.42	122,400	139	45	1.8	519	8.1	6
Oct. 20-24.....	125,400	11	.00	37	7.6		32	4.4	110	37	50	.2	2.9		257	.35	87,010	124	34	1.2	404	7.7	8
Oct. 25-30.....	67,550	10	.00	44	8.7		50	5.3	120	47	76	.2	3.6		352	.48	64,200	146	48	1.8	534	7.6	8
Oct. 31-Nov. 3.	30,720	13	.00	57	13		79	6.3	154	63	130	.2	2.8		480	.65	39,810	196	70	2.5	762	7.9	5
Nov. 4-5.....	78,350	--	--	36	5.7		38	4.0	97	31	63	--	2.8		250	.34	52,890	114	34	1.5	422	7.9	6
Nov. 6.....	116,000	--	--	43	11		76	5.3	120	49	118	--	3.0		a364	.50	114,000	152	54	2.7	642	8.2	5
Nov. 7-12.....	75,770	16	.00	40	8.0		44	4.8	110	35	76	.1	2.3		326	.44	66,740	133	43	1.7	494	7.8	5
Nov. 13-16.....	35,750	11	.00	45	12		61	4.1	124	47	102	.2	2.5		400	.54	38,610	162	60	2.1	614	7.9	8
Nov. 17-21.....	26,220	13	.00	55	12		87	6.0	148	60	140	.2	2.5		509	.69	36,030	186	65	2.8	801	8.0	8
Nov. 22-30.....	18,260	10	.00	67	16		116	7.2	172	73	192	.2	4.7		648	.88	31,950	233	92	3.3	1,010	8.0	5
Dec. 1-4.....	15,850	--	--	74	21		148	40	b236	90	255	--	3.3		846	1.15	36,200	271	73	3.9	1,350	8.4	6
Dec. 5-10.....	16,400	11	.00	69	18		122	7.2	174	79	202	.1	4.3		668	.91	29,580	246	104	3.4	1,080	8.0	10
Dec. 11-19.....	29,160	10	.00	39	11		74	4.2	106	48	120	.3	2.2		404	.55	31,810	142	56	2.7	673	7.9	8
Dec. 20-23.....	77,400	9.0	.00	37	9.4		55	4.4	98	37	94	.3	2.5		339	.46	70,840	131	50	2.1	542	7.7	10
Dec. 24-26.....	50,170	--	--	45	13		93	5.8	113	65	152	--	2.3		502	.68	68,000	166	74	3.1	808	8.1	7
Dec. 27.....	47,300	--	--	40	11		63	4.2	114	49	94	--	2.5		a320	.44	40,870	145	52	2.3	583	8.0	5
Dec. 28-29.....	58,700	--	--	35	7.8		42	3.7	100	39	62	--	2.0		270	.37	42,790	120	38	1.7	445	7.8	5

a Calculated from determined constituents.
b Includes equivalent of 5 ppm of carbonate (CO_3).

ARKANSAS RIVER BASIN--Continued

7-2580. ARKANSAS RIVER AT DARDANELLE, ARK.--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Mean discharge	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Strontium (Sr)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Dec. 30-Jan. 3. 1960	56,360	10	0.00	38	9.5		52	4.2	98	42	88	0.1	2.5		345	0.47	52,500	134	54	2.0	526	7.8	8
Jan. 4	38,700	--	--	41	13		73	4.5	110	52	122	--	2.9		a362	.49	37,820	156	66	2.5	656	8.1	6
Jan. 5-12	33,490	10	.00	49	13		91	4.8	108	63	155	.2	7.0		519	.71	46,930	176	88	3.0	805	7.8	7
Jan. 13-15	65,400	--	--	38	7.4		67	3.8	96	41	108	--	2.2		378	.51	66,750	126	47	2.6	615	7.8	6
Jan. 16-20	72,380	9.3	.00	32	8.5		45	3.3	88	36	75	.0	2.5		287	.39	56,090	115	43	1.8	466	7.6	10
Jan. 21-31	37,660	8.6	.00	48	13		80	4.3	120	75	122	.2	3.0		457	.62	46,470	174	75	2.6	738	7.9	7
Feb. 1-2	25,400	--	--	54	14		93	4.9	139	60	158	--	2.8		564	.77	38,680	192	78	2.9	855	8.0	5
Feb. 3-4	23,800	--	--	60	15		108	5.6	151	67	185	--	2.8		629	.86	40,420	211	88	3.2	985	8.2	6
Feb. 5-10	60,270	9.1	.00	47	12		82	3.6	116	60	134	.2	2.6		456	.62	74,200	167	72	2.8	774	7.9	10
Feb. 11	74,500	--	--	58	16		150	7.6	c130	88	242	--	4.8		a631	.86	126,900	210	102	4.5	1,190	8.3	5
Feb. 12-24	41,320	9.3	.00	53	13		105	6.0	120	75	170	.3	4.7		549	.75	61,250	186	87	3.4	903	7.9	8
Feb. 25-29	27,980	11	.00	71	14		142	6.8	158	101	220	.4	2.6		719	.98	54,320	234	105	4.0	1,110	7.7	10
Mar. 1-7	27,270	8.3	.00	58	13		119	5.9	130	82	190	.4	2.3		615	.84	45,280	198	92	3.7	961	7.8	5
Mar. 8-9	20,900	--	--	50	14		79	4.2	126	66	135	--	3.8		492	.67	27,760	182	79	2.5	768	7.3	5
Mar. 10-15	36,830	7.6	.00	58	15		110	5.6	140	77	175	.4	2.8		589	.80	58,570	206	92	3.3	920	8.0	5
Mar. 16-20	69,160	7.4	.00	55	9.3		86	4.7	120	67	135	.4	3.0		492	.67	91,870	175	76	2.8	752	7.6	5
Mar. 21-31	53,480	6.9	.02	52	13		94	5.5	124	78	145	.4	4.3		460	.62	66,420	183	82	3.0	804	7.5	5
Apr. 1-10	39,750	12	.00	56	15		87	6.1	148	80	130	.4	2.8		510	.69	54,740	201	80	2.7	805	7.5	5
Apr. 11-16	29,980	14	.01	66	18		96	6.3	160	105	145	.5	4.1		579	.79	46,870	238	108	2.7	886	7.9	5
Apr. 17-18	86,900	--	--	50	12		71	7.0	134	65	110	--	4.6		481	.65	112,900	174	64	2.3	683	6.9	5
Apr. 19-22	66,900	12	.02	49	9.7		49	4.4	120	56	80	.2	3.6		334	.45	60,330	162	64	1.7	569	7.9	7
Apr. 23-30	34,310	8.7	.02	55	13		64	5.0	136	70	102	.4	3.4		448	.61	41,500	190	79	2.0	685	7.5	10
May 1	28,200	--	--	59	11		80	4.1	148	69	122	--	3.2		515	.70	39,210	192	70	2.5	715	7.0	5
May 2	49,200	--	--	67	16		120	4.8	166	93	181	--	3.6		700	.95	92,990	233	97	3.4	1,000	7.2	5
May 3-5	49,800	--	--	51	10		72	3.1	128	54	113	--	3.7		470	.64	63,200	168	63	2.4	671	6.9	5
May 6	91,900	--	--	24	5.9		20	2.0	78	21	28	--	3.3		190	.26	47,140	84	20	.9	255	6.7	5
May 7-15	145,100	12	.00	34	7.6		31	2.8	104	34	45	.3	3.5		241	.33	94,420	116	32	1.3	387	7.7	5
May 16-19	55,750	11	.00	37	10		46	3.9	108	42	70	.3	3.4		297	.40	44,700	134	45	1.7	482	7.9	10

May 20-29.....	149,400	12	.01	33	4.7		24	2.9	100	23	34	.3	2.8		189	.26	76,240	102	20	1.0	323	8.0	10
May 30-31.....	44,750	--	--	37	8.1		39	3.0	110	34	60	--	3.1		298	.40	36,000	126	36	1.5	435	6.8	5
June 1-3.....	72,130	--	--	46	10		61	3.9	124	48	97	--	4.7		408	.55	79,460	156	54	2.1	603	6.9	5
June 4-6.....	69,330	--	--	44	11		78	3.5	124	51	118	--	3.9		457	.62	85,550	155	54	2.7	686	6.8	5
June 7.....	52,000	--	--	41	8.4		48	3.6	118	42	71	--	3.7		339	.46	47,600	137	40	1.8	489	6.9	5
June 8-16.....	50,430	12	.02	45	13		72	5.5	116	65	120	.4	3.1		451	.61	61,410	166	71	2.4	689	7.8	10
June 17.....	54,800	--	--	56	17		122	6.5	140	101	180	--	4.1		682	.93	100,900	210	95	3.7	989	7.0	5
June 18-20.....	48,530	--	--	78	11		162	6.8	154	117	246	--	4.3		829	1.13	108,600	240	114	4.9	1,250	7.1	5
June 21-30.....	25,960	12	.02	51	18		99	6.6	136	80	160	.4	3.2		546	.74	38,270	201	90	3.0	863	8.0	5
July 1.....	20,100	--	--	74	15		146	6.8	168	110	224	--	3.5		778	1.06	42,220	246	108	4.1	1,170	7.1	5
July 2-8.....	16,270	9.5	.00	56	15		98	6.9	144	78	160	.5	2.6		541	.74	23,760	201	83	3.0	889	7.9	10
July 9-13.....	24,800	11	.02	59	17		119	7.9	146	95	190	.7	1.9		653	.89	43,720	217	98	3.5	1,020	7.7	10
July 14-15.....	25,150	--	--	51	8.5		90	4.9	134	69	129	--	1.5		473	.64	32,120	162	52	3.1	740	6.8	5
July 16-24.....	22,470	11	.01	67	20		174	12	166	139	260	.2	4.3		836	1.14	50,720	249	113	4.8	1,340	8.1	5
July 25-26.....	102,400	--	--	42	9.5		66	3.9	120	50	99	--	2.7		382	.52	105,600	144	46	2.4	603	6.9	5
July 27-31.....	98,700	8.3	.00	31	8.8		33	3.5	98	27	55	.3	1.1		216	.29	57,560	114	33	1.4	412	7.5	10
Aug. 1-7.....	34,840	14	.00	37	6.6		48	3.1	108	36	68	.3	2.0		285	.39	26,810	120	31	1.9	486	7.0	4
Aug. 8-13.....	16,380	18	.00	46	18		97	3.9	150	60	146	.2	1.3		496	.67	21,940	189	66	3.1	846	7.4	7
Aug. 14-18.....	14,860	12	.00	55	11		80	3.8	156	56	114	.4	.9		434	.59	17,410	182	54	2.6	739	7.4	7
Aug. 19.....	19,800	--	--	69	16		127	6.0	172	85	199	--	2.2		687	.93	36,730	238	97	3.6	1,050	7.2	5
Aug. 20-30.....	20,120	17	.00	59	12		127	4.1	148	85	182	.4	3.6		572	.78	30,070	197	76	3.9	1,010	7.7	5
Aug. 31.....	58,700	--	--	72	14		184	6.8	144	105	287	--	6.0		879	1.20	139,300	237	119	5.2	1,330	7.1	5
Sept. 1.....	66,200	--	--	46	8.5		70	4.4	132	46	102	--	6.0		415	.56	74,180	150	42	2.5	614	7.1	5
Sept. 2-5.....	43,480	14	.00	41	6.8		59	3.8	118	40	82	.2	3.5		320	.44	37,840	130	34	2.3	560	7.2	5
Sept. 6-12.....	19,100	15	.00	48	9.5		91	4.1	124	62	130	.3	2.8		437	.59	22,540	159	58	3.1	758	7.6	5
Sept. 13-18....	10,250	16	.00	64	12		114	4.5	162	81	174	.4	2.8		578	.79	16,000	209	76	3.4	989	7.9	4
Sept. 19-30....	9,120	15	.00	67	14		141	4.5	176	84	210	.5	1.5		654	.89	16,100	225	80	4.1	1,130	7.5	5
Weighted average.....	55,030	11	0.00	43	9.7		63	4.7	117	50	99	0.3	3.1		377	0.51	55,900	148	52	2.2	605	7.6	7
Time-weighted average.....	--	11	0.00	50	12		85	5.5	130	64	133	0.3	3.1		472	--	--	175	68	2.7	761	7.6	7
Tons per day..	--	1,613	0.52	6,446	1,438		9,380	696	17,420	7,360	14,700	40	462		55,900	--	--	22,020	7,760	--	--	--	50

a Calculated from determined constituents.
c Includes equivalent of 2 ppm of carbonate (CO_3).

ARKANSAS RIVER BASIN--Continued

7-2580. ARKANSAS RIVER AT DARDANELLE, ARK.--Continued

Temperature (°F) of water, water year October 1959 to September 1960

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

7-2605. PETIT JEAN CREEK AT DANVILLE, ARK.

LOCATION.--At gaging station at bridge on State Highway 10 at Danville, Yell County, 1,800 feet upstream from Chicago, Rock Island and Pacific Railroad bridge, 0.5 mile upstream from Spring Creek, and 0.6 mile downstream from Dutch Creek.
DRAINAGE AREA.--741 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1948 to September 1952, October 1957 to September 1960.
Water temperatures: October 1948 to September 1952.
EXTREMES, 1948-52.--Dissolved solids: Maximum, 108 ppm Mar. 17, 18, 20, 22, 1952; minimum, 13 ppm Feb. 1-3, 1950.
Hardness: Maximum, 34 ppm Mar. 17-18, 20, 22, July 11-20, 1952; minimum, 9 ppm Feb. 1-10, 1949, Feb. 1-3, 1950.
Specific conductance: Maximum daily, 204 micromhos July 25, 1950; minimum daily, 21 micromhos Mar. 22, 1952.
Water temperatures: Maximum, 96°F Sept. 8, 10, 1951; minimum, freezing point Feb. 2, 3, 1951.
REMARKS.--Records of specific conductance of daily samples (1948-52) available in district office at Little Rock, Ark. Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (calculated)	Hardness as $CaCO_3$		Specific conductance (micromhos at 25°C)	pH	Color
														Calcium, magnesium	Noncarbonate			
Oct. 19, 1959.....	128			2.9	2.3	4.2	1.6	16	9.4	3.5		0.9	33	16	4	61	7.2	20
Nov. 16.....	120			2.3	2.2	3.7	2.2	17	7.2	3.0		1.0	30	14	0	52	6.9	15
Dec. 16.....	1,490			3.3	1.9	4.7	2.2	14	12	4.0		.4	35	16	4	64	6.7	5
Jan. 12, 1960.....	1,440			2.8	2.1	4.9	.8	12	10	4.8		.3	32	16	6	59	6.8	28
Feb. 24.....	725			2.5	2.0	4.6	.8	12	11	3.5		.1	30	14	4	57	6.6	6
Mar. 9.....	909			2.5	2.1	4.7	.6	11	11	4.5		.2	31	14	6	58	6.7	15
Apr. 5.....	232			2.8	1.9	4.1	.7	13	9.6	4.0		.2	30	15	4	54	6.6	15
May 2.....	90			3.2	2.0	4.3	1.3	19	6.4	3.8		.3	31	16	0	54	6.5	7
June 1.....	2,140			2.2	1.3	2.3	1.9	13	5.2	2.0		.7	22	11	0	36	6.3	60
June 29.....	300			2.7	2.2	3.0	1.4	18	5.4	3.0		1.0	28	16	0	50	6.8	40
July 27.....	923			3.7	1.8	3.2	2.1	20	6.0	2.0		.6	29	16	0	53	6.5	12
Aug. 22.....	38			4.4	2.4	3.6	2.1	26	5.4	2.8		.3	34	21	0	62	6.5	8
Sept. 20.....	22			3.9	3.1	4.2	2.0	26	6.8	3.5		.4	37	22	0	64	6.6	15

ARKANSAS RIVER BASIN--Continued

7-2625. FOURCHE LA FAVE RIVER NEAR NIMROD, ARK.

LOCATION.--At gaging station, 2,000 feet downstream from Nimrod Dam, 4.5 miles southwest of Nimrod, Perry County, and 9.8 miles upstream from South Fourche La Fave River.
DRAINAGE AREA.--680 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1957 to September 1960.
REMARKS.--Records of discharge for water year October 1959 to September 1960 given in WSP 1711. Flow regulated by Nimrod Dam since May 1942.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (calculated)	Hardness as $CaCO_3$		Specific conductance (micromhos at 25°C)	pH	Color
														Calcium, magnesium	Noncarbonate			
Oct. 20, 1959.....	144			2.5	1.2	2.9	0.8	16	3.6	2.5		0.4	22	11	0	38	6.7	6
Nov. 17.....	1.1			1.3	2.3	3.0	.9	17	2.4	3.0		.7	22	12	0	39	7.0	10
Dec. 15.....	5,400			1.5	1.7	2.7	1.3	15	2.6	2.8		.4	20	10	0	36	6.7	10
Jan. 12, 1960.....	2,080			2.4	.7	1.6	.9	10	3.2	2.0		.0	16	9	1	27	6.8	6
Feb. 10.....	2,860			2.1	.7	2.1	.8	10	3.0	2.0		.0	16	8	0	27	6.7	6
Mar. 8.....	672			1.9	.8	2.4	.3	9	3.8	2.5		.3	16	8	0	34	6.4	15
Apr. 5.....	310			2.1	.8	2.2	.3	8	4.4	2.8		.4	17	8	2	29	6.3	10
May 3.....	206			2.1	.9	2.7	.8	10	4.8	2.2		.1	18	8	0	32	6.5	2
June 1.....	5,000			1.8	.7	.8	1.5	8	2.2	1.0		.6	12	8	1	23	6.1	33
June 28.....	621			3.0	2.0	1.3	1.3	19	1.4	1.5		.7	21	16	0	41	6.9	10
July 26.....	458			3.8	1.6	1.8	2.0	21	1.6	2.0		.3	23	16	0	41	6.6	10
Aug. 23.....	110			3.0	1.6	2.0	1.4	19	2.8	2.0		.6	23	14	0	40	6.4	3
Sept. 20.....	567			2.7	1.8	2.4	1.5	17	3.2	2.8		.9	24	14	0	40	6.4	4

7-2635. ARKANSAS RIVER AT LITTLE ROCK, ARK.

LOCATION.--At gaging station at Missouri Pacific Railroad bridge at Little Rock, Pulaski County, at mile 165.5.
DRAINAGE AREA.--158,201 square miles, of which 22,241 square miles probably is noncontributing.
RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1960.
Water temperatures: October 1945 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 894 ppm Sept. 1; minimum, 186 ppm May 25-27.
Hardness: Maximum, 298 ppm Sept. 1; minimum, 85 ppm May 25-27.
Specific conductance: Maximum daily, 1,530 micromhos July 19; minimum daily, 262 micromhos May 26.
Water temperatures: Maximum, 90°F July 12; minimum, 33°F Jan. 23.
EXTREMES, 1945-60.--Dissolved solids: Maximum, 2,400 ppm Nov. 28-29, 1953; minimum, 105 ppm Mar. 3, 1957.
Hardness: Maximum, 556 ppm Nov. 28-29, 1953; minimum, 46 ppm Feb. 2-4, 9, 12-18, 1957.
Specific conductance: Maximum daily, 5,050 micromhos Apr. 8, 1954; minimum daily, 173 micromhos Feb. 4, 1957, Nov. 20, 1958.
Water temperatures: Maximum, 98°F Aug. 16, 1954, July 5, 1956; minimum, freezing point Dec. 19, 1945, Feb. 10, 11, 1947, Jan. 28, 29, 1948.
REMARKS.--Records of specific conductance of daily samples available in district office at Little Rock, Ark. Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Strontium (Sr)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Oct. 1-2, 1959.	79,000	--	--	59	10		139	7.1	144	69	222	--	2.5		690	0.94	147,200	188	70	4.1	1,110	7.3	7
Oct. 3-5.....	115,400	--	--	42	8.8		63	4.7	104	44	105	--	1.5		386	.52	120,300	141	56	2.3	611	7.4	6
Oct. 6-9.....	309,500	4.2	0.00	35	5.1		45	3.9	112	25	67	0.2	2.5		271	.37	226,500	108	16	1.9	440	7.2	16
Oct. 10-18.....	230,200	4.5	.00	34	4.7		31	4.0	100	24	50	.2	2.5		232	.32	144,200	104	22	1.2	361	7.2	18
Oct. 19-20.....	147,500	--	--	42	7.4		51	4.7	108	41	82	--	1.6		343	.47	136,600	136	47	1.9	534	7.3	5
Oct. 21-26.....	122,200	4.9	.00	38	6.0		34	4.1	102	36	52	.3	3.7		252	.34	83,140	120	36	1.4	403	7.5	12
Oct. 27-Nov. 1.	64,530	4.5	.00	45	6.5		50	4.5	116	45	80	.2	2.8		320	.44	55,750	139	44	1.8	521	7.4	7
Nov. 2-5.....	41,080	5.3	.00	57	9.3		75	5.1	146	53	120	.2	10		439	.60	48,690	180	60	2.4	729	7.4	10
Nov. 6-8.....	116,400	--	--	43	7.2		53	4.5	109	35	90	--	1.2		345	.47	108,400	137	48	2.0	522	7.4	6
Nov. 9-14.....	69,880	5.0	.00	40	6.3		45	4.5	110	33	75	.2	3.2		291	.40	54,900	126	36	1.7	476	7.3	17
Nov. 15-18.....	37,520	--	--	48	12		59	4.7	124	53	100	--	1.8		407	.55	41,230	170	68	2.0	608	7.0	5
Nov. 19-23.....	27,540	5.8	.00	57	11		86	5.2	150	59	140	.2	2.6		471	.64	35,020	187	64	2.7	791	7.2	8
Nov. 24-30.....	20,460	12	.00	61	17		110	4.5	168	66	178	.2	2.4		625	.85	34,530	222	84	3.2	942	7.9	5
Dec. 1-3.....	16,330	--	--	85	16		126	7.1	180	78	225	--	5.9		732	1.00	32,270	278	130	3.3	1,120	7.1	5
Dec. 4-6.....	17,800	--	--	81	19		148	7.4	197	93	245	--	4.0		806	1.10	38,740	280	118	3.8	1,290	7.6	6
Dec. 7-10.....	18,550	9.6	.00	65	19		121	4.9	174	76	200	.3	3.5		667	.91	33,410	240	98	3.4	1,040	8.0	5
Dec. 11-12.....	29,750	--	--	49	13		83	5.7	128	62	135	--	4.4		481	.65	38,640	176	71	2.7	786	7.3	6
Dec. 13-24.....	65,770	11	.01	29	8.7		48	2.9	80	31	80	.1	2.0		307	.42	54,520	108	43	2.0	466	7.7	5
Dec. 25-28.....	68,420	8.5	.01	37	12		73	3.3	104	46	118	.1	2.1		395	.54	72,970	142	57	2.7	632	7.2	5
Dec. 29-30.....	79,900	--	--	32	7.5		36	4.5	90	37	56	--	2.4		243	.33	52,420	111	37	1.5	415	7.7	5
Dec. 31.....	94,700	--	--	44	8.1		60	4.6	114	48	95	--	3.2		a319	.43	81,570	144	50	2.2	551	8.2	5

a Calculated from determined constituents.

ARKANSAS RIVER BASIN--Continued

7-2635. ARKANSAS RIVER AT LITTLE ROCK, ARK.--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Mean discharge	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Strontium (Sr)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Noncarbonate				
Jan. 1-5, 1960.	66,940	5.2	0.04	33	10		45	2.4	98	33	72	0.1	2.1		272	0.37	49,160	124	43	1.8	467	7.6	6
Jan. 6-13.....	46,450	11	.00	38	13		76	2.7	108	51	118	.1	2.4		418	.57	52,420	148	60	2.7	657	7.9	5
Jan. 14-16.....	84,530	--	--	38	9.0		61	4.1	96	41	105	--	2.6		356	.48	81,250	132	54	2.3	584	7.7	6
Jan. 17-22.....	94,730	8.9	.00	30	8.0		43	2.6	86	30	70	.1	2.4		287	.39	73,410	108	38	1.8	431	7.8	10
Jan. 23-31.....	48,470	11	.00	36	13		69	2.7	108	48	110	.1	2.3		400	.54	52,350	144	55	2.5	616	8.0	10
Feb. 1-11.....	54,410	11	.00	37	17		82	2.9	120	50	132	.1	2.7		461	.63	67,720	162	64	2.8	718	8.0	5
Feb. 12.....	87,300	--	--	57	18		148	7.4	130	83	245	--	4.7		a627	.85	147,800	216	110	4.4	1,150	8.2	5
Feb. 13-15.....	65,030	--	--	48	12		101	5.5	115	70	155	--	3.6		531	.72	93,230	170	76	3.4	850	8.2	6
Feb. 16-20.....	46,520	8.8	.00	48	15		120	3.9	124	77	185	.2	3.7		593	.81	74,480	182	80	3.9	947	7.8	5
Feb. 21-29.....	41,120	9.6	.00	43	18		97	3.2	120	78	152	.2	3.1		533	.72	59,180	182	83	3.1	836	7.9	5
Mar. 1-9.....	36,770	9.4	.00	44	17		98	3.0	122	73	150	.1	2.9		520	.71	51,620	180	80	3.2	828	8.0	5
Mar. 10-12.....	35,600	--	--	40	9.6		60	3.6	101	49	95	--	2.7		355	.48	34,120	140	56	2.2	582	7.9	7
Mar. 13-31.....	68,800	8.2	.00	39	18		84	2.9	114	69	135	.1	3.8		491	.67	91,210	172	78	2.8	748	8.1	5
Apr. 1-9.....	47,570	15	.00	46	14		80	3.7	122	76	118	.3	4.2		481	.65	61,780	172	72	2.6	726	8.1	5
Apr. 10.....	38,400	--	--	67	14		110	4.2	b152	92	160	--	13		a537	.73	55,680	224	96	3.2	924	8.3	5
Apr. 11-17.....	32,330	12	.00	58	18		84	3.9	152	96	125	.3	4.0		552	.75	48,180	218	94	2.5	828	8.1	5
Apr. 18-19.....	87,000	--	--	56	13		80	4.3	130	80	122	--	4.9		530	.72	124,500	193	86	2.5	757	8.1	5
Apr. 20-23.....	73,380	10	.00	43	12		55	2.9	110	77	78	.3	4.8		372	.50	73,700	157	67	1.9	555	8.1	5
Apr. 24-30.....	40,370	11	.00	44	17		68	3.2	134	70	102	.2	4.0		442	.60	48,180	180	70	2.2	674	8.0	5
May 1-2.....	26,000	--	--	52	14		68	3.7	148	66	100	--	4.1		476	.65	33,420	187	66	2.2	678	7.9	20
May 3.....	46,800	--	--	67	16		115	5.0	c166	89	175	--	4.5		a554	.75	70,000	233	95	3.3	945	8.3	5
May 4-5.....	56,750	--	--	50	11		78	4.3	120	59	125	--	8.7		506	.69	77,530	170	72	2.6	717	8.0	25
May 6.....	55,100	--	--	44	12		70	3.6	138	52	98	--	3.3		a355	.48	52,810	160	40	2.4	575	8.3	5
May 7-17.....	139,500	11	.00	31	8.1		30	2.6	96	33	44	.2	4.3		246	.33	92,660	111	32	1.2	369	8.0	5
May 18-20.....	60,700	--	--	37	8.3		41	3.6	112	31	64	--	5.8		299	.41	49,000	126	34	1.6	453	7.7	5
May 21-24.....	230,500	8.5	.31	30	7.1		27	2.5	116	15	38	.1	1.2		212	.29	131,900	104	9	1.1	335	7.0	80
May 25-27.....	164,000	--	--	25	5.5		20	2.2	82	17	30	--	2.8		186	.25	82,360	85	18	.9	268	7.5	10
May 28-31.....	82,650	7.6	.13	29	6.9		22	2.3	92	27	30	.2	3.2		195	.26	43,520	101	26	1.0	295	8.0	10
June 1-2.....	56,400	--	--	32	7.4		38	2.8	92	33	58	--	2.9		269	.36	40,960	110	35	1.6	408	7.7	5
June 3-7.....	84,620	9.1	.00	36	10		61	3.7	103	45	95	.2	3.7		392	.53	89,560	131	46	2.3	564	7.9	10
June 8-10.....	58,200	--	--	32	9.1		45	3.3	96	40	66	--	3.2		317	.43	48,810	118	39	1.8	450	7.8	5
June 11-13.....	58,930	--	--	29	14		55	3.1	96	50	85	--	2.9		351	.48	55,850	130	52	2.1	528	7.6	10
June 14-17.....	57,300	7.5	.00	41	13		80	4.4	109	63	125	.3	3.1		487	.66	75,340	156	66	2.8	711	7.7	10
June 18-19.....	56,700	--	--	52	19		118	4.7	130	102	178	--	4.8		667	.91	102,100	208	101	3.5	971	7.9	5

June 20-22.....	45,470	--	--	55	17		149	6.0	132	101	228	--	3.9		729	.99	89,500	207	99	4.5	1,150	7.7	5
June 23-24.....	31,400	--	--	51	14		109	5.2	132	86	160	--	4.1		593	.81	50,270	184	76	3.5	907	7.8	5
June 25-26.....	30,000	--	--	46	16		96	4.5	128	81	145	--	3.2		532	.72	43,090	181	76	3.1	822	7.9	5
June 27-29.....	38,870	--	--	34	13		62	2.9	108	50	95	--	3.2		372	.50	39,040	138	50	2.3	590	7.9	5
June 30.....	32,800	--	--	33	10		53	2.6	112	43	73	--	2.8		a272	.37	24,090	124	32	2.0	479	8.0	5
July 1-9.....	24,860	11	0.00	43	12		73	4.3	116	57	115	0.3	2.8		453	.62	30,410	157	62	2.5	672	8.0	5
July 10.....	23,900	--	--	48	16		86	4.3	138	72	135	--	2.5		a432	.59	27,880	186	73	2.7	796	8.2	20
July 11-14.....	27,920	9.9	.00	58	18		128	6.0	c140	97	195	.5	4.0		668	.91	50,360	218	102	3.8	1,040	8.3	5
July 15-16.....	24,500	--	--	39	14		81	4.5	128	62	120	--	4.0		443	.60	29,300	155	50	2.8	724	8.1	5
July 17.....	33,500	--	--	54	17		111	5.3	160	80	165	--	5.5		a517	.70	46,760	204	74	3.4	931	8.2	5
July 18-26.....	28,770	12	.00	62	21		164	6.8	162	126	230	.7	6.3		810	1.10	62,920	241	108	4.6	1,240	8.2	5
July 27.....	110,000	--	--	39	11		60	4.0	132	43	80	--	10		a312	.42	92,660	142	34	2.2	522	7.7	5
July 28-31.....	104,300	9.9	.00	31	6.2		33	2.8	94	28	48	.3	2.8		262	.36	73,780	103	26	1.4	387	8.2	10
Aug. 1-7.....	47,100	10	.00	33	6.9		39	3.3	100	33	58	.2	2.9		260	.35	33,060	111	29	1.6	409	8.1	10
Aug. 8-10.....	23,800	--	--	34	11		62	4.2	108	46	90	--	3.0		356	.48	22,880	130	42	2.4	563	7.3	5
Aug. 11-15.....	15,280	10	.00	48	15		91	4.8	d142	61	140	.3	3.2		493	.67	20,340	182	62	2.9	792	8.4	10
Aug. 16-20.....	16,340	--	--	53	11		63	4.3	156	52	95	--	3.0		402	.55	17,740	177	49	2.1	647	7.5	5
Aug. 21.....	23,300	--	--	70	22		134	5.9	224	84	200	--	4.8		a631	.86	39,700	265	82	3.6	1,020	7.9	5
Aug. 22-31.....	22,370	10	.00	50	17		112	4.1	144	81	165	.3	4.1		616	.84	37,210	195	77	3.5	911	8.2	5
Sept. 1.....	53,500	--	--	85	21		219	7.0	226	123	320	--	7.8		a894	1.22	129,100	298	114	5.5	1,450	7.9	5
Sept. 2.....	66,400	--	--	58	13		118	4.9	180	70	160	--	13		a526	.72	94,300	198	50	3.6	837	7.7	5
Sept. 3-7.....	43,720	8.9	.00	31	12		53	3.8	106	40	80	.3	4.6		335	.46	39,540	127	40	2.0	513	8.2	10
Sept. 8-14.....	18,490	8.6	.00	44	11		75	4.8	118	59	115	.3	3.3		438	.60	21,870	155	58	2.6	686	7.9	10
Sept. 15-21.....	12,240	8.5	.00	56	15		99	5.4	156	74	150	.3	4.0		580	.79	19,170	201	73	3.0	871	8.1	5
Sept. 22-24.....	11,630	--	--	69	14		141	5.6	172	88	215	--	2.7		693	.94	21,760	230	88	4.0	1,130	7.7	5
Sept. 25-30.....	10,130	9.1	.00	53	14		112	4.2	d150	67	165	.3	3.5		562	.76	15,370	190	64	3.5	892	8.4	5
Weighted average.....	62,390	--	--	39	10		60	3.7	111	47	94	--	3.2		369	0.50	62,100	140	49	2.1	572	7.5	11
Time-weighted average.....	--	--	--	44	13		76	3.9	122	58	118	--	3.5		443	--	--	161	61	2.5	687	7.7	8
Tons per day..	--	--	--	6,571	1,752		10,190	616	18,780	7,840	15,800	--	544		--	--	--	23,620	8,200	--	--	--	420

a Calculated from determined constituents.
c Includes equivalent of 2 ppm of carbonate (CO_3).
d Includes equivalent of 3 ppm of carbonate (CO_3).

ARKANSAS RIVER BASIN--Continued

7-2635. *ARKANSAS RIVER AT LITTLE ROCK, ARK.--Continued*

Temperature (°F) of water, water year October 1959 to September 1960

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

7-2999.3. SALT FORK RED RIVER NEAR HEDLEY, TEX.

LOCATION.--One mile downstream from Whitefish Creek and 9.5 miles northeast of Hedley, Donley County.
DRAINAGE AREA.--868 square miles, of which 209 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: March 1956 to September 1960.
Water temperatures: March 1956 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 1,090 ppm Nov. 8-9, 17-21, 23-30; minimum, 270 ppm June 7-9.
Hardness: Maximum, 526 ppm Nov. 8-9, 17-21, 23-30; minimum, 147 ppm June 7-9.
Specific conductance: Maximum daily, 1,980 micromhos Nov. 8; minimum daily, 373 micromhos June 7-8.
Water temperatures: Maximum, 97°F June 2; minimum, 34°F Mar. 8.
EXTREMES, 1956-60.--Dissolved solids: Maximum, 2,600 ppm Apr. 30, 1956; minimum, 231 ppm Aug. 29, 1957.
Hardness: Maximum, 1,640 ppm Apr. 30, 1956; minimum, 126 ppm Aug. 29, 1957.
Specific conductance: Maximum daily, 3,530 micromhos Jan. 25, 1957; minimum daily, 373 micromhos June 7-8, 1960.
Water temperatures: Maximum, 97°F June 2, 1960; minimum, freezing point Jan. 16-18, 1957, Feb. 17, 1958.
REMARKS.--Dashes omitted in potassium (K) column indicate sodium (Na) plus potassium (K) are calculated. Values reported for dissolved solids concentrations less than 1,000 ppm are residues at 180°C and for concentrations more than 1,000 ppm are calculated from determined constituents unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. No discharge records available.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)[a]	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Dissolved solids: Tons per day	Hardness as $CaCO_3$: Calcium, Magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
Oct.1-6,8-15,1959.	--	38		108	39	133		135		388	143	0.9	2.0		950	1.29	--	430	315	2.8	1340	7.8
Oct. 7.....	25.2	54		75	35	127		113		294	146	.8	1.5		b789	1.07	53.6	331	238	3.0	1220	7.9
Oct. 16-31.....	--	36		112	40	146		124		420	155	.9	2.0		995	1.35	--	444	339	3.0	1400	7.8
Nov. 3-7, 10-16,22	--	44		80	23	98		148		230	101	.8	2.2		673	.92	--	294	169	2.5	976	8.0
Nov.8-9,17-21, 23-30.....	--	46		130	49	145		113		516	148	.9	1.8		1090	1.48	--	526	433	2.8	1510	7.9
Dec. 1-10.....	--	32		111	38	130		152		380	136	.6	2.8		908	1.23	--	434	306	2.7	1320	7.7
Dec. 11-20.....	--	31		108	34	133		177		336	143	.7	1.5		875	1.19	--	410	260	2.9	1300	7.8
Dec. 21-31.....	--	36		90	36	137		131		324	156	.8	2.8		882	1.20	--	372	263	3.1	1300	7.6
Jan. 1, 1960.....	--	36		78	35	130		135		270	160	.8	2.8		b779	1.06	--	338	225	3.1	1230	7.7
Mar. 8.....	250	22		70	23	89		164		167	107	.6	2.8		581	.79	392	269	131	2.4	911	7.8
Mar. 9-12, 21-30..	--	30		100	39	128		147		340	147	.8	4.5		b908	1.23	--	410	285	2.7	1330	7.7
Apr. 4-10.....	--	31		104	43	135	5.8	144		390	158	.8	4.8		995	1.35	--	436	317	2.8	1430	7.7
Apr. 11-16, 20....	--	36		86	41	149		106		378	156	.7	2.5		903	1.23	--	383	293	3.3	1350	7.5
Apr. 21-30.....	--	30		106	44	138		111		430	144	.8	2.5		b950	1.29	--	446	354	2.8	1410	7.7
May 1-4, 6, 17....	--	31		115	46	148		113		476	146	.7	2.2		1020	1.39	--	476	383	3.0	1460	7.7

a Represents less than 0.05 cfs.
b Calculated from determined constituents.

RED RIVER BASIN--Continued

7-2999.3. SALT FORK RED RIVER NEAR HEDLEY, TEX.--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Mean discharge (cfs)[a]	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
May 5,11-14,18-20, 23, 30, 1960....	--	24		88	26	98		171		236	106	0.6	3.0		709	0.96	--	326	185	2.4	1030	7.8
May 7-10, 31.....	--	28		98	36	125		125		378	116	.7	2.2		910	1.24	--	392	288	2.7	1240	7.8
June 1-2, 4-6.....	--	26		85	26	105		177		234	110	.7	2.8		724	.98	--	319	170	2.6	1050	7.9
June 3, 10.....	--	19		54	12	49		155		94	44	.5	1.5		372	.51	--	184	53	1.6	563	7.5
June 7-9.....	--	13		45	8.5	29		131		59	27	.4	2.0		270	.37	--	147	38	1.0	413	7.6
June 15-26.....	--	30		91	28	114		162		282	113	.7	1.8		787	1.07	--	342	207	2.7	1120	7.8
July 5-12.....	--	44		63	26	125		95		263	129	.8	.8		712	.97	--	264	182	3.3	1050	7.6
Aug. 18-23.....	--	30		62	17	73		133		157	75	.7	3.0		494	.67	--	224	111	2.1	757	7.8
Aug. 24.....	12.1	--		--	--	--		130		--	118	--	--		--	--	--	315	204	--	1100	7.7
Sept. 9-20.....	--	35		84	29	125		137		284	134	.8	2.0		782	1.06	--	328	213	3.0	1160	7.8
Sept. 21-30.....	--	37		84	32	124		116		310	134	.8	1.8		810	1.10	--	341	245	2.9	1200	7.7
Time-weighted average	--	34		95	34	123		137		331	131	0.8	2.4		843	--	--	377	262	2.8	1220	7.7

a Represents less than 0.05 cfs.
b Calculated from determined constituents.

RED RIVER BASIN--Continued

7-2999.3. SALT FORK RED RIVER NEAR HEDLEY, TEX.--Continued

Temperature (F°) of water, water year October 1959 to September 1960

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

RED RIVER BASIN--Continued

7-3004. SALT FORK RED RIVER NEAR VINSON, OKLA.

LOCATION.--At bridge on State Highway 30, 5 miles southwest of Vinson, Harmon County.
RECORDS AVAILABLE.--Chemical analyses: December 1959 to September 1960.
REMARKS.--No discharge records available.

Chemical analyses, in parts per million, December 1959 to September 1960

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Dec. 21, 1959.....				220	56	134		70	0	719	185	0.6	4.4		a 1350	1.84		780	722	2.1	1880	8.2
Jan. 14, 1960.....				250	65	156		130	0	820	190	.7	2.5		1660	2.26		890	784	2.3	2050	8.0
Jan. 26.....				210	67	146		86	0	727	202	.6	3.8		a 1400	1.90		800	730	2.2	1970	8.1
Mar. 14.....				290	92	161		64	0	1050	215	.7	2.3		1970	2.68		1100	1050	2.1	2380	7.9
Apr. 18.....				460	105	234		144	0	1540	260	1.0	.8		2850	3.88		1580	1460	2.6	3230	7.5
Apr. 28.....				112	49	100		152	0	402	108	--	2.8		950	1.29		480	356	2.0	1270	8.1
May 16.....				464	122	269		204	0	1600	292	1.0	.0		3020	4.11		1660	1490	2.9	3440	7.4
June 21.....				404	93	201		124	0	1360	220	--	.2		2540	3.45		1390	1290	2.3	2820	8.0
July 19.....				440	93	180		180	0	1310	255	--	.1		2550	3.47		1480	1330	2.0	2940	7.7
Sept. 13.....				320	51	181		138	0	969	200	--	.1		1890	2.57		1010	897	2.5	2270	7.5

a Calculated from determined constituents.

RED RIVER BASIN--Continued

7-3005. SALT FORK RED RIVER AT MANGUM, OKLA.

LOCATION.--At gaging station at bridge on State Highway 34, 0.5 mile south of Mangum, Greer County, and 13 miles downstream from Fish Creek.
DRAINAGE AREA (revised).--1,566 square miles, of which 209 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: October 1946 to September 1948, October 1959 to September 1960.
Water temperatures: December 1946 to September 1948.
REMARKS.--Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 28, 1959.....	a 0.2	18	--	520	74	131		144	0	1440	188	0.5	1.2	0.42	b 2440	3.32	1.32	1600	1480	1.4	2830	7.6
Dec. 21.....	45	--	--	224	49	125		132	0	677	152	.6	4.3	--	b 1300	1.77	158	760	652	2.0	1740	8.1
Jan. 14, 1960.....	300	--	--	276	64	149		144	0	846	192	.6	3.6	--	1600	2.18	1300	950	832	2.1	2090	8.2
Jan. 26.....	a 407	--	--	300	66	156		114	0	933	205	.7	4.2	--	b 1720	2.34	1890	1020	926	2.1	2280	8.1
Feb. 25.....	120	20	0.00	508	125	192		220	0	1580	260	1.0	3.7	--	2820	3.84	914	1780	1600	2.0	3290	7.8
Apr. 18.....	2.0	--	--	544	142	213		124	0	1870	252	.9	.6	--	3280	4.46	17.7	1940	1840	2.1	3540	7.5
May 25.....	100	14	.00	320	71	150		118	0	1020	182	.7	.1	.41	1950	2.65	526	1090	994	2.0	2280	7.4
June 20.....	26	--	--	408	64	224		118	0	1320	210	--	.2	--	2400	3.26	168	1280	1180	2.7	2740	8.2
July 12.....	14	17	.00	192	45	129		104	0	619	152	.7	.6	.24	1250	1.70	47.2	665	580	2.2	1660	7.8
July 19.....	11	--	--	336	56	159		112	0	1030	178	--	.2	--	1950	2.65	57.9	1070	978	2.1	2270	8.1
Sept. 13.....	a 10	--	--	272	60	110		140	0	784	165	--	.7	--	1560	2.12	42.1	925	810	1.6	1970	7.7

a Daily mean discharge.
b Calculated from determined constituents.

RED RIVER BASIN--Continued

7-3012. SALT FORK RED RIVER NEAR ELMER, OKLA.

LOCATION.--At bridge on State Highway 5, 1.5 miles west of Elmer, Jackson County.
DRAINAGE AREA.--2,088 square miles.
RECORDS AVAILABLE.--Chemical analyses: December 1959 to September 1960.
REMARKS.--No discharge records available.

Chemical analyses, in parts per million, December 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Dec. 29, 1959.....				304	76	197		176	2	911	280	0.6	5.9		a 1860	2.53		1070	922	2.6	2470	8.3
Jan. 14, 1960.....				270	72	185		178	0	823	260	.7	4.5		1830	2.49		970	824	2.6	2320	8.2
Mar. 14.....				280	78	219		118	0	920	310	--	6.2		2040	2.77		1020	924	3.0	2570	8.1
Apr. 18.....				512	171	509		236	0	1660	825	--	.4		4080	5.55		1980	1790	5.0	5030	7.6
May 16.....				472	151	433		178	0	1560	688	--	.4		3680	5.00		1800	1650	4.4	4550	7.7
June 20.....				348	100	215		158	0	1090	342	--	.5		2350	3.20		1280	1150	2.6	2910	7.6
July 18.....				282	75	228		172	0	878	320	--	.2		1980	2.69		1010	869	3.1	2540	7.7
Aug. 15.....				188	71	242		136	0	662	345	--	.0		1650	2.24		760	648	3.8	2320	7.7
Sept. 12.....				296	51	141		188	0	795	195	--	.5		1680	2.28		950	796	2.0	2110	8.0

a Calculated from determined constituents.

7-3045. ELK CREEK NEAR HOBART, OKLA.

LOCATION.--At gaging station at highway bridge, 7 miles downstream from Little Elk Creek, 7.5 miles south of Hobart, Kiowa County, and 10.9 miles upstream from mouth.
DRAINAGE AREA.--549 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1949 to September 1951, October 1958 to September 1960.
Water temperatures: October 1949 to September 1951, October 1958 to September 1960.
Sediment records: December 1958 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 1,410 ppm Nov. 11-30; minimum, 150 ppm July 23-24.
Hardness: Maximum, 880 ppm Nov. 21-30; minimum, 92 ppm Oct. 1-4.
Specific conductance: Maximum daily, 2,180 micromhos Nov. 29; minimum daily, 196 micromhos Oct. 2.
Water temperatures: Maximum, 85°F June 22-25; minimum, freezing point on several days during November, February, and March.
Sediment concentrations: Maximum daily, 6,410 ppm Oct. 1; minimum daily, 5 ppm Dec. 5.
Sediment loads: Maximum daily, 20,800 tons Oct. 3; minimum daily, less than 0.50 ton on several days during November, December, and June.
EXTREMES, 1949-51, 1958-60.--Dissolved solids: Maximum, 2,620 ppm Nov. 26-30, 1958; minimum, 150 ppm July 23-24, 1960.
Hardness: Maximum, 1,640 ppm Nov. 26-30, 1958; minimum, 92 ppm Oct. 1-4, 1959.
Specific conductance: Maximum daily, 3,100 micromhos Nov. 27, 1958; minimum daily, 154 micromhos May 26, 1959.
Water temperatures: Maximum, 95°F July 8, 1951; minimum, freezing point on many days during winter months.
Sediment concentrations (1958-60): Maximum daily, 6,860 ppm Sept. 25, 1959; minimum daily, 5 ppm Dec. 5, 1959.
Sediment loads (1958-60): Maximum daily, 39,800 tons Sept. 25, 1959; minimum daily, less than 0.05 ton on several days.
REMARKS.--Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1-4, 1959....	2282	--	--	29	4.7	16	--	96	0	32	9.5	--	2.4	--	155	0.21	955	92	14	0.7	221	7.7
Oct. 5-6.....	626	--	--	51	16	42	--	140	0	112	35	--	4.2	--	337	.46	570	192	78	1.3	499	7.6
Oct. 7-10.....	65.5	--	--	112	51	104	--	296	0	327	90	--	7.3	--	875	1.19	155	490	248	2.0	1180	8.0
Oct. 11-31.....	24.0	23	0.00	174	48	160	2.0	404	0	363	200	0.0	2.2	0.00	1250	1.70	81.0	632	301	2.8	1740	8.0
Nov. 1-10.....	24.9	21	.00	205	57	150	2.0	432	0	407	210	.0	1.6	.00	1270	1.73	85.4	744	390	2.4	1760	8.1
Nov. 11-20.....	24.0	--	--	192	83	151	--	498	0	525	132	--	9.2	--	1410	1.92	91.4	820	412	2.3	1820	8.2
Nov. 21-30.....	21.9	--	--	208	88	138	--	518	0	527	142	--	9.7	--	1410	1.92	83.4	880	456	2.0	1920	8.2
Dec. 1-10.....	19.3	10	.00	181	79	135	1.5	350	6	526	160	.3	4.5	.01	1360	1.85	70.9	775	478	2.1	1830	8.4
Dec. 11-16.....	26.0	--	--	192	93	150	--	456	12	564	140	--	8.5	--	1400	1.90	98.3	860	466	2.2	1880	8.4
Dec. 17.....	590	--	--	128	66	135	--	264	8	440	135	--	5.7	--	1130	1.54	1800	590	360	2.4	1470	8.3
Dec. 18-20.....	827	--	--	50	17	45	--	160	0	104	36	--	4.6	--	a 336	.46	750	196	65	1.4	520	8.0
Dec. 21.....	159	--	--	85	41	83	--	264	4	233	62	--	10	--	a 648	.88	278	380	157	1.9	934	8.3
Dec. 22-31.....	106	--	--	128	67	110	--	376	14	329	105	--	16	--	a 954	1.30	273	595	264	2.0	1380	8.4

a Calculated from determined constituents.

RED RIVER BASIN--Continued

7-3045. ELK CREEK NEAR HOBART, OKLA.--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Jan. 1-10, 1960...	79.0	20	0.00	139	86	93	3.2	412	24	356	110	0.5	18	0.36	1080	1.47	230	700	322	1.5	1550	8.4
Jan. 11-14.....	184	--	--	130	82	123	--	328	20	348	178	--	13	--	1140	1.55	566	660	358	2.1	1620	8.5
Jan. 15-20.....	175	--	--	94	60	54	--	300	18	204	70	--	13	--	733	1.00	346	480	204	1.1	1070	8.5
Jan. 21-31.....	87.1	--	--	131	86	86	--	432	14	329	95	--	17	--	1040	1.41	245	680	302	1.4	1480	8.4
Feb. 1-2.....	70.0	--	--	147	81	112	--	468	0	370	115	--	16	--	1150	1.56	217	700	316	1.8	1610	7.2
Feb. 3.....	522	--	--	82	35	99	--	140	8	196	160	--	8.6	--	732	1.00	1030	350	222	2.3	1110	8.5
Feb. 4.....	1420	--	--	54	21	45	--	132	4	106	60	--	10	--	407	.55	1560	220	106	1.3	623	8.4
Feb. 5-6.....	1212	--	--	46	25	35	--	186	0	82	33	--	8.8	--	343	.47	1120	216	64	1.0	550	7.9
Feb. 7-10.....	230	--	--	98	52	66	--	340	0	204	70	--	17	--	737	1.00	458	460	182	1.3	1090	8.1
Feb. 11-29.....	111	17	.00	122	72	92	2.6	420	0	291	88	.4	27	.16	961	1.31	288	600	256	1.6	1390	8.1
Mar. 1-20.....	87.2	18	.00	146	82	113	4.8	454	4	376	112	.5	19	.28	1130	1.54	266	700	322	1.9	1620	8.3
Mar. 21-31.....	75.9	--	--	122	85	110	--	376	0	398	112	--	16	--	1140	1.55	234	655	347	1.9	1570	7.8
Apr. 1-20.....	47.7	3.6	.00	114	91	123	4.3	396	0	428	112	.5	17	.37	1130	1.54	146	660	336	2.1	1570	8.2
Apr. 21-30.....	31.5	--	--	152	91	129	--	440	16	453	116	--	16	--	1220	1.66	104	755	368	2.0	1700	8.4
May 1-4.....	65.0	--	--	142	94	147	--	460	18	455	118	--	15	--	1230	1.67	216	740	333	2.3	1680	8.4
May 5-6.....	150	--	--	77	29	47	--	146	0	238	33	--	.7	--	563	.77	228	312	192	1.2	766	8.1
May 7-8.....	53.0	--	--	102	55	77	--	260	12	312	59	--	8.0	--	826	1.12	118	480	247	1.5	1140	8.5
May 9-17.....	30.7	--	--	150	94	112	--	468	0	441	106	--	14	--	1200	1.63	99.5	760	376	1.8	1660	8.0
May 18-20.....	136	--	--	114	72	78	--	282	6	354	94	--	9.9	--	924	1.26	339	580	339	1.4	1280	8.4
May 21-24.....	44.2	--	--	90	56	69	--	264	22	225	78	--	8.5	--	770	1.05	91.9	455	202	1.4	1080	8.6
May 25-29.....	35.6	--	--	146	74	126	--	378	18	421	112	--	7.8	--	1190	1.62	114	670	330	2.1	1570	8.5
May 30-31.....	29.0	--	--	120	58	99	--	316	0	328	110	--	.5	--	930	1.26	72.8	540	281	1.9	1340	7.6
June 1-6.....	33.8	--	--	123	66	96	--	316	20	328	105	--	8.0	--	997	1.36	91.0	580	288	1.7	1370	8.5
June 7-12.....	156	--	--	64	22	39	--	148	0	156	34	--	4.8	--	426	.58	179	252	130	1.1	644	7.9
June 13-15.....	50.3	--	--	92	46	85	--	300	0	236	76	--	7.1	--	740	1.01	100	420	174	1.8	1050	8.1
June 16-20.....	23.2	--	--	130	74	118	--	332	40	391	94	--	11	--	1080	1.47	67.6	630	292	2.0	1410	8.7
June 21-30.....	21.0	--	--	149	85	132	--	368	32	461	115	--	11	--	1270	1.73	72.0	720	365	2.1	1600	8.6
July 1-7.....	10.5	--	--	149	85	119	--	400	0	462	118	--	4.3	--	1220	1.66	34.6	720	392	1.9	1630	8.0
July 8.....	19	--	--	106	61	79	--	278	0	327	82	--	2.4	--	849	1.15	43.6	515	287	1.5	1230	8.2
July 9-14.....	20.7	--	--	143	89	108	--	402	0	444	115	--	6.8	--	1190	1.62	66.5	725	396	1.7	1620	8.0
July 15-22.....	51.3	--	--	56	26	46	--	204	0	119	36	--	5.5	--	418	.57	57.9	246	79	1.3	647	8.2
July 23-24.....	1535	--	--	29	9.6	9.2	--	116	0	26	7.0	--	.0	--	150	.20	622	112	17	.4	258	7.2
July 25-26.....	170	--	--	62	31	41	--	234	0	135	28	--	.0	--	467	.64	214	282	90	1.1	672	7.2

July 27-31.....	56.4	--	--	125	80	65	--	430	0	314	68	--	7.5	--	943	1.28	144	640	288	1.1	1300	8.1
Aug. 1-10.....	29.0	22	0.00	141	97	122	3.2	456	0	462	95	0.5	8.7	0.54	1220	1.66	95.5	750	376	1.9	1600	8.2
Aug. 11-20.....	22.1	--	--	150	106	121	--	432	12	523	105	--	7.5	--	1360	1.85	81.2	810	436	1.8	1750	8.4
Aug. 21.....	32	--	--	112	71	74	--	300	8	352	70	--	6.8	--	937	1.27	81.0	570	310	1.3	1250	8.3
Aug. 22-25.....	19.0	--	--	152	102	104	--	416	24	478	100	--	8.5	--	1310	1.78	67.2	800	419	1.6	1650	8.5
Aug. 26-29.....	21.8	--	--	90	52	60	--	252	0	264	60	--	6.5	--	723	.98	42.6	440	234	1.2	987	8.2
Aug. 30-31.....	23.0	--	--	45	23	31	--	126	0	119	32	--	2.3	--	352	.48	21.8	208	104	.9	521	7.6
Sept. 1-10.....	10.7	--	--	176	94	142	--	418	24	560	113	--	12	--	1370	1.86	39.6	825	442	2.2	1800	8.5
Sept. 11-12.....	9.8	--	--	46	21	38	--	152	0	114	27	--	3.5	--	325	.44	8.60	202	78	1.2	528	7.8
Sept. 13.....	9.2	--	--	87	42	65	--	224	4	248	54	--	9.0	--	638	.87	15.8	390	200	1.4	941	8.3
Sept. 14-25.....	8.6	--	--	186	87	143	--	410	24	563	112	--	13	--	1370	1.86	31.8	820	444	2.2	1780	8.5
Sept. 26.....	35	--	--	104	56	75	--	212	2	389	47	--	5.4	--	a 782	1.06	73.9	490	313	1.5	1100	8.3
Sept. 27-30.....	14.5	--	--	83	27	70	--	256	2	174	50	--	8.0	--	562	.76	22.0	320	106	1.7	856	8.3
Weighted average	110	--	--	81	41	61	--	250	--	196	62	--	8.7	--	611	0.83	181	370	166	1.4	873	--

a Calculated from determined constituents.

Temperature (°F) of water, water year October 1959 to September 1960

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

RED RIVER BASIN--Continued

7-3045. ELK CREEK NEAR BOBART, OKLA.--Continued

Suspended sediment, water year October 1959 to September 1960

Day	OCTOBER			NOVEMBER			DECEMBER		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1..	1090	6410	J 16300	24	302	20	20	9	0.5
2..	1660	2990	S 13400	29	322	25	20	8	T
3..	2970	2650	S 20800	24	--	E 22	19	9	.5
4..	3410	1500	S 13900	22	--	E 20	19	9	.5
5..	1020	2150	S 5580	23	--	E 13	19	5	T
6..	231	1400	S 912	30	189	15	19	7	T
7..	105	795	225	25	180	12	20	8	T
8..	65	518	91	25	157	11	19	14	.7
9..	56	507	77	24	162	10	19	13	.7
10..	36	430	42	23	266	17	19	12	.6
11..	31	488	41	23	276	17	19	89	4.6
12..	32	491	42	23	246	15	19	294	15
13..	26	400	28	24	255	17	18	300	15
14..	34	445	41	23	168	10	20	310	17
15..	26	453	32	26	79	5.5	21	320	18
16..	25	356	24	24	37	2.4	59	568	S 110
17..	24	348	23	24	48	3.1	590	4340	J 9430
18..	28	374	28	25	26	1.8	1440	3390	J 13500
19..	22	350	21	24	11	.7	813	1850	S 4150
20..	22	329	20	24	9	.6	227	1200	S 770
21..	22	360	21	23	9	.6	159	580	S 251
22..	21	360	20	22	11	.7	132	392	140
23..	20	338	18	22	9	.5	114	335	103
24..	20	317	17	22	12	.7	105	300	85
25..	22	305	18	22	14	.8	96	275	71
26..	21	322	18	22	14	.8	94	316	80
27..	21	238	13	21	15	.9	114	670	206
28..	20	188	10	24	25	1.6	141	1000	381
29..	20	247	13	21	9	.5	102	525	145
30..	24	280	18	20	8	T	82	400	89
31..	22	306	18	--	--	--	75	301	61
Total	11146	--	71811	708	--	245.6	4633	--	29646.6

Day	JANUARY			FEBRUARY			MARCH		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1..	73	288	57	65	257	45	86	237	55
2..	76	288	59	75	361	S 88	83	226	51
3..	79	254	54	522	5980	J 9940	83	226	51
4..	72	217	42	1420	5600	J 19300	84	226	51
5..	72	200	39	1680	2600	S 12000	100	224	60
6..	74	229	46	744	1910	S 3940	123	232	77
7..	74	214	43	308	1410	S 1190	80	238	51
8..	86	197	46	227	890	S 547	73	215	42
9..	79	237	51	202	710	387	80	253	55
10..	105	309	88	182	612	301	105	413	117
11..	114	329	101	164	487	216	123	564	187
12..	123	342	114	132	420	150	110	480	143
13..	136	460	170	123	352	117	83	319	71
14..	361	3910	J 4580	118	305	97	79	276	59
15..	361	4040	J 3930	118	282	90	76	262	54
16..	223	2090	J 1370	123	252	84	82	220	49
17..	132	808	S 290	123	295	98	83	235	53
18..	123	400	133	128	289	100	74	229	46
19..	114	280	86	114	242	74	70	234	44
20..	96	251	65	100	253	68	66	238	42
21..	110	283	84	100	250	68	61	262	43
22..	105	280	79	103	233	65	60	237	38
23..	114	271	83	96	236	61	60	215	35
24..	96	254	66	95	238	61	63	227	39
25..	74	266	53	98	245	65	65	220	39
26..	77	273	57	88	206	49	74	214	43
27..	80	273	59	89	300	72	86	243	56
28..	82	275	61	98	265	70	74	240	48
29..	80	274	59	90	247	60	132	1820	S 787
30..	73	247	49	--	--	--	90	1030	S 259
31..	67	223	40	--	--	--	70	279	53
Total	3531	--	12054	7525	--	49403	2578	--	2798

E Estimated.
S Computed by subdividing day.
T Less than 0.50 ton.
J Computed from partly estimated concentration graph and subdividing day.

RED RIVER BASIN--Continued

7-3045. ELK CREEK NEAR HOBART, OKLA.--Continued

Suspended sediment, water year October 1959 to September 1960--Continued

Day	APRIL			MAY			JUNE		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	61	218	36	28	248	19	45	690	84
2	58	248	39	28	234	18	45	890	108
3	54	256	37	30	215	17	30	390	32
4	54	238	35	174	2610 J	2920	32	260	22
5	48	249	32	214	3860 J	2450	26	195	14
6	48	259	34	86	1660 S	401	25	239 J	21
7	48	263	34	60	645 S	106	193	3100 J	1880
8	47	257	33	46	260	32	55	978 S	151
9	45	259	31	37	172	17	220	2920 J	2770
10	46	257	32	31	206	17	288	2560 J	2220
11	45	248	30	30	192	16	101	932 S	262
12	44	246	29	30	156	13	79	630	134
13	45	258	31	29	149	12	64	490	85
14	45	268	33	26	198	14	51	280	39
15	48	267	35	26	186	13	36	211	21
16	47	234	30	26	164	12	29	171	13
17	45	219	27	41	776 J	174	25	167	11
18	46	242	30	58	1660 J	293	23	173	11
19	42	198	22	197	2580 J	1740	20	164	8.9
20	38	215	22	153	1990 J	866	19	146	7.5
21	34	210	19	70	1000 S	196	18	122	5.9
22	33	230	20	41	350	39	19	95	4.9
23	33	260	23	34	223	20	18	72	3.5
24	33	277	27	32	150	13	18	56	2.7
25	31	260	22	27	90	6.6	32	66 J	8.6
26	31	265	22	26	60	4.2	39	54 J	7.8
27	30	285	23	24	37	2.4	22	40	2.4
28	29	258	20	26	99 J	10	17	19	.9
29	30	264	21	75	3980 J	899	14	11	T
30	31	267	22	33	650 S	63	13	7	T
31	--	--	--	25	415	28	--	--	--
Total	1269	--	851	1763	--	10431.2	1616	--	7931.8

Day	JULY			AUGUST			SEPTEMBER		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	12	32	1.0	40	163	18	13	308	11
2	10	60	1.6	36	151	15	7.9	360	7.7
3	9.6	65	1.7	33	153	14	9.6	366	9.5
4	10	83	2.2	31	128	11	9.2	361	9.0
5	9.2	93	2.3	29	112	8.8	9.2	279	6.9
6	11	95	2.8	25	148	10	10	159	4.3
7	12	98	3.2	24	105	6.8	10	247	6.7
8	19	178 S	15	24	233	15	9.2	265	6.6
9	18	87	4.2	24	179	12	9.2	290	7.2
10	17	77	3.5	24	189	12	20	502 S	28
11	20	57	3.1	24	201	13	10	389	11
12	21	45	2.6	25	249	17	9.6	258	6.7
13	16	65	2.8	24	271	18	9.2	159	3.9
14	32	557 J	128	21	261	15	8.5	135	3.1
15	135	4570 J	1840	20	274	15	8.5	143	3.3
16	35	1340 S	138	18	301	15	7.9	135	2.9
17	17	425	20	18	288	14	7.9	132	2.8
18	14	210	7.9	23	332	21	7.7	173	3.6
19	13	145	5.1	23	326	20	8.5	157	3.6
20	11	97	2.9	25	433	29	9.2	86	2.1
21	9.2	65	1.6	32	802 S	71	8.2	85	1.9
22	176	3170 S	3390	20	265	14	8.5	86	2.0
23	1390	4010 S	14200	18	270	13	10	86	2.3
24	1680	1900 S	8750	18	295	14	9.2	79	2.0
25	232	2260 S	1390	20	316 S	17	9.6	117	3.0
26	107	1120 S	341	36	1110 S	116	35	2120 S	217
27	78	640	135	24	428 S	31	21	512 S	31
28	60	444	72	14	150	5.7	14	230	8.7
29	55	312	46	13	102 S	3.8	13	132	4.6
30	47	274	35	31	1820 S	169	10	99	2.7
31	42	214	24	15	122 S	5.5	--	--	--
Total	4318.0	--	30572.5	752	--	759.6	332.8	--	415.1

Total discharge for year (cfs-days)..... 40171.8
Total load for year (tons)..... 216919.4

S Computed by subdividing day.
T Less than 0.50 ton.
J Computed from partly estimated concentration graph and subdividing day.

RED RIVER BASIN--Continued

7-3045. ELK CREEK NEAR HOBART, OKLA.--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1959 to September 1960
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Water temperature (°F)	Sampling point	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters											Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
July 22, 1960.....	2300	74		760	8560	17600		66	74	82	92	96	99	100				SPWC
July 23.....	0900	77		1300	4300	15100		63	67	74	81	87	92	97				SPWC
July 23.....	1625	77		1610	3360	14600		71	77	81	88	93	97	99				SPWC
Aug. 26.....	1200	80		36	2770	269	62	72	79	87	95	99	--	--				BCW

7-3050. NORTH FORK RED RIVER NEAR HEADRICK, OKLA.

LOCATION.--At gaging station at bridge on U.S. Highway 62, 2.5 miles east of Headrick, Jackson County, and 12.9 miles upstream from Otter Creek.
DRAINAGE AREA.--4,244 square miles, of which 399 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: October 1959 to September 1960.
Water temperatures: November 1959 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 10,900 ppm Sept. 12; minimum, 805 ppm Dec. 18-20.
Hardness: Maximum, 1,970 ppm Sept. 12; minimum, 400 ppm Dec. 18-20.
Specific conductance: Maximum daily, 16,100 micromhos Sept. 12; minimum daily, 1,050 micromhos Dec. 19.
Water temperatures: Maximum, 100°F June 2; minimum, freezing point on several days during February and March.
REMARKS.--Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 27, 1959.....	35	2.5	--	320	88	1340	--	232	0	84	2150	0.1	1.9	0.55	4840	6.58	457	1160	970	17	7620	7.6
Nov. 13-20.....	47.6	14	0.04	356	122	1720	10	312	0	938	2700	.3	--	.66	6160	8.38	792	1390	1130	20	9710	8.2
Nov. 21-30.....	49.9	9.0	.00	359	132	1850	12	271	0	981	3040	.3	--	.43	6720	9.14	905	1440	1220	21	10600	8.1
Dec. 1-10.....	50.6	--	--	399	103	2090	--	249	0	1210	3190	--	--	--	7160	9.74	978	1420	1220	24	10700	8.0
Dec. 11-14.....	55.2	--	--	382	111	2090	--	239	0	1210	3190	--	--	--	a 7100	9.66	1060	1410	1210	24	10800	8.1
Dec. 15-16.....	124	--	--	360	64	1710	--	236	0	1050	2550	--	--	--	5870	7.98	1970	1160	966	22	9000	8.0
Dec. 17.....	1470	--	--	248	34	811	--	124	0	632	1250	--	--	--	3080	4.19	12220	760	658	13	4850	7.9
Dec. 18-20.....	2503	--	--	121	24	118	--	120	0	323	155	--	3.3	--	805	1.09	5440	400	302	2.6	1200	7.9
Dec. 21.....	680	--	--	212	22	221	--	142	0	535	300	--	3.7	--	1370	1.86	2520	620	504	3.9	1900	8.0
Dec. 22-31.....	351	--	--	300	66	736	--	248	0	833	1100	--	--	--	3180	4.32	3010	1020	817	10	4800	7.7
Jan. 1-10, 1960...	270	16	.00	326	99	1020	14	300	0	853	1680	.3	--	.38	4240	5.77	3090	1220	974	13	6560	8.2
Jan. 11-14.....	366	--	--	280	98	873	--	252	0	785	1400	--	--	--	3760	5.11	3720	1100	894	11	5660	8.0
Jan. 15.....	1170	--	--	134	48	295	--	154	4	333	485	--	9.9	--	1480	2.01	4680	530	398	5.6	2320	8.3
Jan. 16-17.....	1155	--	--	212	59	478	--	184	0	574	750	--	3.6	--	2260	3.07	7050	770	619	7.5	3510	7.8
Jan. 18-21.....	756	--	--	188	54	272	--	186	0	533	405	--	3.2	--	1650	2.24	3370	690	538	4.5	2440	8.2
Jan. 22-27.....	273	--	--	282	92	763	--	278	0	759	1220	--	--	--	3450	4.69	2540	1080	852	10	5240	8.1
Jan. 28-31.....	790	--	--	218	66	420	--	198	0	621	650	--	3.1	--	2170	2.95	4630	815	652	6.4	3270	8.2
Feb. 1-3.....	616	--	--	220	59	484	--	200	4	614	730	--	4.5	--	2340	3.18	3890	790	620	7.5	3470	8.3
Feb. 4.....	3580	--	--	118	32	215	--	124	0	328	315	--	5.5	--	1170	1.59	11310	425	324	4.5	1770	8.0
Feb. 5-8.....	3772	--	--	158	38	157	--	148	0	439	220	--	3.1	--	1180	1.60	12020	550	428	2.9	1650	8.1

a Calculated from determined constituents.

RED RIVER BASIN--Continued

7-3050. NORTH FORK RED RIVER NEAR HEADRICK, OKLA.--Continued

Chemical analyses, in parts per million, October 1959 to September 1960--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Feb. 9-10, 1960	1195	--	--	188	56	281	--	86	0	627	410	--	11	--	1730	2.35	5580	700	630	4.6	1730	8.0
Feb. 11-27	611	--	--	276	66	484	--	240	0	749	730	--	7.5	--	2560	3.48	4220	960	764	6.8	3710	8.2
Feb. 28-29	202	--	--	246	94	908	--	66	0	882	1420	--	--	--	3840	5.22	2090	1000	946	12	5680	7.9
Mar. 1-10	232	17	0.00	328	85	874	11	298	0	897	1350	0.4	--	0.37	3890	5.29	2440	1170	926	11	5810	8.1
Mar. 11-14	1344	--	--	204	62	321	--	198	0	596	480	--	4.2	--	1880	2.56	6820	765	602	5.1	2760	8.1
Mar. 15	633	--	--	178	70	383	--	84	0	618	600	--	4.3	--	2000	2.72	3420	730	661	6.2	3000	7.9
Mar. 16-20	555	--	--	248	73	574	--	224	0	715	875	--	7.1	--	2700	3.67	4050	920	736	8.2	4010	8.1
Mar. 21-28	537	--	--	250	74	640	--	226	0	728	975	--	3.7	--	2950	4.01	4280	930	745	9.1	4420	7.5
Mar. 29-31	1283	--	--	212	62	365	--	188	0	621	550	--	3.7	--	2030	2.76	7030	785	631	5.7	3000	8.1
Apr. 1-10	378	9.6	.00	296	93	840	30	196	0	882	1400	.4	5.2	.44	3910	5.32	3990	1120	960	11	5750	8.2
Apr. 11-15	233	--	--	336	112	1230	--	206	0	1020	1950	--	--	--	4940	6.72	3110	1300	1130	15	7600	8.1
Apr. 16-17	531	--	--	256	93	689	--	190	0	807	1080	--	--	--	3120	4.24	4470	1020	864	9.4	4790	8.2
Apr. 18-20	240	--	--	284	100	1030	--	188	0	919	1600	--	--	--	4090	5.56	2650	1120	966	13	6310	8.0
Apr. 21-30	148	--	--	340	115	1490	--	192	0	1080	2320	--	--	--	5690	7.74	2270	1320	1160	18	8530	8.1
May 1-5	171	--	--	352	112	1510	--	128	0	1090	2400	--	--	--	5820	7.92	2690	1340	1240	18	9020	8.0
May 6	407	--	--	178	54	586	--	136	0	501	925	--	2.9	--	2380	3.24	2620	665	554	9.9	3860	7.7
May 7-10	181	--	--	344	90	1310	--	186	0	984	2050	--	--	--	4990	6.79	2440	1230	1080	16	7540	8.2
May 11-20	105	--	--	332	115	1470	--	174	0	1070	2300	--	--	--	5620	7.64	1590	1300	1160	18	8560	8.0
May 21	308	--	--	248	76	705	--	206	0	741	1080	--	--	--	3080	4.19	2560	930	761	10	4650	8.2
May 22-31	145	--	--	352	100	1340	--	162	4	993	2150	--	--	--	5320	7.24	2080	1290	1150	16	7970	8.3
June 1-7	203	--	--	304	100	1240	--	134	10	880	2000	--	--	--	4860	6.61	2660	1170	1040	16	7460	8.4
June 8-16	994	--	--	206	57	325	--	136	6	602	500	--	2.9	--	1910	2.60	5130	750	628	5.2	2770	8.3
June 17-18	308	--	--	418	80	2110	--	127	0	1240	3230	--	--	--	7530	10.2	6260	1370	1270	25	11100	8.2
June 19-20	94.0	--	--	202	89	375	--	134	8	686	600	--	2.9	--	2100	2.86	533	870	746	5.5	3060	8.4
June 21-30	58.1	--	--	380	110	1570	--	142	0	1130	2500	--	4.3	--	6380	8.68	1000	1400	1280	18	9220	8.2
July 1-9	64.1	--	--	310	92	1370	--	118	0	890	2200	--	--	--	5160	7.02	893	1150	1050	18	7880	7.9
July 10-12	122	--	--	210	53	623	--	108	0	572	1000	--	--	--	2620	3.56	863	740	652	10	4060	7.4
July 13-21	147	--	--	326	75	1050	--	128	0	900	1680	--	--	--	4340	5.90	1720	1120	1020	14	6480	7.8
July 22-23	700	--	--	172	49	438	--	128	0	481	690	--	4.2	--	2000	2.72	3780	630	525	7.6	3090	7.6
July 24-28	2300	--	--	151	58	184	--	160	0	465	282	--	2.0	--	1310	1.78	8140	615	484	3.2	1900	8.1
July 29-31	129	--	--	170	76	417	--	144	0	554	670	--	3.6	--	2110	2.87	735	735	617	6.7	3140	7.6
Aug. 1-10	41.2	16	.00	212	98	838	9.5	156	0	754	1300	.5	--	1.0	3440	4.68	383	930	802	12	5170	8.0
Aug. 11-20	25.8	12	.00	216	105	1010	9.3	144	0	803	1550	.5	--	1.1	3860	5.25	269	970	852	14	5890	7.9

Aug. 21-23.....	126	--	--	260	54	777	--	142	0	722	1200	--	--	--	3210	4.37	1090	870	754	11	4900	8.0
Aug. 24.....	84	--	--	415	76	1820	--	154	0	1060	2890	--	--	--	6710	9.13	1520	1350	1220	22	10100	7.9
Aug. 25-27.....	259	--	--	296	64	1090	--	152	0	807	1700	--	--	--	4200	5.71	2940	1000	876	15	6360	8.0
Aug. 28-31.....	130	--	--	328	39	530	--	128	0	862	800	--	3.1	--	2740	3.73	962	980	875	7.4	3940	7.9
Sept. 1-2.....	60.0	--	--	208	34	618	--	120	0	509	975	--	1.4	--	2460	3.35	399	660	562	10	3690	7.9
Sept. 3-11.....	22.6	--	--	376	88	1630	--	134	0	1020	2600	--	--	--	5960	8.11	364	1300	1190	20	9050	7.9
Sept. 12.....	28	--	--	581	127	3200	--	157	0	1550	5090	--	--	--	10900	14.8	824	1970	1840	31	16100	7.9
Sept. 13-20.....	36.4	--	--	372	83	1430	--	124	0	1060	2250	--	--	--	5420	7.37	533	1270	1170	17	8180	7.8
Sept. 21.....	21	--	--	352	78	1510	--	130	0	947	2400	--	--	--	5560	7.56	315	1200	1090	19	8390	7.9
Sept. 22-25.....	30.0	--	--	328	88	1050	--	168	0	868	1720	--	--	--	4360	5.93	353	1180	1040	13	6610	8.0
Sept. 26-27.....	190	--	--	196	34	633	--	102	0	556	950	--	6.2	--	2560	3.48	1310	630	546	11	3960	7.8
Sept. 28-29.....	68.5	--	--	414	99	2130	--	143	0	1120	3390	--	--	--	7490	10.2	1390	1440	1320	24	11200	7.7
Sept. 30.....	41	--	--	296	73	1290	--	136	0	810	2050	--	--	--	4810	6.54	532	1040	928	17	7400	7.9
Weighted average b.....	395	--	--	225	63	531	--	180	---	644	821	--	--	--	2500	3.40	2670	820	673	8.1	3730	--

Analyses of additional samples

Feb. 25, 1960.....	c 780	12	0.01	232	78	404		220	0	675	630	0.7	4.8	0.35	2240	3.05	4720	900	720	5.8	3320	7.9
May 25.....	c 129	7.4	.00	384	98	1410		200	0	1050	2250	.5	2.0	.59	5630	7.66	1960	1360	1200	17	8280	7.4
July 13.....	c 111	10	.00	439	98	1960		156	0	1230	3090	.5	1.7	.46	7110	9.67	2130	1500	1370	22	10700	7.6

b Represents 83 percent of flow for water year.
c Discharge at time of sampling.

Temperature (°F) of water, November 1959 to September 1960

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

RED RIVER BASIN--Continued

7-3070.1. OTTER CREEK NEAR SNYDER, OKLA.

LOCATION.--At bridge on U.S. Highway 62, 2.5 miles west of Snyder, Kiowa County.
DRAINAGE AREA.--203 square miles.
RECORDS AVAILABLE.--Chemical analyses: December 1959 to September 1960.
REMARKS.--No discharge records available.

Chemical analyses, in parts per million, December 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Dec. 29, 1959.....				32	7.8	23		120	4	22	22		2.5		221	0.30		112	7	0.9	309	8.4
Jan. 26, 1960.....				68	22	70		204	10	69	108	0.3	3.0		a 450	.61		260	76	1.9	803	8.6
Mar. 14.....				38	17	64		208	8	45	51		1.4		a 326	.44		164	0	2.2	570	8.6
Apr. 18.....				67	26	56		272	0	67	74		.0		436	.59		275	52	1.5	804	7.4
Apr. 28.....				67	29	85		286	0	92	98		1.4		530	.72		285	50	2.2	880	8.0
May 16.....				74	31	65		312	0	72	85		.2		497	.68		310	54	1.6	877	7.4
June 20.....				45	13	40		198	0	32	42		1.2		311	.42		168	6	1.4	513	7.4
July 14.....				37	20	38		222	0	27	34		1.9		304	.41		176	0	1.3	513	7.8
July 18.....				44	7.8	22		182	0	17	15		1.9		221	.30		142	0	.8	365	8.0

a Calculated from determined constituents.

RED RIVER BASIN--Continued

7-3070.2. OTTER CREEK NEAR TIPTON, OKLA.

LOCATION.--At section-line road, 4.5 miles north of Tipton, Tillman County.
DRAINAGE AREA.--266 square miles.
RECORDS AVAILABLE.--Chemical analyses: December 1959 to September 1960.
REMARKS.--No discharge records available.

Chemical analyses, in parts per million, December 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Dec. 29, 1959.....				50	14	68		178	10	49	82	--	2.9		413	0.56		184	22	2.2	646	8.7
Mar. 14, 1960.....				57	24	110		198	4	93	148	--	5.4		547	.74		240	71	3.1	966	8.4
Apr. 18.....				120	46	242		316	0	204	385	--	2.0		1220	1.66		490	231	4.8	2040	7.6
May 16.....				120	32	239		272	0	188	375	--	2.0		1180	1.60		430	207	5.0	1930	7.7
June 14.....				56	15	103		182	0	77	135	0.3	3.6		530	.72		200	51	3.2	865	7.7
June 20.....				115	32	226		232	0	184	375	--	.5		1140	1.55		420	230	4.8	1870	7.2
July 18.....				138	35	296		220	0	251	490	--	.5		1430	1.94		490	310	5.8	2270	8.2
Aug. 15.....				188	54	498		186	0	403	850	.3	1.7		2160	2.94		690	538	8.2	3450	7.4
Sept. 12.....				168	51	377		246	0	318	650	--	1.8		1770	2.41		630	428	6.5	2890	7.6

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RED RIVER BASIN--Continued

7-3115. DEEP RED RUN NEAR RANDLETT, OKLA.

LOCATION.--At gaging station at bridge on U.S. Highway 277, 2.8 miles north of Randlett, Cotton County, and 4.8 miles upstream from mouth.
DRAINAGE AREA.--617 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1949 to September 1950, February to September 1951, November 1959 to August 1960 (discontinued).
Water temperatures: October 1949 to September 1950, February to September 1951.
REMARKS.--Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, November 1959 to August 1960

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Nov. 12, 1959.....	16			74	24	138		190	8	99	220	0.3	1.8		a 658	0.89	28.4	284	115	3.6	1170	8.5
Jan. 6, 1960.....	24.5			70	89	346		336	0	--	580	--	--		--	--	--	540	264	6.5	2560	8.2
Jan. 28.....	15.4			75	91	502		140	0	--	840	--	--		--	--	--	560	446	9.2	3330	8.1
Mar. 9.....	11.5			78	94	540		168	0	--	910	--	--		--	--	--	580	442	9.8	3610	8.1
Mar. 16.....	b 11			63	37	216		196	0	130	342	.7	.8		a 886	1.20	26.3	310	150	5.3	1560	8.2
Apr. 1.....	9.2			66	57	314		400	0	--	430	--	--		--	--	--	400	72	6.8	2180	8.2
June 13.....	b 34			66	19	121		208	8	69	175	--	1.7		655	.89	60.1	242	58	3.4	1020	8.4
July 13.....	b 4.0			54	13	107		200	6	47	140	--	1.2		533	.72	5.76	188	14	3.4	845	8.4
July 20.....	24.0			24	6.8	34		120	0	19	30	--	.2		182	.25	11.8	88	0	1.6	310	7.8
Aug. 9.....	b .2			45	17	85		234	4	36	93	--	1.2		438	.60	.24	184	0	2.7	687	8.3

a Calculated from determined constituents.
b Daily mean discharge.

7-3135. BEAVER CREEK NEAR WAURIKA, OKLA.

LOCATION.--At gaging station at bridge on State Highway 5, 4.5 miles northwest of Waurika, Jefferson County, and 6.2 miles upstream from Cow Creek.
DRAINAGE AREA.--563 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1955 to September 1960.
Water temperatures: October 1955 to September 1960.
Sediment records: May to Septemher 1957, October 1959 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 1,090 ppm Mar. 1-20; minimum, 168 ppm Oct. 1-7.
Hardness: Maximum, 620 ppm Nov. 21-30; minimum, 92 ppm Oct. 1-7.
Specific conductance: Maximum daily, 2,030 micromhos Feb. 27; minimum daily, 203 micromhos Oct. 5.
Water temperatures: Maximum, 84°F Aug. 7; minimum, 34°F Mar. 1.
Sediment concentrations: Maximum daily, 4,800 ppm May 6; minimum daily, no flow Sept. 13-16.
Sediment loads: Maximum daily, 22,500 tons Oct. 5; minimum daily, 0 tons Sept. 13-16.
EXTREMES, 1955-60.--Dissolved solids: Maximum, 1,210 ppm May 16, 18, 20, 1956; minimum, 125 ppm July 4-8, 1956.
Hardness: Maximum, 655 ppm Dec. 1-10, 1957; minimum, 58 ppm Apr. 21-30, 1957.
Specific conductance: Maximum daily, 2,060 micromhos Feb. 14, 1958; minimum daily, 151 micromhos July 9, 1959.
Water temperatures: Maximum, 89°F Aug. 15, 1958; minimum, freezing point on several days during December 1956 and January 1957.
Sediment concentrations (1957, 1959-60): Maximum daily, 4,800 ppm May 6, 1960; minimum daily, no flow Sept. 13-16, 1960.
Sediment loads (1957, 1959-60): Maximum daily, 75,000 tons May 26, 1957; minimum daily, 0 tons Sept. 13-16, 1960.
REMARKS.--Maximum observed during water year: Hardness, 680 ppm Feb. 25. Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of discharge for water year October 1959 to September 1960 given in WSP 1711. Flow affected by ice Feb. 27 to Mar. 5.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1-7, 1959....	1339	--	--	26	6.6	14	--	84	0	23	20	--	1.4	--	168	0.23	607	92	23	0.6	258	7.4
Oct. 8-10.....	78.0	--	--	85	29	63	--	244	0	118	102	--	1.0	--	557	.76	117	330	130	1.5	889	8.0
Oct. 11-20.....	31.9	--	--	115	57	101	--	304	0	223	182	--	1.1	--	906	1.23	78.0	520	271	1.9	1390	7.9
Oct. 21-30.....	18.3	--	--	130	68	104	--	370	0	261	182	--	.8	--	993	1.35	49.1	605	302	1.8	1530	7.8
Oct. 31.....	157	--	--	68	32	64	--	220	0	105	105	--	1.7	--	531	.72	225	300	120	1.6	865	7.9
Nov. 1-4.....	192	--	--	82	32	54	--	216	0	126	102	--	1.1	--	530	.72	275	335	158	1.3	872	8.0
Nov. 5-8.....	706	--	--	52	15	24	--	168	0	66	27	--	1.2	--	282	.38	538	192	54	.8	465	7.9
Nov. 9-12.....	66.2	--	--	106	43	55	--	328	0	167	82	--	1.1	--	661	.90	118	440	171	1.1	1010	8.1
Nov. 13-20.....	45.4	--	--	127	62	85	--	370	0	254	132	--	1.0	--	903	1.23	111	570	267	1.5	1360	8.0
Nov. 21-30.....	38.7	14	0.00	150	60	104	0.6	310	0	321	170	0.6	.6	0.03	997	1.36	104	620	366	1.8	1490	8.0
Dec. 1-10.....	33.2	--	--	118	71	87	--	350	0	294	128	--	.6	--	940	1.28	84.3	585	298	1.6	1390	7.9
Dec. 11-16.....	66.3	--	--	112	58	92	--	330	0	265	122	--	.8	--	851	1.16	152	520	250	1.7	1270	8.2
Dec. 17.....	1230	--	--	54	20	43	--	160	0	74	70	--	3.2	--	362	.49	1200	215	84	1.3	611	8.2

RED RIVER BASIN--Continued

7-3135. BEAVER CREEK NEAR WAURIKA, OKLA.--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Dec. 18-20, 1959..	1570	--	--	42	12	27	--	134	0	56	32	--	1.4	--	237	0.32	1000	156	46	0.9	410	8.0
Dec. 21.....	171	--	--	79	32	57	--	226	12	122	85	--	2.3	--	518	.70	239	330	125	1.4	859	8.5
Dec. 22-27.....	168	--	--	110	54	105	--	318	0	209	172	--	2.4	--	871	1.18	395	495	234	2.0	1340	8.1
Dec. 28-29.....	306	--	--	61	24	34	--	190	0	95	48	--	2.0	--	368	.50	304	250	94	.9	608	8.2
Dec. 30-31.....	118	--	--	80	39	71	--	222	10	164	102	--	1.9	--	612	.83	195	360	162	1.6	1050	8.4
Jan. 1-10, 1960...	119	17	0.01	127	60	115	2.6	360	0	236	185	0.3	2.6	0.34	934	1.27	300	565	270	2.1	1480	8.0
Jan. 11-13.....	318	--	--	97	53	69	--	262	12	170	140	--	1.8	--	741	1.01	636	460	226	1.4	1160	8.5
Jan. 14-15.....	285	--	--	63	26	42	--	190	8	100	57	--	2.4	--	413	.56	318	265	96	1.1	675	8.5
Jan. 16-20.....	137	--	--	101	49	80	--	306	4	179	130	--	1.7	--	746	1.01	276	455	198	1.6	1170	8.3
Jan. 21-31.....	87.3	--	--	114	72	119	--	342	0	276	190	--	3.2	--	1010	1.37	238	580	300	2.1	1550	8.2
Feb. 1-2.....	77.0	--	--	58	72	126	--	124	12	277	215	--	2.3	--	955	1.30	199	440	318	2.6	1410	8.3
Feb. 3-7.....	480	--	--	69	24	61	--	220	0	111	74	--	2.4	--	471	.64	610	270	90	1.6	710	8.1
Feb. 8-10.....	117	--	--	70	55	107	--	204	0	228	160	--	2.4	--	779	1.06	246	400	233	2.3	1200	8.1
Feb. 11-29.....	74.0	--	--	120	76	130	--	378	0	294	195	--	2.5	--	1020	1.39	204	610	300	2.3	1610	7.9
Mar. 1-20.....	70.7	17	.00	126	72	139	3.6	360	0	308	195	.4	3.0	.32	1090	1.48	208	610	315	2.4	1640	8.0
Mar. 21-31.....	78.0	--	--	105	68	108	--	288	0	301	158	--	1.7	--	988	1.34	208	540	304	2.0	1430	7.9
Apr. 1-13.....	5.1	13	.00	102	73	128	2.6	302	0	327	175	.4	1.4	.52	1060	1.44	147	555	308	2.4	1500	8.0
Apr. 14.....	84	--	--	79	40	84	--	248	4	169	110	--	2.5	--	648	.88	147	360	150	1.9	1010	8.4
Apr. 15.....	77	--	--	63	74	164	--	150	0	278	285	--	2.2	--	1050	1.43	218	460	337	3.3	1840	8.1
Apr. 16-20.....	52.6	--	--	122	71	112	--	354	0	318	152	--	3.6	--	1040	1.41	148	595	305	2.0	1510	7.4
Apr. 21-30.....	37.0	--	--	125	70	124	--	364	0	302	180	--	3.1	--	1060	1.44	106	600	302	2.2	1560	7.9
May 1-4.....	32.0	--	--	78	71	119	--	216	4	298	175	--	2.9	--	973	1.32	84.1	485	302	2.3	1380	8.3
May 5.....	43	--	--	54	60	87	--	158	6	230	135	--	.4	--	796	1.08	92.4	380	240	1.9	1070	8.5
May 6.....	268	--	--	71	72	121	--	198	4	278	198	--	.4	--	a 841	1.14	609	475	306	2.4	1360	8.4
May 7-10.....	119	--	--	93	43	41	--	210	10	215	60	--	3.1	--	614	.84	197	410	222	.9	902	8.6
May 11-19.....	42.7	--	--	112	60	97	--	288	8	286	132	--	2.2	--	917	1.25	106	525	276	1.8	1310	8.5
May 20-23.....	1109	--	--	61	20	39	--	172	6	91	50	--	2.3	--	428	.58	1280	234	83	1.1	610	8.4
May 24-31.....	98.4	--	--	117	54	110	--	318	6	240	165	--	2.2	--	922	1.25	245	515	244	2.1	1350	8.4
June 1-8.....	89.1	--	--	117	55	98	--	334	0	231	155	--	1.7	--	889	1.21	214	520	246	1.9	1330	8.1

June 9	149	--	--	91	32	47	--	204	2	178	75	--	1.2	--	590	.80	237	360	190	1.1	870	8.3
June 10-20	38.8	--	--	88	56	81	--	242	0	241	125	--	1.6	--	795	1.08	83.3	450	252	1.7	1160	8.2
June 21-30	14.0	17	0.00	86	63	123	2.8	274	4	283	136	0.4	1.4	0.73	875	1.19	33.1	475	244	2.5	1300	8.3
July 1-5	9.9	--	--	58	65	104	--	198	2	299	112	--	.8	--	811	1.10	21.7	410	244	2.2	1150	8.3
July 6-9	834	--	--	30	9.0	29	--	104	0	25	44	--	2.0	--	225	.31	507	112	27	1.2	356	8.0
July 10-11	68.0	--	--	66	31	71	--	196	0	72	148	--	.5	--	559	.76	103	290	130	1.8	869	7.9
July 12-28	63.1	--	--	99	54	152	--	274	6	144	295	--	1.4	--	1000	1.36	170	470	236	3.1	1540	8.4
July 29-31	9.6	--	--	82	43	130	--	294	0	128	205	--	.7	--	797	1.08	20.6	380	139	2.9	1260	8.1
Aug. 1-8	5.4	--	--	74	57	135	--	284	4	191	195	--	.7	--	840	1.14	12.2	420	181	2.9	1350	8.3
Aug. 9-11	54.7	--	--	32	18	38	--	140	0	51	49	--	.1	--	274	.37	40.5	154	40	1.3	475	7.8
Aug. 12-14	5.5	--	--	59	31	89	--	240	0	117	106	--	.4	--	544	.74	8.08	274	78	2.3	902	7.9
Aug. 15-19	29.0	--	--	72	39	144	--	184	0	104	278	--	.8	--	788	1.07	61.7	340	189	3.4	1330	8.2
Aug. 20-30	20.0	--	--	72	29	35	--	200	0	151	38	--	1.9	--	445	.61	24.0	300	136	.9	690	7.8
Aug. 31	11	--	--	30	12	20	--	110	0	51	18	--	2.5	--	203	.28	6.03	126	36	.8	351	7.8
Sept. 1-10	3.8	14	.00	77	40	75	1.8	286	0	172	68	.5	.8	.20	616	.84	6.32	355	120	1.7	924	8.1
Sept. 11-12, 17-21	.8	16	.00	77	47	104	3.8	304	0	202	110	.5	.6	.40	739	1.01	1.60	384	135	2.3	1110	8.2
Sept. 22-30	13.8	--	--	28	10	41	--	120	0	48	36	--	1.7	--	233	.32	8.68	112	14	1.7	410	7.9
Weighted average	135	--	--	68	31	58	--	203	--	127	88	--	1.8	--	517	0.70	188	297	130	1.5	794	--

Analyses of additional samples

Oct. 27, 1959	15	14	--	157	59	113		412	0	265	188	0.3	0.5	0.34	a 1000	1.36	40.5	635	298	1.9	1540	7.7
Oct. 29	b 16.6	--	--	53	63	201		216	22	274	228	--	9.9	--	1010	1.37	45.3	390	176	4.4	1380	8.7
Feb. 25, 1960	b 65	10	0.02	141	80	118		416	0	310	192	.5	1.9	.22	1090	1.48	191	680	339	2.0	1670	7.7
May 25	b 120	14	.00	136	46	88		366	0	206	145	.5	.7	.33	913	1.24	296	530	230	1.7	1330	8.2
July 11	b 49	10	.00	59	27	76		192	0	69	138	.3	.7	.17	491	.67	65.0	260	102	2.1	842	7.5

a Calculated from determined constituents.
b Discharge at time of sampling.

Temperature (°F) of water, water year October 1959 to September 1960

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

RED RIVER BASIN--Continued

7-3135. BEAVER CREEK NEAR WAURIKA, OKLA.--Continued

Suspended sediment, water year October 1959 to September 1960

Day	OCTOBER			NOVEMBER			DECEMBER		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1..	22	342	K 24	158	618	S 282	33	193	17
2..	53	1510	K 220	64	429	S 74	34	183	17
3..	1100	4750	K 13200	62	630	S 110	34	182	17
4..	2050	2510	K 13400	486	2060	S 3840	34	173	16
5..	3820	2160	K 22500	1500	1260	4960	34	194	18
6..	2100	1300	K 7830	1080	658	S 2110	33	193	17
7..	230	711	J 479	148	423	S 172	33	170	15
8..	106	342	S 99	96	281	S 73	32	147	13
9..	72	232	45	78	231	49	32	153	13
10..	56	210	32	67	250	45	33	155	14
11..	47	222	28	61	252	42	33	159	14
12..	41	254	28	59	252	40	33	160	14
13..	36	261	25	55	285	42	34	153	14
14..	33	263	23	52	282	40	34	147	13
15..	32	282	24	47	288	37	50	461	S 79
16..	30	294	24	43	288	33	214	1150	S 1080
17..	28	279	21	43	236	27	1230	1780	J 5610
18..	26	249	17	41	217	24	2250	957	K 5770
19..	24	246	16	38	225	23	2050	633	K 3620
20..	22	252	15	44	244	29	409	459	K 528
21..	22	240	14	44	245	29	171	325	K 151
22..	22	220	13	43	231	27	138	255	95
23..	21	214	12	42	216	24	122	250	82
24..	17	217	10	41	220	24	114	250	77
25..	17	237	11	40	218	24	106	270	77
26..	17	242	11	38	194	20	106	307	88
27..	15	233	9.4	36	201	20	422	2050	S 3070
28..	16	245	11	36	190	18	444	1240	S 1630
29..	17	250	11	34	177	16	169	592	S 274
30..	19	263	13	33	192	17	126	407	138
31..	157	1280	S 638	--	--	--	110	340	101
Total	10268	--	58803.4	4609	--	12271	8697	--	22682
	JANUARY			FEBRUARY			MARCH		
1..	106	345	99	76	301	62	63	309	53
2..	106	366	105	78	305	64	62	274	46
3..	103	355	99	491	2220	J 3560	63	264	45
4..	96	340	88	822	2220	S 4900	62	279	47
5..	96	307	80	699	921	S 1920	60	286	46
6..	115	286	89	238	344	S 219	66	276	49
7..	142	275	105	150	329	133	76	268	55
8..	146	268	106	126	317	108	80	280	60
9..	142	279	107	114	299	92	80	257	56
10..	138	280	104	110	270	80	87	317	74
11..	130	286	100	100	232	63	84	288	65
12..	241	913	S 777	83	215	48	78	287	60
13..	584	2190	3450	76	212	44	71	307	59
14..	368	1410	S 1490	75	285	58	69	304	57
15..	202	601	S 334	76	329	68	69	241	45
16..	162	422	185	76	320	66	75	290	59
17..	130	365	128	84	312	71	74	244	49
18..	158	338	144	82	294	65	69	223	42
19..	134	290	105	75	283	57	64	203	35
20..	100	275	74	73	249	49	62	155	26
21..	92	274	68	73	261	51	59	189	30
22..	96	272	71	73	267	53	58	209	33
23..	89	322	77	72	256	50	58	225	35
24..	83	331	74	70	226	43	62	241	40
25..	85	324	74	65	176	31	105	432	J 127
26..	88	331	79	59	170	27	90	330	S 79
27..	92	320	79	63	182	31	122	205	68
28..	92	324	80	66	298	53	92	245	61
29..	86	309	72	65	315	55	78	237	50
30..	81	308	67	--	--	--	70	234	44
31..	76	292	60	--	--	--	64	221	38
Total	4359	--	8570	4310	--	12121	2272	--	1633

S Computed by subdividing day.
J Computed from partly estimated concentration graph and subdividing day.
K Computed from estimated-concentration graph and subdividing day.

RED RIVER BASIN--Continued

7-3135. BEAVER CREEK NEAR WAURIKA, OKLA.--Continued

Suspended sediment, water year October 1959 to September 1960--Continued

Day	APRIL			MAY			JUNE		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1..	60	233	38	34	365	34	82	391	87
2..	56	245	37	331	356	30	130	407	143
3..	53	242	35	30	339	27	110	397	118
4..	51	262	36	33	376 J	37	76	385	79
5..	52	231	32	43	806 J	95	63	370	63
6..	52	258	36	268	4800 S	4710	59	359	57
7..	52	261	37	273	2200 S	1820	62	391	65
8..	52	263	37	93	1670 S	428	131	1190 K	634
9..	49	270	36	62	770	129	149	1690 K	779
10..	45	265	32	48	409	53	71	304 K	59
11..	45	263	32	41	388	43	53	254	36
12..	46	270	34	36	319	331	44	227	27
13..	52	307 J	46	32	309	27	39	217	23
14..	84	1020 J	269	32	357	31	51	227	31
15..	77	395 S	82	32	358	31	48	245	32
16..	72	318 S	62	32	346	30	33	255	23
17..	56	308	47	31	306	26	28	264	20
18..	49	317	42	32	293	25	21	272	15
19..	44	295	35	116	1200 J	621	20	272	15
20..	42	291	33	607	3950 S	7200	19	278	14
21..	37	293	29	2390	2140 S	12400	17	267	12
22..	39	306	32	1200	1020 S	3530	16	260	11
23..	39	314	33	240	685 S	456	16	257	11
24..	37	318	32	153	454 S	192	15	264	11
25..	40	333	36	122	262 S	128	14	260	9.8
26..	38	340	35	122	280	92	12	247	8.0
27..	35	351	33	92	387	96	13	290	10
28..	33	378	34	80	426	92	13	186	6.5
29..	36	343	33	73	394	78	13	190	6.7
30..	36	344	33	71	381	73	11	196	5.8
31..	--	--	--	74	383	77	--	--	--
Total	1459	--	1368	6523	--	32642	1429	--	2411.8

	JULY			AUGUST			SEPTEMBER		
1..	9.6	175	4.5	6.5	240	4.2	5.0	153	2.1
2..	7.4	185	3.7	7.2	242	4.7	4.2	145	1.6
3..	6.8	201	3.7	6.5	241	4.2	4.5	149	1.8
4..	4.9	156	2.1	5.3	220	3.1	4.7	161	2.0
5..	21	395 J	90	4.7	203	2.6	4.5	168	2.0
6..	455	4210 J	5590	4.9	214	2.8	4.2	168	1.9
7..	1170	1730 S	5570	4.4	224	2.7	3.4	157	1.4
8..	1390	1340 S	5020	4.0	223	2.4	3.2	157	1.4
9..	321	828 S	796	58	789 J	355	2.5	163	1.1
10..	86	209 S	50	93	606 J	214	1.8	205	1.0
11..	50	180	24	13	151 S	5.1	1.6	222	1.0
12..	36	148	14	6.3	89	1.5	.6	192	T
13..	27	142	10	5.2	73	1.0	0	--	0
14..	22	191	11	5.0	84	1.1	0	--	0
15..	20	212	11	4.9	1000	13	0	--	0
16..	18	210	10	7.1	1430 S	28	0	--	0
17..	16	204	8.8	29	1420 J	122	.7	--	T
18..	29	272 J	25	24	656 J	69	.8	--	T
19..	25	398	27	80	1950 J	510	.7	--	T
20..	47	725 J	176	64	1960 J	371	.7	--	T
21..	398	2660 J	3020	22	655 S	41	.7	--	T
22..	118	1030 S	359	17	409 J	24	.6	--	T
23..	83	378 J	82	43	726 J	106	.6	--	T
24..	114	310 J	95	18	187	9.1	27	578 K	67
25..	61	242 J	42	11	172	5.1	39	926 K	99
26..	28	85	6.4	8.8	156	3.7	11	204 B	6.1
27..	18	76	3.7	7.5	144	2.9	15	203	8.2
28..	13	131	4.6	9.2	159 J	4.2	17	189	8.7
29..	12	156	5.1	11	193	5.7	8.8	143	3.4
30..	9.2	208	5.2	8.3	184	4.1	5.2	79	1.1
31..	7.7	239	5.0	11	211 K	7.3	--	--	--
Total	4623.6	--	21074.8	599.8	--	1930.5	168.0	--	211.5

Total discharge for year (cfs-days)..... 49317.4
Total load for year (tons)..... 175719.0

S Computed by subdividing day.
T Less than 0.50 ton.
B Computed from estimated-concentration graph.
J Computed from partly estimated concentration graph and subdividing day.
K Computed from estimated-concentration graph and subdividing day.

RED RIVER BASIN--Continued

7-3150. LITTLE WICHITA RIVER NEAR HENRIETTA, TEX.

LOCATION.--At gaging station on left bank at downstream side of bridge on State Highway 148, 1.5 miles northwest of Henrietta, Clay County, 4 miles upstream from Turkey Creek, and 5 miles upstream from Dry Fork Little Wichita River.
DRAINAGE AREA.--1,037 square miles.
RECORDS AVAILABLE.--Chemical analyses: December 1952 to January 1956, March 1959 to September 1960.
Water temperatures: December 1952 to January 1956, March 1959 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 4,120 ppm June 2; minimum, 110 ppm Mar. 26.
Hardness: Maximum, 1,060 ppm June 2; minimum, 49 ppm Oct. 4-7.
Specific conductance: Maximum daily, 7,520 micromhos June 2; minimum daily, 204 micromhos Mar. 26.
EXTREMES, 1952-56, 1959-60.--Dissolved solids: Maximum, 4,120 ppm June 2, 1960; minimum, 57 ppm Mar. 19, 1955.
Hardness: Maximum, 1,060 ppm June 2, 1960; minimum, 25 ppm Feb. 20, 1955.
Specific conductance: Maximum daily, 7,520 micromhos June 2, 1960; minimum daily, 81 micromhos Oct. 24, 1953.
REMARKS.--Dashes omitted in potassium (K) column indicate sodium (Na) plus potassium (K) are calculated. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1-2, 1959....	0.6	8.6		36	9.5	141	4.3	72		14	255	0.4	1.5		a 524	71	0.83	129	66	5.4	979	7.1
Oct. 3, 4.....	707	7.8		17	4.8	45		61		7.8	72	.3	.8		a 197	27	376	62	10	2.5	347	6.8
Oct. 5-7.....	2034	7.4		14	3.4	23		56		4.2	34	.3	.5		115	16	632	49	0	1.4	212	7.4
Oct. 8-9.....	1780	11		18	5.2	38		68		11	56	.1	3.2		a 191	26	918	66	9	2.0	310	7.6
Oct. 10-15.....	40.9	12		23	7.1	39		92		6.0	63	.1	1.2		a 205	28	22.5	87	9	1.8	360	7.8
Oct. 16-31.....	b .9	15		26	7.9	47		105		6.8	75	.2	1.0		a 242	33	.57	97	9	2.1	424	7.6
Nov. 1-5.....	8.8	21		30	8.0	48		110		7.4	80	.4	1.2		250	34	5.92	108	15	2.0	448	7.3
Nov. 6.....	164	--		--	--	--		112		--	440	--	--		--	--	--	236	143	--	1620	7.8
Nov. 7-11.....	24.3	13		40	9.9	102		92		8.8	195	.5	1.2		415	56	27.1	140	60	3.7	800	7.1
Nov. 12-30.....	.5	8.8		54	14	143		97		9.2	292	.5	1.2		571	78	.76	192	111	4.5	1120	7.8
Dec. 1-15.....	b2.1	9.6		57	14	148		105		10	300	.3	1.0		a 648	88	3.66	200	109	4.6	1150	7.8
Dec. 16.....	288	8.6		18	5.9	34		61		9.2	58	.2	.2		164	22	128	69	15	1.8	321	7.0
Dec. 17.....	696	12		37	9.7	115		86		11	210	.2	3.5		a 480	65	902	132	60	4.4	866	7.2
Dec. 18-31.....	137	9.6		26	6.9	60		87		7.2	102	.2	1.5		256	35	94.6	93	19	2.7	493	7.4
Jan. 1-7, 1960....	24.0	13		28	7.6	54		100		8.0	90	.3	.8		251	34	16.2	101	18	2.3	474	6.9
Jan. 8-12, 16.....	75.5	14		35	10	104		81		8.4	198	.2	1.0		a 451	61	91.8	124	54	4.0	803	7.0
Jan. 13-14.....	114	16		24	6.9	57		78		7.6	98	.3	.8		249	34	76.6	88	21	2.6	480	7.1

Jan. 15	115	--	--	--	--	71	--	660	--	--	--	--	--	340	277	--	2200	7.6
Jan. 17-31	14.0	8.2	38	8.7	115	87	8.6	212	.2	1.0	435	.59	16.5	131	59	4.4	856	7.0
Feb. 1-2	.8	10	37	11	115	96	9.0	210	.2	4.2	443	.60	.94	138	56	4.3	855	7.1
Feb. 3	330	9.4	14	5.3	31	60	6.0	46	.3	3.2	145	.20	129	57	5	1.8	270	7.1
Feb. 4-7	910	8.8	23	7.1	50	68	6.8	92	.2	3.2	224	.30	550	87	29	2.3	449	6.9
Feb. 8-20	18.3	9.8	26	7.7	52	91	7.8	89	.3	1.8	239	.33	11.7	96	20	2.3	460	7.2
Feb. 21-29	.4	9.4	28	8.2	59	104	8.2	96	.2	1.8	262	.36	.27	104	15	2.5	501	7.1
Mar. 1-12	b .1	11	30	8.7	57	103	8.6	98	.2	1.8	266	.36	.06	111	26	2.4	505	7.1
Mar. 13-24	0	8.6	32	9.0	56	107	8.2	100	.2	1.8	269	.37	--	117	27	2.3	519	7.4
Mar. 25	104	9.0	38	11	69	127	9.0	125	.2	1.5	325	.44	91.2	140	31	2.5	632	7.5
Mar. 26	245	7.8	16	3.8	18	59	6.8	26	.2	2.8	110	.15	72.7	56	6	1.0	204	7.0
Mar. 27-29	53.0	7.2	23	5.8	44	71	7.6	76	.3	3.2	202	.27	28.8	81	22	2.1	383	7.2
Mar. 30	10.0	--	--	--	--	73	--	--	--	--	--	--	--	175	110	--	910	7.4
Mar. 31, Apr. 1-14	b .9	--	--	--	--	75	--	750	--	--	--	--	--	450	384	--	2500	7.2
Apr. 15-30	0	--	--	--	--	88	--	730	--	--	--	--	--	435	358	--	2450	6.7
May 1-20	0	--	--	--	--	102	--	690	--	--	--	--	--	435	347	--	2330	7.3
May 21, 29-31, June 1	20.3	10	50	15	199	102	12	368	.4	4.8	709	.96	38.8	186	102	6.3	1350	7.5
May 22-24, 27-28	12.7	9.6	110	36	417	131	18	850	.4	4.0	1510	2.05	51.7	422	313	8.8	2830	7.6
May 25-26	46.0	--	--	--	--	75	--	2050	--	--	--	--	--	770	704	--	6210	6.8
June 2	115	--	--	--	--	58	--	2500	--	--	4120	5.60	1280	1060	1010	--	7520	6.3
June 3	124	--	--	--	--	106	--	495	--	--	--	--	--	236	148	--	1770	6.9
June 4-10	34.3	11	38	11	133	106	11	230	1.1	5.1	a 520	.71	48.1	140	48	4.9	940	7.4
June 11-30	b6.1	10	60	17	269	94	23	495	.5	5.0	926	1.26	15.3	220	142	7.9	1740	7.1
July 1-9	b .6	--	--	--	--	106	--	530	--	--	--	--	--	238	148	--	1860	7.1
July 10-11, 15	19.3	11	28	8.4	78	116	8.0	118	.4	2.5	a 321	.44	16.6	104	5	3.3	575	7.3
July 12-14	3.3	9.6	18	4.9	32	94	6.8	34	.3	3.0	155	.21	1.37	65	0	1.7	269	7.1
July 16	89.0	--	--	--	--	76	--	260	--	--	--	--	--	145	78	--	965	7.0
July 17-31	b10.0	11	34	9.0	100	100	7.4	175	.4	2.0	a 409	.56	11.0	122	38	3.9	726	7.4
Aug. 1-15	0	12	40	11	112	126	8.6	195	.5	.8	a 477	.65	--	145	37	4.0	851	7.6
Aug. 16-31	0	15	44	12	116	140	8.6	202	.5	1.0	a 502	.68	--	160	40	4.0	897	7.6
Sept. 1-25	0	--	--	--	--	159	--	230	--	--	--	--	--	174	40	--	994	7.6
Sept. 26	1.0	--	--	--	--	113	--	178	--	--	--	--	--	120	22	--	774	7.4
Sept. 27	68.0	5.2	173	52	598	72	23	1320	.4	1.0	2210	3.01	406	646	587	10	4190	7.1
Sept. 28, 29-30	158	8.6	29	8.0	94	102	7.8	154	.3	1.5	a 380	.52	162	106	21	4.0	682	7.1
Weighted average	--	--	--	--	--	71	--	118	--	--	249	0.33	53	91	31	--	511	7.2
Time-weighted average	--	--	--	--	--	102	--	304	--	--	459	--	--	194	107	--	1140	7.2
Tons per day	--	--	--	--	--	12	--	19	--	--	--	--	--	--	--	--	--	--

a Residue at 180°C.
b Includes days of less than 0.05 cfs discharge.

RED RIVER BASIN--Continued

7-3150. LITTLE WICHITA RIVER NEAR HENRIETTA, TEX.--Continued

Temperature (°F) of water, water year October 1959 to September 1960

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

7-3154. LITTLE WICHITA RIVER NEAR RINGGOLD, TEX.

LOCATION.--At gaging station on right bank at upstream side of bridge on abandoned County Road, 2 miles downstream from East Fork Little Wichita River, 8 miles northwest of Ringgold, Montague County, 11.5 miles upstream from mouth, and 13 miles downstream from gaging station near Henrietta.
DRAINAGE AREA.--1,350 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: March 1959 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 4,440 ppm June 3; minimum, 47 ppm Oct. 3-4.
Hardness: Maximum, 1,150 ppm June 3; minimum, 22 ppm Dec. 16-18, Feb. 3.
Specific conductance: Maximum daily, 7,860 micromhos June 3; minimum daily, 64 micromhos Oct. 3.
EXTREMES, March 1959 to September 1960.--Dissolved solids: Maximum, 4,440 ppm June 3, 1960; minimum, 38 ppm Sept. 4, 1959.
Hardness: Maximum, 1,150 ppm June 3, 1960; minimum, 19 ppm Sept. 4, 1959.
Specific conductance: Maximum daily, 7,860 micromhos June 3, 1960; minimum daily, 60 micromhos Sept. 4, 1959.
REMARKS.--Dashes omitted in potassium (K) column indicate sodium (Na) plus potassium (K) are calculated. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1-2, 1959....	3.2	10		27	8.1	94	4.8	77		13	168	0.3	1.5		365	0.50	3.14	101	37	4.1	700	7.5
Oct. 3-4.....	1366	10		4.5	2.9	6.3		33		1.4	5.0	.2	1.0		47	.06	173	23	0	.6	72	7.4
Oct. 5-10.....	2770	11		12	3.5	23		53		3.8	32	.2	1.5		113	.15	845	44	0	1.5	195	7.2
Oct. 11-20.....	23.8	14		24	7.4	35		105		7.0	51	.2	1.2		a198	.27	12.6	90	0	1.6	341	7.6
Oct. 21-31.....	1.4	17		35	10	39		156		6.2	56	.2	.5		a246	.33	.91	128	0	1.5	430	7.8
Nov. 1-6.....	67.5	12		29	9.1	37		123		8.6	56	.2	.8		a228	.31	41.5	110	4	1.5	387	7.2
Nov. 7.....	118	--		--	--	--		98		--	400	--	--		--	--	--	232	150	--	1440	7.8
Nov. 8-17.....	8.7	10		33	9.4	70		116		8.4	120	.2	.8		a334	.45	7.83	121	25	2.8	589	7.0
Nov. 18-30.....	.6	18		36	9.9	68		139		10	108	.2	.2		a346	.47	.55	130	11	2.6	580	6.9
Dec. 1-13.....	.2	19		43	12	63		172		9.6	100	.3	.5		a342	.47	.17	157	14	2.2	602	7.8
Dec. 14-15, 19-28.	190	9.6		24	7.1	56		89		7.8	91	.2	1.0		241	.33	124	89	12	2.6	464	6.9
Dec. 16-18.....	1401	9.6		4.7	2.5	8.3		32		3.0	7.0	.2	.5		52	.07	197	22	0	.8	84	6.6
Dec. 29-30.....	17.0	11		67	21	180	7.1	115		18	375	.2	2.0		738	1.00	33.8	254	156	4.9	1450	7.4
Dec. 31.....	12.0	--		--	--	--		169		--	134	--	--		--	--	--	189	47	--	734	8.2
Jan. 1-5, 7-11, 17-19, 1960.....	50.4	12		33	9.8	65		112		11	113	.3	.8		300	.41	40.7	123	28	2.6	576	6.8

a Residue at 180°C.

RED RIVER BASIN--Continued

7-3154. LITTLE WICHITA RIVER NEAR RINGGOLD, TEX.--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Jan. 6,12-15, 1960	374	10		20	5.1	40		76		7.8	61	0.3	0.8		182	0.25	184	71	7	2.1	340	6.7
Jan. 16	110	--		--	--	--		77		--	308	--	--		--	--	--	196	132	--	1140	6.9
Jan. 20-31,Feb.1-2	11.1	18		44	13	92		137		15	166	.3	1.0		416	.57	12.5	164	48	3.1	786	7.6
Feb. 3	390	18		1.7	4.3	6.1		25		4.8	5.0	.4	2.0		54	.07	56.8	22	0	.6	72	6.9
Feb. 4	1530	--		--	--	--		56		--	49	--	--		--	--	--	58	9	--	271	7.3
Feb. 5-13	512	14		24	7.3	47		88		8.8	76	.3	2.5		223	.30	308	90	13	2.2	419	7.3
Feb. 14-21	7.1	11		41	13	72		164		15	114	.2	1.5		349	.47	6.68	156	21	2.5	649	7.5
Feb. 22-29	3.3	11		58	18	101		230		23	158	.3	.8		483	.66	4.29	210	17	3.0	891	7.7
Mar. 1-10	2.9	10		82	25	147		289		33	250	.3	2.5		a754	1.03	5.89	308	68	3.6	1270	8.0
Mar. 11-20	1.6	7.8		90	31	191		366		41	300	.2	2.5		a878	1.19	3.78	352	50	4.4	1470	7.8
Mar. 21-34	.7	7.8		76	26	143		318		40	215	.4	1.2		a695	.95	1.30	296	34	3.6	1210	8.0
Mar. 25-30,Apr.1-3	95.4	11		27	8.2	50	5.5	98		15	84	.3	2.8		252	.34	64.8	101	20	2.2	461	7.5
Apr. 4-13	1.5	12		48	14	76		193		24	112	.4	.8		a408	.55	1.64	178	17	2.5	697	7.8
Apr. 14-27	2.3	12		59	18	79		255		25	111	.4	1.2		a442	.60	2.73	221	11	2.3	783	7.5
Apr. 28	13.0	8.6		24	8.1	33		113		18	36	.4	3.2		187	.25	6.55	93	0	1.5	336	7.8
Apr. 29-30	4.2	8.8		45	15	69		152		26	120	.4	3.0		362	.49	4.09	174	45	2.3	682	7.4
May 1-5	1.2	9.4		37	13	53		147		21	82	.4	2.8		a317	.43	1.01	146	25	1.9	539	7.3
May 6-19	b1.7	8.0		150	50	567		121		42	1180	.4	4.8		2060	2.80	9.44	579	476	10	3910	6.9
May 20-21	1.8	9.4		73	25	272		132		23	525	.5	2.8		996	1.35	4.83	285	172	7.0	1900	7.5
May 22	12.0	11		40	16	155		128		20	265	.6	3.0		a615	.84	19.8	166	60	5.2	1090	7.6
May 23-26	20.7	11		114	35	317		124		25	700	.5	1.2		1260	1.71	70.3	428	324	6.7	2390	7.3
May 27-29	23.0	9.4		128	45	636		90		32	1260	.6	1.5		2160	2.94	134	504	427	12	4000	7.0
May 30-31	7.4	8.2		81	27	422		84		28	800	.6	2.2		1410	1.92	28.1	313	241	10	2660	7.1
June 1-2	54.0	7.8		68	21	328		90		18	618	.6	2.8		1110	1.51	162	256	181	8.9	2110	7.1
June 3	133	10		302	96	1260		60		62	2680	.5	--		4440	6.04	1590	1150	1100	16	7860	6.8

June 4-8.....	30.7	11		50	15	206		104	15	375	.5	3.0		a790	1.07	65.5	186	100	6.6	1390	7.5
June 9-11.....	49.0	10		35	11	111		126	12	180	.5	2.0		a446	.61	59.0	132	27	4.2	790	7.5
June 12-13.....	18.5	--		--	--	--		94	--	585	--	--		--	--	--	244	163	--	2010	7.4
June 14.....	98.0	--		--	--	--		108	--	140	--	--		--	--	--	134	42	--	650	7.6
June 15.....	123	14		17	4.9	42		58	8.4	67	.4	3.0		186	.25	61.7	62	13	2.3	330	7.4
June 16-30.....	b3.3	11		44	14	155		96	15	290	.5	1.2		578	.79	5.13	168	86	5.2	1110	7.3
July 1-5, 12-15...	b2.1	9.0		52	16	196		120	15	358	.5	2.2		a775	1.05	4.38	196	97	6.1	1360	6.9
July 6-7, 11.....	45.7	7.8		31	10	126		69	12	228	.4	2.5		452	.61	55.7	118	59	5.0	875	6.7
July 8.....	141	6.4		8.5	2.6	8.9		40	5.4	7.0	.3	2.8		62	.08	23.5	32	0	.7	96	7.2
July 9-10, 16-17..	62.8	9.4		20	6.1	47		70	7.8	77	.3	2.5		204	.28	34.5	75	13	2.4	382	7.4
July 18-19, 21-22.	41.2	8.8		25	6.7	81		80	8.0	134	.3	2.8		a336	.46	37.3	90	19	3.7	578	6.7
July 20, 23-28....	11.6	8.6		15	2.9	30		63	5.4	39	.3	2.8		135	.18	4.21	49	0	1.9	242	6.6
July 29-31.....	.2	11		22	6.1	35		94	5.8	50	.3	2.2		178	.24	.08	80	0	17	334	7.1
Aug. 1-31.....	0	12		26	7.8	40		123	4.0	55	.3	2.0		207	.28	--	97	0	1.8	393	7.2
Sept. 1-30.....	b19.5	11		33	9.1	106		108	8.6	178	.4	2.5		402	.55	21.1	120	27	4.2	770	7.2
Weighted average	--	11		17	5.4	39		63	5.9	66	0.2	1.5		177	0.24	50.0	66	13	1.8	325	7.0
Time-weighted average	c108	12		45	14	155		136	15	209	0.3	1.7		488	--	--	171	57	3.4	898	7.2
Tons per day....	--	3.1		4.9	1.5	11		19	1.7	19	0.1	0.4		--	--	--	--	--	--	--	--

a Residue at 180°C.
b Includes days of less than 0.05 cfs.
c Mean discharge based on 366 days; mean discharge for 335 days of chemical analyses, 120 cfs.

RED RIVER BASIN--Continued

7-3160. RED RIVER NEAR GAINESVILLE, TEX.

LOCATION.--At gaging station at bridge on U.S. Highway 77, 0.2 mile downstream from Gulf, Colorado, and Santa Fe Railway Co. bridge, 5 miles downstream from Fish Creek, and 7 miles north of Gainesville, Cooke County.
DRAINAGE AREA.--30,782 square miles, of which 5,936 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: May 1944 to April 1946, October 1952 to September 1960.
Water temperatures: October 1952 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 4,760 ppm July 1-8; minimum, 217 ppm Oct. 4.
Hardness: Maximum, 1,240 ppm July 1-8; minimum, 116 ppm Oct. 4.
Specific conductance: Maximum daily, 7,810 micromhos Sept. 2; minimum daily, 362 micromhos Oct. 4.
Water temperatures: Maximum, 86°F on several days during July and August; minimum, 33°F on several days during November, January, and March.
EXTREMES, 1944-46, 1952-60.--Dissolved solids: Maximum, 6,480 ppm Apr. 11, 1953; minimum, 115 ppm Nov. 4, 1958.
Hardness: Maximum, 1,510 ppm Apr. 11, 1953; minimum, 83 ppm Nov. 4, 1958.
Specific conductance: Maximum daily, 9,890 micromhos Apr. 11, 1953; minimum daily, 176 micromhos Nov. 4, 1958.
Water temperatures (1952-60): Maximum, 95°F July 13, 1954; minimum, freezing point Dec. 23, 1953, Jan. 21, 1954, Jan. 16, 17, 1957, Jan. 21, 1959.
REMARKS.--Records of specific conductance of daily samples for period May 1944 to April 1946 available in district office at Austin, Tex. Records of specific conductance of daily samples for period October 1952 to September 1960 available in district office at Oklahoma City, Okla. Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1-3, 1959....	3683	--	--	74	16	140	--	114	0	149	215	--	3.3	--	685	0.93	6810	250	156	3.8	1180	8.0
Oct. 4.....	27900	--	--	36	6.3	32	--	108	0	32	45	--	.4	--	217	.30	16350	116	28	1.3	362	7.9
Oct. 5-10.....	34720	--	--	54	12	71	--	110	0	90	110	--	2.0	--	419	.57	39280	185	95	2.3	733	7.9
Oct. 11-14.....	4570	--	--	73	17	132	--	122	0	133	210	--	3.9	--	658	.89	8120	250	150	3.6	1110	7.8
Oct. 15-31.....	1120	--	--	148	44	359	--	178	0	326	600	--	1.3	--	1660	2.26	5020	550	404	6.7	2690	7.1
Nov. 1-5.....	999	--	--	152	53	442	--	170	0	344	750	--	1.1	--	1890	2.57	5100	595	456	7.9	3080	8.1
Nov. 6-11.....	5008	--	--	66	18	120	--	132	0	98	205	--	1.8	--	605	.82	8180	240	132	3.4	1060	7.9
Nov. 12.....	1330	--	--	66	16	128	--	134	0	85	218	--	2.0	--	617	.84	2220	230	120	3.7	1040	8.1
Nov. 13.....	1130	--	--	86	24	207	--	140	0	137	360	--	2.0	--	953	1.30	2910	315	200	5.1	1590	8.0
Nov. 14-30.....	613	--	--	178	54	447	--	240	0	367	750	--	1.8	--	2000	2.72	3310	665	468	7.5	3280	7.8
Dec. 1-10.....	463	--	--	202	74	580	--	248	0	472	975	--	1.4	--	2550	3.47	3190	810	607	8.9	4050	8.0
Dec. 11-13.....	436	--	--	210	79	593	--	266	0	491	1000	--	--	--	2670	3.63	3140	850	632	8.8	4190	8.2
Dec. 14-18.....	5046	--	--	105	31	237	--	164	0	204	395	--	1.1	--	1120	1.52	15260	390	256	5.2	1850	8.1
Dec. 19.....	30200	--	--	154	32	470	--	130	0	353	750	--	6.9	--	1870	2.54	152500	515	408	9.0	3070	8.1
Dec. 20-31.....	7554	--	--	166	33	300	2.0	166	0	272	520	0.0	--	0.00	1510	2.05	30800	550	414	5.6	2530	7.7
Jan. 1-10, 1960...	2207	15	0.04	192	48	524	12	216	0	402	370	.4	2.3	.17	2270	3.09	13530	675	498	8.8	3630	7.2
Jan. 11-12.....	3010	--	--	80	20	161	--	146	0	130	265	--	2.4	--	798	1.09	6490	280	160	4.2	1300	8.2
Jan. 13-15.....	7033	--	--	107	31	287	--	148	4	216	470	--	2.8	--	1300	1.77	24690	395	267	6.3	2100	8.3

Jan. 16-19.....	4718	--	--	158	46	484	--	180	0	346	800	--	2.5	--	2160	2.94	27520	585	438	8.7	3360	8.1
Jan. 20-31.....	2154	14	0.00	208	71	641	10	232	0	492	1050	--	.3	--	2710	3.69	15760	810	620	9.8	4340	8.2
Feb. 1-2.....	1355	--	--	254	77	734	--	260	14	592	1200	--	--	--	3200	4.35	11710	950	714	10	4860	8.4
Feb. 3-12.....	6170	--	--	145	46	338	--	166	0	343	560	--	2.4	--	1670	2.27	27820	550	414	6.3	2620	8.2
Feb. 13.....	3180	--	--	198	79	831	--	74	0	637	1350	--	--	--	3330	4.53	28590	820	760	13	5170	8.1
Feb. 14-29.....	1562	--	--	178	57	468	--	144	0	499	750	--	3.2	--	2150	2.92	9070	680	562	7.8	3300	8.2
Mar. 1-9.....	1134	--	--	222	70	517	--	256	0	528	850	--	6.4	--	2460	3.35	7530	840	630	7.7	3690	8.1
Mar. 10.....	894	--	--	182	84	670	--	64	0	600	1120	--	--	--	2900	3.94	7000	800	748	10	4460	7.8
Mar. 11-25.....	1126	--	--	252	71	617	--	250	0	621	1000	--	--	--	2860	3.89	8690	920	715	8.8	4350	8.1
Mar. 26.....	2820	--	--	102	29	186	--	150	0	217	305	--	.4	--	994	1.35	7570	375	252	4.2	1620	7.8
Mar. 27.....	3740	--	--	145	47	336	--	184	0	303	580	--	.2	--	1630	2.22	16460	555	404	6.2	2580	8.0
Mar. 28-29.....	3230	--	--	108	39	218	--	156	0	239	372	--	3.3	--	1160	1.58	10120	430	302	4.6	1860	8.1
Mar. 30-31.....	1470	--	--	164	74	391	--	186	0	406	700	--	3.0	--	1940	2.64	7700	715	562	6.4	3050	8.1
Apr. 1-6.....	1253	--	--	226	74	653	--	166	0	646	1050	--	--	--	2910	3.96	9840	870	734	9.6	4370	8.1
Apr. 7.....	1330	--	--	196	77	553	--	168	0	543	925	--	.4	--	2560	3.48	9190	805	668	8.5	3930	8.2
Apr. 8-10.....	946	--	--	182	71	538	--	154	0	565	850	--	1.1	--	2420	3.29	6180	745	619	8.6	3680	8.2
Apr. 11-20.....	725	--	--	192	78	565	--	162	0	533	950	--	--	--	2410	3.28	4720	800	667	8.7	3890	8.2
Apr. 21-24.....	560	--	--	184	78	618	--	150	4	534	1020	--	--	--	2700	3.67	4080	780	650	9.6	4120	8.4
Apr. 25-27.....	584	--	--	204	82	678	--	170	0	603	1100	--	--	--	2950	4.01	4650	845	706	10	4490	7.6
Apr. 28-30.....	573	--	--	180	70	523	--	192	0	494	850	--	.4	--	2380	3.24	3680	735	578	8.4	3630	8.2
May 1-8.....	523	--	--	212	71	627	--	194	0	521	1050	--	--	--	2700	3.67	3810	820	661	9.5	4200	7.6
May 9.....	2330	--	--	152	66	509	--	122	4	365	900	--	1.9	--	2200	2.99	13840	650	544	8.7	3520	8.4
May 10.....	3090	--	--	130	37	325	--	156	8	264	540	--	4.5	--	1490	2.03	12430	475	334	6.5	2350	8.5
May 11.....	2130	--	--	102	31	268	--	146	0	188	460	--	.1	--	1260	1.71	7250	380	260	6.0	1970	8.2
May 12-22.....	691	--	--	158	48	455	--	158	0	342	775	--	1.9	--	1970	2.68	3680	590	460	8.2	3120	7.6
May 23-26.....	3732	--	--	103	30	199	--	140	0	207	340	--	3.7	--	1050	1.43	10580	380	266	4.4	1670	7.5
May 27.....	1380	--	--	168	39	363	--	140	4	400	590	--	.4	--	1720	2.34	6410	580	459	6.6	2680	8.3
May 28-31.....	1168	--	--	220	62	567	--	172	0	534	950	--	1.7	--	2600	3.54	8200	805	664	8.7	3950	7.7
June 1-10.....	4449	--	--	168	49	514	--	138	0	407	850	--	3.7	--	2220	3.02	26670	620	507	9.0	3410	7.7
June 11-20.....	9569	--	--	248	39	635	--	122	0	692	950	--	.2	--	2800	3.81	72340	780	680	9.9	4030	8.2
June 21-30.....	1149	--	--	304	59	779	--	154	0	841	1200	--	--	--	3480	4.73	10800	1000	874	11	5090	8.2
July 1-8.....	799	--	--	348	90	1190	--	138	0	990	1900	--	--	--	4760	6.47	10270	1240	1130	15	7080	8.0

RED RIVER BASIN--Continued

7-3160. RED RIVER NEAR GAINESVILLE, TEX.--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
July 9, 1960	9050	--	--	149	37	406	--	148	0	369	640	--	0.0	--	1810	2.46	44230	525	404	7.7	2790	7.9
July 10	10800	--	--	66	15	136	--	122	0	108	218	--	.0	--	667	.91	19450	225	125	3.9	1090	7.9
July 11-12	7435	--	--	139	19	275	--	88	0	311	445	--	.0	--	1340	1.82	26900	425	353	5.8	2050	7.4
July 13-18	3873	--	--	268	54	830	--	116	0	737	1300	--	--	--	3490	4.75	36500	890	795	12	5110	8.0
July 19	2350	--	--	151	30	417	--	110	0	384	650	--	.0	--	1810	2.46	11480	500	410	8.1	2860	7.8
July 20-23	2115	--	--	206	39	673	--	114	0	542	1050	--	--	--	2730	3.71	15590	675	582	11	4140	7.6
July 24	4780	--	--	128	28	376	--	122	0	327	575	--	.0	--	1620	2.20	20910	435	335	7.8	2550	7.7
July 25-26	2655	--	--	90	21	242	--	112	0	193	385	--	.0	--	1090	1.48	7810	310	218	6.0	1730	7.7
July 27-31	2432	--	--	220	45	636	--	124	0	583	1000	--	--	--	2760	3.75	18120	735	634	10	4100	7.9
Aug. 1-7	890	--	--	196	48	436	--	140	0	551	670	--	1.0	--	2070	2.82	4970	685	570	7.2	3120	7.9
Aug. 8-10	365	--	--	196	59	605	--	46	0	620	960	--	12	--	2580	3.51	2540	730	692	9.7	3940	7.3
Aug. 11-19	470	--	--	196	50	605	--	70	0	544	980	--	6.3	--	2530	3.44	3210	695	638	10	3970	7.4
Aug. 20-21	474	--	--	320	64	1020	--	124	0	863	1620	--	--	--	4120	5.60	5270	1060	958	14	6240	7.8
Aug. 22-31	752	--	--	260	51	739	--	132	0	666	1180	--	--	--	3090	4.20	6270	860	752	11	4780	7.9
Sept. 1-20	502	14	0.00	268	68	905	11	120	0	753	1400	0.5	--	0.76	3510	4.77	4760	950	852	13	5370	7.3
Sept. 21-25	273	--	--	214	60	679	--	124	0	580	1100	--	--	--	2820	3.84	2080	780	678	11	4380	8.0
Sept. 26-30	1370	--	--	121	34	371	--	112	0	295	600	--	2.2	--	1520	2.07	5620	440	348	7.7	2480	8.0
Weighted average	2916	--	--	147	36	364	--	144	--	342	590	--	--	--	1660	2.26	13070	515	397	7.0	2590	--
Analyses of additional samples																						
Nov. 2, 1959	622	4.0	--	182	53	541		170	0	419	900	0.3	0.5	0.34	a 2180	2.96	3660	670	530	9.1	3680	7.4
Feb. 24, 1960	b 1220	10	0.00	240	76	530		266	0	568	885	.7	4.3	.24	2590	3.52	8530	910	692	7.6	3900	8.0
May 23	b 4240	10	.00	164	59	451		202	0	321	800	.5	.7	.37	2110	2.87	2420	650	484	7.7	3230	7.4
July 14	b 4780	16	.00	318	60	982		162	0	860	1520	.5	3.1	.35	3950	5.37	50980	1040	907	13	6030	7.6

a Calculated from determined constituents.
b Discharge at time of sampling.

RED RIVER BASIN--Continued

7-3160. RED RIVER NEAR GAINESVILLE, TEX.--Continued

Temperature (°F) of water, water year October 1959 to September 1960

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

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RED RIVER BASIN--Continued

7-3255. WASHITA RIVER AT CARNEGIE, OKLA.

LOCATION.--At gaging station at bridge on State Highway 9, 1,300 feet upstream from Running Creek and 2.7 miles east of Carnegie, Caddo County.
DRAINAGE AREA.--3,129 square miles, includes that of Running Creek.
RECORDS AVAILABLE.--Chemical analyses: October 1953 to September 1960.
Water temperatures: October 1953 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 1,860 ppm Dec. 1-10; minimum, 374 ppm Oct. 2-10.
Hardness: Maximum, 1,150 ppm Nov. 11-20; minimum, 260 ppm Oct. 2-10.
Specific conductance: Maximum daily, 2,410 micromhos Dec. 8-10; minimum daily, 273 micromhos Oct. 4.
Water temperatures: Maximum, 88°F on several days during July and August; minimum, 34°F Jan. 23.
EXTREMES, 1953-60.--Dissolved solids: Maximum, 2,460 ppm May 9-10, 1956; minimum, 163 ppm Sept. 21, 1957.
Hardness: Maximum, 1,480 ppm May 9-10, 1956; minimum, 120 ppm Sept. 21, 1957.
Specific conductance: Maximum daily, 3,530 micromhos Aug. 26, 1954; minimum daily, 222 micromhos Sept. 21, 1957.
Water temperatures: Maximum, 90°F July 14, 30, 31, 1955, July 5, 1956; minimum, freezing point on several days during winter months.
REMARKS.--Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1, 1959.....	716	--	--	101	25	13	--	114	0	258	14	--	2.9	--	499	0.68	965	355	262	0.3	686	8.1
Oct. 2-10.....	4452	--	--	72	20	18	--	128	0	161	17	--	2.8	--	374	.51	4500	260	155	.5	547	8.0
Oct. 11-31.....	285	22	0.00	238	49	65	0.6	248	0	581	90	0.4	1.3	0.05	1280	1.74	985	796	593	1.0	1770	7.9
Nov. 1-10.....	174	13	.00	211	71	148	4.0	248	0	664	165	.3	5.9	.02	1500	2.04	705	820	617	2.2	2050	7.9
Nov. 11-20.....	142	--	--	290	104	97	--	324	0	914	100	--	3.9	--	1790	2.43	686	1150	884	1.2	2120	8.0
Nov. 21-30.....	132	--	--	250	106	113	--	198	0	956	102	--	5.1	--	1740	2.37	620	1060	898	1.5	2050	8.0
Dec. 1-10.....	133	4.6	.00	282	65	130	--	324	0	692	180	.1	4.0	.05	1860	2.53	668	960	694	1.8	2230	8.1
Dec. 11-16.....	143	--	--	276	110	104	--	258	0	974	98	--	4.5	--	1810	2.46	699	1140	928	1.3	2120	8.2
Dec. 17.....	691	--	--	160	55	54	--	192	4	471	58	--	6.2	--	953	1.30	1780	625	461	.9	1280	8.3
Dec. 18-20.....	3627	--	--	84	24	26	--	128	0	208	29	--	3.5	--	473	.64	4630	310	205	.6	695	8.1
Dec. 21-24.....	746	--	--	122	40	54	--	210	6	330	41	--	4.5	--	751	1.02	1510	470	288	1.1	1020	8.4
Dec. 25-31.....	424	--	--	178	68	75	--	294	0	535	60	--	6.6	--	1130	1.54	1290	725	484	1.2	1450	8.2
Jan. 1-10, 1960...	316	20	.00	216	80	85	6.8	316	0	672	76	.4	6.9	.26	1410	1.92	1200	870	611	1.3	1750	7.7
Jan. 11-14.....	395	--	--	192	85	106	--	248	0	666	112	--	6.4	--	1380	1.88	1470	830	627	1.6	1790	8.1
Jan. 15-20.....	623	--	--	154	59	62	--	260	0	446	55	--	6.5	--	973	1.32	1640	625	412	1.1	1280	8.2
Jan. 21-31.....	314	21	--	206	89	87	2.8	318	0	683	75	.3	7.9	.36	1380	1.88	1170	880	620	1.3	1720	8.2
Feb. 1-3.....	328	--	--	270	62	99	--	352	0	713	78	--	5.0	--	1490	2.03	1320	930	642	1.4	1830	7.9
Feb. 4.....	1930	--	--	131	34	75	--	128	0	387	80	--	7.3	--	894	1.22	4660	465	360	1.5	1140	8.1
Feb. 5-6.....	3475	--	--	76	21	32	--	136	0	188	26	--	3.1	--	468	.64	4390	276	164	.8	653	7.7
Feb. 7-10.....	1271	--	--	127	49	55	--	248	0	363	39	--	5.5	--	868	1.18	2980	520	317	1.1	1100	8.2

Feb. 11-20.....	701	20	.00	182	76	74	4.4	312	0	564	59	.4	12	.18	1220	1.66	2310	765	510	1.2	1540	7.9
Feb. 21-29.....	502	--	--	218	84	92	--	338	0	682	70	--	5.4	--	1410	1.92	1910	890	613	1.3	1750	7.9
Mar. 1-10.....	404	--	--	216	91	100	--	280	0	760	76	--	5.0	--	1480	2.01	1610	915	686	1.4	1820	7.8
Mar. 11-20.....	494	--	--	182	93	98	--	230	0	717	75	--	9.2	--	1410	1.92	1880	835	646	1.5	1710	7.8
Mar. 21-31.....	418	--	--	192	95	100	--	192	0	789	72	--	7.9	--	1490	2.03	1680	870	719	1.5	1760	7.8
Apr. 1-20.....	360	20	.00	210	91	92	3.4	242	0	798	75	.5	9.7	.46	1540	2.09	1500	900	702	1.3	1780	8.0
Apr. 21-30.....	256	--	--	232	112	115	--	216	0	952	83	--	4.8	--	1710	2.33	1180	1040	863	1.5	2020	7.8
May 1-10.....	256	--	--	262	113	99	--	264	0	946	92	--	4.8	--	1810	2.46	1250	1120	904	1.3	2100	7.6
May 11-19.....	237	--	--	220	100	104	--	132	0	913	88	--	3.3	--	1570	2.14	1000	960	852	1.5	1860	8.2
May 20-23.....	381	--	--	188	59	69	--	176	0	629	40	--	5.9	--	1150	1.56	1180	710	566	1.1	1400	8.2
May 24-31.....	271	--	--	240	88	103	--	248	0	841	72	--	3.8	--	1530	2.08	1120	960	757	1.4	1840	8.2
June 1.....	644	--	--	252	107	83	--	178	0	975	60	--	5.0	--	1730	2.35	3010	1070	924	1.1	1850	8.2
June 2.....	419	--	--	134	40	37	--	132	0	420	24	--	.4	--	811	1.10	917	500	392	.7	972	8.1
June 3-9.....	308	--	--	194	62	83	--	204	0	654	50	--	3.8	--	1280	1.74	1060	740	573	1.3	1460	8.2
June 10-17.....	504	--	--	172	49	49	--	164	0	538	27	--	4.5	--	1040	1.41	1420	630	496	.8	1200	8.0
June 18-20.....	192	--	--	212	80	59	--	250	0	684	50	--	.1	--	1400	1.90	726	860	655	.9	1560	7.9
June 21-30.....	141	--	--	240	85	117	--	188	6	890	80	--	1.4	--	1670	2.27	636	950	786	1.7	1870	8.4
July 1-20.....	166	22	.00	244	80	71	5.0	188	0	828	68	.5	2.6	.82	1470	2.00	659	940	836	1.0	1710	7.7
July 21-23.....	303	--	--	122	31	31	--	138	0	344	18	--	.0	--	669	.91	547	430	317	.6	837	8.0
July 24-31.....	481	--	--	92	43	13	--	164	0	258	19	--	3.1	--	563	.77	731	405	270	.3	760	8.1
Aug. 1-10.....	139	20	.00	146	60	58	4.4	212	0	460	52	.5	1.8	.56	945	1.29	355	610	436	1.0	1230	7.6
Aug. 11-20.....	112	--	--	190	74	78	--	212	0	635	81	--	2.3	--	1270	1.73	384	780	606	1.2	1540	8.1
Aug. 21-28.....	162	--	--	190	49	42	--	160	0	561	34	--	3.0	--	1040	1.41	455	675	544	.7	1250	8.2
Aug. 29-31.....	86.0	--	--	206	82	75	--	198	0	691	92	--	1.4	--	1340	1.82	311	850	688	1.1	1620	8.2
Sept. 1-20.....	68.2	18	.00	236	76	113	3.6	204	0	806	112	.3	2.0	--	1520	2.07	280	900	733	1.6	1850	7.7
Sept. 21-28.....	55.0	9.0	--	252	81	129	--	206	0	878	108	.5	3.3	--	1610	2.19	239	960	791	1.8	1980	8.0
Sept. 29-30.....	124	14	--	164	53	47	--	152	0	543	25	.4	1.9	--	932	1.27	312	625	500	.8	1200	8.0
Weighted average	449	--	--	153	55	62	--	201	--	481	52	--	4.7	--	983	1.34	1190	608	443	1.1	1240	--

RED RIVER BASIN--Continued

7-3255. WASHITA RIVER AT CARNEGIE, OKLA.--Continued

Temperature (°F) of water, water year October 1959 to September 1960

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

RED RIVER BASIN--Continued

7-3299. ROCK CREEK AT DOUGHERTY, OKLA.

LOCATION.--At gaging station at bridge on State Highway 7-C, 1 mile east of Dougherty, Murray County, and 1 mile upstream from mouth.
DRAINAGE AREA.--138 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1956 to September 1960 (discontinued).
Water temperatures: October 1956 to September 1960 (discontinued).
EXTREMES, 1959-60.--Specific conductance: Maximum daily, 1,990 micromhos Oct. 1; minimum daily, 227 micromhos May 6.
Water temperatures: Maximum, 98°F July 27; minimum, 37°F Nov. 16, Feb. 27.
EXTREMES, 1956-60.--Dissolved solids (1956-57): Maximum, 1,760 ppm Oct. 1-10, 1956; minimum, 145 ppm May 17-18, 1957.
Hardness (1956-57): Maximum, 470 ppm Dec. 1-7, 1956; minimum, 110 ppm Sept. 21-22, 1957.
Specific conductance: Maximum daily, 3,250 micromhos Oct. 2, 1956; minimum daily, 171 micromhos Sept. 21, 1957.
Water temperatures: Maximum, 98°F July 27, 1960; minimum, freezing point on many days during winter months.
REMARKS.--Records of discharge for water year 1959 to September 1960 given in WSP 1711.

Chloride and specific conductance, water year October 1959 to September 1960

Day	OCTOBER		NOVEMBER		DECEMBER		JANUARY	
	Chloride (Cl) ppm	Specific conductance (micromhos at 25°C)	Chloride (Cl) ppm	Specific conductance (micromhos at 25°C)	Chloride (Cl) ppm	Specific conductance (micromhos at 25°C)	Chloride (Cl) ppm	Specific conductance (micromhos at 25°C)
1..	470	1990	108	814	260	1400	120	916
2..	244	1140	102	812	245	1420	122	892
3..	66	475	22	313	270	1430	112	870
4..	10	263	28	352	275	1450	70	674
5..	44	411	40	483	275	1460	75	720
6..	138	899	102	810	278	1460	72	720
7..	90	680	102	805	285	1470	75	721
8..	118	799	102	800	285	1470	65	668
9..	174	1040	165	1060	288	1490	50	601
10..	149	994	168	1070	292	1500	50	607
11..	250	1300	165	1070	300	1500	65	660
12..	255	1280	--	--	306	1510	24	414
13..	250	1270	--	--	300	1510	19	375
14..	300	1480	--	--	300	1500	28	496
15..	240	1280	--	--	170	963	32	545
16..	255	1310	205	1210	29	377	45	614
17..	305	1470	205	1200	50	535	35	574
18..	265	1350	220	1240	21	364	32	567
19..	295	1470	220	1220	50	552	45	640
20..	295	1480	220	1250	90	779	58	695
21..	300	1470	168	1060	91	778	--	--
22..	300	1490	218	1230	89	783	58	655
23..	325	1590	265	1390	98	813	65	663
24..	320	1600	260	1400	90	775	70	737
25..	325	1580	260	1390	110	867	77	765
26..	325	1600	255	1380	112	863	71	740
27..	325	1610	262	1400	50	486	79	751
28..	330	1590	262	1390	76	708	78	744
29..	325	1620	260	1400	94	786	77	743
30..	106	839	265	1410	110	861	--	--
31..	106	826	--	--	126	909	87	776

RED RIVER BASIN--Continued

7-3299. ROCK CREEK AT DOUGHERTY, OKLA.--Continued

Chloride and specific conductance, water year October 1959 to September 1960--Continued

Day	FEBRUARY		MARCH		APRIL		MAY	
	Chloride (Cl) ppm	Specific conductance (micromhos at 25°C)	Chloride (Cl) ppm	Specific conductance (micromhos at 25°C)	Chloride (Cl) ppm	Specific conductance (micromhos at 25°C)	Chloride (Cl) ppm	Specific conductance (micromhos at 25°C)
1..	92	777	58	673	63	583	41	527
2..	102	779	60	671	78	722	52	592
3..	29	505	60	678	76	722	53	561
4..	--	--	70	716	72	637	10	302
5..	24	444	70	725	75	673	9	291
6..	37	551	70	732	81	753	3	227
7..	41	590	72	708	80	657	26	469
8..	49	639	90	775	75	693	33	463
9..	51	639	65	726	83	773	18	434
10..	67	713	70	721	86	753	39	516
11..	68	734	82	767	86	778	44	583
12..	60	627	85	765	57	648	65	692
13..	70	683	82	752	57	634	60	552
14..	68	700	75	742	68	692	65	601
15..	65	731	65	693	60	663	66	679
16..	65	664	68	697	88	785	63	645
17..	62	659	82	758	75	692	62	602
18..	68	690	82	753	72	688	56	587
19..	70	717	80	730	86	767	17	385
20..	70	723	85	760	88	777	7	255
21..	75	721	83	729	86	790	19	406
22..	60	715	78	667	94	798	--	--
23..	55	676	--	--	101	846	51	615
24..	58	666	90	700	102	843	34	512
25..	60	669	2	299	104	843	56	613
26..	60	667	20	444	116	877	--	--
27..	88	771	46	575	104	847	66	683
28..	62	687	45	537	98	753	68	615
29..	60	680	26	506	116	883	--	--
30..	--	--	52	578	13	296	61	675
31..	--	--	62	584	--	--	52	587

	JUNE		JULY		AUGUST		SEPTEMBER	
1..	40	501	200	1110	212	1120	255	1260
2..	37	435	238	1230	230	1160	270	1290
3..	46	550	190	1100	225	1150	265	1280
4..	71	616	160	1080	225	1180	292	1360
5..	86	585	178	1070	230	1310	292	1360
6..	17	317	124	783	265	1300	288	1350
7..	46	504	30	349	205	1380	292	1380
8..	70	585	78	637	285	1380	292	1380
9..	112	727	159	920	288	1380	290	1370
10..	102	677	157	926	308	1430	290	1360
11..	116	703	150	903	275	1310	285	1350
12..	80	695	160	905	280	1320	285	1370
13..	72	594	190	1050	250	1250	285	1410
14..	72	591	210	1110	275	1330	285	1370
15..	96	676	190	1060	245	1210	285	1340
16..	120	774	215	1110	240	1210	288	1340
17..	127	829	215	1140	245	1210	285	1350
18..	110	803	110	737	245	1210	270	1300
19..	144	920	205	1120	280	1320	250	1250
20..	138	838	110	742	218	1110	250	1250
21..	140	822	110	742	190	997	270	1300
22..	152	913	147	905	--	--	268	1280
23..	152	901	150	903	--	--	252	1250
24..	180	1050	27	333	--	--	248	1220
25..	170	985	62	529	--	--	248	1220
26..	175	1020	105	713	222	1110	--	--
27..	180	1030	145	868	182	997	--	--
28..	180	1000	150	893	260	1250	--	--
29..	205	1130	170	950	230	1160	348	884
30..	200	1120	180	989	260	1260	362	876
31..	--	--	215	1150	270	1290	--	--

RED RIVER BASIN--Continued

7-3299. ROCK CREEK AT DOUGHERTY, OKLA.--Continued

Temperature (°F) of water, water year October 1959 to September 1960

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

RED RIVER BASIN--Continued

7-3310. WASHITA RIVER NEAR DURWOOD, OKLA.

LOCATION.--At gaging station at bridge on State Highway 18, 1.3 miles downstream from Caddo Creek and 4 miles north of Durwood, Carter County.
DRAINAGE AREA.--7,202 square miles.
RECORDS AVAILABLE.--Chemical analyses: May 1944 to September 1960.
Water temperatures: April 1947 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 1,200 ppm Dec. 1-10; minimum, 229 ppm May 19-20.
Hardness: Maximum, 770 ppm Dec. 1-10; minimum, 162 ppm May 19-20.
Specific conductance: Maximum daily, 1,580 micromhos Dec. 7; minimum daily, 351 micromhos May 20.
Water temperatures: Maximum, 96°F Aug. 5; minimum, freezing point Nov. 13.
EXTREMES, 1944-60.--Dissolved solids: Maximum, 1,210 ppm Sept. 14-17, 1959; minimum, 70 ppm Nov. 2, 1951.
Hardness: Maximum, 770 ppm Dec. 1-10, 1959; minimum, 41 ppm Nov. 2, 1951.
Specific conductance: Maximum daily, 1,830 micromhos Jan. 23, 1957, Sept. 13, 1959; minimum daily, 94.9 micromhos Nov. 2, 1951.
Water temperatures (1947-60): Maximum, 96°F Aug. 5, 1960; minimum, freezing point on many days during winter months.
REMARKS.--Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1-2, 1959....	2515	--	--	69	17	21	--	152	0	124	20	--	4.2	--	a 330	0.45	2240	240	116	0.6	529	7.8
Oct. 3-10.....	12220	--	--	60	13	13	--	148	0	83	14	--	2.2	--	263	.36	8680	202	80	.4	432	7.5
Oct. 11-15.....	2054	--	--	80	21	22	--	162	0	154	26	--	2.3	--	391	.53	2170	285	152	.6	604	8.1
Oct. 16-20.....	1015	--	--	131	35	36	--	236	0	281	43	--	2.3	--	675	.92	1850	470	276	.7	960	8.2
Oct. 21-31.....	675	--	--	168	51	66	--	306	0	412	65	--	3.2	--	950	1.29	1730	630	379	1.1	1290	8.1
Nov. 1-2.....	835	--	--	150	59	69	--	252	0	419	85	--	3.0	--	965	1.31	2180	615	408	1.2	1310	8.2
Nov. 3-10.....	2344	--	--	95	29	25	--	198	0	185	38	--	1.9	--	520	.71	3290	355	192	.6	764	8.0
Nov. 11-30.....	548	--	--	168	63	63	--	296	0	440	80	--	3.1	--	1050	1.43	1550	680	438	1.0	1400	8.1
Dec. 1-10.....	447	--	--	188	73	77	--	336	0	509	92	--	3.2	--	1200	1.63	1450	770	494	1.2	1560	8.0
Dec. 11-14.....	424	--	--	176	68	82	--	288	0	506	95	--	3.0	--	1160	1.58	1330	720	484	1.3	1510	8.2
Dec. 15-20.....	2090	--	--	97	32	41	--	214	0	190	63	--	2.3	--	573	.78	3230	375	200	.9	857	8.2
Dec. 21-31.....	1996	--	--	105	31	37	--	204	0	225	47	--	3.1	--	591	.80	3190	390	223	.8	850	8.1
Jan. 1-10, 1960...	1110	15	0.00	136	48	71	2.6	294	0	312	73	0.3	2.9	0.09	835	1.14	2500	535	294	1.3	1180	8.0
Jan. 11.....	1120	--	--	74	46	54	--	124	0	276	72	--	1.9	--	641	.87	1940	375	274	1.2	952	8.1
Jan. 12-13.....	8340	--	--	54	14	17	--	158	2	58	24	--	1.9	--	259	.35	5830	192	59	.5	457	8.4
Jan. 14-17.....	2745	--	--	99	31	37	--	238	4	181	45	--	2.2	--	553	.75	4100	375	174	.8	825	8.3
Jan. 18-20.....	2083	--	--	126	50	59	--	254	0	319	75	--	2.9	--	812	1.10	4570	520	312	1.1	1150	8.2
Jan. 21-31.....	1315	16	.00	143	52	67	2.3	302	0	327	85	.3	4.3	.22	856	1.16	3040	570	322	1.2	1210	8.2

Feb. 1-2.....	1060	--	--	86	56	79	--	108	0	389	87	--	1.9	--	854	1.16	2440	445	356	1.6	1140	8.2
Feb. 3-5.....	4753	--	--	72	20	33	--	178	2	123	38	--	1.4	--	435	.59	5580	260	110	.9	625	8.3
Feb. 6-20.....	1989	--	--	98	39	51	--	184	0	274	55	--	2.9	--	683	.93	3670	405	254	1.1	933	8.2
Feb. 21-29.....	1231	--	--	124	56	73	--	216	0	396	76	--	3.2	--	894	1.22	2970	540	363	1.4	1230	7.9
Mar. 1-10.....	1188	17	.00	170	60	75	3.2	348	0	412	88	.3	5.4	.19	1050	1.43	3370	670	385	1.3	1440	8.0
Mar. 11-20.....	1191	--	--	154	63	81	--	266	0	458	87	--	3.5	--	1050	1.43	3380	645	427	1.4	1400	8.1
Mar. 21-24.....	982	--	--	127	68	74	--	200	0	452	82	--	6.4	--	1040	1.41	2760	595	431	1.3	1330	7.8
Mar. 25.....	4110	--	--	58	16	22	--	160	0	90	24	--	.2	--	320	.44	3550	210	79	.7	488	8.0
Mar. 26-27.....	2935	--	--	83	34	54	--	186	0	216	59	--	3.2	--	629	.86	4980	345	192	1.3	847	8.0
Mar. 28-31.....	1482	--	--	118	49	65	--	224	0	337	70	--	4.3	--	870	1.18	3480	495	312	1.3	1140	7.9
Apr. 1-14.....	942	--	--	154	71	62	--	272	0	449	83	--	2.6	--	1170	1.59	2980	675	452	1.0	1410	7.9
Apr. 15.....	1760	--	--	83	37	28	--	172	10	212	28	--	4.8	--	620	.84	2950	360	202	.6	900	8.6
Apr. 16-20.....	962	--	--	142	57	43	--	272	0	396	32	--	3.3	--	978	1.33	2540	590	367	.8	1300	8.0
Apr. 21-30.....	782	--	--	141	62	83	--	216	0	470	84	--	1.0	--	1110	1.51	2340	605	428	1.5	1360	8.0
May 1.....	1310	--	--	63	24	38	--	140	12	144	38	--	.4	--	394	.54	1390	256	122	1.0	629	8.4
May 2-3.....	945	--	--	132	54	76	--	216	0	421	70	--	.7	--	896	1.22	2290	550	373	1.4	1210	7.9
May 4-5.....	1970	--	--	77	24	47	--	160	10	144	68	--	.6	--	476	.65	2530	292	144	1.2	730	8.4
May 6-9.....	8052	--	--	69	18	32	--	168	6	114	36	--	1.9	--	391	.53	8500	248	100	.9	588	8.5
May 10-11.....	1385	--	--	102	35	34	--	214	4	212	50	--	.4	--	597	.81	2230	400	218	.7	840	8.3
May 12-18.....	793	--	--	138	52	62	--	256	0	361	75	--	2.5	--	880	1.20	1880	560	350	1.1	1180	8.1
May 19-20.....	17200	--	--	46	11	18	--	142	6	45	20	--	.2	--	229	.31	10630	162	36	.6	376	8.4
May 21-27.....	4943	--	--	62	22	27	--	188	0	101	31	--	2.4	--	360	.49	4800	246	92	.7	562	8.2
May 28-31.....	1380	--	--	107	38	43	--	222	8	228	59	--	2.4	--	693	.94	2580	425	230	.9	954	8.3
June 1-10.....	1272	15	.00	115	46	62	4.1	252	0	288	67	.4	3.2	.28	739	1.01	2540	475	268	1.2	1060	8.1
June 11.....	840	--	--	32	38	14	--	244	12	21	18	--	.0	--	324	.44	735	236	16	.4	495	8.5
June 12-16.....	1000	--	--	120	46	54	--	184	6	344	60	--	3.6	--	845	1.15	2280	490	329	1.1	1060	8.4
June 17-20.....	704	--	--	101	41	41	--	232	8	236	41	--	3.9	--	704	.96	1340	420	216	.9	872	8.4
June 21-30.....	471	--	--	133	59	52	--	206	12	389	65	--	2.3	--	935	1.27	1190	575	386	.9	1160	8.5
July 1-6.....	455	--	--	125	65	63	--	206	0	417	80	--	.8	--	935	1.27	1150	580	411	1.1	1230	8.2
July 7-11.....	1344	--	--	60	25	32	--	158	0	120	46	--	1.9	--	412	.56	1500	252	122	.9	600	8.2
July 12-23.....	449	--	--	126	51	69	--	204	0	377	81	--	1.0	--	890	1.21	1080	525	358	1.3	1180	7.9
July 24-29.....	724	--	--	118	50	41	--	192	0	319	69	--	3.6	--	762	1.04	1490	500	342	.8	1030	8.2
July 30-31.....	682	--	--	75	28	36	--	172	0	181	36	--	.0	--	490	.67	902	302	161	.9	706	7.7

a Calculated from determined constituents.

RED RIVER BASIN--Continued

7-3310. WASHITA RIVER NEAR DURWOOD, OKLA.--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Aug. 1-5, 1960....	506	16	--	82	26	42	--	172	0	183	46	0.3	4.8	--	497	0.68	679	310	169	1.0	739	8.1
Aug. 6-10.....	332	17	--	106	38	51	--	198	0	283	49	.3	3.8	--	668	.91	599	420	258	1.1	925	8.2
Aug. 11.....	352	--	--	68	26	38	--	156	0	165	39	--	2.8	--	450	.61	428	275	147	1.0	660	8.1
Aug. 12-17.....	244	20	--	99	42	66	--	196	0	295	66	.3	3.0	--	715	.97	471	420	260	1.4	997	8.1
Aug. 18.....	338	--	--	100	46	123	--	204	0	239	205	--	3.3	--	904	1.23	825	440	273	2.6	1350	8.2
Aug. 19-20.....	596	--	--	84	34	63	--	198	0	215	71	--	.2	--	592	.81	953	350	188	1.5	880	7.9
Aug. 21-29.....	963	13	--	59	23	37	--	166	0	123	38	.3	2.6	--	390	.53	1010	240	104	1.0	589	8.1
Aug. 30-31.....	354	--	--	115	47	72	--	188	0	362	73	--	1.8	--	805	1.09	769	480	326	1.4	1090	8.1
Sept. 1-10.....	204	12	0.00	122	50	67	5.4	164	0	415	72	.3	1.9	0.59	869	1.18	479	510	376	1.3	1170	7.7
Sept. 11-23.....	143	16	.00	114	56	83	3.6	168	0	421	95	.3	3.8	.56	917	1.25	354	515	378	1.6	1240	8.0
Sept. 24-30.....	957	12	--	59	17	40	--	174	0	91	47	.3	2.0	--	368	.50	951	218	76	1.2	588	7.9
Weighted average	1594	--	--	94	32	40	--	202	--	212	46	--	2.4	--	572	0.78	2460	366	40	0.9	812	--

Analyses of additional samples

Nov. 2, 1959.....	835	12	--	170	50	77		314	0	401	85	0.4	2.5	0.23	a 952	1.29	2150	630	372	1.3	1360	7.9
Feb. 23, 1960.....	b 1230	13	0.04	158	62	68		340	0	392	75	.3	4.6	.14	974	1.32	3230	650	372	1.2	1370	8.0
May 25.....	b 2050	10	.00	81	30	29		212	0	153	38	.5	.5	.20	501	.68	2770	325	152	.7	730	7.9
July 12.....	b 490	12	.00	94	38	51		212	0	234	58	.3	.7	.20	631	.86	835	390	216	1.1	908	7.7

a Calculated from determined constituents.
b Discharge at time of sampling.

RED RIVER BASIN--Continued

7-3310. WASHITA RIVER NEAR DURWOOD, OKLA.--Continued

Temperature (°F) of water, water year October 1959 to September 1960

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

RED RIVER BASIN--Continued

7-3316. RED RIVER AT DENISON DAM, NEAR DENISON, TEX.

LOCATION.--Immediately below Denison Dam, 1.7 miles upstream from Sand Creek, 4 miles northwest of Denison, Grayson County, and 3 miles upstream from gaging station near Colbert, Bryan County, Okla.
DRAINAGE AREA.--39,719 square miles upstream from dam, 39,777 square miles upstream from gaging station, of which 5,936 miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: May 1944 to September 1960.
Water temperatures: October 1945 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 1,160 ppm Sept. 1-30; minimum, 900 ppm May 1-31.
Hardness: Maximum, 398 ppm Aug. 1-31; minimum, 312 ppm Feb. 1-29.
Specific conductance: Maximum daily, 1,990 micromhos Oct. 23; minimum daily, 1,490 micromhos Feb. 16-19, May 25.
EXTREMES, 1944-60.--Dissolved solids: Maximum, 1,430 ppm Aug. 11-20, Sept. 1-10, 1944; minimum, 464 ppm Oct. 21-31, 1945.
Hardness: Maximum, 522 ppm Aug. 11-20, Sept. 1-10, 1944; minimum, 233 ppm Dec. 21-31, 1945, Jan. 11-20, 1946.
Specific conductance: Maximum daily, 3,520 micromhos Aug. 14, 1944; minimum daily, 656 micromhos Oct. 16, 1945.
REMARKS.--Dashes omitted in potassium (K) column indicate sodium (Na) plus potassium (K) are calculated. Values reported for dissolved solids concentrations less than 1,000 ppm are residues at 180°C and for concentrations more than 1,000 ppm are calculated from determined constituents unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for gaging station near Colbert, Okla. for water year October 1959 to September 1960 given in WSP 1711. No appreciable inflow between dam and gaging station except during periods of heavy local rains.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1-31, 1959...	15990	10		108	29	250	6.1	116		255	405	0.4	1.5		1120	1.52	48350	388	290	5.5	1940	7.5
Nov. 1-30.....	2600	9.6		102	29	243		117		264	375	--	1.0		1080	1.47	7580	374	274	5.5	1830	7.6
Dec. 1-31.....	6739	8.8		99	27	219		114		247	342	.3	1.2		1000	1.36	18200	358	262	5.0	1720	7.5
Jan. 1-31, 1960...	7904	9.6		94	22	210		122		222	318	.4	.8		962	1.31	20530	325	220	5.1	1570	7.5
Feb. 1-29.....	7468	8.8		89	22	198		124		220	290	.3	4.2		929	1.26	18730	312	209	4.9	1510	7.4
Mar. 1-31.....	4149	8.6		94	22	198		134		211	300	.5	1.2		971	1.32	10880	325	210	4.8	1560	7.5
Apr. 1-30.....	3216	7.8		96	28	185		145		214	292	.4	1.8		932	1.27	8090	354	231	4.3	1550	7.6
May 1-31.....	2703	8.6		99	25	187		155		223	280	.3	1.0		900	1.22	6570	350	218	4.3	1530	7.5
June 1-30.....	3575	11		100	28	188		160		222	290	.3	1.5		971	1.32	9370	364	229	4.3	1560	7.4
July 1-31.....	3785	10		106	29	220		153		243	342	.3	1.5		1030	1.40	10530	384	255	4.9	1740	7.7
Aug. 1-31.....	2217	11		110	30	243		157		256	375	.4	1.5		1100	1.50	6580	398	267	5.3	1840	7.5
Sept. 1-30.....	1930	12		113	28	264		153		266	400	.6	2.5		1160	1.58	6040	397	270	5.8	1960	7.5
Weighted average	--	9.6		101	26	221		129		238	343	0.4	1.7		1020	1.38	14340	359	249	5.1	1710	7.5
Time-weighted average	5203	9.7		101	27	217		138		237	334	0.4	1.6		1010	--	--	361	245	5.0	1690	7.5
Tons per day....	--	134		1410	370	3100		1820		3340	4810	5.5	23		--	--	--	--	--	--	--	--

RED RIVER BASIN--Continued

7-3316. RED RIVER AT DENISON DAM, NEAR DENISON, TEX.--Continued

Temperature (°F) of water, water year October 1959 to September 1960

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

RED RIVER BASIN--Continued

7-3325. BLUE RIVER NEAR BLUE, OKLA.

LOCATION.--At gaging station at bridge on U.S. Highway 70, 1 mile west of Blue, Bryan County, 7 miles east of Durant, and 7.7 miles upstream from Caddo Creek.
DRAINAGE AREA.--476 square miles.
RECORDS AVAILABLE.--Chemical analyses: November 1959 to September 1960.
Water temperatures: November 1959 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 317 ppm Nov. 20-30; minimum, 183 ppm Sept. 27-30.
Hardness: Maximum, 300 ppm Nov. 20-30; minimum, 160 ppm Sept. 27-30.
Specific conductance: Maximum daily, 547 micromhos Nov. 30; minimum daily, 194 micromhos May 21.
Water temperatures: Maximum, 85°F July 4, Aug. 5, 8; minimum, 35°F Mar. 3.
REMARKS.--Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, November 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Nov. 12-19, 1959..	58.4	12	0.03	47	18	9.8	4.0	228	0	9.1	6.0	0.3	2.2	0.12	a 221	0.30	34.8	192	5	0.3	371	8.2
Nov. 20-30.....	52.7	14	.02	65	34	9.8	3.8	326	12	9.1	6.8	.1	1.8	.16	a 317	.43	45.1	300	13	.2	534	8.4
Dec. 1-10.....	49.8	--	--	61	35	5.3	--	330	10	9.1	7.0	--	1.4	--	314	.43	42.2	296	9	.1	518	8.4
Dec. 11-20.....	692	10	.02	48	21	9.3	2.6	238	0	12	6.1	.3	2.8	.10	a 229	.31	428	208	13	.3	396	8.2
Dec. 21-31.....	215	14	.04	54	16	9.8	2.4	226	0	18	8.4	.1	1.7	.13	240	.33	139	200	15	.3	395	8.2
Jan. 1-10, 1960...	454	12	.04	48	14	9.8	2.2	200	0	20	7.1	.3	1.8	.19	a 213	.29	261	176	12	.3	359	7.9
Jan. 11-31.....	406	--	--	42	14	3.7	--	176	0	16	6.2	--	1.4	--	185	.25	203	162	18	.1	318	8.1
Feb. 1-10.....	698	13	.01	51	16	10	1.8	204	6	17	8.0	.2	2.5	.07	228	.31	430	192	15	.3	376	8.4
Feb. 11-29.....	200	--	--	67	26	4.4	--	304	0	19	9.3	--	1.9	--	289	.39	156	274	25	.1	503	8.2
Mar. 1-20.....	183	13	.00	61	21	13	1.4	260	4	23	11	.1	1.6	.17	287	.39	142	240	20	.4	475	8.4
Mar. 21-23.....	115	--	--	56	27	7.4	--	254	14	19	9.8	--	.6	--	a 259	.35	80.4	250	18	.2	468	8.5
Mar. 24-31.....	961	--	--	48	14	5.1	--	184	2	21	6.4	--	1.8	--	201	.27	522	176	22	.2	350	8.3
Apr. 1-20.....	138	9.6	.00	61	24	10	1.5	276	8	20	13	.1	1.0	.00	288	.39	107	250	10	.3	487	8.3
Apr. 21-30.....	102	--	--	56	28	12	--	284	8	19	11	--	1.7	--	281	.38	77.4	256	10	.3	487	8.4
May 1-20.....	411	13	.00	44	16	5.4	2.2	204	0	14	7.4	.1	2.5	.12	211	.29	234	174	7	.2	355	7.4
May 21-31.....	470	--	--	54	15	4.8	--	228	0	9.1	6.0	--	2.0	--	221	.30	280	196	9	.2	375	8.1
June 1-20.....	126	14	.00	58	22	7.2	2.1	276	0	12	7.6	.1	2.3	.20	a 262	.36	89.1	236	10	.2	443	8.1
June 21-30.....	69.6	13	.00	49	30	8.8	1.9	268	18	7.6	10	.0	1.3	.30	a 271	.37	50.9	246	0	.2	457	8.8
July 1-20.....	84.5	13	.00	45	26	6.8	2.2	240	8	9.9	5.6	.1	2.0	.48	a 237	.32	54.1	220	10	.2	398	8.4
July 21-31.....	221	14	.00	38	20	5.6	2.7	200	2	7.8	4.6	.3	2.0	.39	a 195	.27	116	176	8	.2	318	8.3

Aug. 1-10.....	59.5	16	.00	54	25	6.7	2.8	272	2	8.6	5.3	.1	1.3	.34	a 256	.35	41.1	236	10	.2	423	8.3
Aug. 11-20.....	52.6	13	.00	48	30	6.1	1.9	290	0	8.6	5.3	.1	1.2	.26	a 252	.34	35.8	244	6	.2	438	8.2
Aug. 21-31.....	96.6	10	.00	37	22	5.0	2.0	216	0	9.5	4.5	.3	1.9	.30	a 198	.27	51.6	182	5	.2	334	8.0
Sept. 1-10.....	44.0	16	.00	43	26	6.2	2.0	248	6	5.8	4.3	.1	1.3	.29	239	.33	28.4	216	3	.2	393	8.5
Sept. 11-26.....	42.9	16	.00	46	31	7.2	1.7	278	8	5.8	5.3	.0	1.1	.22	a 259	.35	30.0	244	2	.2	436	8.4
Sept. 27-30.....	174	--	--	32	19	5.8	--	194	0	6.6	3.8	--	1.4	--	183	.25	86.0	160	1	.2	310	8.1
Weighted average b.....	231	--	--	50	19	5.3	--	228	--	15	7.3	--	2.0	--	228	0.31	142	203	16	0.2	387	--

a Calculated from determined constituents.
b Represents 82 percent of flow for water year.

Temperature (°F) of water, November 1959 to September 1960

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

RED RIVER BASIN--Continued

7-3415. RED RIVER AT FULTON, ARK.

LOCATION.--At gaging station at bridge on U.S. Highway 67 at Fulton, Miller County, 0.3 mile downstream from Missouri Pacific Railroad bridge, 2.5 miles downstream from Little River, and at mile 463.0.
DRAINAGE AREA.--52,380 square miles, of which 5,936 square miles probably are noncontributing.
RECORDS AVAILABLE.--Chemical analyses: October 1946 to September 1947, October 1952 to September 1960.
Water temperatures: October 1946 to September 1947, October 1952 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 1,000 ppm Sept. 21-30; minimum, 71 ppm May 12-13.
Hardness: Maximum, 344 ppm Oct. 1-5; minimum, 44 ppm May 12-13.
Specific conductance: Maximum daily, 1,650 micromhos Sept. 23; minimum daily, 104 micromhos May 27.
Water temperatures: Maximum, 85°F July 12-14, Aug. 5-10; minimum, 38°F Jan. 24, 25.
EXTREMES, 1946-47, 1952-60.--Dissolved solids: Maximum, 1,380 ppm Sept. 21-30, 1956; minimum, 54 ppm Nov. 1-3, 1954, Dec. 11-16, 1956.
Hardness: Maximum, 468 ppm Sept. 21-30, 1956; minimum, 17 ppm Dec. 11-16, 1956.
Specific conductance: Maximum daily, 2,210 micromhos Oct. 5, 1956; minimum daily, 49 micromhos Mar. 8, 1953.
Water temperatures: Maximum, 88°F July 30, 1955; minimum, 35°F Dec. 23, 24, 26, 1953, Dec. 16, 1955.
REMARKS.--Records of specific conductance of daily samples available in district office at Little Rock, Ark. Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$		Specific conductance (micromhos at 25°C)	pH	Color
														Calcium, magnesium	Noncarbonate			
Oct. 1-5, 1959.....	4,392	7.5	0.00	100	23	181	7.0	132	214	300	0.3	2.2	998	344	236	1,550	7.7	7
Oct. 6, 8.....	29,300	--	--	45	11	62	4.1	89	88	95	--	1.1	409	158	84	607	6.8	6
Oct. 7, 9-10.....	42,100	--	--	34	6.2	35	3.5	82	49	52	--	1.5	242	110	44	382	8.0	7
Oct. 11-16.....	5750	6.0	.04	88	17	152	6.6	104	181	245	.3	2.8	844	290	204	1,320	7.3	6
Oct. 17-18.....	48,850	--	--	62	15	105	5.6	92	139	170	--	.5	633	216	140	927	8.0	5
Oct. 19-20.....	28,100	--	--	76	18	132	6.6	96	178	210	--	1.5	807	264	185	1,130	7.7	5
Oct. 21-25.....	16,650	6.2	.00	90	20	196	7.0	98	206	280	.2	2.1	944	306	226	1,460	7.4	8
Oct. 26-31.....	5,300	5.8	.00	75	17	132	5.6	104	154	215	.2	2.1	732	257	172	1,140	7.5	9
Nov. 1-4.....	4,200	3.2	.01	72	22	135	4.1	128	165	205	.0	.1	740	270	165	1,140	7.0	7
Nov. 5-7.....	13,940	--	--	60	13	86	5.5	105	111	140	--	.6	542	203	117	829	7.5	7
Nov. 8.....	20,900	--	--	35	11	48	4.6	92	69	70	--	1.0	338	132	57	468	7.8	6
Nov. 9-11.....	16,070	--	--	19	9.0	29	3.7	70	34	40	--	1.1	239	84	27	326	7.4	6
Nov. 12-13.....	11,900	--	--	47	8.1	55	5.0	88	73	90	--	1.2	400	151	79	557	7.9	5
Nov. 14-15.....	9,450	--	--	58	15	96	6.1	92	129	145	--	.7	566	206	130	849	8.0	5
Nov. 16-24.....	7,211	1.8	.07	72	18	126	5.3	110	145	202	.0	.1	741	254	164	1,130	6.9	7
Nov. 25-30.....	3,553	1.8	.01	69	12	100	3.8	139	111	158	.0	.2	604	222	108	959	7.0	6
Dec. 1-10.....	2,960	1.4	.02	73	20	108	5.3	173	124	160	.0	.0	651	264	122	989	7.9	7
Dec. 11-12.....	5,640	--	--	69	18	80	6.6	a166	121	120	--	.8	592	246	113	814	8.3	5

Dec. 13-16	34,240	5.0	.01	22	4.2	21	1.6	65	23	30	.0	.0	165	72	19	276	7.3	6
Dec. 17-18	51,900	--	--	35	6.5	40	3.3	80	51	60	--	1.0	308	114	48	414	7.9	6
Dec. 20-24	65,160	3.6	.00	18	3.2	13	1.6	54	18	18	.0	.3	110	58	14	189	7.6	6
Dec. 25-26	51,400	--	--	22	4.6	29	3.3	48	38	41	--	.6	230	74	34	287	7.7	5
Dec. 27-31	35,580	4.5	.01	41	8.8	65	3.6	68	93	95	.0	.0	392	138	83	601	7.4	7
Jan. 1-6, 1960	27,400	2.7	.01	41	9.2	60	3.4	73	74	100	.0	.1	385	140	82	590	6.7	7
Jan. 7-9	34,900	--	--	36	8.0	46	4.0	76	63	72	--	1.1	315	123	60	490	7.2	6
Jan. 10-13	36,900	--	--	28	6.6	33	3.1	65	45	47	--	1.5	218	97	44	358	7.2	6
Jan. 14-24	45,530	6.4	.01	21	4.2	22	1.3	53	30	32	.0	.1	174	70	26	267	7.5	7
Jan. 25-26	23,350	--	--	36	7.0	45	8.6	65	65	75	--	1.4	329	119	66	492	7.1	6
Jan. 27-31	17,140	3.6	.01	55	13	90	4.2	89	116	138	.0	.2	510	190	118	785	7.0	6
Feb. 1-4	15,420	3.6	.01	61	14	101	3.8	99	132	152	.0	.0	580	210	128	891	7.4	7
Feb. 5-7	34,200	--	--	48	12	60	4.7	90	83	105	--	1.0	447	170	96	676	7.5	5
Feb. 8-13	32,470	4.5	.00	32	5.9	36	2.6	71	49	54	.0	.1	256	104	46	400	7.2	7
Feb. 14-20	17,630	3.1	.01	52	12	86	3.9	89	106	135	.0	.1	493	179	106	769	7.4	7
Feb. 21	18,000	--	--	46	9.3	57	4.4	80	79	95	--	2.2	b332	153	88	574	8.0	6
Feb. 22-29	17,600	3.2	.00	36	5.7	41	2.4	73	53	62	.0	.1	282	114	54	439	6.8	6
Mar. 1-3	17,430	--	--	33	8.1	40	3.3	71	55	62	--	1.0	291	116	58	445	7.8	6
Mar. 4-8	21,260	2.8	.00	29	6.0	34	2.1	63	45	51	.0	.0	241	97	46	366	7.2	7
Mar. 9-13	14,740	4.6	.00	35	7.5	47	2.4	72	58	72	.0	.1	310	118	60	472	7.0	7
Mar. 14-15	14,450	--	--	38	10	56	4.4	76	77	88	--	1.2	364	136	74	563	7.5	5
Mar. 16-23	17,720	3.5	.01	27	5.0	32	1.9	56	42	49	.0	.1	222	88	42	346	7.0	7
Mar. 24-28	9,948	12	.00	34	7.9	40	2.6	84	48	62	.2	1.2	297	118	48	418	7.7	7
Mar. 29	23,800	--	--	44	12	58	3.9	100	73	95	--	1.4	b336	160	78	599	8.2	5
Mar. 30-31	20,400	--	--	29	6.9	26	4.1	80	39	39	--	2.0	225	101	36	341	8.0	5
Apr. 1-4	11,490	11	.00	26	4.9	22	2.1	74	27	32	.2	2.0	188	85	24	275	7.1	20
Apr. 5-6	7,965	--	--	39	11	47	3.6	104	65	71	--	1.3	335	142	58	491	7.4	10
Apr. 7-11	6,272	12	.00	53	12	65	3.9	120	78	100	.2	1.3	489	182	83	661	7.8	5
Apr. 12-18	6,524	8.6	.00	62	17	92	4.5	136	110	145	.3	1.2	617	224	113	866	7.7	5
Apr. 19-20	8,890	--	--	50	17	73	4.6	112	76	112	--	1.6	464	195	103	701	7.7	8

a Includes equivalent of 2 ppm carbonate (CO_3).
b Calculated from determined constituents.

RED RIVER BASIN--Continued

7-3415. RED RIVER AT FULTON, ARK.--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$		Specific conductance (micromhos at 25°C)	pH	Color
														Calcium, magnesium	Noncarbonate			
Apr. 21-23, 1960....	7,297	--	--	40	10	55	3.8	92	60	85	--	1.3	348	141	66	546	7.4	5
Apr. 24-25.....	7,700	--	--	37	3.9	33	2.6	84	42	52	--	1.6	228	108	40	365	7.9	10
Apr. 26.....	7,490	--	--	42	10	49	3.4	128	52	68	--	2.6	290	146	41	465	8.2	5
Apr. 27-30.....	6,912	8.1	0.00	46	13	62	3.8	100	77	105	0.3	1.0	443	168	86	645	7.4	5
May 1.....	7,280	--	--	49	9.0	58	3.6	108	67	90	--	3.8	b333	160	71	574	8.0	5
May 2.....	10,100	--	--	25	4.0	26	2.1	74	26	35	--	2.5	b157	79	18	263	7.8	5
May 3-4.....	10,130	--	--	28	6.9	37	2.5	60	49	59	--	1.6	223	98	50	385	7.6	10
May 5-6.....	8,495	--	--	37	8.3	49	2.8	78	67	70	--	1.6	298	126	62	489	7.6	8
May 7.....	15,400	--	--	15	3.5	16	1.3	50	17	22	--	1.5	b101	52	11	167	7.6	10
May 8-9.....	37,100	--	--	27	5.6	23	2.2	80	28	33	--	3.4	169	90	25	290	7.8	15
May 10-11.....	38,750	--	--	18	3.5	14	1.9	52	21	19	--	2.0	116	60	17	192	7.5	40
May 12-13.....	24,750	--	--	13	2.7	9.2	1.8	40	14	13	--	2.0	71	44	10	131	7.5	45
May 14-17.....	10,140	9.0	.00	22	3.9	14	2.2	68	19	20	.2	1.5	156	71	16	226	7.5	33
May 18-21.....	5,940	9.5	.00	34	8.0	34	2.8	92	42	54	.3	1.6	278	118	42	394	7.9	10
May 22-25.....	52,250	6.3	.03	22	3.8	15	1.9	64	18	22	.3	1.6	150	70	18	214	7.5	37
May 26-31.....	65,530	6.8	.16	16	2.1	7.5	2.2	48	11	11	.3	1.7	119	48	9	138	7.0	--
June 1-2.....	26,550	--	--	21	3.7	16	2.5	60	23	24	--	1.7	134	68	18	215	7.6	38
June 3-4.....	15,550	--	--	25	5.0	24	2.7	66	34	35	--	2.0	181	83	29	281	7.3	23
June 5.....	11,600	--	--	40	6.6	41	3.6	94	54	62	--	1.7	b255	127	50	438	7.9	10
June 6-11.....	7,062	9.5	.00	59	9.5	62	5.8	120	86	100	.4	1.7	496	186	88	652	7.6	15
June 12-14.....	4,980	--	--	65	14	79	4.4	142	112	120	--	1.2	563	220	103	807	7.9	10
June 15-16.....	6,465	--	--	61	14	62	4.6	162	89	90	--	1.5	466	210	76	701	8.2	10
June 17-19.....	5,913	--	--	81	21	116	6.5	152	166	185	--	1.7	777	288	164	1,110	7.8	10
June 20-21.....	4,305	--	--	69	17	95	5.4	150	127	145	--	2.1	597	242	119	920	8.1	10
June 22-28.....	6,401	8.8	.00	82	19	116	6.7	154	138	190	.4	2.5	740	282	156	1,080	6.7	7
June 29-30.....	18,650	--	--	31	6.1	40	3.0	56	59	66	--	3.5	282	102	56	435	7.5	10
July 1.....	14,600	--	--	27	6.6	40	2.9	60	48	60	--	3.2	222	94	46	353	7.2	5
July 2.....	9,560	--	--	39	9.5	57	3.4	80	71	85	--	5.4	346	136	71	497	7.3	5
July 3-4.....	6,860	--	--	50	12	71	3.8	104	90	105	--	2.1	440	174	90	693	7.4	5
July 5.....	6,230	--	--	60	18	92	4.0	128	114	140	--	2.4	538	224	118	811	7.5	5

July 6-12	6,233	7.9	.00	66	16	100	5.2	124	118	160	.3	2.5	661	230	129	934	8.0	10
July 13-22	5,463	7.9	.00	84	21	134	6.1	136	159	220	.5	3.0	876	296	184	1,210	7.9	5
July 23-24	3,750	--	--	75	22	122	4.5	152	150	185	--	2.0	714	278	153	1,100	7.6	5
July 25	6,440	--	--	94	26	155	5.3	188	189	230	--	3.1	926	342	188	1,300	7.7	5
July 26-27	21,550	--	--	50	10	74	3.7	88	89	115	--	1.6	451	166	94	701	7.4	5
July 28-29	35,400	--	--	33	5.9	43	2.7	68	52	65	--	2.0	259	107	52	424	7.3	10
July 30-31	24,550	--	--	20	4.0	20	2.0	60	23	26	--	2.5	144	66	18	228	7.2	10
Aug. 1-3	11,130	--	--	34	6.6	48	3.1	68	61	70	--	1.8	295	112	56	469	7.4	10
Aug. 4-5	5,635	--	--	41	10	67	3.6	82	82	100	--	1.5	393	144	76	628	7.4	5
Aug. 6-9	5,048	13	.00	62	15	100	4.9	120	113	155	.3	2.8	669	216	118	912	7.7	5
Aug. 10-20	4,011	13	.00	95	18	154	6.3	156	168	240	.4	2.3	895	311	183	1,300	8.0	5
Aug. 21-23	4,743	--	--	67	18	93	4.5	160	113	140	--	1.2	582	241	110	911	7.8	5
Aug. 24	11,000	--	--	25	6.6	38	2.1	80	35	50	--	2.8	250	90	24	339	7.6	5
Aug. 25-26	13,200	--	--	41	9.5	65	3.3	82	78	95	--	1.3	375	142	74	609	7.4	5
Aug. 27-30	7,835	--	--	21	4.5	28	2.2	60	30	38	--	3.8	192	71	22	280	7.3	20
Aug. 31	6,650	--	--	48	14	68	3.9	156	69	90	--	4.6	442	178	50	675	7.8	5
Sept. 1-8	4,498	9.5	.00	66	16	109	5.8	124	122	170	.4	2.9	644	230	129	976	7.9	5
Sept. 9-20	2,969	10	.00	106	18	168	8.0	164	191	265	.4	2.7	969	338	204	1,430	7.3	5
Sept. 21-30	3,993	--	--	96	22	172	6.8	156	204	260	--	1.4	1,000	330	202	1,460	8.2	5
Weighted average..	17,080	--	--	40	8.6	55	3.4	79	69	86	--	1.1	357	135	71	540	7.3	9
Time-weighted average	--	--	--	53	12	79	4.2	102	96	123	--	1.4	494	182	99	737	7.3	8
Tons per day	--	--	--	1,846	395	2,550	157	3,640	3,200	3,950	--	52	16,500	6,230	3,250	--	--	420

b Calculated from determined constituents.

Temperature (°F) of water, water year October 1959 to September 1960

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

7-3425. SOUTH SULPHUR RIVER NEAR COOPER, TEX.

LOCATION.--At gaging station on left bank of cut channel at downstream side of pile bent of bridge on State Highway 154, 0.6 mile downstream from Big Creek, 1.0 mile upstream from Brushy Creek, 3.5 miles downstream from Doctors Creek, and 5.7 miles southeast of Cooper, Delta County.
DRAINAGE AREA.--527 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1958 to September 1960.
Water temperatures: October 1958 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 1,120 ppm Nov. 1; minimum, 85 ppm July 25.
Hardness: Maximum, 326 ppm Apr. 21-30; minimum, 48 ppm July 25.
Specific conductance: Maximum daily, 2,040 micromhos Nov. 1; minimum daily, 136 micromhos June 26.
Water temperatures: Maximum, 97°F Aug. 6; minimum, 40°F Mar. 2, 4.
EXTREMES, 1958-60.--Dissolved solids: Maximum, 1,120 ppm Nov. 1, 1959; minimum, 85 ppm July 25, 1960.
Hardness: Maximum, 326 ppm Apr. 21-30, 1960; minimum, 48 ppm July 25, 1960.
Specific conductance: Maximum daily, 2,040 micromhos Nov. 1, 1959; minimum daily, 136 micromhos June 26, 1960.
Water temperatures: Maximum, 97°F Aug. 6, 1960; minimum, 40°F Mar. 2, 4, 1960.
REMARKS.--Dashes omitted in potassium (K) column indicate sodium (Na) plus potassium (K) are calculated. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1-10, 1959...	943	13		26	2.8	12	4.4	93		17	6.8	0.4	3.0		131	0.18	334	76	0	0.6	214	7.2
Oct. 11-20.....	121	16		34	3.5	20		123		23	12	.4	1.2		170	.23	55.5	99	0	.9	283	7.3
Oct. 21-31.....	1.6	13		44	4.5	23		160		27	12	.4	.5		a222	.30	.94	128	0	.9	341	7.4
Nov. 1.....	19.0	16		88	9.1	328		182		36	555	--	2.2		1120	1.52	57.5	257	106	8.9	2040	8.2
Nov. 2-3.....	13.8	18		46	5.5	48		175		27	48	.3	.8		280	.38	10.3	137	0	1.8	477	8.2
Nov. 4-7.....	2204	11		22	2.7	14		82		16	7.0	.2	2.0		115	.16	684	66	0	.7	195	7.3
Nov. 8-14.....	31.1	13		40	4.4	23		145		23	16	.2	1.5		192	.26	16.0	118	0	.9	328	7.6
Nov. 15-30.....	8.8	14		66	6.5	52		229		49	46	.2	.8		a365	.50	8.66	191	2	1.6	595	7.4
Dec. 1-11.....	2.5	16		80	8.7	46		289		46	35	.3	.8		a398	.54	2.67	236	0	1.3	625	7.9
Dec. 12.....	39.0	--		--	--			188		--	164	--	--		--	--	--	169	11	--	913	8.2
Dec. 13-15.....	293	13		50	5.7	39		168		34	38	.4	6.0		269	.37	213	148	7	1.4	455	8.0
Dec. 16-18.....	8920	10		21	1.5	13		70		15	6.0	.4	4.5		105	.14	2530	59	0	.7	171	7.0
Dec. 19-31.....	486	13		47	4.9	28		155		37	22	.4	2.2		a249	.34	327	137	8	1.0	381	7.0
Jan.1-5,17-19,1960	1160	9.4		28	3.5	14		97		20	7.5	.4	2.2		133	.18	417	84	0	.7	230	7.3
Jan. 6-9.....	3396	9.4		19	2.4	12		75		13	4.0	.6	1.0		98	.13	890	57	0	.7	164	7.4
Jan. 10-16.....	241	10		46	5.5	28		158		38	18	.4	2.2		a237	.32	154	137	5	1.0	386	7.5
Jan. 20-31.....	38.8	13		68	8.1	37		235		44	30	.3	2.2		a325	.44	34.0	203	7	1.1	540	7.6
Feb. 1-3.....	42.0	11		97	11	80		323		72	84	.5	1.5		516	.70	58.5	287	20	2.1	879	7.9
Feb. 4-7.....	1653	11		30	3.4	17		102		26	8.5	.5	3.2		150	.20	669	89	1	.8	252	7.6
Feb. 8-23.....	43.7	8.8		75	8.8	43		251		61	32	.4	2.2		a372	.51	43.8	223	14	1.3	604	7.7

Feb. 24-29.....	146	7.8		42	5.5	31		137		46	23	.4	.8		224	.30	88.2	127	13	1.2	384	7.4
Mar. 1-7.....	336	9.6		36	4.3	22		118		36	14	.3	1.5		182	.25	165	108	8	.9	309	7.2
Mar. 8-14.....	37.9	9.6		64	7.9	45		210		61	37	.3	1.5		a336	.46	34.3	192	18	1.4	551	7.3
Mar. 15-19.....	312	9.2		42	5.2	26		130		46	18	.4	1.5		212	.29	179	126	19	1.0	358	7.4
Mar. 20-31.....	106	9.0		60	7.1	39		188		62	31	.3	1.5		a322	.44	92.1	178	21	1.3	511	7.3
Apr. 1-10.....	8.1	9.2		76	9.2	48	3.7	251		71	41	.5	.8		a389	.53	8.50	228	19	1.4	628	8.0
Apr. 11-20.....	4.0	9.8		94	12	65		326		76	55	.5	.5		a480	.65	5.17	284	13	1.7	784	7.9
Apr. 21-30.....	101	9.0		109	13	80		370		88	74	.5	.2		a561	.76	153	326	22	1.9	912	7.7
May 1-3, 6-8.....	1154	8.0		28	2.4	15		96		18	7.0	.5	3.8		130	.18	405	80	0	.7	217	7.0
May 4-5, 9-12.....	86.7	12		42	4.3	19		143		26	12	.4	3.0		a196	.27	45.8	122	2	.7	321	7.4
May 13-25.....	4.2	12		68	7.3	38		238		35	35	.4	1.5		a318	.43	3.59	200	0	1.2	532	7.7
May 25-31.....	89.5	8.2		35	2.7	24		120		26	15	.5	4.0		a184	.25	44.5	98	0	1.1	298	7.1
June 1-12.....	196	12		34	2.2	18		113		19	10	.6	6.9		a160	.22	84.6	94	0	.8	272	6.8
June 13-14, 26-28.	1728	11		22	2.1	10		74		13	5.0	.4	4.2		104	.14	485	64	0	.5	180	6.6
June 15-25, 29-30.	41.1	12		42	4.2	19		144		24	12	.5	2.2		a194	.26	21.5	122	2	.7	325	7.0
July 1-4.....	10.0	23		36	3.8	18		132		16	12	.4	3.5		178	.24	4.79	105	0	.8	266	7.7
July 5-6, 16-17...	933	11		23	2.2	10		80		12	4.5	.5	3.5		106	.14	267	66	0	.5	174	7.0
July 7-15, 18-24..	70.4	13		36	3.6	16		129		17	9.5	.4	1.8		a175	.24	33.2	105	0	.7	265	7.3
July 25.....	489	--		--	--			62		--	4.2	--	--		85	.12	112	48	0	--	139	6.8
July 26-31.....	83.2	9.0		21	2.5	10		73		12	7.2	.4	2.0		100	.14	22.5	63	0	.5	174	6.6
Aug. 1-11.....	1.7	14		29	3.2	15		108		14	8.8	.4	1.2		139	.19	.62	86	0	.7	229	7.1
Aug. 12-22.....	50.7	13		32	3.3	27		119		27	17	.6	2.0		a197	.27	27.0	93	0	1.2	302	7.3
Aug. 23-31.....	27.6	10		31	2.8	19		112		20	11	.5	1.8		151	.21	11.2	89	0	.9	258	7.0
Sept. 1-12.....	.1	15		42	4.4	24		155		25	14	.5	1.2		202	.27	.04	123	0	.9	345	7.2
Sept. 13-26.....	b10.5	13		45	5.0	38		164		33	30	.5	3.8		a265	.36	7.50	133	0	1.4	422	7.3
Sept. 27-30.....	961	13		28	2.8	21		106		20	10	.6	4.8		152	.21	394	81	0	1.0	255	7.1
Weighted average	--	11		28	2.9	17		98		21	9.7	0.4	3.1		143	0.19	131	83	2	0.8	236	7.1
Time-weighted average.....	340	12		49	5.4	31		169		35	25	0.4	2.1		250	--	--	144	5	1.1	410	7.2
Tons per day....	--	9.7		26	2.7	15		90		19	8.8	0.4	2.8		--	--	--	--	--	--	--	--

a Residue at 180°C.
b Includes days of less than 0.05 cfs.

RED RIVER BASIN--Continued

7-3425. SOUTH SULPHUR RIVER NEAR COOPER, TEX.--Continued

Temperature (F°) of water, water year October 1959 to September 1960

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

7-3444. RED RIVER NEAR HOSSTON, LA.

LOCATION.--At gaging station in second pier from right abutment of bridge on State Highway 2, 1.8 miles downstream from Dry Bayou and 3.2 miles east of Hosston, Caddo Parish.
DRAINAGE AREA.--57,041 square miles, of which 5,936 square miles above Denison Dam is noncontributing.
RECORDS AVAILABLE.--Chemical analyses: March 1957 to September 1960.
Water temperatures: March 1957 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 932 ppm Sept. 18-27; minimum, 171 ppm May 25 to June 2.
Hardness: Maximum, 364 ppm Sept. 18-27; minimum, 89 ppm Dec. 21-25.
Specific conductance: Maximum daily, 1,730 micromhos Oct. 3; minimum daily, 166 micromhos May 27-28.
Water temperatures: Maximum, 89°F Sept. 7; minimum, 40°F Jan. 23.
EXTREMES, 1957-60.--Dissolved solids: Maximum, 965 ppm Aug. 22-31, 1959; minimum, 121 ppm Feb. 16-28, 1959.
Hardness: Maximum, 364 ppm Sept. 18-27, 1960; minimum, 68 ppm Feb. 16-28, 1959.
Specific conductance: Maximum daily, 1,760 micromhos Aug. 28, 1959; minimum daily, 165 micromhos Feb. 20, 1959.
Water temperatures: Maximum, 90°F Sept. 3, 4, 1958; minimum, 40°F Feb. 17, 1958, Jan. 9, 23, 1959, Jan. 23, 1960.
REMARKS.--Records of specific conductance of daily samples available in district office at Baton Rouge, La. Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Oct. 1-8, 1959....	8800	11	0.03	88	26	192	4.4	144		214	290	0.5	0.5		908	1.23	21570	328	207	4.6	1480	7.7	10
Oct. 10-12.....	43300	9.1	.08	40	6.6	50	2.7	88		59	72	.3	1.0		292	.40	34140	127	53	1.9	488	7.5	40
Oct. 13-20.....	47600	10	.02	60	29	150	4.3	103		176	240	.4	.4		753	1.02	96780	267	181	4.0	1240	7.1	10
Oct. 21-31.....	15100	12	.05	67	26	161	4.7	106		180	260	.5	.4		789	1.07	32170	273	183	4.2	1340	7.5	10
Nov. 1-8.....	8450	12	.04	60	23	122	4.4	132		128	193	.5	.1		748	1.02	17070	243	132	3.4	1080	7.7	10
Nov. 9-15.....	17100	9.8	.14	37	6.5	46	3.1	92		52	68	.3	.7		284	.39	13110	119	40	1.8	477	7.3	50
Nov. 16-24.....	10600	11	.00	57	16	109	4.3	110		132	160	.5	.4		546	.74	15630	206	115	3.3	929	7.5	20
Nov. 25-30.....	4430	13	.02	63	23	113	4.7	135		131	185	.4	.6		655	.89	7830	250	135	3.1	1080	7.7	5
Dec. 1-14.....	4150	13	.08	63	23	92	3.8	178		102	145	.4	.5		576	.78	6450	252	104	2.5	959	7.9	10
Dec. 15-20.....	44400	9.9	.11	31	4.6	29	2.7	79		36	42	.4	.9		208	.28	24940	96	30	1.3	337	7.3	40
Dec. 21-25.....	62200	10	.18	30	3.5	19	2.8	75		28	28	.4	1.1		182	.25	30570	89	24	.9	272	7.4	50
Dec. 26-31.....	42600	11	.05	47	8.0	68	3.3	79		83	106	.7	.6		380	.52	43710	150	80	2.4	642	7.7	20
Jan. 1-11, 1960...	40200	10	.08	42	6.9	58	3.1	77		72	88	.8	.7		337	.46	36580	133	67	2.2	559	7.4	30
Jan. 12-20.....	59800	10	.16	32	4.7	32	2.7	75		41	48	.7	.4		226	.31	36490	99	34	1.4	368	7.5	60
Jan. 21-27.....	47400	11	.16	32	4.4	34	2.6	68		43	52	.4	.4		232	.32	29690	98	39	1.5	371	7.5	50
Jan. 28-Feb. 8....	32100	9.4	.08	47	8.5	68	3.1	83		80	107	.4	.4		384	.52	33280	152	82	2.4	647	7.6	20
Feb. 9-15.....	38500	9.6	.17	34	5.4	39	2.6	73		51	58	.4	.8		254	.35	26400	107	45	1.6	410	7.6	50
Feb. 16-23.....	26600	9.8	.08	48	8.4	72	2.9	82		86	112	.5	.7		404	.55	29020	154	83	2.5	668	7.7	30
Feb. 25-Mar. 13...	26700	11	.13	36	6.9	46	2.6	82		59	68	.1	.8		284	.39	20470	118	48	1.8	469	7.5	40
Mar. 14-17.....	24300	11	.09	42	8.3	58	2.7	89		66	90	.2	.6		349	.47	22900	139	62	2.1	580	7.5	20

RED RIVER BASIN--Continued

7-3444. RED RIVER NEAR HOSSTON, LA.--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Mar. 18-28, 1960..	21800	8.8	0.09	36	6.9	44	2.2	86		54	66	0.2	0.6		278	0.38	16360	118	45	1.8	465	7.3	30
Mar. 29-31.....	24300	11	.02	49	10	60	2.3	116		76	94	.2	.7		368	.50	24140	164	65	2.0	614	7.7	15
Apr. 1-7.....	15500	10	.09	34	7.6	30	2.1	96		46	42	.1	1.1		226	.31	9460	116	36	1.2	367	7.5	40
Apr. 8-14.....	7900	13	.01	54	17	71	2.8	150		85	108	.4	.6		440	.60	9390	204	77	2.2	725	7.8	10
Apr. 15-20.....	6600	12	.01	66	24	103	3.4	170		119	160	.3	.4		605	.82	10780	261	121	2.8	987	7.9	10
Apr. 21-28.....	7100	11	.02	52	16	71	2.6	137		83	112	.4	.4		427	.58	8190	194	78	2.2	715	7.6	15
Apr. 29-May 9.....	12800	13	.00	56	14	51	3.1	131		74	120	.5	.7		472	.64	16310	199	88	1.6	763	7.6	10
May 10-18.....	26900	11	.14	28	4.9	19	2.7	82		22	28	.2	1.0		179	.24	13000	90	18	.9	306	7.4	60
May 19-24.....	19000	13	.04	41	7.7	37	2.8	110		40	55	.5	.8		271	.37	13900	134	40	1.4	439	7.4	20
May 25-June 2.....	60200	12	.29	27	5.8	14	2.8	84		27	18	.2	.9		171	.23	27790	91	21	.6	300	7.2	100
June 3-7.....	20700	13	.08	34	5.2	29	3.0	89		36	42	.5	.9		227	.31	12690	106	32	1.2	355	7.3	40
June 8-16.....	9600	12	.01	52	12	61	3.8	129		76	92	.5	.7		411	.56	10650	180	69	2.0	658	7.6	10
June 20-22.....	8200	12	.03	61	31	106	5.6	157		136	171	.7	.4		651	.89	14410	279	146	2.8	1060	7.5	10
June 23-25.....	7500	11	.01	55	24	70	4.7	165		89	114	.8	.3		494	.67	10000	234	95	2.0	805	7.6	10
June 26-30.....	10500	12	.00	54	36	99	5.5	162		126	167	.7	.2		653	.89	18510	281	147	2.6	1030	7.8	10
July 1-5.....	15600	12	.02	40	11	52	3.4	88		61	82	.5	.6		335	.46	14110	145	68	1.9	547	7.5	20
July 16-26.....	10000	10	.00	66	17	94	3.3	143		109	152	.6	.4		578	.79	15610	236	118	2.7	929	7.5	20
July 27-29.....	25200	14	.00	57	15	86	3.0	118		96	136	.5	.7		500	.68	34020	202	103	2.6	813	7.2	20
July 30-Aug. 3....	25700	14	.12	28	5.4	32	2.1	74		33	47	.3	.4		222	.30	15400	92	29	1.5	356	6.8	40
Aug. 4-10.....	8300	13	.03	58	8.1	77	2.7	108		85	117	.4	.1		448	.61	10040	178	87	2.5	719	7.4	20
Aug. 11-20.....	5700	12	.02	87	23	133	4.3	164		157	223	.5	.1		779	1.06	11990	312	176	3.3	1250	7.6	10
Aug. 21-23.....	4500	13	.05	90	15	113	3.7	176		131	190	.4	.2		691	.94	8400	286	141	2.9	1120	7.7	10
Aug. 24-25,27-28..	10700	11	.02	66	12	87	2.9	133		91	136	.4	.1		512	.70	14790	212	101	2.6	835	7.5	10
Aug. 26, 29-31, Sept. 1-2.....	9600	10	.08	28	8.8	40	2.0	84		40	58	.2	.2		269	.37	6970	106	36	1.7	419	7.2	30
Sept. 3-10.....	5100	10	.02	70	17	108	3.3	143		116	172	4	.2		612	.83	8430	244	123	3.0	996	7.5	10
Sept. 11-17.....	4100	11	.01	109	18	163	4.3	188		167	257	5	.1		861	1.17	9530	344	186	3.8	1400	7.8	10
Sept. 18-27.....	3600	10	.01	56	55	171	3.5	200		189	272	6	.1		932	1.27	9060	364	196	3.9	1500	7.2	10
Sept. 28-30.....	7400	9.3	.07	76	23	146	3.7	151		148	224	6	.1		764	1.04	15260	282	156	3.8	1230	7.6	10
Weighted average	--	11	0.10	43	10	59	3.0	94		72	92	0.4	0.6		361	0.49	20400	148	69	2.0	593	7.4	38
Time-weighted average.....	21000	11	0.06	51	15	78	3.3	115		91	124	0.4	0.5		464	--	--	188	91	2.4	757	7.5	26
Tons per day....	--	610	5.80	2410	578	3350	172	5290		4050	5220	24	36		--	--	--	--	--	--	--	--	--

RED RIVER BASIN--Continued

7-3444. RED RIVER NEAR HOSSTON, LA.--Continued

Temperature (°F) of water, water year October 1959 to September 1960

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

RED RIVER BASIN--Continued

7-3470. KELLY BAYOU NEAR HOSSTON, LA.

LOCATION.--At bridge on U.S. Highway 71, 0.4 mile downstream from Willow Lake lateral, 2.0 miles south of Hosston, and 2.7 miles upstream from mouth.
RECORDS AVAILABLE.--Chemical analyses: October 1959 to September 1960.
REMARKS.--Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 29, 1959.....	4.6	17	0.02	67	51	105	2.8	417		44	150	0.6	1.2		645	0.88	8.0	376	34	2.3	1,130	7.6
Nov. 24.....	11	26	.03	49	24	161	3.7	217		34	266	.5	.4		680	.92	20	221	43	4.7	1,210	7.2
Dec. 23.....	84	15	.22	13	3.3	37	2.2	37		15	58	.1	.2		167	.23	38	46	16	2.3	274	6.7
Jan. 28, 1960.....	89	14	.39	16	4.2	29	1.6	52		16	46	.1	.2		a154	.21	37	57	14	1.7	256	6.9
Feb. 26.....	272	10	.23	8.5	2.1	10	1.5	25		6.6	18	.1	.4		a69	.09	51	30	10	.8	117	6.7
Mar. 29.....	68	12	.30	20	6.9	31	1.6	76		13	53	.2	.8		194	.25	34	78	16	1.5	326	7.4
Apr. 28.....	20	76	.02	48	18	108	2.7	202		26	167	.4	.2		500	.68	27	192	26	3.4	877	7.5
May 24.....	14	15	.05	55	22	99	3.5	224		23	165	.5	.8		515	.70	19	226	42	2.9	906	6.9
June 28.....	20	16	.03	45	14	101	2.7	165		20	165	.5	.3		487	.66	26	170	35	3.4	836	7.1
July 27.....	5.0	18	.02	105	37	163	4.3	476		48	241	.9	.2		956	1.3	13	412	22	3.5	1,580	7.4
Aug. 30.....	15	14	.03	65	39	83	3.6	345		40	129	.7	.8		580	.79	23	322	39	2.0	982	7.5
Sept. 27.....	21	13	.05	51	22	84	3.0	202		29	144	.4	.8		502	.68	28	218	52	2.5	857	7.0

a Calculated from determined constituents.

7-3555. RED RIVER AT ALEXANDRIA, LA.

LOCATION.--At gaging station near center of span on downstream side of old bridge on U.S. Highway 165 between Alexandria and Pineville, Rapides Parish, 1.7 milee downetream from Bayou Rigolette.
DRAINAGE AREA.--67,500 square miles, of which 5,936 square miles above Denison Dam is noncontributing.
RECORDS AVAILABLE.--Chemical analyses: October 1952 to September 1960.
Water temperatures: October 1952 to September 1960.
EXTREMES, 1959-60.--Diseolved solids: Maximum, 871 ppm Oct. 1-10; minimum, 175 ppm May 21-31.
Hardnees: Maximum, 332 ppm Oct. 1-10; minimum, 85 ppm May 12-20.
Specific conductance: Maximum daily, 1,560 micromhos Oct. 8-10; minimum daily, 189 micromhos May 30.
Water temperatures: Maximum, 91°F July 29; minimum, 44°F Jan. 25, 28.
EXTREMES, 1952-60.--Dissolved solids: Maximum, 1,130 ppm Oct. 1, 3-20, 1956; minimum, 91 ppm June 1-9, 1953.
Hardness: Maximum, 464 ppm Oct. 11-20, 1956; minimum, 57 ppm June 1-9, 1953.
Specific conductance: Maximum daily, 2,020 micromhoe Oct. 8, 1956; minimum daily, 133 micromhos June 24, 1953.
Water temperatures: Maximum, 93°F Aug. 2, 8, 10, 1956; minimum, 43°F Jan. 7, 1958.
REMARKS.--Records of specific conductance of daily samples available in district office at Baton Rouge, La. Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Oct. 1-10, 1959.	6040	12	0.00	87	28	161	4.3	211		152	260	0.5	1.3		871	1.18	4200	33	157	3.8	1440	8.1	10
Oct. 11-13.....	38500	8.6	.06	44	7.9	55	2.5	105		63	80	.4	.6		315	.43	32740	142	54	2.0	531	7.5	10
Oct. 14-23.....	51700	9.5	.00	62	23	147	3.8	103		168	228	.5	.8		716	.97	99950	248	161	4.1	1210	7.7	10
Oct. 24-31.....	18500	11	.00	73	21	166	4.4	103		180	258	.5	.6		805	1.09	40210	268	181	4.4	1330	7.5	10
Nov. 1-10.....	8770	12	.00	71	18	141	3.8	123		153	218	.5	.6		700	.95	16580	252	149	3.9	1180	7.6	10
Nov. 11-20.....	17700	9.9	.00	41	9.7	74	3.1	98		83	101	.5	.5		374	.51	17870	142	60	2.7	620	7.3	20
Nov. 21-30.....	11000	12	.04	61	12	115	2.5	121		108	174	.6	.2		552	.75	16390	202	101	3.5	925	7.6	20
Dec. 1-13.....	5830	13	.03	65	18	125	2.5	176		117	175	.6	.5		613	.83	9650	238	91	3.5	998	7.8	20
Dec. 14-23.....	44240	11	.13	35	5.5	47	2.7	98		42	66	.5	.8		259	.35	30940	110	25	1.9	440	7.5	50
Dec. 24-28.....	76720	11	.16	32	4.7	37	2.2	84		32	57	.2	.8		235	.32	48680	99	26	1.6	385	7.7	60
Dec. 30-31.....	53300	12	.06	45	--	--	--	80		--	120	.3	--		--	--	--	141	75	--	660	7.6	--
Jan. 1-13, 1960.	53060	11	.06	39	6.5	58	3.0	61		53	94	.3	.6		327	.44	46850	124	54	2.3	564	7.6	40
Jan. 14-30.....	65760	11	.15	32	4.4	40	2.2	78		40	59	.2	.2		242	.33	42970	96	31	1.8	393	7.6	60
Jan. 31, Feb. 1-20	48650	9.3	.16	35	6.0	49	3.0	74		48	79	.2	.6		293	.40	38490	112	49	2.0	487	7.5	60
Feb. 21-24.....	47780	10	.10	35	7.2	58	3.0	72		60	69	.2	.9		314	.43	40510	117	56	2.3	523	7.4	50
Feb. 25-Mar. 26.	52200	8.8	.23	28	4.9	39	2.4	65		39	61	.1	.8		236	.32	33540	90	32	1.8	386	7.2	70
Mar. 27-Apr. 1																							
Apr. 6-11.....	22260	11	.16	31	5.3	32	2.3	79		34	52	.1	.5		229	.31	13760	99	30	1.4	359	6.8	50
Apr. 3-5, 12-20.	16240	11	.03	47	9.2	54	3.8	114		56	68	.1	.4		342	.47	15000	155	57	1.9	568	7.2	30
Apr. 21-28.....	11080	10	.03	63	17	83	3.1	152		89	138	.4	.3		519	.71	15530	226	101	2.4	846	7.5	20
Apr. 29-May 11..	14180	16	.02	51	11	74	1.7	128		81	102	.6	.4		408	.55	15620	171	65	2.5	664	7.8	10

RED RIVER BASIN--Continued

7-3555. RED RIVER AT ALEXANDRIA, LA.--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
May 12-20, 1960.	27400	14	0.15	30	2.5	24	0.8	77		28	32	0.4	0.3		191	0.26	14130	85	17	1.1	282	7.2	50
May 21-31.....	39740	12	.09	26	4.9	16	1.7	80		24	23	.6	.8		175	.24	18780	90	19	.7	269	6.9	30
June 1-9.....	34880	13	.08	31	5.0	24	2.0	68		31	34	.3	.6		200	.27	16840	98	23	1.1	313	7.2	40
June 10-14.....	13040	14	.03	28	14	41	1.6	102		49	58	.4	.6		268	.36	9440	126	41	1.6	450	7.4	20
June 15-24.....	9810	12	.00	62	13	69	2.2	150		74	114	.4	.4		448	.61	11870	208	82	2.1	744	7.6	20
June 25-30.....	9190	12	.00	64	21	78	3.0	170		93	132	.6	.1		521	.71	12930	244	101	2.2	877	7.6	20
July 1-10.....	13580	10	.00	48	10	55	1.9	104		61	94	.5	.1		366	.50	13420	161	75	1.9	609	7.2	20
July 11-20.....	10900	9.5	.00	60	14	72	2.3	134		82	122	.5	.1		430	.56	12650	208	95	2.2	781	7.3	20
July 21-Aug. 1..	14000	12	.00	69	17	94	3.3	146		105	154	.7	.2		587	.80	22190	241	121	2.6	940	7.7	20
Aug. 2-10.....	17740	10	.02	40	8.1	41	1.7	104		44	66	.5	.4		281	.38	13460	133	45	1.5	469	6.8	20
Aug. 11-20.....	5380	11	.00	58	11	78	3.0	124		76	132	.5	.7		474	.64	6890	191	68	2.5	779	7.5	20
Aug. 21-29.....	6520	11	.00	69	19	102	3.9	152		102	182	.6	.1		626	.85	11020	252	126	2.8	1020	7.7	20
Aug. 30-31, Sept. 1-10....	9780	11	.02	47	9.5	60	2.4	113		55	98	.3	.2		369	.50	9740	156	62	2.1	617	7.4	20
Sept. 11-20.....	4980	11	.00	57	28	105	3.1	176		97	180	.6	.2		638	.87	8560	259	111	2.8	1030	7.5	20
Sept. 21-30.....	4520	12	.04	82	25	152	1.2	192		145	232	.7	1.2		808	1.10	9860	309	148	3.8	1280	7.8	20
Weighted average.....	--	11	0.11	40	8.3	57	2.6	90		59	89	0.3	0.6		333	0.45	23800	133	55	2.1	551	7.3	44
Time-weighted average.....	26700	11	0.06	49	12	73	2.7	113		75	115	0.4	0.5		420	--	--	169	74	2.3	691	7.3	32
Tons per day..	--	767	7.90	2850	593	4100	185	6520		4250	6420	23	41		--	--	--	--	--	--	--	--	--

RED RIVER BASIN--Continued

7-3555. RED RIVER AT ALEXANDRIA, LA.--Continued

Temperature (°F) of water, water year October 1959 to September 1960

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

RED RIVER BASIN--Continued

7-3600. OUACHITA RIVER AT ARKADELPHIA, ARK.

LOCATION.--At gaging station at bridge on State Highway 8, at Arkadelphia, Clark County, 800 feet upstream from Missouri Pacific Railroad bridge.
DRAINAGE AREA.--2,311 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1948 to September 1960.
Water temperatures: October 1948 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 54 ppm Oct. 1-2; minimum, 26 ppm Dec. 17-23.
Hardness: Maximum, 40 ppm Oct. 1-2; minimum, 16 ppm Dec. 17-23.
Specific conductance: Maximum daily, 127 micromhos Oct. 2; minimum daily, 38 micromhos Dec. 19, June 27-29.
Water temperatures: Maximum, 84°F July 15, 16; minimum, 35°F Jan. 7, 19, 20.
EXTREMES, 1948-60.--Dissolved solids: Maximum, 266 ppm Jan. 16, 1956; minimum, 26 ppm Dec. 17-23, 1959.
Hardness: Maximum, 77 ppm June 20, 1957; minimum, 11 ppm Jan. 25-31, 1949.
Specific conductance: Maximum daily, 390 micromhos Jan. 16, 1956; minimum daily, 27 micromhos Jan. 27, 1949.
Water temperatures: Maximum, 99°F July 7, 1955; minimum, 35°F Jan. 7, 19, 20, 1960.
REMARKS.--Records of specific conductance of daily samples available in district office at Little Rock, Ark. Records of discharge for water year October 1959 to September 1960 furnished by District Office, Corps of Engineers, Vicksburg, Miss.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue (calculated)	Hardness as $CaCO_3$		Specific conductance (micromhos at 25°C)	pH	Color
														Calcium, magnesium	Noncarbonate			
Oct. 1-2, 1959.....	2,490	--	--	9.5	4.0	3.5	1.1	26	8.6	13	--	1.7	54	40	18	104	6.5	5
Oct. 3-10.....	1,960	3.8	0.00	8.6	2.5	2.5	.9	28	9.2	2.5	0.0	.8	45	32	9	72	7.1	5
Oct. 11-20.....	1,773	--	--	8.3	2.0	2.8	1.0	31	5.2	3.8	--	1.1	39	28	3	72	6.8	5
Oct. 21-31.....	1,382	--	--	6.9	2.6	2.7	.9	30	5.4	3.5	--	1.0	38	28	3	69	6.8	5
Nov. 1-10.....	1,618	3.5	.04	8.3	2.6	3.1	1.1	29	7.0	3.5	.0	.7	44	31	7	71	7.1	5
Nov. 11-20.....	2,240	--	--	7.0	2.3	2.5	1.1	29	6.8	3.0	--	.8	38	27	3	68	6.8	8
Nov. 21-30.....	1,427	--	--	7.0	2.8	2.7	1.0	29	6.2	3.8	--	.8	38	29	5	69	6.7	6
Dec. 1-10.....	1,212	3.2	.03	8.7	1.5	3.4	.9	29	7.2	4.0	.0	1.0	44	28	4	74	7.0	5
Dec. 11-16.....	6,615	--	--	6.4	2.1	2.5	1.1	24	6.4	3.5	--	1.5	36	24	5	64	6.9	12
Dec. 17-23.....	13,000	--	--	4.3	1.5	1.8	1.2	14	6.8	2.5	--	1.3	26	16	5	46	6.6	35
Dec. 24-31.....	4,642	--	--	5.2	2.3	2.3	1.0	21	6.2	2.5	--	1.8	31	22	6	58	6.7	18
Jan. 1-10, 1960.....	4,877	2.3	.00	5.6	1.4	2.7	1.0	22	5.0	3.0	.1	.7	33	20	2	70	6.2	8
Jan. 11-20.....	8,049	--	--	5.1	1.3	2.7	1.2	18	6.8	2.5	--	1.5	30	18	3	50	6.3	23
Jan. 21-31.....	4,360	--	--	6.2	.9	2.7	1.2	20	7.0	2.5	--	1.3	32	19	2	53	7.0	15
Feb. 1-10.....	5,519	2.7	.00	5.0	1.8	2.5	.7	20	4.2	2.5	.2	.2	30	20	4	64	7.3	8
Feb. 11-20.....	4,228	--	--	5.8	2.2	2.5	.9	22	5.6	3.5	--	1.2	33	24	6	56	7.0	13
Feb. 21-29.....	4,702	--	--	6.1	1.4	2.7	.8	21	5.8	3.2	--	2.5	32	21	4	58	6.3	10
Mar. 1-10.....	5,119	.9	.00	5.8	1.8	2.6	.7	22	6.4	3.5	.0	.3	33	22	4	78	6.8	8
Mar. 11-20.....	6,010	--	--	5.1	2.0	3.2	.8	20	6.6	3.5	--	1.1	32	20	4	56	7.1	15
Mar. 21-31.....	3,341	--	--	6.5	1.8	3.0	.7	25	5.6	3.5	--	1.1	34	24	3	61	7.0	5

Apr. 1-10	1,655	3.2	.00	7.6	1.6	3.4	.9	28	5.4	4.5	.0	.2	41	26	2	80	7.5	8
Apr. 11-20	749	--	--	7.7	2.8	4.2	.8	28	9.2	5.5	--	.9	45	30	8	81	7.1	7
Apr. 21-30	644	--	--	8.6	2.4	4.0	.8	29	10	4.5	--	.8	45	32	8	81	7.1	13
May 1-7	1,835	1.4	.00	8.9	2.3	4.3	.9	30	9.4	5.0	.1	.5	48	32	7	98	7.4	7
May 8-11	3,702	--	--	6.2	2.5	2.8	.6	25	6.8	2.8	--	1.1	35	26	6	61	6.8	10
May 12-23	4,669	.9	.00	7.9	2.2	4.3	.9	24	10	5.5	.1	.8	45	28	9	95	7.4	7
May 24-31	7,564	2.2	.00	6.0	1.7	2.1	.9	20	4.6	2.5	.2	.5	31	22	6	70	6.9	7
June 1-10	3,378	3.6	.00	7.3	1.7	2.5	.8	29	2.8	3.5	.0	.8	37	25	1	69	7.0	5
June 11-20	1,679	--	--	7.7	2.0	2.8	.7	30	5.0	3.2	--	1.3	38	27	2	69	7.2	7
June 21-30	5,669	--	--	6.5	1.8	2.8	.8	25	4.4	3.5	--	1.2	33	24	3	62	6.9	5
July 1-10	2,437	5.0	.00	7.5	2.2	3.0	.9	27	6.0	3.2	.0	.9	42	28	6	71	7.0	6
July 11-20	2,190	--	--	7.5	2.0	3.2	.8	28	5.0	4.0	--	1.7	38	26	4	72	7.1	7
July 21-31	2,280	--	--	7.5	1.9	3.0	.7	30	4.2	2.8	--	1.9	37	26	2	69	7.2	7
Aug. 1-10	1,977	3.6	.00	7.7	1.8	3.8	.9	34	3.4	3.8	.0	.6	43	26	0	71	7.1	6
Aug. 11-20	2,299	--	--	7.5	1.7	2.6	.7	30	3.6	2.8	--	.7	34	26	1	66	7.2	8
Aug. 21-31	2,334	--	--	7.8	2.1	2.7	.7	30	6.6	3.0	--	1.0	39	28	4	69	7.2	7
Sept. 1-10	2,564	4.1	.00	6.9	1.7	2.1	.7	26	4.0	2.5	.2	1.1	36	24	2	60	6.4	0
Sept. 11-20	1,896	--	--	6.6	2.3	2.4	.7	28	4.6	2.5	--	1.5	35	26	3	66	7.2	0
Sept. 21-30	3,508	--	--	5.7	2.4	2.1	.7	25	5.6	2.0	--	1.2	32	24	4	61	7.2	0
Weighted average	3,423	--	--	6.3	1.9	2.7	0.9	23	5.9	3.2	--	1.1	35	23	4	65	6.7	11
Time-weighted average	--	--	--	6.9	2.0	2.9	0.9	26	6.0	3.4	--	1.0	37	25	4	68	6.8	8
Tons per day	--	--	--	58	17	25	8.3	217	55	30	--	10	320	215	39	--	--	100

Temperature (°F) of water, water year October 1959 to September 1960

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

RED RIVER BASIN--Continued

7-3610. LITTLE MISSOURI RIVER NEAR MURFREESBORO, ARK.

LOCATION.--At gaging station at bridge on State Highway 27, 1.9 miles downstream from Muddy Fork, 2 miles southwest of Murfreesboro, Pike County, 4.6 miles upstream from Prairie Creek, and 11.4 miles downstream from Lake Greeson.
DRAINAGE AREA.--380 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1958 to September 1960.
REMARKS.--Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$		Specific conductance (micromhos at 25°C)	pH	Color
														Calcium, magnesium	Noncarbonate			
Oct. 30, 1959.....	300			2.5	1.0	1.7	0.7	13	2.8	1.5		0.8	28	10	0	34	6.4	10
Nov. 30.....	28			--	--	2.3	.7	19	4.2	1.8		.2	36	16	1	45	6.8	5
Jan. 4, 1960.....	1,400			4.5	1.2	1.7	.5	14	5.8	2.5		.6	34	16	4	42	6.3	13
Jan. 27.....	846			4.8	1.1	1.6	.3	15	5.6	2.0		.8	24	16	4	43	6.1	15
Feb. 1.....	274			7.5	1.4	2.3	.5	19	10	3.0		.6	44	24	9	66	6.4	17
Mar. 31.....	320			6.2	1.2	2.4	.8	20	7.2	2.8		.0	34	20	4	55	6.8	7
May 2.....	72			4.1	1.0	2.2	.6	18	3.6	1.5		.4	34	14	0	41	6.9	5
May 31.....	223			2.2	1.0	2.0	.6	15	1.6	1.5		.5	26	10	0	30	6.8	5
June 30.....	756			3.2	.8	2.2	.6	16	3.6	1.5		.5	28	12	0	35	6.9	5
Aug. 1.....	610			2.2	.9	2.0	.7	14	1.6	1.5		.6	20	9	0	29	6.8	5
Sept. 29.....	880			5.4	1.5	2.5	.8	18	8.4	2.5		.5	36	20	4	54	6.7	5

7-3622. SMACKOVER CREEK NEAR NORPHLET, ARK.

LOCATION.--At bridge on county road, 3.5 miles north of Norphlet, Union County.
DRAINAGE AREA.--500 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: October 1952 to September 1955, October 1959 to September 1960.
Water temperatures: October 1952 to September 1955, October 1959 to July 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 23,500 ppm July 19; minimum, 266 ppm Feb. 27-29.
Hardness: Maximum, 4,980 ppm July 19; minimum, 64 ppm Feb. 24.
Specific conductance: Maximum daily, 36,800 micromhos July 19; minimum daily, 569 micromhos Feb. 29.
Water temperatures: Maximum, not determined; minimum, freezing point Mar. 2.
EXTREMES, 1952-55, 1959-60.--Dissolved solids: Maximum, 73,000 ppm Sept. 1-4, 1954; minimum, 266 ppm Feb. 27-29, 1960.
Hardness: Maximum, 13,200 ppm Sept. 1-4, 1954; minimum, 44 ppm May 1-2, 1953.
Specific conductance: Maximum daily, 96,400 micromhos Sept. 4, 1954; minimum daily, 396 micromhos May 2, 1953.
Water temperatures: Maximum, 102°F July 18, 24, 26, Aug. 17, 1954; minimum, freezing point Mar. 2, 1960.
REMARKS.--Records of specific conductance of daily samples available in district office at Little Rock, Ark. No discharge records available for this station.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue (calculated)	Hardness as $CaCO_3$		Specific conductance (micromhos at 25°C)	pH	Color
														Calcium, magnesium	Noncarbonate			
Oct. 1-2, 1959				1,260	337	6,310	110	28	1.0	13,000			21,000	4,530	4,510	34,300	7.3	
Oct. 3-4				1,040	318	5,350	187	22	1.0	11,200			18,100	3,900	3,880	29,000	6.8	
Oct. 5-11				681	226	3,880	40	6	5.0	7,740			12,600	2,630	2,620	21,600	5.9	
Oct. 12-13				925	252	4,600	66	4	2.0	9,510			15,400	3,340	3,340	27,600	5.4	
Oct. 14-16				310	47	1,270	28	4	3.0	2,620			4,280	977	964	7,960	5.1	
Oct. 17-18				422	92	1,810	43	3	5.0	3,850			6,220	1,430	1,430	12,600	5.0	
Oct. 19-20				583	183	2,990	70	3	7.0	6,260			10,100	2,210	2,200	17,200	5.0	
Oct. 21-26				785	219	3,940	90	0	10	8,260			13,300	2,860	2,860	22,900	4.3	
Oct. 27-31				938	265	5,040	66	2	4.0	10,300			16,600	3,400	3,400	27,200	5.1	
Nov. 1-2				1,000	319	5,330	104	44	5.0	10,900			17,700	3,810	3,770	28,900	7.0	
Nov. 3-4				657	193	3,280	64	2	8.0	6,890			11,100	2,430	2,430	18,600	4.9	
Nov. 5-6				363	130	1,890	38	3	13	4,030			6,470	1,440	1,440	12,000	5.4	
Nov. 7-10				527	160	2,670	55	3	4.0	5,500			8,920	1,970	1,970	15,700	5.2	
Nov. 11-13				707	207	3,680	71	4	5.0	7,520			12,200	2,620	2,610	21,200	5.3	
Nov. 14-16				494	85	2,240	37	2	10	4,580			7,450	1,580	1,580	13,700	5.0	
Nov. 17-19				517	127	2,610	45	6	7.0	5,270			8,580	1,810	1,810	15,200	5.5	
Nov. 20-30				692	250	3,810	69	2	8.0	7,930			12,700	2,750	2,750	19,900	5.0	
Dec. 1-11				763	249	4,070	39	1	4.0	8,320			13,400	2,930	2,930	21,200	4.6	
Dec. 12-14				214	74	1,120	22	0	13	2,350			3,790	838	838	7,350	4.5	
Dec. 15				246	93	1,560	34	0	13	3,120			5,070	996	996	9,570	4.5	
Dec. 16				132	48	698	17	0	10	1,450			2,360	527	527	4,340	4.5	

RED RIVER BASIN--Continued

7-3622. SMACKOVER CREEK NEAR NORPHLET, ARK.--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue (calculated)	Hardness as $CaCO_3$		Specific conductance (micromhos at 25°C)	pH	Color
														Calcium, magnesium	Noncarbonate			
Dec. 17, 1959.....				71	23	341	11	2	12	730			1,190	272	270	2,490	4.6	
Dec. 18-21.....				35	14	179	3.6	4	2.0	380			616	145	142	1,360	5.5	
Dec. 22-23.....				58	19	286	9.9	2	12	600			986	222	221	2,180	4.8	
Dec. 24-25.....				116	28	541	25	0	20	1,150			1,880	404	404	3,740	4.5	
Dec. 26.....				175	67	793	18	0	17	1,750			2,820	712	712	5,440	4.2	
Dec. 27.....				238	78	1,250	22	0	5.0	2,600			4,190	914	914	7,310	4.0	
Dec. 28.....				143	32	612	13	0	13	1,300			2,110	488	488	4,320	4.3	
Dec. 29-31.....				90	22	404	9.9	2	13	840			1,380	315	314	2,900	5.0	
Jan. 1-4, 1960.....				78	28	709	8.1	2	3.0	840			1,370	310	308	2,730	4.8	
Jan. 5.....				141	43	704	14	4	17	1,480			2,400	529	526	4,490	4.9	
Jan. 6-10.....				48	13	226	4.4	3	3.0	470			766	174	171	1,630	5.4	
Jan. 11-12.....				64	17	286	7.4	6	7.0	610			994	230	224	2,050	5.4	
Jan. 13-15.....				86	25	428	12	1	13	880			1,640	318	316	2,860	4.8	
Jan. 16-17.....				45	18	219	6.9	4	13	455			759	186	184	1,580	6.0	
Jan. 18-21.....				64	17	304	8.0	4	2.0	635			1,030	230	226	2,090	5.9	
Jan. 22.....				43	12	210	56	4	13	420			706	157	154	1,380	5.9	
Jan. 23-26.....				68	16	310	7.4	2	13	648			1,060	236	234	2,170	5.0	
Jan. 27-29.....				156	52	756	16	0	13	1,580			2,570	603	603	7,990	4.3	
Jan. 30-31.....				137	28	588	19	0	12	1,220			2,000	457	457	3,790	4.5	
Feb. 1-4.....				106	35	556	8.8	1	4.0	1,140			1,850	408	408	3,480	4.8	
Feb. 5.....				22	4.8	80	3.0	8	12	162			288	74	68	636	6.4	
Feb. 6-13.....				44	15	214	3.9	3	3.0	445			726	172	169	1,590	5.5	
Feb. 14-15.....				68	18	331	7.1	2	13	670			1,110	244	242	2,300	5.1	
Feb. 16-20.....				119	42	609	7.9	2	3.0	1,300			2,080	470	468	3,930	4.7	
Feb. 21-23.....				52	14	228	5.1	4	13	485			799	187	184	1,680	6.0	
Feb. 24.....				17	5.2	81	2.9	8	10	160			280	64	58	602	6.3	
Feb. 25-26.....				57	17	274	6.7	2	13	565			934	212	210	1,900	5.1	
Feb. 27-29.....				19	5.9	71	3.4	6	12	152			266	72	67	593	6.1	
Mar. 1-2.....				42	9.7	175	5.0	3	8.0	362			603	145	142	1,260	5.6	
Mar. 3.....				22	4.3	74	2.9	6	13	155			275	72	68	571	6.1	
Mar. 4-7.....				25	7.6	117	2.8	4	3.0	250			407	94	90	843	5.2	
Mar. 8-9.....				44	16	220	4.9	3	5.0	458			750	176	174	1,550	5.5	
Mar. 10-18.....				31	12	156	3.5	2	3.0	335			542	127	126	1,120	5.8	
Mar. 19-31.....				84	19	378	5.6	4	3.0	770			1,260	288	284	2,460	5.8	
Apr. 1.....				70	21	332	5.4	3	2.0	690			1,120	261	258	2,630	5.2	

Apr. 2-7	127	44	644	7.6	2	2.0	1,340		2,170	498	496	4,230	5.1
Apr. 8-17	170	50	900	3.4	4	3.0	1,850		2,980	630	626	5,560	5.1
Apr. 18-23	111	37	590	3.4	4	4.0	1,200		1,950	429	426	3,850	5.4
Apr. 24-30	175	84	990	13	2	4.0	2,080		3,540	782	780	6,180	4.7
May 1-5	191	52	1,070	22	2	3.0	2,150		3,490	690	689	6,490	7.9
May 6-10	48	19	256	6.1	2	4.0	545		879	198	196	1,950	5.3
May 11	1,190	291	5,750	99	9	4.0	11,800		19,100	4,170	4,160	30,300	5.9
May 12-13	67	22	309	7.1	1	3.0	650		1,060	258	256	2,300	5.1
May 14	1,230	295	5,760	89	10	3.0	12,000		19,400	4,280	4,280	30,200	6.0
May 15	274	78	1,370	26	2	4.0	2,850		4,600	1,000	1,000	8,680	4.8
May 16-17	1,280	272	5,110	75	14	3.0	11,200		18,000	4,310	4,300	31,700	6.4
May 18	403	132	2,150	13	3	3.0	4,380		7,080	1,550	1,550	12,600	5.0
May 19-27	1,220	309	5,660	88	10	4.0	11,900		19,200	4,310	4,310	32,000	6.3
May 28	64	17	303	4.4	6	6.0	620		1,020	230	230	2,470	6.2
May 29-30	1,320	262	5,670	63	11	4.0	11,900		19,200	4,370	4,360	32,000	6.3
May 31	298	105	1,540	19	0	4.0	3,200		5,170	1,180	1,180	9,720	4.4
June 1-2	1,180	342	5,670	75	11	6.0	12,000		19,300	4,350	4,340	32,200	6.5
June 3	349	74	1,550	23	3	3.0	3,250		5,250	1,180	1,170	9,810	4.7
June 4-5	1,200	318	5,710	89	10	2.0	11,800		19,100	4,300	4,290	31,500	6.3
June 6-7	435	116	2,120	49	4	6.0	4,330		7,060	1,560	1,560	13,200	5.0
June 8	1,180	310	5,670	120	10	2.0	11,800		19,100	4,220	4,210	30,300	6.3
June 9	294	81	1,360	13	0	2.0	2,850		4,600	1,070	1,070	8,620	4.2
June 10-30	995	343	5,190	93	16	2.0	10,900		17,500	3,890	3,890	28,700	6.5
July 1-11	1,020	296	5,230	118	4	7.0	10,900		17,600	3,760	3,760	26,100	5.7
July 12-13	1,210	384	6,750	174	16	5.0	13,800		22,300	4,600	4,580	34,900	6.4
July 14-15	636	230	3,670	81	1	4.0	7,520		12,100	2,530	2,530	20,400	5.1
July 16-17	1,170	304	6,260	140	13	5.0	12,800		20,700	4,170	4,160	32,100	6.3
July 18	809	277	4,300	123	5	8.0	8,700		14,200	3,160	3,150	24,700	5.9
July 19	1,350	392	7,110	161	22	5.0	14,500		23,500	4,980	4,960	36,800	6.4
July 20-31	1,140	370	6,010	136	14	5.0	12,600		20,300	4,370	4,350	32,800	6.3
Aug. 1-16	1,130	323	5,920	136	14	15	12,300		19,800	4,150	4,140	31,500	6.2
Aug. 17-18	414	136	2,290	69	3	7.0	4,800		7,780	1,740	1,740	14,200	5.4
Aug. 19-21	364	133	2,000	54	3	7.0	4,190		6,750	1,460	1,450	11,400	4.9
Aug. 22	692	254	3,990	54	0	4.0	8,130		13,100	2,770	2,770	20,300	4.4
Aug. 23-31	622	217	3,290	51	4	5.0	6,940		11,100	2,440	2,440	18,200	5.7

RED RIVER BASIN--Continued

7-3622. SMACKOVER CREEK NEAR NORPHLET, ARK.--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue (calculated)	Hardness as $CaCO_3$		Specific conductance (micromhos at 25°C)	pH	Color
														Calcium, magnesium	Noncarbonate			
Sept. 1-13, 1960....				582	236	3,300	57	6	7.0	6,900			11,100	2,420	2,420	18,200	5.8	
Sept. 14-15.....				214	78	1,110	31	2	10	2,350			3,790	854	853	6,920	4.7	
Sept. 16.....				786	278	4,250	75	2	4.0	8,910			14,300	3,100	3,100	21,800	4.9	
Sept. 17-18.....				214	74	1,100	32	3	3.0	2,300			3,720	838	838	7,130	4.7	
Sept. 19.....				841	249	4,450	77	18	7.0	9,100			14,700	3,120	3,110	21,900	6.5	
Sept. 20-29.....				238	62	1,120	34	1	5.0	2,350			3,810	849	848	7,080	4.6	
Sept. 30.....				679	149	3,290	77	2	5.0	6,660			10,900	2,310	2,300	16,900	4.8	
Time-weighted average.....				507	155	2,610	49	6	6.0	5,430			8,760	1,900	1,900	14,600	5.1	

Temperature (°F) of water, October 1959 to July 1960

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

RED RIVER BASIN--Continued

7-3625. MORO CREEK NEAR FORDYCE, ARK.

LOCATION.--At gaging station at bridge on State Highway 8, 1,100 feet upstream from Caney Creek, 4 miles southeast of Fordyce, Bradley County, and 12 miles upstream from White Water Creek.
DRAINAGE AREA.--216 square miles.
RECORDS AVAILABLE.--Chemical analyses: September 1957 to September 1960.
REMARKS.--Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (calculated)	Hardness as $CaCO_3$		Specific conductance (micromhos at 25°C)	pH	Color
														Calcium, magnesium	Noncarbonate			
Oct. 27, 1959.....	0.3			18	5.4	32	9.3	92	17	30		18	175	67	0	319	6.9	33
Nov. 24.....	1.9			8.3	3.3	8.7	6.5	49	6.2	9.0		1.5	68	34	0	114	7.0	45
Dec. 16.....	166			1.9	.9	2.3	3.1	7	7.0	3.0		.7	22	8	2	41	6.5	25
Jan. 12, 1960.....	426			3.3	.4	2.0	1.1	6	6.4	3.0		.8	20	10	4	36	6.4	40
Feb. 9.....	992			3.1	.6	1.6	1.1	8	5.8	2.0		.3	18	10	4	34	6.4	40
Mar. 15.....	1,400			2.9	.8	1.9	1.1	7	6.0	2.8		.6	20	10	5	36	6.3	25
Apr. 12.....	30			4.8	1.4	4.6	1.5	20	5.2	4.8		.3	32	18	2	60	6.3	22
May 10.....	370			4.0	.8	2.4	2.2	13	2.8	3.2		2.2	24	14	3	42	6.1	50
June 7.....	4.6			5.1	1.3	4.9	2.5	24	3.0	4.8		1.7	35	18	0	64	6.3	28
July 6.....	26			4.1	.7	2.1	1.9	14	4.6	2.2		.4	23	13	2	41	6.2	23
Sept. 20.....	.5			6.5	2.2	4.4	3.2	30	5.2	4.5		1.4	42	25	0	79	6.5	45

RED RIVER BASIN--Continued

7-3635. SALINE RIVER NEAR RYE, ARK.

LOCATION.--At gaging station at bridge on State Highway 15, 4 miles southwest of Rye, Cleveland County, and 5 miles upstream from Hudgin Creek.
DRAINAGE AREA.--2,062 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1946 to September 1947, October 1948 to September 1955, November 1957 to September 1960.
Water temperatures: October 1946 to September 1947, October 1948 to September 1955, October 1958 to September 1959.
EXTREMES, 1946-47, 1948-55, 1958-59.--Dissolved solids: Maximum, 186 ppm July 13-15, 1955; minimum, 18 ppm Jan. 11-14, 1950.
Hardness: Maximum, 77 ppm Jan. 24, 30, 1949; minimum, 8 ppm June 1-7, 9-10, 1947.
Specific conductance: Maximum daily, 534 micromhos Jan. 18, 1949; minimum daily, 20 micromhos June 24, 1947.
Water temperatures: Maximum, not determined; minimum, 35°F Jan. 6, 1959.
REMARKS.--Records of specific conductance of daily samples (1946-47, 1948-55, 1958-59) available in district office at Little Rock, Ark. Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$		Specific conductance (micromhos at 25°C)	pH	Color
														Calcium, magnesium	Noncarbonate			
Oct. 27, 1959.....	189			17	3.4	9.2	1.3	54	30	2.5		0.8	100	56	12	154	7.8	15
Nov. 24.....	491			14	3.6	7.1	2.2	40	28	4.0		.6	94	50	17	131	7.4	--
Dec. 17.....	2,920			6.0	2.1	3.6	2.3	17	17	2.5		.4	44	24	10	72	6.8	30
Jan. 13, 1960.....	3,920			6.8	1.8	3.8	1.2	18	15	3.0		.4	42	24	10	72	6.6	18
Feb. 10.....	4,670			5.5	1.5	2.9	.9	15	11	2.2		.3	38	20	7	58	6.6	22
Mar. 16.....	8,010			4.9	1.2	2.7	.8	13	11	2.2		.2	41	17	6	53	6.5	18
Apr. 12.....	743			8.9	3.0	6.0	.9	34	16	3.5		.2	59	34	6	105	6.9	5
May 10.....	2,920			8.3	1.0	5.5	1.9	31	9.0	2.2		1.2	44	24	0	82	6.8	40
June 7.....	711			9.3	2.2	4.8	1.0	36	10	2.5		.3	57	32	2	88	6.6	10
July 6.....	12,600			4.6	.8	2.2	2.6	15	6.0	2.0		1.4	27	15	2	45	6.4	60
Aug. 2.....	189			9.8	2.6	12	1.8	42	20	5.5		1.0	92	35	0	124	6.8	15
Aug. 30.....	80			5.4	1.5	4.9	1.1	24	11	1.5		.0	37	20	0	65	6.6	12
Sept. 21.....	73			9.2	2.8	13	.9	52	16	4.5		.0	91	34	0	136	6.9	10

7-3640.8. OUACHITA RIVER NEAR FELSENTHAL, ARK.

LOCATION.--At U.S. Engineers Lock No. 6, 3 miles south of Felsenthal, Union County.
DRAINAGE AREA.--10,787 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1949 to September 1960.
Water temperatures: October 1949 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 1,720 ppm Nov. 12-13; minimum, 100 ppm Mar. 14-15.
Hardness: Maximum, 324 ppm Oct. 20; minimum, 22 ppm Mar. 14-15.
Specific conductance: Maximum daily, 2,830 micromhos Nov. 13; minimum daily, 102 micromhos Mar. 14.
Water temperatures: Maximum, 90°F Sept. 1; minimum, 40°F Feb. 24, Mar. 2, 4-11.
EXTREMES, 1949-60.--Dissolved solids: Maximum, 2,730 ppm Jan. 27, 1957; minimum, 44 ppm Jan. 23-31, Mar. 1-9, 1950.
Hardness: Maximum, 522 ppm Jan. 27, 1957; minimum, 5 ppm May 8, 1956.
Specific conductance: Maximum daily, 7,610 micromhos Oct. 7, 1954; minimum daily, 44 micromhos May 19, 1958.
Water temperatures: Maximum, 96°F June 9, 1953, Aug. 29,1954; minimum, freezing point Feb. 8, 12, 13, 1958.
REMARKS.--Records of specific conductance of daily samples available in district office at Little Rock, Ark. No discharge records available for this station.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Specific conductance (micromhos at 25°C)	pH	Color
Oct. 1, 1959.....		--	--	33	16	152	5.1	20	5.8	330	--	4.1	796	148	132	1,130	6.8	6
Oct. 2-3.....		--	--	30	9.0	118	4.0	25	7.2	245	--	3.4	578	112	92	910	7.0	8
Oct. 4-10.....		4.6	0.00	22	5.1	71	3.0	30	8.8	142	0.3	3.6	349	76	52	572	6.7	4
Oct. 11-15.....		4.9	.00	33	6.8	120	3.6	25	10	235	.3	7.6	549	110	90	870	6.2	4
Oct. 16-17.....		--	--	46	10	194	5.7	22	13	380	--	6.9	868	156	142	1,360	6.8	5
Oct. 18-19.....		--	--	36	12	145	4.9	26	7.6	300	--	5.6	--	140	118	1,070	6.8	5
Oct. 20.....		--	--	82	29	346	7.2	6	9.2	765	--	6.3	--	324	318	2,520	6.0	5
Oct. 21.....		--	--	56	16	250	7.3	12	8.0	515	--	7.8	--	206	196	1,800	6.9	6
Oct. 22.....		--	--	42	9.0	150	5.1	22	8.4	310	--	5.7	684	142	124	1,100	6.6	5
Oct. 23-Nov. 1.....		5.4	.00	25	6.1	81	3.3	28	9.0	165	.2	4.8	402	88	64	643	6.6	8
Nov. 2-7.....		5.9	.00	34	7.5	133	4.3	24	9.4	265	.3	7.5	616	116	96	967	6.6	8
Nov. 8.....		--	--	34	6.4	98	3.5	22	8.0	210	--	5.4	--	112	94	781	7.0	5
Nov. 9-10.....		--	--	53	6.6	202	5.8	20	13	398	--	11	882	159	142	1,440	6.8	5
Nov. 11.....		--	--	39	9.7	159	5.1	22	15	315	--	6.9	784	138	120	1,160	6.8	6
Nov. 12-13.....		--	--	91	16	398	10	3	16	800	--	9.5	1,720	293	290	2,670	5.8	5
Nov. 14.....		--	--	58	14	266	7.6	7	13	528	--	15	1,300	202	196	1,850	6.2	6
Nov. 15.....		--	--	40	8.3	158	5.1	16	13	320	--	7.2	828	134	121	1,170	6.6	6
Nov. 16-19.....		4.8	.00	28	6.8	100	3.0	30	9.4	200	.0	5.2	494	98	74	719	6.8	8
Nov. 20-21.....		--	--	42	8.8	158	5.4	24	13	320	--	7.6	732	141	122	1,180	6.5	6
Nov. 22-23.....		--	--	54	15	228	6.5	16	13	470	--	5.9	1,070	196	183	1,640	6.8	5
Nov. 24-30.....		7.5	.00	30	7.0	101	5.5	34	12	202	.3	5.6	523	104	76	783	7.0	22

RED RIVER BASIN--Continued

7-3640.8. OUACHITA RIVER NEAR FELSENTHAL, ARK.--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$		Specific conductance (micromhos at 25°C)	pH	Color
														Calcium, magnesium	Noncarbonate			
Dec. 1-6, 1959.....		5.9	0.00	32	6.7	109	2.8	26	14	220	0.1	3.7	560	108	86	830	6.6	15
Dec. 7-10.....		--	--	41	12	163	5.4	24	14	330	--	6.7	792	152	132	1,210	6.7	5
Dec. 11-13.....		--	--	41	3.8	128	4.7	26	14	255	--	3.0	641	118	96	958	6.8	5
Dec. 14-15.....		--	--	49	8.3	181	5.6	22	12	365	--	5.0	897	156	138	1,320	6.8	7
Dec. 16, 18-19.....		--	--	22	4.6	75	4.2	24	12	150	--	1.1	392	74	54	581	7.0	5
Dec. 17, 20.....		--	--	15	2.4	40	3.0	20	12	79	--	.9	229	48	31	327	6.8	5
Dec. 21-23.....		--	--	7.2	2.0	17	2.1	14	7.6	32	--	1.5	134	26	14	155	6.0	30
Dec. 24-27.....		--	--	11	3.1	37	2.8	12	9.0	72	--	1.5	199	40	30	283	5.7	30
Dec. 28-31.....		--	--	9.1	2.0	24	2.4	12	8.4	47	--	1.6	158	30	20	201	6.4	70
Jan. 1-3, 1960.....		--	--	8.3	2.9	26	2.3	14	12	49	--	1.3	159	32	21	213	5.7	40
Jan. 4-10.....		5.8	.00	11	5.4	35	2.0	18	10	72	.1	1.4	243	50	34	308	6.8	23
Jan. 11-19.....		5.9	.00	9.9	3.8	26	1.1	16	10	54	.0	.6	184	40	27	234	6.0	25
Jan. 20-30.....		3.7	.00	8.5	3.3	23	1.2	16	11	42	.0	1.0	152	34	22	182	6.7	28
Jan. 31-Feb. 6.....		5.9	.00	11	3.5	36	1.4	14	12	68	.0	1.9	215	45	34	278	6.2	25
Feb. 7.....		--	--	17	5.1	64	4.8	20	9.4	115	--	3.3	--	64	47	446	6.6	33
Feb. 8-9.....		--	--	9.7	3.5	31	1.7	13	13	59	--	2.0	--	38	28	257	5.8	30
Feb. 10-15.....		3.8	.10	9.8	2.7	22	1.0	15	8.8	45	.0	1.7	182	36	23	208	6.5	65
Feb. 16-20.....		5.3	.04	12	4.8	34	1.3	14	9.6	71	.0	2.3	217	50	38	290	6.2	40
Feb. 21.....		--	--	15	4.6	54	1.6	14	15	105	--	5.1	--	56	45	411	6.5	18
Feb. 22-29.....		6.1	.03	11	4.6	32	1.2	16	9.4	65	.0	1.6	206	46	34	262	6.2	40
Mar. 1-7.....		5.0	.06	9.1	4.5	23	1.3	14	9.6	50	.0	1.4	178	41	30	214	6.5	35
Mar. 8-13.....		4.5	.00	6.9	3.7	19	.9	10	14	36	.0	1.4	143	32	24	159	6.6	29
Mar. 14-15.....		--	--	8.3	.5	11	.9	12	9.2	19	--	2.6	100	22	12	115	6.1	22
Mar. 16-27.....		4.2	.00	8.1	3.5	16	.9	16	8.6	35	.0	.9	140	34	22	161	6.5	25
Mar. 28-31.....		3.5	.00	9.2	3.7	23	1.0	14	7.8	49	.0	.8	171	38	26	208	6.5	28
Apr. 1-9.....		4.8	.00	13	5.5	39	1.6	16	17	79	.1	1.6	241	55	42	317	6.6	30
Apr. 10-16.....		5.8	.00	17	6.8	56	2.0	20	9.4	119	.1	1.5	301	70	54	458	6.7	20
Apr. 17-20.....		5.0	.00	26	8.6	95	2.1	20	9.8	200	.1	4.2	496	100	84	735	6.7	15
Apr. 21-23.....		--	--	32	7.2	132	3.2	38	11	250	--	4.9	598	110	78	889	6.5	10
Apr. 24.....		--	--	46	11	198	5.6	20	9.6	390	--	9.1	--	160	144	1,330	6.8	10
Apr. 25-26.....		--	--	29	9.0	130	3.3	16	11	265	--	5.3	557	110	96	953	6.6	15
Apr. 27.....		--	--	20	5.3	82	2.2	20	10	155	--	5.5	--	72	56	599	6.6	19
Apr. 28-30.....		--	--	14	3.7	52	2.3	16	11	98	--	2.3	210	50	37	400	6.8	37
May 1-2.....		--	--	16	3.2	55	2.4	18	11	105	--	2.3	310	53	38	421	6.6	45
May 3-4.....		--	--	17	4.8	65	2.7	18	13	128	--	2.9	344	62	47	496	6.6	40

May 5-6		--	--	26	4.3	94	5.2	16	9.6	190	--	3.4	429	82	70	665	7.1	13
May 7-9		--	--	31	5.9	118	4.5	18	9.2	240	--	3.2	609	102	87	858	6.7	15
May 10		--	--	23	5.0	84	3.4	22	8.2	165	--	4.0	--	78	60	591	7.3	15
May 11-18		5.3	0.00	12	5.1	33	1.8	16	10	70	0.1	2.7	208	57	38	308	6.6	30
May 19-21		--	--	11	3.1	30	2.3	20	12	54	--	1.9	170	40	24	270	7.2	25
May 22		--	--	17	4.8	57	2.9	24	10	110	--	4.2	--	62	42	430	7.1	20
May 23		--	--	26	6.6	100	4.7	24	8.8	200	--	3.4	--	92	72	717	7.2	15
May 24		--	--	49	11	211	7.2	20	9.6	420	--	8.6	--	168	151	1,440	6.8	8
May 25-31		6.2	.08	10	2.3	27	1.5	21	7.6	48	.1	2.6	154	34	18	211	7.2	25
June 1-4		5.4	.04	11	3.3	35	1.7	23	7.2	65	.2	3.2	183	41	22	271	6.9	15
June 5		--	--	16	4.0	50	2.6	32	7.6	95	--	2.2	--	56	30	416	7.3	20
June 6-8		--	--	20	5.6	74	3.4	30	8.6	145	--	3.1	387	73	48	553	7.1	20
June 9-13		6.0	.00	16	4.3	50	1.9	28	6.8	95	.2	3.6	268	58	34	385	7.3	5
June 14-20		6.5	.02	18	6.4	70	2.4	29	7.2	135	.1	3.8	353	72	48	530	7.4	5
June 21-25		7.8	.02	22	7.2	92	3.0	29	7.6	175	.2	4.7	464	84	60	657	7.0	5
June 26-27		--	--	35	9.3	146	5.1	0	9.6	305	--	15	732	126	126	1,070	3.9	3
June 28		--	--	33	8.6	116	4.2	68	7.8	215	--	4.0	--	118	62	843	7.9	3
June 29		--	--	23	5.8	75	3.0	40	7.8	145	--	4.2	--	82	48	587	7.7	5
June 30		--	--	51	11	202	6.6	30	8.2	410	--	6.8	--	172	148	1,410	7.3	5
July 1		--	--	43	11	187	6.1	6	8.0	385	--	14	--	152	148	1,340	6.6	5
July 2-10		6.5	.03	8.6	2.9	27	1.8	18	7.2	47	.3	4.0	150	34	18	217	6.9	15
July 11-13		--	--	13	3.0	36	2.4	21	10	68	--	2.5	188	45	28	313	6.2	25
July 14-15		--	--	13	3.1	38	2.5	20	8.8	70	--	4.6	184	45	28	303	6.4	25
July 16-22		6.9	.02	20	6.1	74	2.8	24	8.6	145	.3	4.4	400	75	56	561	6.6	5
July 23-28		5.9	.02	16	6.0	63	2.3	24	7.8	122	.2	4.0	325	64	45	485	6.9	5
July 29-31		--	--	27	6.5	100	3.6	24	7.6	200	--	3.4	488	94	74	754	6.5	10
Aug. 1-4		5.5	.00	20	6.6	80	2.6	27	7.2	155	.1	3.4	399	77	55	611	7.0	5
Aug. 5		--	--	30	9.0	124	4.3	28	7.6	250	--	3.6	--	112	89	890	6.8	8
Aug. 6-14		6.1	.02	19	7.2	80	2.6	23	6.4	160	.2	4.7	383	77	58	605	6.9	5
Aug. 15-16		--	--	32	14	157	4.5	22	3.0	330	--	5.5	690	138	120	1,160	6.7	5
Aug. 17-18		--	--	52	16	233	4.3	17	2.0	490	--	12	974	196	182	1,670	6.5	3
Aug. 19		--	--	42	14	191	4.3	19	2.0	395	--	5.7	836	162	147	1,410	6.4	10
Aug. 20		--	--	30	10	132	3.3	26	4.0	265	--	4.1	558	116	94	963	6.9	5
Aug. 21-28		6.0	.02	25	5.6	97	2.6	23	6.0	190	.3	3.6	460	86	66	694	6.7	5
Aug. 29-31		--	--	40	14	197	4.3	16	4.0	402	--	6.7	830	158	144	1,390	6.8	5

RED RIVER BASIN--Continued

7-3640.8. OUACHITA RIVER NEAR FELSENTHAL, ARK.--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$		Specific conductance (micromhos at 25°C)	pH	Color
														Calcium, magnesium	Noncarbonate			
Sept. 1-5, 1960.....		4.6	0.23	19	5.6	74	2.6	20	6.0	145	--	4.3	387	70	54	552	6.8	5
Sept. 6-7.....		--	--	24	12	105	1.9	33	3.0	215	--	4.6	452	110	82	763	7.3	5
Sept. 8.....		--	--	51	16	230	3.8	7	5.2	472	--	12	992	193	188	1,620	6.2	5
Sept. 9.....		--	--	33	8.6	128	3.0	27	4.0	260	--	4.9	590	118	96	959	6.8	5
Sept. 10.....		--	--	21	6.7	82	1.7	29	5.0	165	--	5.0	362	80	56	600	6.9	7
Sept. 11-14.....		4.6	.02	18	5.3	66	2.4	24	6.0	130	0.2	3.3	353	67	48	500	6.8	5
Sept. 15-17.....		--	--	24	6.9	95	2.3	21	11	185	--	6.9	440	94	76	671	6.7	5
Sept. 18.....		--	--	35	12	146	3.6	13	7.2	300	--	13	690	137	126	1,040	6.4	5
Sept. 19.....		--	--	46	17	224	3.6	17	5.0	460	--	12	1,010	185	171	1,510	6.5	5
Sept. 20-23.....		4.6	.00	33	10	147	3.9	10	7.0	295	.1	10	743	124	116	1,070	6.4	5
Sept. 24.....		--	--	27	7.4	106	4.1	26	5.0	210	--	5.5	418	98	76	748	6.8	5
Sept. 25-28.....		4.8	.02	19	5.5	73	2.5	24	6.0	145	.1	4.3	385	70	50	556	6.9	5
Sept. 29.....		--	--	33	8.8	128	2.7	16	3.0	260	--	14	528	118	106	880	7.0	10
Sept. 30.....		--	--	23	6.6	89	2.2	26	4.0	175	--	6.0	432	84	63	650	7.0	5
Time-weighted average.....		--	--	21	6.0	77	2.7	20	9.3	154	--	3.8	377	77	60	580	6.0	17

Temperature (°F) of water, water year October 1959 to September 1960

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

7-3641.5. BAYOU BARTHOLOMEW NEAR McGEHEE, ARK.

LOCATION.--At gaging station at bridge on State Highway 4, 2.7 miles west of McGehee, Desha County, and 17.5 miles downstream from Ables Creek.
DRAINAGE AREA.--592 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1959 to September 1960.
Water temperatures: October 1959 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 204 ppm Sept. 24-30; minimum, 32 ppm Mar. 15-29.
Hardness: Maximum, 123 ppm Sept. 24-30; minimum, 16 ppm Mar. 15-29.
Specific conductance: Maximum daily, 363 micromhos Nov. 3; minimum daily, 49 micromhos Mar. 18.
Water temperatures: Maximum, 89°F Aug. 7; minimum, 37°F Mar. 5.
REMARKS.--Records of specific conductance of daily samples available in district office at Little Rock, Ark. Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$		Specific conductance (micromhos at 25°C)	pH	Color
														Calcium, magnesium	Noncarbonate			
Oct. 1-8, 1959.....	164	11	0.02	22	7.8	13	4.0	115	5.8	15	0.1	1.8	152	87	0	225	7.6	9
Oct. 9-20.....	171	9.3	.23	16	5.6	8.9	3.8	78	7.4	11	.0	1.4	121	63	0	168	7.6	20
Oct. 21-31.....	147	8.2	.21	16	6.5	9.2	3.8	80	8.4	12	.1	1.8	122	66	1	178	7.2	20
Nov. 1-2, 4-10.....	86.2	12	.04	18	6.8	9.2	3.8	94	7.2	10	.0	2.0	134	73	0	188	7.6	10
Nov. 3.....	80.0	--	--	29	8.7	22	4.5	a166	8.4	10	--	1.7	166	108	0	363	8.6	--
Nov. 11-20.....	97.5	12	.05	22	6.0	10	3.0	107	5.6	9.0	.0	1.2	139	75	0	201	7.8	8
Nov. 21-30.....	117	11	.03	22	6.3	10	3.6	106	7.2	10	.1	.8	140	81	0	206	7.6	8
Dec. 1-10.....	93.8	11	.10	22	6.6	10	4.6	100	9.6	13	.0	.8	142	82	0	211	7.7	12
Dec. 11-17.....	115	11	.28	21	6.4	11	3.8	102	8.0	12	.0	1.4	136	79	0	201	7.7	20
Dec. 18-22.....	465	7.5	.32	11	4.4	8.0	4.0	54	10	9.0	.1	1.5	90	46	1	138	7.1	70
Dec. 23-31.....	979	5.5	.25	7.8	2.7	4.9	5.0	32	10	8.0	.0	1.4	68	30	4	94	7.4	110
Jan. 1-10, 1960.....	902	.9	.05	4.9	2.5	3.6	4.4	24	8.4	4.5	.2	.6	41	22	3	84	7.3	50
Jan. 11-20.....	782	3.6	.02	6.3	2.6	4.4	4.4	26	11	4.0	.2	.6	60	26	4	97	6.8	60
Jan. 21-31.....	934	1.4	.00	4.8	2.8	4.1	3.3	24	9.6	4.0	.0	.6	43	25	6	77	6.8	40
Feb. 1-10.....	1,118	1.4	.04	4.1	2.0	3.8	3.2	20	7.6	3.0	.2	.6	75	18	2	83	6.4	45
Feb. 11-20.....	1,124	--	--	4.8	2.8	3.7	3.2	24	8.6	4.0	--	1.9	42	24	4	72	6.9	90
Feb. 21-29.....	940	--	--	4.2	2.7	3.8	2.6	20	8.6	4.0	--	2.2	35	22	5	68	7.3	40
Mar. 1-13.....	1,630	2.3	.00	5.1	1.7	3.7	3.7	20	8.2	3.5	.0	.7	40	20	3	62	7.0	35
Mar. 14.....	1,950	--	--	6.0	5.3	5.2	2.3	16	8.8	19	--	3.0	58	37	24	104	6.8	--
Mar. 15-29.....	2,097	3.6	.00	4.6	1.2	3.0	3.4	18	8.2	2.2	.0	.6	32	16	4	53	6.8	40

a Includes equivalent of 10 ppm of carbonate (CO_3).

RED RIVER BASIN--Continued

7-3641.5. BAYOU BARTHOLOMEW NEAR McGEHEE, ARK.--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$		Specific conductance (micromhos at 25°C)	pH	Color
														Calcium, magnesium	Noncarbonate			
Mar. 30, 1960.....	1,530	--	--	4.0	3.7	10	2.3	24	9.6	14	--	2.1	58	25	6	101	7.2	--
Mar. 31-Apr. 4.....	1,236	1.5	0.00	5.2	1.2	3.3	2.7	20	7.8	2.8	0.0	.9	36	18	2	57	7.0	40
Apr. 5-13.....	644	4.1	.00	6.0	2.6	4.8	2.8	26	9.2	5.0	.0	.8	44	26	4	78	7.0	70
Apr. 14-20.....	238	3.0	.00	8.7	3.5	6.0	2.8	42	9.4	5.5	.0	1.4	58	36	2	104	7.0	60
Apr. 21-30.....	247	5.2	.00	10	4.6	6.2	2.8	51	8.6	5.5	.0	1.4	60	44	2	112	7.2	60
May 1-10.....	292	3.8	.00	9.8	3.8	6.7	2.8	45	9.0	7.0	.0	1.3	94	40	3	117	7.0	50
May 11-15.....	332	5.5	.00	11	3.8	7.4	2.7	51	8.6	7.5	.0	1.3	100	43	1	126	7.0	40
May 16-20.....	332	5.5	.00	14	6.1	12	3.8	67	13	13	.0	1.9	100	60	5	173	7.2	40
May 21-31.....	378	4.1	.00	10	3.4	7.1	2.9	50	6.0	7.5	.0	1.5	68	39	0	118	6.5	50
June 1-13.....	310	4.1	.01	11	3.6	7.1	2.9	52	9.4	6.5	.0	2.1	74	42	0	106	7.0	60
June 14-30.....	100	7.3	.01	16	5.7	9.1	2.9	84	4.2	8.0	.0	1.5	116	64	0	166	7.3	25
July 1-10.....	137	14	.01	19	5.8	12	3.4	92	9.4	10	.0	1.3	137	72	0	191	7.1	10
July 11-15.....	162	17	.28	18	6.3	14	3.1	92	11	13	.3	.8	132	71	0	209	7.1	15
July 16-31.....	114	17	.03	14	4.5	9.5	2.5	74	7.0	8.0	.2	1.2	100	54	0	156	7.0	15
Aug. 1-10.....	22.4	25	.00	21	5.8	13	2.7	110	6.4	10	.2	.1	137	76	0	210	7.2	7
Aug. 11-20.....	17.4	31	.00	26	7.0	13	2.3	132	6.0	9.0	.2	.2	160	94	0	243	7.3	5
Aug. 21-31.....	59.2	24	.01	23	6.4	12	2.6	118	9.2	8.0	.2	.1	145	84	0	224	7.2	6
Sept. 1-23.....	106	20	.03	22	7.2	15	3.3	108	9.8	16	.2	.4	153	84	0	243	7.0	11
Sept. 24-30.....	82.1	21	.01	31	11	22	4.6	150	11	30	.3	.1	204	123	0	347	7.2	9
Weighted average..	479	4.4	0.04	7.3	2.8	5.1	3.4	34	8.6	5.3	0.1	1.0	59	30	3	92	6.9	48
Time-weighted average.....	--	9.9	0.05	14	4.7	8.5	3.3	68	8.3	8.5	0.1	1.1	98	54	2	150	7.0	33
Tons per day.....	--	5.7	0.05	9.5	3.6	6.6	4.4	43	11	6.9	0.1	1.4	76	39	4	--	--	60

RED RIVER BASIN--Continued

7-3641.5. BAYOU BARTHOLOMEW NEAR McGEHEE, ARK.--Continued

Temperature (°F) of water, water year October 1959 to September 1960

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

RED RIVER BASIN--Continued

7-3658. CORNIE BAYOU NEAR THREE CREEKS, ARK.

LOCATION.--At gaging station at bridge on State Highway 15, 4.5 miles downstream from Pidgeon Roost Creek and 6 miles southwest of Three Creeks, Union County.
DRAINAGE AREA.--180 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1952 to September 1955. (Specific conductance, chloride, and pH: May 1950 to September 1952, February 1956 to September 1960.)
Water temperatures: May 1950 to September 1955, February 1956 to September 1960.
EXTREMES, 1959-60.--Specific conductance: Maximum daily, 4,510 micromhos Oct. 2; minimum daily, 120 micromhos Aug. 24.
Water temperatures: Maximum, 92°F Aug. 5; minimum, freezing point Dec. 8, 10.
EXTREMES, 1950-60.--Dissolved solids (1952-55): Maximum, 20,600 ppm July 15-21, 1954; minimum, 287 ppm Apr. 28-30, 1953.
Hardness (1952-55): Maximum, 6,270 ppm July 15-21, 1954; minimum, 62 ppm Apr. 28-30, 1953.
Specific conductance: Maximum daily, 33,200 micromhos Dec. 9, 1954; minimum daily, 114 micromhos Apr. 27, 1958.
Water temperatures: Maximum, 95°F July 8, 1953; minimum, freezing point on many days during winter months.
REMARKS.--Records of discharge for water year October 1959 to September 1960 given in WSP 1711. Prior to February 1956 this station was published as Cornie Creek near Junction City, Ark.

Specific conductance, chloride, and pH, water year October 1959 to September 1960

Day	Mean discharge (cfs)	Specific conductance (micromhos at 25°C)	Chloride (Cl)	pH	Mean discharge (cfs)	Specific conductance (micromhos at 25°C)	Chloride (Cl)	pH	Mean discharge (cfs)	Specific conductance (micromhos at 25°C)	Chloride (Cl)	pH
	October				November				December			
1.....	3.6	4,120	1,350	4.2	5.2	2,230	700	4.8	7.8	1,630	475	5.1
2.....	3.3	4,510	1,430	4.0	4.7	2,260	680	4.8	8.1	1,650	475	5.1
3.....	2.6	4,440	1,400	4.0	4.5	2,220	680	4.8	8.3	1,660	480	5.5
4.....	4.0	4,180	1,300	4.0	4.5	2,040	590	5.0	8.6	1,760	520	5.2
5.....	7.6	3,690	1,140	4.1	18	1,660	500	5.2	9.5	1,620	480	5.7
6.....	9.5	2,890	880	4.1	19	1,580	470	5.1	11	1,570	470	5.4
7.....	8.6	2,220	650	4.4	28	1,080	310	6.0	12	1,580	460	5.2
8.....	17	2,020	590	4.4	30	1,060	320	5.9	13	1,570	470	4.9
9.....	16	1,650	472	4.7	20	1,390	420	6.4	13	1,490	438	5.3
10.....	9.5	2,230	668	4.9	15	1,810	550	6.5	13	1,420	412	6.0
11.....	6.3	1,800	525	5.0	11	1,820	550	5.9	15	1,180	340	5.4
12.....	5.0	2,080	625	5.4	9.5	1,880	570	6.0	31	1,190	345	5.9
13.....	4.0	2,470	745	4.8	8.8	2,320	700	6.0	38	1,050	300	6.1
14.....	8.8	2,380	720	4.6	11	2,030	610	5.6	73	1,240	360	6.0
15.....	28	2,310	690	4.6	17	2,020	620	6.4	66	3,390	1,060	4.9
16.....	58	3,120	960	5.0	18	1,380	310	6.1	112	2,970	900	4.7
17.....	43	2,220	655	5.1	21	1,520	470	6.3	257	970	260	5.5
18.....	23	2,320	695	4.8	19	1,750	540	6.2	357	752	222	5.0
19.....	15	2,700	820	4.7	16	1,800	550	6.3	376	872	248	4.4
20.....	10	2,650	800	4.7	13	2,380	730	5.9	433	885	250	4.5
21.....	8.6	2,300	685	4.9	12	2,180	670	5.7	530	1,110	320	4.7
22.....	7.4	2,260	698	4.7	10	2,100	640	5.6	393	1,120	322	4.9
23.....	6.7	2,320	705	4.7	9.8	2,130	670	5.5	157	1,340	400	4.6
24.....	6.3	2,300	685	4.8	9.5	2,100	650	5.4	98	1,970	585	4.5
25.....	8.3	2,210	665	5.0	9.0	1,960	590	5.4	86	1,990	595	4.5
26.....	7.4	2,150	642	4.8	9.0	1,750	520	5.6	86	2,170	640	4.5
27.....	7.4	2,050	612	4.8	8.6	1,660	510	5.5	83	2,280	685	4.4
28.....	8.8	2,020	595	4.9	8.6	1,790	550	5.7	111	2,030	605	4.6
29.....	8.6	2,200	650	4.9	7.8	1,780	540	5.7	171	1,860	545	4.5
30.....	7.6	1,990	592	5.0	7.6	1,720	520	5.8	219	1,760	520	4.5
31.....	6.3	2,250	678	4.8	--	--	--	--	214	1,600	470	4.5
Average	11.8	2,580	784	4.7	12.8	1,850	558	5.7	129	1,600	473	5.0

RED RIVER BASIN--Continued

7-3658. CORNIE BAYOU NEAR THREE CREEKS, ARK.--Continued

Specific conductance, chloride, and pH, water year October 1959 to September 1960--Continued

Day	Mean discharge (cfs)	Specific conductance (micromhos at 25°C)	Chloride (Cl)	pH	Mean discharge (cfs)	Specific conductance (micromhos at 25°C)	Chloride (Cl)	pH	Mean discharge (cfs)	Specific conductance (micromhos at 25°C)	Chloride (Cl)	pH
	January				February				March			
1....	165	1,590	460	4.5	121	2,020	600	4.5	414	539	150	5.0
2....	198	1,670	480	4.6	102	--	--	--	565	532	145	5.0
3....	238	1,670	490	4.5	94	2,230	650	4.4	1,400	248	64	5.6
4....	244	1,180	330	4.6	218	916	255	4.8	2,500	316	86	5.7
5....	198	1,170	332	4.7	330	826	230	4.7	1,840	380	102	5.6
6....	238	1,000	280	4.7	354	905	250	4.9	1,120	435	118	5.5
7....	302	997	282	4.6	387	921	258	5.1	700	794	220	5.0
8....	316	1,160	328	4.7	414	1,010	282	4.8	560	787	220	5.0
9....	346	--	--	--	302	1,450	418	4.6	480	1,250	360	4.8
10....	338	1,270	362	4.6	177	1,460	418	4.6	396	992	280	4.8
11....	218	1,300	375	4.7	147	2,050	595	4.5	354	981	278	4.8
12....	141	1,510	440	4.7	153	2,050	595	4.5	330	983	278	4.7
13....	118	1,860	540	4.6	138	1,930	565	4.5	302	1,020	290	4.8
14....	107	2,300	685	4.6	102	1,900	550	4.5	281	504	142	5.3
15....	129	2,300	680	4.6	84	1,570	450	4.5	432	501	138	5.3
16....	202	1,110	312	4.5	82	1,570	455	4.4	542	458	124	5.4
17....	323	1,100	310	4.6	96	1,530	438	4.6	600	592	170	5.3
18....	510	970	275	4.6	162	1,410	405	4.5	700	626	175	5.2
19....	600	967	270	4.8	244	1,540	445	4.6	580	850	240	4.9
20....	525	1,110	315	5.0	309	1,040	292	4.7	460	861	240	4.9
21....	470	1,110	315	4.9	378	965	268	4.7	316	1,160	330	4.7
22....	338	1,150	330	4.7	470	719	192	4.8	194	1,170	335	4.7
23....	177	1,340	388	4.7	495	780	218	4.9	153	1,450	425	4.8
24....	126	1,620	460	4.6	510	605	168	5.0	138	1,460	420	4.7
25....	107	1,640	465	4.6	600	596	162	5.2	150	1,490	430	4.6
26....	96	1,730	500	4.5	600	581	160	5.1	156	1,210	342	4.6
27....	102	1,740	500	4.5	542	707	192	5.9	159	1,200	342	4.6
28....	112	1,760	510	4.6	542	769	215	4.9	147	1,210	345	4.6
29....	132	1,770	510	4.6	510	878	245	4.8	132	1,390	405	4.6
30....	126	1,770	510	4.6	--	--	--	--	123	1,270	360	4.6
31....	129	2,070	615	4.5	--	--	--	--	112	1,350	392	4.6
Average	238	1,460	422	4.6	299	1,250	356	4.8	526	904	256	5.0
	April				May				June			
1....	99	1,500	437	4.7	38	2,250	680	4.6	9.4	--	--	--
2....	82	1,870	553	4.6	39	2,270	677	4.5	12	1,400	395	4.4
3....	72	1,930	555	4.6	36	2,470	742	4.5	12	1,440	400	4.1
4....	64	1,630	460	4.6	28	2,410	725	4.4	15	1,450	405	4.4
5....	58	1,540	435	4.6	43	1,760	510	4.6	12	956	258	4.4
6....	54	1,730	502	4.6	99	1,420	412	4.7	8.7	936	258	5.1
7....	50	1,730	500	4.7	135	2,160	625	4.5	7.2	1,450	402	4.6
8....	47	1,600	457	4.6	174	2,190	655	4.5	6.0	1,460	400	4.6
9....	45	1,590	455	4.7	162	1,430	412	4.5	5.5	1,400	385	4.6
10....	44	1,520	430	4.6	82	1,420	412	4.6	4.8	1,400	385	4.5
11....	48	1,510	428	4.6	42	1,470	420	4.4	4.4	1,450	402	4.6
12....	58	1,580	455	4.7	31	1,480	425	4.4	3.9	1,480	412	4.7
13....	51	1,710	492	4.7	25	1,550	455	4.4	3.9	1,500	420	4.4
14....	44	1,410	398	4.8	21	1,580	462	4.2	4.0	1,620	455	4.4
15....	41	1,470	420	4.9	20	1,530	445	4.3	4.0	1,740	495	4.7
16....	38	1,800	518	4.7	19	1,530	445	4.3	4.0	1,770	508	4.4
17....	38	1,810	528	4.6	19	1,500	440	4.2	3.9	1,680	475	4.4
18....	42	1,430	405	4.9	18	1,510	435	4.4	3.6	1,580	440	4.8
19....	58	1,420	400	4.8	17	1,510	440	4.2	3.3	1,590	442	4.5
20....	67	812	225	5.4	16	1,590	468	4.6	3.2	1,570	442	4.5
21....	217	809	222	5.8	16	1,540	452	4.2	3.0	1,560	440	4.6
22....	274	448	120	6.0	17	1,550	460	4.2	2.7	1,570	438	4.4
23....	194	1,560	460	5.0	16	1,490	435	4.3	2.5	1,590	445	4.3
24....	121	1,590	455	4.9	16	1,500	435	4.3	2.1	1,590	442	4.4
25....	74	1,710	487	4.7	14	1,490	435	4.4	2.7	1,600	450	4.3
26....	49	1,710	495	4.7	14	1,370	400	4.4	3.6	1,510	420	4.4
27....	42	2,260	680	4.5	12	1,340	388	4.4	7.0	1,490	425	4.4
28....	44	2,290	680	4.5	11	1,330	382	4.3	9.4	1,520	430	4.4
29....	42	1,940	565	4.7	11	1,250	360	4.4	11	1,090	300	4.8
30....	41	1,750	505	4.8	10	1,250	360	4.3	15	1,080	300	4.9
31....	--	--	--	--	10	1,290	375	4.6	--	--	--	--
Average	73.3	1,590	457	4.8	39.1	1,630	476	4.4	6.33	1,460	409	4.5

RED RIVER BASIN--Continued

7-3658. CORNIE BAYOU NEAR THREE CREEKS, ARK.--Continued

Specific conductance, chloride, and pH, water year October 1959 to September 1960--Continued

Day	Mean discharge (cfs)	Specific conductance (micromhos at 25°C)	Chloride (Cl)	pH	Mean discharge (cfs)	Specific conductance (micromhos at 25°C)	Chloride (Cl)	pH	Mean discharge (cfs)	Specific conductance (micromhos at 25°C)	Chloride (Cl)	pH
	July				August				September			
1.....	12	847	225	4.0	0.6	2,480	740	4.2	3.3	1,210	295	4.8
2.....	8.3	865	222	4.0	.6	2,530	740	4.2	11	1,120	308	5.1
3.....	6.0	800	210	4.0	.5	2,640	790	4.0	14	1,340	388	4.8
4.....	4.4	726	192	4.3	1.4	2,650	770	4.0	8.9	1,350	385	4.6
5.....	4.0	790	205	4.0	.8	2,670	780	4.3	5.9	1,140	320	4.9
6.....	3.4	851	228	4.0	.6	2,670	780	4.0	4.5	1,140	320	4.6
7.....	3.0	1,080	288	4.0	.3	2,670	790	4.2	3.8	658	174	5.5
8.....	3.0	1,070	295	4.6	.3	2,690	790	4.2	3.3	592	156	5.9
9.....	3.0	1,580	452	4.5	.2	2,690	790	4.2	2.6	3,070	970	4.4
10.....	2.9	1,610	450	3.9	.3	2,720	790	4.3	2.7	3,130	990	5.0
11.....	2.9	1,570	445	4.7	.5	2,470	725	4.4	3.8	2,760	860	5.5
12.....	3.0	1,510	425	5.5	.3	2,480	725	4.4	5.2	2,760	840	4.7
13.....	2.6	1,510	430	4.6	.5	2,440	705	4.2	5.2	1,780	505	5.0
14.....	2.0	1,540	440	4.9	.6	2,420	710	4.4	5.5	1,740	495	5.0
15.....	1.5	1,540	445	4.9	.9	2,420	700	4.5	8.1	1,410	395	4.3
16.....	1.2	1,650	475	5.1	1.6	2,050	595	4.3	7.2	1,290	365	5.0
17.....	1.2	1,820	520	4.3	1.3	2,030	600	4.5	5.2	3,430	1,100	4.6
18.....	1.0	1,820	520	4.4	.9	1,840	535	4.5	3.9	3,100	960	4.6
19.....	1.0	1,930	555	4.3	.8	1,830	535	4.5	3.2	3,080	960	4.7
20.....	.9	1,840	522	4.4	.8	1,770	510	4.4	2.6	2,530	760	4.7
21.....	.8	1,960	555	4.4	1.6	1,770	510	4.2	2.4	2,160	625	4.9
22.....	.8	1,880	580	4.8	19	396	115	5.2	1.8	2,480	735	4.8
23.....	.7	1,980	615	4.6	41	122	24	6.3	1.8	2,160	625	4.8
24.....	.6	2,080	615	4.2	31	120	28	6.5	1.6	2,030	585	4.7
25.....	.6	2,190	640	4.4	20	796	215	4.3	1.4	1,950	568	4.6
26.....	.6	2,290	660	4.2	13	818	225	5.0	1.4	3,100	980	5.3
27.....	.6	2,290	670	4.2	9.6	649	175	5.3	2.0	1,890	530	5.0
28.....	.5	2,370	680	4.1	7.0	641	175	5.3	2.2	1,840	530	5.0
29.....	.6	2,370	690	4.2	5.2	602	165	5.6	2.2	1,950	572	4.9
30.....	.7	2,440	710	4.4	3.8	599	160	5.7	2.0	1,960	570	4.8
31.....	.6	2,500	720	4.1	3.4	591	165	6.1	--	--	--	--
Average	2.40	1,650	474	4.4	5.43	1,780	518	4.7	4.29	2,000	596	4.9

RED RIVER BASIN--Continued

7-3658. CORNIE BAYOU NEAR THREE CREEKS, ARK.--Continued

Temperature (°F) of water, water year October 1959 to September 1960

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

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RED RIVER BASIN--Continued

7-3659. THREE CREEK NEAR THREE CREEKS, ARK.

LOCATION.--At gaging station at bridge on State Highway 15, 2.2 miles southwest of Three Creeks, Union County, and 2.2 miles upstream from small tributary.
DRAINAGE AREA.--46 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1952 to September 1955. (Specific conductance, chloride, and pH: May 1950 to September 1952, February 1956 to September 1960.)
Water temperatures: May 1950 to September 1955, February 1956 to September 1960.
EXTREMES, 1959-60.--Specific conductance: Maximum daily, 16,600 micromhos June 9; minimum daily, 265 micromhos Mar. 4.
Water temperatures: Maximum, 85°F Aug. 4, 9; minimum, 38°F Jan. 24, Mar. 3.
EXTREMES, 1950-60.--Dissolved solids (1952-55): Maximum, 13,200 ppm July 29-31, 1953; minimum, 133 ppm Apr. 28-30, 1953.
Hardness (1952-55): Maximum, 4,390 ppm July 29-31, 1953; minimum, 30 ppm Apr. 28-30, May 12-15, 1953.
Specific conductance: Maximum daily, 20,300 micromhos Sept. 4, 1952; minimum daily, 46 micromhos Feb. 1, 1952.
Water temperatures: Maximum, 89°F Sept. 1, 1951, Aug. 4, 1953; minimum, freezing point Dec. 16, 1952, Jan. 17-19, 1957.
REMARKS.--Records of discharge for water year October 1959 to September 1960 given in WSP 1711. Prior to February 1956 this station was published as Three Creeks near Junction City, Ark.

Specific conductance, chloride, and pH, water year October 1959 to September 1960

Day	Mean discharge (cfs)	Specific conductance (micromhos at 25°C)	Chloride (Cl)	pH	Mean discharge (cfs)	Specific conductance (micromhos at 25°C)	Chloride (Cl)	pH	Mean discharge (cfs)	Specific conductance (micromhos at 25°C)	Chloride (Cl)	pH
	October				November				December			
1.....	3.4	1,880	535	7.9	2.5	1,160	340	7.7	2.5	--	--	--
2.....	2.4	1,780	490	8.2	2.5	1,440	410	7.6	2.8	2,410	720	7.0
3.....	2.1	1,730	460	8.0	2.5	1,600	470	7.6	2.8	2,270	670	7.2
4.....	2.1	2,220	628	8.3	5.4	1,500	440	7.6	2.8	2,060	590	7.4
5.....	2.5	1,720	460	8.3	9.9	648	162	7.5	3.6	1,760	500	7.6
8.....	3.0	1,660	448	8.0	12	2,720	840	7.8	3.5	1,530	425	7.5
7.....	3.6	2,130	612	8.0	7.2	1,550	450	7.6	3.2	1,340	370	7.4
8.....	2.6	1,680	450	8.2	5.4	1,520	450	7.4	3.6	1,490	420	7.7
9.....	2.4	1,560	415	8.1	4.6	1,370	410	7.1	3.5	1,690	480	7.8
10.....	2.1	1,370	352	8.1	2.1	1,360	410	7.4	3.5	1,860	525	7.6
11.....	2.1	1,350	348	8.3	3.6	1,360	400	7.4	5.1	1,770	500	7.6
12.....	2.1	1,560	420	7.7	4.1	2,050	640	7.2	20	2,550	750	7.5
13.....	9.7	1,540	412	8.0	4.7	1,600	470	7.1	24	2,580	760	7.6
14.....	22	1,680	478	7.9	4.7	1,590	480	7.2	17	2,340	690	7.5
15.....	19	1,570	452	7.6	6.9	1,820	620	7.4	41	4,710	1,520	7.2
16.....	8.8	1,340	380	7.6	8.0	1,830	550	7.5	121	934	225	7.2
17.....	4.7	1,240	350	7.7	7.2	2,150	650	7.7	290	721	198	6.8
18.....	4.0	2,590	698	7.6	4.2	1,570	450	7.5	390	564	155	6.4
19.....	3.0	2,810	820	7.4	4.2	1,740	530	7.5	191	665	182	5.8
20.....	2.6	3,180	990	7.2	4.0	1,730	520	7.5	61	908	255	5.4
21.....	2.4	3,040	930	7.3	3.6	1,850	570	7.4	26	1,010	290	5.4
22.....	2.6	2,630	800	7.6	4.0	2,050	620	7.5	15	1,200	350	6.1
23.....	2.9	2,330	685	7.5	3.5	2,290	710	7.6	15	1,170	330	6.2
24.....	4.2	1,800	512	7.6	2.5	2,880	910	7.6	16	1,150	335	6.5
25.....	3.8	1,490	420	7.6	2.5	2,250	680	7.4	15	1,270	370	6.7
26.....	3.4	2,030	582	7.7	2.2	2,220	680	7.7	14	1,280	365	6.8
27.....	2.8	1,980	560	7.7	2.1	2,230	680	7.4	21	1,390	405	6.8
28.....	2.5	2,040	578	7.8	2.1	2,050	610	7.5	33	1,430	415	6.8
29.....	2.4	1,770	490	7.9	2.4	2,320	720	6.9	28	--	--	--
30.....	2.4	1,500	405	7.9	2.9	2,320	710	7.5	22	1,980	595	5.5
31.....	2.4	1,360	358	7.8	--	--	--	--	19	--	--	--
Average	4.39	1,890	533	7.8	4.45	1,820	553	7.5	45.7	1,640	478	6.9

RED RIVER BASIN--Continued

7-3659. THREE CREEK NEAR THREE CREEKS, ARK.--Continued

Specific conductance, chloride, and pH, water year October 1959 to September 1960--Continued

Day	Mean discharge (cfs)	Specific conductance (micromhos at 25°C)	Chloride (Cl)	pH	Mean discharge (cfs)	Specific conductance (micromhos at 25°C)	Chloride (Cl)	pH	Mean discharge (cfs)	Specific conductance (micromhos at 25°C)	Chloride (Cl)	pH
	January				February				March			
1.....	50	1,320	385	5.9	16	1,620	470	7.0	65	877	245	6.3
2.....	98	1,200	345	6.5	15	1,670	480	6.7	675	367	96	6.3
3.....	74	860	235	5.9	15	1,670	480	6.9	1,380	317	84	6.0
4.....	33	898	255	6.0	184	541	148	6.8	650	265	70	6.2
5.....	41	1,140	322	6.1	255	563	152	6.7	290	357	96	6.0
6.....	151	650	178	6.3	190	657	180	6.5	184	553	155	6.2
7.....	184	708	195	5.8	83	770	215	6.2	127	584	160	6.2
8.....	121	714	198	5.9	41	891	245	6.3	98	682	188	6.3
9.....	65	832	182	5.7	30	989	302	6.2	98	723	198	6.5
10.....	36	977	270	5.8	28	1,140	320	6.3	139	940	268	6.5
11.....	23	1,010	290	6.3	30	1,280	368	6.4	127	833	230	6.4
12.....	22	1,090	308	6.6	22	1,480	422	6.6	83	866	240	6.2
13.....	19	1,250	355	6.7	16	1,650	475	6.7	61	1,040	295	6.0
14.....	18	1,240	352	6.6	15	1,550	435	6.7	68	1,020	285	6.3
15.....	18	1,460	415	6.6	14	1,710	485	6.7	299	379	104	6.4
16.....	21	1,680	525	6.8	17	1,730	495	7.0	458	467	124	5.8
17.....	54	1,090	305	6.6	24	1,520	432	7.1	230	420	110	6.2
18.....	61	1,060	298	6.6	65	1,420	398	7.2	145	503	138	5.9
19.....	57	801	222	6.1	132	1,320	372	6.6	83	604	168	6.2
20.....	47	794	220	6.0	127	875	240	6.0	50	791	222	6.3
21.....	28	929	260	6.1	139	601	160	6.4	36	830	230	6.2
22.....	15	963	268	6.2	198	617	170	6.2	28	945	262	6.4
23.....	15	1,050	292	6.5	158	617	170	6.4	26	1,100	312	6.2
24.....	15	1,200	345	6.7	184	683	185	6.2	25	1,210	342	6.7
25.....	14	1,190	332	6.8	240	369	96	6.9	28	1,220	342	6.6
26.....	13	1,300	372	6.9	255	441	118	6.3	28	1,180	330	6.6
27.....	19	1,520	442	6.9	164	585	160	6.8	30	1,470	422	6.6
28.....	28	1,460	372	7.0	93	615	165	6.0	30	1,400	398	6.3
29.....	26	2,010	590	6.8	74	720	200	6.3	30	1,240	352	6.4
30.....	26	1,940	570	6.5	--	--	--	--	28	1,230	350	6.4
31.....	19	1,730	500	6.5	--	--	--	--	25	1,350	380	6.4
Average	45.5	1,160	329	6.4	97.4	1,040	294	6.6	181	831	232	8.3
	April				May				June			
1.....	20	1,450	402	6.6	8.8	2,040	615	8.5	5.9	1,130	285	7.7
2.....	17	1,480	422	7.0	8.0	2,590	782	6.5	8.2	443	95	7.6
3.....	13	1,580	448	6.8	7.4	2,220	652	6.5	5.1	1,170	305	7.8
4.....	10	1,560	437	7.0	6.5	2,020	605	7.1	4.6	1,340	345	7.9
5.....	8.4	1,720	492	7.0	11	2,290	680	6.8	3.8	2,080	770	7.6
6.....	8.2	1,680	480	6.9	74	1,310	365	6.6	3.0	1,880	510	7.8
7.....	7.8	1,800	520	7.0	74	2,460	748	5.2	2.4	1,990	545	7.8
8.....	7.4	2,020	570	7.0	30	2,520	765	5.4	2.6	9,910	3,260	6.8
9.....	7.6	2,080	605	6.9	13	2,360	700	5.5	2.2	16,600	5,680	6.1
10.....	7.0	1,870	535	7.0	11	1,850	540	6.0	2.1	13,300	4,420	6.5
11.....	6.7	2,170	630	7.1	8.6	1,840	535	6.0	2.1	5,770	1,660	7.1
12.....	6.3	2,190	640	7.1	6.7	1,850	542	6.0	2.1	12,000	4,020	7.2
13.....	6.7	1,970	560	7.3	4.2	1,830	533	6.3	2.4	5,880	1,720	7.7
14.....	7.8	2,410	700	7.0	3.5	1,880	550	6.3	2.9	2,600	695	8.0
15.....	7.6	2,290	670	7.2	2.9	1,790	520	6.4	2.6	1,960	515	8.1
16.....	8.2	1,820	520	7.2	2.9	1,690	488	6.5	2.4	2,040	550	8.0
17.....	8.4	1,940	545	7.2	3.0	1,590	462	6.7	2.2	2,260	620	8.1
18.....	7.4	1,840	525	7.1	3.0	1,600	460	6.6	1.9	2,390	660	8.0
19.....	7.2	1,950	557	7.2	3.2	1,600	455	6.7	1.4	2,570	720	8.1
20.....	8.0	2,130	615	7.0	3.0	1,520	425	6.4	1.3	3,160	900	7.8
21.....	24	1,740	487	7.2	3.0	1,500	425	6.8	1.6	3,080	870	8.0
22.....	47	1,480	405	6.9	2.8	2,060	595	6.9	1.7	3,170	905	8.0
23.....	30	2,190	625	7.0	2.8	2,360	698	6.7	1.6	3,240	920	7.8
24.....	12	3,210	950	6.9	2.8	2,290	662	6.5	1.2	3,750	1,070	7.6
25.....	9.0	2,670	765	6.8	2.5	2,140	612	6.6	2.1	3,420	970	7.6
26.....	11	2,120	595	6.6	3.5	1,630	452	6.7	4.6	1,660	402	7.8
27.....	14	1,470	402	6.8	4.4	1,160	308	6.7	9.7	755	158	7.4
28.....	12	1,580	442	7.0	3.5	1,350	358	7.0	6.7	633	135	7.5
29.....	11	1,750	500	7.0	2.9	1,370	365	6.8	4.2	794	178	7.3
30.....	9.3	1,970	565	7.2	2.5	1,460	392	7.0	3.0	1,430	375	7.8
31.....	--	--	--	--	2.2	1,320	342	7.0	--	--	--	--
Average	12.0	1,940	544	7.0	10.2	1,850	536	6.5	3.25	3,750	1,140	7.6

RED RIVER BASIN--Continued

7-3659. THREE CREEK NEAR THREE CREEKS, ARK.--Continued

Specific conductance, chloride, and pH, water year October 1959 to September 1960--Continued

Day	Mean discharge (cfs)	Specific conductance (micromhos at 25°C)	Chloride (Cl)	pH	Mean discharge (cfs)	Specific conductance (micromhos at 25°C)	Chloride (Cl)	pH	Mean discharge (cfs)	Specific conductance (micromhos at 25°C)	Chloride (Cl)	pH
	July				August				September			
1.....	3.0	1,710	465	8.1	2.5	895	185	8.1	3.0	1,120	260	8.1
2.....	3.0	1,830	500	8.1	2.5	1,540	390	8.2	3.0	1,020	220	8.2
3.....	3.0	1,850	495	8.2	2.4	2,040	550	8.2	3.0	1,110	255	8.4
4.....	3.0	1,890	515	8.3	2.0	1,420	345	8.2	2.9	1,230	295	8.1
5.....	3.0	1,640	425	8.5	2.0	1,420	355	8.2	2.8	1,380	335	8.2
6.....	2.9	1,390	345	8.6	2.1	1,510	375	8.1	2.6	1,300	310	8.2
7.....	3.0	1,200	285	8.6	2.1	1,550	385	8.2	2.6	1,540	390	8.0
8.....	2.6	1,050	235	7.7	2.1	1,310	310	8.2	2.8	1,310	310	8.2
9.....	2.5	1,000	215	8.5	2.0	798	140	8.4	2.8	1,130	260	8.2
10.....	2.4	1,080	250	8.6	2.5	775	140	8.3	3.2	930	195	8.1
11.....	2.4	1,150	255	7.6	3.5	656	112	8.4	3.2	919	202	8.2
12.....	2.2	1,540	385	8.5	2.8	527	88	8.1	3.4	1,040	242	8.1
13.....	2.0	1,250	290	8.6	2.5	618	100	8.3	2.9	1,250	302	8.1
14.....	2.1	997	208	8.6	2.5	637	105	8.3	2.8	1,400	348	7.9
15.....	2.0	888	178	8.6	2.5	964	215	8.3	2.6	1,400	345	8.1
16.....	1.7	830	160	8.6	2.5	1,620	420	8.2	2.5	1,500	370	7.6
17.....	2.0	787	145	8.6	2.0	1,630	425	8.2	2.5	2,220	618	8.0
18.....	2.0	743	125	7.9	2.1	1,190	275	8.2	2.4	1,450	352	8.1
19.....	2.0	755	135	8.6	2.2	918	185	8.2	2.2	1,110	250	8.2
20.....	2.1	766	140	7.7	2.2	923	185	8.3	2.4	977	205	8.2
21.....	2.0	819	155	8.6	2.9	871	175	8.4	3.0	997	220	8.2
22.....	2.2	796	145	8.6	23	297	66	8.3	2.8	833	170	7.6
23.....	2.1	732	130	8.6	14	556	135	8.0	3.0	823	172	8.1
24.....	2.1	706	120	8.5	5.2	1,990	575	7.8	2.6	800	168	7.9
25.....	2.0	854	170	8.5	3.8	2,480	730	7.8	2.2	784	160	8.1
26.....	2.0	1,190	275	7.6	3.4	2,240	635	7.8	2.4	1,360	345	8.1
27.....	2.2	1,330	320	8.4	3.2	2,160	610	7.9	3.0	2,850	825	8.0
28.....	2.5	1,220	280	8.1	3.0	2,150	598	7.9	3.2	1,670	425	8.1
29.....	2.2	857	162	8.4	3.0	2,550	712	7.9	2.9	1,180	275	8.1
30.....	1.9	785	142	7.3	3.0	1,770	500	7.8	1.7	1,060	240	8.2
31.....	2.0	972	200	8.3	3.4	--	--	--	--	--	--	--
Average	2.33	1,120	253	8.3	3.71	1,330	334	8.1	2.75	1,260	302	8.1

RED RIVER BASIN--Continued

7-3659. THREE CREEK NEAR THREE CREEKS, ARK.--Continued

Temperature (°F) of water, water year October 1959 to September 1960

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

RED RIVER BASIN--Continued

7-3660. CORNEY BAYOU NEAR LILLIE, LA.

LOCATION.--At gaging station at bridge on U.S. Highway 167, 2 miles upstream from Little Corney Bayou, and 3 miles south of Lillie, Union Parish.
DRAINAGE AREA.--462 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1954 to September 1957 and October 1959 to September 1960.
REMARKS.--Records of discharge not available.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 29, 1959....		4.8	0.02	40	9.3	100	4.0	5		6.0	248	0.2	0.5		460	0.63		138	134	3.7	833	5.9
Nov. 23.....		3.2	.04	42	7.6	105	4.3	3		4.2	260	.1	.1		a428	.58		136	134	3.9	876	5.3
Dec. 21.....		9.4	.08	10	1.7	23	3.4	4		6.6	53	.2	.4		a110	.15		32	28	1.8	209	5.4
Jan. 7, 1960.....		11	.02	34	5.4	76	4.7	3		15	187	.1	.1		376	.51		107	105	3.2	654	5.2
Feb. 23.....		13	.11	32	5.4	76	2.8	3		0.0	184	.3	.2		396	.54		102	100	3.3	645	5.3
Apr. 21.....		11	.05	26	3.7	58	2.5	3		7.6	141	.4	.2		296	.40		80	78	2.8	496	5.2
May 17.....		10	.03	30	4.2	69	2.5	3		2.4	169	.2	.1		370	.50		92	90	3.1	590	5.3
June 15.....		8.0	.00	32	3.9	67	2.2	7		3.0	167	.1	.0		387	.53		96	90	3.0	603	5.4
July 20.....		3.7	.01	38	5.9	88	3.6	4		1.2	218	.1	.0		442	.60		119	116	3.5	742	5.3
Aug. 24.....		5.4	.05	18	3.2	41	2.6	4		4.8	101	.1	.3		230	.31		58	55	2.3	363	5.0
Sept. 14.....		4.1	.01	42	7.1	97	3.6	2		.6	248	.1	.1		445	.61		134	132	3.6	815	5.3

a Calculated from determined constituents.

RED RIVER BASIN--Continued

7-3663.6. BAYOU D'ARBONNE NEAR FARMERVILLE, LA.

LOCATION.--On downstream side of State Highway 44 bridge, 1.2 miles south of Farmerville, Union Parish, and 36.1 miles upstream from mouth.
DRAINAGE AREA.--1,550 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1959 to September 1960.
REMARKS.--Records of discharge not available.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 29, 1959.....		14	0.33	8.1	2.4	20	2.3	19		3.4	40	0.1	0.3		122	0.17		30	14	1.6	179	6.3
Dec. 21.....		12	.22	5.6	1.2	15	2.7	6		9.0	28	.2	.8		a78	.11		19	14	1.5	129	5.9
Jan. 7, 1960.....		11	.10	9.8	1.6	23	2.1	8		8.2	49	.2	.2		133	.18		31	25	1.8	196	5.8
Feb. 23.....		13	.17	8.8	1.5	21	2.3	7		8.0	46	.2	.3		a105	.14		28	23	1.8	187	5.8
Mar. 7.....		9.7	.08	9.1	1.5	19	1.8	3		6.8	45	.3	.2		122	.17		29	27	1.6	175	5.3
Apr. 6.....		12	.12	13	3.3	30	1.5	12		9.2	66	.2	.1		a141	.19		46	36	1.9	253	6.1
May 17.....		14	.15	18	2.5	38	1.9	8		4.4	92	.1	.2		226	.31		55	49	2.2	339	5.6
June 29.....		10	.00	23	3.1	66	4.0	12		7.8	143	.1	.0		330	.45		70	60	3.4	519	5.6
July 27.....		9.0	.01	21	3.8	51	1.6	12		4.4	114	.2	1.7		239	.32		68	58	2.7	425	6.2
Sept. 14.....		9.9	.18	22	3.4	51	2.0	8		5.8	120	.1	.2		286	.39		69	62	2.6	439	5.8

a Calculated from determined constituents.

RED RIVER BASIN--Continued

7-3670. OUACHITA RIVER AT MONROE, LA.

LOCATION.--At gaging station near center of span on downstream side of bridge on U.S. Highway 80 at Monroe, 0.4 mile upstream from Illinois Central Railroad bridge, and 5.5 miles upstream from lock and dam No. 4.
DRAINAGE AREA.--15,298 square miles.
RECORDS AVAILABLE.--Chemical analyses: August 1954 to September 1960.
Water temperatures: August 1954 to September 1958.
EXTREMES, 1959-60.--Specific conductance: Maximum daily, 2,750 micromhos Dec. 17; minimum daily, 160 micromhos Mar. 23, 26-28.
EXTREMES, 1954-58.--Dissolved solids: Maximum, 2,860 ppm Oct. 16-18, 1954; minimum, 35 ppm May 21-31, 1958.
Hardness: Maximum 558 ppm Oct. 16-18, 1954; minimum, 0 ppm May 11 to June 10, 1958.
Specific conductance: Maximum daily, 6,070 micromhos Oct. 17, 1954; minimum daily, 50 micromhos June 1, 1958.
Water temperatures: Maximum, 95°F Aug. 11, 1956; minimum, 49°F Jan. 18, 1956.
REMARKS.--Records of continuous specific conductance available in district office at Baton Rouge, La. Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 28, 1959....	3,000	3.8	0.04	33	7.0	125	2.7	31		14	246	0.3	0.3		530	0.72	4,290	111	86	5.2	892	6.5
Nov. 24.....	4,600	6.8	.07	34	7.4	134	3.8	28		16	264	.3	1.4		562	.76	6,980	115	92	5.4	951	6.4
Dec. 22.....	18,500	6.8	.15	9.1	2.8	29	2.3	16		11	53	.3	1.5		124	.17	6,190	34	21	2.2	237	6.3
Jan. 28, 1960....	28,400	7.5	.22	10	1.7	27	1.8	14		8.8	52	.3	.6		a117	.16	8,970	32	21	2.1	221	6.1
Feb. 25.....	29,900	7.0	.16	11	2.6	35	2.4	13		8.4	71	.2	.5		185	.25	14,900	38	27	2.5	281	6.2
Mar. 29.....	39,600	6.0	.05	8.6	1.4	18	1.4	11		7.4	36	.1	.5		111	.15	11,900	27	18	1.5	171	6.0
Apr. 27.....	11,100	7.6	.11	28	5.4	114	2.3	19		9.6	224	.3	1.0		458	.62	13,700	92	76	5.2	789	6.4
May 23.....	7,300	7.8	.12	13	3.6	32	1.6	22		13	62	.3	1.0		164	.22	3,230	47	29	2.0	272	6.3
June 27.....	3,900	6.0	.02	27	5.8	82	2.3	34		9.4	164	.5	.6		445	.61	4,690	91	63	3.7	668	6.4
July 26.....	3,400	6.3	.02	30	1.3	83	3.0	32		8.6	161	.2	.3		a310	.42	2,850	80	54	4.0	624	6.2
Aug. 29.....	4,600	5.7	.08	33	5.5	119	2.5	22		6.8	240	.3	2.5		523	.71	6,500	105	87	5.0	864	6.1
Sept. 27.....	3,600	5.2	.02	41	9.4	160	2.5	12		9.0	329	.1	7.4		686	.93	6,670	141	131	5.9	1,150	5.8

a Calculated from determined constituents.

7-3685. BIG COLEWA BAYOU NEAR OAK GROVE, LA.

LOCATION.--At bridge on State Highway 11, 0.1 mile downstream from confluence with Little Colewa Bayou and 8 miles southwest of Oak Grove, West Carroll Parish.
DRAINAGE AREA.--39.5 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1959 to September 1960.
REMARKS.--Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 28, 1959....	0.1	5.2	1.3	4.0	1.0	3.7	1.2	17		3.2	3.8	0.1	0.1		32	0.04	0.01	14	0	0.4	58	6.6
Nov. 10.....	3.3	4.7	.28	3.6	1.0	2.3	3.1	17		1.8	2.8	.3	1.5		30	.04	.27	13	0	.3	56	5.9
Dec. 9.....	.5	3.9	.57	4.2	1.1	3.2	5.1	16		7.4	4.8	.2	.6		39	.05	.05	15	2	.4	61	6.1
Jan. 7, 1960.....	210	3.7	.30	3.5	.5	1.6	.4	13		1.2	.8	.3	.8		20	.03	11	11	0	.2	39	6.4
Feb. 17.....	42	3.7	.32	3.9	1.5	2.8	.8	20		1.4	3.1	.1	.2		28	.04	3.2	16	0	.3	52	6.3
Mar. 8.....	17	2.2	.23	3.3	1.4	1.8	2.0	11		1.6	6.2	.2	.6		24	.03	1.1	14	5	.2	39	5.6
Apr. 13.....	.5	1.5	.24	6.1	2.1	2.8	1.8	30		2.0	3.2	.1	.3		35	.05	.05	24	0	.2	66	6.4
May 12.....	1.7	5.5	.62	5.0	1.3	3.0	2.4	15		6.4	4.7	.2	1.6		38	.05	.17	18	6	.3	59	5.4
June 7.....	.1	4.5	.41	6.3	2.5	2.8	1.9	28		5.6	1.8	.2	2.5		43	.06	.00	26	3	.2	76	6.2
July 12.....	.1	4.0	.52	4.7	2.0	2.3	3.6	24		1.6	4.0	.5	1.0		36	.05	.00	20	0	.2	69	6.4
Aug. 10.....	.1	3.3	.24	3.8	.6	1.2	2.9	17		1.0	1.8	.1	.2		23	.03	.00	12	0	.1	44	5.6
Sept. 21.....	.2	5.1	.71	4.0	.2	1.2	.6	14		.6	1.0	.1	.4		20	.03	.01	11	0	.1	46	5.5

RED RIVER BASIN--Continued

7-3732.67. BLACK RIVER AT JONESVILLE, LA.

LOCATION.--At bridge on U.S. Highway 64 in Jonesville, 1.5 miles below the confluence of Ouachita, Tensas and Little Rivers, and at Catahoula-Concordia Parish line.
DRAINAGE AREA.--24,158 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1958 to September 1960.
Water temperatures: October 1958 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 799 ppm Sept. 9, 14-16; minimum, 94 ppm Mar. 21, 23, 25-26, 29-30, Apr. 2, 4.
Hardness: Maximum, 172 ppm Nov. 8-9; minimum, 26 ppm Mar. 22, 24, 27-28, 31, Apr. 1, 3, 5-10.
Specific conductance: Maximum daily, 1,660 micromhos Nov. 30; minimum daily, 156 micromhos Mar. 26.
Water temperatures: Maximum, 90°F Aug. 9; minimum, 42°F Jan. 23.
EXTREMES, 1958-60.--Dissolved solids: Maximum, 799 ppm Sept. 9, 14-16, 1959; minimum, 80 ppm Mar. 5-10, 1959.
Hardness: Maximum, 172 ppm Nov. 8-9, 1959; minimum, 26 ppm Mar. 22, 24, 27-28, 31, Apr. 1, 3, 5-10, 1960.
Specific conductance: Maximum daily, 1,840 micromhos Nov. 24, 1958; minimum daily, 137 micromhos Mar. 10, 1959.
Water temperatures: Maximum, 91°F Aug. 6, 8, 1959; minimum, 41°F Jan. 6, 7, 1958.
REMARKS.--Records of specific conductance of daily samples available in district office at Baton Rouge, La. Records of discharge not available for this station.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Oct. 1-6, 1959..		10	0.31	35	11	141	3.6	61		13	272	0.3	1.5		539	0.73		132	80	5.3	1030	7.3	10
Oct. 7-14.....		9.3	.18	27	7.2	96	1.9	54		12	179	.4	1.8		394	.54		97	51	4.2	716	7.1	20
Oct. 15-22.....		6.4	.19	31	8.9	122	3.3	50		16	236	.3	1.7		468	.64		114	69	5.0	877	6.9	20
Oct. 23-31.....		11	.12	29	8.0	92	2.0	69		16	168	.2	1.5		388	.53		105	44	3.9	698	7.3	20
Nov. 1-7.....		10	.10	27	7.5	79	3.3	65		12	148	.2	1.6		352	.48		98	42	3.5	626	7.5	40
Nov. 8-9.....		12	.35	45	15	166	5.3	103		17	308	.2	1.4		641	.87		172	86	5.5	1210	7.7	40
Nov. 10-20.....		11	.08	28	7.4	86	3.0	66		16	155	.2	1.7		368	.50		100	41	3.7	655	7.3	40
Nov. 21-30.....		10	.16	29	8.0	92	2.7	70		15	167	.4	1.8		396	.54		105	43	3.9	705	7.1	50
Dec. 1-10.....		13	.18	34	9.3	119	3.3	70		16	220	.3	1.6		476	.65		123	63	4.7	882	7.3	20
Dec. 11-20.....		13	.29	37	13	138	4.1	76		15	268	.2	1.6		543	.74		146	83	5.0	1050	7.3	20
Dec. 21.....		13	.17	--	--			47		--	194	.1	--		--	--		101	62	--	782	7.5	--
Dec. 22, 25.....		9.1	.25	21	--			40		--	116	.3	--		--	--		68	32	--	475	7.2	--
Dec. 23-24,26-31		6.1	.25	14	2.7	26	3.2	31		10	52	.3	1.7		172	.23		46	21	1.8	263	7.3	80
Jan. 1-16, 1960.		7.9	.20	13	26	28	2.7	26		11	54	.2	0.5		168	.23		43	19	1.0	253	6.9	70
Jan. 17.....		8.3	.19	--	--			23		--	146	.2	--		--	--		45	21	--	537	7.0	--

Jan. 18-31, 1960	8.4	.20	12	2.2	26	2.2	20	10	51	.2	1.0	159	.22	39	19	1.8	235	6.9	70
Feb. 1-20.....	7.7	.25	12	2.5	27	2.1	22	12	50	.3	1.3	159	.22	40	17	1.9	225	6.6	80
Feb. 21-39, Mar. 1-3.....	7.5	.25	12	2.5	27	2.3	25	8.4	50	.1	1.8	164	.22	40	15	1.9	233	6.9	80
Mar. 10.....	--	--	12	--		--	--	--	30	.1	--	--	--	59	--	--	491	--	--
Mar. 4-9, 11-20.	6.3	.31	9.3	2.1	21	2.1	19	10	39	.1	1.2	136	.18	32	14	1.6	183	6.6	80
Mar.21,23,25,26, 29-30,Apr.2,4.	6.7	.20	9.2	2.2	18	2.3	19	11	34	.2	1.0	94	.13	32	14	1.4	164	6.2	80
Mar.22,24,27,28, 31,Apr.1,3, 5-10.....	7.3	.25	8.0	1.5	41	1.7	14	10	68	.1	.5	167	.23	26	14	3.5	274	6.3	100
Apr. 11-18.....	6.9	.18	11	2.8	33	1.7	17	11	62	.2	.8	156	.21	39	21	2.3	256	6.1	50
Apr. 19-27.....	6.7	.29	16	3.4	43	1.8	23	10	88	.2	1.1	214	.29	54	31	2.5	345	6.5	60
Apr. 28-May 2...	9.5	.19	16	4.7	58	2.7	25	11	110	.3	1.9	280	.38	59	35	3.3	449	6.5	50
May 3-6.....	12	.12	29	5.0	97	3.5	34	11	190	.3	2.5	453	.62	93	62	4.4	718	6.8	40
May 7-13.....	11	.20	18	5.1	45	2.4	44	12	82	.4	2.0	240	.33	66	29	2.4	380	6.7	60
May 14-26.....	9.9	.20	16	4.2	97	3.3	27	10	162	.2	1.2	373	.51	57	33	5.6	645	6.6	60
May 27-30, June 2-6, 9-10	9.5	.09	14	3.7	35	1.9	30	9.8	66	.3	1.8	191	.26	50	20	2.2	299	6.4	40
June 7-8, 11-13.	8.0	.12	15	5.0	83	2.6	33	10	142	.3	1.0	322	.44	58	28	4.7	554	6.6	40
June 14-19.....	9.7	.05	20	6.1	48	2.7	54	12	90	.4	1.5	257	.35	75	26	2.4	417	6.7	40
June 20-30.....	10	.13	24	4.9	92	2.8	54	11	158	.5	.7	365	.50	80	31	4.5	635	6.8	40
July 1-6.....	9.7	.06	25	4.8	88	2.9	39	9.8	160	.3	3.3	379	.52	62	48	4.2	631	6.8	30
July 7-8.....	6.8	.01	35	7.5			22	9.0	286	.3	--	--	--	118	97	--	1010	6.5	10
July 9-19.....	6.6	.10	13	3.6	34	1.6	23	7.6	68	.2	2.1	186	.25	47	26	2.2	283	6.5	40

RED RIVER BASIN--Continued

7-3732.67. BLACK RIVER AT JONESVILLE, LA.--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
July 20-26, 1960		8.1	0.05	25	5.5	76	2.8	62		12	137	0.4	0.9		327	0.44		85	29	3.6	563	6.6	30
July 27.....		--	--	22	--			58		--	80	--	--			--		76	28	--	390	7.1	--
July 28-Aug. 6..		9.5	.08	26	7.1	93	2.0	58		11	170	.3	1.0		394	.54		94	43	4.2	689	7.0	40
Aug. 7-8.....		13	.08	35	--			81		10	369	.4	--		--	--		129	59	--	1360	7.1	--
Aug. 9-20.....		6.2	.02	28	7.4	95	2.2	63		9.8	180	.3	.4		423	.58		100	43	4.1	722	6.9	20
Aug. 21-29.....		7.6	.08	32	7.4	91	2.2	66		10	176	.3	.6		427	.58		110	51	3.8	719	7.0	40
Aug.30,31,Sept.3		9.0	.04	46	10	156	4.3	52		11	315	.3	.4		776	1.06		156	113	5.4	1270	7.1	30
Sept.1,2,4-8,10.		9.0	.09	29	7.2	102	3.1	60		9.2	190	.3	.4		442	.60		102	51	4.4	734	7.2	30
Sept. 9, 14-16..		8.2	.02	44	10	176	3.7	52		10	355	.3	.6		799	1.09		152	108	6.2	1290	7.0	20
Sept.11-13,17-24		7.4	.06	31	8.9	105	2.0	56		9.4	206	.3	.1		453	.62		114	64	4.3	785	6.9	30
Sept. 25-27.....		8.1	.02	47	12	205	2.0	47		13	392	.3	6.2		709	.96		168	127	6.9	1370	6.7	20
Sept. 28-30.....		9.0	.07	26	7.4	90	1.8	51		11	170	.3	2.7		343	.47		95	48	4.0	678	7.1	30
Time-weighted average.....		8.7	0.16	22	6.6	71	2.5	42		11	135	0.3	1.3		316	0.42		75	40	3.4	546	6.7	49

Temperature (°F) of water, water year October 1959 to September 1960

Month	Day																													Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
October.....	82	82	82	82	81	81	80	80	80	80	81	81	80	77	76	76	74	73	73	74	73	74	73	73	71	72	69	68	68	68	68	76
November.....	68	68	68	69	69	63	62	61	59	60	60	61	62	60	59	59	56	53	54	55	56	57	--	58	60	56	57	55	54	53	--	60
December.....	54	54	54	51	52	51	50	51	53	54	54	55	54	54	54	55	58	57	55	54	54	53	52	53	53	53	54	52	52	51	51	53
January.....	50	51	51	50	50	49	48	48	48	49	48	47	50	51	51	51	54	52	50	50	50	49	42	47	46	46	47	46	45	45	45	49
February.....	45	45	47	47	47	48	49	49	50	51	51	51	49	49	49	49	49	48	48	47	43	43	47	47	46	47	43	47	46	--	--	47
March.....	46	45	44	44	43	43	43	43	44	43	43	44	45	45	46	46	46	46	47	48	48	50	50	54	52	52	54	55	55	56	58	48
April.....	60	58	61	58	60	61	61	64	61	63	63	63	64	66	66	67	68	66	69	69	69	70	71	72	72	72	--	74	73	73	--	66
May.....	75	71	72	73	73	74	71	71	72	72	72	71	72	72	72	73	72	74	75	76	77	77	77	79	81	80	80	80	81	82	81	75
June	--	83	82	82	83	82	83	82	82	82	84	83	84	83	83	84	84	83	84	85	85	84	85	85	85	86	85	86	86	86	--	84
July.....	87	87	88	88	88	89	88	88	86	86	87	85	87	87	86	86	86	86	86	85	86	--	87	88	87	88	88	89	88	88	88	87
August.....	83	87	88	88	88	88	88	89	90	88	85	87	86	86	84	86	85	87	84	84	85	82	80	83	83	85	84	85	85	85	85	86
September.....	83	82	82	83	83	82	82	88	87	86	84	83	83	83	82	83	84	84	83	84	84	84	84	84	84	83	81	80	79	79	--	83

MISSISSIPPI RIVER MAIN STEM

7-3734.2. MISSISSIPPI RIVER NEAR ST. FRANCISVILLE, LA.

LOCATION.--At ferry on State Highway 10 Crossing, 2 miles southwest of St. Francisville, West Feliciana Parish.
DRAINAGE AREA.--1,243,000 square miles, arbitrarily determined.
RECORDS AVAILABLE.--Chemical analyses: August 1954 to September 1960.
Water temperatures: August 1954 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 313 ppm Oct. 1-10; minimum, 203 ppm Jan. 1-31.
Hardness: Maximum, 175 ppm Oct. 1-10; minimum, 120 ppm Jan. 1-31.
Specific conductance: Maximum daily, 645 micromhos Oct. 9; minimum daily, 275 micromhos Feb. 6.
Water temperatures: Maximum, 81°F Oct. 1; minimum, 42°F Jan. 15.
EXTREMES, 1954-60.--Dissolved solids: Maximum, 320 ppm Oct. 11-20, 1955; minimum, 111 ppm Feb. 11-19, 1957.
Hardness: Maximum, 185 ppm Jan. 21-31, 1956; minimum, 75 ppm Feb. 11-19, 1957.
Specific conductance: Maximum daily, 683 micromhos Oct. 16, 1955; minimum daily, 173 micromhos Apr. 15, 1955.
Water temperatures: Maximum, 87°F July 12, Aug. 12, 1955, Aug. 8, 11-13, 1956; minimum, 37°F Feb. 18, 1958.
REMARKS.--Records of specific conductance of daily samples available in district office at Baton Rouge, La. Records of discharge not available for this station.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Oct. 1-10, 1959.		10	0.02	48	13	41	3.3	160		71	44	0.5	1.2		313	0.43		175	39	1.4	514	7.7	10
Oct. 11-20.....		9.4	.03	38	8.8	33	3.0	124		44	39	.4	1.5		239	.33		131	28	1.3	410	7.7	10
Oct. 21-31.....		10	.04	36	9.3	22	3.4	118		44	27	.4	.8		219	.30		128	28	.8	360	7.5	10
Nov. 1-10.....		10	.06	40	12	25	3.1	131		57	29	.4	1.4		246	.33		149	38	.9	411	7.6	10
Nov. 11-20.....		9.3	.06	43	11	28	2.9	125		59	38	.4	1.5		261	.35		154	48	1.0	443	7.6	10
Nov. 21-30.....		9.7	.08	42	14	24	3.0	133		60	31	.4	1.6		266	.36		161	51	.8	438	7.5	10
Dec. 1-31.....		12	.02	40	9.8	20	2.3	108		56	26	.4	2.5		239	.33		140	47	.7	389	7.8	10
Jan. 1-31, 1960.		9.6	.05	34	8.6	14	2.2	93		41	22	.3	3.8		203	.28		120	39	.6	320	7.7	10
Feb. 1-29.....		9.0	.03	37	9.2	16	2.0	102		50	22	.2	5.2		205	.28		130	41	.6	331	7.3	20
Mar. 1-31.....		10	.02	36	9.8	17	1.7	102		44	23	.3	4.6		204	.28		130	41	.6	327	7.2	15
Apr. 1-30.....		14	.02	40	6.1	18	2.2	106		48	18	.4	3.6		208	.28		125	33	.7	347	7.5	10
May 1-31.....		14	.02	44	9.3	15	2.5	126		46	20	.5	2.9		220	.30		148	42	.5	360	7.6	10
June 1-30.....		8.0	.04	49	6.8	15	2.0	129		48	19	.7	1.4		228	.31		150	39	.5	369	7.7	20
July 1-31.....		11	.00	45	7.0	18	2.7	131		42	20	.4	3.2		253	.34		141	33	.7	371	7.0	10
Aug. 1-31.....		12	.01	51	7.5	25	2.8	149		46	31	.5	.7		267	.36		158	33	.9	411	7.3	10
Sept. 1-30.....		8.9	.01	43	13	25	2.5	146		51	28	.7	2.3		255	.35		162	40	.9	425	7.4	20
Time-weighted average.....		11	0.02	42	9.1	20	2.4	121		49	25	0.4	2.7		233	0.32		142	39	0.7	376	7.4	13

MISSISSIPPI RIVER MAIN STEM--Continued

7-3734.2. MISSISSIPPI RIVER NEAR ST. FRANCISVILLE, LA.--Continued

Temperature (°F) of water, water year October 1959 to September 1960

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

7-3744. MISSISSIPPI RIVER AT LULING FERRY, LA.

LOCATION.--At ferry at Luling-to-Destrehan Crossing, St. Charles Parish, 17 miles west of New Orleans.
DRAINAGE AREA.--1,243,600 square miles, arbitrarily determined.
RECORDS AVAILABLE.--Chemical analyses: October 1957 to September 1960.
Water temperatures: October 1957 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 326 ppm Oct. 11-16; minimum, 195 ppm Jan. 1-20.
Hardness: Maximum, 178 ppm Oct. 1-10; minimum, 118 ppm Jan. 1-20.
Specific conductance: Maximum daily, 636 micromhos Oct. 12; minimum daily, 285 micromhos Feb. 8.
Water temperatures: Maximum, 86°F Sept. 11-14, 20-23; minimum, 40°F Mar. 5-8, 9-13.
EXTREMES, 1957-60.--Dissolved solids: Maximum, 326 ppm Oct. 11-16, 1959; minimum, 152 ppm Dec. 11-20, 1957.
Hardness: Maximum, 182 ppm Nov. 11-20, 1958, Jan. 1-10, 1959; minimum, 90 ppm Dec. 1-10, 1957.
Specific conductance: Maximum daily, 636 micromhos Oct. 12, 1959; minimum daily, 225 micromhos Dec. 14, 1957.
Water temperatures: Maximum, 86°F Sept. 11-14, 20-22, 1960; minimum, 39°F Feb. 18, 19, 1958.
REMARKS.--Records of specific conductance of daily samples available in district office at Baton Rouge, La. Records of discharge not available for this station.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Oct. 1-10, 1959.		8.3	0.02	49	14	38	3.3	159		77	37	0.5	2.6		311	0.42		178	45	1.2	484	7.7	10
Oct. 11-16.....		8.6	.02	45	10	53	3.4	133		75	60	.5	2.8		326	.44		154	41	1.9	514	7.6	10
Oct. 17-20.....		10	.02	36	8.1	28	2.9	114		44	34	.4	1.4		224	.30		123	27	1.1	364	7.6	10
Oct. 21-31.....		13	.02	36	9.1	24	3.3	115		44	31	.4	1.4		227	.31		127	31	.9	362	7.5	10
Nov. 1-10.....		11	.03	39	10	26	3.2	121		54	32	.4	1.3		241	.33		140	36	1.0	392	7.5	10
Nov. 11-19.....		11	.02	44	12	32	3.1	127		68	40	.3	1.3		279	.38		158	51	1.1	450	7.5	10
Nov. 21-30.....		8.1	.10	46	12	29	3.0	126		66	37	.5	2.9		278	.38		162	57	1.0	473	7.4	20
Dec. 1-10.....		8.1	.10	42	15	32	3.1	136		68	38	.4	3.2		284	.39		166	54	1.1	478	7.5	20
Dec. 11-20.....		6.9	.13	43	11	24	2.7	119		54	38	.4	3.5		254	.35		154	53	.8	446	7.4	20
Dec. 21-31.....		8.2	.03	35	8.2	18	2.3	89		46	29	.3	3.1		204	.28		121	47	.7	340	7.3	10
Jan. 1-20, 1960.		6.9	.04	34	8.1	15	2.2	90		42	24	.3	3.4		195	.27		118	41	.6	320	7.4	10
Jan. 21-31.....		8.0	.04	36	8.8	18	2.1	95		48	26	.4	3.9		213	.29		126	47	.7	340	7.8	10
Feb. 1-29.....		8.8	.01	37	9.7	18	2.0	103		51	26	.1	5.4		213	.29		132	46	.7	343	7.3	15
Mar. 1-31.....		8.5	.01	37	9.2	17	1.8	102		50	24	.1	5.0		207	.28		130	41	.6	331	7.4	10
Apr. 1-30.....		10	.02	38	11	14	2.1	105		49	23	.5	2.5		214	.29		140	49	.5	345	7.4	10
May 1-31.....		11	.02	43	9.7	13	2.5	122		43	19	.6	1.9		219	.30		147	45	.5	357	7.8	10
June 1-30.....		12	.00	47	7.0	18	2.7	130		47	22	.5	3.1		243	.33		146	39	.6	389	7.2	10
July 1-31.....		12	.00	45	6.8	21	2.7	144		43	21	.4	.0		233	.32		140	17	.8	371	7.1	10
Aug. 1-31.....		10	.00	44	11	22	3.0	148		47	24	.5	1.2		253	.34		153	29	.8	436	7.2	10
Sept. 1-30.....		9.0	.02	44	13	27	2.5	150		54	31	.7	2.3		274	.37		164	37	.9	447	7.4	20
Time-weighted average.....		9.7	0.02	41	9.9	21	2.5	122		51	27	0.4	2.7		237	0.32		143	40	0.8	386	7.4	12

MISSISSIPPI RIVER MAIN STEM--Continued

7-3744. MISSISSIPPI RIVER AT LULING FERRY, LA.--Continued

Temperature (°F) of water, water year October 1959 to September 1960

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

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MISSISSIPPI RIVER DELTA

7-3825. BAYOU COURTABLEAU AT WASHINGTON, LA.

LOCATION.--At bridge on State Highway 5 at Washington, 0.2 mile upstream from Texas and New Orleans Railroad bridge, 1.5 miles upstream from Bayou Carron, and 3.5 miles downstream from confluence of Bayou Cocodrie and Bayou Boeuf.
RECORDS AVAILABLE.--Chemical analyses: October 1959 to August 1960.
REMARKS.--Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, October 1959 to August 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 26, 1959....	217	17	0.39	9.0	3.3	7.4	2.0	48		1.4	8.1	0.1	0.6		73	0.10	43	36	0	0.5	108	7.3
Nov. 18.....	206	18	.25	9.8	4.3	6.2	2.0	52		1.0	9.4	.1	.5		78	.11	43	42	0	.4	131	6.6
Dec. 20.....	4,050	7.7	.40	7.9	2.0	5.8	2.1	30		3.4	8.6	.2	2.2		55	.07	601	28	3	.5	96	6.3
Jan. 19, 1960....	2,610	7.6	.51	12	3.2	8.0	2.9	56		11	10	.3	.9		79	.11	557	43	5	.5	124	6.8
Feb. 10.....	1,030	7.8	.54	10	2.7	6.9	2.2	42		5.4	8.4	.3	.7		66	.09	184	36	2	.5	108	6.6
Mar. 9.....	1,270	6.1	.32	9.1	2.5	4.8	1.4	40		3.8	5.4	.2	.3		54	.07	185	33	0	.4	95	6.9
Apr. 6.....	562	4.6	.27	14	4.2	13	2.2	59		3.2	21	.1	.4		a115	.16	175	52	4	.8	177	6.4
May 12.....	509	7.9	.47	13	4.5	5.8	2.0	54		3.2	11	.2	.8		76	.10	104	51	7	.4	138	6.4
June 9.....	191	9.5	.22	13	3.8	9.0	2.2	58		3.2	12	.1	1.6		84	.11	43	48	0	.6	142	6.4
July 15.....	44	9.6	.11	12	4.2	15	2.1	60		1.0	21	.2	.4		a112	.15	13	47	0	.9	176	6.3
Aug. 10.....	245	12	.27	12	4.6	31	3.3	54		2.6	52	.4	1.5		147	.20	97	49	5	1.9	269	6.7

a Residue at 180°C.

MISSISSIPPI RIVER DELTA--Continued

7-3835. BAYOU DES GLAISES DIVERSION CHANNEL AT MOREAUVILLE, LA.

LOCATION.--At bridge on State Highway 1 at Moreauville, 150 feet downstream from point of diversion from Bayou des Glaises.
DRAINAGE AREA.--270 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1959 to August 1960.
REMARKS.--Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, October 1959 to August 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 29, 1959....	35	12	0.02	49	19	48	4.8	262		39	38	0.6	0.3		345	0.47	33	199	0	1.5	572	7.3
Nov. 24.....	22	14	.05	57	21	45	4.0	278		47	40	.5	.7		367	.50	22	228	0	1.3	595	7.9
Dec. 15.....	185	10	.24	50	15	38	5.5	206		48	37	.3	1.2		321	.44	160	186	17	1.2	532	7.1
Jan. 14, 1960....	598	6.8	.42	20	4.7	6.4	1.8	76		10	6.0	.5	1.0		a95	.13	153	69	7	.3	166	6.8
Feb. 8.....	706	6.5	.85	22	6.1	8.0	3.4	92		13	6.9	.5	1.4		a114	.16	217	80	5	.4	193	6.8
Mar. 11.....	596	4.8	.42	22	6.4	8.3	2.7	92		16	7.1	.3	1.0		a114	.16	183	81	6	.4	198	7.1
Apr. 4.....	116	9.1	.05	51	17	29	3.1	229		34	28	.1	1.6		304	.41	95	195	7	.3	495	7.1
June 6.....	22	14	.02	52	36	45	2.8	320		50	46	.6	.1		404	.55	24	279	17	1.2	688	7.9
July 11.....	11	19	.02	85	11	43	3.8	328		27	41	.9	.2		403	.55	12	258	0	1.2	664	7.2
Aug. 8.....	36	12	.01	64	16	72	3.5	290		43	72	1.0	.9		427	.58	42	225	0	2.1	801	7.3

a Calculated from determined constituents.

7-3855. BAYOU TECHE AT ARNAUDVILLE, LA.

LOCATION.--At gaging station near center of span on upstream side of bridge on State Highway 356 at Arnaudville, St. Martin-St. Landry Parish line, 300 feet upstream from Bayou Fusulier.
DRAINAGE AREA.--1,531 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1958 to August 1960.
REMARKS.--Records of discharge for water year October 1959 to September 1960 given in WSP 1711.

Chemical analyses, in parts per million, October 1959 to August 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 26, 1959....	480	15	0.16	28	8.3	20	3.7	126		13	26	0.3	0.1		a187	0.25	242	104	1	0.9	294	7.2
Nov. 19.....	325	12	.30	14	4.6	8.3	3.9	64		7.8	11	.2	.3		94	.13	82	54	2	.5	161	6.7
Dec. 19.....	1,600	3.6	.41	3.2	1.0	3.2	2.1	18		1.0	3.0	.2	1.1		28	.04	121	12	0	.4	54	6.3
Jan. 18, 1960....	1,230	6.9	.59	7.8	2.3	6.2	3.4	31		7.8	8.0	.3	1.3		60	.08	199	29	4	.5	95	6.4
Feb. 11.....	960	7.3	.64	11	3.3	7.4	1.4	48		2.8	10	.4	.4		69	.09	179	41	2	.5	121	6.8
Mar. 9.....	1,010	5.9	.32	9.8	2.8	6.0	2.1	42		3.0	9.0	.2	.6		61	.08	166	36	2	.4	110	6.9
Apr. 8.....	830	6.1	.32	23	7.0	16	2.7	98		11	22	.1	1.2		a155	.21	347	86	6	.8	245	6.8
May 12.....	970	8.0	.57	13	4.8	4.8	2.0	54		2.6	11	.3	.9		75	.10	196	52	8	.3	142	6.3
June.....	940	7.2	.04	32	9.8	14	2.9	137		14	18	.3	.7		166	.23	421	120	8	.6	298	6.8
July 14.....	700	10	.03	32	3.9	13	3.8	112		9.6	19	.2	.7		a151	.21	285	96	4	.6	259	6.5
Aug. 11.....	400	10	.49	15	2.8	9.9	4.7	57		4.8	17	.2	.9		a124	.17	134	49	2	.6	167	6.4

a Residue at 180°C.

MISSISSIPPI RIVER DELTA--Continued

7-3857.3. BAYOU TECHE AT OLIVIER, LA.

LOCATION.--On State Highway 320 off U.S. Highway 90 at Olivier, Iberia Parish.
RECORDS AVAILABLE.--Chemical analyses: October 1959 to September 1960.
REMARKS.--Records of discharge not available.

Chemical analyses in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 27, 1959....		12	0.38	24	6.9	17	3.4	108		4.2	25	0.3	0.5		a171	0.23		88	0	0.8	265	6.9
Nov. 19.....		10	.50	14	2.9	8.7	1.6	56		2.4	13	.1	.8		82	.11		47	1	.6	149	6.3
Dec. 14.....		15	1.1	19	6.2	12	3.0	93		2.2	17	.1	.5		a141	.19		73	0	.6	223	6.7
Feb. 18, 1960....		8.3	1.4	21	4.5	34	3.3	75		7.0	56	.4	1.1		174	.24		71	10	1.8	319	7.2
Mar. 24.....		6.5	.88	16	4.2	13	2.3	64		5.6	19	.2	1.9		102	.14		57	5	.8	184	6.9
Apr. 25.....		4.1	.02	31	11	22	2.9	144		9.0	31	.4	.2		a197	.27		121	3	.9	334	7.4
May 31.....		9.1	.95	23	6.0	12	3.3	90		3.4	22	.3	1.6		126	.17		82	8	.6	221	6.3
June 23.....		11	.02	31	7.9	17	2.6	130		11	22	.5	.3		a194	.26		110	3	.7	307	6.8
Aug. 18.....		10	.45	16	5.1	14	2.7	64		12	21	.2	1.4		115	.16		61	9	.8	202	6.2
Sept. 20.....		12	.02	30	8.3	26	3.2	126		7.8	40	.2	.4		a212	.29		109	6	1.1	342	6.8

a Residue at 180°C.

7-3869. VERMILION RIVER AT LAFAYETTE, LA.

LOCATION.--At gaging station at bridge on U.S. Highway 90, 1.4 miles downstream from Southern Pacific Railroad bridge, and 0.9 mile south of Lafayette, Lafayette Parish.
RECORDS AVAILABLE.--Chemical analyses: October 1958 to September 1960.
REMARKS.--Records of discharge not available.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 26, 1959....		15	0.17	32	11	108	4.8	129		13	174	0.4	0.1		453	0.62		124	19	4.2	785	7.0
Nov. 19.....		13	.90	17	6.2	86	4.1	68		11	136	.4	1.0		319	.43		68	12	4.6	587	6.6
Dec. 21.....		5.4	.26	6.7	3.5	33	5.0	25		8.2	56	.4	1.7		a132	.18		31	10	2.6	255	6.2
Jan. 18, 1960....		9.7	.40	14	3.7	39	3.2	46		4.4	66	.3	1.1		219	.30		50	12	2.4	311	6.7
Feb. 12.....		7.3	.62	14	3.4	36	2.9	52		5.6	58	.3	.8		a155	.21		49	6	2.2	289	6.9
Mar. 11.....		5.7	.34	13	3.3	19	2.4	47		3.2	34	.2	.6		a105	.14		46	8	1.2	202	6.7
Apr. 8.....		6.4	.34	23	7.2	22	2.8	96		6.2	35	.2	.9		182	.25		87	8	1.0	285	6.8
May 12.....		8.1	1.04	12	5.1	20	3.3	55		3.0	32	.2	1.4		182	.25		51	6	1.2	204	7.0
June 10.....		7.0	.09	28	8.6	20	3.0	120		8.6	32	.1	1.4		195	.27		105	7	.8	315	6.7
July 13.....		6.6	.03	35	9.4	76	3.9	138		8.6	120	.3	1.6		358	.49		126	13	3.0	677	7.1
Aug. 12.....		9.5	.37	14	4.6	18	2.7	58		7.6	28	.4	2.1		149	.20		54	6	1.1	208	6.2

a Calculated from determined constituents.

MISSISSIPPI RIVER DELTA--Continued

7-3870. VERMILION RIVER AT BANCKER FERRY, NEAR ABBEVILLE, LA.

LOCATION.--At Bancker Ferry about 6 miles south of Abbeville, Vermilion Parish.
RECORDS AVAILABLE.--Chemical analyses: January 1949 to September 1960.
Water temperatures: January 1949 to September 1960.
EXTREMES, 1959-60.--Specific conductance: Maximum daily, 3,080 micromhos June 23; minimum daily, 87.6 micromhos Oct. 16.
Water temperatures: Maximum, 91°F July 10; minimum, 48°F Jan. 23, 25, 26, Feb. 19.
EXTREMES, 1949-60. --Specific conductance: Maximum daily, 21,200 micromhos Sept. 18, 1954; minimum daily, 39.1 micromhos Feb. 26, 1959.
Water temperatures: Maximum, 98°F Aug. 9, Sept. 3, 1951; minimum, 32°F Dec. 11, 12, 1956.
REMARKS.--Records of discharge not available for this station.

Specific conductance and chloride (Cl), in parts per million, water year October 1959 to September 1960

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	353	56	357	73	1,670	--	440	108
2	344	--	343	--	663	162	440	--
3	416	--	439	--	652	--	288	--
4	374	--	412	--	651	--	298	--
5	406	--	293	--	639	--	280	--
6	339	--	806	227	639	--	325	--
7	531	123	502	--	638	--	230	--
8	531	--	946	264	1,030	274	243	--
9	543	--	471	--	1,030	--	314	--
10	297	59	818	--	1,070	--	538	140
11	302	--	761	209	1,910	538	321	--
12	222	--	430	--	--	--	296	--
13	261	--	340	--	500	700	295	--
14	300	--	433	--	2,470	--	250	50
15	115	--	348	--	1,140	301	197	--
16	87.6	9.4	336	--	2,430	--	259	--
17	1,250	354	342	--	1,160	--	196	--
18	1,250	--	245	--	345	85	194	--
19	789	--	320	--	187	--	197	--
20	523	--	901	238	170	--	293	--
21	481	--	898	--	178	--	198	--
22	388	82	895	--	240	58	191	38
23	436	--	307	60	238	--	200	--
24	311	--	300	--	212	--	230	--
25	313	--	301	--	225	--	208	--
26	306	--	1,650	460	217	--	231	--
27	297	--	1,660	--	240	--	222	--
28	266	--	1,640	--	240	--	221	--
29	288	--	1,680	--	280	--	218	--
30	343	--	1,670	--	259	--	240	46
31	449	--	--	--	272	--	672	--

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	679	177	224	41	1,230	--	94.3	13
2	483	--	221	--	350	61	104	--
3	499	--	258	--	334	--	266	--
4	247	--	267	--	431	--	304	62
5	217	--	266	--	271	--	292	--
6	239	--	1,320	381	277	--	281	--
7	249	--	999	--	284	--	262	--
8	245	--	293	--	322	--	251	--
9	211	39	253	--	361	--	247	--
10	220	--	256	--	358	--	252	--
11	192	--	235	50	485	--	226	38
12	190	--	215	--	839	205	219	--
13	280	--	251	--	845	--	189	--
14	240	--	252	--	643	--	196	--
15	239	43	217	--	396	--	244	--
16	237	--	251	--	382	--	242	--
17	227	--	378	89	402	--	231	--
18	738	199	262	50	393	--	228	--
19	273	--	262	--	385	56	229	--
20	274	--	265	--	386	--	266	--
21	226	44	274	--	390	--	258	42
22	239	--	240	--	480	--	299	--
23	238	--	232	--	366	--	348	55
24	237	--	262	--	413	--	316	--
25	234	--	257	--	366	--	300	--
26	266	--	273	--	450	--	285	--
27	214	--	273	--	420	--	291	--
28	238	--	249	--	381	--	309	--
29	227	--	272	--	340	--	310	--
30	--	--	302	--	332	--	310	--
31	--	--	--	795	--	--	311	--

MISSISSIPPI RIVER DELTA--Continued

7-3870. VERMILION RIVER AT BANCKER FERRY, NEAR ABBEVILLE, LA.--Continued

Specific conductance and chloride (Cl), in parts per million, water year October 1959 to September 1960--Continued

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	321	--	502	82	351	--	266	40
2	319	--	491	--	352	--	345	--
3	321	--	475	--	444	--	329	--
4	328	--	414	--	236	--	315	--
5	402	63	430	--	251	--	325	--
6	399	--	434	--	252	--	391	--
7	369	--	393	--	429	--	396	--
8	371	--	393	--	427	--	390	--
9	375	--	995	--	355	--	363	61
10	372	--	1,820	470	274	--	374	--
11	339	43	436	53	391	72	393	66
12	338	--	413	--	301	38	435	--
13	338	--	409	--	273	--	433	--
14	341	--	383	--	241	--	409	--
15	341	--	383	--	222	--	367	--
16	340	--	347	--	252	--	376	--
17	346	--	350	--	255	--	377	--
18	348	--	349	--	242	--	328	--
19	348	--	377	--	239	46	328	--
20	369	--	299	--	314	--	369	67
21	364	--	275	--	309	42	586	133
22	364	41	248	--	331	--	586	--
23	3,080	821	288	--	239	--	499	--
24	3,060	--	293	--	294	--	462	--
25	1,450	367	324	48	221	--	460	--
26	1,830	--	328	--	240	--	471	--
27	551	--	319	--	285	--	460	--
28	559	--	318	--	283	--	440	--
29	478	--	323	--	281	--	432	--
30	498	--	313	--	234	--	436	93
31	--	--	312	--	264	--	--	--

MISSISSIPPI RIVER DELTA--Continued

7-3870. VERMILION RIVER AT BANCKER FERRY, NEAR ABBEVILLE, LA.--Continued

Temperature (°F) of water, water year October 1959 to September 1960

Month	Day																													Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
October	82	81	83	86	82	79	80	76	78	77	70	78	78	78	79	76	72	69	68	69	70	71	70	71	69	69	70	67	67	68	--	74
November	71	71	70	72	73	70	66	61	58	58	60	60	60	62	58	60	59	57	60	68	69	69	70	72	71	68	67	78	66	67	--	65
December	69	70	67	66	67	68	68	68	67	56	--	--	59	58	59	61	61	61	61	59	59	55	56	56	58	57	59	58	56	59	59	61
January	57	57	53	51	51	53	49	49	50	54	53	55	56	56	57	56	57	56	55	53	52	49	48	49	48	48	52	52	52	51	51	52
February	52	51	52	51	53	54	54	54	57	59	58	56	55	53	51	51	50	50	48	50	53	53	52	51	50	51	53	55	54	--	--	52
March	53	52	51	51	50	52	50	50	53	54	54	52	52	53	57	58	57	58	58	59	56	58	62	64	65	67	67	66	68	68	69	57
April	69	59	57	67	67	67	68	70	70	71	70	71	71	72	73	74	74	82	72	74	75	75	77	78	78	77	75	77	77	75	--	72
May	69	70	70	72	73	75	65	72	72	74	72	71	70	72	74	75	76	77	78	79	78	81	82	83	84	82	83	84	84	83	84	76
June	84	84	84	85	85	85	85	84	84	84	85	85	86	86	87	85	85	83	85	86	85	87	85	89	86	87	85	87	88	88	--	85
July	88	90	86	88	86	90	89	--	88	91	88	88	87	82	85	87	88	87	87	84	86	87	--	90	90	88	89	88	90	90	89	87
August	86	83	84	88	89	95	87	87	86	83	84	83	83	81	82	81	82	83	84	85	84	84	83	84	85	83	84	83	83	85	83	84
September	85	86	86	85	86	86	87	87	86	86	85	82	81	81	80	81	82	82	82	82	83	83	83	80	85	85	82	80	80	78	--	83

CANADIAN RIVER AND TUCUMCARI IRRIGATION PROJECT SEEPAGE INVESTIGATION

Samples were collected for chemical analyses on the Canadian River below Conchas Dam and throughout the Tucumcari Irrigation Project during Apr. 11-12, 1960, June 20-21, 1960. Discharge measurements and sample collections were concentrated on the Tucumcari Irrigation Project which is drained primarily by Pajarito and Ruvuelto Creeks and their tributary systems in New Mexico. Records of discharge for water year October 1958 to September 1959 given in WSP 1711.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date	Stream or diversion	Location	Discharge (cfs)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Hardness as $CaCO_3$		Specific conductance (micromhos at 25°C)	pH
							Calcium, magnesium	Noncarbonate		
June 20, 1960	Conchas Reservoir	At dam	--	156	231	16	272	144	730	7.9
Apr. 11	Canadian River.	SW¼SW¼ sec.28, T.14 N., R.26 E., 150 feet below toe of Conchas Dam.	2.68	346	512	390	695	412	2560	7.7
June 20	Do	....do	4.43	252	447	305	552	346	2090	7.0
Apr. 11	Do	SW¼SW¼ sec.36, T.13 N., R.28 E., below Johnson Rincon 14 miles northwest of Tucumcari.	.73	246	752	180	720	518	2200	7.3
June 20	Do	....do	.02	285	415	133	290	56	1620	7.9
Apr. 11	Pajarito Creek	SE¼NE¼ sec.3, T.11 N., R.30 E., at bridge on State Highway 104, 2.5 miles northwest of Tucumcari.	3.40	a428	1080	170	530	180	3090	8.3
June 20	Do	....do	2.34	357	966	144	455	162	2680	8.1
Apr. 11	Drain No. 10	SW¼NE¼ sec.33, T.12 N., R.30 E., below State Highway 104, 4 miles northwest of Tucumcari.	.05	288	612	290	520	284	2420	8.1
June 20	Do	....do	.01	306	889	158	720	469	2380	7.8
Apr. 12	Dawson Drain	SW¼SE¼ sec.36, T.12 N., R.30 E., at end 2 miles north of Tucumcari.	.13	500	1200	345	755	345	3770	8.1
June 21	Do	....do	.29	459	945	218	650	274	2900	7.9
Apr. 12	Sewage Creek	SW¼SW¼ sec.30, T.12 N., R.31 E., above pond 2 miles north of Tucumcari.	--	588	227	105	284	0	1510	7.4
June 21	Do	....do	--	777	186	122	285	0	1590	7.4
Apr. 11	Do	SE¼NE¼ sec.35, T.12 N., R.30 E., above mouth 3 miles north of Tucumcari.	.97	590	389	155	350	0	1970	7.9
June 20	Do	....do	1.33	575	346	137	320	0	1750	8.1
Apr. 11	Pajarito Creek	NW¼NW¼ sec.25, T.12 N., R.30 E., below railroad bridge at county line, 3 miles north of Tucumcari and 6 miles above mouth.	4.42	442	968	175	490	128	2950	8.0
June 20	Do	....do	3.86	b425	825	146	430	82	2480	8.4
Apr. 12	Drain No. 20	SW¼NE¼ sec.18, T.11 N., R.31 E., at end 1.5 miles east of Tucumcari.	.24	427	608	155	440	90	2200	7.7
June 20	Do	....do	.25	376	567	152	375	67	2090	7.7

a Includes equivalent of 4 parts per million of carbonate (CO_3).
b Includes equivalent of 10 parts per million of carbonate (CO_3).

CANADIAN RIVER AND TUCUMCARI IRRIGATION PROJECT SEEPAGE INVESTIGATION--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date	Stream or diversion	Location	Discharge (cfs)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Hardness as $CaCO_3$		Specific conductance (micromhos at 25°C)	pH
							Calcium, magnesium	Noncarbonate		
Apr. 12, 1960.....	Canadian River.....	NW¼SE¼ sec.24, T.13 N., R.31 E., below dripping springs 2 miles east of Quay County line and 12 miles northeast of Tucumcari.	3.22	c432	910	298	515	160	3100	8.5
Apr. 11.....	Ute Creek.....	NE¼ sec.35, T.14 N., R.32 E., at regular gaging station near Logan.	.10	280	177	68	290	60	949	8.2
June 21.....	Do.....	....do.....	.09	238	165	54	224	29	841	7.9
June 21.....	Canadian River.....	NE¼ sec.15, T.13 N., R.33 E., at regular gaging station at Logan.	7.48	315	596	920	540	282	4250	7.9
Apr. 11.....	Plaza Larga Creek.....	SE¼SW¼ sec.15, T.10 N., R.31 E., below Conchas Canal siphon 32, at gaging station of Arch Hurley Conservancy District, 7 miles southeast of Tucumcari.	.01	315	884	140	395	138	2540	8.0
June 20.....	Do.....	....do.....	.05	309	469	76	238	0	1600	7.3
Apr. 11.....	Do.....	SW¼NW¼ sec.13, T.10 N., R.31 E., at Highway 88, 8 miles southeast of Tucumcari.	.10	342	1650	315	785	504	4220	8.0
June 20.....	Do.....	....do.....	.46	330	1410	268	655	384	3690	7.8
Apr. 11.....	Do.....	NW¼SE¼ sec.29, T.11 N., R.32 E., at 9-mile Road, 9 miles east of Tucumcari.	.14	238	1590	240	795	600	3830	8.0
June 20.....	Do.....	....do.....	1.65	252	950	151	480	274	2510	7.7
Apr. 12.....	Drain No. 50.....	NE¼SE¼ sec.1, T.11 N., R.31 E., at mouth, 7 miles east of Tucumcari.	.03	432	591	85	412	58	1950	7.8
June 20.....	Do.....	....do.....	.05	507	653	86	430	14	2090	7.7
June 20.....	Drain No. 51.....	SE¼SW¼ sec.4, T.11 N., R.32 E., at mouth, 9 miles northeast of Tucumcari.	.05	500	537	61	362	0	1880	7.8
June 20.....	Barranca Creek.....	SW¼SW¼ sec.16, T.10 N., R.32 E., at Underwood farm, 11 miles southeast of Tucumcari.	.06	208	1150	160	505	334	2840	7.6
Apr. 11.....	Do.....	SW¼SW¼ sec.19, T.11 N., R.33 E., at mouth, 13 miles east of Tucumcari.	.04	374	1130	228	355	48	3330	8.2
June 20.....	Do.....	....do.....	1.15	344	805	136	295	13	2410	8.0
Apr. 11.....	Plaza Larga Creek.....	SE¼NE¼ sec.19, T.11 N., R.33 E., at mouth, 14 miles east of Tucumcari.	.18	276	1300	205	580	354	3300	8.2
June 20.....	Do.....	....do.....	4.67	276	736	110	380	154	2090	7.7
Apr. 11.....	Revuelto Creek.....	NW¼NE¼ sec.20, T.11 N., R.33 E., below Plaza Larga Creek, 14 miles east of Tucumcari.	.20	288	1320	210	592	356	3390	7.9
June 21.....	Do.....	....do.....	3.47	222	398	100	216	34	1420	8.1
June 20.....	Do.....	NE¼NW¼ sec.24, T.13 N., R.33 E., at State Highway 39, 2 miles above mouth and 3 miles southeast of Logan.	2.54	276	715	110	360	134	2110	7.7

c Includes equivalent of 16 parts per million of carbonate (CO_3)

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN LOWER MISSISSIPPI RIVER BASIN

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
ARKANSAS RIVER BASIN																							
7-1436.3. LITTLE ARKANSAS RIVER AT MEDORA, KANS.																							
Dec. 12, 1959...	a 3	12	0.00	117	25	68	5.5	426	0	68	95	0.2	0.1	0.08	609	0.83	4.93	396	47	1.5	1010	7.9	5
May 1, 1960.....	30.4	14	.01	169	32	355	7.2	255	0	69	752	.4	1.9	.12	2060	2.80	169	552	343	6.6	2810	7.2	--
Aug. 4.....	2.7	15	.47	90	17	142	6.4	259	0	35	261	.5	1.1	.11	731	.99	5.33	295	83	3.6	1280	7.4	22
7-1436.6. TURKEY CREEK NEAR BUHLER, KANS.																							
Sept. 17, 1959..	a 4	23	0.14	99	12	96	5.8	259	0	53	176	0.4	2.1	0.11	630	0.86	6.80	295	83	2.4	1050	7.8	15
Dec. 15.....	4.6	21	.01	171	25	360	6.9	248	0	123	710	.5	30	.15	1730	2.35	21.5	528	325	6.8	2810	7.0	11
May 2, 1960.....	--	13	.01	280	46	750	7.0	214	0	73	1600	.4	.2	.22	4160	5.66	--	889	714	11	5240	6.9	--
May 5.....	--	7.4	.30	8.7	1.5	15	5.1	20	0	6.8	27	.2	3.6	.04	171	.23	--	28	12	1.2	173	6.2	--
Aug. 4.....	4.5	18	.22	169	27	354	6.9	259	0	62	756	.4	.3	.28	1700	2.31	20.7	531	319	6.7	2840	7.3	19
7-1436.65. LITTLE ARKANSAS RIVER AT ALTA MILLS, KANS.																							
Dec. 16, 1959...	11.8	--	--	142	24	184	--	322	0	125	324	--	--	--	1020	1.39	32.5	452	188	3.8	1690	7.8	
May 2, 1960.....	55.3	17	0.01	135	22	258	6.0	227	0	62	532	0.4	0.3	0.23	1380	1.88	206	426	240	5.4	2120	7.3	
Aug. 4.....	16.4	19	.36	105	17	152	5.3	254	0	54	274	.4	.7	.14	820	1.12	36.3	330	122	3.6	1390	7.4	20
7-1439. LITTLE ARKANSAS RIVER NEAR HALSTEAD, KANS.																							
Dec. 17, 1959...	16.5			124	18	132		320	0	82	230				802	1.09	35.7	384	122	2.9	1340	7.4	
May 3, 1960.....	65.9					168		163	0	40	338							306	172	4.2	1410	7.1	

a Estimated.

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN LOWER MISSISSIPPI RIVER BASIN--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
ARKANSAS RIVER BASIN--Continued																							
7-1440.35. EMMA CREEK NEAR SEDGWICK, KANS.																							
Dec. 18, 1959...	5.5	3.9	0.00	81	14	74	3.5	272	0	40	120	0.4	0.1	0.05	478	0.65	7.14	261	38	2.0	852	7.5	7
May 4, 1960:																							
At 0900.....	130	14	.08	58	7.4	31	5.1	204	0	34	36	.4	3.1	.04	312	.42	110	175	8	1.0	498	7.6	--
At 1045.....	a 3000	14	.06	18	3.4	13	6.2	62	0	13	15	.7	7.1	.03	144	.20	1170	59	8	.7	203	7.2	--
Aug. 4.....	3.4	22	.01	69	12	60	3.7	247	0	28	90	.5	1.7	.14	425	.58	3.90	221	18	1.8	709	7.2	9
7-1440.9. SAND CREEK NEAR SEDGWICK, KANS.																							
Dec. 18, 1959...	7.8	--	--	105	35	50	--	294	0	200	47	--	--	--	640	0.87	13.6	407	166	1.1	964	7.1	
May 4, 1960.....	--	24	0.05	56	11	11	5.4	175	0	54	5.5	0.5	2.4	0.07	276	.38	--	186	42	.4	408	7.8	
Aug. 4.....	11	30	.01	75	23	73	9.8	276	0	94	73	.5	24	.65	555	.75	16.5	282	56	1.9	874	7.0	18
7-1441.4. JESTER CREEK NEAR VALLEY CENTER, KANS.																							
Dec. 18, 1959...	2.2	7.4	0.01	104	27	33	4.9	362	0	116	22	0.2	0.2	0.06	501	0.68	2.91	370	73	0.7	791	7.6	
May 4, 1960.....	a 150					5.9		37	0	18	4.6							42	12	.4	132	7.4	
7-1490. MEDICINE LODGE RIVER NEAR KIOWA, KANS.																							
Oct. 26, 1959...	98	16	--	143	29	69		248	0	301	75	0.3	1.7	0.19	b 757	1.03	200	475	272	1.4	1110	7.9	
Feb. 16, 1960...	190	16	0.02	186	38	65		256	0	424	75	.5	2.5	.18	958	1.30	491	620	410	1.1	1300	8.2	
Apr. 4.....	174	14	.00	218	42	80		228	0	558	85	.3	1.1	.24	1140	1.55	536	715	528	1.3	1500	8.0	
July 27.....	47	20	.00	172	31	67		180	0	435	70	.3	.5	.22	953	1.30	121	555	408	1.2	1220	7.5	

7-1505. SALT FORK ARKANSAS RIVER NEAR JET, OKLA.

(Formerly published as 7-1505. Salt Fork Arkansas River at Great Salt Plains Reservoir, near Jet, Okla.)

Oct. 26, 1959...	400	4.0	--	118	35	576		128	0	303	900	0.3	1.6	0.17	b 2000	2.72	2160	440	335	12	3460	7.4
Feb. 16, 1960...	829	5.0	0.00	172	37	680		180	0	412	1050	.3	.6	.04	2450	3.33	5480	580	432	12	4080	8.0
Apr. 4.....	394	9.0	.00	192	62	624		164	0	593	950	.3	.0	.24	2640	3.59	2810	735	600	10	4120	7.9
July 27.....	452	10	.00	138	38	1050		122	0	409	1600	.3	1.0	.17	3370	4.58	4110	500	400	20	5620	7.3

7-1522.5. BOIS D'ARC CREEK NEAR PONCA CITY, OKLA.

Dec. 7, 1959....				236	63	106		184	0	687	152	--	1.2		1460	1.99		850	699	1.6	1840	7.9
Feb. 3, 1960....				204	53	112		148	0	612	145	0.3	5.6		b 1200	1.63		725	604	1.8	1660	8.0
Apr. 21.....				246	49	78		358	0	507	115	--	.4		1270	1.73		815	522	1.2	1670	7.6
May 19.....				260	51	85		350	0	558	125	--	.1		1360	1.85		860	573	1.3	1770	7.5
June 16.....				196	42	55		324	0	378	85	.3	.1		989	1.35		660	394	.9	1340	7.6
July 21.....				124	26	35		200	0	245	50	.3	.5		622	.85		415	251	.7	905	7.5
Aug. 19.....				88	20	43		168	0	164	60	--	.5		496	.67		300	162	1.1	787	7.3
Sept. 15.....				280	56	73		368	0	599	115	.3	.5		1410	1.92		930	628	1.0	1810	7.6

7-1575. CROOKED CREEK NEAR NYE, KANS.

Oct. 27, 1959...	8.4			92	32	543		240	0		950							360	164	12	3240	8.1
Nov. 23.....	13.7			108	20	493		248	0		860							350	147	11	2980	8.1
Feb. 17, 1960...	19.0			68	27	300		200	0		510							280	116	7.8	2090	7.9
Mar. 18.....	44.0			104	20	246		296	0		410							340	98	5.8	1870	7.4
Apr. 15.....	17.5			92	27	440		252	0		720							340	134	10	2790	7.8
May 24.....	3.3			84	46	602		204	0		1050							400	233	13	3540	8.0
June 22.....	10.3			88	32	493		244	0		850							350	150	11	3000	7.6
July 20.....	.1			88	37	572		184	0		1000							370	219	13	3410	7.8

a Estimated.
b Calculated from determined consituents.

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN LOWER MISSISSIPPI RIVER BASIN--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
ARKANSAS RIVER BASIN--Continued																							
SALT CREEK NEAR HITCHCOCK, OKLA.																							
Nov. 16, 1959 c.		4.0		1700	578	52100		103	0	3200	82600				b140000	190		6620	6540	279	159000	7.4	
Jan. 16, 1960...				725	246	10300		59	0	1880	18500				30500	41.5		2820	2770	85	44800	7.8	
7-1598. COTTONWOOD CREEK NEAR GUTHRIE, OKLA.																							
Feb. 17, 1960...	89.6			38	57	131		132	8		125							330	208	3.1	1160	8.4	
Mar. 23.....	65.0			42	55	128		152	10		125							330	189	3.1	1170	8.4	
Apr. 12.....	48.6			53	51	135		196	4		125							340	173	3.2	1180	8.3	
May 16.....	42.4			61	51	137		208	14		110							360	166	3.1	1070	8.4	
May 23.....	--			83	30	67		274	16	122	68		2.3		659	0.90		330	79	1.6	858	8.5	
June 16.....	105			67	27	67		276	12		60							280	34	1.7	753	8.5	
July 13.....	20.3			120	49	126		412	0		95							500	162	2.5	1290	8.2	
7-1640. CIMARRON RIVER AT MANNFORD, OKLA.																							
Oct. 27, 1959...	d 976	8.0	--	232	29	1120		324	0	313	1800	--	3.6	0.40	b 3670	4.99	9670	700	434	18	6250	7.5	
Dec. 8.....	d 611	--	--	142	63	1420		116	0	355	2300	0.7	--	--	b 4340	5.90	7160	615	520	25	7780	8.1	
Feb. 17, 1960...	1900	12	0.03	212	71	1080		272	0	527	1700	.5	1.3	.20	3820	5.20	19600	820	597	16	6260	7.7	
Apr. 5.....	1640	11	.00	188	59	852		246	0	504	1300	.5	1.3	.37	3120	4.24	13820	710	508	14	5090	7.6	
Apr. 19.....	d 3220	--	--	82	29	397		172	2	182	600	--	10	--	1420	1.93	12350	325	180	9.6	2370	8.3	
May 17.....	d 2690	--	--	86	29	402		176	8	127	650	--	5.1	--	1490	2.03	10820	335	178	9.6	2420	8.4	
July 25.....	14000	10	.00	72	18	268		178	0	111	408	.3	.5	.21	997	1.36	37690	255	109	7.3	1710	7.3	

7-1645. ARKANSAS RIVER AT TULSA, OKLA.

Oct. 27, 1959...	d 8070	16	--	136	20	298		264	0	162	482	0.1	3.0	0.10	b 1250	1.70	27240	420	204	6.3	2200	7.6
Feb. 15, 1960...	11100	10	0.00	85	19	211		162	0	170	308	.3	4.4	.06	910	1.24	27270	290	157	5.4	1530	8.0
Apr. 4.....	15600	12	.00	83	20	126		196	0	140	182	.3	2.0	.14	731	.99	30790	290	130	3.2	1150	7.7
July 25.....	8300	10	.00	82	21	262		180	0	140	400	.3	1.0	.15	1060	1.44	23760	290	142	6.7	1780	7.7

7-1655.1. POLECAT CREEK NEAR JENKS, OKLA.

Dec. 8, 1959....				91	35	318		148	4	35	630	1.2	6.4		b 1190	1.62		370	242	7.2	2140	8.3
Feb. 10, 1960...				35	15	84		90	0	23	165		3.9		464	.63		150	76	3.0	726	8.0
Apr. 19.....				26	18	50		62	0	24	122		1.7		338	.46		140	89	1.9	560	7.6
May 17.....				48	18	122		120	0	19	238		2.9		654	.89		192	94	3.8	997	8.2

SNAKE CREEK NEAR LEONARD, OKLA.

Aug. 22, 1960...				32	5.8	80		70	0	15	143		2.9		b 313	0.43		104	46	3.4	606	8.0
Sept. 16.....				70	20	229		142	2	107	370		.8		b 869	1.18		255	135	6.2	1590	8.3

CANE CREEK NEAR JAMESVILLE, OKLA.

Aug. 15, 1960...				51	10	152		140	0	60	228		1.0		628	0.85		168	54	5.1	1080	8.2
Sept. 16.....				50	19	152		146	2	62	245		1.7		658	.89		204	81	4.6	1130	8.3

7-1730. CANEY RIVER NEAR HULAH, OKLA.

Oct. 20, 1959...	7250			37	4.3	7.2		120	0		10							110	12	0.3	245	7.8
Nov. 4.....	312			48	7.3	12		156	0		16							150	22	.4	330	7.6
Dec. 7.....	53			62	8.6	15		204	0		24							190	23	.5	418	8.0
Apr. 7, 1960....	222			67	10	21		216	0		33							210	33	.6	473	7.9
May 16.....	113			64	12	19		216	0		30							210	33	.6	442	8.0
June 1.....	910			67	10	20		216	0		30							210	33	.6	472	8.1
July 26.....	12			59	10	22		204	0		34							190	23	.7	469	8.0

7-1746. SAND CREEK AT OKESA, OKLA.

June 14, 1960...	13			--	--	--		120	0	14	36		--		--	--	--	114	16	--	329	7.8
July 14.....	.3			67	21	80		174	8	35	164		1.7		525	0.71	0.42	252	96	2.2	848	8.4
Aug. 22.....	2.2			74	14	119		146	0	39	242		1.8		647	.88	3.84	244	124	3.3	1050	8.2

b Calculated from determined constituents.
c Spring tributary to Salt Creek.
d Daily mean discharge.

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN LOWER MISSISSIPPI RIVER BASIN--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
ARKANSAS RIVER BASIN--Continued																							
7-1910. BIG CABIN CREEK NEAR BIG CABIN, OKLA.																							
Dec. 3, 1959....	28.9			49	16	17		120	0		14							188	90	0.5	422	7.6	
Apr. 25, 1960...	76.4			42	11	15		96	0		7.8							152	74	.5	356	7.3	
May 25.....	144			34	8.5	8.4		88	0		8.0							120	48	.3	245	7.0	
July 14.....	3.7			35	18	15		160	0		13							160	29	.5	369	7.8	
7-1915. NEOSHO RIVER NEAR CHOUTEAU, OKLA.																							
Apr. 22, 1960...	3610			53	7.8	12		132	0		12							164	56	0.4	400	7.1	
May 18.....	14600			42	8.5	10		112	0		9.8							140	48	.4	307	7.0	
7-1920. PRYOR CREEK NEAR PYROR, OKLA.																							
Jan. 14, 1960...	254			12	5.4	14		36	0		9.4							52	22	0.8	161	7.2	
Apr. 1.....	37			22	10	30		44	0		24							96	60	1.3	302	7.7	
7-1969. BARREN FORK AT DUTCH MILLS, ARK.																							
Mar. 14, 1960...	86			30	2.7	--		84	0	--	9.4	0.1	3.0		--	--	--	86	17	--	181	7.6	
Apr. 7.....	17			41	4.3	2.1		124	0	14	4.5		2.2		b 129	0.18	5.92	120	18	0.1	233	7.9	
May 13.....	38			--	--	--		114	4	--	4.2		--		--	--	--	112	12	--	240	8.4	
June 14.....	18			--	--	--		130	2	--	3.9		--		--	--	--	122	12	--	242	8.3	
July 14.....	2.1			--	--	--		136	2	2.1	3.5		1.4		168	.23	.95	--	--	--	242	8.4	
Aug. 14.....	5.6			35	2.1	1.2		108	0	3.3	3.0		2.9		124	.17	1.87	96	8	.1	197	8.2	
Sept. 9.....	2.4			45	2.3	1.4		140	2	2.1	3.3		.6		148	.20	.96	122	4	.1	237	8.4	

7-1985. DIRTY CREEK NEAR WARNER, OKLA.

Aug. 22, 1960...				72	39	45		42	0	353	25		1.4		613	0.83		340	306	1.1	810	7.3
Sept. 16.....				90	45	59		60	0	426	32		1.7		731	.99		410	361	1.3	965	7.6

EAST AMARILLO CREEK NEAR AMARILLO, TEX.

Oct. 1, 1959....	15.8	64		52	28	112		318		70	102	2.0	6.6		593	0.81		244	0	3.1	957	8.2
Nov. 11.....	12.8	71		47	34	134		266		82	114	2.5	98		714	.97		258	40	3.6	1,090	8.2
Dec. 10.....	13.7	68		47	34	130		261		76	114	2.8	99		699	.95		258	44	3.5	1,080	8.1
Jan. 14, 1960...	15.8	64		52	32	139		397		82	103	2.4	.2		670	.91		261	0	3.7	1,080	7.8
Feb. 11.....	15.9	68		54	34	151		478		78	88	2.5	.2		711	.97		274	0	4.0	1,140	7.8
Mar. 10.....	12.3	59		54	32	173		500		89	94	2.8	.5		750	1.02		266	0	4.6	1,190	7.5
Apr. 6.....	10.8	62		51	34	183		514		81	109	2.3	.2		776	1.06		267	0	4.9	1,280	7.3
May 13.....	12.2	60		63	34	177		532		77	112	2.8	.0		788	1.07		297	0	4.5	1,240	7.2
June 6.....	14.2	50		48	27	98		253		74	76	2.0	59		558	.76		232	24	2.8	869	7.2
July 13.....	17.1	52		58	24	139		445		60	81	2.3	.0		635	.86		244	0	3.9	981	7.5
Sept. 8.....	17.2	56		55	28	107		271		64	95	2.4	70		610	.83		252	30	2.9	1,040	7.8

7-2280. CANADIAN RIVER NEAR CANADIAN, TEX.

Nov. 3, 1959....	86	13	--	87	45	364		198	0	210	570	1.4	3.7	0.23	b 1390	1.89	323	400	238	7.9	2410	8.0
Feb. 16, 1960...	d 380	10	0.00	101	38	346		256	0	235	498	1.3	2.9	.09	1400	1.90	1440	410	200	7.4	2350	8.2
Apr. 6.....	2.4	32	.00	70	24	70		316	0	16	106	1.1	.1	.28	490	.67	3.18	275	16	1.8	855	8.1
July 25.....	275	18	.00	80	32	360		204	0	247	488	.9	1.4	.32	1360	1.85	1010	332	165	8.6	2250	7.7

7-2284. DEER CREEK AT HYDRO, OKLA.

Nov. 24, 1959...	56			262	99	61		128	0	988	38		6.6		1660	2.26	251	1060	955	0.8	1830	7.8
July 8, 1960....	27.5			166	27	29		224	0	371	14		.0		781	1.06	58.0	525	342	.6	976	8.2
July 25.....	27.2			152	32	9.2		190	0	344	11		1.2		707	.96	51.9	510	354	.2	899	8.2
Sept. 1.....	19.0			132	29	7.4		220	0	261	10		.0		619	.84	31.8	450	270	.2	819	7.2
Sept. 29.....	16			160	25	29		226	0	345	13		.0		782	1.06	33.8	500	315	.6	966	7.1

7-2292. CANADIAN RIVER AT PURCELL, OKLA.

Oct. 26, 1959...	d 86	10	--	118	48	128		234	0	393	115	0.5	3.7	0.32	b 932	1.27	216	490	298	2.5	1420	7.7
Feb. 16, 1960...	676	10	0.00	136	37	203		300	0	309	255	.9	1.2	.22	1110	1.51	2020	490	244	4.0	1730	8.0
Apr. 7.....	147	13	.00	148	61	152		254	0	473	175	.7	1.2	.28	1220	1.66	484	620	412	2.7	1710	7.6
July 26.....	1460	14	.00	72	21	175		208	0	185	198	.8	1.6	.21	811	1.10	3200	265	94	4.7	1330	7.8

b Calculated from determined constituents.
d Daily mean discharge.

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MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN LOWER MISSISSIPPI RIVER BASIN--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
ARKANSAS RIVER BASIN--Continued																							
7-2293. WALNUT CREEK AT PURCELL, OKLA.																							
Oct. 26, 1959...	9.2			29	54	43		324	6		28							294	18	1.1	615	8.4	
Dec. 7.....	19.5			32	56	34		346	4		26							312	22	.8	636	8.4	
ELM CREEK NEAR MOORE, OKLA.																							
Oct. 5, 1959....	--			25	15	8.5		144	6	6.2	6.5		1.0		161	0.22		126	0	0.3	254	8.4	
Oct. 7.....	4.8			26	28	19		190	12	7.8	26		2.9		238	.32	3.08	182	6	.6	400	8.5	
Oct. 12.....	6.7			42	24	--		220	18	--	17		--		--	--		204	0	--	419	8.6	
EAST ELM CREEK NEAR MOORE, OKLA.																							
Oct. 5, 1959....				22	32	9.4		194	16	7.8	7.7		2.4		215	0.29		186	0	0.3	417	8.7	
Oct. 7.....	5.1			10	53	14		258	22	8.2	12		1.3		262	.36	3.61	244	0	.4	454	8.7	
HOG CREEK NEAR STELLA, OKLA.																							
Oct. 5, 1959....				32	14	7.6		154	8	2.5	8.0		1.1		162	0.22		138	0	0.3	293	8.5	
Oct. 8.....	8.5			19	25	18		174	8	7.8	19		.8		197	.27	4.52	152	0	.6	340	8.5	
Oct. 12.....				12	45	7.8		214	22	1.6	12		.5		208	.28		214	2	.2	415	8.8	

Oct. 26, 1959...	38	14	--	46	57	82		374	0	35	130	0.3	0.7	0.35	b 549	0.75	56.3	350	44	1.9	986	8.2
Feb. 9, 1960....	177	--	--	24	18	16		148	0	--	32	--	--	--	--	--	--	132	10	.6	315	7.9
Feb. 16.....	145	8.0	0.00	77	52	49		396	0	26	114	.2	.0	.15	541	.74	212	405	80	1.1	941	8.2
Apr. 6.....	50	14	.00	57	53	93		380	10	36	140	.3	.2	.36	598	.81	80.7	360	32	1.1	1060	8.4
May 4.....	87.8	--	--	53	41	77		328	0	--	110	--	--	--	--	--	--	300	31	1.9	811	7.8
July 28.....	430	12	.00	29	9.6	21		128	0	9.5	29	.3	1.3	.19	180	.24	209	112	7	.9	306	7.4

7-2307. SALT CREEK NEAR PEARSON, OKLA.

Oct. 6, 1959....	--			128	114	787		76	0	40	1700		--		3400	4.62		790	728	12	5420	8.2
Oct. 19.....	4.6			19	54	110		190	16	83	168		1.0		591	.80	7.34	268	86	2.9	1030	8.7
Mar. 8, 1960....	28.6			35	45	102		216	4	--	142		--		--	--		272	88	2.7	861	8.4
Aug. 18.....	--			18	10	8.3		90	0	8.6	15		2.5		144	.20		88	14	.4	219	8.1

SALT CREEK NEAR ST. LOUIS, OKLA.

Oct. 6, 1959....				124	88	582		86	0	31	1300				2680	3.64		670	600	9.8	4330	8.2
Aug. 18, 1960...				48	20	158		100	0	11	320		2.8		744	1.01		204	122	4.8	1210	8.1

7-2308. SALT CREEK NEAR DEWRIGHT, OKLA.

Oct. 6, 1959....	d 637	--	--	91	36	269		146	10	12	575	--	1.4	--	1350	1.84	2320	376	240	6.0	2090	8.6
Oct. 19.....	d 27	--	--	270	179	1600		62	0	49	3400	--	--	--	6270	8.53	457	1410	1360	19	9750	7.9
Oct. 26.....	d 20	10	--	447	142	1730		281	0	59	3670	0.0	1.3	0.54	b 6200	8.43	335	1700	1470	18	11000	7.5
Feb. 16, 1960...	d 82	10	0.00	280	112	1010		316	0	54	2150	.0	1.4	.29	4180	5.68	925	1160	901	13	6440	8.1
Mar. 24.....	32.4	--	--	208	141	--		134	0	--	2450	--	--	--	--	--	--	1100	990	--	7380	8.0
Apr. 6.....	29	10	.00	256	156	1240		238	0	52	2650	.0	.5	.40	4790	6.51	375	1280	1080	15	8130	7.9
July 27.....	52	9.0	.00	104	54	390		164	0	34	820	.3	.4	.22	1860	2.53	261	480	346	7.7	2870	7.4
Aug. 18.....	182	--	--	58	25	217		104	0	9.1	440	--	2.9	--	994	1.35	488	246	161	6.0	1610	8.1

7-2315. CANADIAN RIVER AT CALVIN, OKLA.

Oct. 26, 1959...	348	10	--	126	57	329		276	0	151	625	0.3	1.1	0.31	b 1440	1.96	1350	550	324	6.1	2510	7.8
Feb. 16, 1960...	1080	2.5	0.00	122	40	232		320	0	145	395	.6	3.8	.31	1140	1.55	3320	470	208	4.7	1920	8.2
Apr. 6.....	460	10	.00	118	52	195		272	0	241	325	.5	.1	.15	1170	1.59	1450	510	287	3.8	1840	7.9
July 27.....	5100	10	.00	57	15	79		190	0	71	102	.5	1.0	.13	446	.61	6140	204	48	2.4	756	7.8

COAL CREEK NEAR MCALESTER, OKLA.

Aug. 16, 1960...				13	4.7	18		66	0	19	10		3.0		b 100	0.14		52	0	1.1	195	7.9
Sept. 14.....				15	7.4	18		84	0	23	9.0		1.6		133	.18		68	0	.9	215	8.0

b Calculated from determined constituents.
d Daily mean discharge.

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN LOWER MISSISSIPPI RIVER BASIN--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
ARKANSAS RIVER BASIN--Continued																							
7-2337. PALO DURO CREEK NEAR RANGE, OKLA.																							
Nov. 24, 1959...	4.8			79	54	188		246	0		258							420	218	4.0	1540	8.2	
Apr. 18, 1960...	3.2			88	63	246		240	0		355							480	284	4.9	1930	7.9	
7-2342. KIOWA CREEK NEAR SLAPOUT, OKLA.																							
Nov. 6, 1959....	--			67	22	70		248	0	56	102	0.9	0.1		b 440	0.60		256	53	1.9	789	8.1	
Mar. 25, 1960...	8.7			59	19	70		228	0		112							224	37	2.0	776	7.5	
Apr. 26.....	9.9			62	17	45		236	0		72							224	30	1.3	634	7.4	
May 27.....	3.5			64	29	96		260	0		120							280	67	2.5	757	7.7	
7-2343. CLEAR CREEK NEAR MAY, OKLA.																							
Feb. 19, 1960...	14.3			93	4.4	53		252	0		76							250	44	1.5	700	8.0	
Mar. 25.....	10.9			61	11	52		216	0		65							196	19	1.6	599	7.6	
Apr. 22.....	8.0			64	15	47		244	0		68							220	20	1.4	624	7.7	
May 27.....	4.4			43	13	47		188	0		62							160	6	1.6	481	7.7	
7-2360. WOLF CREEK NEAR FARGO, OKLA.																							
Oct. 28, 1959...	10.3			81	21	128		238	0		145							290	95	3.3	1010	8.0	
Nov. 6.....	d 16			86	24	78		260	0	98	118	0.7	1.4		b 534	0.73	23.1	315	102	1.9	920	8.2	
Dec. 8.....	20.3			94	21	121		244	0		145							320	120	2.9	1050	8.1	
Jan. 5, 1960....	29.2			98	21	149		268	0		155							330	110	3.6	1080	8.0	
Feb. 18.....	69.2			37	5.2	29		114	0		36							114	20	1.2	345	8.0	
Mar. 24.....	49.8			85	21	118		266	0		135							300	82	3.0	988	7.9	

7-2370. WOLF CREEK NEAR FORT SUPPLY, OKLA.

Feb. 18, 1960...	74.4			62	22	106		170	0		140							245	106	2.9	915	7.9
Mar. 24.....	48.3			85	23	106		234	0		142							305	113	2.6	1020	7.9

7-2410. NORTH CANADIAN RIVER BELOW LAKE OVERHOLSER, NEAR OKLAHOMA CITY, OKLA.

Oct. 28, 1959...	d 130	16	--	105	36	124		312	0	188	160	0.7	0.1	0.26	b 783	1.06	275	410	154	2.7	1260	7.7
Feb. 16, 1960...	392	1.5	0.00	82	26	96		198	0	175	122	.8	1.2	.19	630	.86	667	310	148	2.4	1010	8.1
Apr. 4.....	302	8.8	.00	94	29	110		220	0	205	140	.7	.1	.18	748	1.02	610	355	174	2.5	1140	7.5
July 25.....	9.6	10	.00	58	23	80		188	0	120	95	.5	.4	.16	491	.67	12.7	240	86	2.3	816	7.5

7-2415. NORTH CANADIAN RIVER NEAR OKLAHOMA CITY, OKLA.

Oct. 28, 1959...	138	16	--	113	48	251		296	0	179	410	0.9	19	0.35	b 1180	1.60	440	480	238	5.0	2040	7.5
Feb. 17, 1960...	547	10	0.01	93	31	164		208	0	176	250	.7	9.7	.22	801	1.17	1180	360	190	3.8	1430	7.4
Apr. 4.....	352	8.0	.00	105	32	157		224	0	194	245	.6	4.5	.18	974	1.32	926	395	212	3.4	1480	7.3
July 25.....	124	12	.00	101	37	273		192	0	140	475	.5	29	.23	1250	1.70	418	405	248	5.9	2060	7.1

7-2421. WEWOKA CREEK NEAR WETUMKA, OKLA.

Oct. 26, 1959...	d 36	0.0	--	296	61	1030		114	0	27	2200	0.0	1.4	0.20	b 3670	4.99	357	990	896	14	6490	7.1
Feb. 16, 1960...	49	6.5	0.00	208	68	776		156	0	30	1650	.1	.6	.14	3210	4.37	425	800	672	12	5120	7.9
Apr. 6.....	56	3.0	.00	142	56	560		130	0	29	1180	.3	.1	.25	2360	3.21	357	585	478	10	3820	8.0
July 27.....	36	6.5	.00	83	29	404		74	0	14	800	.1	.8	.16	1500	2.04	146	325	264	9.8	2590	6.9

b Calculated from determined constituents.
d Daily mean discharge.

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN LOWER MISSISSIPPI RIVER BASIN--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
ARKANSAS RIVER BASIN--Continued																							
FISH CREEK NEAR WETUMKA, OKLA.																							
Aug. 26, 1960...				13	7.7	12		86	0	9.1	6.0		1.2		118	0.16		64	0	0.6	165	7.8	
Sept. 30.....				9.6	5.8	8.0		58	0	7.8	6.0		1.8		86	.12		48	0	.5	113	7.6	
7-2422. NORTH CANADIAN RIVER NEAR PIERCE, OKLA.																							
Dec. 9, 1959....				108	50	322		232	0	48	660		4.8		1480	2.01		475	285	6.4	2450	8.2	
Feb. 11, 1960...				54	25	92		158	0	47	180		3.3		563	.77		236	106	2.6	902	8.0	
July 1.....				96	54	250		204	0	111	510		1.6		1280	1.74		460	293	5.1	2050	8.1	
July 15.....				107	57	242		164	4	76	850		4.2		1820	2.48		500	359	8.2	3020	8.3	
Sept. 15.....				91	45	326		196	4	86	610		1.8		1380	1.88		410	243	7.0	2310	8.3	
7-2422.5. DEEP FORK AT OKLAHOMA CITY, OKLA.																							
Dec. 10, 1959...				35	60	117		210	4	217	125	2.2	2.2		b 665	0.90		335	156	2.8	1030	8.4	
Feb. 2, 1960....				40	71	134		218	6	280	140	.3	2.2		b 780	1.06		390	202	2.9	1280	8.4	
July 18.....				43	15	33		146	0	69	32	--	4.2		296	.40		168	48	1.1	465	8.0	
Aug. 16.....				62	43	70		232	0	167	82	--	3.7		586	.80		330	140	1.7	892	8.2	
7-2423. DEEP FORK AT WITCHER, OKLA.																							
Aug. 16, 1960...				66	38	184		248	6	117	255		33		898	1.22		320	107	4.5	1450	8.4	
Aug. 16.....				66	39	173		244	8	112	245		32		879	1.20		325	112	4.2	1410	8.3	

7-2424. DEEP FORK NEAR CHANDLER, OKLA.

Dec. 8, 1959....				93	60	170		388	44	66	265	0.4	19		907	1.23		480	88	3.4	1540	8.7
Apr. 17, 1960...				84	52	124		326	44	58	205		6.2		773	1.05		425	84	2.6	1310	8.8
May 17.....				--	--	--		308	34	--	160		--		--	--		382	73	--	1230	8.7
June 15.....				--	--	--		250	20	--	135		--		--	--		290	52	--	883	8.7
July 15.....				64	43	125		292	22	64	180		14		725	.99		336	60	3.0	1150	8.8
Sept. 15.....				80	46	193		328	26	94	270		20		982	1.34		388	76	4.2	1540	8.7

7-2430. DRY CREEK NEAR KENDRICK, OKLA.

Mar. 8, 1960....	28.4			19	32	26		152	14		42							180	32	0.8	444	8.5
June 10.....	8.0			38	35	25		272	4		38							240	10	.7	545	8.3
July 12.....	1.7			34	33	25		248	12		34							220	0	.7	518	8.4

7-2434.5. LITTLE DEEP FORK CREEK NEAR EDNA, OKLA.

Dec. 9, 1959....				118	51	413		118	0	33	900	0.5	1.7		b 1580	2.15		505	408	8.0	3020	8.1
Feb. 1, 1960....				66	35	157		120	4	30	365		1.6		867	1.18		310	205	3.9	1390	8.3
Apr. 17.....				40	16	89		74	0	23	194		1.7		498	.68		165	104	3.0	811	8.1
May 17.....				--	--	--		144	6	--	492		--		--	--		354	226	--	1780	8.3
June 15.....				--	--	--		88	0	--	255		--		--	--		172	100	--	971	8.0
July 15.....				155	48	485		188	4	12	1040		--		2450	3.33		585	424	8.7	3420	8.4
Sept. 15.....				93	32	279		152	6	4.1	590		.6		1420	1.93		365	230	6.3	2050	8.4

7-2442. DEEP FORK NEAR PIERCE, OKLA.

Dec. 9, 1959....				66	45	237		196	4	52	452	1.4	3.8		b 957	1.30		350	183	5.5	1770	8.3
Feb. 10, 1960...				37	21	65		138	0	33	121		2.9		391	.53		180	67	2.1	655	7.9

b Calculated from determined constituents.

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN LOWER MISSISSIPPI RIVER BASIN--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
ARKANSAS RIVER BASIN--Continued																							
7-2442. DEEP FORK NEAR PIERCE, OKLA.--Continued																							
Apr. 17, 1960...				16	7.8	34		48	0	22	57		2.2		208	0.28		72	32	1.7	321	7.9	
May 17.....				--	--	--		110	0	--	48		--		--	--		108	18	--	349	8.2	
June 15.....				--	--	--		206	10	--	140		--		--	--		236	50	--	811	8.6	
July 15.....				41	33	138		156	10	40	250		1.4		682	.93		240	96	3.9	1120	8.5	
Sept. 15.....				50	24	91		204	10	39	140		1.1		511	.69		224	40	2.6	837	8.5	
7-2445. NORTH CANADIAN RIVER NEAR EUFAULA, OKLA.																							
Oct. 26, 1959...		13	--	116	22	162		252	0	49	335	0.3	1.3	0.16	b 823	1.12		380	174	3.6	1520	7.5	
Feb. 16, 1960...		8.0	0.00	85	23	135		208	0	91	235	.4	.2	.11	720	.98		305	134	3.3	1210	7.7	
Apr. 5.....		7.4	.00	94	35	219		194	0	76	438	.4	.4	.16	1100	1.50		380	221	4.9	1810	7.8	
July 26.....		5.5	.00	21	5.7	42		64	0	14	70	.3	1.3	.02	208	.28		76	24	2.1	343	7.1	
LITTLE VIAN CREEK NEAR VIAN, OKLA.																							
Oct. 15, 1959...				19	4.0	4.6		60	0		3.4		0.7					64	15	0.2	129	7.5	
Aug. 16, 1960...								72	0		2.8	0.0	.2					60	1		146	7.6	
7-2494. JAMES FORK NEAR HACKETT, ARK.																							
Jan. 14, 1960...	304			--	--	34		64	0	--	14		0.7		--	--	--	64	12	1.8	284	8.0	
Mar. 10.....	183			7.2	6.8	15		26	0	42	9.6		.7		105	0.14	51.9	46	24	1.0	174	7.7	
Apr. 9.....	41			13	8.6	36		62	0	76	12		.2		b 176	.24	19.5	68	17	1.9	293	8.1	
May 12.....	113			--	--	--		48	0	70	7.8		--		--	--	--	68	28	--	253	7.7	
June 4.....	54			--	--	--		76	0	100	11		--		--	--	--	86	24	--	359	8.0	

July 9, 1960....	10			30	17	80		134	0	147	39		0.8		388	0.53	10.5	144	34	2.9	614	8.2
Aug. 13.....	5.2			14	12	45		100	0	79	12		.2		219	.30	3.07	84	2	2.1	353	7.6
Sept. 14.....	6.7			22	12	103		194	4	121	27		1.4		382	.52	6.91	106	0	4.4	620	8.4

7-2498. LEE CREEK NEAR SHORT, OKLA.

Oct. 6, 1959....				8.8	1.9	6.9		38	0	8.2	2.8	--	1.7		56	0.08		30	0	0.5	83	7.2
Apr. 12, 1960...				9.6	1.5	11		34	0	7.8	13	--	.1		b 60	.08		30	2	.9	114	7.6
May 7.....				--	--	--		34	0	--	3.0	--	--		--	--		26	0	--	68	7.9
June 14.....				--	--	--		52	0	--	3.4	--	--		--	--		40	0	--	90	7.8
July 2.....				13	1.3	5.1		48	0	1.6	5.4	--	.5		68	.09		38	0	.4	107	7.9
July 29.....				13	2.3	5.3		52	0	2.5	4.4	--	2.9		72	.10		42	0	.4	110	7.9
Sept. 3.....				--	--	--		54	0	--	4.8	0.0	.8		--	--		52	8	--	113	7.5
Sept. 20.....				--	--	--		52	0	--	4.5	.0	.7		--	--		48	6	--	111	7.6

7-2505. ARKANSAS RIVER AT VAN BUREN, ARK.

Oct. 26, 1959...	d 79800	17	--	50	5.1	54		120	0	41	86	0.1	0.0	0.05	b 312	0.42	67220	146	48	1.9	533	7.4
Feb. 15, 1960...	35400	4.0	0.00	66	11	146		160	0	85	218	.4	.2	.11	620	.84	59260	210	79	4.4	1100	7.5
Apr. 4.....	41900	9.6	.06	74	3.3	96		152	0	90	132	.3	2.0	.10	553	.75	62560	198	74	3.0	836	7.6
July 26.....	123000	6.5	.00	37	6.7	20		108	0	20	38	.3	.4	.28	195	.27	64760	120	32	.8	335	7.3

b Calculated from determined constituents.
d Daily mean discharge.

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN LOWER MISSISSIPPI RIVER BASIN--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
RED RIVER BASIN																							
7-2985. PRAIRIE DOG TOWN FORK RED RIVER NEAR BRICE, TEX.																							
Nov. 3, 1959....	--	10	--	644	81	3100		131	0	1570	4920	0.9	2.0	0.72	b 10400	14.1	--	1940	1830	31	15900	7.5	
Feb. 24, 1960...	0.4	17	0.01	1280	520	15600		203	0	3460	25200	.9	--	1.1	46400	63.1	50.1	5330	5160	93	62500	7.6	
May 20.....	.1	22	.00	767	201	1740		179	0	2080	2990	.5	1.4	.54	8380	11.4	2.26	2740	2590	14	11400	7.7	
July 12.....	328	17	.00	184	39	337		140	0	475	525	.9	.8	.22	1680	2.28	1490	620	506	5.9	2630	7.7	
7-2995.7. RED RIVER NEAR QUANAH, TEX.																							
Oct. 29, 1959...	--	7.5	--	776	208	2720		179	0	2350	4330	0.6	5.5	1.1	b 10500	14.3	--	2790	2640	22	15200	7.7	
Feb. 23, 1960...	8	16	0.00	872	247	4560		188	0	2570	7280	.7	--	.42	16100	21.9	348	3190	3040	35	23100	7.6	
May 19.....	113	12	.00	518	97	2500		125	0	1410	3930	.6	1.3	.43	8560	11.6	2610	1690	1590	26	13200	7.5	
May 25.....	1020	16	.00	655	152	3150		109	0	1940	4970	.7	--	.79	11400	15.5	31400	2260	2170	29	16600	7.6	
July 13.....	85	18	.00	296	44	1060		148	0	803	1600	.9	1.2	.35	3980	5.41	913	920	798	15	6200	7.8	
7-3000. SALT FORK RED RIVER NEAR WELLINGTON, TEX.																							
Oct. 28, 1959...	d 6.2	21	--	568	98	137		168	0	1570	242	0.7	3.0	0.23	b 2720	3.70	45.5	1820	1680	1.4	3130	7.5	
Feb. 24, 1960...	67	22	0.01	480	105	198		236	0	1390	295	.9	3.1	.17	2750	3.74	497	1630	1440	2.1	3180	7.8	
Apr. 28.....	--	--	--	476	93	149		136	0	1440	200	--	2.0	--	2610	3.55	--	1570	1460	1.6	2850	7.9	
May 18:																							
At 0830.....	2660	--	--	158	33	90		264	0	353	100	--	1.0	--	943	1.28	6770	530	314	1.7	1270	7.7	
At 1858.....	423	--	--	162	31	93		244	0	372	102	--	.7	--	952	1.29	1090	530	330	1.8	1280	7.8	
May 24.....	1.3	22	.00	472	83	177		166	0	1390	225	.7	2.9	.34	2630	3.58	9.23	1520	1380	2.0	2920	7.8	
July 12.....	28	21	.00	278	65	169		126	0	881	215	.7	1.2	.31	1770	2.41	134	960	856	2.4	2200	7.7	

7-3014.5. NORTH FORK RED RIVER NEAR ERICK, OKLA.

Mar. 14, 1960...				182	90	283		104	0	811	360		3.9		1980	2.69		825	740	4.3	2560	8.1
Apr. 9.....				192	80	284		220	0	716	355		.5		1840	2.50		810	630	4.3	2580	8.0
May 17.....				170	79	276		144	0	737	330		.0		1790	2.43		750	632	4.4	2470	8.1
June 22.....				168	85	303		118	0	764	380		.5		1890	2.57		770	674	4.7	2600	8.2
July 19.....				174	45	147		216	0	459	202		.5		1200	1.63		620	443	2.6	1720	7.7
Aug. 16.....				320	107	544		140	0	1330	655		.1		3250	4.42		1240	1130	6.7	4130	7.9
Sept. 13.....				254	79	256		154	0	948	285		.6		2010	2.73		960	834	3.6	2540	7.4

7-3015. NORTH FORK RED RIVER NEAR CARTER, OKLA.

Oct. 28, 1959...	d 12	14	--	332	95	359		232	0	1060	500	0.5	0.7	0.41	b 2480	3.37	80.4	1220	1030	4.5	3490	7.8
Dec. 10.....	32.9	--	--	270	96	279		212	0	919	388	--	.6	--	2190	2.98	194	1070	896	3.7	2910	8.0
Dec. 21.....	161	--	--	142	38	147		178	2	371	205	.6	5.8	--	b 998	1.36	434	510	360	2.8	1500	8.3
Feb. 25, 1960...	250	21	0.01	270	121	260		368	0	893	350	1.0	10	.23	2210	3.01	1490	1170	868	3.3	2890	7.9
May 24.....	37	14	.00	270	101	252		154	0	1030	310	.7	1.0	.52	2240	3.05	224	1090	964	3.3	2750	7.3
July 12.....	156	17	.00	204	56	194		172	0	635	252	.7	1.8	.26	1500	2.04	632	740	599	3.1	2100	7.5

ELM FORK OF NORTH FORK RED RIVER AT SALTON CROSSING, OKLA.

Oct. 28, 1959...		7.5	--	685	117	1870		122	0	1880	2970	0.4	5.0	0.58	b 7600	10.3		2190	2090	17	11200	7.8
Feb. 24, 1960...		12	0.01	640	142	698		178	0	1780	1200	.7	5.9	.27	4730	6.43		2180	2030	6.5	6180	7.9
May 24.....		11	.00	668	130	1160		108	0	1910	1880	.6	2.6	.56	6170	8.39		2200	2110	11	8070	7.6
July 12.....		13	.00	640	127	1420		100	0	1870	2250	.5	1.6	.46	6620	9.00		2120	2040	13	9200	7.6

b Calculated from determined constituents.
d Daily mean discharge.

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN LOWER MISSISSIPPI RIVER BASIN--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
RED RIVER BASIN--Continued																							
7-3034. ELM FORK OF NORTH FORK RED RIVER NEAR CARL, OKLA.																							
Oct. 28, 1959...	d 9.3	6.5	--	761	253	9900		110	0	2020	15800	0.1		1.1	b 28800	39.2	723	2940	2850	79	43000	7.5	
Jan. 14, 1960...	d 107	--	--	508	76	702		122	0	1370	1120	.6		--	b 3840	5.22	1110	1580	1480	7.7	5550	8.1	
Jan. 26.....	d 40	--	--	558	111	2320		84	0	1560	3690	.3		--	b 8280	11.3	894	1850	1780	23	12700	7.9	
Feb. 24.....	48	13	0.03	664	205	3600		183	0	1840	5860	.5		.36	12500	17.0	1620	2500	2350	31	18600	7.8	
Mar. 14.....	d 41	--	--	578	133	2470		62	0	1690	3930	--		--	9440	12.8	1040	1990	1940	24	13600	7.8	
May 24.....	28	12	.00	743	194	5480		107	0	1990	8790	.4		.70	17500	23.8	1320	2650	2560	46	25900	7.4	
July 12.....	21	12	.00	690	184	5040		89	0	1940	8050	.3		.66	16200	22.0	918	2480	2410	44	23500	7.5	
7-3035. ELM FORK OF NORTH FORK RED RIVER NEAR MANGUM, OKLA.																							
Jan. 14, 1960...				534	99	1800		106	0	1500	2840	0.9			b 6830	9.29		1740	1650	19	10400	7.9	
Jan. 26.....				567	118	2180		94	0	1590	3480	.3			b 7980	10.8		1900	1820	22	12100	7.9	
ELK CREEK NEAR ELK CITY, OKLA.																							
Apr. 20, 1960...				78	74	80		372	66	100	92		32		758	1.03		500	85	1.6	1110	8.9	
Sept. 2.....				18	44	37		256	0	37	22		31		333	.45		224	14	1.1	551	8.1	
SPRING CREEK NEAR SENTINEL, OKLA.																							
Apr. 20, 1960...				19	26	27		160	20	27	13		3.1		246	0.33		154	0	1.0	388	8.7	
Apr. 20.....				10	53	117		392	56	27	38		2.3		524	.71		244	0	3.2	827	9.0	

7-3055. WEST OTTER CREEK AT SNYDER LAKE, NEAR MOUNTAIN PARK, OKLA.

July 14, 1960...				41	20	36		184	4	41	43		2.3		328	0.45		184	26	1.2	524	8.3
Aug. 9.....				41	15	42		188	0	33	46		1.8		298	.41		164	10	1.4	499	8.0

NORTH FORK RED RIVER NEAR TIPTON, OKLA.

Jan. 14, 1960...				256	78	838		154	0	720	1350	0.9			b 3320	4.52		960	834	12	5380	8.1
Mar. 14.....				162	62	311		102	0	579	458		5.2		1750	2.38		660	576	5.3	2530	8.1

7-3082. PEASE RIVER NEAR VERNON, TEX.

Oct. 27, 1959...	--	10	--	576	93	1500		176	0	1490	2400	0.5	1.7	1.1	b 6160	8.38	--	1820	1680	15	9210	7.4
Feb. 25, 1960...	10	13	0.01	633	192	1980		239	0	1770	3290	.5	.8	.61	8210	11.2	222	2370	2170	18	12000	7.9
May 25.....	100	12	.00	388	61	950		92	0	1050	1500	.5	1.3	.50	4160	5.66	1120	1220	1140	12	6070	7.5
July 13.....	108	14	.00	268	51	761		132	0	728	1180	.9	1.1	.37	3110	4.23	907	880	772	11	4820	7.6

7-3085. RED RIVER NEAR BURKBURNETT, TEX.

Oct. 26, 1959...	--	10	--	316	90	994		160	0	827	1650	0.3	1.7	0.38	b 3970	5.40	--	1160	1030	13	6260	7.5
Feb. 25, 1960...	300	12	0.00	352	117	810		264	0	997	1320	.7	3.1	.38	3890	5.29	3150	1360	1140	9.5	5720	7.7
May 25.....	768	12	.00	320	85	926		158	0	948	1450	.5	.7	.56	4090	5.56	8480	1150	1020	12	6100	7.6
July 11.....	4060	18	.00	334	60	1000		186	0	944	1500	.7	2.6	.44	4040	5.49	44290	1080	928	13	6120	7.6

b Calculated from determined constituents.
d Daily mean discharge.

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN LOWER MISSISSIPPI RIVER BASIN--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
RED RIVER BASIN--Continued																							
7-3110. CACHE CREEK NEAR WALTERS, OKLA.																							
Oct. 27, 1959...	d 72	13	--	106	20	64		342	0	98	62	0.5	12	0.21	b 548	0.75	106	345	64	1.5	882	7.8	
Nov. 10.....	d 139	--	--	77	12	38		234	14	52	34	.2	6.0	--	b 348	.47	131	240	24	1.1	591	8.6	
Jan. 29, 1960...	172	--	--	99	21	48		308	0	--	48	--	--	--	--	--	--	332	80	1.2	806	7.3	
Feb. 25.....	220	10	0.02	110	26	45		302	0	142	55	.3	5.6	.24	547	.74	325	380	132	1.0	882	7.7	
May 25.....	80	11	.00	94	18	53		240	0	144	56	.2	.0	.19	533	.72	115	310	114	1.3	805	6.9	
July 11.....	58	12	.00	42	9.5	49		180	0	35	43	.5	5.1	.25	b 285	.39	44.6	144	0	1.8	498	7.5	
7-3115.5. WEST CACHE CREEK NEAR COOKIETOWN, OKLA.																							
Nov. 10, 1959...				25	5.2	20		102	4	13	17		0.7		161	0.22		84	0	1.0	243	8.4	
Mar. 16, 1960...				38	7.5	52		148	6	24	57	0.3	.7		b 258	.35		126	0	2.0	452	8.4	
Apr. 7.....				39	9.4	44		170	0	21	50		.1		290	.39		136	0	1.6	463	8.2	
June 13.....				38	7.1	36		156	6	8.6	38		1.3		295	.40		124	0	1.4	404	8.5	
July 13.....				47	15	61		174	0	8.6	114		.2		390	.53		180	38	2.0	638	8.2	
7-3130. LITTLE BEAVER CREEK NEAR DUNCAN, OKLA.																							
Jan. 5, 1960....	35.0			100	73	211		140	0		440							550	436	3.9	1850	7.8	
Feb. 2.....	26.6			124	80	145		308	0		305							640	388	2.5	1700	7.4	
Feb. 4.....	152			72	32	48		196	0		78							310	150	1.2	732	7.9	
Feb. 16.....	36.5			80	69	136		112	0		270							485	393	2.7	1500	7.8	
Mar. 9.....	35.3			120	71	106		292	0		195							590	350	1.9	1510	7.6	
7-3136. COW CREEK AT WAURIKA, OKLA.																							
Nov. 10, 1959...				78	33	112		122	8	48	285		9.9		879	1.20		330	216	2.7	1340	8.5	
Mar. 31, 1960...	22.4			148	85	405		420	0	--	830		--		--	--		720	376	6.6	3180	7.3	

May 5, 1960.....				60	26	158		136	8	54	285		19		866	1.18		255	130	4.3	1270	8.5
July 13.....				240	105	713		244	32	68	1600		--		3550	4.83		1030	776	9.7	4960	8.7

BEAVER CREEK NEAR RYAN, OKLA.

Mar. 16, 1960...				85	75	187		206	0	292	312	0.4	14		b 1070	1.46		520	351	3.6	1730	8.1
Apr. 5.....				59	76	174		172	0	291	275		7.8		1050	1.43		460	319	3.5	1610	8.2
June 13.....				90	35	66		182	16	168	115		2.6		642	.87		370	194	1.5	957	8.6
Sept. 8.....				101	48	208		188	6	151	410		4.4		1130	1.54		450	286	4.3	1780	8.4

7-3155. RED RIVER NEAR TERRAL, OKLA.

Oct. 26, 1959...	d 515	5.0	--	194	57	622		164	0	478	1020	0.3	2.3	0.38	b 2460	3.35	3420	720	586	10	4120	7.7
Feb. 25, 1960...	d 1020	10	0.00	248	90	515		280	0	623	870	.7	4.2	.35	2680	3.64	7380	990	760	7.1	4010	8.0
May 23.....	d 4010	8.8	.00	92	21	136		164	0	172	210	.3	.2	.25	806	1.10	8730	315	180	3.3	1240	7.1
July 14.....	d 2370	16	.00	276	47	838		164	0	770	1250	.7	1.8	.38	3380	4.60	21630	880	746	12	5210	7.5

NORTH MUD CREEK NEAR RINGLING, OKLA.

Mar. 7, 1960....				129	134	691		102	0	104	1550				3040	4.13		875	792	10	4880	8.0
June 13.....				204	98	737		92	0	39	1700				3250	4.42		910	834	11	5230	7.9
July 19.....				67	27	300		72	0	24	600		1.7		1180	1.60		280	221	7.8	2000	7.9

b Calculated from determined constituents.
d Daily mean discharge.

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN LOWER MISSISSIPPI RIVER BASIN--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
RED RIVER BASIN--Continued																							
MUD CREEK NEAR GRADY, OKLA.																							
Nov. 10, 1959...				22	8.5	29		108	0	6.6	40		1.4		b 160	0.22		90	2	1.3	297	8.2	
Nov. 12.....				28	9.7	33		122	2	6.6	50		1.2		b 190	.26		110	6	1.4	358	8.3	
May 5, 1960.....				72	56	221		178	4	37	495		.7		1160	1.58		410	258	4.7	1890	8.3	
7-3157. MUD CREEK NEAR COURTNEY, OKLA.																							
Jan. 21, 1960...				40	17	74		164	4	15	122		1.0		b 354	0.48		168	27	2.5	658	8.3	
Mar. 7.....				144	101	557		88	0	50	1320		--		2560	3.48		775	703	8.7	4320	8.0	
Apr. 5.....				80	34	180		186	10	24	380		1.1		901	1.23		340	171	4.2	1500	8.5	
June 2.....				58	29	90		208	4	35	174		1.8		572	.78		265	88	2.4	931	8.3	
July 19.....				30	10	24		128	0	11	36		1.4		216	.29		116	11	1.0	346	8.2	
Sept. 8.....				50	23	63		186	2	41	112		1.1		434	.59		220	64	1.9	717	8.3	
WALNUT BAYOU NEAR OSWALT, OKLA.																							
Mar. 7, 1960....				90	46	250		124	0	76	550		4.4		1280	1.74		415	314	5.3	2030	8.0	
Apr. 7.....				366	126	1010		126	0	133	2400		--		4800	6.53		1430	1330	7.8	7460	7.8	
June 2.....				182	66	432		136	0	69	1050		--		2240	3.05		725	614	7.0	3550	8.0	
July 19.....				66	21	189		102	0	44	375		2.2		834	1.13		250	166	5.2	1400	8.0	
SIMON CREEK NEAR OSWALT, OKLA.																							
Mar. 7, 1960....				27	20	52		170	10	30	52		0.0		347	0.47		148	0	1.8	496	8.4	
June 2.....				17	26	54		200	10	23	42		3.3		318	.43		148	0	1.9	513	8.5	

SIMON CREEK AT PIKE, OKLA.

Apr. 7, 1960....				28	23	50		182	8	32	56		0.2		304	0.41		166	4	1.7	541	8.4
May 5.....				21	24	63		192	8	35	56		.1		352	.48		150	0	2.2	537	8.4
July 19.....				9.6	3.4	4.6		46	0	4.1	3.1		1.9		b 50	.07		38	0	.3	102	7.8

7-3159. WALNUT BAYOU NEAR BURNEYVILLE, OKLA.

Nov. 12, 1959...	2.1			70	20	115		138	2	39	248	0.5	1.0		b 564	0.77	3.20	258	142	3.1	1080	8.4
Jan. 21, 1960...				33	9.1	37		112	0	10	70		.7		284	.39		120	28	1.5	431	8.1
May 5.....				62	23	60		200	14	19	122		.6		556	.76		250	62	1.6	752	8.6

7-3165. WASHITA RIVER NEAR CHEYENNE, OKLA.

Apr. 13, 1960...	52.9			133	46	108		288	0	423	56		0.0		982	1.34	140	520	284	2.1	1290	7.9
July 26.....	46.3			74	17	46		220	0	127	30		.1		440	.60	55.0	255	74	1.3	653	8.1

7-3250. WASHITA RIVER NEAR CLINTON, OKLA.

Nov. 19, 1959...	d 48			188	121	54		96	0	933	20	0.3	4.6		1530	2.08	198	965	886	0.8	1710	8.0
Mar. 17, 1960...	d 271			130	86	73		164	0	616	36	.5	13		b 1040	1.41	761	680	546	1.2	1370	8.2

7-3260. POND CREEK NEAR FORT COBB, OKLA.

Nov. 23, 1959...	d 1.5			33	18	19		152	0	52	12		2.4		273	0.37	1.10	156	32	0.7	381	8.2
Mar. 8, 1960....	d 4.1			27	19	27		132	4	64	13		5.0		304	.41	3.36	144	30	1.0	395	8.3

b Calculated from determined constituents.
d Daily mean discharge.

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MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN LOWER MISSISSIPPI RIVER BASIN--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
RED RIVER BASIN--Continued																							
7-3260. POND CREEK NEAR FORT COBB, OKLA.--Continued																							
May 4, 1960.....	d 4.1			54	16	21		208	0	56	11	0.4	--		b 260	0.35	2.88	200	30	0.6	459	8.2	
June 1.....	d 3.4			38	12	29		132	12	56	11		5.7		286	.39	2.62	144	16	1.0	414	8.5	
Sept. 14.....	3.0			68	14	21		222	0	75	7.8		.6		325	.44	2.63	226	44	.6	489	8.0	
Sept. 15.....	d 2.6			43	18	22		158	0	82	9.3		2.9		279	.38	1.96	182	52	.7	418	8.2	
7-3270. SUGAR CREEK NEAR GRACEMONT, OKLA.																							
May 2, 1960.....	d 15			138	45	46		232	0	384	28	0.8			b 756	1.03	30.6	530	340	0.9	1040	8.2	
Sept. 14.....	.1			138	15	21		180	0	278	10		0.4		612	.83	.16	405	258	.5	778	7.6	
7-3273. WASHITA RIVER NEAR CHICKASHA, OKLA.																							
Nov. 9, 1959....				171	80	91		96	0	705	95	0.5	5.0		b 1190	1.62		755	676	1.4	1600	8.1	
Feb. 9, 1960....				108	29	27		184	0	239	30		8.0		588	.80		390	239	.6	815	8.0	
May 2.....				180	115	61		118	0	810	78		3.7		1440	1.96		920	824	.9	1670	8.1	
WEST BITTER CREEK NEAR TABLER, OKLA.																							
Mar. 8, 1960....				24	66	49		186	6	235	21		3.7		571	0.78		332	170	1.2	767	8.4	
June 1.....				35	47	26		348	4	23	14	0.2			b 320	.44		280	0	.7	574	8.3	

EAST BITTER CREEK NEAR TABLER, OKLA.

Mar. 28, 1960...								382	0		14	0.3	1.3					318	5		600	8.2
Mar. 28.....								374	6		13	.3	.8					316	0		600	8.3
Mar. 28.....								342	12		16	.3	1.7					308	8		571	8.5

MCCARDO CREEK NEAR CEMENT, OKLA.

Jan. 11, 1960...				885	236	2730		268	0	199	6160				11500	15.6		3180	2960	21	17400	7.4
Jan. 12.....				701	175	2000		247	0	156	4580				8690	11.8		2470	2270	18	13300	7.8
Jan. 20.....				1020	213	3030		153	0	213	6850				12200	16.6		3420	3290	23	18800	7.4
Jan. 28.....				1000	227	2820		274	0	212	6460				11800	16.0		3430	3210	21	18200	7.3
Apr. 11.....				1040	237	3230		52	0	223	7320				14100	19.2		3570	3530	24	19200	7.6
Apr. 25.....				934	219	3140		56	0	198	6960	0.0			b 11500	15.6		3230	3180	24	18200	7.7
Apr. 28.....				964	242	2940		48	0	202	6760				12700	17.3		3400	3360	22	18800	8.2

7-3282. CRINER CREEK NEAR PAYNE, OKLA.

Feb. 18, 1960...				68	38	21		368	0	46	15		2.3		b 371	0.50		326	24	0.5	651	8.1
Sept. 1.....				19	44	32		240	12	53	18		1.9		310	.42		230	14	.9	520	8.6
Sept. 18.....				18	44	27		236	10	46	18		2.2		294	.40		226	16	.8	495	8.6

7-3283. FINN CREEK NEAR STORY, OKLA.

June 1, 1960....				16	51	43		228	26	61	31		4.0		357	0.49		248	18	1.2	596	8.8
July 18.....				29	11	22		154	10	12	5.7		4.3		173	.24		118	0	.9	274	8.5
Sept. 15.....	1.7			53	65	37		490	0	48	21		.1		485	.66	2.23	400	0	.8	807	8.0

b Calculated from determined constituents.
d Daily mean discharge.

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN LOWER MISSISSIPPI RIVER BASIN--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
RED RIVER BASIN--Continued																							
7-3285. WASHITA RIVER NEAR PAULS VALLEY, OKLA.																							
Oct. 6, 1959....	6910			66	15	21		146	0		12							225	106	0.6	455	7.9	
Feb. 9, 1960....	3630			92	26	32		160	0	214	32		6.6		514	0.70	5040	336	205	.7	734	7.9	
7-3295. RUSH CREEK NEAR MAYSVILLE, OKLA.																							
Apr. 1, 1960....	27.2			77	91	115		236	0	--	200		--		--	--	--	565	372	2.1	1420	8.2	
Apr. 20.....	35.2			103	77	106		286	0	--	185		--		--	--	--	575	340	1.9	1490	8.2	
June 3.....	75.4			96	41	58		262	0	180	95		0.1		662	0.90	135	410	196	1.2	989	7.8	
July 7.....	488			85	25	26		324	0	46	41		.4		415	.56	547	315	50	.6	678	7.5	
Aug. 26.....	97.4			74	30	34		312	0	45	56		.7		422	.57	111	308	52	.8	708	7.6	
Sept. 15.....	2.8			98	108	263		284	0	336	482		.2		1530	2.08	11.6	690	458	4.4	2370	7.9	
ROCK CREEK NORTH OF SULPHUR, OKLA.																							
July 20, 1960...				54	25	143		236	0	20	235		1.2		649	0.88		236	42	4.1	1120	8.2	
Aug. 23.....				58	43	254		134	2	179	405		.6		1090	1.48		320	206	6.2	1780	8.3	
ROCK CREEK SOUTH OF PLATT NATIONAL PARK, NEAR SULPHUR, OKLA.																							
Apr. 14, 1960...				27	16	36		132	4	28	48		2.0		246	0.33		134	20	1.4	423	8.5	
July 20.....				24	31	115		154	8	38	182		1.0		516	.70		186	46	3.7	895	8.5	
7-3312. MILL CREEK NEAR MILL CREEK, OKLA.																							
Jan. 27, 1960...	16.5			51	33	5.5		304	0		10							264	15	0.1	485	7.5	
May 3.....	12.0			51	27			296	0		6.0							240	0	.1	431	7.7	

7-3320. RED RIVER NEAR COLBERT, OKLA.

Nov. 3, 1959....	d 959	5.0	--	110	26	250		124	0	267	385	0.3	0.5	0.14	b 1100	1.50	2850	380	278	5.6	1860	7.6
Feb. 24, 1960...	5620	5.5	0.00	94	28	177		132	0	207	290	.5	.8	.26	895	1.22	13580	350	242	4.1	1520	8.0
May 23.....	8970	6.8	.00	107	25	174		158	0	220	275	.2	.5	.25	983	1.34	23810	370	240	3.9	1510	7.7
July 12.....	9530	7.5	.00	110	31	215		154	0	253	338	.3	.7	.25	1070	1.46	27530	400	274	4.7	1750	7.9

7-3324.5. BLUE CREEK AT MILBURN, OKLA.

Jan. 27, 1960...	133			18	30	5.0		176	8		5.6							168	10	0.2	313	8.4
Mar. 23.....	82.8			22	33	6.0		236	0		6.6							192	0	.2	390	8.2

7-3335. CHICKASAW CREEK NEAR STRINGTOWN, OKLA.

Mar. 22, 1960...	7.6			6.4	1.0	6.5		16	0		7.4							20	7	0.6	73	7.0
May 2.....	3.8			7.2	1.9	9.2		26	0		7.6							26	4	.8	82	7.2

7-3344. CLEAR BOGGY CREEK NEAR TUPELO, OKLA.

Jan. 25, 1960...	135			80	34	56		312	0		100							340	84	1.3	809	8.1
Mar. 21.....	95.0			42	23	56		156	0		100							198	70	1.7	600	8.0

7-3344.2. LEADER CREEK AT TUPELO, OKLA.

Jan. 25, 1960...	18.6			48	5.8	45		220	0		38							144	0	1.6	496	7.9
Mar. 21.....	13.4			53	6.8	46		192	0		42							160	2	1.6	512	8.1

b Calculated from determined constituents.
d Daily mean discharge.

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN LOWER MISSISSIPPI RIVER BASIN--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
RED RIVER BASIN--Continued																							
7-3344.4. DELAWARE CREEK NEAR WAPANUCKA, OKLA.																							
Jan. 26, 1960...	28.5			26	20	24		120	4		41							146	41	0.9	385	8.3	
Mar. 23.....	19.3			46	23	25		200	0		46							208	44	.8	487	8.2	
May 3.....	11.8			69	26	31		296	0		48							280	38	.8	572	8.2	
7-3350. CLEAR BOGGY CREEK NEAR CANEY, OKLA.																							
Nov. 2, 1959....	d 46	7.5	--	119	25	121		368	0	34	230	0.1	0.2	0.20	b 718	0.98	89.2	400	98	2.6	1280	8.0	
Feb. 23, 1960...	214	8.0	0.04	86	20	33		278	0	39	68	.3	.4	.11	407	.55	235	295	67	.8	697	8.2	
May 25.....	576	11	.06	79	12	26		248	0	22	53	.2	.1	.08	376	.51	585	245	42	.7	593	7.6	
July 12.....	42	5.5	.00	45	11	33		166	0	22	49	.3	.7	.07	247	.34	28.0	158	22	1.1	444	7.5	
7-3355. RED RIVER AT ARTHUR CITY, TEX.																							
Nov. 3, 1959....	d 1210	1.5	--	100	24	200		160	0	207	310	0.3	0.1	0.13	b 922	1.25	3010	350	219	4.6	1570	7.7	
Feb. 23, 1960...	7690	7.5	0.00	85	25	139		148	0	170	225	.5	.7	.28	761	1.03	15800	315	194	3.4	1260	7.9	
May 24.....	19100	7.5	.23	18	3.2	12		58	0	12	15	.5	1.2	.15	111	.15	5720	58	10	.7	162	7.2	
July 13.....	2630	8.0	.00	96	33	171		170	0	209	275	.3	.6	.19	902	1.23	6400	375	236	3.8	1540	7.9	
7-3359. BUCK CREEK NEAR MOYERS, OKLA.																							
Jan. 26, 1960...	62.5			1.6	2.4	4.8		16	0		6.9							14	1	0.6	58	7.1	
Mar. 22.....	44.4			4.8	1.5	7.5		6	0		7.6							18	13	.8	92	6.9	
7-3370. RED RIVER AT INDEX, ARK.																							
Nov. 4, 1959....	d 3900	3.0	--	93	24	174		164	0	181	272	0.2	0.4	0.16	b 829	1.13	8730	330	196	4.2	1420	7.7	
Feb. 23, 1960...	10600	7.5	0.00	60	16	86		114	0	106	140	.3	.7	.20	489	.67	14000	215	122	2.6	820	7.8	
May 24.....	50400	5.8	.15	21	9.1	15		82	0	20	24	.1	.7	.26	175	.24	23810	90	23	.7	253	7.3	
July 13.....	7140	8.0	.00	94	26	183		138	0	217	282	.3	.2	.17	975	1.33	18800	340	227	4.3	1500	7.7	

b Calculated from determined constituents.
d Daily mean discharge.

7-3750. TCHEFUNCTA RIVER NEAR FOLSUM, LA.

Oct. 27, 1959....	63	12	0.11	2.0	1.2	2.1	0.5	9		1.4	4.1	0.1	0.2		28	0.04	4.8	10	3	0.3	37	6.6
Dec. 1.....	66	9.9	.15	1.2	.7	2.5	.7	8		.0	3.9	.1	.2		a23	.03	4.1	6	0	.4	30	6.3
Jan. 25, 1960....	107	5.5	.11	1.6	.2	3.0	.6	6		.0	4.7	.1	.4		a23	.03	6.6	5	0	.6	27	6.4
Apr. 27.....	63	10	.08	1.9	.3	2.8	.8	8		.4	3.9	.1	.1		a24	.03	4.1	6	0	.5	28	6.0
Aug. 10.....	56	10	.04	2.0	.7	2.5	.4	7		.8	5.2	.0	.1		a26	.04	3.9	8	2	.4	26	5.6

7-3812.5. BAYOU LAFOURCHE AT CUT-OFF, LA.

Oct. 27, 1959....		6.9	0.40	25	8.4	56	3.1	89		19	93	0.3	1.0		276	0.38		97	24	2.5	481	7.3
Mar. 24, 1960....		8.8	.18	37	12	83	3.8	118		31	143	.2	.7		404	.55		143	46	3.0	705	7.4
June 23.....		3.0	.03	41	19	110	6.6	132		46	196	.3	.2		538	.73		180	72	3.6	929	6.7
Aug. 19.....		5.9	.05	43	15	104	3.2	122		51	175	.5	.3		485	.66		169	69	3.5	851	6.8

7-3813.3. INTRACOASTAL CANAL AT HOUMA, LA.

Oct. 27, 1959....		6.1	0.11	25	8.4	53	2.5	88		21	85	0.4	1.0		254	0.35		97	25	2.3	463	7.2
Feb. 11, 1960....		5.6	.03	22	8.1	63	1.8	30		55	104	.9	.3		304	.41		88	63	2.9	507	8.3
May 24.....		3.5	.13	36	9.3	59	3.3	121		27	96	.2	.7		315	.43		128	29	2.3	554	7.6
June 23.....		5.2	.01	35	11	55	3.0	110		29	95	.3	.9		334	.45		131	41	2.1	569	6.8
Aug. 19.....		7.0	.12	31	9.9	75	3.4	95		31	126	.5	.5		365	.50		118	40	3.0	615	6.7

7-3814.1. BAYOU GROSSE TETE AT ROSEDALE, LA.

July 8, 1960.....		11	0.05	39	14	15	2.2	201		4.8	10	0.4	0.1		215	0.29		155	0	0.5	342	7.2
Aug. 19.....		14	.01	29	12	12	3.2	161		4.4	8.1	.3	.8		169	.23		121	0	.5	288	6.8

7-3814.2. BAYOU POYDROS NEAR ROSEDALE, LA.

July 8, 1960.....		6.5	0.05	44	15	18	3.5	238		1.6	11	0.7	0.2		233	0.32		172	0	0.6	392	7.3
Aug. 19.....		12	.01	41	13	14	4.5	128		72	6.6	.5	.6		233	.32		154	49	.5	344	6.7

a Calculated from determined constituents.

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN LOWER MISSISSIPPI RIVER BASIN--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
MISSISSIPPI RIVER DELTA--Continued																						
7-3814.3. BAYOU GROSSE TETE NEAR PLAQUEMINE, LA.																						
June 30, 1960....		9.5	0.02	54	15	159	6.6	190		28	256	0.5	0.7		638	0.87		195	39	4.9	1,160	7.1
Aug. 19.....		10	.05	50	14	162	4.3	164		33	264	.5	.2		641	.87		181	47	5.2	1,150	7.0
7-3814.5. LOWER GRAND RIVER AT BAYOU SORREL FERRY, LA.																						
June 30, 1960....		7.6	0.03	42	13	67	3.9	142		37	105	0.5	0.5		353	0.48		158	42	2.3	633	7.1
Aug. 19.....		9.2	.01	47	13	119	3.6	156		41	184	.5	.2		517	.70		172	44	3.9	921	6.9

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN LOWER MISSISSIPPI RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1959 to September 1960
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water;
P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Water temperature (°F)	Sampling point	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
ARKANSAS RIVER BASIN																	
7-1400. ARKANSAS RIVER NEAR KINSLEY, KANS.																	
May 5, 1958.....	1900	70		269	462	336											
July 13, 1960.....	0910	74		126	164	56											
Aug. 29.....	1600	86		30	37	3.0											
Sept. 1.....	1430	95		27	40	2.9											
Sept. 13.....	1515	80		19	12	.6											
Sept. 19.....	1800	--		18	21	1.0											
Sept. 24.....	1735	72		28	27	2.0											
7-1412. PAWNEE RIVER NEAR LARNED, KANS.																	
May 5, 1958.....	1555	--		342	2240	2070	--	--		--							
July 28.....	1730	--		15800	1430	61000	86	94		99		100					VPWC
July 29.....	1805	--		10500	1570	44500	85	94		99							PWC
Sept. 22, 1959.....	0735	--		334	1760	1590	--	--		--							
Sept. 23.....	1615	66		990	2920	7810	--	--		--							
July 13, 1960.....	1010	78		9.1	464	11	--	--		--							
7-1413. ARKANSAS RIVER AT GREAT BEND, KANS.																	
Oct. 8, 1959.....	1600	--		1830	2040	10100	--	--		--		--	--	--	--		
Nov. 24.....	1500	--		598	318	513	35	46		70		84	--	--	--		SPWC
Mar. 22, 1960.....	1400	38		5680	3620	55500	53	67		84		92	93	96	100		VPWC
Mar. 22.....	1400	38		5680	3620	--	7	12		84		92	93	96	100		VPN
Apr. 28.....	1320	--		382	172	177	--	--		--		--	--	--	--		
June 3.....	0840	--		217	328	192	--	--		--		--	--	--	--		
July 13.....	1225	--		161	144	63	--	--		--		--	--	--	--		
Aug. 29.....	1815	--		12	12	.4	--	--		--		--	--	--	--		

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN LOWER MISSISSIPPI RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1959 to September 1960--Continued
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water;
P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Water temperature (°F)	Sampling point	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
ARKANSAS RIVER BASIN--Continued																	
7-1426.2. RATTLESNAKE CREEK NEAR RAYMOND, KANS.																	
Mar. 21, 1960.....	1600			e 750	843	1710											
Mar. 30.....	--			e 550	1520	2260											
Apr. 26.....	--			e 300	397	322											
June 2.....	1700			82	537	119											
July 13.....	1450			36	588	57											
Aug. 29.....	1300			19	357	18											
Sept. 13.....	1830			7.0	115	2.2											
7-1433. COW CREEK NEAR LYONS, KANS.																	
Mar. 29, 1958.....	1745			e 2000	1200	6480	74	78		89		100					VPWC
Mar. 18, 1960.....	1015			e 400	190	205	--	--		--							
Mar. 22.....	1640	34		e 100	2750	742	40	45		62							PWC
Apr. 26.....	1430			e 230	1420	882	--	--		--							
June 2.....	1615			e 86	526	122	--	--		--							
July 13.....	1555			e 120	585	190	--	--		--							
Aug. 29.....	1205			e 65	278	49	--	--		--							
Aug. 31.....	1400			e 1500	2160	8750	76	88		94							PWC
Sept. 13.....	1905			e 25	113	7.6	--	--		--							
7-1433.3. ARKANSAS RIVER NEAR HUTCHINSON, KANS.																	
Sept. 26, 1959.....	1230	70		6500	4080	71600	--	--		--		--	--	--	--		
Sept. 26.....	1500	70		6250	4160	70200	--	--		--		--	--	--	--		
Sept. 28.....	1610	74		4600	2760	34300	--	--		--		--	--	--	--		
Mar. 21, 1960.....	1345	43		2980	1750	14100	31	38		50		76	82	95	100		VPWC
Mar. 21.....	1345	43		2980	1750	14100	10	10		57		76	82	95	100		VPN

Apr. 28, 1960.....	1530	59			960	332	860	72	88		90		--	--	--	--			PWC
June 2.....	1315	77			800	464	1000	--	--		--		--	--	--	--			
July 4.....	1400	81			780	68	143	--	--		--		--	--	--	--			
July 12.....	1000	--			590	290	467	52	58		70		--	--	--	--			PWC
Aug. 12.....	1120	84			209	124	70	--	--		--		--	--	--	--			
Sept. 12.....	1545	78			179	574	277	--	--		--		--	--	--	--			
Sept. 19.....	1600	87			159	20	8.6	--	--		--		--	--	--	--			
Sept. 23.....	1330	70			208	429	241	--	--		--		--	--	--	--			
Sept. 25.....	1430	73			520	994	1400	--	--		--		--	--	--	--			

7-1436. LITTLE ARKANSAS RIVER AT LITTLE RIVER, KANS.

Oct. 30, 1958.....	1000			e	2	84	0.5											
May 5, 1959.....	0910			e	300	6960	5640											
Sept. 26.....	1615				.5	332	.4											
Oct. 2.....	1410				190	5600	2870											
Mar. 22, 1960.....	1715				150	1650	668											
May 1.....	1530				15	153	6.2											
Aug. 4.....	1015				1.0	144	.4											
Aug. 29.....	1130				980	4110	10900											

7-1436.3. LITTLE ARKANSAS RIVER AT MEDORA, KANS.

Mar. 29, 1958.....	0800			e	100	1300	351	74	76		89		98	99	99	100			VPWC
June 25.....	1305	71		e	10	177	4.8						97	100					V
Oct. 30.....	1210			e	15	175	7.1						--	--					
May 5, 1959.....	1035			e	900	2360	5730						--	--					
Apr. 19, 1960.....	--			e	60	3640	590						--	--					

e Estimated.

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN LOWER MISSISSIPPI RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1959 to September 1960--Continued
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Water temperature (°F)	Sampling point	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
ARKANSAS RIVER BASIN--Continued																		
7-1436.3. LITTLE ARKANSAS RIVER AT MEDORA, KANS.--Continued																		
Apr. 19, 1960.....	--			e 200	1140	616						--	--					
Apr. 19.....	--			e 500	790	1070						--	--					
May 5.....	1715			e 180	2220	1080						--	--					
Aug. 4.....	1145			2.7	72	.5						--	--					
Sept. 21.....	--			e 60	3210	520						--	--					
7-1436.6. TURKEY CREEK NEAR BUHLER, KANS.																		
Mar. 29, 1958.....	0920	--		e 20	1140	62	85	88		95		99	99	100				VPWC
June 25.....	1330	70		e 20	277	15						100						V
July 5.....	1330	73		e 30	208	17						--						
Oct. 30.....	1250	50		e 12	122	4.0						--						
May 9, 1959.....	1120	62		e 120	3090	1000						--						
June 12.....	0930	60		e 10	143	3.9						--						
Oct. 2.....	1535	53		e 50	2810	379						--						
Nov. 24.....	0930	40		e 5	34	.4						--						
Dec. 4.....	1145	--		e 5	12	.2						--						
Dec. 15.....	1730	--		4.6	24	.3						--						
Jan. 4, 1960.....	1320	--		e 8	37	.8						--						
7-1436.63. CROOKED CREEK NEAR BUHLER, KANS.																		
May 5, 1959.....	1135			e 10	1350	36												
Oct. 2.....	1545			e 40	3950	427												
Mar. 24, 1960.....	1410			e 80	1300	281												

7-1436.65. LITTLE ARKANSAS RIVER AT ALTA MILLS, KANS.

Dec. 16, 1959.....	1220			12	76	2.5												
May 2, 1960.....	1730			56	319	48												
Aug. 4.....	1505	82		16	81	3.5												

7-1439. LITTLE ARKANSAS RIVER NEAR HALSTEAD, KANS.

Dec. 17, 1959.....	1210	--		16	31	1.3												
May 3, 1960.....	2345	61		66	187	33												
Aug. 4.....	1530	84		20	195	10												

7-1440.9. SAND CREEK NEAR SEDGWICK, KANS.

Mar. 29, 1958.....	1125			e 150	835	338						98	99	100				V
July 5.....	1545	72		e 180	475	231	50	68		80		95	96	97	99	100		VPWC
Nov. 4.....	1530			e .5	32	.1						--	--	--				
Mar. 24, 1960.....	1810			e 60	811	131						--	--	--				

7-1441. LITTLE ARKANSAS RIVER AT FRY BRIDGE, NEAR SEDGWICK, KANS.

Nov. 24, 1959.....	1020	--		e 46	15	1.9	--	--		--		--	--					
Jan. 4, 1960.....	1205	--		e 60	24	3.9	--	--		--		--	--					
Mar. 9.....	1400	--		e 76	12	2.5	--	--		--		--	--					
Mar. 23.....	1650	--		e 3500	930	8790	--	--		--		--	--					
Mar. 23.....	1815	--		e 3500	1220	11500	--	--		--		--	--					
Mar. 24.....	1530	--		e 5000	1050	14200	--	--		--		--	--					
Mar. 24.....	1610	--		e 5000	1130	15300	--	--		--		--	--					
Mar. 25.....	1615	--		e 5300	1100	15700	--	--		--		--	--					
Mar. 26.....	1210	--		e 5400	1200	17500	--	--		--		--	--					

e Estimated.

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN LOWER MISSISSIPPI RIVER BASIN--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1959 to September 1960--Continued
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Water temperature (°F)	Sampling point	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters											Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
ARKANSAS RIVER BASIN--Continued																		
7-1441. LITTLE ARKANSAS RIVER AT FRY BRIDGE, NEAR SEDGWICK, KANS.--Continued																		
Mar. 27, 1960	1645	--		e 5700	1280	19700	--	--		--		--	--					
Mar. 28	1635	--		e 4200	1400	15900	--	--		--		--	--					
Mar. 29	1700	--		e 2200	1100	6530	--	--		--		--	--					
Apr. 19	1345	--		e 137	296	109	--	--		--		--	--					
May 4	1015	--		e 9000	3260	79200	--	--		--		--	--					
May 4	2100	--		e 8400	3470	78700	--	--		--		--	--					
May 5	0845	--		e 11000	2310	68600	--	--		--		--	--					
May 5	1630	--		e 9700	2010	52600	--	--		--		--	--					
May 5	1850	--		e 9200	1860	46200	--	--		--		--	--					
May 6	1655	--		e 8300	1500	33600	--	--		--		--	--					
May 7	1430	--		e 6800	1300	23900	--	--		--		--	--					
June 16	1115	--		e 307	658	545	--	--		--		--	--					
July 12	1600	--		e 85	126	29	--	--		--		--	--					
Aug. 2	1140	--		e 51	65	9.0	--	--		--		--	--					
Aug. 24	1200	73		e 1500	3680	14900	58	70		92		99	100					SPWC
Aug. 24	1430	--		e 2500	2660	18000	--	--		--		--	--					
Aug. 24	1645	--		e 3700	2900	29000	--	--		--		--	--					
Aug. 24	1910	--		e 4300	1750	20300	--	--		--		--	--					
Aug. 24	2100	--		e 4400	1330	15800	--	--		--		--	--					
Aug. 24	2250	--		e 4400	2230	26500	--	--		--		--	--					
Aug. 25	0825	77		e 3200	1290	11100	64	79		81		82	82	83	91	100		VPWC
Aug. 25	1055	--		e 2900	1220	9550	--	--		--		--	--					
Aug. 25	1645	--		e 2600	2710	19000	--	--		--		--	--					
Aug. 25	1845	--		e 2400	2380	15400	--	--		--		--	--					
Aug. 26	1845	--		e 11000	1540	45700	--	--		--		--	--					
Aug. 26	1945	--		e 11000	1500	44600	--	--		--		--	--					
Aug. 27	1520	--		e 8200	959	21200	--	--		--		--	--					
Aug. 27	2020	--		e 7000	1010	19100	--	--		--		--	--					

Aug. 28, 1960.....	1625	--		e 4600	684	8500	--	--		--		--	--					
Sept. 13.....	1315	--		e 140	281	106	--	--		--		--	--					

7-1441.4. JESTER CREEK NEAR VALLEY CENTER, KANS.

Mar. 29, 1958.....	1230	--		e 120	1160	376	--	--		--		99	100					V
July 5.....	1655	73		e 900	353	858	93	94		--		100						VPWC
Nov. 4.....	1435	--		e 3	216	1.7	--	--		--		--						
Mar. 4, 1960.....	1550	--		e 40	531	57	--	--		--		--						
May 4.....	1320	59		e 150	4050	1640	72	96		99		--						PWC
May 4.....	1630	61		e 250	3190	2150	68	77		91		--						PWC

7-1448. NORTH FORK NINNESCAH RIVER NEAR CHENEY, KANS.

May 16, 1958.....	1600	--		140	74	28												
July 12, 1960.....	1055	78		40	46	5.0												
Aug. 12.....	1300	87		13	27	.9												
Sept. 13.....	1115	72		41	90	10												

7-1455. NINNESCAH RIVER NEAR PECK, KANS.

May 16, 1958.....	0630	--		383	567	586	71	78				99	100					VPWC
July 12, 1960.....	1355	95		181	113	55	--	--										
Aug. 12.....	1355	87		133	89	32	--	--										
Aug. 27.....	1135	--		4780	1820	23500	73	84		94								PWC
Sept. 13.....	0945	70		156	163	69	--	--										

e Estimated.

MISCELLANEOUS ANALYSES OF STREAMS IN LOWER MISSISSIPPI RIVER BASIN--Continued

Particle-size analyses of suspended sediemnt, water year October 1959 to September 1960
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Water temperature (°F)	Sampling point	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.156	0.031	0.062	0.125	0.250	0.350	0.500	1.000	
MISSISSIPPI RIVER DELTA																	
7-3804. BAYOU LAFOURCHE AT CULVERT AT DONALDSONVILLE, LA.																	
Oct. 30, 1959	1040			330	607		59	70	76	86	94	98	99	100				BNC
Jan. 29, 1960	1720			208	627		--	--	--	--	--	--	--	--				
Feb. 4	0320			208	407		--	--	--	--	--	--	--	--				
Feb. 9	1400			148	385		--	--	--	--	--	--	--	--				
Feb. 12	1115			156	288		--	--	--	--	--	--	--	--				
Mar. 1	1100			216	374		--	--	--	--	--	--	--	--				
Mar. 31	1100			248	245		--	--	--	--	--	--	--	--				
Apr. 26	1125			257	455		--	--	--	--	--	--	--	--				
May 27	--			251	440		--	--	--	--	--	--	--	--				
July 7	1145			248	689		58	64	76	84	92	99	99	100				BNC
July 29	1000			216	275		79	85	94	96	96	97	100	--				BNC
Aug. 31	1035			210	92		--	--	--	--	--	--	--	--				BNC
Sept. 26	1000			208	182		--	--	--	--	--	--	--	--				BNC

MISCELLANEOUS ANALYSES OF LAKES AND STREAMS IN LOWER MISSISSIPPI RIVER BASIN--Continued

Particle-size analyses of bed material, water year October 1959 to September 1960
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Water temperature (°F)	Sampling point	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Bed material: Percent finer than size indicated, in millimeters										Method of analysis
							0.062	0.125	0.250	0.500	1.000	2.000	4.000	8.000	16.00	32.00	64.00	
ARKANSAS RIVER BASIN																	
7-1413. ARKANSAS RIVER AT GREAT BEND, KANS.																	
June 3, 1960.....	0840		10	217				0	3	33	62	79	94	99	100			SV
July 13.....	1225		5	161				0	3	45	56	82	93	96	99	100		SV
Aug. 29.....	1815		2	12				0	2	50	81	92	99	100	--			SV
7-1433.3. ARKANSAS RIVER NEAR HUTCHINSON, KANS.																	
June 2, 1960.....	1315		9	800				0	8	43	69	80	90	95	100			SV
July 4.....	1400		10	780				0	5	40	66	81	92	96	98	100		SV
Aug. 12.....	1120		6	209				0	6	31	53	69	88	99	100			SV
Sept. 12.....	1545		10	179				0	6	41	69	84	96	99	100			SV

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PART 8. WESTERN GULF OF MEXICO BASINS

MERMENTAU RIVER BASIN

8-124. MERMENTAU RIVER AT LAKE ARTHUR, LA.

LOCATION.--At bridge on State Highway 14, 0.5 mile east of Lake Arthur, Jefferson Davis Parish.
RECORDS AVAILABLE.--Chemical analyses: January 1949 to September 1960.
Water temperatures: January 1949 to September 1951, October 1959 to September 1960.
EXTREMES, 1959-60.--Specific conductance: Maximum daily, 749 micromhos July 14; minimum daily, 87 micromhos Dec. 23.
Water temperatures: Maximum, 87°F July 28; minimum, 48°F Jan. 30.
EXTREMES, 1949-60.--Specific conductance: Maximum daily, 6,330 micromhos June 30, 1952; minimum daily, 22 micromhos Sept. 12, 1956.
Water temperatures (1949-51, 1959-60): Maximum, 99°F June 27, 1950; minimum, freezing point Dec. 15, 18, 25, 1949.
REMARKS.--Records of specific conductance of daily samples available in district office at Baton Rouge, La. Records of discharge not available for this station.

Specific conductance and chloride, in parts per million, water year October 1959 to September 1960

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	194	27	196	38	174	37	91	17
2	196	--	164	--	173	--	97	--
3	195	--	162	--	171	--	96	--
4	195	--	163	--	173	--	96	--
5	195	--	150	--	170	--	95	--
6	239	36	235	--	172	--	123	
7	241	--	426	110	169	36	168	--
8	240	--	222	47	172	--	294	--
9	242	--	247	--	171	--	357	92
10	243	--	247	--	177	--	200	--
11	243	--	197	42	173	37	200	--
12	270	44	182	--	172	--	167	--
13	271	--	195	--	173	--	165	--
14	271	--	251	--	179	--	149	--
15	245	--	157	--	199	44	125	--
16	244	--	158	--	207	--	117	23
17	234	45	--	--	361	--	124	--
18	238	--	165	--	397	93	88	--
19	240	--	164	--	124	--	225	50
20	228	--	--	--	108	21	224	--
21	231	--	--	--	108	--	131	--
22	213	41	--	--	99	--	121	--
23	209	--	--	--	87	--	118	--
24	210	--	--	--	90	--	118	--
25	198	--	--	--	89	--	118	--
26	195	--	169	37	94	--	104	21
27	193	37	169	--	92	--	105	--
28	194	--	169	--	96	--	102	--
29	194	--	174	--	99	--	100	--
30	194	--	177	--	105	--	103	--
31	--	--	--	--	111	--	101	--

MERMENTAU RIVER BASIN--Continued

8-124. MERMENTAU RIVER AT LAKE ARTHUR, LA.--Continued

Specific conductance and chloride, in parts per million, water year October 1959 to September 1960--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	99	19	103	103	147	30	172	30
2	102	--	101	101	148	--	172	--
3	100	--	90	17	149	--	169	--
4	100	--	96	--	148	--	178	--
5	128	--	99	--	149	--	178	--
6	272	--	99	--	149	--	164	--
7	275	66	96	--	148	--	135	--
8	162	--	96	--	148	--	134	--
9	126	--	117	--	150	--	149	--
10	155	--	124	24	148	--	149	--
11	102	20	125	--	147	28	159	31
12	106	--	125	--	147	--	157	--
13	109	--	126	--	147	--	160	--
14	108	--	127	--	147	--	157	--
15	107	--	126	--	149	--	156	--
16	107	--	131	--	153	--	156	--
17	109	21	133	--	153	--	160	--
18	104	--	129	--	153	--	158	--
19	182	--	134	--	148	--	155	--
20	186	--	133	26	147	--	152	--
21	228	51	135	--	147	28	160	--
22	187	--	136	--	146	--	156	--
23	156	--	142	--	148	--	151	29
24	175	--	146	--	148	--	158	--
25	149	--	146	--	176	--	156	--
26	151	--	151	--	158	--	158	--
27	143	--	139	--	174	--	157	--
28	137	--	149	--	178	--	162	--
29	104	20	149	--	176	--	158	--
30	--	--	150	--	197	--	163	--
31	--	--	145	--	--	--	169	--

	June		July		August		September	
1	179	3.2	441	98	700	169	182	--
2	193	--	453	--	667	--	182	--
3	207	--	448	--	666	--	187	--
4	214	--	429	--	763	--	193	--
5	223	--	516	--	517	--	192	--
6	222	--	501	--	518	--	193	--
7	219	--	570	--	371	78	196	26
8	222	--	574	--	372	--	199	--
9	191	--	600	--	369	--	203	--
10	184	--	624	--	367	--	206	--
11	180	3.3	625	170	362	--	204	
12	172	--	669	--	359	--	210	--
13	172	--	710	--	397	--	207	--
14	183	--	749	--	395	--	210	28
15	194	--	723	--	420	--	213	--
16	245	--	723	--	337	55	213	--
17	246	--	728	--	337	--	207	29
18	261	--	667	--	334	--	214	--
19	282	--	631	--	333	--	215	--
20	282	6.0	579	--	322	--	124	--
21	298	--	525	103	322	--	215	31
22	315	--	506	--	272	--	215	--
23	369	80	466	--	270	--	215	--
24	370	--	510	--	246	--	218	--
25	375	--	503	--	219	--	218	--
26	377	--	511	--	220	--	220	--
27	378	--	553	--	223	--	224	--
28	387	--	626	--	193	27	232	--
29	409	--	682	--	194	--	234	--
30	435	--	701	--	191	--	239	36
31	--	--	701	--	184	--	--	--

MERMENTAU RIVER BASIN--Continued

8-124. MERMENTAU RIVER AT LAKE ARTHUR, LA.--Continued

Temperature (°F) of water, water year October 1959 to September 1960

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

8-220. SABINE RIVER NEAR TATUM, TEX.

LOCATION.--At gaging station near right bank on downstream side of pier of bridge on State Highway 43, 5 miles upstream from Potter Creek, 5.2 miles northeast of Tatum, Rusk County, 7 miles downstream from Cherokee Bayou, and at mile 339.
DRAINAGE AREA.--3,586 square miles.
RECORDS AVAILABLE.--Chemical analyses: February 1952 to September 1960.
Water temperatures: February 1952 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 513 ppm Aug. 17, 19-21; minimum, 96 ppm Oct. 12-21.
Hardness: Maximum, 96 ppm July 1-3, 9-11; minimum, 30 ppm Dec. 21-25, 27-31.
Specific conductance: Maximum daily, 1,020 micromhos Oct. 1; minimum daily, 127 micromhos Oct. 14.
Water temperatures: Maximum, 91°F on several days during August and September; minimum, 40°F Mar. 1.
EXTREMES, 1952-60.--Dissolved solids: Maximum, 936 ppm Aug. 21-31, 1956; minimum, 74 ppm Apr. 24-30, 1957.
Hardness: Maximum, 121 ppm Oct. 20, 1958; minimum, 22 ppm Apr. 24-30, 1957.
Specific conductance: Maximum daily, 1,850 micromhos Oct. 25, 1954, Aug. 31, 1956; minimum daily, 98 micromhos Apr. 29, 1957.
Water temperatures: Maximum, 98°F Aug. 13, 1956; minimum, 40°F Jan. 6, 1959, Mar. 1, 1960.
REMARKS.--Dashes omitted in potassium (K) column indicate sodium (Na) plus potassium (K) are calculated. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1959 to September 1960.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1-4, 1959....	213	18		16	6.6	146	4.2	41		21	240	--	1.8		474	0.64	273	67	33	7.8	912	6.8
Oct. 5-11.....	752	18		12	4.9	77		36		15	121	--	1.8		a292	.40	593	50	20	4.7	508	6.8
Oct. 12-21.....	4298	14		10	2.9	17		46		10	18	--	1.2		96	.13	1110	37	0	1.2	160	6.8
Oct. 22-26.....	3780	14		16	3.9	30		58		15	40	--	1.2		149	.20	1520	56	8	1.7	261	6.8
Oct. 27-31.....	516	19		20	4.4	52		63		20	77	--	1.2		225	.31	313	68	16	2.7	412	7.5
Nov. 1-9.....	762	20		19	4.9	78		50		24	121	--	1.2		a306	.42	630	68	27	4.1	544	7.0
Nov. 10-21.....	1441	16		17	3.3	47		50		23	66	--	1.0		198	.27	770	56	15	2.7	359	7.5
Nov. 22-30.....	512	20		18	4.8	76		50		23	116	--	1.2		a306	.42	423	65	24	4.1	524	7.5
Dec. 1-14.....	607	22		17	6.0	101		40		27	159	--	1.0		a368	.50	603	67	34	5.4	654	6.5
Dec. 15-20, 26....	4777	13		10	3.5	43		22		21	65	--	1.0		168	.23	2170	39	21	3.0	299	6.4
Dec. 21-25, 27-31.	8821	9.6		9.2	1.8	23		30		15	28	--	.8		102	.14	2430	30	5	1.8	174	6.4
Jan. 1, 7-8, 1960.	9153	11		11	3.1	24		29		19	34	--	1.5		118	.16	2920	40	16	1.6	208	6.8
Jan. 2-6, 9-11....	8965	13		14	4.3	35		29		27	55	--	.2		162	.22	3920	53	29	2.1	294	6.6
Jan. 12-21.....	9154	11		11	3.2	27		29		20	38	--	.2		124	.17	3060	41	17	1.8	225	6.5
Jan. 22-31.....	10920	11		12	3.8	28		30		23	41	--	.2		134	.18	3950	46	21	1.8	241	6.3
Feb. 1-14.....	4281	13		16	5.7	--		25		37		0.1	.5		--	--	--	--	--	--	367	--
Feb. 15-24.....	4820	11		16	3.8	28		39		27	39	.2	.8		145	.20	1890	56	24	1.6	249	6.9
Feb. 25-29.....	5306	14		14	4.9	44		26		31	68	.1	.5		190	.26	2720	55	34	2.6	340	6.9
Mar. 1-14.....	6671	11		13	4.7	37		22		33	55	.2	.8		166	.23	2990	52	34	2.2	296	6.6
Mar. 15-24.....	2751	14		16	6.2	59		24		43	91	.1	.5		a266	.36	1980	65	45	3.2	434	6.7
Mar. 25-31.....	2227	14		16	6.2	53		22		39	86	.1	.8		a248	.34	1490	65	47	2.9	409	6.5

a Residue at 180°C.

SABINE RIVER BASIN--Continued

8-220. SABINE RIVER NEAR TATUM, TEX.--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Apr. 1-10, 1960...	1150	16		17	7.6	62	2.5	26		42	106	--	0.5		a286	0.39	888	74	53	3.1	502	6.5
Apr. 11-20.....	763	14		17	7.7	68		30		39	111	--	.5		a292	.40	602	74	49	3.4	520	6.6
Apr. 21-30.....	639	15		16	7.1	74		29		34	121	--	.5		a301	.41	519	69	45	3.9	539	6.5
May 1-9.....	899	15		20	8.1	92		36		41	150	--	1.2		a360	.49	874	84	54	4.4	653	7.0
May 10-12, 15.....	1410	13		22	4.3	26		75		21	32	--	1.8		157	.21	598	73	11	1.3	281	7.3
May 13-14, 16-17..	1560	11		25	7.4	61		64		46	87	--	1.8		270	.37	1140	93	41	2.8	503	7.0
May 18-31.....	663	14		18	4.9	51		51		23	78	--	1.5		a232	.32	415	65	23	2.8	404	7.0
June 1-6.....	282	17		18	6.4	76		56		28	113	--	2.0		a298	.41	227	71	25	3.9	534	7.1
June 7-18.....	748	14		14	3.7	43		46		19	61	--	1.5		179	.24	362	50	12	2.6	331	6.6
June 19-20.....	752	--		--	--	--		45		--	147	--	--		--	--	--	66	29	--	609	6.8
June 21-30.....	776	12		12	3.7	41		29		21	62	--	1.0		167	.23	350	45	21	2.7	315	6.4
July 1-3, 9-11....	1224	14		25	8.3	126		34		29	220	--	2.0		441	.60	1460	96	68	5.6	842	6.6
July 4-8.....	1988	26		14	3.9	40		47		21	54	--	2.0		184	.25	988	51	12	2.4	313	6.6
July 12-31.....	667	13		17	4.3	47		54		18	69	--	2.0		197	.27	355	60	16	2.6	366	6.6
Aug. 1-16.....	164	19		23	5.8	69		85		18	100	--	1.0		a292	.40	129	81	11	3.3	511	7.2
Aug. 17, 19-21....	124	17		23	7.0	159		67		20	251	--	2.8		513	.70	172	86	31	7.5	957	7.2
Aug. 18, 22, 29...	254	15		14	4.0	52		36		22	79	--	2.0		206	.28	141	51	21	3.2	374	7.0
Aug. 23-28, 30-31.	470	15		19	5.0	87		57		22	133	--	1.2		a339	.46	430	68	21	4.6	576	6.7
Sept. 1-10.....	241	13		15	5.1	96		46		25	144	--	1.0		a348	.47	226	58	20	5.5	619	6.9
Sept. 11-21.....	108	10		16	5.5	95		63		24	135	--	1.2		a325	.44	94.7	62	10	5.2	599	6.9
Sept. 22-30.....	859	10		9.0	3.1	53		23		16	81	--	1.5		185	.25	429	35	16	3.9	348	6.5
Weighted average	--	13		13	4.1	38	--	32		25	56	--	0.7		168	0.22	1120	50	23	2.3	303	6.6
Time-weighted average.....	2530	14		16	5.0	59	--	42		25	91	--	1.1		241	--	--	60	25	3.3	428	6.7
Tons per day....	--	86		92	28	252	--	221		172	373	--	5.0		--	--	--	--	--	--	--	--

a Residue at 180°C.

SABINE RIVER BASIN--Continued

8-220. SABINE RIVER NEAR TATUM, TEX.--Continued

Temperature (°F) of water, water year October 1959 to September 1960

Month	Day																													Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
October	77	77	78	78	78	78	71	70	70	70	70	70	73	67	67	67	67	67	67	65	64	65	64	62	63	64	61	59	--	64	63	69
November	65	65	67	66	65	58	56	57	58	59	60	60	57	51	--	52	--	44	45	45	50	52	47	50	49	--	48	48	48	47	--	54
December	46	47	52	47	49	49	49	50	52	56	--	53	50	49	53	51	54	55	54	51	51	47	48	--	--	54	55	54	53	51	49	51
January	51	49	50	49	--	45	47	45	47	49	48	48	48	57	51	49	48	49	49	47	48	48	49	51	52	53	53	54	53	52	52	50
February	50	54	52	51	--	--	53	50	50	50	50	50	48	47	47	48	--	49	51	48	49	--	50	--	--	48	48	57	50	--	--	50
March	40	42	45	45	47	49	53	53	50	49	47	47	49	--	50	51	52	52	53	52	56	59	--	--	59	60	61	60	61	62	62	52
April	63	62	63	62	62	64	64	63	63	64	70	68	70	70	60	60	52	65	67	65	68	68	69	67	67	68	68	68	52	52	--	64
May	56	56	56	68	68	65	63	68	68	68	68	67	68	69	69	69	69	70	71	68	67	--	--	68	67	68	68	68	70	71	80	67
June	81	81	82	83	83	85	87	85	85	86	86	88	89	89	88	88	87	87	86	88	85	85	86	82	81	82	84	86	86	87	--	85
July	87	88	86	88	84	78	79	80	83	86	86	89	89	89	89	89	89	88	79	82	89	87	87	88	88	89	89	88	89	87	89	86
August	89	87	89	89	91	90	90	90	91	91	90	90	90	90	89	90	90	90	90	90	90	90	90	--	89	89	89	89	90	91	91	90
September	91	91	91	91	91	91	84	81	--	--	80	80	80	80	79	79	81	82	89	89	89	89	89	86	80	80	79	80	80	80	--	84

SABINE RIVER BASIN--Continued

8-242. BAYOU LA NANA NEAR ZWOLLE, LA.

LOCATION.--At gaging station at bridge on State Highway 475, 8 miles south of Zwolle, Sabine Parish, and 4 miles upstream from mouth.
DRAINAGE AREA.--130 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1959 to September 1960.
REMARKS.--Records of discharge for water year October 1959 to September 1960 given in WSP 1712.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 29, 1959....	1.1	12	0.77	10	6.1	21	3.4	63		25	16	0.4	1.1		127	0.17	0.38	50	0	1.3	183	6.6
Nov. 11.....	1.2	14	.16	13	5.7	24	3.4	84		16	18	.3	.6		136	.18	.44	56	0	1.4	219	6.7
Dec. 9.....	2.5	16	.31	16	6.6	31	4.3	102		14	30	.3	.3		169	.23	1.1	67	0	1.7	286	7.2
Feb. 3, 1960.....	80	13	.45	13	5.7	33	2.5	32		46	40	.2	.5		170	.23	37	56	30	1.9	293	6.6
Mar. 1.....	122	14	.42	8.4	3.7	18	1.7	18		32	20	.1	.5		108	.15	36	36	21	1.3	175	6.0
Apr. 6.....	20	12	.22	14	8.6	39	1.8	58		48	44	.3	.2		a204	.28	11	70	22	2.0	340	7.1
May 3.....	8.9	13	2.7	17	8.2	54	2.4	114		1.0	70	.3	.7		a278	.38	.38	76	0	2.7	431	4.6
June 2.....	2.2	13	.32	20	6.1	48	2.1	95		23	56	.3	.0		a245	.33	1.5	75	0	2.4	404	6.5
July 5.....	5.9	15	.43	8.8	4.9	20	2.3	44		15	25	.2	.9		115	.16	1.8	42	6	1.3	193	6.1
Aug. 3.....	1.8	11	.28	9.6	4.4	23	2.6	58		11	24	.3	.9		a132	.18	.64	42	0	1.5	208	6.2
Sept. 7.....	1.7	14	.39	15	4.5	32	2.0	93		12	28	.2	.3		154	.21	.71	56	0	1.9	263	6.7

a Residue at 180°C.

8-255. BAYOU TORO NEAR TORO, LA.

LOCATION.--At gaging station at bridge on State Highway 473, 0.2 mile upstream from Hanby Creek and 7.8 miles west of Hornbeck, Vernon Parish.
DRAINAGE AREA.--148 square miles (revised).
RECORDS AVAILABLE.--Chemical analyses: November 1959 to September 1960.
REMARKS.--Records of discharge for water year October 1959 to September 1960 given in WSP 1712.

Chemical analyses, in parts per million, November 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Nov. 6, 1959.....	10	23	0.24	3.7	1.2	5.3	0.8	16		5.0	5.3	0.1	0.4		53	0.07	1.4	14	1	0.6	64	6.3
Dec. 10.....	9.0	25	.15	3.8	.6	7.4	2.3	17		8.6	6.0	.2	.1		62	.08	1.5	12	0	.9	67	6.2
Feb. 4, 1960.....	650	13	.37	4.5	.9	6.7	2.2	6		14	8.3	.1	1.0		54	.07	95	15	10	.7	82	5.5
Mar. 1.....	150	17	.37	4.4	1.7	6.4	1.4	8		15	8.0	.2	.5		59	.08	24	18	12	.7	74	6.6
Apr. 6.....	45	19	.35	5.1	1.8	8.7	1.8	19		12	9.2	.1	.3		67	.09	8.1	20	4	.8	82	6.6
May 3.....	24	21	.40	5.9	1.3	8.0	1.7	19		10	9.4	.2	.4		67	.09	4.3	20	4	.8	82	5.7
May 31.....	7.2	22	.83	5.3	1.1	8.5	1.9	25		7.6	7.2	.1	.0		67	.10	1.3	18	0	.9	84	6.6
July 6.....	26	20	.40	7.0	1.6	5.1	2.4	19		7.8	9.4	.1	.5		a64	.09	4.5	24	8	.4	81	5.7
Aug. 3.....	7.0	18	.47	7.6	1.2	4.8	1.2	18		7.8	9.0	.1	.6		60	.08	1.1	24	9	.4	87	6.1
Sept. 6.....	5.0	20	.14	5.6	.5	4.6	.8	17		5.0	5.5	.0	.4		50	.07	.68	16	2	.5	64	5.9

a Residue at 180°C.

SABINE RIVER BASIN--Continued

8-305. SABINE RIVER NEAR RULIFF, TEX.

LOCATION.--At gaging station at bridge on State Highway 12, 2.4 miles north of Ruliff, Newton County, 4.2 miles upstream from the Kansas City Southern Railway Co. bridge, 4.5 miles downstream from Cypress Creek, and at mile 40.
DRAINAGE AREA.--9,440 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1946, October 1947 to September 1960.
Water temperatures: October 1947 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 217 ppm May 13-24; minimum, 72 ppm Dec. 16-31.
Hardness: Maximum, 62 ppm May 13-24; minimum, 23 ppm June 25-30.
Specific conductance: Maximum daily, 457 micromhos May 19, 21; minimum daily, 122 micromhos Dec. 26, 28.
Water temperatures: Maximum, 90°F July 11, 12; minimum, 48°F on several days during February and March.
EXTREMES, 1945-46, 1947-60.--Dissolved solids: Maximum, 411 ppm Dec. 26-27, 1948; minimum, 32 ppm Sept. 23-26, 28-30, 1958.
Hardness: Maximum, 65 ppm Dec. 21-22, 1954; minimum, 8 ppm May 20-24, 1953.
Specific conductance: Maximum daily, 774 micromhos Dec. 26, 1948; minimum daily, 33 micromhos May 22, 1953.
Water temperatures (1947-60): Maximum, 95°F Aug. 12, 1953; minimum, 34°F Jan. 28, 1948.
REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1959 to September 1960 given in WSP 1712. Calculated as sodium (Na).

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Oct. 1-10, 1959.	956	18		9.8	3.1	37	2.8	41		9.2	56	0.1	0.8		a162	0.22	418	37	3	2.6	273	6.9	
Oct. 11-22.....	2627	14		8.0	2.6	40	--	32		12	56	--	1.2		150	.20	1060	30	3	3.1	273	6.5	
Oct. 23-31.....	5389	14		10	2.3	18	--	42		11	20	--	.8		97	.13	1410	34	0	1.3	162	6.8	
Nov. 1-10.....	2557	15		12	4.0	31	--	46		15	43	--	1.2		144	.20	994	46	8	2.0	255	6.7	
Nov. 11-13.....	3483	10		7.0	3.2	17	--	24		11	26	--	.8		87	.12	818	30	10	1.3	151	6.6	
Nov. 14-30.....	2586	16		13	4.4	34	--	42		17	50	--	1.2		157	.21	1100	50	16	2.1	275	6.8	
Dec. 1-15.....	1644	15		8.5	3.4	29	--	28		13	44	--	.5		a137	.19	608	35	12	2.1	217	6.4	
Dec. 16-31.....	12860	7.8		7.5	2.1	14	--	23		9.0	20	--	.8		72	.10	2500	27	8	1.2	126	6.9	
Jan. 1-15, 1960.	14870	11		8.8	3.6	23	--	17		20	34	--	4.5		113	.15	4540	37	23	1.6	194	5.9	
Jan. 16-31.....	15980	11		8.8	3.4	21	--	20		19	32	--	1.2		106	.14	4570	37	21	1.5	188	6.2	
Feb. 1-11.....	16730	11		9.0	2.8	23	--	20		20	32	.2	.2		108	.15	4880	34	18	1.7	186	6.3	
Feb. 12-17.....	14330	12		8.8	3.4	25	--	18		22	37	.1	.5		118	.16	4570	36	21	1.8	208	6.2	
Feb. 18-29.....	17580	10		6.8	2.5	19	--	16		18	26	.1	1.0		91	.12	4320	28	15	1.6	153	6.1	
Mar. 1-15.....	20910	9.6		8.5	3.3	25	--	13		24	36	.1	1.8		114	.16	6440	34	23	1.8	196	6.1	
Mar. 16-31.....	13560	11		9.0	3.7	25	--	18		24	36	.1	1.2		119	.16	4360	38	23	1.8	204	6.4	

Apr. 1-10, 1960.	7880	12		9.5	4.3	25	2.3	23		24	38	--	0.8		127	0.17	2700		41	22	1.7	226	6.5
Apr. 11-21.....	3816	15		11	5.5	36	--	30		25	54	--	1.0		a176	.24	1810		50	25	2.2	293	6.5
Apr. 22-30.....	2883	16		12	5.7	39	--	34		24	60	--	.5		a186	.25	1450		54	26	2.3	315	6.8
May 1-12.....	4585	12		9.5	3.9	33	--	26		21	47	--	1.0		140	.19	1730		40	19	2.3	253	6.3
May 13-24.....	2838	13		15	5.8	50	--	44		32	71	--	1.0		217	.30	1660		62	26	2.8	380	6.3
May 25-31.....	2307	14		15	4.7	33	--	52		21	45	--	1.0		a172	.23	1070		57	14	1.9	286	6.4
June 1-15.....	1499	15		13	4.4	30	--	55		14	38	.3	1.2		143	.19	579		50	4	1.8	243	6.8
June 16-24.....	1861	13		12	4.5	56	--	43		19	81	.2	.5		a214	.29	1080		48	13	3.5	375	6.8
June 25-30.....	4757	6.8		6.0	1.9	24	--	14		11	36	.2	1.0		94	.13	1210		23	12	2.2	164	6.2
July 1-3, 8-10..	4560	10		8.0	2.9	23	--	26		12	34	--	1.0		104	.14	1280		32	11	1.8	188	6.4
July 4-7.....	3292	9.0		6.5	2.2	18	--	22		9.6	25	--	1.2		82	.11	729		25	7	1.6	133	6.5
July 11-20.....	3052	11		9.2	3.4	29	--	34		12	42	--	.5		124	.17	1020		37	9	2.1	216	6.5
July 21-31.....	2495	10		12	4.5	39	--	37		17	60	--	.5		a172	.23	1160		48	18	2.4	288	6.3
Aug. 1-13.....	1505	14		13	3.9	47	--	42		13	72	--	.5		a196	.27	796		48	14	2.9	328	6.3
Aug. 14-20.....	1004	18		12	3.5	34	--	50		11	46	--	.5		a160	.22	434		44	3	2.2	249	6.4
Aug. 21-31.....	1911	12		9.2	3.0	42	--	42		9.0	58	--	.8		a155	.21	800		36	1	3.1	272	6.2
Sept. 1-4, 9-11.	2023	30		13	4.4	41	--	90		7.8	40	--	.5		190	.26	1040		50	0	2.5	292	6.4
Sept. 5-8.....	2410	11		11	4.3	60	--	36		13	93	--	.5		211	.29	1370		45	15	3.9	402	6.9
Sept. 12-20.....	921	13		7.8	3.4	24	--	38		9.8	31	--	.8		109	.15	271		34	2	1.8	188	6.4
Sept. 21-30.....	758	15		9.0	3.7	28	--	41		11	37	--	.8		124	.17	254		38	4	2.0	213	6.4
Weighted average.....	--	11		9	3.3	25	--	23		19	36	--	1.3		117	0.16	2070		36	18	1.8	202	6.2
Time-weighted average.....	6546	13		10	3.7	31	--	33		17	44	--	1.0		139	--	--		40	14	2.1	238	6.4
Tons per day..	--	197		159	59.0	442	--	406		333	637	--	24.0		--	--	--		--	--	--	--	--

a Residue at 180°C.

Temperature (°F) of water, water year October 1959 to September 1960

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

NECHES RIVER BASIN

8-325. NECHES RIVER NEAR ALTO, TEX.

LOCATION.--At gaging station at bridge on State Highway 21, 600 feet downstream from Bowles Creek, 7.5 miles southwest of Alto, Cherokee County, and at mile 274.
DRAINAGE AREA.--1,943 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1959 to September 1960.
Water temperatures: October 1959 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 198 ppm June 18; minimum, 90 ppm June 13-15, 26-28.
Hardness: Maximum, 54 ppm Apr. 1-10; minimum, 30 ppm June 13-15, 26-28.
Specific conductance: Maximum daily, 360 micromhos July 12; minimum daily, 117 micromhos June 27.
Water temperatures: Maximum, 87°F Aug. 5; minimum, 43°F Feb. 25-27, Mar. 5, 6.
REMARKS.--Dashes omitted in potassium (K) column indicate sodium (Na) plus potassium (K) are calculated. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1959 to September 1960 given in WSP 1712.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 27-31, Nov. 1-4, 6-7, 1959....	487	24		8.0	3.8	26		20	0	21	38	0.1	1.0		132	0.18	174	36	20	1.9	200	6.2
Nov. 5, 8-20.....	626	20		9.2	4.6	33		25	0	21	50	.1	.8		161	.22	272	42	22	2.2	263	6.2
Nov. 21-30.....	433	27		10	5.1	34		29	0	22	51	.1	.5		166	.23	194	46	22	2.2	275	6.5
Dec. 1-15.....	508	25		9.0	4.5	26		28	0	21	36	.1	.8		136	.18	187	41	18	1.8	222	6.9
Dec. 16-30.....	2711	18		7.0	3.8	20		14	0	23	28	.1	.8		108	.15	791	33	22	1.5	177	6.6
Jan. 1-10, 1960...	2941	18		9.0	4.9	23		16	0	28	35	.1	.4		126	.17	1000	43	30	1.5	204	6.1
Jan. 11-20.....	3429	15		9.0	4.7	20		12	0	28	32	.1	.5		115	.16	1060	42	32	1.3	194	5.8
Jan. 21-31.....	3728	14		8.2	4.4	20		14	0	27	30	.1	.5		111	.15	1120	39	28	1.4	183	6.1
Feb. 1-10.....	2292	14		10	4.7	23		18	0	29	34	.1	.2		124	.17	767	44	29	1.5	215	6.7
Feb. 11-23.....	1940	13		10	5.1	24		18	0	33	34	.1	.2		128	.17	670	46	31	1.5	225	6.7
Feb. 24-29.....	2858	14		9.0	4.0	20		18	0	26	28	.1	.2		110	.15	849	39	24	1.4	186	6.7
Mar. 1-10.....	3665	12		8.2	4.5	20		12	0	27	30	.2	.8		109	.15	1080	39	29	1.4	186	6.2
Mar. 11-20.....	3049	12		9.0	4.9	20		15	0	31	29	.1	.5		114	.16	938	43	31	1.3	198	6.2
Mar. 21-31.....	1660	13		10	5.9	24		20	0	33	36	.1	.5		144	.20	645	49	33	1.5	233	6.3
Apr. 1-10.....	1157	13		11	6.4	24	2.8	28	0	31	38	.2	.8		141	.19	440	54	31	1.4	243	6.6

Apr. 11-20, 1960..	902	15		11	6.2	24		32	0	25	36	0.2	0.8		134	0.18	326	53	27	1.4	232	6.8
Apr. 21-29.....	704	17		9.0	5.6	26		36	0	22	34	.3	1.0		133	.18	253	46	16	1.7	226	6.5
Apr. 30, May 1....	1695	--		--	--	15		18	0	18	21	.2	1.5		--	--	--	33	18	1.1	148	6.5
May 2-15.....	677	20		10	4.9	28		31	0	19	41	.2	1.8		140	.19	256	45	20	1.8	231	6.7
May 16-31.....	372	18		9.5	5.0	27		32	0	18	40	.2	1.8		136	.18	137	44	18	1.8	226	6.8
June 1-12.....	257	20		10	4.3	25		36	0	16	34	.2	1.8		12[illegible]	.18	89.5	43	13	1.7	207	6.5
June 13-15, 26-28.	817	16		6.5	3.3	16		19	0	15	22	.6	1.8		96	.12	199	30	14	1.3	139	6.2
June 16-17, 19-25, 29-30.....	425	20		10	4.4	28		30	0	18	42	.2	1.5		139	.19	160	43	18	1.9	227	6.4
June 18.....	374	17		--	--	51		11	11	17	81	.2	.2		198	.27	200	48	21	3.2	354	8.8
July 1-10.....	553	20		9.8	4.4	26		26	0	20	39	.2	1.2		134	.18	200	43	22	1.7	215	6.6
July 11-20.....	225	22		13	5.1	37		35	0	21	57	.2	1.8		174	.24	106	53	24	2.2	288	6.6
July 21-31.....	405	19		10	4.1	24		26	0	22	35	.2	1.2		128	.17	140	42	21	1.6	206	6.6
Aug. 1-10.....	188	19		11	4.7	29		34	0	21	42	.4	1.2		145	.20	73.5	47	19	1.8	245	6.6
Aug. 11-20.....	145	19		10	4.2	25		34	0	15	37	.3	1.2		129	.18	50.5	42	14	1.7	209	6.5
Aug. 21-31.....	162	20		10	4.4	28		34	0	15	42	.2	1.2		138	.19	60.3	43	15	1.9	231	6.6
Sept. 1-10.....	193	17		10	4.2	27		32	0	22	36	.1	1.5		147	20	76.5	42	16	1.8	218	6.6
Sept. 11-20.....	118	18		10	4.4	25		38	0	16	34	.1	1.5		140	19	44.5	43	12	1.7	208	6.7
Sept. 21-30.....	174	15		8.8	3.7	20		36	0	11	28	.1	1.2		106	14	49.7	37	7	1.4	175	6.6
Weighted average	--	16		9	4.7	22		19	--	26	33	0.1	0.7		122	0.16	393	42	27	1.5	204	6.3
Time-weighted average.....	1194	18		9.5	4.7	25		26	--	22	37	0.2	1.0		132	--	--	43	22	1.7	217	6.4
Tons per day....	--	50		29	15	72		60	--	84	107	0.4	2.2		--	--	--	--	--	--	--	--

Temperature (°F) of water, water year October 1959 to September 1960

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

8-370. ANGELINA RIVER NEAR LUFKIN, TEX.

LOCATION.--At gaging station at bridge on U.S. Highway 59, 200 feet upstream from Procella Creek, 1.5 miles downstream from Bayou Loco, 1.5 miles upstream from Southern Pacific Railroad bridge, and 8 miles north of Lufkin, Angelina County.
DRAINAGE AREA.--1,604 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1954 to September 1960.
Water temperatures: October 1954 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 254 ppm Aug. 5-17; minimum, 56 ppm Feb. 22-29.
Hardness: Maximum, 56 ppm Aug. 5-17; minimum, 20 ppm Feb. 22-29.
Specific conductance: Maximum daily, 593 micromhos Aug. 10; minimum daily, 56 micromhos Feb. 26.
Water temperatures: Maximum, 86°F July 14; minimum, 38°F Jan. 20-22, Feb. 25.
EXTREMES, 1954-60.--Dissolved solids: Maximum, 412 ppm Nov. 4-18, 26-30, 1954; minimum, 36 ppm Oct. 16-18, 1957.
Hardness: Maximum, 76 ppm Nov. 4-18, 26-30, 1954; minimum, 11 ppm Oct. 16-18, 1957.
Specific conductance: Maximum daily, 895 micromhos Nov. 10, 1954; minimum daily, 38 micromhos Sept. 21, 1958.
Water temperatures: Maximum, 89°F July 9, 1957; minimum, 38°F on several days during winter months.
REMARKS.--Dashes omitted in potassium (K) column indicate sodium (Na) plus potassium (K) are calculated. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1959 to September 1960 given in WSP 1712.

Chemical analyses, in parts per million, water year Ocotber 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Oct. 1-15, 1959.	141	18		6.5	3.4	18	3.1	38		12	21	0.1	0.8		102	0.14	38.7	30	0	1.4	163	6.8	
Oct. 16-25.....	274	17		7.2	3.8	29		21		20	42	--	.2		129	.18	95.3	34	17	2.2	224	6.8	
Oct. 26-31.....	162	14		10	5.4	61		22		18	101	--	.8		220	.30	96.1	47	29	3.9	414	6.5	
Nov. 1-5.....	319	15		8.8	5.1	37		26		17	60	--	.8		157	.21	135	43	22	2.5	286	6.4	
Nov. 6-10.....	713	13		5.0	4.0	21		17		27	22	--	.8		101	.14	194	29	15	1.7	147	6.3	
Nov. 11-21.....	700	17		7.5	3.0	33		16		24	45	--	.5		138	.19	261	31	18	2.6	241	6.3	
Nov. 22-30.....	424	16		8.2	3.5	38		20		26	52	--	.5		a160	.22	183	35	18	2.8	268	6.4	
Dec. 1-2, 6-12, 16, 31.....	593	19		7.0	4.4	29		25		23	38	--	.1		a138	.19	221	36	16	2.1	212	6.9	
Dec. 3-5, 13-15.	387	16		9.5	5.5	52		22		21	84	--	.2		a209	.28	218	46	28	3.3	351	6.7	
Dec. 17-30.....	2418	15		6.0	3.2	--		16		18	--	--	.5		--	--	--	28	15	--	128	6.5	
Jan. 1-10, 1960.	2087	15		5.8	3.2	14		16		20	17	--	.8		102	.14	575	28	15	1.2	130	6.2	
Jan. 11-17.....	2193	15		8.0	5.0	23		16		30	32	--	.4		a133	.18	788	40	27	1.6	201	6.3	
Jan. 18-23.....	2535	14		5.5	3.0	12		18		16	14	--	.8		74	.10	506	26	11	1.0	114	6.4	
Jan. 24-31.....	2745	15		6.5	4.1	16		18		21	22	--	.5		94	.13	697	33	18	1.2	153	6.5	
Feb. 1-10.....	1741	17		7.8	4.8	21		18		28	29	.1	.2		117	.16	550	39	24	1.5	193	6.1	
Feb. 11-21.....	1647	15		7.8	5.0	22		18		27	31	,1	.5		117	.16	520	40	25	1.5	200	6.3	
Feb. 22-29.....	2698	13		3.8	2.6	6.9	1.4	16		11	8	.1	1.0		56	.08	408	20	6	.7	85	5.9	
Mar. 1-8.....	3708	13		4.5	2.9	8.4	1.5	14		14	11	.1	1.2		64	.09	641	23	12	.8	99	6.1	
Mar. 9-15.....	4377	14		5.5	3.9	17		13		22	23	.1	.5		92	.13	1090	30	19	1.4	152	6.2	
Mar. 16-21.....	2567	13		5.2	3.2	11		18		14	14	.1	1.0		70	.10	485	26	11	.9	114	6.3	
Mar. 22-31.....	1437	12		8.0	5.1	19		20		27	26	.1	.5		108	.15	419	41	25	1.3	186	6.2	

Apr. 1-10.....	1369	11		8.5	6.5	21	1.8	28		30	28	.1	.5		a129	.18	477	48	25	1.3	209	6.8
Apr. 11-20.....	917	14		10	6.8	25		30		29	37	.2	.5		a150	.20	371	53	28	1.5	238	6.8
Apr. 21-30.....	593	15		8.8	6.4	24		34		25	33	.1	.5		a143	.19	229	48	20	1.5	225	6.8
May 1-3.....	1333	14		5.1	4.2	21		22		19	26	--	.8		101	.14	364	30	12	1.7	160	6.6
May 4-10.....	863	16		9.0	5.4	19		26		28	24	--	1.0		115	.16	268	45	24	1.2	189	6.4
May 11-18.....	297	17		10	6.1	35		30		24	54	--	.8		a174	.24	140	50	25	2.2	280	6.7
May 19-31.....	183	18		8.0	4.8	20		33		17	26	--	1.2		111	.15	54.8	40	13	1.4	182	6.5
June 1-14.....	150	20		7.2	3.7	23		40		15	24	.2	1.0		114	.16	46.1	33	0	1.7	170	6.7
June 15-18,28-30	687	15		5.2	3.0	15		18		17	17	.1	1.0		82	.11	152	25	10	1.3	130	6.3
June 19-20.....	676	15		10	6.3	52		15		32	85	.1	.5		208	.28	380	52	40	3.2	375	6.7
June 21-27.....	309	16		8.2	4.6	25		20		25	36	.1	1.0		126	.17	105	39	23	1.7	213	6.3
July 1-6.....	956	15		8.8	4.9	31		16		24	50	--	1.0		143	.19	369	42	29	2.1	245	6.3
July 7-13.....	241	18		12	6.2	52		23		23	88	--	1.0		211	.29	137	55	36	3.0	377	6.3
July 14-20.....	115	20		9.0	4.6	26		36		16	36	--	1.8		131	.18	40.6	41	11	1.8	208	6.8
July 21-26.....	402	16		6.2	3.4	20		22		16	26	--	1.2		100	.14	109	29	11	1.6	155	6.4
July 27-31.....	305	14		11	5.5	61		16		20	105	--	.5		225	.31	185	50	37	3.8	412	6.1
Aug. 1-4.....	168	20		9.2	4.1	34		28		16	52	--	1.2		150	.20	68.0	40	17	2.3	247	6.9
Aug. 5-17.....	66.2	17		12	6.3	70		29		18	117	--	.2		254	.35	45.3	56	32	4.1	456	6.5
Aug. 18-29.....	192	16		6.2	3.2	21		30		14	24	--	1.2		101	.14	52.3	29	4	1.7	154	6.4
Aug. 30-31.....	247	--		--	--	--		14		--	51	--	--		--	--	--	35	24	--	251	6.5
Sept. 1-4.....	185	19		8.8	5.5	50		16		25	80	--	.8		197	.27	98.3	45	32	3.3	348	6.7
Sept 5-11.....	155	18		6.5	3.8	24		22		20	32	--	.8		116	.16	48.5	32	14	1.8	189	6.5
Sept. 12-18.....	56.0	16		11	6.2	62		22		20	105	--	.5		232	.32	35.0	53	35	3.7	437	6.4
Sept.19-25,29-30	141	15		7.0	4.3	35		30		14	51	--	.8		142	.19	54.0	35	10	2.6	255	6.3
Sept. 26-28.....	113	18		5.8	3.7	21		32		13	24	--	.8		102	.14	31.0	30	3	1.7	169	7.0
Weighted average.....	--	15		6.6	4.1	19	--	19		21	26	--	0.7		106	0.14	266	33	18	1.4	166	6.3
Time-weighted average.....	984	16		7.7	4.5	28	--	24		21	39	--	0.7		133	--	--	38	18	1.9	217	6.4
Tons per day..	--	39		18	11	48	--	50		56	65	--	1.8		--	--	--	--	--	--	--	--

a Residue at 180°C.

NECHES RIVER BASIN--Continued

8-370. ANGELINA RIVER NEAR LUFKIN, TEX.--Continued

Temperature (°F) of water, water year October 1959 to September 1960

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

8-410. 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 Co. bridge at Evadale, Jasper County, 600 feet downstream from Mill Creek, 15 miles upstream from Village Creek, and at mile 55.
DRAINAGE AREA.--7,923 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1960.
Water temperatures: October 1947 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 172 ppm Dec. 1-10, 11-20; minimum, 72 ppm Mar. 1-10.
Hardness: Maximum, 50 ppm Apr. 11-20, June 1-15; minimum, 26 ppm Mar. 1-10.
Specific conductance: Maximum daily, 357 micromhos Dec. 8; minimum daily, 112 micromhos Mar. 5.
Water temperatures: Maximum, 91°F July 29; minimum, 44°F Mar. 2-4, 6-8.
EXTREMES, 1947-60.--Dissolved solids: Maximum, 222 ppm Oct. 21-31, 1956; minimum, 35 ppm Sept. 21-22, 24, 1958.
Hardness: Maximum, 70 ppm Nov. 1-10, 1947; minimum, 14 ppm May 3-15, Oct. 27-31, 1957, Sept. 21-22, 24, 1958.
Specific conductance: Maximum daily, 422 micromhos Jan. 25, 1957; minimum daily, 44 micromhos Sept. 22, 1958.
Water temperatures: Minimum, 37°F Jan. 30-31, 1948, Jan. 31, 1949.
REMARKS.--Dashes omitted in potassium (K) column indicate sodium (Na) plus potassium (K) are calculated. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1959 to September 1960 given in WSP 1712.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Oct. 1-10, 1959.	274	--		--	--	--		--		--	--	--	--		--	--	--	--	--	--	204	--	
Oct. 11-20.....	510	22		10	3.5	21		40		12	28	0.1	0.8		117	0.16	161	40	6	1.5	185	6.7	
Oct. 21-31.....	1191	18		9.8	3.4	29		42		14	37	.2	.8		133	.18	428	38	4	2.0	225	6.7	
Nov. 1-10.....	1704	17		8.0	2.8	28		38		17	30	.2	1.2		123	.17	566	32	0	2.2	210	6.5	
Nov. 11-20.....	3435	17		7.8	2.5	26		30		18	29	.1	1.2		117	.16	1090	30	6	2.1	199	6.4	
Nov. 21-30.....	2569	16		7.5	2.7	25		24		19	30	.1	1.2		114	.16	791	30	10	2.0	194	6.4	
Dec. 1-10.....	1870	39		12	4.1	32		42		23	40	.1	1.2		172	.23	868	47	12	2.0	267	6.9	
Dec. 11-20.....	3540	47		11	4.0	30		40		21	38	.1	1.2		172	.23	1640	44	11	2.0	241	7.0	
Dec. 21-31.....	11430	53		10	2.8	20		40		18	19	.1	1.0		144	.20	4440	36	4	1.4	173	6.9	
Jan. 1-10, 1960.	10680	11		8.2	2.8	18		13		23	26	.1	.5		96	.13	2770	32	22	1.4	165	6.4	
Jan. 11-20.....	11230	13		8.0	2.8	18		12		24	24	.1	.5		96	.13	2910	32	22	1.4	158	6.3	
Jan. 21-31.....	9302	11		9.0	3.3	20		14		28	28	.1	.2		107	.15	2690	36	24	1.4	182	6.4	
Feb. 1-10.....	10840	13		8.2	3.6	21		13		27	30	.1	.2		109	.15	3190	36	25	1.5	184	6.3	
Feb. 11-20.....	8882	13		8.5	3.3	23		15		27	30	.1	.2		112	.15	2690	34	22	1.7	181	6.4	
Feb. 21-29.....	13640	12		7.5	2.9	18		14		23	24	.1	.2		95	.13	3500	30	19	1.4	164	6.2	
Mar. 1-10.....	18060	9.6		6.2	2.5	12		10		20	16	.1	.8		72	.10	3510	26	18	1.0	124	6.1	
Mar. 11-20.....	13070	11		8.0	3.5	20		12		26	28	.1	.5		103	.14	3630	34	24	1.5	172	6.1	
Mar. 21-31.....	10760	11		9.0	3.9	23		15		29	32	.1	.2		115	.16	3340	38	26	1.6	198	6.1	

NECHES RIVER BASIN--Continued

8-410. NECHES RIVER AT EVADALE, TEX.--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Apr. 1-10, 1960.	4856	14		10	5.0	24	2.4	22		32	36	0.2	0.2		a146	0.20	1910	46	28	1.5	221	6.9	
Apr. 11-20.....	3593	12		5.3	5.3	27		26		33	36	.2	.2		a148	.20	1440	50	28	3.2	226	7.0	
Apr. 21-30.....	2683	12		11	5.2	29		30		30	39	.2	.2		a154	.21	1120	49	24	1.8	235	6.7	
May 1-10.....	5553	13		10	5.2	26		28		27	35	.2	1.2		132	.18	1980	46	24	1.7	221	6.5	
May 11-20.....	3176	13		9.5	4.1	22		26		25	28	.2	1.2		116	.16	995	40	19	1.5	190	6.4	
May 21-31.....	2286	13		9.5	4.1	23		28		24	29	.2	.8		118	.16	728	40	18	1.6	198	6.7	
June 1-15.....	1445	13		12	4.8	27		40		22	36	.2	1.0		136	.18	531	50	16	1.7	232	6.5	
June 16-30.....	1852	13		10	4.2	31		40		20	38	.3	1.0		138	.19	690	42	10	2.1	230	6.4	
July 1-15.....	2662	13		8.0	2.9	18		27		15	23	.2	1.2		94	.13	676	32	10	1.4	154	6.7	
July 16-31.....	1662	14		9.0	3.2	20		29		16	26	.2	1.2		104	.14	467	36	12	1.5	163	6.6	
Aug. 1-10.....	1704	16		9 0	3.1	23		28		16	32	.2	.8		114	.16	524	35	12	1.7	181	6.7	
Aug. 11-20.....	730	18		11	3.7	26		36		16	36	.1	1.0		130	.18	256	42	13	1.7	202	6.6	
Aug. 21-31.....	319	16		10	3.8	21		36		12	30	.1	1.0		112	.15	96.5	40	11	1.4	175	6.2	
Sept. 1-10.....	254	19		10	3.8	24		41		12	32	.2	1.0		122	.17	83.6	41	7	1.6	191	6.6	
Sept. 11-20.....	610	16		10	4.0	29		37		16	40	.2	.8		134	.18	221	41	11	2.0	223	6.4	
Sept. 21-30.....	532	15		9.5	3.8	29		38		15	38	.2	1.0		a142	.19	204	39	8	2.0	217	6.4	
Weighted average.....	--	16		8.5	3.4	21	--	20		24	27	0.1	0.6		112	0.15	1470	35	19	1.5	180	6.3	
Time-weighted average.....	4728	17		9.2	3.6	24	--	28		21	31	0.2	0.8		122	--	--	38	15	1.7	196	6.5	
Tons per day..	--	213		112	44	274	--	267		310	360	1.6	7.9		--	--	--	--	--	--	--	--	

a Residue at 180°C.

8-410. NECHES RIVER AT EVADALE, TEX.--Continued

Temperature (°F) of water, water year October 1959 to September 1960

Month	Day																													Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
October																																
Maximum	84	83	83	83	83	82	80	80	82	81	82	82	80	79	73	71	71	70	70	70	71	71	71	71	69	68	68	66	66	66	66	75
Minimum	81	81	81	81	81	79	76	76	78	78	78	80	79	73	70	69	70	69	68	68	68	69	68	69	68	67	66	65	65	66	66	73
November																																
Maximum	68	68	69	70	70	69	62	60	59	57	58	59	61	61	58	57	56	54	52	51	52	54	55	56	56	57	57	56	54	52	--	59
Minimum	66	68	68	69	69	62	60	59	57	56	56	58	59	58	57	56	54	52	51	50	50	52	54	55	55	56	56	54	52	51	--	57
December																																
Maximum	52	53	53	52	52	52	52	52	53	54	55	55	55	54	55	58	59	59	58	56	53	53	53	53	53	54	55	55	53	51	50	54
Minimum	52	52	52	52	52	52	52	52	52	53	54	55	54	54	54	55	58	58	56	53	53	53	53	53	53	53	54	52	51	50	50	53
January																																
Maximum	50	50	50	49	48	47	46	46	46	47	49	51	51	52	52	52	51	51	50	48	46	46	46	46	45	46	47	47	47	47	47	48
Minimum	49	49	49	48	47	46	46	46	46	46	47	49	51	51	52	51	51	50	48	46	46	46	46	45	45	45	46	47	47	47	47	48
February																																
Maximum	48	48	48	49	50	50	50	51	54	56	56	54	48	47	47	47	47	47	46	46	46	46	48	48	47	46	46	47	47	--	--	49
Minimum	47	48	48	48	49	50	50	50	51	54	54	48	46	46	47	47	47	46	46	46	46	46	46	47	45	45	45	46	47	--	--	48
March																																
Maximum	47	45	44	45	45	45	44	45	46	47	48	48	48	48	50	50	50	49	52	54	55	57	59	60	60	60	61	62	64	64	64	52
Minimum	45	44	44	44	45	44	44	44	45	46	47	48	48	48	48	50	49	47	49	52	54	55	57	59	60	59	59	61	62	62	64	51
April																																
Maximum	64	63	62	61	62	63	65	66	66	66	66	66	66	66	67	68	68	68	68	69	71	71	71	71	71	72	73	75	75	72	--	68
Minimum	63	62	61	61	61	62	63	65	66	65	64	66	66	66	66	67	68	67	66	68	69	71	71	71	71	71	72	73	72	71	--	67
May																																
Maximum	71	70	70	69	70	72	72	71	70	70	70	69	70	70	71	72	74	74	76	76	76	78	79	79	78	80	80	80	81	81	81	74
Minimum	69	69	69	69	69	70	71	70	70	70	69	68	68	69	69	71	72	74	74	76	75	76	77	78	78	78	78	78	79	79	79	73
June																																
Maximum	81	83	85	85	85	85	85	85	85	85	85	85	83	85	86	85	85	86	87	87	86	86	86	86	84	78	80	82	82	82	--	84
Minimum	80	80	81	83	83	83	83	83	83	83	83	83	83	83	83	84	84	82	82	82	84	85	85	84	78	78	73	79	80	81	--	82
July																																
Maximum	83	84	85	84	84	85	87	87	88	88	89	90	90	89	88	88	88	88	85	84	86	88	88	88	88	88	89	90	91	89	89	87
Minimum	81	82	83	82	83	84	85	85	86	87	88	89	89	86	86	86	87	85	83	83	83	85	86	87	87	86	87	88	88	89	87	86
August																																
Maximum	88	88	88	88	90	89	89	88	87	87	86	86	84	84	83	86	85	86	86	85	84	84	83	85	87	86	85	84	82	86	87	86
Minimum	87	86	84	86	87	88	88	87	86	86	86	84	84	82	81	81	83	84	84	84	84	82	80	81	82	82	80	81	82	80	82	84
September																																
Maximum	87	86	88	89	88	88	88	88	88	87	85	83	83	83	84	85	85	86	87	87	86	87	86	84	82	80	79	76	76	78	--	85
Minimum	83	82	83	84	84	83	84	84	84	84	83	80	79	79	79	79	80	81	82	82	82	82	82	82	80	79	76	73	73	74	--	81

TRINITY RIVER BASIN

8-475. CLEAR FORK TRINITY RIVER AT FORT WORTH, TEX.

LOCATION.--Temperature recorder at gaging station at bridge on Vickery Boulevard at Fort Worth, Tarrant County, 100 feet upstream from East-West Expressway bridge, 310 feet downstream from The Texas and Pacific Railway Co. bridge, and 3 miles upstream from mouth.
DRAINAGE AREA.--526 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1948 to September 1952.
Water temperatures: November 1947 to September 1960.
EXTREMES, 1959-60.--Water temperatures: Maximum, 91°F July 30,31, Aug. 6-9; minimum, 40°F Feb. 26, Mar. 2-7.
EXTREMES, 1947-60.--Water temperatures: Maximum, 97°F Aug. 6, 1952; minimum, freezing point on several days during January 1949.
REMARKS.--Records of discharge for water year October 1959 to September 1960 given in WSP 1712.

Temperature (°F) of water, water year October 1959 to September 1960

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

TRINITY RIVER BASIN--Continued

8-503. ELM FORK TRINITY RIVER NEAR MUENSTER, TEX.

LOCATION.--At gaging station on left bank 40 feet upstream from bridge on Farm Road 373, 2.5 miles south of Muenster, Cooke County, 2.5 miles downstream from Long Branch, and 6.5 miles upstream from Brushy Elm Creek.
DRAINAGE AREA.--46.0 square miles, of which 31.0 square miles is above flood-detention structures.
RECORDS AVAILABLE.--Water temperatures: October 1956 to September 1958.
Sediment records: October 1956 to September 1960.
EXTREMES, 1959-60.--Sediment concentrations: Maximum daily, 2,160 ppm Oct. 3; minimum daily, no flow on many days.
Sediment loads: Maximum daily, 12,100 tons Oct. 3; minimum daily, 0 tons on many days.
EXTREMES, 1956-60.--Water temperatures (1956-58): Maximum, 91°F May 27, 1958; minimum, 37°F Feb. 11, 1958.
Sediment concentrations (1956-60): Maximum daily, 3,020 ppm May 2, 1958; minimum daily, no flow on many days.
Sediment loads: Maximum daily, 16,000 tons May 1, 1958; minimum daily, 0 tons on many days.
REMARKS.--Records of discharge for water year October 1959 to September 1960 given in WSP 1712.

Suspended sediment, water year October 1959 to September 1960
(Where no concentrations are reported, loads are estimated)

Day	OCTOBER				NOVEMBER				DECEMBER			
	Mean discharge (cfs)	Suspended sediment			Mean discharge (cfs)	Suspended sediment			Mean discharge (cfs)	Suspended sediment		
		Mean concentration (ppm)		Tons per day		Mean concentration (ppm)		Tons per day		Mean concentration (ppm)		Tons per day
1	0.2	C 20		T	2.2	C 64		0.4	1.7	C 65		0.3
2	.1	C 20		T	2.2	C 64		.4	1.7	C 65		.3
3	955	2160	S	12100	2.0	C 64		.3	1.5	C 65		.3
4	903	1290	S	4600	3.4	C 64		.6	1.5	C 65		.3
5	185	520	A	260	3.4	C 42		.4	1.2	C 65		.2
6	152	340	A	140	3.4	C 42		.4	1.0	C 65		.2
7	145	--		117	3.4	C 42		.4	1.0	C 65		.2
8	140	--		94	3.4	C 42		.4	1.0	C 65		.2
9	130	--		70	3.4	C 42		.4	1.2	C 65		.2
10	122	--		49	3.4	C 42		.4	1.5	C 65		.3
11	116	C 92		29	3.7	C 42		.4	1.7	C 92		.4
12	106	C 92		29	3.7	C 41		.4	1.5	C 92		.4
13	103	C 92		26	3.7	C 41		.4	1.2	C 92		.3
14	98	C 92		24	3.4	C 41		.4	1.2	C 92		.3
15	94	C 92		23	3.7	C 41		.4	26	276	S	24
16	86	C 54		13	3.7	C 41		.4	71	315	S	124
17	45	C 54		6.6	3.4	C 41		.4	136	220	A	81
18	30	C 54		4.4	3.4	C 41		.4	76	C 46		9.4
19	22	C 54		3.2	3.7	C 41		.4	44	C 46		5.5
20	16	C 54		2.3	3.7	C 20		.2	31	C 46		4.4
21	9.6	C 54		1.4	3.7	C 20		.2	24	C 46		3.0
22	7.1	C 54		1.0	3.7	C 20		.2	22	C 46		2.7
23	7.6	C 6		.1	3.4	C 20		.2	20	C 46		2.5
24	3.7	C 6		.1	3.4	C 20		.2	17	C 16		.7
25	3.2	C 6		.1	2.6	C 86		.6	16	C 16		.7
26	2.6	C 6		.1	1.8	C 86		.4	16	C 16		.7
27	2.2	C 6		.1	1.5	C 86		.3	31	96	B	8.1
28	2.2	140		.8	1.5	C 86		.3	22	C 16		1.0
29	2.2	C --		.6	1.5	C 86		.3	17	C 16		.7
30	2.2	C --		.6	1.7	C 86		.4	14	C 16		.6
31	2.2	C --		.6	--	--		--	16	37	B	2.1
Total	3493.1	--		17596.0	91.1	--		11.0	617.9	--		274.3

S Computed by subdividing day.
T Less than 0.05 ton.
A Computed from partly estimated-concentration graph.
B Computed from estimated-concentration graph.
C Composite period.

TRINITY RIVER BASIN--Continued

8-503. ELM FORK TRINITY RIVER NEAR MUENSTER, TEX.--Continued

Suspended sediment, water year October 1959 to September 1960--Continued

Day	JANUARY				FEBRUARY				MARCH			
	Mean discharge (cfs)	Suspended sediment			Mean discharge (cfs)	Suspended sediment			Mean discharge (cfs)	Suspended sediment		
		Mean concentration (ppm)		Tons per day		Mean concentration (ppm)		Tons per day		Mean concentration (ppm)		Tons per day
1	28	C 18		1.4	12	C 92		3.0	8.9	C 13		0.3
2	24	C 18		1.2	12	C 92		3.0	9.2	C 13		.3
3	21	C 18		1.0	16	C 92		4.0	8.0	C 13		.3
4	19	C 18		.9	20	C 92		5.0	7.7	C 13		.3
5	46	209	A	32	19	C 69		2.8	7.4	C 13		.3
6	74	90	A	18	15	C 69		2.8	7.4	C 13		.3
7	90	100	A	24	14	C 69		2.6	7.4	C 13		.3
8	102	120	A	33	13	C 69		2.4	7.7	C 13		.3
9	78	40	A	8.4	12	C 69		2.2	8.3	C 13		.3
10	56	36		5.4	9.6	C 69		1.8	8.0	C 13		.3
11	45	36	A	4.4	7.7	C 82		1.7	7.7	C 7		.1
12	310	1160	B	1430	7.2	C 82		1.6	6.9	C 7		.1
13	225	609	B	664	7.2	C 82		1.6	6.7	C 7		.1
14	225	669	B	614	7.2	C 82		1.6	7.4	C 7		.1
15	136	240		88	7.2	C 82		1.6	8.3	C 7		.2
16	92	150		37	7.4	C 82		1.6	7.7	C 7		.1
17	82	78		17	7.7	C 82		1.7	6.7	C 7		.1
18	65	C 78		14	7.4	C 91		1.8	6.4	C 80		1.4
19	50	C 78		11	7.2	C 91		1.8	6.1	C 80		1.3
20	37	C 78		7.8	7.2	C 91		1.8	5.9	C 80		1.3
21	34	C 82		7.5	7.2	C 91		1.8	5.6	C 80		1.2
22	28	C 82		6.2	6.9	C 91		2.2	5.6	C 80		1.2
23	23	C 82		5.1	6.7	C 91		2.1	5.6	C 80		1.2
24	22	C 82		4.9	6.4	C 91		1.6	7.2	C 80		1.6
25	21	C 82		4.6	6.5	C 82		1.4	62	390	S	63
26	21	C 82		4.6	6.4	C 82		1.4	51	130		18
27	20	C 82		4.4	7.4	C 82		1.6	32	110		9.5
28	18	C 92		4.5	10	C 82		2.2	24	--		4.8
29	14	C 92		3.5	9.6	C 82		2.1	21	--		4.8
30	12	C 92		3.0	--	--		--	14	--		4.8
31	12	C 92		3.0	--	--		--	12	--		4.8
Total	2060	--		3063.8	283.1	--		62.5	389.8	--		122.7

Day	APRIL				MAY				JUNE			
	Mean discharge (cfs)	Suspended sediment			Mean discharge (cfs)	Suspended sediment			Mean discharge (cfs)	Suspended sediment		
		Mean concentration (ppm)		Tons per day		Mean concentration (ppm)		Tons per day		Mean concentration (ppm)		Tons per day
1	10	C 78		2.1	6.4	C 95		1.6	2.2	C 106		0.6
2	8.6	C 78		1.8	6.0	C 95		1.5	1.9	C 106		.5
3	7.7	C 78		1.6	5.0	C 95		1.3	1.2	C 106		.3
4	7.2	C 78		1.5	6.0	C 95		1.5	.8	C 106		.2
5	6.7	C 78		1.4	5.4	C 95		1.4	.8	C 106		.2
6	6.7	C 78		1.4	6.1	C 95		1.6	.8	C 106		.2
7	6.4	C 98		1.7	5.1	C 88		1.4	45	469	A	40
8	6.1	C 98		1.6	4.4	C 88		1.2	66	280		50
9	5.6	C 98		1.5	4.1	C 88		1.0	55	--		15
10	5.4	C 98		1.4	3.4	C 88		.8	49	--		9.9
11	5.6	C 98		1.5	3.1	C 88		.7	24	--		3.2
12	5.9	C 98		1.6	2.9	C 88		.7	11	27		.8
13	6.9	C 98		1.8	2.4	C 84		.5	8.3	C 27		.8
14	12	C 78		2.5	2.4	C 84		.5	6.1	C 27		.4
15	9.2	C 78		1.9	2.4	C 84		.5	4.4	C 27		.3
16	7.4	C 78		1.6	2.2	C 84		.5	3.1	C 27		.2
17	6.7	C 78		1.4	1.9	C 84		.4	2.2	C 27		.2
18	5.1	C 78		1.1	7.4	255		5.6	1.5	C 86		.3
19	4.6	C 78		1.0	5.1	C 116		1.6	1.0	C 86		.2
20	4.4	C 78		.9	4.4	C 116		1.4	.6	C 86		.1
21	4.1	C 78		.9	3.6	C 116		1.1	.5	C 86		.1
22	4.4	C 107		1.3	3.1	C 116		1.0	.3	C 86		.1
23	4.4	C 107		1.3	3.1	C 116		1.0	.2	C 86		.1
24	4.4	C 107		1.3	2.6	C 116		.8	.2	C 37		T
25	4.5	C 107		1.3	1.7	C 116		.5	.3	C 37		T
26	4.5	C 107		1.3	1.2	C 106		.3	.3	C 37		T
27	6.5	C 107		1.8	1.0	C 106		.3	.3	C 37		T
28	5.5	C 107		1.6	1.0	C 106		.3	.2	C 37		T
29	9.0	C 107		2.6	1.5	C 106		.4	.2	C 37		T
30	7.5	C 107		2.2	1.5	C 106		.4	.2	C 37		T
31	--	--		--	1.5	C 106		.4	--	--		--
Total	193.0	--		46.9	107.9	--		32.2	287.6	--		324.0

S Computed by subdividing day.
T Less than 0.05 ton.
A Computed from partly estimated-concentration graph.
B Computed from estimated-concentration graph.
C Composite period.

TRINITY RIVER BASIN--Continued

8-503. ELM FORK TRINITY RIVER NEAR MUENSTER, TEX.--Continued

Suspended sediment, water year October 1959 to September 1960--Continued

Day	JULY				AUGUST				SEPTEMBER			
	Mean discharge (cfs)	Suspended sediment			Mean discharge (cfs)	Suspended sediment			Mean discharge (cfs)	Suspended sediment		
		Mean concentration (ppm)		Tons per day		Mean concentration (ppm)		Tons per day		Mean concentration (ppm)		Tons per day
1	0.2	C	81	T	0.1	C	68	T	0		--	0
2	.2	C	81	T	.1	C	68	T	0		--	0
3	.1	C	81	T	.1	C	68	T	0		--	0
4	.2	C	81	T	.1	C	127	T	0		--	0
5	.2	C	81	T	.1	C	127	T	0		--	0
6	.2	C	81	T	.1	C	127	T	0		--	0
7	.2	C	84	T	.1	C	127	T	0		--	0
8	.2	C	84	T	.1	C	127	T	0		--	0
9	.2	C	84	T	.1	C	127	T	0		--	0
10	.2	C	84	T	.1	C	127	T	0		--	0
11	.2	C	84	T	.1	C	63	T	0		--	0
12	.2	C	84	T	.1	C	63	T	0		--	0
13	.2	C	84	T	.1	C	63	T	0		--	0
14	2.0		251	B .3	.1	C	63	T	0		--	0
15	.5	C	140	.2	.1	C	63	T	0		--	0
16	.3	C	140	.1	.2	C	63	T	0		--	0
17	.2	C	140	.3	.2	C	63	T	0		--	0
18	.4	C	140	.1	.2	C	83	T	.1	C	38	T
19	.3	C	140	.1	.1	C	83	T	.1	C	38	T
20	1.9	C	140	.7	.1	C	83	T	0		--	0
21	1.5	C	140	.6	.2	C	83	T	0		--	0
22	.5	C	84	.1	.2	C	83	T	0		--	0
23	.3	C	84	.1	.2	C	83	T	.1	C	17	T
24	.3	C	84	.1	.2	C	83	T	.1	C	17	T
25	.3	C	84	.1	.2	C	134	T	.1	C	17	T
26	.2	C	84	.1	.1	C	134	T	.6	C	17	T
27	.2	C	84	.1	.1	C	134	T	1.3	C	17	T
28	.2	C	84	.1	.1	C	134	T	.2	C	17	T
29	.2	C	68	T	.1	C	134	T	.1	C	17	T
30	.1	C	68	T	.1	C	134	T	.1	C	17	T
31	.1	C	68	T	0		--	0	--		--	--
Total	12.0		--	5.7	3.8		--	1.0	2.8		--	0.1

Total discharge for year (cfs-days)..... 7,542.1
Total load for year (tons)..... 21,540.2

T Less than 0.05 ton.
B Computed from estimated-concentration graph.
C Composite period.

TRINITY RIVER BASIN--Continued

8-503. ELM FORK TRINITY RIVER NEAR MUENSTER, TEX.--Continued

Periodic determinations of suspended-sediment discharge and particle size, water year October 1959 to September 1960
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water;
P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Water temperature (°F)	Sampling point	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters											Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Oct. 3, 1959.....	0800			2,380	9,080		38	42	51	59	69	77	78	92	100			SBWC
Oct. 3.....	1030			4,020	4,020		47	50	58	61	74	87	90	96	98			SBWC
Jan. 12, 1960.....	0830			610	2,460		11	28	51	56	72	86	90	92	93			SBNM
Jan. 12.....	0830			610	2,460		49	51	57	64	70	82	86	87	90			SBWC
Mar. 25.....	0900			76	488		45	52	56	61	64	95	99	100	--			SBWC
June 8.....	0530			70	201		73	82	84	88	90	99	100	--	--			SBWC

8-625. TRINITY RIVER NEAR ROSSER, TEX.

LOCATION.--At gaging station at bridge on State Highway 34, 2.5 miles south of Rosser, Kaufman County, 8.5 miles downstream from East Fork Trinity River, and at mile 451.
DRAINAGE AREA.--8,162 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1954 to September 1960.
Water temperature: October 1954 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 653 ppm Aug. 16-20; minimum, 133 ppm Oct. 5.
Hardness: Maximum, 210 ppm Mar. 11-20; minimum, 86 ppm Oct. 5.
Specific conductance: Maximum daily, 1,160 micromhos July 13; minimum daily, 220 micromhos Oct. 5.
Water temperatures: Maximum, 91°F July 27, 28; minimum, 37°F Feb. 25.
EXTREMES, 1954-60.--Dissolved solids: Maximum, 1,800 ppm Aug. 21-31, 1956; minimum, 133 ppm Oct. 5, 1959.
Hardness: Maximum, 310 ppm Oct. 11-20, 1956; minimum, 86 ppm Oct. 5, 1959.
Specific conductance: Maximum daily, 2,990 micromhos Oct. 13, 1956; minimum daily, 220 micromhos Oct. 5, 1959.
Water temperatures: Maximum, 97°F July 1, 1955; minimum, 34°F Jan. 20, 1956, Dec. 23, 1958, Jan. 3, 1959.
REMARKS.--Dashes omitted in potassium (K) column indicate sodium (Na) plus potassium (K) are calculated. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1959 to September 1960 given in WSP 1712.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1, 1959.....	2020	--		--	--	--	--	131		--	62	--	--		--	--		116	8	--	600	7.7
Oct. 2-4, 6-10....	11720	11		45	3.4	21	5.1	128		42	18	--	4.5		216	29	6840	126	21	0.8	360	7.1
Oct. 5.....	14900	--		--	--	--	--	78		--	11	--	--		133	18	5350	86	22	--	220	7.6
Oct. 11-20.....	5747	10		46	4.9	26	--	154		28	23	--	4.0		222	30	3440	135	8	1.0	381	7.4
Oct. 21-31.....	2178	9.0		46	5.4	32	--	151		35	30	--	6.0		245	33	1440	137	13	1.2	422	7.0
Nov. 1-9.....	1582	11		52	4.7	45	--	160		60	33	--	8.8		308	42	1320	149	18	1.6	496	7.3
Nov. 10-20.....	757	14		65	5.2	60	--	186		81	46	--	15		386	52	789	184	31	1.9	635	6.9
Nov. 21-30.....	514	12		65	5.6	87	--	217		96	57	--	20		451	61	626	185	7	2.8	750	6.8
Dec. 1-12.....	420	14		65	5.6	104	--	201		117	72	--	27		522	71	592	185	20	3.3	822	7.8
Dec. 13-20.....	6173	12		50	2.6	24	--	138		45	16	--	7.5		234	32	3900	135	22	.9	373	7.6
Dec. 21-31.....	3768	11		58	4.4	34	--	160		50	35	--	5.3		288	39	2930	163	32	1.2	467	7.9
Jan. 1-10, 1960...	8238	9.4		52	3.7	24	--	142		48	18	--	6.4		239	33	5320	145	29	.9	394	7.5
Jan. 11-20.....	7845	9.0		56	4.2	29	--	161		43	29	--	4.2		260	35	5510	157	25	1.0	436	7.4
Jan. 21-31.....	5152	7.0		57	4.9	29	--	166		44	29	--	4.5		263	36	3660	162	26	1.0	444	7.3
Feb. 1-15.....	4033	7.4		60	4.7	32	--	168		52	29	0.4	5.3		276	38	3010	169	31	1.1	464	7.3
Feb. 16-29.....	2304	5.6		62	4.6	35	--	171		61	28	.4	7.3		302	41	1880	174	34	1.2	500	7.1
Mar. 1-10.....	2048	6.4		67	5.4	41	--	184		66	34	.6	11		334	45	1850	189	38	1.3	530	7.5
Mar. 11-20.....	1118	7.0		74	6.2	64	--	199		96	49	.8	18		432	59	1300	210	47	1.9	672	7.7

TRINITY RIVER BASIN--Continued

8-625. TRINITY RIVER NEAR ROSSER, TEX.--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Mar. 21-31, 1960..	1048	6.2		69	6.1	69	--	196		91	53	0.8	18		423	0.58	1200	197	36	2.1	669	7.7
Apr. 1-10.....	750	9.2		68	6.3	75	8.2	199		97	65	.6	16		462	.63	936	196	33	2.3	734	7.5
Apr. 11-25.....	425	12		70	6.7	109	--	212		126	80	.7	23		557	.76	639	202	28	3.3	875	7.0
Apr. 26-30.....	1389	8.4		56	4.9	58	--	160		80	43	.5	11		358	.49	1340	160	29	2.0	572	7.0
May 1-10.....	2314	10		58	5.0	50	--	162		70	42	--	10		341	.46	2130	165	32	1.7	553	7.4
May 11-20.....	1158	8.2		58	4.7	49	--	179		61	38	--	9.5		336	.46	1050	164	17	1.7	546	7.3
May 21-31.....	550	11		58	5.2	95	--	188		107	66	--	17		474	.64	704	166	12	3.2	767	6.9
June 1-14.....	346	15		57	5.8	127	--	200		111	101	--	24		583	.77	526	166	1	4.3	916	7.3
June 15-25.....	274	11		54	5.9	135	--	200		127	100	--	18		574	.78	425	159	0	4.7	934	7.1
June 26-30.....	873	13		48	4.0	68	--	150		75	50	--	18		373	.51	879	136	13	2.5	593	7.3
July 1-7, 10-13...	304	18		51	5.6	142	--	194		130	104	--	21		619	.84	508	150	0	5.0	939	7.6
July 8-9, 14-18...	1019	13		43	3.7	47	--	136		39	46	--	11		a270	.37	743	122	10	1.8	494	7.4
July 19-31.....	436	17		49	4.6	86	--	163		78	72	--	19		a404	.55	476	142	8	3.1	723	7.0
Aug. 1-10.....	270	17		50	5.3	128	--	187		111	98	--	23		556	.76	405	147	0	4.6	869	7.6
Aug. 11-15.....	467	14		45	4.8	101	--	159		86	83	--	18		444	.60	560	132	1	3.8	709	7.5
Aug. 16-20.....	370	18		51	6.0	162	--	192		156	114	--	29		653	.89	652	152	0	5.7	1020	7.2
Aug. 21-31.....	1079	13		46	3.9	76	--	148		82	54	--	16		378	.51	1100	131	9	2.9	602	6.9
Sept. 1-10.....	287	16		50	5.5	122	--	169		117	94	--	25		541	.74	419	148	9	4.4	854	7.6
Sept. 11-20.....	276	16		44	5.9	138	--	183		108	107	--	26		565	.77	421	134	0	5.2	911	7.0
Sept. 21-30.....	347	13		43	5.8	141	--	172		135	97	--	25		566	.77	530	132	0	5.4	921	6.8
Weighted average	--	9.7		54	4.4	39	--	157		55	32	--	7.8		286	0.39	1660	152	24	1.4	472	7.3
Time-weighted average.....	2150	11		56	5.1	74	--	175		82	57	--	15		--	--	402	161	19	2.6	651	7.2
Tons per day....	--	55		309	25	221	--	909		312	185	--	45		--	--	--	--	--	--	--	--

a Calculated from determined constituents.

TRINITY RIVER BASIN--Continued

8-625. TRINITY RIVER NEAR ROSSER, TEX.--Continued

Temperature (°F) of water, water year October 1959 to September 1960

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

TRINITY RIVER BASIN--Continued

8-632. PIN OAK CREEK NEAR HUBBARD, TEX.

LOCATION.--At gaging station on right bank, 85 feet downstream from bridge on State Highway 171, 5.8 miles southeast of Hubbard, Hill County, and 9 miles upstream from Elm Creek.
DRAINAGE AREA.--17.6 square miles.
RECORDS AVAILABLE.--Water temperatures: January 1957 to September 1960.
Sediment records: October 1956 to September 1960.
EXTREMES, 1959-60.--Water temperatures: Maximum, 87°F May 23; minimum, 34°F Feb. 25.
Sediment concentrations: Maximum daily, 2,780 ppm Oct. 4; minimum daily, no flow on many days.
Sediment loads: Maximum daily, 5,080 tons Oct. 4; minimum daily, 0 tons on many days.
EXTREMES, 1956-60.--Water temperatures (1957-60): Maximum, 87°F May 23, 1960; minimum, 34°F Jan. 27, 1957, Feb. 12, 1958, Feb. 25, 1960.
Sediment concentrations: Maximum daily, 5,160 ppm June 4, 1957; minimum daily, no flow on many days.
Sediment loads: Maximum daily, 12,200 tons Apr. 20, 1957; minimum daily, 0 tons on many days.
REMARKS.--Records of discharge for water year October 1959 to September 1960 given in WSP 1712.

Temperature (°F) of water, water year October 1959 to September 1960

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

TRINITY RIVER BASIN--Continued

8-632. PIN OAK CREEK NEAR HUBBARD, TEX.--Continued

Suspended sediment, water year October 1959 to September 1960

Day	OCTOBER				NOVEMBER				DECEMBER			
	Mean discharge (cfs)	Suspended sediment			Mean discharge (cfs)	Suspended sediment			Mean discharge (cfs)	Suspended sediment		
		Mean concentration (ppm)		Tons per day		Mean concentration (ppm)		Tons per day		Mean concentration (ppm)		Tons per day
1	0	--		0	0.1	22		T	0.2	--		0.1
2	0	--		0	.2	5		T	.5	--		.1
3	1.2	375	S	3.3	.1	9		T	.4	--		.1
4	789	2780	A	5080	30	1480	S	156	.4	--		.1
5	23	438	A	42	8.0	200	S	4.5	.4	--		.1
6	2.6	--	E	.7	2.3	106		.7	.3	--		.1
7	1.2	--	E	.2	.6	106	B	.2	.2	--		.1
8	.7	--		T	0	--		0	.5	--		.1
9	.5	--		T	0	--		0	.6	--		.1
10	.3	--		T	0	--		0	.6	--		.1
11	.2	--		T	0	--		0	3.6	118	S	1.5
12	.1	--		T	0	--		0	3.4	145		1.3
13	80	2530	A	1220	0	--		0	.4	--		T
14	51	566	S	138	0	--		0	.1	--		T
15	3.0	--	B	1.5	0	--		0	416	1050	S	1430
16	1.4	--	B	.6	.1	--		T	119	441	S	137
17	.6	--		T	0	--		0	23	290		18
18	.3	--		T	0	--		0	15	200		8.1
19	.1	--		T	0	--		0	5.6	80		1.2
20	.2	--		T	0	--		0	2.9	50	A	.4
21	.1	--		T	0	--		T	1.7	20		.1
22	.1	--		T	.1	--		T	.8	28		.1
23	0	--		0	.2	--		T	.5	--		T
24	0	--		0	.2	--		T	.2	--		T
25	0	--		0	.1	--		T	.1	--		T
26	0	--		0	0	--		0	.1	--		T
27	0	--		0	0	--		0	4.0	207	A	2.7
28	0	--		0	.1	--		T	1.8	69		.3
29	0	--		0	.1	--		T	.6	--		T
30	0	--		0	.1	--		T	.1	--		T
31	0	--		0	--	--		--	185	1460	S	1080
Total	955.6	--		6486.7	42.3	--		161.6	788.0	--		2681.9

Day	JANUARY				FEBRUARY				MARCH			
	Mean discharge (cfs)	Suspended sediment			Mean discharge (cfs)	Suspended sediment			Mean discharge (cfs)	Suspended sediment		
		Mean concentration (ppm)		Tons per day		Mean concentration (ppm)		Tons per day		Mean concentration (ppm)		Tons per day
1	48	367	S	63	1.1	C 24		0.1	4.6	140	S	2.3
2	11	200		5.9	1.1	C 24		.1	17	399		18
3	6.5	92		1.6	33	639	S	76	8.0	110	S	2.5
4	3.9	--		.8	3.0	110		2.4	2.6	64		.4
5	209	987	S	725	3.6	110		1.1	1.7	45		.2
6	37	250		25	2.3	48		.3	1.3	78		.3
7	7.8	59		1.2	1.8	69		.3	1.1	50		.1
8	4.1	58		.6	1.6	C 18		.1	1.0	--		.1
9	2.6	70		.5	1.6	C 18		.1	1.1	C 19		.1
10	2.2	63		.4	1.4	C 18		.1	1.0	C 19		.1
11	2.0	C 39		.2	1.1	C 18		.1	1.0	C 19		.1
12	3.4	C 39		.4	1.0	C 23		.1	.7	C 19		T
13	12	565		58	.7	C 23		.1	.6	C 19		T
14	25	608	S	51	.8	C 23		.1	.8	C 19		T
15	5.8	98		1.5	1.0	C 23		.1	1.0	C 19		.1
16	4.4	178	S	6.7	1.4	227		.9	1.0	C 19		.1
17	79	1090	S	388	1.3	38		.1	.8	81		.2
18	9.0	105		2.6	1.1	C 21		.1	.6	81		.1
19	4.6	92		1.1	.9	C 21		.1	.6	130		.2
20	3.1	64		.5	1.1	C 21		.1	.5	94		.1
21	2.6	50		.4	2.3	C 21		.1	.5	92		.1
22	2.3	C 30		.2	1.7	C 21		.1	.6	86		.1
23	2.2	C 30		.2	2.3	C 21		.1	.7	97		.2
24	2.0	C 30		.2	3.7	C 20		.2	.7	190		.4
25	1.8	C 30		.1	2.6	C 20		.1	1.1	180		.5
26	1.8	C 30		.1	3.1	C 20		.2	7.7	698	S	19
27	1.8	C 30		.1	2.3	C 20		.1	3.1	50		.4
28	1.7	C 30		.1	2.2	C 20		.1	1.7	20		.1
29	1.7	C 24		.1	1.8	C 20		.1	1.1	114		.3
30	1.3	C 24		.1	--	--		--	.8	134		.3
31	1.3	C 24		.1	--	--		--	.5	122		.2
Total	500.9	--		1336.1	87.9	--		83.4	65.5	--		46.5

E Estimated.
S Computed by subdividing day.
T Less than 0.05 ton.
A Computed from partly estimated-concentration graph.
B Computed from estimated-concentration graph.
C Composite period.

TRINITY RIVER BASIN--Continued

8-632. PIN OAK CREEK NEAR HUBBARD, TEX.--Continued

Suspended sediment, water year October 1959 to September 1960--Continued

Day	APRIL			MAY			JUNE		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	0.5	168	0.2	2.2	200	1.2	0	--	0
2	.5	120	.2	1.1	125	.4	0	--	0
3	.4	204	.2	.9	150	.4	0	--	0
4	.3	--	.2	2.2	176 S	5.5	0	--	0
5	.2	268	.1	56	130 S	572	0	--	0
6	.1	325	.1	3.8	250 S	2.7	0	--	0
7	.1	274	.1	1.7	111	.5	0	--	0
8	.2	296	.2	.6	53	.1	0	--	0
9	.2	350	.2	.2	26	T	0	--	0
10	.2	235	.1	.1	58	T	0	--	0
11	.2	--	.1	.1	123	T	0	--	0
12	.1	320	.1	0	--	0	0	--	0
13	.1	302	.1	0	--	0	6.1	1320 S	27
14	.1	333	.1	0	--	0	.4	233 S	.5
15	.1	369	.1	0	--	0	0	--	0
16	.1	250	.1	0	--	0	0	--	0
17	.2	306	.2	0	--	0	0	--	0
18	.1	210	.1	0	--	0	0	--	0
19	.1	184	T	0	--	0	0	--	0
20	.1	143	T	.6	167	.3	0	--	0
21	.1	121	T	.6	185 S	.4	0	--	0
22	0	--	0	0	--	0	0	--	0
23	0	--	0	0	--	0	0	--	0
24	0	--	0	0	--	0	0	--	0
25	1.2	248 S	.9	0	--	0	.2	75 S	.2
26	.5	170	.2	0	--	0	120	2550 S	1020
27	7.5	860 S	68	.2	--	T	3.9	300	3.2
28	18	1420 S	103	0	--	0	.1	76	T
29	70	2210 S	720	0	--	0	0	--	0
30	9.8	1120 S	40	0	--	0	0	--	0
31	--	--	--	0	--	0	--	--	--
Total	111.0	--	934.7	70.3	--	583.6	130.7	--	1050.9

Day	JULY			AUGUST			SEPTEMBER		
1				0	--	0			
2				0	--	0			
3				0	--	0			
4				0	--	0			
5				0	--	0			
6				0	--	0			
7				0	--	0			
8				0	--	0			
9				0	--	0			
10				0	--	0			
11				0	--	0			
12				0	--	0			
13				0	--	0			
14				0	--	0			
15				0	--	0			
16				0	--	0			
17				0	--	0			
18				0	--	0			
19				7.8	-- B	30			
20				2.0	-- B	3			
21				42	1170 S	308			
22				81	746 S	253			
23				1.4	76	.3			
24				0	--	0			
25				0	--	0			
26				0	--	0			
27				0	--	0			
28				0	--	0			
29				0	--	0			
30				1.0	284 S	10			
31				2.0	936 S	11			
Total	0	--	0	137.2	--	615.3	0	--	0

Total discharge for year (cfs days)..... 2,889.4
Total load for year (tons)..... 13,980.6

S Computed by subdividing day.
T Less than 0.05 ton.
B Computed from estimated-concentration graph.

8-632. PIN OAK CREEK NEAR HUBBARD, TEX.--Continued

Particle-size analyses of suspended sediment, water year October 1959 to September 1960
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Water temperature (°F)	Sampling point	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters											Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Oct. 4, 1959.....	0820	70		1,340	3,640		62	72	77	84	92	95	99	100	--			SBWC
Oct. 4.....	0820	70		1,340	3,640		16	20	65	76	89	93	99	100	--			SBN
Nov. 4.....	1300	68		245	896		84	87	91	95	99	99	100	--	--			SBWC
Dec. 15.....	1535	58		988	1,670		64	69	76	79	87	93	98	99	100			SBWC
Dec. 31.....	1600	42		434	3,120		--	65	69	71	83	91	99	100	--			SPWC
Jan. 1, 1960.....	1400	38		364	1,920		56	62	69	74	82	92	98	100	--			SBWC
Jan. 1.....	1400	38		364	1,920		14	37	61	68	83	93	97	99	100			SBN
Feb. 3.....	0930	49		32	2,550		--	80	83	88	95	99	100	--	--			SPWC
Apr. 28.....	0620	66		35	1,940		83	83	89	94	97	99	100	--	--			SBWC
Apr. 29.....	1415	64		144	13,800		--	74	78	83	91	95	99	100	--			SPWC
May 5.....	0730	68		264	2,170		--	82	83	85	93	97	99	100	--			SPWC
June 26.....	0800	71		186	3,310		--	79	85	89	93	97	99	100	--			SPWC
Aug. 21.....	1000	73		1	2,440		--	65	--	80	--	98	99	100	--			SPWC
Aug. 21.....	0100	83		92	5,840		--	51	--	70	--	92	98	100	--			SPWC

TRINITY RIVER BASIN--Continued

8-646. RICHLAND CREEK NEAR FAIRFIELD, TEX.

LOCATION.--At bridge on State Farm Highway 488, 4 miles upstream from mouth, 4 miles downstream from Chambers Creek, and 16 miles north of Fairfield, Freestone County.
RECORDS AVAILABLE.--Chemical analyses: April 1956 to September 1960.
Water temperatures: April 1956 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 6,500 ppm Aug. 22; minimum, 178 ppm Jan. 10, 14-17.
Hardness: Maximum, 325 ppm Sept. 18-24, 26-28, 30; minimum, 90 ppm Oct. 2.
Specific conductance: Maximum daily, 12,700 micromhos Sept. 30; minimum daily, 244 micromhos Oct. 5.
Water temperatures: Maximum, 92°F July 27; minimum, 35°F Jan. 20.
EXTREMES, 1956-60.--Dissolved solids: Maximum, 13,500 ppm Aug. 11-31, 1956; minimum, 131 ppm Apr. 21-30, 1957.
Hardness: Maximum, 460 ppm Oct. 18, 1956; minimum, 79 ppm Nov. 5-8, 1956.
Specific conductance: Maximum daily, 22,000 micromhos Aug. 22, 1956; minimum daily, 157 micromhos Apr. 25, 1957.
Water temperature: Maximum, 98°F Aug. 3, 1957; minimum, freezing Jan. 3, 4, 1959.
REMARKS.--Dashes omitted in potassium (K) column indicate sodium (Na) plus potassium (K) are calculated. Values reported for dissolved solids concentrations less than 1,000 ppm are residues at 180°C and for concentrations more than 1,000 ppm are calculated from determined constituents unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. No discharge records available.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 2, 1959.....		--		--	--	--		133		--	265	--	--		--	--		90	0	--	1,130	7.8
Oct. 3-6, 9-11....		14		46	2.7	38		125		49	37	0.4	2.2		259	0.35		126	23	1.5	420	7.6
Oct. 12-20.....		13		56	3.6	44		153		45	53	.4	2.8		299	.41		154	29	1.5	505	7.5
Oct. 21-31.....		12		84	5.3	151		234		62	212	.4	4.5		a646	.88		232	40	4.3	1,150	7.8
Nov. 1, 3, 5-10...		13		64	4.9	84		171		72	103	.4	2.2		438	.60		180	40	2.7	745	7.5
Nov. 11-15.....		14		82	7.0	185		223		86	255	.5	4.2		745	1.01		234	51	5.3	1,290	8.1
Nov. 16-21.....		15		100	8.3	250		278		86	358	.5	4.5		968	1.32		284	56	6.4	1,700	8.2
Nov. 22-30.....		16		98	9.6	309		279		97	440	.6	4.5		1,110	1.51		284	56	8.0	2,050	8.1
Dec. 1-12.....		13		106	10	452		305		98	660	.6	4.5		1,490	2.03		306	56	11	2,720	8.1
Dec. 13, 24.....		22		77	5.7	60		213		63	71	.6	4.5		a409	.56		215	41	1.8	692	8.1
Dec. 14-22.....		22		52	4.2	11		132		34	15	.6	4.5		a208	.28		147	39	.4	379	7.9
Dec. 25-27.....		19		82	5.2	62		214		70	76	.3	6.4		440	.60		226	50	1.8	735	8.0
Jan. 10, 14-17, 1960.....		14		38	2.8	20		123		24	16	.3	2.0		178	.24		106	6	.8	297	7.8
Jan. 11-13, 18-21.		12		66	4.4	38		184		55	37	.3	4.6		a307	.42		182	32	1.2	517	7.9
Jan. 22-27, Feb. 3.		11		99	7.1	72		251		81	89	.5	18		518	.70		276	70	1.9	849	7.8
Feb. 4-6.....		8.6		59	5.0	36		140		79	32	.5	3.8		307	.42		168	53	1.2	486	7.5
Feb. 8-12.....		10		95	6.5	66		247		87	76	.5	6.6		479	.65		264	61	1.8	787	7.8
Feb. 14-16, 18-22.		11		112	8.2	125		283		106	167	.4	7.1		684	.93		313	81	3.1	1,150	7.8
Feb. 29, Mar. 1-9.		9.6		86	7.7	79		193		115	96	.6	4.8		512	.70		246	88	2.2	827	8.0

Mar. 10, 12, 14-19, 1960.....		7.0		94	9.0	140		205		134	186	.5	6.5		713	.97		272	104	3.7	1,170	7.8
Mar. 22-26, 28-31.		6.0		104	11	193		238		146	262	.6	6.1		881	1.20		304	110	4.8	1,460	7.9
Mar. 27.....		--		--	--	--		224		--	143	--	--		--	--		262	78	--	997	8.2
Apr. 1-3, 29.....		6.4		98	10	197	3.9	195		170	270	.4	6.0		875	1.19		286	126	5.1	1,490	7.5
Apr. 5-6, 8, 10-11, 14-16, 19-21, 26.		8.0		102	11	307		245		147	430	.5	5.7		1,130	1.54		300	98	7.7	1,990	7.8
Apr. 7, 18, 22, 24-25, 27.....		8.0		106	12	444		260		137	650	.6	7.6		1,490	2.03		314	101	11	2,600	7.6
Apr. 28.....		--		--	--	--		232		--	140	--	--		--	--		292	102	--	1,060	8.0
May 1-3, 7-9.....		15		56	4.4	60		130		84	64	.6	4.5		352	.48		158	51	2.1	591	7.6
May 4-6.....		14		70	6.7	167		184		97	218	.6	4.0		a667	.91		202	51	5.1	1,170	7.8
May 10-16.....		15		69	6.2	199		182		99	265	.6	3.0		a746	1.01		198	48	6.1	1,310	7.8
May 17-21, 24-26, 28.....		13		84	9.4	379		240		96	545	.5	5.3		1,250	1.70		248	52	10	2,280	7.8
May 29.....		--		--	--	--		233		--	205	--	--		--	--		256	65	--	1,220	7.9
May 30, June 1-2..		11		72	8.4	287		195		108	398	.6	4.0		a985	1.34		214	54	8.5	1,740	7.5
June 10, 12-13....		11		83	9.8	561		198		113	840	.7	2.0		1,720	2.34		248	83	15	3,070	7.7
June 14-15.....		13		36	3.3	54		110		38	62	.4	4.0		a265	.36		103	13	2.3	453	7.2
June 16-19, 21-22, 24.....		12		55	5.2	123		162		70	154	.6	1.0		a501	.68		158	26	4.3	878	7.4
June 25.....		--		--	--	--		230		--	372	--	--		--	--		230	64	--	1,610	7.9
June 26.....		--		--	--	--		199		--	615	--	--		--	--		240	77	--	2,310	7.9
June 27.....		--		--	--	--		232		--	1,420	--	--		--	--		184	0	--	4,680	7.7
June 28.....		14		41	3.8	63		124		46	70	.6	6.7		a306	.42		118	16	2.5	530	7.4
June 29-30, July 1-2.....		20		50	3.9	54		145		53	54	.7	7.4		326	.44		141	22	2.0	507	7.8
July 4-7.....		16		69	6.4	244		197		65	350	.6	4.8		868	1.18		198	37	7.5	1,500	7.7
July 8-11, 13-15, 17-19, 21-24, 26-27.....		7.6		82	9.5	731		233		82	1,100	.7	3.5		2,130	2.90		244	52	20	3,830	7.7
Aug. 8-11.....		--		--	--	--		290		--	2,580	--	--		--	--		270	32	--	8,010	7.6
Aug. 12.....		13		48	4.3	104		129		132	84	0.8	0.0		a449	0.61		138	32	3.8	740	7.9
Aug. 14-18.....		12		43	4.3	263		150		32	380	.6	3.0		a812	1.10		125	2	10	1,490	7.8
Aug. 20-21.....		12		54	7.7	711		228		39	1,050	.6	3.0		1,990	2.71		166	0	24	3,540	7.9
Aug. 22.....		--		--	--	--		438		--	3,760	--	--		b6,500	8.87		284	0	--	11,200	8.0
Aug. 24-25.....		13		43	3.2	47		115		49	51	.5	4.5		a268	.36		120	26	1.9	439	7.8
Aug. 27-28.....		13		44	3.7	115		132		47	152	.6	1.2		a442	.60		125	17	4.5	770	8.1
Aug. 29-30.....		12		50	4.9	255		166		47	362	.6	3.5		a817	1.11		145	9	9.2	1,460	7.9
Sept. 1-2.....		14		53	5.8	311		183		51	445	--	1.5		982	1.34		156	6	11	1,790	8.1
Sept. 7-16.....		6.0		92	13	979		266		75	1,500	--	1.5		2,800	3.81		283	65	25	5,050	7.6
Sept. 18-24, 26-28, 30.....		6.4		94	22	2,110		404		64	3,200	--	--		5,700	7.75		325	0	51	9,940	7.7

a Calculated from determined constituents.
b Residue at 180°C.

TRINITY RIVER BASIN--Continued

8-646. RICHLAND CREEK NEAR FAIRFIELD, TEX.--Continued

Temperature (°F) of water, water year October 1959 to September 1960

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

8-665. TRINITY RIVER AT ROMAYOR, TEX.

LOCATION.--At gaging station at bridge on State Highway 105, 1.9 miles south of Romayor, Liberty County, 2.0 miles downstream from Gulf, Colorado and Santa Fe Railway Co. bridge, 4.1 miles downstream from Big Creek, and at mile 94.
DRAINAGE AREA.--17,192 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1945 to November 1949, February 1950 to September 1951, April 1953 to September 1960.
Water temperatures: February 1950 to September 1951, April 1953 to January 1959.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 719 ppm Oct. 1-7; minimum, 94 ppm June 27.
Hardness: Maximum, 188 ppm Dec. 1-15; minimum, 55 ppm June 27.
Specific conductance: Maximum daily, 1,530 micromhos Oct. 7; minimum daily, 160 micromhos June 27.
EXTREMES, 1945-50, 1953-60.--Dissolved solids: Maximum, 1,900 ppm Nov. 7, 1953; minimum, 82 ppm July 31, 1954.
Hardness: Maximum, 258 ppm Oct. 21-31, 1956; minimum, 32 ppm Nov. 1-3, 1953.
Specific conductance: Maximum daily, 3,800 micromhos Oct. 30, 1956; minimum daily, 103 micromhos Nov. 9, 1946.
Water temperatures (1953-58): Maximum, 98°F July 18, 27, 1953; minimum, 38°F Jan. 18, 1956.
REMARKS.--Dashes omitted in potassium (K) column indicate sodium (Na) plus potassium (K) are calculated. Records of specific conductance of daily samples available in dietrict office at Austin, Tex. Records of discharge for water year October 1959 to September 1960 given in WSP 1712.

Chemical analyees, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (Residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons psr acre-foot	Tons psr day	Calcium, Magnesium	Noncarbonate				
Oct. 1-7, 1959..	1097	14		59	7.3	186	7.5	181		88	252		3.2		719	0.98	2130	177	28	6.1	1280	7.3	
Oct. 8-9.....	6675	--		--	--			175		--	78		--		--	--		131	0	--	701	7.5	
Oct. 10-20.....	16090	18		40	3.6	24		126		23	27		1.8		a199	.27	8650	115	12	1.0	362	7.2	
Oct. 21-31.....	8389	17		46	4.8	40		143		42	41		2.8		270	.37	6120	134	18	1.5	436	7.3	
Nov. 1-5.....	7152	16		28	3.0	28		88		21	33		2.2		a174	.24	3360	82	10	1.3	295	7.9	
Nov. 6-10.....	7004	14		34	4.2	50		98		27	71		2.2		a250	.34	4730	102	22	2.2	445	7.8	
Nov. 11-19.....	3429	17		46	5.6	51		132		46	63		3.5		317	.43	2930	136	30	1.9	510	7.4	
Nov. 20-30.....	1769	16		51	6.3	57		141		44	80		2.2		352	.48	1680	153	38	2.0	572	7.6	
Dec. 1-15.....	1359	16		64	6.8	93		171		62	129		3.8		468	.64	1720	188	48	3.0	801	7.4	
Dec. 16-21.....	19270	11		27	2.7	37		70		28	51		2.0		193	.26	10040	78	21	1.8	343	7.2	
Dec. 22-31.....	18890	12		42	3.9	31		121		40	33		2.2		241	.33	12290	121	22	1.2	389	7.6	
Jan. 1-10, 1960.	17000	11		44	4.0	28		102		39	44		2.2		244	.33	11200	126	43	1.1	393	6.6	
Jan. 11-20.....	22520	13		43	3.7	24		110		37	32		2.2		228	.31	13860	122	32	.9	360	6.8	
Jan. 21-31.....	21840	14		42	4.2	28		115		35	36		1.8		236	.32	13920	122	28	1.1	371	7.3	
Feb. 1-10.....	10310	12		48	5.4	40		130		48	50		3.2		290	.39	8070	142	36	1.5	469	7.2	
Feb. 11-24.....	10460	11		43	4.2	32		115		40	40		4.0		231	.31	6520	125	31	1.2	411	7.1	
Feb. 25-29.....	20980	9.0		20	1.7	13		49		15	19		1.5		103	.14	5830	56	16	.7	198	6.9	
Mar. 1-10.....	13860	9.8		36	4.7	42		97		43	53		3.0		240	.33	8980	110	30	1.7	429	7.0	
Mar. 11-17.....	5751	13		44	5.8	44		110		60	53		2.2		293	.40	4550	134	44	1.7	479	7.2	
Mar. 18-31.....	3896	13		58	7.9	62		141		77	81		4.0		395	.54	4160	177	62	2.0	651	7.2	
Apr. 1-10.....	3011	14		58	8.6	82	4.9	153		76	111		4.8		474	.64	3850	180	54	2.7	753	7.5	

a Calculated from determined constituents.

TRINITY RIVER BASIN--Continued

8-665. TRINITY RIVER AT ROMAYOR, TEX.--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (Residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Apr. 11-22, 1960	1842	11		56	8.1	86		155		64	118		1.2		448	0.61	2230	173	46	2.8	742	7.6	
Apr. 23-29.....	1750	9.6		58	8.4	114		159		73	156		1.2		541	.74	2560	179	48	3.7	889	7.5	
Apr. 30.....	9590	15		44	3.6	59		140		37	70		3.8		a301	.41	7790	126	12	2.3	520	7.4	
May 1-3.....	12330	12		25	2.5	43		69		36	50		2.0		a204	.28	6790	73	16	2.2	352	7.0	
May 4-15.....	4182	16		56	6.2	85		145		84	99		5.0		434	.59	4900	165	46	2.9	733	7.4	
May 16-31.....	2362	8.0		48	5.4	68		139		49	87		2.2		a336	.46	2140	142	28	2.5	601	7.3	
June 1-14.....	1257	9.0		54	6.9	98		164		59	128		.5		460	.63	1560	163	28	3.3	782	7.2	
June 15-24.....	1589	15		55	6.8	98		170		54	128		2.0		469	.64	2010	165	26	3.3	780	7.2	
June 25-26.....	5840	--		--	--	--		92		--	73		--		--	--	--	87	12	--	417	7.3	
June 27.....	27300	8.6		19	2.0	10		59		14	9		2.0		a94	.13	6930	55	6	.6	160	6.9	
June 28-30, July 1-3.....	11270	14		21	3.0	30		62		23	38		1.8		a161	.22	4900	65	14	1.6	284	7.2	
July 4.....	4180	--		--	--	--		130		--	292		--		--	--	--	136	30	--	1250	7.4	
July 5-19.....	1218	18		46	5.7	51		137		42	65		2.2		318	.43	1050	138	26	1.9	514	7.2	
July 20-31.....	1743	14		46	6.0	87		142		63	101		4.8		417	.57	1960	140	23	3.2	687	7.1	
Aug. 1-12.....	584	22		53	5.8	88		168		44	116		.5		428	.58	675	156	18	3.1	722	7.8	
Aug. 13-19, 21-22,27.....	928	20		42	3.3	59		130		26	78		3.2		320	.44	802	118	12	2.4	519	7.5	
Aug. 20, 23-26, 28-31.....	3696	17		48	5.0	89		149		57	106		5.1		422	.57	4210	140	18	3.3	707	7.5	
Sept. 1-9.....	1670	18		43	4.3	59		126		41	74		2.8		318	.43	1430	125	22	2.3	530	7.6	
Sept. 10-18.....	650	14		64	5.9	104		190		55	140		.8		488	.66	856	184	28	3.3	844	7.8	
Sept. 19-26.....	695	16		36	3.9	78		124		45	89		1.5		358	.49	672	106	4	3.3	589	7.5	
Sept. 27-30.....	1375	5.4		51	6.3	130		182		58	161		.2		a501	.68	1860	153	4	4.6	914	7.6	
Weighted average.....	--	13		41	4.3	40	--	113		40	51		2.5		258	0.35	4610	120	28	1.5	434	7.1	
Time-weighted average.....	6622	14		47	5.4	64	--	135		49	83		2.6		347	--	--	140	29	2.3	584	7.2	
Tons per day..	--	234		736	77	709	--	2030		712	909		45		--	--	--	--	--	--	--	--	

a Calculated from determined constituents.

8-671. TRINITY RIVER NEAR MOSS BLUFF, TEX.

LOCATION.--At Devers Pumping Plant No. 1, 1 mile west of Moss Bluff, Liberty County.
RECORDS AVAILABLE.--Chemical analyses: Short periods during summers of 1946 to 1949, daily records October 1949 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 604 ppm Oct. 1-12; minimum, 125 ppm June 26-30.
Hardness: Maximum, 192 ppm Dec. 1-13; minimum, 61 ppm May 6-8.
Specific conductance: Maximum daily, 1,360 micromhos Oct. 10; minimum daily, 183 micromhos June 29-30.
EXTREMES, 1949-60.--Dissolved solids: Maximum, 3,930 ppm Aug. 26-31, 1956; minimum, 110 ppm Oct. 4-10, 1949.
Hardness: Maximum, 790 ppm Aug. 26-31, 1956; minimum, 40 ppm Apr. 9-13, 1955.
Specific conductance: Maximum daily, 7,630 micromhos Aug. 27, 1952; minimum daily, 127 micromhos Oct. 7, 1949.
REMARKS.--Dashes omitted in potassium (K) column indicate sodium (Na) plus potassium (K) are calculated. Records of specific conductance of daily samples available in district office at Austin, Tex. No discharge records available for this station.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Oct. 1-12, 1959.		14		58	7.2	148	7.1	189		64	199	0.5	2.0		604	0.82		174	19	4.9	1060	7.1	
Oct. 13-21.....		15		42	3.9	25		127		35	24	--	2.0		228	.31		121	17	1.0	364	7.1	
Oct. 22-31.....		16		44	4.0	32		134		31	37	--	2.0		251	.34		126	16	1.2	408	7.0	
Nov. 1-10.....		13		36	2.9	43		112		28	51	--	3.0		246	.33		102	10	1.9	405	8.1	
Nov. 11-22.....		15		44	4.1	51		130		44	59	--	3.5		298	.41		127	20	2.0	492	7.4	
Nov. 23-30.....		19		54	5.0	69		156		45	90	--	3.0		383	.52		155	27	2.4	636	7.3	
Dec. 1-13.....		14		66	6.8	92		186		63	122	--	3.2		466	.63		192	39	2.9	802	7.2	
Dec. 14-31.....		13		35	3.0	28		96		32	33	--	2.5		a194	.26		100	21	1.2	331	7.3	
Jan. 1-15, 1960.		12		40	3.9	31		108		37	39	--	2.0		234	.32		116	27	1.3	376	7.4	
Jan. 17-31.....		12		40	3.8	27		114		34	31	--	2.2		217	.30		115	21	1.1	351	7.4	
Feb. 1-10.....		13		45	4.8	38		124		42	48	.2	2.2		265	.36		132	30	1.4	429	7.7	
Feb. 11-21.....		12		44	4.3	43		122		40	54	.2	2.8		269	.37		128	28	1.7	442	7.5	
Feb. 22-29.....		9.6		29	2.6	26		81		26	32	.2	1.2		a167	.23		83	17	1.2	285	7.4	
Mar. 1-10.....		10		31	4.2	35		79		40	44	--	2.0		a205	.28		95	30	1.6	360	7.0	
Mar. 11-16, 18..		9.4		39	4.7	37		110		39	46	--	2.0		258	.35		117	27	1.5	410	7.0	
Mar. 19-31.....		13		56	7.5	66		144		68	87	--	3.2		401	.55		170	52	2.2	661	7.0	

a Calculated from determined constituents.

TRINITY RIVER BASIN--Continued

8-671. TRINITY RIVER NEAR MOSS BLUFF, TEX.--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Color
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Apr. 1-8,10,1960		13		55	8.0	72	5.2	146		71	96	--	4.5		412	0.56		170	50	2.4	696	7.3	
Apr. 11-20.....		9.6		62	8.5	81		173		69	106	--	2.2		436	.59		190	48	2.6	755	7.4	
Apr. 21-23,25-29		4.8		55	7.9	89		164		61	116	--	.8		426	.58		170	35	3.0	753	7.4	
May 1-5.....		17		44	6.1	89		124		69	106	--	6.4		426	.58		135	33	3.3	709	7.2	
May 6-8.....		12		21	2.0	32		69		24	34	--	1.2		a160	.22		61	4	1.8	276	6.9	
May 9-20.....		14		54	5.9	62		154		58	73	--	4.8		369	.50		159	33	2.1	614	7.3	
May 21-31.....		10		52	5.8	60		153		54	71	--	3.8		346	.47		154	28	2.1	586	7.1	
June 1-12.....		9.2		60	6.9	91		177		51	125	--	1.0		454	.62		178	33	3.0	789	7.1	
June 13-25.....		5.8		51	6.2	100		151		67	125	--	1.2		460	.63		152	28	3.5	792	7.0	
June 26-30.....		10		22	1.9	19		73		15	20	--	1.2		a125	.17		63	3	1.0	217	6.8	
July 1-15.....		14		42	5.3	80		132		38	107	--	3.2		384	.52		127	19	3.1	636	7.0	
July 16-31.....		15		46	5.8	73		141		48	93	--	2.5		378	.51		139	23	2.7	626	7.0	
Aug.1,3-5, 7-16.		13		52	5.5	86		160		45	114	--	1.0		411	56		152	21	3.0	699	7.7	
Aug. 17-20,25-31		9.6		22	2.0	59		73		29	71	--	1.5		a230	31		63	3	3.2	414	6.8	
Aug. 21-24.....		12		42	4.3	95		119		49	127	--	1.8		413	56		122	24	3.7	693	7.0	
Sept. 1-8.....		14		38	4.0	54		113		32	71	--	3.8		287	39		111	18	2.2	489	7.2	
Sept. 9-19.....		17		48	4.8	55		146		30	76	--	2.5		312	42		140	20	2.0	544	7.4	
Sept. 20-30.....		15		54	6.2	92		162		37	133	--	.5		432	59		160	27	3.2	765	7.3	
Time-weighted average		13		46	5.1	62	--	134		45	80	--	2.4		334			136	26	2.3	565	7.2	

a Calculated from determined constituents.

8-672. OLD RIVER NEAR COVE, TEX.

LOCATION--At Barber Hill pumping plant, 5 miles northwest of Cove, Chambers County.
RECORDS AVAILABLE--Chemical analyses: Short periods during summers of 1946 to 1949, daily records October 1949 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 822 ppm June 1-6; minimum, 145 ppm June 26-29.
Hardness: Maximum, 240 ppm June 1-6; minimum, 58 ppm June 26-29.
Specific conductance: Maximum daily, 1,430 micromhos June 3-5; minimum daily, 197 micromhos June 27.
EXTREMES, 1949-60.--Dissolved solids: Maximum, 11,300 ppm Oct. 14-29, 1956; minimum, 77 ppm Apr. 29, May 1-2, 1957.
Hardness: Maximum, 2,460 ppm Oct. 14-29, 1956; minimum, 34 ppm Apr. 29, May 1-2, 1957.
Specific conductance: Maximum daily, 18,000 micromhos Oct. 15, 17, 1956; minimum daily, 101 micromhos Apr. 29, 1957.
REMARKS.--Dashes omitted in potassium (K) column indicate sodium (Na) plus potassium (K) are calculated. Records of specific conductance of daily samples available in district office at Austin, Tex. No discharge records available.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1-9, 1959....		23		54	8.0	89		157		43	131	0.3	1.0		428	0.58		168	39	3.0	720	8.0
Oct. 10-14.....		19		71	14	162		150		60	282	.3	3.8		739	1.01		234	111	4.6	1240	7.9
Oct. 15-31.....		19		28	4.3	35		88		21	49	.3	.8		a200	.27		88	16	1.6	336	7.7
Nov. 1-15.....		18		40	5.3	41		127		26	56	.3	.8		267	.36		122	18	1.6	426	7.9
Nov. 16-30.....		18		44	6.0	54		138		35	70	.3	2.2		308	.42		134	21	2.0	503	8.0
Dec. 1-19.....		17		54	6.6	72		161		41	101	--	1.5		388	.53		162	30	2.5	655	7.9
Dec. 20-31.....		12		24	2.6	30		72		20	39	--	.5		a163	.22		71	12	1.6	279	7.3
Jan. 1-15, 1960...		13		26	3.5	32		79		18	46	.3	.8		a179	.24		80	15	1.6	306	7.6
Jan. 16-18, 20-31.		13		29	3.6	33		90		16	47	.3	.8		a187	.25		87	13	1.5	323	7.6
Feb. 1-10.....		9.4		30	3.4	34		91		16	50	.3	.8		a189	.26		89	14	1.6	334	7.5
Feb. 11-19.....		7.8		26	3.1	32		77		14	48	.3	.8		a170	.23		78	15	1.6	301	7.3
Feb. 20-29.....		15		22	3.2	27		76		12	35	.3	1.5		a153	.21		68	5	1.4	257	7.2
Mar. 1-15.....		17		30	4.3	36		103		14	49	.3	1.2		212	.29		93	8	1.6	341	7.3
Mar. 16-21, 23-31.		25		38	5.2	44		130		18	60	.5	1.0		268	.36		116	9	1.8	421	7.8
Apr. 1-14.....		33		49	6.9	57		155		36	77	--	1.8		360	.49		151	24	2.0	550	7.8
Apr. 15-30.....		21		66	9.9	96		180		71	135	--	2.0		524	.71		205	57	2.9	838	7.7
May 1-15.....		15		52	7.5	78		136		55	113	--	2.5		418	.57		160	48	2.7	682	7.4
May 16-31.....		17		60	8.6	90		152		72	126	--	3.5		478	.65		185	60	2.9	777	7.6
June 1-6.....		14		70	16	192		159		83	312	--	1.8		822	1.12		240	110	5.4	1380	7.3
June 7-16.....		17		59	11	129		177		62	186	--	1.2		577	.78		192	47	4.0	973	7.7

a Calculated.

TRINITY RIVER BASIN--Continued

8-672. OLD RIVER NEAR COVE, TEX.--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
June 17-25, 1960..		15		60	8.2	100		179		62	134	--	1.5		496	0.67		183	36	3.2	818	7.4
June 26-29.....		16		18	3.1	27		62		18	32	--	1.2		a145	.20		58	7	1.5	238	7.2
June 30, July 1-10		14		32	4.6	38		107		21	50	--	1.2		a214	.29		99	11	1.7	366	7.2
July 11-20.....		18		39	5.1	44		129		24	58	--	1.8		272	.37		118	13	1.8	432	7.5
July 21-31.....		12		46	6.1	63		152		31	84	--	1.2		342	.47		140	15	2.3	562	7.4
Aug. 1-10.....		15		50	9.1	127		144		48	192	--	1.5		542	.74		162	44	4.3	927	7.1
Aug. 11-22.....		15		47	7.6	85		173		27	116	--	1.0		410	.56		149	7	.3	682	7.3
Aug. 23-29.....		16		36	5.2	59		170		15	60	--	1.2		a276	.38		111	0	2.4	478	7.4
Aug. 30-31.....		--		--	--	--		170		--	61	--	--		--	--		109	0	--	475	7.7
Sept. 1-10.....		16		42	5.4	73		156		27	91	--	1.5		352	.48		127	0	2.8	583	7.5
Sept. 11-20.....		13		46	5.8	83		162		36	105	--	1.0		384	.52		139	6	3.1	652	7.8
Sept. 22-30.....		11		50	6.1	73		168		30	99	--	.5		364	.50		150	12	2.6	629	7.7
Time-weighted average		17		43	6.2	62		132		34	90	--	1.4		336	0.46		132	25	2.3	556	7.5

a Calculated.

8-673. TRINITY RIVER AT ANAHUAC, TEX.

LOCATION.--At Lone Star pumping plant in Anahuac, Chambers County.
RECORDS AVAILABLE.--Chemical analyses: Short periods during summers of 1946 to 1949, December 1949 to September 1960.
EXTREMES, 1949-56.--Dissolved solids: Maximum, 18,400 ppm Aug. 1-31, 1956; minimum, 140 ppm Apr. 12-19, 1955.
Hardness: Maximum, 3,550 ppm Oct. 21-31, 1952; minimum, 45 ppm Apr. 12-19, 1955.
Specific conductance: Maximum daily, 33,700 micromhos Sept. 26, 1956; minimum daily, 199 micromhos Apr. 15, 1955.
REMARKS.--Dashes omitted in potassium (K) column indicate sodium (Na) plus potassium (K) are calculated. Records of specific conductance of daily samples available in district office at Austin, Tex. No discharge records available.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 5, 1959.....		--		--	--	--		156		--	198	--	--		--	--		155	27	--	942	8.2
Oct. 17.....		--		--	--	--		119		--	28	--	--		--	--		114	16	--	346	8.2
Oct. 22.....		--		--	--	--		145		--	46	--	--		--	--		125	6	--	421	8.2
Oct. 29.....		--		--	--	--		138		--	66	--	--		--	--		130	17	--	492	8.2
Nov. 4.....		--		--	--	--		126		--	57	--	--		--	--		113	10	--	433	8.2
Nov. 12.....		--		--	--	--		100		--	77	--	--		--	--		98	16	--	457	8.2
Nov. 22.....		--		--	--	--		135		--	154	--	--		--	--		159	48	--	820	8.2
Nov. 26.....		--		--	--	--		151		--	100	--	--		--	--		150	26	--	654	8.2
Jan. 1, 1960.....		--		--	--	--		73		--	107	--	--		--	--		88	28	--	507	7.9
Jan. 7.....		--		--	--	--		101		--	56	--	--		--	--		110	27	--	414	7.8
Jan. 14.....		--		--	--	--		120		--	37	--	--		--	--		116	18	--	389	7.8
Jan. 21.....		--		--	--	--		109		--	46	--	--		--	--		115	26	--	398	7.7
Jan. 28.....		--		--	--	--		121		--	41	--	--		--	--		118	19	--	388	7.8
Feb. 4.....		--		--	--	--		128		--	55	--	--		--	--		137	32	--	450	7.9
Feb. 11.....		--		--	--	--		116		--	64	--	--		--	--		127	32	--	470	7.7
Feb. 18.....		--		--	--	--		128		--	57	--	--		--	--		135	30	--	461	7.8
Feb. 25.....		--		--	--	--		102		--	55	--	--		--	--		106	22	--	417	7.6
Mar. 5.....		--		--	--	--		86		--	56	--	--		--	--		102	32	--	397	7.6
Mar. 10.....		--		--	--	--		94		--	59	--	--		--	--		103	26	--	416	7.6
Mar. 17.....		--		--	--	--		110		--	69	--	--		--	--		125	35	--	496	7.7
Mar. 24.....		--		--	--	--		132		--	99	--	--		--	--		157	49	--	649	7.8
Mar. 31.....		--		--	--	--		165		--	125	--	--		--	--		194	59	--	836	7.8
Apr. 4.....		--		--	--	--		129		--	104	--	--		--	--		154	48	--	684	7.8
Apr. 6.....		--		--	--	--		127		--	110	--	--		--	--		156	52	--	697	8.0
Apr. 9.....		--		--	--	--		145		--	118	--	--		--	--		175	56	--	761	8.0
Apr. 11.....		--		--	--	--		144		--	132	--	--		--	--		179	61	--	818	7.9
Apr. 13.....		--		--	--	--		163		--	180	--	--		--	--		198	64	--	991	8.0
Apr. 15.....		--		--	--	--		177		--	193	--	--		--	--		207	62	--	1,060	8.0

TRINITY RIVER BASIN--Continued

8-673. TRINITY RIVER AT ANAHUAC, TEX.--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Apr. 17, 1960.....		--		--	--	--		179		--	158	--	--		--	--		198	52	--	946	8.1
Apr. 20.....		--		--	--	--		167		--	136	--	--		--	--		184	47	--	828	8.0
Apr. 21.....		--		--	--	--		176		--	186	--	--		--	--		196	52	--	991	8.0
Apr. 24.....		--		--	--	--		173		--	173	--	--		--	--		196	54	--	943	8.1
Apr. 27.....		--		--	--	--		164		--	222	--	--		--	--		196	62	--	1,100	8.0
Apr. 29.....		--		--	--	--		158		--	190	--	--		--	--		186	56	--	982	8.1
May 2.....		--		--	--	--		120		--	117	--	--		--	--		136	38	--	682	7.6
May 6.....		--		--	--	--		95		--	74	--	--		--	--		104	26	--	494	7.6
May 9.....		--		--	--	--		86		--	101	--	--		--	--		96	26	--	514	7.5
May 11.....		--		--	--	--		119		--	138	--	--		--	--		152	54	--	793	7.6
May 13.....		--		--	--	--		127		--	195	--	--		--	--		167	63	--	974	7.8
May 16.....		--		--	--	--		138		--	97	--	--		--	--		155	42	--	675	7.7
May 18.....		--		--	--	--		151		--	78	--	--		--	--		163	40	--	653	7.8
May 23.....		--		--	--	--		141		--	106	--	--		--	--		153	38	--	674	7.7
May 25.....		--		--	--	--		144		--	197	--	--		--	--		183	65	--	983	7.8
May 27.....		--		--	--	--		156		--	163	--	--		--	--		173	45	--	872	7.8
June 1, 3, 6, 20, 27.....		14		58	9.6	152		150		61	230	0.4	3.8		623	0.85		184	61	4.9	1,080	7.5
June 13, 15, 17...		13		81	49	589		153		166	980	.5	3.5		a1,960	2.67		404	278	13	3,460	7.6
June 22, 24.....		16		74	20	286		192		99	442	.5	3.5		a1,040	1.41		266	109	7.6	1,830	7.9
June 29.....		--		--	--	--		79		--	43	--	--		--	--		76	11	--	298	7.4
July 1, 4, 6.....		19		26	3.2	43		75		21	61	.3	2.2		213	.29		78	17	21	356	7.4
July 8, 11, 13, 22, 25, 27, 29..		18		46	5.4	106		126		46	150	.4	3.2		452	.61		137	34	3.9	769	7.5
Aug. 1, 3.....		22		52	9.4	203		139		77	292	--	5.0		752	1.02		168	54	6.8	1,280	7.7
Aug. 5, 8, 10, 12, 15.....		14		56	10	282		148		90	408	--	4.3		959	1.30		180	59	9.1	1,650	7.7
Aug. 17, 19, 22, 24, 29, 31.....		16		40	4.6	124		114		39	179	--	1.8		490	.67		119	26	4.9	814	7.5

Sept. 2, 5, 7, 9, 1960		20		41	5.5	113		128		55	145	--	4.5		447	0.61		125	20	4.4	793	7.7
Sept. 12		--		--	--	--		126		--	770	--	--		--	--		302	198	--	2,840	7.3
Sept. 14, 18		--		--	--	--		127		--	405	--	--		--	--		194	90	--	1,630	7.7
Sept. 16		--		--	--	--		127		--	552	--	--		--	--		244	140	--	2,120	7.6
Sept. 21, 23, 28		--		--	--	--		158		--	270	--	--		--	--		174	44	--	1,220	7.7
Sept. 26		--		--	--	--		154		--	540	--	--		--	--		256	130	--	2,120	7.4
Sept. 30		--		--	--	--		184		--	175	--	--		--	--		179	28	--	936	7.4

a Calculated from determined constituents.

TRINITY RIVER BASIN--Continued

8-674. TRINITY BAY AT MOUTH OF TRINITY RIVER, NEAR ANAHUAC, TEX.

LOCATION.--At four sampling stations in Trinity Bay opposite mouth of Trinity River near Anahuac, Chambers County. Station 2: In Anahuac Channel immediately below delta. Station 3: In Anahuac Channel about 1.5 miles southwest of Station 2. Station 6: In Anahuac Channel at south end. Station 7: In Trinity Bay about 1.5 miles west of Station 6.
RECORDS AVAILABLE.--Chemical analyses: October 1950 to September 1960.

Specific conductance (micromhos at 25°C) and chloride, in parts per million, water year October 1959 to September 1960

Date of collection	Station 2		Station 3		Station 6		Station 7	
	Conductance	Chloride	Conductance	Chloride	Conductance	Chloride	Conductance	Chloride
Oct. 5, 1959	756	156	744	150	1310	280	1350	305
Oct. 17	347	26	346	27	346	26	347	27
Oct. 22	418	44	421	42	419	44	424	44
Oct. 29	730	133	744	138	734	135	744	137
Nov. 4	426	57	414	57	419	57	427	56
Nov. 12	452	77	456	76	458	78	451	76
Nov. 22	848	165	855	165	1060	232	1050	228
Nov. 26	736	126	734	125	684	109	7370	2280
Dec. 3	844	138	838	138	8820	2780	8020	2500
Dec. 10	1100	205	1100	208	1080	202	1050	195
Dec. 17	543	93	546	94	589	110	546	95
Jan. 7, 1960	437	58	506	85	504	79	422	55
Jan. 14	436	57	465	71	362	37	--	--
Jan. 21	410	50	461	64	389	47	389	48
Jan. 28	376	37	379	38	376	38	381	39
Feb. 1	--	--	511	106	502	106	515	110
Feb. 4	451	53	453	54	462	54	451	53
Feb. 11	502	63	535	63	470	62	512	70
Feb. 18	458	57	452	55	509	68	447	56
Feb. 25	401	50	496	77	400	51	394	51
Mar. 5	402	54	398	55	399	54	398	55
Mar. 10	415	58	412	57	412	57	412	58
Mar. 17	492	68	493	67	491	67	496	66
Mar. 24	651	98	642	96	628	93	626	93
Mar. 31	785	113	784	113	784	111	785	111
Apr. 4	685	103	685	103	680	103	682	103
Apr. 6	698	111	690	109	693	110	693	110
Apr. 8	758	119	760	119	759	119	759	119
Apr. 11	819	135	828	135	832	138	828	138
Apr. 13	976	170	979	172	991	175	994	178
Apr. 15	1120	205	1120	205	1130	210	1140	212
Apr. 17	949	158	943	155	1070	198	1010	178
Apr. 20	828	135	919	162	1170	235	1560	350
Apr. 21	949	172	925	168	1770	420	2370	600

8-674. TRINITY BAY AT MOUTH OF TRINITY RIVER NEAR ANAHUAC, TEX.--Continued

Specific conductance (micromhos at 25°C) and chloride, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Station 2		Station 3		Station 6		Station 7	
	Conductance	Chloride	Conductance	Chloride	Conductance	Chloride	Conductance	Chloride
Apr. 24	946	170	957	175	1760	420	1890	480
Apr. 27	1110	220	1110	220	1670	410	1850	470
Apr. 29	1240	265	1090	222	1270	272	1660	400
May 2	702	118	731	126	1330	302	1220	272
May 4	328	50	408	61	322	47	1030	228
May 6	500	72	518	75	501	74	490	74
May 9	837	148	815	139	731	127	724	128
May 11	819	139	801	139	796	140	813	139
May 13	971	190	971	195	974	192	971	192
May 16	653	93	651	93	661	95	653	95
May 18	660	81	660	79	656	80	658	79
May 20	655	87	656	85	655	86	653	85
May 23	726	121	721	121	721	123	721	122
May 25	877	164	893	171	895	171	820	149
May 27	881	164	877	166	855	157	855	157
May 30	937	175	917	170	942	180	966	182
June 1	975	195	986	198	1060	222	1120	238
June 3	1440	340	1560	375	1910	480	--	--
June 6	1430	335	1420	332	1910	490	1850	470
June 8	1660	400	1670	420	1720	430	1750	450
June 13	4210	1200	4210	1200	4360	1280	4510	1320
June 15	2770	760	2750	740	3080	850	3370	940
June 17	4040	1150	4040	1180	5050	1500	5510	1680
June 20	1160	245	1160	245	1210	255	1210	258
June 22	1830	440	1780	430	1670	400	1640	390
June 24	2420	630	2590	690	2750	750	2890	780
June 27	767	158	755	157	767	159	780	162
June 29	301	44	298	43	293	41	293	41
July 1	--	--	--	--	--	--	278	41
July 6	464	89	--	--	469	86	--	--
July 11	--	--	771	150	766	148	--	--
July 13	665	119	669	121	747	141	--	--
July 22	828	166	824	167	800	157	786	154
July 25	688	123	684	124	677	123	677	123
July 27	650	121	648	121	648	120	648	121
July 29	776	144	777	144	779	145	785	149

TRINITY RIVER BASIN--Continued

8-674. TRINITY BAY AT MOUTH OF TRINITY RIVER, NEAR ANAHUAC, TEX.--Continued

Specific conductance (micromhos at 25°C) and chloride, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Station 2		Station 3		Station 6		Station 7	
	Conductance	Chloride	Conductance	Chloride	Conductance	Chloride	Conductance	Chloride
Aug. 1, 1960	1270	285	1270	288	1280	290	1290	298
Aug. 3	1320	305	1310	305	1310	305	1350	325
Aug. 5	1700	428	1690	428	1710	432	1720	438
Aug. 8	1660	412	1680	415	1680	422	1680	420
Aug. 10	1610	382	1610	382	1640	398	1650	402
Aug. 12	1870	462	1870	462	1840	452	1830	450
Aug. 15	1460	350	1450	345	1460	352	1440	342
Aug. 17	2060	542	1490	368	1490	368	2450	668
Aug. 19	1080	242	1090	245	1110	250	1100	248
Aug. 22	992	205	989	205	960	200	949	198
Aug. 24	833	180	830	180	854	185	875	188
Aug. 29	727	154	727	155	727	154	727	155
Aug. 31	674	151	674	153	674	152	674	153
Sept. 2	844	164	842	165	844	165	842	165
Sept. 5	815	132	812	132	812	132	817	134
Sept. 7	634	98	633	98	634	98	641	100
Sept. 9	863	168	863	168	2050	520	2450	640
Sept. 12	3000	820	3000	820	2920	800	2500	660
Sept. 14	2180	570	2170	560	3110	860	3700	1040
Sept. 16	2530	680	2480	670	4170	1220	6170	1880
Sept. 18	2600	700	2650	710	1950	500	3820	1090
Sept. 21	1080	230	1080	230	2090	530	1860	470
Sept. 23	1240	275	1230	272	1180	258	1210	265
Sept. 26	4490	1300	4460	1300	4210	1220	7120	2220
Sept. 28	1200	255	1180	250	1270	275	1290	280
Sept. 30	956	180	976	190	1440	325	1920	475

BRAZOS RIVER BASIN

8-805. DOUBLE MOUNTAIN FORK BRAZOS RIVER NEAR ASPERMONT, TEX.

LOCATION.--At gaging station at bridge on U.S. Highway 83, 8 miles downstream from Mountain Creek, and 10 miles south of Aspermont, Stonewall County.
DRAINAGE AREA.--7,980 square miles, approximately, of which 6,470 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: October 1948 to November 1951, October 1956 to September 1960.
Water temperatures: November 1949 to November 1951, October 1956 to September 1960.
Sediment records: November 1949 to September 1951.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 6,350 ppm Nov. 6; minimum, 674 ppm Dec. 18-21.
Hardness: Maximum, 2,420 ppm May 13-26; minimum, 202 ppm Dec. 18-21.
Specific conductance: Maximum daily, 9,090 micromhos Nov. 6; minimum daily, 897 micromhos July 8.
Water temperatures: Maximum, 95°F July 25, Aug. 24; minimum, freezing point Nov. 13, Feb. 24.
EXTREMES, 1948-51, 1956-60.--Dissolved solids: Maximum, 6,350 ppm Feb. 23-28, 1958, Nov. 6, 1959; minimum, 636 ppm Oct. 22-28, 1957.
Hardness: Maximum, 2,510 ppm Aug. 5, 8, 1951; minimum, 193 ppm Oct. 22-28, 1957.
Specific conductance: Maximum daily, 10,400 micromhos Feb. 25, 1958; minimum daily, 735 micromhos Oct. 24, 1957.
Water temperatures (1949-51, 1956-60): Maximum, 96°F July 20, 1951; minimum, freezing point Jan. 4, 1950, Jan. 29, 1951, Jan. 16, 1957, Nov. 13, 1959 and Feb. 24, 1960.
REMARKS.--Dashes omitted in potassium (K) column indicate sodium (Na) plus potassium (K) are calculated. Values reported for dissolved solids concentrations less than 1,000 ppm are residues at 180°C and for concentrations more than 1,000 ppm are calculated from determined constituents unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1959 to September 1960 given in WSP 1712.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Dissolved solids: Tons per day	Hardness as $CaCO_3$: Calcium, Magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
Oct. 1-2,9-12,1959	45.1	14		280	22	329	7.7	116		765	460		1.8		1940	2.64	236	,789	694	5.1	2810	7.8
Oct. 3-8.....	1221	14		129	13	146		122		379	139		2.8		a883	1.20	2910	376	276	3.3	1310	7.7
Oct. 13-29.....	11.6	16		450	68	922		121		1280	1400		1.0		4200	5.71	132	1400	1300	11	5720	7.7
Oct. 30-31.....	47.0	12		378	32	433		82		1010	635		1.5		2540	3.45	322	1070	1000	5.7	3580	7.8
Nov. 1-2, 5.....	14.3	14		460	61	789		102		1230	1240		1.0		3840	5.22	148	1400	1320	9.2	5620	8.0
Nov. 3-4, 7-11....	21.0	12		420	59	577		117		1200	850		1.0		3180	4.32	180	1290	1190	7.0	4500	7.6
Nov. 6.....	20.0	--		--	--	--		91		--	2420		--		6350	8.64	343	1640	1570	--	9090	7.9
Nov. 12-30.....	4.7	14		580	84	888		152		1560	1400		.5		4600	6.26	58.2	1790	1670	9.1	6450	8.0
Dec. 1-14.....	1.1	13		670	89	758		127		1800	1210		.5		4600	6.26	13.7	2040	1930	7.3	6140	7.6
Dec. 15-17, 22....	419	9.8		152	20	196		115		444	232		3.5		1110	1.51	1260	461	367	4.0	1710	7.7
Dec. 18-21.....	559	11		63	11	158		138		204	155		3.2		674	.92	1020	202	89	4.8	1110	8.1
Dec. 23-24.....	73.0	12		138	24	293		142		424	370		1.2		1330	1.81	262	443	327	6.1	2120	8.0
Dec. 25-27.....	45.0	12		242	41	493		150		708	698		1.5		2270	3.09	276	772	650	7.7	3470	7.8
Dec. 28-31.....	30.5	13		340	55	682		156		952	1020		1.0		3140	4.27	259	1070	942	9.0	4730	8.0
Jan. 1-9, 1960....	29.3	12		380	67	776		136		1060	1200		4.5		3570	4.86	282	1220	1110	9.6	5630	7.7
Jan. 10-12.....	22.7	14		250	49	504		142		756	720		3.5		2370	3.22	145	826	710	7.6	3670	7.8
Jan. 13-31.....	5.4	12		435	78	1020		150		1250	1550		4.5		4420	6.01	64.5	1410	1290	12	6550	7.6

a Calculated from determined constituents.

BRAZOS RIVER BASIN--Continued

8-805. DOUBLE MOUNTAIN FORK BRAZOS RIVER NEAR ASPERMONT, TEX.--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Feb. 1-2,4-15,1960	10.5	13		550	94	1290		145		1560	2000		--		5580	7.59	158	1760	1640	13	7780	7.8
Feb. 3	72.0	--		--	--	--		66		--	445		--		--	--	--	950	896	--	2850	7.6
Feb. 16-29	3.9	13		640	105	1150		158		1740	1830		0.9		5560	7.56	58.5	2030	1900	11	7810	7.8
Mar. 1-12	3.5	12		650	98	1080		120		1750	2090		--		5740	7.81	54.2	2020	1920	10	8350	7.5
Mar. 13-23	1.1	10		690	10.4	1110		140		1840	1800		.0		5620	7.64	16.6	2150	2040	11	7660	7.6
Mar. 24	15.0	11		320	20	82		116		691	172		1.2		1350	1.84	54.6	880	785	1.2	1950	7.2
Mar. 25	6.4	--		--	--	--		78		--	850		--		--	--	--	1100	1040	--	3830	7.7
Mar. 26-31	.6	8.6		680	101	826		118		1820	1360		.0		4850	6.60	7.84	2110	2010	7.8	6490	7.5
Apr. 1-15	.2	4.2		520	95	620		84		1230	1190		9.5		3710	5.05	2.00	1690	1620	6.6	5350	6.6
Apr. 16-30	.2	8.8		710	127	819		126		1790	1490		6.0		5010	6.81	2.69	2290	2190	7.4	6830	6.9
May 1-12	.1	9.6		700	143	852		126		1860	1520		5.5		5150	7.00	1.38	2330	2230	7.7	6960	7.3
May 13-26	.1	13		745	145	821		132		2070	1400		3.0		5260	7.15	1.41	2420	2310	7.2	6910	7.6
May 27-31	300	13		285	32	202		114		763	278		2.0		1630	2.22	1320	842	748	3.0	2250	7.4
June 1-4, 9-12	224	22		180	20	186		117		518	210		6.2		1200	1.63	726	531	435	3.5	1770	7.6
June 5-8, 13-15	3.8	23		298	34	346		100		840	480		3.8		2070	2.82	21.1	884	802	5.1	2990	7.6
June 16-30	.3	28		650	77	603		67		1890	870		1.0		4150	5.64	3.35	1940	1890	6.0	5200	7.5
July 1-5	.3	72		680	109	591		58		2030	900		.0		4410	6.00	3.56	2140	2090	5.6	5450	7.5
July 6-10	7037	25		114	14	94		108		337	73		5.0		746	1.01	14170	342	253	2.2	1060	7.6
July 11-20	173	--		--	--	--		120		--	332		--		--	--	--	420	322	--	2060	7.8
July 21-31	32.4	45		450	79	850		67		1350	1300		3.0		4110	5.59	360	1450	1400	9.7	5940	7.3
Aug. 1-8	4.1	26		585	92	945		69		1680	1480		.8		4840	6.58	53.5	1840	1780	9.6	6780	7.4
Aug. 9-10, 12-13	65.8	18		410	24	142		78		1060	185		1.5		1880	2.56	334	1120	1060	1.8	2350	7.6
Aug. 11, 14-17	35.1	17		450	45	475		85		1220	710		1.0		2960	4.03	281	1310	1240	5.7	4090	7.5
Aug. 18-29	2.4	17		645	76	760		86		1740	1200		.5		4480	6.09	29.0	1920	1850	7.5	6070	7.6
Aug. 30-31	11.9	13		412	32	225		67		1070	340		.8		2130	2.90	68.3	1160	1110	2.9	2770	7.9
Sept. 1-22	.1	16		690	116	625		82		1970	1020		.5		4480	6.09	1.19	2200	2130	5.8	5690	7.1
Sept. 23-24	3.1	14		302	34	129		76		764	222		3.2		1510	2.05	12.5	894	832	1.9	2020	7.4
Sept. 25-28	4.8	12		495	42	305		76		1290	472		.8		2650	3.60	34.3	1410	1350	3.5	3420	7.5
Sept. 29-30	.6	--		--	--	--		84		--	860		--		--	--	--	1870	1800	--	4950	7.5
Weighted average	--	22		138	17	144		112		403	159		4.4		958	1.30	387	417	324	2.9	1410	7.6
Time-weighted average	148.8	16		523	78	732		115		1440	1150		2.5		4030	--	--	1600	1510	7.8	5460	7.4
Tons per day	--	8.7		56	6.9	58		45		163	64		1.9		--	--	--	--	--	--	--	--

BRAZOS RIVER BASIN--Continued

8-805. DOUBLE MOUNTAIN FORK BRAZOS RIVER NEAR ASPERMONT, TEX.--Continued

Temperature (°F) of water, water year October 1959 to September 1960

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

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BRAZOS RIVER BASIN--Continued

8-812. CROTON CREEK NEAR JAYTON, TEX.

LOCATION.--At gaging station on left bank, 460 feet upstream from county road ford, 1.5 miles upstream from mouth, and about 8 miles northeast of Jayton, Stonewall County.
DRAINAGE AREA.--310 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: October 1959 to September 1960.
REMARKS.--Values expressed in parts per million are multiplied by density when computing loads. Records of discharge for water year October 1959 to September 1960 given in WSP 1712.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (calculated)	Hardness as $CaCO_3$: Calcium, magnesium	Hardness as $CaCO_3$: Noncarbonate	Specific conductance (micromhos at 25°C)	pH	Density at 20°C
Oct. 6, 1959	14.3	15		787	70	1,910	--	78	2,050	2,960			a7,830	2,250	2,190	11,300	7.5	1.004
Oct. 14-15	b.7	19		1,040	140	3,770	--	122	2,610	6,050			c13,700	3,170	3,070	19,300	7.4	1.009
Oct. 17	.2	--		--	--	2,420	--	--	1,690	3,690			--	1,830	--	12,600	--	1.003
Oct. 20-22, 30	b.3	15		1,130	170	4,670	--	146	2,720	7,720			d16,500	3,520	3,400	23,200	7.3	1.011
Oct. 27	.1	--		--	--	--	--	--	--	--			--	--	--	24,100	--	--
Nov. 2	.6	--		--	--	4,670	--	--	2,510	7,810			--	3,420	--	23,100	--	1.011
Nov. 3 (12 m.-12 p.m.)	15.6	--		--	--	4,500	--	--	2,450	7,230			--	3,150	--	22,200	--	1.010
Nov. 4	4.1	--		--	--	4,360	--	--	2,330	6,840			--	2,790	--	21,100	--	1.009
Nov. 19	.1	--		--	--	--	--	--	--	10,600			--	--	--	28,800	--	1.011
Dec. 2	.1	--		--	--	--	--	--	--	11,800			--	--	--	31,900	--	1.013
Dec. 16 (12 p.m.-12 m.)	78.8	--		--	--	--	--	--	1,660	1,800			--	--	--	7,600	--	--
Jan. 5, 1960	6.10	--		--	--	--	--	--	2,370	8,630			--	--	--	24,400	--	1.008
Jan. 21	1.5	--		--	--	--	--	--	3,110	12,400			--	--	--	33,300	--	1.014
Feb. 3	19.0	--		--	--	6,030	--	--	2,300	9,400			--	2,690	--	26,900	--	1.011
Feb. 4	21.4	--		--	--	5,010	--	--	2,260	8,030			--	2,700	--	23,600	--	1.009
Feb. 17	1.0	--		--	--	7,770	--	--	3,100	12,400			--	4,210	--	33,300	--	1.016
Mar. 2	1.6	--		--	--	8,580	--	--	3,150	13,900			--	4,220	--	36,700	--	1.018
Mar. 15	.8	--		--	--	8,680	--	--	3,240	14,000			--	4,500	--	37,300	--	1.018
Mar. 30	.1	--		--	--	--	--	--	--	15,200			--	--	--	39,700	--	1.020
Apr. 14	.1	--		--	--	--	--	--	--	16,900			--	--	--	39,100	--	1.020
Apr. 15	.1	--		--	--	--	--	--	--	17,900			--	--	--	40,800	--	1.022
Apr. 18	.1	--		--	--	--	--	--	--	21,700			--	--	--	47,300	--	1.027
Apr. 26	.2	--		--	--	7,270	--	--	2,890	12,000			--	4,190	--	33,300	--	1.014
Apr. 27 (12 m.-12 p.m.)	7.2	--		--	--	5,580	--	--	2,610	9,100			--	3,660	--	26,700	--	1.011
Apr. 28	.9	--		--	--	11,500	--	--	3,540	18,100			--	4,740	--	46,700	--	1.023

May 11, 1960.....	.1	--		--	--	--	--	--	--	34,300			--	--	--	76,700	--	1.043
May 30 (4 p.m. 12 p.m.).....	25.6	--		--	--	5,940	--	--	2,780	9,190			--	2,980	--	26,300	--	1.012
May 31, June 1.....	b.2	--		--	--	5,940	--	--	2,920	9,480			--	3,400	--	26,500	--	1.013
June 8-10.....	11.2	--		--	--	6,890	--	--	3,200	10,700			--	3,650	--	29,600	--	1.015
July 5-6.....	b66.1	--		--	--	2,910	--	--	1,980	4,570			--	2,130	--	14,800	--	1.006
July 7-8.....	b791	--		--	--	269	8.5	72	1,600	410			--	1,670	1,610	3,630	7.5	--
July 10-11.....	b9.4	--		--	--	1,960	--	--	2,250	3,080			--	2,470	--	11,400	--	1.005
July 13.....	2.3	--		--	--	3,500	--	--	2,740	5,560			--	3,120	--	17,800	--	1.008
July 15.....	15.5	--		--	--	1,400	--	72	2,100	2,040			--	2,150	2,090	8,850	7.3	--
July 16-17.....	b4.2	--		--	--	2,330	--	--	2,450	3,600			--	2,600	--	12,900	--	1.006
July 19.....	.9	--		--	--	3,930	--	--	2,800	6,240			--	3,250	--	19,300	--	1.009
July 21 (12 p.m.- 10 a.m.).....	56.4	--		--	--	1,810	--	68	2,080	2,850			--	2,380	2,320	10,600	7.4	--
Aug. 1.....	.1	--		--	--	--	--	--	--	7,140			--	--	--	22,100	--	1.008
Aug. 20.....	.1	--		--	--	--	--	--	--	21,700			--	--	--	51,200	--	1.026
Aug. 21.....	.1	--		--	--	1,230	9.1	71	2,120	1,900			--	2,180	2,120	8,470	7.7	--
Aug. 25 (12 m.- 12 p.m.).....	69.1	--		--	--	3,620	--	--	2,590	5,860			--	3,000	--	18,500	--	1.007
Aug. 26.....	17.1	--		--	--	837	7.4	59	1,930	1,240			--	1,920	1,870	6,400	7.6	--
Aug. 28.....	.1	--		--	--	--	--	--	--	2,600			--	--	--	10,400	--	--
Sept. 20.....	20.7	--		--	--	4,100	--	--	2,580	6,350			--	2,740	--	19,900	--	1.008

a Tons per acre-foot, 10.7.
b Daily mean discharge.
c Tons per acre-foot, 18.8.
d Tons per acre-foot, 22.7.

BRAZOS RIVER BASIN--Continued

8-814. SALT CROTON CREEK AT WEIR D, NEAR ASPERMONT, TEX.

LOCATION.--About 500 feet upstream from Haystack Creek, 1,000 feet upstream from gaging station, and 20 miles northwest of Aspermont, Stonewall County.
RECORDS AVAILABLE.--Chemical analyses: October 1956 to September 1960.
REMARKS.--Values reported for sodium (Na) are determined by analysis and do not include potassium (K). Values expressed in parts per million are multiplied by density when computing loads.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$		Specific conductance (micromhos at 25°C)	pH	Density at 20°C
														Calcium, magnesium	Noncarbonate			
Oct. 5, 1959	2.3					24,200			2,500	37,800				4,300		76,900		1.046
Oct. 22	.6					95,600			3,370	150,000				9,550		156,000		1.194
Oct. 27	.5					100,000			2,920	157,000				9,150		158,000		1.202
Nov. 3	11.7					22,100			1,550	34,600				3,000		72,400		1.041
Nov. 20	.6					91,500			3,180	143,000				9,040		158,000		1.183
Dec. 2	.6					89,300			3,280	141,000				8,820		158,000		1.179
Dec. 18	2.5					27,700			2,310	43,700				4,180		85,900		1.053
Jan. 5, 1960	--					21,500			1,800	33,700				3,160		71,300		1.039
Jan. 19	.7					76,600			3,400	121,000				8,220		152,000		1.156
Feb. 17	1.4					85,200			3,140	134,000				8,610		155,000		1.173
Mar. 2	1.1					83,000			3,340	132,000				8,570		122,000		1.167
Mar. 16	.4					89,900			3,570	142,000				9,070		157,000		1.180
Mar. 31	.2					71,300			3,720	112,000				7,980		147,000		1.141
Apr. 14	.2					98,100			3,060	154,000				9,100		126,000		1.198
Apr. 20	.5					99,800			2,880	157,000				9,560		178,000		1.203
Apr. 28	1.2					77,800			4,030	121,000				7,950		168,000		1.157
May 16	.5					99,100			2,530	158,000				9,910		146,000		1.201
May 25	.2					99,300			2,630	158,000				10,700		146,000		1.202
June 3	.5					71,700			4,230	112,000				8,640		135,000		1.146
June 10	.7					46,900			3,630	73,100				6,760		112,000		1.095
June 23	.6					98,800			2,600	158,000				10,400		163,000		1.202
July 1	.6					98,500			2,470	158,000				11,100		164,000		1.202
July 9	.2					29,800			2,970	48,100				5,620		92,800		1.060
July 12	.5					71,800			4,010	114,000				9,700		150,000		1.144
Aug. 4	.5					101,000			2,610	158,000				9,970		146,000		1.204
Aug. 15	.6					100,000			2,770	158,000				9,060		163,000		1.203
Aug. 23	.8					83,800			3,780	132,000				8,980		157,000		1.169
Sept. 5	.9					97,700			2,690	154,000				9,170		163,000		1.199
Sept. 13	.5					99,400			2,570	157,000				8,980		144,000		1.203
Sept. 29	1.0					97,700			2,820	153,000				8,930		143,000		1.198

8-814.5. HAYSTACK CREEK NEAR ASPERMONT, TEX.

LOCATION.--About 400 feet upstream from mouth and 20 miles northwest of Aspermont, Stonewall County.
RECORDS AVAILABLE.--Chemical analyses: October 1956 to September 1960.
REMARKS.--Values expressed in parts per million are multiplied by density when computing loads.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$		Specific conductance (micromhos at 25°C)	pH	Density at 20°C
														Calcium, magnesium	Noncarbonate			
Oct. 5, 1959	0.2					17,800			3,710	28,000				5,160		63,400		1.037
Oct. 22	.2					37,500			4,390	58,200				6,520		104,000		1.074
Oct. 27	.2					34,500			4,150	54,300				6,080		98,300		1.069
Nov. 3	1.9					14,400			2,550	22,400				3,630		53,800		1.029
Nov. 20	.2					28,800			4,100	45,400				5,680		87,900		1.057
Dec. 2	.1					32,500			4,110	50,300				5,790		94,900		1.063
Dec. 18	.5					15,900			3,250	24,800				4,300		57,500		1.032
Jan. 19, 1960	.2					28,600			4,010	44,500				5,610		87,500		1.056
Feb. 17	.6					33,700			3,690	52,600				5,260		96,500		1.065
Mar. 16	.2					32,200			4,090	50,400				5,930		94,100		1.062
Mar. 31	.1					58,200			4,010	91,600				7,540		134,000		1.114
Apr. 14	.7					36,700			4,400	56,900				6,250		87,000		1.072
Apr. 20	.2					38,800			4,540	60,300				6,590		115,000		1.078
Apr. 28	.2					42,600			4,740	66,700				7,080		122,000		1.087
May 16	.1					52,800			5,080	82,400				8,030		119,000		1.108
May 25	.1					47,700			5,360	75,100				7,920		114,000		1.099
June 3	.1					47,100			5,250	74,000				7,740		113,000		1.098
June 10	.1					36,000			4,700	56,400				6,900		95,400		1.073
June 23	.1					53,700			5,160	83,600				7,770		131,000		1.107
July 1	.1					47,400			4,990	74,200				7,400		122,000		1.095
July 9	(a)					33,700			4,640	53,300				7,450		100,000		1.069
July 12	.1					48,400			5,120	76,300				7,930		124,000		1.097
July 29	.1					47,800			5,060	75,500				7,510		113,000		1.092
Aug. 4	.1					50,100			5,090	79,300				7,610		116,000		1.104
Aug. 15	.2					43,300			4,620	67,800				6,810		11,400		1.087
Aug. 23	.1					47,900			4,860	75,300				7,210		120,000		1.095
Sept. 5	.2					44,000			4,700	68,900				6,890		115,000		1.088
Sept. 13	.1					45,100			4,910	70,200				7,160		107,000		1.090
Sept. 29	.2					41,700			4,530	65,500				6,640		104,000		1.084

a Less than 0.05 ppm discharge.

BRAZOS RIVER BASIN--Continued

8-815. SALT CROTON CREEK NEAR ASPERMONT, TEX.

LOCATION.--At gaging station just below mouth of Haystack Creek and about 20 miles northwest of Aspermont, Stonewall County.
DRAINAGE AREA.--69 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: October 1956 to September 1960.
REMARKS.--Records of discharge for water year October 1959 to September 1960 given in WSP 1712. Values expressed in parts per million are multiplied by density when computing loads.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$		Specific conductance (micromhos at 25°C)	pH	Density at 20°C
														Calcium, magnesium	Noncarbonate			
Oct. 1, 1959	21.4					73,900			3,530	116,000				8,370		149,000		1.147
Oct. 2	670					1,970			800	3,220				1,060		10,600		1.003
Oct. 5	2.5					22,500			2,610	35,400				4,310		73,900		1.044
Oct. 22	1.0					84,500			3,530	133,000				9,070		152,000		1.169
Oct. 27	.6					84,800			3,580	132,000				8,880		153,000		1.171
Nov. 3	14.6					17,000			1,870	26,900				3,040		60,000		1.033
Nov. 20	.8					81,100			3,420	127,000				8,590		152,000		1.164
Dec. 2	.9					79,400			3,450	124,000				8,350		153,000		1.161
Dec. 18	2.8					25,300			2,450	39,600				4,120		80,500		1.048
Jan. 5, 1960	19.0					18,900			1,800	29,800				3,210		65,000		1.035
Jan. 19	1.0					64,100			3,740	99,600				7,620		141,000		1.129
Feb. 17	2.8					68,600			3,270	108,000				7,640		144,000		1.138
Mar. 2	1.5					66,600			3,510	104,000				7,610		143,000		1.130
Mar. 16	1.0					70,200			3,750	112,000				7,980		146,000		1.140
Mar. 31	.3					85,000			3,490	133,000				8,640		156,000		1.169
Apr. 14	1.0					93,500			3,130	146,000				8,840		125,000		1.188
Apr. 20	.8					91,800			3,240	144,000				9,440		177,000		1.187
Apr. 28	1.1					63,700			4,150	99,600				7,350		153,000		1.129
May 16	.6					70,100			4,180	112,000				8,840		134,000		1.143
May 25	.6					94,300			2,850	152,000				10,300		146,000		1.198
June 3	.9					59,100			4,380	93,700				7,940		128,000		1.121
June 10	.9					40,900			3,660	63,900				6,330		103,000		1.080
June 23	.7					95,100			3,030	152,000				10,700		146,000		1.196
July 1	.8					92,900			3,160	147,000				10,700		146,000		1.190
July 5	13.6					22,100			2,420	34,500				3,760		69,800		1.043
July 7	550					37,200			1,610	58,800				3,730		97,200		1.072
July 9	.7					24,400			2,930	38,400				5,010		75,100		1.048
July 12	.7					52,400			3,940	84,500				8,560		121,000		1.110
July 20	8.0					88,000			2,940	138,000				8,510		160,000		1.175
July 29	.7					94,200			3,150	149,000				9,650		145,000		1.192

Aug. 4	.3					98,500			2,920	156,000				10,100		152,000		1.202
Aug. 15	.9					98,400			2,990	155,000				9,000		163,000		1.200
Aug. 23	.9					75,200			4,050	117,000				8,430		152,000		1.150
Aug. 24	450					64,700			3,270	102,000				7,360		144,000		1.128
Aug. 24	8.0					96,700			2,800	152,000				10,200		163,000		1.195
Sept. 5	.7					93,500			2,980	147,000				9,170		161,000		1.189
Sept. 13	.6					92,000			3,030	145,000				8,760		141,000		1.187
Sept. 20	8.0					86,700			2,970	135,000				8,190		159,000		1.172
Sept. 29	.9					96,600			2,880	152,000				9,030		142,000		1.196

BRAZOS RIVER BASIN--Continued

8-815.5. SALT CROTON CREEK AT FALLS, NEAR ASPERMONT, TEX.

LOCATION.--At falls about 1.5 miles upstream from mouth and 17 miles northwest of Aspermont, Stonewall County.
RECORDS AVAILABLE.--Chemical analyses: January 1958 to September 1960.
REMARKS.--Values expressed in parts per million should be multiplied by the density when computing loads.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$		Specific conductance (micromhos at 25°C)	pH	Density at 20°C
														Calcium, magnesium	Noncarbonate			
Oct. 22, 1959.....	0.8					48,200			3,970	76,400				8,490		120,000		1.096
Nov. 20.....	1.2					63,900			3,660	101,000				8,160		139,000		1.127
Jan. 19, 1960.....	1.3					50,600			3,550	79,500				6,860		125,000		1.100
Feb. 17.....	1.3					56,100			3,740	87,600				7,460		132,000		1.113
Apr. 20.....	.2					83,000			3,310	131,000				9,010		121,000		1.166
Apr. 28.....	1.4					82,400			3,330	130,000				8,140		171,000		1.167
May 16.....	.2					84,500			3,580	135,000				9,370		142,000		1.174
May 25.....	(a)					51,100			2,970	80,500				6,710		116,000		1.103
June 3.....	.7					41,300			3,920	64,800				6,960		104,000		1.081
June 10.....	1.3					17,000			3,060	26,600				3,680		57,800		1.032
June 23.....	.2					16,900			3,060	26,400				4,220		51,200		1.034
July 1.....	(a)					15,400			3,600	24,200				4,170		57,200		1.031
July 12.....	1.3					12,900			2,420	20,700				3,650		50,300		1.026
July 29.....	.3					8,120			2,200	12,700				2,830		33,000		1.016
Aug. 4.....	.2					5,500			2,140	8,700				2,610		24,400		1.011
Aug. 15.....	(a)					44,000			4,960	68,900				8,270		117,000		1.088
Sept. 5.....	.1					3,780			2,010	5,950				2,420		18,900		1.009
Sept. 13.....	.2					28,600			3,110	46,700				5,740		85,600		1.060
Sept. 29.....	.4					51,700			2,880	81,700				6,620		116,000		1.102

a Less than 0.05 cfs discharge.

8-820. SALT FORK BRAZOS RIVER NEAR ASPERMONT, TEX.

LOCATION.--At gaging station at bridge on U.S. Highway 83, 5.5 miles downstream from Salt Croton Creek, and 13.2 miles northwest of Aspermont, Stonewall County.
DRAINAGE AREA.--4,830 square miles, approximately, of which 2,770 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: October 1948 to September 1951, October 1956 to September 1960.
Water temperatures: October 1948 to September 1951, October 1956 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 83,900 ppm Apr. 28-30; minimum, 1,240 ppm July 7-9.
Hardness: Maximum, 5,510 ppm Apr. 28-30; minimum, 334 ppm July 7-9.
Specific conductance: Maximum daily, 125,000 micromhos Apr. 28; minimum daily, 1,690 micromhos July 8.
Water temperatures: Maximum, 91°F Aug. 3; minimum, freezing point on several days during winter months.
EXTREMES, 1948-51, 1956-60.--Dissolved solids: Maximum, 99,200 ppm Mar. 30-31, 1959; minimum, 1,240 ppm July 7-9, 1960.
Hardness: Maximum, 6,200 ppm Mar. 30-31, 1959; minimum, 334 ppm July 7-9, 1960.
Specific conductance: Maximum daily, 125,000 micromhos Apr. 28, 1960; minimum daily, 1,690 micromhos July 8, 1960.
Water temperatures: Maximum, 95°F July 5, 1959; minimum, freezing point on many days during winter months.
REMARKS.--Where no potassium (K) is reported, sodium (Na) and potassium (K) are calculated and reported as sodium. Values expressed in parts per million are multiplied by density when computing loads. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1959 to September 1960 given in WSP 1712.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Density at 20°C
														Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Oct. 1, 1959.....	31.0	--	--	--	--		67		--	52800		--		--	--	--	4780	4730	--	99100	7.4	1.066
Oct. 2, 9-17.....	67.9	14	570	115	3760	20	146		1460	5950		--		12000	16.5	2220	1900	1780	38	18300	7.7	1.009
Oct. 3-8.....	602	12	268	33	1110		98		713	1700		3.0		3890	5.29	6320	804	724	17	6340	7.4	--
Oct. 18-30.....	4.2	13	933	201	8660		141		2320	13800		--		26000	36.0	300	3150	3030	67	35700	7.6	1.018
Oct. 31, Nov. 1-4.	14.1	11	1090	305	19000		126		2370	30300		--		53100	75.0	2020	3970	3870	131	65700	7.4	1.038
Nov. 5-13.....	7.8	11	883	189	9230		148		2240	14600		--		27200	37.6	584	2980	2860	74	37800	7.6	1.019
Nov. 14-30.....	2.1	11	1180	268	16400		170		2820	25900		--		46700	65.6	270	4050	3910	112	58700	7.5	1.033
Dec. 1-12.....	1.3	11	1240	345	19400		162		2910	30900		--		54900	77.4	200	4510	4380	126	63500	7.4	1.036
Dec. 13-14.....	1.8	11	1260	349	22400		151		2910	35600		--		62600	88.5	304	4580	4460	144	70000	7.5	1.040
Dec. 15, 20-26....	118	11	402	79	3630		135		1010	5710		--		10900	14.8	3500	1330	1220	43	17000	8.1	1.007
Dec. 27-31.....	37.0	13	690	169	7320		183		1760	11600		--		21600	29.7	2190	2420	2270	65	30700	7.7	1.015
Jan. 1-15, 1960...	36.3	12	762	213	9260		162		1960	14700		--		27000	37.3	2690	2780	2650	76	38800	7.7	1.017
Jan. 16-31.....	20.1	12	826	229	9200		191		2170	14600		--		27100	37.5	1500	3000	2840	73	38300	7.6	1.017
Feb. 1-17.....	16.6	13	883	270	1000		159		2330	16000		--		29600	41.0	1330	3310	3180	76	39600	7.6	1.019
Feb. 18-29.....	12.9	14	1010	302	13700		193		2600	21700		--		39400	55.0	1370	3760	3600	97	50200	7.6	1.027

BRAZOS RIVER BASIN--Continued

8-820. SALT FORK BRAZOS RIVER NEAR ASPERMONT, TEX.--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Density at 20°C
														Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Mar. 1-14, 1960...	11.0	14	984	309	13300		151		2520	21200		--		38400	53.6	1140	3730	3600	95	48000	7.7	1.026
Mar. 15-31.....	3.6	9.5	1130	333	16400		152		2850	26100		--		46900	65.9	461	4190	4060	110	56200	7.7	1.033
Apr. 1-16.....	.7	11	1310	368	17600	63	155		3290	27800		--		50500	71.2	92.7	4780	4650	111	62600	7.5	1.036
Apr. 17-27.....	.6	9.7	1390	346	15800		146		3370	25200		--		46200	64.8	72.3	4890	4770	98	58200	7.3	1.032
Apr. 28-30.....	2.3	13	1420	478	30400		158		3240	48300		--		83900	121	514	5510	5380	178	92400	7.3	1.060
May 1-29.....	1.9	17	1450	339	18100		122		3580	28700		--		52200	73.5	268	5010	4910	111	65300	7.2	1.036
May 30.....	155	--	--	--	--		107		--	10900		--		--	--	--	1400	1310	--	28700	7.7	1.011
May 31, June 1,5-8	107	17	422	91	4190		147		1020	6630		--		12500	17.1	3610	1430	1310	48	19400	7.6	1.007
June 2-4.....	56.7	18	248	46	2090		127		678	3220		--		6360	8.65	974	808	704	32	10400	8.0	--
June 9-13.....	147	17	168	33	941		151		509	1380		2.0		3120	4.24	1240	554	431	17	5160	7.8	--
June 14-19.....	25.6	19	334	81	2540		150		840	4040		--		7930	10.8	548	1170	1040	32	12600	7.8	1.003
June 20.....	.8	--	--	--	--		76		--	9980		--		--	--	--	2380	2320	--	26200	7.3	1.012
June 21-30, July 1-4.....	.4	23	1430	348	16300		114		3470	26100		--		47700	67.1	46.4	5000	4910	100	58000	6.1	1.034
July 5.....	200	--	--	--	--		105		--	12000		--		--	--	--	1950	1860	--	30900	7.4	1.012
July 6.....	1308	17	140	30	711		148		412	1040		2.5		2430	3.30	8580	473	352	14	4030	7.7	--
July 7-9.....	4280	22	106	17	310		125		299	420		3.8		1240	1.69	14330	334	232	7.4	2140	7.8	--
July 10-17.....	278	19	140	28	661		130		368	1000		2.0		2280	3.10	1710	464	358	13	3850	7.6	--
July 18-21, 23-24.	97.5	20	310	56	1430		127		798	2260		--		4940	6.72	1300	1000	900	20	7900	7.6	--
July 22.....	135	--	--	--	--		95		--	9580		--		--	--	--	2640	2560	--	26000	7.5	1.012
July 25-31.....	10.1	17	586	129	3700		113		1550	5910		--		12000	16.4	327	1990	1900	36	17700	7.4	1.007
Aug. 1-6.....	1.3	12	897	199	6950		101		2330	11100		--		21500	29.6	74.3	3060	2970	55	30300	7.2	1.014
Aug. 7-9.....	.4	16	1210	254	11400		127		2990	18100		--		34000	47.3	43.1	4060	3960	78	44200	7.6	1.024
Aug. 10-20, 28-31.	.6	49	1450	320	15400		119		3410	24700		--		45400	63.7	77.2	4930	4830	95	56500	7.0	1.032
Aug. 21-27.....	14.6	22	1520	384	22200		134		3410	35400		--		63000	89.5	2530	5370	5260	132	72900	7.1	1.045
Sept. 1-15.....	.2	17	1540	360	17800		128		3750	28400		--		51900	73.2	32.2	5320	5220	106	60300	7.0	1.037
Sept. 16-30.....	.2	17	1540	351	18000		132		3730	28700		--		52400	74.0	35.4	5290	5180	108	60600	7.5	1.038
Weighted average	--	18	241	49	1780		128		636	2980		--		5570	7.68	1120	831	726	17	8690	7.7	--
Time-weighted average.....	73.6	16	1020	258	12400		144		2530	19600		--		36100	--	--	3600	3480	29	45400	7.2	--
Tons per day....	--	3.6	48	9	358		26		127	602		--		1120	--	--	--	--	--	--	--	--

BRAZOS RIVER BASIN--Continued

8-820. SALT FORK BRAZOS RIVER NEAR ASPERMONT, TEX.--Continued

Temperature (°F) of water, water year October 1959 to September 1960

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

BRAZOS RIVER BASIN--Continued

8-825. BRAZOS RIVER AT SEYMOUR, TEX.

LOCATION.--At gaging station at bridge on U.S. Highways 277 and 283, 0.8 mile upstream from Wichita Valley Railway bridge, 1 mile southwest of courthouse in Seymour, Baylor County, and at mile 832.
DRAINAGE AREA.--14,490 square miles, approximately, of which 9,240 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: August 1959 to September 1960.
Water temperatures: August 1959 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 14,000 ppm Mar. 1-16; minimum, 1,260 ppm July 6-15.
Hardness: Maximum, 2,580 ppm May 1-4; minimum, 386 ppm Sept. 27-28.
Specific conductance: Maximum daily, 26,200 micromhos Feb. 9; minimum daily, 1,700 micromhos July 9.
Water temperatures: Maximum, 98°F July 27; minimum, 33°F Mar. 4.
REMARKS.--Dashes omitted in potassium (K) column indicate sodium (Na) plus potassium (K) are calculated. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1959 to September 1960 given in WSP 1712.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1-2, 1959....	1.0	24		338	66	1410	13	80		1090	2100	--	--		5080	6.91	13.6	1120	1050	18	7870	7.8
Oct. 3-4, 8-12....	2407	13		192	21	537		98		500	800	--	3.5		2110	2.87	13710	566	486	9.8	3490	7.5
Oct. 5-7.....	2360	18		175	22	339		108		478	478	--	5.0		1570	2.14	10000	527	438	6.4	2500	8.1
Oct. 13-20.....	100	14		322	58	1410		118		896	2180	--	--		4940	6.72	1330	1040	943	19	7800	7.7
Oct. 21-29.....	40.2	16		463	82	2210		111		1400	3360	--	--		7590	10.2	824	1490	1400	25	11500	7.6
Oct. 30-31, Nov. 1, 4-6.....	76.3	11		280	54	1070		116		772	1660	--	2.0		3910	5.32	805	920	825	15	6230	7.5
Nov. 2-3, 7-10....	69.0	11		422	83	1970		132		1160	3100	--	--		6810	9.26	1270	1390	1280	23	10600	7.6
Nov. 11-15.....	38.2	9.9		545	122	3630		163		1390	5800	--	--		11600	15.7	1200	1860	1730	37	17600	7.7
Nov. 16-30.....	18.1	14		547	125	2510		183		1630	3900	--	--		8820	12.0	431	1880	1730	25	13300	7.7
Dec. 1-14.....	10.2	11		538	131	2480		148		1550	3930	--	--		8710	11.8	240	1880	1760	25	13100	7.4
Dec. 15-16, 27-31.	119	10		302	57	1670		156		772	2620	--	--		5510	7.49	1770	988	860	23	8950	7.8
Dec. 17-20, 26....	874	10		232	37	918		121		624	1400	--	4.5		3290	4.47	7760	731	632	15	5370	8.0
Dec. 21-25.....	352	10		152	26	627		128		426	920	--	3.8		2230	3.03	2120	486	381	12	3740	7.6
Jan. 1-10, 1960...	104	9.8		434	96	2610		171		1110	4160	--	--		8500	11.5	2390	1480	1340	30	13300	7.8
Jan. 11-31.....	72.0	11		572	135	3750		175		1510	5970	--	--		12000	16.2	2330	1980	1840	37	17700	7.7

Feb. 1-3,9-13,1960	56.1	13		575	153	4180		150		1590	6650	--	--		13200	18.0	2000	2060	1940	40	19700	7.6
Feb. 4-8.....	114	13		365	83	1970		137		1010	3100	--	--		6610	8.99	2030	1250	1140	24	10500	7.8
Feb. 14-29.....	32.7	14		631	166	3870		179		1760	6160	--	--		12700	17.2	1120	2260	2110	35	18600	7.6
Mar. 1-16.....	27.3	22		644	189	4310		74		1830	6940	0.6	--		14000	19.0	1030	2380	2320	38	20800	6.8
Mar. 17-31.....	20.4	12		635	185	3760		111		1830	6050	.7	--		12500	17.0	688	2340	2250	34	18600	7.1
Apr. 1-13.....	8.5	7.8		606	171	3200	19	101		1950	4970	--	--		11000	15.0	252	2220	2140	30	15900	7.2
Apr. 14-16.....	33.0	13		220	58	1010		161		644	1550	--	1.0		3580	4.87	319	788	656	16	5800	7.9
Apr. 17-30.....	4.8	6.2		557	172	3150		101		2280	4600	--	--		10800	14.6	140	2100	2020	30	15000	7.4
May 1-4.....	6.3	--		--	--			95		--	5210	--	--			--	--	2580	2500	--	17200	7.3
May 5, 8-10.....	21.6	11		238	62	1010		106		736	1550	--	3.0		3660	4.98	213	849	762	15	5960	7.5
May 6-7.....	26.5	16		143	26	417		96		410	610	--	5.4		1670	2.27	119	464	385	8.4	2750	7.7
May 11-28.....	3.1	8.4		488	149	2520		102		1690	3880	--	--		8790	12.0	73.5	1830	1750	26	13300	7.2
May 29-31.....	254	20		320	42	611		91		872	930	--	6.0		2850	3.88	1950	971	896	8.5	4360	7.6
June 1-8.....	408	18		270	42	1000		126		706	1550	--	5.0		3650	4.96	4020	846	743	15	6000	6.9
June 9-10.....	448	21		177	24	305		78		498	438	--	4.8		1510	2.05	1830	540	476	5.7	2360	7.5
June 11-21.....	162	20		335	48	1080		93		948	1640	--	4.0		4120	5.60	1800	1030	954	15	6450	7.5
June 22-30, July 1-5.....	11.1	16		636	131	2770		89		1830	4370	--	--		9800	13.2	294	2130	2060	26	14500	7.4
July 6-15.....	4953	18		150	19	256		103		425	340	--	3.5		1260	1.71	16850	452	367	5.2	1990	7.4
July 16-24.....	497	22		232	40	689		127		616	1060	--	1.0		2720	3.70	3650	744	640	11	4420	7.6
July 25-31.....	144	31		495	81	1970		76		1370	3100	--	--		7080	9.63	2750	1570	1510	22	10800	7.3
Aug. 1-16.....	36.1	26		568	115	2150		72		1640	3410	--	--		7940	10.7	774	1890	1830	22	12000	7.2
Aug. 17-18, 21-23.	55.2	18		420	61	822		85		1190	1260	--	2.0		3820	5.20	569	1300	1230	9.9	5610	7.6
Aug. 19-20.....	57.5	16		269	34	424		76		749	630	--	2.2		2160	2.94	335	811	749	6.5	3270	7.5
Aug. 24-31.....	5.9	15		525	95	1600		85		1540	2480	--	--		6300	8.57	100	1700	1630	17	9300	7.3
Sept. 1-25.....	.9	16		746	158	2530		111		2180	4000	--	--		9680	13.1	23.5	2510	2420	22	14000	7.2
Sept. 26, 29-30...	14.6	10		278	50	852		86		759	1340	--	1.2		3330	4.53	131	899	828	12	5310	7.6
Sept. 27-28.....	72.0	12		115	24	362		82		349	525	--	3.0		1430	1.94	278	386	319	8.0	2420	7.4
Weighed average.	--	17		209	32	649		108		576	975	--	--		2510	3.41	1910	654	565	9.7	3960	7.4
Time-weighted average.....	279	15		480	111	2330		119		1410	3670	--	--		8060	--	--	1660	1570	24	12100	7.3
Tons per day....	--	13		159	24	493		81		438	734	--	--		--	--	--	--	--	--	--	--

BRAZOS RIVER BASIN--Continued

8-825. BRAZOS RIVER AT SEYMOUR, TEX.--Continued

Temperature (°F) of water, water year October 1959 to September 1960

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

8-865. HUBBARD CREEK NEAR BRECKENRIDGE, TEX.

LOCATION.--At gaging station at bridge on U.S. Highway 183, 2.3 miles downstream from Big Sandy Creek, 6.8 miles northwest of Breckenridge, Stephens County, 7 miles upstream from Gonzales Creek, and 8 miles upstream from Clear Fork Brazos River.
DRAINAGE AREA.--1,087 square miles.
RECORDS AVAILABLE.--Chemical analyses: April 1955 to September 1960.
Water temperatures: April 1955 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 5,350 ppm July 1-5; minimum, 142 ppm July 6.
Hardness: Maximum, 1,820 ppm July 1-5; minimum, 99 ppm July 6.
Specific conductance: Maximum daily, 9,270 micromhos July 4; minimum daily, 247 micromhos July 6.
EXTREMES, 1955-60.--Dissolved solids: Maximum, 5,350 ppm July 1-5, 1960; minimum, 118 ppm Feb. 6-8, 1957.
Hardness: Maximum, 1,820 ppm July 1-5, 1960; minimum, 72 ppm Feb. 6-8, 1957.
Specific conductance: Maximum daily, 9,270 micromhos July 4, 1960; minimum daily, 121 micromhos Apr. 27, 1957.
REMARKS.--Dashes omitted in potassium (K) column indicate sodium (Na) plus potassium (K) are calculated. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1959 to September 1960 given in WSP 1712.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1, 1959.....	1230	--		--	--	--	--	110		--	272	--	--		--	--	--	244	154	--	1160	7.8
Oct. 2-4.....	5493	8.8		34	4.2	14	4.7	101		12	29	0.2	2.0		159	0.22	2360	102	19	0.6	281	7.4
Oct. 5-13.....	309	12		40	6.8	38	--	103		21	72	.3	2.5		a260	.35	217	128	43	1.5	436	7.3
Oct. 14-17.....	20.2	13		46	7.0	39	--	99		28	83	--	2.5		268	.36	14.5	144	63	1.4	492	6.9
Oct. 18-25.....	1.0	13		78	14	61	--	155		72	128	--	2.0		444	.60	1.18	252	125	1.7	806	7.7
Oct. 26-31, Nov. 1-10.....	.4	12		122	24	97	--	209		152	200	--	2.0		a761	1.03	.81	403	232	2.1	1220	7.6
Nov. 11-30.....	.3	10		147	35	137	--	185		254	275	--	4.8		954	1.30	.76	511	359	2.6	1660	7.6
Dec. 1-16, 27-31..	.2	9.8		169	42	180	--	161		347	345	.2	7.3		1180	1.60	.62	594	462	3.2	1880	7.6
Dec. 17-26.....	.9	8 8		124	27	128	--	184		141	282	.2	2.2		865	1.18	2.09	420	269	2.7	1390	7.8
Jan. 1-2, 10-11, 15-17, 1960	46.7	8.0		86	17	136	--	132		58	290	.3	2.2		662	.90	83.5	284	176	3.5	1230	7.5
Jan. 3-6, 9, 12-13	155	7.8		80	17	117	--	128		74	240	.3	2.2		601	.82	252	270	165	3.1	1090	7.8
Jan. 7-8, 14.....	149	9.6		122	30	267	--	110		37	622	.3	2.2		1140	1.55	459	428	338	5.6	2170	7.5
Jan. 18-21.....	21.2	13		90	23	177	--	114		42	400	.2	2.8		804	1.09	46.0	319	225	4.3	1560	7.3
Jan. 22-31, Feb. 1-2.....	3.3	8.6		155	41	330	--	132		69	772	.2	3.2		1440	1.96	12.7	555	447	6.1	2740	7.2
Feb. 3-5.....	123	7.4		63	10	106	--	88		38	220	.3	5.9		494	.67	164	198	126	3.3	937	7.1
Feb. 6-15.....	10.3	6.8		128	30	277	--	113		55	632	.2	4.2		1190	1.62	33.0	443	350	5.7	2270	7.2

a Residue at 180°C.

BRAZOS RIVER BASIN--Continued

8-865. HUBBARD CREEK NEAR BRECKENRIDGE, TEX.--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Feb. 16-29, 1960..	1.0	4.2		165	36	316	--	153		108	712	0.2	3.7		1420	1.93	3.82	560	434	5.8	2640	7.4
Mar. 1-15.....	.7	4.8		190	47	369	--	139		119	870	.3	4.2		1670	2.27	3.14	668	554	6.2	3040	7.8
Mar. 16-26.....	69.2	6.0		208	52	383	--	137		145	920	.2	4.8		1790	2.43	334	733	621	6.2	3240	7.7
Mar. 27-31, Apr. 1-3.....	19.8	6.0		99	23	178	4.8	96		44	440	.2	4.2		846	1.15	45.1	342	263	4.2	1630	7.5
Apr. 4-21.....	.4	4.2		156	34	233	--	169		164	512	.4	4.0		1190	1.62	1.27	529	390	4.4	2110	7.8
Apr. 22-25.....	1.4	--		--	--	--	--	172		--	520	--	--		--	--	--	615	474	--	2340	7.7
Apr. 26.....	2330	9.8		67	14	109	--	101		25	245	.2	8.9		529	.72	3330	224	141	3.2	1020	7.7
Apr. 27-28.....	470	9.6		50	8.7	62	--	108		27	124	.3	3.8		338	.46	429	161	72	2.1	636	7.5
Apr. 29-30, May 1-10.....	44.6	9.0		74	16	109	--	124		34	245	.3	3.8		552	.75	66.5	250	148	3.0	1060	7.5
May 11-20.....	3.0	7.8		134	29	179	--	167		144	390	.3	5.0		971	1.32	7.85	454	317	3.7	1750	7.5
May 21-31.....	1.0	6.0		88	19	106	--	166		87	212	.3	2.8		603	.82	1.61	298	162	2.7	1100	7.6
June 1-9.....	1.8	9.0		104	25	126	--	169		124	260	.3	2.0		733	1.00	3.55	362	223	2.9	1310	7.3
June 10.....	2.8	7.0		180	36	399	--	106		35	950	.4	1.5		1660	2.26	12.5	597	510	7.1	3120	7.6
June 11-30.....	.1	8.2		502	114	1260	--	88		118	3020	--	--		5070	6.90	1.35	1720	1650	13	8850	6.6
July 1-5.....	.1	--		--	--	--	--	109		--	3180	--	--		5350	7.28	1.43	1820	1730	--	9220	7.4
July 6.....	1340	8.8		34	3.5	12	--	101		11	20	.4	2.0		142	.19	514	99	16	.5	247	8.0
July 7, 8-13.....	43.5	11		62	11	84	--	112		22	188	.3	2.2		436	.59	51.1	200	108	2.6	821	7.3
July 14-15, 21-31.	5.8	13		68	13	70	--	148		62	133	.3	1.8		434	.59	6.78	223	102	2.0	766	7.3
July 16-20.....	2.7	15		43	6.5	36	--	120		22	62	.3	4.0		248	.34	1.79	134	36	1.4	429	7.7
Aug. 1-15.....	.1	11		84	16	88	--	178		88	162	.3	.8		a557	.76	.14	276	130	2.3	932	7.3
Aug. 16-19, 21-26.	4.5	8.0		78	15	121	--	131		58	248	.4	1.8		594	.81	7.20	256	148	3.3	1090	6.9
Aug. 20.....	59.0	9.0		112	23	290	--	121		28	620	.4	2.5		1140	1.55	182	374	275	6.5	2160	7.6
Aug. 27-31, Sept. 1-15.....	.2	9.4		80	15	90	--	126		108	170	.3	1.2		a586	.80	.30	261	158	2.4	962	7.3
Sept. 16-30.....	2.6	7.4		82	16	98	--	131		95	195	.3	1.5		559	.76	3.91	270	163	2.6	1020	7.2
Weighted average	--	9.1		50	8.6	53	--	105		24	123	--	2.9		320	0.43	68	162	76	1.5	607	7.4
Time-weighted average.....	83	8.7		136	30	223	--	143		115	538	--	3.2		1160	--	--	482	365	4.0	2050	7.3
Tons per day....	--	2.0		11	1.9	12	--	23		5.1	27	--	0.7		--	--	--	--	--	--	--	--

a Residue at 180°C.

BRAZOS RIVER BASIN--Continued

8-865. HUBBARD CREEK NEAR BRECKENRIDGE, TEX.--Continued

Temperature (°F) of water, water year October 1959 to September 1960

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

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BRAZOS RIVER BASIN--Continued

8-882. SALT CREEK NEAR NEWCASTLE, TEX.

LOCATION.--At gaging station at county bridge, 1.0 mile upstream from Oak Creek, 5.0 miles east of Newcastle, Young County, and about 8.5 miles upstream from Lake Graham (revised) dam.
DRAINAGE AREA.--57.9 square miles.
RECORDS AVAILABLE.--Chemical analyses: April 1958 to March 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 1,700 ppm Oct. 19-29; minimum, 82 ppm Oct. 3-4.
Hardness: Maximum, 570 ppm Oct. 19-29; minimum, 34 ppm Oct. 3-4.
Specific conductance: Maximum daily, 3,630 micromhos Oct. 30; minimum daily, 96 micromhos Oct. 3.
EXTREMES, 1958-60.--Dissolved solids: Maximum, 4,350 ppm June 21-30, July 1-5, 1958; minimum, 51 ppm July 18-19, 1959.
Hardness: Maximum, 1,230 ppm June 21-30, July 1-5, 1958; minimum, 22 ppm July 18-19, 1959.
Specific conductance: Maximum daily, 11,000 micromhos June 24, 1958; minimum daily, 72 micromhos July 19, 1959.
REMARKS.--Values reported for sodium (Na) and potassium (K) values are calculated and reported as sodium. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1959 to September 1960 given in WSP 1712. No flow Mar. 1 to Oct. 31.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1-2, 7-9,1959	2.4	13		52	11	88	6.9	111		12	190	0.5	1.5		430	0.58	27.6	174	84	2.9	838	7.9
Oct. 3-4	1,670	18		9.3	2.6	12		47		4.2	10	.4	3.0		82	.11	370	34	0	.9	120	7.3
Oct. 5-6	106	14		26	5.0	39		82		6.2	67	.4	1.5		199	.27	57.0	86	19	1.8	367	7.8
Oct. 10-18	.3	17		110	22	248		132		22	545	.4	4.0		1,030	1.40	.95	365	257	5.7	1,960	7.9
Oct. 19-29	.1	12		166	38	424		140		32	950	.4	4.0		1,700	2.31	.46	570	456	7.7	3,230	8.0
Oct. 30-31, Nov.1, 4, 7-10	13.2	12		30	6.7	53		71		11	104	.3	.2		252	.34	8.98	102	44	2.3	504	7.7
Nov. 2-3, 11-15	.3	12		50	11	103		87		15	214	.3	4.5		453	.62	.40	170	98	3.4	863	7.7
Nov. 5-6	8.0	18		15	4.2	25		56		7.4	38	.4	1.8		138	.19	3.00	55	9	1.5	230	7.6
Nov. 16-30	.1	11		74	18	173		104		16	375	.3	3.8		722	.98	--	258	174	4.7	1,380	7.7
Dec. 1-14, 16	1.0	8.0		103	28	259		123		18	578	.2	1.0		1,060	1.44	2.86	372	271	5.8	2,020	7.6
Dec. 15, 17-19	14.5	8.0		50	11	115		86		14	235	.2	3.8		479	.65	18.8	170	100	3.8	948	7.6
Dec. 20-31	.7	9.9		78	19	213		103		19	445	.3	2.2		837	1.14	1.63	272	188	5.6	1,630	7.3
Jan. 1-4, 1960	.7	7.9		94	20	277		102		28	570	.4	1.0		1,050	1.43	1.98	316	233	6.8	2,010	7.3
Jan. 5, 7-11	9.1	8.7		42	8.9	95		74		11	194	.3	2.5		a427	.58	10.5	142	81	3.5	790	7.4
Jan. 6, 12-13	205	9.8		29	6.2	61		62		18	112	.3	4.2		270	.37	149	98	47	2.7	508	7.3
Jan. 14-23	3.6	11		42	9.4	86		91		16	167	.3	2.2		a410	.56	4.01	144	69	3.1	726	7.2
Jan. 24-31	.2	12		75	16	186		122		31	370	.3	3.8		a804	1.09	.39	253	153	5.1	1,440	7.4
Feb. 1-2, 17-19. 1960	0.1	7.0		114	27	284		153		38	598	0.2	4.2		1,150	1.56	0.34	396	270	6.2	2,210	7.2
Feb. 3-6	260	12		19	3.8	29		55		9.6	48	.3	3.5		152	.21	107	63	18	1.6	275	7.1
Feb. 7-9	.6	14		44	9.6	80		97		15	159	.1	3.5		373	.51	.63	150	70	2.8	720	7.2
Feb. 10-16	.1	10		74	16	154		134		25	315	.1	5.1		665	.90	.20	250	140	4.2	1,280	7.1
Weighted average	b19.5	15		16	3.8	27		54		7.3	42	0.4	3.1		140	0.19	13.8	56	11	1.6	242	--

a Residue at 180°C.

b Mean discharge based on 366 days; mean discharge for 152 days of chemical analyses, 36.4 cfs.

8-886. BRAZOS RIVER AT POSSUM KINGDOM DAM, NEAR GRAFORD, TEX.

LOCATION.--Immediately below Possum Kingdom Dam, 2.6 miles upstream from Loving Creek, 11.3 miles southwest of Graford, Palo Pinto County, and 20 miles upstream from gaging station near Palo Pinto.
DRAINAGE AREA.--22,550 square miles, approximately, of which 9,240 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: January 1942 to September 1960.
Water temperatures: October 1949 to September 1955.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 2,220 ppm Jan. 1-21; minimum, 1,240 ppm Nov. 1-30.
Hardness: Maximum, 600 ppm Jan. 1-21; minimum, 376 ppm Nov. 1-30, Dec. 1-31.
Specific conductance: Maximum daily, 4,170 micromhos Jan. 12; minimum daily, 2,090 micromhos Dec. 23-27.
EXTREMES, 1942-60.--Dissolved solids: Maximum, 2,640 ppm Jan. 1-31, 1956; minimum, 331 ppm Apr. 26-30, May 1-10, 1957.
Hardness: Maximum, 828 ppm Jan. 1-31, 1956; minimum, 135 ppm Apr. 26-30, May 1-10, 1957.
Specific conductance: Maximum daily, 5,720 micromhos Jan. 7, 1956; minimum daily, 494 micromhos May 4, 1957.
Water temperatures (1949-55): Maximum, 76°F Sept. 27-30, 1950; minimum, 45°F on several days in February 1951.
REMARKS.--Dashes omitted in potassium (K) column indicate sodium (Na) plus potassium (K) are calculated. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for gaging station near Palo Pinto for water year October 1959 to September 1960 given in WSP 1712. No appreciable inflow between dam and gaging station except during periods of heavy local rains.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1-31, 1959...	2900	11		123	21	310		110		288	480	--	0.8		1290	1.75	10100	394	304	6.8	2180	7.2
Nov. 1-30.....	293	11		118	20	298		109		288	450	--	.5		1240	1.69	981	376	287	6.7	2130	8.0
Dec. 1-31.....	300	9.6		118	20	305		107		288	462	--	.5		1260	1.71	1020	376	288	6.8	2130	7.6
Jan. 1-21, 1960...	296	9.4		188	32	577		118		416	940	--	.8		2220	3.02	1770	600	503	10	3710	7.5
Jan. 22-31.....	1250	8.8		150	24	396		109		328	640	--	.8		1600	2.18	5400	472	383	7.9	2750	7.5
Feb. 1-29.....	862	11		140	23	388		114		306	620	--	.8		1540	2.09	3580	444	351	8.0	2620	7.8
Mar. 1-31.....	192	9.6		135	24	399		116		292	640	--	.8		1560	2.12	809	436	341	8.3	2650	7.7
Apr. 1-30.....	285	9.0		140	29	429		120		300	700	0.4	3.5		1670	2.27	1290	468	370	8.6	2850	7.5
May 1-31.....	407	9 6		128	20	365		114		286	570	--	.8		1440	1.96	1580	402	308	7.9	2460	7.2
June 1-30.....	172	9 6		125	23	336		114		267	542	.5	.5		1360	1.85	632	406	312	7.2	2350	7.3
July 1-31.....	2087	9 4		125	20	333		116		263	530	.3	.8		1340	1.82	7550	394	299	7.3	2270	7.5
Aug. 1-31.....	422	11		130	22	359		122		278	570	.4	.5		1430	1.94	1630	415	315	7.7	2430	7.7
Sept. 1-30.....	411	11		134	26	365		124		288	590	--	.4		1480	2.01	1640	442	340	7.6	2500	7.5
Weighted average	--	10		129	22	345		114		288	546	--	0.8		1400	1.90	2830	413	319	7.4	2370	7.4
Time-weighted average.....	749	10		133	23	367		115		294	583	--	0.9		1470	--	--	426	332	7.7	2500	7.5
Tons per day....	--	21		261	44	698		230		582	1100	--	1.7		--	--	--	--	--	--	--	--

8-926. BRAZOS RIVER AT WHITNEY DAM, NEAR WHITNEY, TEX.

LOCATION.--Immediately below Whitney Dam, 4.0 miles upstream from Iron Creek, 3.4 miles upstream from gaging station near Whitney, and 7.4 miles southwest of Whitney, Hill County.
DRAINAGE AREA.--26,170 square miles, approximately, of which 9,240 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: October 1947 to May 1948, October 1948 to September 1960.
Water temperatures: October 1947 to May 1948, October 1948 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 831 ppm Sept. 1-30; minimum, 589 ppm Mar. 1-24.
Hardness: Maximum, 280 ppm Sept. 1-30; minimum, 246 ppm Nov. 1-30.
Specific conductance: Maximum daily, 1,530 micromhos Sept. 27; minimum daily, 807 micromhos Oct. 17.
Water temperatures: Maximum, 81°F Aug. 1; minimum, 39°F Feb. 25.
EXTREMES, 1947-60.--Dissolved solids: Maximum, 1,560 ppm Oct. 1-10, 1948; minimum, 183 ppm June 11-20, 1952.
Hardness: Maximum, 542 ppm Oct. 1-10, 1948; minimum, 96 ppm June 11-20, 1952.
Specific conductance: Maximum daily, 2,660 micromhos Oct. 1, 1948; minimum daily, 203 micromhos May 23, 1952.
Water temperatures: Maximum, 92°F July 21, 28, 29, 1957; minimum, freezing point Jan. 28, 29, 1948.
REMARKS.--Dashes omitted in potassium (K) column indicate sodium (Na) plus potassium (K) are calculated. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1959 to September 1960 given in WSP 1712. No appreciable inflow between dam and gaging station except during periods of heavy local rains.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1-31, 1959...	9295	8.8		78	14	160	5.3	115		138	258	--	0.8		739	1.01	18550	252	158	4.4	1240	7.5
Nov. 1-30.....	664	12		77	13	150		122		135	235	--	.5		710	.97	1270	246	146	4.2	1200	7.6
Dec. 1-31.....	1277	11		80	12	151		130		140	230	--	1.2		699	.95	2410	249	142	4.2	1180	7.7
Jan. 1-31, 1960...	2801	15		84	14	145		148		137	225	--	1.0		718	.98	5430	267	146	3.9	1190	7.7
Feb. 1-29.....	1914	10		80	13	109		166		108	170	--	1.5		598	.81	3000	253	117	3.0	1010	7.8
Mar. 1-24.....	968	9.6		79	13	107		169		106	165	--	2.0		589	.80	1540	250	111	2.9	977	7.7
Mar. 25-31.....	760	9.0		90	13	146		179		132	220	--	1.8		732	1.00	1500	278	131	3.8	1210	7.7
Apr. 1-30.....	989	11		82	13	118	3.4	170		114	185	0.3	1.5		667	.91	1780	258	119	3.2	1070	7.4
May 1-31.....	1227	11		76	14	119		148		114	188	--	1.8		634	.86	2100	247	126	3.3	1070	7.4
June 1-30.....	557	10		77	14	125		153		115	195	.4	1.2		661	.90	994	250	125	3.4	1070	7.5
July 1-31.....	1656	11		77	14	134		155		118	205	.3	.8		680	.92	3040	250	123	3.7	1090	7.5
Aug. 1-31.....	556	12		85	16	155		151		132	250	--	2.8		771	1.05	1160	278	154	4.0	1260	7.6
Sept. 1-30.....	580	11		84	17	176		141		147	278	--	1.0		831	1.13	1300	280	164	4.6	1380	7.6
Weighted average	--	10		79	14	145		136		130	229	--	1.1		705	0.95	3580	255	143	3.9	1170	7.6
Time-weighted average.....	1882	11		80	14	138		147		126	217	--	1.3		694	--	--	257	136	3.7	1150	7.6
Tons per day....	--	53		404	70	736		693		661	1160	--	5.6		--	--	--	--	--	--	--	--

BRAZOS RIVER BASIN--Continued

8-926. BRAZOS RIVER AT WHITNEY DAM, NEAR WHITNEY, TEX.--Continued

Temperature (°F) of water, water year October 1959 to September 1960

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

BRAZOS RIVER BASIN--Continued

8-1025. LEON RIVER NEAR BELTON, TEX.

LOCATION.--Temperature recorder at gaging station, 1,400 feet upstream from bridge on State Farm to Market Road 817, one mile upstream from bridge on U.S. Highway 81, 2 miles northeast (revised) of Belton, Bell County, and 3.2 miles downstream from Belton Dam.
DRAINAGE AREA.--3,513 square miles.
RECORDS AVAILABLE.--Water temperatures: March 1957 to September 1960.
EXTREMES, 1959-60.--Water temperatures: Maximum, 87°F Oct. 1; minimum, 45°F Feb. 25, Mar. 8-11.
EXTREMES, 1957-60.--Water temperatures: Maximum, 95°F Sept. 1, 1958; minimum, 45°F Feb. 25, Mar. 8-11, 1960.
REMARKS.--Recorder stopped; range in temperature from Feb. 28 to Mar. 7, 46°F to 48°F, pen not tracing May 1-7. Records of discharge for water year October 1959 to September 1960 given in WSP 1712.

Temperature (°F) of water, water year October 1959 to September 1960

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

8-1065. LITTLE RIVER AT CAMERON, TEX.

LOCATION.--At bridge on U.S. Highway 77, 2,020 feet downstream from gaging station, 0.5 mile upstream from Gulf, Colorado, and Santa Fe Railway Co. bridge, and 2 miles southeast of Cameron, Milam County.
DRAINAGE AREA.--7,000 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1959 to September 1960.
Water temperatures: October 1959 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 607 ppm Sept. 29; minimum, 130 ppm June 25-26.
Hardness: Maximum, 273 ppm June 1-24; minimum, 92 ppm June 25-26.
Specific conductance: Maximum daily, 1,000 micromhos Sept. 29; minimum daily, 191 micromhos June 26.
Water temperatures: Maximum, 89°F on several days during July and August; minimum, 40°F Jan. 19.
REMARKS.--Dashes omitted in potassium (K) column indicate sodium (Na) plus potassium (K) are calculated. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1959 to September 1960 given in WSP 1712.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 29-31, 1959..	5700	14		45	8.5	17		157		20	24	0.4	0.0		a206	0.28	3170	147	18	0.6	359	8.1
Nov. 1-10.....	5981	13		50	8.3	21		171		24	25	.5	4.0		242	.33	3910	159	19	.7	394	7.2
Nov. 11-20.....	6729	13		49	8.5	18		167		21	24	.5	3.0		233	.32	4230	157	20	.6	384	7.3
Nov. 21-30.....	1813	14		71	13	25		245		30	32	.6	8.3		332	.45	1630	230	29	.7	538	7.4
Dec. 1-15.....	1076	12		76	16	32		270		36	40	.3	10		a355	.48	1030	256	34	.9	611	7.5
Dec. 16.....	16300	--		40	3.9			132		--	7.0	--	--		--	--	--	116	7	--	277	8.1
Dec. 17-31.....	5723	13		68	12	21		234		29	26	.3	6.9		a291	.40	4500	219	27	.6	502	7.5
Jan. 1-12, 1960...	4503	13		74	12	25		248		36	28	.3	9.7		322	.44	3910	234	31	.7	542	7.5
Jan. 13-31.....	5824	12		69	10	30		234		33	32	.3	7.9		309	.42	4860	213	21	.9	526	7.6
Feb. 1-6.....	6642	11		63	12	25		211		33	32	.3	7.9		300	.41	5380	206	33	.8	485	7.8
Feb. 7-20.....	4372	12		74	14	29		256		34	36	.3	9.7		346	.47	4080	242	32	.8	561	8.0
Feb. 21-29.....	2592	9.0		80	17	29		273		40	40	.3	12		370	.50	2590	270	46	.8	620	7.9
Mar. 1-13.....	2468	12		76	16	32		254		45	43	.4	12		376	.51	2510	256	48	.9	622	7.5
Mar. 14-31.....	1654	10		76	17	35		265		41	46	.4	12		385	.52	1720	260	43	.9	641	7.5
Apr. 1-14.....	1210	11		74	18	33	2.5	255		43	50	.4	9.8		378	.51	1230	258	49	.9	645	7.4
Apr. 15-28.....	940	13		77	19	39		268		48	54	.4	11		409	.56	1040	270	50	1.0	684	7.5
Apr. 29-30.....	2865	12		55	10	28		178		39	33	.3	5.4		a271	.37	2100	178	32	.9	476	7.5
May 1-15.....	1112	13		74	17	37		253		44	53	.5	8.0		386	.52	1160	254	46	1.0	642	7.7
May 16-31.....	620	10		74	19	43		268		46	57	.4	7.7		402	.55	673	262	42	1.2	683	7.3
June 1-24.....	268	13		70	24	50		276		48	70	.4	7.6		421	.57	305	273	47	1.3	727	7.4

a Calculated from determined constituents.

BRAZOS RIVER BASIN--Continued

8-1065. LITTLE RIVER AT CAMERON, TEX.--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C): Parts per million	Dissolved solids (residue at 180°C): Tons per acre-foot	Dissolved solids (residue at 180°C): Tons per day	Hardness as $CaCO_3$: Calcium, Magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
June 25-26, 1960..	630	13		--	--	10		120		6.8	4.0	0.5	2.2		130	0.18	221	92	0	0.5	191	7.1
June 27-30.....	640	16		70	15	48		218		75	54	.7	8.0		a394	.54	681	236	57	1.4	656	7.1
July 1-21.....	253	14		64	21	57		256		48	74	.4	5.7		436	.59	298	246	36	1.6	692	7.6
July 22-31.....	269	13		54	13	36		207		31	42	.4	5.4		312	.42	227	188	18	1.1	503	7.5
Aug. 1-10.....	132	14		66	21	49		256		46	67	.4	5.8		410	.56	146	251	41	1.3	673	7.6
Aug. 11-20.....	270	13		58	16	46		222		35	61	.4	5.6		365	.50	266	210	28	1.4	600	7.3
Aug. 21-31.....	205	15		62	18	49		245		38	63	.4	6.6		396	.54	219	228	27	1.4	645	7.4
Sept. 1-14.....	129	14		66	20	50		254		50	64	.4	5.6		406	.55	141	246	38	1.4	684	7.6
Sept. 15-26.....	59.8	12		67	24	57		281		52	71	.4	5.8		436	.59	70.3	266	35	1.5	747	7.5
Sept. 27-28, 30...	491	15		52	18	46		209		32	66	.4	6.0		a338	.46	448	204	33	1.4	603	7.6
Sept. 29.....	375	--		--	--			194		--	203	--	--		607	.83	615	236	77	--	1000	7.5
Weighted average	--	12		66	12	27		226		33	34	0.4	7.7		315	0.42	1780	215	30	0.8	520	7.5
Time-weighted average	b2787	13		68	16	37		245		40	49	0.4	7.8		364	--	--	237	36	1.0	606	7.5
Tons per day....	--	70		384	72	155		1310		188	194	2.1	43		--	--	--	--	--	--	--	--

a Calculated from determined constituents.

b Mean discharge based on 366 days; mean discharge for 338 days of chemical analyses, 2,139 cfs.

Temperature (°F) of water, water year October 1959 to September 1960

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

8-1110. NAVASOTA RIVER NEAR BRYAN, TEX.

LOCATION.--At gaging station at bridge on U.S. Highway 190, 2.5 miles upstream from Shepherd Creek and 17 miles northeast of Bryan, Brazos County.
DRAINAGE AREA.--1,439 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1958 to September 1960.
Water temperatures: October 1958 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 1,130 ppm June 25; minimum, 100 ppm Dec. 18-21.
Hardness: Maximum, 355 ppm June 25; minimum, 32 ppm Dec. 18-21.
Specific conductance: Maximum daily, 2,110 micromhos June 25; minimum daily, 125 micromhos Dec. 20.
Water temperatures: Maximum, 87°F July 31; minimum, 40°F Feb. 26, Mar. 3.
EXTREMES, 1958-60.--Dissolved solids: Maximum, 1,130 ppm June 25, 1960; minimum, 72 ppm Feb. 15, 1959.
Hardness: Maximum, 355 ppm June 25, 1960; minimum, 27 ppm Feb. 15, 1959.
Specific conductance: Maximum daily, 2,370 micromhos Sept. 22, 1959; minimum daily, 114 micromhos Feb. 15, 1959.
Water temperatures: Maximum, 89°F Aug. 4, 1959; minimum, 38°F Jan. 4, 5, 1959.
REMARKS.--Dashes omitted in potassium (K) column indicate sodium (Na) plus potassium (K) are calculated. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1959 to September 1960 given in WSP 1712.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct.1,3,5-6,9,1959	246	11		19	4.9	60	5.0	52		22	96	--	0.8		245	0.33	163	68	22	3.2	464	6.8
Oct. 2, 4, 8.....	312	15		12	3.4	36		36		18	52	--	1.0		155	.21	131	44	11	2.4	273	6.8
Oct. 7.....	391	--		--	--			75		--	392	--	--		--	--	--	306	244	--	1430	7.4
Oct. 10-16, 18....	1394	13		22	4.7	80		64		13	129	--	.8		294	.40	1110	74	18	4.0	564	6.9
Oct. 17, 19-23....	743	14		19	4.1	49		67		14	72	--	.8		206	.28	413	64	5	2.7	381	6.8
Oct. 24-31.....	58.8	15		29	6.3	86		85		22	137	--	.8		338	.46	53.6	98	25	3.8	632	7.1
Nov. 1-3.....	220	18		31	6.8	97		106		27	143	--	.8		a391	.53	232	106	18	4.1	663	7.1
Nov. 4-13.....	1402	12		12	2.9	29		44		15	38	--	.8		132	.18	500	42	4	2.0	232	7.1
Nov. 14-20.....	193	16		24	5.5	45		74		30	62	--	.5		219	.30	114	82	19	2.2	393	7.4
Nov. 21-30.....	103	17		38	9.7	71		101		48	110	--	.5		a361	.49	100	135	47	2.7	623	7.7
Dec. 1-15.....	131	19		44	10	69		101		53	115	--	.0		a394	54	139	151	67	2.4	637	7.5
Dec. 16-17, 22....	2827	10		17	3.9	38		41		25	57	--	1.0		172	23	1310	58	21	2.2	306	7.0
Dec. 18-21.....	6618	14		9.0	2.2	20		34		14	23	--	.5		100	14	1790	32	2	1.5	154	6.5
Dec. 23-31.....	1153	18		33	8.4	95		73		38	159	--	.8		388	53	1210	117	55	3.8	709	7.5
Jan. 1-3, 10, 28-31, 1960.....	574	14		35	9.6	65		72		57	106	0.2	.5		a353	48	547	127	66	2.5	580	7.0
Jan. 4-9, 11-27...	1883	12		22	4.8	42		59		28	62	.2	.8		201	27	1020	75	22	2.1	356	6.7
Feb. 1-3.....	281	16		44	9.0	68		88		71	105	.2	.5		357	49	271	147	73	2.4	632	7.2
Feb. 4-11.....	908	13		27	6.9	70		60		43	63	.1	.5		224	30	549	96	46	3.1	399	7.1
Feb. 12-21.....	234	14		44	9.0	68		94		68	104	.2	.2		a379	52	239	147	68	2.4	625	7.3
Feb. 22-29.....	784	11		31	8.9	46		58		59	74	.1	.2		259	35	548	114	63	1.9	463	6.9

a Residue at 180°C.

BRAZOS RIVER BASIN--Continued

8-1110. NAVASOTA RIVER NEAR BRYAN, TEX.--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Mar. 1-7, 1960....	1094	10		25	6.4	48		72		44	62	0.4	0.8		232	0.32	685	89	26	2.2	379	7.3
Mar. 8-17.....	516	13		43	11	113		79		64	188	.4	1.0		a518	.70	722	152	85	4.0	860	7.4
Mar. 18-27.....	150	17		52	16	91		95		94	152	.5	.5		470	.64	190	196	117	2.8	816	7.7
Mar. 28-31.....	817	10		35	11	61		56		70	102	.3	.8		318	.43	701	132	84	2.3	567	7.3
Apr. 1-10.....	162	15		40	13	70	4.4	71		73	124	--	.5		376	.51	164	154	92	2.5	679	7.3
Apr. 11-20.....	70.3	17		53	17	95		96		94	164	--	.5		488	.66	92.5	202	121	2.9	877	7.3
Apr. 21-30.....	121	18		51	14	86		87		99	140	--	.5		452	.61	148	184	109	2.8	799	7.0
May 1, 5-8.....	1221	12		35	9.0	107		69		41	183	--	.5		422	.57	1390	124	64	4.2	809	7.4
May 2-4.....	2033	10		20	5.4	51		48		32	77	--	1.0		220	.30	1210	72	31	2.6	408	7.1
May 9-20.....	104	14		44	12	135		101		54	22	.3	1.2		a561	.76	158	160	72	4.7	1000	7.3
May 21-31.....	75.6	15		47	13	105		101		67	174	--	.8		a477	.65	97.3	171	87	3.5	865	7.3
June 1-8.....	28.9	16		62	16	206		116		73	350	.3	2.5		a840	1.14	65.5	220	120	6.0	1440	7.2
June 9-19.....	39.5	17		40	12	85		96		59	137	.3	1.0		a422	.57	45.0	150	66	3.0	715	7.1
June 20-24, 26....	79.8	12		63	16	157		114		62	285	.4	3.0		a709	.96	153	223	127	4.6	1210	7.0
June 25.....	24.0	--		--	--			119		--	578	--	--		1130	1.54	73.1	355	253	--	2110	7.2
June 27-30.....	824	10		16	4.6	35		36		26	54	.2	1.2		165	.22	367	59	26	2.0	291	6.7
July 1.....	1100	--		--	--			56		--	136	--	--		--	--	--	77	29	--	577	6.8
July 2-14.....	221	12		36	8.8	158		84		28	262	--	1.0		a599	.81	357	126	56	6.1	1040	7.3
July 15-17.....	68.0	13		22	5.8	72		57		30	112	--	1.5		284	.39	52.1	79	28	3.5	528	7.2
July 18-31.....	107	11		18	4.9	42		48		29	61	--	1.0		191	.26	55.1	65	21	2.3	351	6.8
Aug. 1-10.....	6.5	18		26	7.4	56		72		38	83	--	.8		264	.36	4.62	95	31	2.5	468	7.1
Aug. 11-22, 24, 27	39.7	13		29	7.8	60		72		40	95	--	.5		280	.38	30.0	104	41	2.6	507	6.9
Aug. 23, 25-26....	184	12		14	4.1	32		34		29	45	--	1.0		154	.21	76.5	52	22	1.9	278	6.9
Aug. 28-31.....	30.8	13		35	9.7	108		46		40	200	--	.5		429	.58	35.6	128	87	4.2	806	7.0
Sept. 1-7.....	26.1	11		22	5.6	57		52		34	87	--	.8		243	.33	17.0	78	32	2.8	444	7.4
Sept. 8-19.....	5.8	16		22	6.0	41		57		38	58	--	.8		210	.29	3.27	80	28	2.0	372	7.1
Sept. 20-30.....	9.5	11		24	7.8	43		61		42	65	--	.5		223	.30	5.74	92	42	1.9	411	7.0
Weighted average	--	13		24	5.9	55		59		33	83	--	0.7		247	0.33	354	84	33	2.6	438	6.9
Time-weighted average	532	14		33	8.7	76		75		47	116	--	0.8		349	--	--	119	55	3.0	616	7.1
Tons per day....	--	18		34	8.4	79		85		47	120	--	1.0		--	--	--	--	--	--	--	--

a Residue at 180°C.

BRAZOS RIVER BASIN--Continued

8-1110. NAVASOTA RIVER NEAR BRYAN, TEX.--Continued

Temperature (°F) of water, water year October 1959 to September 1960

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

8-1140. BRAZOS RIVER AT RICHMOND, TEX.

LOCATION.--At gaging station at bridge on U.S. Highway 59 in Richmond, Fort Bend County, 925 feet downstream from Texas and New Orleans Railroad Co. bridge, and at mile 93.
DRAINAGE AREA.--44,020 square miles, approximately, of which 9,240 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1960.
Water temperatures: November 1950 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 694 ppm Sept. 18-30; minimum, 155 ppm June 26-27, 29-30.
Hardness: Maximum, 276 ppm Sept. 18-30; minimum, 88 ppm June 26-27, 29-30.
Specific conductance: Maximum daily, 1,220 micromhos Sept. 26; minimum daily, 226 micromhos May 2.
Water temperatures: Maximum, 88°F Oct. 8, July 30, 31, Aug. 1; minimum, 40°F Feb. 23.
EXTREMES, 1945-60.--Dissolved solids: Maximum, 1,400 ppm Sept. 1-10, 1951; minimum, 133 ppm Aug. 27-31, 1947.
Hardness: Maximum, 446 ppm Sept. 1-10, 1948; minimum, 74 ppm Jan. 13-14, 18-20, 1950.
Specific conductance: Maximum daily, 2,540 micromhos Sept. 4, 1951; minimum daily, 187 micromhos Aug. 31, 1947.
Water temperatures (1950-60): Maximum, 91°F Aug. 5, 1951; minimum, 39°F Jan. 4, 1959.
REMARKS.--Dashes omitted im potassium (K) column indicate sodium (Na) plus potassium (K) are calculated. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1959 to September 1960 given in WSP 1712.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1-7, 1959....	5231	12		71	15	121	5.0	161		108	192	--	1.2		638	0.87	9010	238	106	3.4	1070	7.7
Oct. 8-11.....	48450	13		36	5.7	13	3.8	123		20	15	--	2.2		a169	.23	22110	114	13	.5	286	7.6
Oct.12,18-19,26-31	20690	12		46	8.4	39	4.1	132		43	61	--	4.2		292	.40	16310	150	42	1.4	499	7.3
Oct. 13-17, 20-25.	28800	11		58	10	74	4.6	128		70	124	--	2.2		441	.60	34290	186	81	2.4	746	7.3
Nov. 1-10.....	13970	14		46	6.2	30	4.0	138		37	43	--	2.5		262	.36	9880	140	27	1.1	440	7.8
Nov. 11-16, 18-20.	9856	14		50	8.1	30	4.3	156		37	44	--	2.5		278	.38	7400	158	30	1.0	463	7.7
Nov. 17.....	10900	--		--	--			160		--	168	--	--		--	--	--	174	43	--	867	8.2
Nov. 21-30.....	6295	14		56	9.3	32	4.1	180		38	47	--	2.5		304	.41	5170	178	30	1.0	505	8.0
Dec. 1-16.....	3695	15		76	13	54	3.2	227		64	80	--	4.5		440	.60	4390	243	57	1.5	728	7.6
Dec. 17-22.....	23630	13		44	6.3	27	4.0	127		40	38	--	4.2		257	.35	16400	136	32	1.0	413	7.5
Dec. 23-31.....	14500	11		52	7.5	34	4.3	147		44	53	--	3.8		308	.42	12060	160	39	1.2	490	7.0
Jan. 1-10, 1960...	16730	16		57	8.2	35	3.9	165		47	53	--	3.8		310	.42	14000	176	41	1.1	517	7.8
Jan. 11-20.....	18500	14		60	9.0	48	3.7	163		58	73	--	4.2		358	.49	17880	186	52	1.5	606	7.5
Jan. 21-31.....	14520	14		60	9.6	43	3.5	169		54	64	--	4.0		344	.47	13490	189	50	1.4	581	7.4
Feb. 1-10.....	15490	8.8		61	10	36	3.5	176		50	56	0.3	4.5		334	.45	13970	193	49	1.1	552	7.7
Feb. 11-20.....	10900	10		65	11	44	3.0	180		58	71	.3	4.5		379	.52	11150	207	60	1.3	620	7.8
Feb. 21-29.....	10230	12		62	10	30	3.2	188		42	48	.3	4.5		322	.44	8890	200	46	.9	522	7.6
Mar. 1-10.....	8607	12		65	11	45	3.0	176		62	66	.7	5.0		375	.51	8710	207	63	1.4	609	7.6
Mar. 11-20.....	6373	11		70	13	51	3.4	195		60	77	.4	8.1		411	.56	7070	228	68	1.5	669	7.8
Mar. 21-31.....	4224	7.6		72	16	56	2.8	212		70	81	.5	4.8		439	.60	5010	246	72	1.6	719	7.7

Apr. 1-10.....	4104	10		65	13	54	3.4	180		71	82	--	4.0		404	.55	4480	216	68	1.6	672	8.0
Apr. 11-20.....	2642	9.4		64	16	62	3.3	191		75	92	--	2.5		422	.57	3010	226	.69	1.8	726	7.9
Apr. 21-30.....	3983	78		60	15	62	3.4	180		71	91	--	2.5		414	.56	4450	211	.63	1.9	701	7.7
May 1-5.....	23940	12		36	5.0	19	3.4	104		30	25	--	3.5		a185	.25	11960	110	25	.8	321	7.8
May 6-9.....	9062	14		45	7.2	41	4.0	117		51	59	--	2.8		a282	.38	6900	142	.46	1.5	487	7.1
May 10-31.....	3856	11		62	12	76	4.4	159		74	114	--	1.2		443	.60	4610	204	74	2.3	763	7.3
June 1-10.....	1384	13		59	16	76		175		85	103	--	.8		466	.63	1740	213	69	2.3	769	7.6
June 11-24.....	925	15		60	17	90		181		87	124	--	.5		504	.69	1260	220	72	2.6	840	7.6
June 25-28.....	27240	12		42	9.0	46		137		46	58	--	2.0		a282	.38	20740	143	31	1.7	491	7.6
June 26-27, 29-30.	32180	11		29	3.9	17		100		16	18	--	1.2		155	.21	13470	88	6	.8	245	7.4
July 1-8.....	8272	14		32	4.7	29		116		27	26	--	2.2		211	.29	4710	100	4	1.3	311	7.0
July 9-13.....	2570	18		46	7.3	51		133		43	72	--	1.5		a304	.41	2110	145	36	1.8	529	7.2
July 14-19.....	3605	8.8		61	11	83		154		76	122	--	1.0		a439	.60	4270	197	71	2.6	782	7.4
July 20-24, 26-31.	5239	13		51	8.2	67		130		60	97	--	1.5		a362	.49	5120	160	53	2.3	642	7.6
July 25.....	7650	--		--	--	--		107		--	41	--	--		--	--	--	105	18	--	361	7.2
Aug. 1-10.....	1676	15		74	13	106		182		91	159	0.4	.5		570	.78	2580	238	89	3.0	930	7.6
Aug. 11-20.....	1547	16		72	14	96		198		82	139	.3	.2		547	.74	2280	237	74	2.7	881	7.2
Aug. 21-31.....	2150	13		61	12	83		168		74	117	.3	.5		469	.64	2720	202	64	2.5	758	7.3
Sept. 1-5.....	1840	17		48	9.2	53		150		48	71	--	1.0		335	.46	1660	158	35	1.8	555	7.6
Sept. 6-17.....	1122	17		70	15	90		203		81	127	--	3.2		533	.72	1610	236	70	2.5	869	7.7
Sept. 18-30.....	954	17		81	18	134		211		110	198	--	.8		694	.94	1790	276	103	3.5	1140	7.6
Weighted average	--	13		54	9	44	--	151		50	67	--	3.3		329	0.44	8060	170	46	1.4	549	7.5
Time-weighted average	8870	15		60	11	60	--	169		63	88	--	2.8		395	--	--	192	55	1.8	650	7.5
Tons per day....	--	316		1280	216	1060	--	3620		1210	1600	--	80		--	--	--	--	--	--	--	--

a Calculated from determined constituents.

Temperature (°F) of water, water year October 1959 to September 1960

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

COLORADO RIVER BASIN

8-1195. COLORADO RIVER NEAR IRA, TEX.

LOCATION.--At gaging station on right bank 530 feet downstream from bridge on State Highway 350, 3.8 miles downstream from Bluff Creek, 4 miles upstream from Willow Creek, 4.5 miles southwest of Ira, Scurry County, and at mile 825.
DRAINAGE AREA.--3,617 square miles, approximately, of which 2,590 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: November 1958 to September 1960.
Water temperatures: November 1958 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 67,600 ppm May 1-8; minimum, 592 ppm July 5-6.
Hardness: Maximum, 6,420 ppm May 1-8; minimum, 152 ppm Sept. 23-24.
Specific conductance: Maximum daily, 87,800 micromhos May 8; minimum daily, 869 micromhos July 6.
Water temperatures: Maximum, 95°F July 10; minimum, freezing point Nov. 18, Feb. 24, Mar. 5.
EXTREMES, 1958-60.--Dissolved solids: Maximum, 67,600 ppm May 1-8, 1960; minimum, 255 ppm June 4-6, 1959.
Hardness: Maximum, 6,420 ppm May 1-8, 1960; minimum, 102 ppm June 4-6, 1959.
Specific conductance: Maximum daily, 87,800 micromhos May 8, 1960; minimum daily, 450 micromhos June 5, 1959.
Water temperatures: Maximum, 95°F July 10, 1960; minimum, freezing point Dec. 14, 1958, Nov. 18, 1959, Feb. 24, Mar. 5, 1960.
REMARKS.--Where no potassium (K) is reported, sodium (Na) and potassium (K) are calculated and reported as sodium. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1959 to September 1960 given in WSP 1712.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1-2, 1959...	0.8	8.5		581	192	7,700		74		1,510	12,300		--		22,300	30.8	48.2	2,240	2,180	71	31,500	7.5
Oct. 3-4.....	78.0	9.6		61	15	474		70		122	750		3.2		1,470	2.00	310	214	156	14	2,790	8.0
Oct. 5-8.....	.7	7.2		201	62	2,410		89		485	3,840		--		7,050	9.62	14.8	756	684	38	11,600	7.1
Oct. 9-19.....	.1	6.4		362	131	4,690		61		921	7,540		--		13,700	18.8	3.70	1,440	1,390	54	20,900	6.9
Oct. 20-29.....	.1	4.8		586	217	7,980		65		1,530	12,800		--		23,200	32.0	6.26	2,350	2,300	72	32,500	6.9
Oct. 30-31.....	10.4	6.5		278	101	3,930		109		777	6,210		--		11,400	15.6	320	1,110	1,020	51	17,500	7.6
Nov. 1-15.....	.2	4.7		479	164	7,020		109		1,340	11,100		--		20,200	27.8	10.4	1,870	1,780	71	29,200	7.3
Nov. 16-30.....	.2	3.6		590	193	8,880		149		1,770	13,900		--		25,400	35.1	10.3	2,270	2,140	81	35,600	7.3
Dec. 1-14.....	.2	7.3		658	237	9,770		154		1,940	15,400		--		28,100	38.9	12.1	2,620	2,490	83	39,600	7.1
Dec. 15-31.....	2.2	5.0		475	179	6,110		140		1,490	9,600		--		17,900	24.6	104	1,920	1,810	61	26,900	7.0
Jan. 1-4, 6-13, 1960.....	.9	3.0		490	182	6,600		160		1,470	10,400		--		19,200	26.4	47.7	1,970	1,840	65	28,600	7.4
Jan. 5.....	4.8	7.8		230	76	2,810		92		691	4,390		--		8,250	11.2	107	886	811	41	13,500	7.2
Jan. 14-31.....	.4	4.0		572	225	7,680		159		1,790	12,100		--		22,400	30.9	27.2	2,350	2,220	69	32,500	7.2
Feb. 1-10.....	.6	3.7		567	214	7,930		165		1,830	12,400		--		23,000	31.7	35.4	2,290	2,160	72	31,500	7.1
Feb. 11-29.....	.4	3.0		679	279	9,610		158		2,220	15,100		--		28,000	38.7	31.8	2,840	2,710	78	36,900	7.3
Mar. 1-15.....	.4	3.9		639	252	8,950		172		2,110	14,000		--		26,000	36.0	30.9	2,630	2,490	76	36,500	7.4
Mar. 16-31.....	.3	3.7		782	308	11,600		103		2,670	18,100		--		33,500	46.6	28.9	3,220	3,130	89	44,700	6.9
Apr. 1-15.....	.2	4.0		934	377	14,400	42	85		3,210	22,400		--		41,400	57.9	17.9	3,880	3,810	101	52,600	6.4
Apr. 16-30.....	.0	4.8		1,200	500	18,400		98		4,080	28,900		--		53,100	74.9	2.87	5,050	4,970	113	64,000	6.4

May 1-8.....	.1	6.3		1,500	650	23,400		115		5,060	36,900		--		67,600	96.5	--	6,420	6,320	127	78,900	6.8
May 30-31,June 1.	2.3	--		--	--	--		135		--	21,900		--		--	--	--	3,850	3,740	--	50,800	7.6
June 2-5.....	.4	--		--	--	--		76		--	13,200		--		--	--	--	2,340	2,280	--	33,200	6.6
July 5-6.....	268	16		47	10	159		144		58	230		1.5		592	.81	428	158	40	5.5	1,040	7.8
July 7.....	41.0	12		57	9.1	297		104		86	460		2.5		975	1.33	108	180	94	9.6	1,740	7.9
July 8-9.....	4.6	15		158	45	1,610		125		330	2,580		--		4,800	6.53	59.0	579	476	29	8,130	7.8
July 10-13.....	.7	--		--	--	--		95		--	6,210		--		--	--	--	1,200	1,120	--	17,700	7.4
July 14-16.....	4.1	13		190	60	1,990		138		436	3,180		--		5,940	8.08	66.2	720	607	32	9,920	7.9
July 17-18.....	.3	--		--	--	--		87		--	5,120		--		--	--	--	990	918	--	15,000	7.6
July 19-21.....	3.6	14		80	22	903		116		176	1,400		.8		2,650	3.60	25.5	290	195	23	4,610	7.9
July 22-27.....	.1	--		--	--	--		75		--	4,110		--		--	--	--	742	680	--	12,400	7.1
Aug. 9-16.....	.4	7.6		377	115	4,810		51		873	7,740		--		13,900	19.1	15.8	1,410	1,370	56	21,300	6.9
Aug. 24-26.....	.1	11		93	18	710		59		212	1,120		2.0		2,200	2.99	--	306	258	18	3,880	7.5
Sept. 23-24.....	.1	--		--	--	--		57		--	465		--		--	--	--	152	106	--	1,770	6.9
Weighted average	2.47	13		124	40	1,320		127		310	2,060		--		3,930	5.34	26.2	474	370	26	5,900	--

Temperature (°F) of water, water year October 1959 to September 1960

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

COLORADO RIVER BASIN--Continued

8-1210. COLORADO RIVER AT COLORADO CITY, TEX.

LOCATION.--At gaging station at Colorado City, Mitchell County, 3,517 feet upstream from bridge on U.S. Highway 80, 4,100 feet upstream from The Texas and Pacific Railway Co. bridge, 1.6 miles upstream from Lone Wolf Creek, and at mile 796.
DRAINAGE AREA.--4,082 square miles, approximately, of which 2,590 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: May 1946 to September 1954, November 1956 to September 1960.
Water temperatures: November 1952 to September 1954, November 1956 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 28,500 ppm June 9-13; minimum, 453 ppm July 7.
Hardness: Maximum, 3,490 ppm June 9-13; minimum, 122 ppm July 7.
Specific conductance: Maximum daily, 38,700 micromhos June 12; minimum daily, 728 micromhos July 7.
Water temperatures: Maximum, 98°F July 29; minimum, freezing point Mar. 1, 3-4.
EXTREMES, 1946-54, 1956-60.--Dissolved solids: Maximum, 32,800 ppm Apr. 1-10, 1952; minimum, 176 ppm Oct. 26, 1947.
Hardness: Maximum, 4,500 ppm Aug. 9-12, 1946; minimum, 65 ppm Sept. 15-20, 1949.
Specific conductance: Maximum daily, 45,800 micromhos Apr. 1-10, 1952; minimum daily, 245 micromhos May 14, 1957.
Water temperatures (1956-60): Maximum, 98°F July 29, 1960; minimum, freezing point on several days during December, January, and March.
REMARKS.--Dashes omitted in potassium (K) column indicate sodium (Na) plus potassium (K) are calculated. Records of specific conductance of daily samples available in district office at Austin, Tex. Values expressed in parts per million are multiplied by density when computing loads. Records of discharge for water year October 1959 to September 1960 given in WSP 1712.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Density at 20°C
														Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Oct. 1,3,5-6, 1959	134	11	54	12	247	6.2	117		97	378		--		a52400	71.2	18960	5290	5190	7.9	60600	7.5	--
Oct. 2, 4 7-10....	42.0	7.8	101	30	875		99		239	1380		2.5		2680	3.64	304	376	295	20	4760	7.0	--
Oct. 11-27.....	.7	4.2	195	72	2120		67		520	3400		--		6340	8.62	12.0	782	727	33	10700	6.8	--
Oct. 28-31,Nov.1-3	32.9	6.6	102	29	864		78		219	1390		.5		2650	3.60	235	374	310	19	4730	7.2	--
Nov. 4-12.....	3.5	5.2	146	52	1400		90		378	2230		--		4260	5.79	40.2	578	504	25	7320	7.3	--
Nov. 13-20.....	1.5	4.8	232	72	2160		115		578	3460		--		6560	8.95	26.6	875	781	32	11100	6.9	1.003
Nov. 21-30.....	1.0	3.8	301	117	3250		116		830	5200		--		9760	13.2	26.5	1230	1130	40	15900	6.9	1.005
Dec. 1-4.....	1.0	4.0	328	130	3660		128		904	5860		--		10900	14.8	29.5	1350	1250	43	17600	7.0	1.006
Dec. 5-14.....	1.2	4.0	365	149	4170		128		996	6700		--		12400	17.0	40.5	1520	1420	46	19800	7.4	1.008
Dec. 15-31.....	9.8	6.4	271	108	2800		148		729	4480		--		8470	11.5	225	1120	999	36	13900	7.3	1.005
Jan. 1-15, 1960...	6.2	3.8	323	132	3350		164		888	5370		--		10100	13.7	170	1350	1220	40	16000	7.5	1.006
Jan. 16-31.....	3.3	3.8	355	148	3710		184		1030	5910		--		11200	15.2	100	1490	1340	42	17500	7.4	1.007
Feb. 1-29.....	2.3	4.6	436	181	4760		174		1220	7630		--		14300	19.5	89.5	1830	1690	48	20800	6.9	1.009
Mar. 1-15.....	2.4	4.0	466	192	4930		164		1290	7930		--		14900	20.5	97.3	1950	1820	49	22400	7.3	1.009
Mar. 16-31.....	1.1	3.8	495	208	5510		135		1480	8810		--		16600	22.7	49.7	2090	1980	52	24600	7.0	1.010

Apr. 1-13.....	.3	4.5	587	254	6950	55	106	1840	11100	--	20800	28.6	17.0	2510	2420	60	29000	7.0	1.014
Apr. 14-26.....	.0	--	--	--			83	--	12700	--	--	--	--	2970	2900	--	32700	6.6	1.016
Apr. 27-30.....	.6	6.2	245	91	2130		92	644	3450	--	6610	8.99	10.6	986	911	30	10800	6.7	--
May 1-3.....	.1	--	--	--			132	--	5370	--	--	--	--	1510	1400	--	16100	6.9	1.005
May 4-10.....	.1	--	--	--			132	--	10600	--	--	--	--	2590	2480	--	28400	6.6	1.013
May 11-21.....	.1	--	--	--			86	--	5910	--	--	--	--	1460	1390	--	17500	6.5	1.006
May 29.....	.1	--	--	--			55	--	9980	--	--	--	--	2690	2640	--	27700	7.1	1.012
May 30.....	.2	--	--	--			94	--	2880	--	--	--	--	820	743	--	9270	6.2	--
May 31.....	.1	--	--	--			96	--	3710	--	--	--	--	1020	941	--	11700	7.7	1.003
June 1-7.....	.1	--	--	--			117	--	7940	--	--	--	--	2020	1920	--	22100	7.4	1.008
June 8.....	8.6	13	156	57	1280		140	375	2050	--	4000	5.44	92.8	624	509	22	6830	7.3	--
June 9-13.....	2.5	6.7	874	318	9530		77	2470	15300	--	28500	39.5	196	3490	3430	70	38300	7.0	1.018
July 5-6, 8.....	185	14	82	16	470		97	160	740	3.0	1530	2.08	764	270	190	12	2670	7.1	--
July 7.....	1700	10	40	5.2	121		102	45	178	3.8	453	.62	2080	122	38	4.8	728	7.9	--
July 9-20.....	15.9	12	180	60	1590		100	378	2600	--	4870	6.62	209	696	614	26	8220	7.4	--
July 21-31.....	1.7	--	--	--			62	--	4180	--	--	--	--	941	890	--	12700	7.1	1.004
Aug. 1-13.....	.2	--	--	--			64	--	6360	--	--	--	--	1410	1360	--	17000	6.5	1.006
Aug. 14-18.....	.8	--	--	--			51	--	9700	--	--	--	--	2200	2160	--	25500	6.8	1.010
Aug. 19-20.....	71.0	12	44	11	257		76	76	405	1.5	844	1.15	162	155	93	9.0	1600	7.5	--
Aug. 21.....	4.6		--	--			66	--	1090	--	--	--	--	294	240	--	3680	7.6	--
Aug. 22-31.....	12.5	7.4	130	40	1340		50	316	2150	--	4010	5.45	135	489	448	26	6770	6.6	--
Sept. 1-2.....	.2	10	175	58	1990		67	394	3220	--	5880	8.00	3.16	675	620	33	9820	7.5	--
Sept. 3-11.....	.1	--	--	--			43	--	4060	--	--	--	--	837	802	--	12200	6.7	1.003
Sept. 12-14.....	2.3	10	291	121	3510		64	844	5620	--	10400	14.1	64.8	1220	1170	44	16500	7.3	1.005
Sept. 15-30.....	.1	--	--	--			57	--	6800	--	--	--	--	1500	1450	--	19400	6.6	1.007
Weighted average	--	--	--	--	--	--	105	--	1320	--	--	12.21	--	1020	932	--	11600	7.3	--
Time-weighted average	b11.8	--	--	--	--	--	111	--	6010	--	--	--	--	1490	1400	--	17800	6.9	--
Tons per day....	--	--	--	--	--	--	3.6	--	46	--	--	--	--	--	--	--	--	--	--

a Residue at 180°C.
b Mean discharge based on 366 days; mean discharge for 338 days of chemical analyses, 12.8 cfs.

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COLORADO RIVER BASIN--Continued

8-1210. COLORADO RIVER AT COLORADO CITY, TEX.--Continued

Temperature (°F) of water, water year October 1959 to September 1960

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

8-1238. BEALS CREEK NEAR WESTBROOK, TEX.

LOCATION.--At gaging station at bridge on State Highway 163, 1.5 miles downstream from Crystal Creek, 11 miles south of Westbrook, Mitchell County, 12 miles upstream from Colorado River, and 16 miles southwest of Colorado City.
DRAINAGE AREA.--9,903 square miles, approximately, of which 8,930 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: November 1958 to September 1960.
Water temperatures: November 1958 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 14,900 ppm May 5-21; minimum, 155 ppm Nov. 4.
Hardness: Maximum, 5,010 ppm May 5-21; minimum, 93 ppm Oct. 2-3.
Specific conductance: Maximum daily, 21,600 micromhos May 16; minimum daily, 242 micromhos Oct. 3.
Water temperatures: Maximum, 98°F July 28; minimum, 34°F Jan. 19.
EXTREMES, 1958-60.--Dissolved solids: Maximum, 14,900 ppm May 5-21, 1960; minimum, 155 ppm Nov. 4, 1959.
Hardness: Maximum, 5,010 ppm May 5-21, 1960; minimum, 84 ppm July 2, 12, 1959.
Specific conductance: Maximum daily, 21,600 micromhos May 16, 1960; minimum daily 242 micromhos Oct. 3, 1959.
Water temperatures: Maximum, 98°F July 28, 1960; minimum, 33°F Dec. 30, 31, 1958, Jan. 21, 1959.
REMARKS.--Dashes omitted in potassium (K) column indicate sodium (Na) plus potassium (K) are calculated. Values reported for dissolved solids concentrations less than 1,000 ppm are residues at 180°C and for concentrations more than 1,000 ppm are calculated from determined constituents unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1959 to September 1960 given in WSP 1712.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1, 4-5, 1959.	619	10		42	11	52	5.6	130		54	76	--	2.2		328	0.45	548	150	44	1.8	600	7.6
Oct. 2-3.....	2,530	10		28	5.7	27		105		19	32	--	1.8		185	.25	1,260	93	7	1.2	312	7.7
Oct. 6-18.....	5.2	9.9		78	36	208		127		213	332	--	1.8		968	1.32	13.7	342	238	4.9	1,600	7.5
Oct. 30-31.....	624	11		39	9.1	70		106		39	112	--	2.2		338	.46	569	135	48	2.6	606	7.0
Nov. 1-3, 5-7.....	13.6	10		37	9.4	62		100		51	91	--	2.0		316	.43	11.6	131	49	2.4	559	7.1
Nov. 4.....	19.0	--		--	--	--		106		--	16	--	--		155	.21	7.95	95	8	--	258	7.9
Nov. 8-21.....	.7	9.5		74	27	178		144		166	278	--	.8		821	1.12	1.64	296	178	4.5	1,410	7.2
Nov. 22-30.....	.3	4.4		104	44	276		177		258	445	--	.5		1,220	1.66	.89	440	296	5.7	2,120	7.6
Dec. 1-15.....	.5	5.3		120	61	359		204		342	570	--	4.4		1,560	2.12	2.15	550	384	6.6	2,690	7.8
Dec. 16-17.....	56.1	6.2		147	156	753		160		754	1,220	--	12		3,130	4.26	474	1,010	878	10	5,050	7.8
Dec. 18-26.....	6.9	9.8		56	31	197		114		158	305	--	8.7		868	1.18	16.1	267	174	5.2	1,480	7.8
Dec. 27-31.....	1.2	10		130	99	521		197		514	820	--	15		2,210	3.01	7.16	732	570	8.4	3,640	7.5
Jan. 1-4, 7-9, 1960.....	4.0	10		186	227	1,030		245		988	1,690	--	24		4,280	5.82	45.9	1,400	1,200	12	6,830	7.5
Jan. 5-6.....	7.6	6.6		124	150	755		154		728	1,190	--	6.5		3,040	4.13	62.8	926	800	11	4,720	7.6
Jan. 10-11.....	1.8	--		--	--	--		268		--	1,610	--	--		--	--	--	1,320	1,100	--	6,490	7.8
Jan. 12-15.....	2.3	7.0		96	89	486		188		454	730	--	6.0		1,960	2.67	12.3	606	452	8.6	3,210	7.3
Jan. 16-31.....	1.1	8.2		172	227	1,010		239		1,020	1,620	--	10		4,190	5.70	12.8	1,360	1,170	12	6,470	7.3

COLORADO RIVER BASIN--Continued

8-1238. BEALS CREEK NEAR WESTBROOK, TEX.--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Feb. 1-14, 1960...	1.2	4.6		180	313	1,340		188		1,370	2,180	--	--		5,480	7.45	17.3	1,740	1,580	14	8,230	7.8
Feb. 15-29.....	.9	3.8		180	324	1,410		177		1,430	2,280	--	--		5,710	7.77	13.9	1,780	1,640	15	8,530	7.6
Mar. 1-12.....	1.3	6.2		185	306	1,460		240		1,420	2,280	--	--		5,780	7.86	20.9	1,720	1,520	15	8,740	7.4
Mar. 13-31.....	.8	10		185	276	1,400		246		1,350	2,150	--	--		5,490	7.47	12.2	1,600	1,400	15	8,310	7.3
Apr. 1-20.....	.4	11		215	302	1,470	35	291		1,440	2,320	1.7	--		5,940	8.08	6.42	1,780	1,540	15	8,840	7.9
Apr. 27-28.....	690	6.2		42	15	91		114		93	122	.6	0.5		442	.60	823	166	73	3.1	757	7.5
Apr. 29 (12 p.m.-12 m.).....	400	9.4		28	6.6	31		103		27	35	.4	.8		a189	.26	204	97	13	1.4	323	7.6
Apr. 30.....	23.0	10		63	18	170		110		102	282	.4	7.1		a706	.96	43.8	231	141	4.9	1,270	7.9
May 1-2.....	16.5	--		--	--	--		138		--	380	--	--		--	--	--	396	283	--	1,870	7.9
May 3 (12 p.m.-3 p.m.).....	22.4	--		--	--	--		192		--	860	--	--		--	--	--	790	632	--	3,770	8.0
May 4.....	19.0	--		--	--	--		236		--	1,280	--	--		--	--	--	1,110	916	--	5,250	7.6
May 5-21.....	5.0	6.9		395	978	3,520		231		3,810	6,030	1.3	--		14,900	20.5	202	5,010	4,820	22	20,200	7.4
May 30-31.....	36.5	5.4		52	33	218		89		163	348	.6	5.2		902	1.23	88.9	265	192	5.8	1,570	7.3
June 1-7.....	2.7	7.0		82	60	431		91		326	690	--	2.0		1,640	2.23	11.9	451	376	8.8	2,820	7.5
July 5, 7.....	213	12		48	17	117		141		102	157	--	1.0		535	.73	308	190	74	3.7	918	7.6
July 6.....	691	10		32	9.6	49		133		38	54	--	.5		a258	.35	481	119	10	2.0	455	7.6
July 8-9.....	70.0	14		91	61	314		128		320	510	--	4.9		1,380	1.88	261	478	373	6.2	2,330	7.4
July 10-14.....	39.6	10		175	280	1,140		122		1,240	1,900	--	4.5		4,810	6.54	514	1,590	1,490	12	7,470	6.8
July 15-20.....	31.3	11		46	20	169		94		120	255	--	3.0		715	.97	60.4	197	120	5.2	1,220	7.4
July 21-22, 25-26.	5.8	9.4		33	11	88		77		59	137	--	2.0		396	.54	6.15	128	64	3.4	689	7.6
July 23-24, 27-29.	.6	8.2		49	20	160		80		112	262	--	.5		712	.97	1.08	204	139	4.9	1,200	7.3
Aug. 26.....	28.0	12		109	87	536		268		492	740	1.3	19		2,130	2.90	161	630	410	9.3	3,420	7.9
Aug. 27.....	7.7	10		40	24	143		104		136	196	.8	5.7		a606	.82	12.6	198	114	4.4	1,050	7.5
Aug. 28-29.....	.9	11		24	13	80		103		67	91	.7	3.2		a341	.46	.83	114	29	3.3	587	7.7
Sept. 9-14.....	14.3	8.8		34	12	132		91		34	220	--	3.2		527	.72	20.3	134	60	5.0	935	6.8
Weighted average	33.7	9.6		44	26	125		116		117	193	--	2.1		585	0.80	53.2	217	122	3.7	942	--

a Calculated from determined constituents.

COLORADO RIVER BASIN--Continued

8-1238. BEALS CREEK NEAR WESTBROOK, TEX.--Continued

Temperature (°F) of water, water year October 1959 to September 1960

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

COLORADO RIVER BASIN--Continued

8-1239. COLORADO RIVER NEAR SILVER, TEX.

LOCATION.--At gaging station on downstream side of left pier of bridge on Farm to Market Road 2059, 4.7 miles southwest of Silver, Coke County, 11 miles upstream from Pecan Creek, 18.1 miles downstream from Big Silver Creek, and at mile 743.
DRAINAGE AREA.--15,480 square miles, approximately, of which 11,600 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: October 1956 to September 1960.
Water temperatures: October 1956 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 11,100 ppm Apr. 15-25; minimum, 253 ppm Aug. 20.
Hardness: Maximum, 2,870 ppm June 1-8; minimum, 127 ppm Oct. 3.
Specific conductance: Maximum daily, 17,500 micromhos Apr. 22, 25; minimum daily 428 micromhos Oct. 3.
Water temperatures: Maximum, 93°F July 23, 29; minimum, 33°F Mar. 5.
EXTREMES, 1956-60.--Dissolved solids: Maximum, 12,800 ppm Apr. 21-30, 1959; minimum, 180 ppm June 1-4, 1957.
Hardness: Maximum, 2,870 ppm June 1-8, 1960; minimum, 93 ppm Apr. 29-30, 1957.
Specific conductance: Maximum daily, 20,300 micromhos May 1, 1959; minimum daily, 202 micromhos June 2, 1957.
Water temperatures: Maximum, 93°F July 23, 29, 1960; minimum, freezing point Dec. 15, 1958, Feb. 1-3, 5, 1959.
REMARKS.--Dashes omitted in potassium (K) column indicate sodium (Na) plus potassium (K) are calculated. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1959 to September 1960 given in WSP 1712.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1, 1959.....	28.0	--		--	--			60		--	1160	--	--		--	--	--	975	926	--	4840	7.4
Oct. 2.....	1290	10		45	10	85	4.8	128		73	116	--	4.0		411	0.56	1430	154	49	3.0	719	7.7
Oct. 3.....	2720	9.6		40	6.7	40		132		38	45	--	3.2		a260	.35	1910	127	19	1.5	428	7.7
Oct. 4.....	3540	11		44	8.4	129		113		53	195	--	2.5		a512	.70	4890	144	51	4.7	919	7.6
Oct. 5.....	741	15		43	8.6	117		111		60	171	--	2.2		472	.64	944	143	52	4.3	842	8.0
Oct. 6.....	252	13		69	15	265		130		125	405	--	2.8		959	1.30	653	234	127	7.5	1710	7.9
Oct. 7-16.....	27.4	10		89	23	441		112		221	675	--	2.5		1520	2.07	112	316	224	11	2660	8.1
Oct. 17-23.....	3.5	11		137	33	609		141		359	930	--	2.0		2150	2.92	20.2	478	362	12	3640	7.9
Oct. 24-30.....	60.5	11		192	43	961		162		518	1470	--	.5		3280	4.46	536	656	523	16	5400	7.7
Oct. 31.....	1140	15		40	9.2	99		113		49	148	--	2.5		419	.57	1290	138	45	3.7	743	8.2
Nov. 1.....	200	12		54	11	210		108		90	320	--	3.0		753	1.02	407	180	91	6.8	1370	8.2
Nov. 2-17.....	23.8	7.4		94	25	474		108		225	740	--	1.0		1620	2.20	104	338	249	11	2890	7.4
Nov. 18-30.....	2.3	9.4		192	43	684		149		492	1070	--	.8		2560	3.48	15.8	656	534	12	4290	7.3
Dec. 1-16.....	1.7	9.6		260	58	955		171		680	1500	--	.5		3550	4.83	16.2	887	747	14	5830	7.5
Dec. 17-20.....	62.0	8.8		142	42	412		128		398	640	--	1.2		1710	2.33	286	528	423	7.8	2860	7.7

Dec. 21-31.....	13.2	6.2	230	75	1580	131	552	2580	--	--	5090	6.92	181	882	775	23	8300	7.5
Jan. 1-21, 1960...	9.3	4.4	248	76	1380	154	656	2220	--	--	4660	6.34	117	932	806	20	7770	7.4
Jan. 22-31,Feb.1-5	4.6	5.2	288	91	1550	162	780	2500	--	--	5290	7.19	65.6	1090	957	20	8550	7.6
Feb. 6-8.....	5.2	5.2	210	62	986	124	556	1590	--	0.8	3470	4.72	48.6	779	677	15	5780	7.5
Feb. 9-21.....	3.6	4.2	355	109	1790	164	992	2880	--	--	6210	8.45	60.3	1330	1200	21	9760	7.2
Feb. 22-29.....	3.1	5.6	390	131	1820	124	1090	3000	--	--	6500	8.84	54.3	1510	1410	20	10200	7.5
Mar. 1-15.....	4.0	5.6	380	122	1780	120	1090	2900	--	--	6340	8.62	68.5	1450	1350	20	9800	7.6
Mar. 16-31.....	1.7	3.2	443	142	2240	132	1270	3640	--	--	7800	10.5	35.7	1690	1580	24	11900	7.5
Apr. 1-14.....	.6	3.5	502	151	2740	117	1480	4400	--	--	9330	12.6	15.0	1870	1770	28	14000	7.5
Apr. 15-25.....	.1	4.3	572	165	3300	109	1740	5240	--	--	11100	15.0	2.98	2110	2020	31	16200	7.3
Apr. 26-27.....	11.3	15	78	19	262	69	179	420	0.4	7.4	1010	1.37	30.7	272	215	6.9	1840	7.3
Apr. 28-30.....	446	18	58	18	110	128	115	159	.5	9.2	a591	.80	712	218	113	3.2	954	7.6
May 1-2.....	30.5	22	56	12	124	117	105	175	--	6.7	559	.76	46.0	189	93	3.9	968	7.9
May 3-4, 11.....	11.9	19	82	21	205	108	151	345	--	6.1	882	1.20	28.2	291	202	5.2	1570	7.6
May 5-10.....	10.3	14	126	35	434	78	225	780	--	4.0	1660	2.26	46.1	458	394	8.8	2950	7.2
May 12-31.....	2.0	8.2	225	66	1040	95	642	1670	--	4.0	3700	5.03	20.0	833	755	16	6120	7.3
June 1-8.....	10.1	7.5	333	497	2290	135	2380	3730	--	--	9300	12.6	254	2870	2760	19	13300	7.4
June 9-10.....	99.0	16	47	11	44	136	57	58	--	6.2	306	.42	81.7	162	50	1.5	526	8.0
June 11-12.....	2.8	13	50	14	102	98	106	150	--	3.2	486	.66	3.66	182	100	3.3	849	7.8
June 13-17.....	.1	9.4	78	25	253	98	204	390	--	5.1	1010	1.37	.26	298	215	6.4	1770	7.3
June 18-25.....	b.1	--	--	--	--	103	--	800	--	--	--	--	--	545	456	--	3390	7.2
June 26-30.....	b.1	--	--	--	--	100	--	1420	--	--	--	--	--	765	679	--	5490	7.1
July 1-5.....	.1	--	--	--	--	90	--	1740	--	--	--	--	--	905	827	--	6470	7.4
July 6.....	340	13	58	23	164	157	154	215	--	3.0	707	.96	649	239	106	4.6	1230	7.5
July 7.....	880	19	230	66	1640	135	544	2650	--	--	5220	7.10	12400	846	735	25	8700	7.7

a Residue at 180°C.
b Includes days of less than 0.05 cfs.

COLORADO RIVER BASIN--Continued

8-1239. COLORADO RIVER NEAR SILVER, TEX.--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
July 8-9, 1960....	842	10		42	9.2	130		116		71	179	--	4.5		a511	0.69	1160	143	45	4.7	918	7.6
July 10-12.....	75.0	8.4		74	24	298		107		167	472	--	3.5		1100	1.50	223	283	193	7.7	1960	7.3
July 13.....	82.0	13		91	30	445		108		218	710	--	2.2		1560	2.12	345	350	257	10	2760	7.5
July 14.....	161	14		40	8.0	83		93		49	130	--	3.2		373	.51	162	133	54	3.1	674	7.8
July 15, 17-19, 23	41.6	11		65	31	292		98		186	460	--	3.2		1100	1.50	124	290	205	7.5	1910	7.6
July 16.....	77.0	--		--	--	--		119		--	970	--	--		--	--	--	805	703	--	4050	7.7
July 20, 22, 24-31	15.2	6.6		102	42	543		91		278	880	--	2.2		1900	2.58	78.0	427	351	11	3310	7.5
July 21.....	36.0	--		--	--	--		90		--	1620	--	--		--	--	--	585	507	--	5570	7.5
Aug. 1-8.....	.3	--		--	--	--		100		--	980	--	--		--	--	--	490	403	--	3750	7.2
Aug. 9.....	34.0	5.8		110	32	443		94		292	700	--	1.5		1630	2.22	150	406	328	9.6	2790	7.2
Aug. 10-18.....	15.4	9.0		64	17	210		88		137	334	--	1.8		a840	1.14	34.8	230	153	6.0	1450	7.2
Aug. 19.....	37.0	13		85	20	354		106		170	565	--	2.8		1260	1.71	126	294	203	9.0	2260	7.3
Aug. 20.....	335	15		78	17	170		120		139	275	--	2.5		756	1.03	684	264	162	4.5	1320	7.7
Aug. 21.....	174	11		43	8.2	122		105		63	178	--	4.8		482	.66	226	141	54	4.5	860	7.1
Aug. 22-25, 29-31.	18.9	7.6		108	29	702		77		244	1130	--	3.5		2260	3.07	115	388	322	15	3970	6.6
Aug. 26-28.....	21.3	9.2		178	52	1280		70		384	2110	--			4050	5.51	233	658	598	22	6900	7.1
Sept. 1-9.....	5.2	4.6		158	48	1200		77		392	1940	--	5.5		3790	5.15	53.1	592	527	21	6530	6.8
Sept. 10-14.....	34.4	9.0		46	9.8	129		106		83	184	--	5.2		a550	.75	51.0	156	68	4.5	953	7.3
Sept. 15-21.....	.3	7.0		53	14	232		80		151	332	--	3.8		a868	1.18	.69	190	120	7.3	1500	7.2
Sept. 22-30.....	b.1	5.8		90	25	433		84		254	660	--	6.6		1520	2.07	.40	328	256	10	2670	7.2
Weighted average	--	12		74	21	301		121		155	474	--	--		1100	1.50	164	273	173	6.4	1880	7.6
Time-weighted average.....	51.2	7.6		223	75	1130		119		641	1760	--	--		3960	--	--	849	750	16	6170	7.3
Tons per day....	--	1.7		11	3.1	45		17		23	66	--	--		--	--	--	--	--	--	--	--

a Residue at 180°C.
b Includes days of less than 0.05 cfs.

COLORADO RIVER BASIN--Continued

8-1239. COLORADO RIVER NEAR SILVER, TEX.--Continued

Temperature (°F) of water, water year October 1959 to September 1960

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

COLORADO RIVER BASIN--Continued

8-1470. COLORADO RIVER NEAR SAN SABA, TEX.

LOCATION.--At gaging station at bridge on U.S. Highway 190, 5.2 miles downstream from San Saba River, 9.2 miles east of San Saba, San Saba County, and at mile 474.
DRAINAGE AREA.--30,600 square miles, approximately, of which 11,900 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: September 1947 to September 1960.
Water temperatures: September 1947 to September 1960.
Sediment records: December 1950 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 1,300 ppm Aug. 13-14; minimum, 136 ppm Oct. 4-8.
Hardness: Maximum, 393 ppm May 3; minimum, 91 ppm Oct. 4-8.
Specific conductance: Maximum daily, 2,650 micromhos Aug. 13; minimum daily, 199 micromhos Oct. 4.
Water temperatures: Maximum, 90°F July 2, 13, 31; minimum, 39°F Mar. 3.
Sediment concentrations: Maximum daily, 2,870 ppm Apr. 28; minimum daily, 18 ppm Nov. 19-28.
Sediment loads: Maximum daily, 165,000 tons Oct. 6; minimum daily, 7.3 tons Nov. 24.
EXTREMES, 1947-60.--Dissolved solids: Maximum, 1,530 ppm Oct. 15-19, 1947; minimum, 102 ppm Sept. 23-25, 1955.
Hardness: Maximum, 522 ppm Oct. 15-19, 1947; minimum, 71 ppm June 25-30, 1949.
Specific conductance: Maximum daily, 3,420 micromhos Sept. 20, 1947; minimum daily, 161 micromhos Sept. 11, 1952.
Water temperatures: Maximum, 98°F Aug. 3, 1956; minimum, freezing point Jan. 29, 1948, Jan. 30, 1951.
Sediment concentrations (1950-60): Maximum daily, 10,500 ppm Oct. 20, 1956; minimum daily, no flow Aug. 27-31, 1954.
Sediment loads (1950-60): Maximum daily, 535,000 tons May 19, 1955; minimum daily, 0 tons Aug. 27-31, 1954.
REMARKS.--Dashes omitted in potassium (K) column indicate sodium (Na) plus potassium (K) are calculated. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1959 to September 1960 given in WSP 1712.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct.1-3,9-13, 1959	5032	14		48	8.2	33		156		28	46	--	4.0		270	0.37	3670	153	25	1.2	458	7.6
Oct. 4-8.....	36700	12		30	4.0	12		108		10	12	--	2.8		136	.18	13480	91	2	.5	237	7.7
Oct. 14-15.....	10770	12		32	4.8	15		115		12	16	--	3.0		a 152	.21	4420	100	5	.7	266	7.6
Oct. 16-31.....	1040	15		70	17	41		230		50	63	--	6.4		376	.51	1060	244	55	1.1	652	7.6
Nov. 1-10.....	796	12		88	26	69		254		98	113	--	7.7		565	.77	1210	326	118	1.7	929	7.8
Nov. 11-20.....	518	10		90	26	86		246		98	149	--	5.1		608	.83	850	332	130	2.1	1030	7.7
Nov. 21-30.....	392	12		88	27	64		282		72	112	--	6.8		548	.75	580	330	99	1.5	924	7.6
Dec. 1-16.....	407	14		90	27	73		268		91	122	--	9.0		592	.81	651	336	116	1.7	979	7.6
Dec. 17-22.....	915	13		69	22	50		218		66	84	--	7.4		437	.59	1080	262	83	1.3	740	7.9
Dec. 23-31.....	558	16		94	32	77		266		112	135	--	9.4		633	.86	954	366	148	1.8	1040	7.9
Jan. 1-10, 1960...	3152	9.4		62	18	58		165		69	101	--	5.5		435	.59	3700	228	93	1.7	721	7.3
Jan. 11-23.....	1896	9.6		60	18	52		171		54	97	--	4.8		414	.56	2120	224	84	1.5	690	7.3
Jan. 24-31,Feb.1-5	1310	12		69	17	70		213		63	105	--	6.7		481	.65	1700	242	67	2.0	788	7.5
Feb. 6-17.....	1016	12		76	24	56		233		64	104	--	7.6		492	.67	1350	288	97	1.4	805	7.7
Feb. 18-29.....	581	11		80	31	60		256		80	114	--	5.3		538	.73	844	327	117	1.4	893	7.1

Mar. 1-16.....	491	11		83	37	82		255		107	148	--	10		648	.88	859	359	150	1.9	1050	7.6
Mar. 17-31.....	376	8.2		78	37	86		255		105	148	--	8.4		635	.86	645	346	137	2.0	1050	7.6
Apr. 1-18.....	294	7.6		65	39	83	4.1	220		104	150	0.3	6.5		595	.81	472	322	142	2.0	994	7.8
Apr. 19-27.....	233	11		66	38	81		232		98	142	.3	4.9		589	.80	371	321	131	2.0	985	7.7
Apr. 28-30, May 1-2	2738	7.4		59	19	59		140		73	112	.3	4.0		a 403	.55	2980	225	110	1.7	733	7.5
May 3.....	1380	5.6		90	41	148		140		144	315	.4	6.7		a 820	1.12	3060	393	278	3.2	1500	7.5
May 4-13.....	571	9.8		65	22	69		188		74	120	.3	3.0		488	.66	752	252	98	1.9	816	7.8
May 14.....	485	--		--	--			139		--	245	--	--		--	--		336	222	--	1350	7.8
May 15-31.....	503	13		62	17	83		185		64	132	--	1.8		488	.66	663	224	72	2.4	830	7.9
June 1-11.....	178	13		54	23	67		218		52	100	--	1.8		430	.58	207	229	50	1.9	744	8.0
June 12-25.....	237	12		79	35	112		198		164	178	--	1.5		706	.96	452	341	179	2.6	1160	7.7
June 26-30, July 1-5.....	71.5	17		55	37	73		215		101	118	--	1.5		547	.74	106	289	113	1.9	875	7.7
July 6-12, 14.....	86.4	18		44	37	62		218		75	99	--	1.2		464	.63	108	262	83	1.7	771	7.6
July 13, 15, 31, Aug. 1-5.....	135	15		84	39	141		209		166	235	--	1.5		857	1.17	312	370	199	3.2	1340	7.4
July 16-30.....	235	15		67	31	85		202		118	134	--	1.5		586	.80	372	294	128	2.2	936	7.5
Aug. 6-12.....	172	14		85	39	199		191		187	322	--	.8		a 941	1.28	437	372	215	4.5	1610	7.3
Aug. 13-14.....	204	18		78	35	354		176		167	560	--	1.5		a1300	1.77	716	338	194	8.4	2310	7.8
Aug. 15-16.....	254	16		42	17	171		135		86	246	--	.5		647	.88	444	175	64	5.6	1160	7.8
Aug. 17-31.....	141	17		49	22	106		201		62	151	--	1.5		515	.70	196	213	48	3.2	895	7.8
Sept. 1-15.....	82.5	17		48	25	81		207		56	121	--	.8		470	.64	105	223	53	2.4	796	7.7
Sept. 16-23, 26-30	114	14		49	25	72		209		53	110	--	.5		459	.62	141	226	55	2.1	758	7.8
Sept. 24-25.....	704	11		36	10	33		128		26	49	--	1.8		230	.31	437	131	26	1.3	413	7.6
Weighted average	--	12		50	13	40	--	158		42	63	--	4.2		316	0.43	1070	180	50	1.2	534	7.6
Time-weighted average	1250	13		68	27	78	--	215		85	129	--	4.6		536	--	--	280	103	2.0	894	7.6
Tons per day....	--	40		170	45	134	--	535		144	214	--	14		--	--	--	--	--	--	--	--

a Calculated from determined constituents.

Temperature (°F) of water, water year October 1959 to September 1960

Month	Day																													Aver-age
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
October	72	72	71	70	65	65	65	67	65	69	--	--	--	--	--	--	--	--	--	--	61	62	65	64	78	65	60	59	60	62	65	--
November	65	64	67	62	59	55	50	50	51	51	60	58	--	--	48	41	40	41	45	50	50	51	50	50	51	50	49	--	45	48	--	52
December	50	49	47	51	50	--	58	45	47	57	55	51	50	54	45	50	51	50	50	51	48	49	50	51	52	50	55	49	48	48	58	51
January.....	--	50	--	--	48	48	--	41	50	--	--	--	57	--	50	--	53	45	42	41	40	41	42	43	42	45	46	48	48	46	50	--
February.....	48	50	51	50	--	--	50	51	55	55	50	48	46	48	49	48	50	50	49	50	50	50	49	--	48	40	45	46	44	--	--	49
March.....	--	40	39	40	40	42	44	46	50	51	50	50	42	50	55	53	50	49	51	58	57	59	58	59	58	60	61	62	65	61	60	52
April.....	60	61	60	59	61	65	65	67	67	72	--	--	65	67	68	69	70	63	62	70	70	70	71	75	70	69	69	70	62	62	--	66
May.....	62	65	66	69	70	69	68	75	71	70	70	65	66	71	--	75	72	72	75	75	76	78	75	75	77	78	80	77	--	78	75	72
June	76	80	80	82	82	80	81	80	80	80	80	86	81	85	82	80	85	81	81	82	82	80	82	81	78	78	80	80	81	82	--	81
July.....	82	90	83	82	83	82	82	80	83	86	84	84	90	86	80	83	80	80	81	80	79	86	85	85	84	--	82	85	81	--	90	83
August.....	82	80	80	82	82	88	82	82	82	81	78	80	79	80	78	78	79	81	81	80	85	81	82	81	80	81	82	85	80	80	80	81
September	80	80	81	79	85	78	79	80	79	80	73	72	74	72	75	76	77	88	79	78	78	78	79	75	70	70	70	67	70	71	--	76

COLORADO RIVER BASIN--Continued

8-1470. COLORADO RIVER NEAR SAN SABA, TEX.--Continued

Suspended sediment, water year October 1959 to September 1960

Day	OCTOBER			NOVEMBER			DECEMBER		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1..	4030	2520	S 27500	492	67	89	338	C 28	26
2..	8100	2280	S 44600	513	63	87	338	C 28	26
3..	9020	1950	S 52200	639	65	112	315	C 28	24
4..	25400	1930	S 128000	1130	100	305	315	C 28	24
5..	38000	1250	S 127000	900	70	170	300	C 28	23
6..	41800	1470	S 165000	1100	69	205	300	C 28	23
7..	40600	1370	150000	1030	89	248	305	C 28	23
8..	37700	938	S 96100	796	78	168	300	C 28	23
9..	8440	1880	S 32000	716	C 19	37	290	C 28	22
10..	2160	1700	9910	639	C 19	33	290	C 28	22
11..	1660	1000	4480	590	C 19	30	300	C 55	46
12..	1410	700	2660	583	C 19	30	618	C 55	92
13..	5440	2080	S 54300	541	C 19	28	415	C 55	62
14..	16500	2360	S 108000	520	C 19	27	344	C 55	51
15..	5040	1360	S 18700	520	C 19	27	740	278	S 584
16..	2580	620	4320	520	C 19	27	998	135	364
17..	2160	420	2450	499	C 19	26	1030	225	S 695
18..	1560	300	1260	471	C 19	24	1200	217	703
19..	1380	140	522	471	C 18	23	908	140	343
20..	1300	119	418	464	C 18	23	820	109	241
21..	1250	107	361	457	C 18	22	820	90	199
22..	948	56	143	450	C 18	22	724	83	162
23..	812	62	136	422	C 18	20	646	86	150
24..	732	102	202	401	C 18	19	576	108	168
25..	676	78	142	387	C 18	19	548	121	179
26..	618	70	117	387	C 18	19	576	108	168
27..	569	79	121	368	C 18	18	562	--	E 152
28..	541	56	82	344	C 18	17	520	83	117
29..	499	41	55	362	C 32	31	499	82	110
30..	506	47	64	344	C 32	27	478	69	89
31..	506	47	64	--	--	--	618	620	S 1340
Total	261937	--	1030907	17056	--	1933	17021	--	6251
	JANUARY			FEBRUARY			MARCH		
1..	2170	613	S 3260	916	56	138	527	C 33	47
2..	1570	500	2120	908	55	135	555	C 33	49
3..	980	250	662	1740	1200	S 6510	541	C 33	48
4..	836	192	433	3030	945	S 7690	520	C 33	63
5..	3230	875	S 12400	1930	320	1670	513	C 33	46
6..	9260	1690	S 42400	1250	146	493	506	C 30	41
7..	5100	925	S 12900	1200	225	729	499	C 30	40
8..	3470	500	4680	1200	240	778	506	C 30	41
9..	2700	300	2190	1130	190	580	506	C 30	41
10..	2200	210	1250	1060	170	487	499	C 37	50
11..	1930	162	844	998	150	404	485	C 57	75
12..	1660	140	627	956	130	336	471	C 57	72
13..	1615	140	610	924	130	324	443	C 57	68
14..	1740	152	S 723	924	110	274	436	C 57	67
15..	3840	468	S 4890	908	100	245			
16..	2920	448	3530	876	92	218	415	C 57	64
17..	2260	282	1720	764	84	173	401	C 57	62
18..	1930	170	886	632	60	102	387	C 55	57
19..	1660	111	498	604	49	80	374	C 55	56
20..	1430	87	336	590	58	92	374	C 55	56
21..	1300	70	246	583	62	98	374	C 55	56
22..	1200	68	220	569	47	72	362	C 55	54
23..	1160	61	191	590	62	99	344	C 55	54
24..	1120	84	254	590	--	E 80	338	C 55	50
25..	1120	80	242	590	38	61	338	C 57	52
26..	1130	79	241	569	C 50	77	374	C 57	58
27..	1110	78	234	541	C 50	73	415	C 57	64
28..	1070	91	263	569	C 50	77	436	C 57	67
29..	1050	92	261	541	C 50	73	387	C 57	60
30..	980	82	217	--	--	--	368	C 57	57
31..	932	73	184	--	--	--	362	C 57	55
Total	64673	--	99512	27682	--	22168	13485	--	1736

E Estimated.
S Computed by subdividing day.
C Composite period.

COLORADO RIVER BASIN--Continued

8-1470. COLORADO RIVER NEAR SAN SABA, TEX.--Continued

Suspended sediment, water year October 1959 to September 1960--Continued

Day	APRIL			MAY			JUNE		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	362	C 58	57	1430	750	2900	209	117	66
2	350	C 58	55	1930	650	3390	196	116	61
3	350	C 58	55	1380	300	1120	192	68	35
4	326	C 58	51	1110	200	599	173	66	31
5	310	C 58	49	916	130	322	166	70	31
6	305	C 62	51	788	124	264	170	63	29
7	290	C 62	49	700	116	219	173	60	28
8	280	C 62	47	527	104	148	159	40	17
9	275	C 62	46	350	93	88	142	66	25
10	270	C 62	48	295	96	76	139	66	25
11	275	C 62	45	261	90	63	242	S 83	93
12	305	C 62	51	280	80	60	972	A 142	416
13	285	C 66	51	485	122	160	527	60	85
14	280	C 66	50	485	114	149	315	44	37
15	270	C 66	48	485	--	E 150	270	34	25
16	261	C 66	47	478	104	134	213	42	24
17	252	C 66	45	590	140	223	166	50	22
18	243	C 86	56	611	140	231	129	36	13
19	230	C 86	53	520	122	171	123	41	14
20	217	C 86	50	492	185	246	120	44	14
21	217	C 86	50	492	122	162	117	48	15
22	221	C 80	48	485	160	210	99	41	11
23	204	C 80	44	457	143	176	89	42	10
24	200	C 80	43	443	170	203	84	32	7.3
25	217	81	47	492	156	207	89	39	9.4
26	261	73	51	590	120	191	91	214	53
27	332	96	86	576	110	171	96	134	35
28	4290	2870	S 49000	740	129	258	87	225	53
29	4010	2090	S 24900	492	120	159	76	206	42
30	2030	1360	S 7970	368	109	108	65	130	23
31	--	--	--	248	117	78	--	--	--
Total	17718	--	83253	19496	--	12636	5689	--	1349.7

Day	JULY			AUGUST			SEPTEMBER		
1	65	C 81	14	78	C 94	20	112	C 93	28
2	64	C 81	14	71	C 94	18	99	C 93	25
3	60	C 81	13	65	C 94	16	89	C 93	22
4	56	C 81	12	67	C 94	17	82	C 93	21
5	55	C 81	12	67	C 94	17	84	C 93	21
6	55	C 92	14	65	C 71	12	82	C 91	21
7	51	C 92	13	58	C 71	11	84	C 91	21
8	50	C 92	12	58	C 71	11	80	C 91	20
9	51	C 92	13	62	C 71	12	80	C 91	20
10	51	C 92	13	167	C 71	32	78	C 91	19
11	48	C 114	15	387	C 130	136	78	C 78	16
12	47	C 114	15	408	C 130	143	76	C 78	16
13	346	C 114	104	230	C 130	81	73	C 78	15
14	338	C 114	104	177	C 130	62	69	C 78	15
15	300	C 114	92	252	C 130	88	71	C 78	15
16	256	C 97	67	256	C 158	109	69	C 64	12
17	225	C 97	59	200	C 158	85	65	C 64	11
18	401	C 97	105	177	C 158	76	64	C 64	12
19	256	C 97	67	170	C 158	73	64	C 64	11
20	305	C 97	80	166	C 158	71	65	C 64	11
21	305	C 88	72	166	C 141	63	64	65	11
22	320	C 88	76	139	C 141	53	58	60	9.4
23	368	C 88	87	139	C 141	53	64	100	17
24	230	C 88	55	132	C 141	50	973	1930	S 7000
25	180	C 88	43	120	C 141	46	434	725	S 869
26	180	C 74	36	129	C 86	30	338	250	228
27	159	C 74	32	114	C 86	26	228	300	185
28	129	C 74	26	99	C 86	23	148	110	44
29	109	C 74	22	101	C 86	23	132	84	30
30	104	C 74	21	142	C 86	33	117	60	19
31	87	C 74	17	126	C 86	29	--	--	--
Total	5251	--	1325	4588	--	1519	4120	--	8764.4

Total discharge for year (cfs-days)..... 458,266
Total load for year (tons)..... 1,271,354.1

E Estimated.
S Computed by subdividing day.
A Computed from partly estimated-concentration graph.
C Composite period.

COLORADO RIVER BASIN--Continued

8-1470. COLORADO RIVER NEAR SAN SABA, TEX.--Continued

Particle-size analyses of suspended sediment, water year October 1959 to September 1960
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Water temperature (°F)	Sampling point	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters											Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Oct. 4, 1959.....	1500	--		27,600	1,730		53	68	80	86	94	99	100	--				BWC
Oct. 4.....	1500	--		27,600	1,730		23	55	71	84	93	98	100	--				BWN
Jan. 6, 1960.....	0800	42		9,580	1,720		56	59	69	78	90	98	99	100				BWC
Feb. 4.....	0800	50		3,360	769		60	69	78	82	93	98	98	100				BWC

8-1575. WALLER CREEK AT 23rd STREET, AT AUSTIN, TEX.

LOCATION.--Temperature recorder at gaging station on San Jacinto Boulevard, 50 feet upstream from bridge on East 23rd Street in Austin, Travis County, and 2.1 miles upstream from Colorado River.
DRAINAGE AREA.--4.13 square miles.
RECORDS AVAILABLE.--Water temperatures: March 1955 to September 1960.
EXTREMES, 1959-60.--Water temperatures: Maximum, 89°F on several days during July and August; minimum, 45°F Nov. 14, Feb. 25, 29, Mar. 1.
EXTREMES, 1955-60.--Water temperatures: Maximum, 93°F June 28, 1955; minimum, 42°F Jan. 4, 5, 1959.
REMARKS.--Records of discharge for water year October 1959 to September 1960 given in WSP 1712.

Temperature (°F) of water, water year October 1959 to September 1960

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

COLORADO RIVER BASIN--Continued

8-1580. COLORADO RIVER AT AUSTIN, TEX.

LOCATION.--At raw-water intake at Austin City Water Plant, just downstream from Lamar Street bridge in Austin, Travis County, 0.5 mile downstream from Barton Creek and 4.5 miles upstream from gaging station at Montopolis bridge on U. S. Highway 183.
DRAINAGE AREA.--38,400 square miles, approximately, above gaging station, of which 11,900 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1960.
Water temperatures: October 1947 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 286 ppm Sept. 1-30; minimum, 199 ppm Oct. 8-31.
Hardness: Maximum, 181 ppm Sept. 1-30; minimum, 120 ppm Oct. 8-31.
Specific conductance: Maximum daily, 486 micromhos Sept. 18; minimum daily, 304 micromhos Oct. 16.
Water temperatures: Maximum, 80°F Oct. 3; minimum, 49°F Feb. 26, Mar. 7.
EXTREMES, 1947-60.--Dissolved solids: Maximum, 340 ppm Nov. 1-30, 1951; minimum, 184 ppm July 1-31, 1957.
Hardness: Maximum, 214 ppm Jan. 1-31, 1954; minimum, 120 ppm Oct. 8-31, 1959.
Specific conductance: Maximum daily, 591 micromhos July 1, 1948; minimum daily, 243 micromhos Dec. 2, 1953.
Water temperatures: Maximum, 87°F on several days during summer months; minimum, 43°F Jan. 28, 1948, Feb. 4, 1949.
REMARKS.--Dashes omitted in potassium (K) column indicate sodium (Na) plus potassium (K) are calculated. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1959 to September 1960 given in WSP 1712. No appreciable inflow between sampling point and gaging station except during periods of heavy local rains.

Chemical analyes, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1-7, 1959....	12230	9.8		38	16	23	3.6	167		24	38	0.2	1.0		243	0.33	8020	161	24	0.8	428	7.8
Oct. 8-31.....	9247	12		32	9.8	23		126		19	31	.3	2.0		199	.27	4970	120	17	.9	340	7.6
Nov. 1-30.....	4799	10		37	14	27		150		26	41	--	1.8		240	.33	3110	150	27	1.0	411	7.8
Dec. 1-31.....	3425	11		40	14	32		158		28	48	.2	1.2		258	.35	2390	158	28	1.1	445	7.7
Jan. 1-31, 1960...	3136	11		41	15	29		162		26	46	--	1.0		252	.34	2130	164	31	1.0	444	8.0
Feb. 1-29.....	3494	9.2		43	15	28		168		27	44	.2	1.8		261	.35	2460	169	32	.9	451	7.9
Mar. 1-31.....	3292	9.0		43	17	24		169		26	44	.3	2.2		a248	.34	2200	178	39	.8	444	7.7
Apr. 1-30.....	3007	9.0		42	16	26	3.8	173		27	41	.3	1.8		256	.35	2080	171	29	.9	451	7.5
May 1-31.....	2703	10		43	15	29		174		26	42	.3	1.8		260	.35	1900	169	26	1.0	453	7.6
June 1-30.....	2679	11		44	15	28		176		27	42	.3	.0		272	.37	1970	172	28	.9	455	7.6
July 1-31.....	2524	9.0		45	16	26		176		26	44	.3	2.2		265	.36	1810	178	34	.8	452	7.5
Aug. 1-31.....	1966	12		45	16	31		184		26	45	.7	1.8		269	.37	1430	178	28	1.0	454	7.7
Sept. 1-30.....	1211	9.4		46	16	33		182		28	52	.3	.8		286	.39	935	181	32	1.1	488	7.6
Weighted average	--	10		40	14	27	--	160		25	41	0.3	1.6		246	0.33	2340	159	28	0.9	426	7.7
Time weighted average	3500	10		42	15	28	--	167		26	43	0.3	1.5		256	--	--	166	29	0.9	442	7.7
Tons per day....	--	98		380	136	255	--	1520		238	393	2.7	15		--	--	--	--	--	--	--	--

a Calculated from determined constituents.

COLORADO RIVER BASIN--Continued

8-1580. COLORADO RIVER AT AUSTIN, TEX.--Continued

Temperature (°F) of water, water year October 1959 to September 1960

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

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COLORADO RIVER BASIN--Continued

8-1610. COLORADO RIVER AT COLUMBUS, TEX.

LOCATION.--At gaging station at bridge on U.S. Highway 90 at eastern edge of Columbus, Colorado County, 340 feet downstream from Texas and New Orleans Railroad Co. bridge, 2.6 miles downstream from Cummins Creek, and at mile 135.
DRAINAGE AREA.--41,070 square miles, approximately, of which 11,900 square miles is probably noncontributing; 41,170 square miles, approximately, at site "near Eagle Lake."
RECORDS AVAILABLE.--Water temperatures: March 1957 to June 1959.
Sediment records: March 1957 to September 1960.
EXTREMES, 1959-60.--Sediment concentrations: Maximum daily, 2,990 ppm Apr. 29; minimum daily, 23 ppm Sept. 11-16.
Sediment loads: Maximum daily, 389,000 tons Apr. 30; minimum daily, 70 tons Sept. 17.
EXTREMES, 1957-60.--Water temperatures (1957-59): Maximum, 89°F July 27, 28, Aug. 11, 1957; minimum, 36°F Jan. 4, 1959.
Sediment concentrations: Maximum daily, 5,650 ppm Mar. 25, 1957; minimum daily, 6 ppm Jan. 4-15, 1959.
Sediment loads: Maximum daily, 497,000 tons Feb. 23, 1958; minimum daily, 9.7 tons Jan. 4-7, 1959.
REMARKS.--Records of discharge for water year October 1959 to September 1960 given in WSP 1712.

Suspended sediment, water year October 1959 to September 1960

Day	OCTOBER			NOVEMBER			DECEMBER		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	2970	198	1590	12100	1290	S 42900	3740	C 41	414
2	2860	141	1090	8320	800	18000	3740	C 41	414
3	2750	114	846	6400	900	15600	3190	C 41	353
4	2750	167	1240	5440	258	3790	2970	C 41	329
5	3580	225	S 2160	5570	129	1940	3410	C 41	281
6	10300	1550	S 55900	7240	534	10400	3520	C 46	437
7	15300	1670	S 69800	5700	714	11000	3520	C 46	437
8	18100	808	S 40200	5050	200	2730	3520	C 46	437
9	26200	1000	70700	5440	146	2140	3520	C 46	437
10	30300	896	73300	5570	120	1800	3630	C 46	451
11	28200	670	51000	5180	108	1510	3630	C 47	461
12	19300	427	22300	5180	90	1260	3520	C 47	447
13	11400	326	10000	5310	90	1290	3520	C 47	447
14	9650	511	S 12800	5310	94	1350	3410	C 47	433
15	9000	498	12100	6400	198	3420	6130	573	S 12700
16	8850	890	21300	6820	289	5320	9940	651	17500
17	12500	698	23600	6120	202	3340	7240	534	10400
18	11100	372	11100	5570	172	2590	5050	704	9600
19	9780	279	7370	5570	95	1430	4090	414	4570
20	6820	178	3280	5570	99	1490	3850	132	1370
21	6120	172	2840	5440	90	1320	3740	88	889
22	5980	129	2080	5440	88	1290	3740	88	889
23	5980	155	2500	4450	66	793	3740	88	889
24	5840	155	2440	4090	57	629	3630	79	774
25	5570	138	2080	3970	70	750	3630	79	774
26	5570	120	1800	3850	53	551	3630	88	862
27	5440	103	1510	3740	C 49	495	3630	66	647
28	5180	120	1680	3740	C 49	495	3520	75	713
29	4930	114	1520	3740	C 49	495	3520	75	713
30	5310	138	1980	3740	C 49	495	3630	62	608
31	7780	529	S 15900	---	---	---	4710	633	S 14000
Total	305410	---	528006	166060	---	140613	126260	---	83676

S Computed by subdividing day.
C Composite period.

COLORADO RIVER BASIN--Continued

8-1610. COLORADO RIVER AT COLUMBUS, TEX.--Continued

Suspended sediment, water year October 1959 to September 1960--Continued

Day	JANUARY			FEBRUARY			MARCH		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	6540	705	12400	3410	106	976	3850	60	624
2	5310	255	3660	3410	88	810	3850	62	644
3	4570	264	3260	5180	1000	S 20300	4210	55	625
4	3970	286	3070	10100	932	25400	4450	62	745
5	3850	114	1190	9300	668	16800	4090	65	718
6	4330	88	1030	6140	1030	17100	3970	69	740
7	4570	81	999	4570	431	5320	3850	53	551
8	4210	75	853	4210	158	1800	3850	46	478
9	3740	79	798	4090	119	1310	3410	48	442
10	3850	75	780	3970	101	1080	2350	58	368
11	3850	97	1010	3970	88	943	1960	70	370
12	3850	57	593	3850	96	998	2300	55	342
13	3630	62	608	3850	79	821	3630	74	725
14	3850	62	644	4090	99	1090	3970	69	740
15	4450	97	1170	3970	67	718	4090	55	607
16	4450	148	1780	3850	72	748	4090	53	585
17	4210	145	1650	3740	65	656	4090	51	563
18	5050	132	1800	3740	67	677	3970	44	472
19	4570	202	2490	3740	63	636	3970	43	461
20	3970	150	1610	3630	62	608	3970	40	429
21	3850	128	1330	4210	84	955	3970	36	386
22	3970	106	1140	4090	70	773	3970	42	450
23	3970	57	611	3850	62	644	3860	39	405
24	3190	62	534	8240	367	S 9050	3850	39	405
25	2500	61	412	6680	284	5120	3850	45	468
26	2350	52	330	4810	150	1950	3850	40	416
27	2250	56	340	4210	97	1100	3850	53	551
28	2250	80	486	3970	66	707	3970	46	493
29	2150	61	354	3850	44	457	3970	45	482
30	2100	85	482	---	---	---	3970	51	547
31	2600	80	562	---	---	---	4090	46	508
Total	118000	---	47976	136720	---	119547	117110	---	16340

Day	APRIL			MAY			JUNE		
1	3970	50	536	28300	954	S 75300	2150	C 49	284
2	3970	52	557	7710	660	S 14400	2650	C 49	351
3	3970	62	665	4330	312	3650	2860	C 49	378
4	3970	52	557	8960	811	S 19900	2860	C 49	378
5	3970	36	386	5570	418	6290	2860	C 67	517
6	3850	32	333	4450	284	3410	2860	C 67	517
7	3850	38	395	4090	129	1420	2750	C 67	497
8	3740	42	424	4090	86	950	2400	C 67	434
9	3850	39	405	3630	83	813	2750	C 67	497
10	3970	58	622	3190	56	482	2860	C 67	517
11	3850	42	437	2750	42	312	2750	C 67	497
12	3850	40	416	3300	55	490	2750	C 67	497
13	3850	47	489	3410	63	580	2750	C 67	497
14	3850	46	478	3410	56	516	2550	C 67	461
15	3850	47	489	3190	51	439	2300	C 67	416
16	3850	48	499	2650	44	315	2600	C 56	393
17	3850	62	644	2750	53	394	2970	C 56	449
18	3520	49	466	2750	46	342	2860	C 56	432
19	3410	44	405	3300	51	454	2860	C 56	432
20	2970	36	289	3300	53	472	2750	C 56	400
21	3410	50	460	3080	53	441	2550	C 56	386
22	3080	71	590	3080	57	474	2250	C 56	340
23	3300	62	552	2970	51	409	2550	C 56	386
24	3520	114	1080	2600	C 48	337	2750	C 56	416
25	5280	837	12500	2550	C 48	330	22500	2230	S 130000
26	5070	722	S 10400	2750	C 48	356	46300	1800	S 227000
27	3630	546	5350	2860	C 48	371	35900	747	S 94000
28	4090	422	4660	2970	C 48	385	17900	841	S 43400
29	14000	2990	S 322000	2970	C 48	385	5670	709	11200
30	59400	2400	S 389000	2860	C 48	371	4330	396	4630
31	---	---	---	2400	C 48	311	---	---	---
Total	180740	---	756084	136220	---	135099	196840	---	520202

S Computed by subdividing day.
C Composite period.

COLORADO RIVER BASIN--Continued

8-1610. COLORADO RIVER AT COLUMBUS, TEX.--Continued

Suspended sediment, water year October 1959 to September 1960--Continued

Day	JULY			AUGUST			SEPTEMBER		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	3850	233	2420	2970	C 54	433	1560	C 124	522
2	3850	163	1690	2750	C 54	401	1560	C 124	530
3	3740	141	1420	2350	C 54	343	1480	C 124	501
4	3300	114	1020	2250	C 54	328	1560	C 124	522
5	3080	123	1020	2350	C 54	343	1320	C 124	442
6	2750	106	787	2550	C 38	262	1320	C 23	82
7	2650	88	629	2750	C 38	282	1360	C 23	82
8	2970	106	850	2650	C 38	272	1320	C 23	82
9	2970	106	850	2600	C 38	267	1200	C 23	75
10	2970	110	882	2350	C 38	241	1480	C 23	92
11	2860	97	749	2450	C 76	503	1360	C 28	103
12	2750	97	720	2600	C 76	534	1160	C 28	88
13	2750	92	683	2450	C 76	503	856	C 28	65
14	2970	92	738	2500	C 76	513	864	C 28	65
15	3630	101	990	2750	396	S 3700	976	C 28	74
16	3740	233	2350	2450	155	1030	848	28	64
17	3190	176	1520	2750	84	624	1040	25	70
18	3190	154	1330	2550	119	819	1480	95	380
19	2970	119	954	3110	188	S 1180	1640	53	235
20	2750	106	787	2350	193	1220	1520	51	209
21	3630	315	S 3120	2050	221	1220	1320	40	143
22	3520	114	1080	2300	118	733	1200	32	104
23	3300	145	1290	1870	66	333	1320	44	157
24	2750	141	1050	2200	56	333	1360	30	110
25	2860	110	849	2150	52	302	1560	48	202
26	2860	97	749	2150	52	302	1960	66	349
27	2400	99	642	2050	70	387	1870	45	227
28	2650	97	694	2000	75	405	1400	55	208
29	2970	119	954	2200	80	475	2100	105	595
30	2970	97	778	2200	85	505	1820	87	428
31	2860	93	718	1870	80	404	--	--	--
Total	95700	--	34313	74570	--	19197	41814	--	6806

Total discharge for year (cfs-days) 1,695,444
Total load for year (tons) 2,407,859

S Computed by subdividing day.
C Composite period.

COLORADO RIVER BASIN--Continued

8-1610. COLORADO RIVER AT COLUMBUS, TEX.--Continued

Particle-size analyses of suspended sediment, water year October 1959 to September 1960
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Water temperature (°F)	Sampling point	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters											Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Dec. 18, 1959.....	0755	55		5,180	876		75	84	92	93	95	96	97	100	--			SBWC
Jan. 1, 1960.....	0845	53		6,680	912		70	77	80	88	93	96	97	99	100			SBWC
Feb. 4.....	0739	51		10,400	1,200		46	62	66	68	75	80	81	87	90			BWCM
Apr. 30.....	1045	68		64,000	2,370		--	43	51	55	61	64	68	85	99			SPWC
Apr. 30.....	1615	68		61,000	1,710		--	49	55	60	67	69	74	87	99			SPWC
May 1.....	1030	68		35,000	1,220		--	70	76	81	85	88	92	97	100			SPWC
May 1.....	1445	68		25,800	906		--	68	74	78	82	86	90	96	100			SPWC
June 25.....	0958	75		14,800	2,450		--	57	--	69	--	84	91	98	100			SPWC

8-1620. *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 Co. bridge, 12 miles upstream from Jones Creek, and at mile 67.
DRAINAGE AREA.--41,380 square miles, approximately, of which 11,900 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: April 1944 to September 1960.
Water temperatures: October 1945 to September 1948, March 1950 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 279 ppm Sept. 1-30; minimum, 114 ppm June 26-28.
Hardness: Maximum, 188 ppm Sept. 1-30; minimum, 78 ppm May 1-3, June 26-28.
Specific conductance: Maximum daily, 532 micromhos Sept. 18; minimum daily, 181 micromhos June 26.
Water temperatures: Maximum, 88°F on several days during July and August; minimum, 42°F Feb. 26.
EXTREMES, 1944-60.--Dissolved solids: Maximum, 386 ppm Apr. 1-10, 1948; minimum, 108 ppm Sept. 27-29, 1957.
Hardness: Maximum, 231 ppm Feb. 1-10, 1947; minimum, 66 ppm Sept. 27-29, 1957.
Specific conductance: Maximum daily, 765 micromhos Feb. 5, 1957; minimum daily, 146 micromhos Sept. 27, 1957.
Water temperatures (1945-48, 1950-60): Maximum, 95°F July 26, 1954; minimum, 38°F Jan. 17, 1957.
REMARKS.--Dashes omitted in potassium (K) column indicate sodium (Na) plus potassium (K) are calculated. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1959 to September 1960 given in WSP 1712.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1-31, 1959...	9751	11		37	11	19	3.9	140		23	30	--	1.8		216	0.29	5690	138	23	0.7	388	7.4
Nov. 1, 4-30.....	5425	13		42	11	23	3.8	154		27	36	--	2.0		240	.33	3520	150	24	.8	409	7.4
Nov. 2-3.....	10120	13		28	6.2	14	3.7	107		14	18	--	1.8		a152	.21	4150	96	8	.6	260	7.5
Dec. 1-16, 20-31..	3783	12		45	14	26	4.0	168		30	44	--	2.0		268	.36	2740	170	32	.9	457	7.8
Dec. 17-19.....	7440	15		32	7.6	18	4.0	112		22	28	--	1.8		a183	.25	3680	112	20	.7	308	7.6
Jan. 1-31, 1960...	4003	12		45	13	26	3.8	165		32	43	--	2.0		262	.36	2830	166	31	.9	463	7.5
Feb. 1-29.....	4690	7.0		46	13	23	3.5	168		28	38	0.3	3.2		258	.35	3270	168	30	.8	440	7.5
Mar. 1-31.....	3530	9.6		48	15	26	3.7	182		31	42	--	1.8		278	.38	2650	182	33	.8	477	7.8
Apr. 1-30.....	4254	8.8		46	14	26	4.0	179		27	41	.4	2.8		264	.36	3030	172	25	.9	455	7.9
May 1-3.....	27340	14		26	3.2	7.4	3.6	92		9.0	8.5	--	2.8		a120	.16	8860	78	2	.4	194	7.2
May 4-31.....	3392	13		46	12	25	3.9	174		28	39	--	1.5		265	.36	2430	164	21	.8	443	7.5
June 1-25.....	2168	12		40	15	31		165		28	45	.3	1.0		255	.35	1490	162	27	1.1	444	7.4
June 26-28.....	44130	12		26	3.0	9.4		93		8.0	8.0	.3	1.5		a114	.16	13580	78	1	.5	190	7.4
June 29-30,July 1.	9810	24		35	5.8	17		123		26	12	.4	1.8		a182	.25	4820	112	11	.7	272	7.9
July 2-31.....	2711	14		46	14	28		178		29	39	.4	1.2		a260	.35	1900	172	26	.9	442	7.6
Aug. 1-31.....	2089	13		44	14	30		172		26	44	.3	1.2		258	.35	1460	168	27	1.0	441	7.5
Sept. 1-30.....	1195	13		47	17	31		193		29	46	.3	1.0		a279	.38	900	188	30	1.0	491	7.5
Weighted average	--	12		41	11	22	--	153		25	34	--	1.9		231	0.31	2850	148	23	0.8	397	7.5
Time-weighted average	4600	12		44	13	26	--	167		28	40	--	1.8		254	--	--	164	27	0.9	438	7.5
Tons per day....	--	144		502	140	272	--	1890		306	416	--	24		--	--	--	--	--	--	--	--

a Calculated from determined constituents.

COLORADO RIVER BASIN--Continued

8-1620. COLORADO RIVER AT WHARTON, TEX.--Continued

Temperature (°F) of water, water year October 1959 to September 1960

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

LAVACA RIVER BASIN

8-1645. NAVIDAD RIVER NEAR GANADO, TEX.

LOCATION.--At gaging station at bridge on U.S. Highway 59, 170 feet upstream from Texas and New Orleans Railroad Co. bridge, 0.2 mile downstream from Sandy Creek, and 2.2 miles southwest of Ganado, Jackson County.
DRAINAGE AREA.--1,116 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1959 to September 1960.
Water temperatures: October 1959 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 480 ppm Nov. 16-30: minimum, 63 ppm Oct. 31.
Hardness: Maximum, 313 ppm Nov. 16-30; minimum, 30 ppm Oct. 31.
Specific conductance: Maximum daily, 840 micromhos Nov. 26; minimum daily, 98 micromhos Oct. 31.
Water temperatures: Maximum, 90°F June 15, July 12, 27; minimum, 41°F Feb. 12.
REMARKS.--Dashes omitted in potassium (K) column indicate sodium (Na) plus potassium (K) are calculated. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1959 to September 1960 given in WSP 1712.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 26-30, 1959..	53.0	25		77	3.6	43		258		12	53	0.3	0.5		a355	0.48	50.7	207	0	1.3	573	7.8
Oct. 31.....	481	--		9.2	1.7	--		42		--	7.0	--	--		63	.09	81.7	30	0	--	98	7.5
Nov. 1-4.....	3750	19		24	2.6	7.0	5.0	89		5.6	9.0	.2	.5		117	.16	1180	71	0	.4	185	7.2
Nov. 5-6.....	860	33		44	4.1	25		161		9.0	28	.3	.5		223	.30	518	127	0	1.0	346	8.2
Nov. 7-15.....	126	26		98	5.9	46		323		17	60	.4	.5		a432	.59	147	269	4	1.2	690	8.2
Nov. 16-30.....	83.4	24		115	6.3	50		356		20	77	.2	.2		a480	.65	108	313	21	1.2	792	7.5
Dec. 1-9.....	63.9	22		89	6.2	55		284		20	79	.3	.2		412	.56	71.0	248	15	1.5	705	7.6
Dec. 10-14, 20-22.	447	14		34	3.2	26		113		12	34	.2	.8		180	.24	217	98	5	1.1	317	7.1
Dec. 15-19.....	2731	12		17	2.0	14		59		7.6	16	.2	.8		99	.13	730	51	2	.9	166	6.7
Dec. 23-29, 31....	175	23		70	4.9	42		231		16	56	.2	.8		a342	.47	162	194	4	1.3	548	8.1
Dec. 30.....	95.0	--		--	--	--		155		--	40	--	--		--	--	--	131	3	--	370	7.4
Jan. 1-4, 1960....	2762	10		13	1.8	13		46		5.8	16	.3	.8		84	.11	626	40	2	.9	147	7.1
Jan. 5-7, 18.....	524	12		21	2.0	17		70		8.2	22	.3	1.0		118	.16	167	61	3	.9	208	6.8
Jan. 8-17.....	208	26		58	4.8	27		191		14	36	.3	.8		261	.35	147	164	7	.9	496	7.8
Jan. 19-20.....	255	16		38	3.8	25		122		11	38	--	1.0		193	.26	133	110	9	1.0	345	7.4

Jan. 21-31.....	91.3	22	87	5.6	48		277	18	69	.3	1.2	a410	.56	101	240	13	1.3	662	7.7
Feb. 1-2.....	59.5	--	--	--	--		271	--	88	--	--	--	--	--	236	14	--	730	8.0
Feb. 3, 8-12.....	156	16	46	2.6	36		155	13	44	.2	.5	234	.32	98.5	125	0	1.4	399	7.9
Feb. 4-7.....	964	8.2	16	.8	19		52	9.4	21	.3	1.2	102	.14	265	43	0	1.3	176	7.3
Feb. 13-17, 25-27.	1385	8.4	15	.8	17		52	7.4	18	.3	.8	94	.13	352	41	0	1.2	156	7.2
Feb. 18-24, 28-29.	351	13	41	2.7	31		133	12	42	.3	.2	207	.28	196	113	3	1.3	356	7.8
Mar. 1-4.....	278	16	58	4.8	36		187	15	51	.3	1.2	274	.37	206	164	11	1.2	477	7.8
Mar. 5-17.....	124	18	82	6.2	56		262	22	79	.4	1.2	a410	.56	137	230	15	1.6	673	7.9
Mar. 18-31.....	105	16	86	6.3	60		274	23	86	.4	.8	a433	.59	123	240	15	1.7	725	7.6
Apr. 1-12.....	58.2	18	80	6.6	68	4.1	263	23	96	.5	.8	a435	.59	68.3	226	10	2.0	746	7.8
Apr. 13-25.....	47.5	20	86	6.8	69		280	22	97	.5	1.0	a450	.61	57.6	242	12	1.9	763	7.7
Apr. 26-30.....	1229	8.8	28	3.0	22		92	9 6	30	.4	2.2	149	.20	494	82	6	1.1	270	7.2
May 1-6.....	1515	14	36	2.3	18		121	8 0	19	.3	3.0	161	.22	659	99	0	.8	275	7.3
May 7-10.....	178	24	82	4.9	41		270	17	52	.4	.8	a376	.51	181	224	2	1.2	603	7.5
May 11-20.....	96.7	30	92	6.2	61		304	24	80	.4	.8	a464	.63	121	255	5	1.7	758	7.5
May 21-31.....	78.1	25	78	7.0	68		268	23	90	.4	.5	a442	.60	93.1	224	4	2.0	734	7.7
June 1-10.....	41.0	28	52	7.1	68		187	20	93	.4	.0	a368	.50	40.6	158	4	2.3	620	7.5
June 11-24.....	28.2	24	62	7.4	64		214	18	92	.4	.2	a384	.52	29.1	185	9	2.0	646	7.7
June 25-30.....	17240	9.0	14	2.6	6.4	3.0	55	3.8	10	.2	1.2	77	.10	3580	46	0	.4	127	6.6
July 1-3.....	1052	23	30	4.9	17		114	5.6	22	.2	2.0	161	.22	457	95	1	.8	257	7.2
July 4-18.....	207	21	68	6.0	37		231	13	49	.3	.5	a332	.45	186	194	4	1.2	519	7.7
July 19-20.....	2980	11	11	2.2	16		50	4.4	17	.2	1.8	89	.12	716	36	0	1.2	138	7.2
July 21-25.....	1456	19	24	4.3	20		94	6.2	26	.2	1.5	147	.20	578	78	0	1.0	239	6.9
July 26-31.....	190	22	56	5.9	35		199	10	46	.3	.5	294	.40	151	164	0	1.2	461	7.2
Aug. 1-13.....	271	25	44	7.1	37		165	11	50	.3	.8	a272	.37	199	139	3	1.4	433	7.1
Aug. 14-17.....	5065	13	16	1.8	10		61	1.4	12	.2	.8	85	.12	1160	47	0	.6	146	7.0
Aug. 18-22.....	1321	20	24	4.1	20		97	4.4	24	.3	.8	146	.20	521	77	0	1.0	240	7.0

a Residue at 180°C.

8-1645. NAVIDAD RIVER NEAR GANADO, TEX.--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Aug. 23-29, 1960..	479	22		34	5.7	26		130		6.6	35	0.3	0.5		194	0.26	251	108	1	1.1	329	7.1
Aug. 30-31.....	3365	--		--	--	--		66		--	15	--	--		--	--	--	52	0	--	154	7.2
Sept. 1-2.....	1425	21		22	4.2	18		89		4.4	23	.2	1.0		138	.19	531	72	0	.9	218	7.2
Sept. 3-10.....	374	19		33	6.9	26		123		8.0	40	.2	.8		a208	.28	210	111	10	1.1	330	6.8
Sept. 11-20.....	170	18		41	9.8	37		160		12	56	.2	.8		a263	.36	121	143	12	1.3	440	7.1
Sept. 21-30.....	106	20		55	8.9	51		208		13	70	.3	.5		a334	.45	95.5	174	3	1.7	563	7.1
Weighted average	--	13		24	3.0	15	--	86		6.3	20	0.2	1.1		129	0.17	273	72	2	0.7	213	6.8
Time-weighted average	b795	20		59	5.4	42	--	199		15	57	0.3	0.8		307	--	--	169	7	1.4	508	7.3
Tons per day....	--	28		51	6.4	33	--	184		13	43	0.5	2.3		--	--	--	--	--	--	--	--

a Residue at 180°C.
b Mean discharge based on 365 days; mean discharge for 341 days of chemical analyses, 798 cfs.

Temperature (°F) of water, water year October 1959 to September 1960

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

8-1765. GUADALUPE RIVER AT VICTORIA, TEX.

LOCATION.--At gaging station at bridge on U.S. Highway 59 in Victoria, Victoria County, 1,300 feet upstream from Texas and New Orleans Railroad bridge, 10 miles upstream from Coleto Creek, and at mile 51.
DRAINAGE AREA.--5,161 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1946, October 1948 to September 1960.
Water temperatures: November 1950 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 404 ppm July 5-20; minimum, 167 ppm June 26-30.
Hardness: Maximum, 258 ppm Mar. 11-20; minimum, 110 ppm June 26-30.
Specific conductance: Maximum daily, 748 micromhos Nov. 16; minimum daily, 262 micromhos June 27.
Water temperatures: Maximum, 87°F May 19; minimum, 42°F Feb. 12.
EXTREMES, 1945-46, 1948-60.--Dissolved solids: Maximum, 1,040 ppm Jan. 11-17, 1946; minimum, 134 ppm Oct. 17-21, 1957.
Hardness: Maximum, 428 ppm Jan. 11-17, 1946; minimum, 86 ppm Oct. 23-31, 1956.
Specific conductance: Maximum daily, 1,950 micromhos Jan. 11-17, 1946; minimum daily, 184 micromhos Oct. 24, 1956.
Water temperatures (1950-60): Maximum, 90°F Aug. 4, 27, 1952; minimum, 40°F Feb. 1-2, 1951.
REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1-3, 1959....	735	20		58	17	26	2.2	232		27	38	--	3.2		312	0.42	619	214	24	0.8	515	7.7
Oct. 4-16.....	4163	16		46	9.2	13	3.4	165		19	18	--	4.0		220	.30	2470	153	18	.5	354	7.6
Oct. 17-31.....	1421	18		70	14	22	2.8	249		26	36	--	6.3		335	.46	1290	232	28	.6	532	7.6
Nov. 1-30.....	1299	18		70	17	27	2.9	262		32	41	--	6.0		346	.47	1210	244	29	.8	577	8.2
Dec. 1-10.....	1024	17		65	19	25	2.1	255		31	38	--	5.5		a328	.45	907	240	31	.7	577	7.7
Dec. 11-20.....	1120	14		--	18	26	2.3	--		31	40	--	5.2		--	--	--	--	--	--	597	--
Dec. 21-31.....	1191	15		73	18	25	2.3	273		31	38	--	5.7		a342	.47	1100	256	32	.7	585	7.7
Jan. 1-15, 1960...	1459	15		69	16	25	2.3	256		32	36	--	5.6		a327	.44	1290	238	28	.7	571	7.7
Jan. 16-31.....	1404	16		74	17	25	2.2	270		34	38	--	5.3		a344	.47	1300	254	32	.7	589	7.8
Feb. 1-15.....	1583	14		70	17	25	2.3	255		34	36	--	5.7		331	.45	1410	244	35	.7	566	7.8
Feb. 16-29.....	1429	10		70	18	24	1.8	267		30	36	--	5.3		330	.45	1270	248	29	.7	570	7.9
Mar. 1-10.....	1295	13		70	16	26	2.1	257		31	40	--	5.7		345	.47	1210	240	29	.7	572	7.6
Mar. 11-20.....	1188	15		72	19	29	2.0	267		37	46	--	5.2		372	.51	1190	258	39	.8	614	7.4
Mar. 21-31.....	1135	9.0		60	19	28	1.9	239		33	43	--	4.3		325	.44	996	228	32	.8	558	7.4
Apr. 1-14.....	1192	14		61	19	27	2.4	240		32	39	0.3	4.8		323	.44	1040	230	33	.8	546	7.8

a Calculated from determined constituents.

GUADALUPE RIVER BASIN--Continued

8-1765. GUADALUPE RIVER AT VICTORIA, TEX.--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Apr. 15-27, 1960..	1098	15		66	19	26	2.4	261		30	38	0.4	4.8		332	0.45	984	242	28	0.7	563	7.8
Apr. 28-30.....	2683	13		52	12	22	3.7	190		26	32	.4	3.8		a258	.35	1870	179	23	.7	445	7.6
May 1-6.....	6963	11		43	6.1	16	4.3	141		27	20	--	1.5		201	.27	3780	132	16	.6	344	7.5
May 7-11.....	1906	18		60	11	31	4.3	198		37	48	--	3.0		316	.43	1630	194	32	1.0	534	7.4
May 12-31.....	1142	16		73	18	34	2.8	270		35	54	--	4.2		374	.51	1150	256	34	.9	645	7.6
June 1-10.....	832	16		54	20	38		226		35	52	.3	3.2		351	.48	788	216	31	1.1	565	7.5
June 11-25.....	684	14		52	19	34		216		32	48	.3	3.0		316	.43	584	208	31	1.0	531	7.4
June 26-30.....	13410	13		34	6.0	17		124		16	18	.3	2.0		a167	.23	6050	110	8	.7	286	7.2
July 1-2.....	16250	22		40	4.8	15		135		21	12	.4	1.2		a182	.25	7990	120	9	.6	283	7.6
July 3-4.....	2615	--		--	--	--		163		--	22	--	--		--	--	--	142	8	--	360	7.8
July 5-20.....	1531	21		76	16	46		274		37	64	.3	2.2		404	.55	1670	256	31	1.3	660	7.5
July 21-31.....	1770	18		63	14	32		228		28	46	.3	3.2		328	.45	1570	214	27	.9	537	7.2
Aug. 1-10.....	951	24		62	18	33		250		30	44	--	2.8		350	.48	899	228	23	.9	565	7.6
Aug. 11-18.....	1524	24		59	16	30		237		26	39	--	2.5		326	.44	1340	213	19	.9	519	7.6
Aug. 19-31.....	2635	17		50	11	17		190		19	20	--	4.2		246	.33	1750	170	14	.6	388	7.7
Sept. 1-15.....	1262	19		67	15	21		244		23	32	.3	4.7		314	.43	1070	228	28	.6	513	7.3
Sept. 16-30.....	920	18		66	17	26		254		28	36	.3	3.8		328	.45	815	234	26	.7	548	7.2
Weighted average	1764	16		58	13	25		215		27	33	--	3.9		288	0.39	1370	198	22	0.8	481	--

a Calculated from determined constituents.

GUADALUPE RIVER BASIN--Continued

8-1765. GUADALUPE RIVER AT VICTORIA, TEX.--Continued

Temperature (°F) of water, water year October 1959 to September 1960

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

GUADALUPE RIVER BASIN--Continued

8-1885. SAN ANTONIO RIVER AT GOLIAD, TEX.--Continued

LOCATION.--At gaging station at bridge on U.S. Highway 183, 1.3 miles southeast of courthouse in Goliad, Goliad County, and 10 miles upstream from Manahuilla Creek.
DRAINAGE AREA.--3,918 square miles.
RECORDS AVAILABLE.--Chemical analyses: September 1945 to September 1946, September 1958 to September 1960.
Water temperatures: September 1958 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 726 ppm June 11-24; minimum, 156 ppm July 21.
Hardness: Maximum, 356 ppm June 11-24; minimum, 90 ppm July 21.
Specific conductance: Maximum daily, 1,140 micromhos Nov. 19, June 22-23; minimum daily, 224 micromhos June 27.
Water temperatures: Maximum, 88°F July 12-14; minimum, 47°F Feb. 25, Mar. 2, 3.
EXTREMES, 1945-46, 1958-60.--Dissolved solids: Maximum, 808 ppm Sept. 18, 1959; minimum, 156 ppm July 21, 1960.
Hardness: Maximum, 362 ppm Mar. 21-31, 1959; minimum, 90 ppm July 21, 1960.
Specific conductance: Maximum daily, 1,390 micromhos Apr. 3, 1959; minimum daily, 208 micromhos Apr. 24, 1946.
Water temperatures (1958-60): Maximum, 88°F July 12-14, 1960; minimum, 45°F Jan. 4, 1959.
REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1-5, 1959....	295	23		83	19	89	7.8	270		86	116	0.6	9.9		a567	0.77	452	285	64	2.3	958	8.0
Oct. 6-10.....	2352	14		37	5.4	31		130		32	26	.5	6.2		225	.31	1430	114	8	1.3	368	7.7
Oct. 11-21.....	446	20		73	17	61		230		79	75	.5	8.9		464	.63	559	252	64	1.7	754	7.7
Oct. 22-31.....	291	21		93	21	80		291		99	100	.5	10		590	.80	464	318	79	1.9	922	7.8
Nov. 1, 5-10.....	337	22		92	19	87		290		97	96	.4	12		584	.79	531	296	58	2.2	919	8.2
Nov. 2-4.....	787	--		--	--	--		--		--	--	--	--		--	--	--	--	--	--	--	--
Nov. 11-20.....	351	22		97	23	84		306		99	108	.6	14		621	.84	589	336	85	2.0	1000	7.9
Nov. 21-30.....	366	17		88	21	70		270		93	91	.5	12		546	.74	540	306	84	1.7	892	7.6
Dec. 1-15.....	324	19		98	19	88		305		100	104	.6	14		606	.82	530	322	72	2.1	988	8.0
Dec. 16-31.....	346	14		96	22	79		294		102	100	.6	16		581	.79	543	330	89	1.9	978	7.6
Jan. 1-15, 1960...	414	19		88	17	75		269		89	91	.4	12		536	.73	599	290	69	1.9	864	8.0
Jan. 16-31.....	375	20		94	19	79		289		91	99	.5	14		563	.77	570	312	75	1.9	915	8.0
Feb. 1-15.....	416	21		82	22	85		285		90	99	.4	14		575	.78	646	295	61	2.2	921	8.0
Feb. 16-29.....	345	19		92	22	87		295		100	107	.4	14		598	.81	557	320	78	2.1	973	7.9
Mar. 1-10.....	349	21		91	20	88		290		98	104	.6	15		612	.83	577	309	71	2.2	956	8.0

Mar. 11-20.....	331	18		94	22	89		296		103	109	.6	16		630	.86	563	325	82	2.1	1000	7.7
Mar. 21-29.....	388	16		90	20	88		281		100	107	.6	14		607	.83	636	306	75	2.2	956	7.7
Mar. 30-31.....	959	14		54	11	46		166		61	48	.5	11		a328	.45	849	178	42	1.5	551	7.6
Apr. 1-10.....	387	19		86	19	77	8.4	280		92	94	.5	12		559	.76	584	292	62	2.0	898	8.0
Apr. 11-20.....	313	20		97	22	88		306		104	108	.5	13		621	.84	525	332	81	2.1	985	8.1
Apr. 21-30.....	349	19		90	20	94		288		101	114	.6	9.9		609	.83	574	306	70	2.3	982	7.9
May 1-15.....	375	20		82	18	76		263		85	92	.5	11		514	.70	520	278	62	2.0	867	7.8
May 16-31.....	265	19		94	20	89		289		104	110	.5	8.9		587	.80	420	316	79	2.2	982	7.8
June 1-10.....	174	22		104	20	96		305		113	124	.4	8.4		675	.92	317	342	92	2.3	1040	8.0
June 11-24.....	124	23		105	23	106		314		122	139	.5	5.2		726	.99	243	356	98	2.4	1100	8.0
June 25, 27-30....	2656	13		34	4.5	20		112		25	18	.2	3.2		a173	.24	1240	103	11	.9	295	7.5
June 26.....	407	18		51	9.1	61		147		44	90	.3	4.0		a350	.48	385	164	43	2.1	614	7.5
July 1-4.....	416	22		64	11	49		190		62	60	.5	5.3		398	.54	447	204	48	1.5	606	7.9
July 5-19.....	258	16		89	18	85		278		93	104	.6	9.2		a552	.75	385	296	68	2.1	905	8.0
July 20, 22-23....	1326	22		51	9.7	49		169		50	52	.5	8.8		a326	.44	1170	167	28	1.6	541	7.9
July 21.....	3070	9.8		25	6.6	21		109		20	15	.4	4.0		a156	.21	1290	90	0	1.0	265	7.3
July 24-31.....	434	20		64	15	63		223		61	72	.4	11		448	.61	525	221	38	1.8	704	7.6
Aug. 1-12.....	304	23		91	18	85		280		90	108	.5	11		583	.79	479	301	71	2.1	914	8.0
Aug. 13-14, 19-20.	1405	16		34	4.7	21		109		27	20	.3	4.9		a182	.25	690	104	15	.9	286	7.7
Aug. 15-18.....	586	17		49	7.5	42		145		46	51	.3	5.5		299	.41	473	153	34	1.5	483	7.3
Aug. 21-22, 30-31.	756	16		40	5.7	26		128		31	28	.3	3.5		222	.30	453	123	18	1.0	353	7.5
Aug. 23-29.....	359	20		76	14	62		236		71	75	.4	8.0		453	.62	439	247	53	1.7	732	7.5
Sept. 1-6.....	363	19		60	12	58		188		58	75	.4	5.8		396	.54	388	199	45	1.8	658	7.7
Sept. 7-16.....	234	21		89	19	81		272		93	105	.5	8.9		565	.77	357	300	77	2.0	919	7.8
Sept. 17-25, 28-30	194	18		94	22	91		292		106	116	.5	8.6		612	.83	321	325	85	2.2	1010	7.6
Sept. 26-27.....	296	15		56	11	58		175		57	74	.4	4.0		a361	.49	289	184	40	1.9	629	7.4
Weighted average b.....	429	18		73	15	65		232		74	78	0.5	9.8		460	0.63	533	244	54	1.8	745	--

a Calculated from determined constituents.
b Includes estimated data for missing period. Represents 100 percent of runoff for water year October 1959 to September 1960.

GUADALUPE RIVER BASIN--Continued

8-1885. SAN ANTONIO RIVER AT GOLIAD, TEX.--Continued

Temperature (°F) of water, water year October 1959 to September 1960

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

8-2110. NUECES RIVER NEAR MATHIS, TEX.

LOCATION.--At intake tower at Wesley E. Seale Dam, 0.6 mile upstream from gaging station at bridge on State Highway 359, and 4 miles southwest of Mathis, San Patricio County.
DRAINAGE AREA.--16,660 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1960.
Water temperatures: October 1947 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 354 ppm Oct. 1-18; minimum, 224 ppm Oct. 19-31, Dec. 1-31.
Hardness: Maximum, 176 ppm Apr. 1-30; minimum, 131 ppm Oct. 19-31.
Specific conductance: Maximum daily, 616 micromhos Oct. 2; minimum daily, 334 micromhos Oct. 26.
Water temperatures: Maximum, 87°F June 1, 2; minimum, 53°F Feb. 26, Mar. 1, 2.
EXTREMES, 1947-60.--Dissolved solids: Maximum, 548 ppm June 1-30, 1948; minimum, 175 ppm Apr. 27-30, 1949.
Hardness: Maximum, 201 ppm May 1-24, 1951; minimum, 85 ppm Apr. 27-30, 1949.
Specific conductance: Maximum daily, 1,040 micromhos July 1, 1948; minimum daily, 233 micromhos July 30, 1949.
Water temperatures: Maximum, 94°F July 27, 1948; minimum, 38°F Jan. 31, 1948.
REMARKS.--Dashes omitted in potassium (K) column indicate sodium (Na) plus potassium (K) are calculated. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1959 to September 1960 given in WSP 1712.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1-18, 1959...	3922	23		52	8.9	53	9.2	197		38	66	0.2	2.0		354	0.48	3750	166	4	1.8	592	7.1
Oct. 19-31.....	4952	23		44	5.1	19	8.0	165		17	18	.2	1.5		224	.30	2990	131	0	.7	350	7.4
Nov. 1-30.....	318	27		48	5.0	18	7.8	182		16	16	--	1.5		232	.32	199	140	0	.7	364	7.8
Dec. 1-31.....	107	20		49	5.3	16	7.7	186		16	14	--	1.5		224	.30	64.6	144	0	.6	359	8.0
Jan. 1-31, 1960...	95.3	18		51	5.7	17	7.7	194		17	14	--	1.0		235	.32	60.5	150	0	.6	378	8.0
Feb. 1-29.....	131	12		54	6.3	18	7.5	201		18	18	.2	1.5		254	.35	89.7	160	0	.6	402	7.4
Mar. 1-31.....	73.3	15		56	6.3	21	7.6	207		20	20	.3	1.0		260	.35	51.5	166	0	.7	419	7.7
Apr. 1-30.....	87.6	17		59	7.0	25	7.6	215		22	31	.3	.5		a275	.37	65.0	176	0	.8	445	8.1
May 1-31.....	85.8	18		58	7.1	34		213		25	32	.2	1.5		290	.39	67.1	174	0	1.1	475	7.4
June 1-30.....	231	19		55	8.0	40		208		26	40	.3	1.2		292	.40	182	170	0	1.3	493	7.0
July 1-31.....	298	17		48	8.2	46		192		29	46	--	.8		312	.42	251	154	0	1.6	490	7.5
Aug. 1-31.....	889	18		46	7.4	49		184		29	49	.3	.5		300	.41	720	146	0	1.8	484	7.7
Sept. 1-30.....	480	15		45	7.4	47		182		30	46	--	.8		293	.40	380	143	0	1.7	486	7.8
Weighted average	--	21		48	7.1	37		185		27	41	--	1.4		288	0.39	468	150	1.3	1.3	469	7.3
Time-weighted average	600	18		51	6.8	31		196		23	31	--	1.1		272	--	--	156	0.2	1.1	441	7.5
Tons per day....	--	34		79	11	61		300		44	67	--	2.3		--	--	--	--	--	--	--	--

a Calculated from determined constituents.

NUECES RIVER BASIN--Continued

8-2110. NUECES RIVER NEAR MATHIS, TEX.--Continued

Temperature (°F) of water, water year October 1959 to September 1960

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

8-2492. RIO GRANDE ABOVE CULEBRA CREEK, NEAR LOBATOS, COLO.

LOCATION.--Half a mile southeast of La Sauces, 7 miles upstream from Culebra Creek, and 15 miles upstream from gaging station near Lobatos, Conejos County.
DRAINAGE AREA.--7,700 square miles, approximately, upstream from gaging station (includes 2,940 square miles in closed basin in northern part of San Luis Valley, Colo.).
RECORDS AVAILABLE.--Chemical analyses: October 1946 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 698 ppm June 24-30; minimum, 142 ppm Apr. 10-13.
Hardness: Maximum, 296 ppm July 1-7; minimum, 64 ppm Apr. 10-13.
Specific conductance: Maximum daily, 1,080 micromhos July 2; minimum daily, 184 micromhos Apr. 11.
EXTREMES, 1946-60.--Dissolved solids: Maximum, 805 ppm Sept. 21, 1959; minimum, 104 ppm May 2-10, 1947.
Hardness: Maximum, 346 ppm June 9-14, 1953; minimum, 44 ppm May 1-10, 1952.
Specific conductance: Maximum daily, 1,110 micromhos Sept. 21, 1959; minimum daily, 122 micromhos June 1, 1949.
REMARKS.--Records of specific conductance of daily samples available in district office at Albuguerque, N. Mex. Records of discharge for gaging station near Lobatos for water year October 1959 to September 1960 given in WSP 1712. Culebra Creek which enters the Rio Grande between ths sampling point and the gaging station is usually dry at its mouth. Inflow from this and other sources between sampling point and gaging station occurs only after heavy rainfall. Flow affected by ice Nov. 28 to Mar. 17.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collsction	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C) Parts per million	Tons per acre-foot	Tons per day	Hardness as $CaCO_3$ Calcium, Magnesium	Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
Oct. 1-3, 1959....	38.0	--	--	43	9.6	50	--	191	0	--	--	--	--	--	368	0.50	37.8	147	0	1.8	504	8.2
Oct. 4-5.....	103	--	--	28	7.3	37	--	135	0	--	--	--	--	--	258	.35	71.8	100	0	1.6	370	7.8
Oct. 6-Nov. 1.....	97.7	48	0.01	47	9.4	45	6.8	162	0	102	14	0.6	1.0	0.13	358	.49	94.4	156	23	1.6	502	7.8
Nov. 2.....	78.0	--	--	36	7.3	34	--	107	28	--	--	--	--	--	306	.42	64.4	120	0	1.4	404	9.0
Nov. 3-6.....	91.8	--	--	46	10	55	--	151	7	--	--	--	--	--	403	.55	99.9	158	22	1.9	548	8.5
Nov. 9.....	150	--	--	32	6.3	29	--	96	13	--	--	--	--	--	246	.33	99.6	106	6	1.2	345	9.0
Nov. 10-25.....	309	--	--	29	5.5	22	--	93	0	--	--	--	--	--	207	.28	173	95	19	1.0	290	8.2
Nov. 26-Dec. 9....	216	--	--	36	6.3	28	--	139	0	--	--	--	--	--	260	.35	152	116	2	1.1	350	8.2
Dec. 10-29.....	258	--	--	32	5.4	21	--	119	0	--	--	--	--	--	211	.29	147	102	4	.9	302	7.7
Dec. 30-Jan. 6, 9, 1960.	196	49	.01	36	6.6	24	4.5	132	0	51	6.6	.4	1.2	.08	250	.34	132	117	9	1.0	339	7.7
Jan. 7-8.....	202	--	--	30	5.1	18	--	102	0	--	--	--	--	--	208	.28	113	96	12	.8	283	7.0
Jan. 10-19, 21-31.	242	--	--	26	4.6	17	--	101	0	--	--	--	--	--	185	.25	121	84	1	.8	249	7.5
Jan. 20.....	200	--	--	30	6.8	20	--	110	6	--	--	--	--	--	224	.30	121	103	3	.9	308	8.6
Feb. 1-29.....	226	--	--	28	3.4	15	--	99	0	--	--	--	--	--	180	.24	110	84	3	.7	243	7.4
Mar. 1-15.....	361	--	--	26	5.6	17	--	96	0	--	--	--	--	--	183	.25	178	88	9	.8	260	7.1

RIO GRANDE BASIN--Continued

8-2492. RIO GRANDE ABOVE CULEBRA, NEAR LOBATOS, COLO.--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Mar. 16-19, 1960..	478	--	--	36	7.3	28	--	118	0	--	--	--	--	--	258	0.35	333	120	23	1.1	370	7.3
Mar. 20-Apr. 2....	587	--	--	29	6.2	22	--	112	0	--	--	--	--	--	214	.29	339	98	6	1.0	302	7.5
Apr. 3-6.....	313	--	--	40	7.5	30	--	162	0	--	--	--	--	--	270	.37	228	131	0	1.1	394	7.5
Apr. 7-9.....	684	--	--	27	5.5	19	--	121	0	--	--	--	--	--	208	.28	384	90	0	.9	271	7.0
Apr. 10-13.....	1395	--	--	19	4.0	12	--	76	0	--	--	--	--	--	142	.19	535	64	2	.7	194	6.6
Apr. 14-19, 22, 24	1034	24	0.11	25	5.7	17	4.5	98	0	35	6.6	0.4	0.8	0.08	185	.25	516	86	6	.8	254	7.0
Apr. 20-21, 23, 25	1052	--	--	20	4.1	11	--	70	0	--	--	--	--	--	150	.20	426	67	10	.6	201	7.0
Apr. 26-30.....	585	--	--	30	6.6	22	--	117	0	--	--	--	--	--	214	.29	338	102	6	.9	307	7.0
May 1-2.....	396	--	--	33	7.7	24	--	26	0	--	--	--	--	--	--	--	--	114	93	1.0	341	4.8
May 3-10.....	242	--	--	40	8.3	33	--	120	0	--	--	--	--	--	291	.40	190	134	36	1.2	414	7.4
May 11-21.....	340	--	--	24	3.2	17	--	99	0	--	--	--	--	--	172	.23	158	73	0	.9	231	7.5
May 22, 29.....	149	--	--	34	6.8	27	--	127	0	--	--	--	--	--	248	.34	99.8	113	9	1.1	348	7.3
May 23, 25-27, 30.	129	--	--	61	12	48	--	144	0	--	--	--	--	--	426	.58	148	200	82	1.5	598	7.6
May 24, 28.....	116	--	--	45	8.6	34	--	136	0	--	--	--	--	--	315	.43	98.7	148	36	1.2	446	7.5
May 31-June 1.....	188	--	--	30	6.1	22	--	130	0	--	--	--	--	--	216	.29	110	100	0	1.0	303	7.8
June 2-3.....	219	--	--	38	7.3	29	--	146	0	--	--	--	--	--	266	.36	157	125	5	1.1	373	8.1
June 4-12, 17.....	882	--	--	28	4.4	26	--	141	0	--	--	--	--	--	205	.28	488	88	0	1.2	285	7.7
June 13-16, 18-20.	1374	--	--	36	7.1	34	--	124	0	--	--	--	--	--	278	.38	1030	119	17	1.4	391	7.3
June 21-23.....	664	--	--	46	10	50	--	142	0	--	--	--	--	--	379	.52	679	158	42	1.7	539	7.7
June 24-30.....	172	--	--	88	18	93	--	190	0	--	--	--	--	--	698	.95	324	294	138	2.4	960	7.2
July 1-7.....	103	27	.03	87	19	90	14	187	0	296	33	.8	2.1	.25	676	.92	188	296	143	2.3	958	7.3
July 8-9.....	156	--	--	57	12	50	--	162	0	--	--	--	--	--	412	.56	174	191	58	1.6	591	7.9
July 10-27.....	116	--	--	72	15	72	--	190	0	--	--	--	--	--	538	.73	169	243	87	2.0	769	7.3
July 28-31.....	68.5	--	--	56	12	56	--	171	0	--	--	--	--	--	414	.56	76.6	190	50	1.8	613	7.2
Aug. 1-26.....	46.0	--	--	56	12	63	--	184	0	--	--	--	--	--	439	.60	54.5	190	39	2.0	646	7.4
Aug. 27-30.....	15.2	--	--	64	14	81	--	198	0	--	--	--	--	--	526	.72	21.6	219	57	2.4	760	8.1
Aug. 31-Sept. 8, 1960...	14.3	--	--	60	13	72	--	194	0	--	--	--	--	--	488	0.66	18.8	202	43	2.2	704	7.7
Sept. 9-10.....	26.5	--	--	40	9.0	50	--	186	0	--	--	--	--	--	321	.44	23.0	137	0	1.9	482	8.2
Sept. 11-21.....	22.7	--	--	50	12	61	--	186	0	--	--	--	--	--	410	.56	25.1	173	20	2.0	601	7.7
Sept. 22-23.....	26.0	--	--	58	12	68	--	185	0	--	--	--	--	--	453	.62	31.8	194	42	2.1	668	7.8
Sept. 24-30.....	29.0	--	--	46	9.5	50	--	171	0	--	--	--	--	--	351	.48	27.5	154	14	1.8	522	7.5
Weighted average	--	--	--	32	6.3	26	--	116	0	--	--	--	--	--	238	0.32	186	107	14	1.0	332	6.7
Time-weighted average.....	290	--	--	41	8.1	37	--	137	1	--	--	--	--	--	306	--	--	136	24	1.3	431	6.9
Tons per day....	--	--	--	25	4.9	21	--	91	0	--	--	--	--	--	--	--	--	--	--	--	--	--

8-2900. RIO CHAMA NEAR CHAMITA, N. MEX.

LOCATION.--At gaging station on left bank 200 feet downstream from bridge on U.S. Highway 285, 0.5 mile west of Chamita, Rio Arriba County, 2.5 miles northwest of San Juan Pueblo, and 3 miles upstream from mouth.
DRAINAGE AREA.--3,200 square miles, approximately.
RECORDS AVAILABLE.--Water temperatures: October 1950 to September 1960.
Sediment records: October 1947 to September 1960.
EXTREMES, 1959-60.--Water temperatures: Maximum, 79°F June 26, Aug. 3, 7; minimum, freezing point on several days during January.
Sediment concentrations: Maximum daily, 16,600 ppm Mar. 14; minimum daily, 19 ppm Aug. 22.
Sediment loads: Maximum daily, 38,000 tons Apr. 7; minimum daily, less than 0.50 ton July 3, Aug. 7, 20-22.
EXTREMES, 1947-60.--Water temperatures (1950-60): Maximum, 89°F July 19, 1951, Aug. 8, 1956; minimum, freezing point on many days during winter months.
Sediment concentrations: Maximum daily, 55,500 ppm Aug. 21, 1955; minimum daily, no flow on many days.
Sediment loads: Maximum daily, 209,000 tons Aug. 7, 1957; minimum daily, 0 tons on many days.
REMARKS.--Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of discharge for water year October 1959 to September 1960 given in WSP 1712. Flow affected by ice Nov. 27 to Dec. 10, 19-20, Dec. 28 to Feb. 24.

Temperature (°F) of water, water year October 1959 to September 1960

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

RIO GRANDE BASIN--Continued

8-2900. RIO CHAMA NEAR CHAMITA, N. MEX.--Continued

Suspended sediment, water year October 1959 to September 1960

Day	OCTOBER			NOVEMBER			DECEMBER		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1..	15	99	4	269	2700	B 2000	90	410	100
2..	18	144	7	227	2150	1320	80	610	132
3..	59	2940	S 533	227	1780	1090	60	550	89
4..	190	4600	B 2500	239	1800	1160	40	700	76
5..	180	5800	2820	221	2000	1190	40	790	B 90
6..	474	4800	6140	200	1940	1050	60	905	147
7..	466	3400	4280	221	1490	889	70	1180	223
8..	350	5220	4930	165	1100	490	80	1100	238
9..	200	3010	1630	157	1240	526	90	1790	435
10..	130	1440	505	152	1500	616	105	1620	459
11..	110	1300	B 390	127	1050	360	127	920	315
12..	110	1190	353	148	1620	647	116	930	291
13..	105	1210	343	75	1320	267	104	820	230
14..	100	1300	351	215	4320	S 5750	89	1530	368
15..	100	1190	321	770	8600	17900	84	1650	374
16..	95	1300	333	860	6700	15600	89	910	219
17..	90	980	238	791	3390	7240	97	1400	367
18..	95	950	244	800	2620	5660	91	2320	570
19..	100	1000	270	667	2400	4320	90	1780	433
20..	136	800	294	443	1850	2210	90	1090	265
21..	136	800	294	268	1220	883	97	850	B 220
22..	136	850	312	193	1270	662	102	800	220
23..	152	1380	566	158	650	277	99	890	238
24..	161	1500	652	145	920	360	97	1130	296
25..	161	1400	B 610	124	960	321	94	1300	B 330
26..	190	1450	744	124	915	306	102	1670	460
27..	185	2090	1040	105	900	255	97	2200	576
28..	152	1100	451	90	850	207	80	1380	298
29..	186	1270	S 688	90	1150	279	70	720	136
30..	261	5640	S 4490	90	720	175	60	740	120
31..	263	3440	2440	--	--	--	70	1230	232
Total	5106	--	38773	8361	--	74010	2660	--	8547
	JANUARY			FEBRUARY			MARCH		
1..	70	1430	270	80	650	140	152	1000	410
2..	65	870	153	90	760	185	180	970	471
3..	70	910	172	90	950	231	177	950	454
4..	70	995	188	80	720	156	197	1180	628
5..	70	970	183	70	800	151	218	1060	624
6..	70	980	185	70	830	157	261	1590	1120
7..	70	1330	251	70	740	140	303	2250	1840
8..	80	1780	384	80	680	147	349	3100	B 2900
9..	85	2050	470	85	910	209	280	8000	6050
10..	80	2000	432	81	880	192	600	13900	22500
11..	85	1910	438	70	750	142	550	13100	19500
12..	100	1880	508	85	480	110	550	9600	14300
13..	90	2080	505	85	630	145	450	10300	12500
14..	90	1450	352	85	950	218	450	16600	20200
15..	90	930	226	85	815	187	400	13800	14900
16..	90	1100	267	100	670	181	349	8200	B 7700
17..	90	1070	260	95	705	181	307	5250	4350
18..	95	960	246	90	730	177	295	3300	2630
19..	95	1010	259	90	740	180	332	4400	3940
20..	100	1110	300	90	920	224	669	14400	31800
21..	100	1200	B 320	90	950	B 230	880	12300	29200
22..	100	1060	286	80	640	138	910	9500	23300
23..	100	1350	364	70	680	129	890	8600	20700
24..	90	1770	430	60	850	138	651	7000	12300
25..	85	1830	420	73	900	177	965	9200	24000
26..	90	1820	442	94	905	230	1140	7900	24300
27..	90	1650	401	119	780	251	1280	9600	33200
28..	90	1890	459	127	810	278	1370	7800	28900
29..	80	790	171	139	1130	424	1360	5800	21300
30..	80	670	145	--	--	--	1370	5000	18500
31..	80	800	173	--	--	--	1350	4750	17300
Total	2640	--	9660	2523	--	5448	19235	--	421817

S Computed by subdividing day.
B Computed from estimated-concentration graph.

RIO GRANDE BASIN--Continued

8-2900. RIO CHAMA NEAR CHAMITA, N. MEX.--Continued

Suspended sediment, water year October 1959 to September 1960--Continued

Day	APRIL			MAY			JUNE		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1..	1280	5000	17300	1180	2100	6690	1570	1220	4510
2..	1140	4500	13900	1090	1280	3770	1360	1040	3820
3..	1080	5250	15300	1040	1940	5450	1370	590	2180
4..	1160	4700	14700	1020	1340	3690	1370	700	2590
5..	1390	4700	17600	1060	1400	4010	1370	720	2660
6..	1590	6900	29600	1370	4400	16300	1400	1400	5290
7..	1900	7400	38000	1520	4380	18000	1290	1830 S	6520
8..	2030	6800	37300	1500	2900	11700	1410	1480	5630
9..	2040	5500	30300	1340	1620	5860	1400	750	2840
10..	2140	5850	33800	1460	2200	8670	1420	780	2990
11..	2240	6100	36900	1590	2700	11600	1440	500	1940
12..	2240	5500	33300	1620	2100	9190	1460	580	2290
13..	1990	5000	26900	1630	2180	9590	1410	600	2280
14..	1880	2500	12700	1650	2400	10700	1370	620	2290
15..	1820	4150	20400	1620	1650	7220	1360	660	2420
16..	1890	4000	20400	1580	1520	6480	1320	400	1430
17..	1720	3400	15800	1540	1480	6150	1310	520	1840
18..	1790	3500	16900	1400	1820	6880	1280	340	1180
19..	1890	3640	18600	1520	1080	4430	1260	550	1870
20..	1900	3380	17300	1530	1360	5620	1250	500	1690
21..	1880	3240	16400	1370	1290	4770	1230	380	1260
22..	2000	3360	18100	1310	960	2930	1220	390	1280
23..	1960	3800	20100	1050	980	2780	1220	420	1380
24..	1920	3420	17700	1050	910	2580	579	330	516
25..	1780	3100	14900	1040	580	1630	239	350	226
26..	1710	2900	13400	932	700	1760	190	230	118
27..	1670	1700	7670	860	550	1280	177	140	67
28..	1610	1300	5650	978	666 S	2010	152	134	55
29..	1540	1050	4370	1360	720	2640	102	85	23
30..	1260	1740	5920	1350	1080	3940	99	90	24
31..	--	--	--	1360	1280	4700	--	--	--
Total	52440	--	591210	40740	--	193020	32428	--	63209

Day	JULY			AUGUST			SEPTEMBER		
1..	37	50	5	34	1490	137	367	500	495
2..	10	30 B	1	16	1030	44	358	420	406
3..	6.8	26	T	4.8	1180	15	367	380	377
4..	8.5	65	1	1.9	1000 B	5	381	360	370
5..	11	54	2	1.7	350 B	2	296	190	152
6..	19	42	2	1.7	120	1	86	80	19
7..	154	2840 S	1900	1.3	75	T	29	32	3
8..	136	1880	690	1.0	780	2	16	40 B	2
9..	65	1350	237	627	3500	5930	12	49	2
10..	50	1470	198	461	2720 S	4250	20	46 S	4
11..	94	2850 B	757	440	4400	5230	21	710	40
12..	74	1000	200	430	1100	1280	10	1230	33
13..	74	570	114	420	590	669	2.9	370	3
14..	99	700 B	190	425	580	666	655	2100 B	4100
15..	102	610	168	318	420	361	466	1200	1510
16..	60	430	70	81	110	24	461	700	871
17..	38	410	42	37	120	12	445	660	793
18..	25	186	13	9.8	70	2	466	570	717
19..	25	141	10	5.7	40 B	1	461	520	647
20..	725	4720	9240	3.9	27	T	399	725 S	990
21..	430	1170	1360	4.8	22	T	442	1320 S	1690
22..	400	448	484	1.7	19	T	398	570	613
23..	410	1200	1330	6.8	296 S	17	190	130	67
24..	445	584	702	9.2	325 S	12	68	90	17
25..	410	356	394	576	2990 S	5230	40	88	10
26..	415	392	439	367	810	803	31	86	7
27..	260	447	314	367	540	535	24	50 B	3
28..	140	450 B	170	386	390	406	19	34	2
29..	70	855	162	367	360	357	17	36	2
30..	48	308	40	353	300	286	11	30 B	1
31..	76	2800	575	367	345	342	--	--	--
Total	4917.3	--	19810	6126.3	--	26620	6558.9	--	13946

Total discharge for year (cfs-days)..... 183,735.5
Total load for year (tons)..... 1,466,070

S Computed by subdividing day.
T Less than 0.50 ton.
B Computed from estimated-concentration graph.

RIO GRANDE BASIN--Continued

8-2900. RIO CHAMA NEAR CHAMITA, N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1959 to September 1960
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Water temperature (°F)	Sampling point	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters											Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Oct. 31, 1959	1410	63		269	2650		--	41		54		66	90	98	100	--		VPWC
Nov. 8	1700	52		152	1060		--	--		--		37	77	99	100	--		V
Nov. 9	1325	45		820	6360		--	8		14		29	54	85	98	100		VPWC
Nov. 16	1215	39		95	1410		--	6		8		18	57	94	100	--		VPWC
Feb. 17, 1960	0750	46		2040	7910		--	11		16		32	53	84	97	100		VPWC
Apr. 7	1840	61		1620	2120		--	--		--		27	34	67	88	100		V
May 14	1915	57		1440	2730		--	44		61		79	84	91	99	100		VPWC
June 6	1430	76		167	114		--	--		--		98	99	99	100	--		S
June 27	0720	71		204	7650		--	86		1		--	--	--	--	--		PWC
July 7	0745	67		24	1060		75	90		1		--	--	--	--	--		PWC
Aug. 2	1850	70		547	2340		23	28		50		86	91	94	98	100		VPWC
Aug. 9	1835	75		1	155		--	--		--		97	98	99	100	--		S
Sept. 13	1300	49		165	1230		--	--		--		41	79	96	100	--		C

8-3130. RIO GRANDE AT OTOWI BRIDGE, NEAR SAN ILDEFONSO, N. MEX.

LOCATION.--At gaging station on pier of former railway bridge, 400 feet downstream from bridge on State Highway 4, 1.8 miles southwest of San Ildefonso Pueblo, 2.5 miles downstream from Pojoaque River, and 7 miles west of Pojoaque, Santa Fe County.
DRAINAGE AREA.--14,300 square miles, approximately (includes 2,940 square miles in closed basin in San Luis Valley, Colo.).
RECORDS AVAILABLE.--Chemical analyses: October 1946 to September 1960.
Water temperatures: October 1948 to September 1960.
Sediment records: October 1947 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 412 ppm July 28; minimum, 138 ppm May 22-26.
Hardness: Maximum, 236 ppm July 28; minimum, 83 ppm May 22-26.
Specific conductance: Maximum daily, 613 micromhos July 28; minimum daily, 204 micromhos May 31.
Water temperatures: Maximum, 83°F Aug. 6; minimum, freezing point on several days during winter months.
Sediment concentrations: Maximum daily, 9,660 ppm Aug. 11; minimum daily, 14 ppm Aug. 23.
Sediment loads: Maximum daily, 42,700 tons Apr. 12; minimum daily, 8 tons Aug. 23.
EXTREMES, 1946-60.--Dissolved solids: Maximum, 884 ppm Aug. 26, 1951; minimum, 137 ppm June 11-20, 1952.
Hardness: Maximum, 572 ppm Aug. 26, 1951; minimum, 83 ppm May 22-26, 1960.
Specific conductance: Maximum daily, 1,230 micromhos Aug. 26, 1951; minimum daily, 165 micromhos June 13, 1952.
Water temperatures (1948-60): Maximum, 88°F Aug. 4, 5, 1954; minimum, freezing point on many days during winter months.
Sediment concentrations (1947-60): Maximum daily, 42,600 ppm Aug. 21, 1955; minimum daily, 14 ppm Aug. 23, 1960.
Sediment loads (1947-60): Maximum daily, 362,000 tons Oct. 19, 1957; minimum daily, 8 tons Aug. 23, 1960.
REMARKS.--Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of discharge for water year October 1959 to September 1960 given in WSP 1712. Temperature recorder stopped Oct. 1 to Mar. 8. Flow affected by ice Nov. 28-29, Jan. 3-25.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1-3,7-31,1959	493	30	0.01	52	8.6	30	3.9	177	0	74	8.6	0.7	0.9	0.07	296	0.40	394	165	20	1.0	436	7.8
Oct. 4-6	529	26	--	62	8.9	40	--	177	0	119	7.4	--	2.9	--	353	.48	504	191	46	1.3	536	7.9
Nov. 1-14	613	29	--	52	8.4	32	--	173	0	75	10	--	1.2	--	293	.40	485	164	22	1.1	451	7.9
Nov. 15-30	922	29	--	42	8.5	24	--	143	0	62	7.6	--	.9	--	244	.33	607	140	23	.9	377	7.8
Dec. 1-31	583	36	--	44	8.0	28		158	0	60	8.8	--	.9	--	264	.36	416	143	13	1.0	391	8.2
Jan. 1-31, 1960	567	34	.01	42	7.3	26	3.2	141	5	53	8.0	.8	.9	.08	249	.34	381	135	11	1.0	366	8.5
Feb. 1-29	592	31	--	40	6.3	24	--	135	5	48	8.4	--	.7	--	229	.31	366	126	7	.9	343	8.5
Mar. 1-8	816	36	--	38	7.3	22	--	129	6	46	7.0	--	1.6	--	227	.31	500	125	9	.9	335	8.5
Mar. 9-19	1308	26	--	45	9.6	28	--	121	0	96	6.2	--	2.3	--	273	.37	964	152	53	1.0	418	8.2
Mar. 20-23	1892	23	--	53	13	32	--	120	0	138	6.8	--	2.4	--	327	.44	1670	186	88	1.0	494	8.2
Mar. 24-27	2148	26	--	46	10	23	--	114	0	97	5.2	--	2.4	--	266	.36	1540	156	62	.8	401	8.2
Mar. 28-Apr. 9	2476	21	--	42	6.8	16	--	118	0	64	4.4	--	1.8	--	214	.29	1430	133	36	.6	335	7.9

RIO GRANDE BASIN--Continued

8-3130. RIO GRANDE AT OTOWI BRIDGE, NEAR SAN ILDEFONSO, N. MEX.--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Apr. 10-17, 1960..	3909	21	--	36	5.1	9.7	--	116	0	30	3.2	--	1.4	--	163	0.22	1720	111	16	0.4	261	7.5
Apr. 18-30.....	3302	19	--	31	3.5	9.7	--	98	0	28	3.4	--	.9	--	144	.20	1280	92	12	.4	229	7.5
May 1-21.....	2290	20	--	39	3.0	11	--	124	0	31	3.6	--	.6	--	169	.23	1040	110	8	.5	265	7.6
May 22-26.....	1918	21	--	28	3.2	10	--	95	0	25	3.2	--	.5	--	138	.19	715	83	5	.5	211	7.6
May 27-28.....	1575	22	--	36	3.2	12	--	121	0	29	3.6	--	.6	--	166	.23	706	103	4	.5	253	7.8
May 29-June 5.....	2104	24	--	28	3.6	11	--	89	2	30	3.2	--	.5	--	146	.20	829	85	9	.5	218	8.4
June 6, 8-13.....	3046	23	--	36	3.2	13	--	110	0	38	4.2	--	.7	--	172	.23	1410	103	13	.6	261	7.9
June 7.....	2930	25	--	42	5.1	19	--	120	0	59	6.0	--	1.3	--	216	.29	1710	126	28	.7	328	7.7
June 14-21.....	3031	26	--	37	5.2	21	--	106	0	64	7.0	--	.6	--	213	.29	1740	114	27	.9	323	8.1
June 22-23.....	2315	26	--	31	4.0	18	--	84	6	49	5.8	--	.4	--	181	.25	1130	94	15	.8	270	8.7
June 24-25.....	1330	26	--	42	5.8	23	--	136	0	59	8.2	--	.5	--	232	.32	833	129	17	.9	357	8.0
June 26-30.....	624	28	--	47	8.1	31	--	152	0	83	10	--	.5	--	283	.38	477	151	26	1.1	431	7.8
July 1-19.....	461	28	--	54	8.1	37	--	163	0	99	12	--	.7	--	319	.43	397	168	34	1.2	486	7.9
July 20-27.....	692	26	--	44	5.4	20	--	139	0	55	6.8	--	1.0	--	226	.31	422	132	18	.8	345	7.8
July 28.....	419	24	--	78	10	39	--	152	4	171	9.8	--	.9	--	412	.56	466	236	105	1.1	613	8.3
July 29-31.....	375	30	--	48	7.5	31	--	162	0	73	10	--	.5	--	280	.38	284	151	18	1.1	430	7.9
Aug. 1-8.....	307	32	--	46	9.2	32	--	165	0	73	11	--	.5	--	285	.39	236	153	18	1.1	434	8.0
Aug. 9, 11.....	762	23	--	47	6.7	30	--	179	0	52	11	--	1.0	--	259	.35	533	145	0	1.1	409	7.7
Aug. 10, 12-24....	405	28	--	40	7.8	24	--	150	0	52	7.6	--	.7	--	234	.32	256	132	9	.9	362	7.7
Aug. 25-31.....	549	22	--	39	6.7	18	--	130	0	51	4.6	--	.6	--	206	.28	305	125	18	.7	319	7.7
Sept. 1-6.....	494	22	--	45	5.0	19	--	141	0	51	5.2	--	.3		216	.29	288	133	17	.7	342	7.8
Sept. 7-12.....	217	30	--	48	5.6	29	--	172	0	51	9.6	--	.3		258	.35	151	143	2	1.1	398	7.9
Sept. 13-14.....	446	28	--	59	5.6	30	--	172	0	85	8.8	--	.5		302	.41	364	170	29	1.0	462	7.6
Sept. 15-30.....	498	23	--	50	5.6	24	--	160	0	60	7.4	--	.5		250	.34	336	148	17	.9	392	7.6
Weighted average	--	25	--	40	5.9	19	--	125	1	52	5.7	--	1.0	--	211	.29	645	124	20	.7	323	7.7
Time-weighted average.....	1131	28	--	43	6.8	24	--	141	1	60	7.3	--	.9	--	241	--	--	137	19	.8	366	7.8
Tons per day....	--	76	--	122	18	57	--	383	3	160	18	--	3.1	--	--	--	--	--	--	--	--	--

RIO GRANDE BASIN--Continued

8-3130. RIO GRANDE AT OTOWI BRIDGE, NEAR SAN ILDEFONSO, N. MEX.--Continued

Temperature (°F) of water, water year October 1959 to September 1960

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

RIO GRANDE BASIN--Continued

8-3130. RIO GRANDE AT OTOWI BRIDGE NEAR SAN ILDEFONSO, N. MEX.--Continued

Suspended sediment, water year October 1959 to September 1960

Day	OCTOBER			NOVEMBER			DECEMBER		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	229	400	S 269	606	2810	4600	561	114	173
2	283	1430	1090	552	3510	5230	571	89	137
3	391	2180	2300	739	3230	6440	566	72	110
4	478	5370	6930	627	1090	1850	542	95	139
5	478	5350	6900	557	860	1290	510	80	110
6	631	4490	7650	524	2040	2890	514	300	416
7	743	3320	6660	621	1300	2180	519	315	441
8	653	1350	2380	586	390	617	552	248	370
9	566	380	581	566	410	627	542	109	160
10	542	810	1190	576	140	218	552	140	209
11	488	1200	A 1600	601	800	1300	606	120	196
12	465	1000	1260	664	1500	2690	611	180	297
13	457	500	617	680	400	734	611	97	160
14	461	275	342	689	1360	S 3340	596	122	196
15	461	380	473	1420	7430	28500	596	144	232
16	440	800	950	1420	5100	19600	542	104	152
17	431	950	1110	1400	2100	7940	524	80	A 110
18	423	460	525	1360	1560	5730	586	63	100
19	452	890	1090	1300	2210	7760	581	83	130
20	461	920	1150	1070	1880	5430	606	71	116
21	452	430	525	837	1020	2310	601	127	206
22	465	240	301	761	640	1320	611	99	163
23	452	310	378	725	230	450	627	156	264
24	496	900	1210	737	140	279	627	142	240
25	519	1310	1840	737	220	438	648	107	187
26	510	700	964	719	1200	2330	731	136	268
27	501	480	649	691	1220	2280	675	154	281
28	461	460	573	550	980	1460	621	108	181
29	474	420	538	500	1020	1380	586	68	108
30	906	3330	8150	528	290	413	528	76	108
31	632	2710	4620	--	--	--	528	71	101
Total	15401	--	64815	23343	--	121626	18071	--	6061

Day	JANUARY			FEBRUARY			MARCH		
1	524	71	101	601	570	925	616	570	948
2	488	75	99	601	510	828	653	375	661
3	430	75	87	621	610	1020	616	320	532
4	420	67	76	621	620	1040	686	430	796
5	470	106	135	632	580	990	737	510	1010
6	490	143	189	611	560	924	850	1000	2300
7	470	147	187	611	840	1390	1120	2890	S 9040
8	510	348	479	611	1030	1700	1250	3150	S 11800
9	540	143	208	632	800	1370	1080	5600	S 24300
10	600	157	254	616	620	1030	1330	4220	15200
11	600	146	237	601	570	925	1420	3530	13500
12	660	230	410	606	630	1030	1190	3100	9960
13	660	180	321	591	530	846	1380	4000	14900
14	640	150	259	611	530	874	1650	6690	29800
15	620	175	293	581	560	878	1550	6540	27400
16	621	350	587	571	625	964	1200	4200	13600
17	600	725	1170	571	680	1050	1180	2350	7490
18	550	750	1110	557	635	955	1190	1460	4690
19	550	945	1400	561	700	1060	1220	1120	3690
20	550	775	1150	586	620	981	1560	3960	S 19400
21	600	780	1260	586	460	728	1960	5000	26500
22	610	1040	1710	591	350	558	2010	4450	24200
23	650	2750	4830	576	450	700	2040	4070	22400
24	630	1350	2300	552	400	596	1840	2830	14100
25	580	1200	1880	528	375	535	2120	3700	21200
26	591	580	926	524	500	707	2240	3150	19100
27	596	590	949	586	425	672	2390	3530	22800
28	601	660	1070	611	350	577	2410	3590	23400
29	576	700	1090	616	575	956	2420	3860	25200
30	571	560	863	--	--	--	2460	3320	22100
31	576	510	793	--	--	--	2550	3180	21900
Total	17574	--	26423	17163	--	26809	46918	--	453917

Total discharge for year (cfs-days)..... 413,987
Total load for year (tons)..... 2,074,261

S Computed by subdividing day.
A Computed from partly estimated-concentration graph.

RIO GRANDE BASIN--Continued

8-3130. RIO GRANDE AT OTOWI BRIDGE NEAR SAN ILDEFONSO, N. MEX.--Continued

Suspended sediment, water year October 1959 to September 1960--Continued

Day	APRIL			MAY			JUNE		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	2540	3160	21700	2180	1820	10700	2130	1750	10100
2	2220	2850	17100	1960	1290	6830	2100	1600	9070
3	2100	2490	14100	1880	1210	6140	2110	1900	10800
4	1980	2170	11600	1830	1430	7070	2120	1530	8760
5	2060	2580	14300	1830	1910	9440	2230	1780	10700
6	2330	3600	22600	1950	1910	10100	2510	1400	9490
7	2800	4590	34700	2040	1890	10400	2930	1700	13400
8	3040	4530	37200	2070	1800	10100	2830	1240	9470
9	3280	4750	42100	2000	1600	8640	2720	1170	8590
10	3660	4110	40600	2030	1510	8280	2950	1500	11900
11	3920	3700	39200	2230	2110	12700	3340	1900	17100
12	4160	3800	42700	2360	1720	11000	3400	1550	14200
13	4060	3100	34000	2450	2100	13900	3570	1600 A	15000
14	4110	2540	28200	2590	1990	13900	3650	1510	14900
15	3920	1830	19400	2720	1880	13800	3420	1200	11100
16	3810	1710	17600	2790	1530	11500	3120	1040	8760
17	3630	2340	22900	2700	1790	13000	2970	1230	9860
18	3520	2540	24100	2570	1560	10800	2830	1400	10700
19	3420	2150	19900	2680	1420	10300	2830	1580	12100
20	3400	2200	20200	2680	1630	11800	2750	970	7200
21	3460	2020	18900	2500	1880	12700	2680	860	6220
22	3630	2600	25500	2190	2230	13200	2440	1050	6920
23	3650	1920	18900	1970	1860	9890	2190	1110	6560
24	3710	1910	19100	1900	1380	7080	1630	820	3610
25	3650	2010	19800	1820	1210	5950	1030	800	2220
26	3430	1880	17400	1710	920	4250	800	700	1510
27	3150	1970	16800	1560	980	4130	680	400	734
28	2880	1510	11700	1590	1170	5020	610	270	445
29	2670	1800	13000	2040	1710	9420	542	300	439
30	2360	1600	10200	2040	1400	7710	488	210	277
31	--	--	--	2060	2080	11600	--	--	--
Total	96550	--	695500	66920	--	301350	69600	--	252135

Day	JULY			AUGUST			SEPTEMBER		
1	478	260	336	407	570	626	552	270	402
2	423	300	343	344	550	511	542	250	366
3	354	300 A	290	312	210	177	528	250	356
4	361	600	585	312	360	303	552	230	343
5	395	730	779	269	300	218	510	300	413
6	478	510	658	267	170	123	278	81	61
7	537	1370 S	2120	272	180	132	218	60 A	35
8	566	2640	4030	272	160	118	206	38	21
9	542	950	1390	725	3110 S	7650	192	45	23
10	519	1420	1990	708	1100	2100	206	25	14
11	561	1000	1510	798	9660 S	21400	242	72	47
12	501	510	690	743	1200	2410	238	74	48
13	465	390	490	703	490	930	231	76	47
14	488	810	1070	686	370	685	661	5790 S	13900
15	492	500	664	632	470	802	686	1800	3330
16	452	330	403	338	450	411	642	480	832
17	411	250	277	272	310	228	637	300	516
18	384	180	187	247	87	58	648	240	420
19	354	180	172	238	37	24	680	525	964
20	890	4470 S	12500	225	30 A	18	637	1950	3350
21	680	1360	2500	222	27	16	760	1750 S	3860
22	632	720	1230	220	19	11	703	480	911
23	632	660	1130	216	14	8	510	260	358
24	675	430	784	220	160	95	361	170	166
25	675	420	765	525	1840 S	4020	309	40	33
26	637	410	705	606	680	1110	309	84	70
27	714	2830 S	5670	542	280	410	286	81	63
28	419	2280	2580	547	800	1180	278	62	47
29	365	830	818	557	350	526	262	55	39
30	365	300	296	528	260	371	252	65	44
31	395	380	405	538	350	508	--	--	--
Total	15840	--	47367	13491	--	47179	13116	--	31079

S Computed by subdividing day.
A Computed from partly estimated-concentration graph.

RIO GRANDE BASIN--Continued

8-3130. RIO GRANDE AT OTOWI BRIDGE NEAR SAN ILDEFONSO, N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1959 to September 1960
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Water temperature (°F)	Sampling point	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Oct. 4, 1959.....	1500	44		457	5900		--	77		96		100	--	--	--	--		PWC
Oct. 30.....	1500	46		743	2710		--	59		87		100	--	--	--	--		PWC
Nov. 1.....	1500	50		591	2730		--	61		85		98	100	--	--	--		SPWC
Nov. 15.....	1600	46		1520	7250		--	11		20		44	76	97	99	100		VPWC
Apr. 3, 1960.....	1450	51		2160	2260		--	--		--		29	49	90	100	--		V
Apr. 16.....	1500	57		3940	1740		--	--		--		40	61	92	100	--		V
May 1.....	1545	57		2170	2100		--	--		--		14	21	65	97	100		V
May 19.....	1535	56		2670	1380		--	--		--		21	31	79	100	--		V
June 4.....	1410	65		1560	2130		--	--		--		11	18	62	95	99		V
July 16.....	1430	78		452	248		--	--		--		50	54	69	100	--		V
Aug. 25.....	1315	73		907	4300		34	44		69		84	85	95	100	--		VPWC
Sept. 15.....	1630	70		664	857		36	46		63		78	80	89	100	--		VPWC

RIO GRANDE BASIN--Continued

8-3180. GALISTEO CREEK AT DOMINGO, N. MEX.

LOCATION.--At gaging station in Santo Domingo Pueblo Grant, 160 feet downstream from highway bridge, 0.3 mile northeast of Domingo, Sandoval County, 2.8 miles east of Santo Domingo Pueblo, and 4 miles upstream from mouth.
DRAINAGE AREA.--640 square miles, approximately.
RECORDS AVAILABLE.--Sediment records: January 1948 to September 1960.
EXTREMES, 1959-60.--Sediment concentrations: Maximum daily, 56,800 ppm June 11; minimum daily, no flow on many days.
Sediment loads: Maximum daily, 140,000 tons Aug. 10; minimum daily, 0 tons on many days.
EXTREMES, 1948-60.--Sediment concentrations: Maximum daily, 96,300 ppm Oct. 20, 1957; minimum daily, no flow on many days.
Sediment loads: Maximum daily, 1,600,000 tons Sept. 25, 1955; minimum daily, 0 tons on many days.
REMARKS.--Records of discharge for water year October 1959 to September 1960 given in WSP 1712.

Suspended sediment, water year October 1959 to September 1960
(Where no concentrations are reported, loads are estimated)

Day	OCTOBER			NOVEMBER			DECEMBER		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	0.2	46	T	---	---	---	0	---	---
2	.9	220	0	---	---	---	0	---	---
3	.9	240	0	---	---	---	0	---	---
4	.3	170	T	---	---	---	0	---	---
5	0	---	0	---	---	---	0	---	---
6	0	---	0	---	---	---	0	---	---
7	0	---	0	---	---	---	0	---	---
8	0	---	0	---	---	---	0	---	---
9	0	---	0	---	---	---	0	---	---
10	0	---	0	---	---	---	0	---	---
11	0	---	0	---	---	---	0	---	---
12	0	---	0	---	---	---	0	---	---
13	0	---	0	---	---	---	0	---	---
14	0	---	0	---	---	---	0	---	---
15	0	---	0	---	---	---	0	---	---
16	0	---	0	---	---	---	0	---	---
17	0	---	0	---	---	---	0	---	---
18	0	---	0	---	---	---	0	---	---
19	0	---	0	---	---	---	0	---	---
20	0	---	0	---	---	---	0	---	---
21	0	---	0	---	---	---	0	---	---
22	0	---	0	---	---	---	0	---	---
23	0	---	0	---	---	---	0	---	---
24	0	---	0	---	---	---	0	---	---
25	0	---	0	---	---	---	.1	---	---
26	0	---	0	---	---	---	.1	---	---
27	0	---	0	---	---	---	0	---	---
28	0	---	0	---	---	---	0	---	---
29	1.0	4000 B	67	---	---	---	0	---	---
30	193	36000 S	30700	---	---	---	0	---	---
31	.4	8800 A	10	---	---	---	0	---	---
Total	196.7	---	30779	0	---	0	0.2	---	1

S Computed by subdividing day.
T Less than 0.50 ton.
A Computed from partly estimated-concentration graph.
B Computed from estimated-concentration graph and subdividing day.

RIO GRANDE BASIN--Continued

8-3180. GALISTEO CREEK AT DOMINGO, N. MEX.--Continued

Suspended sediment, water year October 1959 to September 1960--Continued

Day	JANUARY			FEBRUARY			MARCH			
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)		Tons per day
1	--	--	--	--	--	--	0	--		0
2	--	--	--	--	--	--	.1	--		T
3	--	--	--	--	--	--	0	--		0
4	--	--	--	--	--	--	0	--		0
5	--	--	--	--	--	--	0	--		0
6	--	--	--	--	--	--	0	--		0
7	--	--	--	--	--	--	11	--		400
8	--	--	--	--	--	--	77	--		3000
9	--	--	--	--	--	--	86	--		4000
10	--	--	--	--	--	--	27	15800		1150
11	--	--	--	--	--	--	11	10800		321
12	--	--	--	--	--	--	4.3	9600	A	110
13	--	--	--	--	--	--	.9	6300		15
14	--	--	--	--	--	--	1.5	6200		25
15	--	--	--	--	--	--	0	--		0
16	--	--	--	--	--	--	.2	--		1
17	--	--	--	--	--	--	.4	1520	S	3
18	--	--	--	--	--	--	.1	--		1
19	--	--	--	--	--	--	0	--		0
20	--	--	--	--	--	--	0	--		0
21	--	--	--	--	--	--	0	--		0
22	--	--	--	--	--	--	0	--		0
23	--	--	--	--	--	--	0	--		0
24	--	--	--	--	--	--	5.7	7580	S	201
25	--	--	--	--	--	--	8.9	11700		281
26	--	--	--	--	--	--	5.2	10000	A	140
27	--	--	--	--	--	--	2.8	--		70
28	--	--	--	--	--	--	2.2	--		40
29	--	--	--	--	--	--	0	--		0
30	--	--	--	--	--	--	0	--		0
31	--	--	--	--	--	--	0	--		0
Total	0	--	0	0	--	0	244.3	--		9758

Day	APRIL			MAY			JUNE			
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)		Tons per day
1	--	--	--	--	--	--	0	--		0
2	--	--	--	--	--	--	0	--		0
3	--	--	--	--	--	--	0	--		0
4	--	--	--	--	--	--	0	--		0
5	--	--	--	--	--	--	0	--		0
6	--	--	--	--	--	--	4.4	--		800
7	--	--	--	--	--	--	1.8	23500	S	284
8	--	--	--	--	--	--	0	--		0
9	--	--	--	--	--	--	0	--		
10	--	--	--	--	--	--	93	50700	S	16100
11	--	--	--	--	--	--	248	56800	S	51400
12	--	--	--	--	--	--	3.5	11000		104
13	--	--	--	--	--	--	0	--		0
14	--	--	--	--	--	--	0	--		0
15	--	--	--	--	--	--	0	--		0
16	--	--	--	--	--	--	0	--		0
17	--	--	--	--	--	--	0	--		0
18	--	--	--	--	--	--	0	--		0
19	--	--	--	--	--	--	0	--		0
20	--	--	--	--	--	--	0	--		0
21	--	--	--	--	--	--	0	--		0
22	--	--	--	--	--	--	0	--		0
23	--	--	--	--	--	--	0	--		0
24	--	--	--	--	--	--	0	--		0
25	--	--	--	--	--	--	0	--		0
26	--	--	--	--	--	--	0	--		0
27	--	--	--	--	--	--	0	--		0
28	--	--	--	--	--	--	0	--		0
29	--	--	--	--	--	--	0	--		0
30	--	--	--	--	--	--	0	--		0
31	--	--	--	--	--	--	--	--		--
Total	0	--	0	0	--	0	350.7	--		68688

S Computed by subdividing day.
T Less than 0.50 ton.
A Computed from partly estimated-concentration graph.

RIO GRANDE BASIN--Continued

8-3180. GALISTEO CREEK AT DOMINGO, N. MEX.--Continued

Suspended sediment, water year October 1959 to September 1960--Continued

Day	JULY			AUGUST			SEPTEMBER		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	0	--	0	0	--	0	0	--	--
2	0	--	0	0	--	0	0	--	--
3	0	--	0	86	--	10000	0	--	--
4	0	--	0	1	--	20	0	--	--
5	0	--	0	9.8	--	500	0	--	--
6	0	--	0	0	--	0	0	--	--
7	0	--	0	0	--	0	0	--	--
8	0	--	0	0	--	0	0	--	--
9	0	--	0	267	16000 B	74000	0	--	--
10	0	--	0	796	50000 B	140000	0	--	--
11	0	--	0	1.7	7500	34	0	--	--
12	0	--	0	.5	8000 A	10	0	--	--
13	81	23900 S	9820	.1	--	1	0	--	--
14	3.9	19000 A	200	0	--	0	0	--	--
15	222	--	30000	37	8900 B	6300	0	--	--
16	157	--	10000	166	46300 S	45100	0	--	--
17	5	--	200	1.2	6390 S	38	0	--	--
18	0	--	0	0	--	0	0	--	--
19	0	--	0	0	--	0	.1	--	4
20	0	--	0	0	--	0	0	--	--
21	0	--	0	0	--	0	0	--	--
22	0	--	0	0	--	0	0	--	--
23	0	--	0	0	--	0	0	--	--
24	18	--	1000	0	--	0	0	--	--
25	0	--	0	0	--	0	0	--	--
26	0	--	0	0	--	0	0	--	--
27	0	--	0	0	--	0	0	--	--
28	0	--	0	0	--	0	0	--	--
29	0	--	0	0	--	0	0	--	--
30	0	--	0	0	--	0	0	--	--
31	0	--	0	0	--	0	0	--	--
Total	486.9	--	51220	1366.3	--	276003	.1	--	4

Total discharge for year (cfs-days)..... 2,645.2
Total load for year (tons)..... 436,453

S Computed by subdividing day.
A Computed from partly estimated-concentration graph.
B Computed from estimated-concentration graph and subdividing day.

RIO GRANDE BASIN--Continued

8-3180. GALISTEO CREEK AT DOMINGO, N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1959 to September 1960
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Water temperature (°F)	Sampling point	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters											Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Oct. 30, 1959.....	1545	45		63	26800		53	61	77	83	90	93	97	100	--			VPWC
Oct. 30.....	1545	45		63	26800		2	2	13	86	89	93	97	100	--			VPN
June 11, 1960.....	0130	55		579	102000		--	46	--	66	--	86	92	98	100			SPWC
July 13.....	1650	62		381	45800		--	43	--	64	--	88	96	99	100			VPWC
Aug. 16.....	1045	72		175	47000		50	56	71	79	88	95	99	100	--			VPWC
Aug. 16.....	1045	72		175	47000		2	6	34	80	88	95	99	100	--			VPN

Particle-size analyses of bed material, water year October 1959 to September 1960
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Water temperature (°F)	Sampling point	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Bed material: Percent finer than size indicated, in millimeters											Method of analysis
							0.062	0.125	0.250	0.500	1.000	2.000	4.000	8.000	16.000	32.000	64.000	
Oct. 30, 1959.....	1600	45	4	51			1	4	23	46	60	69	76	84	95	100		S
Aug. 16, 1960.....	1040	72	5	175			1	5	40	75	95	100	--	--	--	--		V

8-3295. RIO GRANDE NEAR BERNALILLO, N. MEX.

LOCATION.--At gaging station 2 miles northwest of Sandia Pueblo, 3 miles southwest of Bernalillo, Sandoval County, 3.5 miles downstream from State Highway 44, and 8.5 miles downstream from Jemez River.
DRAINAGE AREA.--17,300 square miles, approximately (includes 2,940 square miles in closed basin in San Luis Valley, Colo.).
RECORDS AVAILABLE.--Water temperatures: October 1948 to September 1960.
Sediment records: November 1947 to September 1960.
EXTREMES, 1959-60.--Water temperatures: Maximum, 88°F July 24; minimum, freezing point on several days during winter months.
Sediment concentrations: Maximum daily, 28,300 ppm Aug. 11; minimum daily, no flow on many days.
Sediment loads: Maximum daily, 58,300 tons Apr. 12; minimum daily, 0 tons on many days.
EXTREMES, 1947-60.--Water temperatures (1948-60): Maximum, 93°F Aug. 18, 1951; minimum, freezing point on many days during winter months.
Sediment concentrations: Maximum daily, 75,000 ppm Sept. 25, 1955; minimum daily, no flow on many days during 1956, 1959, and 1960.
Sediment loads: Maximum daily, 1,680,000 tons Sept. 25, 1955; minimum daily, 0 tons on many days during 1956, 1959, and 1960.
REMARKS.--Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of discharge for water year October 1959 to September 1960 given in WSP 1712. Flow affected by ice Jan. 4-7, 20.

Temperature (°F) of water, water year October 1959 to September 1960

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

RIO GRANDE BASIN--Continued

8-3295. RIO GRANDE NEAR BERNALILLO, N. MEX.--Continued

Suspended sediment, water year October 1959 to September 1960

Day	OCTOBER			NOVEMBER			DECEMBER		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	0	--	0	486	7100	9320	439	1040	1230
2	0	--	0	674	6350	11600	479	1020	1320
3	0	--	0	595	5000	8030	472	980	1250
4	7	-- E	100	642	4650	8060	458	900	1110
5	85	6550	1500	521	2600	3660	420	1070	1210
6	84	6600	1500	465	1770	2220	406	770	844
7	143	6320 S	2560	432	1630	1900	400	650	702
8	190	4130	2120	458	2090	2580	439	810	960
9	118	1800	573	432	1560	1820	479	740	957
10	94	1150	292	439	1380	1640	472	790	1010
11	65	770	135	446	1340	1610	479	830	1070
12	32	400	35	479	1470	1900	528	960	1370
13	7	400	2	595	2000	3210	520	1450	2040
14	5	100	1	618	1870	3120	530	1250	1790
15	0	--	0	822	5170 S	14700	540	1100	1600
16	0	--	0	1220	7300	24000	550	1230	1830
17	0	--	0	1250	6650	22400	472	900	1150
18	0	--	0	1270	5500	18900	465	1080	1360
19	0	--	0	1210	4910	16000	565	1270	1940
20	0	--	0	1250	6650	22400	558	1580	2380
21	0	--	0	965	3440	8960	558	1520	2290
22	0	--	0	793	2330	4990	595	2450	3940
23	0	--	0	707	1900 B	3600	580	1730	2710
24	0	--	0	610	1490	2450	588	1670	2650
25	0	--	0	682	1440	2650	634	1490	2550
26	8	-- E	300	658	1600	2840	698	2280	4300
27	0	--	0	610	1380	2270	732	2180	4310
28	0	--	0	580	1490	2330	698	2000	3770
29	0	--	0	465	1150	1440	602	1920	3120
30	332	13600 S	26500	352	810	770	602	1920	3120
31	499	21000	28000	--	--	--	572	1660	2560
Total	1653	--	63618	20726	--	211370	16530	--	62443

Day	JANUARY			FEBRUARY			MARCH		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	580	1550	2430	565	1700	2590	642	1400 B	2400
2	565	1720	2620	595	1820	2920	674	1580	2880
3	521	910	1280	618	1900	3170	595	1620	2600
4	350	660	624	595	1270	2040	514	1410	1960
5	200	520	281	610	1650	2720	535	1100	1590
6	250	460	311	595	1380	2220	618	1440	2400
7	350	620	586	588	1600	2540	750	2890 S	7020
8	426	1250	1440	542	1400	2050	1100	5860 S	18800
9	500	1650	2230	610	1530	2520	1300	7430 S	28300
10	572	1620	2500	634	1600	2740	1340	6920	25000
11	610	2370	3900	610	1590	2620	1390	5900	22100
12	766	2710	5600	580	1500	2350	1270	6490	22300
13	750	2460	4980	580	1720	2690	1110	6450	19300
14	610	2640	4350	580	1340	2100	1410	6680	25400
15	650	2270	3980	595	1350	2170	1510	10000	40800
16	626	1940	3280	572	1280	1980	1270	9020	30900
17	595	1600	2570	580	1300	2040	1070	5000	14400
18	565	2420	3690	588	1420	2250	1000	3690	9960
19	535	3330	4810	580	1530	2400	965	2700	7030
20	500	2380	3210	572	1300 B	2000	1250	2950	9960
21	462	2900 B	4100	588	1610	2560	1590	6250	26800
22	486	2940	3860	602	1300	2110	1810	8350	40800
23	558	3570	5380	602	1390	2260	1940	7500	39300
24	618	2800	4670	542	2000	2930	2000	6100	32900
25	595	3190	5120	542	1550	2270	1810	5200	25400
26	558	2310	3480	565	1210	1850	2270	5880	36000
27	558	2550	3840	588	1400 B	2200	2690	5500	39900
28	558	1970	2970	602	1500	2440	2760	5680	42300
29	558	1840	2770	626	1600	2700	2800	5700	43100
30	528	1800	2570	--	--	--	2900	5790	45300
31	542	1730	2530	--	--	--	3090	6060	50600
Total	16542	--	95962	17046	--	69430	45973	--	717500

E Estimated.
S Computed by subdividing day.
B Computed from estimated-concentration graph.

RIO GRANDE BASIN--Continued

8-3295. RIO GRANDE NEAR BERNALILLO, N. MEX.--Continued

Suspended sediment, water year October 1959 to September 1960--Continued

Day	APRIL			MAY			JUNE		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	2930	5300	41900	1830	1870	9240	1590	1280	5500
2	2690	3700	26900	1590	2200	9440	1510	730	2980
3	2110	3350	19100	1590	1810	7770	1430	800	3090
4	1940	3800	19900	1540	2000	8320	1490	1250	5030
5	1910	4070	21000	1660	2600	11700	1640	1290	5710
6	2620	3650	25800	1540	1620	6740	1570	2020	8560
7	3460	4050	37800	1830	2300	11400	2430	2980	19600
8	3500	4650	43900	2080	2300	12900	2650	2530	18100
9	3550	4590	44000	2000	2100	11300	2880	1600	12400
10	3600	5600	54400	1710	1800	8310	3500	1150	10900
11	3790	4660	47700	1830	1580	7810	3850	5150	53500
12	4160	5190	58300	2170	1890	11100	3180	1300	11200
13	4330	4590	53700	2210	1620	9670	2730	1980	14600
14	4670	4610	58100	2650	2000	14300	3140	1500	12700
15	4110	3890	43200	2690	2310	16800	2840	2590	19900
16	4000	2700	29200	2370	2700	17300	2240	1800	10900
17	3950	5300	56500	2330	2300	14500	1830	2100	10400
18	3050	3200	26400	2050	2610	14400	2430	1840	12100
19	2930	3000	23700	2200	1750	10400	2760	2950	22000
20	3140	3600	30500	2370	1640	10500	2330	1480	9310
21	3220	3490	30300	2430	1550	10200	2000	1150	6210
22	3180	4100	35200	2240	1220	7380	2110	1230	7010
23	3220	3800	33000	1530	1740	7190	1760	1310	6230
24	3360	4500	40800	1340	1250	4520	1470	950	3770
25	3270	3800	33600	1190	1720	5530	810	820	1790
26	2840	2800	21500	1150	1550	4810	327	400	353
27	3010	2820	22900	988	1580	4210	270	200	146
28	2690	2100	15300	1000	1520	4100	226	200	122
29	2330	2220	14000	1270	1510	5180	221	130	78
30	2030	2100	11500	1550	1620	6780	119	71	23
31	--	--	--	1530	960	3970	--	--	--
Total	95590	--	1020100	56458	--	287770	57333	--	294212

Day	JULY			AUGUST			SEPTEMBER		
1	62	63	11	0	--	0	0		
2	65	78	14	0	--	0	0		
3	65	60	B 11	0	--	0	0		
4	0	--	0	0	--	0	0		
5	0	--	0	0	--	0	0		
6	36	3570	S 910	0	--	0	0		
7	72	3000	583	0	--	0	0		
8	38	900	92	0	--	0	0		
9	150	1800	729	0	--	0	0		
10	217	2240	1280	104	17500	S 9620	0		
11	26	900	63	123	28300	S 11400	0		
12	24	1420	92	54	6100	889	0		
13	15	700	28	28	5000	378	0		
14	15	5990	243	14	2200	83	0		
15	82	21800	S 9630	255	22700	15600	0		
16	93	20000	S 5470	368	20800	20700	2.0		
17	100	5700	1540	22	16000	950	.5		
18	32	600	52	2.4	700	5	0		
19	0	--	0	0	--	0	0		
20	0	--	0	0	--	0	0		
21	110	--	E 10000	0	--	0	0		
22	56	7100	1070	0	--	0	3.8		
23	60	1300	211	0	--	0	7.7		
24	52	1700	239	0	--	0	.5		
25	9.3	1200	30	0	--	0	0		
26	0	--	0	0	--	0	0		
27	0	--	0	0	--	0	0		
28	0	--	0	0	--	0	0		
29	0	--	0	0	--	0	0		
30	0	--	0	0	--	0	0		
31	0	--	0	0	--	0	0		
Total	1374.3	--	32298	970.4	--	59625	14.5	--	E 100

Total discharge for year (cfs-days)..... 330,510.2
Total load for year (tons)..... 2,914,128

E Estimated.
S Computed by subdividing day.
B Computed from estimated-concentration graph.

RIO GRANDE BASIN--Continued

8-3295. RIO GRANDE NEAR BERNALILLO, N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1959 to September 1960
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Water temperature (°F)	Sampling point	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Oct. 7, 1959	0630	45		100	4540		--	76	--	94	--	95	97	100	--	--		VPWC
Nov. 5	1330	50		521	2020		--	48	--	71	--	94	96	98	100	--		VPWC
Nov. 20	0830	38		1270	7210		--	9	--	16	--	54	79	95	100	--		VPWC
Dec. 17	1500	44		425	724		--	20	--	33	--	72	90	98	100	--		VPWC
Dec. 21	1115	40		530	1190		--	--	--	--	--	65	86	98	100	--		V
Jan. 4, 1960	1215	32		350	473		--	--	--	--	--	54	62	79	100	--		V
Feb. 1	1415	44		580	1200		11	12	14	18	30	50	76	95	100	--		VPWC
Feb. 1	1415	44		580	1200		4	10	11	17	29	50	76	95	100	--		VPN
Feb. 15	1430	44		596	1430		--	--	--	--	--	34	49	77	98	100		V
Apr. 6	1110	54		2300	2260		--	17	--	24	--	46	76	95	99	100		VPWC
Apr. 6	1320	59		2100	1900		--	20	--	27	--	50	83	97	100	--		VPWC
Apr. 7	0730	50		3500	3900		--	17	--	22	--	48	79	97	100	--		VPWC
Apr. 17	0830	49		4440	6020		--	7	--	9	--	24	58	95	100	--		VPWC
May 24	1220	65		1270	1200		--	18	--	24	--	36	55	89	100	--		VPWC
June 22	0950	66		2110	781		--	--	--	--	--	33	64	94	100	--		V
June 29	1800	85		187	87		--	--	--	--	--	91	97	100	--	--		S
Aug. 17	0630	62		35	891		8	92	--	98	--	98	99	100	--	--		SPWC

Particle-size analyses of bed material, water year October 1959 to September 1960
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Water temperature (°F)	Sampling point	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Bed material: Percent finer than size indicated, in millimeters										Method of analysis
							0.062	0.125	0.250	0.500	1.000	2.000	4.000	8.000	16.00	32.00	64.00	
Feb. 15, 1960	1430	44	4	602			0	8	34	78	92	95	96	97	100			S

8-3320. RIO GRANDE NEAR BERNARDO, N. MEX.

LOCATION.--At gaging station at bridge on U.S. Highway 60, 2 miles east of Bernardo, Socorro County, and 4.5 miles upstream from Rio Puerco.
DRAINAGE AREA.--19,230 square miles, approximately (includes 2,940 square miles in closed basin in San Luis Valley, Colo.).
RECORDS AVAILABLE.--Chemical analyses: October 1956 to September 1960.
Water temperatures: October 1958 to September 1960 (conveyance channel).
Sediment records: October 1947 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 738 ppm Aug. 1 to Sept. 30; minimum, 238 ppm Apr. 10-30.
Hardness: Maximum, 294 ppm Aug. 1 to Sept. 30; minimum, 134 ppm June 7-16.
Specific conductance: Maximum daily, 1,170 micromhos Aug. 26; minimum daily, 316 micromhos Apr. 27.
Water temperatures: Maximum, 98°F Aug. 6; minimum, 34°F Jan. 17.
Sediment loads: Maximum daily, 80,300 tons Apr. 13; minimum daily, less than 0.50 ton on many days in August and September.
EXTREMES, 1947-60.--Dissolved solids (1956-60): Maximum, 1,080 ppm Aug. 28, 1959; minimum, 207 ppm June 1-9, 1958.
Hardness (1956-60): Maximum, 584 ppm Aug. 28, 1959; minimum, 120 ppm July 1-4, 1957, June 1-9, 1958.
Specific conductance (1956-60): Maximum daily, 1,490 micromhos Aug. 28, 1959; minimum daily, 292 micromhos June 3, 1956.
Water temperatures (1958-60): Maximum, 98°F Aug. 6, 1960; minimum, 34°F Feb. 1, 1959, Jan. 17, 1960.
Sediment loads: Maximum daily, 348,000 tons Sept. 26, 1955; minimum daily, 0 tons on many days during summer months of most years.
REMARKS.--Records of specific conductance of daily samples and mean daily sediment concentrations available in district office at Albuquerque, N. Mex.
Records are summation of water and sediment discharges in Main Channel, Conveyance Channel, and Bernardo Interior Drain. Table for particle-size analyses for Conveyance Channel and Main Channel are published separately and show water discharges and concentrations in the channel at the time of sampling.
Chemical records computed from summation of water discharges from all channels. Records of discharge for water year October 1959 to September 1960 given in WSP 1712.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1-21, 1959...	86.1	50		77	12	76		224	0	170	35		3.7		534	0.73	124	240	56	2.1	779	8.1
Oct. 22-29.....	60.4	52		85	15	91		255	0	198	43		2.4		611	.83	99.6	272	63	2.4	895	7.9
Oct. 30-Nov. 13...	402	36		84	11	65		234	0	156	31		3.2		501	.68	544	256	64	1.8	756	7.7
Nov. 14-17.....	583	37		73	8.3	56		198	4	128	26		4.3		434	.59	683	216	47	1.7	647	8.3
Nov. 18-30.....	900	38		64	7.4	48		160	10	113	22		3.0		384	.52	933	190	42	1.5	564	8.6
Dec. 1-31.....	633	36		68	9.4	52	5.0	200	0	114	25		2.9		410	.56	701	208	44	1.6	612	8.2
Jan. 1-31, 1960...	612	33		70	8.1	50	5.5	206	0	110	25		2.6		405	.55	669	208	39	1.5	613	7.7
Feb. 1-29.....	663	36		62	7.7	47	4.5	177	6	108	22		2.6		383	.52	686	186	31	1.5	553	8.5
Mar. 1-31.....	1197	30		63	8.5	41		179	0	104	18		2.6		355	.48	1150	192	45	1.3	549	7.7
Apr. 1-9.....	1962	31		60	6.4	33		173	0	84	15		2.6		317	.43	1680	176	34	1.1	480	7.9
Apr. 10-30.....	3231	29		47	4.3	23		146	0	50	11		1.2		238	.32	2080	135	15	.9	363	8.1
May 1-2, 4-22.....	1598	26		49	5.2	29		153	0	62	14		1.6		262	.36	1130	144	18	1.1	405	8.1
May 3.....	1450	26		67	5.1	29		202	0	63	14		2.4		306	.42	1200	188	22	.9	476	7.8
May 23-31.....	1017	27		52	5.4	33		162	0	69	16		1.5		284	.39	780	152	19	1.2	437	8.0
June 1-6.....	1071	25		51	6.1	33		160	0	71	15		1.3		281	.38	813	152	21	1.2	436	8.0

RIO GRANDE BASIN--Continued

8-3320. RIO GRANDE NEAR BERNARDO, N. MEX.--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
June 7-16, 1960...	2647	26		46	4.6	28		122	7	66	12		1.6		251	0.34	1790	134	22	1.1	382	8.5
June 17-27.....	1459	26		53	5.8	34		152	0	83	14		1.0		292	.40	1150	156	31	1.2	450	7.9
June 28-30.....	259	31		70	10	57		208	0	131	27		.6		429	.58	300	216	45	1.7	654	7.6
July 1-17.....	110	36		84	11	83		242	0	180	40		1.1		554	.75	165	256	57	2.3	827	8.1
July 18-31.....	26.6	42		90	16	123		243	0	267	63		.6		721	.98	51.7	292	93	3.1	1060	8.1
Aug. 1-Sept. 30...	4.7	48		89	18	125		242	0	274	64		1.0		738	1.00	9.35	294	95	3.2	1080	8.1
Weighted average	--	30		57	6.5	36		165	1	84	17		2.0		316	0.43	698	168	30	1.2	479	8.0
Time-weighted average.....	817	37		70	10	64		196	1	143	31		2.1		457	--	--	215	50	1.8	680	8.0
Tons per day....	--	67		125	14	80		365	3	185	37		4.4		--	--	--	--	--	--	--	--

Temperature (°F) of water, water year October 1959 to September 1960

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

RIO GRANDE BASIN--Continued

8-3320. RIO GRANDE NEAR BERNARDO, N. MEX.--Continued

Suspended sediment, water year October 1959 to September 1960
(Where no concentrations are reported, loads are estimated)

Day	OCTOBER			NOVEMBER			DECEMBER		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1..	20	--	A 19	464	--	S 12800	535	--	2510
2..	29	--	22	408	--	11100	510	--	2170
3..	23	--	9	429	--	7770	543	--	2630
4..	40	--	34	442	--	5180	554	--	2630
5..	48	--	45	466	--	6020	552	--	2400
6..	75	--	96	463	--	6480	529	--	2260
7..	87	--	168	437	--	3960	524	--	2150
8..	96	--	490	421	--	3140	515	--	1950
9..	107	--	798	408	--	2770	526	--	3110
10..	104	--	576	424	--	2600	554	--	2690
11..	119	--	610	432	--	2300	563	--	2370
12..	137	--	577	434	--	2250	566	--	2520
13..	108	--	283	442	--	2410	580	--	2660
14..	70	--	111	453	--	2530	623	--	2960
15..	121	--	213	505	--	3360	683	--	3920
16..	122	--	177	539	--	3600	716	--	3830
17..	85	--	119	835	--	S 8990	704	--	3440
18..	87	--	101	1150	--	16200	668	--	3110
19..	118	--	145	1350	--	18800	609	--	2440
20..	114	--	126	1280	--	15800	606	--	2640
21..	99	--	83	1220	--	13600	641	--	2840
22..	88	--	59	992	--	9840	632	--	2730
23..	80	--	50	848	--	6590	656	--	2890
24..	60	--	29	758	--	4970	674	--	2860
25..	63	--	31	710	--	4370	681	--	2710
26..	60	--	30	716	--	4400	708	--	3210
27..	45	--	16	710	--	4460	746	--	3950
28..	35	--	9	692	--	3880	854	--	5600
29..	52	--	37	656	--	3680	851	--	5670
30..	134	--	S 491	612	--	3100	770	--	4080
31..	226	--	971	--	--	--	738	--	3170
Total	2652	--	6525	19696	--	196950	19611	--	94100
	JANUARY			FEBRUARY			MARCH		
1..	653	--	2930	662	--	2450	618	--	2270
2..	590	--	2800	678	--	2800	609	--	2650
3..	557	--	A 2400	710	--	3580	600	--	2590
4..	473	--	1310	718	--	3160	570	--	2060
5..	367	--	885	690	--	3150	591	--	1890
6..	352	--	866	702	--	2850	552	--	1850
7..	357	--	709	662	--	2740	553	--	1660
8..	369	--	1110	658	--	2610	508	--	1430
9..	428	--	1200	650	--	2700	571	--	2250
10..	468	--	1710	654	--	3020	959	--	S 11300
11..	546	--	2180	706	--	3220	1100	--	S 16300
12..	666	--	5010	710	--	3130	1230	--	15100
13..	934	--	S 9370	686	--	2710	1200	--	13700
14..	1070	--	11200	678	--	2970	1030	--	9410
15..	794	--	5770	686	--	2970	1160	--	14100
16..	758	--	5240	662	--	2860	1490	--	21800
17..	678	--	3400	658	--	2470	1250	--	15800
18..	626	--	2920	638	--	2400	1020	--	10300
19..	650	--	3170	643	--	2350	901	--	7820
20..	588	--	2460	662	--	2720	1020	--	9190
21..	465	--	1420	634	--	2180	950	--	7200
22..	465	--	1440	654	--	2220	1040	--	8610
23..	525	--	1900	661	--	2490	1280	--	17100
24..	552	--	1950	670	--	2520	1420	--	19200
25..	674	--	2930	638	--	2400	1820	--	26700
26..	766	--	3700	612	--	2050	1550	--	18200
27..	746	--	3670	633	--	2890	2200	--	35000
28..	754	--	3930	593	--	2250	2420	--	36100
29..	702	--	2920	629	--	2200	2260	--	31300
30..	702	--	2920	--	--	--	2300	--	33000
31..	710	--	2810	--	--	--	2320	--	36200
Total	18985	--	96230	19237	--	78060	37092	--	432080

S Computed by subdividing day.
A Computed from partly estimated-concentration graph.

RIO GRANDE BASIN--Continued

8-3320. RIO GRANDE NEAR BERNARDO, N. MEX.--Continued

Suspended sediment, water year October 1959 to September 1960--Continued

Day	APRIL			MAY			JUNE		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	2480	--	40800	2210	--	22100	1080	--	2930
2	2220	--	33000	1660	--	17100	1020	--	2450
3	1960	--	23000	1450	-- S	15400	963	--	2180
4	1730	--	18200	1160	--	8650	844	-- A	1900
5	1470	--	10100	1580	--	11300	1100	-- S	4590
6	1420	--	11700	1780	--	11800	1420	--	4660
7	1820	--	20700	1260	--	6210	1320	--	4550
8	2240	--	33100	1580	--	11500	1830	-- S	13400
9	2320	--	39400	1420	--	6290	2000	--	16900
10	2870	-- A	50000	1330	--	6070	2270	-- A	31000
11	3060	--	56600	1200	--	4900	3290	--	63000
12	3180	-- A	55000	1020	--	3470	3710	--	48500
13	3850	--	80300	1230	--	5300	3070	--	43600
14	4350	--	70700	1380	--	7930	2820	--	41700
15	4040	--	57500	1900	-- S	18800	3230	--	46000
16	3920	--	37200	1730	--	9930	2930	--	35500
17	4240	--	45200	1660	--	9760	2220	--	13200
18	3730	--	42800	1800	--	12700	1860	--	10400
19	3200	--	37600	1790	--	10900	1920	--	12200
20	2830	--	20800	1830	--	7950	1950	--	19900
21	2740	--	28100	1800	--	11100	1490	--	11200
22	2730	--	19100	2230	--	15600	1250	--	5010
23	2790	--	25600	1580	--	9350	1250	--	5450
24	3440	--	26000	1100	-- A	5800	1200	-- A	5200
25	3480	--	31600	1100	--	5430	1090	--	4190
26	3520	--	21600	1000	--	3380	1040	--	3900
27	3240	-- A	29000	959	--	3460	776	--	2590
28	2590	--	23600	828	--	3690	376	--	697
29	2200	--	14800	645	--	1490	225	--	574
30	1860	--	8660	902	-- A	2400	176	--	303
31	--	--	--	1040	--	3040	--	--	--
Total	85520	--	1011760	44154	--	271800	49720	--	457674

	JULY			AUGUST			SEPTEMBER		
1	157	--	234	11	--	1	2.5	--	--
2	121	--	69	9.5	--	1	2.4	--	--
3	107	--	25	7.3	--	T	2.5	--	--
4	92	--	38	5.4	--	T	2.5	--	--
5	94	--	38	4.3	--	T	2.4	--	--
6	115	--	125	4.9	--	T	2.4	--	--
7	120	--	129	7.2	--	T	2.1	--	--
8	108	--	98	6.5	--	T	1.8	--	--
9	107	--	66	4.4	--	T	1.6	--	--
10	124	--	130	3.7	--	T	1.6	--	--
11	146	--	153	3.2	--	T	1.8	--	--
12	136	--	135	3.8	--	T	1.8	--	--
13	108	--	138	2.6	--	T	1.6	--	--
14	72	--	228	3.6	--	T	1.5	--	--
15	80	--	205	3.4	--	T	1.5	--	--
16	87	--	224	16	--	200	1.6	--	--
17	101	--	192	15	--	100	1.5	--	--
18	58	--	74	18	--	100	1.5	--	--
19	48	--	45	24	--	136	1.6	--	--
20	35	--	23	15	--	71	1.7	--	--
21	29	--	6	9.3	--	15	1.6	--	--
22	29	--	3	9.3	--	6	1.6	--	--
23	27	--	2	15	--	7	1.3	--	--
24	26	--	3	8.6	--	1	1.2	--	--
25	22	--	2	5.1	--	1	1.2	--	--
26	22	--	2	3.5	--	T	1.2	--	--
27	18	--	1	2.7	--	T	1.2	--	--
28	16	--	1	2.4	--	T	1.4	--	--
29	17	--	1	4.3	--	T	1.3	--	--
30	14	--	1	3.4	--	T	1.2	--	--
31	11	--	1	2.7	--	T	--	--	--
Total	2247	--	2392	235.1	--	641	51.1	--	1

Total discharge for year (cfs-days)..... 299,200.2
Total load for year (tons)..... 2,648,213

S Computed by subdividing day.
T Less than 0.50 ton.
A Computed from partly estimated-concentration graph.

8-3320. RIO GRANDE NEAR BERNARDO, N. MEX.--Continued

CONVEYANCE CHANNEL

Particle-size analyses of suspended sediment, water year October 1959 to September 1960
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Water temperature (°F)	Sampling point	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters											Method of analysis
							0.002	0.004	0.008	0.016	0.032	0.062	0.125	0.250	0.500	1.000	2.000	
Oct. 11, 1959	0900	56		92	2140		--	87	--	95	--	99	100	--	--			SPWC
Nov. 3	1800	51		436	5650		--	72	--	87	--	88	92	100	--			VPWC
Nov. 20	1700	50		1260	4590		--	42	--	56	--	60	70	98	100			VPWC
Dec. 2	1700	45		517	1570		--	29	--	44	--	53	70	100	--			VPWC
Jan. 11, 1960	1205	45		553	1550		--	--	--	--	--	44	62	100	--			V
Feb. 3	1700	46		704	1670		--	--	--	--	--	48	68	100	--			V
Mar. 12	1000	50		370	2680		40	54	61	70	73	73	84	100	--			VPWC
Mar. 12	1000	50		370	2680		6	17	56	67	69	73	84	100	--			VPN
May 25	1205	67		454	966		--	--	--	--	--	58	87	100	--			V
June 21	1100	80		586	1140		21	23	--	34	--	70	91	100	--			VPWC
July 13	1700	83		92	510		--	--	--	--	--	50	52	76	99	100		V
Aug. 19	1700	82		16	2060		71	84	--	93	--	100	--	--	--			PWC

FLOODWAY

Particle-size analyses of suspended sediment, water year October 1959 to September 1960
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Water temperature (°F)	Sampling point	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters											Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Mar. 20, 1960	1000	50		830	4330			39		54		68	87	99	100			VPWC
Apr. 20	1630	63		2520	2310			26		44		84	96	100	--			VPWC
Apr. 27	1730	60		2790	9230			5		9		31	85	100	--			VPWC
May 6	1830	60		910	2370			15		22		44	70	95	100			VPWC
May 25	1300	70		678	2240			--		--		28	64	100	--			V
June 11	0900	66		3070	7850			10		15		35	64	96	100			VPWC
June 29	1900	76		1.8	40			--		--		96	99	100	--			S

RIO GRANDE BASIN--Continued

8-3530. RIO PUERCO NEAR BERNARDO, N. MEX.

LOCATION.--At gaging station at bridge on U.S. Highway 85, 1.2 miles southwest of Bernardo, Socorro County, 3 miles upstream from mouth, and 18 miles south of Belen.
DRAINAGE AREA.--5,860 *square miles, approximately.*
RECORDS AVAILABLE.--Sediment records: October 1947 to September 1960.
EXTREMES, 1959-60.--Sediment concentrations: Maximum daily, 214,000 ppm Mar. 9; minimum daily, no flow on many days.
Sediment loads: Maximum daily, 1,000,000 tons Mar. 9; minimum daily, 0 tons on many days.
EXTREMES, 1947-60.--Sediment concentrations: Maximum daily, 230,000 ppm July 26, 1957; minimum daily, no flow on many days.
Sediment loads: Maximum daily, 2,240,000 tons Aug. 7, 1957; minimum daily, 0 tons on many days.
REMARKS.--Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of miscellaneous water temperatures available in district office at Albuquerque, N. Mex. Records of discharge for water year October 1959 to September 1960 given in WSP 1712.

Suspended sediment, water year October 1959 to September 1960
(Where no concentrations are reported, loads are estimated)

Day	OCTOBER			NOVEMBER			DECEMBER		
		Suspended sediment			Suspended sediment			Suspended sediment	
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1	0	--	0	406	92000 B	120000	--	--	--
2	0	--	0	111	51000	15900	--	--	--
3	.1	--	20	25	48000	3360	--	--	--
4	0	--	0	136	93000 B	50000	--	--	--
5	0	--	0	64	80000	14300	--	--	--
6	0	--	0	5.5	39000 B	600	--	--	--
7	0	--	0	.4	6500 B	14	--	--	--
8	0	--	0	0	--	0	--	--	--
9	0	--	0	0	--	0	--	--	--
10	0	--	0	0	--	0	--	--	--
11	0	--	0	0	--	0	--	--	--
12	0	--	0	0	--	0	--	--	--
13	0	--	0	0	--	0	--	--	--
14	0	--	0	0	--	0	--	--	--
15	0	--	0	0	--	0	--	--	--
16	0	--	0	0	--	0	--	--	--
17	0	--	0	0	--	0	--	--	--
18	0	--	0	0	--	0	--	--	--
19	0	--	0	0	--	0	--	--	--
20	0	--	0	0	--	0	--	--	--
21	0	--	0	0	--	0	--	--	--
22	0	--	0	0	--	0	--	--	--
23	0	--	0	0	--	0	--	--	--
24	0	--	0	0	--	0	--	--	--
25	0	--	0	0	--	0	--	--	--
26	0	--	0	0	--	0	--	--	--
27	0	--	0	0	--	0	--	--	--
28	0	--	0	0	--	0	--	--	--
29	2.5	3000 B	48	0	--	0	--	--	--
30	11	8200	244	0	--	0	--	--	--
31	233	53000 B	120000	--	--	--	--	--	--
Total	246.6	--	120312	747.9	--	204174	0	--	0

B Computed from estimated-concentration graph.

RIO GRANDE BASIN--Continued

8-3530. RIO PUERCO NEAR BERNARDO, N. MEX.--Continued

Suspended sediment, water year October 1959 to September 1960--Continued

Day	JANUARY			FEBRUARY			MARCH		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	--	--	--	--	--	--	0	--	0
2	--	--	--	--	--	--	0	--	0
3	--	--	--	--	--	--	0	--	0
4	--	--	--	--	--	--	0	--	0
5	--	--	--	--	--	--	0	--	0
6	--	--	--	--	--	--	0	--	0
7	--	--	--	--	--	--	0	--	0
8	--	--	--	--	--	--	95	45500 S	46200
9	--	--	--	--	--	--	1430	214000 S	1000000
10	--	--	--	--	--	--	1480	180000 S	935000
11	--	--	--	--	--	--	1190	174000 S	698000
12	--	--	--	--	--	--	875	147000 S	413000
13	--	--	--	--	--	--	285	99000	81800
14	--	--	--	--	--	--	264	112000	85700
15	--	--	--	--	--	--	220	103000	65700
16	--	--	--	--	--	--	184	92500	49400
17	--	--	--	--	--	--	110	86000	26500
18	--	--	--	--	--	--	70	68700	13500
19	--	--	--	--	--	--	50	66800	9350
20	--	--	--	--	--	--	10	62100	1740
21	--	--	--	--	--	--	30	70000	5880
22	--	--	--	--	--	--	50	91000	13200
23	--	--	--	--	--	--	34	84500	8040
24	--	--	--	--	--	--	26	90500	6820
25	--	--	--	--	--	--	9.5	96500	2660
26	--	--	--	--	--	--	9.0	92000	2400
27	--	--	--	--	--	--	8.6	91500	2820
28	--	--	--	--	--	--	13	92000 B	3500
29	--	--	--	--	--	--	5.4	87000	1360
30	--	--	--	--	--	--	2.2	81000 B	500
31	--	--	--	--	--	--	1.0	78000 B	220
Total	0	--	0	0	--	0	6451.7	--	3473290

Day	APRIL			MAY			JUNE		
1	0.4	72000 B	81	5.0	--	600	0	--	0
2	.3	65500	55	1.5	--	250	0	--	0
3	.5	68000 B	95	.4	--	70	0	--	0
4	.1	79500	22	.3	--	45	0	--	0
5	0	--	0	.8	--	150	0	--	0
6	0	--	0	.1	--	15	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	276	18000 B	63000
11	0	--	0	0	--	0	482	39600 S	73800
12	0	--	0	0	--	0	37	25000 S	2790
13	0	--	0	0	--	0	1.1	1210	4
14	.3	2100 B	77	0	--	0	0	--	0
15	49	100000 B	14000	0	--	0	0	--	0
16	58	95000 B	16000	0	--	0	0	--	0
17	40	88000 B	10000	1.5	34000 B	310	0	--	0
18	18	83000 B	4200	4.5	--	800	0	--	0
19	16	85000	3810	2.4	--	400	0	--	0
20	17	82000	3900	1.1	--	150	0	--	0
21	17	81000	3860	.7	--	90	0	--	0
22	6.4	80500	1440	0	--	0	0	--	0
23	7.7	80000 B	1700	0	--	0	0	--	0
24	14	--	3000	0	--	0	0	--	0
25	22	--	5500	0	--	0	0	--	0
26	30	--	8000	0	--	0	0	--	0
27	35	--	9500	0	--	0	0	--	0
28	20	--	5000	0	--	0	0	--	0
29	12	--	3000	0	--	0	0	--	0
30	6.4	--	1500	0	--	0	0	--	0
31	--	--	--	0	--	0	--	--	--
Total	370.1	--	94740	16.3	--	2880	796.1	--	139594

S Computed by subdividing day.
B Computed from estimated-concentration graph.

RIO GRANDE BASIN--Continued

8-3530. RIO PUERCO NEAR BERNARDO, N. MEX.--Continued

Suspended sediment, water year October 1959 to September 1960--Continued

Day	JULY			AUGUST			SEPTEMBER		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	--	--	--	0	--	0	0	--	0
2	--	--	--	0	--	0	0	--	0
3	--	--	--	0	--	0	0	--	0
4	--	--	--	0	--	0	0	--	0
5	--	--	--	0	--	0	0	--	0
6	--	--	--	0	--	0	0	--	0
7	--	--	--	0	--	0	0	--	0
8	--	--	--	0	--	0	0	--	0
9	--	--	--	0	--	0	0	--	0
10	--	--	--	0	--	0	0	--	0
11	--	--	--	0	--	0	.5	5000 B	87
12	--	--	--	0	--	0	4.5	--	250
13	--	--	--	158	56200 S	108000	0	--	0
14	--	--	--	27	86000 B	6500	0	--	0
15	13	15100 S	1950	8.2	--	2000	0	--	0
16	--	--	--	3.0	--	600	0	--	0
17	--	--	--	2.3	--	450	.9	10000 B	130
18	--	--	--	5.3	--	1100	0	--	0
19	--	--	--	2.3	--	450	0	--	0
20	--	--	--	0	--	0	0	--	0
21	--	--	--	0	--	0	0	--	0
22	--	--	--	0	--	0	0	--	0
23	--	--	--	0	--	0	0	--	0
24	--	--	--	0	--	0	0	--	0
25	--	--	--	0	--	0	0	--	0
26	--	--	--	0	--	0	0	--	0
27	--	--	--	0	--	0	0	--	0
28	--	--	--	0	--	0	0	--	0
29	--	--	--	0	--	0	0	--	0
30	--	--	--	0	--	0	0	--	0
31	--	--	--	0	--	0	--	--	--
Total	13	--	1950	206.1	--	119100	5.9	--	467

Total discharge for year (cfs-days)..... 8,853.7
Total load for year (tons)..... 4,156,507

S Computed by subdividing day.
B Computed from estimated-concentration graph.

8-3530. RIO PUERCO NEAR BERNARDO, N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1959 to September 1960
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Water temperature (°F)	Sampling point	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Nov. 2, 1959.....	1400	55		175	46900			78		92		98	100	--	--			VPWC
Nov. 3.....	1030	50		32	48600			88		98		100	--	--	--			PWC
Mar. 8, 1960.....	2030	50		356	157000			56		79		94	98	100	--			VPWC
Mar. 9.....	1530	50		654	193000			36		48		74	88	99	100			SPWC
Mar. 10.....	0100	45		3700	227000			29		37		58	71	98	100			SPWC
Mar. 11.....	0300	45		2830	202000			28		36		62	80	99	100			SPWC
Mar. 11.....	1530	52		768	158000			39		51		73	87	99	100			SPWC
Mar. 13.....	1205	51		288	100000			54		74		85	91	99	100			SPWC
Apr. 21.....	1630	61		5	77200			90		100		--	--	--	--			PWC
June 12.....	1100	65		44	25700			90		99		99	100	--	--			VPWC
Aug. 13.....	0900	72		228	125000		62	75		96		100	--	--	--			PWC

Particle-size analyses of bed material, water year October 1959 to September 1960
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Water temperature (°F)	Sampling point	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Bed material: Percent finer than size indicated, in millimeters											Method of analysis
							0.062	0.125	0.250	0.500	1.000	2.000	4.000	8.000	16.00	32.00	64.00	
Nov. 3, 1959.....	1050	50	3	32			4	12	66	99	100							S
Mar. 9, 1960.....	1600	50	3	654			53	70	90	98	100							V

RIO GRANDE BASIN--Continued

8-3548. RIO GRANDE CONVEYANCE CHANNEL AT SAN ACACIA, N. MEX.

LOCATION.--At gaging station at railway crossing, 0.5 mile south of San Acacia, and 0.8 mile downstream from San Acacia diversion dam, Socorro County.
RECORDS AVAILABLE.--Water temperatures: May 1959 to September 1960.
Sediment records: January 1959 to September 1960.
EXTREMES, 1959-60.--Water temperatures: Maximum, 91°F July 22; minimum, 37°F Jan. 17.
Sediment concentrations: Maximum daily, 97,200 ppm Mar. 9; minimum daily, no flow Sept. 9-10, 14-18.
Sediment loads: Maximum daily, 423,000 tons Mar. 10; minimum daily, 0 tons Sept. 9-10, 14-18.
EXTREMES, 1959-60.--Water temperatures: Maximum, 93°F July 10, 1959; minimum, 37°F Jan. 17, 1960.
Sediment concentrations: Maximum daily, 131,000 ppm Aug. 10, 1959; minimum daily, no flow on several days each year.
Sediment loads: Maximum daily, 423,000 tons Mar. 10, 1960; minimum daily, 0 tons on several days each year.
REMARKS.--Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of discharge for water year October 1959 to September 1960 furnished by Santa Fe district office of Surface Water Branch. Records of composite discharge for Rio Grande conveyance channel at San Acacia, and Rio Grande floodway at San Acacia given under Rio Grande at San Acacia in WSP 1712. Quality of Water records for Rio Grande floodway at San Acacia given on page 472.

Temperature (°F) of water, water year October 1959 to September 1960

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

RIO GRANDE BASIN--Continued

8-3548. RIO GRANDE CONVEYANCE CHANNEL AT SAN ACACIA, N. MEX.--Continued

Suspended sediment, water year October 1959 to September 1960

Day	OCTOBER			NOVEMBER			DECEMBER		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	0.2	20	T	728	37100	S 86100	581	7600	11900
2	.3	21	T	623	34300	59800	527	8700	12400
3	.6	34	T	461	21500	26800	569	8150	12500
4	.3	31	T	491	27600	36600	590	7600	12100
5	.4	24	T	491	35200	48400	581	7300	11500
6	.4	30	T	500	19200	25900	569	7300	11200
7	.5	37	T	461	14700	18300	554	7000	10500
8	7.4	1800	S 129	428	11000	12700	527	6800	9680
9	2.4	1220	8	419	9200	10400	521	8100	11400
10	2.0	2780	15	425	9100	10400	551	6700	9970
11	2.0	2940	16	440	9700	11500	563	6700	10200
12	1.8	1060	5	443	7800	9330	554	6850	10200
13	1.6	580	3	452	7000	8540	557	6450	9700
14	1.0	640	2	464	7300	9150	584	7100	11200
15	1.3	550	2	512	6700	9260	683	7200	13300
16	1.3	210	1	587	7200	11400	752	6900	14000
17	1.1	72	T	806	10100	S 25100	728	7150	14100
18	1.0	40	T	1180	15400	49100	686	7050	13100
19	1.1	72	T	.8	720	2	611	4150	6850
20	1.1	31	T	590	5600	S 17200	584	3500	5520
21	1.1	30	T	1150	12700	39400	626	5200	8790
22	1.1	30	T	1060	7200	20600	632	6550	11200
23	1.1	29	T	848	7400	16900	644	7050	12300
24	1.1	58	T	749	7800	15800	656	8000	14200
25	1.0	27	T	686	7800	14400	656	6700	11900
26	.8	28	T	701	8500	16100	686	5850	10800
27	.6	36	T	740	9300	18600	713	6450	12400
28	.6	88	T	725	8800	17200	818	6000	13300
29	.9	254	1	722	9500	18500	872	6400	15100
30	55	5630	S 2200	674	8700	15800	746	7300	14700
31	243	13000	8530	--	--	--	692	7500	14000
Total	334.1	--	10914	18556.8	--	679282	19613	--	360010

Day	JANUARY			FEBRUARY			MARCH		
1	695	7150	13400	659	4800	8540	629	3600	6110
2	647	6950	12100	650	4750	8340	581	4400	6900
3	623	7150	12000	695	4450	8350	543	2900	4250
4	578	6200	9680	719	4750	9220	503	2450	3330
5	431	5700	6630	518	3050	S 5280	482	1850	2410
6	374	6250	6310	14	162	6	431	1550	1800
7	365	6050	5960	4.7	216	3	434	1800	2110
8	356	5300	5090	4.2	15	T	407	1800	1980
9	398	5250	5640	4.2	26	T	1360	97200	S 383000
10	458	5800	7170	216	2010	S 3460	1550	94000	423000
11	518	5850	8180	692	6500	12100	859	61000	S 170000
12	638	5900	10200	692	5800	10800	716	56000	112000
13	812	7150	15700	689	5650	10500	674	31000	56400
14	773	8200	17100	662	6500	11600	671	23000	41700
15	698	8000	15100	656	5300	9390	713	22000	42400
16	776	5750	12000	653	4650	8200	743	22000	44000
17	725	6150	12000	662	5000	8940	725	20000	39200
18	686	6450	11900	656	4450	7880	680	16000	29400
19	680	6000	11000	662	5000	8940	581	12500	19600
20	671	6700	12100	674	5600	10200	548	12200	18100
21	479	6450	8340	665	5550	9970	557	11900	17900
22	509	5550	7630	662	4800	8580	548	7600	11200
23	536	6450	9330	680	4900	9000	626	11300	19100
24	530	5600	8010	680	4800	8810	698	13800	26000
25	629	5050	8580	656	5050	8940	701	12800	24200
26	743	4700	9430	644	5700	9910	580	9450	14800
27	755	4500	9170	659	5300	9430	815	12500	S 29100
28	770	4850	10100	632	4800	8190	875	12500	29500
29	710	4900	9390	611	4300	7090	785	10200	21600
30	680	4750	8720	--	--	--	803	12200	26500
31	695	4650	8730	--	--	--	800	9900	21400
Total	18938	--	306690	16071.1	--	221669	21718	--	1648990

S Computed by subdividing day.
T Less than 0.50 ton.

RIO GRANDE BASIN--Continued

8-3548. RIO GRANDE CONVEYANCE CHANNEL AT SAN ACACIA, N. MEX.--Continued

Suspended sediment, water year October 1959 to September 1960--Continued

Day	APRIL			MAY			JUNE		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	727	8500	16600	8.8	450	11	260	5020	3520
2	692	12700	23700	8.5	400	9	171	2710 S	2010
3	641	1 500	18200	13	621 S	33	23	1100	68
4	560	8050	12200	28	1530	116	15	1330	54
5	458	6500	8040	27	1490	109	13	1020	36
6	365	6000	5910	24	1050	68	12	630	20
7	304	6700	5500	23	1490	93	20	1310	71
8	293	7650	6050	23	1990	124	21	2210	125
9	452	8550	10400	23	1500	93	16	2300	99
10	560	8500	12900	22	995	59	13	1010	35
11	376	7400	7510	21	1020	58	8.5	515	12
12	12	2800	91	20	1200	65	7.6	430	9
13	8.5	330	8	20	1010	55	597	10100 S	31800
14	7.3	80	2	20	1070	58	392	13600 S	21600
15	7.0	45	1	20	1450	78	30	1520	123
16	6.8	31	1	18	1240	60	14	680	26
17	6.5	24	T	17	980	45	17	575	26
18	6.0	76	1	16	1000	43	19	590	30
19	5.5	30	T	13	800	28	16	550	24
20	5.7 C	15	T	12	515	17	14	480	18
21	5.7 C	15	T	9.1	280	7	11	550	16
22	5.5 C	35	1	6.0	205	3	11	320	10
23	5.5 C	35	1	331	2550 S	2960	14	360	14
24	5.7 C	35	1	734	4320	8560	13	420	15
25	5.7 C	13	T	605	4400	7190	12	775	25
26	6.0 C	13	T	100	2490 S	888	12	520	17
27	6.0 C	13	T	22	1730	103	11	175	5
28	6.0	12	T	21	2210	125	12	350	11
29	7.3	95	2	21	1500	85	11	390	12
30	9.8	510	13	21	2030	115	10	320	9
31	--	--	--	118	3840 S	1500	--	--	--
Total	5551.5	--	127134	2365.4	--	22758	1796.1	--	59840

Day	JULY			AUGUST			SEPTEMBER		
1	9.8	220	6	1.1	28	T	0.2	12	T
2	9.4	200	5	1.4	36	T	.1	10	T
3	9.1	325	8	1.8	24	T	.1	4	T
4	8.8	200	5	1.8	55	T	.1	10	T
5	8.8	100	2	1.4	22	T	.1	12	T
6	8.8	76	2	2.1	20	T	.1	13	T
7	8.5	308	7	1.8	22	T	.1	3	T
8	9.4	94	2	1.7	16	T	.1	11	T
9	10	134	4	1.6	11	T	0	--	0
10	10	143	4	1.4	16	T	0	--	0
11	10	119	3	1.6	14	T	.2	22	T
12	11	75	2	1.4	23	T	.2	10	T
13	10	83	2	1.0	15	T	.2	9	T
14	6.4	90 B	2	.9	18	T	0	--	0
15	3.5	120 B	1	.8	51	T	0	--	0
16	3.2	179	2	.6	58	T	0	--	0
17	3.2	158	1	.6	17	T	0	--	0
18	4.0	100 B	1	.6	11	T	0	--	0
19	3.5	44	T	.6	10	T	.6	142 S	1
20	3.2	38	T	.6	9	T	.4	42	T
21	3.2	32	T	.6	9	T	.2	8	T
22	3.0	33	T	.5	49	T	.3	55	T
23	2.6	29	T	.5	49	T	.3	3	T
24	2.4	32	T	.4	16	T	.3	12	T
25	2.1	23	T	.4	10	T	.4	4	T
26	2.1	30	T	.4	5	T	.4	4	T
27	2.0	31	T	.4	12	T	.3	4	T
28	2.0	22	T	.4	16	T	.3	4	T
29	1.6	20	T	.4	5	T	.3	4	T
30	1.2	17	T	.3	10	T	.3	4	T
31	1.0	32	T	.2	13	T	--	--	--
Total	173.8	--	62	29.3	--	2	5.6	--	1

Total discharge for year (cfs-days)..... 105,152.7
Total load for year (tons)..... 3,437,352

S Computed by subdividing day.
T Less than 0.50 ton.
B Computed from estimated-concentration graph.
C Composite period.

8-3548. RIO GRANDE CONVEYANCE CHANNEL AT SAN ACACIA, N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1959 to September 1960
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Water temperature (°F)	Sampling point	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Oct. 13, 1959.....	1800	61		2.3	837		--	93	--	99	--	100	--	--	--	--		PWC
Nov. 4.....	1715	54		635	40000		--	61	--	72	--	84	91	98	100	--		VPWC
Nov. 21.....	1630	54		1180	11600		--	29	--	39	--	72	92	99	100	--		VPWC
Dec. 3.....	1700	45		566	7800		--	11	--	16	--	35	64	92	100	--		VPWC
Jan. 4, 1960.....	1630	40		548	5750		--	12	--	19	--	41	67	88	100	--		VPWC
Jan. 13.....	1815	42		824	7700		--	20	--	27	--	48	76	95	99	100		VPWC
Feb. 12.....	1700	52		683	5380		--	13	--	19	--	38	62	93	100	--		VPWC
Mar. 9.....	0040	50		1280	11100		37	43	59	67	78	86	92	98	100	--		VPWC
Mar. 9.....	0040	50		1280	11100		1	4	27	68	78	86	92	98	100	--		VPN
Mar. 11.....	0630	47		1720	102000		--	40	--	54	--	84	96	100	--	--		SPWC
May 8.....	1715	72		22	2000		--	21	--	33	--	52	65	89	100	--		VPWC
May 25.....	1830	70		353	4200		--	8	--	12	--	23	43	84	99	100		VPWC
June 13.....	1515	77		1580	5750		--	21	--	30	--	51	75	96	100	--		VPWC
July 7.....	0640	66		8.8	308		--	--	--	--	--	75	78	89	99	100		S

RIO GRANDE BASIN--Continued

8-3549. RIO GRANDE FLOODWAY AT SAN ACACIA, N. MEX.

LOCATION.--At gaging station, 0.1 mile southeast of San Acacia, Socorro County, 0.7 mile downstream from San Acacia diversion dam, and 2.5 miles downstream from Rio Salado.
DRAINAGE AREA.--26,770 square miles, approximately (includes 2,940 square miles in closed basin in San Luis Valley, Colo.).
RECORDS AVAILABLE.--Chemical analyses: March 1939 to September 1956.
Water temperatures: October 1947 to August 1956, July 1959 to September 1960.
Sediment records: July 1946 to June 1956, January 1959 to September 1960.
EXTREMES, 1959-60.--Water temperatures: Not determined.
Sediment concentrations: Maximum daily, 68,700 ppm Mar. 10; minimum daily, no flow on many days.
Sediment loads: Maximum daily, 303,000 tons Mar. 11; minimum daily, 0 tons on many days.
EXTREMES, 1946-56, 1959-60.--Water temperatures (1947-56, 1959-60): Maximum, 93°F July 15, 1955; minimum, freezing point on several days during winter months.
Sediment concentrations: Maximum daily, 196,000 ppm Aug. 11, 1946; minimum daily, no flow on many days.
Sediment loads: Maximum daily, 1,760,000 tons Aug. 12, 1955; minimum daily, 0 tons on many days.
REMARKS.--Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of discharge for water year October 1959 to September 1960 furnished by Santa Fe district office of Surface Water Branch. Records of composite discharge for Rio Grande conveyance channel at San Acacia and Rio Grande floodway at San Acacia given under Rio Grande at San Acacia in WSP 1712. Quality of Water records for Rio Grande conveyance channel at San Acacia given on page 468.

Temperature (°F) of water, water year October 1959 to September 1960

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

RIO GRANDE BASIN--Continued

8-3549. RIO GRANDE FLOODWAY AT SAN ACACIA, N. MEX.--Continued

Suspended sediment, water year October 1959 to September 1960
(Where no concentrations are reported, loads are estimated)

Day	OCTOBER			NOVEMBER			DECEMBER		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1..	0	--	--	117	--	--	0	--	--
2..	0	--	--	.2	--	--	0	--	--
3..	.1	--	--	0	--	--	0	--	--
4..	.9	--	--	0	--	--	0	--	--
5..	2.5	--	--	0	--	--	0	--	--
6..	3.2	--	--	0	--	--	0	--	--
7..	6.8	--	--	0	--	--	0	--	--
8..	3.2	--	--	0	--	--	0	--	--
9..	4.0	--	--	0	--	--	0	--	--
10..	6.4	--	--	0	--	--	0	--	--
11..	4.4	--	--	0	--	--	0	--	--
12..	4.4	--	--	0	--	--	0	--	--
13..	3.8	--	--	0	--	--	0	--	--
14..	2.8	--	--	0	--	--	0	--	--
15..	4.0	--	--	0	--	--	0	--	--
16..	4.4	--	--	0	--	--	0	--	--
17..	4.0	--	--	0	--	--	0	--	--
18..	4.0	--	--	40	--	--	0	--	--
19..	6.4	--	--	1320	--	--	.8	--	--
20..	7.2	--	--	669	--	--	.9	--	--
21..	7.2	--	--	24	--	--	1.0	--	--
22..	6.4	--	--	12	--	--	1.2	--	--
23..	5.6	--	--	4.8	--	--	1.0	--	--
24..	6.0	--	--	3.5	--	--	.8	--	--
25..	4.8	--	--	2.8	--	--	1.2	--	--
26..	4.0	--	--	1.8	--	--	.8	--	--
27..	4.0	--	--	2.5	--	--	.9	--	--
28..	5.2	--	--	2.2	--	--	.6	--	--
29..	25	--	--	1.5	--	--	.6	--	--
30..	37	--	--	.8	--	--	.6	--	--
31..	3.8	--	--	--	--	--	.6	--	--
Total	181.5	--	6000	2202.1	--	80000	11.0	--	10
	JANUARY			FEBRUARY			MARCH		
1..	0.8	--	3	2.5	--	2	6.8	--	5
2..	1.5	--	3	2.2	--	2	5.6	--	5
3..	1.4	--	3	2.8	--	2	13	--	50
4..	1.2	--	3	.2	--	2	14	--	50
5..	.9	--	3	164	1300 B	1800	14	--	50
6..	1.4	--	3	724	3130	6120	20	--	100
7..	1.8	--	3	698	3000	5650	33	--	450
8..	2.2	--	3	672	2990	5430	18	1800 B	87
9..	2.2	--	3	659	2600	4630	553	63000 S	177000
10..	2.2	--	3	433	1750 S	2590	1140	68700 S	288000
11..	3.5	--	3	17	610	28	1710	57700 S	303000
12..	3.8	--	3	14	620	23	1750	45000	220000
13..	3.5	--	3	11	530	16	905	28200	68900
14..	371	6500 B	6500	11	440	13	544	16600	24400
15..	182	3780 S	2730	13	460	16	577	16000	24900
16..	23	900	56	13	500	18	781	17500	36900
17..	15	--	30	12	480	16	439	15900	18800
18..	5.6	--	4	11	430	13	236	18000	11500
19..	3.0	--	4	8.6	510	12	171	8500	3920
20..	2.8	--	4	6.4	450	8	288	10300 S	10300
21..	2.5	--	4	5.2	330	5	336	8600	7800
22..	2.5	--	4	4.4	260 B	3	374	6000	6060
23..	2.0	--	4	4.0	--	3	739	8600	17200
24..	2.0	--	4	4.0	--	3	659	8600	15300
25..	2.8	--	4	7.2	--	3	1110	9200	27600
26..	2.8	--	4	6.0	--	3	633	8200	14000
27..	2.8	--	4	4.4	--	3	1050	12700	36000
28..	2.5	--	4	3.2	--	3	1400	8200	31000
29..	2.5	--	4	5.2	--	3	1420	8800	33700
30..	2.5	--	4	--	--	--	1530	8050	33300
31..	2.5	--	4	--	--	--	1650	7300	32500
Total	656.2	--	9411	3518.3	--	26420	20119.4	--	1442877

S Computed by subdividing day.
B Computed from estimated-concentration graph.

RIO GRANDE BASIN--Continued

8-3549. RIO GRANDE FLOODWAY AT SAN ACACIA, N. MEX.--Continued

Suspended sediment, water year October 1959 to September 1960--Continued

Day	APRIL			MAY			JUNE		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	1810	6500	31800	2160	3800	22200	788	3030	6450
2	1870	4900	24700	1680	3100	14100	772	2900	6040
3	1350	4500	16400	1460	3400	13400	852	2800	6440
4	1240	4500	15100	1060	3600	10300	756	2500	5100
5	1110	3800	11400	1270	3600	12300	780	2420	5100
6	1040	3700	10400	1730	3300	15400	1110	3500	10500
7	1490	4000	16100	1560	2400 B	10000	1020	2400	6610
8	1930	4600	24000	1370	2400	8880	1400	2450	9260
9	1930	6900	36000	1510	2330	8280	1790	2950	14300
10	1930	7600	39600	1320	1400	4990	2300	4900	30400
11	2730	6400	47200	1140	980	3020	4460	14800 S	193000
12	3020	6100	49700	939	1080	2740	3460	9000	84100
13	3230	8200	71500	1050	1480	4200	2470	4950	33000
14	3760	8300	84300	1250	1470	4960	2280	3250	20000
15	3550	7800	74800	1720	3610 S	20300	2800	2950	22300
16	3150	8400	71400	1740	2700	12700	2600	2650	18600
17	3400	7050	64700	1610	2350	10200	2120	2050	11700
18	3250	6300	55300	1630	2840	12500	1850	1450	7240
19	2620	6050	42800	1570	2680	11400	2160	1850	10800
20	2520	6900	46900	1610	2330	10100	1870	1400	7070
21	2520	5300	36100	1570	2060	8730	1260	1040	3540
22	2440	6500	42800	1790	2040	9860	1060	1110	3180
23	2680	5200	37600	1300	2070	7270	1020	1300	3580
24	3100	5000	41800	371	921 S	1060	1070	1300	3760
25	3250	5500	48300	401	1350 S	1840	878	1310	3110
26	3000	5500	44600	693	1980	3700	788	1300	2770
27	2900	7100	55600	740	2030	4060	616	1900 S	3320
28	2640	5500	39200	740	1680	3360	336	390	354
29	2250	6700	40700	609	1450	2380	152	190	78
30	2040	4300	23700	772	2030	4230	84	160	36
31	--	--	--	812	2350	5150	--	--	--
Total	73750	--	1244500	39177	--	263610	44902	--	531738

Day	JULY			AUGUST			SEPTEMBER		
1	51	200	28	0	--	0	0.1	--	T
2	30	140	11	0	--	0	.1	--	T
3	25	--	6	0	--	0	.1	--	T
4	20	--	6	0	--	0	.1	--	T
5	20	--	6	0	--	0	.1	--	T
6	15	--	6	0	--	0	.1	--	T
7	10	--	6	0	--	0	.1	--	T
8	10	--	6	0	--	0	.1	--	T
9	10	--	6	0	--	0	.1	--	T
10	20	--	6	0	--	0	669	46800 S	128000
11	15	--	6	60	--	20000	5	--	100
12	10	--	6	11	--	2000	1	--	5
13	10	--	6	5.3	60000 B	2900	0	--	0
14	69	14800 S	5920	.1	40000 S	57	0	--	0
15	56	14000 B	4500	45	36300 S	14000	0	--	0
16	41	12000 B	2800	3	--	4	0	--	0
17	2	--	3	.2	--	T	0	--	0
18	1	--	1	.1	--	T	0	--	0
19	.4	--	T	.1	--	T	57	16000 B	10000
20	.4	--	T	.1	--	T	48	21900 S	3590
21	.4	--	T	.1	--	T	24	5000 B	320
22	.3	--	T	.1	--	T	21	2500 B	140
23	.1	--	T	.1	--	T	19	1340	69
24	.1	--	T	.1	--	T	22	1080	64
25	.1	--	T	.1	--	T	20	1130	61
26	0	--	0	.1	--	T	9.9	--	20
27	0	--	0	.1	--	T	.3	--	T
28	0	--	0	.1	--	T	0	--	0
29	0	--	0	.1	--	T	0	--	0
30	0	--	0	.1	--	T	0	--	0
31	0	--	0	.1	--	T	--	--	--
Total	416.8	--	13331	126.0	--	38962	897.1	--	142370

Total discharge for year (cfs-days)..... 185,957.4
Total load for year (tons)..... 3,799,279

S Computed by subdividing day.
T Less than 0.50 ton.
B Computed from estimated-concentration graph.

RIO GRANDE BASIN--Continued

8-3549. RIO GRANDE FLOODWAY AT SAN ACACIA, N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1959 to September 1960
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Water temperature (°F)	Sampling point	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Jan. 15, 1960.....	1650	45		32	1080		--	71		98		99	100	--				SPWC
Feb. 6.....	1730	51		698	2870		--	24		37		71	92	99	100			VPWC
Mar. 9.....	0615	48		2510	109000		--	51		71		95	98	100				VPWC
Mar. 11.....	1815	55		781	50700		--	64		84		99	100	--				VPWC
Apr. 23.....	1700	66		2720	4430		--	23		32		58	86	100				VPWC
May 24.....	1830	62		286	477		--	--		--		95	99	100				S
June 3.....	1800	75		772	1440		--	--		--		52	84	100				V
June 17.....	1845	76		1970	1880		20	24		35		65	89	100				VPWC
July 14.....	0830	72		62	22800		64	82		98		100	--	--				PWC

RIO GRANDE BASIN--Continued

8-3583. RIO GRANDE CONVEYANCE CHANNEL AT SAN MARCIAL, N. MEX.

LOCATION.--At gaging station, 1,800 feet west of San Marcial gage on railway bridge, about 18.5 miles southwest of San Antonio, and about 1 mile south of the site of former village of San Marcial, Socorro County.
RECORDS AVAILABLE.--Chemical analyses: March 1954 to September 1960.
Water temperatures: March 1954 to September 1960.
Sediment records: March 1954 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 1,310 ppm Mar. 9-10; minimum, 332 ppm May 24-25.
Hardness: Maximum, 520 ppm Nov. 1-2; minimum, 165 ppm May 24-25.
Specific conductance: Maximum daily, 1,950 micromhos Nov. 2; minimum daily, 476 micromhos May 25.
Water temperatures: Maximum, 90°F on several days in August and September; minimum, 33°F Jan. 4, 18.
Sediment concentrations: Maximum daily, 94,500 ppm Mar. 10; minimum daily, 1 ppm Sept. 23, 30.
Sediment loads: Maximum daily, 356,000 tons Mar. 10; minimum daily, less than 0.50 ton on several days in August and September.
EXTREMES, 1954-60 --Dissolved solids: Maximum, 2,010 ppm Aug. 2-8, 1956; minimum, 332 ppm May 24-25, 1960.
Hardness: Maximum, 948 ppm Aug. 2-8, 1956; minimum, 165 ppm May 24-25, 1960.
Specific conductance: Maximum daily, 2,860 micromhos Oct. 25, 1956; minimum daily, 476 micromhos May 25, 1960.
Water temperatures: Maximum, 95°F June 21, 22, July 8, 15, 1955; minimum, 33°F on several days in 1954-56, and 1960.
Sediment concentrations: Maximum daily, 119,000 ppm Aug. 8, 1959; minimum daily, no flow on several days in 1956 and 1958.
Sediment loads: Maximum daily, 356,000 tons Mar. 10, 1960; minimum daily, 0 tons on several days in 1956 and 1958.
REMARKS.--Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of discharge for water year October 1959 to September 1960 furnished by Santa Fe district office of Surface Water Branch. Records of composite discharge for Rio Grande conveyance channel at San Marcial, and Rio Grande floodway at San Marcial given under Rio Grande at San Marcial in WSP 1712. Quality of Water records for Rio Grande floodway given on page 472.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1-9, 1959....	22.2	57	0.00	66	26	257	11	174	0	326	249	0.8	0.2	0 36	1070	1.46	64.0	270	127	6.8	1650	8.2
Oct. 10-13.....	60.2	--	--	83	13	116	--	216	0	--	--	--	--	--	664	.90	108	260	83	3.1	978	8.2
Oct. 14-23.....	67.2	--	--	75	26	112	--	240	0	--	--	--	--	--	672	.91	122	292	95	2.8	1000	8.1
Oct. 24-30.....	52.4	--	--	100	24	158	--	268	6	--	--	--	--	--	915	1.24	129	350	120	3.7	1290	8.3
Oct. 31.....	153	--	--	100	18	83	--	265	0	--	--	--	--	--	610	.83	252	322	105	2.0	910	7.6
Nov. 1-2.....	584	--	--	160	29	152	--	304	0	--	--	--	--	--	1060	1.44	1670	520	271	2.9	1500	8.0
Nov. 3-5.....	442	--	--	105	16	108	--	240	0	--	--	--	--	--	731	.99	872	328	131	2.6	1050	7.9
Nov. 6-12.....	401	--	--	84	12	77	--	225	0	--	--	--	--	--	567	.77	614	260	75	2.1	817	8.1
Nov. 13-17.....	441	--	--	78	11	64	--	222	0	--	--	--	--	--	496	.67	591	240	58	1.8	728	7.9
Nov. 18-20.....	621	--	--	92	12	122	--	254	0	--	--	--	--	--	744	1.01	1250	280	72	3.2	1060	7.7
Nov. 21-23.....	942	--	--	62	8 4	47	--	170	0	--	--	--	--	--	390	.53	992	189	50	1.5	568	8.0
Nov. 24-Dec. 31...	619	--	--	70	10	59	--	204	0	--	--	--	--	--	464	.63	775	216	49	1.7	664	8.2
Jan. 1-6, 1960....	576	33	.01	66	10	61	4.8	178	6	130	36	.7	1.5	.13	465	.63	723	206	50	1.8	657	8.4
Jan. 7-10.....	400	--	--	75	12	75	--	193	10	--	--	--	--	--	533	.72	576	236	61	2.1	767	8.6
Jan. 11-31.....	663	--	--	68	7 9	60	--	191	0	--	--	--	--	--	442	.60	791	202	45	1.8	647	8.2

Feb. 1-5.....	705	--	--	65	9.2	58	--	171	10	--	--	--	--	--	438	.60	834	200	43	1.8	626	8.6
Feb. 6-10.....	180	--	--	81	15	114	--	200	8	--	--	--	--	--	665	.90	323	265	88	3.1	1000	8.4
Feb. 11-29.....	635	--	--	66	8.9	56	--	193	0	--	--	--	--	--	426	.58	730	201	43	1.7	625	8.0
Mar. 1-8.....	558	--	--	73	8.8	59	--	227	0	--	--	--	--	--	459	.62	692	218	32	1.7	674	7.7
Mar. 9-10.....	1225	--	--	152	29	216	--	244	0	--	--	--	--	--	1310	1.78	4330	500	300	4.2	1740	7.5
Mar. 11-12.....	750	--	--	108	17	134	--	248	0	--	--	--	--	--	828	1.13	1680	338	135	3.2	1160	7.4
Mar. 13-16.....	780	--	--	87	13	89	--	215	0	--	--	--	--	--	609	.83	1280	272	96	2.4	887	7.6
Mar. 17-29.....	818	--	--	70	11	60	--	190	0	--	--	--	--	--	466	.63	1030	219	63	1.8	679	7.6
Mar. 30-Apr. 11...	737	31	0.01	62	9.4	52	4.9	170	0	123	30	0.5	2.5	0.16	408	.55	812	193	54	1.6	602	8.1
Apr. 12-30.....	408	--	--	76	12	91	--	199	0	--	--	--	--	--	569	.77	627	240	77	2.6	853	8.0
May 1-23.....	407	--	--	74	12	88	--	200	0	--	--	--	--	--	548	.75	602	234	70	2.5	829	8.0
May 24-25.....	924	--	--	54	7.4	41	--	164	0	--	--	--	--	--	332	.45	828	165	30	1.4	504	8.0
May 26.....	571	--	--	63	9.0	58	--	182	0	--	--	--	--	--	408	.55	629	194	45	1.8	627	8.0
May 27-31.....	395	--	--	74	12	85	--	206	0	--	--	--	--	--	536	.73	572	234	65	2.4	808	8.2
June 1-2.....	519	--	--	60	9.4	59	--	178	0	--	--	--	--	--	412	.56	577	188	42	1.9	618	8.1
June 3-30.....	431	--	--	71	9.5	83	--	196	0	--	--	--	--	--	512	.70	596	216	55	2.5	769	8.1
July 1-21.....	202	28	.00	79	12	106	6.2	214	0	194	74	.4	.6	.23	609	.83	332	248	72	2.9	927	8.0
July 22-31.....	68.5	--	--	85	15	152	--	224	6	--	--	--	--	--	787	1.07	146	274	80	4.0	1190	8.4
Aug. 1-10.....	37.2	--	--	91	14	165	--	248	0	--	--	--	--	--	835	1.14	83.8	284	81	4.3	1280	7.8
Aug. 11-13.....	26.3	--	--	74	12	120	--	232	0	--	--	--	--	--	642	.87	45.5	234	44	3.4	971	7.6
Aug. 14-25.....	20.4	--	--	76	17	188	--	202	4	--	--	--	--	--	865	1.18	47.6	258	86	5.1	1340	8.3
Aug. 26-29.....	15.5	--	--	62	13	125	--	198	4	--	--	--	--	--	624	.85	26.0	206	37	3.8	947	8.3
Aug. 30-Sept. 12..	12.0	--	--	82	18	192	--	232	0	--	--	--	--	--	897	1.22	29.0	278	88	5.0	1390	7.7
Sept. 13-25.....	9.7	--	--	72	13	126	--	236	0	--	--	--	--	--	659	.90	17.2	233	39	3.6	995	8.1
Sept. 26-28.....	9.4	--	--	81	18	214	--	240	0	--	--	--	--	--	949	1.29	24.0	276	79	5.6	1490	7.7
Sept. 29-30.....	9.3	--	--	71	14	128	--	234	0	--	--	--	--	--	665	.90	16.6	234	42	3.6	1010	7.8
Weighted average	--	--	--	74	11	74	--	200	1	--	--	--	--	--	515	0.70	552	229	64	2.1	753	8.0
Time-weighted average.....	397	--	--	75	13	100	--	208	1	--	--	--	--	--	598	--	--	240	68	2.8	890	8.0
Tons per day....	--	--	--	79	12	80	--	214	1	--	--	--	--	--	--	--	--	--	--	--	--	--

RIO GRANDE BASIN--Continued

8-3583. RIO GRANDE CONVEYANCE CHANNEL AT SAN MARCIAL, N. MEX.--Continued

Temperature (°F) of water, water year October 1959 to September 1960

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

RIO GRANDE BASIN--Continued

8-3583. RIO GRANDE CONVEYANCE CHANNEL AT SAN MARCIAL, N. MEX.--Continued

Suspended sediment, water year October 1959 to September 1960

Day	OCTOBER			NOVEMBER			DECEMBER		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	17	130 B	6	443	52300 S	85500	574	4500	6970
2	18	440	21	726	74800	152000	522	4000	5640
3	23	1000 B	62	448	34000	42600	536	4300	6220
4	17	200	9	395	16200	17300	568	5200	7970
5	17	80	4	484	38500	52200	560	4300 B	6500
6	17	70 B	3	431	19000	22100	550	4300	6390
7	17	70 B	3	431	15000	17500	536	3300	4780
8	27	1100 B	80	398	11500	12400	522	3200	4510
9	47	1050	133	383	6100	6310	508	3500	4800
10	52	910 B	130	377	A 5600	5700	532	4400	6320
11	60	1020	165	398	5800	6230	550	3600	5350
12	64	1200 B	210	392	6100	6460	532	4000	5750
13	65	1240	218	398	6000	6450	532	3800	5460
14	69	1300 B	240	404	6000	6540	536	3700	5350
15	63	1310	223	417	5400	6080	592	4200	6710
16	46	1100 B	140	470	5500	6980	669	4800	8670
17	74	1460	292	518	6400	8950	672	4900	8890
18	74	1200 B	240	1130	20000	61000	658	4500	7990
19	78	1010	213	581	12300 S	27600	620	4100	6860
20	69	840 B	160	152	4120 S	3960	560	2800 B	4200
21	66	510	91	984	15500	41200	606	3500	5730
22	67	600	109	1030	10700	29800	620	3600	6030
23	66	610	109	812	6700	14700	630	3700	6290
24	63	640 B	110	725	5600	11000	652	3100	5460
25	61	500	82	666	6000 B	11000	655	3100 B	5500
26	63	610 B	100	627	6100	10300	641	3700	6400
27	50	335	45	669	5300	9570	683	4100 B	7600
28	43	180 B	21	676	5800	10600	725	4300	8420
29	43	96	11	652	5600 B	9900	832	4700	10600
30	44	90 B	11	641	4300	7440	760	4100	8410
31	153	1 800 S	4920	--	--	--	718	3500	6790
Total	1633	--	8161	16858	--	709370	18851	--	202560
	JANUARY			FEBRUARY			MARCH		
1	669	3500	6320	690	2600	4840	620	2800	4690
2	655	3200	5660	658	3500	6220	568	2100	3220
3	616	3000 B	5000	683	4600	8480	529	2500	3570
4	610	2600	4280	750	3200	6480	515	2300 B	3200
5	490	2600	3440	746	2900	5840	592	3300	5270
6	417	3100 B	3500	298	1900 B	1500	554	3200	4790
7	398	2500	2690	154	1620	674	560	2000	3020
8	377	2700	2750	144	950	369	529	1610	2300
9	386	2800 B	2900	152	593	243	1150	53300 S	259000
10				152	1300	534	1300	94500	356000
11	501	2000	2710	548	3320 S	5070	800	60000	134000
12	578	3000	4680	658	3700	6570	700	47000	92100
13	690	6100	11400	666	4000 B	7200	700	38400	75300
14	820	7300	16200	641	4800	8310	672	31200	56600
15	662	5300	9470	648	3400	5950	852	29500	67900
16	746	5200	10500	641	2400	4150	896	22900	55400
17	725	4200	8220	624	2500	4210	808	18900	41200
18	686	3000	5560	648	2300	4020	750	10400	21100
19	672	3200	5810	627	2300	3890	746	10000	20100
20	683	3000	5530	627	3600	6090	768	6200	12900
21	574	2400 B	3700	634	2800	4790	728	5700	11200
22	529	3100	4430	616	2500	4160	772	6600	13800
23	515	3000	4170	662	2600	4650	776	7500	15700
24	536	3100 B	4500	666	3000	5390	904	11000	26800
25	599	3500	5660	659	2900	5160	836	8800	19900
26	708	3600	6880	630	3200	5440	832	7600	17100
27	750	3400	6880	624	3800	6400	812	6800	14900
28	788	3500	7450	641	2500	4330	988	10300	27500
29	746	4200	8460	606	2800	4580	908	8700	21300
30	711	3400	6530	--	--	--	864	6800	15900
31	700	3100	5860	--	--	--	880	7500	17800
Total	18975	--	185040	16493	--	135540	23909	--	1423560

S Computed by subdividing day.
B Computed from estimated-concentration graph.

RIO GRANDE BASIN--Continued

8-3583. RIO GRANDE CONVEYANCE CHANNEL AT SAN MARCIAL, N. MEX.--Continued

Suspended sediment, water year October 1959 to September 1960--Continued

Day	APRIL			MAY			JUNE		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	832	7000	15700	398	800	860	482	1020	1330
2	824	6200	13800	407	900	989	556	990	1490
3	856	5800	13400	407	500	549	395	500	533
4	800	5500	11900	410	420	465	383	510 B	530
5	728	3800	7470	414	620	693	376	430	437
6	624	2200	3710	424	680	778	386	370	386
7	556	1800	2700	427	520 B	600	400	1130	1220
8	544	2700	3970	410	510	565	386	720	750
9	608	4500	7390	383	1240	1280	400	600	648
10	717	7300	14100	395	1010	1080	417	520	585
11	759	7200	14600	393	610	647	429	520	602
12	434	2600	3050	400	544	588	410	510	565
13	378	1900	1940	386	611	637	542	1540 S	3460
14	427	1430	1650	383	620 B	640	1140	3620 S	12200
15	390	1120	1180	388	700	733	512	1230	1700
16	398	1200 B	1300	410	950 B	1100	426	700	805
17	414	1280	1430	419	670	758	434	1330	1560
18	432	1750	2040	414	400	447	424	810 B	930
19	410	900	996	412	700	779	415	790	885
20	410	830	919	414	710	794	398	600	645
21	410	820	908	419	640 B	720	395	460	491
22	395	740	789	419	580	656	378	570	582
23	390	700 B	740	432	440	513	383	550	569
24	395	670	715	808	1640	3580	383	460	476
25	424	850	973	1040	2700	7580	381	550 B	570
26	429	680	788	571	1450	2240	395	510	544
27	422	410	467	414	690	771	402	610	662
28	405	430	470	388	710	744	378	600 B	610
29	400	600	648	393	840 B	890	361	580	565
30	398	680 B	730	398	790	849	334	540 B	490
31	--	--	--	381	1100	1130	--	--	--
Total	15603	--	130473	13757	--	34655	13101	--	36820
	JULY			AUGUST			SEPTEMBER		
1	280	390	295	48	47	6	14	15	1
2	259	390	273	43	35	4	13	13	T
3	251	500 B	340	40	79	9	12	11	T
4	241	670	436	47	80	10	12	24	1
5	225	640 B	390	44	75	9	12	10	T
6	201	530	288	37	60 B	6	12	24 B	1
7	209	570	322	33	44	4	12	24 B	1
8	209	810	457	27	34	2	12	38	1
9	217	870 B	510	26	26	2	11	55 B	2
10	217	740	434	27	37	3	10	55 B	1
11	219	870 B	510	25	16	1	10	73	2
12	213	620	357	27	10 B	1	10	18	T
13	199	300	161	27	4	T	10	73 B	2
14	179	160	77	25	27	2	10	73 B	2
15	164	310	137	25	37 B	2	10	128	3
16	166	680	305	24	49	3	9.8	67 B	2
17	172	1000 B	460	23	51	3	9.8	67 B	2
18	172	1110	515	21	19	1	9.4	5	T
19	164	1100 B	490	20	21	1	10	5	T
20	149	650	261	20	38 B	2	9.4	5	T
21	138	350	130	20	54	3	10	5	T
22	113	220	67	18	40 B	2	10	2	T
23	89	150 B	36	17	40 B	2	9.4	1	T
24	80	157	34	16	26	1	9.4	25 B	1
25	72	66	13	16	50	2	9.1	25 B	1
26	64	70 B	12	16	6	T	9.1	25 B	1
27	58	68	11	16	50	2	9.1	51	1
28	56	66	10	15	35 B	1	10	25 B	1
29	54	77	11	15	20	1	9.4	25 B	1
30	50	80 B	11	14	32	1	9.1	1	T
31	49	70	9	14	24 B	1	--	--	--
Total	4929	--	7362	786	--	88	313.0	--	29

Total discharge for year (cfs-days) 145,208
Total load for year (tons) 2,873,658

S Computed by subdividing day.
T Less than 0.50 ton.
B Computed from estimated-concentration graph.

RIO GRANDE RIVER BASIN

8-3583. RIO GRANDE CONVEYANCE CHANNEL AT SAN MARCIAL, N. MEX.

Particle-size analyses of suspended sediment, water year October 1959 to September 1960
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Water temperature (°F)	Sampling point	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Nov. 1, 1959.....	1205	50		341	38,200			26		88		98	100	--				VPWC
Nov. 22.....	0300	46		1,030	9,680			29		39		74	95	100				VPWC
Dec. 3.....	0100	39		550	4,210			23		34		62	90	99	100			VPWC
Jan. 4, 1960.....	0245	33		630	2,520			24		36		66	94	100				VPWC
Feb. 9.....	0400	48		148	593			--		--		62	94	100				V
Feb. 22.....	0115	46		655	3,110			18		24		51	92	100				VPWC
Mar. 10.....	0850	49		1,400	85,000			49		66		90	98	100				VPWC
Mar. 14.....	0230	50		715	30,300			57		70		92	99	100				VPWC

8-3584. RIO GRANDE FLOODWAY AT SAN MARCIAL, N. MEX.

LOCATION.--At gaging station at Atchison, Topeka, and Santa Fe Railway bridge, 1.1 miles downstream from former site of San Marcial, Socorro County, and 18.5 miles southwest of San Antonio.
DRAINAGE AREA.--27,700 square miles, approximately (includes 2,940 square miles in closed basin in San Luis Valley, Colo.).
RECORDS AVAILABLE.--Chemical analyses: July 1946 to September 1960.
Water temperatures: January 1949 to September 1960.
Sediment records: July 1946 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 1,600 ppm Mar. 10; minimum, 258 ppm Apr. 22-27.
Hardness: Maximum, 600 ppm Mar. 10; minimum, 132 ppm Apr. 22-27.
Specific conductance: Maximum daily, 2,050 micromhos Mar. 10; minimum daily, 350 micromhos Apr. 24.
Water temperatures: Maximum, 90°F June 29.
Sediment concentrations: Maximum daily, 93,200 ppm Mar. 10; minimum daily, no flow on many days.
Sediment loads: Maximum daily, 178,000 tons Mar. 11; minimum daily, 0 tons on many days.
EXTREMES, 1946-60.--Dissolved solids: Maximum, 1,950 ppm Aug. 3-10, 1954; minimum, 233 ppm June 11-20, 1952.
Hardness: Maximum, 1,010 ppm Aug. 3-10, 1954; minimum, 132 ppm June 20, 1957, Apr. 22-27, 1960.
Specific conductance: Maximum daily, 2,730 micromhos Apr. 8, 1953; minimum daily, 311 micromhos June 14, 1952.
Water temperatures(1949-60): Maximum, 97°F Aug. 11, 1951; minimum, freezing point on many days.
Sediment concentrations: Maximum daily, 117,000 ppm Aug. 8, 1959; minimum daily, no flow on many days.
Sediment loads: Maximum daily, 966,000 tons Oct. 22, 1957; minimum daily, 0 tons on many days.
REMARKS.--Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of chemical analyses and sediment loads for years prior to 1946 have been published in Water Bulletins of International Boundary and Water Commission. Records of discharge for water year October 1959 to September 1960 furnished by Santa Fe district office of Surface Water Branch. Records of composite discharge for Rio Grande conveyance channel at San Marcial and Rio Grande floodway at San Marcial given under Rio Grande at San Marcial in WSP 1712. Quality of Water records for Rio Grande conveyance channel at San Marcial given on page 482. No flow Oct. 1-31, Nov. 5-18, Nov. 22 to Jan. 14, Jan. 18 to Feb. 5, Feb. 13 to Mar. 9, July 2 to Sept. 10, Sept. 13-20, 23-30.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Nov. 1-4, 19-21, 1959	143	--	--	80	9.1	52	--	222	0	--	--	--	--	--	449	0.61	173	237	55	1.5	669	7.8
Jan. 15-17, 1960.	5.33	--	--	65	8.3	61	--	160	10	--	--	--	--	--	428	.58	6.16	196	48	1.9	639	8.7
Feb. 6-12	180	28	0.02	65	8.3	58	4.9	181	4	121	28	0.8	3.3	0.13	434	.59	211	197	42	1.8	638	8.3
Mar. 10	265	--	--	188	32	262	--	236	0	--	--	--	--	--	1,600	2.18	1,140	600	406	4.7	2,050	7.9
Mar. 11-12	1,049	--	--	109	17	160	--	180	0	--	--	--	--	--	937	1.27	2,650	340	192	3.8	1,290	7.9
Mar. 13-15	699	--	--	80	13	97	--	176	0	--	--	--	--	--	618	.84	1,170	251	107	2.7	890	7.8
Mar. 16-25	323	--	--	66	8.9	57	--	170	0	--	--	--	--	--	430	.58	375	201	62	1.8	641	7.8
Mar. 26-31	964	--	--	57	8.8	47	--	143	0	--	--	--	--	--	384	.52	999	178	61	1.5	445	7.8
Apr. 1-5	1,167	--	--	59	8.8	37	--	174	0	--	--	--	--	--	362	.49	1,140	183	40	1.2	524	7.7
Apr. 6-21	2,166	27	.07	52	6.9	30	4.5	157	0	74	14	.5	3.5	.14	303	.41	1,770	158	30	1.0	445	7.9

Apr. 22-27.....	2,370			43	6.0	26		136	0						258	.35	1,650	132	20	1.0	379	7.9
Apr. 28-May 8....	1,473			50	7.3	30		159	0						292	.40	1,160	155	24	1.0	436	7.9
May 9-18.....	952			56	6.0	33		172	0						312	.42	802	164	23	1.1	466	7.6
May 19-26.....	1,040			46	5.8	30		146	0						278	.38	781	139	20	1.1	406	8.0
May 27-June 10...	537			50	5.6	36		152	0						307	.42	445	148	24	1.3	452	8.1
June 11-12.....	2,955			66	10	44		166	0						399	.54	3,180	206	70	1.3	591	7.9
June 13-July 1...	1,038			50	6.3	34		145	0						310	.42	869	151	32	1.2	449	8.0
Sept. 11-12, 21-22.....	26.7			157	31	121		418	0						972	1.32	70.1	518	176	2.3	1,410	7.5
Weighted average	a1,024	--	--	54	7.2	37	--	156	--	--	--	--	--	--	330	0.45	912	164	36	1.3	483	--

a Average for 135 days of flow.

Temperature (°F) of water, water year October 1959 to September 1960

Month	Day																													Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
October.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
November.....	--	72	60	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	51	46	--	--	--	--	--	--	--	--	--	--	--
December.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
January.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	40	36	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
February.....	--	--	--	--	--	--	39	50	--	42	39	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
March.....	--	--	--	--	--	--	--	--	--	54	54	56	47	54	48	47	45	53	53	50	59	56	60	59	59	62	--	61	58	63	59	--
April.....	54	--	45	60	62	54	65	65	65	--	63	60	62	63	61	--	62	61	60	65	65	60	--	61	60	60	60	60	62	--	--	61
May.....	60	62	64	60	55	55	--	69	75	71	74	74	75	--	70	71	70	70	62	55	--	69	69	70	75	71	75	72	--	72	79	68
June.....	80	78	79	--	78	71	71	69	71	70	71	70	80	75	76	75	85	--	75	80	84	78	80	80	--	85	75	--	90	--	--	77
July.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
August.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
September.....	--	--	--	--	--	--	--	--	--	--	72	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

RIO GRANDE BASIN--Continued

8-3584. RIO GRANDE FLOODWAY AT SAN MARCIAL, N. MEX.--Continued

Suspended sediment, water year October 1959 to September 1960
(Where no concentrations are reported, loads are estimated)

Day	OCTOBER			NOVEMBER			DECEMBER		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	--	--	--	9.1	10000 A	3300	--	--	--
2	--	--	--	66	58900 S	16400	--	--	--
3	--	--	--	11	4500	134	--	--	--
4	--	--	--	5.5	300 A	4	--	--	--
5	--	--	--	0	--	0	--	--	--
6	--	--	--	0	--	0	--	--	--
7	--	--	--	0	--	0	--	--	--
8	--	--	--	0	--	0	--	--	--
9	--	--	--	0	--	0	--	--	--
10	--	--	--	0	--	0	--	--	--
11	--	--	--	0	--	0	--	--	--
12	--	--	--	0	--	0	--	--	--
13	--	--	--	0	--	0	--	--	--
14	--	--	--	0	--	0	--	--	--
15	--	--	--	0	--	0	--	--	--
16	--	--	--	0	--	0	--	--	--
17	--	--	--	0	--	0	--	--	--
18	--	--	--	0	--	0	--	--	--
19	--	--	--	47	3500 A	3500	--	--	--
20	--	--	--	732	17000	33600	--	--	--
21	--	--	--	127	6050 S	2940	--	--	--
22	--	--	--	0	--	0	--	--	--
23	--	--	--	0	--	0	--	--	--
24	--	--	--	0	--	0	--	--	--
25	--	--	--	0	--	0	--	--	--
26	--	--	--	0	--	0	--	--	--
27	--	--	--	0	--	0	--	--	--
28	--	--	--	0	--	0	--	--	--
29	--	--	--	0	--	0	--	--	--
30	--	--	--	0	--	0	--	--	--
31	--	--	--	--	--	--	--	--	--
Total	0	--	0	997.6	--	59878	0	--	0

Day	JANUARY			FEBRUARY			MARCH		
	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day	Mean discharge (cfs)	Suspended sediment: Mean concentration (ppm)	Suspended sediment: Tons per day
1	0	--	0	0	--	0	0	--	0
2	0	--	0	0	--	0	0	--	0
3	0	--	0	0	--	0	0	--	0
4	0	--	0	0	--	0	0	--	0
5	0	--	0	0	--	0	0	--	0
6	0	--	0	6.0	400 A	150	0	--	0
7	0	--	0	260	8150	5720	0	--	0
8	0	--	0	277	6800	5090	0	--	0
9	0	--	0	291	7200	5660	0	--	0
10	0	--	0	310	6700	5610	265	93200 S	92800
11	0	--	0	114	3750 S	1580	838	68500 S	178000
12	0	--	0	5	900 A	12	1260	48000	169000
13	0	--	0	0	--	0	1170	33500	110000
14	0	--	0	0	--	0	662	30900	55200
15	6.5	4300 A	250	0	--	0	264	26800	19100
16	9.1	6900 S	226	0	--	0	326	19000	16700
17	.4	379 S	1	0	--	0	424	23600	27000
18	0	--	0	0	--	0	240	15700	10200
19	0	--	0	0	--	0	250	8800	5940
20	0	--	0	0	--	0	250	10200	6890
21	0	--	0	0	--	0	264	10000	7130
22	0	--	0	0	--	0	147	5000	1980
23	0	--	0	0	--	0	204	10000	5510
24	0	--	0	0	--	0	469	14200	18000
25	0	--	0	0	--	0	654	16000	28300
26	0	--	0	0	--	0	833	14800	33300
27	0	--	0	0	--	0	581	13000 A	20000
28	0	--	0	0	--	0	990	13600	36400
29	0	--	0	0	--	0	1180	15500	49400
30	0	--	0	--	--	--	1070	12800	37000
31	0	--	0	--	--	--	1130	13500	41200
Total	16.0	--	477	1263.0	--	23822	13471	--	969050

S Computed by subdividing day.
A Computed from partly estimated concentration graph.

RIO GRANDE BASIN--Continued

8-3584. RIO GRANDE FLOODWAY AT SAN MARCIAL, N. MEX.--Continued

Suspended sediment, water year October 1959 to September 1960--Continued

Day	APRIL			MAY			JUNE		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	1340	13600	49200	1610	5900	25600	450	2820	3430
2	1530	14000 A	58000	1740	4350	20400	369	2050	2040
3	1210	11900	38900	1180	4000	12700	410	2250	2490
4	940	10700	27200	950	3800	9750	417	2200 A	2500
5	814	9200	20200	871	4050	9520	369	2040	2030
6	541	7400	10800	1420	6100	23400	508	2050	2810
7	882	10000	23800	1400	5700 S	22000	723	2820	5500
8	1260	13000	44200	930	3750	9420	637	3000	5160
9	1500	13000	52600	1330	4600	16500	1150	7320 S	25700
10	1500	12000 A	49000	843	4200	9560	1480	7200	28800
11	1980	14500	77500	823	3100	6890	2620	15200	108000
12	2460	12600	83700	645	2150	3740	3290	14500	129000
13	2640	10200	72700	512	2050	2830	2660	9100	65400
14	2980	11300	90900	646	3100 A	5400	1340	5800	21000
15	3140	10300	87300	900	4100	9960	2130	5050	29000
16	3060	10000 A	83000	1670	6150	27700	2400	6900	44700
17	2920	11200	88300	1170	4450	14100	2140	5100	29500
18	3000	11600	94000	980	5300	14000	1480	4100 A	16000
19	2480	8800	58900	2100	6450	36600	1230	4100	13600
20	2240	8400	50800	1260	6750	23000	1470	4550	18100
21	2070	8600	48100	1270	5800 A	20000	1120	3800	11500
22	2000	8300	44800	1330	5300	19000	881	3000	7140
23	2070	8300 A	46000	1640	5650	25000	696	2500	4700
24	2360	8000	51000	532	2900	4170	654	2400	4240
25	2730	10100	74400	66	1850	330	549	2200 A	3300
26	2540	9800	67200	126	1610 S	1030	424	1700	1950
27	2520	8900	60600	326	2750	2420	326	1300	1140
28	2240	7100	42900	358	2400	2320	179	900 A	440
29	2030	7400	40600	273	2000 A	1500	46	472	59
30	1830	6600 A	33000	214	2000	1160	3.9	350 A	4
31	--	--	--	369	2400	2390	--	--	--
Total	60807	--	1669600	29484	--	382390	32151.9	--	589233

	JULY			AUGUST			SEPTEMBER		
1	0.4	250	T	--	--	--	0	--	0
2	--	--	--	--	--	--	0	--	0
3	--	--	--	--	--	--	0	--	0
4	--	--	--	--	--	--	0	--	0
5	--	--	--	--	--	--	0	--	0
6	--	--	--	--	--	--	0	--	0
7	--	--	--	--	--	--	0	--	0
8	--	--	--	--	--	--	0	--	0
9	--	--	--	--	--	--	0	--	0
10	--	--	--	--	--	--	0	--	0
11	--	--	--	--	--	--	99	70100 S	28400
12	--	--	--	--	--	--	1.5	16000 S	110
13	--	--	--	--	--	--	0	--	0
14	--	--	--	--	--	--	0	--	0
15	--	--	--	--	--	--	0	--	0
16	--	--	--	--	--	--	0	--	0
17	--	--	--	--	--	--	0	--	0
18	--	--	--	--	--	--	0	--	0
19	--	--	--	--	--	--	0	--	0
20	--	--	--	--	--	--	0	--	0
21	--	--	--	--	--	--	4.6	26000 A	650
22	--	--	--	--	--	--	1.6	18000 A	78
23	--	--	--	--	--	--	0	--	0
24	--	--	--	--	--	--	0	--	0
25	--	--	--	--	--	--	0	--	0
26	--	--	--	--	--	--	0	--	0
27	--	--	--	--	--	--	0	--	0
28	--	--	--	--	--	--	0	--	0
29	--	--	--	--	--	--	0	--	0
30	--	--	--	--	--	--	0	--	0
31	--	--	--	--	--	--	--	--	--
Total	0.4	--	T	0	--	0	106.7	--	29238

Total discharge for year (cfs-days)..... 138,297.6
Total load for year (tons)..... 3,723,688

S Computed by subdividing day.
T Less than 0.50 ton.
A Computed from partly estimated concentration graph.

RIO GRANDE BASIN--Continued

8-3584. RIO GRANDE FLOODWAY AT SAN MARCIAL, N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1959 to September 1960
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Water temperature (°F)	Sampling point	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Nov. 3, 1959.....	1530	60		1.7	812			--		--		99	100	--				S
Jan. 16, 1960.....	1530	40		4.9	3570			88		97		100	--	--				PWC
Feb. 10.....	1405	42		320	6560			55		78		86	97	100				VPWC
Mar. 10.....	1815	57		43	84400			84		98		100	--	--				PWC
Mar. 12.....	0750	45		1100	51000			70		87		94	97	100				VPWC
Apr. 24.....	1600	61		2450	7800			22		36		71	95	100				VPWC
May 15.....	1530	70		920	3310			24		39		76	95	100				VPWC
June 11.....	1630	71		3400	20500			46		64		90	98	100				VPWC
June 22.....	1630	78		777	2780		23	30		42		69	97	100				VPWC

Particle-size analyses of bed material, water year October 1959 to September 1960
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Water temperature (°F)	Sampling point	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Bed material: Percent finer than size indicated, in millimeters											Method of analysis
							0.062	0.125	0.250	0.500	1.000	2.000	4.000	8.000	16.00	32.00	64.00	
Feb. 10, 1960.....	1440	42	3	320			33	52	99	100								S
Mar. 10.....	1815	57	3	43			13	52	97	100								V

8-3830. PECOS RIVER AT SANTA ROSA, N. MEX.

LOCATION (revised).--At gaging station, 0.2 mile upstream from bridge on U.S. Highway 66, in Santa Rosa, Guadalupe County, and 1.7 miles upstream from Rio Agua Negra Chiquita.
DRAINAGE AREA.--2,650 square miles, approximately (contributing area).
RECORDS AVAILABLE.--Water temperatures: October 1958 to September 1960.
Sediment records: October 1958 to September 1960.
EXTREMES, 1959-60.--Water temperatures: Maximum, 77°F May 31; minimum, 33°F Dec. 12, 14.
Sediment concentrations: Maximum daily, 18,500 ppm Aug. 5; minimum daily, 21 ppm Dec. 1-15.
Sediment loads: Maximum daily, 52,000 tons June 11; minimum daily, 1 ton on many days.
EXTREMES, 1958-60.--Water temperatures: Maximum, 86°F June 30, 1959; minimum, freezing point on several days during winter months in 1959.
Sediment concentrations: Maximum daily, 18,500 ppm Aug. 5, 1960; minimum daily, 13 ppm Mar. 15, 1959.
Sediment loads: Maximum daily, 86,800 tons Aug. 15, 1959; minimum daily, 1 ton on many days.
REMARKS.--Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of discharge for water year October 1959 to September 1960 given in WSP 1712.

Temperature (°F) of water, water year October 1959 to September 1960

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

RIO GRANDE BASIN--Continued

8-3830. PECOS RIVER AT SANTA ROSA, N. MEX.--Continued

Suspended sediment, water year October 1959 to September 1960

Day	OCTOBER			NOVEMBER			DECEMBER		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	33	C 39	3.47	26	C 23	1.61	26	C 21	1.47
2	33	C 39	3.47	24	C 23	1.49	26	C 21	1.47
3	28	C 39	2.95	23	C 23	1.43	26	C 21	1.47
4	35	C 39	3.69	22	C 23	1.37	26	C 21	1.47
5	31	C 39	3.26	23	C 23	1.43	25	C 21	1.41
6	31	C 39	3.26	23	C 23	1.43	24	C 21	1.36
7	27	C 39	2.84	24	C 23	1.49	28	C 21	1.59
8	27	C 39	2.84	23	C 23	1.43	27	C 21	1.53
9	27	C 39	2.84	23	C 23	1.43	23	C 21	1.30
10	26	C 39	2.74	22	C 23	1.37	27	C 21	1.53
11	26	C 39	2.74	22	C 23	1.37	25	C 21	1.41
12	26	C 39	2.74	21	C 23	1.30	23	C 21	1.30
13	25	C 39	2.63	23	C 23	1.43	23	C 21	1.30
14	26	C 39	2.74	22	C 23	1.37	26	C 21	1.47
15	25	C 39	2.63	23	C 23	1.43	22	C 21	1.25
16	25	C 39	2.63	23	C 23	1.43	53	36	5.15
17	23	C 39	2.42	21	C 23	1.30	32	38	3.28
18	24	C 39	2.53	25	C 23	1.55	28	34	2.57
19	23	C 39	2.42	27	C 23	1.68	25	29	1.96
20	23	C 39	2.42	25	C 23	1.55	24	C 22	1.43
21	23	C 39	2.42	23	C 23	1.43	23	C 22	1.37
22	23	C 39	2.42	25	C 23	1.55	23	C 22	1.37
23	22	C 39	2.32	25	C 23	1.55	22	C 22	1.31
24	22	C 39	2.32	25	C 23	1.55	22	C 22	1.31
25	21	C 39	2.21	23	C 23	1.43	23	C 22	1.37
26	21	C 39	2.21	23	C 23	1.43	22	C 22	1.31
27	22	C 39	2.32	23	C 23	1.43	22	C 22	1.31
28	23	C 39	2.42	23	C 23	1.43	20	C 22	1.19
29	26	C 39	2.74	27	C 23	1.68	22	C 22	1.31
30	34	C 39	3.58	26	C 23	1.61	20	C 22	1.19
31	31	C 39	3.26	---	---	---	22	C 22	1.31
Total	812	--	86.48	708	--	42.55	780	--	50.07
	JANUARY			FEBRUARY			MARCH		
1	20	C 28	1.51	22	C 22	1.31	19	C 24	1.23
2	13	C 28	.98	22	C 22	1.31	25	C 24	1.62
3	17	C 28	1.28	25	C 22	1.48	18	C 24	1.17
4	20	C 28	1.51	23	C 22	1.37	20	C 24	1.30
5	23	C 28	1.74	22	C 22	1.31	18	C 24	1.17
6	19	C 28	1.44	23	C 22	1.37	19	C 24	1.23
7	26	C 28	1.97	23	C 22	1.37	18	C 24	1.17
8	30	C 28	2.27	21	C 22	1.25	16	C 24	1.04
9	23	C 28	1.74	20	C 22	1.19	17	C 24	1.10
10	21	C 28	1.59	22	C 22	1.31	17	C 24	1.10
11	21	C 28	1.59	22	C 22	1.31	18	C 24	1.17
12	21	C 28	1.59	24	C 22	1.43	19	C 24	1.23
13	20	C 28	1.51	23	C 22	1.37	20	C 24	1.30
14	23	C 28	1.74	22	C 22	1.31	27	C 24	1.75
15	19	C 28	1.44	23	C 22	1.37	28	C 24	1.81
16	22	C 28	1.66	22	C 22	1.31	30	C 76	6.16
17	20	C 28	1.51	20	C 22	1.19	32	C 76	6.57
18	22	C 28	1.66	20	C 22	1.19	27	C 76	5.54
19	15	C 28	1.13	20	C 22	1.19	21	C 76	4.31
20	21	C 28	1.59	19	C 22	1.13	18	C 76	3.69
21	26	C 28	1.97	17	C 22	1.01	18	C 76	3.69
22	28	C 28	2.12	17	C 22	1.01	18	C 76	3.69
23	26	C 28	1.97	18	C 22	1.07	17	C 76	3.49
24	23	C 28	1.74	18	C 22	1.07	25	1150 S	77.6
25	23	C 28	1.74	21	C 22	1.25	77	1860	387
26	23	C 28	1.74	26	C 22	1.54	133	1900 A	690
27	22	C 28	1.66	21	C 22	1.25	133	2380	855
28	22	C 28	1.66	20	C 22	1.19	145	1600 A	630
29	22	C 28	1.66	19	C 22	1.13	208	1470	826
30	22	C 28	1.66	---	---	---	225	1330	808
31	22	C 28	1.66	---	---	---	194	1320	691
Total	675	--	51.03	615	--	36.59	1620	--	5021.13

S Computed by subdividing day.
A Computed from partly estimated-concentration graph.
C Composite period.

RIO GRANDE BASIN--Continued

8-3830. PECOS RIVER AT SANTA ROSA, N. MEX.--Continued

Suspended sediment, water year October 1959 to September 1960--Continued

Day	JANUARY			FEBRUARY			MARCH		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	145	1180	462	144	205	80	78	188	40
2	156	920	388	126	173	59	71	172	33
3	133	850	305	86	170	39	66	208	37
4	110	460	137	69	155	29	55	197	29
5	78	290	61	50	130 A	18	55	174	26
6	58	260	41	44	122	14	50	130	18
7	52	450	63	40	115	12	80	400	86
8	86	1980	460	31 C	50	4.18	90	530	129
9	208	1770	994	26 C	50	3.51	126	570	194
10	270	1690	1230	25 C	50	3.38	239	3720 S	2550
11	299	1580	1280	25 C	50	3.38	1750	8600 S	52000
12	320	2100	1810	24	210	14	1340	8200	29700
13	319	2630	2270	54	410	60	624	6800	11500
14	310	2210	1850	103	930	259	429	3900 A	4500
15	277	1910	1430	204	1210	666	346	2080	1940
16	221	1090	650	217	810	475	303	1940	1590
17	211	1010	575	231	860 A	540	274	1610	1190
18	231	1110	692	235	840 A	530	236	1360	867
19	228	720	443	224	850	514	191	1040	536
20	221	1320	788	201	700	380	205	933 S	570
21	231	980	611	207	460	257	113	410	125
22	249	830	558	182	360	177	75	380	77
23	281	1310	994	157	360	153	48	290 A	38
24	302	1500	1220	141	355	135	40	1700 A	180
25	297	1220	978	120	280	91	765	7740 S	29300
26	273	1090	803	118	320	102	230	5100	3170
27	228	780	480	115	340	106	86	1400	325
28	191	420	217	106	206	59	52	370	52
29	165	330 A	150	84	172	39	42	261	30
30	149	209	84	88	172	41	38	190	19
31	--	--	--	82	221	49	--	--	--
Total	6299	--	22024	3559	--	4912.46	8097	--	140851

Day	JULY			AUGUST			SEPTEMBER		
1	37	123	12	22	200	12	32	160 A	14
2	36	120 A	12	21	222	13	32	260	22
3	105	3220 S	1020	23	205	13	32	300 A	26
4	55	2900 A	430	194	12000 S	9700	32	260	22
5	52	950 A	130	188	18500	9390	30	180 A	15
6	55	600	89	84	6000 A	1400	30	530	43
7	52	300 A	42	131	11200 S	4760	31	430	36
8	110	820 S	290	88	9050	2150	34	300	28
9	259	2700 S	1990	310	8400 S	7290	35	350	33
10	92	1200 A	300	854	15000 S	44000	32	270 A	23
11	121	917 S	410	238	5200	3340	31	165	14
12	164	2440 S	1030	126	8080	2750	30	170	14
13	78	5200 A	1100	175	5000 A	2400	28	250 A	19
14	327	11000 S	12000	115	4670	1450	28	260 A	20
15	239	9750	6290	99	4550	1220	28	160	12
16	276	7900 S	6330	92	5100 S	1400	34	630	58
17	222	5100	3060	266	7800	5600	34	375	34
18	128	5000 A	1700	133	4990	1790	28	140 A	11
19	140	4570 S	2240	92	3400 A	840	28	140 A	11
20	171	5200	2400	67	2400 A	430	28	120	9
21	69	4500	838	50	1350	182	28	120	9
22	45	730	89	42	550	62	32	330	29
23	31	550 A	46	40	730	79	37	620 A	62
24	27	410 A	30	37	2440	244	28	150 A	11
25	30	350 S	48	36	1580	154	28	130 A	10
26	61	2500 S	426	35	760	72	28	120	9
27	30	1600	130	48	750 A	97	28	114	9
28	26	700	49	40	1280	138	28	103	8
29	24	350	23	34	620 A	57	28	100 A	8
30	24	242	16	34	375	34	27	84	6
31	24	211	14	33	215	19	--	--	--
Total	3110	--	42584	3747	--	101086	909	--	625

Total discharge for year (cfs-days)..... 30,931
Total load for year (tons)..... 317,370.18

S Computed by subdividing day.
A Computed from partly estimated-concentration graph.
C Composite period.

RIO GRANDE BASIN--Continued

8-3830. PECOS RIVER AT SANTA ROSA, N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1959 to September 1960
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Water temperature (°F)	Sampling point	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters											Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Mar. 3, 1960.....	1300	46		18	107		--	--		--		80	87	92	97	98	100	S
Mar. 29.....	2000	55		232	1520		--	--		--		96	99	100	--			S
Apr. 9.....	2000	61		255	1520		--	42		62		93	99	100	--			SPWC
Apr. 24.....	2120	59		273	1520		--	32		46		79	91	100	--			VPWC
May 12.....	1330	66		23	289		--	--		--		93	98	100	--			S
June 10.....	1800	68		211	3460		41	50		71		92	97	100	--			VPWC
June 26.....	2000	70		148	3880		49	61		85		97	99	100	--			SPWC
July 9.....	1030	70		243	5390		47	55		74		90	95	98	100			VPWC
July 26.....	2000	74		40	2110		45	58		72		85	93	99	100			VPWC
Aug. 17.....	2100	70		187	4110		48	65		88		98	99	100	--			SPWC
Sept. 17.....	2100	68		28	158		--	--		--		98	100	--	--			S

8-3845. PECOS RIVER BELOW ALAMOGORDO DAM, N. MEX.

LOCATION.--At gaging station, 1,200 feet downstream from Alamogordo Dam, 1.5 miles downstream from Alamogordo Creek, and 4.5 miles northeast of Guadalupe, DeBaca County.
DRAINAGE AREA.--4,390 square miles, approximately (contributing area).
RECORDS AVAILABLE.--Chemical analyses: June 1937 to September 1960.
Water temperatures: June 1959 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 1,580 ppm Apr. 1-30; minimum, 1,130 ppm Aug. 1-31.
Hardness: Maximum, 1,070 ppm Apr. 1-30; minimum, 755 ppm Aug. 1-31.
Specific conductance: Maximum daily, 1,940 micromhos on several days during April; minimum daily, 1,400 micromhos July 29-30.
Water temperatures: Maximum, 79°F July 29, 30; minimum, 35°F Jan. 4-6.
EXTREMES, 1937-60.--Dissolved solids: Maximum, 2,730 ppm May 11-20, 1954; minimum, 435 ppm Oct. 1-8, 1941.
Hardness: Maximum, 1,910 ppm May 1-10, 1954; minimum, 294 ppm Oct. 1-8, 12-20, 1941.
Specific conductance: Maximum daily, 3,200 micromhos Jan. 14, 1948; minimum daily, 513 micromhos July 22, 1937.
REMARKS.--Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of discharge for water year October 1959 to September 1960 given in WSP 1712.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1-31, 1959...	79.0	16		278	30	52		117		722	57		0.8		1210	1.65	258	815	719	.8	1520	7.3
Nov. 1-30.....	28.5	16		298	36	62		127		798	64		.8		1340	1.82	103	890	786	.9	1640	7.3
Dec. 1-31.....	5.8	17		310	38	74		113		864	70		.5		1430	1.94	22.8	930	837	1.1	1720	7.3
Jan. 1-31, 1960...	4.5	15		330	37	72		124		888	74		.5		1480	2.01	18.0	975	873	1.0	1790	7.4
Feb. 1-29.....	4.4	17		330	43	77		121		924	76		.3		1530	2.08	18.2	1000	901	1.1	1820	7.5
Mar. 1-31.....	463	22		355	38	58		128		915	77		.5		1530	2.08	1910	1040	935	.8	1880	7.6
Apr. 1-30.....	106	20		362	41	63		130		948	80		.8		1580	2.15	452	1070	963	.8	1920	7.6
May 1-31.....	631	15		355	35	59		126		909	76		.9		1510	2.05	2570	1030	927	.8	1870	7.6
June 1-30.....	208	15		320	49	52		124		829	70		.5		1400	1.90	786	950	848	.7	1730	7.4
July 1-31.....	73.4	12		262	31	50		114		686	58		.3		1160	1.58	230	780	686	.8	1490	7.6
Aug. 1-31.....	165	16		254	30	49		113		668	52		.7		1130	1.54	503	755	662	.8	1450	7.3
Sept. 1-30.....	97.7	16		270	29	54		117		706	55		.5		1190	1.62	314	792	696	.8	1510	7.4
Weighted average	--	17		330	37	57		124		853	71		0.7		1430	1.94	604	968	866	0.7	1770	7.5
Time-weighted average.....	156.9	16		310	36	60		121		821	67		0.6		1370	--	--	918	819	0.8	1694	7.4
Tons per day....	--	7.2		140	15	24		53		361	30		0.3		--	--	--	--	--	--	--	--

RIO GRANDE BASIN--Continued

8-3845. PECOS RIVER BELOW ALAMOGORDO DAM, N. MEX.--Continued

Temperature (°F) of water, water year October 1959 to September 1960

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

8-3860. PECOS RIVER NEAR ACME, N. MEX.

LOCATION.--At gaging station, 1 mile southeast of Melena railroad station, 2.5 miles south of U.S. Highway 70, 3.5 miles downstream from Salt Creek, 5 miles southwest of Acme, Chaves County, and 13 miles northeast of Roswell.
DRAINAGE AREA.--11,380 square miles, approximately, upstream from gaging station (contributing area).
RECORDS AVAILABLE.--Chemical analyses: July 1937 to September 1960.
Water temperatures: May 1952 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 7,710 ppm Mar. 11-17; minimum, 1,220 ppm June 7-11.
Hardness: Maximum, 2,530 ppm Mar. 11-17; minimum, 770 ppm June 7-11.
Specific conductance: Maximum daily, 11,600 micromhos Mar. 17-18; minimum daily, 1,590 micromhos June 9-10.
Water temperatures: Maximum, 92°F June 18; minimum, freezing point Jan. 23, Feb. 24, 27, 28, Mar. 1.
EXTREMES, 1937-60.--Dissolved solids: Maximum, 19,870 ppm May 23 to June 2, 1938; minimum, 594 ppm Aug. 11-16, 1957.
Hardness: Maximum, 5,320 ppm May 23 to June 2, 1938; minimum, 366 ppm July 26-27, 1957.
Specific conductance: Maximum daily, 39,300 micromhos Aug. 9, 1945; minimum daily, 847 micromhos June 23, 1958.
Water temperatures (1952-60): Maximum, 95°F July 15, 1955; minimum, freezing point on several days in 1958 and 1960.
REMARKS.--Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of discharge for gaging station near Acme for water year October 1959 to September 1960 given in WSP 1712. No appreciable inflow between gaging station and sampling point except during periods of heavy local rainfall. No flow Oct. 1-3, June 30 to July 3.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 4-16, 1959...	21.9	21		405	121	225		96		1330	380		1.2		2530	3.44	150	1510	1430	2.5	3290	8.0
Oct. 17-20.....	6.0	23		492	108	598		106		1550	900		1.8		3720	5.06	60.3	1670	1580	6.4	5120	7.9
Oct. 21-22.....	7.0	32		560	127	984		102		1800	1490		1.7		5040	6.85	95.3	1920	1840	9.8	6990	7.9
Oct. 23-31.....	10.6	20		475	128	459		118		1540	715		1.1		3400	4.62	97.3	1710	1610	4.8	4590	7.7
Nov. 1-6.....	71.2	21		365	75	156		120		1070	245		1.9		1990	2.71	383	1220	1120	1.9	2660	7.9
Nov. 7-30.....	25.7	22		438	94	305		112		1360	450		1.5		2730	3.71	189	1480	1390	3.4	3570	7.9
Dec. 1-5.....	26.8	21		41.5	9.4	35.4		84		1370	490		1.5		2790	3.79	202	1420	1350	1.3	3700	8.0
Dec. 6-13.....	19.1	20		435	96	457		103		1420	645		1.4		3130	4.26	161	1480	1400	5.2	4190	7.6
Dec. 14-24.....	44.0	17		395	98	397		115		1250	600		1.6		2830	3.85	336	1390	1300	4.6	3880	7.9
Dec. 25-27, 29....	17.8	19		470	119	663		114		1520	1010		2.2		3860	5.25	186	1660	1570	7.1	5450	7.9
Dec. 28, 30-31....	13.0	18		390	92	417		110		1260	605		1.4		2840	3.86	99.7	1350	1260	4.9	3860	7.9
Jan. 1-6, 1960....	8.7	26		520	122	880		146		1690	1300		1.2		4610	6.27	108	1800	1680	9.0	6450	7.8
Jan. 7-12.....	28.0	19		460	100	619		136		1470	895		1.7		3630	4.94	274	1560	1450	6.8	5000	7.7
Jan. 13-14.....	46.0	22		475	137	1110		118		1540	1750		1.2		5090	6.92	632	1750	1650	12	7420	7.9
Jan. 15-17.....	36.3	21		405	90	443		128		1290	635		.8		2950	4.01	289	1380	1280	5.2	4040	7.6

RIO GRANDE BASIN--Continued

8-3860. PECOS RIVER NEAR ACME, N. MEX.--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Jan. 18-20, 1960..	17.0	18		515	113	1060		134		1660	1570		1.4		5000	6.80	230	1750	1640	11	7050	7.8
Jan. 21-31.....	18.6	16		485	109	704		122		1600	1010		1.0		3980	5.41	200	1660	1560	7.5	5460	7.8
Feb. 1-4.....	11.2	17		505	131	900		78		1750	1320		.9		4670	6.35	141	1800	1740	9.2	6460	7.9
Feb. 5.....	14.0	18		600	156	1360		76		2040	2070		--		6280	8.54	237	2140	2080	13	8930	8.0
Feb. 6-11,13-14,16	7.0	16		560	137	928		97		1860	1390		1.0		4940	6.72	93.4	1960	1880	9.1	6810	7.9
Feb. 12,15.....	5.5	18		620	159	1400		117		2080	2110		--		6440	8.76	95.6	2200	2100	13	9030	7.9
Feb. 17-22.....	6.3	17		625	161	1440		100		2100	2190		--		6580	8.95	112	2220	2140	13	9310	7.9
Feb. 23-25.....	5.7	16		605	144	976		106		1980	1470		1.1		5240	7.13	80.6	2100	2010	9.3	7170	8.0
Feb. 26-27.....	8.0	17		605	148	1340		92		2020	2030		--		6200	8.43	134	2120	2050	13	8780	7.9
Feb. 28-29.....	12.0	16		515	120	647		93		1700	950		.8		3990	5.43	129	1780	1700	6.7	5360	7.9
Mar.1-2,5,7-8,10..	9.2	15		545	126	709		114		1760	1060		1.9		4270	5.81	106	1880	1790	7.1	5770	7.8
Mar. 3-4, 6, 9....	8.2	15		600	144	1160		105		1960	1760		1.9		5690	7.74	126	2090	2000	11	7950	7.7
Mar. 11-17.....	2.9	15		707	186	1740		125		2290	2710		--		7710	10.5	60.4	2530	2430	15	10900	7.8
Mar. 18-21, 25-26, 28-29.....	591	15		412	59	190		108		1170	266		1.8		2170	2.95	3460	1270	1180	2.3	2750	7.9
Mar.22-24,27,30-31	720	15		385	51	95		121		1070	116		1.1		1790	2.43	3480	1170	1070	1.2	2170	7.6
Apr. 1-3.....	548	21		415	47	157		128		1120	212		1.7		2040	2.77	3020	1230	1130	1.9	2550	8.0
Apr. 4-8.....	87.2	21		450	63	245		124		1280	338		1.7		2460	3.35	579	1380	1280	2.9	3120	7.7
Apr. 9-15, 17.....	35.0	24		522	102	507		96		1650	728		.8		3580	4.87	338	1720	1640	5.3	4700	7.7
Apr.16, 18.....	26.0	24		418	60	185		47		1250	250		.9		2210	3.01	155	1290	1250	2.2	2730	7.8
Apr. 19-30.....	17.2	25		625	136	929		105		2050	1360		1.6		5180	7.04	241	2120	2030	8.8	6960	7.8
May 1, 3.....	9.5	30		660	137	1060		131		2130	1550		.8		5630	7.66	144	2210	2100	9.8	7640	7.8
May 2, 4-13.....	9.0	22		635	125	646		109		2020	930		.9		4430	6.02	108	2100	2010	6.1	5750	7.8
May 14-31.....	644	19		386	43	89		120		1040	108		1.0		1740	2.37	3180	1140	1040	.1	2140	7.7
June 1-6.....	697	20		362	36	78		100		965	94		1.0		1600	2.18	3010	1050	968	1.0	1960	7.8
June 7-11.....	637	19		258	31	77		124		682	88		3.1		1220	1.66	2100	770	668	1.2	1620	7.7

June 12-14, 1960..	171	18		268	42	146		124		772	178		1.4		1490	2.03	688	840	738	2.2	1990	7.5
June 15-20.....	35.0	24		470	77	312		108		1420	426		1.2		2780	3.78	263	1490	1400	3.5	3560	7.7
June 21-24, 26-29.	12.1	22		482	89	492		105		1490	710		1.1		3340	4.54	109	1570	1480	5.4	4510	7.3
June 25.....	22.0	27		655	130	1220		155		1970	1870		1.4		5950	8.09	353	2170	2040	11	8350	7.6
July 4-11, 13.....	4922	17		372	27	106		116		963	122		1.6		1670	2.27	22190	1040	945	1.4	2080	7.4
July 12, 17-18....	297	22		428	64	341		145		1190	505		2.3		2620	3.56	2100	1330	1210	4.1	3560	7.3
July 14-16.....	505	21		535	116	1180		156		1670	1780		1.7		5380	7.32	7340	1810	1680	12	7780	7.2
July 19-21.....	382	15		380	44	163		120		1020	228		2.0		1910	2.60	1970	1130	1030	2.1	2470	7.4
July 22-26.....	200	18		495	79	359		123		1440	525		1.8		2980	4.05	1610	1560	1460	4.0	3890	7.4
July 27-31.....	220	18		345	61	315		131		1050	420		2.5		2280	3.10	1350	1110	1000	4.1	3120	7.2
Aug. 1-3.....	202	22		448	73	303		122		1310	435		1.6		2650	3.60	1450	1420	1320	3.5	3470	7.9
Aug. 4-8.....	74.2	25		555	96	516		116		1660	765		1.2		3680	5.00	737	1780	1690	5.3	4830	7.9
Aug. 9-10.....	194	19		398	60	257		120		1130	370		3.8		2300	3.13	1200	1240	1140	3.2	3060	7.9
Aug. 11-16.....	671	18		274	37	118		128		751	144		2.6		1410	1.92	2550	835	730	1.8	1860	7.8
Aug. 17.....	137	18		360	44	146		120		962	210		2.0		1800	2.45	666	1080	982	1.9	2340	7.9
Aug. 18-21.....	114	19		415	67	266		113		1210	380		1.4		2410	3.28	742	1310	1220	3.2	3170	8.0
Aug. 22-30.....	46.8	22		530	87	483		115		1570	710		1.3		3460	4.71	437	1680	1590	5.1	4590	8.0
Aug. 31-Sept. 7...	27.2	21		590	92	569		112		1760	825		1.0		3910	5.32	287	1850	1760	5.8	5130	8.0
Sept. 8-9.....	40.0	18		500	95	416		102		1570	585		1.5		3240	4.41	350	1640	1560	4.5	4200	8.0
Sept. 10-14.....	74.0	16		388	76	246		104		1220	325		1.9		2320	3.16	464	1280	1200	3.0	3000	7.9
Sept. 15-25.....	44.8	18		462	89	349		106		1460	475		1.7		2910	3.96	352	1520	1430	3.9	3780	7.9
Sept. 26-30.....	66.8	17		420	66	238		102		1270	305		1.8		2370	3.22	427	1320	1240	2.9	3000	7.9
Weighted average	--	18		380	42	150		118		1030	212		1.6		1910	2.60	1340	1120	1030	1.8	2430	7.5
Time-weighted average	a254	20		465	93	491		113		1460	735		1.5		3330	--	--	1560	1470	5.1	4470	7.7
Tons per day....	--	13		267	29	106		83		726	149		1.1		--	--	--	--	--	--	--	--

a Mean discharge based on 366 days; mean discharge for 359 days of chemical analyses, 260 cfs.

Temperature (°F) of water, water year October 1959 to September 1960

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

RIO GRANDE BASIN--Continued

8-3905. RIO HONDO AT DIAMOND A RANCH, NEAR ROSWELL, N. MEX.

LOCATION.--At gaging station on downstream side of road bridge at Diamond A Ranch, 18 (revised) miles upstream from Rocky Arroyo, and 18 miles west of Roswell, Chaves County.
DRAINAGE AREA.--947 square miles (contributing area).
RECORDS AVAILABLE.--Chemical analyses: November 1955 to September 1960 (intermittent).
Water temperatures: September 1951 to September 1955, October 1956 to September 1960.
Sediment records: September 1951 to September 1960.
EXTREMES, 1959-60.--Water temperatures: Maximum, 76°F July 8; minimum, 56°F July 14.
Sediment concentrations: Maximum daily, 36,300 ppm June 11; minimum daily, no flow on many days.
Sediment loads: Maximum daily, 27,900 tons June 11; minimum daily, 0 tons on many days.
EXTREMES, 1951-60.--Water temperatures (1951-55, October 1956 to September 1960): Maximum, 88°F Aug. 1, 1957, July 8, 1959; minimum, 34°F Jan. 5, 6, 1959.
Sediment concentrations: Maximum daily, 64,900 ppm July 19, 1956; minimum daily, no flow on many days.
Sediment loads: Maximum daily, 630,000 tons Oct. 6, 1954; minimum daily, 0 tons on many days.
REMARKS.--No flow during October to May, and August; tabulation omitted for these periods. Records of discharge for water year October 1959 to September 1960 given in WSP 1712.

Temperature (°F) of water, water year October 1959 to September 1960

Month	Day																													Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
June	--	--	--	--	--	--	--	--	--	66	68	60	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
July	--	--	--	--	--	68	65	76	58	62	65	65	71	56	63	61	62	--	60	--	--	--	--	--	--	--	--	--	--	--	--	--
August	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
September	--	--	--	--	--	--	--	--	70	63	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

RIO GRANDE BASIN--Continued

8-3905. RIO HONDO AT DIAMOND A RANCH, NEAR ROSWELL, N. MEX.--Continued

Suspended sediment, water year October 1959 to September 1960
(Where no concentrations are reported, loads are estimated)

Day	APRIL			MAY			JUNE		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	--	--	--	--	--	--	20	--	500
2	--	--	--	--	--	--	0	--	0
3	--	--	--	--	--	--	0	--	0
4	--	--	--	--	--	--	0	--	0
5	--	--	--	--	--	--	0	--	0
6	--	--	--	--	--	--	0	--	0
7	--	--	--	--	--	--	60	--	3000
8	--	--	--	--	--	--	49	--	100
9	--	--	--	--	--	--	60	10000 A	9300
10	--	--	--	--	--	--	150	28300 S	13200
11	--	--	--	--	--	--	190	36300 S	27900
12	--	--	--	--	--	--	110	15600 S	5480
13	--	--	--	--	--	--	55	4000 A	600
14	--	--	--	--	--	--	45	--	250
15	--	--	--	--	--	--	21	--	50
16	--	--	--	--	--	--	11	--	16
17	--	--	--	--	--	--	5	--	4
18	--	--	--	--	--	--	2	--	1
19	--	--	--	--	--	--	0	--	0
20	--	--	--	--	--	--	1	--	10
21	--	--	--	--	--	--	1	--	3
22	--	--	--	--	--	--	0	--	0
23	--	--	--	--	--	--	0	--	0
24	--	--	--	--	--	--	5	--	300
25	--	--	--	--	--	--	1	--	15
26	--	--	--	--	--	--	0	--	0
27	--	--	--	--	--	--	0	--	0
28	--	--	--	--	--	--	0	--	0
29	--	--	--	--	--	--	0	--	0
30	--	--	--	--	--	--	0	--	0
31	--	--	--	--	--	--	--	--	--
Total	0	--	0	0	--	0	786	--	60729

Day	JULY			AUGUST			SEPTEMBER		
1	0	--	0	--	--	--	0	--	0
2	0	--	0	--	--	--	0	--	0
3	0	--	0	--	--	--	0	--	0
4	0	--	0	--	--	--	0	--	0
5	0	--	0	--	--	--	0	--	0
6	260	8070 S	13700	--	--	--	0	--	0
7	5	400	5	--	--	--	0	--	0
8	10	717 S	53	--	--	--	0	--	0
9	355	8600 S	13200	--	--	--	6	6710 S	206
10	77	6900	1430	--	--	--	1	1000 S	3
11	36	1700	165	--	--	--	0	--	0
12	70	2880 S	2460	--	--	--	0	--	0
13	75	3450 S	853	--	--	--	0	--	0
14	29	1200	94	--	--	--	0	--	0
15	22	700	42	--	--	--	0	--	0
16	16	150	6	--	--	--	0	--	0
17	11	700	21	--	--	--	0	--	0
18	1	150	T	--	--	--	0	--	0
19	?	--	8	--	--	--	0	--	0
20	0	--	0	--	--	--	0	--	0
21	0	--	0	--	--	--	0	--	0
22	0	--	0	--	--	--	0	--	0
23	0	--	0	--	--	--	0	--	0
24	0	--	0	--	--	--	0	--	0
25	0	--	0	--	--	--	0	--	0
26	0	--	0	--	--	--	0	--	0
27	0	--	0	--	--	--	0	--	0
28	0	--	0	--	--	--	0	--	0
29	0	--	0	--	--	--	0	--	0
30	0	--	0	--	--	--	0	--	0
31	0	--	0	--	--	--	--	--	--
Total	969	--	32037	0	--	0	7	--	209

Total discharge for year (cfs-days)..... 1,762
Total load for year (tons)..... 92,975

S Computed by subdividing day.
T Less than 0.50 ton.
A Computed from partly estimated-concentration graph.

RIO GRANDE BASIN--Continued

8-3905. RIO HONDO AT DIAMOND A RANCH, NEAR ROSWELL, N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1959 to September 1960
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Water temperature (°F)	Sampling point	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
July 6, 1960.....	0740	66		1600	19300			22		39		80	96	99	100			VPWC
July 6.....	0005	67		231	11200			17		26		60	86	97	100			VPWC
July 7.....	0500	65		72	442			--		--		62	75	96	100			S
July 9.....	0615	59		544	12500			19		29		51	72	96	100			VPWC
July 9.....	1900	60		305	8110			21		31		64	83	95	100			VPWC

8-3965. PECOS RIVER NEAR ARTESIA, N. MEX.

LOCATION.--At gaging station at bridge on State Highway 83, 4.3 miles east of Artesia, Eddy County, 7.0 miles north of mouth of Rio Penasco, and 17 miles north of McMillan Dam.
DRAINAGE AREA.--15,300 square miles, approximately (contributing area).
RECORDS AVAILABLE.--Chemical analyses: July 1937 to September 1960.
Water temperatures: April 1949 to September 1960.
Sediment records: January 1949 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 12,800 ppm Oct. 2-5; minimum, 727 ppm July 6-7.
Hardness: Maximum, 3,590 ppm Oct. 2-5; minimum, 375 ppm July 6-7.
Specific conductance: Maximum daily, 20,600 micromhos Oct. 2; minimum daily, 1,090 micromhos July 7.
Water temperatures: Maximum, 91°F July 2; minimum, 36°F Jan. 6.
Sediment concentrations: Maximum daily, 10,800 ppm June 12, July 15; minimum daily, 18 ppm Dec. 28.
Sediment loads: Maximum daily, 113,000 tons July 8; minimum daily, less than 0.5 ton July 1-3.
EXTREMES, 1937-60.--Dissolved solids: Maximum, 16,300 ppm June 22-23, 1959; minimum, 479 ppm Oct. 7-8, 1954.
Hardness: Maximum, 4,360 ppm June 22-23, 1959; minimum, 270 ppm Oct. 7-8, 1954.
Specific conductance: Maximum daily, 22,600 micromhos June 23, 1959; minimum daily, 727 micromhos July 8, 1958.
Water temperatures (1949-60): Maximum, 92°F June 30, 1953; minimum, freezing point Feb. 2, 1956, Jan. 5, 1959.
Sediment concentrations (1949-60): Maximum daily, 20,800 ppm July 22, 1955; minimum daily, no flow on many days.
Sediment loads (1949-60): Maximum daily, 183,000 tons Sept. 26, 1955; minimum daily, 0 tons on many days.
REMARKS.--Dashes omitted in potassium (K) column indicate sodium (Na) plus potassium (K) are calculated. Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of discharge for water year October 1959 to September 1960 given in WSP 1712.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1, 1959.....	6.0	33		815	303	2700		179	0	2790	4320		--		11000	15.0	178	3280	3130	20	15800	7.8
Oct. 2-5.....	14.5	29		863	349	3250		175	0	2920	5260		--		12800	17.4	501	3590	3450	24	18000	7.5
Oct. 6-11.....	28.2	26		658	250	1640		161	0	2270	2650		--		7570	10.3	576	2670	2540	14	10600	7.7
Oct. 12-22.....	29.5	22		548	178	1020		135	0	1810	1640		2.8		5290	7.19	421	2100	1990	9.6	7530	7.8
Oct. 23-31.....	26.1	22		600	220	1340		150	0	2040	2180		--		6480	8.81	457	2400	2280	12	9120	7.7
Nov. 1-4.....	43.0	21		570	199	1160		160	0	1900	1880		1.5		5810	7.90	675	2240	2110	11	8130	7.4
Nov. 5-6.....	85.0	21		525	153	756		147	0	1740	1170		2.3		4440	6.04	1020	1940	1820	7.5	6070	7.9
Nov. 7-10.....	62.8	22		470	123	600		150	0	1500	920		2.6		3710	5.05	629	1680	1560	6.4	5070	7.9
Nov. 11-30.....	58.8	22		530	165	891		158	0	1760	1400		2.6		4850	6.60	770	2000	1870	8.7	6710	7.9
Dec. 1-20.....	63.8	21		540	178	1020		171	0	1820	1600		1.9		5260	7.15	906	2080	1940	9.7	7350	7.9
Dec. 21-27.....	81.4	21		500	149	857		151	0	1600	1370		2.0		4570	6.22	1000	1860	1740	8.6	6530	7.8
Dec.28-Jan.31,1960	84.7	23		540	176	1040		183	0	1760	1660		4.8		5290	7.19	1210	2070	1920	9.9	7410	7.8
Feb. 1-17.....	78.1	22		555	189	1100		197	0	1800	1780		5.0		5550	7.55	1170	2160	2000	10	7730	7.8
Feb. 18-29.....	57.7	19		575	215	1280		143	0	2000	2060		--		6220	8.46	969	2320	2200	12	8730	8.1
Mar. 1-19.....	50.4	17		585	229	1250		142	0	2020	2060		--		6230	8.47	848	2400	2280	11	8810	8.0

RIO GRANDE BASIN--Continued

8-3965. PECOS RIVER NEAR ARTESIA, N. MEX.--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Mar. 20-22, 1960..	401	27		455	89	276	--	125	0	1380	095		4.8		2690	3.66	2910	1500	1400	3.1	3460	8.1
Mar. 23-31.....	632	19		418	63	152	--	136	0	1180	205		1.6		2110	2.87	3600	1300	1190	1.8	2610	7.6
Apr. 1-5.....	469	17		434	63	180	--	110	0	1230	255		1.9		2230	3.03	2820	1340	1250	2.1	2800	7.9
Apr. 6-8.....	80.7	15		480	91	455	--	142	0	1410	690		1.6		3210	4.37	699	1570	1450	5.0	3920	7.6
Apr. 9-10.....	55.0	17		516	108	522	--	146	0	1580	780		1.1		3600	4.90	535	1730	1610	5.5	4770	7.4
Apr. 11-14.....	64.8	17		540	139	667	--	120	0	1760	1020		.5		4200	5.71	735	1920	1820	6.6	5660	7.2
Apr. 15-20.....	53.0	21		600	181	953	--	140	0	2000	1500		1.0		5320	7.24	761	2240	2130	8.8	7240	7.3
Apr. 21-30.....	34.0	23		660	217	1280	--	146	0	2260	2020		.7		6530	8.88	599	2540	2420	11	9010	7.5
May 1-15.....	26.8	21		700	234	1430	--	172	0	2280	2340		--		7090	9.64	513	2710	2570	12	9920	7.5
May 16-17.....	350	16		495	96	316	--	138	0	1500	455		1.5		2950	4.01	2790	1630	1520	3.4	3790	7.3
May 18-31.....	597	16		425	53	117	--	116	0	1130	185		1.9		1980	2.69	3190	1280	1180	1.4	2500	7.5
June 1-12.....	714	22		388	47	132	--	133	0	1030	188		2.2		1870	2.54	3600	1160	1050	1.7	2370	7.8
June 13.....	556	24		166	21	85	--	150	0	354	136		2.5		862	1.17	1290	500	377	1.7	1290	8.1
June 14.....	283	18		224	32	181	--	151	0	533	286		1.8		1350	1.84	1030	690	566	3.0	2020	7.7
June 15-16.....	152	25		296	54	304	--	149	0	774	490		2.9		2020	2.75	829	960	838	4.3	2980	7.5
June 17-19.....	72.7	29		380	83	443	--	166	0	1070	710		3.8		2800	3.81	550	1290	1150	5.4	3990	8.0
June 20-25.....	21.8	23		528	112	732	--	128	0	1620	1120		2.1		4200	5.71	247	1780	1680	7.5	5710	7.5
June 26-29.....	8.8	25		632	161	1060	--	135	0	2040	1630		2.4		5620	7.64	134	2240	2130	9.7	7580	7.8
June 30-July 5....	4.5	23		741	229	1890	--	132	0	2420	3030		5.9		8400	11.4	102	2790	2680	16	11700	7.8
July 6-7.....	1716	17		130	12	92	--	112	4	294	118		5.2		727	.99	3370	375	276	2.1	1090	8.3
July 8-12.....	6280	16		452	32	145	--	106	0	1200	168		2.6		2070	2.82	35100	1260	1170	1.8	2470	7.7
July 13-17.....	1189	19		464	47	277	--	142	0	1240	385		3.3		2510	3.41	8060	1350	1230	3.3	3180	7.7
July 18-25.....	375	22		536	93	514	--	158	0	1550	775		2.4		3570	4.86	3610	1720	1590	5.4	4690	7.7
July 26-31.....	206	25		592	127	670	--	158	0	1760	1060		2.1		4310	5.86	2400	2000	1870	6.5	5730	7.7
Aug. 1-6.....	158	25		550	143	739	--	150	0	1720	1170		3.2		4420	6.01	1890	1960	1840	7.3	6060	7.7

Aug. 7-11.....	94.2	24		640	183	1050	--	148	0	2030	1700		1.6		5700	7.75	1450	2350	2230	9.4	7920	7.7
Aug. 12.....	563	22		580	134	718	--	157	0	1780	1120		1.5		4430	6.02	6730	2000	1870	7.0	6050	7.8
Aug. 13.....	703	17		392	61	349	--	147	0	1110	505		.9		2510	3.41	4760	1230	1110	4.3	3470	7.4
Aug. 14-17.....	520	18		328	49	170	--	132	0	915	232		2.8		1780	2.42	2500	1020	912	2.3	2360	7.6
Aug. 18-19.....	169	20		398	80	337	--	130	0	1190	500		2.1		2590	3.52	1180	1320	1210	4.0	3460	7.5
Aug. 20-21.....	132	21		468	105	512	--	154	0	1400	800		1.6		3380	4.60	1200	1600	1470	5.6	4640	7.5
Aug. 22-25.....	94.5	21		545	136	733	--	132	0	1700	1160		.7		4360	5.93	1110	1920	1810	7.3	5970	7.6
Aug. 26-31.....	60.0	21		600	190	1020	--	140	0	1960	1660		.8		5520	7.51	894	2280	2160	9.3	7670	7.4
Sept. 1-12.....	45.2	20		675	232	1340	--	156	0	2330	2120		.9		6790	9.23	829	2640	2510	11	9330	7.4
Sept. 13-30.....	64.7	18		575	184	947	--	140	0	1980	1470		1.0		5240	7.13	915	2190	2080	8.8	7210	7.2
Weighted average	--	19		449	70	332	--	128	0	1270	494		2.6		2700	3.67	1860	1410	1300	3.5	3510	7.6
Time-weighted average.....	255	21		546	161	917	--	152	0	1760	1460		2.5		4940	--	--	2020	1900	8.4	6820	7.6
Tons per day....	--	13		309	48	228	--	88	0	876	340		1.8		--	--	--	--	--	--	--	--

Temperature (°F) of water, water year October 1959 to September 1960

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

RIO GRANDE BASIN--Continued

8-3965. PECOS RIVER NEAR ARTESIA, N. MEX.--Continued

Suspended sediment, water year October 1959 to September 1960

Day	OCTOBER			NOVEMBER			DECEMBER		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1..	6	38	1	38	76	8	59	64	10
2..	7	72	1	40	77	8	59	C 83	13
3..	15	128	5	41	83	9	59	C 83	13
4..	20	124	7	53	180	S 32	64	49	8
5..	16	63	3	84	233	53	64	99	17
6..	19	42	2	86	129	30	64	C 81	14
7..	18	35	2	76	118	24	64	C 81	14
8..	24	84	5	65	C 68	12	64	C 81	14
9..	32	68	6	56	C 68	10	58	54	8
10..	37	93	9	54	111	16	61	38	6
11..	39	85	9	55	C 74	11	59	29	5
12..	36	58	6	59	C 74	12	56	C 30	5
13..	35	64	6	60	C 50	8	58	C 30	5
14..	36	50	5	60	C 50	8	62	44	7
15..	35	56	5	60	C 50	8	62	C 37	6
16..	31	81	7	61	89	15	61	C 37	6
17..	29	56	4	59	87	14	64	C 37	6
18..	25	C 67	4	56	74	11	70	28	5
19..	24	C 67	4	55	99	15	77	38	8
20..	24	C 83	5	53	C 90	13	90	100	24
21..	25	C 83	5	55	C 90	13	95	C 74	19
22..	24	C 121	8	60	100	16	92	C 74	19
23..	22	C 121	7	61	C 106	17	85	35	8
24..	24	C 121	8	61	C 106	17	79	45	10
25..	23	33	2	64	C 73	12	75	43	9
26..	32	82	7	61	C 73	12	72	33	6
27..	30	91	3	58	135	21	72	44	9
28..	22	25	1	60	C 82	13	71	18	3
29..	23	33	2	60	C 82	13	70	41	8
30..	26	45	3	59	C 82	13	61	24	4
31..	33	61	5	--	--	--	61	21	3
Total	792	--	147	1770	--	464	2108	--	292

Day	JANUARY			FEBRUARY			MARCH		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1..	66	29	5	89	C 52	12	58	31	5
2..	69	40	7	85	C 52	12	60	45	7
3..	72	33	6	85	C 52	12	58	C 31	5
4..	72	42	8	80	C 39	8	59	C 31	5
5..	74	37	7	77	C 39	8	60	C 31	5
6..	76	57	12	79	C 39	8	61	C 32	5
7..	77	45	9	80	C 51	11	59	C 32	5
8..	77	43	9	81	C 51	11	57	C 32	5
9..	76	40	8	78	C 51	11	53	C 20	3
10..	71	31	6	78	C 45	10	44	C 20	2
11..	77	52	11	80	C 45	10	39	C 20	2
12..	87	43	10	80	C 45	10	40	C 23	2
13..	93	72	18	78	C 38	8	46	C 23	3
14..	101	72	20	77	C 38	8	46	C 23	3
15..	103	64	18	68	C 38	7	45	C 23	3
16..	103	65	18	67	C 37	7	43	C 23	3
17..	104	73	20	66	C 37	7	44	C 23	3
18..	101	62	17	67	C 37	7	43	C 20	2
19..	98	72	19	54	C 41	6	42	C 20	2
20..	97	C 45	12	57	C 41	6	217	1810	S 1670
21..	97	C 45	12	57	C 41	6	486	3500	4590
22..	92	C 45	11	56	C 32	5	501	3000	4060
23..	90	C 40	10	54	C 32	4	542	2730	4000
24..	89	C 40	10	55	C 32	5	611	3000	4950
25..	90	C 40	10	57	C 34	5	730	3620	7140
26..	91	C 41	10	59	C 34	5	671	3030	5490
27..	91	C 41	10	59	C 34	5	644	2570	4470
28..	92	C 41	10	58	C 31	5	637	2550	4390
29..	92	C 52		59	C 31	5	608	2500	4100
30..	91	C 52		--	--	--	631	2430	4140
31..	91	C 52	13	--	--	--	618	2380	3970
Total	2700	--	362	2020	--	224	7853	--	53040

S Computed by subdividing day.
C Composite period.

RIO GRANDE BASIN--Continued

8-3965. PECOS RIVER NEAR ARTESIA, N. MEX.--Continued

Suspended sediment, water year October 1959 to September 1960--Continued

Day	APRIL			MAY			JUNE		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	685	2500	4620	37	C 83	8	1080	4850	14100
2	904	4210	10300	34	C 83	8	730	4310	8300
3	430	2890	3360	33	C 83	7	719	3800	7380
4	200	1410	761	26	81	6	666	3000	5390
5	124	1200	402	22	56	3	668	3030	5460
6	95	490	126	19	45	2	682	2600	4790
7	81	295	65	21	C 72	4	753	2700	5490
8	66	186	33	22	C 72	5	1150	5870	S 19000
9	56	96	14	27	C 72	5	600	5600	9070
10	54	102	15	36	C 80	8	302	3300	2690
11	75	138	28	32	C 80	7	372	3300	3310
12	75	78	16	27	C 57	4	840	10800	24500
13	55	93	14	24	C 57	4	556	6700	10100
14	53	82	12	24	41	3	283	2600	1990
15	54	113	16	18	23	1	175	3040	1440
16	57	86	13	215	1210	S 1040	130	2230	783
17	53	67	10	484	2500	3270	93	970	244
18	56	C 65	9	546	2450	3610	69	350	65
19	51	C 65	9	551	2400	3570	56	230	35
20	47	C 81	10	551	2230	3320	42	210	24
21	41	C 81	10	574	2130	3300	32	270	23
22	46	C 81	10	574	2010	3120	24	170	11
23	43	C 47	5	556	1890	2840	16	140	6
24	28	C 47	3	569	2030	3120	12	66	2
25	29	C 47	4	587	2060	3260	5	119	2
26	30	C 101	8	579	1870	2920	12	76	2
27	29	C 101	8	592	1920	3070	8	59	1
28	30	C 101	8	566	1820	2780	7	80	2
29	32	C 38	3	598	1920	3100	8	62	1
30	32	C 38	3	652	2390	4210	8	83	2
31	--	--	--	860	3360	7800	--	--	--
Total	3611	--	19897	9456	--	54403	10098	--	124413

	JULY			AUGUST			SEPTEMBER		
1	3	49	T	185	400	200	50	78	11
2	3	39	T	186	417	209	42	81	9
3	3	39	T	188	455	231	39	85	9
4	5	55	1	151	300	122	39	71	7
5	5	56	1	129	205	71	49	78	10
6	253	2170	S 5620	110	133	40	42	62	7
7	3180	9000	77300	98	129	34	40	95	10
8	4500	9300	113000	103	129	36	40	92	10
9	6000	6300	102000	92	136	34	44	129	15
10	8200	3500	77500	87	163	38	40	110	12
11	9800	2300	60900	91	162	40	48	91	12
12	2900	5000	39100	563	5380	S 8530	69	118	22
13	1100	4100	12200	703	9400	17800	69	105	20
14	2500	8300	56000	860	9700	22500	61	75	12
15	1100	1 800	32100	624	6300	10600	76	100	21
16	702	5400	10200	346	3580	3340	70	75	14
17	544	2260	3320	251	1950	1320	62	53	9
18	449	1880	2280	182	1400	688	66	60	A 11
19	381	1090	1120	156	530	223	72	47	9
20	494	1390	S 2200	139	265	99	59	38	6
21	539	2900	4220	124	155	52	44	30	4
22	350	2230	2110	120	130	42	48	34	4
23	285	1150	885	103	60	17	48	39	5
24	254	490	336	85	112	26	61	120	20
25	251	320	217	70	48	9	71	54	10
26	231	270	168	60	99	16	69	62	12
27	206	180	100	65	67	12	68	63	12
28	261	550	388	65	62	11	71	72	14
29	218	450	265	60	66	11	74	83	17
30	164	340	151	60	88	14	75	91	18
31	154	360	150	50	79	11	--	--	--
Total	45035	--	603833	6106	--	66376	1706	--	352

Total discharge for year (cfs-days)..... 93,255
Total load for year (tons)..... 923,803

S Computed by subdividing day.
T Less than 0.50 ton.
A Computed from partly estimated-concentration graph.
C Composite period.

RIO GRANDE BASIN--Continued

8-3965. PECOS RIVER NEAR ARTESIA, N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1959 to September 1960
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Water temperature (°F)	Sampling point	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Mar. 2, 1960	1000	40		64	45		--	--		--		42	55	100				VPWC
Mar. 22	0730	53		489	2890		--	56		78		95	98	100				VPWC
Apr. 2	0930	50		1030	4390		--	33		57		92	99	100				VPWC
May 16	1415	74		308	1270		--	36		58		84	94	100				VPWC
May 31	0745	69		759	2460		--	34		53		90	99	100				VPWC
June 1	0600	70		1270	5060		--	35		53		92	99	100				VPWC
June 6	0800	72		666	2500		--	37		54		84	96	100				VPWC
June 12	1900	--		847	12300		43	52		72		94	99	100				VPWC
July 9	1045	72		3830	6070		--	47		65		84	96	100				VPWC
July 10	1030	75		3700	3160		--	43		58		74	94	100				VPWC
July 14	1850	77		2070	10700		44	57		79		96	99	100				VPWC
July 15	0600	70		1230	11200		49	60		79		92	98	100				VPWC
July 27	1045	83		191	123		--	--		--		49	72	100				V
Aug. 21	1640	85		115	130		--	--		--		90	94	100				S

Particle-size analyses of bed material, water year October 1959 to September 1960
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Water temperature (°F)	Sampling point	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Bed material: Percent finer than size indicated, in millimeters										Method of analysis
							0.062	0.125	0.250	0.500	1.000	2.000	4.000	8.000	16.00	32.00	64.00	
July 9, 1960	1045	72		3830								4	40	99	100			S
July 10	1030	75		3700								5	42	99	100			S
July 27	1045	83		191								0	6	92	100			S

RIO GRANDE BASIN--Continued

8-3985. RIO PENASCO AT DAYTON, N. MEX.

LOCATION.--At gaging station, 3 feet upstream from crest of abandoned diversion dam, 1 mile northeast of old Dayton railway station, 3.5 miles upstream from mouth, and 7 miles southeast of Artesia, Eddy County.
DRAINAGE AREA.--1,070 square miles, approximately.
RECORDS AVAILABLE.--Sediment records: September 1951 to September 1960.
EXTREMES, 1959-60.--Sediment concentrations: Maximum daily, 6,690 ppm Aug. 12; minimum daily, no flow on many days.
Sediment loads: Maximum daily, 9,160 tons July 9; minimum daily, 0 tons on many days.
EXTREMES, 1951-60.--Sediment concentrations: Maximum daily, 30,000 ppm Oct. 7, 1954; minimum daily, no flow on many days.
Sediment loads: Maximum daily, 600,000 tons Oct. 7, 1954; minimum daily, 0 tons on many days.
REMARKS.--Records of specific conductance of daily samples and a few water temperature observations are available in district office at Albuquerque, N. Mex. Records of discharge for water year October 1959 to September 1960 given in WSP 1712. No flow October to June and September, tabulation omitted for these periods.

Suspended sediment, water year October 1959 to September 1960
(Where no concentrations are reported, loads are estimated)

Day	JULY			AUGUST			SEPTEMBER		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	0	--	0	0	--	0	--	--	--
2	0	--	0	0	--	0	--	--	--
3	0	--	0	0	--	0	--	--	--
4	0	--	0	0	--	0	--	--	--
5	0	--	0	0	--	0	--	--	--
6	128	3200	B 2200	0	--	0	--	--	--
7	469	4130	S 6410	0	--	0	--	--	--
8	364	2700	S 6590	0	--	0	--	--	--
9	503	3800	S 9160	0	--	0	--	--	--
10	28	560	B 72	0	--	0	--	--	--
11	0	--	0	0	--	0	--	--	--
12	0	--	0	69	6690	S 3100	--	--	--
13	0	--	0	8	1500	B 58	--	--	--
14	0	--	0	0	--	0	--	--	--
15	0	--	0	0	--	0	--	--	--
16	0	--	0	0	--	0	--	--	--
17	0	--	0	0	--	0	--	--	--
18	0	--	0	0	--	0	--	--	--
19	0	--	0	0	--	0	--	--	--
20	0	--	0	0	--	0	--	--	--
21	0	--	0	0	--	0	--	--	--
22	0	--	0	0	--	0	--	--	--
23	0	--	0	0	--	0	--	--	--
24	0	--	0	0	--	0	--	--	--
25	0	--	0	0	--	0	--	--	--
26	0	--	0	0	--	0	--	--	--
27	0	--	0	0	--	0	--	--	--
28	0	--	0	0	--	0	--	--	--
29	0	--	0	0	--	0	--	--	--
30	0	--	0	0	--	0	--	--	--
31	0	--	0	0	--	0	--	--	--
Total	1492	--	24432	77	--	3158	0	--	0

Total discharge for year (cfs-days)..... 1,569
Total load for year (tons)..... 27,590

S Computed by subdividing day.
B Computed from estimated-concentration graph.

RIO GRANDE BASIN--Continued

8-3985. RIO PENASCO AT DAYTON, N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1959 to September 1960
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Water temperature (°F)	Sampling point	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
July 7, 1960.....	0400	69		792	7810		--	51	--	79	--	95	99	100				VPWC
July 7.....	0745	68		184	2380		--	70	--	93	--	99	100	--				SPWC
July 7.....	1100	70		890	7060		--	44	--	71	--	93	99	100				VPWC
July 8.....	0730	69		538	4000		--	49	--	79	--	96	100	--				VPWC
July 8.....	0030	74		71	783		--	--	--	--	--	100	--	--				S
July 9.....	0035	75		860	2640		36	47	62	74	83	94	99	100				VPWC
July 9.....	0035	75		860	2640		12	26	44	59	80	94	99	100				VPN
Aug. 12.....	1130	69		239	23400		47	69	--	99	--	100	--	--				PWC

8-4020. PECOS RIVER AT DAMSITE 3, NEAR CARLSBAD, N. MEX.

LOCATION.--At gaging station at damsite 3 of Carlsbad project of Bureau of Reclamation, about 1 mile upstream from flow line of Lake Avalon, 1.3 miles downstream from Rocky Arroyo, and 8 miles northwest of Carlsbad, Eddy County.
DRAINAGE AREA.--17,980 square miles (revised), approximately (contributing area).
RECORDS AVAILABLE.--Chemical analyses: July 1951 to September 1960.
REMARKS.--Records of discharge for water year October 1959 to September 1960 given in WSP 1712.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Dissolved solids: Tons per day	Hardness as $CaCO_3$: Calcium, Magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
Oct. 1, 1959.....	144							115	0		405										3360	7.0
Oct. 9.....	46							158	0		660										4540	7.6
Oct. 13.....	45							154	0		655										4540	7.9
Oct. 14.....	44							153	0		655										4520	8.1
Oct. 15.....	44							153	0		655										4530	7.2
Oct. 21.....	41							149	0		660										4560	7.7
Oct. 28.....	37							137	4		665										4570	8.3
Nov. 2.....	36							155	0		655										4530	7.5
Nov. 4.....	33							153	0		665										4570	7.6
Nov. 11.....	33							156	0		665										4580	8.1
Nov. 17.....	34							--	0		670										4580	8.0
Nov. 19.....	35							158	0		670										4610	7.8
Nov. 26.....	44							163	0		665										4610	6.9
Dec. 1.....	33							155	0		665										4590	7.0
Dec. 3.....	32							152	0		665										4600	7.2
Dec. 9.....	33							156	0		665										4600	7.2
Dec. 17.....	33							153	0		660										4520	7.3
Dec. 24.....	33							122	0		670										4550	8.0
Dec. 30.....	34							110	0		680										4540	7.8
Jan. 6, 1960.....	35							158	0		670										4560	7.2

RIO GRANDE BASIN--Continued

8-4020. PECOS RIVER AT DAM SITE 3, NEAR CARLSBAD, N. MEX.--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Jan. 13, 1960.....	36							166	0		670										4590	6.9
Jan. 20.....	40							128	0		1080										5780	7.9
Jan. 20.....	40							127	0		1040										5700	7.2
Jan. 27.....	241							119	0		1270										6360	7.2
Feb. 3.....	126							121	0		1110										5900	7.7
Feb. 10.....	40							148	0		750										4870	7.5
Feb. 17.....	39							152	0		680										4630	8.0
Feb. 25.....	39							153	0		670										4600	7.9
Mar. 1.....	37							158	0		680										4600	8.1
Mar. 2.....	39							157	0		670										4590	7.9
Mar. 10.....	35							142	0		690										4630	7.4
Mar. 16.....	34							147	0		690										4710	7.5
Mar. 23.....	32							143	0		690										4670	7.2
Mar. 30.....	370							127	0		920										5260	6.7
Apr. 6.....	422							118	0		880										5100	7.5
Apr. 13.....	472							119	0		780										4790	7.3
Apr. 20.....	146							132	0		775										4840	7.1
Apr. 27.....	208							136	0		930										5430	7.0
May 4.....	40							132	0		995										5750	7.2
May 11.....	231							138	0		1250										6670	7.1
May 18.....	161							140	0		1280										6840	7.2
May 26.....	191							111	0		304										3120	7.2
July 27.....	113							78	0		670										4530	7.9
Aug. 3.....	228							132	0		505										3830	7.3
Aug. 10.....	319							135	0		540										3960	7.0
Aug. 17.....	92							155	0		670										4530	7.6
Aug. 24.....	384							122	0		565										4020	7.4
Aug. 30.....	83							163	0		695										4180	7.2
Sept. 8.....	346							113	0		600										4180	7.2
Sept. 15.....	212							123	0		645										4410	7.2
Sept. 21.....	180							117	0		675										4510	6.9
Sept. 28.....	135							122	0		710										4700	7.6

8-4050. PECOS RIVER AT CARLSBAD, N. MEX.

LOCATION.--At gaging station at Greene Street bridge in Carlsbad, Eddy County, 0.5 mile upstream from Dark Canyon.
DRAINAGE AREA.--18,100 square miles, approximately (contributing area).
RECORDS AVAILABLE.--Chemical analyses: May 1937 to September 1946, July 1951 to September 1960.
Water temperatures: July 1951 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 3,040 ppm Apr. 15-30; minimum, 1,550 ppm July 11-13.
Hardness: Maximum, 1,580 ppm Apr. 15-30; minimum, 930 ppm July 11-13.
Specicic conductance: Maximum daily, 4,240 micromhos Apr. 18; minimum daily, 2,040 micromhos July 12.
Water temperatures: Maximum, 90°F June 20-21; minimum, 50°F Jan. 5, 23.
EXTREMES, 1937-46, 1951-60.--Dissolved solids: Maximum, 3,590 ppm May 1, 1941; minimum, 360 ppm May 22, 1941.
Hardness: Maximum, 1,970 ppm May 1, 1941; minimum, 290 ppm May 22, 1941.
Specific conductance: Maximum daily, 5,870 micromhos Apr. 25, 1942; minimum daily, 649 micromhos May 22, 1941.
Water temperatures (1951-60): Maximum, 98°F July 3, 1957; minimum, 38°F Jan. 5, 1958.
REMARKS.--Dashes omitted in potassium (K) column indicate sodium (Na) plus potassium (K) are calculated. Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of discharge for water year October 1959 to September 1960 given in WSP 1712.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1-31, 1959...	33.3	19		355	125	312		144		1170	525		2.6		2580	3.51	232	1400	1280	3.6	3520	7.8
Nov. 1-30.....	31.3	19		358	101	282		146		1060	495		2.5		2390	3.25	202	1310	1190	3.4	3330	7.8
Dec. 1-31.....	32.0	20		330	94	280		146		1000	465		3.1		2260	3.07	195	1210	1090	3.5	3180	7.7
Jan. 1-31, 1960...	27.6	21		348	93	273		182		1010	455		3.3		2290	3.11	171	1250	1100	3.4	3170	7.5
Feb. 1-29.....	29.2	21		342	101	301		192		1050	475		3.8		2390	3.25	188	1270	1110	3.7	3250	7.5
Mar. 1-31.....	28.6	24		340	107	262		188		1020	455		3.3		2300	3.13	178	1290	1140	3.2	3150	7.5
Apr. 1-14.....	26.7	24		345	95	307		165		1060	480		3.1		2400	3.26	173	1250	1110	3.8	3290	7.6
Apr. 15-30.....	49.7	21		425	126	393		152		1360	630		5.3		3040	4.13	408	1580	1460	4.3	4030	7.6
May 1-31.....	18.2	13		370	114	334		143		1180	545		2.6		2630	3.58	129	1390	1270	3.9	3620	7.7
June 1-30.....	21.5	18		380	100	325		152		1140	534		2.0		2570	3.50	149	1360	1240	3.8	3590	7.5
July 1-6, 8-10....	23.3	20		365	104	324		164		1130	518		2.2		2540	3.45	160	1340	1210	3.9	3520	7.8
July 7.....	23	19		285	80	249		154		858	398		2.4		1970	2.68	122	1040	914	3.4	2840	7.6
July 11-13.....	2839	13		320	32	122		101		841	166		2.8		1550	2.11	11880	930	847	1.7	2040	7.3
July 14-19.....	1420	13		410	45	156		100		1130	206		1.5		2010	2.73	7710	1210	1130	2.0	2540	7.3
July 20-31.....	165	15		422	70	241		107		1240	344		1.3		2390	3.25	1060	1340	1250	2.9	3090	7.7
Aug. 1-31.....	34.7	20		410	99	303		187		1210	478		3.2		2620	3.56	245	1430	1280	3.5	3620	7.5
Sept. 1-30.....	32.5	21		398	111	341		200		1210	542		4.0		2720	3.70	239	1450	1290	3.9	3700	7.4
Weighted average	--	16		370	64	205		124		1050	308		2.5		2080	2.82	448	1190	1090	2.5	2750	7.4
Time-weighted average.....	79.9	20		367	102	300		163		1120	490		3.0		2480	--	--	1340	1200	3.6	3400	7.6
Tons per day....	--	3.4		80	14	44		27		227	66		0.5		--	--	--	--	--	--	--	--

RIO GRANDE BASIN--Continued

8-4050. PECOS RIVER AT CARLSBAD, N. MEX.--Continued

Temperature (°F) of water, water year October 1959 to September 1960

Month	Day																													Aver-age
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
October	80	76	79	75	72	72	75	73	73	78	78	77	68	67	74	69	73	68	75	78	78	77	76	75	78	72	68	73	78	68	68	74
November	73	72	68	68	66	63	64	65	65	--	65	66	67	63	62	58	60	65	65	63	64	63	64	62	60	57	63	60	63	62	--	64
December	63	62	60	63	60	61	63	60	62	64	64	62	63	60	62	59	60	60	58	59	61	64	64	62	62	63	--	57	62	60	64	63	62
January	60	60	58	58	50	55	60	59	61	62	63	64	58	52	58	53	52	57	52	55	52	51	50	59	57	60	66	62	62	62	64	58
February	63	60	60	58	64	65	63	67	60	62	57	63	63	63	60	66	62	60	63	62	66	65	55	55	60	63	62	67	60	--	--	62
March	57	61	63	61	63	62	66	72	73	72	68	64	63	65	66	65	63	70	--	70	72	75	74	72	67	72	73	74	73	73	72	68
April	70	72	72	74	75	77	78	78	77	75	78	77	77	74	77	73	75	68	72	77	79	76	79	78	77	78	76	77	73	73	68	75
May	68	73	76	75	70	73	75	80	82	82	80	80	83	84	--	83	83	80	78	76	80	80	80	82	80	81	80	85	80	77	78	79
June	77	83	84	85	85	83	80	85	80	82	78	85	85	83	85	85	83	88	85	90	90	84	85	83	85	85	85	84	87	85	--	84
July	85	86	85	83	80	79	77	83	82	85	87	82	82	82	80	84	85	84	85	83	80	85	84	83	83	85	84	86	88	86	84	83
August	86	84	83	84	85	85	84	85	84	79	82	81	82	83	83	83	84	85	85	87	89	86	88	88	87	86	82	83	85	83	85	84
September	83	85	85	84	83	85	83	84	79	80	78	80	83	83	85	82	85	85	85	83	85	85	83	78	78	78	80	78	80	79	--	82

8-4063. PECOS RIVER EAST OF MALAGA, N. MEX.

LOCATION.--One and a half miles upstream from gaging station near Malaga, which is 3 miles southeast of Malaga, Eddy County, and 4 miles downstream from Black River.
DRAINAGE AREA.--19,190 square miles, approximately, upstream from gaging station (contributing area).
RECORDS AVAILABLE.--Chemical analyses: July 1937 to September 1960.
Water temperatures: February 1959 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 8,460 ppm June 1-13, June 20 to July 3; minimum, 1,080 ppm July 13.
Hardness: Maximum, 2,530 ppm June 1-13, June 20 to July 3; minimum, 632 ppm July 13.
Specific conductance: Maximum daily, 13,200 micromhos June 26; minimum daily, 1,290 micromhos July 6.
Water temperatures: Maximum, 90°F June 21; minimum, 42°F Feb. 25.
EXTREMES, 1937-60.--Dissolved solids: Maximum, 9,100 ppm June 22 to July 21, 1957; minimum, 384 ppm Sept. 21-22, 1941.
Hardness: Maximum, 2,750 ppm June 1-10, 1955; minimum, 254 ppm Sept. 21-22, 1941.
Specific conductance: Maximum daily, 14,600 micromhos July 21, 1957; minimum daily, 450 micromhos Sept. 21, 1941.
REMARKS.--Dashes omitted in potassium (K) column indicate sodium (Na) plus potassium (K) are calculated. Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of discharge for gaging station near Malaga, for water year October 1959 to September 1960 given in WSP 1712. No appreciable inflow between sampling point and gaging station.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1-17, 1959...	53.8	38		605	200	1390		146		2020	2220		--		6540	8.89	950	2330	2210	13	9210	7.9
Oct. 18-31.....	65.2	30		580	200	1180		164		1930	1900		9.2		5910	8.04	1040	2270	2140	11	8260	7.8
Nov. 1-30.....	74.4	24		545	185	1030		150		1820	1650		9.4		5340	7.26	1070	2120	2000	9.7	7460	7.9
Dec. 1-14.....	49.6	27		540	166	1100		154		1750	1740		11		5410	7.36	725	2030	1900	11	7630	7.7
Dec. 15-31.....	72.6	23		520	171	929		184		1690	1490		10		4920	6.69	964	2000	1850	9.0	6900	7.8
Jan. 1-31, 1960...	66.4	24		530	177	961		213		1700	1550		12		5060	6.88	907	2050	1880	9.2	7060	7.5
Feb. 1-12.....	57.2	23		520	178	982		185		1720	1570		12		5100	6.94	788	2030	1880	9.5	7130	7.3
Feb. 13-27.....	27.5	22		575	184	1400		177		1900	2210		--		6380	8.68	474	2190	2050	13	9140	7.3
Feb. 28-Mar. 23...	25.4	22		618	201	1590		178		2040	2530		--		7090	9.64	486	2370	2220	14	10100	7.3
Mar. 24-Apr. 17...	24.5	25		623	218	1840		174		2140	2890		--		7820	10.6	517	2450	2310	16	11200	7.2
Apr. 18-May 15....	33.6	18		610	209	1520		167		2050	2420		--		6910	9.40	627	2380	2240	14	9760	7.3
May 16-31.....	19.8	24		632	217	2010		192		2160	3140		--		8280	11.3	443	2470	2310	18	11900	7.5
June 1-13, 20-July 3.....	20.4	33		657	217	2050		179		2160	3240		16		8460	11.5	466	2530	2380	18	12300	7.9
June 14-19.....	31.5	24		639	220	1520		148		2140	2450		6.3		7070	9.62	601	2500	2380	13	10100	7.5
July 4-5.....	204	18		330	53	413		148		825	675		5.5		2390	3.25	1320	1040	919	5.6	3590	7.4

RIO GRANDE BASIN--Continued

8-4063. PECOS RIVER EAST OF MALAGA, N. MEX.--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
July 6-10, 1960...	800	13		318	89	467		134		952	760		3.8		2670	3.63	5770	1160	1050	6.0	3940	7.3
July 11-12.....	446	17		385	117	672		102		1200	1110		3.4		3550	4.83	4270	1440	1360	7.7	5230	7.6
July 13.....	5850	14		220	20	93		98		552	125		4.8		1080	1.47	17060	632	552	1.6	1510	7.5
July 14-15.....	4505	17		390	43	158		117		1060	206		3.7		1940	2.64	23600	1150	1050	2.0	2460	7.7
July 16.....	1940	16		442	53	234		128		1220	320		4.1		2350	3.20	12310	1320	1220	2.8	2990	7.1
July 17.....	322	16		458	67	395		128		1300	580		2.6		2880	3.92	2500	1420	1320	4.6	3880	7.8
July 18.....	176	26		490	97	647		92		1450	1020		5.1		3780	5.14	1800	1620	1550	7.0	5330	8.1
July 19-20.....	134	22		505	109	775		146		1490	1220		4.8		4200	5.71	1520	1710	1590	8.2	5960	7.6
July 21-26.....	350	19		475	91	453		124		1390	705		3.7		3200	4.35	3020	1560	1460	5.0	4310	7.1
July 27-28.....	72.0	24		550	124	950		149		1660	1480		9.6		4870	6.62	947	1880	1760	9.5	6880	7.1
July 29-31.....	40.0	26		585	161	1350		171		1850	2120		12		6190	8.42	669	2120	1980	13	8900	7.3
Aug. 1-11.....	35.3	27		623	193	1720		199		1970	2750		7.5		7390	10.1	704	2350	2190	15	10800	7.4
Aug. 12-13.....	77.5	22		555	155	1140		170		1720	1820		7.2		5500	7.48	1150	2020	1880	11	7980	7.8
Aug. 14-16.....	40.0	24		595	191	1510		184		1950	2380		6.7		6750	9.18	729	2270	2120	14	9740	7.1
Aug. 17.....	279	16		428	66	506		148		1160	785		6.0		3040	4.13	2290	1340	1220	6.0	4350	7.3
Aug. 18-19.....	53.0	26		535	128	1070		144		1620	1690		7.1		5150	7.00	737	1860	1740	11	7420	7.7
Aug. 20-26.....	45.7	25		623	210	1680		185		2060	2680		8.3		7380	10.0	911	2420	2270	15	10700	7.4
Aug. 27-31.....	113	20		585	168	942		148		1880	1500		5.4		5170	7.03	1580	2150	2030	8.8	7180	7.5
Sept. 1-2.....	49.0	21		595	191	1200		170		1940	1930		8.3		5970	8.12	790	2270	2130	11	8470	7.6
Sept. 3-30.....	38.0	29		632	217	1730		193		2110	2740		9.8		7560	10.3	776	2470	2310	15	10900	7.6
Weighted average	--	19		437	106	650		139		1330	1240		--		3630	4.94	1090	1530	1410	6.5	5074	7.4
Time-weighted average.....	111	25		579	189	1370		173		1900	2230		--		6340	--	--	2220	2080	12.5	9018	7.4
Tons per day....	--	5.8		131	32	195		42		398	372		--		1090	--	--	--	--	--	--	--

RIO GRANDE BASIN--Continued

8-4063. PECOS RIVER EAST OF MALAGA, N. MEX.--Continued

Temperature (°F) of water, water year October 1959 to September 1960

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

RIO GRANDE BASIN--Continued

8-4070. PECOS RIVER AT PIERCE CANYON CROSSING, NEAR MALAGA, N. MEX.

LOCATION.--At Pierce Canyon Crossing, 0.2 mile downstream from gaging station and 6 miles southeast of Malaga, Eddy County.
DRAINAGE AREA.--19,260 square miles, approximately (contributing area).
RECORDS AVAILABLE.--Chemical analyses: March 1938 to September 1941, October 1951 to September 1960.
Water temperatures: October 1952 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 14,700 ppm May 25-31; minimum, 1,450 ppm July 14.
Hardness: Maximum, 3,060 ppm June 15-20; minimum, 800 ppm July 6-8.
Specific conductance: Maximum daily, 23,500 micromhos July 4; minimum daily, 1,960 micromhos July 14.
Water temperatures: Maximum, 89°F June 21; minimum, 41°F Jan. 18.
EXTREMES, 1938-41, 1951-60.--Dissolved solids: Maximum, 23,700 ppm Aug. 11-21, 1954; minimum, 280 ppm Sept. 21, 1941.
Hardness: Maximum, 3,420 ppm Aug. 11-21, 1954; minimum, 202 ppm Sept. 21, 1941.
Specific conductance: Maximum daily, 34,400 micromhos Aug. 2, 1954; minimum daily, 433 micromhos Sept. 21, 1941.
Water temperatures (1952-60): Maximum, 90°F Aug. 3, 1953, July 24, 1954, July 1, 1957; minimum, 37°F Dec. 24, 1953, Feb. 5, 1956.
REMARKS.--Dashes omitted in potassium (K) column indicate sodium (Na) plus potassium (K) are calculated. Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of discharge for water year October 1959 to September 1960 given in WSP 1712. No appreciable inflow between sampling point and gaging station except during periods of heavy local rains.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Density at 20°C
														Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Oct. 1-6, 1959....	66.5	35		572	239	2720		94	2080	4320		--		10000	13.6	1800	2410	2330	24	14900	7.9	1.005
Oct. 7-9.....	53.3	29		578	228	2310		147	2000	3690		--		8910	12.1	1280	2380	2260	21	13300	8.0	1.004
Oct. 10-14.....	58.2	23		596	244	2760		134	2220	4310		--		10200	13.9	1600	2490	2380	24	14900	8.0	1.006
Oct. 15-31.....	71.6	24		578	231	2250		139	2050	3570		--		8770	11.9	1700	2390	2280	20	13000	8.0	1.004
Nov. 1-Dec. 4.....	75.6	26		544	210	1860		154	1930	2930		--		7580	10.3	1550	2220	2090	17	11100	7.9	1.002
Dec. 5-14.....	47.4	34		538	206	2390		159	1910	3730		--		8890	12.1	1140	2190	2060	22	13300	7.9	1.004
Dec.15-Jan.31,1960	73.8	26		514	199	1690		176	1810	2650		--		6980	9.49	1390	2100	1960	16	10200	7.7	1.002
Feb. 1-11.....	62.6	24		504	205	1670		137	1740	2700		--		6910	9.40	1170	2100	1990	16	10000	8.0	1.001
Feb. 12-17.....	26.5	20		543	210	2440		123	1940	3840		--		9050	12.3	648	2220	2120	23	13400	7.9	1.003
Feb. 18-29.....	28.1	22		577	229	3080		101	2110	4820		--		10900	14.8	827	2380	2300	28	16000	7.9	1.006
Mar. 1-31.....	27.9	24		591	252	3160		163	2150	4970		--		11200	15.2	844	2510	2380	27	16600	7.3	1.006
Apr. 1-17.....	29.2	24		616	314	3610		172	2260	5810		--		12700	17.3	1000	2830	2690	30	19000	7.3	1.007
Apr. 18-May 3.....	41.0	18		608	237	2740		158	2120	4330		--		10100	13.7	1120	2490	2360	24	14800	7.2	1.004
May 4-24.....	28.3	18		645	285	3390		183	2270	5410		--		12100	16.5	925	2780	2630	28	18000	7.3	1.007
May 25-31.....	25.0	22		655	303	4340		192	2390	6850		--		14700	20.0	992	2880	2720	35	21500	7.3	1.008
June 1-14.....	25.3	26		625	362	4210		162	2380	6800		3.1		14500	19.7	991	3050	2920	33	21700	7.7	1.008
June 15-20.....	33.0	19		652	349	3080		136	2350	5100		7.8		11600	15.8	1030	3060	2950	24	17400	7.2	1.005
June 21-July 3....	24.1	20		650	330	4230		131	2410	6780		5.3		14500	19.7	944	2980	2870	34	20900	7.4	1.007
July 4-5.....	186	19		335	64	544		153	917	850		5.5		2810	3.82	1410	1100	974	7.1	4270	7.0	--
July 6-8.....	1067	11		238	50	289		111	639	475		2.3		1760	2.39	5070	800	709	4.4	2690	7.6	--

July 9-10, 1960...	228	12		310	104	671	124		951	1110		3.0		3220	4.38	1980	1200	1100	8.4	5010	7.2	--
July 11.....	82.0	13		340	132	1130	140		1070	1850		4.2		4610	6.27	1020	1390	1280	13	7250	7.0	--
July 12-13.....	2895	19		380	115	394	207		1170	630		1.3		2810	3.82	21960	1420	1250	4.5	3960	6.9	--
July 14.....	6290	15		280	42	118	98		778	166		4.0		1450	1.97	24630	870	790	1.7	1960	7.8	--
July 15-16.....	3050	8.5		398	48	170	68		1140	225		1.5		2020	2.75	16630	1190	1130	2.1	2550	7.9	--
July 17.....	411	19		440	61	353	111		1240	520		2.4		2690	3.66	2990	1350	1260	4.2	3620	7.6	--
July 18.....	180	26		468	105	1000	134		1410	1560		3.5		4640	6.31	2260	1600	1490	11	6860	7.8	--
July 19-21.....	229	21		498	148	1390	135		1580	2210		4.7		5920	8.05	3660	1850	1740	14	8790	7.0	--
July 22-25.....	391	18		460	95	564	114		1400	860		2.7		3460	4.71	3650	1540	1450	6.3	4800	7.3	--
July 26-27.....	155	19		490	116	980	126		1520	1520		3.1		4710	6.41	1970	1700	1600	10	6810	7.1	--
July 28-29.....	68.0	20		524	137	1610	131		1700	2480		2.3		6540	8.89	1200	1870	1760	16	9750	6.9	--
July 30-31.....	45.5	26		542	179	2250	150		1840	3510		2.6		8420	11.5	1030	2090	1970	21	12700	7.6	1.004
Aug. 1-13.....	44.3	26		631	215	3140	174		2190	4870		4.6		11200	15.2	1340	2460	2320	28	16500	7.3	1.006
Aug. 14-16.....	46.3	25		578	194	2380	162		1920	3710		6.3		8890	12.1	1110	2240	2110	22	13300	7.8	1.004
Aug. 17-19.....	135	16		392	71	802	143		1100	1240		4.3		3700	5.03	1350	1270	1150	9.8	5590	7.5	--
Aug. 20-22.....	37.3	19		499	123	1950	139		1540	3020		4.4		7220	9.82	727	1750	1640	20	11100	7.3	1.003
Aug. 23-26.....	51.5	28		621	234	3120	171		2160	4900		4.9		11200	15.2	1560	2510	2370	27	16700	7.4	1.006
Aug. 27-31.....	112	22		590	192	1520	158		2000	2380		5.7		6790	9.23	2050	2260	2130	14	9670	7.4	--
Sept. 1-6.....	51.8	19		598	233	2260	161		2060	3610		5.2		8860	12.1	1240	2450	2320	20	13200	7.2	1.004
Sept. 7-30.....	45.4	24		656	244	3100	190		2230	4890		6.0		11200	15.2	1370	2640	2480	26	16800	7.5	1.006
Weighted average	--	18		438	133	1140	136		1410	1800		--		5020	6.83	1580	1640	1530	10.8	7200	7.3	--
Time-weighted average.....	116	23		571	232	2560	157		2010	4060		--		9530	--	--	2380	2250	22.4	14000	7.4	--

Temperature (°F) of water, water year October 1959 to September 1960

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

RIO GRANDE BASIN--Continued

8-4075. PECOS RIVER AT RED BLUFF, N. MEX.

LOCATION.--At pipeline bridge, 2.5 miles downstream from gaging station at Red Bluff, Eddy County, 0.2 mile downstream from Red Bluff Draw, and 5.5 miles upstream from Delaware River.
DRAINAGE AREA.--19,540 square miles, approximately, upstream from gaging station (contributing area).
RECORDS AVAILABLE.--Chemical analyses: July 1937 to September 1960.
Water temperatures: October 1952 to September 1960.
EXTREMES, 1959-60.--Dissolved solids: Maximum, 15,000 ppm June 1-10, 12-23; minimum, 1,100 ppm Aug. 19.
Hardness: Maximum, 2,900 ppm May 23-31; minimum, 510 ppm Aug. 19.
Specific conductance: Maximum daily, 24,500 micromhos June 16; minimum daily, 1,530 micromhos July 7.
Water temperatures: Maximum, 93°F July 3; minimum, 43°F Jan. 5, 6.
EXTREMES, 1937-60.--Dissolved solids: Maximum, 22,800 ppm Sept. 1-20, 1953; minimum, 456 ppm June 3, 1948.
Hardness: Maximum, 3,860 ppm Sept. 1-10, 1953; minimum, 256 ppm June 3, 1948.
Specific conductance: Maximum daily, 33,200 micromhos Sept. 18, 1953; minimum daily, 268 micromhos Sept. 19, 1946.
Water temperatures (1952-60): Maximum, 93°F Aug. 30, 1959, July 3, 1960; minimum, 35°F Dec. 28, 1954.
REMARKS.--Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of discharge for water year October 1959 to September 1960 given in WSP 1712. No appreciable inflow between gaging station and sampling point except during periods of heavy local rains.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Density at 20°C
														Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Oct. 1-21, 1959...	62.2	26	0 00	613	236	2640	80	167	2150	4240	1.2		0.59	10400	14.1	1750	2500	2360	23	14700	7.6	1.003
Oct. 22-Nov. 7....	74.9	--	.--	584	229	2140		160	--	3490	--		--	9070	12.3	1830	2400	2270	19	12700	7.5	1.002
Nov. 8-Dec. 7.....	75.2	--	--	539	215	1920		154	--	2990	--		--	7960	10.8	1620	2230	2100	18	11200	7.6	1.002
Dec. 8-17.....	65.6	--	--	544	222	2320		174	--	3690	--		--	9210	12.5	1630	2270	2130	21	13100	7.8	1.002
Dec. 18-Jan.3,1960	72.6	20	.00	498	209	1720	48	162	1810	2800	1.0		.46	7400	10.1	1450	2100	1970	16	10400	7.8	1.001
Feb. 1-15.....	57.9	--	--	500	202	1720		115	--	2800	--		--	7390	10.1	1160	2080	1990	16	10400	8.2	1.001
Feb. 16-20.....	32.8	--	--	539	213	2320		124	--	3740	--		--	9200	12.5	815	2220	2120	21	13100	8.2	1.002
Feb. 21-38.....	33.1	--	--	563	254	2960		119	--	4780	--		--	11300	15.4	1010	2450	2350	26	16200	8.1	1.004
Feb. 29-Mar. 18...	34.2	--	--	588	263	3150		135	--	5130	--		--	11900	16.2	1100	2550	2440	27	16900	7.9	1.004
Mar. 19-22.....	29.5	--	--	608	251	2840		132	--	4540	--		--	11200	15.2	892	2550	2440	25	15600	7.7	1.003
Mar. 23-Apr. 5....	27.5	--	--	611	269	3430		130	--	5450	--		--	12700	17.3	943	2630	2520	29	18100	7.5	1.006
Apr. 6-21.....	34.1	16	.00	635	308	3890	139	152	2470	6230	1.3		.96	14400	19.6	1330	2850	2730	32	20100	7.4	1.008
Apr. 22-May 3.....	34.1	--	--	622	259	2740		131	--	4420	--		--	11100	15.1	1020	2610	2500	23	15400	7.2	1.005
May 4-22.....	27.1	--	--	641	282	3400		159	--	5370	--		--	13000	17.7	951	2760	2630	28	17900	7.5	1.006
May 23-31.....	24.3	--	--	655	308	4000		145	--	6470	--		--	14800	20.1	971	2900	2780	32	20800	7.4	1.008
June 1-10, 12-23..	29.3	--	--	653	307	4260		139	--	6810	--			15000	20.4	1190	2890	2780	35	21700	7.7	1.010
June 11.....	34.0	--	--	532	239	3210		119	--	5050	--			11500	15.6	1060	2310	2210	29	16800	7.5	1.006
June 24.....	60.0	--	--	631	293	3260		109	--	5210	--			12200	16.6	1980	2780	2690	27	17500	7.7	1.006
June 25-29.....	37.0	--	--	408	188	2350		96	--	3780	--			8500	11.6	849	1790	1710	24	12800	7.2	1.004
June 30-July 3....	24.0	--	--	605	290	4180		114	--	6500	--			14500	19.7	940	2700	2610	35	21000	7.2	1.009

July 4-5	176	--	--	513	178	1690		1157	--	2670	--	--	--	7120	9.68	3380	2010	1060	16	10300	8.1	1.003
July 6	298	--	--	280	60	481		125	--	750	--	--	--	2530	3.44	2040	945	842	6.8	3790	7.9	--
July 7-8	1775	--	--	212	22	123		92	--	192	--	--	--	1170	1.59	5610	620	545	2.1	1670	7.8	--
July 9	476	--	--	280	68	447		104	--	718	--	--	--	2440	3.32	3140	980	895	6.2	3640	7.4	--
July 10-11	202	--	--	312	88	662		117	--	1050	--	--	--	3260	4.43	1780	1140	1040	8.5	4820	7.6	--
July 12	217	--	--	375	118	1210		137	--	1930	--	--	--	5060	6.88	2960	1420	1310	14	7610	7.4	--
July 13	2280	--	--	360	83	336		180	--	500	--	--	--	2580	3.51	15880	1240	1090	4.2	3410	7.4	--
July 14	5740	--	--	248	32	112		120	--	152	--	--	--	1320	1.80	20460	750	652	1.8	1750	7.3	--
July 15-16	3735	--	--	395	50	168		94	--	222	--	--	--	2110	2.87	21280	1190	1110	2.1	2550	7.7	--
July 17	725	--	--	445	70	471		129	--	687	--	--	--	3080	4.19	6030	1400	1290	5.5	4180	7.7	--
July 18	242	--	--	480	86	900		143	--	1370	--	--	--	4460	6.07	2910	1550	1430	9.9	6300	7.5	--
July 19	181	--	--	500	117	1440		152	--	2220	--	--	--	6120	8.32	2990	1730	1610	15	8860	7.4	--
July 20-21	208	--	--	523	171	1990		155	--	3150	--	--	--	7900	10.7	4440	2010	1880	19	11500	7.5	1.004
July 22-24	417	17	0.02	475	113	664	19	96	1510	1020	0.8	7.7	0.27	3950	5.37	4450	1650	1570	7.1	5340	7.2	--
July 25-27	244	--	--	485	112	984		124	--	1540	--	--	--	4930	6.70	3250	1670	1570	11	6820	7.3	--
July 28-29	82.5	--	--	545	143	1640		145	--	2550	--	--	--	6930	9.42	1540	1950	1830	16	9920	7.4	--
July 30-31	56.0	--	--	563	191	2340		160	--	3710	--	--	--	9040	12.3	1370	2190	2060	22	13100	7.4	1.004
Aug. 1-16	54.8	--	--	645	224	3450		181	--	5460	--	--	--	12500	17.0	1850	2530	2380	30	18200	7.4	1.007
Aug. 17-18	167	--	--	612	217	2390		190	--	3810	--	--	--	9530	13.0	4300	2420	2260	21	13800	7.5	1.005
Aug. 19	166	--	--	179	15	151	11	100	--	214	--	--	--	1100	1.50	493	510	428	2.9	1640	7.2	--
Aug. 20-21	47.0	--	--	372	71	621		134	--	965	--	--	--	3310	4.50	420	1220	1110	7.7	4810	7.5	--
Aug. 22-23	37.5	--	--	418	101	1170		125	--	1920	--	--	--	5200	7.07	527	1460	1360	13	7690	7.2	--
Aug. 24-25	46.0	--	--	489	146	2140		116	--	3490	--	--	--	8240	11.2	1020	1820	1730	22	12200	7.0	1.003
Aug. 26, 28	142	--	--	611	218	2970		151	--	4800	--	--	--	11200	15.2	4290	2420	2300	26	16300	7.2	1.006
Aug. 27	146	--	--	375	94	1410		124	--	2300	--	--	--	5620	7.64	2220	1320	1220	17	8690	7.1	--
Aug. 29-31	99.0	--	--	588	203	1600		140	--	2670	--	--	--	7410	10.1	1980	2300	2190	15	10400	7.3	1.003
Sept. 1-6	55.3	--	--	588	222	1970		122	--	3260	--	--	--	8640	11.8	1290	2380	2280	18	12200	7.0	1.004
Sept. 7-30	46.8	--	--	636	259	3080		166	--	5090	--	--	--	12000	16.3	1520	2650	2510	26	17300	7.5	1.007
Weighted average	--	--	--	435	130	1230		139	--	1950	--	--	--	5460	7.43	1710	1620	1500	11	7640	7.5	--
Time-weighted average	115	--	--	568	232	2590		153	--	4160	--	--	--	10100	--	--	2370	2240	22	14400	7.5	--
Tons per day	--	--	--	136	41	383		43	--	609	--	--	--	--	--	--	--	--	--	--	--	

RIO GRANDE BASIN--Continued

8-4075. PECOS RIVER AT RED BLUFF, N. MEX.--Continued

Temperature (°F) of water, water year October 1959 to September 1960

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

8-4101. PECOS RIVER BELOW RED BLUFF DAM, NEAR ORLA, TEX.

LOCATION.--Just below dam, 3 miles upstream from Salt (Screwbean) Draw, 5 miles northwest of Orla, Reeves County, and 14 miles upstream from gaging station near Orla.
DRAINAGE AREA.--20,720 square miles, approximately (contributing area).
RECORDS AVAILABLE.--Chemical analyses: July 1937 to September 1960.
Water temperatures: March 1953 to September 1959, October 1959 to September 1960 (intermittent).
EXTREMES, 1959-60.--Dissolved solids: Maximum, 12,600 ppm July 8-18; minimum, 6,480 ppm Nov. 1-30.
Hardness: Maximum, 2,650 ppm July 8-18; minimum, 1,990 ppm Dec. 1-31.
Specific conductance: Maximum daily, 18,400 micromhos July 9; minimum daily, 8,050 micromhos Oct. 6.
Water temperatures: Maximum, 78°F July 12, 13; minimum, 45°F Jan. 23-26.
EXTREMES, 1937-60.--Dissolved solids: Maximum, 15,600 ppm Sept. 17-30, 1953; minimum, 1,090 ppm June 1, 2, 1948.
Hardness: Maximum, 3,430 ppm July 1-31, Oct. 1-16, 1953; minimum, 602 ppm June 1-2, 1948.
Specific conductance: Maximum daily, 24,200 micromhos Sept. 28, 30, 1953; minimum daily, 1,610 micromhos June 2, 1948.
Water temperatures (1953-60): Maximum, 81°F Aug. 1-4, 1958; minimum, 40°F on several days during winter months.
REMARKS.--Dashes omitted in potassium (K) column indicate sodium (Na) plus potassium (K) are calculated. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for gaging station near Orla for water year October 1959 to September 1960 given in WSP 1712. Mean discharge values reported below have been adjusted to exclude inflow from Salt (Screwbean) Draw which enters Pecos River between sampling point and gaging station.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1-31, 1959...	14.6	18		540	163	1650	48	144		1720	2680				6890	9.37	272	2020	1900	16	10200	7.6
Nov. 1-30.....	1.3	17		530	180	1500		138		1860	2320				6480	8.81	23.4	2060	1950	14	9300	7.7
Dec. 1-31.....	32.6	17		530	162	1570		138		1880	2370				6600	8.98	581	1990	1880	15	9520	7.2
Jan. 1-31, 1960...	3.2	14		555	183	1580		141		1890	2480				6770	9.21	58.7	2140	2020	15	9790	7.5
Feb. 1-29.....	2.1	13		555	172	1590		258		1910	2380				6750	9.18	37.5	2090	1880	15	9450	7.6
Mar. 1-31.....	1.8	12		555	195	1810		140		1960	2820				7420	10.1	35.3	2190	2070	17	10700	7.4
Apr. 1-30.....	225	11		550	201	1810	51	142		2010	2800				7500	10.2	4560	2200	2080	17	10700	7.1
May 1-31.....	114	10		578	209	1910		129		2110	2940				7820	10.7	2410	2300	2200	17	11100	7.2
June 1-30.....	72.4	10		592	215	2100		131		2210	3210				8400	11.5	1640	2360	2250	19	11900	7.2
July 1-7, 19-31...	117	10		597	223	2140		126		2200	3310				8540	11.7	2700	2410	2300	19	12000	7.3
July 8-18.....	9.7	14		595	284	3610		125		2360	5630				12600	17.3	331	2650	2550	31	18000	7.3
Aug. 1-31.....	93.0	12		597	201	1960		127		2110	3030				7970	10.9	2000	2320	2210	18	11400	6.9
Sept. 1-30.....	108	15		535	181	1750		130		1860	2720				7120	9.68	2080	2080	1970	17	10300	7.0
Weighted average	--	12		566	201	1890		134		2040	2920				7710	10.5	1290	2240	2130	18	1100	7.1
Time-weighted average.....	62.1	13		560	192	1830		145		1980	2830				7480	--	--	2190	2070	17	10700	7.2
Tons per day....	--	2.0		95	34	317		22		343	490				--	--	--	--	--	--	--	--

RIO GRANDE BASIN--Continued

8-4465. PECOS RIVER NEAR GIRVIN, TEX.

LOCATION.--At supplementary gage at bridge on U.S. Highway 67, 0.5 mile downstream from Panhandle and Santa Fe Railway Co. bridge, 2.1 miles east of Girvin, Pecos County, 6.5 miles downstream from Comanche Creek, and 7.8 miles downstream from regular gaging station.
DRAINAGE AREA.--29,560 square miles, approximately (contributing area at supplementary gage).
RECORDS AVAILABLE.--Chemical analyses: October 1939 to June 1941, October 1946 to September 1947, October 1953 to September 1960.
Water temperatures: October 1953 to January 1959.
EXTREMES, 1959-60.--Hardness: Maximum, 4,900 ppm May 1-31; minimum, 2,350 ppm July 1-31.
Specific conductance: Maximum daily, 25,900 micromhos on several days during May; minimum daily, 12,700 micromhos July 20, 22-24, 31.
EXTREMES, 1939-41, 1946-47, 1953-60.--Hardness: Maximum, 5,040 ppm June 1-30, 1956; minimum, 330 ppm May 18, 1957.
Specific conductance: Maximum daily, 29,100 micromhos Aug. 13, 1958; minimum daily, 790 micromhos Apr. 26, 1957.
Water temperatures (1953-59): Maximum, 93°F June 1, 1954; minimum, 38°F Feb. 3, 4, 1956.
REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1959 to September 1960 given in WSP 1712.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH	Density at 20°C
														Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate				
Oct. 1-31, 1959...	17.1				4020		67		3580	6400							4080	4020	27	21000	7.5	1.011
Nov. 1-30.....	23.1				4050		129		3590	6530							4060	3950	28	21200	7.4	1.011
Dec. 1-31.....	28.4				3770		172		3280	6040							3780	3640	27	19400	7.6	1.010
Jan. 1-31, 1960...	32.5				3830		182		3410	5950							3770	3620	27	20300	7.5	1.004
Feb. 1-29.....	33.7				4060		223		3660	6340							3960	3780	28	20200	7.5	1.010
Mar. 1-31.....	27.3				4180		164		3680	6630							4090	3950	28	21500	7.7	1.011
Apr. 1-30.....	19.2				4680		52		4220	7310							4410	4370	31	23500	6.9	1.012
May 1-31.....	11.0				5230		58		4870	8000							4900	4850	33	25300	6.8	1.013
June 1-30.....	19.6				4900		50		4370	7700							4640	4600	31	24000	6.4	1.013
July 1-31.....	35.1				2470		84		2270	3830							2350	2280	22	13300	6.7	1.006
Aug. 1-31.....	21.4				3750		67		3190	5950							3570	3510	27	18700	7.1	1.009
Sept. 1-30.....	26.3	6.5			3480		59		3070	5500							3390	3340	26	18000	7.4	1.009
Weighted average	--	--			3890		120		3460	6120							3780	3680	27	19900	7.0	--
Time-weighted average.....	24.5	--			4030		109		3600	6340							3910	3820	28	20500	7.0	--

RIO GRANDE BASIN LOW-FLOW INVESTIGATION

LOS ALAMOS SEEPAGE RUN

The order of tabulation for two samples collected on the same date at a given site is: first sample, right bank; second sample, left bank; for 3 samples: first sample, right bank; second sample, center; third sample, left bank.

Chemical analyses, in parts per million, water years October 1958 to September 1960

Date of collection	River miles (a)	Discharge (cfs)	Silica (SiO_2)	Sodium (Na)	Chloride (Cl)	Dissolved solids		Hardness as $CaCO_3$	Specific conductance (micromhos at 25°C)
						Parts per million	Tons per acre-foot	calcium, magnesium	
NEW MEXICO									
SANTA CLARA CREEK									
Oct. 15, 1958.	15.18	0.57	--	--	--	--	--	--	64
Oct. 15.....	14.87	.87	--	8.2	1.0	--	--	17	71
Oct. 15.....	14.64	2.05	--	--	--	79	--	--	64
Apr. 14, 1959.	14.64	2.21	41	7.0	1.0	--	--	12	57
June 2.....	14.64	2.71	44	7.5	1.8	--	--	16	68
Aug. 31.....	14.64	2.58	--	7.1	1.0	--	--	14	60
Oct. 12.....	14.64	2.15	--	8.0	1.4	--	--	15	69
Oct. 12.....	14.64	2.15	--	--	--	--	--	--	68
Oct. 12.....	14.64	2.15	--	7.5	1.2	--	--	14	62
May 16, 1960..	14.64	5.41	--	5.0	1.2	--	--	10	48
June 20.....	14.64	1.92	--	6.6	1.7	--	--	13	59
Oct. 15, 1958.	14.55	2.30	--	--	--	--	--	--	64
Oct. 15.....	14.32	2.77	--	--	--	--	--	--	65
Oct. 15.....	14.15	3.20	--	8.2	1.0	--	--	14	67
Apr. 14, 1959.	14.15	3.33	43	7.7	1.0	--	--	13	60
June 2.....	14.15	3.99	--	--	--	--	--	--	63
Sept. 7, 1960.	14.15	2.96	--	--	1.1	--	--	15	66
Oct. 15, 1958.	13.89	3.10	--	--	--	--	--	--	68
Oct. 15.....	13.60	3.21	--	--	--	84	--	--	69
Oct. 15.....	13.57	4.01	--	--	--	--	--	--	72
Apr. 14, 1959.	13.57	3.94	--	8.4	1.2	--	--	13	65
June 2.....	13.57	4.86	--	--	--	--	--	--	68
Aug. 31.....	13.57	4.14	--	8.6	1.6	--	--	17	72
Aug. 31.....	13.57	4.14	--	8.5	1.6	--	--	15	68
Oct. 12.....	13.57	3.40	--	--	--	--	--	--	72
Oct. 12.....	13.57	3.40	--	--	--	--	--	--	73
Oct. 12.....	13.57	3.40	--	--	--	--	--	--	71
June 20, 1960.	13.57	1.99	--	--	--	--	--	--	66
Oct. 15, 1958.	13.19	3.68	--	--	--	--	--	--	72
Oct. 15.....	12.90	3.62	--	--	--	--	--	--	72
Oct. 15.....	12.63	4.00	--	--	--	88	--	--	73
Apr. 14, 1959.	12.63	4.08	--	8.1	1.2	--	--	14	66
June 2.....	12.63	5.15	48	8.2	1.8	--	--	19	72
Aug. 31.....	12.63	4.75	--	8.2	1.2	--	--	19	75
Aug. 31.....	12.63	4.75	--	--	--	--	--	--	75
Oct. 12.....	12.63	3.80	--	--	--	--	--	--	73
Oct. 12.....	12.63	3.80	--	--	--	--	--	--	75
Oct. 12.....	12.63	3.80	--	--	--	--	--	--	72
May 16, 1960..	12.63	8.61	--	6.3	1.7	--	--	14	60
May 16.....	12.63	8.61	--	6.3	2.5	--	--	15	66
June 20.....	12.63	2.77	--	8.0	1.3	--	--	16	69
Oct. 15, 1958.	12.24	4.00	--	--	--	--	--	--	74
Oct. 15.....	11.85	4.06	--	--	--	--	--	--	75
Oct. 15.....	11.53	3.91	--	--	--	--	--	--	76
Apr. 14, 1959.	11.53	4.80	45	8.1	1.0	--	--	15	68
June 2.....	11.53	4.73	--	--	--	--	--	--	71
Aug. 31.....	11.53	6.57	--	8.3	1.6	--	--	21	80
Aug. 31.....	11.53	6.57	--	--	--	--	--	--	80
Oct. 12.....	11.53	4.70	--	--	--	--	--	--	75
Oct. 12.....	11.53	4.70	--	--	--	--	--	--	75
Oct. 12.....	11.53	4.70	--	--	--	--	--	--	75
May 16, 1960..	11.53	8.39	--	--	--	--	--	--	60
June 20.....	11.53	2.41	--	7.8	1.4	--	--	17	72
Oct. 15, 1958.	11.07	3.88	--	--	--	89	--	--	75
Apr. 14, 1959.	11.07	4.55	44	8.0	1.0	--	--	16	68
June 2.....	11.07	4.52	--	--	--	--	--	--	71
Oct. 12.....	11.07	3.97	--	--	--	--	--	--	75
Oct. 12.....	11.07	3.97	--	--	--	--	--	--	74
Oct. 12.....	11.07	3.97	--	8.9	1.4	--	--	18	79
May 16, 1960..	11.07	7.31	--	6.2	1.6	--	--	14	64
June 20.....	11.07	2.51	--	--	--	--	--	--	71
Oct. 15, 1958.	10.76	4.58	--	--	--	92	--	--	77
Apr. 14, 1959.	10.76	5.36	44	8.1	1.0	--	--	15	68
June 2.....	10.76	4.91	49	8.3	2.0	--	--	18	76
Aug. 31.....	10.76	5.58	--	--	--	--	--	--	81
Aug. 31.....	10.76	5.58	--	--	--	--	--	--	81
Oct. 12.....	10.76	4.47	--	8.6	.8	--	--	17	75
Oct. 12.....	10.76	4.47	--	8.8	2.4	--	--	22	86
May 16, 1960..	10.76	8.63	--	--	--	--	--	--	68
May 16.....	10.76	8.63	--	--	--	--	--	--	70
June 20.....	10.76	2.82	--	--	--	--	--	--	73

a River miles for Santa Clara Creek are above to below former gaging station at lat 35°58', long 106°11', SW¼SW¼ sec.11 T.20 N., R.7 E., 5.5 miles upstream from mouth and 5.5 miles southwest of Espanola.

RIO GRANDE BASIN LOW-FLOW INVESTIGATION--Continued

LOS ALAMOS SEEPAGE RUN--Continued

Chemical analyses, in parts per million, water years October 1958 to September 1960--Continued

Date of collection	River miles (a)	Discharge (cfs)	Silica (SiO_2)	Sodium (Na)	Chloride (Cl)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Hardness as $CaCO_3$: calcium, magnesium	Specific conductance (micromhos at 25°C)
NEW MEXICO--Continued									
SANTA CLARA CREEK--Continued									
Oct. 15, 1958.	10.40	3.91	--	--	--	91	--	--	77
Oct. 18.....	10.29	4.06	--	--	--	--	--	--	77
Oct. 15.....	9.82	3.92	--	--	--	--	--	--	78
Oct. 15.....	9.37	4.07	--	8.7	1.0	--	--	18	78
Apr. 14, 1959.	9.37	5.31	45	8.2	1.2	--	--	15	69
June 2.....	9.37	4.86	--	--	--	--	--	--	74
Sept. 7, 1960.	9.37	4.53	--	--	1.2	--	--	18	73
October 1958..	8.84	4.26	--	--	--	92	--	--	80
October.....	8.37	4.17	--	--	--	--	--	--	82
October.....	7.97	4.54	--	8.9	1.1	--	--	--	82
Apr. 14, 1959.	7.97	5.36	--	8.1	1.2	--	--	17	72
June 2.....	7.97	5.15	--	8.1	1.6	--	--	19	76
Aug. 31.....	7.97	6.55	--	8.4	1.2	--	--	23	86
Aug. 31.....	7.97	6.55	--	--	--	--	--	--	86
Oct. 12.....	7.97	4.31	--	--	--	--	--	--	81
Oct. 12.....	7.97	4.31	--	--	--	--	--	--	82
Oct. 12.....	7.97	4.31	--	--	--	--	--	--	80
June 20, 1960.	7.97	3.67	--	7.8	1.3	--	--	20	77
October 1958..	7.37	3.90	--	--	--	92	--	--	83
Apr. 14, 1959.	7.37	5.07	--	8.2	1.3	88	0.12	17	73
June 2.....	7.37	5.17	--	8.2	1.6	--	--	22	83
Aug. 31.....	7.37	6.18	--	--	--	--	--	--	87
Aug. 31.....	7.37	6.18	--	--	--	--	--	--	86
October 1958..	6.90	3.98	--	9.7	1.2	--	--	--	95
Apr. 14, 1959.	6.90	5.26	46	8.7	1.2	91	.12	23	82
June 2.....	6.90	5.21	48	8.5	1.6	--	--	28	97
Aug. 31.....	6.90	6.03	--	8.8	1.6	--	--	26	91
Aug. 31.....	6.90	6.03	--	--	--	--	--	--	92
Oct. 12.....	6.90	4.66	--	9.9	2.0	--	--	27	102
Oct. 12.....	6.90	4.66	--	--	--	--	--	--	90
Oct. 12.....	6.90	4.66	--	9.7	1.4	--	--	27	99
May 16, 1960..	6.90	8.38	--	--	--	--	--	--	70
May 16.....	6.90	8.51	--	6.7	1.2	--	--	18	71
May 16.....	6.90	8.38	--	--	--	--	--	--	71
June 20.....	6.90	4.37	--	8.1	1.5	--	--	23	84
October 1958..	6.50	3.86	--	10	2.0	--	--	27	102
Aug. 14, 1959.	6.50	6.00	46	8.9	1.1	--	--	22	84
June 2.....	6.50	5.26	46	8.6	2.0	--	--	25	89
Aug. 31.....	6.50	5.41	--	--	--	--	--	--	93
Aug. 31.....	6.50	5.41	--	--	--	--	--	--	95
Oct. 12.....	6.50	4.47	--	9.4	1.6	--	--	27	98
Oct. 12.....	6.50	4.47	--	--	--	--	--	--	93
Oct. 12.....	6.50	4.47	--	12	1.2	--	--	32	113
May 16, 1960..	6.50	8.98	--	--	--	--	--	--	73
May 16.....	6.50	8.98	--	6.7	1.1	--	--	19	72
May 16.....	6.50	8.98	--	--	--	--	--	--	72
June 20.....	6.50	4.33	--	--	--	--	--	--	88
October 1958..	5.98	4.06	--	--	--	--	--	--	100
October	5.34	3.90	--	--	--	--	--	--	100
October	4.78	4.01	--	--	--	100	--	--	99
Apr. 14, 1959.	4.78	5.70	--	--	--	--	--	--	86
June 2.....	4.78	4.81	--	--	--	--	--	--	87
Sept. 7, 1960.	4.78	4.68	--	--	1.4	--	--	25	90
Oct. 15, 1958.	4.21	4.36	--	9.8	1.4	--	--	27	100
Apr. 14, 1959.	4.21	5.80	46	8.8	1.2	--	--	23	85
June 2.....	4.21	4.96	50	8.9	2.2	--	--	26	94
Aug. 31.....	4.21	5.62	--	--	--	--	--	--	97
Aug. 31.....	4.21	5.62	--	--	--	--	--	--	97
Oct. 12.....	4.21	4.38	--	--	--	--	--	--	100
Oct. 12.....	4.21	4.38	--	--	--	--	--	--	105
Oct. 12.....	4.21	4.38	--	--	--	--	--	--	104
May 16, 1960..	4.21	8.19	--	7.0	1.4	--	--	19	74
May 16.....	4.21	8.19	--	--	--	--	--	--	74
June 20.....	4.21	4.27	--	--	--	--	--	--	88
October 1958..	3.28	4.51	--	--	--	101	--	--	100
Apr. 14, 1959.	3.28	4.99	--	--	--	--	--	--	85
June 2.....	3.28	4.62	--	--	--	--	--	--	95
Aug. 31.....	3.28	5.78	--	9.2	1.4	--	--	27	96
Oct. 12.....	3.28	3.64	--	9.5	1.0	--	--	26	96
Oct. 12.....	3.28	3.64	--	11	1.8	--	--	31	111
Oct. 12.....	3.28	3.64	--	9.7	1.8	--	--	30	104
May 16, 1960..	3.28	8.42	--	--	--	--	--	--	75
May 16.....	3.28	8.42	--	7.0	1.2	--	--	20	75
May 16.....	3.28	8.42	--	--	--	--	--	--	76
June 20.....	3.28	3.63	--	8.5	1.6	--	--	25	89
October 1958..	2.06	3.94	--	10	1.4	--	--	--	103
Apr. 14, 1959.	2.06	4.61	46	8.7	1.2	--	--	23	85
October 1958..	1.19	3.67	--	--	--	103	--	--	102

a River miles for Santa Clara Creek are above to below former gaging station at lat 35°58', long 106°11', SW¼SW¼ sec.11 T.20 N., R.7 E., 5.5 miles upstream from mouth and 5.5 miles southwest of Espanola.

RIO GRANDE BASIN LOW-FLOW INVESTIGATION--Continued

LOS ALAMOS SEEPAGE RUN--Continued

Chemical analyses, in parts per million, water years October 1958 to September 1960--Continued

Date of collection	River miles (a)	Discharge (cfs)	Silica (SiO_2)	Sodium (Na)	Chloride (Cl)	Dissolved solids		Hardness as $CaCO_3$	Specific conductance (micromhos at 25°C)
						Parts per million	Tons per acre-foot	calcium, magnesium	
NEW MEXICO--Continued									
SANTA CLARA CREEK--Continued									
October 1958..	0.0	3.07	--	9.9	1.5	--	--	28	103
Apr. 14, 1959.	.0	3.60	46	8.8	1.4	96	0.13	22	86
June 2.....	.0	3.91	52	9.1	1.6	--	--	26	93
Aug. 31.....	.0	4.82	--	--	--	--	--	--	97
Aug. 31.....	.0	4.82	--	--	--	--	--	--	98
Oct. 12.....	.0	3.46	--	9.6	1.4	--	--	29	104
Oct. 12.....	.0	3.46	--	--	--	--	--	--	95
Oct. 12.....	.0	3.46	--	9.4	1.2	--	--	26	95
May 16, 1960..	.0	7.58	--	--	--	--	--	--	78
May 16.....	.0	7.58	--	7.4	1.1	--	--	20	78
May 16.....	.0	7.58	--	--	--	--	--	--	77
June 20.....	.0	2.10	--	--	--	--	--	--	90
May 16.....	.4	.91	--	--	--	--	--	--	98
June 20.....	.4	.21	--	--	--	--	--	--	116
May 16.....	1.2	.71	--	--	--	--	--	--	119
June 20.....	1.2	.15	--	11	2.9	--	--	54	162
May 16.....	2.1	.21	--	9.7	1.8	--	--	42	130
May 16.....	3.0	.11	--	--	--	--	--	--	192
May 16.....	4.0	.30	--	11	2.2	--	--	111	258

a River miles for Santa Clara Creek are above to below former gaging station at lat 35°58', long 106°11', SW¼SW¼ sec.11 T.20 N., R.7 E., 5.5 miles upstream from mouth and 5.5 miles southwest of Espanola.

GUAJE CREEK									
Oct. 17, 1958.	2.13	0.27	--	--	--	--	--	--	71
Oct. 17.....	1.94	.24	--	--	--	--	--	--	73
Apr. 15, 1959.	1.94	.23	47	6.2	1.2	--	--	18	70
June 3.....	1.94	.28	46	5.8	1.2	--	--	19	71
Sept. 1.....	1.94	.51	--	5.1	1.8	--	--	20	70
Oct. 14.....	1.94	.20	--	6.3	1.0	--	--	19	72
May 16, 1960..	1.94	.45	--	5.1	1.3	--	--	18	68
June 21.....	1.94	.26	--	5.9	1.6	--	--	19	72
Oct. 17, 1958.	1.72	.35	--	6.6	1.1	--	--	20	75
Oct. 17.....	1.50	.37	--	--	--	97	--	--	78
Apr. 15, 1959.	1.50	.40	49	6.9	1.2	--	--	21	77
June 3.....	1.50	.44	49	6.0	1.4	--	--	22	78
Sept. 1.....	1.50	1.02	--	5.8	1.6	--	--	24	79
Oct. 14.....	1.50	.42	--	7.1	1.2	--	--	21	80
May 16, 1960..	1.50	.94	--	5.3	1.4	--	--	22	76
June 21.....	1.50	.54	--	--	--	--	--	--	79
Oct. 17, 1958.	1.27	.35	--	--	--	--	--	--	80
Oct. 17.....	1.05	.36	--	--	--	--	--	--	80
Oct. 14, 1959.	1.05	.39	--	--	--	--	--	--	83
Oct. 17, 1958.	.91	.37	--	--	--	--	--	--	80
Oct. 17.....	.64	.37	--	--	--	99	--	--	82
Apr. 15, 1959.	.64	.40	48	6.7	1.2	--	--	21	77
June 3.....	.64	.51	49	6.5	1.6	--	--	24	84
Sept. 1.....	.64	1.99	--	5.5	2.2	--	--	28	88
Sept. 1.....	.64	1.99	--	5.5	2.2	--	--	28	87
Oct. 14.....	.64	.39	--	--	--	--	--	--	81
May 16, 1960..	.64	1.06	--	--	--	--	--	--	74
June 21.....	.64	.48	--	6.4	1.4	--	--	24	81
Oct. 17, 1958.	.35	.47	--	--	--	99	--	--	85
Apr. 15, 1959.	.35	.51	--	--	--	--	--	--	79
June 3.....	.35	.52	--	--	--	--	--	--	82
Sept. 1.....	.35	2.04	--	5.5	1.6	--	--	29	89
Sept. 1.....	.35	2.04	--	5.5	1.6	--	--	29	89
Oct. 14.....	.35	.41	--	--	--	--	--	--	83
June 21, 1960.	.35	.57	--	--	--	--	--	--	84
Oct. 17, 1958.	.20	.43	--	--	--	--	--	--	85
Apr. 15, 1959.	.04	.65	48	6.7	1.4	--	--	24	81
June 3.....	.04	.38	49	6.5	1.4	--	--	25	84
Sept. 1.....	.04	2.63	--	5.4	1.6	--	--	30	89
Sept. 1.....	.04	2.63	--	5.4	1.6	--	--	30	90
Oct. 14.....	.04	.46	--	6.8	1.4	--	--	25	86
May 16, 1960..	.04	1.53	--	5.0	1.5	--	--	23	76
June 21.....	b.04	.54	--	6.4	1.6	--	--	26	86
Oct. 17, 1958.	b.04	.31	--	6.5	1.6	--	--	26	85
Apr. 15, 1959.	.04	.67	47	6.7	1.4	101	0.14	24	83
Sept. 1.....	.04	1.84	--	--	--	--	--	--	91
Sept. 1.....	.04	1.84	--	--	--	--	--	--	91
June 21, 1960.	.04	0	--	--	--	--	--	--	117
Sept. 7.....	.04	.26	--	--	1.6	--	--	25	86

a River miles for Guaje Creek beginning from above to below dam.
b Dam.

RIO GRANDE BASIN LOW-FLOW INVESTIGATION--Continued

LOS ALAMOS SEEPAGE RUN--Continued

Chemical analyses, in parts per million, water years October 1958 to September 1960--Continued

Date of collection	River miles (a)	Discharge (cfs)	Silica (SiO_2)	Sodium (Na)	Chloride (Cl)	Dissolved solids		Hardness as $CaCO_3$	Specific conductance (micromhos at 25°C)
						Parts per million	Tons per acre-foot	calcium, magnesium	
NEW MEXICO--Continued									
GUAJE CREEK--Continued									
Oct. 17, 1958.	0.70	0.31	--	--	--	99	--	--	84
June 3, 1959..	.70	.01	--	--	--	--	--	--	112
Oct. 17, 1958.	1.18	.27	--	--	--	--	--	--	88
Oct. 17.....	1.46	.28	--	--	--	--	--	--	93
Apr. 15, 1959.	1.46	.65	46	6.7	1.4	97	0.13	24	82
Sept. 1.....	1.46	2.28	--	6.2	3.0	--	--	36	104
Sept. 7, 1960.	1.46	.19	--	--	1.5	--	--	29	93
Oct. 17, 1958.	1.75	.27	--	6.8	1.8	--	--	--	103
Apr. 15, 1959.	1.75	.79	46	6.5	1.5	98	.13	23	80
June 3.....	1.75	.04	--	--	--	--	--	--	95
Sept. 1.....	1.75	2.29	--	--	--	--	--	--	106
Oct. 14.....	1.75	.01	--	8.3	2.0	--	--	41	128
May 16, 1960..	1.75	.82	--	5.6	1.6	--	--	28	87
June 21.....	1.75	.04	--	6.7	2.0	--	--	35	107
Oct. 17, 1958.	2.03	.24	--	6.6	1.9	--	--	32	99
Apr. 15, 1959.	2.03	.49	45	6.4	1.6	96	.13	23	80
Sept. 1.....	2.03	2.29	--	--	--	--	--	--	107
Sept. 7, 1960.	2.03	.25	--	--	1.6	--	--	31	98
Oct. 17, 1958.	2.51	.22	--	--	--	122	--	--	112
Apr. 15, 1959.	2.51	.53	45	6.3	1.4	99	.13	23	80
June 3.....	2.51	.02	--	--	--	--	--	--	95
Sept. 1.....	2.51	2.74	--	6.7	2.2	--	--	36	107
Sept. 1.....	2.51	2.74	--	6.7	2.2	--	--	36	106
May 16, 1960..	2.51	1.05	--	5.8	1.9	--	--	30	94
June 21.....	2.51	.05	--	--	--	--	--	--	110
Oct. 17, 1958.	2.80	.03	--	7.7	2.4	--	--	--	121
Apr. 15, 1959.	2.80	.34	45	6.2	1.6	98	.13	23	80
Sept. 1.....	2.80	2.26	--	6.9	2.8	--	--	36	108
Sept. 4.....	2.80	1.01	--	7.2	2.4	--	--	36	110
Oct. 17, 1958.	2.81	.08	--	--	--	--	--	--	131
Oct. 14, 1959.	2.88	.09	--	8.0	1.6	--	--	36	117
May 16, 1960..	2.88	.98	--	--	--	--	--	--	96
June 21.....	2.88	.15	--	6.7	2.3	--	--	34	106
Oct. 17, 1958.	3.13	.09	--	--	--	133	--	--	135
Oct. 17.....	3.37	.05	--	8.2	2.7	--	--	--	136
June 3, 1959..	3.37	.04	--	--	--	--	--	--	106
Sept. 4.....	3.37	1.30	--	7.4	2.6	--	--	36	109
Oct. 14.....	3.37	.08	--	--	--	--	--	--	113
May 16, 1960..	3.37	1.21	--	6.4	2.2	--	--	32	100
June 21.....	3.37	.12	--	7.4	2.5	--	--	36	114
Sept. 7.....	3.37	.10	--	--	2.0	--	--	36	115
Sept. 4, 1959.	3.95	1.08	--	--	--	--	--	--	109
Sept. 4.....	3.95	1.08	--	--	--	--	--	--	111
Oct. 14.....	3.95	.07	--	--	--	--	--	--	114
Sept. 4.....	4.10	.99	--	--	--	--	--	--	110
Sept. 4.....	4.10	.99	--	--	--	--	--	--	109
Sept. 4.....	4.55	.70	--	--	--	--	--	--	111
Sept. 4.....	4.85	.16	--	--	--	--	--	--	112
Sept. 4.....	4.85	.16	--	--	--	--	--	--	111
May 16, 1960..	4.85	.87	--	6.7	2.0	--	--	32	102
Sept. 4, 1959.	5.10	.01	--	--	--	--	--	--	109
Sept. 4.....	5.10	.01	--	--	--	--	--	--	110
Sept. 4.....	5.50	.14	--	--	--	--	--	--	111
May 16, 1960..	5.85	.55	--	--	--	--	--	--	106
May 16.....	6.80	.32	--	8.6	2.9	--	--	37	122
May 16.....	7.15	.06	--	8.9	2.9	--	--	39	128
Oct. 17, 1958.	11.64	.02	--	--	--	211	--	--	273

a River miles for Guaje Creek beginning from above to below dam.

RIO GRANDE BASIN LOW-FLOW INVESTIGATION--Continued

LOS ALAMOS SEEPAGE RUN--Continued

Chemical analyses, in parts per million, water years October 1958 to September 1960--Continued

Date of collection	River miles (a)	Discharge (cfs)	Silica (SiO_2)	Sodium (Na)	Chloride (Cl)	Dissolved solids		Hardness as $CaCO_3$	Specific conductance (micromhos at 25°C)
						Parts per million	Tons per acre-foot	calcium, magnesium	
NEW MEXICO--Continued									
LOS ALAMOS CREEK									
Oct. 30, 1958.	1.15	0.045	--	4.5	1.2	--	--	29	84
Apr. 15, 1959.	1.15	.28	33	4.1	1.2	--	--	25	74
Oct. 30, 1958.	.96	.045	--	--	--	85	--	--	79
Oct. 30.....	.79	.035	--	--	--	83	--	--	78
Apr. 15, 1959.	.79	.29	32	4.1	1.0	78	0.11	22	68
Apr. 15.....	.72	.17	32	4.1	1.2	--	--	22	67
Oct. 30, 1958.	.59	.11	--	--	--	91	--	--	85
Apr. 15, 1959.	.59	.39	35	4.4	1.2	80	.11	22	68
Oct. 30.....	.49	.12	--	5.6	1.5	--	--	--	86
Oct. 30, 1958.	.30	.12	--	5.5	1.6	--	--	28	88
Apr. 15, 1959.	.30	.36	36	4.7	1.3	--	--	22	71
Oct. 30, 1958.	.00	.135	--	--	--	91	--	--	85
Apr. 15, 1959.	.00	.50	37	4.8	1.2	--	--	23	71

a River miles are miles above dam.

RITO DE LOS FRIJOLES									
Apr. 29, 1959.	4.97	0.14	22	3.4	1.5	--		23	65
June 2.....	4.97	.05	--	--	--	--		--	77
Apr. 29.....	4.79	.16	--	--	--	--		--	70
Apr. 29.....	4.53	.17	23	3.4	1.6	23		--	64
June 2.....	4.53	.02	25	3.6	1.8	--		27	75
Apr. 29.....	4.29	.16	--	--	--	--		--	70
Apr. 29.....	4.01	.12	25	3.1	1.4	--		22	64
June 2.....	4.01	.07	26	3.1	2.0	--		24	69
Apr. 29.....	3.64	.24	--	--	--	--		--	74
Apr. 29.....	3.48	.26	38	4.5	1.4	--		27	80
June 2.....	3.48	.22	39	4.5	1.8	--		29	86
Sept. 2.....	3.48	.12	--	5.4	1.6	--		34	99
Sept. 2.....	3.48	.12	--	--	--	--		--	100
Oct. 12.....	3.48	.15	--	6.2	.8	--		34	101
May 17, 1960..	3.48	.35	--	4.0	1.4	--		28	80
June 22.....	3.48	.24	--	--	--	--		--	89
June 2, 1959..	c3.87	.14	--	--	--	--		--	72
June 2.....	c3.63	.24	--	--	--	--		--	74
Apr. 29.....	c3.39	.60	32	3.7	1.2	--		23	70
June 2.....	c3.39	.20	38	4.3	1.8	--		26	79
Sept. 2.....	c3.39	.16	--	5.0	1.8	--		27	84
Oct. 12.....	c3.39	.06	--	5.6	1.2	--		27	86
May 17, 1960..	c3.39	.43	--	4.0	1.2	--		24	74
June 22.....	c3.39	.19	--	4.6	1.2	--		27	77
Apr. 29, 1959.	3.33	.93	38	4.7	1.4	--		26	78
June 2.....	3.33	.46	--	5.4	1.4	--		28	88
June 2.....	3.33	.46	--	5.5	1.8	--		30	90
Sept. 2.....	3.33	.26	--	--	--	--		--	97
Sept. 2.....	3.33	.26	--	--	--	--		--	98
Oct. 12.....	3.33	.12	--	--	--	--		--	103
June 22, 1960.	3.33	.46	--	5.8	1.4	--		29	88
Apr. 29, 1959.	3.05	.94	--	--	--	--		--	79
Apr. 29.....	2.78	1.00	--	--	--	--		--	80
Apr. 29.....	2.50	1.23	47	6.4	1.4	--		25	82
Apr. 29.....	2.45	1.25	--	--	--	--		--	83
Apr. 29.....	2.22	1.42	--	--	--	--		--	83
Apr. 29.....	1.97	1.45	49	6.8	1.4	--		25	84
June 2.....	1.97	.89	--	7.9	1.4	--		28	94
June 2.....	1.97	.89	--	7.8	1.8	--		29	97
Sept. 2.....	1.97	.57	--	9.3	2.2	--		29	101
Oct. 12.....	1.97	.63	--	9.6	1.2	--		29	102
May 17, 1960..	1.97	1.35	--	6.8	1.4	--		26	88
June 22.....	1.97	.92	--	7.9	1.7	--		28	94
Apr. 29, 1959.	1.74	1.25	49	6.8	1.5	--		25	84
Apr. 29.....	1.52	1.31	--	--	--	--		--	85
Apr. 29.....	1.37	1.26	--	--	--	--		--	86
June 2.....	1.37	.89	--	8.0	2.2	--		28	96
June 2.....	1.37	.89	--	8.0	1.8	--		28	95
Sept. 2.....	1.37	.80	--	9.6	2.0	--		31	105
Sept. 2.....	1.37	.80	--	9.6	1.8	--		30	103
Oct. 12.....	1.37	.66	--	--	--	--		--	103
June 22, 1960.	1.37	.94	--	--	--	--		--	95
Apr. 29, 1959.	1.15	1.44	50	7.0	1.5	--		26	86
June 2.....	1.15	1.08	--	8.0	1.8	--		30	99
June 2.....	1.15	1.08	--	8.0	1.8	--		28	94

a River miles begin with miles above to below gaging station at upper Frijoles crossing.
c South Fork.

RIO GRANDE BASIN LOW-FLOW INVESTIGATION--Continued

LOS ALAMOS SEEPAGE RUN--Continued

Chemical analyses, in parts per million, water years October 1958 to September 1960--Continued

Date of collection	River miles (a)	Discharge (cfs)	Silica (SiO_2)	Sodium (Na)	Chloride (Cl)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Hardness as $CaCO_3$: calcium, magnesium	Specific conductance (micromhos at 25°C)
NEW MEXICO--Continued									
RITO DE LOS FRIJOLES--Continued									
Apr. 29, 1959.	0.86	1.30	50	7.2	1.4	--		27	89
Oct. 20, 1958.	.72	--	--	9.4	2.0	--		35	114
Apr. 29, 1959.	.72	1.25	--	--	--	--		--	90
June 2.....	.72	1.01	--	8.4	1.6	--		30	100
June 2.....	.72	1.01	--	8.8	2.6	--		32	106
Sept. 2.....	.72	.90	--	9.6	2.0	--		33	108
Sept. 2.....	.72	.90	--	9.6	2.0	--		32	106
Oct. 12.....	.72	.81	--	--	--	--		--	107
May 17, 1960..	.72	1.52	--	--	--	--		--	94
June 22.....	.72	.99	--	--	--	--		--	99
Apr. 29, 1959.	.44	1.91	53	7.7	1.7	--		28	93
June 2.....	.44	1.49	--	--	--	--		--	101
Sept. 2.....	.44	.92	--	--	--	--		--	108
Sept. 2.....	.44	.92	--	--	--	--		--	107
Oct. 12.....	.44	1.12	--	9.6	1.4	--		32	108
May 17, 1960..	.44	1.75	--	7.3	1.4	--		29	96
June 22.....	.44	1.26	--	8.5	1.7	--		31	101
Apr. 29, 1959.	.23	1.95	--	--	--	--		--	94
Oct. 20, 1958.	0	1.61	--	8.8	2.2	--		34	110
Apr. 16, 1959.	0	2.60	52	7.6	1.8	--		27	91
Apr. 29.....	0	2.05	54	7.8	1.6	--		28	94
June 2.....	0	1.47	60	8.6	1.6	--		31	102
Sept. 2.....	0	1.17	--	9.7	2.0	--		32	108
Sept. 2.....	0	1.19	--	--	--	--		--	109
Oct. 12.....	0	1.17	--	--	--	--		--	109
Oct. 13.....	0	1.11	--	--	--	--		--	108
June 22, 1960.	0	1.22	--	--	--	--		--	102
Oct. 20, 1958.	.22	1.90	--	--	--	--		--	108
Apr. 16, 1959.	.22	2.68	--	--	--	--		--	90
June 2.....	.22	1.77	60	8.5	1.6	--		31	101
Oct. 13.....	.22	1.36	--	9.7	1.2	--		32	108
May 17, 1960..	.22	2.12	--	7.8	1.9	--		29	97
June 22.....	.22	1.17	--	--	--	--		--	103
Oct. 20, 1958.	.43	1.48	--	--	--	123		--	108
Apr. 16, 1959.	.43	2.51	52	7.7	1.8	--		27	91
June 2.....	.43	1.34	--	--	--	--		--	102
Sept. 3.....	.43	1.36	--	9.9	2.2	--		33	109
Oct. 13.....	.43	1.29	--	--	--	--		--	108
Oct. 20, 1958.	.64	1.70	--	--	--	--		--	107
Oct. 20.....	.81	1.54	--	9.1	1.8	--		--	107
Oct. 20.....	.97	1.52	--	9.6	2.2	--		--	111
Apr. 16, 1959.	.97	2.68	52	7.8	1.7	--		27	92
June 3.....	.97	1.57	60	8.8	1.8	--		32	105
Sept. 7, 1960.	.97	.82	--	--	1.9	--		32	108
Oct. 20, 1958.	1.22	1.43	--	--	--	--		--	108
Oct. 20.....	1.47	1.43	--	--	--	124		--	109
Oct. 20.....	1.90	1.24	--	--	--	--		--	108
Apr. 16, 1959.	1.90	2.63	52	7.9	1.8	--		27	93
June 3.....	1.90	1.53	60	8.8	1.8	--		32	105
Sept. 3.....	1.90	1.09	--	--	--	--		--	110
Sept. 3.....	1.90	1.09	--	--	--	--		--	110
Oct. 13.....	1.90	.92	--	9.7	1.4	--		32	109
May 17, 1960..	1.90	1.54	--	7.8	1.6	--		29	98
June 22.....	1.90	.85	--	8.6	1.8	--		32	104
Oct. 20, 1958.	2.18	1.44	--	--	--	--		--	110
June 3, 1959..	2.18	1.42	60	9.4	2.2	--		32	110
Sept. 3.....	2.18	1.16	--	--	--	--		--	111
Sept. 3.....	2.18	1.07	--	--	--	--		--	111
Oct. 13.....	2.18	1.02	--	--	--	--		--	109
May 17, 1960..	2.18	1.75	--	7.7	1.6	--		29	98
June 22.....	2.18	1.06	--	8.7	1.6	--		32	104
Oct. 20, 1958.	2.35	1.10	--	--	--	--		--	109
Apr. 16, 1959.	2.35	2.72	53	7.9	1.8	--		27	93
June 3.....	2.35	1.18	60	8.8	1.6	--		32	105
Oct. 13.....	2.35	1.01	--	--	--	--		--	110
Oct. 20, 1958.	2.52	1.35	--	--	--	--		--	110
Apr. 16, 1959.	2.52	2.68	53	7.9	1.8	--		28	93
Oct. 20, 1958.	2.70	1.26	--	9.1	1.7	--		--	110
June 3, 1959..	2.70	.94	60	8.8	1.8	--		32	103
Sept. 3.....	2.70	1.04	--	9.9	2.0	--		36	116
Sept. 3.....	2.70	1.04	--	10	2.2	--		34	112
Oct. 13.....	2.70	1.07	--	--	--	--		--	110
May 17, 1960..	2.35	1.69	--	--	--	--		--	99
June 22.....	2.70	.86	--	--	--	--		--	104

a River miles begin with miles above to below gaging station at upper Frijoles crossing.

RIO GRANDE BASIN LOW-FLOW INVESTIGATION--Continued

LOS ALAMOS SEEPAGE RUN--Continued

Chemical analyses, in parts per million, water years October 1958 to September 1960--Continued

Date of collection	River miles (a)	Discharge (cfs)	Silica (SiO_2)	Sodium (Na)	Chloride (Cl)	Dissolved solids		Hardness as $CaCO_3$	Specific conductance (micromhos at 25°C)
						Parts per million	Tons per acre-foot	calcium, magnesium	
NEW MEXICO--Continued									
RITO DE LOS FRIJOLES--Continued									
Oct. 20, 1958.	2.90	1.28	--	--	--	123		--	110
Apr. 16, 1959.	2.90	2.15	53	8.0	1.8	--		28	94
Oct. 20, 1958.	3.05	1.48	--	9.3	1.6	--		--	113
Apr. 16, 1959.	3.05	1.95	53	8.2	1.6	--		28	94
June 3.....	3.05	1.09	59	8.9	2.2	--		33	105
Sept. 3.....	3.05	1.18	--	9.9	2.0	--		34	111
Oct. 13.....	3.05	1.05	--	--	--	--		--	110
June 22, 1960.	3.05	.92	--	--	--	--		--	103
Oct. 20, 1958.	3.21	1.20	--	--	--	--		--	112
Apr. 16, 1959.	3.21	2.15	53	8.2	1.6	--		28	96
June 3.....	3.21	1.01	--	--	--	--		--	105
Oct. 13.....	3.21	1.06	--	--	--	--		--	111
May 17, 1960..	3.21	1.59	--	7.7	1.7	--		30	99
June 22.....	3.21	.79	--	--	--	--		--	103
Oct. 20, 1958.	3.50	1.24	--	--	--	--		--	113
Oct. 20.....	3.72	1.41	--	--	--	--		--	113
Oct. 20.....	3.94	1.30	--	--	--	123		--	112
Oct. 20.....	4.16	1.34	--	--	--	--		--	112
Apr. 16, 1959.	4.16	2.18	--	--	--	--		--	95
June 3.....	4.16	.94	59	9.2	2.4	--		32	109
Sept. 3.....	4.16	1.02	--	10	2.4	--		35	116
Sept. 3.....	4.16	1.02	--	10	2.2	--		35	114
Oct. 13.....	4.16	.98	--	--	--	--		--	109
May 17, 1960..	4.16	1.54	--	--	--	--		--	100
June 22.....	4.16	.61	--	8.7	1.7	--		33	105
Oct. 20, 1958.	4.32	1.15	--	--	--	--		--	111
Apr. 16, 1959.	4.32	1.81	--	--	--	--		--	96
June 3.....	4.32	1.28	59	9.1	1.8	--		33	108
Sept. 3.....	4.32	.99	--	--	--	--		--	115
Sept. 3.....	4.32	.99	--	--	--	--		--	115
Oct. 13.....	4.32	.90	--	--	--	--		--	114
June 22, 1960.	4.32	1.05	--	8.8	1.7	--		33	106
Apr. 16, 1959.	4.55	2.19	54	8.4	1.5	--		28	96
June 3.....	4.55	1.06	--	--	--	--		--	108
Sept. 3.....	4.55	.89	--	10	2.0	--		36	119
Sept. 3.....	4.55	.89	--	10	2.4	--		36	117
Oct. 13.....	4.55	.96	--	--	--	--		--	114
May 17, 1960..	4.55	1.48	--	8.0	1.7	--		30	101
June 22.....	4.55	.81	--	--	--	--		--	106
Oct. 20, 1958.	4.81	1.28	--	--	--	126		--	114
Oct. 20.....	5.06	1.17	--	--	--	--		--	114
Oct. 20.....	5.29	1.09	--	--	--	--		--	116
Oct. 20.....	5.56	1.17	--	10	1.8	--		--	117
Apr. 16, 1959.	5.56	1.91	54	8.6	1.4	--		29	98
June 3.....	5.56	1.05	--	--	--	--		--	112
Sept. 3.....	5.56	.83	--	--	--	--		--	118
Sept. 3.....	5.56	.98	--	--	--	--		--	117
Oct. 13.....	5.56	.74	--	10	1.8	--		35	116
Oct. 14.....	5.56	.95	--	--	--	--		--	118
Oct. 14.....	5.56	.95	--	10	1.4	--		36	121
May 17, 1960..	5.56	1.39	--	8.4	2.1	--		31	105
June 22.....	5.56	.77	--	--	--	--		--	107
Sept. 3, 1959.	6.96	.64	--	11	2.6	--		37	122
Sept. 3.....	6.96	.64	--	12	2.6	--		39	126
Oct. 14.....	6.96	.75	--	--	--	--		--	121
Oct. 14.....	6.96	.75	--	--	--	--		--	119
May 17, 1960..	6.96	1.35	--	--	--	--		--	106
June 22.....	6.96	.49	--	--	--	--		--	110
Sept. 3, 1959.	7.19	.74	--	11	2.4	--		36	121
Sept. 3.....	7.19	.74	--	--	--	--		--	120
Oct. 14.....	7.19	.80	--	11	1.8	--		35	119
Oct. 14.....	7.19	.80	--	11	3.0	--		38	127
May 17, 1960..	7.19	1.33	--	--	--	--		--	107
May 17.....	7.19	1.33	--	9.0	2.0	--		32	107
June 22.....	7.19	.45	--	--	--	--		--	111
Sept. 3, 1959.	7.30	.63	--	13	5.4	--		36	131
Sept. 3.....	7.30	.63	--	12	3.0	--		36	122
Oct. 14.....	7.30	.79	--	--	--	--		--	121
Sept. 3.....	7.65	.53	--	12	3.4	--		36	124
Oct. 14.....	7.65	.64	--	--	--	--		--	121
May 17, 1960..	7.65	1.22	--	9.1	1.8	--		32	109
June 22.....	7.65	.29	--	10	2.2	--		35	116

a River miles begin with miles above to below gaging station at upper Frijoles crossing.

RIO GRANDE BASIN--Continued

PECOS RIVER SEEPAGE INVESTIGATION

Samples were collected on June 22-23, 1960 for chemical analyses on the Pecos River and its tributaries in New Mexico, beginning at the gaging station at Pecos River "below Alamogordo Dam" and ending at the gaging station "near Acme". Records of discharge for water year October 1959 to September 1960 given in WSP 1712.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Stream or diversion	Location	Discharge (cfs)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Hardness as $CaCO_3$		Specific conductance (micromhos at 25°C)	pH
						Calcium, magnesium	Noncarbonate		
	June 22, 1960								
Pecos River	Below Alamogordo Dam (gaging station).	--	119	768	61	860	762	1570	8.0
Arroyo Salado	At mouth.	0.45	189	1760	121	1880	1720	3080	7.5
Pecos River	Below Arroyo Salado.	--	119	777	62	870	772	1610	7.2
Yeso Arroyo	At Highway 20, 5 miles above mouth.	.2	147	958	126	1200	1080	2050	7.1
Pecos River	At the mouth of Yeso Arroyo.	--	153	1390	295	1430	1300	3170	7.4
Do	1.2 miles below Arroyo Yeso.	--	144	1400	305	1420	1300	3200	7.3
Do	Below mouth of Cedar Creek.	--	127	1410	435	1430	1330	3540	7 2
Do	Below mouth of Blanco Canyon near Dunlap.	--	124	1530	485	1620	1520	3860	6.9
	June 23, 1960								
Pecos River	0.5 mile above Conejos Creek.	--	141	1420	425	1450	1330	3570	7.2
Conejos Creek	At mouth.	0.05	187	3450	210	3420	3270	5200	7.8
Pecos River	0.5 mile below Conejos Creek.	33.8	138	1400	425	1520	1410	3530	7.3
Arroyo de la Mora	At road crossing 6 miles above mouth.	.04	72	2060	120	2080	2020	3330	7.8
Pecos River	1.1 miles above Wylie Draw.	--	118	1460	450	1490	1390	3670	7.0
Do	4.5 miles above Hernandez Draw.	--	114	1510	495	1600	1510	3920	7.2
Do	In SW¼ sec.36, T.4 S., R.25 E., 4.0 miles above Huggins Creek.	22.3	110	1500	490	1530	1440	3810	7.3
Do	0.2 mile below Huggins Creek.	--	113	1500	470	1600	1510	3760	7.0
Do	0.7 mile below Crockett Draw.	--	103	1510	445	1580	1500	3700	7.1
Do	0.8 mile below Bosque Draw.	12.9	100	1530	440	1600	1520	3720	7.4
Do	1 mile above Five Mile Draw.	--	100	1580	445	1630	1550	3740	7.1
Do	In NE¼ sec.29, T.7 S., R.26 E., 500 feet above Transwestern pipeline crossing.	--	99	1600	460	1640	1560	3840	7.1
Six Mile Draw	2 miles above mouth.	--	158	2960	605	2970	2840	5850	7.3
Pecos River	In SW¼ sec.1, T.8 S., R.25 E., at El Paso pipeline crossing.	--	98	1610	475	1640	1560	3870	7.8
Do	0.2 mile above Arroyo Atascoso.	--	98	1610	455	1680	1600	3850	7.0
Do	800 feet below Arroyo Atascoso.	--	96	1610	460	1680	1600	3850	7.0
Do	Near Acme (gaging station).	6.37	100	1660	460	1700	1620	3880	7.1

PECOS RIVER SEEPAGE INVESTIGATION--Continued

Samples were collected for chemical analyses at the time discharge measurements were made on the Pecos River and its tributaries, in the reach beginning at the gaging station near Acme, New Mexico, and ending at the gaging station near Artesia, New Mexico. Discharge data are given in WSP 1712.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Stream or diversion	Location	Discharge (cfs)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Hardness as $CaCO_3$		Specific conductance (micromhos at 25°C)	pH
						Calcium, magnesium	Noncarbonate		
		Jan. 27, 1960							
Pecos River	Near Acme (gaging station), right bank.	24.9			620			4190	
Do	Near Acme (gaging station), left bank.	--			620			4190	
Do	Above Bitter Lakes, 10.5 miles northeast of Roswell, right bank.	21.5			815			4800	
Do	Above Bitter Lakes, 10.5 miles northeast of Roswell, left bank.	--			815			4810	
Do	At Bitter Lakes, 9.5 miles northeast of Roswell, right bank.	23.2			1000			5410	
Do	At Bitter Lakes, 9.5 miles northeast of Roswell, left bank.	--			1000			5450	
Do	Above Bitter Creek, right bank.	26.2			1160			5920	
Do	Above Bitter Creek, left bank.	--			1150			5920	
Bitter Creek	At gage.	7.87			2400			9710	
Bitter Creek and Roswell sewage	0.9 mile above mouth and 6.5 miles east of Roswell.	10.8			2710			10500	
Pecos River	At Tatum Bridge (U.S. Highway 380), 7.4 miles east of Roswell, right bank.	37.2			1590			7220	
Do	At Tatum Bridge (U.S. Highway 380), 7.4 miles east of Roswell, left bank.	--			1580			7210	
Do	Above Rio Hondo, right bank.	39.8			1590			7220	
Do	Above Rio Hondo, left bank.	--			1600			7240	
Rio Hondo	At mouth.	24.9			1380			6200	
East Grand Plains Drainage District A-B-C Lines	At mouth, 3.4 miles northeast of East Grand Plains.	1.31			195			3920	
Gravel Pit Drain	At mouth 3.8 miles east of East Grand Plains.	.49			320			3140	
Pecos River	Below Gravel Pit Drain, right bank.	70.8			1370			6400	
Do	Below Gravel Pit Drain, left bank.	--			1380			6440	
Inflow to Pecos River	Above Oasis-Miller Drain, 4.2 miles east of East Grand Plains.	.17			325			3560	
Pecos River	Above Oasis-Miller Drain, 4.5 miles east of East Grand Plains, right bank.	73.1			1330			6310	
Do	Above Oasis-Miller Drain, 4.5 miles east of East Grand Plains, left bank.	--			1350			6310	
Do	At Pipeline Crossing, S½ NE¼NE¼ sec.17, T.12 S., R.26 E., 6 miles south of East Grand Plains, right bank.	74.9			1350			6360	
Do	At Pipeline Crossing, S½ NE¼NE¼ sec.17, T.12 S., R.26 E., 6 miles south of East Grand Plains, left bank.	--			1330			6360	
Do	Above Nine Mile Draw, right bank.	77.9			1380			6430	
Do	Above Nine Mile Draw, left bank.	--			1360			6430	
Nine Mile Draw	At mouth, 3 miles north of Dexter.	2.39			355			3690	

RIO GRANDE BASIN--Continued

PECOS RIVER SEEPAGE INVESTIGATION--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Stream or diversion	Location	Discharge (cfs)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Hardness as $CaCO_3$		Specific conductance (micromhos at 25°C)	pH
						Calcium, magnesium	Noncarbonate		
	Jan. 27, 1960--Continued								
Pecos River	Above Dexter Bridge, 2.2 miles northeast of Dexter, right bank.	83.2			1320			6330	
Do	.....do..... left bank.	--			1330			6340	
Berry Drain	At mouth, 3 miles east of Dexter.	.50			170			3850	
Pecos River	Above Dexter-Greenfield Drains, 4 miles southeast of Dexter, right bank.	80.3			1340			6470	
Do	.....do..... left bank.	--			1320			6390	
Do	0.7 mile above Rio Felix, right bank.	80.9			1350			6460	
Do	.....do..... left bank.	--			1330			6440	
Rio Felix	At mouth.....	2.97			1530			7150	
Pecos River	At Hagerman Bridge, 2.5 miles east of Hagerman, right bank.	83.4			1380			6560	
Do	.....do..... left bank.	--			1390			6580	
	Jan. 28, 1960								
Pecos River	Above Hagerman Drainage District "A" Line, right bank.	91.9			1410			6680	
Do	Above Hagerman Drainage District "A" Line, left bank.	--			1420			6720	
Do	In NE¼SW¼SW¼ sec.25, T.14 S., R.26 E., near Pritchard Lakes, 3.5 miles southeast of Hagerman, right bank.	86.9			1420			6680	
Do	In NE¼SW¼SW¼ sec.25, T.14 S., R.26 E., near Pritchard Lakes, 3.5 miles southeast of Hagerman, left bank.	--			1430			6720	
Do	Above Buffalo Valley pump, SE¼SE¼SW¼ sec.31, T.14 S., R.27 E., 5 miles southeast of Hagerman, right bank.	89.2			1410			6710	
Do	Above Buffalo Valley pump, SE¼SE¼SW¼ sec.31, T.14 S., R.27 E., 5 miles southeast of Hagerman, left bank.	--			1410			6670	
Do	Above Lake Arthur (gaging station), right bank.	98.0			1570			7210	
Do	Above Lake Arthur (gaging station), left bank.	--			1570			7220	
Do	Near Lake Arthur (gaging station), right bank.	99.0			1590			7280	
Do	Near Lake Arthur (gaging station), left bank.	--			1590			7280	
Do	Below Walnut Creek, 2.5 miles south of Lake Arthur, right bank.	95.4			1620			7340	
Do	Below Walnut Creek, 2.5 miles south of Lake Arthur, left bank.	--			1620			7330	
Do	Above Artesia sewage line NW¼NW¼NW¼ sec.12, T.17 S., R.26 E., right bank.	91.7			1630			7350	
Do	Above Artesia sewage line NW¼NW¼NW¼ sec.12, T.17 S., R.26 E., left bank.	--			1610			7370	
Do	Near Artesia (gaging station), right bank.	91.5			1640			7410	
Do	Near Artesia (gaging station), left bank.	--			1630			7410	

PECOS RIVER SEEPAGE INVESTIGATION--Continued

HAGERMAN CANAL SEEPAGE INVESTIGATION

Samples were collected at time of discharge measurements for chemical analyses from the Hagerman Canal in New Mexico from the headworks near Roswell, where the water is diverted from the Rio Hondo, to a point 1 mile west of Hagerman. Discharge data given in WSP 1712.

Chemical analyses, in parts per million, water year October 1959 to September 1960

Stream or diversion	Location	Discharge (cfs)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Hardness as $CaCO_3$		Specific conductance (micromhos at 25°C)	pH
						Calcium, magnesium	Noncarbonate		
		Aug. 11, 1960							
Hagerman Irrigation Co...	Well "b", NE¼ sec.35, T.10 S., R.24 E., 3 miles east of Roswell.	4.50	199	1030	3690	1350	1190	12100	7.5
Do.....	Well "a", NE¼ sec.35, T.10 S., R.24 E., 3 miles east of Roswell.	5.46	201	1110	4090	1420	1260	13500	7.1
Hagerman Canal.....	NE¼ sec. 31, T.10 S., R.25 E., at head.	24.4	240	1300	2350	1760	1560	8980	8.0
Drain.....	NE¼ sec. 31, T.10 S., R.25 E., 0.6 mile above Route 380.	.28	271	1610	2490	2030	1810	9810	7.3
Hagerman Canal.....	SW¼ sec. 32, T.10 S., R.25 E., at Route 380.	25.6	238	1320	2370	1770	1580	9030	7.2
LFD Drain (Roswell Drainage District "X" line).	NW¼ sec. 5, T.11 S., R.25 E., 0.55 mile below Route 380.	.92	247	2090	2590	2930	2730	10500	7.0
Hagerman Canal.....	SE¼ sec. 5, T.11 S., R.25 E., 0.7 mile below LFD Drain.	25.9	235	1350	2370	1790	1600	9040	7.9
Do.....	SE¼ sec.8, T.11 S., R.25 E., at bridge.	23.6	234	1330	2370	1760	1570	9010	8.0
Do.....	SE¼ sec.8, T.11 S., R.25 E., at bridge.	23.0	243	1280	2250	1720	1520	8700	6.9
Do.....	NW¼ sec. 16, T.11 S., R.25 E., below floodway.	27.1	241	1290	2180	1760	1560	8510	7.0
Do.....	NE¼ sec. 16, T.11 S., R.25 E., at bridge.	31.5	236	1170	1910	1600	1410	7570	7.2
Do.....	SE¼ sec.15, T.11 S., R.25 E., at bridge 0.1 mile west of Oasis Well.	31.3	234	1200	1830	1620	1430	7370	7.2
Do.....	NE¼ sec.22, T.11 S., R.25 E., above Pamona Drain.	30.6	234	1210	1830	1680	1490	7390	7.2
Do.....	NE¼ sec.22, T.11 S., R.25 E., above Pamona Drain.	33.6	246	1240	1810	1680	1480	7420	7.5
Pamona Drain.....	SE¼ sec.22, T.11 S., R.25 E., at mouth.	7.81	194	1400	135	1570	1410	2710	8.0
Hagerman Canal.....	NE¼ sec.27, T.11 S., R.25 E., at bridge 3 miles east of East Grand Plains.	40.3	247	1290	1530	1720	1520	6600	7.1
Do.....	NE¼ sec.27, T.11 S., R.25 E., 0.5 mile below bridge to East Grand Plains.	41.4	251	1290	1520	1660	1450	6590	8.0
Do.....	NW¼ sec.35, T.11 S., R.25 E., at State engineer gage.	41.0	246	1280	1540	1700	1500	6600	7.3
Do.....	SW¼ sec.35, T.11 S., R.25 E., at unnamed arroyo 0.8 mile below State engineer gage.	38.7	248	1290	1550	1660	1460	6700	7.3
Do.....	SE¼ sec.6, T.12 S., R.26 E., at power line crossing.	39.4	245	1290	1560	1700	1500	6650	8.1
Do.....	NE¼ sec.18, T.12 S., R.26 E., at bridge.	37.2	243	1280	1560	1660	1460	6620	8.2
Do.....	NE¼ sec.19, T.12 S., R.26 E., at bridge above T.O. 4.	35.0	244	1280	1540	1700	1500	6630	7.7
Do.....	NE¼ sec.31, T.12 S., R.26 E., at upstream end of flume.	37.9	242	1280	1550	1650	1450	6650	7.5
Do.....	NE¼ sec.6, T.13 S., R.26 E., at bridge.	37.8	241	1270	1570	1650	1450	6710	7.4
Do.....	NE¼ sec.6, T.13 S., R.26 E., at bridge.	39.4	245	1280	1590	1680	1480	6790	7.2
Do.....	NE¼ sec.7, T.13 S., R.26 E., 0.7 mile above Route 285.	40.0	248	1280	1580	1710	1510	6740	8.0
Do.....	NE¼ sec.18, T.13 S., R.26 E., above Dexter well, 0.3 mile below Route 285.	39.4	246	1290	1570	1670	1470	6790	7.2
Do.....	NE¼ sec.18, T.13 S., R.26 E., below Dexter well, 0.3 mile below Route 285.	41.9	245	1270	1490	1640	1440	6520	7.3

RIO GRANDE BASIN--Continued

PECOS RIVER SEEPAGE INVESTIGATION--Continued

HAGERMAN CANAL SEEPAGE INVESTIGATION--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Stream or diversion	Location	Discharge (cfs)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Hardness as $CaCO_3$		Specific conductance (micromhos at 25°C)	pH
						Calcium, magnesium	Noncarbonate		
	Aug. 11, 1960--Continued								
Hagerman Canal	SE¼ sec.18, T.13 S., R.26 E., at bridge.	36.5	246	1270	1500	1630	1430	6520	7.8
Do	NE¼ sec.30, T.13 S., R.26 E., below bridge.	28.6	244	1260	1490	1630	1430	6490	7.3
Do	NE¼ sec.30, T.13 S., R.26 E., below bridge.	27.7	248	1250	1470	1710	1510	6390	7.2
Do	NE¼ sec.31, T.13 S., R.26 E., at bridge.	26.9	251	1240	1470	1680	1470	6360	7.2
Do	NE¼ sec.6, T.14 S., R.26 E., below bridge.	26.7	247	1250	1460	1600	1400	6430	7.5
Do	SE¼ sec.6, T.14 S., R.26 E., just above siphon under Rio Felix.	26.2	250	1250	1460	1600	1400	6400	7.4
Do	SE¼ sec.6, T.14 S., R.26 E., just below siphon under Rio Felix.	26.6	250	1240	1460	1600	1400	6380	7.4
Do	SE¼ sec.8, T.14 S., R.26 E., just above bridge.	26.0	247	1240	1470	1630	1430	6410	7.2

MISCELLANEOUS ANALYSES OF STREAMS IN WESTERN GULF OF MEXICO BASINS

Chemical analyses, in parts per million, water year October 1959 to September 1960

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
CALCASIEU RIVER BASIN																						
8-120. CALCASIEU RIVER NEAR GLENMORA, LA.																						
Dec. 11, 1959....	41	20	0.04	4.1	0.7	5.8	1.4	20		0.8	6.8	0.2	0.1		50	0.07	5.5	12	0	0.7	57	6.1
Feb. 2, 1960.....	600	11	.24	2.5	.9	3.4	.8	8		2.0	6.6	.1	.2		32	.04	52	10	3	.5	40	6.0
Apr. 4.....	403	19	.15	5.4	1.1	7.8	.9	24		3.0	9.0	.1	.2		59	.08	64	18	0	.8	74	6.7
June 1.....	39	21	.38	9.5	1.5	6.9	1.4	36		8.2	7.2	.0	.0		a77	.10	8.1	30	0	.5	92	6.0
July 11.....	126	7.4	.24	2.5	.4	.9	.9	7		1.0	2.6	.1	.3		20	.03	6.8	8	2	.1	31	5.5
8-136.5. BIRDS CREEK AT CRAVENS, LA.																						
Dec. 9, 1959.....		11	0.12	2.2	0.4	2.8	1.1	10		0.4	4.1	0.1	0.1		27	0.04		7	0	0.5	31	6.5
Apr. 25, 1960....		10	.12	3.1	.8	2.5	1.2	11		.4	5.5	.0	.8		29	.04		11	2	.3	39	5.8
8-139.5. BIG BRUSHY CREEK NEAR PITKIN, LA.																						
Dec. 9, 1959.....	15	21	0.02	2.6	0.4	5.5	1.0	15		0.4	6.0	0.1	0.2		44	0.06	1.6	8	0	0.8	56	6.0
Apr. 25, 1960....	7.9	24	.06	3.6	.7	6.7	1.4	18		1.6	8.0	.1	.7		56	.08	1.2	12	0	.8	64	5.7
8-140. SIX MILE CREEK NEAR SUGARTOWN, LA.																						
Nov. 11, 1959....	85	22	0.12	2.5	0.9	5.5	1.2	16		1.2	6.0	0.1	0.4		48	0.07	11	10	0	0.8	50	6.1
May 2, 1960.....	130	19	.11	2.8	.5	4.8	1.2	10		2.0	7.0	.1	.5		43	.06	15	9	1	.7	44	5.2
8-142. TEN MILE CREEK NEAR ELIZABETH, LA.																						
Nov. 11, 1959....	17	26	0.06	2.6	0.6	7.1	1.6	22		1.0	5.0	0.1	0.1		58	0.07	2.5	9	0	1.0	55	6.3
May 2, 1960.....	28	25	.08	3.5	.8	8.0	1.7	18		6.4	6.8	.1	.6		62	.08	4.7	12	0	1.0	59	5.6

a Residue at 180°C.

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MISCELLANEOUS ANALYSES OF STREAMS IN WESTERN GULF OF MEXICO BASINS--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
CALCASIEU RIVER BASIN--Continued																						
8-146. FLAT CREEK NEAR DE RIDDER, LA.																						
Dec. 10, 1959....	6.6	19	0.21	4.2	1.1	10	2.2	13		3.0	14	0.3	6.0		66	0.09	1.2	15	4	1.2	100	6.6
May 18, 1960.....	2.5	26	.84	5.3	1.7	12	2.9	8		1.6	18	.3	20		92	.13	.62	20	14	1.2	126	5.1
8-148. BUNDICK CREEK NEAR DE RIDDER, LA.																						
Nov. 24, 1959....	84	19	0.13	4.1	0.4	6.0	1.4	17		2.0	7.0	0.1	0.7		49	0.07	11	12	0	0.8	57	6.3
May 3, 1960.....	45	14	.25	3.2	.7	4.6	1.1	6		2.0	9.0	.1	2.1		40	.05	4.9	11	6	.6	55	5.1
SABINE RIVER BASIN																						
8-272. EAST ANACOCO CREEK NEAR ANACOCO, LA.																						
Dec. 10, 1959....	5.2	21	0.07	2.1	0.2	3.7	1.4	10		0.6	4.9	0.1	0.1		39	0.05	0.54	6	0	0.7	38	6.0
May 18, 1960.....	4.5	20	.17	3.0	.4	3.7	1.1	9		4.6	4.0	.1	.3		42	.06	.51	9	2	.5	42	6.1
8-277. ANACOCO PRAIRIE LAKE NEAR LEESVILLE, LA.																						
Nov. 6, 1959.....		6.6	0.01	4.7	0.8	2.8	1.0	18		0.0	3.6	0.2	1.3		a37	0.05		15	27	0.3	58	6.2
May 18, 1960.....		3.5	.08	5.0	.9	2.8	.9	13		6.0	4.3	.1	.2		33	.04		16	5	.3	49	5.7
8-280. BAYOU ANACOCO NEAR ROSEPINE, LA.																						
Nov. 14, 1959....	24	13	0.06	5.4	0.9	3.7	1.4	10		1.4	9.9	0.1	3.5		44	0.06	2.9	17	9	0.4	65	6.4
Jan. 4, 1960.....	670	8.6	.19	2.8	.2	2.3	.7	6.2		1.8	4.2	.1	.5		24	.03	43	8	3	.4	37	6.0
Mar. 14.....	300	11	.19	4.1	.4	4.8	1.7	12		3.4	7.0	.1	1.6		40	.05	32	12	2	.6	55	6.1
May 3.....	91	13	.17	3.6	.7	4.6	1.7	8.6		2.2	9.0	.1	2.0		41	.06	10	12	5	.6	55	5.2
July 6.....	66	13	.01	6.0	.3	2.1	1.1	18		1.0	4.2	.1	.0		37	.05	6.6	16	1	.2	53	6.3

a Residue at 180°C.

MISCELLANEOUS ANALYSES OF STREAMS IN WESTERN GULF OF MEXICO BASINS--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Dissolved solids: Tons per day	Hardness as $CaCO_3$: Calcium, Magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
BRAZOS RIVER BASIN--Continued																						
8-809.2. RED MUD CREEK AT MOUTH NEAR CLAIREMONT, TEX.																						
Jan. 20, 1960	0.11					--				1490	432							--			3470	
Feb. 18	0					--				--	325							--			3600	
May 12	0					--				--	7040							--			21600	
June 15	.01					186	11	80		620	250							630	564		1940	7.3
July 26	.01					4680				2010	7920							3320			22100	
Aug. 17	0					--				--	6700							--			20200	
Sept. 22	0					--				--	10900							--			29400	
8-809.6. BUTTE CREEK AT MOUTH NEAR JAYTON, TEX.																						
Dec. 17, 1959	0.60					30	4.8	112		1260	22							1321	1230		2090	7.9
Jan. 20, 1960	0										2020										8510	
June 15	0										2940										11000	
July 26	0										385										2460	
8-810.5. SHORT CROTON CREEK AT MOUTH NEAR JAYTON, TEX.																						
Oct. 20, 1959	0.01					12900				3810	20200							5010			49700	
Nov. 19	.01					--				3350	18300							--			44600	
Jan. 21, 1960	.10					--				3350	19700							--			47600	
Feb. 18	.02					14800				3610	23100							4700			53400	
Apr. 15	.01					11500				3490	18100							4490			41900	
May 11	0					--				--	21900							--			54000	
June 15	0					--				--	20700							--			49000	
July 26	.02					8170				3250	12900							4150			34000	
Aug. 17	0					--				--	27600							--			62100	
Sept.21	.01					9090				3410	14500							4220			37000	

MISCELLANEOUS ANALYSES OF STREAMS IN WESTERN GULF OF MEXICO BASINS--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Dissolved solids: Tons per day	Hardness as $CaCO_3$: Calcium, Magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
BRAZOS RIVER BASIN																						
8-799. ROUGH CREEK AT MOUTH NEAR ROTAN, TEX.																						
Nov. 19, 1959	0										47										1900	
Jan. 20, 1960	.08									1140	56										2020	
Feb. 19	0										57										2090	
May 12	0										1440										7690	
June 17	0										360										3470	
July 27	0										42										1800	
Aug. 18	0										43										1700	
8-805.5. McDONALD CREEK AT MOUTH NEAR POST, TEX.																						
Nov. 18, 1959	0									--	7650										21200	
Dec. 17	12.7					1160		172		238	1730							320	179		5850	7.9
Jan. 20, 1960	.22									1670	13200										33800	
Feb. 18	.01									1910	13600										35000	
Mar. 15	0									--	15900										40400	
8-808. WHITE RIVER NEAR CROSBYTON, TEX.																						
Mar. 15, 1960	0.47					--	--	446		60	24							274	0		782	7.9
June 22	3.62					22	8.5	203		19	8							137	0		358	8.0
Sept. 21	.65					62	11	366		50	22							234	0		698	8.1
8-809. WHITE RIVER BELOW FALLS NEAR CROSBYTON, TEX.																						
Mar. 15, 1960	1.01					--	--	402		63	24							270	0		763	8.0
June 22	4.36					30	9.1	225		21	12							149	0		413	8.0
Sept. 21	.62					57	9.4	325		44	21							200	0		617	8.0

8-811. CROTON CREEK BELOW SHORT CROTON CREEK NEAR JAYTON, TEX.

Oct. 20, 1959.....	0.02					5930				3070	9370							3690			27500	
Nov. 8.....	.02					--				3460	13300							--			35300	
Jan. 21, 1960.....	.84					--				3240	12500							--			33700	
Feb. 18.....	1.09					9470				3400	14800							4300			38300	
Mar. 15.....	.35					9890				3600	15700							4530			40200	
Apr. 5.....	.05					--				--	21200							--			53500	
Apr. 15.....	.02					13300				4700	20700							5490			46300	
June 15.....	.06					10200				3930	16300							4840			41400	
July 26.....	.43					3170				2700	5060							3060			16500	
Aug. 17.....	0					--				--	11600							--			32600	
Sept. 21.....	.05					5910				2710	9400							3110			26100	

8-822. NORTH CROTON CREEK AT MOUTH NEAR KNOX CITY, TEX.

Oct. 26, 1959.....	0					--		--		--	1600							--	--		6680	--
Nov. 17.....	0					641		72		1050	1110							1310	1250		4980	7.7
Feb. 16, 1960.....	.78					4230		--		2190	6940							2980	--		20700	--
Mar. 14.....	.71					3510		--		2400	5960							3260	--		18800	--
Apr. 18.....	0					--		--		--	7090							--	--		21000	--
May 13.....	0					--		--		--	8270							--	--		24200	--
June 14.....	2.27					940		68		1280	1460							1430	1370		6120	7.5
July 25.....	1.42					492		92		1100	810							1250	1170		4190	7.6
Aug. 16.....	2.67					372	5.5	43		433	600							500	465		2760	6.5
Sept. 20.....	0					--		--		--	3510							--	--		12400	--

MISCELLANEOUS ANALYSES OF STREAMS IN WESTERN GULF OF MEXICO BASINS--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
BRAZOS RIVER BASIN--Continued																						
8-824. MUSTANG CREEK AT MOUTH NEAR KNOX CITY, TEX.																						
Nov. 17, 1959	0					--	--	--		--	200							--	--		2060	--
Dec. 15	35.4					19	4.0	68		324	22							370	314		774	7.6
Feb. 12, 1960	.02					572	--	126		2260	700							2160	2060		5350	7.7
Mar. 14	.10					--	--	138		2330	760							2110	2000		5620	7.8
Apr. 18	0					--	--	--		--	1390							--	--		8350	--
June 14	.38					832	--	94		1130	1280							1230	1150		5500	7.5
July 25	.02					--	--	--		2150	1520							--	--		7250	--
Aug. 16	29.8					25	5.2	91		358	30							415	340		901	7.3
Sept. 20	.02					2520	--	--		2910	3680							2890	--		13800	--
8-883. OAK CREEK NEAR GRAHAM, TEX.																						
Mar. 22, 1960	0	2.4		56	11	35	--	149		63	52	0.2	0.0		293	0.40		184	62	1.1	520	7.6
Apr. 25-26	a28.1	8.8		10	3.0	7.4	--	40		8.8	6.0	.4	2.5		67	.09		37	4	.5	108	6.8
May 1-2, 5-7	a.18	12		20	3.7	6.2	6.7	70		12	9.0	.4	2.5		106	.14		65	8	.3	177	7.1
May 30-31	a23.4	6.6		10	2.8	4.8	--	37		5.6	6	.3	1.8		60	.08		36	6	.3	94	6.7
June 1-3	a.40	7.8		20	3.5	13	--	65		11	18	.3	2.2		108	.15		64	11	.7	201	6.6
July 6-8	a75.3	9.4		9.5	2.2	4.3	--	34		6.8	3.0	.3	2.5		55	.07		33	5	.3	85	6.7
July 9-11	a.63	12		19	3.4	5.1	8.1	69		11	8.5	.2	1.8		103	.14		61	5	.3	160	7.0
Aug. 19	a2.70	7.8		7.3	1.9	1.8	6.2	32		4.4	2.2	.3	3.0		51	.07		26	0	.2	74	6.9
LAKE GRAHAM NEAR GRAHAM, TEX.																						
Oct. 7, 1959		3.7		48	10	b80		113		9.6	165	0.2	0.5		c408	0.55		161	68	2.7	724	7.3
Nov. 11		5.9		34	7.2	b52		95		6.8	101	.2	.8		255	.35		114	37	2.1	493	7.2
Dec. 9		6.4		37	7.0	b51		96		8.2	102	.2	1.0		260	.35		121	42	2.0	502	6.9

Jan. 13, 1960.....		4.1		37	7.8	b57		100		7.4	111	0.4	0.8		274	0.37		124	42	2.2	528	7.5
Mar. 10.....		3.0		38	8.7	b55		100		7.8	113	.1	.5		275	.37		131	49	2.1	550	7.4
Mar. 22.....		6.4		38	8.5	b59		90		11	122	.2	.5		290	.39		130	56	2.2	560	7.1
Mar. 22.....		7.4		72	18	b168		106		23	358	.2	2.2		701	.95		254	166	4.6	1350	7.7
Apr. 13.....		2.6		40	8.1	b57		103		7.6	116	.3	.8		283	.38		134	49	2.1	560	7.3
May 11.....		.5		41	8.7	b56		108		9.2	115	.2	.2		284	.39		138	50	2.1	581	7.4
June 15.....		1.9		44	10	b58		117		6.8	123	.3	.0		302	.41		151	55	2.1	620	7.4
July 13.....		2.9		47	8.8	b62		124		6.8	127	.2	.0		316	.43		154	52	2.2	620	7.5
Aug. 10.....		4.3		44	9.1	b59		122		6.4	120	.3	.2		303	.41		148	48	2.1	582	7.0
Sept. 9.....		4.4		44	8.7	b60		124		5.6	120	.3	.2		304	.41		146	44	2.2	593	7.3

GUADALUPE RIVER BASIN

8-1870. ESCONDIDO RESERVOIR NO. 1 NEAR KENEDY, TEX.

Oct. 26, 1959.....		12		36	2.0	3.8	7.4	131		0.6	3.0	0.4	0.8		c143	0.19		98	0	0.2	233	7.0
Aug. 2, 1960.....		8.0		43	2.2	12		163		.6	4.8	.3	.2		151	.21		116	0	.5	271	7.0

RIO GRANDE BASIN

BERRENDO CREEK AT BERRENDO ROAD CROSSING AT ROSWELL, N. MEX.

Apr. 14, 1960.....								99			850									4540	7.3
July 25.....								186			228									1420	7.6

a Daily mean discharge.
b Sodium (Na) and potassium values are calculated and reported as sodium.
c Residue on evaporation at 180°C.

MISCELLANEOUS ANALYSES OF STREAMS IN WESTERN GULF OF MEXICO BASINS--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fs)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Dissolved solids: Tons per day	Hardness as $CaCO_3$: Calcium, Magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
RIO GRANDE BASIN--Continued																						
8-4005. LAKE McMILLAN AT McMILLAN DAM NEAR LAKEWOOD, N. MEX.																						
Oct. 7, 1959								78			290										2780	7.3
Oct. 14								77			365										3040	6.9
Oct. 21								73			465										3490	7.1
Oct. 28								75			555										3920	7.5
Nov. 4								86			695										4380	7.4
Nov. 10								98			735										4560	6.9
Nov. 18								100			760										4700	7.7
Nov. 24								98			780										4790	7.3
Dec. 2								100			875										5110	7.0
Dec. 9								101			945										5370	6.8
Dec. 16								111			1090										5830	8.0
Dec. 22								107			1060										5670	7.7
Dec. 30								110			1170										6050	7.1
Jan. 6, 1960								111			1230										6280	6.9
Jan. 13								108			1260										6360	6.9
Jan. 19								108			1290										6410	7.3
Jan. 27								114			1360										6540	7.5
Feb. 3								122			1400										6710	7.2
Feb. 10								104			1490										7020	7.5
Feb. 23								102			1660										7520	7.8
Mar. 3								105			1670										7680	7.7
Mar. 9								106			1680										7680	7.1
Mar. 16								104			1810										8080	7.7
Mar. 22								105			1780										8040	8.1
Mar. 30								113			990										5430	7.6
Apr. 6								118			860										4990	7.6
Apr. 13								114			790										4770	7.3
Apr. 20								119			820										4930	8.1
Apr. 26								128			990										5600	7.1

May 4								133			1150											6230	7.1
May 14								140			1440											7480	7.4
May 23								106			270											2950	7.7
June 1								88			200											2620	7.5
June 6								94			218											2670	7.3
June 13								96			204											2570	7.3
June 20								91			212											2510	7.2
June 28								90			242											2640	7.2
July 5								85			252											2710	7.7
Aug. 4								109			388											3300	7.2

8-4013. PECOS RIVER AT FORD CROSSING ABOVE MAJOR JOHNSONS SPRINGS, NEAR LAKEWOOD, N. MEX.

Oct. 21, 1959								171			645											4570	7.4
Nov. 24								171			650											4630	7.3
Dec. 22								169			655											4580	7.2
Jan. 19, 1960								149			860											5210	7.8
Feb. 23								166			660											4550	7.4
Mar. 22								174			640											4770	7.2
Apr. 26								123			975											5560	7.1
June 1								161			590											4480	7.2

8-4015. PECOS RIVER BELOW MAJOR JOHNSON SPRINGS, NEAR CARLSBAD, N. MEX.

Oct. 7, 1959								149			655											4430	7.8
Oct. 14								153			660											4410	7.4
Oct. 21								163			655											4440	7.4

MISCELLANEOUS ANALYSES OF STREAMS IN WESTERN GULF OF MEXICO BASINS--Continued

Chemical analyses, in parts per million, water year October 1959 to September 1960--Continued

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Dissolved solids: Tons per day	Hardness as $CaCO_3$: Calcium, Magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
RIO GRANDE BASIN--Continued																						
8-4015. PECOS RIVER BELOW MAJOR JOHNSON SPRINGS, NEAR CARLSBAD, N. MEX.--Continued																						
Nov. 4								152			665										4590	7.6
Nov. 10								160			660										4580	7.5
Nov. 18								159			660										4570	7.4
Nov. 24								162			660										4580	7.8
Dec. 2								129			660										4540	8.0
Dec. 9								159			665										4570	7.7
Dec. 16								160			650										4550	7.9
Dec. 22								162			660										4560	7.7
Dec. 30								156			665										4560	7.7
Jan. 6, 1960								157			665										4560	7.6
Jan. 19								150			765										4870	7.5
Feb. 10								151			680										4560	7.5
Feb. 23								151			670										4550	7.7
Mar. 3								120			670										4540	7.9
Mar. 9								154			670										4590	7.2
Mar. 16								157			670										4580	7.5
Mar. 22								159			670										4600	7.5
May 4								155			740										4820	7.7
June 1								152			645										4520	7.5
June 6								151			628										4400	7.9
June 13								110			656										4400	8.0
July 15								110			288										2760	7.0
PECOS RIVER ABOVE CARLSBAD FLUME, AT CARLSBAD, N. MEX.																						
Oct. 14, 1959								--			770										4650	--
Nov. 17								117			785										4830	7.6
Dec. 21								122			765										4720	7.2
Jan. 20, 1960								130			745										4650	8.0

Mar. 2.....								138			765										4760	7.6
July 26.....								106			322										3030	7.6
Aug. 30.....								157			735										4650	7.2
BLACK RIVER AT HARKEY CROSSING, NEAR MALAGA, N. MEX.																						
Oct. 13, 1959.....								154			23										1500	7.9
Nov. 18.....								167			30										1730	7.7
Dec. 21.....								193			17										1510	7.7
Jan. 20, 1960.....								175			17										1530	8.0
Mar. 1.....								81			29										1630	7.7
Apr. 15.....								177			24										1600	7.5
June 2.....								175			18										1470	7.3
June 29.....								161			20										1660	7.6
July 26.....								130			16										1330	7.7
Aug. 30.....								117			9.7										761	7.1

Particle-size analyses of suspended sediment, water year October 1959 to September 1960
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Water temperature (°F)	Sampling point	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
RIO GRANDE BASIN--Continued																	
8-3540. RIO SALADO NEAR SAN ACACIA, N. MEX.--Continued																	
Nov. 2, 1959.....	1500	54		1.7	45,600			71		95		99	100					VPWC
Aug. 11, 1960.....	1700	79		217	114,000		63	81		98		100						PWC

MISCELLANEOUS ANALYSES OF STREAMS IN WESTERN GULF OF MEXICO BASINS--Continued

Periodic determinations of suspended sediment discharge, water year October 1959 to September 1960

Date of collection	Time (24 hour)	Water temperature (°F)	Sampling point	Discharge (cfs)	Suspended sediment	
					Sediment concentration (ppm)	Sediment discharge (tons per day)
RIO GRANDE BASIN--Continued						
8-3540. RIO SALADO NEAR SAN ACACIA, N. MEX.						
Oct. 30, 1959.....	1030			3.8	37,900	403
Oct. 30.....	1600			8.6	57,800	1,390
Oct. 31.....	--			16	35,800	1,600
Nov. 2.....	--			1.7	45,600	217
Nov. 3.....	--			21	65,000	3,820
June 10, 1960.....	--			.1	97,600	28
June 11.....	--			1.4	87,000	353
Aug. 11.....	1700			217	114,000	71,700
Aug. 11.....	1800			67	146,000	29,300
Aug. 11.....	1900			45	148,000	20,000
Sept. 10.....	0500			5,300	93,800	1,440,000
Sept. 10.....	0600			1,850	91,500	491,000
Sept. 10.....	0700			1,030	89,100	266,000
8-3560. SOCORRO MAIN CANAL NORTH AT SAN ACACIA, N. MEX.						
Oct. 6, 1959.....	0900			82	1,060	235
Oct. 9.....	1130			136	2,810	1,030
Oct. 19.....	1500			109	844	248
Oct. 21.....	1100			120	874	283
Oct. 30.....	1100			97	7,840	2,050

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