

# Quality of Surface Waters of the United States 1953

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

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

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



**UNITED STATES DEPARTMENT OF THE INTERIOR**

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# CONTENTS

	Page
Introduction .....	1
Collection and examination of samples .....	3
Chemical quality .....	3
Suspended sediment .....	4
Temperature .....	6
Expression of results .....	6
Composition of surface waters .....	8
Mineral constituents in solution .....	9
Silica .....	9
Aluminum .....	9
Manganese .....	9
Iron .....	9
Calcium .....	10
Magnesium .....	10
Sodium and potassium .....	10
Carbonate and bicarbonate .....	11
Sulfate .....	11
Chloride .....	11
Fluoride .....	11
Nitrate .....	12
Boron .....	12
Dissolved solids .....	12
Properties and characteristics of water .....	13
Oxygen consumed .....	13
Color .....	13
Hydrogen-ion concentration .....	13
Specific conductance .....	13
Hardness .....	14
Total acidity .....	14
Corrosiveness .....	15
Percent sodium .....	15
Sodium-adsorption-ratio .....	15
Sediment .....	16
Publications .....	17
Cooperation .....	18
Division of work .....	21
Stream flow .....	21
Literature cited .....	22
Chemical analyses, water temperatures, and suspended sediment .....	23
Part 7-Lower Mississippi River basin .....	23
Mississippi River at St. Louis, Mo. (main stem) ..	23
St. Francis River basin .....	28

## Chemical analyses, etc.--Continued

## Lower Mississippi River basin--Continued

St. Francis River basin--Continued	Page
St. Francis River at Marked Tree, Ark. ....	28
Miscellaneous analyses of streams in St. Francis River basin in Arkansas .....	31
White River basin.....	32
White River at Beaver, Ark.....	32
White River at Cotter, Ark. ....	35
Black River at Black Rock, Ark. ....	38
White River at Newport, Ark.....	41
Cache River at Patterson, Ark. ....	44
White River at Clarendon, Ark. ....	47
Miscellaneous analyses of streams in White River basin in Arkansas .....	50
Arkansas River basin .....	54
Arkansas River below John Martin Reservoir, at Caddoa, Colo. ....	54
Arkansas River at Arkansas City, Kans. ....	57
Arkansas River at Ralston, Okla. ....	61
Skeleton Creek near Lovell, Okla. ....	65
Cimarron River at Perkins, Okla. ....	69
Arkansas River at Sand Springs Bridge near Tulsa, Okla. ....	76
Verdigris River near Lenapah, Okla. ....	81
Verdigris River near Claremore, Okla. ....	85
Bird Creek near Sperry, Okla. ....	88
Verdigris River near Inola, Okla. ....	92
Neosho River near Commerce, Okla. ....	96
Neosho River at Pensacola Reservoir, at Langley, Okla. ....	100
Neosho River at Fort Gibson Reservoir, near Fort Gibson, Okla. ....	102
Ute Creek near Bueyeros, N. Mex. ....	104
Ute Creek near Logan, N. Mex. ....	110
Canadian River near Tascosa, Tex. ....	111
Canadian River near Amarillo, Tex. ....	114
Canadian River at Bridgeport, Okla. ....	117
Little River near Norman, Okla. ....	121
North Canadian River at Canton Reservoir, near Canton, Okla. ....	125
North Canadian River near Yukon, Okla. ....	127
Deep Fork River near Beggs, Okla. ....	130
Canadian River near Whitefield, Okla. ....	135
Arkansas River at Van Buren, Ark. ....	141
Arkansas River at Dardanelle, Ark. ....	145
Fourche La Pave River near Alpin, Ark. ....	149
Arkansas River at Little Rock, Ark. ....	152

## Chemical analyses, etc. --Continued

## Lower Mississippi River basin--Continued

Arkansas River basin--Continued	Page
Miscellaneous analyses of streams in Arkansas River basin in Arkansas .....	156
Miscellaneous analyses of streams in Arkansas River basin in Missouri and Oklahoma .....	159
Miscellaneous analyses of streams in Arkansas River basin in New Mexico .....	188
Red River basin .....	189
Salt Fork Red River near Wellington, Tex. ....	189
North Fork Red River near Carter, Okla. ....	192
Cache Creek near Walters, Okla. ....	196
Little Wichita River near Archer City, Tex. ....	199
Little Wichita River near Henrietta, Tex. ....	202
Red River near Gainesville, Tex. ....	206
Washita River near Durwood, Okla. ....	212
Red River at Denison Dam near Denison, Tex. ....	216
Red River at Fulton, Ark. ....	218
Saline Bayou near Clarence, La. ....	222
Red River at Alexandria, La. ....	225
Kiamichi River near Belzoni, Okla. ....	228
Little River below Lukfata Creek, near Idabel, Okla. ....	230
Ouachita River at Arkadelphia, Ark. ....	233
Little Missouri River near Boughton, Ark. ....	236
Smackover Creek near Norphlet, Ark. ....	239
Ouachita River at Calion, Ark. ....	243
Saline River near Benton, Ark. ....	247
Hurricane Creek near Sheridan, Ark. ....	250
Saline River near Rye, Ark. ....	254
Bayou Lapile near Strong, Ark. ....	257
Ouachita River near Felsenthal, Ark. ....	262
Bartholomew Bayou near Wilmot, Ark. ....	266
Bayou Bartholomew near Beekman, La. ....	268
Cornie Creek near Junction City, Ark. ....	269
Three Creeks near Junction City, Ark. ....	272
Bayou D'Arbonne near Dubach, La. ....	276
Bayou Macon near Delhi, La. ....	277
Dugdemonia River near Winnfield, La. ....	278
Miscellaneous analyses of streams in Red River basin in Oklahoma .....	279
Miscellaneous analyses of streams in Red River basin in Arkansas .....	288
Miscellaneous analyses of streams in Red River basin in Texas .....	290
Mississippi River Delta .....	293
Amite River near Denham Springs, ....	293
Atchafalaya River at Krotz Springs, La. ....	294

## Chemical analyses, etc.--Continued

## Lower Mississippi River basin--Continued

Mississippi River Delta--Continued	Page
Bayou Cocodrie near Clearwater, La.....	297
Vermilion River at Bancker's Ferry, near	

Abbeville, La. ....	304
---------------------	-----

Part 8--Western Gulf of Mexico basins .....	308
---	-----

Mermentau River basin .....	308
-----------------------------	-----

Mermentau River at Lake Arthur, La. ....	308
--	-----

Calcasieu River basin .....	311
-----------------------------	-----

Calcasieu River near Glenmora, La. ....	311
---	-----

Calcasieu River at Moss Bluff, La. ....	312
---	-----

Sabine River basin .....	316
--------------------------	-----

Sabine River near Emory, Tex. ....	316
------------------------------------	-----

Sabine River near Tatum, Tex. ....	319
------------------------------------	-----

Bayou Anacoco near Rosepine, La. ....	322
---------------------------------------	-----

Sabine River near Ruliff, Tex. ....	323
-------------------------------------	-----

Cow Bayou near Mauriceville, Tex. ....	326
--	-----

Miscellaneous analyses of streams in Sabine River	
basin in Texas .....	329

Neches River basin .....	332
--------------------------	-----

Neches River at Evadale, Tex. ....	332
------------------------------------	-----

Trinity River basin .....	335
---------------------------	-----

Clear Fork Trinity River at Fort Worth, Tex. ....	335
---	-----

Trinity River near Oakwood, Tex. ....	336
---------------------------------------	-----

Trinity River at Romayor, Tex. ....	340
-------------------------------------	-----

Trinity River near Moss Bluff, Tex. ....	342
--	-----

Old River near Cove, Tex. ....	344
--------------------------------	-----

Trinity River at Anahuac, Tex. ....	346
-------------------------------------	-----

Trinity Bay at mouth of Trinity River, near	
Anahuac, Tex. ....	348

Miscellaneous analyses of streams in Trinity River	
basin in Texas .....	353

San Jacinto River basin .....	354
-------------------------------	-----

San Jacinto River near Huffman, Tex. ....	354
---	-----

Brazos River basin .....	357
--------------------------	-----

Clear Fork Brazos River at Nugent, Tex. ....	357
--	-----

Brazos River at Possum Kingdom Dam near Graford,	
Tex. ....	360

Brazos River near Whitney, Tex. ....	362
--------------------------------------	-----

Leon River near Eastland, Tex. ....	365
-------------------------------------	-----

Brazos River at Richmond, Tex. ....	366
-------------------------------------	-----

Miscellaneous analyses of streams in Brazos River	
basin in Texas .....	369

Colorado River basin .....	371
----------------------------	-----

Bull Creek near Ira, Tex. ....	371
--------------------------------	-----

Deep Creek near Dunn, Tex. ....	373
---------------------------------	-----

Colorado River at Colorado City, Tex. ....	374
--	-----

Colorado River near San Saba, Tex. ....	378
---	-----

Chemical analyses, etc.--Continued

Western Gulf of Mexico basins--Continued

Colorado River basin--Continued	Page
Colorado River at Austin, Tex. ....	384
Colorado River at Wharton, Tex. ....	386
Miscellaneous analyses of streams in Colorado	
River basin in Texas .....	387
Guadalupe River basin .....	388
Guadalupe River at Victoria, Tex. ....	388
Nueces River basin .....	391
Nueces River near Mathis, Tex. ....	391
Rio Grande basin .....	393
Rio Grande above Culebra Creek, near Lobatos, Colo. ....	393
Rio Grande at Embudo, N. Mex. ....	395
Rio Chama near Abiquiu, N. Mex. ....	398
Rio Chama near Chamita, N. Mex. ....	402
Rio Grande at Otowi Bridge near San Ildefonso, N. Mex. ....	406
Galisteo Creek at Domingo, N. Mex. ....	412
Jemez River near Bernalillo, N. Mex. ....	416
Rio Grande near Bernalillo, N. Mex. ....	420
Rio Grande near Bernardo, N. Mex. ....	425
Rio Puerco below Cabezon, N. Mex. ....	430
Chico Arroyo near Guadalupe, N. Mex. ....	433
San Jose River at Correo, N. Mex. ....	436
Rio Puerco at Rio Puerco, N. Mex. ....	439
Rio Puerco near Bernardo, N. Mex. ....	442
Rio Salado near San Acacia, N. Mex. ....	445
Socorro Main Canal North at San Acacia, N. Mex. ...	448
Rio Grande at San Acacia, N. Mex. ....	449
Rio Grande at San Antonio, N. Mex. ....	456
Rio Grande Tiffany Channel at San Marcial, N. Mex.	461
Rio Grande at San Marcial, N. Mex. ....	467
Pecos River near Puerto De Luna, N. Mex. ....	475
Pecos River below Alamogordo Dam, N. Mex. ....	482
Pecos River near Acme, N. Mex. ....	484
Rio Hondo at Diamond A Ranch near Roswell, N. Mex. ....	487
Pecos River near Artesia, N. Mex. ....	490
Rio Penasco at Dayton, N. Mex. ....	496
Pecos River at Dam site 3 near Carlsbad, N. Mex. .	498
Carlsbad Main Canal at head near Carlsbad, N. Mex. ....	500
Pecos River at Carlsbad, N. Mex. ....	502
Refinery Intake Canal near Loving, N. Mex. ....	505
Pecos River east of Malaga, N. Mex. ....	506
Pecos River at Pierce Canyon Crossing near Malaga, N. Mex. ....	508

Chemical analyses, etc. --Continued	
Western Gulf of Mexico basins--Continued	
Rio Grande basin -Continued	Page
Pecos River near Red Bluff, N. Mex. ....	511
Pecos River below Red Bluff Dam near Orla, Tex. ....	514
Pecos River below Grandfalls, Tex. ....	516
Miscellaneous analyses of streams in Rio Grande	
basin in New Mexico .....	517
Index .....	519

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## ILLUSTRATION

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	Page
Figure 1. Map of the United States showing basins	
covered by the four water-supply papers on quality	
of surface waters in 1953 .....	2

# QUALITY OF SURFACE WATERS OF THE UNITED STATES, 1953

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## PARTS 7-8

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### INTRODUCTION

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

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

The regular yearly publication of records of chemical analyses, suspended sediment, and water temperature was begun by the Geological Survey in 1941. The annual records prior to 1948 were published in a single volume for the entire country. Beginning in 1948, the records were published in two volumes, and beginning in 1950, in four volumes, covering the drainage basins shown in figure 1. The samples for which data are given were collected from October 1, 1952, to September 30, 1953. Descriptive statements are given for each sampling station for which regular series of chemical analyses or sediment determinations have been made. These statements include the location of the stream-sampling station, drainage area, length of time for which records are available, extremes of dissolved solids, hardness, sediment loads, water temperature, and other pertinent data.

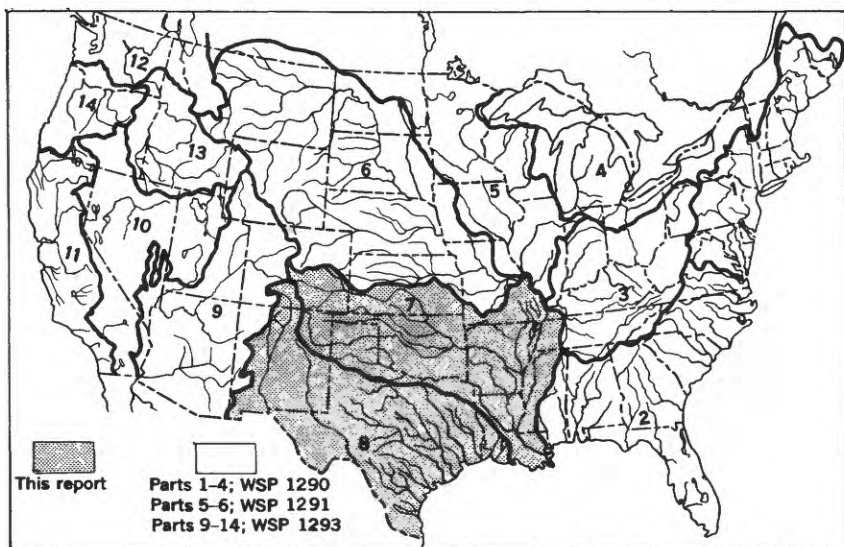


Figure 1. Map of the United States showing basins covered by the four water-supply papers on quality of surface waters in 1953. The shaded portion represents the section of the country covered by this volume; the unshaded portion represents the section of the country covered by other water-supply papers.

Records of water discharge of the streams at, or near, the sampling point for the sampling period are included in most tables of analyses. The records are arranged by drainage basins, according to Geological Survey practice in reporting records of stream flow.

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

During the year ended September 30, 1953, 134 regular sampling stations on 66 streams for the study of the chemical character of surface waters were maintained by the Geological Survey in the area covered by this volume. Samples were collected less frequently during the year at many other points. Water temperatures were measured daily at 96 of the regular sampling stations. Not all analyses of samples of surface water collected during the year have been included. Single analyses of an incomplete nature generally have been omitted. Also, determinations made on the

daily samples before compositing have not been reported. Specific conductance was usually determined on each daily sample, and pH, chloride, or other determinations were also made on many of the daily samples. As noted in the table headings these data are available for reference at the district offices listed under Division of Work, on page 21.

Quantities of suspended sediment are reported for 29 stations during the year ended September 30, 1953. The sediment samples were collected one or more times daily at most stations, depending on the rate of flow and changes in stage of the stream. Sediment samples were collected less frequently during the year at many other points. In connection with measurements of sediment discharge, sizes of sediment particles were determined at 25 of the stations. As noted under "Remarks" in the table headings, suspended-sediment concentrations also were determined from the samples collected for chemical analyses in some parts of the country. The data do not provide a reliable basis for computing the loads of suspended sediment carried by the stream but may be of value for design and operation of filtration plants utilizing these stream waters. Records of these infrequent determinations are available for reference in the district offices listed.

Material which is transported essentially in continuous contact with the stream bed is termed bed load and is not considered in this report. All other undissolved material in transport is termed suspended sediment and generally constitutes the major part of the total sediment load. At the present time no reliable method has been developed for determining bed load on a routine basis.

## COLLECTION AND EXAMINATION OF SAMPLES

### CHEMICAL QUALITY

Samples for chemical analyses were usually collected daily at, or near, points on streams where gaging stations are maintained for measurement of water discharge. Most of the analyses were made on 10-day composites of daily samples collected for a period of a year at each sampling point. Three composite samples were usually prepared each month by mixing together equal volumes of daily samples collected from the 1st to the 10th, from the 11th to the 20th, and during the remainder of the month. For some streams that are subject to sudden and large changes in chemical composition or concentration, samples were composited for shorter periods on the basis of the concentration of dissolved solids indicated by measurements of specific conductance of the daily samples.

The samples were analyzed according to methods regularly used by the Geological Survey. These methods are essentially the same as or are modifications of methods described in recognized

authoritative publications for the mineral analysis of water samples (Collins, 1928; Am. Public Health Assoc., 1946).

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

### SUSPENDED SEDIMENT

In general, samples were collected daily with the US D-43 depth-integrating sampler (U. S. Inter-agency, 1948, p. 70-76) from a fixed sampling point at one vertical in the cross section. The US DH-48 hand sampler was used at many stations during periods of low flow. Suspended-sediment samples, consisting of depth-integrated samples at three or more verticals in the cross section were made periodically to determine the cross-sectional distribution of the suspended concentration with respect to that at the daily sampling vertical. In streams where comparatively rapid fluctuations in transverse distribution of water discharge or sediment concentration are encountered at the sampling point, samples were taken regularly at two or more verticals to determine the average concentration across the section. During periods of high flow, samples were taken two or more times throughout the day at many sampling stations, and during periods of rapidly changing flow samples were taken hourly at some stations.

Sediment concentrations were determined by filtration or evaporation of the samples as required. At many stations the mean daily concentration for some days was obtained by plotting the instantaneous concentrations on the original or copies of the original gage-height chart. The plotted concentrations adjusted, if necessary, for cross-sectional distribution with respect to that at the daily sampling vertical, were connected or averaged by continuous curves to obtain a concentration graph. This graph represented the estimated concentration at any time and, for most periods, mean daily concentrations were determined from the graph. When the concentration and water discharge were changing rapidly, the day was often subdivided for this computation. For some periods when the day-to-day variation in the concentration was negligible, the data were not plotted, and the average concentration of the samples was used as the mean concentration for the day. For certain stations, when the discharge and sediment concentrations were relatively low and varied only slightly from day to day, the

samples for a number of days were composited and the mean daily concentrations and mean daily loads are shown.

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

In many instances where there were no observations for several days, the sediment loads for individual days are not estimated, as numerous factors influencing the quantities of transported sediment made it very difficult to make accurate estimates of sediment loads for individual days. However, estimated sediment loads for missing days in an otherwise continuous period of sampling have been included in monthly and annual totals for most streams to provide a complete record.

In addition to the records of total quantities of sediment, records of the particle sizes of sediment are included also. The particle sizes of the suspended sediments were determined periodically for many of the stations. As much of the material carried in suspension can pass through the finest sieves, the bottom-withdrawal tube method (U. S. Inter-agency, 1943, p. 82-90) was used in most of the analyses. Generally, sieves were used in the determination of particle sizes for sediments which were predominantly coarser than 0.062 mm. Size distribution for some sediments was determined by a combination of sieves and pipette methods in which the size fraction 0.062 mm and larger was analyzed by sieves and that smaller than 0.062 mm was analyzed by the pipette method (Kilmer and Alexander, 1949). Native or distilled water, as noted in the tables of analyses, was used as the settling medium. In some instances, chemical dispersing agents were added to the settling medium. As settling diameters of the clay and colloidal fractions are often affected by the chemical character of the settling medium, analyses made using native water may more nearly simulate particle sizes existing in the stream. Results of analyses using distilled water or using a settling medium containing dispersing agents approximate ultimate particle sizes of the finer fractions. The concentration of sediment suspension for analysis was reduced to less than 5,000 parts per million, where necessary, by means of a sample splitter, in order to stay within limits recommended for the bottom-withdrawal tube or pipette method. The concentration of suspended sediment used in the bottom-withdrawal tube or pipette cylinder was often different from the concentration in the original suspension. The concentration at which analyses were made is indicated in the appropriate tables.

## TEMPERATURE

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

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

## EXPRESSION OF RESULTS

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

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

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

tity of sodium and potassium is given in some analyses and is the quantity of sodium needed in addition to the calcium and magnesium to balance the acid constituents.

The hardness, as calcium carbonate ( $\text{CaCO}_3$ ), is calculated from the equivalents of calcium and magnesium except for a few samples for which the reported values also include equivalents of free mineral acid, aluminum, iron, and manganese when present in significant quantities. The hardness caused by calcium and magnesium (and other ions if significant) equivalent to the carbonate and bicarbonate is called carbonate hardness; the hardness in excess of this quantity is called noncarbonate hardness.

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

Specific conductance values are expressed in reciprocal ohms times  $10^6$  (micromhos at  $25^\circ\text{C}$ ). The discharge of the streams is reported in cubic feet-per second (see Stream Flow, p. 21) and the temperature in degrees Fahrenheit. Color is expressed in units of the platinum-cobalt scale proposed by Hazen (1892, p. 427-428). Hydrogen-ion concentration is expressed in terms of pH units. By definition the pH value of a solution is the negative logarithm of the concentration of gram ions of hydrogen. However, the pH meter which is generally used in Survey laboratories, determines the activity of the hydrogen ions as distinguished from concentration.

An average of analyses (arithmetical or weighted) for the water year is given for most daily sampling stations. An arithmetical average represents the composition of water that would be contained in a vessel or reservoir that had received equal quantities of water from the river each day for the water year. A weighted average represents approximately the composition of water that would be found in a reservoir containing all of the water passing a given station during the year after thorough mixing in the reservoir. The weighted average of the analyses is computed by multiplying the discharge for the sampling period by the quantities of the individual constituents for the corresponding period and dividing the sum of the products by the sum of the discharges. Water as represented by the weighted average is less concentrated than that represented by the average of the individual analyses for most streams because at times of high discharge the rivers generally have lower concentrations of dissolved solids.

Mean daily sediment concentrations are expressed in parts per million by weight. A part per million of sediment is computed as

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

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

## COMPOSITION OF SURFACE WATERS

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

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

## MINERAL CONSTITUENTS IN SOLUTION

Silica ( $\text{SiO}_2$ )

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

## Aluminum (Al)

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

## Manganese (Mn)

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

## Iron (Fe)

Iron is dissolved from many rocks and soils. On exposure to the air, normal basic waters that contain more than 1 part per

million of iron soon become turbid with the insoluble reddish ferric oxide produced by oxidation. Surface waters, therefore, seldom contain as much as 1 part per million of dissolved iron, although some acid waters carry large quantities of iron in solution. Iron causes reddish-brown stains on white porcelain or enameled ware and fixtures and on fabrics washed in the water.

### Calcium (Ca)

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

### Magnesium (Mg)

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

### Sodium and potassium (Na and K)

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

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

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

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

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

### Chloride (Cl)

Chloride is dissolved from rock materials in all parts of the country. Surface waters in the humid regions are usually low in chloride, whereas streams in arid or semiarid regions may contain several hundred parts per million of chloride leached from soils and rocks, especially where the streams receive return drainage from irrigated lands or are affected by ground-water-inflow carrying appreciable quantities of chloride. Large quantities of chloride may affect the industrial use of water by 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. Recent investigations indicate that the incidence of dental caries is less when there are small amounts of

fluoride present in the water supply than when there is none. However, excess fluoride in water is associated with the dental defect known as mottled enamel if the water is used for drinking by young children during calcification or formation of the teeth (Dean, 1936, p. 1269-1272). This defect becomes increasingly noticeable as the quantity of fluoride in water increases above 1.5 to 2.0 parts per million.

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

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

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

### Boron (B)

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

### Dissolved solids

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

solved solids are usually satisfactory for domestic and some industrial uses. Waters containing several thousand parts per million of dissolved solids are sometimes successfully used for irrigation where practices permit the removal of soluble salts through the application of large volumes of water on well-drained lands.

## PROPERTIES AND CHARACTERISTICS OF WATER

### Oxygen consumed

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

### Color

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

### Hydrogen-ion concentration (pH)

The degree of acidity or alkalinity of water, as indicated by the hydrogen-ion concentration, expressed as pH, is related to the corrosive properties of water, and is useful in determining the proper treatment for coagulation that may be necessary at water-treatment plants. A pH value of 7.0 indicates that the water is neither acid nor alkaline. Waters having pH values progressively lower than 7.0 denote increasing acidity, whereas values progressively higher than 7.0 denote increasing alkalinity (see p. 7). The pH of most natural surface waters ranges between 6

and 8. Some alkaline surface waters have pH values greater than 8.0, and waters containing free mineral acid usually have pH values less than 4.5.

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

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

#### Hardness

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

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

#### Total acidity

The total acidity of a natural water represents the content of free carbon dioxide, mineral acids, and salts--especially sulfates

of iron and aluminum-- that hydrolyze to give hydrogen ions. Acid waters are very corrosive and generally contain excessive amounts of objectionable constituents, such as iron, aluminum, and manganese.

### Corrosiveness

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

### Percent sodium

Percent sodium is reported in most of the analyses of waters collected from streams in the western part of the country where irrigation is practiced extensively. The proportion of sodium to all the basic constituents in the water has a bearing on the suitability of a water for irrigation. (See p. 7 ) Waters in which the percent sodium is more than 60 may be injurious when applied to certain types of soils, particularly when adequate drainage is not provided (Magistad and Christiansen, 1944, p. 8-9; Wilcox, 1948, p. 6).

### Sodium-adsorption-ratio

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

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

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

The term is used for soil extracts and irrigation waters to ex-

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

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

## SEDIMENT

Fluvial sediment is generally regarded as that sediment which is transported by, suspended in, or deposited by water. Suspended sediment is that sediment which remains in suspension in water owing to the upward components of turbulent currents or by colloidal suspension. Most fluvial sediment results from the normal process of erosion, which in turn is part of the geologic cycle of rock transformation. In some instances, this normal process may have been accelerated by agricultural practices. Sediment also results from a number of industrial activities. In certain sections, waste materials from mining, logging, oil-field, and other industrial operations introduce large quantities of suspended as well as dissolved material.

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

teristics, the size of particles transported, as well as the total sediment load, is in constant adjustment with the characteristics and physical features of the stream and drainage area.

## PUBLICATIONS

Reports giving chemical analyses, suspended-sediment loads, and water temperatures of samples of surface water made by the Geological Survey have been published yearly since 1941. Records for the years ended September 30, 1941, 1942, 1943, 1944, 1945, 1946, 1947, 1948, 1949, 1950, 1951, and 1952, for many of the stations listed in this report are given in Water-Supply Papers 942, 950, 970, 1022, 1030, 1050, 1102, 1132, 1163, 1188, 1199, and 1252.

Geological Survey reports containing analyses of surface-water samples collected prior to 1941 are listed below. Publications dealing largely with the quality of ground-water supplies and only incidentally covering the chemical composition of surface-waters are not included. Publications that are out of print are preceded by an asterisk.

### PROFESSIONAL PAPER

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

### BULLETINS

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

### WATER-SUPPLY PAPERS

- \*108. Quality of water in the Susquehanna River drainage basin, with an introductory chapter on physiographic features, 1904.
- \*161. Quality of water in the upper Ohio River basin and at Erie, Pa., 1906.
- \*193. The quality of surface waters in Minnesota, 1907.
- \*236. The quality of surface waters in the United States, Part 1, Analyses of waters east of the one hundredth meridian, 1909.

- \*237. The quality of the surface waters of California, 1910.
- \*239. The quality of the surface waters of Illinois, 1910.
- \*273. Quality of the water supplies of Kansas, with a preliminary report on stream pollution by mine waters in south-eastern Kansas, 1911.
- \*274. Some stream waters of the western United States, with chapters on sediment carried by the Rio Grande and the industrial application of water analyses, 1911.
- \*339. Quality of the surface waters of Washington, 1914.
- \*363. Quality of the surface waters of Oregon, 1914.
- \*418. Mineral springs of Alaska, with a chapter on the chemical character of some surface waters of Alaska, 1917.
- \*596-B. Quality of water of Colorado River in 1925-26, 1928.
- \*596-D. Quality of water of Pecos River in Texas, 1928.
- \*596-E. Quality of the surface waters of New Jersey, 1928.
- \*636-A. Quality of water of the Colorado River in 1926-28, 1930.
- \*636-B. Suspended matter in the Colorado River in 1925-28, 1930.
- \*638-D. Quality of water of the Colorado River in 1928-30, 1932.
- \*839. Quality of water of the Rio Grande basin above Fort Quitman, Tex., 1938.
- \*889-E. Chemical character of surface water of Georgia, 1944.
- \*998. Suspended sediment in the Colorado River, 1925-41, 1947.
- 1048. Discharge and sediment loads in the Boise River drainage basin, Idaho, 1939-40, 1948.
- 1110-C. Quality of water of Conchas Reservoir, New Mexico, 1939-49, 1952.

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

## COOPERATION

The table on p. 19-20 lists State and local agencies that cooperated in quality-of-water investigations in the drainage basins included in this volume. The locations of quality-of-water district or regional offices responsible for the data collected in the drainage basins are given in the table, also.

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

Financial assistance was also furnished by the Corps of Engineers, Department of Army, in the operation of some stations in

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

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

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

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

## DIVISION OF WORK

The quality-of-water program was conducted by the Water Resources Division of the Geological Survey, Carl G. Paulsen, Chief Hydraulic Engineer and S. K. Love, Chief of the Quality of Water Branch. The records were collected and prepared for publication under supervision of district or regional chemists and engineers as follows: In Arkansas--J. W. Geurin; in Missouri--P. C. Benedict; in Oklahoma, and in the Arkansas River basin in Kansas--T. B. Dover; in New Mexico, and in the Rio Grande and Arkansas River basins in Colorado--J. D. Hem, and in Texas and Louisiana--Burdge Irelan. Any additional information on file can be obtained by writing the responsible Survey district office.

## STREAM FLOW

Most of the records of stream discharge, used in conjunction with the chemical analyses and in the computation of sediment loads in this volume, are published in Geological Survey reports on the surface-water supply of the United States. The discharge reported for a composite sample is usually the average of the mean daily discharges for the normal composite period. For analyses in which the composite periods differ from the normal 10 or 11-day period, the discharges reported are the averages of the mean daily discharges for the days indicated. The discharges reported in the tables of single analyses 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.

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## PART 7. LOWER MISSISSIPPI RIVER BASIN

## MISSISSIPPI RIVER MAIN STEM

## MISSISSIPPI RIVER AT ST. LOUIS, MO.

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

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

RECORDS AVAILABLE.--Water temperatures: October 1950 to September 1953.

Sediment Records: April 1948 to September 1953.

EXTREMES, 1952-53.--Water temperatures: Maximum, 86°F July 31; minimum freezing point

Jan. 7, 8.

Sediment concentrations: Maximum daily, 2,870 ppm June 30; minimum daily, 66 ppm Jan. 7.

Sediment loads: Maximum daily, 2,420,000 tons Apr. 4; minimum daily, 10,300 tons Jan. 7.

EXTREMES, 1948-53.--Water temperatures (1950-53): Maximum, 86°F July 31, 1953; minimum,

freezing point on several days during winter months.

Sediment concentrations: Maximum daily, 6,420 ppm June 7, 1951; minimum daily 38 ppm

Feb. 2, 3, 1951.

Sediment loads: Maximum daily 7,010,000 tons May 5, 1951; minimum daily, 4,340 tons

Feb. 3, 1951.

REMARKS.--Records of discharge for water year October 1952 to September 1953 given in WSP 1281.

Temperature (°F) of water, water year October 1952 to September 1953  
[Once-daily temperature measurement, generally between 10 a.m. and 3 p.m.]

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

## LOWER MISSISSIPPI RIVER BASIN

## MISSISSIPPI RIVER MAIN STEM--Continued

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

Suspended sediment, water year October 1952 to September 1953

Day	October			November			December		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day
1.....	82,200	300	66,600	77,400	410	a 85,700	86,200	394	91,700
2.....	79,800	311	67,000	74,300	394	79,000	87,800	357	a 84,600
3.....	72,900	294	57,900	72,900	430	84,600	78,200	343	72,400
4.....	67,300	292	a 53,100	68,700	487	84,800	74,300	338	67,800
5.....	72,900	289	56,900	70,800	415	79,300	82,200	308	68,400
6.....	66,600	278	50,000	73,600	383	76,100	78,200	262	55,300
7.....	66,600	291	52,300	70,800	294	56,200	70,100	229	a 43,300
8.....	69,400	299	56,000	69,400	446	83,600	65,900	215	38,300
9.....	67,300	324	58,900	78,200	510	a 108,000	72,200	177	34,500
10.....	70,800	294	56,200	72,900	381	75,000	71,500	195	37,600
11.....	66,600	304	a 54,700	68,000	332	a 61,000	68,700	187	34,700
12.....	68,000	314	57,700	68,700	326	a 60,500	66,600	170	30,600
13.....	69,400	321	60,100	70,800	323	61,700	67,300	154	a 28,000
14.....	68,000	337	61,900	66,600	318	57,800	67,300	146	26,500
15.....	71,500	337	65,100	72,200	323	a 69,000	67,300	156	28,300
16.....	71,500	321	62,000	72,900	328	a 64,600	67,300	164	a 29,800
17.....	72,900	316	62,200	72,900	340	66,900	66,600	161	29,000
18.....	75,800	319	a 65,300	80,600	339	73,800	68,000	152	27,900
19.....	75,000	324	a 65,600	93,400	300	75,700	69,400	133	24,900
20.....	76,600	328	67,800	99,900	332	89,600	76,600	162	33,500
21.....	70,800	338	64,600	114,000	364	112,000	79,800	173	a 37,300
22.....	72,200	322	62,800	105,000	401	a 114,000	76,600	154	31,900
23.....	73,600	322	64,000	93,400	454	114,000	86,200	162	37,700
24.....	72,900	343	67,500	89,400	508	123,000	92,600	148	37,000
25.....	71,500	359	69,300	86,200	724	169,000	86,200	139	a 32,400
26.....	71,500	369	a 71,200	94,200	691	176,000	77,400	119	24,900
27.....	70,800	390	74,600	94,200	643	a 164,000	72,200	97	a 18,900
28.....	75,800	421	86,200	87,800	616	146,000	70,800	87	16,600
29.....	70,800	452	86,400	81,400	562	a 124,000	67,300	91	16,500
30.....	69,400	463	86,800	84,600	470	a 107,000	65,900	85	15,100
31.....	73,600	452	89,800	--	--	--	68,700	94	17,400
Total.	2,224,000	--	2,020,500	2,425,200	--	2,835,300	2,295,400	--	1,172,800
Day	January			February			March		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day
1.....	66,600	97	a 17,400	75,000	85	a 17,200	134,000	461	a 167,000
2.....	66,600	100	18,000	72,200	71	13,800	133,000	446	160,000
3.....	69,400	105	19,700	71,500	81	15,600	124,000	378	127,000
4.....	65,900	97	a 17,300	70,800	87	16,600	128,000	490	169,000
5.....	63,800	89	15,300	72,200	94	18,300	128,000	578	200,000
6.....	60,400	82	13,400	75,800	154	31,500	145,000	634	248,000
7.....	58,000	66	10,300	80,600	325	70,700	139,000	475	a 178,000
8.....	61,000	76	12,500	95,800	296	a 78,600	134,000	439	159,000
9.....	62,400	74	12,500	111,000	261	78,200	130,000	415	146,000
10.....	64,500	116	20,200	122,000	261	86,000	121,000	364	119,000
11.....	65,900	116	a 20,600	129,000	235	81,900	112,000	353	107,000
12.....	61,000	101	16,600	124,000	266	89,100	117,000	396	125,000
13.....	62,400	91	a 15,300	120,000	284	92,000	144,000	284	110,000
14.....	63,800	78	13,400	121,000	322	105,000	175,000	281	133,000
15.....	70,100	101	19,100	121,000	354	a 116,000	196,000	347	a 184,000
16.....	74,300	111	22,300	118,000	378	120,000	209,000	605	341,000
17.....	65,900	102	a 18,100	116,000	401	126,000	220,000	792	470,000
18.....	64,500	98	a 17,100	106,000	380	109,000	223,000	688	414,000
19.....	65,200	100	17,600	98,200	379	100,000	233,000	742	467,000
20.....	68,000	113	20,700	95,800	355	91,800	237,000	930	595,000
21.....	75,800	140	28,700	113,000	312	a 95,200	234,000	894	a 565,000
22.....	75,800	102	20,900	129,000	298	104,000	234,000	937	592,000
23.....	80,600	98	21,300	181,000	413	202,000	238,000	934	600,000
24.....	82,200	84	18,600	203,000	734	402,000	234,000	880	556,000
25.....	75,000	101	a 20,500	201,000	855	464,000	230,000	890	553,000
26.....	71,500	107	20,700	186,000	893	448,000	236,000	956	609,000
27.....	73,600	112	22,300	159,000	741	a 318,000	243,000	926	608,000
28.....	75,000	111	22,500	143,000	570	a 220,000	240,000	1,010	a 654,000
29.....	75,000	103	20,900	--	--	--	242,000	1,150	751,000
30.....	75,800	101	20,700	--	--	--	243,000	1,150	755,000
31.....	75,800	111	22,700	--	--	--	252,000	1,100	748,000
Total.	2,135,800	--	577,200	3,310,900	--	3,708,500	5,808,000	--	11,610,000

a Computed from estimated concentration graph.

## MISSISSIPPI RIVER MAIN STEM--Continued

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

Suspended sediment, water year October 1952 to September 1953--Continued

Day	April			May			June		
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1.....	290,000	1,500	1,170,000	219,000	561	332,000	167,000	483	218,000
2.....	328,000	1,900	1,680,000	212,000	520	a 298,000	167,000	525	237,000
3.....	356,000	2,270	2,180,000	212,000	500	a 286,000	164,000	614	272,000
4.....	367,000	2,440	a 2,420,000	236,000	622	396,000	164,000	640	283,000
5.....	360,000	2,200	a 2,140,000	244,000	653	430,000	172,000	572	266,000
6.....	332,000	1,760	1,580,000	240,000	602	390,000	174,000	704	a 331,000
7.....	303,000	1,380	1,130,000	254,000	697	478,000	169,000	730	333,000
8.....	279,000	1,090	821,000	267,000	768	554,000	173,000	614	287,000
9.....	276,000	970	723,000	294,000	1,290	1,020,000	178,000	488	235,000
10.....	276,000	959	715,000	307,000	1,520	a 1,260,000	178,000	410	197,000
11.....	269,000	906	a 658,000	288,000	1,360	1,060,000	183,000	447	221,000
12.....	260,000	780	548,000	263,000	1,130	802,000	188,000	525	266,000
13.....	246,000	677	450,000	242,000	1,100	719,000	205,000	801	a 443,000
14.....	231,000	593	370,000	228,000	1,410	868,000	261,000	1,150	810,000
15.....	223,000	609	a 368,000	216,000	1,610	939,000	274,000	1,520	1,120,000
16.....	223,000	757	456,000	209,000	1,690	a 954,000	261,000	1,850	1,300,000
17.....	219,000	596	352,000	212,000	2,200	a 1,260,000	243,000	1,990	1,310,000
18.....	216,000	579	338,000	214,000	2,200	1,270,000	231,000	1,870	1,170,000
19.....	216,000	592	a 345,000	214,000	1,740	1,010,000	226,000	1,620	989,000
20.....	214,000	514	297,000	203,000	1,360	745,000	216,000	1,240	a 723,000
21.....	212,000	422	242,000	200,000	1,430	772,000	198,000	956	511,000
22.....	210,000	416	236,000	193,000	1,140	594,000	181,000	840	411,000
23.....	212,000	435	278,000	181,000	768	a 375,000	174,000	861	404,000
24.....	223,000	790	476,000	174,000	636	a 299,000	163,000	850	374,000
25.....	244,000	874	a 576,000	179,000	588	284,000	166,000	840	376,000
26.....	249,000	616	414,000	178,000	562	270,000	196,000	1,260	667,000
27.....	240,000	500	324,000	174,000	482	226,000	202,000	1,180	644,000
28.....	237,000	484	310,000	176,000	498	237,000	202,000	1,240	a 676,000
29.....	230,000	597	371,000	185,000	488	244,000	205,000	1,820	1,010,000
30.....	226,000	627	383,000	183,000	456	a 225,000	216,000	2,870	1,670,000
31.....	--	--	--	172,000	456	212,000	--	--	--
Total.	7,768,000	--	22,351,000	6,769,000	--	18,809,000	5,897,000	--	17,540,000
Day	July			August			September		
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1.....	227,000	2,420	1,480,000	137,000	244	a 90,300	117,000	218	68,900
2.....	243,000	1,620	1,060,000	133,000	205	73,600	113,000	239	a 72,900
3.....	240,000	2,110	1,370,000	126,000	211	71,800	107,000	234	67,600
4.....	231,000	1,820	1,140,000	125,000	187	63,100	111,000	213	63,800
5.....	231,000	1,690	a 1,050,000	133,000	165	59,300	106,000	196	a 56,100
6.....	228,000	1,590	979,000	137,000	229	84,700	110,000	191	a 56,700
7.....	227,000	1,500	919,000	141,000	275	105,000	101,000	187	a 51,000
8.....	230,000	1,280	795,000	154,000	273	a 114,000	99,000	175	46,800
9.....	228,000	979	603,000	156,000	270	114,000	91,000	170	a 41,800
10.....	223,000	989	595,000	159,000	255	109,000	86,200	165	38,400
11.....	212,000	898	a 514,000	163,000	263	116,000	87,800	180	42,700
12.....	203,000	806	442,000	170,000	303	139,000	89,400	166	a 41,200
13.....	197,000	745	396,000	174,000	300	141,000	86,200	177	a 41,200
14.....	188,000	571	290,000	175,000	340	161,000	85,400	187	43,100
15.....	178,000	479	230,000	173,000	326	a 152,000	86,200	187	43,500
16.....	174,000	458	215,000	166,000	332	149,000	83,800	205	46,400
17.....	168,000	422	191,000	162,000	360	157,000	81,400	210	46,200
18.....	168,000	390	177,000	155,000	352	147,000	78,200	152	32,100
19.....	166,000	394	a 177,000	147,000	327	130,000	75,000	136	a 27,500
20.....	159,000	383	164,000	145,000	325	127,000	77,400	147	a 30,700
21.....	159,000	366	157,000	142,000	277	106,000	75,800	189	38,700
22.....	159,000	337	145,000	139,000	251	a 94,200	75,800	262	53,600
23.....	158,000	367	157,000	140,000	242	91,500	78,200	226	47,700
24.....	149,000	338	136,000	143,000	236	91,100	75,800	229	46,900
25.....	146,000	352	a 139,000	144,000	220	85,500	82,200	198	43,900
26.....	139,000	333	125,000	142,000	226	86,600	79,800	187	a 40,300
27.....	134,000	291	105,000	139,000	197	73,400	76,600	198	41,000
28.....	129,000	325	113,000	136,000	186	68,300	69,400	211	39,500
29.....	133,000	325	117,000	135,000	186	a 67,800	69,400	216	40,500
30.....	141,000	246	93,700	129,000	191	a 68,500	70,800	216	41,300
31.....	144,000	258	100,000	125,000	197	66,500	--	--	--
Total.	5,712,000	--	14,174,700	4,544,000	--	3,201,200	2,625,800	--	1,390,900
Total discharge for year (cfs-days).....									51,515,100
Total load for year (tons).....									99,605,100

a Computed from estimated concentration graph.

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

Particle-size analyses of suspended sediment, water year October 1952 to September 1953  
(Methods of analysis: B, bottom withdrawal tube; D, decantation; F, pipette; S, sieve; N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date of collection	Time	Water discharge (cfs)	Water temperature per- centage (° F)	Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Suspended sediment										Methods of analysis
						Percent finer than indicated size, in millimeters										
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.350	0.500	
Oct. 22, 1952 . . .	12:00 p. m.	72,900	52	312	55	65	75	83	91	96	98	100				BSW
Dec. 30 . . .	2:50 p. m.	66,600	35	84	38	46	56	64	71	76	87	98			--	BSW
Jan. 14, 1953 . . .	12:45 p. m.	63,800	41	75	33	43	52	62	77	83	94	99			100	BSW
Feb. 26 . . .	1:30 p. m.	186,000	39	904	46	56	70	80	88	91	95	100			--	BSW
Mar. 18 . . .	1:50 p. m.	221,000	48	665	38	48	58	70	80	85	92	99			100	BSW
Apr. 8 . . .	12:20 p. m.	278,000	50	1,120	47	55	65	74	84	89	94	100			--	BSW
Apr. 24 . . .	12:35 p. m.	221,000	54	788	30	38	46	59	78	86	93	99			100	BSW
May 26 . . .	10:20 a. m.	178,000	73	546	28	38	49	59	76	85	90	99			100	BSW
June 10 . . .	11:05 a. m.	176,000	80	408	30	40	53	62	74	78	82	98			100	BSW
June 25 . . .	1:30 p. m.	166,000	82	819	40	50	60	72	86	91	93	99			100	BSW
July 14 . . .	12:00 p. m.	188,000	79	583	44	55	65	75	84	89	92	99			100	BSW
July 22 . . .	2:30 p. m.	160,000	84	322	38	47	56	65	76	81	86	97			100	BSW
Aug. 10 . . .	11:10 a. m.	159,000	79	255	38	47	55	64	75	80	86	97			100	BSW
Aug. 21 . . .	10:50 a. m.	142,000	74	274	46	57	68	77	85	88	91	98			100	BSW
Sept. 15 . . .	11:00 a. m.	87,800	71	180	52	60	69	78	87	93	97	99			100	BSW
Sept. 30 . . .	1:20 p. m.	70,800	70	198	48	58	71	80	91	96	98	99			100	BSW

## MISSISSIPPI RIVER MAIN STEM--Continued

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

Particle-size analyses of bed material, water year October 1952 to September 1953

(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water;

W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date of collection	Number of sampling points	Water discharge (cfs)	Water temperature (°F)	Bed material										Methods of analysis	
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters									
						0.002	0.004	0.062	0.125	0.250	0.500	1.000	2.000		4.000
Oct. 23, 1952	4	74,300				1	5	13	22	46	68	81	94	100	S
Dec. 9	4	72,900				0	2	17	32	69	81	88	95	99	S
Dec. 31	4	69,400				0	3	24	42	73	84	90	96	98	S
Jan. 14, 1953	4	83,800				1	4	4	22	44	77	85	90	95	S
Feb. 12	4	124,000				0	4	30	50	81	88	92	97	99	S
Feb. 18	4	107,000				0	4	46	64	90	94	96	97	99	S
Feb. 26	4	188,000				0	2	15	40	74	88	95	99	100	S
Mar. 18	4	220,000				0	2	34	52	78	91	97	99	100	S
Apr. 8	4	281,000				0	4	41	48	83	97	98	99	100	S
Apr. 27	4	240,000				0	11	90	94	100	--	--	--	--	S
May 28	3	178,000				0	2	81	88	95	98	99	100	--	S
June 10	4	176,000				0	1	66	72	87	96	99	100	--	S
June 26	4	193,000				0	2	52	62	78	89	95	98	99	S
July 14	4	188,000				0	1	59	71	88	97	99	100	--	S
July 22	4	159,000				0	1	61	80	94	98	99	100	--	S
Aug. 10	4	159,000				0	1	68	88	98	99	100	--	--	S
Aug. 21	4	143,000				0	1	59	75	93	97	99	100	--	S
Sept. 16	4	83,800				0	1	46	76	93	97	100	--	--	S
Sept. 30	4	70,800				0	1	44	70	90	97	99	100	--	S

## ST. FRANCIS RIVER BASIN

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

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

RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1946, November 1949 to September 1953.

Water temperatures: October 1945 to September 1946, November 1949 to September 1953.

EXTREMES, 1952-53.--Dissolved solids: Maximum, 314 ppm Aug. 15-17; minimum, 132 ppm Mar. 21, 24-27, May 20-22.

Hardness: Maximum, 260 ppm Nov. 1-10; minimum, 88 ppm Aug. 20-22.

Specific conductance: Maximum, 887 micromhos Sept. 40<sup>f</sup>; minimum daily, 168 micromhos May 20.

Water temperatures: Maximum, 87<sup>f</sup>, June 20-22; minimum, 40<sup>f</sup>, Dec. 2.

EXTREMES, 1949-53.--Dissolved solids: Maximum, 329 ppm Dec. 2.

Hardness: Maximum, 262 ppm Aug. 1-10, 1953; minimum, 84 ppm Feb. 14-19, 1950.

Specific conductance: Maximum, 746 micromhos Sept. 40<sup>f</sup>, 1953; minimum daily, 99.3 micromhos Jan. 27, 1951.

Water temperatures: Maximum, 80<sup>f</sup>, June 29; minimum, freezing point Feb. 1-2, 1951.

REMARKS.--Records of specific conductance of daily samples available in district office at Fayetteville, Ark. Records of discharge for water year October 1952 to September 1953 given in WSP 1281.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Mag- nesium (Mg)	Sodium (Na)	Potas- sium (K)	Bicar- bonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue on evap- oration at 180°C)	Hardness as CaCO <sub>3</sub>		Specific conductance (micro-mhos at 25°C)	pH	Color	
														Calcium nesium	Non-carbonate				
Oct. 1-10, 1952	165	--	--	68	16	12	--	a 282	22	7.0	--	0.7	286	234	3	445	8.5	7	
Oct. 11-20	142	--	--	58	19	6.7	--	b 240	22	6.2	--	--	.4	264	223	26	441	8.4	7
Oct. 21-31	126	26	0.02	54	18	11	2.2	249	22	6.0	0.1	--	.4	261	209	5	418	8.2	6
Nov. 1-10	122	--	--	77	17	11	--	309	24	5.5	--	.5	311	260	6	484	8.0	5	
Nov. 11-20	126	--	--	50	17	11	*	c 225	24	5.8	--	1.1	241	192	7	386	8.4	6	
Nov. 21-30	138	--	--	75	15	11	--	293	25	6.5	--	--	.7	298	248	8	484	8.0	7
Dec. 1-4	214	--	--	72	14	11	--	284	24	6.2	--	.5	289	238	11	467	8.1	7	
Dec. 5-10	398	--	--	53	10	8.1	--	189	23	5.0	--	1.7	217	174	11	353	8.2	8	
Dec. 11-15	299	--	--	53	11	8.4	--	d 203	26	4.5	--	2.0	232	219	12	362	8.2	15	
Dec. 16-20	270	--	--	69	14	10	--	268	27	5.8	--	1.1	283	231	12	453	8.1	6	
Dec. 21-31	242	--	--	71	16	11	--	283	26	5.8	--	--	.9	293	242	10	474	8.1	7
Jan. 1-10, 1953	285	--	--	51	17	9.6	--	e 224	26	5.2	--	--	252	197	13	401	8.5	5	
Jan. 11-20	310	22	.02	65	14	10	2.6	f 253	24	5.0	.0	3.0	271	220	13	423	8.3	8	
Jan. 21-31	444	--	--	63	15	8.3	--	f 246	27	4.0	--	1.9	273	218	16	417	8.3	6	
Feb. 1-9	556	--	--	69	15	8.4	--	268	27	4.0	--	1.8	283	234	14	445	8.1	10	
Feb. 10-11, 15-17	1,952	--	--	47	11	8.2	--	182	21	7.2	--	--	200	164	15	341	7.7	10	
Feb. 12-14, 18-20	2,050	--	--	29	14	6.4	--	144	17	6.0	--	2.1	170	129	11	277	7.7	20	
Feb. 21-28	2,009	--	--	43	9.6	7.6	--	160	20	6.0	--	1.8	189	147	16	301	7.8	20	

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

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

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

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

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

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

Mar. 1-10, 1953	2,122	--	42	11	8.1	--	164	18	5.5	--	1.8	204	148	14	309	7.6	18
Mar. 11-20	2,635	--	36	9.6	6.9	--	142	17	6.0	--	2.4	176	129	12	277	7.1	28
Mar. 21, 24-27	3,474	--	27	6.1	4.4	--	102	12	3.2	--	2.1	132	91	8	196	7.8	70
Mar. 22-23, 28-31	3,198	--	33	7.5	6.0	--	130	13	5.8	--	2.0	164	114	7	248	7.8	23
Apr. 1-10	2,572	16	41	11	7.2	2.7	164	16	5.0	.1	1.2	188	146	12	299	7.6	23
Apr. 11-20	2,111	--	56	15	10	--	224	19	8.0	--	.9	246	202	18	396	8.0	18
Apr. 21-30	2,014	--	50	14	11	--	228	19	8.8	--	.9	247	195	8	403	7.9	13
May 1-11	2,332	--	48	11	8.7	--	192	16	7.0	--	2.5	220	165	7	352	8.1	12
May 12-19	3,251	--	38	8.4	6.2	--	144	14	5.2	--	2.9	172	125	7	270	8.1	12
May 20-22	2,667	--	28	5.6	3.6	--	98	11	3.5	--	3.0	132	88	8	191	7.8	17
May 23-31	2,439	--	39	8.3	5.8	--	154	14	4.8	--	2.2	1.5	132	6	283	7.8	17
June 1-10	2,544	--	53	12	10	--	218	16	7.5	--	1.2	237	182	3	382	8.2	18
June 11-20	2,044	--	62	13	12	--	252	16	9.8	--	1.3	274	206	0	424	8.2	20
June 21-30	1,357	--	63	16	13	--	g 264	17	11	--	1.8	289	223	6	439	8.6	9
July 1-10	1,227	20	60	14	12	2.2	e 252	18	10	.1	1.3	273	207	1	429	8.4	8
July 11-20	1,103	--	52	15	11	--	e 224	17	9.2	--	1.4	248	191	8	388	8.4	13
July 21-31	1,275	--	54	14	10	--	h 222	15	9.0	--	1.4	244	192	10	385	8.3	14
Aug. 1-10	322	--	72	18	11	--	i 303	23	6.0	--	1.4	314	254	6	493	8.3	8
Aug. 11-20	247	--	49	18	12	--	j 233	23	5.8	--	1.1	255	186	5	397	8.3	8
Aug. 21-31	200	--	57	18	12	--	263	22	5.8	--	1.1	276	216	1	447	7.9	7
Sept. 1-10	161	--	57	19	12	--	c 264	23	6.0	--	.9	280	220	4	441	8.4	8
Sept. 11-20	141	--	87	19	12	--	290	23	6.5	--	.9	298	245	8	479	8.2	9
Sept. 21-30	166	--	51	17	12	--	c 238	23	8.2	--	1.6	297	197	2	409	8.4	7
Average	1,132	--	54	14	9.4	--	221	20	6.3	--	1.5	243	192	11	383	--	13

c Includes equivalent of 7 parts per million of carbonate (CO<sub>3</sub>).e Includes equivalent of 6 parts per million of carbonate (CO<sub>3</sub>).g Includes equivalent of 14 parts per million of carbonate (CO<sub>3</sub>).h Includes equivalent of 2 parts per million of carbonate (CO<sub>3</sub>).i Includes equivalent of 1 part per million of carbonate (CO<sub>3</sub>).j Includes equivalent of 4 parts per million of carbonate (CO<sub>3</sub>).

## LOWER MISSISSIPPI RIVER BASIN

## ST. FRANCIS RIVER BASIN--Continued

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

Temperature (°F) of water, water year October 1952 to September 1953

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

ST. FRANCIS RIVER BASIN--Continued  
 MISCELLANEOUS ANALYSES OF STREAMS IN ST. FRANCIS RIVER BASIN IN ARKANSAS  
 Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal- cium (Ca)	Mag- ne- sium (Mg)	So- dium (Na)	Po- tas- sium (K)	Bicar- bonate (HCO <sub>3</sub> )	Car- bonate (CO <sub>3</sub> )	Sul- fate (SO <sub>4</sub> )	Chlo- ride (Cl)	Fluo- ride (F)	Ni- trate (NO <sub>3</sub> ) (B)	Dissolved solids		Hardness as CaCO <sub>3</sub>	Per- cent so- lids	So- dium con- duct- ivity ratio	Specific conduct- ance (micro- mhos at 25°C)	pH
														Parts per mil- lion	Tons per acre- foot	Calcium mag- nesium	Non- carbon- ate			

## ST. FRANCIS RIVER AT ST. FRANCIS

Oct. 2, 1952	117							168	0	2.0	4.0		1.1			136	0		272	7.5
Feb. 12, 1953	1,160							91	0	13	3.0		2.3			82	7		174	8.2
Sept. 24	132							150	3	5.0	3.8		1.6			127	0		261	8.4

## ST. FRANCIS RIVER AT LAKE CITY

Oct. 2, 1952	253							174	2	5.0	3.8		1.6			142	0		284	8.3
Feb. 12, 1953	5,490							19	0	6.0	1.0		3.0			19	3		50.4	7.4
Sept. 24	121							176	0	8.0	3.5		1.5			144	0		292	7.8

## RIGHT HAND CHUTE OF LITTLE RIVER AT RIVERVALE

Oct. 3, 1952	246							212	13	15	12		1.4			202	7		407	8.6
Feb. 13, 1953	2,050							174	7	23	10		1.3			158	4		335	8.5
Sept. 25	134							242	3	16	15		.5			208	5		445	8.3

## ST. FRANCIS RIVER FLOODWAY NEAR MARKED TREE

Feb. 3, 1953	3,050							115	3	15	7.8		1.6			106	9		243	8.4
Sept. 16	270							192	16	13	7.2		1.0			181	3		379	8.7

## ST. FRANCIS RIVER AT PARKIN

Feb. 11, 1953	2,130							144	3	13	5.0		2.5			130	7		278	8.4
Sept. 23	330							299	5	17	6.5		.7			252	0		496	8.3

## ST. FRANCIS BAY NEAR RIVERFRONT

Feb. 11, 1953	4,680							60	0	3.0	1.8		1.7			52	3		118	7.4
Sept. 23	407							245	6	12	7.5		.6			210	0		425	8.4

WHITE RIVER BASIN  
WHITE RIVER AT BEAVER, ARK.

LOCATION.--At gaging station at Missouri and North Arkansas Railway bridge, a quarter of a mile east of Beaver, Carroll County, and 2 3/4 miles upstream from Leatherwood Creek.

DRAINAGE AREA.--1,238 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1946. October 1949 to September 1953.

Water temperatures: October 1945 to September 1953.

EXTREMES, 1952-53.--Dissolved solids: Maximum, 170 ppm Sept. 21-30; minimum, 45 ppm Apr. 3-4, 7-10.

Hardness: Maximum, 42 ppm Nov. 17-21; minimum, 30 ppm Sept. 15-17, 19-21, May 3-13-15.

Specific conductance: Maximum daily, 248 micromhos May 3; minimum daily, 59.8 micromhos May 14.

Water temperature: Maximum 91°F, July 28; minimum, 35°F, Jan. 17.

Extremes 1945-46 1949-53.--Dissolved solids: Maximum, 170 ppm Sept. 21-30, 1953; minimum, 41 ppm Feb. 13-15, 1950.

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

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

Water temperatures: Maximum 92°F July 27, 1952; minimum, freezing point on several days during winter months.

REMARKS.--Records of specific conductance of daily samples available in district office at Fayetteville, Ark. Records of discharge for water year October 1952 to September 1953 given in WSP 1281. Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue on evaporation at 180°C)	Hardness as CaCO <sub>3</sub>		Specific conductance (micro-mhos at 25°C)	pH	Color
														Calcium, magnesium	Non-carbonate			
Oct. 1-10, 1952	54.8	--	--	38	5.2	3.3	--	135	4.7	3.8	--	0.6	132	116	6	226	8.2	3
Oct. 11-20	53.6	--	--	39	4.6	3.7	--	136	4.4	4.0	--	.4	140	118	5	230	8.1	3
Oct. 21-31	47.7	12	0.00	38	7.2	3.7	1.5	a146	4.9	4.5	0.1	.2	130	124	6	237	8.5	5
Nov. 1-10	52.0	--	--	34	9.5	3.1	--	a146	4.5	5.0	--	.2	139	124	4	242	8.5	7
Nov. 11-20	87.1	--	--	43	4.3	3.1	--	b147	5.1	4.5	--	.5	140	125	4	247	8.4	5
Nov. 21-30	395	--	--	42	3.2	3.8	--	140	4.0	5.2	--	1.1	139	118	3	242	8.0	5
Dec. 1-10	294	--	--	36	3.2	4.7	--	c112	9.9	5.2	--	3.0	128	103	6	213	8.3	12
Dec. 11-20	214	--	--	34	2.4	3.3	--	107	8.1	5.0	--	2.2	117	96	8	201	7.8	6
Dec. 21-31	415	--	--	32	2.9	3.1	--	104	8.3	4.0	--	1.8	122	92	7	187	8.1	5
Jan. 1-10, 1953	235	--	--	27	3.4	2.6	--	92	7.6	3.5	--	1.0	109	82	7	166	8.1	7
Jan. 11-20	163	--	--	30	2.9	3.1	--	102	7.2	1.5	--	.9	109	88	4	179	7.8	8
Jan. 21-25	422	--	--	35	3.6	3.1	--	118	7.7	3.0	--	1.5	122	102	5	205	7.8	4
Jan. 26-31	100	--	--	25	3.4	2.8	--	78	10	3.8	--	3.6	108	76	12	160	7.7	20
Feb. 1-10	388	6.8	.02	26	2.6	3.0	.9	84	8.6	4.2	.2	1.9	96	76	7	160	7.6	10
Feb. 11-20	348	--	--	28	2.6	2.5	--	90	8.4	3.8	--	1.4	111	80	6	167	7.7	7
Feb. 21-28	351	--	--	26	3.9	2.7	--	90	7.2	3.5	--	.7	100	82	8	165	7.8	8
Mar. 1-4, 12-14	1,637	--	--	28	3.2	2.7	--	99	7.2	3.0	--	2.0	116	82	1	177	8.1	12
Mar. 5-11, 18	3,072	--	--	18	1.5	2.3	--	61	6.2	3.0	--	3.1	95	53	3	124	7.9	40
Mar. 15-17, 19-21	11,960	--	--	14	1.9	1.5	--	44	4.9	2.5	--	3.4	94	42	6	93.7	7.5	22
Mar. 22-31	1,961	--	--	20	2.2	2.0	--	68	5.8	2.5	--	3.5	94	60	4	130	7.8	18

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

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

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

Apr. 1-2, 5-6, 1953 ...	2,702	--	20	2.7	2.5	--	68	6.1	3.5	--	2.4	93	62	6	133	8.0	21
Apr. 3-4, 7-10 .....	4,990	--	15	1.6	1.8	--	50	5.4	2.5	--	1.6	75	44	3	101	7.6	35
Apr. 11-18 .....	2,372	--	20	1.8	1.9	--	66	5.8	2.8	--	1.8	82	58	4	125	7.7	23
Apr. 19-20, 25-28, 30	6,426	7.2	14	1.6	1.7	1.1	48	5.5	2.5	.0	1.6	76	43	4	101	7.6	50
Apr. 21-24, 29 .....	2,902	--	20	1.9	3.0	--	67	5.4	4.8	--	1.7	91	59	4	134	7.7	23
May 1-3, 13-15 .....	10,230	--	14	1.4	2.2	--	48	5.4	2.0	--	2.0	85	42	4	94.0	7.6	45
May 4-11 .....	1,829	--	20	1.3	2.8	--	66	5.8	2.8	--	1.9	85	55	1	123	8.1	11
May 12, 16-24 .....	2,977	--	24	3.9	2.8	--	80	6.3	2.8	--	2.9	96	76	11	144	8.2	9
May 25-31 .....	899	--	26	2.3	2.8	--	90	5.1	2.8	--	1.7	100	74	1	160	7.5	6
June 1-10 .....	384	--	30	2.7	3.2	--	106	5.4	3.2	--	1.2	108	87	0	182	7.8	5
June 11-20 .....	180	--	34	3.0	3.3	--	c118	5.0	3.5	--	1.4	122	97	0	196	8.3	5
June 21-30 .....	101	--	34	3.2	3.2	--	118	5.1	3.8	--	.8	125	96	1	200	8.0	7
July 1-10 .....	99.9	9.0	31	4.8	3.4	1.3	114	3.6	4.0	.1	.9	124	97	4	201	8.1	5
July 11-20 .....	113	--	32	3.8	3.4	--	117	3.0	3.5	--	.6	121	95	0	202	7.7	7
July 21-31 .....	126	--	34	4.0	3.2	--	123	3.6	3.5	--	.8	123	101	0	204	7.8	5
Aug. 1-10 .....	63.1	--	34	3.8	3.3	--	122	3.0	4.0	--	.4	122	100	0	214	7.9	7
Aug. 11-20 .....	77.2	--	33	3.8	3.5	--	122	3.6	4.2	--	.3	122	98	0	212	8.1	10
Aug. 21-31 .....	62.7	--	33	3.3	3.5	--	118	2.6	4.8	--	.4	120	96	0	209	8.1	7
Sept. 1-10 .....	39.6	--	34	3.9	3.6	--	124	3.0	4.5	--	.6	125	101	0	216	8.0	10
Sept. 11-20 .....	28.9	--	33	5.4	3.3	--	128	4.4	4.5	--	1.0	163	105	0	219	7.8	5
Sept. 21-30 .....	21.3	--	36	4.5	3.4	--	d130	5.2	5.0	--	.7	170	108	2	226	8.3	5
Average .....	1,125	--	29	3.4	3.0	--	100	5.7	3.7	--	1.5	114	86	4	180	--	12

c Includes equivalent of 2 parts per million of carbonate (CO<sub>3</sub>).d Includes equivalent of 1 part per million of carbonate (CO<sub>3</sub>).

## LOWER MISSISSIPPI RIVER BASIN

## WHITE RIVER BASIN--Continued

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

Temperature (°F) of water, water year October 1952 to September 1953  
 /Once-daily temperature measurement at approximately 5 p.m./

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

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

LOCATION.--At bridge on U. S. Highway 62 at Cotter, Baxter County, about 5 miles downstream from gaging station near Flippin.

DRAINAGE AREA.--6,067 square miles (above gaging station).

RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1953.

Water temperatures: October 1947 to September 1953.

EXTREMES, 1952-53.--Dissolved solids: Maximum, 198 ppm Feb. 16, 18, 23; minimum, 146 ppm Feb. 11-15, 17, 19-20, Mar. 21-27, 29-31.

Hardness: Maximum, 155 ppm Oct. 11-20; minimum, 11-20; minimum daily, 238 microhms Aug. 13.

Specific conductance: Maximum, 510 microhms Mar. 28; minimum daily, 238 microhms Aug. 13.

Temperatures: Maximum, 64°F on several days during June and July; minimum, 44°F on several days during winter months.

EXTREMES, 1952-53.--Dissolved solids: Maximum, 200 ppm Feb. 1-10, 1952; minimum, 146 ppm Feb. 11-15, 17, 19-20, Mar. 21-27, 29-31, 1953.

Hardness: Maximum, 191 ppm Feb. 11-19, 1952; minimum, 128 ppm June 11-20, 1952, Sept. 11-20, 21-30, 1953.

Specific conductance: Maximum, 510 microhms Mar. 28, 1953; minimum daily, 212 microhms Mar. 11, 1952.

Water temperatures: Maximum, 73°F on several days during July and August 1952; minimum, 42°F Dec. 16-17, 1951.

REMARKS.--Records of specific conductance of daily samples available in district office at Fayetteville, Ark. Records of discharge for gaging station near Flippin for water year October 1952 to September 1953 given in WSP 1281. No appreciable inflow between sampling point and gaging station. Flow regulated by Bull Shoals Reservoir since July 23, 1951.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue on evaporation at 180°C)	Hardness as CaCO <sub>3</sub>		Specific conductance (microhms at 25°C)	pH	Color
														Calcium, mg./ml.	Non-carbonate, mg./ml.			
Oct. 1-10, 1952	732	--	--	41	12	2.4	--	172	7.0	3.5	--	6.3	159	152	11	294	7.7	6
Oct. 11-20	684	--	--	43	12	1.7	--	176	5.4	3.5	--	--	158	155	11	293	7.8	5
Oct. 21-31	869	--	--	44	10	2.5	--	174	5.8	4.0	--	2.5	180	152	9	289	7.7	3
Nov. 1-10	1,050	11	0.00	41	11	2.7	1.2	172	5.8	3.5	0.1	2.3	160	146	5	274	8.1	5
Nov. 11-20	1,499	--	--	43	12	1.7	--	176	5.4	3.2	--	1.8	157	155	11	283	8.4	3
Nov. 21-30	1,649	--	--	40	11	2.0	--	168	5.4	3.2	--	1.8	151	146	8	279	8.0	4
Dec. 1-10	2,103	--	--	42	12	2.8	--	173	5.2	2.5	--	2.6	154	152	11	280	8.5	6
Dec. 11-20	1,944	--	--	40	12	2.4	--	174	4.4	3.5	--	2.1	156	149	6	277	8.4	6
Dec. 21-31	1,716	--	--	42	12	3.0	--	177	4.4	3.0	--	2.0	156	152	7	283	8.5	6
Jan. 1-10, 1953	1,859	8.0	0.00	41	11	2.3	1.2	173	6.3	4.0	1.1	2.5	157	147	6	279	8.0	5
Jan. 11-20	1,787	--	--	41	12	2.5	--	178	5.4	3.2	--	2.3	156	153	10	280	8.4	6
Jan. 21-31	1,584	--	--	37	12	2.0	--	167	5.8	3.0	--	3.5	158	142	5	265	8.3	7
Feb. 1-10	1,904	--	--	40	12	3.3	--	177	5.8	5.0	--	1.8	160	150	5	286	8.4	8
Feb. 11-15, 17, 19-20	2,112	--	--	37	13	2.0	--	168	5.6	3.0	--	1.2	146	146	8	269	8.2	6
Feb. 16, 18, 23	1,760	--	--	47	13	7.8	--	192	6.4	14	--	3.0	198	172	15	363	7.8	4
Feb. 21-22, 24-28	1,923	--	--	37	12	1.7	--	168	5.5	2.8	--	1.7	153	142	4	270	8.0	9

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

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

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

## LOWER MISSISSIPPI RIVER BASIN

## WHITE RIVER BASIN--Continued

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

Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue on filter at 180°C)	Hardness as CaCO <sub>3</sub>		Specific conductance (micro-mhos at 25°C)	pH	Color
														Calcium-magnesium	Non-carbonate			
Mar. 1-10, 1953.....	1,681	--	--	36	13	2.5	--	b174	4.3	4.0	--	1.2	155	143	1	267	8.4	9
Mar. 11-20.....	2,639	--	--	37	13	2.4	--	e174	4.1	3.8	--	1.7	154	147	2	278	8.3	6
Mar. 21-27, 29-31..	7,944	--	--	37	12	1.7	--	172	4.8	2.2	--	1.5	146	142	1	271	8.1	8
Apr. 1-10.....	7,277	8.0	0.01	38	13	2.4	1.2	170	5.8	3.5	0.0	1.2	156	147	8	268	8.0	11
Apr. 11-20.....	9,368	--	--	38	10	2.2	--	166	4.6	3.5	--	1.0	153	136	0	266	7.9	10
Apr. 21-30.....	13,510	--	--	36	11	3.6	--	166	4.8	3.5	--	1.1	155	135	0	264	8.1	8
May 1-6, 8-10.....	18,020	--	--	36	11	2.8	--	f162	4.4	3.5	--	1.6	156	135	2	255	8.6	8
May 11-17, 19-20..	9,494	--	--	37	11	3.6	--	f164	5.3	4.5	--	2.8	161	137	2	266	8.6	7
May 21-31.....	13,360	--	--	37	11	3.0	--	g162	5.6	4.0	--	3.1	162	136	5	263	8.5	9
June 1-10.....	5,606	--	--	37	10	3.0	--	b162	5.1	3.5	--	2.0	153	133	1	264	8.4	10
June 11-20.....	3,927	--	--	37	11	3.7	--	a162	5.1	3.2	--	2.0	149	132	5	262	8.4	8
June 21-30.....	3,316	--	--	36	11	3.1	--	164	5.6	4.2	--	2.3	149	136	2	269	7.8	6
July 1-10.....	3,385	8.3	.01	36	11	2.9	1.6	159	5.3	3.5	.2	3.3	158	135	5	271	8.2	10
July 11-20.....	3,254	--	--	36	12	2.9	--	a160	7.0	4.0	--	2.4	156	139	8	260	8.3	7
July 21-31.....	3,833	--	--	37	9,6	2.5	--	157	4.6	3.5	--	2.4	164	132	3	262	7.5	4
Aug. 1-10.....	3,461	--	--	36	11	3.6	--	155	3.6	5.8	--	3.0	170	135	8	270	8.1	5
Aug. 11-20.....	3,555	--	--	38	11	2.5	--	e158	4.0	4.2	--	3.2	166	135	7	258	8.3	7
Aug. 21-31.....	3,413	--	--	36	11	2.6	--	153	7.0	4.2	--	3.6	166	135	10	261	7.8	9
Sept. 1-10.....	3,676	--	--	34	11	2.6	--	a153	6.0	3.5	--	3.1	186	130	5	255	8.4	6
Sept. 11-20.....	3,980	--	--	35	10	2.1	--	b152	5.2	2.5	--	2.9	168	128	4	265	8.5	4
Sept. 21-30.....	4,458	--	--	35	10	2.1	--	b152	5.8	3.0	--	2.9	166	128	4	264	8.5	5
Average.....	h4,199	--	--	38	11	2.7	--	167	5.4	3.9	--	2.4	159	140	3	273	--	7

d Includes equivalent of 3 parts per million of carbonate (CO<sub>3</sub>).e Includes equivalent of 4 parts per million of carbonate (CO<sub>3</sub>).f Includes equivalent of 2 parts per million of carbonate (CO<sub>3</sub>).g Includes equivalent of 8 parts per million of carbonate (CO<sub>3</sub>).h Includes equivalent of 7 parts per million of carbonate (CO<sub>3</sub>).

i Mean discharge for water year October 1952 to September 1953 was 4,291 second feet.

## WHITE RIVER BASIN--Continued

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

Temperature (°F) of water, water year October 1952 to September 1953

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

## WHITE RIVER BASIN--Continued

## BLACK RIVER AT BLACK ROCK, ARK.

LOCATION.--At gaging station 900 feet downstream from St. Louis-San Francisco Railway bridge at Black Rock, Lawrence County, 3 3/4 miles downstream from Spring River.

DRAINAGE AREA.--7,323 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1946, October 1952 to September 1953.

Water temperatures: October 1945 to September 1953. Maximum, 203 ppm Oct. 21-31; minimum, 128 ppm Mar. 16-19, 21-24.

EXTREMES, 1952-1953.--Dissolved solids: Maximum, 203 ppm Oct. 21-31; minimum, 94 ppm Mar. 16-19, 21-24.

Hardness: Maximum, 208 ppm Oct. 21-31; minimum, 94 ppm Mar. 16-19, 21-24.

Specific conductance: Maximum daily, 393 microhmhos Sept. 23; minimum daily, 84.8 microhmhos Dec. 4.

Water temperatures: Maximum, 83° F June 20; minimum, 39° F Dec. 29.

REMARKS.--Records of specific conductance of daily samples available in district office at Fayetteville, Ark. Records of discharge for water year October 1952 to September 1953 given in MSP 1281.

## Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue on evaporation at 180°C)		Hardness as CaCO <sub>3</sub>		Specific conductance (microhmhos at 25°C)	pH	Color
															Calcium, mg/l	Non-carbonate, mg/l			
Oct. 1-10, 1952	2,888	11	0.02	40	24	3.4	1.1	a234	2.7	3.2	0.0	2.3	201	198	198	7	370	8.3	4
Oct. 11-20	2,880	11	.05	40	23	3.3	1.2	b237	2.4	3.5	.1	2.2	200	194	194	0	356	8.5	4
Oct. 21-31	2,814	12	.05	42	25	3.4	1.5	241	2.9	3.2	.1	1.7	203	208	208	10	382	8.0	4
Nov. 1-10	2,840	12	.08	41	24	2.9	1.2	b242	2.2	2.8	.1	1.0	202	201	201	3	357	8.5	3
Nov. 11-20	3,020	12	.24	41	23	2.7	1.2	c237	3.7	3.2	.0	1.1	190	197	197	2	351	8.5	5
Nov. 21-28	4,707	10	.13	38	23	2.6	1.2	d216	2.9	2.8	.1	1.7	173	189	189	12	331	8.3	8
Nov. 27-30	7,525	--	--	35	16	6.1	--	192	4.1	2.8	--	3.2	181	154	154	0	291	7.5	13
Dec. 1-3, 8-10	6,507	11	.20	34	20	2.6	1.2	d190	5.0	3.5	.2	5.2	174	167	167	11	300	8.3	8
Dec. 4-7	11,750	--	--	24	11	4.9	--	128	5.6	2.5	--	2.9	140	106	106	1	202	8.6	14
Dec. 11-20	5,098	11	.16	35	19	1.8	1.2	e192	4.6	3.0	.1	6.2	175	163	163	8	327	8.0	5
Dec. 21-31	3,936	12	.00	38	23	1.8	.8	215	4.2	3.0	.0	2.4	182	189	189	13	326	8.1	6
Jan. 1-10, 1953	3,739	9.7	.00	38	23	2.6	.8	220	3.7	3.5	.0	1.4	191	189	189	9	334	8.1	5
Jan. 11-20	3,892	9.7	.03	38	23	2.9	.8	d222	4.3	4.5	.0	1.4	189	189	189	11	331	8.3	5
Jan. 21-31	6,524	11	.06	32	17	3.0	1.2	177	5.1	4.0	.2	2.5	155	150	150	5	295	8.2	12
Feb. 1-10	4,981	9.7	.02	38	18	3.4	.9	202	4.6	3.5	.1	2.2	184	169	169	3	310	7.4	5
Feb. 11-20	5,897	8.6	.07	37	18	2.6	1.0	196	4.6	3.0	.1	2.1	176	168	168	7	302	7.7	5
Feb. 21-28	6,827	9.4	.02	32	17	2.5	1.0	180	4.7	3.0	.1	2.2	168	152	152	4	280	7.8	10

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

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

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

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

## WHITE RIVER BASIN

39

Mar. 1-10, 1953	11,290	8.9	.07	29	14	2.6	1.3	152	4.8	3.5	.1	2.4	152	128	3	242	8.0	25
Mar. 11-15, 20	14,150	9.0	.06	26	12	5.0	1.3	133	4.9	8.0	.1	1.9	156	115	6	233	7.8	30
Mar. 16-18, 21-24	16,910	7.2	.10	24	11	4.6	1.2	122	3.6	2.5	--	2.0	128	94	6	181	8.1	18
Mar. 25-31	10,730	9.0	.04	28	15	2.1	1.1	153	3.8	3.5	.0	2.9	143	104	4	199	7.9	30
Apr. 1-10	9,555	9.6	.02	32	16	2.1	1.9	178	3.4	3.0	.0	2.2	160	146	1	277	8.0	12
Apr. 11-20	11,310	8.8	.03	29	15	2.8	1.0	a166	3.9	4.0	.0	1.8	150	135	0	257	8.4	11
Apr. 21-30	8,851	9.6	.04	30	18	2.3	1.0	e172	3.1	3.5	.0	2.2	157	147	6	271	8.6	12
May 1-10	11,950	11	.07	30	15	2.3	1.1	b166	3.6	3.2	.1	2.8	136	136	0	260	8.4	17
May 11-20	10,390	11	.06	30	16	2.2	1.1	d162	3.5	2.8	.1	3.2	155	140	7	257	8.3	16
May 21-31	5,884	14	.02	35	18	2.7	1.0	b199	3.3	3.2	.0	1.8	175	159	0	297	8.5	4
June 1-10	4,691	11	.03	35	19	2.5	1.0	204	2.9	3.5	.0	1.4	181	168	0	312	8.0	5
June 11-20	3,534	12	.01	38	20	2.4	.9	220	2.9	3.5	.0	1.3	192	179	0	333	8.0	4
June 21-30	3,533	12	.00	40	18	3.3	1.3	c213	2.6	3.0	.0	2.5	182	174	0	396	8.5	7
July 1-10	3,108	12	.00	39	20	2.9	1.4	f223	2.4	3.0	.0	2.4	184	160	0	373	8.5	8
July 11-20	2,928	12	.00	41	19	3.0	1.3	g226	3.6	3.2	.0	1.6	191	160	0	346	8.4	3
July 21-31	2,659	12	.00	39	20	3.3	1.2	b227	4.2	3.2	.1	1.5	184	160	0	350	8.5	4
Aug. 1-10	2,521	11	.00	40	21	3.0	1.2	c230	3.0	3.2	.0	1.5	190	166	0	348	8.5	4
Aug. 11-20	2,407	10	.00	42	19	2.9	1.3	h231	3.2	3.2	.0	1.2	195	163	0	352	8.3	5
Aug. 21-31	2,305	11	.01	38	23	2.7	.8	e231	3.4	3.5	.0	1.6	197	139	0	345	8.7	3
Sept. 1-10	2,224	9.4	.02	39	22	2.7	.9	b233	4.0	4.0	.0	.8	196	186	0	351	8.4	3
Sept. 11-20	2,206	9.6	.01	38	23	3.4	.9	a234	2.6	5.2	.0	1.2	198	189	0	357	8.4	3
Sept. 21-30	6,033	11	0.05	35	19	2.9	1.1	197	3.7	3.5	0.0	2.2	175	165	3	307	--	9
Average																		

a Includes equivalent of 4 parts per million of carbonate (CO<sub>2</sub>).  
 b Includes equivalent of 6 parts per million of carbonate (CO<sub>2</sub>).  
 c Includes equivalent of 7 parts per million of carbonate (CO<sub>2</sub>).  
 d Includes equivalent of 2 parts per million of carbonate (CO<sub>2</sub>).  
 e Includes equivalent of 8 parts per million of carbonate (CO<sub>2</sub>).  
 f Includes equivalent of 9 parts per million of carbonate (CO<sub>2</sub>).  
 g Includes equivalent of 5 parts per million of carbonate (CO<sub>2</sub>).  
 h Includes equivalent of 3 parts per million of carbonate (CO<sub>2</sub>).

34

## LOWER MISSISSIPPI RIVER BASIN

## WHITE RIVER BASIN--Continued

## BLACK RIVER AT BLACK ROCK, ARK.--Continued

Temperature (°F) of water, water year October 1952 to September 1953  
 (Once-daily temperature measurement at approximately 7. a.m.)

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

## WHITE RIVER BASIN--Continued

## WHITE RIVER AT NEWPORT, ARK.

LOCATION.--At gaging station at bridge on U. S. Highway 67 at Newport, Jackson County, 7 1/4 miles downstream from Black River.

DRAINAGE AREA--19,812 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1953

EXTREMES AVAILABLE.--Temperature: October 1945 to September 1953.

EXTREMES AVAILABLE.--Dissolved solids: Maximum, 108 ppm Aug. 21-31; minimum, 124 ppm Dec. 1-10.

Hardness: Maximum, 189 ppm Oct. 1-10; minimum, 108 ppm Aug. 21-31.

Specific conductance: Maximum daily, 404 micromhos Oct. 18; minimum daily, 182 micromhos Dec. 1.

Water temperature: Maximum, 80°F on many days during June, July, and August; minimum, 42°F on several days during December and January.

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

Hardness: Maximum, 189 ppm Oct. 1-10, 1952; minimum, 51 ppm Jan. 25-31, 1949.

Specific conductance: Maximum daily, 404 micromhos Oct. 18, 1952; minimum daily, 103 micromhos Jan. 28, 1949.

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

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

October 1952 to September 1953 given in WSP 1281.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue on evaporation at 180°C)	Hardness as CaCO <sub>3</sub>		Specific conductance (micro-mhos at 25°C)	pH	Color
														Calcium, mg-nesium	Non-carbonate			
Oct. 1-10, 1952.....	5,433	14	0.04	41	21	3.2	1.2	a 220	3.1	4.0	0.1	0.9	185	189	8	332	8.5	6
Oct. 11-20.....	5,229	13	.04	40	21	4.4	1.3	a 224	4.2	5.0	.1	1.4	185	186	2	335	8.6	5
Oct. 21-31.....	5,001	--	--	41	19	3.0	--	217	3.5	4.0	--	.7	179	182	4	334	8.2	3
Nov. 1-10.....	5,660	--	--	42	18	2.9	--	212	3.6	4.0	--	--	183	178	4	331	8.2	4
Nov. 11-20.....	6,115	--	--	32	16	2.6	--	211	3.7	3.5	--	2.7	169	179	6	334	8.1	6
Nov. 21-30.....	17,700	--	--	38	13	1.2	--	b 174	4.7	3.0	--	1.5	151	146	6	214	8.5	8
Dec. 1-10.....	23,020	--	--	30	8.3	1.6	--	124	4.3	3.5	--	1.8	124	108	6	211	8.2	25
Dec. 11-20.....	12,900	--	--	36	15	2.5	--	177	5.5	2.5	--	1.8	153	154	9	243	8.2	7
Dec. 21-31.....	9,172	--	--	38	16	1.6	--	c 183	4.6	3.0	--	3.0	158	162	8	298	8.3	4
Jan. 1-10, 1953.....	9,234	7.9	.09	38	16	4.5	1.1	195	5.2	4.0	.1	.7	171	160	1	305	7.4	10
Jan. 11-20.....	10,020	--	--	35	16	2.6	--	186	4.6	3.2	--	1.3	169	156	3	293	8.0	9
Jan. 21-31.....	18,850	--	--	33	13	1.9	--	158	4.9	2.5	--	1.6	146	134	5	254	7.7	16
Feb. 1-10.....	13,860	--	--	34	15	2.5	--	170	5.3	4.0	--	1.8	158	148	9	282	7.7	6
Feb. 11-20.....	15,230	--	--	34	14	2.8	--	172	5.4	2.0	--	1.9	157	148	7	276	7.8	7
Feb. 21-28.....	16,800	--	--	33	14	3.8	--	160	5.2	4.5	--	1.6	132	138	7	265	7.5	7
Mar. 1-10.....	25,200	--	--	27	11	1.7	--	136	4.1	2.5	--	1.8	130	114	3	223	8.0	25
Mar. 11-20.....	41,200	--	--	27	11	1.4	--	132	3.7	2.0	--	2.2	130	112	4	207	7.9	30
Mar. 21-31.....	50,400	--	--	30	12	3.0	--	142	5.3	3.8	--	2.2	138	122	6	239	7.6	15

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

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

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

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

Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue on evaporation at 180°C)	Hardness as CaCO <sub>3</sub>		Specific conductance (micro-mhos at 25°C)	pH	Color
														Calcium	Non-carbonate			
Apr. 1-10, 1953.....	30,740	7.4	0.01	33	11	2.1	0.9	154	5.0	3.5	0.0	2.2	145	128	2	253	7.8	9
Apr. 11-20.....	28,100	--	--	35	12	2.3	--	160	4.4	3.5	--	1.2	148	137	6	261	7.8	10
Apr. 21-30.....	37,280	--	--	25	18	2.3	--	158	4.9	3.5	--	1.2	146	137	7	254	8.2	8
May 1-10.....	38,670	--	--	34	12	2.5	--	162	4.8	3.0	--	3.1	154	134	1	268	7.8	10
May 11-20.....	42,620	--	--	32	11	2.3	--	152	4.0	2.2	--	1.6	149	126	0	244	8.1	8
May 21-31.....	38,300	--	--	34	12	2.7	--	162	3.9	2.8	--	1.7	159	133	0	254	8.1	8
June 1-10.....	17,850	--	--	38	15	5.8	--	d190	4.8	8.5	--	1.7	180	156	1	313	8.3	7
June 11-20.....	12,610	--	--	38	16	3.8	--	d196	4.4	4.8	--	1.4	175	161	0	307	8.3	6
June 21-30.....	10,060	--	--	39	16	3.6	--	e202	4.0	4.0	--	1.5	179	163	0	315	8.4	8
July 1-10.....	9,654	--	--	37	17	3.6	--	193	3.6	4.5	--	3.0	186	162	4	309	8.1	8
July 11-20.....	9,317	9.2	.01	34	16	3.5	1.6	f182	7.6	4.0	.2	1.9	172	151	1	292	8.5	10
July 21-31.....	9,094	--	--	35	17	3.4	--	a188	5.0	3.2	--	1.5	164	157	3	298	8.5	10
Aug. 1-10.....	8,796	--	--	37	17	3.4	--	a192	3.6	3.8	--	3.4	175	162	5	309	8.6	7
Aug. 11-20.....	8,128	--	--	37	16	3.3	--	d196	4.0	3.5	--	1.7	170	158	0	313	8.3	5
Aug. 21-31.....	8,310	--	--	38	18	7.6	--	188	5.2	12	--	4.1	190	169	15	337	8.0	7
Sept. 1-10.....	7,861	--	--	37	16	3.3	--	e192	5.6	4.0	--	1.5	188	158	1	306	8.4	7
Sept. 11-20.....	8,479	--	--	37	16	2.7	--	f189	5.2	3.5	--	1.9	182	158	3	304	8.5	9
Sept. 21-30.....	8,061	--	--	37	15	2.7	--	a187	4.8	3.5	--	2.2	186	154	1	304	8.5	5
Average.....	17,440	--	--	35	15	3.0	--	179	4.6	3.9	--	1.9	163	149	2	287	--	9

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

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

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

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

## WHITE RIVER BASIN--Continued

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

Temperature (°F) of water, water year October 1952 to September 1953

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

## WHITE RIVER BASIN--Continued

## CACHE RIVER AT PATTERSON, ARK.

LOCATION.--250 feet north of bridge on U. S. Highway 64, just west of Patterson, Woodruff County.

DRAINAGE AREA.--1,041 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1952 to September 1953.

EXTREMES, 1952-53.--Dissolved solids: Maximum, 224 ppm Nov. 21-24; minimum, 71 ppm Dec. 9-11, 14, 16-20.

Hardness: Maximum, 147 ppm Nov. 1-10; minimum, 15 ppm Nov. 21-24, Feb. 1-9, Feb. 21-28, Mar. 21-31.

Specific conductance: Maximum, 475 micromhos Nov. 21-24; minimum, 36 micromhos Mar. 24.

Water temperatures: Maximum, 84°F July 4-8; minimum, 40°F Dec. 2, 16, 28-29.

REMARKS.--Maximum specific conductance of daily samples available in district office at Fayetteville, Ark. Records of discharge for water year October 1952 to September 1953 furnished by the District Office, Corps of Engineers, Memphis, Tenn.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue on evaporation at 180°C)	Hardness as CaCO <sub>3</sub>		Specific conductance (micro-mhos at 25°C)	pH	Color
														Calcium	Non-carbonate			
Oct. 1-10, 1952.....	61.0	24	0.13	31	11	13	3.0	a102	5.3	7.2	0.1	1.0	186	123	0	273	8.5	15
Oct. 11-20.....	77.4	22	.08	35	12	16	2.8	b186	4.3	8.0	.2	.8	195	137	0	308	8.3	8
Oct. 21-31.....	62.7	24	.14	38	12	16	2.8	c197	5.3	7.0	.1	.8	206	144	0	328	8.5	9
Nov. 1-10.....	62.3	26	.08	39	12	16	3.0	d208	5.4	7.5	.2	.8	212	147	0	334	8.6	10
Nov. 11-20.....	82.7	24	.06	38	12	15	3.1	b200	6.1	7.5	.1	.4	205	144	0	330	8.3	10
Nov. 21-24.....	119	24	.06	38	12	16	3.1	e191	7.1	7.5	.2	.6	224	144	0	336	8.6	12
Nov. 25-30.....	247	21	.23	30	10	14	4.2	162	8.7	8.8	.1	1.2	189	116	0	290	8.1	30
Dec. 1-4.....	517		--	21	5.8	12	--	98	12	7.8	--	2.5	154	76	0	212	7.7	30
Dec. 5-8, 12-13, 15.....	3,664		--	4.6	1.7	3.8	--	17	7.2	3.5	--	3.4	--	80	4	81.6	6.6	35
Dec. 9-11, 14, 16-20.....	3,449	7.2	.25	4.8	1.0	3.5	2.8	16	7.4	2.8	--	.8	71	16	3	55.4	7.2	80
Dec. 21-26.....	600	9.8	.36	7.5	1.5	5.7	3.4	25	9.1	5.8	.2	1.2	100	25	4	83.9	6.9	80
Dec. 27-31.....	279	--	--	13	2.4	5.5	--	40	11	4.2	--	1.8	106	42	9	113	7.0	35
Jan. 1-10, 1953.....	252	15	.04	12	4.1	7.9	3.2	58	11	5.2	.2	1.2	125	48	0	131	7.8	30
Jan. 11-14.....	608	--	--	9.9	4.7	6.6	--	43	9.4	4.2	--	7.2	154	44	9	116	7.4	30
Jan. 15-18.....	768	--	--	6.9	2.8	5.6	--	30	8.7	3.5	--	2.3	164	29	3	83.7	7.1	35
Jan. 19-23.....	1,080	--	--	5.3	2.3	4.2	--	24	8.1	3.0	--	1.7	153	23	3	68.3	7.5	35
Jan. 24-31.....	1,978	7.4	.35	4.5	.9	4.1	2.9	18	6.8	3.0	.2	1.0	117	13	0	58.3	7.2	100

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

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

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

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

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

## WHITE RIVER BASIN

45

Period	1-746	7-2	34	4.8	8	3.8	2.7	20	5.9	3.0	2	0.7	100	15	0	57.8	6.8	100
Feb. 1-9, 1953	1,746	7.2	34	4.8	8	3.8	2.7	20	5.9	3.0	2	0.7	100	15	0	57.8	6.8	100
Feb. 10-13	1,855	--	--	5.1	2.2	5.1	--	24	6.1	6.2	--	1.7	99	22	2	104	6.9	40
Feb. 14-20	3,046	6.0	.04	4.2	1.5	3.7	2.4	18	4.5	3.7	1.7	1.7	83	17	2	51.8	6.8	50
Feb. 21-28	2,932	5.4	.02	3.6	1.5	4.0	2.5	19	5.4	2.5	1.1	.9	84	15	0	48.0	6.9	40
Mar. 1-10	2,447	6.2	.02	4.4	1.5	3.9	2.4	22	5.4	3.0	2.2	1.2	105	17	0	54.5	6.9	40
Mar. 11-20	3,540	4.4	.02	4.0	1.7	3.8	2.6	22	5.7	2.2	1.1	1.4	95	17	0	52.4	6.7	50
Mar. 21-31	6,428	5.2	.02	4.0	1.2	2.8	2.2	20	3.0	1.2	1.1	1.1	78	15	0	42.9	6.6	50
Apr. 1-10	3,707	3.2	.09	4.6	2.3	2.9	2.5	27	2.6	1.5	1.1	.8	80	21	0	52.7	6.9	50
Apr. 11-17	1,914	2.8	.01	6.0	2.3	3.4	2.6	34	3.0	2.0	1.1	.8	75	25	0	64.7	7.1	45
Apr. 18-30	1,374	5.8	--	7.5	2.3	4.2	2.9	37	3.0	2.0	1.1	2.3	101	28	0	77.8	7.0	25
May 1-10	1,451	6.4	--	7.9	2.4	4.4	2.6	41	2.4	2.5	1.1	1.8	109	29	0	82.0	7.0	20
May 11, 19-25	3,442	6.8	--	6.2	1.1	3.8	2.2	28	4.0	1.8	.3	4.8	102	20	0	73.7	7.2	45
May 12-18	5,421	5.8	--	4.6	1.1	3.1	2.0	22	3.5	2.0	.3	2.0	95	18	0	48.3	7.3	32
May 26-31	1,442	9.8	--	7.9	2.1	4.2	2.6	41	3.2	1.8	.3	2.2	102	29	0	77.8	7.2	45
June 1-5	597	15	--	13	3.6	6.4	3.1	64	3.2	3.2	2	3.2	114	47	0	122	7.7	40
June 6-10	317	--	--	17	5.8	7.8	3.2	92	3.8	4.0	.5	3.0	130	66	0	198	7.5	40
June 11-18	248	21	.20	24	7.3	11	3.2	128	4.2	5.8	.3	2.3	154	90	0	221	7.9	40
June 19-30	159	24	.06	30	8.6	14	3.2	188	4.9	6.8	.5	3.2	169	110	0	272	7.7	25
July 1-10	128	27	.08	34	10	16	3.1	180	4.9	7.0	.2	1.2	195	126	0	298	8.4	20
July 11-16	210	21	.06	34	10	19	3.5	186	5.9	8.0	.3	1.5	206	126	0	306	7.0	33
July 17-20	224	14	.06	18	6.4	13	3.2	104	5.8	7.0	.6	2.7	185	171	0	181	7.9	33
July 21-31	353	15	.39	14	4.6	9.5	2.3	78	4.6	4.2	.1	2.3	141	54	0	154	8.0	70
Aug. 1-10	119	19	.16	22	6.1	11	2.6	118	2.2	4.8	.2	2.1	152	90	0	210	8.2	37
Aug. 11-20	93.9	22	.01	29	8.4	15	2.7	160	1.2	6.0	.3	1.6	185	107	0	271	8.3	22
Aug. 21-31	75.2	20	.00	33	9.5	15	2.5	179	5.2	6.2	.3	1.1	200	121	0	297	8.5	15
Sept. 1-10	73.9	19	.00	34	10	15	2.6	183	4.6	6.8	.3	1.5	199	126	0	307	8.3	14
Sept. 11-20	59.7	22	.00	37	10	17	2.8	194	4.8	7.5	.0	1.2	212	133	0	318	8.5	6
Sept. 21-30	68.1	20	.02	40	11	17	2.9	197	5.2	7.2	.0	1.4	214	145	0	329	8.5	9
Average	1,301	14	--	18	5.4	9.0	2.8	90	5.6	4.8	0.2	1.8	142	87	0	189	--	36

e Includes equivalent of 8 parts per million of carbonate (CO<sub>3</sub>).  
f Includes equivalent of 6 parts per million of carbonate (CO<sub>3</sub>).a Includes equivalent of 4 parts per million of carbonate (CO<sub>3</sub>).  
b Includes equivalent of 2 parts per million of carbonate (CO<sub>3</sub>).

## LOWER MISSISSIPPI RIVER BASIN

## WHITE RIVER BASIN--Continued

## CACHE RIVER AT PATTERSON, ARK.--Continued

Temperature (°F) of water, water year October 1952 to September 1953

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

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

LOCATION.--At gaging station on Cottonbelt Railroad bridge at Clarendon, Monroe County.  
DRAINAGE AREA.--25,497 square miles.  
RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1953.  
WATER TEMPERATURES: October 1948 to September 1953.  
EXTREMES, 1952-53.--Dissolved solids: Maximum, 225 ppm July 1-10; minimum, 86 ppm Mar. 21-31.  
Hardness: Maximum, 186 ppm Oct. 11-20; minimum 43 ppm Mar. 21-31.  
Specific conductance: Maximum daily, 438 micromhos July 14; minimum, 43 F Dec. 26, Jan. 16.  
WATER TEMPERATURES: Maximum, 88 F Aug. 7; minimum, 43 F Dec. 26, Jan. 16.  
EXTREMES, 1947-53.--Dissolved solids: Maximum, 225 ppm July 1-10, 1953; minimum, 38 ppm Feb. 1-9, 1950.  
Hardness: Maximum, 186 ppm Oct. 11-20, 1952; minimum, 29 ppm Mar. 1-10, 1948.  
Specific conductance: Maximum daily, 438 micromhos July 14, 1953; minimum daily, 60.7 micromhos Feb. 3, 1950.  
TEMPERATURES (1948-53): Maximum, 88 F on several days during summer months; minimum, 35 F Jan. 31, Feb. 1, 1951.  
REMARKS. Records of specific conductance of daily samples available in district office at Fayetteville, Ark.  
Records of discharge for water year October 1952 to September 1953 obtained from District Office, Corps of Engineers, Memphis, Tenn.

Chemical analyses, in parts per million water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue on evaporation at 180°C)	Hardness as CaCO <sub>3</sub>		Specific conductance (micro-mhos at 25°C)	pH	Color
														Calcium	Non-carbonate			
Oct. 1-10, 1952	6,075	--	--	42	19	3.9	--	a220	3.2	5.0	--	0.7	191	184	4	342	8.4	4
Oct. 11-20	5,464	18	0.06	40	21	5.1	1.5	b217	3.6	6.5	0.1	.6	181	186	8	335	8.5	6
Oct. 21-31	5,095	--	--	40	19	4.1	--	214	3.8	8.0	--	.8	185	179	3	341	8.2	4
Nov. 1-10	5,517	--	--	42	18	4.8	--	c218	3.7	5.5	--	1.3	182	180	1	339	8.3	7
Nov. 11-20	6,061	--	--	41	20	4.0	--	d214	4.7	4.5	--	1.2	185	184	8	330	8.6	7
Nov. 21-27	7,877	--	--	40	17	4.8	--	e203	4.0	5.8	--	1.8	180	168	2	324	8.4	8
Nov. 28-30	22,100	--	--	22	6.9	3.8	--	93	4.0	6.5	--	2.9	124	184	8	181	8.1	40
Dec. 1-7	26,440	--	--	21	6.8	2.6	--	89	6.7	3.2	--	3.3	114	80	7	160	8.0	23
Dec. 8-15	37,710	--	--	17	4.9	3.1	--	71	7.6	4.0	--	1.9	92	62	4	136	7.8	37
Dec. 16-21	26,050	--	--	18	6.0	3.7	--	76	7.9	3.8	--	1.4	106	70	8	146	7.7	70
Dec. 22-31	15,950	--	--	23	8.9	3.7	--	107	7.7	4.2	--	2.2	124	95	7	193	7.8	23
Jan. 1-10, 1953	12,160	13	0.06	31	12	4.6	1.3	147	7.5	4.8	1	1.7	152	126	6	247	8.1	15
Jan. 11-20	13,870	--	--	27	12	3.9	--	138	5.6	4.2	--	2.4	143	117	4	237	7.9	21
Jan. 21-25	20,460	--	--	20	8.8	3.8	--	102	5.9	4.8	--	1.8	119	86	2	184	7.8	35
Jan. 26-31	33,770	--	--	15	6.3	2.7	--	74	5.6	2.0	--	1.2	108	64	3	139	7.6	40
Feb. 1-10	32,020	--	--	15	6.5	3.8	--	68	6.3	3.5	--	1.6	100	85	9	137	7.6	50
Feb. 11-20	29,900	--	--	14	6.2	3.4	--	73	5.7	3.5	--	1.5	96	84	4	137	7.7	50
Feb. 21-26	31,220	--	--	15	6.2	3.0	--	67	5.1	3.0	--	1.1	99	61	6	128	7.6	50

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

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

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

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

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

## LOWER MISSISSIPPI RIVER BASIN

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

Chemical analyses, in parts per million, water year October 1952 to September 1953.--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue on evaporation at 180°C)	Hardness as CaCO <sub>3</sub>		Specific conductance (micro-mhos at 25°C)	pH	Color
														Calcium, mg-nesium	Non-carbonate			
Mar. 1-10, 1953.....	34,840	--	--	15	5.7	2.7	--	72	4.6	2.2	--	1.2	98	60	1	130	7.8	23
Mar. 11-20.....	43,020	--	--	15	4.7	2.3	--	71	3.8	2.2	--	1.3	95	57	0	128	7.9	30
Mar. 21-31.....	80,520	--	--	11	3.6	2.4	--	52	3.3	2.0	--	.9	86	43	0	96.6	7.6	32
Apr. 1-10.....	72,020	--	--	13	4.9	2.8	--	63	3.3	2.0	--	1.6	92	53	1	112	7.8	50
Apr. 11-20.....	51,680	--	--	18	5.9	3.1	1.4	f 103	3.8	2.8	0.1	1.4	104	70	0	150	8.0	22
Apr. 21-30.....	43,760	7.0	0.19	21	7.5	2.5	--	--	3.9	2.2	--	1.3	109	84	0	171	8.3	35
May 1-10.....	51,820	--	--	23	7.0	4.1	--	103	4.5	4.2	--	2.0	114	86	2	182	8.0	12
May 11-15.....	58,740	--	--	21	6.4	3.7	--	96	4.4	3.5	--	1.9	111	79	1	168	7.9	35
May 16-25.....	84,360	--	--	13	3.8	3.6	--	60	3.7	3.5	--	.8	92	48	0	112	7.8	50
May 26-31.....	69,020	--	--	19	5.7	3.6	--	86	4.1	3.2	--	2.6	109	71	0	151	7.9	50
June 1-10.....	42,200	--	--	24	9.2	3.6	--	117	1.0	4.2	--	3.0	141	98	2	200	8.1	22
June 11-20.....	18,960	--	--	34	14	4.0	--	a 168	1.6	5.0	--	2.7	178	142	5	271	8.4	20
June 21-30.....	11,960	--	--	38	16	4.9	--	c 193	1.6	6.2	--	2.5	199	161	2	314	8.4	9
July 1-10.....	10,670	11	0.00	38	14	5.0	1.5	e 186	5.6	5.5	.1	1.7	225	152	0	310	8.3	4
July 11-20.....	10,870	--	--	37	17	6.6	--	c 187	4.0	10	--	1.7	190	162	9	319	8.4	8
July 21-31.....	10,860	--	--	36	15	5.0	--	182	1.0	6.2	--	1.5	180	152	2	301	7.9	10
Aug. 1-10.....	10,150	--	--	37	15	4.1	--	d 188	4.8	4.8	--	1.7	183	154	0	300	8.6	7
Aug. 11-20.....	9,471	--	--	37	16	4.2	--	d 192	5.0	5.8	--	2.0	179	158	1	309	8.6	8
Aug. 21-31.....	89,570	--	--	38	16	3.9	--	b 194	4.8	5.0	--	2.0	179	161	1	310	8.5	7
Sept. 1-10.....	8,588	--	--	38	15	4.1	--	c 191	5.0	5.0	--	3.4	178	156	0	313	8.4	8
Sept. 11-20.....	8,473	--	--	38	16	4.6	--	b 195	5.2	7.0	--	1.6	182	161	1	318	8.5	9
Sept. 21-30.....	8,792	--	--	37	15	4.1	--	a 188	4.8	5.5	--	1.5	182	154	0	310	8.4	8
Average.....	26,570	--	--	27	11	3.8	--	134	4.6	4.5	--	1.7	142	113	3	225	--	24

a Includes equivalent of 5 parts per million of carbonate (CO<sub>3</sub>).b Includes equivalent of 6 parts per million of carbonate (CO<sub>3</sub>).c Includes equivalent of 7 parts per million of carbonate (CO<sub>3</sub>).d Includes equivalent of 8 parts per million of carbonate (CO<sub>3</sub>).e Includes equivalent of 9 parts per million of carbonate (CO<sub>3</sub>).f Includes equivalent of 10 parts per million of carbonate (CO<sub>3</sub>).g Includes equivalent of 11 parts per million of carbonate (CO<sub>3</sub>).h Includes equivalent of 12 parts per million of carbonate (CO<sub>3</sub>).i Includes equivalent of 13 parts per million of carbonate (CO<sub>3</sub>).j Includes equivalent of 14 parts per million of carbonate (CO<sub>3</sub>).k Includes equivalent of 15 parts per million of carbonate (CO<sub>3</sub>).l Includes equivalent of 16 parts per million of carbonate (CO<sub>3</sub>).m Includes equivalent of 17 parts per million of carbonate (CO<sub>3</sub>).n Includes equivalent of 18 parts per million of carbonate (CO<sub>3</sub>).o Includes equivalent of 19 parts per million of carbonate (CO<sub>3</sub>).p Includes equivalent of 20 parts per million of carbonate (CO<sub>3</sub>).q Includes equivalent of 21 parts per million of carbonate (CO<sub>3</sub>).r Includes equivalent of 22 parts per million of carbonate (CO<sub>3</sub>).s Includes equivalent of 23 parts per million of carbonate (CO<sub>3</sub>).t Includes equivalent of 24 parts per million of carbonate (CO<sub>3</sub>).u Includes equivalent of 25 parts per million of carbonate (CO<sub>3</sub>).v Includes equivalent of 26 parts per million of carbonate (CO<sub>3</sub>).w Includes equivalent of 27 parts per million of carbonate (CO<sub>3</sub>).x Includes equivalent of 28 parts per million of carbonate (CO<sub>3</sub>).y Includes equivalent of 29 parts per million of carbonate (CO<sub>3</sub>).z Includes equivalent of 30 parts per million of carbonate (CO<sub>3</sub>).

## WHITE RIVER BASIN--Continued

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

Temperature (°F) water, water year October 1952 to September 1953

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

WHITE RIVER BASIN--Continued  
 MISCELLANEOUS ANALYSES OF STREAMS IN WHITE RIVER BASIN IN ARKANSAS  
 Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal-cium (Ca)	Mag-nesium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Car-bonate (CO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> )	Dissolved solids (residue on evap- oration at 180°C)	Hardness as CaCO <sub>3</sub>		Specific conduct- ance (micro- mhos at 25°C)	pH
															Calcium, mg- mag- nesium	Non- carbon- ate		
WEST FORK WHITE RIVER NEAR GREENLAND																		
Feb. 17, 1953	32							27	0	4.0	3.2		1.6		28	6	68.1	7.5
Sept. 3	.2							48	0	7.0	3.5		1.2		41	2	105	7.8
WHITE RIVER NEAR ROGERS																		
Oct. 14, 1952	43							136	0	2.0	5.0		2.1		112	0	230	7.9
Feb. 3, 1953	339							64	0	3.0	4.0		1.8		56	4	136	8.2
Sept. 3	36							121	0	2.0	38		.2		110	11	323	8.2
WAR EAGLE CREEK NEAR HINDSVILLE																		
Oct. 7, 1952	12							128	4	1.0	5.0		1.7		114	2	226	8.4
Feb. 5, 1953	66							74	0	5.0	3.8		1.5		32	0	142	8.2
Sept. 3	7.5							117	4	1.0	3.5		.7		99	0	206	8.4
WHITE RIVER AT BEAVER																		
Oct. 2, 1952	64							134	4	5.0	4.0		0.6		117	1	232	8.4
Feb. 4, 1953	415							85	0	4.0	3.8		2.5		76	6	164	8.2
KINGS RIVER NEAR BERRYVILLE																		
Feb. 4, 1953	152							128	2	5.0	3.5		5.0		111	3	225	8.4
Sept. 4	8.2							154	5	1.0	2.0		.4		136	2	255	8.4
BUFFALO RIVER NEAR ST. JOE																		
Feb. 16, 1953	840							80	0	5.0	2.2		3.1		70	4	150	7.9
Aug. 31	34							125	3	4.0	11		.4		112	5	247	8.4
BUFFALO RIVER NEAR RUSH																		
Feb. 17, 1953	1,010							96	0	3.0	2.5		0.8		84	5	167	8.2
Aug. 31	54							113	3	4.0	4.5		2.5		102	4	209	8.3

## NORTH FORK RIVER AT NORFOLK DAM NEAR NORFOLK

Nov. 6, 1952.....	1,180	7.6	0.00	34	19	1.4	1.4	133	0	2.1	2.8	0.0	2.1	b187	165	7	301	7.2
Dec. 13, 1952.....	1,070	7.3	.00	31	20	1.5	1.5	138	0	2.5	3.5	.1	1.6	b181	158	4	292	7.7
Jan. 5, 1953.....	1,170	7.2	.00	32	19	1.5	1.4	130	0	2.7	2.8	.1	1.1	c137	159	3	294	7.8
Feb. 9, 1953.....	1,540	6.4	.04	34	20	1.2	1.4	132	0	3.9	2.5	.1	1.5	d181	187	10	298	7.5
Mar. 30, 1953.....	1,190	5.0	.04	32	22	.8	1.4	136	0	3.8	5.8	.1	1.2	b188	170	10	299	7.6
May 14, 1953.....	1,180	5.6	.01	34	21	1.3	.9	204	0	4.2	2.5	0	1.0	e170	171	4	298	8.0
June 3, 1953.....	1,950	6.0	.01	33	20	1.3	1.0	202	0	3.7	2.0	0	1.4	d177	167	1	311	7.9
July 6, 1953.....	2,150	7.1	.03	33	21	1.6	1.4	186	7	3.8	2.0	0	2.2	f170	169	5	304	8.5
Sept. 14, 1953.....	1,220	5.7	.04	36	21	1.9	1.5	207	0	3.4	2.0	0	1.9	e176	176	7	320	7.4

## WHITE RIVER AT CALICO ROCK

Feb. 18, 1953.....	5,110							174	7	1.0	2.5		1.1		140	0	277	8.5
Sept. 1, 1953.....	5,660							146	7	7.0	3.5		.5		138	5	280	8.5

## WHITE RIVER AT BATESVILLE

Feb. 18, 1953.....	6,680							149	4	3.0	4.0		2.7		120	0	254	8.4
Sept. 22, 1953.....	3,990							164	0	7.0	3.0		2.0		140	6	273	7.6

## BLACK RIVER NEAR CORNING

Feb. 19, 1953.....	882							136	4	1.0	3.0		3.8		123	5	237	8.4
Sept. 2, 1953.....	325							178	0	2.0	2.8		.9		146	0	279	7.8

## BLACK RIVER AT POCAHONTAS

Feb. 20, 1953.....	3,160							168	6	5.0	2.5		1.5		138	0	268	8.5
Sept. 2, 1953.....	1,540							196	7	2.0	2.5		.7		174	2	319	8.5

## SPRING RIVER AT IMBODEN

Feb. 19, 1953.....	919							180	4	1.0	2.2		2.2		156	2	283	8.4
Sept. 3, 1953.....	376							214	7	2.0	2.0		1.0		185	0	331	8.5

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

b Color, 5 units

c Color, 3 units

d Color, 6 units

e Color, 7 units

f Color, 4 units

## WHITE RIVER BASIN--Continued

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

Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

Date of collection	Dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal-cium (Ca)	Mag-nesium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> ) (CO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> ) (Cl)	Chlo-ride (F)	Ni-trate (NO <sub>3</sub> )	Dissolved solids (residue on evap- oration at 180°C)	Hardness as CaCO <sub>3</sub>		Specific conduct- ance (micro- mhos at 25°C)	pH
													-Calcium, mag- nesium	Non-carbon- ate		
ELEVEN POINT RIVER NEAR RAVENDEN SPRINGS																
Feb. 19, 1953.....	641							210	0	2.0	2.0	1.8	170	0	313	8.2
Sept. 3.....	455							193	5	1.0	2.0	1.5	167	1	301	8.4
PINEY FORK STRAWBERRY RIVER AT EVENING SHADE																
Feb. 17, 1953.....	52							185	9	2.0	3.0	1.7	162	0	305	8.5
Sept. 10.....	1.6							227	0	1.0	2.8	1.4	188	2	341	7.3
STRAWBERRY RIVER NEAR EVENING SHADE																
Feb. 17, 1953.....	125							197	0	3.0	3.0	1.8	162	0	297	8.2
Sept. 10.....	8.9							301	0	6.0	3.2	2.4	250	3	454	7.5
STRAWBERRY RIVER NEAR POUHKEEPSIE																
Feb. 17, 1953.....	354							188	10	2.0	2.8	1.5	164	0	310	8.5
Sept. 9.....	49							256	0	4.0	2.2	.6	202	0	383	7.9
LITTLE RED RIVER NEAR HEBER SPRINGS																
Feb. 18, 1953.....	1,400							22	0	3.0	2.2	0.9	16	0	48.4	7.7
Sept. 10.....	.1							40	0	2.0	2.5	.8	38	5	66.8	6.9
WHITE RIVER AT DE VALLS BLUFF																
Feb. 2, 1953.....	33,700							92	0	5.0	2.8	2.2	77	2	158	7.9
Sept. 14.....	6,920							201	0	5.0	4.8	1.4	169	4	319	7.5
CACHE RIVER AT PATTERSON																
Oct. 1, 1952.....	60							142	4	5.0	6.5	1.4	106	0	259	8.4
Feb. 10, 1953.....	1,056							23	0	5.0	2.5	1.5	20	1	79.5	7.0

BAYOU DE VIEW NEAR MORTON

Oct. 1, 1952.....	15							136	0	2.0	12					1.3		92	0	254	7.2
Feb. 10, 1953.....	169							30	0	4.0	4.0					1.5		21	0	74.9	7.4
Sept. 22.....	78							185	3	11	26					1.1		138	0	483	8.4

LAGRUE BAYOU NEAR STUTTGART

Feb. 4, 1953.....	1,380							32	0	16	7.0					1.7		24	0	95.8	7.8
Sept. 2.....	0							210	14	3.0	19					.6		148	0	412	8.7

## ARKANSAS RIVER BASIN

## ARKANSAS RIVER BELOW JOHN MARTIN RESERVOIR AT CADDOA, COLO.

LOCATION --At gaging station 1 mile upstream from Caddoa Creek, 1½ miles downstream from John Martin Dam, Bent County, and 3 miles southeast of Hasty. DRAINAGE AREA, 16,355 square miles.

RECORDS AVAILABLE --Chemical analyses: August 1942 to August 1943, October 1945 to July 1949 (intermittent and weekly samples), January 1951 to September 1953 (daily samples).

Water temperatures: January 1951 to September 1953.

EXTREMES 1952-53 --Dissolved solids: Maximum, 3,640 ppm Feb. 1-10; minimum, 712 ppm June 21-30.

HARDNESS: Maximum, 1,680 ppm Feb. 1-10; minimum, 400 ppm June 21-30.

Specific conductance: Maximum observed, 4,510 micromhos Feb. 20; minimum observed, 851 micromhos June 24.

Water temperatures: Maximum observed, 78°F July 5, 25-26; minimum observed, 32°F Jan. 15.

EXTREMES Jan. 1951-53 --Dissolved solids: Maximum, 3,640 ppm Feb. 1-10, 1953; minimum, 712 ppm June 21-30, 1953.

HARDNESS: Maximum, 1,710 ppm Feb. 1-10, 1952; minimum, 400 ppm June 21-30, 1953.

Specific conductance: Maximum observed, 4,520 micromhos Jan. 29, 1952; minimum observed, 830 micromhos June 19, 1952.

Water temperatures: Maximum observed, 85°F Aug. 6, 1951; minimum observed, 32°F Jan. 15, 1953.

REMARKS --Records of specific conductance of daily samples available in district offices at Albuquerque, N.Mex. Values reported for dissolved solids are sums of determined constituents. Records of discharge for water year October 1952 to September 1953 given in WSP 1281.

## Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boiron (B)	Dissolved solids (sum)		Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Calcium, mg./l.	Non-carbonate			
Oct. 1-10, 1952	66.3	20	0.01	334	134	371	6.4	305	0	1,710	92	0.9	8.3	0.58	2,830	3.85	1,380	1,130	37	3,330	8.0
Oct. 11-20	50.8	18	.01	368	149	415	6.2	305	0	1,920	104	.9	6.7	.65	3,140	4.27	1,530	1,280	37	3,670	8.0
Oct. 21-31	58.6	18	.01	360	146	404	7.0	316	0	1,970	101	.9	6.5	.65	3,070	4.18	1,500	1,240	37	3,610	7.9
Nov. 1-10	59.7	21	--	365	148	404	--	328	0	1,990	106	--	8.1	--	3,100	4.22	1,520	1,250	37	3,660	7.8
Nov. 11-20	94.3	17	--	284	115	282	--	318	0	1,360	75	--	5.4	--	2,290	3.11	583	1,180	34	2,940	7.8
Nov. 21-30	51.3	16	--	322	145	376	--	334	0	1,700	98	--	5.4	--	2,830	3.85	1,400	1,130	37	3,400	7.7
Dec. 1-10	2.72	17	--	334	170	475	--	341	0	1,990	124	--	5.0	--	3,280	4.46	24.1	1,530	40	3,910	7.8
Dec. 11-20	2.93	16	--	326	175	465	--	360	0	1,970	123	--	5.0	--	3,260	4.43	25.8	1,530	40	3,910	7.8
Dec. 21-31	2.65	17	--	344	185	484	--	410	0	2,030	124	--	4.9	--	3,390	4.61	24.3	1,620	39	4,040	7.8
Jan. 1-10, 1953	2.27	24	--	367	174	490	--	376	0	2,110	128	--	5.5	--	3,480	4.73	21.3	1,620	40	4,110	7.7
Jan. 11-20	2.45	18	--	338	176	475	--	408	0	1,990	118	--	4.0	--	3,320	4.52	22.0	1,570	40	3,920	7.7
Jan. 21-31	4.25	17	--	365	175	490	--	366	0	2,100	124	--	5.0	--	3,460	4.71	29.7	1,630	40	4,050	7.7
Feb. 1-10	2.83	20	--	380	179	520	--	362	0	2,220	133	--	5.9	--	3,640	4.95	25.8	1,680	40	4,210	7.7
Feb. 11-20	2.51	17	--	343	164	500	--	382	0	2,120	126	--	4.3	--	3,490	4.75	23.7	1,640	40	4,080	7.7
Feb. 21-28	2.84	17	--	346	183	468	--	408	0	2,060	125	--	3.2	--	3,410	4.64	24.3	1,660	38	4,000	7.6
Mar. 1-10	6.86	18	--	386	189	478	--	380	0	2,100	125	--	4.1	--	3,460	4.71	24.3	1,670	36	4,130	7.8
Mar. 11-20	6.89	18	--	384	179	451	--	366	0	1,990	113	--	4.1	--	3,280	4.43	26.5	1,590	37	3,930	7.8
Mar. 21-31	14.5	16	--	330	162	400	7.0	279	0	1,580	96	--	4.8	--	3,040	4.13	119	1,490	37	3,600	7.7

Apr. 1-10.....	643	14	--	310	152	370	6.9	229	0	1,790	105	--	4.8	--	2,870	3.90	4,980	1,400	1,210	36	4.3	3,400	7.7
Apr. 11-16.....	660	13	--	328	153	390	6.9	246	0	1,870	100	--	5.1	--	2,990	4.07	5,330	1,450	1,250	37	4.5	3,530	7.8
Apr. 17-30.....	57.0	13	--	340	169	425	6.6	270	0	2,010	108	--	4.6	--	3,210	4.37	4,937	1,550	1,330	37	4.7	3,750	7.9
May 1-10.....	100	15	--	340	158	412	--	253	0	1,940	103	--	4.0	--	3,100	4.22	4,831	1,370	1,290	37	4.6	3,700	7.8
May 11-17, 19-20.....	115	13	--	310	146	388	--	244	0	1,780	96	--	3.2	--	2,860	3.69	4,888	1,370	1,170	38	4.5	3,430	7.9
May 18.....	230	18	--	198	79	200	--	204	0	1,967	46	--	3.5	--	1,610	2.19	1,000	819	1,652	35	3.0	2,070	7.6
May 21-30.....	237	12	--	303	149	382	--	210	0	1,810	91	--	2.3	--	2,850	3.88	1,820	1,370	1,200	38	4.5	3,370	7.7
May 31, June 1-2.....	502	19	--	225	84	155	--	208	0	984	30	--	3.5	--	1,600	2.18	2,170	907	736	27	2.2	2,020	7.5
June 3-10.....	504	16	--	130	45	100	--	174	0	530	24	--	1.0	--	1,932	1.27	1,270	510	367	30	1.9	1,280	7.8
June 11-17.....	557	16	--	110	37	79	--	171	0	414	21	--	3.1	--	764	1.04	1,150	426	286	29	1.7	1,080	7.8
June 18.....	1,140	16	--	314	128	232	--	286	0	1,450	43	--	2	--	2,320	3.16	7,140	1,310	1,080	28	2.8	2,760	7.5
June 19-20.....	473	15	--	174	62	108	--	166	0	1,724	19	--	4.1	--	1,190	1.62	1,520	589	553	25	1.8	1,540	7.7
June 21-30.....	475	15	--	104	34	73	--	155	0	387	19	--	4.3	--	712	.97	913	400	272	28	1.6	1,010	7.8
July 1-10.....	488	15	--	124	42	93	--	160	0	488	22	--	4.3	--	867	1.18	1,140	482	351	30	1.8	1,200	7.7
July 11-20.....	1,083	14	--	132	44	94	--	152	0	539	18	--	4.1	--	920	1.25	2,690	510	386	29	1.8	1,250	7.8
July 21-30.....	910	13	--	175	59	119	--	150	0	738	24	--	4.4	--	1,210	1.65	2,970	679	556	28	2.0	1,580	7.9
July 31.....	66.0	13	--	334	134	358	--	272	0	1,720	87	--	8.4	--	2,790	3.79	497	1,380	1,160	36	4.2	3,280	7.7
Aug. 1-3.....	408	16	--	263	101	251	--	245	0	1,280	65	--	2.1	--	2,100	2.86	2,310	1,070	870	34	3.3	2,600	7.3
Aug. 4-10.....	594	16	--	153	49	109	--	187	0	602	24	--	1.0	--	1,050	1.43	1,680	583	430	29	2.0	1,410	7.2
Aug. 11-12, 18-20.....	983	14	--	148	43	93	--	173	0	547	22	--	5.0	--	957	1.30	2,540	546	404	27	1.7	1,290	7.3
Aug. 13-17.....	268	17	--	242	90	217	--	226	0	1,120	56	--	7.7	--	1,860	2.53	1,350	974	789	33	3.0	2,330	7.5
Aug. 21-30.....	360	16	--	166	49	116	--	144	0	675	29	--	3.2	--	1,130	1.54	1,100	616	498	29	2.0	1,480	7.4
Aug. 31, Sept. 1-3, 8-10.....	89.1	20	--	304	121	310	--	280	0	1,520	76	--	3.5	--	2,490	3.39	599	1,260	1,030	35	3.8	2,960	7.7
Sept. 4-7.....	217	19	--	182	68	148	--	236	0	790	32	--	1	--	1,360	1.85	797	734	540	31	2.4	1,760	7.8
Sept. 11-20.....	37.9	18	--	342	148	394	--	282	0	1,460	98	--	6.3	--	2,980	4.07	306	1,460	1,230	37	4.5	3,490	7.7
Sept. 21-30.....	29.8	17	--	352	157	418	--	269	0	1,960	106	--	4.9	--	3,150	4.28	253	1,520	1,300	37	4.7	3,670	7.6
Weighted average ...	219	15	--	202	79	186	--	193	0	960	46	--	3.9	--	1,590	2.16	940	829	671	33	2.8	1,990	--

## ARKANSAS RIVER BASIN--Continued

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

Temperature (°F) of water, water year October 1952 to September 1953  
 (Once-daily temperature measurement between 8:00 a. m. and 10:00 a. m.)

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

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

LOCATION--At gaging station at Chestnut Avenue highway bridge, and half a mile west of Arkansas City, Cowley County, 5 miles upstream from Walnut River.  
 DRAINAGE AREA 43,775 square miles.  
 RECORDS AVAILABLE--Chemical analyses: October 1951 to September 1953.

Water temperatures: October 1951 to September 1953.

EXTREMES 1952-53--Dissolved solids: Maximum, 1,800 ppm June 21-23; minimum, 338 ppm Aug. 8-10.

Hardness: Maximum, 445 ppm Jan 16-19; minimum, 148 ppm Aug. 8-10.

Specific conductance: Maximum daily, 3,460 micromhos June 20; minimum daily, 483 micromhos Aug. 9.

Water temperatures: Maximum, 81° F. July 22; minimum, freezing point on several days during November, December, January, and February.

EXTREMES 1951-53--Dissolved solids: Maximum, 1,800 ppm June 21-23, 1953; minimum, 338 ppm Aug. 8-10, 1953.

Hardness: Maximum, 561 ppm Dec. 22-23, 1951; minimum, 148 ppm Aug. 8-10, 1953.

Specific conductance: Maximum daily, 3,460 micromhos June 20, 1953; minimum daily, 438 micromhos Aug. 9, 1953.

Water temperatures: Maximum, 81° F. July 22, 1953; 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 1952 to September 1953 given in WSP 1281.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal-cium (Ca)	Mag-ni-sium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Car-bonate (CO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> )	Bo-ron (B)	Dissolved solids (residue at 180° C)			Hardness as CaCO <sub>3</sub>		Per-cent so-lidum	So-lidum adsorp-tion ratio	Specific conduct-ance (micro-mhos at 25° C)	
															Parts per mil-lion	Tons per acre-foot	Tons per day	Total	Non-carbon-ate				
Oct. 1-10, 1952	211	12	0.00	116	31	412	7.9	253	0	174	635	0.3	7.7	0.28	1,570	2.14	894	417	210	68	8.8	2,640	7.8
Oct. 11-20	278	--	--	98	30	405	--	262	0	170	605	--	6.5	--	1,460	1.99	1,100	368	154	71	9.2	2,350	8.1
Oct. 21-31	368	13	.00	100	27	380	8.0	244	0	165	565	.3	7.2	.21	1,430	1.94	1,420	360	160	69	8.7	2,490	7.9
Nov. 1-10	408	--	--	90	26	382	--	251	0	163	555	--	7.1	--	1,440	1.96	1,590	332	126	71	9.2	2,450	7.7
Nov. 11-20	455	16	.00	102	26	376	7.2	248	0	173	550	.3	9.4	.21	1,390	1.90	1,710	362	158	69	8.6	2,470	7.9
Nov. 21, 25-27	561	--	--	87	24	331	--	226	0	161	480	--	6.5	--	1,260	1.71	1,910	316	130	70	8.1	2,150	7.6
Nov. 22-24, 28-30	433	--	--	107	28	393	--	254	0	190	585	--	6.5	--	1,510	2.05	1,770	382	174	69	8.8	2,570	7.6
Dec. 1-10	604	13	.00	96	23	318	6.2	235	0	156	475	.3	10	.19	1,230	1.67	2,010	334	142	67	7.6	2,170	7.7
Dec. 11-20	722	--	--	102	27	308	--	244	0	186	450	--	8.3	--	1,260	1.71	2,460	366	166	65	7.0	2,160	7.9
Dec. 21, 24	824	--	--	95	27	276	--	222	0	177	410	--	3.9	--	1,160	1.58	2,580	348	166	63	6.4	1,990	7.5
Dec. 22-23, 25-31	683	--	--	112	29	342	--	246	0	196	515	--	11	--	1,400	1.90	2,580	398	196	65	7.4	2,380	7.4

## ARKANSAS RIVER BASIN--Continued

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

Chemical analyses, in parts per million, water year October 1952 to September 1953.--Continued

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Mag-nesium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Car-bonate (CO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> )	Bo-trate (B)	Dissolved solids (residue at 180° C)			Hardness as CaCO <sub>3</sub>		Per-cent so-lidum	So-lidum adsorp-tion ratio	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate				
Jan. 11-10, 1953	809	14	.00	107	25	330	5.9	251	0	191	485	.3	8.6	.22	1,300	1.77	2,840	370	164	66	7.5	2,280	7.8
Jan. 11-15, 20	875	--	--	110	28	350	--	250	0	232	495	--	7.3	--	1,350	1.84	3,190	390	184	66	7.7	2,280	8.1
Jan. 16-19	750	--	--	124	33	385	--	253	0	288	545	--	7.1	--	1,570	2.14	3,180	445	238	65	7.9	2,600	7.9
Jan. 21-31	958	14	.00	118	31	340	6.3	252	0	285	470	.5	5.8	.23	1,420	1.93	3,670	422	216	63	7.2	2,360	8.1
Feb. 1-10	840	--	--	110	35	355	--	249	0	270	495	--	7.9	--	1,410	1.92	3,200	418	214	65	7.5	2,360	7.7
Feb. 11-20	861	12	.00	108	28	326	6.2	245	0	242	450	.5	5.2	.21	1,320	1.80	3,070	384	184	64	7.2	2,260	7.8
Feb. 21-28	763	14	.00	113	28	335	5.8	255	0	245	500	.5	9.0	.27	1,380	1.88	2,840	397	188	64	7.3	2,330	7.8
Mar. 1-8	1,216	--	--	88	24	265	--	217	0	183	370	--	3.5	--	1,060	1.47	3,550	318	140	64	6.4	1,850	7.8
Mar. 9-10	1,190	--	--	99	25	310	--	227	0	217	430	--	6.4	--	1,250	1.70	4,020	350	164	66	7.2	2,100	7.9
Mar. 11-20	1,079	17	.00	104	28	324	6.2	240	0	214	490	.3	5.8	.36	1,340	1.82	3,900	374	178	65	7.3	2,230	8.0
Mar. 21-31	872	16	.00	109	30	355	7.8	245	0	228	515	.3	4.6	.32	1,420	1.93	3,340	396	194	66	7.8	2,390	7.9
Apr. 1	4,280	--	--	47	9.5	66	--	177	0	34	89	--	1.0	--	362	.49	4,180	156	12	46	2.3	599	7.3
Apr. 2-3	1,465	--	--	63	13	197	--	156	0	118	222	--	2.4	--	674	.92	2,720	218	89	61	4.6	1,190	8.0
Apr. 4-5	975	--	--	81	23	230	--	190	0	174	368	--	3.5	--	1,010	1.37	2,660	296	141	65	6.3	1,750	8.0
Apr. 6-10	858	--	--	94	25	283	--	219	0	197	435	--	3.6	--	1,160	1.56	2,680	346	166	65	6.9	2,020	8.1
Apr. 11-20	751	12	.00	100	28	341	6.5	232	0	213	495	.3	5.3	.37	1,350	1.84	2,740	366	176	66	7.7	2,480	8.6
Apr. 21-30	653	12	.00	100	28	356	6.9	229	0	206	535	.3	2.6	.44	1,410	1.92	2,490	364	177	67	8.1	2,430	8.1
May 1, 4-10	670	--	--	92	31	354	--	222	0	199	490	--	2.9	--	1,290	1.75	2,330	357	175	67	7.7	2,280	7.9
May 2-3	836	--	--	75	23	281	--	198	0	174	398	--	2.8	--	1,050	1.43	2,370	292	120	68	7.3	1,820	7.9
May 11	644	--	--	94	28	350	--	186	18	197	520	--	6.9	--	1,390	1.89	2,430	342	159	69	6.3	2,360	8.6
May 12-13	981	--	--	76	20	256	--	182	0	156	375	--	2.2	--	1,070	1.46	2,830	272	122	67	6.8	1,800	7.9
May 14	1,510	--	--	52	10	107	--	139	0	79	153	--	5.7	--	494	.67	2,010	170	56	58	5.2	866	8.2
May 15	844	--	--	64	15	179	--	150	3	120	280	--	3.3	--	806	1.10	1,840	221	93	64	5.2	1,320	8.3
May 16-18	843	--	--	76	20	238	--	186	0	161	340	--	2.8	--	998	1.36	2,270	272	119	66	6.3	1,720	7.9
May 19	1,020	--	--	62	15	179	--	147	3	114	255	--	6.4	--	763	1.04	2,100	216	90	64	5.3	1,280	8.3
May 20	1,060	--	--	80	20	227	--	197	0	144	322	--	3.6	--	962	1.31	2,750	282	120	64	5.9	1,620	8.2
May 21-22	904	--	--	74	17	213	--	189	0	128	305	--	2.4	--	866	1.18	2,110	256	101	64	5.8	1,520	8.2
May 23-26	862	--	--	85	22	307	--	193	0	159	458	--	1.4	--	1,170	1.59	2,150	304	146	69	7.6	2,080	7.7
May 27-31	545	--	--	95	27	375	--	220	0	164	560	--	3.7	--	1,410	1.92	2,070	350	170	70	8.7	2,460	8.2

June 1-6, 1953	439	--	--	106	29	413	248	0	182	630	--	2.8	--	1,550	2.11	1,840	385	182	70	9.2	2,690	7.8
June 7	416	--	--	94	26	350	210	7	161	530	--	3.0	--	1,350	1.84	1,520	340	156	69	8.3	2,350	8.4
June 8-10	340	--	--	98	32	455	185	0	185	720	--	4.9	--	1,660	2.26	1,520	375	224	10	10	2,960	7.2
June 11-20	268	16	--	95	35	485	177	0	197	765	5	5.7	46	1,790	2.43	1,300	381	236	73	11	3,100	8.0
June 21-23	220	--	--	98	33	491	187	0	191	770	--	5.5	--	1,800	2.45	1,070	380	227	74	11	3,090	8.2
June 24-25	297	--	--	81	22	318	157	0	157	485	--	6.9	--	1,220	1.68	978	292	164	70	8.1	2,120	8.0
June 26-30	246	--	--	78	28	418	156	0	179	640	--	9.3	--	1,530	2.08	1,020	310	182	75	10	2,650	8.0
July 1-3	269	--	--	84	28	408	177	0	176	630	--	11	--	1,540	2.09	1,120	324	180	73	9.8	2,640	7.8
July 4-5	451	--	--	84	22	348	174	0	164	515	--	9.8	--	1,320	1.80	1,610	300	158	72	8.7	2,270	7.9
July 6-7	402	--	--	72	19	275	187	0	136	402	--	5.2	--	1,050	1.43	1,140	258	104	70	7.4	1,840	8.1
July 8-10	324	--	--	82	23	348	183	0	139	525	--	5.4	--	1,300	1.77	1,140	299	149	72	8.7	2,240	8.0
July 11-13	452	--	--	76	22	331	176	0	138	495	--	5.6	--	1,240	1.69	1,510	280	136	72	8.6	2,160	7.8
July 14-18	964	--	--	58	14	189	168	0	96	270	--	1.8	--	758	1.03	1,970	202	64	67	5.8	1,330	7.7
July 19-20	1,000	--	--	55	11	109	156	0	71	158	--	5.5	--	531	.72	1,430	182	54	57	3.5	1,922	8.1
July 21-22	744	--	--	70	13	187	167	0	98	278	--	3.7	--	785	1.07	1,580	228	91	64	5.4	1,380	8.2
July 23-27	573	--	--	80	17	284	187	0	138	425	--	3.3	--	1,130	1.54	1,750	270	116	70	7.8	1,920	8.1
July 28-31	372	--	--	82	23	380	182	0	158	565	--	3.7	--	1,380	1.88	1,390	299	150	73	9.5	2,410	7.7
Aug. 1-4	377	--	--	86	28	413	181	0	168	625	--	5.2	--	1,550	2.11	1,580	330	181	73	9.9	2,630	7.9
Aug. 5-7	728	--	--	56	13	160	155	0	82	235	--	3.0	--	674	.92	1,330	193	66	64	5.0	1,160	7.6
Aug. 8-10	2,633	--	--	46	8.2	56	155	0	41	73	--	1.8	--	338	.46	2,400	148	22	45	2.0	569	8.0
Aug. 11-13	1,263	--	--	51	7.5	76	147	0	53	108	--	4.0	--	413	.56	1,410	138	38	51	2.6	1,704	7.7
Aug. 16-20	1,10	--	--	68	12	175	171	0	99	255	--	4.4	--	756	1.03	1,450	219	79	53	5.1	1,300	7.9
Aug. 21-23	543	--	--	76	18	299	194	0	133	370	--	3.7	--	1,010	1.37	1,460	268	110	68	6.9	2,520	7.1
Aug. 24-31	404	--	--	82	24	344	176	0	166	515	--	4.9	--	1,260	1.74	1,400	303	157	71	8.6	2,250	7.6
Sept. 1-10	307	--	--	94	27	411	203	0	178	595	--	5.1	52	1,480	2.01	1,230	346	179	72	9.6	2,500	7.7
Sept. 11-20	214	13	--	104	30	430	233	0	189	840	5	5.8	5	1,560	2.16	919	383	194	70	9.5	2,740	8.0
Sept. 21-30	167	9.6	--	115	33	483	253	0	197	705	5	6.4	52	1,710	2.33	771	422	215	70	9.8	2,930	8.0
Weighted average	650	--	--	92	25	a 305	b 219	--	180	443	--	5.4	--	1,210	1.63	2,120	332	153	67	7.3	2,080	--

a Calculated from other weighted average constituents.  
b Includes equivalent of individual carbonate values shown above.

## LOWER MISSISSIPPI RIVER BASIN

## ARKANSAS RIVER BASIN--Continued

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

Temperature (°F) of water, water year October 1952 to September 1953  
 /Once-daily temperature measurement at 7:30 a. m./

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

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

LOCATION --At gaging station at bridge on State Highway 18 at Ralston, Pawnee County, 2 miles downstream from Salt Creek, 2 miles upstream from Grayhorse Creek, and at mile 594.0.

DRAINAGE AREA --54,227 square miles.

RECORDS AVAILABLE --Chemical analyses: January 1950 to September 1953.

Water temperatures: January 1950 to September 1953.

EXTREMES, 1952-53 --Dissolved solids: Maximum, 2,670 ppm July 21-31; minimum, 252 ppm May 31.

Hardness: Maximum, 456 ppm Oct. 21-31; minimum, 117 ppm Aug. 6.

Specific conductance: Maximum, 5,150 micromhos July 29; minimum daily, 398 micromhos May 31.

Water temperatures: Maximum, 97°F June 13-14; minimum, freezing point Jan. 16.

EXTREMES, January 1950 to September 1953 --Dissolved solids: Maximum, 2,670 ppm July 21-31, 1953; minimum, 208 ppm July 15-17, 1951.

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

Specific conductance: Maximum daily, 5,150 micromhos July 29, 1953; minimum daily, 319 micromhos July 16, 1951.

Specific temperatures: Maximum, 97°F June 13-14, 1953; minimum, freezing point on many days during winter months.

REMARKS --Specific conductance of 1953 samples available in district office at Oklahoma City, Okla. Records of discharge for water year October 1952 to September 1953 given in NSF 1261.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean dis- charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal- cium (Ca)	Mag- ne- sium (Mg)	So- dium (Na)	Po- tas- sium (K)	Bicar- bonate (HCO <sub>3</sub> )	Car- bonate (CO <sub>3</sub> )	Sul- fate (SO <sub>4</sub> )	Chlo- ride (Cl)	Fluo- ride (F)	Ni- trate (NO <sub>3</sub> )	Bo- ron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Per- cent so- dium	So- dium adsorp- tion ratio	Specific conduct- ance (micro- mhos at 25°C)	pH
															Parts per mil- lion	Tons per acre- foot	Tons per day	Total	Non- carbon- ate				
Oct. 1-10, 1952	340	--	--	108	38	448		206	0	205	720	--	1.8	--	1,680	2.28	1,540	428	256	70	9.4	2,910	7.6
Oct. 11-20	302	7.5	0.00	116	38	472	7.6	210	0	205	765	0.3	1.1	0.19	1,800	2.45	1,470	446	274	69	9.7	3,100	8.2
Oct. 21-31	394	8.0	.00	122	37	488	9.8	221	0	216	800	.5	1.2	.22	1,840	2.50	1,960	456	276	69	9.9	3,180	8.2
Nov. 1-10	455	--	--	104	37	472		222	0	198	745	--	.2	--	1,780	2.39	2,160	412	230	71	10	2,980	8.1
Nov. 11-20	560	5.5	.00	108	33	441	7.7	219	0	201	690	.5	.8	.23	1,650	2.24	2,490	405	226	70	9.5	2,860	8.0
Nov. 21-30	812	--	--	114	30	431		231	0	188	680	--	.6	--	1,630	2.22	3,570	408	218	70	9.3	2,800	7.9
Dec. 1-10	734	--	--	118	34	405		241	0	190	650	--	3.5	--	1,610	2.19	3,190	434	237	67	8.4	2,780	7.8
Dec. 11-20	875	12	.00	110	29	368	6.6	236	0	178	555	.3	5.6	.23	1,410	1.92	3,330	394	200	66	7.8	2,430	8.0
Dec. 21-31	946	10	.00	118	31	376	7.6	237	0	205	590	.3	6.8	.22	1,480	2.01	3,760	422	228	65	8.0	2,560	8.0
Jan. 1-10, 1953	899	--	--	113	34	391		243	0	200	610	--	7.2	--	1,500	2.04	3,640	422	223	67	8.3	2,650	8.2
Jan. 11-20	961	12	.00	112	31	368	6.0	242	0	217	565	.3	6.2	.25	1,500	2.03	3,870	407	208	66	8.9	2,540	8.0
Jan. 21-31	1,017	--	--	119	33	394		237	0	247	580	--	6.0	--	1,550	2.11	4,260	432	238	66	8.3	2,680	7.6
Feb. 1-10	1,033	10	.00	118	33	376	7.0	239	0	287	555	.5	2.6	.27	1,480	2.01	4,130	430	234	65	7.9	2,530	8.0
Feb. 11-20	1,078	--	--	112	31	365		231	0	238	570	--	3.2	--	1,450	1.97	4,220	407	213	67	8.3	2,520	7.9
Feb. 21-28	1,066	10	.00	116	33	372	6.3	236	0	222	595	.5	5.5	.30	1,500	2.04	4,320	425	232	65	7.8	2,540	8.1

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

Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal-cium (Ca)	Mag-nesium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Car-bonate (CO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> ) (B)	Dissolved solids (residue at 160°C)			Hardness as CaCO <sub>3</sub>		Per-cent ad-sorp-tion ratio	So-dium ad-sorp-tion ratio	Specific conduct-ance (micro-mhos at 25°C)	pH	
														Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbon-ate					
Mar. 1-4, 1953	1,275	--	--	112	31	383	--	218	0	203	600	--	5.6	--	1,520	2,07	5,230	407	228	67	8.3	3,520	8.1
Mar. 3-4	1,615	--	--	102	26	321	--	209	0	171	500	--	5.2	--	1,300	1,77	6,370	362	190	66	7.3	2,170	8.0
Mar. 5-10	2,185	--	--	95	24	275	--	197	0	159	432	--	6.0	--	1,150	1,56	6,780	336	182	64	6.5	1,940	7.8
Mar. 11-19	1,557	--	--	101	28	327	--	215	0	194	500	--	5.6	--	1,290	1,75	5,420	387	191	66	7.4	2,180	8.2
Mar. 20	1,780	--	--	115	39	597	--	193	0	281	885	--	4.8	--	2,060	2,80	9,900	448	290	74	12	3,520	8.2
Mar. 21-22	1,610	--	--	114	35	495	--	220	0	247	755	--	3.5	--	1,870	2,54	8,130	428	248	72	10	3,140	8.0
Mar. 23-24	1,450	--	--	112	34	451	--	229	0	235	685	--	3.3	--	1,730	2,35	6,770	420	232	70	9.6	2,800	7.9
Mar. 25-31	1,251	--	--	90	33	406	--	186	0	221	610	--	4	--	1,530	2,08	5,170	360	208	71	9.3	2,690	7.7
Apr. 1-3	3,243	--	--	102	32	375	--	171	0	188	630	--	2.9	--	1,460	1,99	12,780	386	246	68	8.3	2,550	8.1
Apr. 4-5	4,900	--	--	62	13	120	--	148	0	74	189	--	3.0	--	558	.76	7,380	208	86	56	3.6	981	7.9
Apr. 6-7	2,665	--	--	71	18	183	--	153	0	110	295	--	3.9	--	794	1.08	5,710	251	126	61	5.0	1,380	8.1
Apr. 8-10	1,843	--	--	85	24	285	--	176	0	150	430	--	2.5	--	1,060	1.44	5,270	310	166	65	6.5	1,880	7.9
Apr. 11-20	1,328	9.6	0.00	94	29	319	6.5	195	0	184	495	0.3	1.9	.31	1,280	1.74	4,590	354	194	66	7.4	2,180	7.8
Apr. 21-30	1,169	10	.00	97	29	361	6.8	182	0	204	570	.1	1.3	.41	1,440	1.96	4,550	361	212	68	8.3	2,450	8.0
May 1-4	1,080	--	--	96	31	418	--	216	0	207	625	--	1.6	--	1,500	2.04	4,370	367	190	71	9.5	2,610	8.2
May 5-10	1,220	--	--	84	26	319	--	186	0	179	475	--	2.0	--	1,190	1.62	3,920	316	164	69	7.8	2,110	8.0
May 11	1,400	--	--	82	24	302	--	180	7	148	468	--	1.8	--	1,180	1.80	4,460	304	162	68	7.5	2,060	8.4
May 12-13	5,540	--	--	50	11	131	--	127	0	58	205	--	4.8	--	553	.75	8,270	170	66	63	4.4	997	7.8
May 14-15	3,175	--	--	58	14	178	--	127	3	78	280	--	4.3	--	733	1.00	6,280	202	93	66	5.4	1,270	8.3
May 16-18	2,563	--	--	67	17	223	--	158	0	105	340	--	4.9	--	866	1.18	5,980	238	108	67	6.3	1,580	8.0
May 19	2,220	--	--	89	22	342	--	183	8	149	532	--	7.0	--	1,300	1.77	7,790	314	167	70	8.4	2,210	8.5
May 20	2,340	--	--	74	20	263	--	157	8	119	402	--	6.3	--	1,020	1.39	6,440	266	124	68	7.0	1,790	8.4
May 21-25	1,896	--	--	86	22	341	--	187	0	159	530	--	3.1	--	1,320	1.80	6,760	305	158	71	8.5	2,310	8.0
May 26-30	1,534	--	--	102	28	426	--	207	0	183	680	--	3.0	.31	1,640	2.23	6,790	370	202	71	9.6	2,810	7.9
May 31	15,800	--	--	40	5.9	37	--	135	0	24	50	--	7.5	--	252	.34	10,610	124	20	39	1.5	398	8.2
June 1	12,000	--	--	46	8.0	70	--	113	0	37	116	--	6.5	--	386	.52	12,510	148	56	51	2.5	674	8.2
June 2-3	3,220	--	--	62	13	174	--	127	2	72	285	--	4.0	--	728	.99	6,330	210	102	64	5.2	1,270	8.3
June 4-6	1,837	--	--	81	18	234	--	162	4	108	375	--	3.3	--	975	1.33	4,840	274	135	65	6.1	1,780	8.3
June 7-8	1,465	--	--	62	15	171	--	145	0	76	275	--	3.7	--	721	.98	4,200	218	99	63	5.0	1,300	7.9
June 9-10	1,465	--	--	95	25	281	--	188	0	125	495	--	2.3	--	1,180	1.80	4,670	338	164	65	6.9	2,050	7.6

June 11-13, 1953.....	1,083	--	--	90	24	330	187	0	141	585	--	3.0	--	1,280	1.74	3,740	324	187	69	8.0	2,210	8.2
June 14-20.....	751	--	--	90	31	396	166	0	163	640	--	3.5	--	1,580	2.15	3,200	350	214	71	9.2	2,550	7.8
June 21-27.....	781	--	--	90	31	375	155	0	154	625	--	3.2	--	1,520	2.07	3,210	352	225	70	8.7	2,540	8.0
June 28-30.....	801	--	--	90	25	290	163	0	114	490	--	2.5	--	1,200	1.63	2,600	328	194	66	6.9	2,060	8.2
July 1-7.....	469	--	--	101	34	427	167	0	172	695	--	2.6	--	1,660	2.26	2,100	392	255	70	9.4	2,800	7.8
July 8-8.....	674	--	--	84	27	373	163	0	156	595	--	2.8	--	1,440	1.96	2,620	320	187	72	9.1	2,470	8.0
July 10.....	786	--	--	74	21	294	159	0	128	445	--	6.9	--	1,140	1.55	2,420	271	140	70	7.8	1,970	8.2
July 11.....	714	--	--	74	21	271	142	2	108	440	--	7.6	--	1,120	1.52	2,160	271	151	68	7.2	1,880	8.3
July 12-18.....	3,700	--	--	33	9.1	98	99	0	38	152	--	2.6	--	426	.58	4,260	120	39	64	3.9	741	7.9
July 19-20.....	3,765	--	--	75	21	596	127	0	174	905	--	4.4	--	1,960	2.67	19,920	274	170	83	16	3,360	8.0
July 21-31.....	1,630	16	.00	102	31	816	151	0	245	1,250	.5	3.5	.51	2,670	3.63	13,190	382	258	82	18	4,580	8.0
Aug. 1-5.....	915	--	--	95	35	780	115	0	260	1,210	--	5.5	--	2,540	3.45	6,280	380	286	82	17	4,340	7.7
Aug. 6.....	4,000	--	--	35	7.2	66	113	0	28	95	--	7.3	--	307	.42	3,320	117	24	55	2.7	538	8.1
Aug. 7-10.....	2,170	--	--	57	15	221	135	0	84	340	--	4.9	--	826	1.12	4,840	202	92	70	6.7	1,470	7.9
Aug. 11-18.....	2,098	--	--	55	10	130	146	0	67	180	--	5.1	--	559	.76	3,170	178	58	61	4.2	971	7.7
Aug. 19-20.....	1,430	--	--	71	16	243	163	0	103	380	--	5.2	--	950	1.29	3,670	242	108	69	7.0	1,660	8.1
Aug. 21-31.....	945	--	--	84	22	386	171	0	158	590	--	3.5	--	1,360	1.85	3,470	300	160	74	9.7	2,360	7.5
Sept. 1-6.....	753	--	--	78	24	382	153	0	149	565	--	3.2	--	1,310	1.78	2,660	292	166	73	9.2	2,290	7.8
Sept. 7-10.....	549	--	--	90	28	450	155	0	166	720	--	2.2	--	1,580	2.15	2,340	340	213	74	11	2,730	7.9
Sept. 11-20.....	361	7.5	.00	87	30	430	163	0	171	665	.5	1.4	.49	1,520	2.07	1,480	340	207	73	10	2,670	7.9
Sept. 21-30.....	216	6.2	.00	92	32	432	180	0	181	670	.5	1.4	.69	1,570	2.14	916	361	214	72	9.9	2,720	7.9
Weighted average.....	1,268	--	--	86	24	a 327	b 177	--	154	507	--	3.9	--	1,250	1.70	4,280	313	188	69	8.0	2,150	--

a Calculated from other weighted average constituents.

b Includes equivalent of individual carbonate values shown above.

## ARKANSAS RIVER BASIN--Continued

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

Temperature (°F) of water, water year October 1952 to September 1953

/Once-daily temperature measurement at 5 p. m. /

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

## ARKANSAS RIVER BASIN--Continued

## SKELETON CREEK NEAR LOVELL, OKLA.

LOCATION --At gaging station at bridge on State Highway 74, 2 miles upstream from Otter Creek, and 2½ miles east of Lovell, Logan County.

DRAINAGE AREA --410 square miles.

RECORDS AVAILABLE --Chemical analyses: October 1950 to September 1953.

Water temperatures: October 1950 to September 1953.

EXTREMES, 1952-53 --Dissolved solids: Maximum, 1,420 ppm Oct. 21, 27-30; minimum, 145 ppm June 11.

Hardness: Maximum, 390 ppm Feb. 12, 14-20; minimum, 54 ppm Aug. 18-20.

Specific conductance: Maximum, 2,530 microhos Oct. 27-30; minimum Aug. 19.

Temperature: Maximum, 90°F July 6, 8, 13; minimum, 33°F Dec. 23-26, 28.

EXTREMES, 1950-53 --Dissolved solids: Maximum, 2,100 ppm Dec. 7-8, 1950; minimum, 122 ppm Sept. 13, 1951.

Hardness: Maximum, 670 ppm Dec. 7-8, 1950; minimum, 48 ppm July 21, 1951.

Specific conductance: Maximum daily, 3,610 microhos Dec. 7, 1950; minimum daily, 174 microhos Aug. 19, 1953.

Water temperatures: Maximum, 91°F July 25, 1952; minimum, freezing point on several days during winter months.

REMARKS --Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of discharge for water year October 1952 to September 1953 given in WSP 1281.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Nitrate (NO <sub>3</sub> )	Phosphate (PO <sub>4</sub> )	Boron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium-sulfate ratio	Specific conductance (micro-mhos at 25°C)
														Parts per million	Tons per acre-foot	Total	Non-carbonate			
Oct. 1-10, 1952	0.28	10	0.00	91	31	297	12	404	7	165	332	1.8	1.8	1,200	1.63	354	12	64	6.9	1,950
Oct. 11-20	.18	8.0	.05	94	34	343	12	442	0	184	392	1.3	1.2	1,340	1.82	.7	274	12	66	7.7
Oct. 21, 27-30	.90	--	--	92	36	383	383	436	0	195	480	1.1	--	1,420	1.93	3.5	378	20	69	8.5
Oct. 22-26, 31	.53	--	--	70	28	283	283	392	0	129	318	1.0	--	1,070	1.46	1.5	290	0	68	7.2
Nov. 1-10	1.35	13	.00	83	29	283	14	428	0	144	318	1.2	4.5	1,140	1.55	.43	328	0	64	6.8
Nov. 11-20	1.70	10	.00	89	32	326	15	466	0	181	352	2.4	7.5	1,250	1.70	5.7	354	0	66	7.5
Nov. 21-28	4.84	--	--	86	38	341	445	0	177	398	3.6	--	--	1,330	1.81	17	370	6	67	7.7
Nov. 29-30	4.00	--	--	55	21	190	252	0	101	220	18	--	--	791	1.08	8.5	234	17	65	5.5
Dec. 1-2	3.65	--	--	63	27	243	320	0	135	268	19	--	--	982	1.34	9.7	268	6	66	6.4
Dec. 3-10	4.10	--	--	51	19	178	238	0	98	200	17	--	--	726	.99	8.0	205	10	65	5.4
Dec. 11-18	4.06	--	--	60	25	181	269	0	110	210	19	--	--	791	1.08	8.7	252	32	61	5.0
Dec. 19-20	10.1	--	--	78	32	276	299	0	133	375	18	--	--	1,150	1.56	31	326	81	65	6.7
Dec. 21, 23-24	17.6	--	--	75	30	236	339	0	152	262	23	--	--	1,030	1.40	49	310	32	62	5.8
Dec. 22, 25-26	9.33	--	--	63	29	191	296	0	114	222	22	--	--	862	1.19	22	276	34	60	5.0
Dec. 27-31	5.10	--	--	35	15	134	175	0	73	144	21	--	--	576	.77	7.8	149	6	66	4.8
Jan. 1-5, 1953	3.40	--	--	41	13	130	165	0	72	137	16	--	--	530	.72	4.9	186	21	62	4.2
Jan. 6-9	4.15	--	--	78	24	239	324	0	157	238	23	--	--	938	1.34	11	293	28	64	6.0
Jan. 10-14	3.40	--	--	86	26	305	344	0	136	323	33	--	--	1,200	1.83	15.2	326	28	67	7.8
Jan. 15-20	3.30	15	.00	89	31	303	393	0	137	328	36	--	46	1,250	1.71	11	354	40	64	7.0
Jan. 21-31	2.90	--	--	86	34	319	391	0	190	358	30	--	--	1,260	1.71	9.9	354	34	66	7.4

## LOWER MISSISSIPPI RIVER BASIN

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

Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Nitrate (NO <sub>3</sub> )	Phosphate (PO <sub>4</sub> )	Boron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Total	Non-carbonate			
Feb. 1-7, 1953.....	3.44	--	--	84	33	317	370	4	188	362	23	--	--	--	1,210	1.65	345	36	67	2,050	8.3
Feb. 8-10.....	4.27	--	--	60	31	252	301	0	156	285	16	--	--	--	1,961	1.31	277	30	66	1,820	7.9
Feb. 11, 13.....	4.60	--	--	72	32	279	347	0	165	318	15	--	--	--	1,060	1.44	311	26	66	1,840	7.9
Feb. 12, 14-20.....	3.46	--	--	100	35	348	450	0	183	388	19	--	--	--	1,320	1.80	394	25	65	2,100	7.9
Feb. 21-22, 24, 26, 28	3.87	--	--	87	30	307	412	0	172	332	30	--	--	--	1,190	1.62	340	3	64	2,000	7.9
Feb. 23, 25.....	4.90	--	--	55	19	179	235	0	119	180	21	--	--	--	1,190	.98	215	6	64	1,230	7.5
Mar. 1-2.....	4.15	--	--	73	30	324	408	0	168	338	29	--	--	--	1,190	1.62	306	0	70	2,000	7.8
Mar. 3-4, 6.....	50.3	--	--	54	18	167	241	0	108	175	16	--	--	--	1,981	.94	208	11	64	1,150	7.7
Mar. 11, 14.....	18.68	--	--	33	12	107	131	0	97	170	11	--	--	--	486	.59	132	8	62	723	7.6
Mar. 15-17.....	6.53	--	--	55	19	131	220	0	92	152	14	--	--	--	608	.83	152	13	60	781	8.1
Mar. 18.....	7.1	--	--	64	24	177	244	6	104	220	17	--	--	--	810	1.10	208	27	58	997	8.2
Mar. 19-20.....	10.5	--	--	86	32	264	356	7	156	312	18	--	--	--	1,110	1.51	346	43	62	1,300	8.3
Mar. 21-31.....	4.33	18	0.00	84	30	259	386	0	152	305	16	--	--	0.56	1,080	1.47	333	16	62	1,810	8.2
Apr. 1-2, 4, 6.....	20.3	--	--	82	29	272	396	0	149	322	8.4	--	--	--	1,070	1.46	324	0	65	1,870	8.2
Apr. 3, 8-10.....	12.1	--	--	31	10	77	133	0	53	86	10	--	--	--	356	.48	118	10	59	1,617	7.6
Apr. 5, 7.....	43.5	--	--	52	19	151	216	0	114	164	10	--	--	--	825	.85	208	30	61	1,080	7.9
Apr. 11, 13, 20.....	4.83	--	--	33	12	91	145	0	57	101	12	--	--	--	402	.55	132	13	60	695	7.7
Apr. 12, 14-15.....	4.40	--	--	82	32	260	357	0	159	310	6.8	--	--	--	1,060	1.44	336	44	63	1,790	7.9
Apr. 16-18.....	4.60	--	--	40	16	111	182	0	63	130	11	--	--	--	491	.67	166	17	59	848	7.9
Apr. 19.....	5.00	--	--	86	35	305	382	8	178	358	6.8	--	--	--	1,210	1.65	358	32	65	2,030	8.3
Apr. 21-30.....	4.69	10	.00	90	30	318	398	0	164	390	5.6	--	--	.55	1,220	1.66	348	22	65	2,060	8.2
May 1-10.....	3.41	8.0	.00	91	30	322	425	0	160	380	3.3	--	--	.48	1,250	1.70	350	2	65	2,110	8.1
May 11.....	5.00	--	--	70	23	236	251	26	128	278	8.8	--	--	--	904	1.23	269	20	66	1,570	8.8
May 12.....	53.0	--	--	38	12	118	152	0	78	134	5.0	--	--	--	480	.65	144	4	64	859	8.6
May 13-15.....	221	--	--	23	7.9	42	100	6	29	40	3.0	--	--	--	219	.30	131	0	50	396	8.6
May 16-17.....	15.5	--	--	30	9.8	63	118	8	37	67	9.2	--	--	--	293	.40	116	6	54	521	8.6
May 18-20.....	27.3	--	--	37	12	91	171	3	58	90	9.8	--	--	--	400	.54	142	0	58	708	8.3
May 21-25.....	7.28	--	--	30	10	61	135	4	34	62	6.1	--	--	--	308	.42	116	0	53	530	8.4
May 26.....	4.00	--	--	39	12	86	145	15	45	96	6.4	--	--	--	388	.53	147	3	56	874	8.6
May 27-31.....	2.46	--	--	56	18	133	217	20	65	168	3.8	--	--	--	606	.82	214	2	58	1,070	8.7
June 1.....	2.00	--	--	59	19	147	239	21	73	178	4.4	--	--	--	646	.88	225	0	59	1,150	8.8
June 2.....	2.20	--	--	32	10	54	154	0	31	54	5.4	--	--	--	262	.36	121	0	49	480	8.1
June 3-4.....	1.60	--	--	21	6.5	32	87	10	20	25	3.9	--	--	--	171	.76	79	0	47	287	8.6
June 5.....	3.10	--	--	53	17	135	210	23	65	158	3.1	--	--	--	557	.76	202	0	59	1,030	8.8

# ARKANSAS RIVER BASIN

67

June 6-8, 1953	668	--	--	23	6.7	37	101	9	20	31	4.4	--	--	187	.25	337	85	0	49	1.8	328	8.6
June 9-10	53.5	--	--	31	9.3	43	121	16	31	54	5.5	--	--	292	.36	38	116	0	45	1.7	459	8.8
June 11	14.0	--	--	19	6.1	28	84	8	19	18	5.9	--	--	145	.20	5.5	72	0	45	1.4	259	8.5
June 12-13	8.70	--	--	36	11	65	133	14	39	70	5.2	--	--	317	.43	7.4	135	2	51	2.4	532	8.1
June 14-20	3.96	--	--	45	14	88	182	0	54	108	3.9	--	--	439	.60	4.0	170	21	53	2.9	768	8.1
June 21-26	2.15	--	--	56	16	115	204	0	71	150	4.2	--	--	542	.74	3.1	206	39	55	3.5	926	8.0
June 27	1.28	--	--	62	23	197	244	14	105	278	3.2	--	--	867	1.18	.7	300	76	59	4.9	1,470	8.5
June 28	1.70	--	--	62	18	128	204	12	74	170	3.8	--	--	618	.64	2.8	223	41	53	5.7	1,430	8.5
June 29-30	1.50	--	--	62	23	200	260	12	107	275	3.1	--	--	868	1.18	3.0	300	67	59	5.0	1,470	8.4
July 1-8	1.60	--	--	90	26	236	387	0	135	302	2.3	--	--	965	1.95	4.3	332	56	61	5.6	1,690	8.1
July 9-10	1.20	--	--	47	19	161	186	4	39	170	2.5	--	--	592	.27	1.7	170	26	61	4.0	888	8.4
July 11-12	33.1	--	--	27	7	9	181	0	21	120	6.8	--	--	292	.40	20	100	1	59	2.8	501	8.1
July 13-14	267	--	--	18	5.4	31	86	0	21	76	7.1	--	--	176	.24	127	87	0	50	1.6	270	8.0
July 15-16	31.5	--	--	47	12	133	84	0	16	270	7.1	--	--	638	.87	54	166	114	64	4.5	1,020	7.7
July 17-20	7.85	--	--	30	8.3	107	103	0	25	104	4.8	--	--	314	.43	6.2	109	24	58	2.9	561	7.9
July 21-22	33.5	--	--	39	5.5	75	111	0	33	120	5.8	--	--	340	.76	31	120	29	59	3.0	606	7.6
July 23-31	24.4	--	--	44	12	114	206	0	64	118	6.5	--	--	487	.86	32	160	0	61	3.9	834	8.0
Aug. 1-3, 6	9.8	--	--	30	8.8	69	142	0	40	71	5.1	--	--	316	.43	8.4	111	0	58	2.9	538	8.2
Aug. 4-5	39.5	--	--	53	14	133	210	3	85	147	4.5	--	--	558	.76	60	188	11	61	4.2	957	8.3
Aug. 7-10	8.65	--	--	46	12	125	198	3	67	140	4.0	--	--	526	.72	12	166	0	62	4.2	899	8.3
Aug. 11-17	2.86	--	--	52	15	150	234	0	77	172	1.8	--	--	601	.82	3.8	190	0	63	4.7	1,060	7.9
Aug. 18-20	197	--	--	15	4.0	29	82	0	15	23	4.2	--	--	148	.20	79	54	0	54	1.7	233	7.7
Aug. 21-31	3.25	--	--	26	7.3	39	126	0	20	38	3.7	--	--	217	.30	1.9	95	0	47	1.8	375	7.8
Sept. 1-3, 6-7, 10	2.75	--	--	37	16	123	214	1	68	131	2.4	--	--	519	.71	3.9	160	0	63	4.2	884	8.3
Sept. 4-5, 8-9	15.0	--	--	38	3.6	66	147	0	33	74	3.0	--	--	318	.43	13	110	0	57	2.7	539	8.0
Sept. 11-15	.68	--	--	43	11	107	204	2	56	114	2.2	--	--	468	.64	1.1	153	0	60	3.8	796	8.3
Sept. 16-20	.32	--	--	66	17	206	309	3	103	228	2.4	--	--	818	1.11	.7	236	0	65	5.9	1,390	8.3
Sept. 21-22	.1	7.4	--	.00	72	228	323	14	112	255	1.3	1.0	.75	898	1.22	.2	274	0	63	6.0	1,520	8.5
Weighted average...	16.9	--	--	33	11	a82	b186	--	47	88	6.8	--	--	366	0.50	17	128	0	58	3.2	623	--

a Calculated from other weighted average constituents.

b Includes equivalent of individual carbonate values shown above.

## LOWER MISSISSIPPI RIVER BASIN

## ARKANSAS RIVER BASIN--Continued

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

Temperature (°F) of water, water year October 1952 to September 1953.

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

## ARKANSAS RIVER BASIN--Continued

## CIMARRON RIVER AT PERKINS, OKLA.

LOCATION.--At gaging station at bridge on State Highway 40, 1 mile south of Perkins, Payne County, 1½ miles upstream from Dugout Creek, 4 miles downstream from Wildhorse Creek, and at mile 87.3.

DRAINAGE AREA.--17,825 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1952 to September 1953.

Water temperatures: October 1952 to September 1953.

EXTREMES, 1952-53.--Dissolved solids: Maximum, 17,600 ppm Jan. 11-12; minimum, 566 ppm July 12-14.

Hardness: Maximum, 1,130 ppm May 26-27; minimum, 121 ppm July 12-14.

Specific conductance: Maximum daily, 27,400 micromhos Jan. 11, 12; minimum, freezing point on several days during November, December, January and February.

Water temperatures: Maximum, 71°F Apr. 16; minimum, freezing point on several days during November, December, January and February.

REMARKS.--Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of discharge for water year October 1952 to September 1953 given in WSP 1281.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boiron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)		
															Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate				
Oct. 1-10, 1952	4.88	12	0.00	246	74	1,640	13	246	0	246	2,650	0.1	--	0.31	5,490	7.47	72	918	717	79	24	9,460	7.9
Oct. 11-19	3.52	--	--	236	78	1,590	289	236	0	233	2,780	--	--	--	5,280	7.15	50	910	714	79	23	8,940	7.7
Oct. 20	4.00	--	--	225	76	1,430	271	271	0	219	2,500	--	--	--	4,770	6.49	52	874	652	78	21	8,120	8.1
Oct. 21-22	4.60	--	--	241	80	1,580	258	0	233	2,780	2,380	--	--	--	5,360	7.29	67	930	719	79	23	8,810	7.8
Oct. 23-31	3.67	--	--	234	73	1,520	261	0	225	2,650	2,650	--	--	--	5,110	6.95	51	884	670	79	22	8,420	7.7
Nov. 1-10	3.30	14	0.00	225	72	1,470	9.5	287	0	217	2,580	.3	--	.34	5,000	6.80	45	858	638	79	22	8,270	7.9
Nov. 11-13	2.90	--	--	223	73	1,410	289	0	212	2,430	2,430	--	--	--	4,770	6.49	37	856	612	78	21	8,060	7.7
Nov. 14-20	4.23	--	--	195	68	1,230	287	0	217	2,250	2,250	--	--	--	4,410	6.00	50	766	547	79	21	7,350	7.9
Nov. 21, 23, 25	15.7	--	--	185	59	1,310	269	0	216	2,080	2,080	--	--	--	4,090	5.56	173	704	484	79	20	7,310	7.6
Nov. 22, 30	30.5	--	--	173	61	1,030	240	0	269	1,740	682	--	--	--	3,710	5.05	306	682	486	77	17	6,320	7.7
Nov. 24, 26-27	31.3	--	--	147	51	843	298	0	198	1,390	1,390	--	--	--	2,910	3.96	246	576	332	76	15	4,930	7.7
Nov. 28	38.0	--	--	135	53	1,716	362	0	227	1,120	2,277	--	--	--	2,570	3.50	264	555	258	74	13	4,370	7.4
Nov. 29	51.0	--	--	169	61	1,020	322	0	338	1,620	1,620	--	--	--	3,550	4.83	489	672	408	77	17	5,990	7.5
Dec. 1-2	48.0	--	--	164	59	1,190	313	0	363	1,950	1,950	--	--	--	3,850	5.24	499	652	395	80	20	6,530	8.1
Dec. 3	40.0	--	--	192	65	1,660	309	0	442	2,560	2,560	--	--	--	5,150	7.00	556	746	494	83	26	8,700	8.2
Dec. 4, 9-10	32.3	--	--	197	71	1,940	306	0	446	3,040	3,040	--	--	--	5,980	8.13	522	784	533	84	30	10,100	7.5
Dec. 5, 8	34.0	--	--	220	73	2,310	302	0	472	3,640	3,640	--	--	--	6,960	9.47	639	849	602	86	34	11,600	8.0
Dec. 6-7	34.0	--	--	239	75	2,580	314	0	512	4,080	4,080	--	--	--	7,810	10.62	717	905	648	86	37	13,100	7.9
Dec. 11-12, 16	34.7	--	--	176	70	1,790	291	0	394	2,820	2,820	--	--	--	5,430	7.38	509	727	488	84	29	9,240	8.0
Dec. 13-15	32.0	--	--	174	66	1,640	301	0	369	2,580	2,580	--	--	--	4,980	6.77	430	706	459	83	27	8,490	8.1

## LOWER MISSISSIPPI RIVER BASIN

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

Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal-cium (Ca)	Mag-ne-sium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Car-bonate (CO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> )	Dissolved solids			Hardness as CaCO <sub>3</sub>		Per-cent so-lu-mion ratio	So-lu-m absorp-tion (micro-mhos at 25° C)	Specific conduct-ance (micro-mhos at 25° C)		
														Bo-ron (B)	Parts per mil-lion		Tons per acre-foot	Tons per day				Total	Non-carbon-ate
Dec. 17, 20, 1952 ..	67.0	--	--	190	75	2,430	247	0	484	3,800	--	--	--	--	7,190	9.78	1,300	782	560	87	38	12,200	8.0
Dec. 18-19 .....	63.5	--	--	229	80	3,020	251	0	574	4,720	--	--	--	--	8,630	12.01	1,510	900	695	88	44	14,700	7.8
Dec. 21-22, 24 .....	125	--	--	185	67	2,530	246	0	467	3,940	--	--	--	--	7,310	9.94	2,470	737	536	88	41	12,300	8.1
Dec. 23, 25-26 .....	147	--	--	177	63	2,080	265	0	417	3,240	--	--	--	--	6,150	8.36	2,440	700	484	87	34	10,500	8.1
Dec. 27 .....	138	--	--	219	82	3,540	259	0	560	5,520	--	--	--	--	10,100	13.74	3,760	884	672	90	52	16,900	8.2
Dec. 28 .....	133	--	--	210	79	3,070	262	0	521	4,800	--	--	--	--	9,000	12.24	3,230	849	634	89	46	15,100	8.1
Dec. 29-30 .....	159	--	--	236	93	4,420	243	0	574	7,250	--	--	--	--	13,100	17.82	5,620	972	772	91	65	21,400	8.0
Dec. 31 .....	164	--	--	246	93	5,360	239	0	615	8,370	--	--	--	--	15,000	20.40	6,640	996	800	92	74	24,100	8.2
Jan. 1, 1953 .....	138	--	--	238	93	5,460	236	0	622	8,520	--	--	--	--	15,300	20.81	5,700	976	783	92	76	24,300	8.2
Jan. 2 .....	116	--	--	183	80	4,030	241	0	504	6,280	--	--	--	--	11,200	15.23	3,510	786	588	92	63	18,400	8.2
Jan. 3-9 .....	99.6	--	--	186	78	3,600	224	0	501	5,610	--	--	--	--	10,100	13.74	2,720	784	601	91	56	16,800	8.1
Jan. 10 .....	201	--	--	237	98	4,360	201	0	617	6,850	--	--	--	--	12,300	16.73	6,660	984	830	90	60	20,200	8.0
Jan. 11-12 .....	195	--	--	275	103	6,260	223	0	702	9,790	--	--	--	--	17,600	23.94	9,270	1,110	927	92	82	27,400	8.0
Jan. 13 .....	168	--	--	169	74	3,720	229	0	504	5,750	--	--	--	--	10,700	14.55	4,850	726	538	92	60	17,600	8.1
Jan. 14-18 .....	112	--	--	178	75	3,320	227	0	476	5,170	--	--	--	--	9,630	13.10	2,910	752	566	91	53	16,000	8.1
Jan. 19-20 .....	124	--	--	173	68	2,970	224	0	444	4,630	--	--	--	--	8,670	11.79	2,900	711	528	90	49	14,500	8.0
Jan. 21-22, 24, 29 .....	147	--	--	201	80	3,290	220	0	495	5,170	--	--	--	--	9,660	13.16	3,840	830	650	90	50	16,000	7.8
Jan. 23, 25, 27-28 .....	126	--	--	190	67	3,030	219	0	478	4,720	--	--	--	--	8,780	11.94	2,980	750	570	90	48	14,500	7.9
Jan. 26 .....	116	--	--	179	62	2,530	262	0	414	3,940	--	--	--	--	7,430	10.10	2,330	702	487	89	42	12,600	7.8
Jan. 30 .....	157	--	--	237	84	4,090	202	0	608	6,410	--	--	--	--	11,800	16.05	5,000	937	772	90	58	19,300	7.9
Jan. 31 .....	141	--	--	242	90	4,760	218	0	630	7,440	--	--	--	--	13,900	18.36	5,140	974	796	91	66	21,900	7.9
Feb. 1, 7-10 .....	111	--	--	190	86	3,520	224	0	510	5,510	--	--	--	--	10,000	13.60	3,000	828	644	90	53	16,700	8.0
Feb. 2-3 .....	133	--	--	173	76	2,840	220	0	468	4,430	--	--	--	--	8,350	11.36	3,000	744	564	89	45	13,900	7.8
Feb. 4-6 .....	113	--	--	204	91	4,210	215	0	533	6,600	--	--	--	--	11,700	15.91	3,670	863	707	91	62	19,200	7.8
Feb. 11-17 .....	145	--	--	200	85	3,260	224	0	521	5,120	--	--	--	--	9,360	12.73	3,660	848	665	89	49	15,600	7.9
Feb. 18-19 .....	186	--	--	216	91	3,650	236	0	569	5,720	--	--	--	--	10,400	14.14	3,220	913	720	90	52	17,200	7.8
Feb. 20-21 .....	168	--	--	221	93	4,170	237	0	580	6,320	--	--	--	--	11,700	15.91	3,510	934	740	91	59	18,600	7.9
Feb. 21-23 .....	132	--	--	254	105	5,680	254	0	622	8,510	--	--	--	--	15,900	21.62	5,670	1,060	857	92	76	25,500	8.0
Feb. 24-25 .....	126	--	--	211	87	3,870	243	0	530	6,060	--	--	--	--	11,000	14.96	3,740	888	690	90	56	16,300	7.9
Feb. 26-28 .....	115	--	--	205	88	3,390	248	0	506	5,320	--	--	--	--	9,790	13.31	3,040	869	666	89	50	16,000	8.0
Mar. 1 .....	150	--	--	200	86	3,320	221	7	498	5,070	--	--	--	--	9,590	13.04	3,880	852	660	89	48	15,700	8.3
Mar. 2, 9 .....	219	--	--	163	67	2,320	217	0	405	3,640	--	--	--	--	6,920	9.41	4,190	562	408	89	39	11,600	8.1
Mar. 3-5 .....	451	--	--	94	37	1,090	163	0	193	1,720	--	--	--	--	3,410	4.64	4,050	386	253	86	24	5,910	8.0
Mar. 6 .....	465	--	--	129	52	1,670	169	4	381	2,580	--	--	--	--	5,060	6.88	6,350	536	374	87	31	8,560	8.3
Mar. 7-8 .....	335	--	--	133	56	2,000	213	3	383	3,070	--	--	--	--	5,950	8.09	6,380	562	383	89	37	10,000	8.3
Mar. 10 .....	265	--	--	178	67	2,690	191	5	480	4,180	--	--	--	--	7,940	10.80	5,680	720	554	89	44	13,100	8.3
Mar. 11 .....	238	--	--	228	89	5,160	210	0	570	8,080	--	--	--	--	14,700	19.99	9,450	935	763	92	73	23,100	8.2

ARKANSAS RIVER BASIN

71

Mar. 12, 1953.....	224	--	--	--	--	78	213	4	502	6,450	--	--	--	11,700	15,91	7,080	792	611	92	64	19,100	8.3	
Mar. 13.....	210	--	--	--	--	157	69	3,240	214	4	441	5,020	--	--	9,320	12,68	5,260	675	493	91	54	15,500	8.3
Mar. 14.....	475	--	--	--	--	108	42	2,780	164	0	245	2,780	--	--	5,200	7,07	3,670	442	308	90	37	8,980	8.0
Mar. 15.....	392	--	--	--	--	130	61	2,310	188	0	338	3,610	--	--	6,770	9,21	7,170	476	422	80	42	11,400	8.0
Mar. 16, 20.....	426	--	--	--	--	98	39	1,320	183	0	229	2,050	--	--	3,950	5,37	4,540	405	255	88	29	6,860	7.7
Mar. 17.....	424	--	--	--	--	108	42	1,500	161	0	249	2,350	--	--	4,530	6,16	3,190	442	310	88	21	7,760	8.1
Mar. 18.....	708	--	--	--	--	64	27	1,796	138	0	147	1,230	--	--	2,450	3,33	4,680	270	158	86	21	4,230	7.9
Mar. 19.....	451	--	--	--	--	85	32	1,160	149	0	189	1,600	--	--	3,470	4,72	4,230	344	222	86	27	5,920	8.0
Mar. 21-22, 27, 29.....	150	--	--	--	--	66	248	2,440	248	0	383	3,800	--	--	7,260	9,87	2,940	650	448	89	42	12,200	7.9
Mar. 23.....	154	--	--	--	--	173	71	2,760	263	0	399	4,330	--	--	8,110	11,03	3,370	724	508	89	45	13,500	8.1
Mar. 24, 31.....	112	--	--	--	--	190	78	2,950	280	0	447	4,630	--	--	8,650	11,76	3,620	794	582	89	45	14,400	7.8
Mar. 25-26.....	126	--	--	--	--	194	83	3,530	254	0	487	5,520	--	--	10,100	13,74	3,270	826	618	90	53	16,700	8.0
Mar. 28.....	95	--	--	--	--	184	80	3,160	249	0	477	4,980	--	--	9,120	12,40	2,340	788	584	90	49	15,100	7.6
Mar. 30.....	97	--	--	--	--	171	72	2,100	306	0	363	3,310	--	--	6,500	8,64	1,700	722	472	86	34	10,900	7.7
Apr. 1-5.....	131	--	--	--	--	189	78	2,910	211	0	456	4,560	--	--	8,370	11,38	2,860	782	619	89	45	13,600	7.8
Apr. 6.....	356	--	--	--	--	92	36	1,050	136	0	167	1,680	--	--	3,130	4,26	3,010	378	266	86	23	5,480	7.6
Apr. 7, 10.....	466	--	--	--	--	120	46	1,480	212	0	278	2,280	--	--	4,320	5,68	5,440	469	315	87	29	7,330	7.6
Apr. 8.....	560	--	--	--	--	58	21	1,475	134	0	117	710	--	3.2	1,470	2,00	2,220	231	121	82	14	2,640	7.1
Apr. 9.....	370	--	--	--	--	64	31	833	219	0	207	1,220	--	--	2,490	3,39	2,490	337	158	84	20	4,430	7.9
Apr. 11-13.....	162	--	--	--	--	166	56	2,400	201	0	388	3,710	--	0.52	7,620	9,19	2,960	644	480	89	40	11,300	8.2
Apr. 14.....	119	--	--	--	--	180	66	2,730	214	0	440	4,260	--	--	7,620	10,64	2,510	720	545	89	44	12,600	8.1
Apr. 15-16.....	101	--	--	--	--	198	74	2,950	225	0	491	4,560	--	--	8,380	11,40	2,290	798	614	89	45	14,000	8.0
Apr. 17-18.....	240	--	--	--	--	209	77	3,140	210	0	500	4,920	--	--	9,020	12,27	5,840	838	666	89	47	14,900	7.6
Apr. 19.....	224	--	--	--	--	90	32	1,130	181	0	249	1,700	--	--	3,290	4,47	1,990	356	208	87	26	5,860	8.0
Apr. 20.....	142	--	--	--	--	100	34	964	173	0	210	1,500	--	--	2,950	4,01	1,130	380	248	84	21	5,120	7.6
Apr. 21.....	119	--	--	--	--	136	47	1,530	187	5	292	2,400	--	--	4,570	6,22	1,470	533	372	86	29	7,790	8.3
Apr. 22, 25.....	99.0	--	--	--	--	167	63	2,310	201	0	365	3,640	--	--	6,830	9,29	1,830	676	511	88	39	11,200	8.1
Apr. 23-24, 26, 28.....	93.3	--	--	--	--	185	73	2,560	224	0	438	4,030	--	--	7,700	10,47	1,940	762	578	88	40	12,800	8.1
Apr. 27, 28-30.....	70.0	--	--	--	--	202	74	2,720	227	0	473	4,280	--	--	8,120	11,04	1,530	808	622	88	42	13,300	7.8
May 1-3, 5-10.....	48.7	--	--	--	--	76	69	2,770	239	0	487	4,360	--	--	8,150	11,08	1,070	839	643	88	41	13,600	8.0
May 4.....	49.0	--	--	--	--	154	69	1,980	247	0	264	3,110	--	--	5,950	8,09	787	688	465	87	33	10,000	8.2
May 11.....	66.0	--	--	--	--	186	79	2,490	172	6	479	3,940	--	--	7,500	10,20	1,340	788	637	87	39	12,400	8.4
May 12.....	290	--	--	--	--	146	54	1,760	270	8	342	2,800	--	--	5,430	7,38	4,250	585	432	87	32	9,200	8.5
May 13.....	860	--	--	--	--	60	26	698	152	0	144	1,100	--	--	2,250	3,06	4,010	308	184	83	17	3,960	8.2
May 14.....	810	--	--	--	--	56	18	299	128	5	94	1,458	--	4.4	1,040	1,41	2,270	212	98	75	9.0	1,850	8.4

## LOWER MISSISSIPPI RIVER BASIN

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

Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Mag-nesium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Car-bonate (CO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> )	Bo-ron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Per-cent so-dium	So-dium adsorp-tion ratio	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per acre-day	Total	Non-carbonate				
May 15, 1953.....	1,150	--	--	90	26	893	893	139	6	261	1,330	--	--	--	2,770	3.77	8,600	330	206	85	21	4,840	8.4
May 16-18.....	618	--	--	93	24	653	142	0	239	930	1,390	--	3.6	--	2,130	2.90	3,550	332	216	81	16	3,660	7.9
May 19-20.....	322	--	--	166	39	1,000	136	4	457	1,530	1,530	--	--	--	3,420	4.85	2,970	575	457	79	18	5,710	8.4
May 21.....	253	--	--	174	40	962	128	4	326	1,500	1,500	--	--	--	4,200	4.35	2,190	475	364	81	19	5,560	8.3
May 22.....	203	--	--	170	44	1,380	169	11	428	2,150	2,150	--	--	--	4,450	6.05	2,440	605	448	83	25	7,330	8.5
May 23.....	160	--	--	192	46	1,600	170	11	465	2,460	2,460	--	--	--	5,130	6.98	2,220	670	512	84	27	8,380	8.5
May 24.....	175	--	--	200	54	1,930	181	8	494	3,000	3,000	--	--	--	6,010	8.17	2,840	720	558	85	31	9,970	8.5
May 25.....	189	--	--	239	70	2,910	187	8	607	4,560	4,560	--	--	--	8,780	11.95	4,490	886	736	88	43	14,900	8.4
May 26-27.....	145	--	--	293	97	5,560	186	0	745	8,720	8,720	--	--	--	16,200	22.03	6,340	1,130	978	91	72	25,200	8.0
May 28.....	112	--	--	234	83	4,600	214	5	641	7,150	7,150	--	--	--	13,200	17.95	3,990	924	740	92	66	21,100	8.4
May 29.....	97.0	--	--	203	74	3,960	201	7	596	6,120	6,120	--	--	--	11,300	15.37	2,960	811	635	91	61	18,300	8.4
May 30-31.....	78.5	--	--	205	74	3,470	228	4	561	5,380	5,380	--	--	--	10,100	13.74	2,140	817	624	90	53	15,800	8.3
June 1-5.....	53.0	--	--	211	80	3,370	216	0	544	5,270	5,270	--	--	--	9,860	13.41	1,410	856	679	90	50	15,400	7.8
June 6.....	127	--	--	177	71	2,590	157	7	429	4,090	4,090	--	--	--	7,720	10.50	2,650	733	593	88	41	12,900	8.4
June 7.....	186	--	--	108	39	1,410	153	6	253	2,200	2,200	--	--	--	4,230	5.75	2,120	430	284	88	30	7,370	8.4
June 8.....	1,270	--	--	42	11	216	139	6	61	305	305	--	3.5	--	741	1.01	2,540	152	28	76	7.6	1,370	8.4
June 9-10.....	788	--	--	45	12	285	122	0	68	430	430	--	3.2	--	949	1.29	2,020	160	60	79	9.8	1,740	7.3
June 11-12.....	305	--	--	88	23	665	130	6	171	1,040	1,040	--	--	--	2,160	2.94	1,780	316	200	82	16	3,820	8.4
June 13-14.....	166	--	--	178	48	1,880	165	0	490	2,900	2,900	--	--	--	5,830	7.93	2,610	640	505	86	32	9,810	8.2
June 15.....	98.0	--	--	182	44	1,420	163	9	552	2,120	2,120	--	--	--	4,570	6.22	1,090	635	486	83	24	7,630	8.5
June 16-17.....	61.5	--	--	192	44	1,250	164	0	551	1,900	1,900	--	--	--	4,220	5.74	701	660	526	81	21	6,730	8.2
June 18.....	45.0	--	--	180	46	1,200	166	6	481	1,850	1,850	--	--	--	3,970	5.40	482	640	494	80	21	6,590	8.5
June 19.....	27.0	--	--	202	53	1,410	167	9	507	2,200	2,200	--	--	--	4,680	6.38	431	720	568	81	23	7,810	8.5
June 20.....	37.0	--	--	198	57	1,540	170	4	493	2,420	2,420	--	--	--	5,100	6.94	372	730	584	82	25	8,450	8.4
June 21-22.....	20.5	--	--	214	60	1,680	--	196	10	472	2,680	--	--	--	5,350	7.23	296	780	604	82	26	8,980	8.4
June 23-24.....	29.5	--	--	186	54	1,490	--	187	2	348	2,450	--	--	--	4,750	6.46	378	686	530	83	25	8,070	8.3
June 25.....	17.0	--	--	181	59	1,650	--	188	0	352	2,650	--	--	--	5,140	6.99	236	640	540	84	27	8,730	8.2
June 26.....	14.0	--	--	200	66	1,820	--	197	0	387	3,020	--	--	--	6,320	7.90	220	770	609	84	29	9,740	7.6
June 27-28.....	11.3	--	--	203	71	1,960	--	187	0	394	3,310	--	--	--	6,320	8.60	193	738	646	84	30	10,500	8.1
June 30.....	11.0	--	--	212	79	2,240	--	148	0	378	3,670	--	--	--	6,960	9.47	207	854	732	85	33	11,400	8.1

# ARKANSAS RIVER BASIN

73

July 1, 1953	10.0	1,140	112	0	219	1,890	--	--	3,520	4.79	95	460	368	84	23	6,380	8.1
July 2-6	9.98	2,170	174	0	374	3,540	--	--	6,680	9.08	180	826	683	85	33	11,300	8.0
July 7	32.0	845	111	0	139	1,440	--	--	3,320	3.74	238	404	312	82	18	4,890	8.2
July 8	14.0	1,080	140	0	170	1,750	--	--	3,330	4.53	126	464	350	83	22	5,930	7.2
July 9	52.0	1,470	161	9	263	2,450	--	--	4,650	6.32	653	625	478	84	26	8,050	8.4
July 10	20.0	1,756	154	0	128	1,250	--	--	2,420	3.28	131	360	234	82	17	4,350	8.2
July 11	20.0	448	118	0	65	730	--	3.8	1,470	2.00	79	342	145	80	13	2,870	8.1
July 12-14	719	1,356	92	0	34	255	--	2.4	566	.77	1,100	121	46	74	6.2	1,060	7.9
July 15-16	2,050	1,330	139	0	463	1,980	--	--	4,150	5.64	22,970	602	488	83	24	6,950	7.9
July 17-19	2,250	2,470	138	0	414	3,740	--	--	6,980	9.49	42,460	622	510	90	43	11,600	7.8
July 20	2,920	604	127	0	311	895	--	5.5	2,000	2.72	15,770	308	204	81	15	3,480	8.0
July 21	4,540	486	123	0	332	710	--	4.4	1,810	2.46	22,190	409	308	72	10	3,060	7.6
July 22	2,690	246	108	0	101	350	--	4.5	650	1.16	6,040	166	78	76	8.3	1,550	8.1
July 23	1,350	379	93	0	112	600	--	3.3	1,290	1.75	4,700	248	172	77	10	2,330	7.6
July 24	900	594	110	0	198	910	--	1.8	1,890	2.57	4,990	290	200	81	15	3,410	8.1
July 25	2,160	1,100	111	0	327	1,750	--	--	3,520	4.79	20,530	460	369	84	22	6,140	7.7
July 26	2,120	588	116	2	362	938	--	2.5	2,190	2.98	12,540	462	384	73	12	3,720	5.3
July 27-28	637	408	104	0	282	985	--	5.5	1,940	2.09	2,650	350	264	72	13	2,630	7.7
July 29	603	726	119	0	332	1,100	--	--	2,490	3.39	4,070	468	370	77	13	4,230	7.7
July 30-31	464	2,410	135	0	641	3,660	--	--	7,690	10.40	9,360	970	860	84	34	12,300	7.9
Aug 1-6	352	1,550	162	0	340	2,450	--	--	4,760	6.47	4,520	508	375	87	30	8,130	7.7
Aug 7	334	1,278	124	0	72	956	--	4.5	3,956	1.30	862	194	82	77	8.9	1,750	8.2
Aug 8-9	205	1,250	167	0	284	1,980	--	--	3,880	5.28	2,150	500	363	84	24	6,710	7.6
Aug 10	281	2,080	182	5	448	3,290	--	--	6,350	8.64	4,820	735	578	86	33	10,700	8.3
Aug 11	172	2,380	174	0	541	3,690	--	--	7,090	9.64	3,290	733	590	88	38	11,900	8.3
Aug 12-15, 17	204	833	187	0	266	1,320	--	--	2,750	3.74	1,510	480	327	79	17	4,780	7.9
Aug 16, 18	215	1,760	98	0	352	2,780	--	--	5,250	7.14	3,050	540	460	88	33	8,960	7.8
Aug 19-20	536	697	124	0	171	1,050	--	--	2,070	2.82	3,000	244	142	86	19	3,710	7.8
Aug 21-22	449	1,340	135	0	257	2,100	--	--	3,970	5.40	4,810	830	320	87	28	6,990	8.0
Aug 23	410	2,640	133	0	524	4,180	--	--	8,010	10.89	8,870	417	708	88	40	13,200	8.1
Aug 24	384	4,440	140	0	635	6,950	--	--	12,600	17.14	13,060	924	810	91	63	20,400	8.1
Aug 25	277	3,490	153	0	575	5,420	--	--	9,840	13.38	7,360	771	646	91	55	16,300	8.0
Aug 26	666	1,550	292	0	263	2,380	--	--	4,660	6.34	8,380	495	256	87	30	8,150	8.2
Aug 27	810	2,970	192	0	499	4,630	--	--	8,650	11.76	18,920	747	580	90	47	14,400	8.2
Aug 28-31	329	1,350	180	0	253	2,100	--	--	4,060	5.52	3,610	440	292	87	28	7,030	7.6

## ARKANSAS RIVER BASIN--Continued

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

Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal- cium (Ca)	Mag- ne- sium (Mg)	So- dium (Na)	Po- tas- sium (K)	Bicar- bonate (HCO <sub>3</sub> )	Car- bonate (CO <sub>3</sub> )	Sul- fate (SO <sub>4</sub> )	Chlo- ride (Cl)	Fluo- ride (F)	Ni- trace (NO <sub>3</sub> )	Bo- ron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Per- cent so- lution ratio	So- lution ratio	Specific conductance (micro- mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate				
Sept. 1-3 .....	174	--	--	156	51	1,710		204	0	323	2,700	--	--	--	5,130	6.99	2,410	600	433	86	30	8,830	8.1
Sept. 4-6 .....	305	--	--	56	13	860		144	0	93	1,730	--	2.3	--	1,480	2.01	3,220	202	214	15	35	2,520	7.7
Sept. 7-10 .....	262	--	--	98	26	895		183	0	182	1,530	--	--	--	2,620	3.96	1,850	540	242	84	25	4,710	7.9
Sept. 11 .....	127	--	--	154	38	1,500		192	0	310	2,330	--	--	--	4,320	6.13	1,300	540	332	86	28	7,850	8.2
Sept. 12-13 .....	137	--	--	193	54	2,170		208	0	437	3,390	--	--	--	6,460	8.81	2,400	708	538	87	35	10,900	8.1
Sept. 14-15 .....	90.0	--	--	260	73	3,700		212	0	528	5,860	--	--	--	10,900	14.82	2,650	949	776	89	52	17,400	8.2
Sept. 16-20 .....	57.4	--	--	173	54	2,300		207	0	374	3,610	--	--	--	6,820	9.28	1,060	833	484	88	39	11,800	7.9
Sept. 21-23 .....	37.3	--	--	191	62	2,340		191	0	415	3,710	--	--	--	7,030	9.56	708	733	576	87	38	11,800	7.7
Sept. 24-28 .....	31.2	--	--	223	71	2,580		228	0	457	4,110	--	--	--	7,790	10.59	656	847	660	87	39	12,700	7.9
Sept. 29-30 .....	26.5	--	--	209	60	2,130		269	0	386	3,390	--	--	--	6,400	8.70	458	768	548	86	33	10,900	8.0
Weighted average ..	235	--	--	140	40	a1,590		b162	--	331	2,480	--	--	--	4,780	6.50	3,030	514	382	87	30	8,020	--

a Calculated from other weighted average constituents.

b Includes equivalent of individual carbonate values shown above.

## ARKANSAS RIVER BASIN--Continued

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

Temperature (°F) of water, water year October 1952 to September 1953

/Once-daily temperature measurement at 6 a. m./

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

## ARKANSAS RIVER BASIN--Continued

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

LOCATION.--At bridge on State Highway 33 in Sand Springs, 7 miles downstream from Cimarron River, and 10 miles above gaging station at Tulsa, Tulsa County. DRAINAGE AREA.--74,350 square miles at gaging station.

RECORDS AVAILABLE.--Chemical analyses: October 1946 to September 1953.

Water temperatures: October 1946 to September 1953.

EXTREMES, 1952-53.--Dissolved solids: Maximum, 5,380 ppm July 14-15.

Hardness: Maximum, 835 ppm June 25; minimum, 161 ppm July 14-15.

Specific conductance: Maximum daily, 10,200 microhmhos Aug. 29; minimum daily, 987 microhmhos July 15.

Water temperatures: Maximum 93° F June 12; minimum, 35° F Jan. 16.

EXTREMES, 1946-53.--Dissolved solids: Maximum, 5,380 ppm July 21, 1953; minimum, 232 ppm July 18-20, 1950.

Hardness: Maximum, 1,260 ppm Oct. 11, 1946; minimum, 106 ppm July 2, 1947.

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

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

REMARKS.--Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of water discharge for gaging station at Tulsa for water year October 1952 to September 1953 given in WSP 1281. No appreciable inflow between sampling station and gaging station except during periods of heavy local runoff.

## Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (residue at 180° C)			Hardness as CaCO <sub>3</sub>		Percent sodium adsorption	Sodium to calcium ratio	Specific conductance (microhm-cm at 25° C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate				
Oct. 1-10, 1952 ...	387	13	0.00	160	48	713	12	188	0	189	1,280	0.3	2.4	0.22	2,690	3.66	2,810	596	442	72	13	4,480	7.7
Oct. 11-20 ...	323	--	--	164	49	765	13	189	0	193	1,360	--	.8	--	2,810	3.82	2,530	610	456	73	13	4,750	7.8
Oct. 21-31 ...	412	8.0	.00	174	50	753	11	204	0	197	1,380	.3	.7	.25	2,870	3.90	3,190	640	472	71	13	4,760	8.0
Nov. 1-4, 6-10 ...	462	--	--	175	57	842	199	0	188	1,520	--	--	.2	--	3,270	4.45	4,080	671	508	73	14	5,230	7.7
Nov. 5-7 ...	463	--	--	215	63	1,000	197	0	194	1,850	--	--	.6	--	3,940	5.36	4,930	786	634	73	15	6,200	7.6
Nov. 11-20 ...	592	6.5	.00	175	49	792	13	200	0	186	1,480	.3	2.3	.29	2,890	3.93	4,620	638	474	72	14	4,900	8.0
Nov. 21-24, 27-29	783	--	--	169	46	780	205	0	189	1,380	--	--	2.8	--	2,890	3.93	6,110	610	442	74	14	4,850	7.5
Nov. 25-28 ...	941	--	--	195	59	921	201	0	161	1,700	--	--	1.7	--	3,430	4.69	8,770	729	564	73	15	5,830	7.8
Nov. 30 ...	1,030	--	--	180	52	644	215	0	162	1,180	--	--	4.5	--	2,560	3.48	7,120	613	437	70	11	4,360	8.1
Dec. 1-3, 7-10 ...	837	--	--	154	52	668	211	0	175	1,200	--	--	3.6	--	2,590	3.52	5,850	598	425	71	12	4,280	8.0
Dec. 4-6 ...	711	--	--	184	59	761	222	0	172	1,410	--	--	3.9	--	2,960	4.03	5,680	698	516	70	13	5,050	7.8
Dec. 11-20 ...	914	7.5	.00	148	39	628	11	212	0	180	1,140	.3	4.0	.26	2,280	3.11	5,650	530	356	72	12	3,990	7.7
Dec. 21-31 ...	1,092	10	.00	163	46	768	11	220	0	204	1,340	.3	4.2	.27	2,710	3.69	7,990	600	420	73	14	4,660	7.7
Jan. 1-3, 8-10, 1953	1,020	--	--	150	48	845	224	0	217	1,410	--	--	3.5	--	2,850	3.88	7,850	564	380	77	15	5,040	7.8
Jan. 3-7 ...	936	--	--	159	58	1,040	227	0	236	1,750	--	--	2.9	--	3,470	4.72	8,770	635	449	78	18	6,100	7.9
Jan. 11-12 ...	1,040	--	--	146	45	811	215	0	208	1,360	--	--	3.7	--	2,720	3.70	7,540	550	374	78	13	4,890	7.8
Jan. 13-15, 20	1,105	--	--	160	50	1,000	185	0	234	1,680	--	--	1.9	--	3,310	4.50	9,860	550	355	79	17	5,380	7.8
Jan. 16-19 ...	1,190	--	--	142	45	931	225	0	238	1,510	--	--	2.3	--	3,010	4.09	9,670	540	355	79	16	5,380	7.9
Jan. 21-28 ...	1,180	--	--	174	54	964	223	0	245	1,640	--	--	3.0	--	3,350	4.56	10,670	666	474	76	16	5,810	8.0
Jan. 29-31 ...	1,267	--	--	155	48	815	205	0	258	1,360	--	--	1.6	--	2,840	3.86	9,720	584	416	75	15	4,960	7.7

# ARKANSAS RIVER BASIN

77

Feb. 1-10, 1953 ...	1,164	47	890	11	176	0	276	1,510	.5	2.4	-.33	3,000	4.08	9,430	570	426	77	16	5,190	7.8
Feb. 11-12 .....	1,230	58	1,100		206	0	261	1,450	---	2.2	---	3,680	5.00	12,220	665	496	78	15	6,260	7.9
Feb. 13-18 .....	1,183	52			197	0	286	1,450	---	2.0	---	2,970	4.04	9,490	598	436	76	15	5,130	7.9
Feb. 19-20 .....	1,240	50	994		209	0	250	1,640	---	2.5	---	3,310	4.45	11,080	586	414	77	18	5,630	7.6
Feb. 21-22, 26 .....	1,300	51	965		208	0	247	1,620	---	1.9	---	3,270	4.45	11,480	614	444	77	17	5,600	7.8
Feb. 23-25 .....	1,220	50	847		204	0	243	1,400	---	2.4	---	2,880	3.92	9,490	555	388	77	16	4,960	8.0
Feb. 27-28 .....	1,090	53	1,080		195	0	249	1,800	---	.5	---	3,550	4.83	10,450	604	444	80	19	6,080	7.7
Mar. 1-2 .....	1,300	52			177	0	223	1,780	---	.7	---	3,510	4.77	12,320	598	453	79	19	5,990	7.7
Mar. 3, 5 .....	2,910	98	547		139	0	119	938	---	1.0	---	1,930	2.62	15,160	372	258	76	12	3,350	7.4
Mar. 4, 6-10 .....	3,008	120	718		165	0	179	1,200	---	3.1	---	2,380	3.25	19,410	456	320	77	15	4,230	7.5
Mar. 11-13 .....	2,357	129	766		194	0	214	1,250	---	3.7	---	2,680	3.64	17,060	482	324	78	15	4,480	8.2
Mar. 14 .....	4,460	73	22		112	0	96	745	---	3.1	---	1,610	2.19	19,390	272	180	78	12	2,700	8.0
Mar. 15-16, 19 .....	3,535	92	647		154	0	137	1,050	---	2.3	---	2,260	3.07	21,570	344	218	80	15	3,790	7.5
Mar. 17 .....	2,850	90	516		171	0	137	840	---	4.2	---	1,820	2.48	14,000	348	208	76	12	3,140	8.2
Mar. 20 .....	2,800	96	581		155	0	169	938	---	4.5	---	2,050	2.79	15,500	367	240	77	13	3,480	8.0
Mar. 21 .....	2,540	94	575		155	0	170	925	---	3.3	---	2,060	2.80	14,130	362	235	78	13	3,410	8.1
Mar. 22-28, 31 .....	1,854	129	41		185	0	232	1,260	---	2.6	---	2,720	3.70	13,620	490	339	77	15	4,560	7.9
Mar. 29-30 .....	1,550	136	901		180	0	239	1,480	---	.6	---	3,060	4.20	12,950	524	377	79	17	5,060	7.9
Apr. 1-3 .....	1,500	125	763	---	165	0	214	1,300	---	2.4	.35	2,570	3.50	10,410	476	342	78	15	4,440	8.2
Apr. 4-5, 8 .....	5,217	70	295	---	119	0	58	725	---	1.7	---	1,070	1.46	15,070	248	151	72	8.1	1,920	7.6
Apr. 6-7 .....	7,960	78	20	---	120	0	55	720	---	1.2	---	1,420	1.93	30,520	276	178	77	11	2,550	7.8
Apr. 9-10 .....	3,180	96	28	---	163	0	138	735	---	2.4	---	1,600	2.18	13,740	354	221	74	11	2,840	8.0
Apr. 11-14 .....	2,450	103	28	---	171	0	140	795	---	2.9	---	1,680	2.28	11,110	372	232	73	11	2,980	8.1
Apr. 15-17 .....	1,855	118	33	---	180	0	168	845	---	1.9	---	1,980	2.71	9,970	430	282	74	12	3,460	8.0
Apr. 18-20 .....	1,583	125	36	---	177	0	179	1,080	---	2.2	.33	2,240	2.05	11,060	400	213	75	13	3,460	8.0
Apr. 21-22 .....	2,600	118	33	---	156	0	151	1,080	---	2.3	.28	2,430	2.62	13,470	463	307	76	13	4,560	7.8
Apr. 23-25, 30 .....	2,598	133	36	---	158	0	151	1,260	---	2.0	.35	2,350	3.22	14,620	492	353	75	13	4,050	7.8
Apr. 26 .....	1,960	104	36	---	172	0	156	1,180	---	1.4	---	1,630	2.28	8,850	380	238	73	11	3,960	7.9
Apr. 27-29 .....	1,790	117	34	---	177	0	154	965	---	.4	.30	2,030	2.76	9,810	432	287	74	12	3,550	7.8
May 1-6 .....	1,210	138	42		738	0	206	1,240	---	1.3	---	2,580	3.51	8,430	517	360	76	14	4,350	7.9
May 7-10 .....	1,235	128	38		662	0	174	1,120	---	1.4	---	2,330	3.17	7,770	476	323	75	13	3,930	7.8
May 11 .....	1,130	152	37		159	6	181	1,280	---	3.8	---	2,600	3.54	7,930	530	390	75	14	4,530	8.4
May 12 .....	2,510	94	25		746	0	90	790	---	3.5	---	1,660	2.26	11,250	336	242	74	11	2,830	8.2
May 13 .....	6,780	192	53		1,070	0	127	1,980	---	4.8	---	3,930	5.34	72,050	695	594	77	18	6,330	8.2
May 14-16 .....	6,757	65	18		285	0	54	498	---	3.9	---	1,080	1.47	19,700	236	142	72	8.1	1,900	8.1

## ARKANSAS RIVER BASIN--Continued

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

Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (residue at 180° C)			Hardness as CaCO <sub>3</sub>		Percent sodium-sulfate	Sodium absorp-tion ratio	Specific conductance (micro-mhos at 25° C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate				
May 17-18, 1953	4,750	--	--	94	27	480		146	0	104	820	--	3.6	--	1,720	2.34	22,060	345	226	75	11	2,980	7.9
May 19	4,420	--	--	94	24	689		146	4	170	1,080	--	7.8	--	2,170	2.95	25,900	335	209	82	16	3,830	8.3
May 20	3,770	--	--	81	23	391		141	4	113	840	--	5.1	--	1,380	1.88	14,050	295	173	74	9.9	2,470	8.4
May 21-24	3,190	--	--	111	31	511		173	0	178	980	--	3.9	--	1,820	2.48	15,680	405	263	73	11	3,340	8.2
May 25-27	2,270	--	--	119	34	594		167	0	196	980	--	3.3	--	2,090	2.84	12,810	435	298	75	12	3,770	8.1
May 28-31	1,680	--	--	140	40	734		154	4	208	1,230	--	2.5	--	2,540	3.45	11,520	515	358	76	14	4,630	8.3
June 1	10,800	--	--	142	38	734		175	8	208	1,240	--	3.2	--	2,620	3.56	76,400	510	353	76	14	4,440	8.4
June 2-5	5,822	--	--	93	21	456		144	0	98	770	--	3.8	--	1,650	2.24	25,940	318	200	76	11	2,810	8.2
June 6	2,990	--	--	130	35	696		132	0	106	1,250	--	3.1	--	2,450	3.33	19,780	470	362	76	14	4,190	7.6
June 7-8	3,770	--	--	83	23	378		126	0	74	665	--	3.9	--	1,430	1.94	14,560	300	197	73	9.5	2,470	7.6
June 9	3,150	--	--	108	32	726		115	0	99	1,260	--	5.0	--	2,480	3.35	20,920	400	306	80	16	4,260	8.1
June 10	3,590	--	--	82	22	387		150	4	83	620	--	4.5	--	1,380	1.85	9,880	286	166	73	9.3	2,370	8.3
June 11-12	2,690	--	--	101	29	462		148	2	121	795	--	3.2	--	1,740	2.37	8,600	370	245	75	12	2,970	8.3
June 13-14	1,930	--	--	106	34	548		134	0	151	940	--	4.2	--	1,980	2.71	6,860	405	295	75	12	3,420	8.2
June 15-17	1,277	--	--	118	43	735		110	0	188	1,260	--	7.5	--	2,570	3.55	5,560	480	388	77	15	4,370	8.1
June 18-20	953	--	--	126	40	734		112	0	193	1,260	--	6.2	--	2,610	3.73	7,320	525	430	76	15	4,380	8.1
June 21-23	789	--	--	140	43	778		116	0	192	1,360	--	4.9	--	2,740	6.34	15,220	435	738	76	19	7,390	8.1
June 24	990	--	--	232	62	1,240		118	0	164	2,320	--	3.2	--	2,320	3.16	6,770	455	348	76	13	3,950	7.8
June 25	1,210	--	--	120	38	645		130	0	163	1,120	--	3.2	--	1,940	2.64	5,960	445	328	70	10	3,250	8.2
June 26-27	1,080	--	--	121	35	488		146	0	144	875	--	2.6	--	1,800	2.45	4,620	420	300	70	9.7	3,040	8.2
June 28-30	1,137	--	--	113	34	457		147	0	121	625	--	2.9	--	2,460	3.37	4,280	325	400	73	13	3,040	7.7
July 1	950	--	--	138	41	654		141	0	162	1,170	--	3.2	--	2,430	3.11	4,500	355	434	73	13	4,500	8.2
July 2-7	641	--	--	150	44	610		147	0	167	1,300	--	3.1	--	2,300	2.80	3,960	345	420	72	13	3,170	7.8
July 8	610	--	--	68	21	376		124	7	172	675	--	3.7	--	3,100	5.22	7,950	454	442	73	16	6,130	8.3
July 9-10	942	--	--	128	54	566		124	0	101	1,340	--	3.2	--	3,840	5.92	7,730	609	609	75	12	6,130	8.1
July 11	876	--	--	204	52	1,020		119	0	101	1,340	--	2.2	--	646	1.88	14,180	161	68	69	5.8	1,160	8.0
July 12-13	3,485	--	--	46	10	168		112	0	20	268	--	2.2	--	2,410	3.28	48,170	383	276	81	17	4,320	8.0
July 14-15	8,130	--	--	114	24	758		130	0	214	1,190	--	4.9	--	3,380	4.57	56,840	508	408	82	20	3,840	7.9
July 16-18	7,403	--	--	154	30	1,050		121	0	294	1,640	--	3.9	--	3,380	4.57	56,840	508	408	82	20	3,840	7.9
July 19-20	6,265	--	--	169	35	1,780		101	0	300	2,820	--	4.4	--	3,380	4.57	56,840	508	408	82	20	3,840	7.9
July 21	7,010	--	--	111	24	1,610		162	0	281	1,610	--	2.8	--	3,250	4.42	63,440	376	243	86	24	5,190	7.6
July 22-24	6,900	--	--	86	16	473		125	0	189	710	--	2.9	--	1,980	2.15	29,440	280	178	79	12	2,860	8.1
July 25-26	8,780	--	--	54	11	219		114	0	56	358	--	1.8	--	1,802	1.09	19,080	180	86	73	7.1	2,470	8.1
July 27	4,240	--	--	66	16	329		101	0	79	535	--	2.4	--	1,160	1.58	13,060	230	148	76	9.4	4,070	8.1
July 28-31	3,110	--	--	128	30	759		126	0	261	1,190	--	2.3	--	2,510	3.41	21,060	443	340	79	16	4,350	7.8

Aug. 1-7, 1953	1,521	--	--	156	40	1,020	--	120	0	296	1,690	--	2.9	--	3,440	4.68	14,130	554	455	80	19	5,620	8.0
Aug. 8-10	3,440	--	--	83	22	468	--	130	0	110	1,775	--	5.1	--	1,650	2.24	15,330	288	191	77	12	2,820	7.9
Aug. 11-19	2,350	--	--	91	23	448	--	138	0	115	745	--	3.9	--	1,580	2.15	10,030	322	208	75	11	2,800	7.9
Aug. 20	1,860	--	--	138	33	662	--	140	0	157	1,190	--	5.8	--	2,380	3.24	11,950	480	366	75	13	4,170	7.6
Aug. 21-22	1,740	--	--	96	22	476	--	144	0	123	790	--	5.0	--	1,700	2.31	7,980	330	212	76	11	2,950	8.1
Aug. 23	1,540	--	--	136	31	844	--	144	0	166	1,420	--	6.8	--	2,900	3.94	12,060	465	347	80	17	4,960	8.2
Aug. 24-26	1,353	--	--	119	18	628	--	162	0	141	1,030	--	3.2	--	2,170	2.95	7,930	370	238	79	14	3,750	8.1
Aug. 27	1,130	--	--	144	33	957	--	159	4	212	1,570	--	3.6	--	3,160	4.30	9,640	495	358	81	19	5,500	8.3
Aug. 28-31	1,163	--	--	158	42	1,560	--	156	0	266	2,520	--	4.6	--	4,830	6.70	15,480	565	437	86	29	8,340	7.6
Sept. 1-10	1,201	--	--	114	32	787 <sup>1</sup>	--	149	0	151	1,300	--	3.9	0.53	2,610	3.55	8,460	416	294	80	17	4,460	7.5
Sept. 11-14	600	--	--	132	35	702	--	157	0	143	1,220	--	2.8	--	2,580	3.51	4,190	475	346	76	14	4,310	8.0
Sept. 15-20	568	--	--	152	42	915	--	138	0	161	1,600	--	1.8	--	3,270	4.45	5,010	550	437	78	17	5,370	7.8
Sept. 21-30	365	8.0	0.00	194	56	1,140 <sup>1</sup>	16	164	0	194	2,000	.5	1.1	.69	3,910	5.32	3,850	714	580	77	19	6,570	7.3
Weighted average	1,822	--	--	119	33	a 666	--	b 157	--	164	1,120	--	3.0	--	2,300	3.13	11,310	432	304	77	14	3,970	--

<sup>a</sup> Calculated from other weighted average constituents.

<sup>b</sup> Includes equivalent of individual carbonate values shown above.

## ARKANSAS RIVER BASIN--Continued

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

Temperature (°F) of water, water year October 1952 to September 1953												
Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	79	66	37	45	53	59	65	63	81	79	83	73
2	79	64	40	40	54	60	64	63	85	79	82	73
3	80	57	41	43	54	48	57	63	84	80	81	73
4	78	56	45	45	55	50	57	60	77	80	81	61
5	61	--	47	45	54	53	55	61	79	80	85	65
6	61	56	45	43	54	52	53	63	83	81	82	66
7	61	57	50	38	53	53	54	66	74	79	86	69
8	62	59	52	38	52	52	65	68	76	77	79	67
9	64	48	47	40	48	54	64	64	87	78	78	69
10	65	50	48	43	48	52	60	74	90	75	78	69
11	63	51	46	45	49	52	55	66	91	76	77	73
12	66	55	47	49	48	54	53	61	93	69	80	70
13	64	59	43	53	49	63	60	56	85	67	80	69
14	65	59	39	55	50	63	58	62	82	66	79	70
15	64	61	41	45	51	62	60	63	82	71	81	69
16	63	67	46	35	48	60	59	61	80	77	83	81
17	63	68	47	37	49	56	58	72	79	76	78	79
18	64	63	44	38	50	60	54	68	92	78	76	78
19	53	53	43	40	42	61	53	67	79	81	74	70
20	59	54	42	41	41	66	60	71	80	83	73	71
21	49	58	40	45	44	64	65	70	91	80	73	64
22	58	52	40	44	45	61	71	76	76	83	73	63
23	60	47	41	41	44	59	70	79	72	82	75	61
24	63	47	38	43	49	57	68	77	77	80	75	69
25	65	44	36	45	50	58	65	76	76	79	76	70
26	66	41	38	48	53	59	64	79	79	80	77	76
27	63	38	37	49	55	64	68	80	80	83	87	75
28	57	37	39	47	56	65	68	82	--	83	85	73
29	60	38	41	50	--	68	69	78	81	83	77	70
30	62	36	42	52	--	67	70	79	80	84	77	81
31	64	--	43	54	--	68	--	77	--	86	77	--
Average	64	53	43	44	50	59	61	69	82	79	79	71

## ARKANSAS RIVER BASIN--Continued

## VERDIGRIS RIVER NEAR LENAPAH, OKLA.

LOCATION --At gaging station at bridge on county road, 2½ miles east of Lenapah, Nowata County, 4½ miles upstream from Cedar Creek, and at mile 144.6.  
DRAINAGE AREA --3,639 square miles.

RECORDS AVAILABLE --Chemical analyses: October 1951 to September 1953.

Water temperatures: October 1951 to September 1953.

EXTREMES, 1952-53 --Dissolved solids: Maximum, 662 ppm Dec. 21-31; minimum, 264 ppm July 7.

Hardness: Maximum, 266 ppm Jan. 11-20; minimum, 108 ppm July 7.

Specific conductance: Maximum, 1,270 microhos Dec. 26-27; minimum daily, 436 microhos July 7.

Water temperatures: Maximum, 88°F June 14; minimum, 35°F Jan. 9-10.

EXTREMES, 1951-53 --Dissolved solids: Maximum, 662 ppm Dec. 21-31, 1952; minimum, 207 ppm Nov. 12, 14, 16, 1951.

Hardness: Maximum, 304 ppm Oct. 4-5, 9-10, 1951, Jan. 1-10, 1952; minimum, 108 ppm July 7, 1953.

Specific conductance: Maximum, 1,270 microhos Dec. 26-27, 1952; minimum daily, 300 microhos Mar. 12, 1952.

Water temperatures: Maximum, 92°F July 28, 1952; minimum, freezing point Dec. 21-22, 1951, Jan. 3, 1952.

Remarks --Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of discharge for water year October 1952 to September 1953 given in WSP 1281.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>		Percent sodium adsorption	Specific conductance (micro-mhos at 25°C)			
															Parts per million	Tons per acre-foot	Total	Non-carbonate					
Oct. 1-10, 1952	8.82	4.2	0.00	57	18	104	4.1	185	0	52	162	0.3	0.6	0.33	522	0.71	12	216	64	51	3.1	911	8.0
Oct. 11-20	6.32	--	--	62	20	98	98	189	0	56	167	--	.4	--	538	.73	9.2	236	82	47	2.8	943	7.8
Oct. 21-31	5.40	4.8	.02	63	20	105	4.3	203	0	55	172	.3	1.1	.19	544	.74	7.9	239	72	48	2.9	959	7.9
Nov. 1-10	9.86	--	--	64	21	103	103	213	0	55	168	--	.7	--	525	.71	14	246	72	48	2.9	964	7.6
Nov. 11-20	15.2	5.2	.00	67	20	103	4.5	223	0	54	168	.3	.8	.20	548	.75	22	249	66	47	2.8	966	7.9
Nov. 21-30	35.8	--	--	66	20	119	119	214	0	58	190	--	.6	--	592	.81	57	246	71	51	3.3	1,040	7.7
Dec. 1-10	25.1	4.8	.00	63	20	120	5.5	213	0	64	188	.5	1.0	.24	587	.80	40	239	64	51	3.4	1,050	7.8
Dec. 11-20	12.5	--	--	64	19	136	136	209	0	66	205	--	5.0	--	640	.87	22	238	66	55	3.8	1,120	8.0
Dec. 21-31	23.9	6.4	.00	66	20	142	6.2	205	0	70	218	.3	12	.25	662	.90	43	246	78	55	3.9	1,180	7.6
Jan. 1-10, 1953	16.8	--	--	64	20	129	129	213	0	67	192	--	10	--	603	.82	27	242	67	54	3.6	1,080	7.7
Jan. 11-20	13.7	5.2	.00	74	20	109	4.5	243	0	59	172	.3	5.7	.25	584	.79	22	266	68	47	2.9	1,040	8.1
Jan. 21-31	15.7	--	--	72	19	110	110	231	0	55	175	--	4.5	--	595	.81	25	258	68	48	3.0	1,030	7.8

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

Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal-cium (Ca)	Mag-ne-sium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Car-bonate (CO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> )	Bo-ron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Per-cent so-lidum	So-lidum ratio	Specific conductance (micro-mhos at 25°C)
															Parts per million	Tons per acre-foot	Tons per acre-day	Total	Non-carbonate			
Feb. 1-10, 1953.....	12.5	3.6	0.00	68	21	119	4.7	210	0	56	198	0.3	3.9	.24	605	.82	20	256	84	50	3.2	1,070 8.0
Feb. 11-20.....	18.2	--	--	70	21	122	--	217	2	64	202	--	3.2	.26	621	.84	31	261	80	50	3.3	1,090 8.3
Feb. 21-28.....	22.3	--	--	65	21	129	--	212	0	65	210	--	4.2	.30	627	.85	38	248	75	53	3.5	1,100 7.9
Mar. 1-5.....	450	--	--	58	17	129	129	160	0	58	210	--	8.2	--	598	.81	727	214	84	57	3.8	1,030 7.7
Mar. 6-10.....	337	--	--	70	17	99	86	229	0	48	137	--	2.5	--	510	.69	464	244	57	43	2.4	880 7.8
Mar. 11-20.....	90.9	3.0	.00	71	18	99	4.1	210	0	50	173	.3	3.2	.31	568	.77	139	251	79	46	2.7	879 8.2
Mar. 21-31.....	22.8	--	--	68	20	106	106	189	0	53	192	--	2.0	--	622	.85	38	252	96	48	2.9	1,020 7.9
Apr. 1-3, 10.....	185	--	--	71	18	101	--	206	0	52	172	--	3.1	--	568	.77	284	251	82	47	2.8	978 8.2
Apr. 4-9.....	391	--	--	62	14	61	--	203	0	41	98	--	3.5	.29	417	.57	440	212	46	38	1.8	707 8.1
Apr. 11-20.....	107	5.8	.00	67	15	71	3.7	206	0	46	123	.1	2.9	.48	471	.64	136	228	60	40	2.0	793 8.0
Apr. 21-22, 24-26.....	518	--	--	59	13	71	83	161	0	46	141	--	1.6	--	468	.64	655	200	66	47	2.5	807 8.0
Apr. 23, 27-30.....	343	--	--	48	12	73	73	135	0	43	121	--	3.3	--	406	.55	376	170	59	48	2.4	704 7.9
May 1.....	1,020	--	--	45	10	68	68	107	0	44	116	--	5.4	--	381	.52	1,050	154	66	49	2.4	639 8.2
May 2-3.....	303	--	--	36	9.6	39	39	99	0	32	69	--	3.5	--	279	.38	228	130	48	40	1.5	457 8.2
May 4-5.....	113	--	--	43	12	63	63	112	0	35	118	--	4.0	--	392	.53	120	162	70	46	2.1	651 8.1
May 6-10.....	109	--	--	49	11	52	52	128	0	38	94	--	3.9	--	354	.48	104	168	62	40	1.7	593 8.2
May 11-13.....	1,915	--	--	50	12	60	60	144	0	40	101	--	3.0	--	381	.52	1,970	174	56	43	2.0	640 8.1
May 14-20.....	1,112	--	--	42	10	40	40	117	0	33	70	--	3.9	--	297	.40	892	146	50	37	1.4	469 8.0
May 21-22.....	681	--	--	56	9.2	40	--	148	0	36	72	--	3.1	--	333	.45	612	178	56	33	1.3	549 8.1
May 23-25.....	270	--	--	62	12	58	--	149	4	44	114	--	3.0	--	418	.57	305	204	76	38	1.8	708 8.3
May 26-31.....	89.7	--	--	49	10	49	--	125	0	42	93	--	1.8	--	353	.48	85	164	61	39	1.7	587 7.4
June 1-10.....	222	5.6	.00	51	9.9	58	3.6	133	0	37	110	.3	1.4	.16	380	.52	228	168	58	42	1.9	656 7.8
June 11-20.....	21.0	5.8	.00	48	11	60	3.8	134	0	34	110	.3	1.2	.46	377	.51	21	165	55	43	2.0	645 7.8
June 21-30.....	7.10	5.8	.00	46	11	58	4.0	132	0	33	109	.3	1.1	.45	373	.51	7.2	160	52	43	2.0	640 7.9
July 1-6.....	8.53	--	--	44	10	65	65	127	0	34	108	--	1.8	--	355	.48	8.2	152	48	48	2.3	615 8.1
July 7.....	874	--	--	32	6.8	46	46	98	0	23	72	--	3.8	--	264	.36	623	108	28	48	1.9	436 8.1
July 8-10.....	233	--	--	45	9.1	59	59	138	0	35	89	--	3.3	--	333	.45	209	150	37	46	2.1	576 7.9
July 11-20.....	71.2	4.8	.00	47	9.9	54	4.4	142	0	33	89	.3	1.6	.54	328	.45	63	158	42	42	1.9	581 8.1
July 21-31.....	21.4	4.6	.00	46	11	73	5.0	141	0	34	122	.5	1.8	.52	363	.52	22	160	44	49	2.5	887 7.9

Aug. 1-10, 1953.....	6.83	3.6	0.00	42	11	77	4.9	136	0	32	124	0.5	1.1	.80	378	.51	7.0	150	38	52	2.7	685	7.7
Aug. 11-20.....	17.9	--	--	40	9.7	79	136	136	0	31	118	--	1.6	--	369	.50	18	140	28	55	2.9	658	8.0
Aug. 21-31.....	26.8	--	--	44	11	66	135	135	0	33	108	--	1.7	--	367	.50	27	156	46	48	2.3	650	8.0
Sept. 1-10.....	316	--	--	50	13	91	154	154	0	32	153	--	1.9	--	447	.61	381	180	54	52	2.9	808	7.8
Sept. 11-20.....	19.3	--	--	48	13	95	145	145	0	44	151	--	1.3	--	452	.61	24	172	53	55	3.2	790	8.0
Sept. 31-30.....	9.19	4.0	.00	48	14	94	4.8	145	0	42	150	.5	.5	.48	454	.62	11	178	58	53	3.1	801	7.8
Weighted average ...	120	--	--	53	13	a 80	b 152	b 152	--	64	117	--	3.5	--	411	0.36	133	186	61	48	2.5	703	--

a Calculated from other weighted average constituents.

b Includes equivalent of individual carbonate values shown above.

## ARKANSAS RIVER BASIN--Continued

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

Temperature (°F) of water, water year October 1952 to September 1953

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

## ARKANSAS RIVER BASIN--Continued

## VERDIGRIS RIVER NEAR CLAREMORE, OKLA.

LOCATION --At gaging station at bridge on State Highway 20, 2.3 miles downstream from Caney River, 4½ miles west of Claremore, Rogers County, 12.4 miles upstream from Bird Creek, and at mile 76.0.

DRAINAGE AREA --6,534 square miles.

RECORDS AVAILABLE --Chemical analyses: October 1947 to September 1953.

Water temperatures: October 1947 to September 1953.

EXTREMES 1952-53 --Dissolved solids: Maximum, 730 ppm Jan. 11-20; minimum, 250 ppm July 15-18.

Hardness: Maximum, 328 ppm Jan. 11-20; minimum, 120 ppm July 15-18.

Specific conductance: Maximum daily, 1,330 microhmhos Jan. 18; minimum daily, 401 microhmhos May 18.

Water temperatures: Maximum, 89°F June 12-13; minimum, freezing point Jan. 17.

EXTREMES 1947-53 --Dissolved solids: Maximum, 747 ppm Feb. 1-10, 1951; minimum, 50 ppm June 22-30, 1948.

Hardness: Maximum, 406 ppm Feb. 1-10, 1951; minimum, 50 ppm June 22-30, 1948.

Specific conductance: Maximum daily, 1,330 microhmhos Jan. 18, 1953; minimum daily, 130 microhmhos June 24, 1948.

Water temperatures: Maximum, 93°F July 22, 1949; minimum, freezing point on many days during winter months.

REMARKS --Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of discharge for water year October 1952 to September 1953 given in WSP 1281.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal-cium (Ca)	Mag-ne-sium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Car-bonate (CO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> )	Bo-ron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Per-cent ad-sorp-tion ratio	So-specific conductance (microhm-ohms at 25°C)	pH	
															Parts per mil-lion	Tons per acre-foot	Tons per day	Total	Non-carbon-ate				
Oct. 1-10, 1952	22.2	--	--	86	18	105		204	0	44	215	--	0.8	--	636	0.86	38	288	122	44	2.7	1,100	7.9
Oct. 11-20	7.15	8.0	0.00	82	17	107	4.1	228	0	35	192	0.3	0.7	0.30	603	.82	12	274	88	45	2.8	1,040	8.0
Oct. 21-31	5.40	7.4	.00	78	17	86	3.9	226	0	46	186	.3	.7	.24	544	.74	7.9	264	80	41	2.3	926	8.2
Nov. 1-10	5.74	--	--	83	22	95		230	0	87	180	--	8	--	573	.78	8.9	298	109	41	2.4	1,010	7.7
Nov. 11-20	14.4	6.2	.05	93	22	94	4.4	244	0	87	186	.5	1.2	.17	646	.88	25	322	122	38	2.3	1,050	7.9
Nov. 21-30	51.4	--	--	78	18	84		234	0	37	187	--	.7	--	528	.72	73	268	77	41	2.2	926	7.8
Dec. 1-10	39.9	--	--	78	20	101		222	0	40	193	--	1.2	--	584	.79	63	276	94	44	2.7	979	7.9
Dec. 11-20	25.7	5.6	.00	79	20	100	3.9	215	0	42	196	.3	.8	.17	576	.78	40	279	103	43	2.6	1,020	8.0
Dec. 21-31	37.3	6.4	.00	80	19	88	4.2	240	0	40	188	.3	1.0	.21	546	.74	55	278	81	40	2.3	982	8.1
Jan. 1-10, 1953	37.6	--	--	92	17	109		242	0	39	210	--	.4	--	642	.87	85	300	101	44	2.7	1,110	7.8
Jan. 11-20	34.9	3.0	.00	97	21	127	3.9	233	0	41	265	.3	.4	.19	730	.99	89	328	138	45	3.0	1,280	8.0
Jan. 21-31	57.6	--	--	81	16	139		216	0	58	235	--	1.8	--	706	.96	110	268	91	53	3.7	1,200	8.0
Feb. 1-10	37.2	4.8	.00	87	17	102	4.3	201	0	74	188	.3	4.9	.21	626	.85	46	287	122	43	2.6	1,090	8.1
Feb. 11-20	33.6	--	--	85	17	106		194	0	76	192	--	3.8	--	639	.86	57	282	123	45	2.7	1,070	8.1
Feb. 21-28	41.6	4.8	.00	88	18	110	4.5	210	0	67	208	.3	2.4	.24	643	.87	72	294	122	44	2.8	1,080	8.1
Mar. 1-10	923	--	--	65	16	129		145	0	55	280	--	8.0	--	649	.88	1,820	228	109	55	3.7	1,100	7.4
Mar. 11-14	470	--	--	71	17	134	--	144	0	61	260	--	7.9	--	694	.94	881	247	129	54	3.7	1,170	8.1
Mar. 15-20	701	--	--	62	12	77	--	146	0	45	143	--	6.4	--	480	.63	871	204	84	45	2.3	789	7.9
Mar. 21-31	110	8.8	.00	68	13	87	3.0	146	0	49	170	.1	6.8	.23	518	.70	154	223	104	45	2.5	890	7.9

## LOWER MISSISSIPPI RIVER BASIN

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

Chemical analyses, in parts per million, water year October 1932 to September 1953--Continued

Date of collection	Mean dis- charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal- cium (Ca)	Mag- ne- sium (Mg)	So- dium (Na)	Po- tas- sium (K)	Bicar- bonate (HCO <sub>3</sub> )	Car- bonate (CO <sub>3</sub> )	Sul- fate (SO <sub>4</sub> )	Chlo- ride (Cl)	Fluo- ride (F)	Ni- trate (NO <sub>3</sub> )	Bo- ron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>	Per- cent so- dium	So- dium absorp- tion ratio	Specific conduct- ance (micro- mhos at 25 °C)	pH
															Parts per mil- lion	Tons per acre- foot	Tons per day					
Apr. 1-10, 1953.....	1,214	9.0	0.00	62	11	85	3.5	140	0	46	158	0.1	3.9	0.33	515	0.70	1,590	200	85	2.6	838	8.0
Apr. 11-19.....	649	--	--	63	13	71	49	152	0	47	134	--	3.8	--	457	.62	801	210	86	2.1	754	8.2
Apr. 20-30.....	2,885	--	--	42	9.2	49	--	100	0	37	89	--	3.6	--	330	.45	2,570	143	61	1.8	544	7.8
May 1-5.....	1,865	--	--	48	10	61	--	123	0	40	105	--	2.9	--	376	.51	1,590	161	60	2.1	694	7.8
May 6-10.....	447	--	--	57	12	72	--	138	0	49	129	--	2.3	--	449	.61	542	192	78	2.3	732	7.8
May 11-15.....	639	--	--	37	8.0	66	--	104	0	34	104	--	3.6	--	345	.47	595	126	40	2.6	594	8.2
May 16-20.....	4,906	--	--	35	8.2	40	--	96	0	35	64	--	3.7	--	269	.37	5,560	121	42	1.6	443	7.9
May 21-31.....	1,096	9.4	0.00	56	9.8	46	3.2	144	7	37	83	.3	3.2	.19	375	.51	1,110	180	50	1.5	596	8.3
June 1-4.....	138	--	--	80	11	48	--	148	12	41	86	--	1.4	--	360	.52	140	194	53	1.5	622	8.5
June 5-8.....	1,320	--	--	38	7.3	39	--	106	0	24	71	--	2.6	--	264	.36	941	125	38	1.5	457	8.1
June 9-10.....	689	--	--	45	8.6	49	--	116	0	31	95	--	2.4	--	325	.44	780	148	53	1.8	375	8.2
June 11-20.....	172	7.2	0.00	49	9.4	58	3.8	124	0	31	107	.3	1.7	.45	361	.49	168	161	60	2.0	619	7.8
June 21-30.....	63.0	8.4	0.00	52	10	63	3.8	134	0	27	125	.3	1.0	.47	396	.54	68	170	80	2.1	677	7.8
July 1-10.....	181	6.4	0.00	51	9.5	66	3.9	136	0	24	123	.3	.8	.48	386	.52	189	166	54	2.2	666	7.9
July 11-14.....	213	--	--	47	8.4	61	--	105	0	29	126	--	1.2	--	349	.41	205	139	54	2.1	608	8.0
July 15-18.....	117	--	--	36	7.3	40	--	103	0	27	143	--	1.4	--	250	.34	70	120	34	1.6	440	7.9
July 19-26.....	571	--	--	53	10.3	74	--	123	0	26	141	--	1.4	--	418	.57	644	172	87	2.4	717	8.1
July 27-31.....	106	5.8	0.00	49	9.2	65	3.8	132	0	23	118	.3	1.1	.53	370	.50	106	160	52	2.2	633	8.1
Aug. 1-10.....	26.3	--	--	46	8.0	57	--	128	0	24	100	--	.7	--	328	.45	23	148	43	2.0	584	7.7
Aug. 11-20.....	13.5	--	--	42	8.5	49	--	121	0	23	86	--	1.1	--	293	.40	11	140	41	1.8	523	8.0
Aug. 21-31.....	20.8	--	--	43	7.4	52	--	129	0	23	85	--	1.0	--	297	.40	17	138	32	1.9	524	8.0
Sept. 1-4.....	116	--	--	42	8.0	55	--	135	0	25	85	--	.4	--	309	.42	97	138	28	2.0	535	8.2
Sept. 5-10.....	1,181	--	--	46	13	89	--	110	0	33	178	--	.4	--	478	.65	1,520	160	70	3.4	840	7.6
Sept. 11-20.....	53.4	6.8	0.00	48	10	102	4.9	103	0	29	185	.5	1.0	.48	484	.66	70	156	72	3.6	832	7.7
Sept. 21-30.....	13.2	4.8	0.00	46	9.5	87	4.4	105	0	23	160	.3	.2	.65	421	.57	16	154	68	3.0	735	7.8
Weighted average...	475	--	--	47	10	a 66	--	b 120	--	38	114	--	3.5	--	387	0.53	496	158	60	2.3	648	--

a Calculated from other weighted average constituents.

b Includes equivalent of individual carbonate values shown above.

## ARKANSAS RIVER BASIN--Continued

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

Temperature (°F) of water, water year October 1952 to September 1953

[Once-daily temperature measurement at 8 a. m.]

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

## ARKANSAS RIVER BASIN--Continued

## BIRD CREEK NEAR SPERRY, OKLA.

LOCATION.--At gaging station at bridge on county highway, 1 1/4 miles upstream from Delaware Creek, 2.4 miles downstream from Hominy Creek, 2 1/2 miles south-east of Sperry, Tulsa County, and at mile 25.0.

DRAINAGE AREA.--905 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1951 to September 1953.

Water temperatures: October 1951 to September 1953.

EXTREMES, 1952-53.--Dissolved solids: Maximum, 3,590 ppm Nov. 12-16, 18-20; minimum, 168 ppm May 11-15.

Hardness: Maximum, 924 ppm Nov. 12-16, 18-20; minimum, 53 ppm July 9.

Specific conductance: Maximum daily, 6,050 micromhos Nov. 11; minimum daily, 233 micromhos May 13.

Water temperatures: Maximum, 91° F June 13; minimum, 39° F Jan. 10.

EXTREMES, 1951-53.--Dissolved solids: Maximum, 3,590 ppm Nov. 12-16, 18-20, 1952; minimum, 168 ppm May 11-15, 1953.

Hardness: Maximum, 924 ppm Nov. 12-16, 18-20, 1952; minimum, 53 ppm July 9, 1953.

Specific conductance: Maximum daily, 6,050 micromhos Nov. 11, 1952; minimum daily, 233 micromhos May 13, 1953.

Water temperatures: Maximum, 91° F Dec. 21, 25, 1951.

REMARKS.--Specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of discharge for water year October 1952 to September 1953 given in WSP 1281.

Chemical analyses: in parts per million, water year October 1952 to September 1953

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal-cium (Ca)	Mag-ne-sium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Car-bonate (CO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> )	Bo-ron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Per-cent ad-sorp-tion	So-dium adsorp-tion ratio	Specific conductance (micro-mhos at 25°C)	pH
															Parts per mil-lion	Tons per acre-foot	Tons per day	Total	Non-carbonate				
Oct. 1-10, 1952	0.58	9.0	0.00	164	51	586	6.7	167	0	18	1,260	0.1	0.8	0.13	2,500	3.40	3.9	618	482	67	10	4,010	8.0
Oct. 11-20	.42	---	---	170	58	635	---	164	0	19	1,340	---	.2	---	2,570	3.50	2.9	662	528	68	11	4,350	7.7
Oct. 21-31	.76	9.0	.00	193	59	722	7.6	170	0	21	1,510	.1	.7	.15	2,980	4.07	6.1	724	584	68	12	4,860	7.8
Nov. 1-10	1.41	---	---	221	72	827	---	167	0	24	1,760	---	.6	---	3,300	4.49	13	848	710	68	12	5,630	7.3
Nov. 11, 17	2.20	---	---	234	80	888	---	176	0	32	1,890	---	.7	---	3,540	4.81	21	913	769	88	13	6,040	7.8
Nov. 12-16, 18-20	2.35	---	---	242	78	892	---	172	0	28	1,910	---	1.0	---	3,590	4.88	23	924	784	68	13	6,080	7.6
Nov. 21-22	3.00	---	---	228	74	815	---	196	0	30	1,740	---	.8	---	3,300	4.49	27	874	713	67	12	5,720	7.9
Nov. 23, 25, 28	6.53	---	---	217	66	754	---	203	0	27	1,600	---	1.1	---	2,950	4.01	52	813	646	87	11	5,140	7.5
Nov. 24, 26-27, 29-30	6.28	---	---	180	56	557	---	209	0	24	1,200	---	1.0	---	2,280	3.10	39	680	508	64	9.3	4,400	7.4
Dec. 1, 4, 6, 8	2.60	---	---	206	61	706	---	209	0	26	1,490	---	1.4	---	2,800	3.81	20	765	594	67	11	4,870	7.7
Dec. 2-3, 5, 7, 9-10	2.47	---	---	160	52	527	---	240	0	24	1,460	---	1.0	---	2,100	2.86	14	613	416	65	9.2	3,730	8.0
Dec. 11-15, 18	1.47	---	---	142	46	453	---	244	0	22	925	---	.8	---	1,860	2.53	9.4	544	344	64	8.4	3,240	7.9
Dec. 16-17, 19-20	4.55	---	---	138	52	320	---	235	0	22	1,060	---	.8	---	2,160	2.94	27	608	416	65	9.2	3,730	8.0
Dec. 21-22, 25, 27	3.77	---	---	150	44	405	---	263	0	21	850	---	1.0	---	1,730	2.35	18	556	340	61	7.5	3,030	7.9
Dec. 28, 31	3.54	---	---	163	49	474	---	231	0	22	1,000	---	.8	---	2,030	2.79	20	608	402	63	8.3	3,530	8.0
Dec. 23-24, 26, 29-30	3.54	---	---	163	49	474	---	231	0	22	1,000	---	.8	---	2,030	2.79	20	608	402	63	8.3	3,530	8.0

Jan. 1, 1953	3.00	--	--	168	58	490	247	0	23	1,080	--	1.0	--	2,050	2.79	17	658	455	62	8.3	3,740	7.9
Jan. 11-20	2.60	--	--	160	49	443	265	0	25	1,938	--	1.0	--	1,820	2.48	13	600	384	64	7.9	3,310	7.8
Jan. 21-30	2.98	--	--	180	56	559	250	0	22	1,180	--	1.2	--	1,290	2.31	18	680	474	64	9.3	4,030	7.6
Jan. 31	5.40	--	--	163	53	466	270	0	24	1,988	--	.4	--	2,030	2.76	30	824	404	62	8.1	3,970	7.7
Jan. 28-31	3.03	--	--	174	56	577	287	0	22	1,110	--	.4	--	2,250	3.06	18	864	446	63	8.9	3,540	7.8
Feb. 1-10	1.77	7.5	--	173	56	555	250	0	28	1,180	1	.1	.20	2,270	3.09	11	862	457	64	9.4	3,980	8.1
Feb. 11-16	7.53	--	--	169	57	557	260	0	31	1,150	--	.5	--	2,170	2.95	44	856	443	65	9.5	3,530	8.0
Feb. 17-20	5.40	--	--	176	62	632	260	0	33	1,290	--	.6	--	2,470	3.36	36	894	481	66	10	4,300	7.9
Feb. 21	121	--	--	178	56	531	238	0	25	1,140	--	1.4	--	2,390	3.25	781	874	480	63	8.9	3,990	7.8
Feb. 22, 24-28	21.6	--	--	132	38	354	159	0	19	1,765	--	.8	--	1,610	2.19	94	460	330	63	7.2	2,680	7.5
Feb. 23	32.0	--	--	140	46	458	142	0	23	988	--	1.3	--	2,030	2.76	175	538	422	65	8.6	3,260	7.9
Mar. 1	20.0	--	--	134	44	374	182	0	22	820	--	.6	--	1,770	2.41	96	516	366	61	7.2	2,850	7.5
Mar. 2	291	--	--	163	56	546	193	0	28	1,160	--	.7	--	2,380	3.24	1,870	637	479	65	9.4	3,870	7.8
Mar. 3-4	1.467	--	--	48	15	140	62	0	23	290	--	3.1	--	687	.93	2,720	182	130	63	4.5	1,110	7.4
Mar. 5-8	267	--	--	29	8.0	59	66	0	16	115	--	2.3	--	355	.48	256	106	52	55	2.5	532	7.1
Mar. 9-10	50.5	--	--	37	9.9	73	79	0	21	145	--	2.0	--	402	.55	57	133	68	55	2.8	655	7.3
Mar. 11-12, 18	129	--	--	36	9.1	96	66	0	20	182	--	3.0	--	480	.65	167	128	74	62	3.7	760	7.5
Mar. 13-17, 19-20	349	--	--	27	8.0	64	57	0	17	119	--	2.5	--	337	.46	318	100	54	58	2.8	522	7.3
Mar. 21-27	43.7	--	--	40	11	89	84	0	22	174	--	2.4	--	465	.63	55	145	76	57	3.2	747	7.7
Mar. 28-31	17.0	--	--	47	13	102	96	0	24	200	--	1.9	--	508	.69	23	171	92	56	3.4	849	7.6
Apr. 1-2	16.5	--	--	52	16	111	111	0	25	225	--	1.7	--	556	.76	25	196	104	55	3.4	950	8.0
Apr. 3-4	22.0	--	--	62	21	128	108	0	26	332	--	1.9	--	752	1.02	45	241	152	59	4.4	1,300	7.8
Apr. 5	1,370	--	--	28	9.5	94	58	0	22	167	--	2.4	--	417	.57	1,540	104	56	66	4.0	679	7.4
Apr. 6-7	2,202	--	--	17	6.6	38	45	0	17	68	--	2.5	--	220	.30	1,310	70	52	54	2.0	336	7.5
Apr. 8-10	234	--	--	27	8.8	47	62	0	17	95	--	3.3	--	276	.38	174	104	52	50	2.0	449	7.2
Apr. 11, 13-14	73.0	--	--	32	10	62	77	0	22	119	--	2.4	--	332	.45	65	121	56	53	2.5	694	7.5
Apr. 12, 15-20	93.6	--	--	42	13	73	95	0	23	151	--	1.6	--	310	.56	104	138	60	50	2.8	620	7.6
Apr. 21, 23-29	266	--	--	34	9.5	71	79	0	21	135	--	1.9	--	368	.50	264	124	60	50	2.8	620	7.6
Apr. 22-27, 30	746	--	--	30	8.3	54	72	0	21	102	--	1.7	--	307	.42	620	109	50	52	2.3	502	7.3
May 1-4	174	--	--	31	8.0	51	81	0	21	93	--	1.8	--	299	.41	140	110	44	50	2.1	477	7.5
May 5-10	52.0	--	--	39	11	74	95	0	22	142	--	1.6	--	408	.55	57	142	64	53	2.7	673	7.3
May 11-15	3,222	--	--	May 11-15	5.6	27	73	0	13	38	--	1.7	--	168	.23	1,460	70	10	45	1.4	260	7.7
May 16-18	606	--	--	29	9.1	33	84	0	19	65	--	1.9	--	247	.34	404	110	41	40	1.3	395	7.7
May 19	3,710	--	--	17	4.7	23	47	0	17	38	--	2.3	--	204	.28	2,040	62	24	44	1.3	237	7.4
May 20	782	--	--	24	6.6	41	67	0	19	70	--	2.4	--	273	.37	576	87	32	50	1.9	384	7.7
May 21-24	180	--	--	32	9.7	42	93	0	19	81	--	2.0	--	272	.37	132	120	44	43	1.7	456	7.7
May 25-31	40.4	--	--	45	11	68	125	0	20	128	--	1.9	--	390	.53	43	158	55	48	2.4	665	7.9

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

Chemical analyses, in parts per million, water year October 1952 to September 1953.--Continued

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal-cium (Ca)	Mag-ne-sium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Car-bonate (CO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> )	Bo-tom (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Per-cent ad-sorp-tion ratio	Specific conduct-ance (micro-mhos at 25°C)
															Parts per mil-lion	Tons per acre-foot	Tons per day	Total	Non-carbon-ate		
June 1-4, 1953	10.9	--	--	56	12	79	142	150	0	22	152	--	1.4	--	452	.61	13	190	67	47	770
June 5-6	76.0	--	--	67	15	142	158	150	0	23	272	--	1.3	--	667	.91	137	230	100	37	1,160
June 7-10	416.0	--	--	42	10	53	115	115	0	19	104	--	1.7	--	331	.45	372	146	52	44	863
June 11-18	26.0	--	--	46	11	64	137	137	0	16	121	--	1.2	--	374	.51	26	164	32	46	933
June 19-20	5.50	--	--	56	12	89	142	142	0	19	169	--	1.3	--	461	.65	8.4	168	97	50	924
June 21-23	5.40	--	--	52	13	124	142	142	0	21	180	--	1.3	--	467	.66	17.1	168	97	50	934
June 22-23	6.90	--	--	62	18	124	149	149	0	19	238	--	1.2	--	945	.82	12	240	87	58	1,030
June 24-29	6.23	--	--	67	18	153	156	156	0	16	300	--	1.2	--	942	1.11	12	240	112	58	1,250
June 30	3.50	--	--	78	20	207	161	161	0	20	405	--	1.1	--	943	1.28	8.9	276	144	62	1,570
July 1-8	2.89	--	--	85	22	256	161	161	0	21	500	--	1.0	--	1,120	1.52	8.7	304	172	65	1,860
July 9	1,080	--	--	15	3.8	33	38	38	0	5.4	80	--	3.7	--	184	.25	537	53	22	57	284
July 10-20	232	5.8	0.30	28	6.9	56	3.7	68	0	9.1	107	0.5	1.9	0.35	295	.40	185	100	44	54	496
July 21-25	23.8	--	--	35	9.1	87	81	81	0	15	163	--	1.6	--	412	.56	29	135	58	60	699
July 26-31	9.48	--	--	46	12	122	124	124	0	14	232	--	1.4	--	536	.73	14	163	78	62	844
Aug. 1-5	17.3	--	--	56	14	140	120	120	0	13	275	--	1.7	--	632	.86	30	198	100	61	1,100
Aug. 6-10	13.1	--	--	42	10	79	111	111	0	8.8	155	--	2.0	--	410	.56	15	148	57	54	709
Aug. 11-20	2.95	--	--	28	8.0	78	113	113	0	6.4	151	--	1.7	--	356	.48	2.8	103	52	62	612
Aug. 21-31	.55	--	--	38	11	107	72	72	0	5.9	218	--	1.4	--	504	.69	.7	140	81	63	841
Sept. 1-3	2.13	--	--	43	12	122	79	79	0	5.5	248	--	1.6	--	574	.78	3.3	156	92	63	945
Sept. 4-10	337	--	--	20	5.6	44	51	51	0	10	81	--	2.0	--	237	.32	216	73	31	57	2,22
Sept. 11-18	5.18	--	--	28	7.1	59	62	62	0	10	113	--	2.3	--	291	.40	4.1	94	43	58	2,7
Sept. 19-20	142	--	--	35	11	103	71	71	0	13	200	--	1.9	--	472	.64	181	132	74	63	802
Sept. 21	31.0	--	--	18	5.1	38	46	46	0	8.4	72	--	2.3	--	187	.23	14	66	28	56	2,1
Sept. 22-24	13.0	--	--	24	5.8	51	56	56	0	7.5	99	--	1.8	--	263	.36	9.2	84	38	57	4,33
Sept. 25-30	3.40	--	--	29	6.7	66	64	64	0	7.6	129	--	1.2	--	323	.44	3.0	100	48	59	545
Weighted average	151	--	--	28	8.3	85.8	b71	b71	--	16	109	--	2.0	--	314	0.43	128	104	46	55	501

a Calculated from other weighted average constituents.

b Includes equivalent of individual carbonate values shown above.

## ARKANSAS RIVER BASIN--Continued

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

Temperature (°F) of water, water year October 1952 to September 1953

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

## LOWER MISSISSIPPI RIVER BASIN

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

LOCATION.--At gaging station at bridge on State Highway 33, 6 miles downstream from Dog Creek, 6 miles west of Inola, Rogers County, and at mile 48.8. DRAINAGE AREA.--7,911 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1953.

EXTREMES, 1952-53.--Dissolved solids: Maximum, 1,030 ppm Oct. 21; minimum, 210 ppm May 18-20.

Hardness: Maximum, 320 ppm Feb. 5-9; minimum, 87 ppm May 18-20.

Water temperatures: Maximum daily, 1,980 micromhos Sept. 3; minimum daily, 337 micromhos May 20.

Specific conductance: Maximum, 93 F June 21; minimum, 34 F Jan. 17.

Hardness, 1947-53.--Dissolved solids: Maximum, 1,830 ppm Feb. 20-22, 1948; minimum, 91 ppm June 22-30, July 1-2, 1948.

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

Water temperatures: Maximum daily, 93 F June 21, 1953; minimum, freezing point on many days during winter months.

Specific conductance, 1953-55: Maximum, 93 F June 21, 1953; 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 1952 to September 1953 given in NSF 1281.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)		
															Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate				
Oct. 1-6, 1952----	45.2	--	--	79	20	239	181	0	23	440	--	--	7.1	--	999	1.36	122	279	130	65	6.2	1,750	7.3
Oct. 7-10-----	58.0	--	--	70	18	192	187	0	22	352	--	--	11	--	844	1.15	132	248	112	63	5.3	1,470	7.1
Oct. 8-9-----	67.0	--	--	59	18	145	166	0	21	260	--	--	14	--	599	81	108	221	85	59	4.2	1,200	7.0
Oct. 11-14, 17-18	39.0	--	--	64	17	181	169	0	21	322	--	--	12	--	780	1.06	82	230	91	63	5.2	1,390	7.4
Oct. 15-16, 19-20	34.8	--	--	74	22	235	172	0	21	435	--	--	11	--	958	1.30	90	275	134	65	6.2	1,740	7.2
Oct. 21-----	37.0	--	--	79	21	257	179	0	23	470	--	--	9.7	--	1,030	1.40	103	284	137	66	6.6	1,850	6.9
Oct. 22-31-----	39.2	--	--	64	18	210	159	0	19	375	--	--	13	--	848	1.15	90	234	103	66	6.0	1,500	7.0
Nov. 1-10-----	44.4	6.4	0.00	65	16	198	149	0	17	360	0.1	0.32	19	0.32	818	1.11	98	228	106	64	5.7	1,450	7.1
Nov. 11-15-----	51.2	--	--	68	16	214	144	0	17	332	--	--	15	--	872	1.19	121	236	118	66	6.1	1,550	7.4
Nov. 16-20-----	85.0	--	--	56	10	110	145	0	17	191	--	--	17	--	532	.71	120	180	62	57	3.6	909	7.2
Nov. 21-30-----	137	5.6	.00	60	13	118	161	0	22	220	.1	.12	12	.23	564	.77	209	203	71	55	3.6	1,020	7.4
Dec. 1-3-----	127	--	--	71	16	130	173	0	47	232	--	--	8.7	--	629	.86	216	243	101	54	3.6	1,090	7.6
Dec. 4-10-----	92.9	--	--	85	23	190	180	0	43	370	--	--	5.9	--	884	1.20	222	306	159	57	4.7	1,530	7.7
Dec. 11-13-----	82.7	--	--	78	20	190	176	0	28	362	--	--	8.7	--	831	1.13	186	276	132	60	5.0	1,510	7.4
Dec. 14-20-----	99.6	--	--	72	16	152	169	0	24	285	--	--	12	--	691	.94	186	246	107	57	4.2	1,260	7.5
Dec. 21-31-----	116	4.0	.00	69	15	127	180	0	29	235	.0	.11	11	.26	610	.83	191	234	86	53	3.6	1,110	7.3
Jan. 1-10, 1953----	87.3	3.2	.00	74	16	161	188	0	29	300	.0	4.6	4.6	.21	736	1.00	173	250	96	58	4.4	1,310	7.6
Jan. 11-20-----	71.1	--	--	68	15	159	186	0	26	278	--	--	6.6	--	664	.90	127	231	78	60	4.6	1,240	7.4
Jan. 21-23, 30-31	95.6	--	--	69	14	136	176	0	34	238	--	--	12	--	636	.86	164	230	86	56	3.9	1,140	7.5
Jan. 24-29-----	167	--	--	62	12	96	181	0	31	162	--	--	4.2	--	495	.67	223	204	56	51	2.9	897	7.3

Feb. 1-2, 1953	77.5	--	--	80	20	131	178	0	60	248	--	9.3	--	696	0.95	146	282	136	50	3.4	1,190	7.8
Feb. 3-4, 10-----	69.0	--	--	87	21	183	176	0	46	355	--	9.7	--	856	1.16	159	304	160	57	4.5	1,510	8.0
Feb. 5-9, 10-----	63.2	--	--	92	22	209	185	0	40	408	--	7.5	--	942	1.28	161	320	168	59	5.1	1,650	7.7
Feb. 11-15-----	108	--	--	80	18	184	172	0	342	274	--	12	--	849	1.15	248	274	132	59	4.8	1,460	8.0
Feb. 16-20-----	84.0	--	--	72	13	162	163	0	35	285	--	17	--	734	1.00	166	233	100	60	4.6	1,280	7.4
Feb. 21-28-----	136	4.6	--	70	15	153	163	0	41	282	3	3.5	33	730	.99	268	253	103	56	4.2	1,280	7.7
Mar. 1-2-----	181	--	--	79	17	161	160	0	38	308	--	14	--	782	1.06	382	267	136	57	4.3	1,360	7.8
Mar. 3-10-----	1,907	--	--	66	14	117	128	0	55	218	--	6.9	--	608	.83	3,130	222	117	53	3.4	1,030	7.4
Mar. 11-13-----	4,490	--	--	63	16	111	138	0	50	200	--	10	--	572	.78	757	223	110	52	3.2	995	7.3
Mar. 14-20-----	2,100	--	--	44	11	173	102	0	40	132	--	6.6	29	414	.56	2,350	155	72	51	2.5	687	7.1
Mar. 21-31-----	253	8.8	--	61	13	106	130	0	42	205	1	9.6	24	563	.77	385	206	99	52	3.2	957	8.0
Apr. 1-5-----	450	--	--	66	15	125	142	0	44	232	--	8.3	26	622	.85	756	226	110	55	3.6	1,060	7.9
Apr. 6-7-----	7,480	--	--	56	8.0	49	86	0	31	181	--	2.0	--	295	.40	5,960	183	52	46	1.9	482	7.7
Apr. 8-10-----	1,771	--	--	56	11	83	103	0	58	152	--	5.0	--	475	.65	2,210	164	100	49	2.7	780	7.3
Apr. 11-17-----	5,519	--	--	51	13	82	122	0	43	149	--	4.6	--	460	.63	645	180	80	50	2.6	534	7.8
Apr. 18-19-----	2,820	--	--	53	12	102	140	0	41	168	--	3.7	--	356	.46	2,610	174	60	39	1.5	913	7.6
Apr. 20-----	2,820	--	--	53	12	102	140	0	41	168	--	3.7	--	356	.46	2,610	174	60	39	1.5	913	7.6
Apr. 21-22-----	1,180	--	--	51	12	113	98	0	41	200	--	4.2	--	348	.73	4,130	176	96	59	3.7	918	8.0
Apr. 23, 25-30---	4,611	--	--	38	8.4	59	95	0	39	197	--	3.7	--	324	.44	1,030	131	52	50	2.3	551	7.6
Apr. 24-----	19,900	--	--	28	5.8	33	71	0	29	52	--	4.3	--	235	.32	12,630	94	36	43	1.5	348	7.9
May 1-10-----	1,372	8.0	.02	52	9.5	66	119	0	41	121	2	3.1	32	414	.56	1,530	168	71	45	2.2	673	7.6
May 11-12-----	2,908	--	--	48	11	79	128	0	47	126	--	5.5	--	426	.58	3,340	165	60	51	2.7	719	8.0
May 13-14-----	19,750	--	--	28	8.2	36	81	0	28	60	--	3.2	--	243	.33	12,960	104	37	43	1.6	391	7.8
May 15-17-----	4,767	--	--	40	8.5	42	103	0	34	74	--	3.0	--	294	.40	3,900	135	60	41	1.6	487	7.9
May 18-20-----	9,037	--	--	25	6.0	34	71	0	27	52	--	2.4	--	210	.29	5,120	87	29	46	1.6	350	7.7
May 21-----	5,770	--	--	46	8.1	46	114	2	31	82	--	4.4	--	322	.44	5,020	148	52	40	1.6	517	8.3
May 22-31-----	1,101	--	--	56	11	60	145	0	37	110	--	3.3	--	404	.55	1,200	184	66	41	1.9	671	7.8
June 1-2-----	190	--	--	62	12	83	156	0	40	180	--	3.7	--	498	.68	255	204	76	47	2.5	860	7.6
June 3-----	170	--	--	72	15	138	152	2	40	265	--	3.6	--	709	.96	325	241	113	55	3.9	1,220	8.3
June 4-6-----	187	--	--	63	13	103	157	0	41	190	--	1.9	--	574	.78	290	210	82	52	3.1	938	8.0
June 7-8-----	2,695	--	--	37	6.9	35	103	0	26	64	--	2.4	--	272	.37	1,970	121	36	39	1.4	433	7.9
June 9-10-----	2,565	--	--	45	9.1	66	110	0	30	121	--	3.1	--	380	.52	2,630	150	60	49	2.4	644	7.8
June 11-14-----	3,383	--	--	52	11	84	122	0	30	166	--	2.2	--	456	.62	472	174	74	51	2.8	815	7.8
June 15-17-----	137	--	--	56	12	96	127	0	30	168	--	1.7	--	513	.70	190	169	85	52	3.0	890	8.2

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

Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids (residue at 180° C)			Hardness as CaCO <sub>3</sub>		Percent sodium-sulfate ratio	Specific conductance (micro-mhos at 25° C)	pH		
														Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate					
June 18-20, 1953--	102	--	--	60	13	131	--	134	0	29	245	--	1.1	--	620	0.84	171	203	93	58	4.0	1,080	7.9
June 21-----	90.0	--	--	58	13	123	--	127	4	33	232	--	2.3	--	610	0.83	148	198	88	57	3.8	1,040	8.3
June 22-23-----	82.5	--	--	63	15	180	--	133	0	30	335	--	1.3	--	802	1.09	179	218	110	64	5.3	1,370	8.2
June 24-----	75.0	--	--	62	14	162	--	131	2	33	300	--	7.6	--	754	1.03	153	212	101	62	4.9	1,360	8.3
June 25-30-----	72.3	--	--	62	14	144	--	143	0	27	272	--	1.6	--	696	.95	136	212	95	60	4.3	1,200	8.0
July 1-8-----	54.8	--	--	64	14	177	--	145	0	28	320	--	2.4	--	764	1.04	113	216	97	64	5.3	1,340	7.2
July 9-10-----	1,165	--	--	51	10	69	--	134	0	28	119	--	15	--	399	.54	1,260	168	58	47	2.3	711	8.0
July 11-15-----	575	--	--	37	7.7	73	--	94	0	20	130	--	2.4	--	365	.50	567	134	47	56	2.9	626	7.8
July 16-----	244	--	--	58	13	164	--	103	0	26	312	--	5.2	--	758	1.03	499	200	116	64	5.0	1,240	8.0
July 17-----	992	--	--	34	8.5	69	--	85	0	26	120	--	4.5	--	342	.47	916	120	50	55	2.7	585	6.8
July 18-19-----	540	--	--	35	8.4	118	--	62	0	20	215	--	3.5	--	485	.66	707	122	71	68	4.6	843	7.6
July 20-----	969	--	--	34	7.3	55	--	102	0	19	91	--	2.8	--	300	.41	785	115	32	51	2.2	504	8.2
July 21-22-----	664	--	--	42	8.0	63	--	101	0	47	99	--	3.9	--	339	.46	608	138	55	50	2.3	577	8.0
July 23-31-----	156	--	--	57	11	125	--	118	0	46	222	--	4.0	--	580	.79	244	188	92	59	4.0	1,010	7.1
Aug. 1-10-----	67.3	--	--	59	13	162	--	130	0	32	292	--	3.1	--	699	.95	127	202	96	64	5.0	1,220	7.3
Aug. 11-20-----	53.6	--	--	56	12	164	--	142	0	24	285	--	4.6	--	883	.93	99	190	74	65	5.2	1,210	7.5
Aug. 21-31-----	42.0	--	--	68	15	225	--	147	0	20	408	--	5.0	--	887	1.21	101	232	112	68	6.4	1,580	7.6
Sept. 1-4-----	80.0	--	--	67	17	221	--	146	0	22	420	--	3.6	--	943	1.28	204	238	118	67	6.2	1,660	8.1
Sept. 5-10-----	1,558	--	--	38	8.0	66	--	94	0	24	126	--	2.5	--	358	.49	1,510	128	51	53	2.5	615	7.9
Sept. 11-16-----	125	--	--	41	10	95	--	105	0	26	177	--	3.2	--	456	.62	154	145	59	59	3.4	804	7.8
Sept. 17-20-----	96.3	--	--	48	12	133	--	109	0	28	248	--	4.6	--	599	.81	156	168	78	63	4.5	1,060	7.6
Sept. 21-27-----	89.1	--	--	41	9.6	94	--	107	0	22	168	--	8.0	--	444	.60	107	142	54	59	3.4	794	7.5
Sept. 28-30-----	51.0	--	--	47	11	132	--	112	0	19	245	--	11	--	588	.80	81	163	71	64	4.5	1,080	7.8
Weighted average	804	--	--	42	9.4	a 65	--	b 103	--	35	114	--	4.2	--	368	0.50	799	144	59	50	2.4	613	--

a Calculated from other weighted average constituents.

b Includes equivalent of individual carbonate values shown above.

## ARKANSAS RIVER BASIN--Continued

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

Temperature (°F) of water, water year October 1952 to September 1953  
 [Once-daily temperature measurement at 5:30 p.m.]

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

## ARKANSAS RIVER BASIN--Continued

## NEOSHO RIVER NEAR COMMERCE, OKLA.

LOCATION.--At gaging station at bridge on county highway, 1 1/4 miles upstream from Mud Creek, 1 1/4 miles downstream from Four Mile Creek, 4 1/4 miles west of Commerce, Ottawa County and at mile 153.4.

DRAINAGE AREA.--5,876 square miles.

RECORDS AVAILABLE.--Chemical analyses.

EXTREMES 1952-53.--Dissolved solids: October 1947 to September 1953.

Temperatures: November 1947 to September 1953.

Hardness: Maximum, 426 ppm Apr. 1-3; minimum, 92 ppm Apr. 24-25.

Specific conductance: Maximum, 95 F.; minimum, 1,140 micromhos Apr. 21; minimum daily, 235 micromhos Apr. 24.

Water temperature: Maximum, 95 F.; minimum, 37 F. Nov. 28.

EXTREMES 1947-53.--Dissolved solids: June 11, 85; minimum, 37 F. Nov. 28.

Hardness: Maximum, 462 ppm Jan. 21-31, 1951.

Specific conductance: Maximum, 95 F. June 11, 1953; minimum daily, 126 micromhos July 27, 28, 1948.

Water temperatures: Maximum, 95 F. June 11, 1953; 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 1952 to September 1953 given in WSP 1281.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)		
														Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate				
Oct. 1-10, 1952.....	21.9	6.8	0.05	84	29	43	3.8	225	0	147	57	0.3	1.4	0.33	516	0.70	31	329	144	22	1.0	768
Oct. 11-20.....	18.6	--	--	82	32	46	51	231	0	164	61	--	1.6	--	513	.70	26	336	147	25	1.2	840
Oct. 21-31.....	17.1	6.8	.00	91	32	46	3.8	238	0	168	69	3	1.3	1.8	555	.75	26	359	164	22	1.1	873
Nov. 1-10.....	7.53	--	--	82	31	43	55	237	0	175	70	--	.7	--	568	.77	12	357	163	25	1.3	874
Nov. 11-20.....	23.4	6.2	.05	90	32	48	4.0	235	0	169	70	.3	1.7	.15	544	.74	34	356	164	22	1.1	851
Nov. 21-31.....	92.1	--	--	85	28	54	54	229	0	159	64	--	.8	--	530	.72	132	327	140	26	1.3	799
Dec. 1-10.....	110	6.2	.00	82	28	43	3.8	243	0	124	54	.3	1.0	.13	461	.63	137	320	121	22	1.0	757
Dec. 11-20.....	97.5	--	--	69	21	47	47	246	0	84	50	--	.5	--	410	.56	108	258	57	28	1.3	677
Dec. 21-31.....	10.2	3.2	.00	68	19	50	3.5	240	0	62	72	.3	.4	.19	400	.54	11	248	51	30	1.4	695
Jan. 1-10, 1953.....	89.0	--	--	78	22	74	74	250	0	117	85	--	.4	--	514	.70	137	285	80	36	1.9	848
Jan. 11-20.....	76.7	4.0	.00	84	26	57	3.6	252	4	142	82	.3	.5	.23	554	.75	115	350	137	26	1.3	884
Jan. 21-31.....	87.6	--	--	98	34	58	58	254	0	181	81	--	.5	--	592	.81	140	384	176	25	1.3	965
Feb. 1-10.....	82.1	2.6	.00	91	28	58	3.6	268	0	132	80	.3	.2	.24	545	.74	121	342	123	27	1.4	887
Feb. 11-20.....	86.5	3.6	.00	91	29	58	3.8	266	0	140	79	.3	.6	.25	555	.75	128	346	126	26	1.4	885
Feb. 21-28.....	90.1	--	--	106	33	75	75	276	0	184	103	--	.6	--	652	.89	159	400	174	29	1.6	1,050

Mar. 1-4, 1953	504	--	104	36	76	244	0	208	109	--	1.9	--	690	0.94	939	408	208	29	1.6	1,080	8.2
Mar. 2-10	391	--	76	24	47	151	0	176	56	--	5.4	--	479	.65	506	288	165	26	1.2	759	8.0
Mar. 11-15, 19-20	275	--	78	24	49	149	0	188	55	--	4.2	--	495	.67	368	283	171	26	1.2	766	8.0
Mar. 16-18	251	--	65	18	37	129	0	142	42	--	5.1	--	393	.53	266	236	130	25	1.1	623	7.5
Mar. 21-25	186	--	84	27	50	167	0	195	62	--	1.8	--	526	.72	264	321	184	25	1.2	819	7.9
Mar. 26-31	131	--	96	33	65	205	0	224	82	--	.8	--	631	.86	223	375	207	27	1.5	979	7.8
Apr. 1-5	1,302	--	113	35	59	231	0	237	85	--	1.3	.26	674	.92	2,370	426	237	23	1.2	1,030	8.2
Apr. 6-10	677	--	54	17	36	129	0	119	36	--	3.5	--	353	.48	643	205	99	28	1.1	556	7.8
Apr. 11-17, 19	516	--	51	12	32	115	0	84	45	--	5.1	.23	310	.42	432	177	82	28	1.0	521	7.7
Apr. 18-20	368	--	36	9.0	23	71	0	76	27	--	4.6	--	225	.31	224	127	69	28	.9	359	7.2
Apr. 21-23, 26-27	399	--	45	13	28	96	0	97	30	--	4.9	--	295	.40	318	166	87	27	.9	460	7.8
Apr. 24-25	2,630	--	24	7.8	16	44	0	71	8.4	--	4.3	--	187	.23	1,180	282	56	27	.7	248	7.3
Apr. 26-30	783	--	53	17	19	102	0	142	21	--	4.6	--	353	.46	1,727	202	119	24	.9	526	7.5
May 1-7, 10	711	--	38	12	30	81	0	100	19	--	4.8	--	272	.37	522	144	70	31	1.1	428	7.6
May 8-9	415	--	30	9.5	23	78	0	71	16	--	4.3	--	215	.29	241	114	50	30	.9	333	7.6
May 11-12	512	--	47	11	25	110	0	86	24	--	5.1	--	280	.38	397	164	74	25	.8	439	7.8
May 13	3,540	--	32	6.8	21	85	0	53	16	--	8.7	--	193	.26	1,840	108	38	30	.9	397	8.2
May 14	1,520	--	38	8.6	27	84	0	75	25	--	7.0	--	233	.32	956	130	61	31	1.0	379	8.2
May 15-20	885	--	45	9.9	31	97	0	89	32	--	7.0	--	274	.37	655	189	74	31	1.1	445	8.2
May 21-31	581	7.4	56	12	33	143	0	74	48	.3	3.6	.15	330	.45	518	153	72	27	1.0	551	7.8
June 1-2	1,312	--	70	16	42	168	5	110	48	--	4.3	--	400	.54	1,420	240	94	28	1.2	623	8.4
June 3-5	1,949	--	98	25	38	203	6	173	48	--	4.9	--	530	.72	750	346	170	19	.9	792	8.4
June 6-10	477	--	70	17	29	186	0	105	29	--	6.4	--	384	.52	495	244	92	21	.8	589	7.9
June 11-20	98.9	9.0	56	17	24	134	0	107	30	.3	4.8	.46	340	.46	91	215	105	19	.7	534	7.9
June 21-30	39.7	--	58	14	31	139	0	100	32	--	3.3	--	334	.45	36	168	84	26	1.0	516	8.2
July 1-10	632	8.0	40	48	22	136	0	66	26	.3	2.8	.49	268	.36	463	169	58	22	.7	440	7.9
July 11-20	196	7.8	39	8.7	16	123	0	39	19	--	4.0	.45	205	.28	108	133	32	20	.6	338	7.8
July 21-31	87.5	--	43	9.9	18	120	0	68	11	--	3.0	--	227	.31	54	148	50	21	.6	377	8.0

## ARKANSAS RIVER BASIN--Continued

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

Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate			
Aug. 1-10, 1953	9.92	--	--	45	9.9	22		130	0	57	23	--	2.4	--	240	0.33	6.4	153	46	24	400	7.9
Aug. 11-20	3.46	--	--	44	11	26		136	0	55	29	--	2.9	--	234	.33	2.5	191	44	26	432	7.7
Aug. 21-31	2.51	--	--	49	13	30		156	0	55	37	--	3.3	--	289	.39	2.2	176	46	27	481	8.0
Sept. 1-10	2.59	--	--	50	12	31		135	0	53	40	--	4.3	--	230	.39	2.0	176	46	27	481	7.4
Sept. 11-20	1.76	10	.00	50	14	34	4.0	133	0	50	49	0.5	0.57	0.57	303	.43	1.9	182	54	28	504	7.7
Sept. 21-30	.21	9.6	.00	50	14	36	3.9	153	0	48	56	.5	3.2	.53	313	.43	.2	182	57	29	521	7.6
Weighted average	2.46	--	--	63	18	23.6		150	--	117	43	--	3.8	--	378	0.51	251	231	108	25	597	--

a Calculated from other weighted average constituents.

b Includes equivalent of individual carbonate values shown above.

## ARKANSAS RIVER BASIN--Continued

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

Temperature (°F.) of water, water year October 1952 to September 1953

/Once-daily temperature measurement at 3 p.m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	78	60	39	39	50	51	67	66	88	88	90	85
2	73	60	43	41	52	49	64	67	86	87	90	85
3	68	57	42	40	54	49	61	67	85	84	--	78
4	73	56	42	41	53	48	58	64	84	87	88	77
5	63	59	41	42	52	49	57	62	83	89	84	79
6	62	57	44	43	52	50	56	60	82	84	86	75
7	60	54	48	40	50	50	49	60	83	83	86	82
8	60	57	49	--	51	51	58	64	86	83	85	80
9	60	50	49	38	49	52	65	68	89	82	86	80
10	61	48	48	40	51	52	63	71	91	83	82	82
11	55	50	47	41	46	53	58	70	95	78	83	82
12	57	54	45	42	47	55	54	65	91	75	84	80
13	57	53	44	39	48	58	57	60	95	76	88	78
14	65	--	42	49	48	63	56	60	92	79	89	79
15	61	59	--	45	49	60	57	64	90	81	89	80
16	65	63	--	39	45	58	58	64	88	81	83	80
17	63	62	42	39	47	56	54	69	85	82	83	79
18	57	58	43	40	49	60	49	75	91	81	83	80
19	56	56	43	41	48	62	52	73	89	85	83	80
20	55	54	43	41	48	64	55	73	89	83	81	80
21	63	52	43	43	44	65	58	77	89	87	--	75
22	64	51	43	42	45	59	64	80	85	88	--	73
23	62	49	41	40	48	62	66	79	85	87	--	72
24	66	48	38	43	45	58	59	87	--	87	--	70
25	60	48	39	44	48	58	62	83	85	89	--	75
26	61	45	40	48	49	60	62	85	88	89	84	77
27	61	45	40	44	52	61	64	85	88	90	83	--
28	61	37	41	41	52	64	67	85	89	90	83	--
29	62	36	39	47	--	63	67	85	89	89	85	--
30	57	40	40	50	--	65	67	85	88	90	85	--
31	59	--	40	51	--	67	--	86	--	90	87	--
Average	62	52	43	42	49	57	59	72	88	85	85	79

## LOWER MISSISSIPPI RIVER BASIN

## ARKANSAS RIVER BASIN--Continued

NEOSHO RIVER AT PENSACOLA RESERVOIR AT LANGLEY, OKLA.  
(Lake o' the Cherokees)

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

DRAINAGE AREA.--10,298 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1951 to September 1953.

Water temperatures: October 1951 to September 1953.

EXTREMES, 1952-53.--Dissolved solids: Maximum, 240 ppm June 1-31; minimum, 214 ppm July 1-31.

Hardness: Maximum, 177 ppm Apr. 1-30; minimum, 158 ppm June 1-30, Sept. 1-30.

Specific conductance: Maximum daily, 397 micromhos Apr. 1, May 1; minimum daily, 349 micromhos Sept. 9, 11.

Water temperatures: Maximum, 82°F July 18; minimum, 42°F Feb. 6-15.

EXTREMES, 1951-53.--Dissolved solids: Maximum, 240 ppm Mar. 1-31, 1953; minimum, 155 ppm Oct. 1-31, 1951.

Hardness: Maximum, 177 ppm Apr. 1-30, 1953; minimum, 104 ppm Oct. 1-31, 1951.

Specific conductance: Maximum daily, 397 micromhos Apr. 1, May 1, 1953; minimum daily, 234 micromhos Oct. 18, 1951.

Water temperatures: Maximum, 82°F July 18, 1953; minimum, 42°F Feb. 6-15, 1953.

REMARKS.--Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of water discharge for gaging station near Langleys for water year October 1952 to September 1953 given in WSP 1281. No appreciable inflow between sampling station and gaging station except during periods of heavy local runoff.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Bo- trate (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Per- cent so- lution ratio	Specific conductance (micro-mhos at 25°C)	pH	
															Parts per million	Tons per acre-foot	Tons per acre-day	Total	Non-carbonate				
Oct. 1-31, 1952.....	2,031	3.6	0.00	51	9.6	12	2.2	150	0	55	11	0.1	1.4	0.08	224	0.30	1,230	167	44	13	0.4	376	8.1
Nov. 1-30.....	1,533	3.2	.00	52	9.2	13	2.1	152	0	57	11	.3	1.6	.11	225	.31	931	168	43	14	.4	374	8.0
Dec. 1-31.....	1,439	2.6	.00	52	9.9	12	2.2	152	0	55	12	.3	1.9	.13	226	.31	878	170	46	13	.4	382	8.1
Jan. 1-31, 1953.....	1,402	1.6	.00	53	9.4	13	2.1	153	0	56	12	.1	1.1	.16	228	.31	863	171	46	14	.4	381	7.9
Feb. 1-28.....	1,297	1.2	.00	54	8.7	13	1.9	154	0	58	12	.3	1.1	.17	227	.31	795	170	44	14	.4	379	8.1
Mar. 1-31.....	1,682	2.6	.00	54	10	12	2.0	152	0	58	12	1.1	1.8	.24	240	.33	1,090	176	51	13	.4	383	8.0
Apr. 1-30.....	4,238	3.6	.00	57	8.5	12	2.1	150	0	58	13	1.1	2.5	.35	234	.32	2,720	177	54	13	.4	388	8.1
May 1-31.....	4,082	4.2	.00	54	8.2	11	2.1	135	4	57	12	.3	3.8	.13	235	.32	2,580	168	51	12	.4	381	8.3
June 1-30.....	2,340	4.8	.00	51	7.4	10	2.2	130	0	55	12	.3	5.0	.40	227	.31	1,430	158	51	12	.4	364	7.9
July 1-31.....	1,171	5.2	.00	52	7.3	11	2.2	131	0	53	12	.3	5.1	.44	214	.29	677	160	52	13	.4	362	8.0
Aug. 1-31.....	523	4.2	.00	52	7.1	11	2.2	133	0	54	12	.3	3.9	.51	219	.30	309	159	50	13	.4	363	7.7
Sept. 1-30.....	77.1	3.2	.00	51	7.5	12	2.3	131	0	55	12	.3	2.6	.40	215	.29	45	158	51	14	.4	360	8.1
Weighted average....	1,820	3.5	--	53	8.7	12	2.1	146	--	56	12	0.2	2.8	0.23	230	0.31	1,130	168	48	13	0.4	378	--

a. Includes equivalent of individual carbonate values shown above.

## ARKANSAS RIVER BASIN--Continued

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

Temperature (°F.) of water, water year October 1952 to September 1953

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

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

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

DRAINAGE AREA --12,492 square miles.

RECORDS AVAILABLE --Chemical analyses: October 1951 to September 1953.

Water temperatures: October 1951 to September 1953.

EXTREMES 1952-53 --Dissolved solids: Maximum 233 ppm Nov. 1-30; minimum, 184 ppm May 1-31.

Hardness: Maximum, 171 ppm Dec. 1-31; minimum, 129 ppm May 1-31.

Specific conductance: Maximum daily, 424 micromhos Feb. 16; minimum daily, 287 micromhos May 16.

Water temperatures: Maximum, 86°F. July 1-3, 9-10; minimum, 39°F. Jan. 16.

EXTREMES 1951-53 --Dissolved solids: Maximum, 233 ppm Nov. 1-30, 1952; minimum, 101 ppm Oct. 1-31, 1951.

Hardness: Maximum, 171 ppm Dec. 1-31, 1952; minimum, 158 ppm Oct. 1-31, 1951.

Specific conductance: Maximum daily, 424 micromhos Feb. 16, 1953; minimum daily, 200 micromhos Oct. 30, 1951.

Water temperatures: Maximum, 86°F. Aug. 4, 1952; July 1-3, 9-10, 1953; minimum, 34°F. Dec. 21, 1951.

REMARKS --Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of water discharge for gaging station near Fort Gibson for water year October 1952 to September 1953 given in WSP 1281. No appreciable inflow between sampling station and gaging station except during periods of heavy local runoff.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal- cium (Ca)	Mag- ne- sium (Mg)	So- dium (Na)	Pot- as- sium (K)	Bicar- bonate (HCO <sub>3</sub> )	Car- bonate (CO <sub>3</sub> )	Sul- fate (SO <sub>4</sub> )	Chlo- ride (Cl)	Fluo- ride (F)	Ni- trate (NO <sub>3</sub> )	Bo- ron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>		Per- cent sodium	So- dium adsorp- tion ratio	Specific conduct- ance (micro- mhos at 25°C)	pH	
															Parts per million	Tons per acre- per day	Total	Non- carbon- ate					
Oct. 1-31, 1952	727	4.8	0.00	52	9.4	14	2.4	147	0	56	14	0.1	1.6	0.11	231	0.31	168	48	15	0.5	388	8.1	
Nov. 1-30	555	5.2	.00	52	9.6	14	2.4	159	0	57	13	.3	1.2	1.1	233	.32	349	169	40	15	.5	389	8.0
Dec. 1-31	767	3.6	.00	52	10	14	2.4	152	0	56	15	.1	1.4	1.6	231	.31	478	171	46	15	.5	387	7.9
Jan. 1-31, 1953	712	2.0	.00	52	9.0	14	2.2	153	0	55	15	.3	.7	1.4	228	.31	438	167	41	15	.5	388	8.1
Feb. 1-28	755	3.0	.00	52	9.4	15	2.3	153	0	56	14	.1	1.0	.26	232	.32	473	168	43	16	.5	396	8.0
Mar. 1-31	2,639	6.2	.00	51	9.4	14	2.2	146	0	54	14	.1	1.3	.20	230	.31	1,630	166	46	15	.5	385	7.9
Apr. 1-30	7,055	4.6	.00	48	7.5	14	2.1	138	0	49	14	.0	1.3	.31	217	.30	4,130	151	38	17	.5	366	7.8
May 1-31	5,733	4.2	.00	42	6.0	10	2.2	117	0	41	10	.1	2.3	1.5	184	.25	2,850	129	34	14	.4	311	8.1
June 1-30	1,251	5.6	.00	47	7.0	11	2.2	127	0	47	12	.3	3.3	.48	209	.28	706	146	42	14	.4	340	8.2
July 1-31	1,091	3.2	.00	47	7.2	12	2.4	132	0	46	12	.3	1.9	.40	202	.27	595	147	39	15	.4	341	7.7
Aug. 1-31	1,067	3.6	.00	46	7.6	12	2.5	130	0	46	14	.3	1.6	.41	203	.28	585	146	39	15	.4	343	7.7
Sept. 1-30	1,738	3.6	.00	48	7.8	13	2.5	134	0	48	14	.3	.8	.46	206	.28	410	152	42	15	.5	347	7.8
Weighted average...	1,928	4.4	--	47	7.6	13	2.2	134	--	48	13	0.1	1.7	0.26	210	0.29	1,090	148	38	16	0.5	354	--

## ARKANSAS RIVER BASIN--Continued

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

Temperature (°F) of water, water year October 1952 to September 1953

/Once-daily temperature measurement at 7 a. m./

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

ARKANSAS RIVER BASIN--Continued  
UTE CREEK NEAR BUEYEROS, N. MEX.

LOCATION.--At gaging station at ford on State Highway 57, 3½ miles northwest of Bueyeros, Harding County, and 19½ miles northeast of Mosquero. DRAINAGE AREA.--220 square miles. (revised) of which 162 square miles are probably noncontributing.

RECORDS AVAILABLE.--Chemical analyses: February 1950 to September 1953, (discontinued).

Water temperatures: March 1949 to September 1953.

Sediment records: March 1949 to September 1953.

EXTREMES, 1952-53.--Dissolved solids: Maximum, 486 ppm Sept. 3-9, 29-30; minimum, 226 ppm Aug. 16-25, Sept. 1-2.

Hardness: Maximum, 244 ppm May 1-31; minimum, 134 ppm July 7-9, 17-18.

Specific conductance: Maximum observed, 953 micromhos Sept. 30; minimum observed, 321 micromhos Aug. 19.

Water temperatures: Maximum observed, 89°F Aug. 9; minimum observed, freezing point on several days during winter months.

Sediment concentrations: Maximum daily, 19,000 ppm Aug. 16; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 840,000 tons Aug. 16; minimum daily, 0 tons on many days.

EXTREMES, 1949-53.--Dissolved solids (1950-53): Maximum, 674 ppm June 20, 1950; minimum, 142 ppm July 31, 1950.

Hardness (1950-53): Maximum, 266 ppm June 1-30, 1952; minimum, 89 ppm July 31, 1950.

Specific conductance (1950-53): Maximum observed, 1,400 micromhos June 20, 1950; minimum observed, 175 micromhos July 31, 1950.

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

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

Sediment loads: Maximum daily, 840,000 tons Aug. 16, 1953; minimum daily, 0 tons on many days.

REMARKS.--Records of specific conductance of daily samples available in district offices at Albuquerque, N. Mex. Values reported for dissolved solids are sums of determined constituents. No flow on many days where temperature is not shown. Stage discharge relation affected by ice Nov. 24-30.

Dec. 1-7, 23-31, Jan. 1-7, 16, 17, Feb. 10-14, 20-22. Records of discharge for water year October 1952 to September 1953 given in WSP 1281.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carb. bonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium adsorption	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-day	Tons per day	Calcium	Non-carbonate			
Oct. 1-31, 1952	1.67	19	42	28	78		280	0	118	0	26	0.4		449	0.61	2.02	220	0	44	2.3	721	7.8
Nov. 1-30	3.43	18	45	29	72		286	0	112	0	27	.2		444	.60	4.11	232	0	40	2.1	718	7.9
Dec. 1-31	5.73	17	46	26	63		270	0	99	0	24	.5		408	.55	6.31	222	1	38	1.8	679	8.2
Jan. 1-31, 1953	6.41	15	48	27	59		272	0	99	0	23	1.1		406	.55	7.03	231	8	36	1.7	669	8.1
Feb. 1-28	4.01	16	47	28	59		272	0	98	0	25	.7		408	.55	4.42	232	10	36	1.7	660	8.0
Mar. 1-31	3.88	16	44	31	67		277	0	112	0	28	.2		434	.59	4.55	238	10	38	1.9	705	8.0
Apr. 1-30	3.02	48	42	33	67		276	0	120	0	25	.2		441	.60	3.60	240	14	38	1.9	743	7.8
May 1-31	2.45	18	40	35	76		286	0	125	0	32	.2		467	.64	3.09	244	10	40	2.1	763	7.9
June 1-7, 10-21, 23, 26, a	.31	22	32	39	72		272	0	119	0	35	1.1		454	.62	.38	240	18	39	2.0	748	7.6
July 6, 19-20, 22-24, a	6.83	24	40	34	68		266	0	117	0	34	.7		449	.61	8.28	240	22	38	1.9	727	7.8

	41.0	8.4	29	15	36	152	0	62	16	3	242	.33	26.8	134	10	37	1.3	415	7.7
July 7-9, 17-18 .....	21	43	19	45	221	0	70	20	43	1.4	328	.58	14.5	166	4	34	1.4	539	7.6
Aug. 3-7 .....	16.9	23	42	31	64	262	0	109	30	.5	458	.58	13.5	232	18	37	1.8	707	7.6
Aug. 8-9, 12, 14, 26-31 ..	466	18	43	10	226	21	180	0	8.5	2.0	31	.81	284	146	1	44	2.4	371	7.6
Aug. 16-25, Sept. 1-2 ..	3.90	22	29	27	84	286	0	131		.5	486	.66	5.12	234	0	44	2.4	761	7.9
Sept. 3-9, 23-30 .....	a																		
Weighted average .....	22.8	18	43	13	30	195	0	48	12	1.7	262	.36	13.7	161	1	29	1.0	429	--

a No flow June 8-9, 22, 24-25, 27 - July 5, 10-16, 21, 25 - Aug. 2, 10-11, 13, 15, Sept. 10-28.

**b Average for 310 days of flow.**

## LOWER MISSISSIPPI RIVER BASIN

## ARKANSAS RIVER BASIN--Continued

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

Temperature (°F) of water, water year October 1952 to September 1953  
 /Once-daily temperature measurement generally between 11 a. m. and 6 p. m. /

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

a Temperature measurement before 11 a. m.

b Temperature measurement after 6 p. m.

## 107

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

**Suspended sediment, water year October 1952 to September 1953**

Day	October			November			December				
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment			
		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day		
1.....	1.6	21	(t)	2.4	33	(t)	5	113	2		
2.....	1.6			2.4			5				
3.....	2.0			2.9			5				
4.....	2.0			3.5			5				
5.....	2.0			2.9			5				
6.....	2.0	28	(t)	1.2	34	(t)	5	129	2		
7.....	2.4			1.2			5				
8.....	2.4			1.2			6.4				
9.....	2.4			1.6			4.7				
10.....	2.0			2.0			4.1				
11.....	1.6	11	(t)	2.0	59	(t)	6.4	203	3		
12.....	1.6			2.4			5.5				
13.....	.9			2.0			6.4				
14.....	.9			2.0			5.5				
15.....	.9			2.0			6.4				
16.....	.9	34	(t)	2.4	59	1	4.7	83	1		
17.....	.6			2.9			5.5				
18.....	.9			4.1			6.4				
19.....	.9			6.4			7.4				
20.....	.9			5.5			6.4				
21.....	1.2	13	(t)	5.5	59	1	6.4	83	1		
22.....	1.6			4.7			6.4				
23.....	2.0			4.7			6				
24.....	2.0			5			6				
25.....	2.0			5			6				
26.....	2.0	13	(t)	5	59	1	6	83	1		
27.....	1.6			5			6				
28.....	2.0			5			6				
29.....	2.0			5			6				
30.....	2.4			5			6				
31.....	2.4			--	--	--	6				
Total.	51.7	--	3	102.9	--	15	177.6	--	88		
	January			February			March				
1.....	6	298	5	5.5	83	1	4.1	174	2		
2.....	6	376	6	6.4			4.1				
3.....	7	262	5	6.4			3.5				
4.....	7	626	12	6.4			3.5				
5.....	7	524	10	5.5			2.9				
6.....	7	203	4	6.4	321	4	2.4	112	1		
7.....	7			448			8			4.7	2.9
8.....	7.4									5.5	5.5
9.....	6.4									4.1	5.5
10.....	6.4									4	4.1
11.....	6.4	108	2	4	310	6	4.7	279	3		
12.....	6.4			4			4.7				
13.....	6.4			3			4.1				
14.....	5.5			3			4.1				
15.....	5.5			2.9			4.1				
16.....	5	369	6	3.5	310	6	4.1	332	3		
17.....	5			1.2			3.5				
18.....	4.7			1.6			3.5				
19.....	7.4			2.9			4.1				
20.....	8.4			3			3.5				
21.....	7.4	210	4	3	439	5	4.1	332	3		
22.....	3.5			2.5			4.1				
23.....	7.4			2.4			3.5				
24.....	5.5			4.7			3.5				
25.....	5.5			4.1			4.1				
26.....	6.4	210	4	3.5	439	5	4.1	332	3		
27.....	6.4			4.1			3.5				
28.....	7.4			4.1			3.5				
29.....	7.4			--			4.1				
30.....	7.4			--			4.1				
31.....	6.4			--	--	--	2.9				
Total.	198.6	--	150	112.4	--	121	120.4	--	67		

t Less than 0.50 ton.

## LOWER MISSISSIPPI RIVER BASIN

## ARKANSAS RIVER BASIN--Continued

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

Suspended sediment, water year October 1952 to September 1953--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.....	2.9			1.6			1.2		
2.....	2.9			2.4			.9		
3.....	2.4			2.4			.2		
4.....	2.4			2.4			.4		
5.....	2.9			2.9			.4	40	(t)
6.....	3.5	75	1	3.5	76	(t)	.6		
7.....	3.5			2.4			.4		
8.....	2.4			2.0			0	--	0
9.....	2.0			.9			0	--	0
10.....	2.4			.6			.1	40	(t)
11.....	4.1			.9			.2		
12.....	4.7			1.6			.1		
13.....	4.7			2.9			.2		
14.....	3.5			3.5			.4		
15.....	2.9			5.5			.2		
16.....	2.4	58	1	5.5	230	3	.1	29	(t)
17.....	2.4			5.5			.2		
18.....	2.9			5.5			.2		
19.....	3.5			5.5			.2		
20.....	3.5			4.7			.2		
21.....	2.9			2.9			.1	65	(t)
22.....	2.9			1.6			0	--	0
23.....	4.7			1.2			.1	65	(t)
24.....	4.1			.6			0	--	0
25.....	3.5			.4			0	--	0
26.....	2.9	186	1	.2	96	(t)	.1	65	(t)
27.....	2.0			.4			0	--	0
28.....	1.6			1.6			0	--	0
29.....	2.0			1.2			0	--	0
30.....	2.0			2.4			0	--	0
31.....	--	--	--	1.2			--	--	--
Total.	90.5	--	30	75.9	--	35	6.5	--	1
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	254	9,300	sb 9,400
2.....	0	--	0	0	--	0	30	1,820	147
3.....	0	--	0	41	4,560	s 665	12	419	
4.....	0	--	0	13	1,200	42	10	160	4
5.....	0	--	0	5.5	1,230	18	5.5	111	2
6.....	.2	15	(t)	6.4	1,700	29	2.4		
7.....	79	9,040	s 2,540	16	221	10	.4	57	(t)
8.....	8.4	4,000	71	5.5	47	1	.1		
9.....	2.4	1,100	9	1.2	46	(t)	.1	73	(t)
10.....	0	--	0	0	--	0	0	--	0
11.....	0	--	0	0	--	0	0	--	0
12.....	0	--	0	.4	44	(t)	0	--	0
13.....	0	--	0	0	--	0	0	--	0
14.....	0	--	0	.1	44	(t)	0	--	0
15.....	0	--	0	0	--	0	0	--	0
16.....	0	--	0	3,910	19,000	sa 840,000	0	--	0
17.....	26	6,000	421	695	16,000	sb 69,000	0	--	0
18.....	89	6,950	s 3,360	145	3,800	sb 1,900	0	--	0
19.....	9.4	6,000	s 152	265	4,800	sb 6,200	0	--	0
20.....	1.6	2,000	9	144	4,600	sb 2,000	0	--	0
21.....	0	--	0	36	1,570	153	0	--	0
22.....	7.4	700	14	26	443	31	0	--	0
23.....	20	2,500	135	22	436	26	0	--	0
24.....	2.4	300	2	46	2,000	248	0	--	0
25.....	0	--	0	19	1,600	82	0	--	0
26.....	0	--	0	17	274	13	0	--	0
27.....	0	--	0	16	184	8	0	--	0
28.....	0	--	0	14	91	3	0	--	0
29.....	0	--	0	14	152	6	.2	34	(t)
30.....	0	--	0	14	28	1	.5		
31.....	0	--	0	87	1,400	sb 4,800	--	--	--
Total.	245.8	--	6,731	5,559.1	--	925,238	315.2	--	9,567

Total discharge for year (cfs-days)..... 7,066.6

Total load for year (tons)..... 942,024

s Computed by subdividing day.

a Computed from estimated concentration graph.

t Less than 0.50 ton.

b Computed from partly estimated concentration graph.

ARKANSAS RIVER BASIN--Continued  
UTE CREEK NEAR BUEYEROS, N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1952 to September 1953

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

Date of collection	Time	Discharge (cfs)	Water tem- per- ature (° F)	Suspended sediment										Methods of analysis	
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters									
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250		
July 7, 1953.....	6:25 a.m.	277	73	15,800	3,780		44		66		80	92	98	100	SPWCM
July 7.....	7:35 a.m.	177	68	13,400	4,710		48		65		78	91	98	99	SPWCM
July 7.....	7:35 a.m.	177	68	13,400	4,620		8		48		78	91	98	99	SPN
July 7.....	10:20 a.m.	114	76	11,800	4,540		59		80		88	96	99	100	SPWCM
July 7.....	10:35 a.m.	114	77	12,100	6,240		62		79		88	96	98	100	SPWCM
July 17.....	7:10 a.m.	31	66	5,840	4,620		31		92		93	98	99	100	SPWCM
July 17.....	7:10 a.m.	31	66	5,840	3,630		20		91		93	98	99	100	SPN
July 17.....	8:00 a.m.	27	77	4,820	3,530		84		93		94	96	98	100	SPWCM
July 18.....	6:20 a.m.	277	66	18,900	3,860		49		72		84	90	98	99	SPWCM
July 18.....	7:50 a.m.	187	66	14,300	5,530		51		76		86	92	97	98	SPWCM
Aug. 3.....	7:55 a.m.	90	65	7,240	5,040		53		66		76	88	97	99	SPWCM
Aug. 17.....	10:15 a.m.	138	61	11,600	3,360		44		57		70	87	97	100	SPWCM
Aug. 17.....	10:15 a.m.	138	61	11,600	3,380		12		51		70	87	97	99	SPN
Aug. 17.....	11:15 a.m.	121	63	9,980	4,300		42		63		71	84	96	98	SPWCM
Aug. 17.....	3:35 p.m.	69	71	6,420	4,420		49		63		74	88	96	99	SPWCM
Aug. 19.....	5:00 p.m.	249	73	5,350	5,250		50		68		82	93	97	98	SPWCM
Sept. 1.....	7:15 a.m.	138	62	9,400	4,140		41		54		66	78	86	93	SPWCM
Sept. 1.....	7:15 a.m.	138	62	9,400	4,480		15		40		66	78	86	93	SPN
Sept. 1.....	7:55 a.m.	134	63	6,460	4,440		50		56		76	91	95	99	SPWCM

ARKANSAS RIVER BASIN --Continued  
UTE CREEK NEAR LOGAN, N. MEX.

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

DRAINAGE AREA --2,073 square miles.

RECORDS AVAILABLE --Chemical analyses: October 1950 to September 1953. (discontinued).

EXTREMES 1952-53 --Dissolved solids: Maximum 545 ppm July 21-31; minimum 340 ppm Aug. 11-13, 16, 18-19.

Hardness: Maximum 256 ppm July 21-31; minimum 176 ppm Aug. 11-13, 16, 18-19.

Specific conductance: Maximum observed 919 micromhos Aug. 4; minimum observed 367 micromhos Aug. 12.

EXTREMES 1950-53 --Dissolved solids: Maximum 1,210 ppm Apr. 24, 1951; minimum 201 ppm May 15, 1951.

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

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

REMARKS --Records of specific conductance of daily samples available in district offices at Albuquerque, N. Mex. Values reported for dissolved solids are sums of determined constituents. Records of discharge for water year October 1952 to September 1953 given in WSP 1281. 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 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH	
															Parts per million	Tons per acre-foot	Tons per day	Calcium magnesium	Non-carbonate				
July 16-20, 1953 . . . a	32.6	26		48	21	--	96	--	289	0	104	48	1.9		487	0.66	42.9	206	0	50	2.9	780	7.7
July 21-31 . . . . .	12.2	31		58	27	--	93	--	285	0	136	58	1.9		545	.74	18.0	256	22	44	2.5	868	7.6
Aug. 1-5 . . . . .	1.8	29		56	28	--	89	--	281	0	128	59	1.7		529	.72	2.57	254	24	43	2.4	850	7.7
Aug. 11-13, 16, 18-19a	92.8	22		44	16	--	53	--	233	0	66	22	1.7		340	.46	85.2	176	0	40	1.7	540	7.7
Aug. 17-20 . . . . .	1,148	29		49	29	--	58	--	283	0	81	30	.6		421	.57	1,300	242	2	34	1.6	685	7.6
Aug. 21-28 . . . . .	34.6	23		50	21	--	83	--	255	0	126	36	2.3		466	.63	43.5	212	2	46	2.5	738	7.7
Sept. 1-10 . . . . .	39.0	23		52	23	--	80	--	255	0	125	41	1.8		471	.64	49.6	224	15	44	2.3	748	7.6
Sept. 11-13 . . . . .	1.0	27		60	26	--	84	--	273	0	136	52	2.0		521	.71	1.41	256	33	42	2.3	830	7.7
Weighted average b	75.1	27		49	26	--	64	--	277	0	90	32	1.1		435	0.58	86.2	230	2	38	1.8	685	--

a No flow Oct. 1, 1952; July 1, July 3-15, Aug. 6-10, 14-15, 29-31, Sept. 14-30, 1953.

b Represents 51 days of flow which includes 99 percent of runoff for water year.

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

LOCATION --At Boy's Ranch near Tascosa, Oldham County, 20 miles upstream from gaging station near Amarillo, Potter County.

DRAINAGE AREA 19,287 square miles above gaging station.

RECORDS AVAILABLE--Chemical analyses from October 1949 to September 1953.

Water temperatures: February 1949 to September 1953.

EXTREMES 1952-53 --Dissolved solids: Maximum 1,760 ppm Jan. 1-10; minimum 413 ppm July 16, 19-24.

Hardness: Maximum 442 ppm Dec. 21-24; minimum 130 ppm July 16, 19-24.

Specific conductance: Maximum daily 3,410 microhos Jan. 8; minimum daily 490 microhos July 19.

EXTREMES 1948-53 --Dissolved solids: Maximum 2,060 ppm Mar. 18-19; minimum 26-27, 1952; maximum 245 ppm Nov. 21-30, 1948.

Hardness: Maximum 514 ppm Mar. 18-19; minimum 46 ppm Mar. 9-10, 1952.

Specific conductance: Maximum daily 3,600 microhos Mar. 2, 1951; minimum daily 347 microhos Feb. 24, 1949.

REMARKS --Values reported for dissolved solids concentration less than 1,000 ppm are residues on evaporation and for concentrations more than 1,000 ppm are sums of determined constituents unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for gaging station near Amarillo for water year October 1952 to September 1953 given in WSP 1281. Mean discharge values reported are adjusted to reflect small discharge of sewage effluent entering Canadian River between sampling point and gaging station. No other appreciable inflow between sampling point and gaging station except during periods of heavy local rains.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> ) (Fe)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids		Hardness as CaCO <sub>3</sub>		Percent sodium chloride ratio	Specific conductance (microhm-cm at 25°C)	pH
														Parts per million	Tons per acre-foot	Calcium	Non-carbonate			
Oct. 1-2, 26	2.1	18		81	43	287		219		415	275	0.8	0.8	1,230	1.67	379	200	62	6.4	1,950
28-31, 1952	1.6	18		89	49	384		253		423	430	.8	3.0	1,520	2.07	6.57	424	66	8.1	2,440
Nov. 1-2, 4-16, 18-20	1.8	14		74	39	295		283		332	288	.6	.8	1,180	1.60	5.73	345	65	6.9	1,930
Nov. 21-24																				
Dec. 1-8	3.6	15		88	46	431		260		362	522	.8	.8	1,600	2.18	15.6	408	70	9.3	2,660
Dec. 11-20	3.7	18		80	49	397		281		367	458	1.0	4.8	1,510	2.05	15.1	401	170	8.6	2,510
Dec. 21-24, 27-31	3.3	16		90	53	401		322		404	442	1.2	4.0	1,570	2.14	14.0	442	179	8.3	2,570
Jan. 1-10, 1953	12.5	16		73	50	498		229		386	620	1.0	4.5	1,760	2.39	59.4	388	200	74	3,000
Jan. 11-20	5.7	18		70	49	385		267		368	428	1.2	4.2	1,450	1.97	22.3	376	157	8.6	2,410
Jan. 21-25, 27, 30-31	2.1	18		66	39	300		281		328	285	.8	1.2	1,180	1.60	6.69	325	94	7.2	1,900
Feb. 1, 3-8, 10	1.3	16		56	27	224		290		254	166	.7	.8	888	1.21	3.12	250	13	6.2	1,490
Feb. 12-13, 15	2.0	18		55	29	211		283		240	164	.8	.2	885	1.18	4.67	256	24	6.8	1,410
Feb. 25-27	1.3	19		45	32	271		237		299	200	.7	4.0	1,010	1.37	3.54	244	9	7.5	1,640
Mar. 1-12, 29, 31																				
Apr. 1-8, 10-12	2.3	36		26	31	244		b221		272	180	.9	2.0	901	1.23	5.60	192	11	7.6	1,460

a Residue on evaporation at 180°C.

b Includes equivalent of 6 ppm of carbonate (CO<sub>3</sub>).

## ARKANSAS RIVER BASIN--Continued

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

Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

Chemical analyses, in parts per million, water year October 1954 to September 1955—Continued																						
Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids (sum)			Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	
														Parts per million	Tons per acre-foot	Tons per day	Calcium	Non-carbonate				
May 5-9, 15-17, June 6, 18, 28-29, 1953.....	1.9	24		64	39	457		261		415	470	1.0	1.2	1,600	2.13	7.78	320	106	76	11	2,630	8.2
July 7-15, 17-18, 25-31.....	87.7	20		44	17	215		227		176	195	.5	2.2	a 809	1.10	148	180	0	72	7.0	1,340	7.9
July 16, 19-24.....	2,015	19		34	11	88		184		80	74	.6	1.8	a 413	.56	2,250	130	0	62	3.7	690	8.2
Aug. 1-6, 18-22.....	1,407	23		36	12	130		172		100	122	.7	3.5	a 518	.70	1,970	140	0	67	4.8	873	8.2
Aug. 7-13, 28-31.....	83.6	23		63	23	279		223		214	318	.8	2.0	1,030	1.40	232	252	69	71	7.7	1,770	8.2
Aug. 14-17, 23-27.....	858	21		43	15	191		208		149	181	.7	3.0	a 717	.98	1,660	169	0	71	6.4	1,210	8.2
Sept. 1-4, 7-13.....	51.0	22		51	19	189		201		177	186	.9	3.5	a 776	1.06	107	205	40	67	5.7	1,230	8.1
Sept. 5-6, 15-20, 25, 29-30.....	7.0	27		94	38	483		254		298	650	2.0	2.0	1,720	2.34	32.5	390	182	73	11	2,900	8.2
Weighted average.....	111	21		38	13	141		187		112	129	0.7	2.7	556	0.76	167	148	0	67	5.0	934	--

a Residue on evaporation at 180°C.

## ARKANSAS RIVER BASIN--Continued

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

Temperature (°F) of water, water year October 1952 to September 1953

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

## ARKANSAS RIVER BASIN--Continued

## CANADIAN RIVER NEAR AMARILLO, TEX.

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

DRAINAGE AREA. 19,287 square miles.

RECORDS AVAILABLE. --Chemical analyses: July 1948 to October 1949, February 1950 to September 1953.

Water temperatures: August 1949 to September 1953.

Soil temperatures: August 1949 to September 1953.

EXTREMES 1952-53: Discharge: Maximum, 2,320 ppm Dec. 25-29; minimum, 438 ppm Aug. 5-8.

Hardness: Maximum, 860 ppm Dec. 25-29; minimum, 116 ppm Aug. 5-8.

Specific conductance: Maximum daily, 3,980 micromhos Dec. 25; minimum daily, 627 micromhos Aug. 6.

Water temperatures: Minimum observed, freezing during winter months.

EXTREMES 1948-53: --Dissolved solids (1950-53): Maximum, 2,320 ppm Dec. 25-29; minimum, 90 ppm Aug. 10-12, 1951.

Hardness (1948-53): Maximum, 860 ppm Dec. 25-29, 1952; minimum daily, 457 micromhos Sept. 3, 1952.

Specific conductance: Maximum daily, 3,980 micromhos Dec. 25, 1952; minimum daily, 457 micromhos Sept. 3, 1952.

Water temperatures (1949-53): Maximum observed, 95° F June 29, 1951; minimum observed, freezing point on many days during winter months.

REMARKS. --Values reported for dissolved solids concentrations less than 1,000 ppm are residues on evaporation and for concentrations more than 1,000 ppm are sums of determined constituent unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1952 to September 1953 given in WSP 1281.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boiron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium sulfate	Specific conductance (micro-mhos at 25° C)	pH
															Parts per million	Tons per acre-foot	Calcium	Non-carbonate				
Oct. 1-12, 20, 1952	9.82	76	78	49	198		384	277	170	179	4.8	86		1,030	1.40	27.3	396	82	52	4.3	1,610	7.2
Oct. 13-19	9.59	80	60	43	159		324	277	126	125	5.2	106		a 886	1.20	22.9	326	61	51	3.8	1,300	8.2
Oct. 21-31	10.5	75	66	46	159		326	319	128	137	4.4	108		a 911	1.24	25.8	354	86	49	3.7	1,340	8.2
Nov. 1-10	11.0	79	82	43	162		315	278	129	134	4.4	112		a 903	1.23	26.8	327	69	51	3.9	1,310	8.2
Nov. 11-24	11.7	78	71	46	178		374	319	134	144	5.2	113		a 957	1.30	30.2	366	60	51	4.1	1,430	7.5
Nov. 25-30	9.33	60	142	60	307		281	407	407	375	3.6	93		1,590	2.16	40.1	601	370	53	5.4	2,460	6.9
Dec. 1-10	12.9	75	99	53	243		291	277	277	260	3.4	113		1,270	1.73	44.2	465	226	53	4.9	1,930	7.5
Dec. 11-20	13.7	73	105	53	285		378	277	277	260	3.8	102		1,320	1.80	48.8	480	170	55	5.3	1,970	7.6
Dec. 21-24, 30-31	13.8	68	116	57	270		283	319	320	320	3.6	107		1,400	1.90	52.2	524	232	53	5.1	2,160	7.3
Dec. 25-29	11.4	64	211	81	481		278	656	622	622	2.6	83		2,320	3.16	71.4	860	632	54	6.8	3,480	7.7
Jan. 1-10, 1953	22.5	52	128	59	367		285	432	448	448	2.6	47		1,680	2.28	102	562	328	59	6.7	2,650	7.4
Jan. 11-20	15.7	68	122	62	334		352	366	375	375	3.4	97		1,600	2.18	67.8	560	271	56	6.1	2,420	7.4
Jan. 21-31	11.5	78	94	51	243		303	256	270	270	3.6	84		1,230	1.67	38.2	444	196	54	5.0	1,900	7.4
Feb. 1-10	10.8	80	80	49	211		382	177	177	187	4.0	111		1,090	1.48	31.8	401	88	53	4.6	1,650	7.4
Feb. 11-19	10.2	78	81	48	236		392	185	185	205	3.6	125		1,150	1.56	31.7	400	78	56	5.1	1,740	7.3
Feb. 20-28	9.22	78	78	48	224		412	174	174	191	4.0	100		1,100	1.50	27.4	392	54	55	4.9	1,680	7.3
Mar. 1-2, 9-11	14.2	67	128	57	300		325	373	373	338	3.6	80		1,510	2.05	57.9	554	288	54	5.5	2,310	7.3
Mar. 3-8, 12-20	10.6	76	73	46	201		398	151	151	162	4.2	107		1,020	1.39	29.2	371	45	54	4.6	1,860	7.2
Mar. 21-31	9.05	84	75	50	179		341	169	169	164	5.2	101		.995	1.35	24.3	392	113	50	3.9	1,540	7.5

a Residue on evaporation at 180°C.

Apr. 1-20, 1953	82	70	48	171	317	150	159	5.2	111	a 994	1.35	28.4	372	112	50	3.9	1,490	7.5
Apr. 21-30	8.8	72	51	231	471	140	183	5.6	108	1,100	1.50	26.1	389	3	56	5.1	1,640	7.5
May 1-10	9.85	64	52	211	375	144	202	4.4	96	1,050	1.43	27.9	374	66	55	4.7	1,640	7.9
May 11-20	10.3	87	50	181	320	137	182	2.8	102	a 984	1.34	26.7	358	96	52	4.1	1,500	8.2
May 21-31	7.63	64	52	216	434	130	190	4.0	91	1,060	1.44	21.8	374	18	56	4.8	1,590	7.8
June 1-10	8.29	63	50	171	365	118	168	4.4	78	a 964	1.31	21.5	362	64	51	3.9	1,460	7.6
June 11-20	8.73	62	49	174	359	120	174	4.4	73	a 948	1.29	24.8	356	62	42	4.0	1,460	8.0
June 21-30	8.05	62	50	185	363	117	186	4.8	69	a 956	1.27	22.9	368	62	42	3.6	1,430	7.3
July 1-10	4.65	56	41	183	b 311	106	139	3.6	77	a 853	1.63	1,012	368	53	52	3.2	1,240	8.4
July 11-20	1.340	40	15	86	311	86	130	1.6	77	a 453	1.63	1,640	362	55	56	3.3	1,746	7.1
July 21-30	1.183	74	30	245	332	246	272	1.6	9.9	1,050	1.40	537	308	118	63	6.1	1,640	8.1
Aug. 1-4, 9-10	191	48	20	174	216	155	164	1.2	9.5	9733	1.00	378	202	25	65	5.3	1,190	8.0
Aug. 5-8	485	30	10	106	196	77	71	1.0	3.0	a 438	1.60	574	116	0	66	4.3	700	8.0
Aug. 11-15, 18, 26-31	1,040	72	31	210	261	200	230	2.0	14	a 957	1.30	2,690	307	93	60	5.2	1,560	8.2
Aug. 16-17, 19-27	999	20	15	142	205	126	117	1.2	3.5	a 976	1.78	1,550	162	0	66	4.9	1,959	8.2
Sept. 1-5, 15, 17-20	53.0	68	39	176	277	164	183	3.6	59	a 913	1.24	131	330	103	54	4.2	1,400	8.1
Sept. 6-14, 16	30.4	88	47	279	297	275	330	2.8	51	1,280	1.75	106	438	194	58	5.8	2,040	8.1
Sept. 21-30	10.1	67	48	149	341	114	146	5.2	87	a 885	1.20	24.1	364	85	47	3.4	1,350	7.5
Weighted average	121	56	28	164	250	149	158	2.1	26	766	1.04	250	254	50	58	4.5	1,220	--

a Residue on evaporation at 180°C.

b Includes equivalent of 8 ppm of carbonate (CO<sub>3</sub>).

## LOWER MISSISSIPPI RIVER BASIN

## ARKANSAS RIVER BASIN--Continued

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

## Temperature (°F) of water, water year October 1952 to September 1953

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

ARKANSAS RIVER BASIN--Continued

CANADIAN RIVER AT BRIDGEPORT, OKLA.

LOCATION.--At gaging station at Chicago, Rock Island & Pacific Railway bridge, 1 mile north of Bridgeport, Caddo County, and 2 3/4 miles upstream from Lumbumouth Creek.

DRAINAGE AREA.--25,071 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1948 to September 1953.

Water temperatures: October 1948 to September 1953.

EXTREMES, 1952-53.--Dissolved solids: Maximum, 1,440 ppm Aug. 21-24; minimum, 186 ppm July 17.

Hardness: Maximum, 600 ppm May 15; minimum, 124 ppm July 10.

Specific conductance: Maximum daily, 2,670 micromhos Aug. 22; minimum daily, 294 micromhos July 17.

Water temperatures: Maximum, 96°F July 21; minimum, freezing point on several days during November and December.

EXTREMES, 1948-53.--Dissolved solids: Maximum, 1,880 ppm June 20, 1950; minimum, 186 ppm July 17, 1953.

Hardness: Maximum, 778 ppm Jan. 30, 1951; minimum, 124 ppm July 10, 1953.

Specific conductance: Maximum daily, 3,100 micromhos Sept. 2, 1952; minimum daily, 226 micromhos May 23, 1952.

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

REMARKS.--Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of discharge for water year October 1952 to September 1953 given in WSP 1281.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium in total hardness	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, mg./nesium	Non-carbonate				
Oct. 1, 7-10, 1952...	1.90	--	--	56	18	41	41	198	0	109	18	--	1.3	370	0.50	1.9	214	52	29	1.2	583	7.7
Oct. 11-20.....	4.83	12	0.00	74	17	33	2.6	237	3	108	13	0.1	1.0	392	.53	5.1	254	56	22	.9	604	8.3
Oct. 21-31.....	7.28	--	--	86	21	29		249	0	138	12	--	.8	439	.60	8.6	301	97	18	.7	670	7.7
Nov. 1-8.....	7.90	--	--	94	22	29		281	0	136	11	--	.8	441	.60	9.4	325	94	16	.7	693	7.9
Nov. 9-10.....	11.0	--	--	116	25	40		273	0	223	17	--	1.2	566	.77	17	392	169	18	.9	849	7.7
Nov. 11.....	10.0	--	--	148	31	43		267	0	335	16	--	.8	785	1.07	21	497	278	16	.8	989	8.1
Nov. 12-20.....	10.6	--	--	118	23	29		275	0	201	12	--	1.0	577	.78	17	389	164	14	.6	799	8.1
Nov. 21-23, 26-27, 29	18.5	--	--	139	22	42		275	0	248	14	--	1.9	624	.85	31	412	187	18	.9	864	8.2
Nov. 24-25, 28, 30	24.8	--	--	132	24	71		268	0	295	44	--	2.3	738	1.00	49	428	216	27	1.5	1,020	8.2
Dec. 1-10.....	15.3	14	.00	136	25	30	2.4	268	0	272	14	.3	1.3	640	.87	26	442	223	13	.6	882	8.2
Dec. 11-20.....	18.7	12	.00	132	26	35	2.5	254	0	262	18	.2	2.5	622	.85	31	436	228	15	.7	881	8.2
Dec. 21-31.....	19.1	--	--	146	24	40		264	0	300	13	--	2.5	684	.93	35	463	246	16	.8	928	8.1

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

Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal- cium (Ca)	Mag- nesium (Mg)	So- dium (Na)	Po- tas- sium (K)	Bicar- bonate (HCO <sub>3</sub> )	Car- bonate (CO <sub>3</sub> )	Sul- fate (SO <sub>4</sub> )	Chlo- ride (Cl)	Fluo- ride (F)	Ni- trate (NO <sub>3</sub> )	Bo- ron (B)	Dissolved solids				Hardness as CaCO <sub>3</sub>		Per- cent adsorp- tion	So- dium absorp- tion ratio	Specific conduct- ance (micro- mhos at 25°C)	pH
															Parts per mil- lion	Tons per acre- foot	Tons per day	Calcium	Non-carbon- ate					
Jan. 1-10, 1953	17.5	10	0.00	136	26	30	2.0	247	0	287	14	0.1	1.7	0.21	638	0.87	30	446	244	13	0.6	897	8.2	
Jan. 11-20	15.9	--	--	135	26	34	--	241	0	285	16	--	2.5	--	648	.88	28	444	246	14	.7	900	8.1	
Jan. 21-31	21.4	12	.00	146	25	31	2.0	252	0	303	14	.3	1.8	.23	680	.92	39	468	261	13	.6	911	8.2	
Feb. 1-8-10	21.8	--	--	134	29	59	--	241	0	312	42	--	1.2	--	698	.95	41	454	256	22	1.2	995	8.1	
Feb. 2-4	37.0	--	--	132	39	268	--	243	0	392	328	--	3.5	--	1,280	1.74	128	490	291	54	5.3	2,040	8.1	
Feb. 5-7	23.0	--	--	125	34	136	--	240	0	327	148	--	1.7	--	914	1.24	57	452	256	39	2.8	1,370	8.1	
Feb. 11-18	18.2	--	--	140	29	55	--	242	0	332	30	--	2.0	--	736	1.00	36	468	270	20	1.1	1,010	8.2	
Feb. 19-20	25.0	--	--	140	39	213	--	234	4	416	240	--	3.2	--	1,200	1.63	81	510	312	48	4.1	1,780	8.3	
Feb. 21-28	23.6	--	--	129	24	51	--	235	0	285	29	--	1.1	--	644	.88	41	420	228	21	1.1	926	8.1	
Mar. 1-2	39.0	--	--	90	23	59	--	204	0	216	38	--	2.0	--	556	.76	59	319	152	29	1.4	819	8.2	
Mar. 3-10	58.1	--	--	132	36	136	--	186	0	403	142	--	2.2	--	988	1.34	155	478	325	38	2.7	1,440	8.1	
Mar. 11-13, 15-16	42.8	--	--	132	39	169	--	215	3	375	186	--	1.6	--	1,050	1.33	138	490	309	43	3.3	1,540	8.3	
Mar. 14, 17-20	35.8	--	--	124	36	133	--	219	0	333	146	--	1.4	--	916	1.25	89	458	278	39	2.7	1,350	8.1	
Mar. 21-31	16.8	15	.00	132	28	40	2.3	220	0	291	32	.1	.8	.34	693	.94	31	444	264	16	.8	940	8.2	
Apr. 1-6	28.0	--	--	117	26	47	--	207	0	276	30	--	1.0	--	628	.85	44	399	230	20	1.0	889	8.1	
Apr. 7-10	42.8	--	--	158	36	57	--	197	0	436	40	--	1.1	--	881	1.20	102	542	380	19	1.1	1,170	8.0	
Apr. 11-20	31.7	14	.00	136	27	35	2.4	218	0	303	14	.1	.5	.26	666	.83	29	450	272	14	.7	919	8.2	
Apr. 21-30	12.4	--	--	124	26	45	--	218	0	304	14	--	.4	--	643	.87	22	416	238	19	1.0	870	7.5	
May 1-9	9.39	--	--	129	25	40	--	223	0	299	13	--	.7	--	639	.87	16	425	242	17	.8	893	8.2	
May 10	11.0	--	--	122	35	101	--	159	5	419	65	--	2.2	--	824	1.13	25	448	310	33	2.1	1,180	8.3	
May 11-14	16.8	--	--	132	26	41	--	210	8	302	16	--	1.1	--	658	.89	30	435	250	17	.8	902	8.4	
May 15	108	--	--	160	49	121	--	118	3	582	109	--	4.0	--	1,170	1.59	341	600	498	31	2.2	1,520	8.3	
May 16-20	131	--	--	122	29	71	--	137	0	372	55	--	3.9	--	779	1.06	276	425	312	27	1.5	1,070	7.2	
May 21	48.0	--	--	142	37	62	--	149	8	409	54	--	3.2	--	833	1.13	103	505	370	21	1.2	1,140	8.5	
May 22-23	35.5	--	--	130	33	157	--	155	8	442	141	--	2.8	--	1,030	1.40	99	480	320	43	3.2	1,470	8.5	
May 24	14.0	--	--	113	29	74	--	163	13	314	54	--	3.2	--	711	.97	27	400	245	29	1.6	1,050	8.6	
May 25-31	6.80	--	--	104	24	--	39	179	0	263	15	--	2.9	--	582	.79	11	360	214	19	.9	791	7.9	
June 1-3, 5-10, 1953	19.6	22	.00	104	22	29	5.4	148	0	263	16	.5	2.2	.23	575	.78	30	350	228	15	.7	772	8.1	
June 11-15	132	--	--	89	29	259	--	153	0	377	270	--	4.8	--	1,100	1.50	392	340	214	62	6.1	1,760	8.2	
June 30	13.0	--	--	61	15	35	--	137	3	142	15	--	5.0	--	371	.50	13	214	96	26	1.0	557	8.3	

July 1	29.0	--	--	49	8.8	27	123	0	70	12	--	4.5	--	244	--	33	19	136	35	30	1.0	376	16.2
July 2-3	4.95	--	--	62	14	24	123	0	142	9.2	--	4.2	--	353	--	48	4.7	214	113	19	.7	506	8.1
July 10	408	--	--	36	8.3	19	119	0	49	11	--	2.5	--	207	--	28	228	124	26	25	.8	313	8.0
July 11-16	94.2	--	--	72	11	19	105	0	160	9.0	--	3.1	--	347	--	47	88	226	149	16	.6	516	7.8
July 17	1,490	--	--	43	6.9	11	119	0	54	3.5	--	1.8	--	186	--	.25	748	136	38	15	.4	294	7.8
July 18-19	220	--	--	100	21	53	95	0	313	30	--	3.2	--	579	--	.79	344	344	256	26	1.3	805	8.0
July 20	1,060	--	--	70	12	26	100	0	162	18	--	3.7	--	360	--	.49	1,030	222	140	20	.8	541	7.9
July 21-23	58.0	--	--	103	21	32	136	6	243	26	--	1.9	--	522	--	.71	82	344	222	17	.7	761	8.3
July 24	1,690	--	--	96	23	74	145	2	247	85	--	4.8	--	615	--	.84	2,690	334	212	33	1.8	978	8.3
July 25-31	1,276	--	--	98	36	276	202	0	327	330	--	5.1	--	1,200	--	1.63	4,130	392	227	60	6.1	1,990	8.2
Aug. 1-3	45.0	--	--	95	33	250	217	0	300	290	--	5.6	--	1,110	--	1.51	135	372	194	59	5.7	1,620	8.0
Aug. 4	22.0	--	--	80	27	131	150	14	237	139	--	2.9	--	707	--	.96	42	310	164	48	3.2	1,180	8.4
Aug. 5	17.0	--	--	84	25	87	164	13	214	83	--	6.6	--	600	--	.82	28	312	156	38	2.1	978	8.3
Aug. 6	14.5	--	--	92	33	232	170	6	319	262	--	3.1	--	1,040	--	1.41	39	305	216	58	5.3	1,760	8.4
Aug. 7	12.5	--	--	89	29	172	193	0	281	190	--	2.2	--	684	--	1.20	30	341	163	52	4.1	1,590	7.8
Aug. 8	7.10	--	--	92	24	69	185	12	207	63	--	4.9	--	593	--	.61	11	326	156	31	1.7	914	8.5
Aug. 9	6.30	--	--	91	27	101	174	11	247	101	--	4.6	--	697	--	.93	12	338	177	39	2.4	1,080	8.5
Aug. 10	11.2	--	--	82	21	38	192	0	176	24	--	1.2	--	456	--	.62	14	291	134	22	1.0	697	8.0
Aug. 11-19	112	--	--	100	32	158	131	0	355	168	--	4.2	--	925	--	1.26	280	381	274	47	3.5	2,320	7.9
Aug. 20	2,850	--	--	113	37	329	244	0	375	402	--	1.8	--	1,440	--	1.96	11,080	438	236	62	6.9	2,320	7.7
Aug. 21-24	878	--	--	79	30	268	208	0	287	312	--	4.4	--	1,120	--	1.52	2,680	320	150	65	6.5	1,860	7.8
Aug. 25-31	59.0	--	--	75	29	272	201	3	279	305	--	8.3	--	1,110	--	1.51	177	306	136	66	6.8	1,830	8.3
Sept. 1-2	51.5	--	--	66	19	153	182	0	187	164	--	1.4	--	1,700	--	.95	97	244	95	58	4.2	1,180	8.1
Sept. 3-6	5.82	--	--	72	23	86	176	1	188	83	--	4.4	--	561	--	.76	88	268	122	41	2.3	901	8.3
Sept. 7-10	80	--	--	74	20	44	205	0	156	26	--	1.1	--	450	--	.61	10	266	98	26	1.2	685	8.1
Sept. 11-20	20	--	--	68	21	51	203	0	152	30	--	1.2	--	450	--	.61	2	264	88	30	1.4	696	8.2
Sept. 24-25	17	--	--	54	17	39	166	0	127	18	--	1.1	--	358	--	.49	2	204	68	29	1.2	562	8.2
Sept. 26-28	107	--	--	99	31	a.224	b.904	--	309	263	--	3.3	--	1,070	--	1.46	309	374	208	57	5.0	1,720	--

a. Calculated from other weighted average constituents.  
b. Includes equivalent of individual carbonate values shown above.

## ARKANSAS RIVER BASIN--Continued

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

Temperature (°F) of water, water year October 1952 to September 1953

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	62	54	39	43	49	56	73	55	88	88	83	80
2	--	54	32	43	57	45	--	52	86	80	80	78
3	--	52	53	41	51	--	--	52	86	85	82	66
4	--	44	38	46	61	42	65	47	--	--	79	--
5	--	46	36	39	48	44	--	49	--	--	79	71
6	--	47	37	46	47	45	49	48	87	--	87	72
7	45	45	35	43	60	44	63	53	82	--	85	75
8	41	58	40	40	--	58	46	54	--	--	76	76
9	45	43	41	52	48	--	62	65	88	--	77	79
10	47	38	33	56	--	47	--	58	82	69	87	81
11	64	40	36	55	38	52	--	58	95	71	84	77
12	61	42	35	51	41	53	--	60	90	67	78	71
13	60	54	39	51	43	54	51	--	92	69	81	71
14	63	45	32	--	45	53	--	--	90	75	87	71
15	--	48	33	--	57	--	--	61	79	87	89	76
16	48	67	33	--	40	55	55	57	--	--	76	--
17	49	60	40	38	54	67	56	58	--	72	77	--
18	48	46	35	--	55	68	43	62	--	79	75	--
19	54	40	36	38	56	56	65	60	--	75	78	80
20	56	40	33	36	--	75	56	65	--	78	72	63
21	47	37	--	52	--	66	59	67	--	96	--	--
22	45	44	--	42	--	61	65	75	--	92	80	--
23	43	42	32	47	--	53	--	75	--	82	78	--
24	49	43	--	61	37	53	66	72	--	76	75	63
25	55	40	33	55	44	50	55	72	--	80	75	63
26	73	35	39	44	46	68	--	74	--	79	76	63
27	56	32	32	--	--	50	65	74	--	83	75	65
28	--	32	35	--	60	52	64	71	--	82	75	63
29	44	32	47	--	--	61	58	75	--	80	77	--
30	53	32	46	--	--	64	54	89	77	82	77	--
31	54	--	34	--	--	--	--	92	--	84	77	--
Average	53	44	37	--	--	55	--	64	--	--	79	--

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

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

DRAINAGE AREA.--120 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1951 to September 1953.

EXTREMES.--Maximum discharge: 99 cfs, Oct. 1951; minimum discharge: 12 cfs, Oct. 1953.

EXTREMES.--Dissolved solids: Maximum, 446 ppm Nov. 1-10; minimum, 97 ppm Aug. 17-20.

Hardness: Maximum, 410 ppm Nov. 1-10; minimum, 70 ppm Aug. 17-20.

Specific conductance: Maximum daily, 786 microhmhos Nov. 3; minimum daily, 154 microhmhos July 16.

Water temperatures: Maximum, 92°F June 16; July 3; minimum, 35°F Jan. 16.

EXTREMES.--Dissolved solids: Maximum, 446 ppm Feb. 23, 27-29, Nov. 1-10, 1952; minimum, 97 ppm Aug. 17-20, 1953.

Hardness: Maximum, 410 ppm Nov. 1-10, 1952; minimum, 70 ppm Aug. 17-20, 1953.

Specific conductance: Maximum daily, 926 microhmhos Feb. 28, 1952; minimum daily, 154 microhmhos July 16, 1953.

Water temperatures: Maximum, 92°F June 16, July 3, 1953; minimum, freezing point Dec. 15, 21, 25, 1951, Jan. 3, 1952.

REMARKS.--Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of discharge for water year October 1952 to September 1953 given in WSP 1281.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boiron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (microhmhos at 25°C)	pH	
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
Oct. 1-10, 1952 ...	0.19	11	0.00	54	52	21	2.4	440	0	6.3	10	0.1	1.0	0.25	380	0.52	0.2	348	0	11	0.5	652	8.2
Oct. 11-20, 1952 ...	.42	13	.00	59	58	17	4.0	494	0	6.2	12	.3	1.1	.21	414	.56	.5	386	0	9	.4	721	8.2
Oct. 21-31, 1952 ...	.65	14	.00	58	58	18	4.4	461	12	6.3	12	.3	1.2	.16	416	.57	.7	383	0	9	.4	700	8.4
Nov. 1-10, 1952 ...	.99	15	.00	69	58	15	5.2	519	0	5.9	13	.3	.7	.18	446	.61	1.2	410	0	7	.3	759	8.0
Nov. 11-20, 1952 ...	1.20	18	.00	68	56	14	4.1	500	0	6.0	12	.3	.8	.17	425	.58	1.4	400	0	7	.3	710	8.2
Nov. 21-30, 1952 ...	2.18	15	.00	57	49	13	3.1	420	0	6.7	12	.3	1.1	.19	364	.50	2.1	344	0	8	.3	619	8.1
Dec. 1-10, 1952 ...	1.63	12	.02	62	50	13	2.3	433	7	6.8	12	.3	.8	.21	379	.52	1.7	360	0	7	.3	645	8.3
Dec. 11-20, 1952 ...	1.73	10	.02	54	50	16	2.2	411	7	6.0	12	.1	1.3	.22	361	.49	1.7	340	0	9	.4	821	8.3
Dec. 21-31, 1952 ...	1.73	7.2	.02	53	50	14	2.2	419	4	7.6	12	.1	.8	.21	357	.49	1.7	338	0	8	.3	627	8.3
Jan. 1-10, 1953 ...	1.67	5.6	.08	53	52	13	1.6	430	0	7.3	11	.1	.2	.18	355	.48	1.6	346	0	8	.3	634	8.2
Jan. 11-13, 1953 ...	1.73	--	--	37	43	30	4.0	480	0	6.4	12	--	.5	--	316	.43	1.5	270	0	20	.8	578	8.2
Jan. 14-15, 17-20, 1953 ...	2.23	--	--	53	42	35	4.2	435	0	6.7	11	--	1.0	--	363	.49	2.2	304	0	20	.9	647	8.1
Jan. 21-31, 1953 ...	2.10	6.2	.00	42	50	14	1.7	391	0	7.4	11	.1	.4	.23	327	.44	1.9	310	0	9	.3	583	8.2
Feb. 1-10, 1953 ...	2.18	5.8	.00	56	52	15	2.0	443	0	6.2	11	.1	.1	.22	370	.50	2.2	354	0	8	.3	654	8.2
Feb. 11, 13, 1953 ...	3.90	--	--	50	40	14	--	357	0	11	--	--	2.0	--	304	.41	3.2	290	0	10	.4	554	8.1
Feb. 12, 14-19, 1953 ...	2.03	--	--	61	47	15	--	433	0	7.2	11	--	1.3	--	362	.49	2.0	346	0	9	.4	635	8.2
Feb. 20, 1953 ...	29.0	--	--	33	20	3.7	--	188	0	7.9	6.5	--	1.9	--	199	.27	16	164	10	5	.1	308	7.6
Feb. 21-23, 1953 ...	2.70	--	--	40	28	12	--	267	0	7.0	8.5	--	3.1	--	244	.33	1.8	215	0	11	.4	433	8.0
Feb. 24-28, 1953 ...	2.08	--	--	57	42	12	--	386	0	7.3	9.5	--	2.6	--	341	.46	1.9	314	0	7	.3	598	8.0

## LOWER MISSISSIPPI RIVER BASIN

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

Chemical analyses, in parts per million, water year October 1952 to September 1953.--Continued

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Mag-nesium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Car-bonate (CO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> )	Bo-ron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Per-cent so-lidum	So-lidum adsorp-tion ratio	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate			
Mar. 1-2, 1953.....	2.65	--	--	35	45	11	11	303	13	8.9	9.5	--	3.3	--	303	0.41	2.2	272	2	8	0.3	8.4
Mar. 3-5.....	116	--	--	23	12	12	12	137	0	7.8	7.5	--	3.7	--	151	.21	48	107	0	20	0.3	7.9
Mar. 6-7.....	4.00	--	--	38	23	15	15	217	6	10	9.2	--	4.3	--	151	.21	48	107	0	20	0.3	7.9
Mar. 8-10.....	3.03	--	--	50	33	12	12	289	16	12	9.2	--	4.3	--	238	.26	2.6	184	0	15	0.3	8.4
Mar. 11-20.....	8.61	--	--	56	36	12	12	341	4	9.9	11	--	2.3	--	282	.40	2.4	260	0	19	0.3	8.5
Mar. 21-29.....	2.00	--	--	58	46	13	13	379	16	8.6	11	--	2.3	--	319	.43	7.4	288	2	8	0.3	8.3
Mar. 30-31.....	39.5	--	--	29	15	8.5	8.5	180	0	8.9	6.8	--	3.0	--	176	.24	1.9	134	3	12	0.3	8.3
Apr. 1, 3-4, 7.....	23.1	--	--	30	18	8.5	8.5	172	0	7.7	11	--	3.7	--	180	.24	11	149	8	11	0.3	8.0
Apr. 2, 8-10.....	8.55	--	--	43	28	11	11	265	0	10	11	--	3.2	--	255	.35	5.9	222	6	9	0.3	8.1
Apr. 5-6.....	619	--	--	19	9.5	8.0	8.0	106	0	6.7	5.2	--	2.8	--	105	.14	175	86	0	17	0.4	196
Apr. 11, 20.....	6.85	--	--	52	35	14	14	314	11	11	10	--	2.3	--	296	.40	5.5	274	0	10	0.4	529
Apr. 12, 17.....	9.00	--	--	39	24	8.0	8.0	209	10	10	8.8	--	3.3	--	223	.30	5.4	196	8	8	0.3	384
Apr. 13-14, 18-19.	5.50	--	--	46	31	13	13	299	0	10	10	--	2.3	--	276	.38	4.1	242	0	11	0.4	475
Apr. 15-16.....	20.5	--	--	22	12	23	23	146	0	10	16	--	3.8	--	159	.22	8.8	104	0	33	1.0	270
Apr. 21-22.....	3.40	--	--	55	38	14	14	342	10	11	10	--	2.2	--	325	.44	3.0	293	0	10	0.4	557
Apr. 23.....	75.0	--	--	24	11	8.0	8.0	132	0	10	7.7	4.0	1.0	--	147	.20	30	105	0	14	0.3	205
Apr. 24.....	26.0	--	--	31	18	10	10	179	0	11	9.0	--	3.9	--	190	.26	13	152	5	13	0.4	315
Apr. 25-26.....	6.00	--	--	40	25	13	13	245	0	11	11	--	3.0	--	249	.34	4.0	203	2	12	0.4	427
Apr. 3-15.....	3.15	--	--	56	36	14	14	353	0	9.4	12	--	.7	--	322	.44	2.7	288	0	9	0.3	567
May 1-10.....	2.70	12	0.00	32	44	13	3.2	309	8	7.2	10	0.1	.7	0.19	286	.39	2.1	261	0	10	0.4	514
May 11, 14-15.....	5.83	--	--	34	40	34	3.2	359	0	12	12	--	4.4	--	311	.42	4.9	280	0	23	0.9	605
May 12-13.....	36.5	--	--	36	20	21	191	12	9	9.7	20	--	3.9	--	226	.31	22	172	0	21	0.7	398
May 16-17.....	146	--	--	25	10	18	18	130	12	7.0	16	--	3.3	--	155	.21	61	104	0	27	0.8	268
May 18-20.....	10.9	--	--	39	23	17	17	225	7	9.9	14	--	4.9	--	239	.33	7.0	182	0	17	0.5	420
May 21-31.....	2.81	13	0.00	40	40	14	3.9	307	13	7.1	12	.3	.7	.19	300	.41	2.3	284	0	10	0.4	532
June 1-10.....	2.26	10	0.00	41	40	14	3.8	328	5	6.3	10	.3	.8	.18	304	.41	1.9	287	0	10	0.4	532
June 11-20.....	.61	11	0.00	29	45	17	3.5	302	12	5.5	11	.1	1.4	.52	286	.39	.5	255	0	12	0.5	510
June 21-30.....	.53	--	--	28	44	21	3.5	318	10	6.1	11	--	2.0	--	287	.39	.3	294	0	15	0.6	517
July 1-6.....	23	--	--	30	45	18	18	334	8	5.7	10	--	1.2	--	287	.39	.2	260	0	13	0.5	516
July 7.....	17.0	--	--	35	17	11	11	183	8	4.5	7.0	--	5.2	--	153	.21	7.0	133	0	16	0.4	305
July 8-10.....	38.3	--	--	22	8.5	18	18	131	0	9.1	6.8	--	4.0	--	146	.20	15	90	0	31	0.8	246
July 11, 13-15, 17-19	13.1	--	--	26	11	16	16	149	0	8.1	6.2	--	5.4	--	160	.22	5.7	109	0	24	0.7	271

July 12, 15, 20, 1953	128	---	18	6.8	8.7	98	0	5.1	3.0	--	2.3	---	101	.14	35	73	0	21	.4	174	7.9
July 21-28	31.6	--	29	13	13	161	0	6.7	7.8	--	4.0	--	167	.23	14	125	0	18	.5	288	8.1
July 29-31	.93	--	50	27	17	293	6	5.8	9.2	--	1.8	--	267	.36	.7	284	0	13	.5	471	8.4
Aug. 1-10	.57	--	50	34	17	336	3	6.3	10	--	1.3	--	298	.41	.5	264	0	13	.5	526	8.3
Aug. 11-16	.68	--	48	31	16	318	0	6.1	10	--	1.9	--	279	.38	.5	248	0	12	.4	493	8.2
Aug. 17-20	183	--	18	6.1	11	98	0	2.8	5.2	--	2.5	--	97	.13	48	70	0	25	.5	173	7.8
Aug. 21-24	3.63	--	35	16	9.7	190	2	4.9	9.5	--	1.9	--	189	.26	1.9	153	0	12	.3	327	--
Aug. 25-31	1.13	--	46	27	16	292	0	6.7	11	--	1.3	--	265	.36	.8	224	0	14	.5	467	8.2
Sept. 1-2	1.20	--	44	29	13	276	9	7.7	9.5	--	.6	--	256	.35	.8	228	0	11	.4	458	8.5
Sept. 3	30.0	--	18	7.8	7.6	98	0	4.7	4.0	--	3.1	--	98	.13	7.9	77	0	18	.4	179	8.0
Sept. 4-6	2.90	--	34	17	8.5	197	1	5.1	7.5	--	1.9	--	185	.25	1.4	155	0	11	.3	327	8.3
Sept. 7-10	.83	--	47	27	12	275	8	3.9	12	--	2.4	--	254	.35	.6	230	0	10	.3	462	8.4
Sept. 11-30	.82	--	50	34	15	332	8	6.2	10	--	.7	--	287	.39	.6	286	0	11	.4	528	8.4
Weighted average	12.6	--	26	14	all	5155	--	6.5	7.4	--	2.8	--	153	0.21	5.2	122	0	17	0.4	267	--

a Calculated from other weighted average constituents.

b Includes equivalent of individual carbonate values shown above.

## LOWER MISSISSIPPI RIVER BASIN

## ARKANSAS RIVER BASIN--Continued

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

Temperature (°F) of water, water year October 1952 to September 1953

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

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

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

DRAINAGE AREA.--12,641 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1951 to September 1953.

Water temperatures: October 1951 to September 1953.

EXTREMES: 1952-53.--Dissolved solids: Maximum, 1,170 ppm July 17-19; minimum, 537 ppm Sept. 8-13.

Hardness: Maximum, 417 ppm Mar. 31, 1953; minimum, 226 ppm Sept. 8-13.

Specific conductance: Maximum daily, 1,790 micromhos July 17-19; minimum daily, 833 micromhos Sept. 8.

Water temperatures: Maximum, 83°F Jan. 16, 1953; minimum, 38°F Dec. 20, 1952.

EXTREMES 1951-53.--Dissolved solids: Maximum, 1,150 ppm July 17-19, 1953; minimum, 537 ppm Sept. 8-13, 1953.

Hardness: Maximum, 417 ppm Mar. 31, 1953; minimum, 226 ppm Sept. 8-13, 1953.

Specific conductance: Maximum, 1,790 micromhos July 17, 1953; minimum, 833 micromhos Sept. 8, 1953.

Water temperatures: Maximum, 85°F July 31, Aug. 5, 7, 9, 1952; minimum, freezing point Dec. 20-21, 1951.

REMARKS.--Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of discharge for Canton Reservoir near Canton, Okla. for water year October 1952 to September 1953 given in WSP 1281.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Mag-nesium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Cur-bonate (CO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> )	Bo-ton (B)	Dissolved solids (residue at 180° C)			Hardness as CaCO <sub>3</sub>		Per-cent so-lidum	So-lidum (micro-mhos at 25°C)
															Parts per million	Tons per acre-foot	Tons per day	Calcium	Non-carbonate		
Oct. 1-31, 1952.....		8.8	0.00	74	44	177	8.8	203	0	246	230	0.9	1.2	0.24	933	1.27		366	199	51	1,510
Nov. 1-30.....		9.4	.00	78	47	183	8.8	214	0	261	240	1.1	1.2	.26	960	1.31		388	212	50	1,540
Dec. 1-31.....		8.4	.00	80	47	188	8.3	222	0	257	242	.9	1.4	.27	988	1.30		393	211	50	1,540
Jan. 1-31, 1953.....		8.0	.00	82	46	186	8.3	230	0	286	245	.9	.7	.25	986	1.34		394	205	50	1,560
Feb. 1-28.....		8.0	.00	86	46	195	8.8	239	0	272	245	1.1	.7	.29	1,000	1.36		404	208	49	1,500
Mar. 1-31.....		10	.00	88	48	196	8.5	241	0	261	252	.9	1.7	.49	1,040	1.43		417	220	49	1,830
Apr. 1-30.....		9.4	.00	89	48	196	9.1	234	0	270	268	.9	1.0	.53	1,050	1.43		411	220	50	1,860
May 1-31.....		11	.00	86	46	196	9.6	202	8	274	268	.9	1.8	.27	1,060	1.44		404	224	51	1,680
June 1-30.....		15	.00	85	49	204	11	199	0	293	272	1.1	2.8	.51	1,110	1.51		414	250	51	1,730
July 1-19.....		--	--	77	49	235		165	0	321	308	--	3.3	--	1,150	1.56		395	260	56	1,800
Sept. 8-13.....		--	--	57	20	91		187	0	125	110	--	2.6	--	537	.73		226	89	47	864

## ARKANSAS RIVER BASIN--Continued

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

Temperature (°F) of water, water year October 1952 to September 1953

/Once-daily temperature measurement at 4 p.m./

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

# ARKANSAS RIVER BASIN--Continued

## NORTH CANADIAN RIVER NEAR YUKON, OKLA.

LOCATION --At bridge on State Highway 4, 16 miles downstream from gaging station near El Reno, and 3 miles north of Yukon, Canadian County.

DRAINAGE AREA --13,200 square miles at gaging station.

RECORDS AVAILABLE --Chemical analyses: October 1952 to September 1953.

Water temperatures: October 1952 to September 1953.

EXTREMES 1952-53 --Dissolved solids: Maximum, 1,060 ppm July 21-24; minimum, 98 ppm Apr. 6-7.

Hardness: Maximum, 416 ppm Apr. 11-14; minimum, 64 ppm Apr. 6-7.

Specific conductance: Maximum daily, 1,780 micromhos July 23; minimum daily 144 micromhos Apr. 6.

Water temperatures: Maximum, 92°F July 8; minimum, 35°F Dec. 25-28, Jan. 16, 18, 23.

REMARKS --Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of water discharge for gaging station near El Reno for water year October 1952 to September 1953 given in WSP 1281. No appreciable inflow between gaging station and sampling station except during periods of heavy local runoff.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal-cium (Ca)	Mag-nesium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Car-bonate (CO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> )	Bo-ron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Per-cent so-lids by weight	So-dium adsorp-tion ratio	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate				
Nov. 14-20, 1952.....	1.51	4.6	0.00	50	20	60	6.7	195	0	82	72	0.5	1.0	0.18	393	0.53	9.7	207	47	38	1.8	676	8.0
Nov. 21-30.....	7.56	4.0	0.00	50	20	58	6.5	193	0	85	70	0.5	1.0	0.17	390	0.53	8.0	207	49	37	1.8	668	8.1
Dec. 1-11.....	7.79	3.2	0.00	50	20	59	6.6	196	0	82	71	0.5	0.8	0.21	398	0.53	8.2	207	46	37	1.8	679	8.1
Dec. 12-19.....	7.00	--	--	47	22	59	--	192	0	77	70	--	0.8	--	396	0.54	7.5	208	50	38	1.8	681	7.9
Dec. 20-31.....	13.2	3.0	0.00	49	21	61	6.5	193	0	81	72	0.5	0.7	0.21	392	0.53	14	209	51	38	1.8	687	8.1
Jan. 1-10, 1953.....	9.25	2.2	0.00	50	20	59	6.5	195	0	82	73	0.5	0.2	0.23	390	0.53	9.7	207	47	37	1.8	683	8.2
Jan. 11-20.....	4.97	--	--	52	21	61	--	197	0	83	71	--	0.6	--	408	0.55	5.5	216	54	36	1.8	707	8.1
Jan. 21-31.....	8.22	3.0	0.00	51	20	61	6.1	198	0	83	75	0.5	0.5	0.25	400	0.54	8.9	209	47	38	1.8	687	8.2
Feb. 1-10.....	5.93	3.6	0.00	52	21	62	6.2	203	0	84	76	0.5	0.4	0.23	409	0.56	6.5	216	50	38	1.8	701	8.2
Feb. 11-20.....	8.79	3.0	0.00	51	20	59	6.0	197	0	81	73	0.5	0.1	0.21	396	0.54	9.4	209	48	37	1.8	682	8.0
Feb. 21-28.....	6.59	3.0	0.00	51	20	61	6.2	196	0	83	73	0.5	0.4	0.18	399	0.54	7.1	209	48	38	1.8	672	7.9
Mar. 1-3, 6-7.....	15.0	--	--	40	18	62	--	142	0	85	71	--	3.6	--	364	0.50	15	174	58	44	2.0	633	7.7
Mar. 4-5.....	18.0	--	--	22	10	41	4.1	74	0	61	40	--	4.8	--	216	0.29	10	96	36	48	1.8	370	7.2
Mar. 8.....	9.70	--	--	52	29	118	156	0	178	0	132	--	7.1	--	593	0.81	16	248	120	51	3.2	949	7.7
Mar. 9-10.....	8.35	--	--	66	39	162	207	0	217	198	--	--	3.1	--	820	1.12	18	325	156	52	3.9	1,360	8.0
Mar. 11-13, 19.....	11.3	--	--	66	40	167	218	0	216	202	--	--	4.5	--	827	1.12	25	329	150	52	4.0	1,380	8.0
Mar. 14, 20.....	29.0	--	--	49	23	104	153	0	134	122	--	--	5.9	--	526	0.72	41	217	92	51	3.1	901	8.0

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

Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal-cium (Ca)	Mag-nesium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Car-bonate (CO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> )	Bo-ron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Per-cent so-dium	So-adium adsorp-tion ratio	Specific conduct-ance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbon-ate				
Mar. 15, 1953	18.0	--	--	27	8.8	22		66	0	47	28	--	9.9	--	258	.35	13	104	50	31	.9	282	7.3
Mar. 16-18	15.3	--	--	31	13	49		104	0	69	54	--	5.5	--	288	.39	12	131	46	45	1.9	492	7.3
Mar. 21	8.60	--	--	42	23	83		160	0	105	96	--	6.4	--	506	.69	12	200	68	48	2.6	760	8.2
Mar. 22-23	6.36	--	--	80	32	136		220	3	162	135	--	6.0	--	708	.96	13	281	96	51	3.5	1,130	8.3
Mar. 24-31	4.96	--	--	80	44	175		312	0	239	245	--	3.5	--	930	1.26	12	380	128	50	3.9	1,460	8.1
Apr. 1-4	5.33	--	--	84	49	204		316	0	239	245	--	2.4	--	1,040	1.41	15	411	152	52	4.4	1,640	7.9
Apr. 5-10	172	--	--	87	26	142		166	0	130	108	--	4.0	--	546	.73	251	227	90	47	2.7	953	7.3
Apr. 11-13	98.5	--	--	16	3.9	11		86	0	23	11	--	3.3	--	285	.38	7.5	64	50	39	1.4	421	7.7
Apr. 22	8.9	--	--	37	11	36		222	0	65	41	--	7.1	--	1,040	1.41	380	416	234	51	4.3	1,670	7.9
Apr. 11-14	135	--	--	86	48	202		222	0	280	262	--	1.6	--	897	.95	46	300	154	48	3.2	1,160	7.8
Apr. 15, 19	24.5	--	--	66	33	127		178	0	185	170	--	3.2	--	897	.95	46	300	154	48	3.2	1,160	7.8
Apr. 16-17	21.0	--	--	31	12	50		88	0	75	62	--	3.3	--	285	.39	16	127	55	46	1.9	482	7.4
Apr. 18	15.0	--	--	46	19	73		125	0	117	93	--	6.0	--	427	.58	17	183	90	45	2.3	709	7.9
Apr. 20	11.0	--	--	78	38	154		209	0	233	208	--	5.4	--	840	1.14	25	350	179	49	3.6	1,360	7.7
Apr. 21-22	9.30	--	--	78	39	154		214	0	218	208	--	4.9	--	852	1.16	21	355	180	49	3.6	1,370	7.7
Apr. 23-30	8.74	--	--	88	46	187		263	0	253	245	--	2.4	--	978	1.33	23	408	193	50	4.0	1,620	8.2
May 1-10	4.51	--	--	77	49	211		280	0	261	248	--	2.0	--	1,010	1.37	12	394	164	54	4.6	1,670	8.0
May 11-13	5.97	--	--	70	48	207		252	6	254	240	--	2.6	--	978	1.33	16	372	156	55	4.7	1,590	8.4
May 14	8.10	--	--	60	42	171		221	4	216	198	--	3.1	--	809	1.10	18	322	134	54	4.2	1,340	8.3
May 15-16	24.5	--	--	50	26	107		177	0	146	116	--	4.5	--	543	.74	36	232	87	50	3.1	917	8.2
May 17	25.0	--	--	55	40	162		195	0	206	195	--	5.0	--	779	1.06	53	302	142	54	4.1	1,310	8.2
May 18	25.0	--	--	46	28	121		147	0	156	145	--	5.6	--	584	.79	39	230	110	53	3.5	997	8.0
May 19-20	20.0	--	--	56	37	158		198	0	188	188	--	3.3	--	762	1.04	41	292	130	54	4.0	1,280	8.1
May 21-28	4.74	--	--	60	37	131		214	0	196	175	--	3.3	--	782	1.06	10	315	140	47	3.2	1,260	8.2
June 6-8	1.70	9.6	.00	73	37	149		232	0	193	188	--	4.9	--	820	1.12	3.8	334	144	48	3.5	1,370	8.2
July 8-9	.60	3.2	.00	66	41	177		214	0	215	218	--	2.4	--	854	1.16	1.4	333	158	53	4.2	1,440	7.5
July 12-13, 16-20	104	--	--	49	28	137		151	0	168	166	--	4.4	--	656	.89	184	238	114	56	3.8	1,100	7.7
July 21-24	409	--	--	76	43	218		158	0	301	278	--	4.8	--	1,060	1.44	1,170	366	236	56	5.0	989	8.0
July 25-31	25.9	--	--	48	26	120		142	0	156	144	--	5.0	--	597	.81	42	226	110	53	3.5	989	7.4
Aug. 1-2	.45	--	--	62	31	140		173	0	184	177	--	4.5	--	720	.98	.9	282	140	52	3.6	1,180	7.5
Sept. 3-6	20.2	--	--	58	35	158		167	0	202	198	--	7.3	--	780	1.06	43	268	151	54	4.0	1,270	8.0
Sept. 10-20	562	12	.02	60	25	95		181	0	139	121	--	2.8	--	562	.76	853	252	104	44	2.6	933	7.9
Sept. 21-30	4.43	12	.00	68	27	103		208	0	145	135	--	2.0	--	628	.85	7.5	280	110	43	2.7	1,030	7.9
Weighted average...	31.8	--	--	61	29	a 120		b 176	--	167	150	--	3.2	--	651	0.89	56	271	127	49	3.2	1,070	--

a.

b.

c.

d.

e.

f.

g.

h.

i.

j.

k.

l.

m.

n.

o.

p.

q.

r.

s.

t.

u.

v.

w.

x.

y.

z.

## ARKANSAS RIVER BASIN--Continued

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

Temperature (°F.) of water, water year October 1952 to September 1953

/Once-daily temperature measurement at 8:30 a.m./

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

## ARKANSAS RIVER BASIN--Continued

## DEEP FORK RIVER NEAR BEGGS, OKLA.

LOCATION --At gaging station at county highway bridge, 3 miles upstream from Adams Creek, 4 miles south of Beggs, Okmulgee County, 8 miles downstream from Flat Rock (Checkerboard) Creek, and at mile 85.0.

DRAINAGE AREA -- 2,018 square miles.

RECORDS AVAILABLE -- Chemical analyses.

Water temperatures: November 1951 to September 1953.

EXTREMES, 1952-53 -- Dissolved solids: Maximum, 5,200 ppm Jan. 24; minimum, 140 ppm July 26-31.

Hardness: Maximum, 1,190 ppm Jan. 24; minimum, 50 ppm July 14-16.

Specific conductance: Maximum daily, 8,700 micromhos Jan. 24; minimum daily, 190 micromhos July 27.

Water temperatures: Maximum, 96° F. June 12, July 6; minimum, 35° F. Jan. 16.

EXTREMES, 1951-53 -- Dissolved solids: Maximum, 5,200 ppm Jan. 24, 1953; minimum, 140 ppm July 26-31, 1953.

Hardness: Maximum, 1,190 ppm Jan. 24, 1953; minimum, 50 ppm July 14-16, 1953.

Specific conductance: Maximum daily, 8,700 micromhos Jan. 24, 1953; minimum daily, 190 micromhos July 27, 1953.

Water temperatures: Maximum, 96° F. June 12, July 6, 1953; minimum, freezing point, Jan. 4, 1952.

REMARKS -- Records of specific conductance available in district office at Oklahoma City, Okla. Records of discharge for water year October 1952 to September 1953 given in NSP 1261.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (residue at 180° C)			Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)		
															Parts per million	Tons per acre-foot	Tons per day	Total carbonate	Non-carbonate				
Oct. 1-10, 1952, . . . . .	1.49	6.8	0.00	54	31	131	4.5	250	0	34	208	0.3	0.6	0.45	628	0.85	2.5	262	57	52	3.5	1,110	7.8
Oct. 11-20 . . . . .	.90	--	--	56	32	122	4.9	245	0	33	212	--	1.0	--	618	.84	1.5	271	70	49	3.2	1,120	7.6
Oct. 21-31 . . . . .	.41	5.6	.02	58	33	128	5.5	271	0	33	212	.3	.6	--	638	.87	.7	280	58	49	3.3	1,160	8.0
Nov. 1-10 . . . . .	.27	5.6	.00	60	34	134	5.5	280	0	33	222	.5	.8	--	657	.89	.5	290	60	50	3.4	1,190	8.0
Nov. 11-18, 20 . . . . .	2.12	--	--	60	35	138	5.5	278	0	31	235	--	.7	--	666	.93	3.9	294	66	50	3.5	1,200	7.9
Nov. 19 . . . . .	9.20	--	--	65	37	144	5.5	266	0	39	262	--	1.6	--	757	1.03	19	314	96	50	3.5	--	--
Nov. 21-22, 28-30 . . . . .	29.0	--	--	69	31	184	5.5	205	0	31	352	--	1.6	--	806	1.10	63	300	132	57	4.6	1,500	8.1
Nov. 23-25 . . . . .	24.3	--	--	74	30	141	5.5	221	0	28	255	--	1.9	--	638	.87	42	266	84	54	3.8	1,210	8.1
Nov. 26 . . . . .	52.0	--	--	104	39	345	5.5	186	0	40	690	--	3.3	--	1,400	1.90	197	420	268	64	7.3	2,540	8.1
Nov. 27-28 . . . . .	64.0	--	--	203	52	793	5.5	173	0	29	1,610	--	3.2	--	2,970	4.04	513	720	578	71	13	5,260	7.8

## ARKANSAS RIVER BASIN

131

Dec. 1-2, 1952	31.5	--	--	81	33	259	181	0	57	490	--	1.9	--	1,060	1.44	90	338	189	63	6.1	1,950	7.8
Dec. 3-4, 10	29.7	--	--	96	41	352	234	0	87	645	--	2.4	--	1,360	1.85	109	408	216	65	7.6	2,510	7.5
Dec. 5-6	29.0	--	--	134	54	492	254	0	63	980	--	1.9	--	1,970	2.68	154	556	373	66	9.1	3,540	7.6
Dec. 7-9	26.3	--	--	152	56	625	234	0	92	1,190	--	2.6	--	2,310	3.14	164	610	418	69	11	4,100	8.0
Dec. 11-20	21.8	5.2	--	100	94	352	252	0	68	630	.3	2.3	.36	2,390	1.89	82	412	205	64	7.6	2,480	8.0
Dec. 21	24.0	--	--	157	58	609	254	0	54	1,210	--	8.7	--	2,320	3.16	150	630	446	88	11	4,170	8.1
Dec. 22-26	27.6	--	--	134	47	570	226	0	54	1,080	--	3.6	--	2,060	2.80	154	538	343	70	11	3,680	7.9
Dec. 27-31	28.2	--	--	76	39	282	254	0	59	480	--	1.0	--	1,040	1.41	79	350	142	62	6.1	1,940	8.1
Jan. 1-6, 1953	25.8	--	--	70	43	280	254	0	65	485	--	1.8	--	1,100	1.50	77	352	144	63	6.5	2,020	8.0
Jan. 7-10	24.5	--	--	80	46	354	239	0	64	635	--	1.2	--	1,330	1.81	88	388	192	66	7.8	2,450	7.8
Jan. 11-20	22.8	2.0	--	101	47	367	264	0	60	670	.3	1.8	.40	1,440	1.96	89	433	216	64	7.7	2,650	7.9
Jan. 21-22, 27-29	45.4	--	--	101	48	394	248	0	56	740	--	2.3	--	1,560	2.12	191	450	246	68	8.1	2,790	8.0
Jan. 23, 25	38.0	--	--	219	72	894	199	0	50	1,820	--	6.6	--	3,550	4.83	364	842	680	70	13	5,910	7.9
Jan. 24	33.0	--	--	330	90	1,410	136	0	45	2,900	--	--	--	5,200	7.07	463	1,190	1,080	72	18	8,700	7.6
Jan. 26, 30-31	42.0	--	--	82	45	298	252	0	57	545	--	3.1	--	1,240	1.69	141	390	183	62	6.6	2,200	7.8
Feb. 1-10	36.7	4.0	--	82	42	314	274	0	60	575	.4	4.2	.45	1,300	1.77	129	402	178	62	6.8	2,330	8.1
Feb. 11, 15	44.5	--	--	108	46	386	268	0	57	720	--	4.6	--	1,520	2.07	183	458	239	65	7.8	2,740	7.9
Feb. 12-14	52.0	--	--	217	69	866	211	0	50	1,760	--	2.0	--	3,350	4.56	470	823	652	70	13	3,720	7.7
Feb. 16-20	45.4	--	--	82	43	279	265	0	55	505	--	2.5	--	1,120	1.52	137	362	164	61	9.2	2,960	7.7
Feb. 21-23, 26-28	41.0	--	--	90	43	337	239	0	59	640	--	2.8	--	1,420	1.93	137	402	180	66	7.8	2,500	8.0
Feb. 24-25	34.5	--	--	115	46	449	241	9	57	835	--	3.2	--	1,780	2.43	167	476	264	67	9.0	3,050	8.4
Mar. 1-2	56.5	--	--	72	35	277	209	0	44	500	--	3.2	--	1,130	1.54	172	324	152	65	6.7	2,000	8.0
Mar. 3	189	--	--	176	37	700	156	0	37	1,450	--	4.4	--	2,920	4.01	1250	674	546	70	12	4,690	8.0
Mar. 4	895	--	--	31	16	93	124	0	36	132	--	4.3	--	439	.58	1030	144	546	70	12	4,690	8.0
Mar. 5	978	--	--	46	23	166	114	0	36	310	--	3.1	--	714	.97	1690	210	116	63	5.0	1,230	7.3
Mar. 7-10	701	--	--	29	16	66	130	0	24	105	--	3.1	--	358	.49	678	138	32	51	2.4	597	7.7
Mar. 11-12, 20	425	--	--	31	15	61	122	0	23	104	--	2.3	--	380	.49	413	139	39	49	2.3	586	7.8
Mar. 13-14	191	--	--	35	19	76	137	0	25	134	--	4.5	--	414	.56	213	166	53	50	2.6	702	8.0
Mar. 15-19	793	--	--	36	18	104	121	0	26	185	--	4.3	--	486	.68	1070	184	65	58	3.5	852	7.6
Mar. 21-27	374	--	--	34	16	61	137	0	21	107	--	3.3	--	337	.46	340	151	38	47	2.2	603	8.1
Mar. 28-31	114	--	--	40	18	86	140	0	23	156	--	3.5	--	437	.59	135	174	60	52	2.8	774	7.9

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

Chemical analyses, in parts per million, water year October 1952 to September 1953.--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate				
Apr. 1, 6, 1953	926	--	--	35	13	111	--	82	0	18	218	--	3.0	--	490	0.67	1,230	141	74	63	4.1	892	7.8
Apr. 2-3, 5	169	--	--	70	26	214	--	153	0	30	430	--	4.2	--	930	1.26	424	282	156	62	5.6	1,640	8.1
Apr. 4	142	--	--	55	21	139	--	145	0	29	268	--	4.2	--	628	.85	241	224	104	57	4.0	1,110	8.1
Apr. 7-10	1,475	--	--	22	10	44	--	88	0	14	77	--	2.2	--	234	.32	932	96	24	50	2.0	1,425	7.5
Apr. 11-12	1,795	--	--	23	11	47	--	94	0	18	76	--	1.9	--	234	.32	1,130	102	26	50	2.0	427	7.5
Apr. 13, 18-20	905	--	--	32	15	78	--	106	0	18	145	--	2.4	--	388	.53	948	142	54	55	2.9	682	7.8
Apr. 14-17	608	--	--	27	14	61	--	96	0	18	112	--	3.0	--	324	.44	532	125	46	51	2.4	563	7.6
Apr. 21-22	418	--	--	33	18	90	--	124	0	21	161	--	3.1	--	449	.61	507	156	55	56	3.1	779	8.0
Apr. 23-25	3,105	--	--	11	5.9	31	--	27	0	9.5	61	--	2.0	--	218	.30	52	30	56	3.0	1.9	250	7.0
Apr. 26	4,520	--	--	18	9.9	37	--	64	0	18	66	--	2.2	--	280	.38	3,420	86	33	48	1.7	345	7.5
Apr. 27-28	3,190	--	--	20	10	65	--	61	0	16	116	--	2.5	--	321	.44	2,760	91	41	61	3.0	510	7.6
Apr. 29-30	1,605	--	--	36	16	99	--	103	0	20	188	--	1.9	--	488	.68	2,160	156	72	58	3.5	822	7.6
May 1-4, 1953	354	--	--	43	19	114	--	127	0	23	215	--	2.4	--	564	.77	539	186	82	57	3.6	947	7.8
May 5-7	150	--	--	56	25	146	--	167	0	26	280	--	.8	--	674	.92	273	242	106	57	4.1	1,220	8.0
May 8-10	110	--	--	72	33	198	--	198	0	32	390	--	.5	--	914	1.24	271	315	153	58	4.9	1,600	8.0
May 11-13	1,628	--	--	16	6.6	48	--	44	0	11	87	--	2.3	--	220	.30	967	67	31	61	2.6	386	7.6
May 14-20	2,110	--	--	26	13	72	--	107	0	14	121	--	2.8	--	333	.45	1,900	118	31	57	2.9	590	8.0
May 21-23	694	--	--	33	14	74	--	125	0	15	128	--	2.4	--	371	.50	695	140	38	53	2.7	654	8.0
May 24-26	268	--	--	46	19	98	--	161	0	18	180	--	2.0	--	489	.67	354	194	62	52	3.0	873	8.1
May 27-31	132	--	--	53	23	129	--	174	4	21	238	--	1.4	--	606	.82	216	228	79	55	3.7	1,070	8.4
June 1-4	64.0	--	--	62	28	166	--	197	0	25	312	--	2.4	--	770	1.05	133	268	106	57	4.4	1,350	7.6
June 5	46.0	--	--	67	26	237	--	153	6	28	442	--	3.5	--	1,010	1.37	125	275	140	65	6.2	1,720	8.4
June 6-7	164	--	--	137	41	522	--	111	0	26	1,080	--	3.5	--	2,240	3.05	992	510	419	69	10	3,620	8.2
June 8	180	--	--	106	37	368	--	154	7	33	740	--	4.2	--	1,650	2.24	602	420	282	66	7.8	2,620	8.5
June 9-10	98.0	--	--	54	23	188	--	152	0	24	345	--	3.1	--	781	1.08	211	230	106	64	5.4	1,360	8.2
June 11-20	50.7	6.8	0.00	56	30	166	6.1	203	4	35	298	0.3	1.3	0.60	763	1.06	107	263	90	57	4.4	1,370	8.3

June 21-24, 1953	16.0	--	--	62	32	196	222	3	38	345	--	1.8	--	976	1.19	38	238	101	60	5.0	1,500	8.3
June 25	85.0	--	72	32	32	328	221	10	40	550	--	1.8	--	1,150	1.53	38	328	147	67	7.3	1,990	8.5
June 26	54.0	--	92	43	343	129	8	30	680	680	--	4.8	--	1,530	2.86	233	420	249	64	7.3	2,530	8.5
June 27	46.0	--	174	57	768	146	2	30	1,590	1,590	--	1.6	--	3,400	4.82	422	670	547	72	17.3	5,230	8.3
June 28	28.0	--	--	86	34	317	217	0	37	495	--	1.4	--	1,260	1.71	95	354	176	66	7.3	2,250	8.0
June 29-30	16.5	--	70	31	238	213	5	36	425	425	--	1.6	--	985	1.34	44	304	121	63	5.9	1,760	8.4
July 1	11.0	--	69	33	227	219	4	35	410	410	--	1.6	--	970	1.32	29	308	122	62	5.6	1,720	8.4
July 2	8.80	--	82	37	273	203	13	32	515	515	--	2.3	--	1,160	1.58	28	356	168	63	6.3	2,030	8.6
July 3-9	6.30	--	--	104	46	360	213	0	34	725	--	1.2	--	1,560	2.12	27	450	276	64	7.8	2,650	8.0
July 10	8.50	--	106	46	412	181	6	32	820	820	--	2.5	--	1,740	2.37	40	455	298	66	8.4	2,950	8.4
July 11	9.50	--	124	50	492	199	9	36	970	970	--	2.4	--	2,100	2.86	54	515	337	68	9.4	3,410	8.5
July 12	85.0	--	54	24	184	149	4	21	340	340	--	2.5	--	775	1.05	178	232	104	63	5.3	1,400	8.4
July 13	1,560	--	15	5.7	68	35	0	6.6	122	122	--	1.6	--	310	.42	1,310	61	32	71	3.8	481	7.7
July 14-16	1,141	--	12	4.9	37	43	0	9.7	59	59	--	2.0	--	182	.25	561	50	15	61	2.2	284	7.7
July 17-20	562	--	23	11	69	92	0	16	112	112	--	4.0	--	321	.44	504	103	28	59	3.0	551	8.0
July 21-25	1,146	--	19	7.9	44	78	0	11	69	69	--	3.8	--	223	.30	690	80	16	55	2.1	380	7.9
July 26-31	2,127	--	16	6.1	22	75	0	7.2	30	30	--	2.2	--	140	.19	804	65	4	43	1.2	233	7.6
Aug. 1-10	356	--	24	10	38	116	0	10	55	55	--	2.2	--	217	.30	209	102	7	45	1.6	385	7.9
Aug. 11-12	360	--	23	9.8	37	111	0	13	51	51	--	1.7	--	199	.27	193	98	7	45	1.6	358	8.1
Aug. 13-14	270	--	61	18	132	122	0	12	375	375	--	2.0	--	836	1.14	609	226	126	65	5.6	1,420	8.0
Aug. 15-20	362	--	27	11	57	112	0	11	94	94	--	2.2	--	279	.38	273	114	22	52	2.3	508	7.8
Aug. 21-31	265	--	26	12	44	122	0	14	65	65	--	2.9	--	238	.32	170	113	13	46	1.8	430	7.5
Sept. 1-4	52.0	--	34	14	57	154	0	15	89	89	--	1.8	--	306	.42	43	144	18	46	2.1	558	8.0
Sept. 5	170	--	266	56	1,120	72	0	17	2,300	2,300	--	6.6	--	4,680	6.36	2,150	895	836	73	16	7,090	7.7
Sept. 6-10	70.2	--	42	15	102	150	0	19	174	174	--	1.7	--	469	.64	189	168	45	57	3.4	832	8.0
Sept. 11-16	36.5	--	38	19	83	174	0	27	128	128	--	1.6	--	397	.54	39	172	30	51	2.8	724	8.0
Sept. 17-20	17.5	--	44	21	114	205	0	46	160	160	--	1.8	--	504	.69	24	196	28	56	3.5	905	8.0
Sept. 21-30	10.3	5.8	02	41	21	93	4.8	202	0	30	138	.5	.7	438	.60	12	189	24	51	2.9	796	8.1
Weighted average	341	--	28	12	a76	b95	--	16	134	134	--	2.6	--	368	0.50	339	120	42	58	3.0	617	--

a Calculated from other weighted average constituents.

b Includes equivalent of individual carbonate values shown above.

## LOWER MISSISSIPPI RIVER BASIN

## ARKANSAS RIVER BASIN--Continued

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

Temperature (°F) of water, water year October 1952 to September 1953  
 /Once-daily temperature measurement at 5:30 p. m./

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

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

LOCATION--At gaging station at bridge on State Highway 2, three-quarters of a mile north of Whitefield, Haskell County, 5½ miles upstream from Snake Creek at mile 18.8.

DRAINAGE AREA--47,576 square miles.

RECORDS AVAILABLE--Chemical analyses: September 1944 to February 1945, September 1946 to September 1953.

Water temperatures: September 1944 to February 1945, September 1946 to September 1953.

EXTREMES, 1952-53.--Dissolved solids: Maximum, 11,800 ppm Dec. 2-3; minimum, 254 ppm Apr. 28.

Hardness: Maximum, 2,260 ppm Dec. 2-3; minimum, 80 ppm Apr. 28.

Specific conductance: Maximum daily, 18,900 micromhos Dec. 2; minimum daily, 378 micromhos Mar. 17.

Water temperatures: Maximum, 87°F July 6; minimum, freezing point Nov. 28, Dec. 27-28, Jan. 16.

EXTREMES, 1944-45, 1946-53.--Dissolved solids: Maximum daily, 11,800 ppm Dec. 2, 3, 1952; minimum daily, 89 ppm Jan. 2, 5-7, 1948.

Hardness: Maximum, 2,260 ppm Dec. 2-3, 1952; minimum, 18 ppm Feb. 17, 1948.

Specific conductance: Maximum daily, 18,900 micromhos Dec. 2, 1952; 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 1952 to September 1953 given in WSP 1281.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Percent sodium in anion ratio	Specific conductance (micro-mhos at 25°C)	pH	
															Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate				
Oct. 1-10, 1952.....	58.4	12	0.00	184	49	747	14	192	0	25	1,490	0.1	--	0.39	2,840	3.86	448	660	503	71	13	4,770	7.8
Oct. 11.....	42.0	--	--	176	50	700	--	202	0	26	1,400	--	--	--	2,750	3.74	312	644	479	70	12	4,680	7.9
Oct. 12-20.....	34.6	--	--	205	60	782	--	210	0	28	1,600	--	--	--	3,070	4.18	287	758	586	89	12	5,290	7.5
Oct. 21-29.....	25.1	--	--	193	56	686	--	230	0	26	1,410	--	--	--	2,670	3.63	181	712	524	68	11	4,670	7.7
Oct. 30-31.....	23.5	--	--	217	58	832	--	232	0	29	1,680	--	--	--	3,170	4.31	201	780	590	70	13	5,390	7.6
Nov. 1-6.....	25.0	--	--	234	66	926	--	210	0	31	1,690	--	--	--	3,720	5.06	251	856	684	70	14	6,140	7.7
Nov. 7-10.....	24.5	--	--	268	74	1,150	--	215	0	33	2,320	--	--	--	4,250	5.78	281	973	797	72	16	7,190	7.4
Nov. 11-12.....	24.0	--	--	288	79	1,140	--	216	0	34	2,350	--	--	--	4,500	6.12	292	1,040	866	70	15	7,540	7.9
Nov. 13.....	28.0	--	--	306	80	1,290	--	207	0	36	2,620	--	--	--	4,920	6.69	372	1,090	923	72	17	8,210	7.8
Nov. 14-18.....	40.0	--	--	339	87	1,470	--	195	0	37	2,980	--	--	--	5,560	7.56	600	1,200	1,040	73	18	8,930	7.6
Nov. 19-20.....	57.0	--	--	373	94	1,680	--	168	0	41	3,390	--	--	--	6,260	8.43	954	1,320	1,180	73	20	10,000	7.4
Nov. 21-24, 29.....	279	--	--	384	96	1,710	--	157	0	47	3,470	--	--	--	6,470	8.80	4,870	1,350	1,220	73	20	10,590	8.0
Nov. 25, 28.....	963	--	--	250	63	1,150	--	102	0	29	2,320	--	--	--	4,290	5.83	1,150	883	800	74	17	7,210	7.5
Nov. 26.....	1,350	--	--	183	52	818	--	112	0	24	1,650	--	--	--	3,100	4.22	1,130	670	578	73	14	5,290	7.8
Nov. 27.....	2,320	--	--	84	26	338	--	94	0	17	675	--	1.1	--	1,320	1.80	8,270	316	240	70	8.2	2,380	7.1
Nov. 30.....	695	--	--	415	115	2,070	--	79	0	36	4,190	--	--	--	7,430	10.19	13,940	1,510	1,440	75	23	12,300	7.5
Dec. 1, 4-5.....	398	--	--	517	134	2,600	--	112	0	42	5,220	--	--	--	9,570	13.02	10,310	1,840	1,759	75	26	15,200	7.5
Dec. 2-3.....	410	--	--	638	162	3,240	--	93	0	47	6,590	--	--	--	11,800	16.05	13,060	2,260	2,180	76	30	18,600	7.3
Dec. 6, 9.....	260	--	--	411	112	2,020	--	155	0	45	4,040	--	--	--	7,570	10.13	5,230	1,490	1,360	75	23	14,900	7.3
Dec. 7-10.....	240	--	--	380	97	1,740	--	161	0	43	3,510	--	--	--	6,570	8.94	4,280	1,350	1,220	74	21	10,700	7.5
Dec. 11-12.....	187	--	--	349	89	1,590	--	165	0	46	3,200	--	--	--	6,010	8.17	3,030	1,240	1,100	74	20	9,960	7.2
Dec. 13-20.....	177	--	--	301	80	1,860	--	173	0	53	2,720	--	--	--	5,160	7.02	2,470	1,080	933	73	18	8,470	7.8
Dec. 21.....	523	--	--	331	86	1,510	--	154	0	44	3,050	--	--	--	5,640	7.67	1,960	1,190	1,060	73	19	9,360	7.6

## LOWER MISSISSIPPI RIVER BASIN

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

Chemical analyses, in parts per million, water year October 1952 to September 1953.--Continued

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Mag-nesium (Mg)	So-odium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Car-bonate (CO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> )	Bo-ron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Per-cent so-lu-sion	So-lu-men-tation ratio	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate				
Dec. 22, 1952	659	--	--	141	46	917	639	78	0	45	1,290	--	--	--	2,440	3,32	4,340	541	477	72	12	4,250	7.4
Dec. 23	516	--	--	197	54	937	90	0	38	1,840	1,840	--	--	--	3,430	4,66	4,780	714	640	74	15	5,590	7.4
Dec. 24	456	--	--	232	65	1,110	100	0	39	2,220	--	--	--	--	4,160	5,66	5,120	846	764	74	17	6,960	7.2
Dec. 25	396	--	--	268	73	1,310	107	0	41	2,620	--	--	--	--	4,790	6,51	5,120	968	881	75	18	8,080	7.2
Dec. 26-28, 30	303	--	--	389	111	1,910	145	0	45	3,840	--	--	--	--	6,900	9,38	5,640	1,430	1,310	74	22	11,200	7.5
Dec. 29, 31	247	--	--	432	125	2,230	167	0	47	4,430	--	--	--	--	8,130	11,06	5,420	1,590	1,460	75	24	13,000	7.4
Jan. 1-7, 1953	187	--	--	450	121	2,100	165	0	48	4,260	--	--	--	--	7,830	10,65	3,950	1,620	1,490	74	23	12,900	7.2
Jan. 8-10	160	--	--	399	103	1,880	167	0	46	3,770	--	--	--	--	6,890	9,37	2,980	1,420	1,280	74	22	11,200	7.3
Jan. 11-20	141	8.0	0.00	420	102	1,890	33	163	0	51	3,870	0.1	--	0.52	6,970	9,48	2,650	1,470	1,330	73	21	11,300	7.6
Jan. 21-28	207	--	--	433	109	1,950	151	0	46	3,970	--	--	--	--	7,230	9,82	4,040	1,530	1,400	74	22	11,900	7.7
Jan. 29-31	263	--	--	492	132	2,330	133	0	50	4,730	--	--	--	--	8,700	11,83	6,180	1,770	1,660	74	24	14,100	7.4
Feb. 1-3, 7	231	--	--	503	133	2,590	114	0	53	5,170	--	--	--	--	9,180	12,48	5,730	1,800	1,710	76	27	14,800	7.6
Feb. 4-6, 8	195	--	--	480	126	2,380	121	0	53	4,780	--	--	--	--	8,570	11,66	4,510	1,620	1,620	75	25	13,800	7.5
Feb. 9-10	156	--	--	439	120	2,030	135	0	53	4,140	--	--	--	--	7,700	10,47	3,240	1,590	1,480	74	22	12,400	7.3
Feb. 11-12, 17	238	--	--	401	116	1,880	125	0	52	3,840	--	--	--	--	6,960	9,47	4,470	1,480	1,380	73	21	11,400	7.8
Feb. 13-14, 18-20	271	--	--	456	125	2,250	120	0	60	4,530	--	--	--	--	8,000	10,88	5,850	1,650	1,550	75	24	13,000	7.5
Feb. 15-16	471	--	--	270	79	1,350	85	0	46	2,700	--	--	--	--	4,840	6,58	6,160	998	929	75	19	8,100	7.5
Feb. 21-23, 27-28	263	--	--	468	131	2,320	105	0	59	4,680	--	--	--	--	8,350	11,36	5,930	1,710	1,620	75	24	13,500	7.1
Feb. 24	375	--	--	340	108	1,610	88	0	61	3,300	--	--	--	--	6,080	8,27	6,160	1,280	1,220	73	19	9,940	7.6
Feb. 25	391	--	--	258	79	1,320	73	0	109	2,600	--	--	--	--	7,060	6,51	5,060	968	908	75	18	7,990	7.4
Feb. 26	355	--	--	398	114	1,920	82	0	68	3,900	--	--	--	--	7,060	9,60	6,770	1,460	1,390	74	22	11,400	7.6
Mar. 1, 8	1,237	--	--	516	147	2,590	115	0	59	5,230	--	--	--	--	9,320	12,68	31,630	1,890	1,900	75	26	14,900	7.3
Mar. 2	1,120	--	--	328	99	1,600	96	0	40	4,250	--	--	--	--	5,870	7,98	17,750	1,220	1,140	74	20	9,650	7.4
Mar. 3, 6, 10	1,593	--	--	170	50	810	84	0	36	1,620	--	--	--	--	3,020	4,11	12,980	630	560	74	14	5,130	7.2
Mar. 4-5	1,740	--	--	147	45	703	67	0	35	1,410	--	--	--	--	2,460	3,59	12,400	582	472	73	13	7,730	7.1
Mar. 7, 9	1,640	--	--	261	73	1,300	92	0	41	2,600	--	--	--	--	4,730	6,43	10,840	951	868	73	19	7,830	7.3
Mar. 11-13	1,166	--	--	136	38	629	118	0	36	1,220	--	--	--	--	2,460	3,37	7,810	898	808	73	15	3,900	8.0
Mar. 14	4,240	--	--	88	26	384	92	0	26	750	--	--	5.6	--	1,503	2,04	17,170	326	251	72	9.3	2,520	7.8
Mar. 15-16, 19	12,500	--	--	26	6.2	68	--	0	14	125	--	--	2.0	--	321	.44	10,830	80	39	62	3.1	516	7.1
Mar. 17	15,900	--	--	24	6.3	41	--	61	0	9.2	--	--	2.8	--	295	.40	12,660	86	36	51	1.9	378	7.4
Mar. 18	25,800	--	--	45	10	125	--	84	0	14	250	--	3.0	--	553	.75	38,520	194	84	64	4.9	927	7.6
Mar. 20	16,200	--	--	48	11	172	--	58	0	12	330	--	2.4	--	707	.96	30,920	163	113	69	5.3	1,170	7.7
Mar. 21	14,500	--	--	46	10	178	--	52	0	10	342	--	1.7	--	737	1.00	28,850	136	114	71	6.2	1,200	7.7

ARKANSAS RIVER BASIN

137

Mar. 22, 31, 1953	22,860	--	--	--	40	9.3	122	--	72	0	13	242	--	2.0	--	548	0.75	135,320	138	79	66	4.5	908	7.7
Mar. 23	3,240	--	--	--	69	17	279	--	68	0	21	560	--	3.8	--	1,060	1.44	9,270	242	186	71	7.8	1,860	7.7
Mar. 24, 28-30	1,429	--	--	--	116	33	524	--	88	0	34	1,060	--	--	--	1,950	2.65	7,520	425	353	73	11	3,440	7.6
Mar. 25-27	11,380	--	--	--	146	40	691	--	81	0	33	1,390	--	--	--	2,800	3.54	9,690	529	462	74	13	4,440	7.6
Apr. 1-2	18,300	--	--	--	82	19	334	--	78	0	15	640	--	3.2	--	1,260	1.71	62,260	282	218	72	8.7	2,200	7.7
Apr. 3-4, 6, 10	9,563	--	--	--	54	13	197	--	73	0	17	380	--	2.4	0.22	780	1.06	20,140	188	128	70	6.3	1,380	7.7
Apr. 5, 8-9	11,910	--	--	--	69	16	250	--	92	0	20	480	--	3.2	--	969	1.32	31,170	238	162	70	7.0	1,730	7.7
Apr. 7	20,300	--	--	--	48	11	159	--	68	0	18	305	--	2.6	--	645	.88	33,350	165	110	68	5.4	1,120	7.8
Apr. 11-12	4,160	--	--	--	52	14	166	--	97	0	24	312	--	3.2	--	657	.89	7,380	187	108	66	5.3	1,220	8.0
Apr. 13-14	3,685	--	--	--	38	13	128	--	95	0	21	230	--	3.2	--	504	.69	5,010	148	70	65	4.6	938	8.0
Apr. 15-16	6,675	--	--	--	34	9.4	90	--	81	0	20	162	--	3.1	--	388	.53	6,980	124	57	61	3.5	702	7.8
Apr. 17-18	4,280	--	--	--	57	15	213	--	74	0	21	412	--	2.5	--	848	1.15	9,900	204	143	69	6.5	1,500	7.7
Apr. 19	2,500	--	--	--	66	21	271	--	81	0	35	525	--	3.0	--	1,080	1.47	7,290	258	190	70	7.4	1,830	7.7
Apr. 20	1,710	--	--	--	161	47	759	--	88	0	29	1,320	--	--	--	2,810	3.62	12,970	595	523	74	14	4,820	7.9
Apr. 21	11,610	--	--	--	130	40	629	--	95	0	28	1,240	--	--	--	2,320	3.16	10,340	439	411	74	12	3,870	7.9
Apr. 22-23	11,335	--	--	--	104	31	162	--	107	0	30	900	--	4.6	--	1,760	2.42	6,320	387	300	72	10	3,040	8.0
Apr. 24-30	39,835	--	--	--	18	10	128	--	11	0	16	315	--	3.2	--	575	.76	46,340	138	100	64	4.4	963	7.7
Apr. 25-26	30,900	--	--	--	52	12	166	--	92	0	13	321	--	1.9	--	500	.41	35,320	148	97	64	2.8	1,510	7.4
Apr. 27-29	20,150	--	--	--	27	7.0	64	--	80	0	12	132	--	1.9	--	500	.41	35,320	148	97	64	2.8	1,510	7.4
Apr. 28	13,600	--	--	--	22	5.9	65	--	57	0	32	100	--	.7	--	254	.35	9,330	80	33	64	3.2	435	7.7
May 1-3	14,590	--	--	--	34	7.6	44	--	60	0	11	89	--	1.1	--	263	.36	10,360	91	42	51	2.0	410	7.2
May 4	3,020	--	--	--	33	11	106	--	63	0	20	202	--	2.0	--	495	.67	4,940	128	76	64	4.1	816	7.7
May 5	2,010	--	--	--	60	21	208	--	78	0	18	430	--	1.8	--	919	1.25	4,390	238	174	66	5.9	1,530	7.9
May 6	1,600	--	--	--	71	25	299	--	80	0	22	595	--	1.8	--	1,330	1.81	5,750	280	214	70	7.8	2,070	7.7
May 7-8	1,275	--	--	--	92	32	400	--	92	0	24	800	--	1.3	--	1,760	2.39	6,060	361	286	71	9.2	2,750	7.9
May 9-10	1,003	--	--	--	109	35	465	--	105	0	26	962	--	.8	--	2,060	2.80	5,360	415	330	72	10	3,270	8.0
May 11	1,360	--	--	--	108	35	469	--	101	0	26	938	--	1.3	--	1,960	2.67	7,200	414	330	71	10	3,200	8.0
May 12	17,700	--	--	--	73	22	264	--	80	0	17	540	--	2.0	--	1,180	1.60	56,390	272	207	68	7.0	1,900	7.7
May 13	30,000	--	--	--	27	6.9	67	--	64	0	12	124	--	1.7	--	340	.46	27,540	96	44	60	3.0	532	7.8
May 14	24,200	--	--	--	52	18	820	--	60	0	10	410	--	1.4	--	897	1.22	58,610	204	154	68	6.1	1,440	7.6
May 15-16	22,450	--	--	--	80	29	8.7	--	60	0	9.1	161	--	1.2	--	406	.85	24,610	108	60	62	3.4	645	7.5
May 17-18	16,450	--	--	--	55	17	231	--	70	0	15	450	--	1.6	--	1,020	1.39	45,300	207	150	71	3.0	1,600	7.8
May 19	9,060	--	--	--	108	33	483	--	89	0	21	962	--	3.1	--	2,060	2.80	50,390	405	332	72	10	3,150	7.8
May 20	7,000	--	--	--	65	22	271	--	89	0	19	530	--	2.0	--	1,130	1.54	23,360	232	180	70	7.5	1,910	8.0
May 21-24	3,785	--	--	--	64	18	235	--	97	3	21	450	--	3.0	--	921	1.25	37,650	232	148	69	6.7	1,650	8.3
May 25	1,750	--	--	--	85	23	301	--	118	5	27	585	--	4.5	--	1,230	1.67	5,810	308	203	68	7.4	2,070	8.4
May 26-31	871	--	--	--	109	30	426	--	133	0	38	830	--	2.4	--	1,680	2.28	3,950	394	285	70	9.3	2,890	7.7

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

Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Mag-nesium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Car-bonate (CO <sub>3</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> )	Bo-ron (B)	Dissolved solids (residue at 180° C)			Hardness as CaCO <sub>3</sub>		Per-cent so-lu-ble	So-dium adsorp-tion ratio	Specific conductance (micro-mhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate				
June 1-2, 1953.....	455	--	--	130	40	491	--	156	0	980	--	1.1	--	2,000	2.72	2,460	490	362	69	9.7	3,440	7.6
June 3.....	356	--	--	150	41	862	--	141	8	1,160	--	--	--	2,400	3.26	2,500	645	416	70	11	3,940	9.5
June 4.....	396	--	--	170	46	692	--	168	0	1,380	--	--	--	2,820	3.94	2,980	930	496	70	12	4,860	7.6
June 5.....	386	--	--	194	51	917	--	132	6	1,630	--	--	--	3,260	4.48	3,420	985	622	72	13	5,340	8.4
June 6.....	479	--	--	244	59	1,117	--	137	6	2,360	--	--	--	3,710	8.48	4,230	768	612	72	14	6,340	8.4
June 7.....	1,030	--	--	284	64	1,190	--	116	4	2,360	--	--	--	4,730	6.43	13,130	920	818	74	17	7,100	8.4
June 8.....	737	--	--	435	118	2,120	--	95	0	4,290	--	--	--	8,320	11.32	16,560	1,570	1,490	75	23	13,200	8.1
June 9.....	462	--	--	351	101	1,760	--	106	0	3,540	--	--	--	7,000	9.52	8,730	1,290	1,200	75	21	10,900	8.2
June 10.....	365	--	--	316	83	1,530	--	120	4	3,050	--	--	--	6,000	8.16	5,910	1,130	1,020	75	20	9,520	8.3
June 11.....	311	--	--	343	98	1,680	--	132	0	3,370	--	--	--	6,820	9.00	5,560	1,260	1,150	74	21	10,500	8.2
June 12.....	279	--	--	395	101	1,990	--	134	4	3,940	--	--	--	7,790	10.59	5,870	1,400	1,280	76	23	12,000	8.3
June 13.....	249	--	--	304	88	1,470	--	129	0	2,950	--	--	--	6,030	8.20	4,050	1,120	1,010	74	19	9,230	8.1
June 14.....	177	--	--	270	72	1,240	--	152	0	2,480	--	--	--	4,750	6.46	2,270	970	845	74	17	7,880	7.7
June 15.....	127	--	--	264	72	1,250	--	136	0	2,500	--	--	--	4,920	6.69	1,690	955	844	74	18	7,790	8.0
June 16.....	122	--	--	248	68	1,100	--	149	0	2,220	--	--	--	4,480	6.09	1,480	900	778	73	16	7,080	8.0
June 17.....	118	--	--	270	73	1,230	--	137	0	2,480	--	--	--	4,910	6.68	1,560	975	862	73	17	7,720	8.2
July 1.....	97.0	--	--	288	85	1,360	--	125	0	2,750	--	--	--	5,450	7.41	1,430	1,070	968	73	18	8,520	8.1
July 2.....	100	--	--	320	90	1,430	--	143	3	2,920	--	--	--	5,870	7.98	1,580	1,170	1,050	73	18	9,030	8.3
July 3.....	87.0	--	--	344	88	1,580	--	138	0	3,200	--	--	--	6,420	8.73	1,810	1,220	1,110	74	20	9,750	8.1
July 4.....	73.0	--	--	387	103	1,750	--	147	0	3,570	--	--	--	6,690	9.10	1,920	1,390	1,270	73	20	10,500	8.0
July 5.....	64.0	--	--	336	93	1,580	--	132	0	3,200	--	--	--	6,330	8.61	1,900	1,220	1,110	74	20	9,850	8.1
July 6.....	54.0	--	--	324	90	1,500	--	134	0	3,050	--	--	--	6,000	8.16	875	1,440	1,070	73	19	9,350	8.1
July 7.....	97.0	--	--	300	90	1,400	--	138	0	2,850	--	--	--	5,480	7.45	1,440	1,120	1,010	73	18	8,760	8.1
July 8.....	169	--	--	276	73	1,210	--	157	0	2,86	--	--	--	4,990	6.79	2,140	990	862	73	17	7,740	7.6
July 9.....	94.5	--	--	218	61	967	--	147	0	2,950	--	--	--	4,020	5.47	1,030	795	674	73	15	6,140	8.0
July 10.....	428	--	--	258	69	1,110	--	150	2	2,300	--	--	--	4,280	5.82	4,950	927	800	72	16	7,170	8.3
July 11.....	2,490	--	--	571	153	2,730	--	84	0	5,570	--	--	--	10,100	13.74	67,900	2,050	1,960	74	28	16,200	7.8
July 12.....	4,435	--	--	183	45	852	--	102	0	2,4	--	--	--	3,150	4.28	37,720	2,62	2,642	74	15	5,530	7.8
July 13.....	3,730	--	--	124	32	531	--	108	0	1,080	--	--	--	2,050	2.79	20,650	441	352	72	11	3,520	7.8
July 14.....	4,010	--	--	74	20	292	--	88	0	575	--	3.3	--	1,180	1.60	12,760	286	194	70	7.8	2,050	7.9

## ARKANSAS RIVER BASIN

139

July 19, 1953	6,360	--	--	122	28	553	--	83	0	20	1,100	--	--	2,080	2.83	35,720	420	352	74	12	3,630	7.9
July 20	9,580	--	--	84	22	337	--	104	0	21	660	--	5.6	1,340	1.82	34,660	300	215	71	8.5	2,320	8.0
July 21	35,600	--	--	46	8.7	123	--	96	0	8.6	232	--	2.2	1,532	1.72	51,140	151	72	64	4.4	944	8.0
July 24-25	27,250	--	--	30	6.3	56	--	80	0	10	104	--	2.3	283	.40	21,560	101	36	55	2.4	501	7.9
July 26	18,300	--	--	63	14	211	--	73	0	11	415	--	4.3	908	1.23	44,860	214	154	68	6.3	1,550	7.9
July 27-31	6,110	--	--	40	9.4	116	--	73	0	14	222	--	1.8	528	.72	8,710	138	78	65	4.3	903	7.5
Aug. 1-3	2,957	--	--	70	20	179	--	120	0	92	325	--	2.9	829	1.13	6,620	356	158	60	4.9	1,440	8.0
Aug. 4-6	1,658	--	--	79	23	265	--	107	0	85	470	--	2.4	1,100	1.50	4,860	292	204	66	6.5	1,880	7.8
Aug. 7	6,170	--	--	150	35	565	--	104	0	34	1,150	--	--	2,360	3.24	39,550	518	434	70	11	3,800	7.4
Aug. 8-9	2,020	--	--	84	21	315	--	70	0	20	630	--	1.7	1,310	1.78	7,140	296	238	70	8.0	2,230	7.8
Aug. 10	1,220	--	--	200	54	856	--	84	0	29	1,800	--	--	3,320	4.52	10,940	721	652	72	14	5,610	7.9
Aug. 11-14	1,118	--	--	143	40	580	--	102	0	34	1,220	--	--	2,490	3.38	7,520	522	438	71	11	4,020	7.6
Aug. 15-16	2,340	--	--	288	30	1,300	--	97	0	21	2,000	--	--	3,580	1.28	27,370	1,050	968	73	17	3,240	7.8
Aug. 17-20	2,950	--	--	189	16	208	--	95	0	24	1,540	--	--	3,740	1.21	24,170	536	1,066	74	17	4,800	7.7
Aug. 21-22	3,950	--	--	168	18	208	--	124	0	28	1,385	--	5.7	2,888	4.21	9,170	326	1,066	66	5.9	1,550	8.0
Aug. 22-23	1,950	--	--	122	33	512	--	88	0	40	1,050	--	--	2,100	2.68	11,960	440	368	72	11	3,440	7.8
Aug. 24-26	1,220	--	--	68	19	254	--	102	0	17	495	--	1.9	1,060	1.44	3,490	248	164	69	7.0	1,830	7.8
Aug. 27-31	1,653	--	--	121	37	390	--	171	0	213	665	--	7.3	1,610	2.19	7,190	454	314	65	8.0	2,740	7.8
Sept. 1-3	989	--	--	118	34	412	--	163	0	178	730	--	6.6	1,650	2.24	4,410	434	300	67	8.6	2,810	8.2
Sept. 4-6	9,690	--	--	52	12	163	--	91	0	34	332	--	2.8	680	.92	17,790	178	104	67	5.3	1,210	8.0
Sept. 7	2,570	--	--	70	14	242	--	76	0	21	432	--	2.6	983	1.35	6,890	234	172	69	6.9	1,760	7.9
Sept. 8-9	1,205	--	--	81	20	301	--	99	0	60	570	--	2.3	1,200	1.63	3,900	286	205	70	7.8	2,110	7.9
Sept. 10	718	--	--	105	28	392	--	121	0	69	760	--	1.9	1,560	2.15	3,060	376	277	69	8.8	2,810	7.9
Sept. 11-12	514	--	--	123	31	466	--	128	0	59	960	--	2.2	1,880	2.56	2,610	436	331	71	10	3,270	8.1
Sept. 13	451	--	--	169	42	697	--	129	0	56	1,400	--	--	2,710	3.69	3,300	595	490	72	12	4,590	8.0
Sept. 14-18	271	--	--	192	48	838	--	117	0	48	1,700	--	--	3,170	4.31	2,320	675	579	73	14	5,440	7.6
Sept. 19-20	180	--	--	220	54	976	--	134	0	50	1,980	--	--	3,740	5.09	1,820	770	660	73	15	6,220	8.0
Sept. 21-23	152	--	--	224	55	972	--	145	0	40	1,980	--	--	3,730	5.07	1,530	785	666	73	15	6,190	8.1
Sept. 24-30	137	--	--	256	60	1,090	--	162	0	40	2,250	--	--	4,190	5.70	1,550	885	752	73	16	6,930	8.0
Weighted average..	3,264	--	--	69	18	a 262	--	b 82	--	20	516	--	--	1,060	1.44	9,340	246	179	70	7.3	1,770	--

a Calculated from other weighted average constituents.

b Includes equivalent of individual carbonate values shown above.

## LOWER MISSISSIPPI RIVER BASIN

## ARKANSAS RIVER BASIN--Continued

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

Temperature (°F) of water, water year October 1952 to September 1953  
 /Once-daily temperature measurement at 7 a.m./

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

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

LOCATION.--At gaging station at Van Buren, Crawford County, 1½ miles downstream from Lee Creek and 8½ miles downstream from Poteau River.

DRAINAGE AREA.--150,218 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1953.

Water temperatures: October 1945 to September 1953.

Hardness: Maximum, 513 ppm Dec. 11-12; minimum, 74 ppm Apr. 29-30.

Specific conductance: Maximum daily, 4,440 micromhos Aug. 14; minimum daily, 273 micromhos Apr. 30.

Water temperatures: Maximum, 88°F June 13; minimum, 36°F Dec. 27.

EXTREMES, 1945-53.--Dissolved solids: Maximum, 2,150 ppm Jan. 11-20, 1953; minimum, 214 ppm May 1-6, 1953.

Hardness: Maximum, 513 ppm Dec. 11-12, 1952; minimum, 70 ppm Jan. 29-31, 1949.

Specific conductance: Maximum daily, 4,900 micromhos July 21, 1952; minimum daily, 132 micromhos May 11, 1948.

Water temperatures: Maximum, 88°F Aug. 23, 1951; June 13, 1953; minimum, freezing point Jan. 30, 1947.

REMARKS.--Values reported for dissolved solids are residues on evaporation. Records of specific conductance of daily samples available in district office at Fayetteville, Ark. Records of discharge for water year October 1952 to September 1953 given in WSP 1281.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	Color	
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate					
Oct. 1-10, 1952..	2,316	--	--	76	18	178	--	168	72	320	--	1.4	0.00	788	1.07	4,930	264	126	59	4.8	1,380	8.1	8
Oct. 11-20 .....	1,538	6.6	0.13	86	23	185	5.9	203	73	350	0.3	1.0	0.10	925	1.26	3,840	309	142	56	4.6	1,570	8.0	7
Oct. 21-31 .....	1,343	--	--	90	25	221	--	208	81	408	--	1.0	0.00	986	1.34	3,580	328	157	59	5.0	1,730	8.1	6
Nov. 1-10 .....	1,388	--	--	95	26	234	--	202	84	420	--	1.7	0.00	1,020	1.39	3,740	344	178	60	5.5	1,760	7.9	7
Nov. 11-20 .....	1,468	--	--	98	26	256	--	202	86	458	--	1.5	0.00	1,090	1.48	4,320	352	186	61	5.9	1,900	7.9	6
Nov. 21-25 .....	1,970	--	--	110	31	320	--	192	89	572	--	1.5	0.15	1,300	1.77	6,910	402	244	63	7.0	2,260	7.5	7
Nov. 26-30 .....	7,252	5.2	0.02	62	16	194	4.9	108	47	356	0.3	1.6	0.00	832	1.13	16,290	220	132	65	5.7	1,400	7.5	10
Dec. 1-3, 5-7 .....	6,640	7.2	0.00	90	24	359	6.3	83	38	688	0.3	2.6	0.00	1,410	1.92	25,280	323	255	70	8.7	2,340	7.3	15
Dec. 4-8, 10 .....	4,675	--	--	109	27	404	--	100	48	772	--	3.0	--	1,530	2.08	19,310	360	278	71	9.3	2,660	7.7	10
Dec. 11-12 .....	4,955	--	--	143	38	546	--	174	81	1,020	--	3.0	--	2,130	2.90	28,500	513	370	70	10	3,440	8.2	7
Dec. 13-20 .....	2,711	--	--	90	23	293	--	162	65	415	--	2.3	0.00	979	1.33	7,170	319	186	60	5.4	1,770	8.1	6
Dec. 21-31 .....	2,806	--	--	112	30	378	--	162	85	690	--	2.9	0.00	1,530	2.08	11,580	403	270	67	8.2	2,570	8.2	10
Jan. 1-10, 1953 ..	2,364	7.3	0.00	136	32	526	8.3	175	97	942	0.3	3.6	0.00	2,010	2.73	12,830	471	328	70	11	3,340	7.8	10
Jan. 11-20 .....	2,244	--	--	134	42	557	--	179	112	980	--	5.2	0.00	2,150	2.92	13,030	507	360	70	11	3,500	7.5	10
Jan. 21-31 .....	4,672	--	--	111	26	483	--	162	105	825	--	2.9	0.00	1,730	2.35	21,820	364	252	73	11	3,000	7.4	12
Jan. 25-27, 29 .....	7,025	--	--	54	12	191	--	90	57	319	--	2.3	0.00	712	0.97	13,500	184	110	69	6.1	1,900	7.3	13
Jan. 28, 30 .....	6,330	--	--	60	17	282	--	96	61	475	--	2.6	--	1,000	1.36	17,090	220	142	74	8.3	1,720	7.1	8

## ARKANSAS RIVER BASIN--Continued

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

Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Percent aluminum adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	Color	
														Parts per million	Tons per acre-foot	Tons per acre-foot	Calcium, mg./medium	Non-carbonate, mg./medium					
Feb. 1-5, 1953...	4,824	--	--	84	19	316	--	112	70	555	--	1.9	0.08	1,190	1.62	15,500	323	196	70	8.1	2,100	7.3	10
Feb. 6-11 .....	3,088	6.6	0.00	114	32	505	8.0	138	97	898	0.3	1.8	.00	1,870	2.54	15,500	416	303	72	11	3,150	7.5	8
Feb. 12, 14, 16, 18-19	5,127	--	--	85	20	343	--	114	632	--	--	1.9	.00	1,360	1.71	17,440	294	200	72	8.7	2,200	7.1	14
Feb. 17, 19 .....	5,795	--	--	62	15	259	--	92	70	440	--	1.5	.00	941	1.28	14,120	216	140	72	7.7	1,690	7.6	15
Feb. 20-21, 26-28	3,894	--	--	106	28	460	--	129	91	618	--	1.9	.10	1,750	2.38	18,350	372	266	73	10	2,950	8.3	10
Feb. 22-25 .....	4,612	--	--	93	23	469	--	104	83	712	--	1.5	.00	1,500	2.04	16,680	326	242	73	9.9	2,580	7.2	15
Mar. 1-2, 9-10 ..	8,185	--	--	80	20	357	--	91	67	620	--	1.3	.00	1,320	1.80	29,170	322	206	73	9.3	2,270	8.8	17
Mar. 3-8 .....	13,330	--	--	56	14	236	--	78	49	400	--	2.0	.05	1,663	1.18	31,240	198	134	72	7.3	1,550	7.4	17
Mar. 11-14 .....	9,825	--	--	98	26	425	--	111	61	767	--	3.5	.00	1,590	2.16	42,180	352	260	72	9.9	2,720	7.6	18
Mar. 15-18 .....	44,120	--	--	27	4.5	63	--	56	23	116	--	2.9	.00	320	1.44	38,120	86	40	61	3.0	540	7.2	25
Mar. 19-21 .....	61,470	--	--	34	4.1	43	--	61	20	172	--	2.0	.00	246	.33	40,830	78	28	55	2.1	377	7.2	40
Mar. 22-25, 31 ..	28,120	--	--	35	7.9	81	--	59	24	146	--	2.1	.00	378	.51	28,700	116	68	60	3.3	619	7.2	25
Mar. 28-30 .....	16,560	7.8	.09	47	20	151	4.8	84	48	300	1.1	1.7	.00	718	.98	32,100	198	130	62	4.7	1,189	7.7	35
Apr. 1-2, 6-8 ..	52,360	--	--	32	7.9	76	--	66	27	136	--	1.6	.20	391	.53	55,280	112	58	59	3.1	605	7.5	23
Apr. 3-5, 9-11 ..	38,820	--	--	45	9.8	114	--	84	29	295	--	2.3	.05	520	.71	54,500	153	94	62	4.0	852	7.8	40
Apr. 12-13, 17, 19-21	24,650	7.6	.04	45	8.5	73	3.7	85	36	151	1.1	1.5	.05	431	.59	28,690	146	78	53	2.8	709	7.7	35
Apr. 14-16, 18, 26-27	49,900	--	--	30	8.3	57	--	79	28	103	--	1.1	.05	339	.46	45,670	119	54	51	3.3	519	7.4	22
Apr. 22-25, 28 ..	44,740	--	--	50	11	113	--	99	40	212	--	1.8	.00	573	.78	69,220	171	90	59	3.8	909	7.5	35
Apr. 29-30 .....	71,900	--	--	23	4.9	30	--	53	16	53	--	2.1	.00	216	.29	41,930	74	31	47	1.5	283	8.2	15
May 1-6 .....	46,050	--	--	22	4.9	31	--	59	18	56	--	2.0	.04	214	.29	26,610	76	28	47	1.5	318	7.8	22
May 7-12, 17 .....	29,000	9.0	.19	29	7.3	59	2.8	87	24	111	1.1	2.0	.00	321	.44	25,130	102	47	55	2.5	517	7.6	50
May 13-16, 18 ..	30,140	--	--	26	4.2	40	--	61	17	75	--	2.1	.06	263	.34	54,740	82	32	51	1.9	380	7.8	18
May 19-22, 30-31	30,130	--	--	34	8.8	86	--	73	27	159	--	2.0	.00	425	.58	34,570	121	61	3.4	669	7.9	35	
May 23-28 .....	21,230	--	--	29	7.2	59	--	74	27	105	--	2.2	.07	304	.41	17,430	101	40	56	2.6	530	7.8	40
June 1-4, 7-10 ..	6,291	11	.04	56	9.3	129	4.3	128	49	211	3.3	2.8	.00	617	.84	10,480	178	74	60	4.2	993	8.1	12
June 5-6 .....	12,450	--	--	79	17	253	--	157	87	445	--	3.1	.00	1,080	1.47	36,300	267	138	67	6.8	1,720	8.0	17
June 11-13 .....	9,160	--	--	74	14	196	--	143	58	345	--	2.6	.00	792	1.08	12,590	243	126	64	5.4	1,440	8.0	13

a Includes equivalent of 1 part per million of carbonate (CO<sub>3</sub>).b Includes equivalent of 9 parts per million of carbonate (CO<sub>3</sub>).

June 14-19, 1953	4,403	--	--	91	21	315	--	134	62	590	--	1.5	.00	1,350	1.94	16,050	312	282	69	7.8	2,190	7.9	13
June 20-24	2,880	--	--	99	24	369	--	c 168	74	700	--	2.2	.00	1,530	2.08	11,900	348	310	70	8.4	2,510	8.3	10
June 25-30	2,842	--	--	76	20	283	--	128	85	500	--	1.8	.10	1,150	1.56	8,820	274	169	69	7.4	1,850	8.1	14
July 1-4	2,600	--	--	77	18	365	--	133	74	455	--	2.4	.10	1,020	1.39	7,160	265	156	66	7.1	1,820	7.8	7
July 5, 6-11	2,286	9.2	--	33	41	231	7.3	146	77	530	.4	3.7	.00	1,260	1.71	7,820	294	174	68	7.4	2,050	7.5	10
July 12-13	2,385	--	--	79	33	352	--	138	78	630	--	2.7	--	1,340	1.69	8,050	299	228	68	8.2	2,440	7.9	8
July 14-19	2,196	--	--	79	20	351	--	135	66	455	--	2.4	--	1,040	1.51	8,760	277	168	67	6.9	1,790	8.1	6
July 20-21	11,250	--	--	66	17	222	--	112	38	400	--	3.2	.00	897	1.23	27,200	234	142	87	6.3	1,670	8.0	12
July 22-24	41,710	--	--	48	8.1	158	--	93	28	263	--	2.7	.00	636	.86	71,620	154	78	69	5.5	1,120	7.5	16
July 25, 26-28	26,850	--	--	35	6.7	122	--	78	33	198	--	2.7	.00	493	.67	35,740	115	52	70	5.0	889	7.5	23
July 29-31	26,850	--	--	50	12	230	--	96	65	375	--	3.2	--	748	1.02	20,840	174	96	74	7.6	1,310	8.0	28
Aug. 1-2	10,320	--	--	66	18	270	--	d 115	100	438	--	2.1	.30	1,020	1.39	20,130	238	144	71	7.6	1,780	8.3	16
Aug. 3-7	6,383	--	--	83	24	364	--	115	87	625	--	2.2	.15	1,360	1.95	23,440	306	212	72	9.1	2,380	8.2	10
Aug. 8-13, 15-18	6,815	--	--	106	28	458	--	128	62	840	--	4.0	.20	1,710	2.33	31,460	350	274	72	10	2,980	7.4	11
Aug. 14, 15-23	4,915	7.1	--	84	17	296	8.0	134	70	515	.3	1.9	.10	1,170	1.59	15,530	280	170	68	7.7	2,010	8.2	14
Aug. 24-31	3,668	--	--	91	23	320	--	164	137	520	--	2.7	.10	1,250	1.70	12,390	322	187	68	7.8	2,160	8.0	8
Sept. 1-4	10,140	--	--	95	20	409	--	145	122	680	--	3.4	--	1,510	2.05	41,940	319	200	74	9.9	2,630	7.9	20
Sept. 5-6	7,540	--	--	64	14	301	--	101	66	490	--	2.3	.10	1,060	1.44	21,590	217	134	75	8.9	1,920	7.9	12
Sept. 7-10	3,853	--	--	72	16	368	--	133	64	450	--	2.5	.10	1,020	1.39	10,610	246	136	70	7.4	1,800	7.6	10
Sept. 11-15	2,355	6.4	--	84	20	352	7.7	147	74	595	.3	1.8	.10	1,310	1.78	8,330	202	171	72	9.0	2,300	7.4	9
Sept. 16-21	1,552	--	--	88	19	301	--	168	69	520	--	1.5	.05	1,220	1.66	5,110	288	160	69	7.6	2,080	7.6	6
Sept. 22-30	12,940	--	--	47	11	137	--	87	38	244	--	2.2	--	597	0.81	20,860	182	91	65	4.7	997	--	16
Average or weighted average																							

c Includes equivalent of 4 parts per million of carbonate (CO<sub>3</sub>).  
d Includes equivalent of 2 parts per million of carbonate (CO<sub>3</sub>).

## ARKANSAS RIVER BASIN--Continued

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

Temperature (°F) of water, water year October 1952 to September 1953  
 Once-daily temperature measurement at approximately 8 a. m.

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

## ARKANSAS RIVER BASIN--Continued

## ARKANSAS RIVER AT DARDANELLE, ARK.

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

DRAINAGE AREA.--153,442 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1948 to September 1953.

Water temperatures: October 1948 to September 1953.

EXTREMES, 1952-53.--Dissolved solids: Maximum, 2,040 ppm Aug. 17-18, 23; minimum, 214 ppm May 1-8.

Hardness: Maximum, 414 ppm Oct. 13, 18, 20; minimum, 74 ppm May 13-19.

Specific conductance: Maximum daily, 4,050 micromhos July 19; minimum daily, 181 micromhos Apr. 30.

EXTREMES, 1948-53.--Dissolved solids: Maximum, 2,040 ppm Aug. 17-18, 23, 1953; minimum, 160 ppm Feb. 12-13, 1950.

Hardness: Maximum, 414 ppm Dec. 20-21, 24-26, 1950; minimum, 54 ppm Feb. 12-13, 1950.

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

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

REMARKS.--Values reported for dissolved solids are residues on evaporation. Records of specific conductance of daily samples available in district office at Fayetteville, Ark. Records of discharge for water year October 1952 to September 1953 given in WSP 1281.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potas- sate- sium (K)	Bicar- bonate (HCO <sub>3</sub> )	Car- bonate (CO <sub>3</sub> )	Sul- fate (SO <sub>4</sub> )	Chlo- ride (Cl)	Fluo- ride (F)	Ni- trate (NO <sub>3</sub> )	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Per- cent so- dium ad- sorp- tion ratio	Specific conductance (micro-mhos at 25°C)	pH	Col- or		
														Parts per million	Tons per acre-foot	Tons per day	Calcium	Non-carbonate						
Oct. 1, 4-10, 1952..	2,840	8.0	0.10	79	20	185	6.4	175	0	89	328	0.3	0.9	798	1.09	6,120	279	136	58	4.8	1,430	8.2	10	
Oct. 2-3.....	3,185	--	--	110	34	327	--	--	160	0	58	638	--	1.5	1,370	1.86	11,780	414	284	63	7.0	2,320	7.4	7
Oct. 11-20.....	1,879	--	--	80	20	168	--	--	206	0	67	300	--	1.0	782	1.06	3,590	282	112	56	4.4	1,380	7.9	4
Oct. 21-31.....	1,517	8.8	.00	97	24	189	6.0	232	0	70	332	.3	1.4	876	1.19	3,590	340	150	54	4.5	1,500	8.1	8	
Nov. 1-10.....	1,645	--	--	97	26	204	--	--	231	0	79	372	--	.8	949	1.29	4,210	349	160	56	4.7	1,650	7.8	6
Nov. 11-20.....	1,932	--	--	96	29	205	--	--	221	0	77	365	--	1.3	930	1.26	4,850	358	178	55	4.7	1,620	7.7	7
Nov. 21-24.....	2,150	--	--	91	26	197	--	--	203	0	72	358	--	1.4	912	1.24	5,290	334	168	56	4.7	1,590	7.8	6
Nov. 25-30.....	15,180	--	--	38	12	104	--	--	98	0	37	182	--	1.9	446	.61	18,260	144	64	61	3.8	818	7.6	16
Dec. 1-6.....	14,920	--	--	41	13	116	--	--	60	0	30	225	--	1.8	488	.66	19,660	156	107	62	4.0	867	7.4	16
Dec. 7-10.....	9,350	5.2	.02	48	10	180	5.0	54	0	29	342	.2	1.9	702	.95	18,670	161	117	70	6.2	1,260	7.1	20	
Dec. 11-13.....	6,433	--	--	62	18	228	--	--	50	0	34	440	--	2.1	894	1.20	15,350	228	188	68	6.5	1,600	7.5	9
Dec. 14-17.....	5,555	--	--	62	26	296	--	--	120	0	62	570	--	2.3	1,060	1.58	17,400	336	238	66	7.0	2,100	7.6	8
Dec. 18-24.....	4,664	--	--	60	16	129	--	--	118	0	41	242	--	1.8	594	.81	7,510	216	119	56	3.8	1,060	8.2	7
Dec. 25-31.....	5,053	--	--	66	20	183	--	--	109	0	52	358	--	1.6	811	1.10	11,060	246	157	62	5.1	1,440	7.8	7
Jan. 1-4, 1953.....	4,180	--	--	78	24	243	--	--	118	0	56	452	--	1.4	982	1.34	11,090	293	198	64	6.2	1,730	7.7	6
Jan. 5-16.....	3,369	6.2	.00	69	27	363	7.1	146	0	69	458	.1	3.6	1,400	1.90	12,730	358	239	63	8.2	2,410	7.7	7	
Jan. 17-20.....	3,746	--	--	71	23	365	--	--	153	0	69	550	--	1.9	1,200	1.63	12,770	312	202	68	7.5	2,110	7.7	7
Jan. 21-22.....	4,705	--	--	75	19	329	--	--	119	0	70	560	--	1.6	1,140	1.55	14,460	265	168	73	8.9	1,990	8.0	8
Jan. 23-25, 27.....	13,295	--	--	38	11	154	--	--	66	0	40	280	--	1.4	594	.81	21,310	140	98	71	5.7	1,990	7.6	24
Jan. 26-30-31.....	17,380	--	--	33	9.3	122	--	--	58	0	33	298	--	1.6	480	.65	14,750	120	73	69	4.8	858	7.4	32
Jan. 28-29.....	10,120	--	--	28	8.0	88	--	--	55	0	34	148	--	2.0	368	.50	10,060	103	58	65	3.8	651	7.2	40

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

Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal-cium (Ca)	Mag-ne-sium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Car-bonate (CO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> )	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Per-cent so-dium	So-dium ad-sorp-tion ratio	Specific conduct-ance (micro-mhos at 25°C)	pH	Color
														Parts per million	Tons per acre-foot	Tons per day	Calcium	Non-mag-nesium					
Feb. 1-2, 1953.....	9,775	--	--	30	8.5	105	--	52	0	33	180	--	1.4	430	0.58	11,350	110	68	68	4.4	745	7.5	33
Feb. 3-5, 10.....	7,638	6.8	0.01	62	16	245	4.2	56	0	54	430	0.2	1.4	832	1.27	19,720	220	150	71	7.2	1,600	7.8	8
Feb. 6-8, 11.....	6,600	--	--	48	16	183	--	51	0	11	335	--	1.4	994	1.94	12,370	186	124	66	6.8	1,280	7.6	8
Feb. 11-13, 17-19.....	8,592	--	--	44	16	202	--	59	0	53	345	--	1.1	581	1.03	17,800	135	119	70	6.6	1,350	7.0	11
Feb. 14-15, 20.....	8,020	--	--	39	16	190	--	58	0	47	321	--	1.2	476	0.85	16,320	138	116	70	6.3	1,300	7.0	11
Feb. 21-23, 25.....	7,833	--	--	38	7.2	111	--	55	0	36	124	--	1.2	476	0.85	16,320	138	116	70	6.3	1,300	7.0	11
Feb. 23-25.....	7,833	--	--	53	11	203	--	72	0	47	360	--	1.1	782	1.06	16,540	176	117	71	6.7	1,380	7.6	7
Mar. 1-3.....	12,320	--	--	40	7.3	157	--	54	0	37	272	--	1.1	599	0.81	19,930	130	86	72	6.0	1,060	7.5	20
Mar. 4-8, 14-16.....	24,410	--	--	32	5.7	111	--	47	0	26	192	--	1.1	456	0.62	36,210	104	65	70	4.7	772	7.1	14
Mar. 9-13.....	14,280	--	--	54	12	222	--	73	0	42	382	--	2.6	796	1.08	30,690	184	124	72	7.1	1,450	7.3	10
Mar. 17-23, 25-26.....	73,910	8.8	.00	30	6.1	51	2.9	56	0	35	93	2	1.7	279	0.38	54,920	100	54	53	2.2	434	7.6	25
Mar. 24, 27-28.....	28,730	--	--	30	4.6	77	--	54	0	21	140	--	1.8	309	0.42	24,800	94	50	64	3.5	605	7.4	80
Mar. 29-31.....	23,370	--	--	36	6.3	93	--	60	0	32	180	--	1.3	384	0.52	23,190	116	67	65	4.0	744	7.3	45
Apr. 1-3, 6, 9, 13.....	55,970	--	--	31	7.4	62	--	66	0	23	116	--	1.5	335	0.46	50,620	108	54	56	2.6	532	7.7	21
Apr. 4-5, 10-12.....	50,780	--	--	44	9.7	102	--	74	0	25	192	--	1.8	510	0.69	69,920	150	90	60	3.6	790	7.3	32
Apr. 7-8, 14-20.....	39,630	9.4	.02	30	5.5	46	2.8	59	0	23	86	1	2.0	284	0.39	30,390	97	49	50	2.0	417	7.4	35
Apr. 21-23.....	28,170	--	--	34	7.4	72	--	77	0	32	126	--	1.5	359	0.49	27,310	116	53	57	2.9	597	7.3	22
Apr. 24-30.....	94,240	--	--	40	5.8	71	--	92	0	22	131	--	2.9	370	0.50	94,150	124	48	55	2.8	614	7.4	22
May 1-8.....	59,410	8.0	.15	25	4.3	30	1.3	64	0	17	54	2	1.7	214	0.29	34,330	79	26	45	1.5	324	7.5	20
May 9-12.....	28,780	--	--	28	5.1	48	--	66	0	21	87	--	1.5	296	0.40	23,000	90	36	54	2.2	430	7.1	32
May 13-19.....	97,610	--	--	22	4.9	35	--	56	0	16	64	--	1.5	248	0.34	65,360	74	28	51	1.8	330	7.3	22
May 20-31.....	34,860	--	--	37	6.0	73	--	83	0	27	128	--	2.0	364	0.50	34,260	118	50	55	2.9	610	7.8	25
June 1-6.....	9,292	--	--	44	7.8	97	--	106	0	45	155	--	1.5	433	0.59	10,860	142	55	60	3.5	770	8.2	9
June 7-9.....	11,620	--	--	68	11	202	--	144	0	73	325	--	3.0	813	1.11	25,510	214	90	67	6.0	1,420	8.4	10
June 10-12.....	7,500	--	--	48	17	122	--	150	0	43	195	--	3.4	542	0.74	10,980	189	66	58	3.9	959	7.8	14
June 13, 15.....	9,425	--	--	63	13	163	--	138	5	52	278	--	2.0	717	0.98	18,250	222	100	61	4.8	1,230	8.5	15
June 14-16.....	8,425	--	--	73	12	193	--	144	0	57	328	--	2.4	814	1.11	18,520	229	111	65	5.5	1,410	7.6	16
June 17-20.....	4,890	--	--	98	21	334	--	154	0	57	590	--	2.0	1,320	1.80	17,450	333	207	69	7.9	2,220	7.9	13
June 21-24.....	3,470	--	--	86	20	271	--	164	0	54	488	--	1.8	1,120	1.52	10,490	295	160	67	6.9	1,900	7.9	7
June 25, 30.....	3,320	--	--	96	22	325	--	188	0	61	555	--	1.6	1,240	1.69	11,120	330	176	68	7.8	2,160	8.2	9
June 26-29.....	3,230	7.9	.00	99	24	359	8.6	194	0	59	635	2	1.5	1,410	1.92	12,300	346	186	67	8.4	2,390	8.1	13

July 1-3, 1953	3,233	--	--	86	18	269	--	161	3	67	465	--	2.0	1,100	1.50	9,780	288	152	67	6.9	1,870	8.3	12
July 4-11	2,904	--	--	74	21	243	--	158	0	66	420	--	1.9	1,000	1.36	7,840	271	142	66	6.4	1,710	8.2	13
July 12-14	2,960	--	--	93	23	313	--	168	0	68	560	--	1.6	1,260	1.71	10,070	326	189	68	7.5	2,150	8.2	8
July 15-21	9,236	--	--	79	20	266	--	142	0	61	460	--	2.0	1,060	1.44	26,430	279	162	67	6.7	1,800	7.9	10
July 22-31	37,140	7.8	.05	49	8.5	161	3.9	94	0	36	285	.5	4.6	705	.96	70,700	158	90	68	5.6	1,140	8.0	12
Aug. 1-5	11,340	--	--	46	11	175	--	96	0	46	282	--	2.8	694	.93	20,940	180	62	70	6.0	1,220	8.1	12
Aug. 6-10	7,180	--	--	70	16	264	--	122	1	94	435	--	2.0	1,010	1.37	19,580	240	139	70	7.4	1,770	8.3	15
Aug. 11-16, 19-21	6,351	4.5	.00	84	17	331	7.2	118	0	90	585	.2	1.9	1,240	1.69	21,300	280	183	71	8.6	2,180	7.9	10
Aug. 17-18, 23	6,317	--	--	100	29	593	--	107	0	130	980	--	2.0	2,040	2.77	34,790	368	281	78	13	3,550	6.9	15
Aug. 22, 24	7,250	--	--	95	27	417	--	118	0	67	750	--	2.7	1,580	2.12	30,540	348	252	72	9.7	2,750	8.2	13
Aug. 25-26	6,600	--	--	113	26	466	--	118	0	48	985	--	4.2	1,750	2.38	31,180	389	292	72	10	3,070	7.7	17
Aug. 27-29	4,520	--	--	72	17	246	--	143	0	50	430	--	2.7	966	1.31	12,830	250	132	68	6.8	1,750	7.6	13
Aug. 30-31	5,300	--	--	77	24	304	--	113	0	55	560	--	3.3	1,170	1.59	16,740	280	198	69	7.8	2,090	7.0	17
Sept. 1-10	6,599	4.4	.00	80	18	301	7.8	130	0	94	508	.3	2.0	1,140	1.52	20,580	274	187	70	7.9	2,010	8.0	10
Sept. 11-15	6,616	--	--	69	15	293	--	123	0	83	480	--	2.2	1,120	1.32	18,980	244	132	73	8.3	1,910	8.0	25
Sept. 16-20	3,038	--	--	68	15	253	--	122	0	68	430	--	1.5	868	1.18	7,120	258	158	68	6.8	1,740	7.9	10
Sept. 21-24	2,472	--	--	84	18	303	--	170	0	74	512	--	1.7	1,140	1.55	7,610	284	144	70	7.8	2,050	8.0	12
Sept. 25-30	1,505	--	--	91	19	329	--	174	7	73	558	--	1.8	1,250	1.70	6,090	305	151	70	8.2	2,220	8.5	7
Average or weighted average..	17,530	--	--	40	8.6	105	--	79	0	32	186	--	2.0	476	0.65	22,530	135	70	63	3.9	792	--	16

## ARKANSAS RIVER BASIN--Continued

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

Temperature (°F) of water, water year October 1952 to September 1953  
 [Once-daily temperature measurement at approximately 5 a. m.]

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

## ARKANSAS RIVER BASIN--Continued

## FOURCHE LA FAVE RIVER NEAR ALPIN, ARK.

LOCATION.--One-half mile below mouth of South Fourche La Fave River and 3 miles west of Alpin, Perry County.

DRAINAGE AREA.--1,000 square miles (approximately).

RECORDS AVAILABLE.--Chemical analyses: October 1952 to September 1953.

Water temperatures: October 1952 to September 1953.

EXTREMES, 1952-53.--Dissolved solids: Maximum, 52 ppm June 21-30; minimum, 26 ppm Nov. 28-30.

Hardness: Maximum, 17 ppm Nov. 1-10, June 21-30; minimum, 7 ppm May 1-10.

Specific conductance: Maximum daily, 324 micromhos June 10; minimum daily, 20.0 micromhos May 14.

Water temperatures: Maximum, 88°F June 16; minimum, 40°F Dec. 16.

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

## Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue on evaporation at 180°C)	Hardness as CaCO <sub>3</sub>		Specific conductance (micro-mhos at 25°C)	pH	Color
														Calcium, mg-nesium	Non-carbonate			
Oct. 1-10, 1952.....	7.4	0.01	2.4	1.5	3.3	1.3	16	2.1	3.5	0.1	1.0	35	35	12	0	45.6	7.1	6
Oct. 11-20.....	6.4	0.02	2.3	1.7	3.9	1.5	16	2.0	3.5	0.3	0.8	36	36	13	0	43.9	7.0	10
Oct. 21-31.....	6.2	0.02	2.8	2.0	4.0	1.5	20	2.3	4.0	0.2	0.6	34	34	15	0	48.1	6.5	8
Nov. 1-10.....	5.2	0.00	3.2	2.2	4.6	1.7	24	2.0	4.5	0.2	0.7	38	38	17	0	55.2	6.6	7
Nov. 11-24.....	5.8	0.10	2.6	2.1	3.8	1.9	20	2.1	4.2	0.2	1.0	40	40	15	0	48.5	6.9	20
Nov. 25-27.....	--	--	2.3	1.0	3.7	3.7	10	4.0	3.5	0.8	0.8	38	38	10	2	37.9	7.0	45
Nov. 28-30.....	--	--	4.2	0.8	1.8	--	10	4.0	2.8	--	0.9	26	26	14	6	30.8	6.8	70
Dec. 1-5, 10.....	--	--	1.9	1.1	1.5	--	8	2.0	2.8	--	0.9	38	38	9	3	35.6	6.4	23
Dec. 6-9.....	--	--	2.8	0.8	3.7	--	7	4.0	5.2	--	1.2	33	33	10	5	43.3	6.7	70
Dec. 10-20.....	6.0	0.16	1.5	1.8	2.8	1.9	12	2.4	3.2	0.2	1.6	40	40	11	1	32.9	6.9	35
Dec. 21-31.....	7.3	0.08	1.6	1.4	3.3	1.5	11	2.3	3.5	0.2	1.4	37	37	15	6	32.4	6.8	30
Jan. 1-10, 1953.....	6.6	0.06	1.8	1.7	2.8	1.1	6	2.5	4.5	0.2	4.8	40	40	12	7	38.5	6.7	20
Jan. 11-20.....	6.4	0.08	1.8	1.6	2.6	1.2	9	2.4	3.5	0.1	2.4	29	29	11	4	35.7	6.9	15
Jan. 21-22, 24-27, 29.....	7.0	0.10	1.8	1.8	3.1	1.2	12	3.0	4.2	0.1	1.7	32	32	12	2	36.9	7.0	35
Jan. 23, 28, 30-31 ..	--	--	1.9	0.9	2.3	--	8	2.0	3.2	--	1.3	41	41	8	2	33.0	6.2	40
Feb. 1-10.....	5.8	0.15	1.3	1.7	2.3	1.0	8	2.6	4.0	0.1	0.6	38	38	10	4	28.6	7.4	50
Feb. 11-18.....	5.1	0.16	1.2	1.8	2.6	1.0	11	2.4	3.8	0.1	1.2	37	37	10	1	29.9	6.9	50
Feb. 19-28.....	6.6	0.00	2.0	0.7	3.1	1.1	8	4.1	4.0	0.1	1.2	39	39	8	1	34.1	6.9	35
Mar. 1-10.....	6.6	0.00	2.6	0.5	2.9	1.1	9	3.7	3.5	0.0	0.7	35	35	9	1	32.6	6.3	25
Mar. 11-20.....	6.6	0.01	2.2	0.6	3.0	1.1	8	2.6	3.0	0.0	1.4	32	32	8	1	30.2	6.6	50
Mar. 21-31.....	6.0	0.02	2.4	0.9	2.4	1.2	8	3.5	3.2	0.1	2.4	35	35	10	3	31.1	6.2	23

ARKANSAS RIVER BASIN--Continued  
FOURCHE LA PAVE RIVER NEAR ALPIN, ARK.--Continued  
Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue on evaporation at 180°C)	Hardness as CaCO <sub>3</sub>		Specific conductance (micro-mhos/cm at 25°C)	pH	Color
														Calcium	Non-carbonate			
Apr. 1-10, 1953		6.6	0.02	2.0	0.7	2.7	1.1	9	2.9	3.5	0.1	0.8	42	8	1	32.3	6.7	50
Apr. 11-20		5.8	.14	2.4	1.0	2.3	.8	9	3.5	3.0	.1	.5	34	10	3	31.4	6.4	45
Apr. 21-30		5.8	.17	2.2	1.4	2.2	.8	10	2.4	3.0	.1	.8	34	11	3	32.4	6.6	40
May 1-10		7.0	.20	1.4	.9	2.1	1.2	9	2.3	2.0	.1	.9	45	7	0	30.2	6.6	45
May 11-20		5.1	.12	2.4	.5	1.6	1.0	9	1.6	2.0	.1	.7	37	8	1	26.7	6.6	45
May 21-31		6.8	.16	2.2	.8	2.2	1.0	12	2.1	2.2	.1	.8	40	9	0	34.3	6.9	32
June 1-5, 8, 12		--	--	2.2	1.2	4.6		16	2.0	3.0	--	1.2	31	10	0	42.3	6.7	21
June 6-7, 9-11, 13-20		6.8	.04	3.0	1.9	3.5	1.3	19	3.0	5.0	.1	1.3	45	15	0	51.3	6.8	17
June 21-30		8.9	.14	4.4	1.4	4.6	1.6	25	2.6	4.2	.1	2.3	52	17	0	63.3	7.3	22
July 1-10		8.3	.06	4.0	1.4	2.9	1.4	23	2.1	2.5	.1	.9	44	16	0	46.9	7.1	15
July 11-20		7.3	.14	2.8	1.9	2.6	1.5	20	2.2	2.5	.1	.9	44	15	0	43.7	7.4	27
July 21-31		7.7	.23	3.2	1.0	2.8	1.5	17	2.9	2.5	.1	1.3	46	12	0	41.4	7.2	40
Aug. 1-10		7.6	.06	2.9	1.2	2.5	.9	17	1.6	2.0	.2	1.6	43	12	0	44.8	7.5	14
Aug. 11-20		7.0	.03	2.3	1.6	2.7	.9	17	2.0	1.8	.1	2.4	47	13	0	43.7	6.9	7
Aug. 21-31		6.7	.01	2.9	1.0	2.5	.9	17	1.0	2.0	.1	1.7	43	11	0	43.2	6.9	7
Sept. 1-10		6.6	.01	2.6	1.3	2.7	.9	18	1.0	2.2	.1	.9	44	12	0	43.1	6.8	5
Sept. 11-20		5.7	.02	2.5	1.1	3.2	1.0	16	2.6	2.6	.1	.9	35	11	0	43.8	6.8	5
Sept. 21-30		4.3	.01	2.9	1.0	3.6	1.0	16	2.2	4.0	.1	.7	42	11	0	47.2	7.2	6
Average		6.5	0.08	2.4	1.3	2.9	1.2	13	2.5	3.3	0.1	1.2	39	11	1	39.2	--	28

ARKANSAS RIVER BASIN--Continued  
FOURCHE LA FAVE RIVER NEAR ALPIN, ARK.--Continued

Temperature (°F) of water, water year October 1952 to September 1953

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

## ARKANSAS RIVER BASIN--Continued

## ARKANSAS RIVER AT LITTLE ROCK, ARK.

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

DRAINAGE AREA --157,936 square miles.

RECORDS AVAILABLE --Chemical analyses: October 1945 to September 1953.

Water temperatures: October 1945 to September 1953.

EXTREMES, 1952-53 --Dissolved solids: Maximum, 1,880 ppm Aug. 21-22, 26; minimum, 166 ppm Dec. 7-8.

Hardness: Maximum, 378 ppm Aug. 21-22, 26; minimum, 48 ppm Dec. 7-8.

Specific conductance: Maximum daily, 3,530 micromhos Aug. 26; minimum daily, 197 micromhos Dec. 6.

Water temperatures: Maximum, 91°F June 18; minimum, 40°F Dec. 1-2.

EXTREMES, 1945-53 --Dissolved solids: Maximum, 1,880 ppm Aug. 21-22, 26, 1953; minimum, 166 ppm Dec. 7-8, 1952.

Hardness: Maximum, 420 ppm Dec. 28-29, 1950; minimum, 48 ppm Jan. 11-14, 1948, Dec. 7-8, 1952.

Specific conductance: Maximum daily, 4,290 micromhos July 26, 1952; minimum daily, 197 micromhos Dec. 6, 1952.

Water temperatures: Maximum, 91°F Aug. 6, 1947, June 18, 1953; minimum, freezing point Dec. 19, 1945, Feb. 10-11, 1947, Jan. 28-29, 1948.

REMARKS --Values reported for dissolved solids are residues on evaporation. Records of specific conductance of daily samples available in district office at Fayetteville, Ark. Records of discharge for water year October 1952 to September 1953 given in WSP 1281.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean dis- charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal- cium (Ca)	Mag- ne- sium (Mg)	So- dium (Na)	Po- tas- sium (K)	Bicar- bonate (HCO <sub>3</sub> )	Car- bonate (CO <sub>3</sub> )	Sul- fate (SO <sub>4</sub> )	Chlo- ride (Cl)	Fluo- ride (F)	Ni- trate (NO <sub>3</sub> )	Dissolved solids (residue at 160° C)			Hardness as CaCO <sub>3</sub>		Per- cent so- dium	So- dium ab- sorp- tion ratio	Specific con- duct- ance (micro- mhos at 25° C)	pH	Col- or
														Parts per mil- lion	Tons per acre- foot	Calcium, magnesium	Non- carbon- ates						
Oct. 1-2, 6, 1952	3,390	--	--	69	16	167	--	143	8	70	280	--	1.5	740	1.01	6,770	238	108	60	4.7	1,290	8.6	9
Oct. 3-5	3,210	--	--	62	17	127	--	186	0	64	200	--	1.5	612	.83	5,300	224	72	55	3.7	1,060	8.1	8
Oct. 7-10	2,902	--	--	88	23	234	--	185	0	64	418	--	1.8	1,010	1.37	7,910	314	162	62	5.7	1,720	7.9	12
Oct. 11-20	2,286	--	--	80	24	153	--	211	0	61	278	--	1.2	779	1.06	4,810	298	125	53	3.8	1,310	7.5	7
Oct. 21-31	1,790	14	0.00	86	18	157	5.6	243	0	56	258	0.2	2.0	772	1.05	3,730	338	140	54	4.0	1,300	7.6	5
Nov. 1-10	1,783	--	--	95	25	172	--	249	0	66	295	--	1.6	834	1.13	4,010	340	136	52	4.1	1,410	8.1	6
Nov. 11-23	2,245	11	.01	91	24	183	4.9	234	0	62	318	.2	2.0	857	1.17	5,190	326	134	55	4.4	1,460	8.1	5
Nov. 24-26	10,750	--	--	66	15	123	--	167	2	49	212	--	1.8	612	.83	47,760	224	84	54	3.6	1,040	8.4	8
Nov. 27-30	37,400	--	--	18	4	18	--	43	0	12	40	--	2.5	172	.23	17,370	63	28	38	.98	248	7.6	90
Dec. 1-6	40,080	--	--	20	7.4	36	--	42	0	17	72	--	1.7	196	.27	21,210	80	46	49	1.7	309	7.4	45
Dec. 7-8	45,650	--	--	14	3.2	31	--	28	0	7.0	59	--	2.3	166	.23	20,460	48	25	58	1.9	256	7.6	50
Dec. 9-16	26,500	--	--	17	5.1	60	--	28	0	13	105	--	3.5	272	.37	19,460	64	41	67	3.3	437	7.2	30
Dec. 17-20	10,660	--	--	57	12	162	--	70	0	34	305	--	2.2	707	.96	20,350	192	134	65	5.1	1,150	8.0	9
Dec. 21-28	7,880	9.2	.06	39	9.8	91	3.5	86	0	28	166	.3	1.5	440	.60	9,360	138	68	58	3.4	736	8.0	10
Dec. 29-31	6,940	--	--	48	12	137	--	94	0	39	242	--	2.0	603	.82	11,300	166	90	64	4.6	1,010	7.9	8
Jan. 1-8, 1953	6,069	--	--	50	12	154	--	94	0	42	272	--	2.2	674	.92	11,040	176	99	66	5.1	1,120	7.8	8
Jan. 9-16	5,288	--	--	69	7.0	214	--	106	0	51	388	--	2.5	950	1.29	13,560	202	115	70	6.6	1,500	8.0	6
Jan. 17-22	8,983	8.8	.01	45	12	132	4.0	211	33	250	.3	2.4	2.5	829	.86	15,260	162	95	63	4.5	1,040	7.9	15

Jan. 23-24, 26-27, 1953	29,900	--	--	28	8.8	68	--	48	0	24	135	--	1.4	340	.46	27,450	106	67	58	2.9	612	7.7	50
Jan. 25, 28-29	32,330	--	--	38	7.4	66	--	34	0	21	115	--	1.4	284	.39	24,790	80	49	61	3.2	486	7.7	50
Jan. 30-31	24,550	--	--	16	4.9	43	--	38	0	12	79	--	2.0	212	.29	14,050	59	31	64	2.4	360	7.8	45
Feb. 1-5	27,820	--	--	14	3.6	46	--	32	0	14	80	--	1.4	212	.29	15,920	51	25	66	2.8	341	7.6	50
Feb. 6-10	16,460	--	--	18	11	96	--	46	0	27	165	--	1.3	396	.54	17,600	88	52	70	4.4	671	7.7	17
Feb. 11-12	14,900	--	--	24	6.0	75	--	50	0	24	125	--	1.8	338	.46	13,600	84	43	66	3.6	538	7.7	30
Feb. 13-20, 22	18,140	7.0	--	38	8.4	101	2.6	40	0	26	182	3.1	1.0	444	.60	21,750	104	67	67	4.3	756	7.5	25
Feb. 21, 26-28	13,920	--	--	32	9.2	111	--	58	0	29	198	--	.7	480	.65	18,040	118	70	67	4.4	795	6.9	22
Feb. 23-25	15,530	--	--	24	7.8	64	--	46	0	24	112	--	1.6	280	.35	11,740	92	54	60	2.9	489	7.8	24
Mar. 1-3, 11	17,520	--	--	32	7.8	119	--	52	0	28	208	--	2.0	522	.71	24,690	112	70	70	4.9	851	7.3	12
Mar. 4-5, 9-10	31,620	--	--	28	6.8	90	--	44	0	21	158	--	2.1	352	.53	33,470	122	66	68	4.9	639	7.6	17
Mar. 6-8, 16-17	27,400	--	--	23	5.0	69	--	46	0	16	122	--	2.6	354	.43	42,530	77	40	71	3.1	521	7.6	25
Mar. 12-15	24,750	--	--	26	8.9	150	--	56	0	30	257	--	2.1	922	.84	56,250	132	84	71	5.7	1,010	8.0	12
Mar. 18-19, 22, 25-29	83,800	9.2	--	21	3.1	63	2.3	50	0	14	80	3.3	2.1	902	.84	56,250	132	84	71	5.7	1,010	8.0	12
Mar. 21, 23-24	100,800	--	--	21	4.5	25	--	53	0	11	50	--	2.6	198	.27	53,460	62	19	50	1.6	286	8.0	50
Mar. 30-31	33,990	--	--	22	4.9	54	--	52	0	19	91	--	2.0	338	.46	30,960	74	31	61	2.7	428	7.9	35
Apr. 1-7, 10, 15	62,920	11	--	28	4.2	65	2.7	61	0	18	116	1.1	1.7	347	.47	59,860	86	36	61	3.1	521	7.5	12
Apr. 8-9, 12	78,850	--	--	21	4.4	40	--	40	0	16	79	--	2.6	256	.35	54,930	70	30	59	2.4	378	7.7	50
Apr. 11-14, 26	74,860	--	--	33	6.5	71	--	68	0	23	124	--	5.2	370	.50	74,790	109	54	59	3.0	582	7.8	23
Apr. 16-22, 30	51,120	--	--	25	3.6	40	--	62	0	18	68	--	2.7	233	.32	32,160	76	25	53	2.0	371	7.3	35
Apr. 23-25, 27-29	86,730	--	--	34	5.8	56	--	81	0	20	105	--	3.2	336	.44	76,340	108	42	54	2.4	524	8.1	20
May 1-2, 7-10	68,500	--	--	20	2.7	21	--	58	0	6.9	38	--	1.5	190	.26	35,140	60	12	43	1.2	243	7.4	17
May 3-6	81,650	--	--	23	3.7	31	--	58	0	16	55	--	2.0	241	.33	53,130	72	25	48	1.6	312	7.3	17
May 11, 18-21	95,060	--	--	22	5.4	38	--	56	0	15	71	--	1.8	263	.36	67,500	78	32	51	1.9	351	7.3	22
May 12-17	111,900	--	--	20	5.2	28	--	52	0	15	51	--	1.6	208	.28	62,840	71	29	46	1.4	273	7.4	22
May 22, 26-31	41,410	7.6	--	28	4.5	52	4.2	68	0	20	91	2.2	1.8	276	.38	30,860	79	32	55	2.4	454	7.5	25
May 23-25	60,170	--	--	30	6.1	70	--	64	0	18	131	--	2.2	375	.51	60,920	100	48	60	3.0	564	7.4	45
June 1-8	15,740	16	--	36	6.5	87	3.0	91	0	31	107	1.1	2.3	330	.45	14,020	116	42	55	2.7	580	7.8	8
June 9, 13-15	13,180	--	--	46	12	98	--	126	1	41	163	--	4.2	472	.64	16,800	164	60	56	3.3	820	8.3	17
June 10-12	12,370	--	--	64	16	211	--	131	0	73	339	--	14	848	1.15	28,320	226	124	67	6.1	1,490	8.1	20
June 16-20	9,928	--	--	57	11	135	--	124	0	42	234	--	2.8	634	.86	16,990	187	80	61	4.3	1,080	8.0	12
June 21-26	6,235	--	--	67	13	181	--	130	0	37	332	--	4.2	795	1.08	13,390	220	114	64	5.3	1,380	8.1	10
June 27-29	4,830	--	--	60	15	155	--	140	0	34	284	--	1.6	665	.93	8,930	211	96	61	4.7	1,220	8.2	15
June 30, July 1, 7-10	3,472	--	--	71	19	231	--	162	0	56	410	--	2.4	938	1.28	8,790	255	122	66	6.3	1,680	8.2	7

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

Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue at 180° C)			Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH	Color	
														Parts per million	Tons per acre-foot	Tons per day	Calcium, mg./neum	Non-carbonate					
July 2-6, 1953.....	3,492	--	--	72	21	277	--	144	0	55	505	--	1.7	1,130	1.54	10,650	266	148	69	7.4	1,880	8.1	13
July 11-16, 20.....	3,939	--	--	73	19	208	--	164	4	62	368	--	1.9	877	1.19	9,330	260	119	53	5.6	1,570	8.3	10
July 17-18.....	5,710	--	--	85	22	263	--	177	0	69	475	--	4.6	1,090	1.48	16,800	302	158	65	6.6	1,910	8.2	7
July 21-23.....	13,830	--	--	98	26	389	--	120	0	58	745	--	2.7	1,540	2.09	57,510	352	253	71	9.0	2,660	8.2	10
July 24-31.....	38,820	7.8	0.01	54	8.7	172	4.8	127	0	22	306	0.1	.9	692	.94	72,530	170	66	68	5.7	1,200	6.4	20
Aug. 1-8.....	13,820	11	.01	49	8.0	164	4.7	95	0	47	272	.3	2.7	632	.86	23,580	155	77	69	5.7	1,140	8.0	13
Aug. 9-13.....	7,528	--	--	68	16	247	--	131	0	86	405	--	2.5	928	1.26	18,860	236	128	70	7.0	1,700	8.2	16
Aug. 14-20.....	6,403	--	--	83	22	309	--	134	0	90	530	--	2.0	1,190	1.62	20,570	298	188	69	7.8	2,080	8.1	13
Aug. 21-22, 26.....	7,147	--	--	104	29	534	--	109	0	103	940	--	6.2	1,880	2.56	36,280	378	289	75	12	3,350	7.6	15
Aug. 23-25.....	6,513	--	--	72	21	307	--	126	0	66	530	--	2.3	1,160	1.56	20,400	266	163	72	8.2	2,060	7.9	13
Aug. 27-31.....	6,062	--	--	91	27	427	--	93	0	55	790	--	1.6	1,630	2.22	26,680	338	262	73	10	2,800	7.7	14
Sept. 1-10.....	6,465	--	--	77	19	283	--	140	0	65	490	--	1.5	1,070	1.46	17,810	270	156	70	7.5	1,880	8.1	10
Sept. 11-19.....	6,071	--	--	69	16	294	--	122	0	59	502	--	1.7	1,070	1.46	17,540	238	138	73	8.2	1,900	8.0	18
Sept. 20-26.....	3,183	8.3	.01	68	17	235	6.1	148	0	65	405	.2	2.2	950	1.29	8,110	240	118	67	6.6	1,680	8.1	8
Sept. 27-30.....	2,500	--	--	84	19	265	--	200	0	63	445	--	1.3	1,020	1.39	6,880	288	124	67	6.8	1,630	8.1	13
Average or weighted average.....	24,940	--	--	31	6.5	75	--	67	--	22	133	--	2.3	370	0.50	24,920	104	49	61	3.2	590	--	21

## ARKANSAS RIVER BASIN--Continued

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

Temperature (°F) of water, water year October 1952 to September 1953  
 (Once-daily temperature measurement at approximately 5 p. m.)

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

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

Chemical analyses in parts per million, water year October 1952 to September 1953

Date of collection	Dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal- cium (Ca)	Mag- ne- sium (Mg)	So- dium (Na)	Po- tas- sium (K)	Bicar- bonate (HCO <sub>3</sub> )	Car- bonate (CO <sub>3</sub> )	Sul- fate (SO <sub>4</sub> )	Chlo- ride (Cl)	Fluo- ride (F)	Ni- trate (NO <sub>3</sub> )	Dissolved solids (residue on evap- oration at 180°C)	Hardness as CaCO <sub>3</sub>		Specific conduct- ance (micro- mhos at 25°C)	pH	Color
															Calcium, mag- nesium	Non- carbon- ate			
OSAGE CREEK NEAR ELM SPRINGS																			
Feb. 3, 1953	35							134	5	2.0	6.8		7.3		120	2	250	8.4	
Sept. 4	32							132	9	1.0	6.0		2.4		116	0	250	8.6	
POTEAU RIVER NEAR CAUTHRON																			
Feb. 16, 1953	114							21	0	30	9.8		2.2		28	11	124	7.6	
Aug. 31	0							34	0	2.0	3.5		1.1		26	0	78.6	7.5	
COVE CREEK NEAR LEE CREEK																			
Jan. 27, 1953	17							90	0	9.0	3.2		1.2		79	5	166	8.2	
Sept. 4	.2							116	4	4.0	2.2		.8		104	2	208	8.4	
LEE CREEK NEAR VAN BUREN																			
Jan. 27, 1953	337							29	0	4.0	5.2		1.7		30	6	83.4	7.8	
Sept. 15	.5							52	0	4.0	4.2		1.1		45	2	109	8.0	
FROG BAYOU NEAR RUDY																			
Jan. 27, 1953	162							10	0	4.0	3.0		1.9		11	3	38.6	7.1	
Sept. 4	1.5							27	0	3.0	3.2		.6		21	0	65.6	7.7	
MULBERRY RIVER NEAR MULBERRY																			
Feb. 12, 1953	1.160							10	0	5.0	1.5		0.4		10	2	29.8	7.1	
Sept. 10	.2							29	0	1.0	2.8		.5		20	0	56.2	7.6	
Sept. 30	0	2.0	0.01	4.8	1.9	3.2	1.4	29	0	1.4	3.0	0.1	.7	37	20	0	63.4	6.8	7
SPADRA CREEK NEAR CLARKSVILLE																			
Feb. 9, 1953	46							10	0	5.0	5.0		1.5		14	6	49.6	7.1	
Sept. 10	.2							31	0	12	44		.3		49	24	239	7.6	

PINEY CREEK NEAR DOVER

[illegible]

ILLINOIS BAYOU NEAR SCOTTSVILLE

[illegible]

PETIT JEAN CREEK NEAR BOONEVILLE

[illegible]

PETIT JEAN CREEK NEAR WAVELAND

[illegible]

## DUTCH CREEK AT WALTREAK

[illegible]

## FOURCHE LA FAVE NEAR GRAVELLY

[illegible]

## FOURCHE LA FAVE NEAR NIMROD

[illegible]

## ARKANSAS RIVER BASIN--Continued

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

Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

Date of collection	Dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal- cium (Ca)	Mag- ne- sium (Mg)	So- dium (Na)	Po- tas- sium (K)	Bicar- bonate (HCO <sub>3</sub> )	Car- bonate (CO <sub>3</sub> )	Sol- ute (SO <sub>4</sub> )	Chlo- ride (Cl)	Fluo- ride (F)	Ni- trate (NO <sub>3</sub> )	Dissolved solids (residue on evap- oration at 100°C)	Hardness as CaCO <sub>3</sub>		Specific conduct- ance (micro- mhos at 25°C)	pH	Color
															Calcium, mg-	Non- carbon- ate			
SOUTH FOURCHE LA PAVE NEAR ROLLIS																			
Oct. 7, 1952.....	0.3							22	0	1.0	2.8		0.4		14	0	44.1		7.6
Feb. 18, 1953....	143							14	0	3.0	4.0		1.1		9	0	37.4		7.3
Sept. 22.....	0							32	0	1.0	3.2		2.7		28	2	86.0		6.7
BAYOU NEAR STUTTGART																			
Feb. 5, 1953....	1,370							16	0	5.0	4.8		2.8		16	3	55.9		7.4
Sept. 2.....	0							85	0	3.0	9.2		1.0		56	0	173		8.1
CROOKED CREEK NEAR HUMPHREY																			
Feb. 5, 1953.....	1,120							17	0	8.0	3.2		1.2		16	2	49.9		7.5
Sept. 2.....	0							100	0	1.0	14		.6		71	0	199		7.0

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

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Water discharge (cfs)	Temperature (°F)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium absorption ratio	Specific conductance (micro-mhos at 25°C)
														Parts per million	Tons per acre-foot	Calcium, mg. nesitum	Non-carbonate			

SALT FORK ARKANSAS RIVER NEAR ALVA, WOODS COUNTY, OKLAHOMA

Nov. 5, 1952	0.19	50		153	35	74		387	0							525	224	23	1.4	1,370
Dec. 2	.67	31		232	45	125		178	0							765	619	26	2.0	1,950
Jan. 6, 1953	44.0	40		232	39	92		193	0							740	582	21	1.5	1,700
Feb. 3	19.5	40		238	47	136		167	0							790	653	27	2.1	1,910
Mar. 2	96.0	51		248	49	114		148	0							820	698	23	1.7	1,880
Apr. 28	5.45	80		342	60	174		256	0							850	640	31	2.6	2,230
June 1	.95	96		39	18	95		379	0							172	0	55	3.1	943
June 29	.56	89		34	19	86		349	0							194	0	53	2.9	821
Aug. 5	79	79		230	46	96		206	0							765	596	21	1.5	1,740
Sept. 1	.26	80		234	39	88		220	0							745	564	20	1.4	1,680

SALT FORK ARKANSAS RIVER NEAR JET, ALFALFA COUNTY, OKLAHOMA

Oct. 15, 1952	14.0	56		304	105			97	0							1,190	1,110			11,200
Nov. 4	13.3	53		338	111			115	0							1,290	1,210			12,300
Dec. 2	10.8	33		331	118			127	0							1,310	1,240			12,200
Jan. 6, 1953	8.84	42		356	86			139	0							1,165	1,040			15,700
Feb. 3	2.90	41		256	75			171	0							1,083	870			15,800
Mar. 3	11.2	60		252	71			141	0							937	797			13,200
Mar. 16	154	60		233	75			149	0							892	771			10,500
Apr. 2	11.1	58		235	68			159	5							867	727			11,300
Apr. 20	27.4	64		215	71			169	0							838	668			11,400
Apr. 28	23.5	65		208	66			202	0							798	623			11,400
May 14	12	56		215	68			155	0							818	691			11,800
June 1	19.8	83		329	77			157	0							886	757			13,400
June 15	18.3	90		225	77			135	0							876	765			14,100
July 7	18.7	90		243	97			116	0							1,000	909			17,100
July 14	452	--		247	90			106	0							985	898			16,800
July 17	717	76		241	84			100	0							945	863			15,600
Aug. 5	12.8	77		211	66			99	0							797	716			12,600
Aug. 17	7.34	78		229	62			105	0							826	739			14,200
Sept. 1	7.21	80		249	71			117	0							910	813			16,200
Sept. 14	7.00	77		263	79			129	0							983	878			18,600

## ARKANSAS RIVER BASIN--Continued

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

Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

Date of collection	Water dis-charge (cfs)	Tem-perature (°F)	Iron (Fe)	Cal-cium (Ca)	Mag-nesium (Mg)	Sod-ium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Car-bonate (CO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> )	Bor-on (B)	Dissolved solids (residue at 180°C)	Hardness as CaCO <sub>3</sub>	Per-cent ad-sorp-tion ratio	Specific conduct-ance (micro-mhos at 25°C)	pH
															Tons per acre-foot	Calcium-mag-nesium			

## POND CREEK NEAR LAMONT, GRANT COUNTY, OKLAHOMA

Nov. 5, 1952	0.32	--		76	37	88		556	0		38					344	0	35	967	7.8
Dec. 23, 1952	1.17	38		74	32	172		498	0		159					316	0	54	1,310	7.5
Feb. 17, 1953	.96	37		55	35	174		530	0		166					330	0	53	1,360	8.0
Mar. 24	.49	61		59	25	91		384	0		65					248	0	44	842	7.7
June 2	.14	82		71	31	154		490	0		119					305	0	52	1,190	8.0
June 23	.90	72		36	14	41		229	0		22					150	0	37	471	7.3
Aug. 25	5.52	78		60	18	66		282	8		48					226	0	39	696	8.3
Sept. 22	.10	68		72	33	89		489	0		42					315	0	38	908	8.0

## DUCK CREEK NEAR TONKAWA, KAY COUNTY, OKLAHOMA

Dec. 3, 1952	0.03	38		141	54	70		380	0		28					575	264	21	1.3	1,240	7.5
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## SALT FORK ARKANSAS RIVER AT TONKAWA, KAY COUNTY, OKLAHOMA

Nov. 5, 1953	28.2	--		248	83			258	0		2,720					960	748		9,080	8.0
Dec. 3	45.2	41		220	68			292	0		2,350					880	590		7,910	8.0
Jan. 7, 1953	34.9	36		212	86			280	0		2,500					810	597		7,980	7.9
Feb. 3	30.7	56		156	61			269	0		1,950					640	420		6,850	7.8
Mar. 11	47.2	55		110	44			255	0		1,280					455	246		4,700	7.7
May 5	26.9	--		162	64			196	0		2,550					670	510		8,580	8.2
June 2	19.2	92		174	69			184	0		3,000					720	569		9,820	7.9
June 23	23.3	74		140	58			150	0		2,480					590	467		8,200	7.4
July 27	264	93		185	63			128	0		3,580					723	620		11,500	7.7
Aug. 13	44.8	92		114	38			162	0		1,550					440	291		5,450	8.0
Sept. 22	5.33	75		168	68			191	0		2,620					700	544		8,490	7.5

## CHICKASAW RIVER AT BLACKWELL, KAY COUNTY, OKLAHOMA

Nov. 5, 1952.....	36.3	--	184	49	--	278	0	810				680	432	--	3,110	7.6	
Nov. 18.....	60.9	36	166	46	371	279	0	740				605	376	57	2,920	8.0	
Nov. 18.....	74.8	36	163	39	311	263	0	735				530	314	56	5.9	2,530	8.1
Dec. 2.....	91.8	41	128	33	216	265	0	635				455	222	51	4.4	1,920	8.2
Dec. 9.....	95.8	35	132	32	216	260	0	505				475	264	53	5.0	2,120	7.7
Dec. 23.....	99.7	35	133	35	289	270	0-										

CHIKASKIA RIVER AT BLACKWELL, KAY COUNTY, OKLAHOMA--Continued

Jan. 7, 1953	32.3	36	124	32	224	252	0	460	234	440	53	4.6	1,960	8.2
Jan. 20	97.9	38	136	40	292	202	0	635	340	505	56	5.7	2,460	7.9
Feb. 3	75.1	46	125	32	188	249	0	430	241	445	48	3.9	1,890	8.0
Feb. 16	85.8	43	123	30	230	249	0	465	226	430	54	4.8	1,960	8.0
Mar. 3	236	43	78	20	98	177	0	203	131	276	44	2.6	1,050	7.7
Mar. 11	121	51	90	22	124	226	0	225	131	316	46	3.0	1,190	7.7
Mar. 24	77.4	53	115	30	188	240	0	380	214	410	50	4.0	1,820	7.8
Apr. 7	140	54	124	33	232	210	3	470	268	445	53	4.8	2,020	8.3
May 6	82.5	--	115	30	215	220	4	445	223	410	53	4.6	1,900	8.3
May 21	168	--	59	15	95	123	0	182	206	105	50	2.9	899	7.5
June 2	33.4	82	168	44	352	222	0	1,760	600	418	56	6.2	2,840	7.6
June 8	87.4	82	89	24	130	207	0	242	320	150	47	3.2	1,250	7.9
June 15	8.68	91	234	61	--	201	0	1,160	635	670	--	--	4,140	7.8
June 22	2.07	78	505	112	--	189	0	2,580	1,720	1,560	--	--	8,330	7.3
June 29	2.21	90	549	126	--	161	0	3,030	1,880	1,760	--	--	9,350	7.3
July 6	1.63	82	728	161	--	152	0	3,590	2,460	2,360	--	--	11,100	7.2
July 17	228	78	33	7.8	16	110	0	42	115	25	23	.7	381	7.4
July 22	78.4	84	65	15	91	163	0	175	224	90	47	2.6	908	7.9
July 27	39.2	86	102	25	200	174	0	418	355	212	55	4.6	1,680	7.9
Aug. 13	57.1	86	115	25	258	114	0	590	375	282	60	5.8	2,100	7.6
Aug. 23	7.05	86	283	66	--	148	0	1,600	980	858	--	--	5,330	7.7
Sept. 22	1.59	67	1,020	213	--	155	0	6,950	3,420	3,280	--	--	13,000	7.7

CHIKASKIA RIVER NEAR TONKAWA, KAY COUNTY, OKLAHOMA

Dec. 3, 1952	81.4	40	188	47	270	0	890	665	444	3,320	8.0
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BOIS D'ARC CREEK NEAR PONCA CITY, KAY COUNTY, OKLAHOMA

Dec. 3, 1952	0.95	40	273	64	306	0	1,170	945	694	3,990	7.6
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ARKANSAS RIVER BASIN--Continued  
MISCELLANEOUS ANALYSES OF STREAMS IN ARKANSAS RIVER BASIN IN OKLAHOMA AND MISSOURI--Continued

Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

Date of collection	Water discharge (cfs)	Temperature (°F)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boiron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	
														Parts per million	Tons per acre-foot	Calcium, mg./per nestum	Non-carbonate				
SALT FORK ARKANSAS RIVER NEAR PONCA CITY, KAY COUNTY, OKLAHOMA																					
Dec. 3, 1952.....	131	41		190	52			285	0	1,290						690	456		4,740	7.9	
RED ROCK CREEK NEAR RED ROCK, NOBLE COUNTY, OKLAHOMA																					
Mar. 24, 1953.....	0.13	60		38	14	44		195	0	43						151	0	39	1.6	509	7.3
May 6.....	.03	--		34	11	45		186	0	38						132	0	43	1.7	466	7.8
June 2.....	.02	88		38	13	41		181	0	44						148	0	38	1.5	481	7.8
June 23.....	.30	78		32	10	37		159	0	35						121	0	40	1.5	422	7.2
Aug. 25.....	.03	77		31	9.5	22		155	0	20						117	0	29	.9	327	7.6
BLACK BEAR CREEK AT PAWNEE, PAWNEE COUNTY, OKLAHOMA																					
Oct. 22, 1952.....	0.55	46		45	17	22		229	0	17						180	0	21	0.7	426	8.1
Nov. 18.....	.87	54		55	19	17		272	0	12						213	0	15	.5	459	8.2
Jan. 29, 1953.....	2.94	44		98	45	144		364	0	275						430	132	42	3.0	1,440	7.9
July 2.....	.41	68		45	14	54		166	0	105						170	34	41	1.8	631	8.0
July 30.....	5.88	90		52	16	77		85	0	204						194	124	46	2.4	828	7.6
SKEDDEE CREEK AT LAKE PAWNEE, PAWNEE COUNTY, OKLAHOMA																					
Nov. 4, 1952.....		--		43	12	15		202	0	6.5						158	0	17	0.5	369	8.2
Jan. 6, 1953.....		40		41	12	14		198	0	6.5						154	0	17	.5	351	8.0
Feb. 2.....		50		41	12	16		196	0	7.0						152	0	19	.6	345	8.2
Mar. 11.....		51		40	11	14		190	0	6.8						146	0	17	.5	339	8.0
May 4.....	0.39	--		38	11	15		185	0	7.0						140	0	19	.5	337	8.1
June 8.....		82		37	9.7	15		172	0	6.0						133	0	20	.6	318	8.1
July 6.....		84		38	11	15		180	0	6.2						141	0	19	.5	347	8.0
Aug. 11.....		81		39	10	15		182	0	6.2						140	0	19	.5	332	8.1
Sept. 21.....		72		39	12	16		190	0	6.5						146	0	19	.6	347	7.6

## RANCH CREEK AT LAKE CLEVELAND NEAR CLEVELAND, PAWNEE COUNTY, OKLAHOMA

May 4, 1953		31	5.4	18	111	0	27		100	9	28	0.8	398	7.8
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## CEDAR CREEK NEAR CLEVELAND, PAWNEE COUNTY, OKLAHOMA

Oct. 24, 1952	1.5	111	31	377	202	0	630		405	240	67	8.1	2,550	7.3
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## CIMARRON RIVER NEAR KENTON, CIMARRON COUNTY, OKLAHOMA

Oct. 15, 1952	0.60	220	28	360	368	7	74		660	337	55	6.1	2,450	8.3
Jan. 26, 1953	1.66	94	94	297	406	0	66		595	262	52	5.3	2,210	8.1
July 15	2.76	53	30	110	231	0	23		278	88	46	2.9	1,010	8.2

## CIMARRON RIVER NEAR MOCAHE, BEAVER COUNTY, OKLAHOMA

Oct. 6, 1952	46.6	79	39	377	222	0	575		360	178	68	8.6	2,420	8.1
Nov. 14	69.7	85	34	317	248	0	490		352	149	66	7.4	2,180	8.2
Jan. 8, 1953	81.8	81	32	335	227	0	520		335	149	69	8.0	2,280	8.1
Feb. 12	--	93	37	359	261	0	178	540	1,430	193	87	7.9	2,450	8.1
Feb. 18	65.5	40	37	319	254	0	485		370	162	65	7.2	2,240	8.2
Feb. 25	--	88	36	308	254	0	169	460	368	160	65	7.0	2,100	7.9
Apr. 21	47.2	79	37	335	227	0	515		350	164	68	7.8	2,320	8.0
June 12	30.8	74	38	446	207	0	690		342	172	74	11	2,750	8.2
Aug. 13	59.3	85	29	286	207	6	445		330	150	65	6.8	2,020	8.3
Sept. 25	50.0	69	34	320	208	0	490		310	141	69	7.9	2,140	8.2

## CIMARRON RIVER NEAR ROSETON, HARPER COUNTY, OKLAHOMA

Feb. 12, 1953		93	40	364	253	0	183	590	1,470	2,000	68	8.4	2,550	7.8
Feb. 25		87	36	336	255	0	172	505	1,340	1,822	69	7.7	2,340	7.9

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

Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

Date of collection	Water discharge (cfs)	Temperature (° F)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Bo-ron (B)	Dissolved solids (residue at 180° C)		Hardness as CaCO <sub>3</sub>		Per-centage adsorption	Specific conductance (micro-mhos at 25° C)		
															Parts per million	Tons per acre-foot	Calcium	Non-carbonate				
CIMARRON RIVER NEAR BUFFALO, HARPER COUNTY, OKLAHOMA																						
Feb. 12, 1953		35		102	42	1,110		221	0	239	1,710				3,430	4.66	427	246	85	23	5,890	7.7
Feb. 24		51		120	45	958		244	0	269	1,480				3,130	4.26	484	284	81	19	5,280	8.2
CIMARRON RIVER NEAR FREEDOM, WOODS COUNTY, OKLAHOMA																						
Feb. 12, 1953		38		176	76	5,200		204	0	471	8,080				14,400	19.58	752	584	94	83	22,900	7.5
Feb. 24		48		247	109	8,340		207	0	667	13,000				22,900	31.14	1,060	895	94	111	35,000	8.0
CIMARRON RIVER NEAR WAYNOKA, WOODS COUNTY, OKLAHOMA																						
Oct. 15, 1952	0.17	57		259	68	--	--	215	0	--	3,170				--	--	924	748	--	--	10,100	7.8
Nov. 15	1.12	56		243	63	--	--	215	0	--	3,410				--	--	867	691	--	--	11,000	7.9
Dec. 2	1.99	31		343	80	--	--	261	0	--	5,220				--	--	1,180	971	--	--	16,300	8.6
Jan. 6, 1953	202	35		185	81	--	--	215	0	--	5,880				--	--	747	571	--	--	17,400	7.9
Feb. 2	87.6	44		203	89	--	--	203	6	--	7,800				--	--	874	698	--	--	22,500	8.4
Feb. 12	--	47		269	98	10,000	--	171	0	686	15,600				27,400	37.26	1,070	934	95	133	41,600	9.7
Feb. 16	144	46		195	79	--	--	229	0	--	7,310				--	--	810	622	--	--	22,500	7.9
Feb. 24	--	43		239	101	6,850	--	223	0	613	10,700			18,700	25.43		1,010	830	94	93	29,400	8.1
Feb. 26	63.5	36		236	95	--	--	216	0	--	9,820			--	--	--	982	806	--	--	27,300	8.0
Mar. 2	238	54		208	79	--	--	190	0	--	7,830			--	--	--	847	692	--	--	22,100	7.9
Mar. 16	145	62		169	68	--	--	201	4	--	6,610			--	--	--	701	530	--	--	19,000	8.3
Apr. 1	40.2	64		265	120	--	--	211	5	--	13,200			--	--	--	1,150	972	--	--	35,300	8.3
Apr. 9	--	68		303	132	--	--	188	0	--	18,600			--	--	--	1,300	1,140	--	--	43,200	8.2
Apr. 20	16.2	54		301	124	--	--	221	0	--	12,400			--	--	--	1,260	1,090	--	--	32,700	8.0
Apr. 28	9.78	74		438	137	--	--	175	0	--	14,100			--	--	--	1,660	1,510	--	--	35,800	8.1
May 15	34.2	56		392	152	--	--	201	0	--	20,700			--	--	--	1,600	1,440	--	--	51,800	8.1
May 18	257	75		372	138	--	--	172	0	--	20,500			--	--	--	1,500	1,360	--	--	51,600	7.5
June 1	11	93		330	94	--	--	206	0	--	7,630			--	--	--	1,210	1,040	--	--	22,800	7.7
June 15	.04	88		461	108	--	--	185	0	--	6,500			--	--	--	1,600	1,450	--	--	20,000	7.7

CIMARRON RIVER NEAR WAYNOKA, WOODS COUNTY, OKLAHOMA--Continued

June 30, 1953	1.12	74	290	67	--	--	138	0	--	4,730	--	985	882	--	--	14,800 8.0
July 13	1.750	--	289	34	--	--	115	0	--	2,070	--	860	766	--	--	7,620 7.8
July 14	764	--	121	36	--	--	157	0	--	3,990	--	449	321	--	--	12,300 7.6
July 17	979	76	243	36	--	--	117	0	--	4,110	--	--	662	--	--	12,800 7.7
July 21	882	78	349	32	--	--	107	0	--	1,500	--	1,000	912	--	--	6,080 7.4
July 24	57.9	80	323	80	--	--	159	0	--	9,840	--	1,140	1,010	--	--	27,400 7.8
July 28	120	78	115	41	--	--	162	0	--	3,120	--	455	322	--	--	9,860 7.9
Aug. 5	47.9	76	332	88	--	--	138	0	--	8,620	--	1,190	1,080	--	--	24,500 7.7
Aug. 17	412	79	213	55	--	--	123	0	--	8,740	--	755	653	--	--	24,400 7.6
Aug. 21	1,340	71	140	41	--	--	191	3	--	3,390	--	518	357	--	--	10,700 8.3
Aug. 31	34.4	80	215	83	--	--	231	0	--	7,110	--	880	691	--	--	20,400 8.1
Sept. 14	2.12	80	261	95	--	--	221	0	--	8,970	--	1,040	860	--	--	24,900 8.2

EAGLE CHIEF CREEK NEAR CARMEN, ALFALFA COUNTY, OKLAHOMA

Nov. 4, 1952	1.95	56	138	72	70	362	0	--	76	--	640	342	19	1.2	1.2	1,360 7.6
Jan. 5, 1953	3.02	46	178	84	78	348	0	--	53	--	785	500	18	1.2	1.2	1,560 8.0
Feb. 3	2.05	43	149	82	77	321	0	--	52	--	710	447	19	1.3	1.3	1,450 7.9
Mar. 3	4.39	44	147	76	75	309	0	--	54	--	680	427	19	1.3	1.3	1,410 8.0
Apr. 21	1.93	51	142	85	88	299	0	--	59	--	705	460	21	1.4	1.4	1,520 7.8
May 15	9.71	61	257	60	57	143	0	--	34	--	885	768	12	.8	.8	1,560 7.9
July 7	.43	85	120	56	61	228	0	--	38	--	530	343	20	1.2	1.2	1,170 7.6
Sept. 1	.68	79	98	45	61	217	5	--	40	--	430	244	24	1.3	1.3	1,020 8.3

EAGLE CHIEF CREEK NEAR ALINE, ALFALFA COUNTY, OKLAHOMA

Oct. 14, 1952	2.46	57	94	56	65	281	0	--	43	--	465	234	23	1.3	1.3	1,070 7.8
Nov. 4	2.58	51	120	64	64	379	0	--	44	--	565	254	20	1.2	1.2	1,210 7.4
Jan. 5, 1953	5.53	47	130	72	70	342	0	--	48	--	645	365	19	1.2	1.2	1,340 8.0
Feb. 3	3.96	47	140	73	70	347	0	--	46	--	625	340	20	1.2	1.2	1,290 8.0
Mar. 3	8.83	44	123	63	63	309	0	--	48	--	565	312	20	1.2	1.2	1,210 8.0
Apr. 21	3.28	52	114	73	81	298	0	--	51	--	585	341	23	1.5	1.5	1,300 7.9
May 15	24.8	59	234	50	50	126	0	--	28	--	790	687	12	1.8	1.8	1,520 7.5
July 7	1.71	81	118	44	52	280	0	--	35	--	475	246	19	1.0	1.0	1,040 8.2
Sept. 1	1.36	78	101	41	29	255	0	--	40	--	420	211	13	.6	.6	1,010 7.9

## ARKANSAS RIVER BASIN--Continued

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

Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

Date of collection	Water discharge (cfs)	Temperature (°F)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Bo-ron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>		Per-cent so-dium	So-dium absorp-tion ratio	Specific conduct-ance (micro-mhos at 25°C)	pH
															Parts per mil-lion	Tons per acre-foot	Calcium	Non-carbon-ate				
EAGLE CHIEF CREEK AT CLEO SPRINGS, MAJOR COUNTY, OKLAHOMA																						
Oct. 14, 1952	3.94	75		96	47	64		280	0		39						435	206	24	1.3	1,010	8.0
Nov. 4	4.84	52		121	51	63		355	0		42						510	219	21	1.2	1,130	7.6
Jan. 5, 1953	7.68	45		134	56	62		336	0		42						575	300	19	1.1	1,210	7.9
Feb. 3	5.90	46		118	59	61		305	0		41						535	285	20	1.1	1,150	8.0
Mar. 3	19.5	44		111	54	54		293	0		43						500	260	19	1.1	1,090	7.9
Apr. 21	5.39	55		107	61	68		275	0		47						515	280	22	1.3	1,150	8.2
May 15	16.0	60		248	46	45		128	0		24						810	765	11	1.7	1,510	7.4
July 7	2.57	82		99	39	59		232	0		36						410	220	24	1.3	982	8.2
Sept. 1	2.58	78		102	37	61		236	0		37						405	212	25	1.3	989	8.2
CIMARRON RIVER NEAR CLEO SPRINGS, MAJOR COUNTY, OKLAHOMA																						
Feb. 12, 1953		45		221	82	4,870		203	0	594	7,590			13,700	18.43		898	722	92	71	22,000	7.4
Feb. 24		38		242	92	5,010		229	0	609	7,840			14,200	19.31		982	785	92	70	22,400	8.0
HOYLE CREEK NEAR AMES, MAJOR COUNTY, OKLAHOMA																						
Feb. 2, 1953	0.01	45		99	27	50		366	0		87						360	60	23	1.1	885	7.9
Mar. 3	.37	46		106	32	60		358	0		112						395	102	25	1.3	992	7.8
Apr. 21	.09	55		73	29	56		283	5		90						300	52	28	1.4	789	8.3
May 14	.08	62		98	26	62		376	0		100						350	42	28	1.4	935	8.0
July 22	.08	78		94	23	47		314	0		96						330	72	24	1.1	852	7.7
CIMARRON RIVER NEAR OKEENE, BLAINE COUNTY, OKLAHOMA																						
Feb. 12, 1953		47		215	85	4,230		212	0	571	6,600			12,000	16.32		886	712	91	62	19,300	8.0
Feb. 24		43		243	92	4,600		235	0	632	7,190			13,100	17.62		985	792	91	64	21,000	7.9

## TURKEY CREEK NEAR DRUMMOND, GARFIELD COUNTY, OKLAHOMA

Oct. 14, 1952	0.04	58	91	85	--	269	0	980				338	--	--	3,430	7.3
Nov. 4	.38	55	100	78	--	358	0	765				570	348	--	3,190	7.3
Dec. 4	.38	43	119	81	--	388	8	1,000				530	290	--	4,090	8.3
Jan. 5, 1953	.32	46	126	105	--	388	0	1,320				745	467	--	5,060	8.2
Feb. 2	.43	41	131	107	--	333	6	1,300				785	482	--	5,040	8.4
Mar. 3	2.95	44	174	136	--	383	0	2,020				995	698	--	7,400	7.9
Apr. 21	.29	69	74	62	410	314	16	650				440	156	67	8.5	2,840
May 12	192	60	24	10	104	75	0	166				102	40	69	4.5	768
June 6	73.8	78	30	11	89	99	0	141				118	37	62	3.6	716
July 13	95.6	--	18	5.8	26	77	0	34				70	7	45	1.4	293
July 14	9.55	--	21	7.1	41	83	0	62				82	14	52	2.0	387
July 22	17.0	80	22	7.3	50	108	0	62				84	0	56	2.4	414
Aug. 3	5.98	77	20	5.6	45	83	0	62				72	4	58	2.3	389

## PREACHER CREEK NEAR HENNESSEY, KINGFISHER COUNTY, OKLAHOMA

Feb. 2, 1953	0.48	40	121	25	103	410	6	138				405	59	38	2.2	1,170
Mar. 2	1.62	46	118	32	138	387	0	200				420	103	42	2.9	1,420

## PREACHER CREEK NEAR DOVER, KINGFISHER COUNTY, OKLAHOMA

Dec. 1, 1952	0.23	35	166	35	160	412	8	235				565	214	38	2.9	1,680
Jan. 3, 1953	.45	42	123	26	109	448	0	151				444	94	35	2.3	1,390
Apr. 10	.46	49	123	11	98	385	10	139				351	16	33	2.3	1,030
May 12	9.78	58	35	14	89	205	0	62				146	0	57	2.2	701
July 22	.04	80	58	13	52	207	0	58				196	26	37	1.6	624
July 28	.04	80	78	16	51	296	0	60				282	20	30	1.4	724

ARKANSAS RIVER BASIN--Continued

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

Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

Date of collection	Water discharge (cfs)	Temperature (°F)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	
															Parts per million	Tons per acre-foot	Calcium, mg/l	Non-carbonate, mg/l			
TURKEY CREEK NEAR DOVER, KINGFISHER COUNTY, OKLAHOMA																					
Oct. 14, 1952	0.15	55		52	27	85		302	0								242	0	43	8.1	
Nov. 4	.12	45		70	30	91		367	0		85						298	0	40	2.3	
Dec. 1	.25	35		80	29	104		401	0		100						320	0	41	2.5	
Jan. 5, 1953	.42	35		100	54	261		400	6		405						470	132	55	2,080	
Feb. 2	.60	45		92	50	260		364	16		375						435	110	57	5.4	
Mar. 2	4.88	49		80	45	230		376	0		340						385	77	56	5.1	
Apr. 20	1.96	50		67	40	258		322	6		360						330	56	63	6.2	
May 14	159	58		22	7.3	31		106	0		35						84	0	45	1.5	
Aug. 3	1.99	79		48	14	57		199	0		76						176	13	41	1.9	
Aug. 31	.32	79		54	17	75		238	5		93						203	0	45	1.9	
CIMARRON RIVER NEAR DOVER, KINGFISHER COUNTY, OKLAHOMA																					
Feb. 12, 1953		47		205	79	3,690		195	0	543	5,760					10,600	14.42	836	676	91	55
Feb. 24		39		228	86	4,110		240	0	588	6,410					11,800	16.05	922	726	91	59
CIMARRON RIVER NEAR CRESCENT, LOGAN COUNTY, OKLAHOMA																					
Feb. 12, 1953		47		222	83	3,800		202	0	563	5,960					11,000	14.96	896	730	90	55
Feb. 24		39		238	87	4,170		234	0	556	6,550					11,900	16.18	952	760	90	59
COTTONWOOD CREEK NEAR GUTHRIE, LOGAN COUNTY, OKLAHOMA																					
Jan. 5, 1953	8.76	40		75	30	87		288	0		90						312	76	38	2.1	993
Feb. 3	4.27	43		87	33	128		391	0		86						352	32	44	3.0	1,160
Mar. 24	7.25	58		74	26	78		260	0		77						292	79	37	2.0	910
Apr. 15	8.44	54		82	30	74		269	8		84						328	94	33	1.8	991
May 22	7.53	75		91	32	100		304	0		70						358	109	38	2.3	1,090
June 23	.01	80		63	24	102		406	0		68						256	0	46	2.8	916
Aug. 10	1.54	75		27	9.0	14		130	0		11						105	0	23	.6	284

## CIMARRON RIVER NEAR GUTHRIE, LOGAN COUNTY, OKLAHOMA

Feb. 12, 1953.....	45	207	82	3,520	209	0	533	5,520			10,200	13.87		684	90	52	16,700	7.7
Feb. 24 .....	40	221	86	3,930	247	0	540	6,160			11,300	15.37		905	702	90	18,400	8.0

## CIMARRON RIVER NEAR COYLE, LOGAN COUNTY, OKLAHOMA

Feb. 12, 1953.....	45	213	79	3,350	222	0	509	5,270			9,730	13.23		886	674	89	15,700	8.2
Feb. 24 .....	41	209	80	3,720	245	0	514	5,820			10,800	14.69		850	650	90	17,400	8.1

## HOUSE CREEK NEAR TERLTON, PAWNEE COUNTY, OKLAHOMA

Oct. 25, 1952.....		170	57		219	0		3,620						659	480		10,900	7.0
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## POLECAT CREEK NEAR HEYBURN, CREEK COUNTY, OKLAHOMA

Jan. 27, 1953.....	43	30	15	32		122	0		66					136	36	34	1.2	443	7.5
Mar. 19 .....	56	22	8.8	42		70	0		88					92	34	50	1.9	419	7.6
May 18 .....	70	11	4.4	20		37	0		40					46	16	49	1.3	209	7.3
July 28 .....	80	16	6.1	23		.55	0		47					65	29	43	1.2	268	7.4

## VERDIGRIS RIVER NEAR SOUTH COFFEYVILLE, NOWATA COUNTY, OKLAHOMA

Oct. 8, 1952.....	58	52	19	126	180	0	87	195			569	0.77		208	80	57	3.8	1,030	6.9
Oct. 30 .....	50	59	20	141	223	0	68	182			608	.83		222	39	59	4.1	1,098	7.4
Feb. 3, 1953 .....	43	67	22	131	247	0	70	188			618	.84		258	55	52	3.5	1,120	7.6

## CALIFORNIA CREEK NEAR NOWATA, NOWATA COUNTY, OKLAHOMA

Feb. 3, 1953.....	42	391	61	645	174	0	17	1,750		0.5	3,380	4.60		1,230	1,080	53	8.0	5,500	7.4
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ARKANSAS RIVER BASIN--Continued  
MISCELLANEOUS ANALYSES OF STREAMS IN ARKANSAS RIVER BASIN IN OKLAHOMA AND MISSOURI--Continued

Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

Date of collection	Water discharge (cfs)	Temperature (°F)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Bo- ton (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>		Per- cent so- so- dium ad- sor- p- tion ratio	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate			
BIG CREEK NEAR NOWATA, NOWATA COUNTY, OKLAHOMA																					
Oct. 7, 1952		60		77	23	187	183	0	42	318			0.6	790	1.07	278	128	57	4.4	1,390	7.5
Oct. 30		47		197	23	196	210	0	42	405			.5	982	1.34	332	190	54	4.5	1,700	7.2
Feb. 3, 1953		44		62	22	207	159	0	60	355			.4	828	1.13	245	114	65	5.7	1,480	7.2
VERDIGRIS RIVER NEAR NOWATA, NOWATA COUNTY, OKLAHOMA																					
Oct. 8, 1952		60		82	22	129	186	0	37	272			0.5	682	0.93	295	142	49	3.3	1,240	7.5
Oct. 30		52		90	26	152	191	0	40	328			.4	811	1.10	332	175	50	3.6	1,410	7.5
Nov. 11		--		90	26	165	189	0	42	348			.4	848	1.15	332	176	52	3.9	1,470	7.4
Dec. 9		--		69	21	114	220	0	53	192			.4	588	.80	268	78	49	3.1	1,040	7.8
Feb. 3, 1953		47		74	22	163	204	0	61	282			.5	750	1.02	275	108	56	4.3	1,330	8.2
SALT CREEK NEAR ALLUWE, NOWATA COUNTY, OKLAHOMA																					
Oct. 30, 1952		44		225	42	554	218	0	10	1,240			0.5	2,486	3.37	734	556	62	8.9	4,190	7.0
Feb. 3, 1953		44		218	38	443	312	0	14	988			.5	2,070	2.82	700	444	58	7.3	3,510	7.4
LIGHTNING CREEK NEAR ALLUWE, NOWATA COUNTY, OKLAHOMA																					
Oct. 8, 1952		59		205	67	906	172	0	75	1,800			0.2	3,480	4.73	787	646	71	14	5,770	7.2
Oct. 30		48		234	74	944	197	0	68	1,920			.7	3,710	5.05	888	727	70	14	6,150	7.0
Feb. 3, 1953		45		389	98	2,030	166	0	69	3,960			--	7,190	9.78	1,370	1,240	76	24	11,700	7.3
VERDIGRIS RIVER NEAR TALALA, ROGERS COUNTY, OKLAHOMA																					
Oct. 8, 1952		58		72	21	110	189	0	44	215			0.6	599	0.81	266	111	47	2.9	1,060	7.9
Oct. 30		50		70	23	119	195	0	43	220			.7	605	.82	281	101	50	3.2	1,080	7.9
Feb. 3, 1953		47		83	22	359	237	0	49	252			.2	894	.94	288	104	50	3.5	1,260	8.0

## VERDIGRIS RIVER NEAR CLAREMORE (STATE HIGHWAY 88 BRIDGE), ROGERS COUNTY, OKLAHOMA

Oct. 8, 1952	62	56	15	58	162	0	42	107		0.5		.383	0.52	201	68	39	1.8	688	7.4
Oct. 30	50	63	14	77	195	0	36	130		.6		.447	.61	214	54	44	2.3	792	7.7
Feb. 3, 1953	45	74	17	101	239	0	46	172		4.0		.544	.74	254	75	46	2.7	971	8.0

## CANEY RIVER NEAR BOULANGER, OSAGE COUNTY, OKLAHOMA

Oct. 7, 1952	56	84	25	91	315	0	39	149		3.2		.570	0.78	312	54	39	2.3	1,090	7.6
Oct. 29	53	130	26	100	439	0	41	170		10		.732	1.00	432	72	34	2.1	1,260	7.6
Feb. 2, 1953	48	79	23	65	325	0	30	95		1.7		.482	.66	292	25	33	1.7	849	7.8

## CANEY RIVER NEAR HULAH, OSAGE COUNTY, OKLAHOMA

Oct. 7, 1952	60	55	16	19	208	0	33	28		0.6		.272	0.37	203	32	17	0.6	475	7.7
Oct. 29	54	57	15	28	226	0	33	28		.8		.281	.38	204	18	22	.8	491	7.6
Dec. 2	40	23	18	26	133	0	--	33		--		--	--	134	25	30	1.0	385	7.9
Dec. 31	35	34	16	24	132	0	--	30		--		--	--	152	44	25	.8	367	7.9
Jan. 28, 1953	42	28	16	24	133	0	--	30		--		--	--	136	27	28	.9	372	8.0
Feb. 2	45	52	17	26	220	0	33	29		.1		.276	.38	200	19	22	.8	488	8.0
Feb. 26	41	31	15	28	143	0	--	32		--		--	--	138	21	29	1.0	391	8.0
Mar. 25	36	22	20	26	133	0	--	35		--		--	--	136	22	31	1.0	394	8.0
May 6	62	33	17	25	184	0	--	31		--		--	--	152	18	26	.9	411	8.2
May 19	58	49	17	21	172	0	--	28		--		--	--	164	23	22	.7	409	8.1
June 3	56	51	18	18	180	0	--	28		--		--	--	162	14	19	.5	379	8.2
July 2	79	49	10	20	182	0	--	23		--		--	--	166	17	21	.7	419	8.1

## COTTON CREEK NEAR COPAN, WASHINGTON COUNTY, OKLAHOMA

Feb. 2, 1953	48	90	19	81	287	0	23	155		0.4		.557	0.76	302	68	37	2.0	966	7.7
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ARKANSAS RIVER BASIN--Continued  
MISCELLANEOUS ANALYSES OF STREAMS IN ARKANSAS RIVER BASIN IN OKLAHOMA AND MISSOURI--Continued  
Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

Date of collection	Water discharge (cfs)	Temperature (°F)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>		Percent adsorption	Specific conductance (micro-mhos at 25°C)
													Parts per million	Tons per acre-foot	Calcium	Non-carbonate		

COON CREEK NEAR DEWEY, WASHINGTON COUNTY, OKLAHOMA

Oct. 7, 1952		58		106	41	50	225	0	106	172		5.9	629	0.86	433	249	20	1.1	1,180	6.8
Oct. 20		59		55	21	147	269	0	80	170		.5	628	.85	224	3	59	4.3	1,130	7.3
Feb. 2, 1953		51		88	29	227	196	0	86	410		5.6	1,040	1.41	338	178	59	5.4	1,820	7.1

CANEY RIVER AT BARTLESVILLE, WASHINGTON COUNTY, OKLAHOMA

Oct. 7, 1952		63		64	17	67	237	0	32	105		0.6	439	0.60	230	36	39	1.9	789	7.1
Oct. 29		52		73	16	105	295	0	32	143		.7	542	.74	248	6	48	2.9	982	7.3
Feb. 2, 1953		51		75	23	156	248	0	47	262		.2	734	1.00	282	78	55	3.4	1,330	7.4

SAND CREEK NEAR PAWTHUSKA, OSAGE COUNTY, OKLAHOMA

Oct. 7, 1952		60		52	9.3	15	209	0	12	11		0.2	225	0.31	168	0	16	0.5	385	7.4
Oct. 29		51		52	8.1	26	236	0	13	12		.5	238	.32	167	0	26	.9	408	7.5
Feb. 2, 1953		46		54	11	31	250	0	18	16		.2	269	.37	180	0	27	1.0	459	7.7

SAND CREEK NEAR OKESA, OSAGE COUNTY, OKLAHOMA

Jan. 6, 1953		45		59	13	33	197	0		75					200	39	26	1.0	593	7.7
Feb. 17	0.03	41		59	14	41	198	0		87					204	42	20	1.2	594	8.1
Mar. 23	1.58	61		44	10	36	161	0		13					191	19	34	1.3	493	7.6
May 5	11.5	--		22	4.9	8.7	80	0		13					75	10	20	.4	204	7.8
June 1	2.01	85		36	6.3	15	128	0		22					116	11	22	.6	312	7.2
June 22	.46	78		26	4.9	9.2	96	0		14					85	6	19	.4	220	7.2
Sept. 21	--	73		18	4.4	11	73	0		17					63	3	28	.6	186	7.2

SAND CREEK AT BARTLESVILLE, WASHINGTON COUNTY, OKLAHOMA

Oct. 7, 1952		51		130	33	366	210	0	12	760		0.7	1,580	2.15	460	288	63	7.4	2,700	7.0
Oct. 29		47		265	69	715	227	0	13	1,940		.5	3,730	5.07	944	753	68	13	6,180	6.9
Feb. 2, 1953		46		198	52	715	216	0	24	1,490		.2	2,930	3.98	749	572	67	11	4,950	7.1

## CANEY RIVER NEAR RAMONA, WASHINGTON COUNTY, OKLAHOMA

Oct. 7, 1952 .....	56		90	19		96	252	0	34	190		0.4		606	0.82		302	96	41	2.1	1,080	7.6
Oct. 29 .....	49	--	84	19		106	246	0	46	190		.6		615	.84		288	86	44	2.7	1,080	7.5
Jan. 19, 1953 .....	17.8		99	17		114	--	248	0	--	232		--	--	--		316	113	44	2.8	1,250	7.7
Feb. 2 .....	45	--	96	20		121	--	231	0	82	218		2.3	694	.94		322	132	45	2.9	1,210	7.5
Mar. 16 .....	121		61	13		154	--	87	0	--	312		--	--	--		206	134	62	4.7	1,230	7.6
Apr. 13 .....	72.8		75	15		122	--	163	0	--	248		--	--	--		248	114	52	3.4	1,120	8.2
May 12 .....	6.940		27	4.4		38	--	59	0	--	73		--	--	--		86	38	49	1.8	391	7.5
May 25 .....	274		53	10		41	--	170	0	--	66		--	--	--		174	34	34	1.3	544	7.5
June 8 .....	1,050		34	5.8		76	--	67	0	--	150		--	--	--		110	55	60	3.1	644	7.6
July 7 .....	15.4		51	7.5		61	--	130	0	--	112		--	--	--		158	52	46	2.1	632	8.0
Aug. 5 .....	11.1		33	5.1		39	--	95	0	--	74		--	--	--		103	25	45	1.7	418	7.8

## CANEY RIVER NEAR COLLINSVILLE, TULSA COUNTY, OKLAHOMA

Oct. 7, 1952 .....	60		77	18		93	223	0	37	175		0.2		543	0.74		266	84	43	2.5	971	7.4
Oct. 29 .....	52		94	18		104	280	0	34	190		.6		624	.85		308	79	42	2.6	1,090	7.4
Feb. 2, 1953 .....	46		92	18		144	242	0	78	238		.6		729	.99		304	105	51	3.5	1,280	7.4

## VERDIGRIS RIVER NEAR CLAREMORE (STATE HIGHWAY 20 BRIDGE), ROGERS COUNTY, OKLAHOMA

Oct. 8, 1952 .....	61		99	18		117	229	0	44	242		0.6		678	0.92		321	134	44	2.8	1,190	7.7
Oct. 30 .....	54		76	16		90	221	0	55	150		.8		535	.73		256	74	43	2.4	915	7.8
Feb. 3, 1953 .....	47		88	18		109	209	0	75	198		3.7		629	.86		294	122	45	2.8	1,090	7.9

## BIRD CREEK AT PAWRUSKA, OSAGE COUNTY, OKLAHOMA

Oct. 7, 1952 .....	62		53	11		30	188	0	22	46		0.1		271	0.37		177	23	27	1.0	487	7.5
Oct. 29 .....	54		53	12		32	198	0	22	47		.8		274	.37		182	20	28	1.0	490	7.6
Feb. 2, 1953 .....	47		57	11		22	198	0	29	31		.2		254	.35		187	25	21	.7	456	7.9

## ARKANSAS RIVER BASIN--Continued

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

Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

Date of collection	Water discharge (cfs)	Temperature (°F)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>		Percent sodium	Specific conductance (micro-mhos at 25°C)		
													Parts per million	Tons per acre-foot	Calcium	Non-carbonate				
BIRD CREEK AT BARNSDALL, OSAGE COUNTY, OKLAHOMA																				
Oct. 7, 1952		62		53	17	83		199	0	48	129	0.4	456	0.62	214	52	46	844	7.0	
Oct. 29		55		57	18	97		225	0	49	135	1.1	495	.67	216	32	49	889	7.3	
Feb. 2, 1953		47		62	28	182		193	0	182	225	.5	810	1.10	270	112	60	1,370	7.3	
BIRD CREEK NEAR SKIATOOK, TULSA COUNTY, OKLAHOMA																				
Oct. 7, 1952		56		83	22	54		307	0	34	90	0.1	460	0.63	298	46	28	807	7.5	
Oct. 29		51		98	24	47		342	0	34	92	.8	508	.69	343	63	23	869	7.5	
Feb. 2, 1953		46		86	16	40		331	0	27	48	.7	387	.53	280	10	24	680	7.6	
HOMINY CREEK NEAR HOMINY, OSAGE COUNTY, OKLAHOMA																				
Feb. 2, 1953		39		132	38	286		192	0	32	650	0.5	1,320	1.80	486	328	56	5.7	2,360	7.8
HOMINY CREEK NEAR SKIATOOK, OSAGE COUNTY, OKLAHOMA																				
Oct. 7, 1952		53		101	26	64		382	0	33	107	0.2	550	0.75	359	46	28	1.5	964	7.5
Oct. 29		47		118	22	68		433	0	53	86	.7	580	.80	385	30	28	1.5	982	7.5
Feb. 2, 1953		44		177	33	166		280	0	25	515	.6	1,250	1.70	577	348	41	3.4	2,030	7.6
Feb. 17	2.83	50		81	26	202		90	0	--	480	--	--	--	310	236	59	5.0	1,700	7.9
Mar. 16	58.9	57		25	6.8	51		63	0	--	103	--	--	--	90	38	55	2.3	464	7.6
Apr. 6	647	65		17	4.6	29		48	0	--	56	--	--	--	62	22	50	1.6	287	7.4
Apr. 13	18.1	64		36	9.2	71		75	0	--	151	--	--	--	128	66	55	2.7	646	7.6
May 14	228	56		15	3.9	18		55	0	--	32	--	--	--	54	9	42	1.1	211	7.8
June 10	27.6	89		34	7.3	47		96	0	--	94	--	--	--	114	36	57	1.9	476	7.5
July 9	1,180	78		19	4.9	36		44	0	--	74	--	--	--	64	28	55	2.0	333	7.4
HOMINY CREEK NEAR SPERRY, TULSA COUNTY, OKLAHOMA																				
Oct. 7, 1952		50		196	65	584		237	0	13	1,280	0.5	2,440	3.32	756	562	63	9.2	4,150	7.1
Oct. 29		44		163	49	418		304	0	14	888	.7	1,900	2.58	608	359	60	7.4	3,220	7.3
Feb. 2, 1953		43		116	33	182		335	0	23	370	.4	969	1.32	425	150	48	3.8	1,720	7.7

## DELAWARE CREEK NEAR SPERRY, TULSA COUNTY, OKLAHOMA

Feb. 2, 1953 .....	42	42	466	865	168	0	116	2,400	--	4,740	6.45	1,766	1,830	52	9.0	7,350	7.1
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## BIRD CREEK NEAR OWASSO, TULSA COUNTY, OKLAHOMA

Oct. 7, 1952 .....	59	37	6.0	40	159	0	14	42	0.2	220	0.30	117	0	43	1.6	435	6.7
Oct. 26, 1953 .....	92	37	5.2	36	162	0	10	32	.6	264	.28	115	0	41	1.5	564	7.2
Feb. 2, 1953 .....	49	56	12	98	175	0	20	168	.4	453	.62	189	46	53	3.1	861	7.2

## VERDIGRIS RIVER NEAR CLAREMORE (U.S. HIGHWAY 66 BRIDGE), ROGERS COUNTY, OKLAHOMA

Oct. 8, 1952 .....	60	62	14	76	189	0	24	137	4.9	448	0.61	212	57	44	2.3	801	7.3
Oct. 30 .....	52	40	7.5	40	158	0	15	48	6.2	243	.53	131	2	40	1.5	462	7.0
Feb. 3, 1953 .....	47	67	21	129	179	0	40	245	1.3	636	.86	254	107	53	3.5	1,160	7.4

## DOG CREEK NEAR CLAREMORE, ROGERS COUNTY, OKLAHOMA

Feb. 3, 1953 .....	49	42	21	36	53	0	129	64	0.4	348	0.47	192	148	28	1.1	557	6.8
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## VERDIGRIS RIVER NEAR WAGONER, WAGONER COUNTY, OKLAHOMA

Oct. 8, 1952 .....	66	80	22	210	177	0	35	400	0.6	916	1.25	290	145	61	5.4	1,630	7.5
Oct. 30 .....	56	70	24	217	183	0	30	400	.4	906	1.23	273	123	63	5.7	1,590	7.5
Feb. 3, 1953 .....	47	64	16	135	192	0	21	238	5.2	610	.83	236	68	57	3.9	1,140	7.7

## VERDIGRIS RIVER NEAR OKAY, WAGONER COUNTY, OKLAHOMA

Oct. 8, 1952 .....	64	70	24	184	175	0	38	348	0.2	810	1.10	273	130	59	4.8	1,440	7.7
Oct. 30 .....	55	74	27	249	170	0	66	445	.7	1,080	1.39	296	156	65	6.3	1,800	7.4
Feb. 3, 1953 .....	51	68	19	157	183	0	27	288	4.9	702	.95	248	98	58	4.3	1,270	7.8

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

Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

Date of collection	Water discharge (cfs)	Temperature (°F)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>	Percent adsorption	Sodium to adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
														Parts per million	Tons per acre-foot					

SPRING RIVER NEAR QUAPAW, OTTAWA COUNTY, OKLAHOMA

Oct. 3, 1952.....	108	66		67	5.8	9.1		142	0		8.0					192	76	9	0.3	402	7.8
Oct. 27.....	135	43		77	8.0	12		137	0		9.5					224	112	10		482	7.6
Dec. 29.....	109	52		72	5.8	13		144	0							204	86	11	.4	446	8.0
Feb. 3, 1953.....	184	50		78	6.8	16		142	0		14					222	106	14	.5	503	7.3
Mar. 17.....	2,230	53		38	2.9	7.3		104	0		5.0					108	23	13	.3	254	7.2
Apr. 8.....	1,980	59		56	4.9	9.2		104	4		7.2					160	68	11	.3	369	8.4
July 23.....	141	86		62	8.8	15		125	0		12					190	88	15	.5	434	7.6
Aug. 13.....	81.7	85		68	7.3	14		100	0		14					200	118	13	.4	470	7.3
Sept. 22.....	113	70		70	7.8	17		120	0		21					206	108	15	.5	480	7.7

LOST CREEK NEAR SENECA, McDONALD COUNTY, MISSOURI

Oct. 2, 1952.....	4.66	55		48	1.7	3.6		148	0		4.2					127	6	6	0.1	251	8.2
Oct. 29.....	5.17	51		49	1.9	5.1		161	0		4.2					131	0	8	.2	270	7.9
Nov. 12.....	5.16	52		48	2.4	3.7		151	0		4.2					130	6	6	.1	249	7.7
Jan. 27, 1953.....	5.27	45		49	1.9	3.3		148	0		4.5					130	8	5	.1	262	7.4
Feb. 10.....	5.34	51		47	1.7	3.9		142	0		3.8					125	8	6	.2	258	7.8
May 19.....	52.4	66		36	1.0	3.0		114	0		3.0					95	2	6	.1	206	7.7
Mar. 23.....	24.9	54		39	1.7	5.4		115	0		7.5					104	10	10	.2	237	7.8
June 2.....	17.1	75		41	1.7	5.3		127	0		5.2					109	5	10	.2	245	7.4
July 23.....	5.18	82		45	1.2	3.4		140	0		4.0					118	4	6	.1	246	8.0
Aug. 12.....	4.81	79		45	1.5	3.4		140	0		3.5					118	4	6	.1	242	8.1
Sept. 14.....	2.93	73		43	1.5	4.3		149	0		5.2					127	5	7	.2	264	7.9

ELK RIVER NEAR TIFF CITY, McDONALD COUNTY, MISSOURI

Oct. 1, 1952.....	--	52		46	2.7	3.4		149	0		5.2					127	5	6	0.1	252	8.1
Oct. 2.....	76.1	58		45	3.2	3.4		145	0		4.5					135	6	6	.1	250	8.1
Nov. 12.....	97.1	53		46	2.9	4.0		150	0		5.8					126	3	6	.2	260	7.3
Jan. 27, 1953.....	275	45		47	2.9	2.9		147	0		5.2					130	10	5	.1	256	8.1
Feb. 10.....	151	50		46	2.9	3.7		142	0		5.2					126	10	6	.1	254	8.0

## ELK RIVER NEAR TIFF CITY, McDONALD COUNTY, MISSOURI--Continued

Mar. 17, 1953.....	1.990	54	42	2.9	--	126	0	5.0		118	15	--	--	236	8.2
Apr. 7.....	2.120	54	42	2.4	4.1	124	0	5.8		111	12	7	0.2	238	8.2
May 19.....	1.220	65	46	2.4	2.6	138	0	3.5		114	0	5	.1	239	8.2
June 2.....	2.82	76	46	2.9	3.6	147	0	4.0		127	6	6	.1	256	8.0
June 29.....	--	78	40	2.9	4.8	135	0	4.2		112	2	9	.2	234	8.0
July 2.....	74.5	84	42	2.9	3.5	137	0	4.5		116	4	9	.1	237	8.2
Aug. 12.....	45.5	80	42	2.7	4.1	141	0	3.8		119	4	9	.1	244	8.2
Sept. 14.....	33.3	73	44	2.7	4.9	146	0	3.5		121	2	8	.2	255	8.0

## BIG CABIN CREEK NEAR BIG CABIN, CRAIG COUNTY, OKLAHOMA

Oct. 22, 1952.....	0.76	42	60	4.4	8.6	188	0	8.5		167	13	10	0.3	345	8.1
Nov. 14.....	2.84	52	61	4.6	8.9	188	0	9.5		170	16	10	.3	350	7.6
Dec. 18.....	1.62	42	56	7.8	30	172	0	42		172	31	27	1.0	468	8.1
Jan. 14, 1953.....	1.61	35	60	8.5	40	190	0	52		184	28	32	1.3	542	7.6
Feb. 18.....	1.77	44	58	9.5	52	184	0	73		184	33	38	1.7	596	8.1
Mar. 27.....	19.9	58	37	8.0	15	94	0	12		126	49	21	.6	330	6.9
Apr. 6.....	1.250	53	22	5.6	10	46	0	5.5		79	42	21	.4	218	7.5
Apr. 24.....	9.680	52	10	2.4	--	24	0	--		36	16	--	--	106	6.4
May 11.....	59.8	66	35	8.0	14	77	0	9.0		120	57	20	.6	314	7.5
June 5.....	5.10	81	44	7.3	15	114	0	12		140	46	19	.5	348	7.9
June 30.....	1.34	84	60	7.3	32	164	0	51		179	44	28	1.0	501	8.2
July 14.....	4.49	76	32	6.8	26	56	0	46		107	61	35	1.1	366	7.4
July 27.....	6.27	81	25	5.6	8.7	60	0	8.0		85	38	18	.4	226	7.5
Aug. 24.....	.86	78	48	4.1	10	134	0	14		133	23	14	.4	312	8.0
Sept. 24.....	.59	67	50	4.9	14	132	0	19		144	20	17	.5	351	7.6

## SALINA CREEK NEAR SALINA, MAYES COUNTY, OKLAHOMA

Oct. 24, 1952.....	0.33	55	39	1.0	2.9	120	0	3.0		102	4	6	0.1	208	8.0
Feb. 20, 1953.....	7.66	48	33	1.2	1.9	104	0	2.8		88	3	4	.1	179	8.1
Mar. 27.....	83.0	56	32	1.0	2.9	95	0	3.5		94	6	7	.1	178	8.1
May 20.....	180	65	30	1.5	2.6	93	0	2.5		78	2	7	.1	173	8.0
July 23.....	5.76	84	36	1.5	3.0	116	0	2.5		96	1	6	.1	197	7.8

## ARKANSAS RIVER BASIN--Continued

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

Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

Date of collection	Water discharge (cfs)	Temperature (°F)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>		Percent sodium in total hardness	Specific conductance (micro-mhos at 25°C)	
														Parts per million	Tons per acre-foot	Calcium magnesium	Non-carbonate			
NEOSHO RIVER NEAR CHOTEAU, MAYES COUNTY, OKLAHOMA																				
Jan. 5, 1953	280	45		53	8.3	12		148	0		12					166	44	14	373	7.8
Feb. 9	155	48		54	8.0	14		152	0		12					187	42	15	376	7.8
May 11	--	69		51	7.3	13		126	6		13					156	43	15	368	8.4
June 1	--	77		53	6.8	11		140	0		13					160	46	13	372	8.1
June 22	--	82		49	7.3	10		126	0		12					152	49	12	350	7.5
July 16	--	83		46	7.1	11		122	0		12					143	43	14	339	7.8
Aug. 23	--	84		41	5.6	13		110	0		17					126	36	18	308	7.8
Sept. 23	--	76		40	6.6	17		107	0		24					128	40	22	349	7.4
PRYOR CREEK NEAR PRYOR, MAYES COUNTY, OKLAHOMA																				
Dec. 31, 1952	0.06	36		31	12	39		82	0		36					128	61	40	450	7.8
Jan. 14, 1953	0.05	48		51	23	42		96	0		40					222	144	29	534	7.0
Jan. 24	1.97	37		25	11	28		76	0		38					107	44	36	382	7.7
Feb. 13	56	44		168	67	--		108	0		2,160					670	582	--	6,780	7.9
Mar. 4	330	40		19	9.2	20		41	0		16					86	52	34	290	7.0
Mar. 19	118	59		14	6.8	13		27	0		10					64	42	31	208	6.8
Apr. 6	1,580	53		6.4	2.9	7.1		16	0		3.8					28	15	36	106	7.2
May 11	27.5	76		21	9.7	28		42	0		3.5					92	58	40	345	7.4
May 15	118	58		12	5.6	13		30	0		13					53	28	35	186	6.9
June 18	52	85		26	11	71		83	0		108					109	41	59	599	7.2
July 23	66	87		36	15	193		50	0		362					152	111	73	1,330	7.4
Aug. 18	11.9	77		27	11	139		65	0		255					114	60	73	1,959	7.6

## CANADIAN RIVER NEAR ROLL, ROGER MILLS COUNTY, OKLAHOMA

Feb. 2, 1953 .....	41	92	40	263	281	0	228	360	1.2	1,190	1.62	164	60	5.9	1,940	8.1
Feb. 16 .....	35	100	46	324	282	0	281	438	3.2	1,360	1.85	394	208	62	2,230	7.9

## CANADIAN RIVER NEAR CAMARGO, DEWEY COUNTY, OKLAHOMA

Feb. 2, 1953 .....	48	108	47	340	275	0	300	470	1.8	1,480	2.01	463	238	61	2,420	8.1
Feb. 16 .....	40	109	52	379	260	0	359	510	4.2	1,560	2.15	486	273	63	2,530	7.9

## CANADIAN RIVER NEAR TALOGA, DEWEY COUNTY, OKLAHOMA

Feb. 3, 1953 .....	50	118	53	400	262	0	375	550	2.6	1,720	2.34	512	288	63	2,780	8.1
Feb. 16 .....	43	108	50	380	230	0	402	490	5.0	1,590	2.16	475	286	64	2,540	7.9

## CANADIAN RIVER NEAR THOMAS, CUSTER COUNTY, OKLAHOMA

Feb. 2, 1953 .....	54	123	56	433	260	0	434	500	2.6	1,930	2.49	538	322	64	2,920	8.1
Feb. 16 .....	46	172	82	398	231	0	629	495	7.6	1,860	2.87	684	484	56	2,920	7.4

## DEER CREEK NEAR HYDRO, CADDO COUNTY, OKLAHOMA

Oct. 8, 1952 .....	54	95	16	27	241	2	--	11	--	--	--	300	99	16	632	8.3
Nov. 4 .....	55	111	13	26	282	0	--	11	--	--	--	354	123	14	734	8.1
Dec. 11 .....	51	164	26	26	263	0	--	12	--	--	--	515	300	10	966	7.8
Jan. 19, 1953 .....	42	168	27	26	254	0	--	12	--	--	--	530	322	10	992	8.1
Feb. 2 .....	53	150	24	40	245	0	328	11	1.8	727	0.99	473	272	15	936	8.1
Feb. 16 .....	50	174	31	32	240	0	397	13	2.4	806	1.10	562	365	11	1,040	8.0
Mar. 2 .....	48	170	28	26	219	0	--	14	--	--	--	540	360	9	1,020	7.9
Mar. 31 .....	69	158	28	27	208	0	--	12	--	--	--	510	340	10	979	8.1
May 18 .....	53	131	20	20	171	0	--	8.5	--	--	--	408	268	10	828	8.2
June 23 .....	82	89	15	29	271	0	--	11	--	--	--	282	60	18	630	8.2
July 27 .....	89	116	17	16	216	0	--	7.0	--	--	--	300	183	9	715	8.2
Aug. 24 .....	89	100	14	25	225	7	--	9.8	--	--	--	308	112	15	664	8.3

ARKANSAS RIVER BASIN--Continued  
MISCELLANEOUS ANALYSES OF STREAMS IN ARKANSAS RIVER BASIN IN OKLAHOMA AND MISSOURI--Continued  
Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

Date of collection	Water discharge (cfs)	Temperature (°F)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Particulates per million	Dissolved solids (residue at 180° C) Tons per acre-foot	Hardness as CaCO <sub>3</sub> Calcium magnesium non-carbonate	Percent sodium in total dissolved solids	Specific conductance (micro-mhos at 25° C)
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CANADIAN RIVER AT BRIDGEPORT, CADDO COUNTY, OKLAHOMA

Feb. 2, 1953.....				130	40	296		246	0	405	360		2.2		1,420	1.93	489	288	57	5.8	2,180	8.1
Feb. 16.....		52		138	29	44	7.8	194	7	346	20		.5		710	.97	464	293	17	.9	938	8.3
July 17.....	736			64	9.7			121	0	--	8.2		--		--	--	200	101	9	.2	436	7.6

CANADIAN RIVER NEAR UNION, CANADIAN COUNTY, OKLAHOMA

Feb. 2, 1953.....		49		110	30	56		172	0	331	24		0.2		679	0.92	398	257	23	1.2	936	8.0
Feb. 16.....		44		114	32	64		191	0	317	49		.2		701	.95	416	260	25	1.4	995	7.9

CANADIAN RIVER AT PURCELL, MCCLAIN COUNTY, OKLAHOMA

Feb. 3, 1953.....		41		23	10	192		499	0	55	35		0.6		584	0.79	98	0	81	8.4	992	7.8
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WALNUT CREEK AT PURCELL, MCCLAIN COUNTY, OKLAHOMA

Oct. 7, 1952.....	0.73	50		18	102	62		524	19	--	28		--		--	--	465	4	22	1.3	947	8.5
Nov. 18.....	2.45	53		32	79	40		452	15	--	20		--		--	--	400	30	16	.9	804	8.5
Dec. 24.....	4.90	37		42	62	28		433	0	--	15		--		--	--	360	5	14	.7	720	8.1
Feb. 3, 1953.....	--	40		40	82	31		431	6	39	14		0.4		422	0.57	355	0	16	.7	707	8.3
Feb. 5.....	8.43	50		42	61	31		436	0	--	16		--		--	--	394	0	16	.7	712	8.0
Feb. 16.....	--	49		30	63	29		435	0	42	14		.5		421	.57	356	0	15	.7	734	8.2
Mar. 11.....	12.4	55		36	49	21		392	0	--	12		--		--	--	292	4	13	.5	593	8.2
Apr. 1.....	17.8	57		35	26	14		393	0	--	9.2		--		--	--	196	2	13	.4	417	8.5
June 3.....	33.39	84		24	59	39		361	14	--	18		--		--	--	302	0	22	1.0	679	8.5
Aug. 20.....	7.67	76		29	16	13		168	0	--	10		--		--	--	136	0	17	.5	311	8.0

CANADIAN RIVER NEAR ASHER, POTTAWATOMIE COUNTY, OKLAHOMA

Feb. 3, 1953.....		44		46	48	155		290	41	45	210		0.4		707	0.96	312	6	52	3.8	1,240	8.8
Feb. 16.....		49		43	41	88		305	32	55	74		1.1		497	.88	276	0	41	2.3	833	8.9



## ARKANSAS RIVER BASIN--Continued

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

Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

Date of collection	Water discharge (cfs)	Temperature (°F)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)
														Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate		

## LITTLE RIVER BELOW HOG CREEK NEAR NORMAN, CLEVELAND COUNTY, OKLAHOMA

Jan. 28, 1953	2.74	45	5	53	47	49	--	404	0	0	48					324	0	25	766
Mar. 30	--	--		41	29	28		271	0	20	28					222	0	22	528
Apr. 5	2,510	55		22	8.3	6.4	--	116	0		4.5					90	0	13	210
Apr. 20	3.57	49		46	25	25	--	248	11		26					218	0	20	515
May 20	13.5	69		51	27	21	--	287	0		22					236	1	16	525
July 14	10.3	76		23	9.0	1.4	--	119	0		12					99	0	26	245

## LITTLE RIVER NEAR TECUMSEH, POTTAWATOMIE COUNTY, OKLAHOMA

Dec. 8, 1952	4.52	47		83	59	293		325	0		560					450	184	58	2,270
Jan. 28, 1953	5.83	43		62	48	184		346	0		300					350	66	58	1,520
Apr. 20	16.8	51		57	27	81		236	10		139					252	42	41	883
May 20	31.4	70		53	26	59		253	0		102					238	30	35	754
July 14	29.6	--		20	8.5	17		106	0		24					88	0	30	266
Aug. 25	8.52	80		51	23	124		198	0		225					224	62	55	1,060

## LITTLE RIVER NEAR DEWRIGHT, SEMINOLE COUNTY, OKLAHOMA

Feb. 17, 1953		38		290	112	1,450		264	0		2,880					5,280	7.18	1	9,060
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## SALT CREEK NEAR DEWRIGHT, SEMINOLE COUNTY, OKLAHOMA

Oct. 7, 1952	0.75	66		8,800	2,430			42	0		99,800					31,900	31,900		162,000
Nov. 12	2.28	54		18,300	2,060			61	0		91,800					23,400	23,400		196,000
Dec. 8	4.75	52		6,180	1,870			112	0		71,800					23,400	23,400		127,000
Jan. 12, 1953	4.35	47		2,430	1,810			118	0		71,800					23,400	23,400		135,000
Feb. 17	--	43		5,180	1,510	32,100		126	0	217	66,100			111,000	150.96	20,900	20,900	77	121,000
Feb. 26	5.76	56		5,740	1,410			102	0		63,300					20,100	20,000		124,000
Apr. 20	5.04	58		3,450	931			87	0		33,500					12,400	12,300		81,300
June 9	4.06	68		819	251			61	0		9,970					3,070	3,020		25,000
Aug. 25	6.80	82		3,310	794			63	0		36,000					11,500	11,500		77,400

## LITTLE RIVER NEAR SASAKWA, SEMINOLE COUNTY, OKLAHOMA

Oct. 7, 1952	0.07	67	1,450	393	--	--	15,700	--	5,220	5,130	--	--	40,200	7.2
Dec. 8	10.3	48	1,860	476	--	--	19,300	--	6,620	6,490	--	--	46,200	7.2
Jan. 12, 1953	11.6	42	3,520	944	--	--	38,500	--	12,700	12,600	--	--	83,300	7.1
Feb. 3	--	43	2,560	675	--	14,200	128	48,900	8,100	8,030	77	65	65,200	7.3
Feb. 7	--	42	2,570	690	--	13,400	137	46,300	8,040	8,130	77	62	61,900	7.3
Feb. 26	21.6	51	2,370	615	--	--	26,500	--	8,460	8,330	--	--	61,100	7.5
Apr. 20	51.4	--	400	105	--	--	4,090	--	1,430	1,340	--	--	11,400	8.1
May 20	97.6	70	240	71	--	--	2,400	--	890	785	--	--	7,390	7.7
July 14	360	--	98	31	421	--	2,840	--	370	279	71	9.5	2,850	7.6
Aug. 25	33.8	82	597	138	--	--	5,860	--	2,080	1,960	--	--	16,300	7.8

## CANADIAN RIVER NEAR CALVIN, HUGHES COUNTY, OKLAHOMA

Feb. 3, 1953		50	1,460	289		8,010	178	0	82	15,600		27,500	37.40	4,830	4,680	78	50	40,200	7.6
Feb. 17		42	1,440	394		7,650	218	0	91	15,300		27,300	37.13	5,030	5,030	76	46	38,800	7.5

## CANADIAN RIVER NEAR EUFAULA, MCINTOSH COUNTY, OKLAHOMA

Feb. 3, 1953		52	926	261		4,880	161	0	58	9,790		17,500	23.80	3,380	3,250	76	37	26,300	7.5
Feb. 17		49	932	256		4,670	148	0	62	9,460		16,900	22.99	3,390	3,260	75	35	25,600	7.5

## NORTH CANADIAN RIVER NEAR GUNNOM, TEXAS COUNTY, OKLAHOMA

Nov. 7, 1952	4.34	58		44	28	24		260	0		12			224	11	19	0.7	517	8.2
Jan. 5, 1953	6.06	33		40	26	28		232	5		12			208	10	23	.8	499	8.4
Feb. 13	8.76	45		50	29	32		270	12		13			242	1	22	.9	579	8.4
June 8	1.98	81		42	25	32		240	0		14			206	10	25	1.0	523	8.2
July 20	344	66		37	10	7.9		163	0		3.0			135	2	11	.3	289	7.8
Aug. 14	1.14	82		28	23	31		189	3		13			165	5	29	1.1	450	8.3
Sept. 24	1.40	63		28	25	30		199	2		14			174	8	27	1.0	456	8.3

ARKANSAS RIVER BASIN--Continued  
 MISCELLANEOUS ANALYSES OF STREAMS IN ARKANSAS RIVER BASIN IN OKLAHOMA AND MISSOURI--Continued  
 Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

Date of collection	Water discharge (cfs)	Temperature (° F)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Boron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>		Percent adsorption	Specific conductance (micro-mhos at 25°C)	pH	
															Parts per million	Tons per acre-foot	Calcium	Non-magnesium				
COLDWATER CREEK NEAR HARDESTY, TEXAS COUNTY, OKLAHOMA																						
Jan. 5, 1953	5.74	33		49	33	38		206	5		21						258	80	24	1.2	649	8.4
Feb. 13	4.79	33		71	41	47		286	0		29						345	102	23	1.1	830	8.2
Apr. 20	1.89	60		54	44	50		224	3		32						315	126	26	1.2	799	8.3
PALO DURO CREEK NEAR RANGE, TEXAS COUNTY, OKLAHOMA																						
Nov. 7, 1952	2.10	46		69	41	156		250	0		218						340	135	50	3.7	1,370	8.1
Jan. 9, 1953	10.7	50		49	36	144		187	4		188						268	108	54	3.8	1,200	8.3
Mar. 19	5.35	56		81	37	184		252	4		245						356	143	53	4.2	1,530	8.3
June 15	4.03	84		87	38	178		238	0		248						375	180	51	4.0	1,520	7.9
Sept. 24	.01	72		295	133	296		166	0		350						1,280	1,140	33	3.6	3,250	8.1
CLEAR CREEK NEAR ELWOOD, BEAVER COUNTY, OKLAHOMA																						
Nov. 19, 1952	0.87	44		66	20	22		269	6		27						248	18	16	0.6	532	8.4
Jan. 14, 1953	1.27	49		27	19	26		164	4		27						146	5	28	.9	414	8.3
Mar. 11	1.34	51		60	19	26		272	0		28						228	5	20	.7	552	8.2
June 22	.20	69		61	22	25		286	0		30						244	2	18	.7	580	8.0
Aug. 12	.84	66		31	18	31		174	0		29						152	10	31	1.1	434	8.2
KIOWA CREEK NEAR SLAPOINT, BEAVER COUNTY, OKLAHOMA																						
Nov. 19, 1952	6.69	44		61	22	71		254	0		101						244	36	39	2.0	810	8.1
Jan. 14, 1953	10.8	54		33	20	74		163	0		96						166	32	49	2.5	674	8.1
Mar. 11	8.24	51		32	21	80		166	0		94						168	32	48	2.3	671	8.2
June 11	3.03	90		61	20	88		226	8		120						236	38	45	2.5	852	8.4
FORT SUPPLY RESERVOIR NEAR FORT SUPPLY, WOODWARD COUNTY, OKLAHOMA																						
Oct. 1, 1952		--		50	29	122		203	0		160						244	78	52	3.4	1,030	8.1
Nov. 19		49		58	31	127		232	0		174						272	82	50	3.4	1,130	8.2
Jan. 29, 1953		41		60	27	130		213	3		166						262	82	52	3.5	1,120	8.3

## WOLF CREEK NEAR FORT SUPPLY, WOODWARD COUNTY, OKLAHOMA

June 10, 1953 .....	3.13	90		138	40	131		197	0		175				510	348	36	2.5	1,520	7.7
Aug. 12 .....	1.83	78		118	35	129		102	0		173				440	356	39	2.7	1,410	8.0
Sept. 28 .....	3.44	69		123	36	128		161	3		177				486	319	38	2.6	1,400	8.3

## INDIAN CREEK NEAR WOODWARD, WOODWARD COUNTY, OKLAHOMA

Jan. 29, 1953 .....	4.59	34		93	84	118		109	0		170				330	240	44	2.6	1,200	8.1
Mar. 11 .....	5.34	58		113	22	122		199	4		145				360	210	37	2.3	1,190	8.3
July 22 .....	1.48	76		176	28	155		239	7		242				355	348	38	2.9	1,680	8.4

## NORTH CANADIAN RIVER NEAR SELLING, MAJOR COUNTY, OKLAHOMA

July 13, 1953 .....	9.13			52	8.5	3.7		81	0		2.5				164	98	5	0.1	382	7.3
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## NORTH CANADIAN RIVER NEAR EL RENO, CANADIAN COUNTY, OKLAHOMA

July 17, 1953 .....	28.8			15	4.4	5.1		68	0		4.0				56	0	16	0.3	148	7.2
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## WEWOKA CREEK NEAR WETUMKA, HUGHES COUNTY, OKLAHOMA

Oct. 8, 1952 .....	0.10	62		875	188			41	0		9,330				2,960	2,930			25,200	7.2
Nov. 13 .....	.50	46		1,760	369			74	0		20,800				5,930	5,870			31,300	6.8
Dec. 9 .....	3.79	49		952	265			70	0		10,000				3,470	3,420			27,000	6.8
Jan. 12, 1953 .....	4.46	44		2,340	510			85	0		24,500				7,940	7,860			38,900	7.0
Feb. 27 .....	14.0	48		2,340	496			79	0		23,500				7,890	7,830			36,100	7.3
Apr. 21 .....	17.7	50		447	97			40	0		4,780				1,510	1,480			13,700	7.4
May 27 .....	9.87	86		792	167			50	0		8,240				2,660	2,620			22,600	6.8
July 13 .....	273	76		434	92			50	0		4,390				1,440	1,400			12,600	6.8
Aug. 26 .....	14.9	80		515	114			62	0		5,080				1,750	1,700			14,000	7.5

ARKANSAS RIVER BASIN--Continued

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

Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

Date of collection	Water discharge (cfs)	Temperature (°F)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate			

BELLOC CREEK AT CHANDLER, LINCOLN COUNTY, OKLAHOMA

Nov. 18, 1952	1.94	58		67	55	21		482	0		18						392	0	10	0.5	748	7.8
Dec. 9	1.74	50		53	46	17		407	0		16						322	0	10	4	620	8.2
Jan. 28, 1953	1.18	48		59	38	16		360	0		16						305	10	10	4	578	8.2
Feb. 27	1.29	57		53	31	25		300	0		34						260	14	17	7	557	8.1
Apr. 21	3.01	62		77	47	212		328	0		382						386	117	54	4.7	1,710	8.0
May 28	2.33	83		65	44	37		358	0		65						320	26	20	9	748	8.2
July 13	3.91	66		18	8.3	13		91	0		16						75	0	28	7	213	7.7
Aug. 26	2.56	83		51	25	16		260	8		18						230	4	13	5	473	8.4

LITTLE DEEP FORK CREEK NEAR EDNA, CREEK COUNTY, OKLAHOMA

Nov. 13, 1952	0.86	44		563	131	--		172	0		4,810						1,940	1,800	--	--	14,000	7.1
Dec. 9	1.26	42		563	109	--		130	0		4,740						1,850	1,740	--	--	13,200	7.0
Feb. 27, 1953	2.86	46		405	88	--		85	0		3,500						1,370	1,300	--	--	10,500	7.1
Mar. 18	362	56		30	8.8	100		30	0		222						111	86	66	4.1	813	6.6
Apr. 21	34.4	56		107	30	--		82	0		930						392	341	--	--	3,100	7.1
May 28	13.2	77		192	46	--		146	0		1,430						670	550	--	--	4,760	7.9
July 13	569	72		27	6.6	110		28	0		425						83	72	72	4.9	811	6.7
Aug. 26	2.47	79		64	16	246		80	0		430						224	156	71	7.2	1,700	7.9

NORTH CANADIAN RIVER NEAR EUFAULA, MCINTOSH COUNTY, OKLAHOMA

Feb. 3, 1953		53		468	120	2,430		129	0	57	4,800						8,870	11,760	76	26	14,000	7.5
Feb. 17		48		595	141	2,940		139	0	64	5,870						10,600	14,420	76	28	16,700	7.2

LONGTOWN CREEK NEAR ENTERPRISE, HASKELL COUNTY, OKLAHOMA

Feb. 3, 1953		53		16	5.7			69	0	8.7	16						63	7	28	0.6	196	7.1
Feb. 17		49		82	22	331		87	0	12	660						295	224	71	8.4	2,300	7.1

## CANADIAN RIVER NEAR WHITEFIELD, HASKELL COUNTY, OKLAHOMA

Feb. 3, 1953.....	55	446	195	2,470	122	0	48	4,860	9,250	12.58	1,630	1,530	77	27	14,100	7.5
Feb. 17, .....	48	389	88	1,960	92	0	53	3,910	6,970	9.48	1,370	1,300	76	23	11,200	7.0

## SALLISAW CREEK NEAR SALLISAW, SEQUOYAH COUNTY, OKLAHOMA

Oct. 2, 1952.....	73	28	2.4	3.8	93	0		4.5			80	4	10	0.2	172	8.0
Dec. 8, .....	48	25	1.9	2.5	75	0		3.8			70	8	7	.1	151	7.9
Jan. 15, 1953.....	46	24	1.5	3.5	76	0		5.2			65	2	10	.2	148	7.4
Mar. 5, .....	51	14	1.5	3.8	45	0		4.5			41	4	17	.3	104	7.6
Mar. 18, .....	56	14	1.0	1.9	40	0		2.2			39	6	9	.1	90.2	7.5
Apr. 9, .....	67	20	1.2	3.2	63	0		3.0			55	4	11	.2	132	8.2
May 13, .....	59	16	.5	1.8	52	0		2.5			42	0	9	.1	102	7.1
June 29, .....	83	28	1.7	3.1	91	0		3.0			78	4	11	.1	175	7.3
July 30, .....	86	26	1.9	2.7	87	0		2.8			73	2	9	.1	157	7.6
Sept. 13, .....	80	28	2.2	3.3	92	0		3.2			78	2	8	.2	173	7.8
Sept. 21, .....	75	27	1.7	3.2	90	0		3.5			74	0	9	.2	164	7.8



## RED RIVER BASIN

## SALT FORK RED RIVER NEAR WELLINGTON, TEX.

LOCATION --At gaging station at bridge on U. S. Highway 83, 4 miles downstream from Fort Worth & Denver (Burlington) Railroad bridge, 4½ miles south of Little and 8½ miles north of Wellington, Collingsworth County, Texas.

DRAINAGE AREA 1,222 square miles, of which 209 square miles is probably non-contributing.

RECORDS AVAILABLE --Chemical analyses: June 1952 to September 1953.

Water temperatures: June 1952 to September 1953.

EXTREMES 1952-53 --Dissolved solids: Maximum, 2,860 ppm Dec. 18-30; minimum, 730 ppm Aug. 6, 18-20.

Hardness: Maximum, 1,940 ppm Dec. 18-30; minimum, 455 ppm Aug. 6, 18-20.

Specific conductance: Maximum daily, 3,720 microhos Dec. 19; minimum daily, 818 microhos Aug. 6, 19.

Water temperatures: Maximum observed, 77° F Sept. 30; minimum observed, 35° F on several days during winter months.

EXTREMES June 1952 to September 1953 --Dissolved solids: Maximum, 2,860 ppm Dec. 18-30, 1952; minimum, 730 ppm Aug. 6, 18-20, 1953.

Hardness: Maximum, 1,940 ppm Dec. 18-30, 1952; minimum, 455 ppm Aug. 6, 18-20, 1953.

Specific conductance: Maximum daily, 3,720 microhos Dec. 19, 1952; minimum daily, 818 microhos Aug. 6, 19, 1953.

Water temperatures: Maximum observed, 77° F Sept. 30, 1953; minimum observed, 35° F on several days during winter months.

REMARKS --Values reported for dissolved solids are sums of determined constituents. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1952 to September 1953 given in WSP 1281.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbates (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (sum)			Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (microhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
Oct. 1-10, 1952.....	3.13	28		566	92		142	126		1,680	170	0.5	7.7		2,750	3.74	23.2	1,790	1,690	15	1.5	3,020	7.9
Oct. 11-20.....	4.19	29		574	94		160	134		1,730	173	.6	5.6		2,830	3.85	32.0	1,820	1,710	16	1.6	3,120	7.8
Oct. 21-31.....	47.8	22		576	100		138	136		1,700	172	.5	7.5		2,790	3.79	360	1,850	1,720	14	1.4	3,110	7.8
Nov. 1-10.....	5.38	22		598	100		146	159		1,710	200	.3	6.8		2,850	3.88	41.4	1,880	1,750	15	1.5	3,210	7.8
Nov. 11-20.....	6.37	25		582	102		133	124		1,670	170	.8	5.9		2,720	3.70	46.8	1,800	1,700	14	1.4	3,060	7.8
Nov. 21-30.....	45.9	24		544	105		152	139		1,660	192	.8	6.0		2,750	3.74	341	1,790	1,680	16	1.6	3,160	7.8
Dec. 1-10.....	7.36	24		552	102		134	134		1,660	172	.8	5.5		2,720	3.70	54.1	1,800	1,690	14	1.4	3,100	7.8
Dec. 11-17, 31.....	8.44	22		556	102		146	164		1,640	198	.8	6.8		2,750	3.74	62.7	1,810	1,670	15	1.5	3,170	7.8
Dec. 18-30.....	15.0	20		600	108		131	174		1,650	255	.8	5.8		2,860	3.89	116	1,940	1,800	13	1.3	3,370	7.8
Jan. 1-10, 1953.....	8.36	20		570	101		150	192		1,650	200	.8	6.0		2,790	3.79	63.0	1,840	1,680	15	1.5	3,190	7.8
Jan. 11-20.....	7.82	20		564	99		148	155		1,640	208	.8	7.7		2,760	3.75	58.3	1,810	1,690	15	1.5	3,240	7.9
Jan. 21-31.....	10.7	22		512	90		156	160		1,480	218	.8	6.3		2,560	3.48	74.0	1,650	1,520	17	1.7	3,090	7.9
Feb. 1-10.....	9.58	19		538	97		164	168		1,570	225	.9	7.5		2,700	3.67	69.8	1,740	1,600	17	1.7	3,230	7.8
Feb. 11-19.....	10.4	24		548	98		158	146		1,600	228	.9	5.1		2,730	3.71	76.7	1,770	1,650	16	1.6	3,280	7.8
Feb. 20-28.....	28.4	24		532	101		155	146		1,580	220	.8	5.1		2,690	3.66	286	1,740	1,620	16	1.6	3,150	7.8
Mar. 1-10.....	28.9	26		436	90		188	150		1,310	265	.9	4.3		2,390	3.25	186	1,460	1,340	22	2.1	3,010	7.8
Mar. 11-20.....	15.2	34		550	94		153	103		1,660	195	.7	3.5		2,740	3.73	112	1,760	1,670	16	1.6	3,080	7.7
Mar. 21-31.....	13.8	36		518	96		128	72		1,610	160	.7	3.0		2,590	3.52	96.5	1,690	1,630	14	1.4	2,970	7.7

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

Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal-cium (Ca)	Mag-nesium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Car-bonate (CO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> )	Bo-ron (B)	Dissolved solids		Hardness as CaCO <sub>3</sub>		Per-cent so-dium ratio	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Calcium	Non-carbonate			
Apr. 1-5, 10-20, 1953	29.6	38		474	95	179		66		1,520	228	0.7	4.5		2,570	3.50	1,570	1,520	20	3,170	7.7
Apr. 6-9	71.5	35		286	70	210		146		956	242	.7	1.5		1,870	2.54	1,000	882	31	2,500	7.8
Apr. 21-30	7.72	33		532	94	154		72		1,670	175	.7	3.5		2,700	3.67	1,710	1,660	16	3,060	7.7
May 1-10	6.57	29		538	93	141		81		1,660	165	.7	3.0		2,670	3.63	1,720	1,680	15	3,060	7.6
May 11-20	12.9	28		542	101	185		110		1,690	225	.7	2.5		2,830	3.85	1,770	1,680	19	3,310	7.7
May 21-31	6.31	32		528	94	134		63		1,600	195	.6	3.2		2,620	3.56	1,700	1,650	15	3,030	7.5
June 1-10	2.72	34		544	97	126		67		1,650	180	.6	3.2		2,670	3.63	1,760	1,700	13	3,050	7.2
June 11-20	1.41	35		514	87	115		75		1,550	150	.5	3.2		2,490	3.89	1,640	1,580	13	2,890	7.2
June 21-30	1.14	34		460	76	98		75		1,380	120	.5	4.2		2,210	3.01	1,460	1,400	13	2,570	7.7
July 1-10	1.01	31		470	80	109		121		1,400	125	.5	4.5		2,280	3.10	1,500	1,400	14	2,590	7.9
July 11-18	3.26	28		540	93	128		130		1,600	165	.6	3.2		2,620	3.56	1,730	1,620	14	3,290	7.6
July 19-21, 24-25	2.871	29		159	33	86		130		431	110	.7	3.8		916	1.25	532	426	26	1,330	8.0
July 22-23, 26-31	70.2	40		380	77	179		102		1,180	255	.7	3.0		2,160	2.04	1,260	1,180	24	2,750	7.8
Aug. 1-5, 11, 13-17	27.2	38		546	93	161		138		1,580	250	.9	2.5		2,720	3.70	1,740	1,630	17	3,330	7.8
Aug. 6, 8, 18-20	194	26		141	25	51		125		359	65	.5	1.5		730	.69	455	352	20	1,080	7.7
Aug. 7, 9-10, 12	20.2	32		390	69	131		147		1,120	192	.7	2.8		2,010	2.73	1,260	1,140	18	2,540	8.0
Aug. 21-22	38.5	32		276	60	138		112		830	195	.6	3.8		1,590	2.16	1,65	935	24	2,100	8.0
Aug. 23-31	11.7	34		498	97	153		67		1,510	242	.8	3.8		2,570	3.50	1,640	1,590	17	3,040	7.7
Sept. 1-10	7.95	31		544	101	155		89		1,620	245	.8	3.8		2,740	3.73	1,770	1,700	16	3,170	7.9
Sept. 11-20	5.43	31		550	101	149		87		1,650	225	.7	4.0		2,750	3.74	1,780	1,720	15	3,150	7.8
Sept. 21-30	5.50	36		560	95	153		90		1,670	215	.7	4.0		2,780	3.78	1,790	1,710	16	3,190	7.7
Weighted average	55.3	29		236	47	102		123		661	134	0.7	3.8		1,300	1.77	788	682	22	1,730	--

## RED RIVER BASIN--Continued

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

Temperature (°F) of water, water year October 1952 to September 1953

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

## RED RIVER BASIN--Continued

## NORTH FORK RED RIVER NEAR CARTER, OKLA.

LOCATION.--At gaging station at bridge on State Highway 34, 3 miles south of Carter, Beckham County, and 10.8 miles downstream from Timber Creek and at mile 110.5.

DRAINAGE AREA.--2,337 square miles of which 399 square miles is probably noncontributing.

RECORDS AVAILABLE.--Sediment records: March 1948 to September 1953.

EXTREMES, 1952-53.--Sediment concentrations: Maximum daily, 13,000 ppm July 20; minimum daily, no flow at times during each month.

Sediment loads: Maximum daily, 63,900 tons July 20; minimum daily, no flow at times during each month.

EXTREMES, 1948-53.--Sediment concentrations: Maximum daily, 19,600 ppm Sept. 26, 1950; minimum daily, no flow at times each year.

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

REMARKS.--Records of discharge for water year October 1952 to September 1953 given in WSP 1281.

Day	Suspended sediment, water year October 1952 to September 1953								
	October			November			December		
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1.....									
2.....									
3.....									
4.....									
5.....									
6.....									
7.....									
8.....									
9.....									
10.....									
11.....									
12.....									
13.....									
14.....									
15.....									
16.....	0	--	0	0	--	0	0	--	0
17.....									
18.....									
19.....									
20.....									
21.....									
22.....									
23.....									
24.....									
25.....									
26.....									
27.....									
28.....									
29.....									
30.....									
31.....				--	--	--			
Total.	0	--	0	0	--	0	0	--	0

## RED RIVER BASIN--Continued

## NORTH FORK RED RIVER NEAR CARTER, OKLA.--Continued

Suspended sediment, water year October 1952 to September 1953--Continued

Day	January			February			March		
	Mean dis- charge (cfs)	Suspended sediment		Mean dis- charge (cfs)	Suspended sediment		Mean dis- charge (cfs)	Suspended sediment	
		Mean con- cen- tration (ppm)	Tons per day		Mean con- cen- tration (ppm)	Tons per day		Mean con- cen- tration (ppm)	Tons per day
1.....							16	963	s 120
2.....							24	2,110	s 140
3.....							26	2,120	s 171
4.....							11	1,860	s 63
5.....							3.5	930	8.8
6.....							1.7	260	1.2
7.....							0	--	0
8.....							0	--	0
9.....							0	--	0
10.....							0	--	0
11.....							1.3	42	.1
12.....							1.9	26	.1
13.....							.9	28	.1
14.....							.7	90	.2
15.....	0	--	0	0	--	0	--	--	--
16.....							--	--	--
17.....							--	--	--
18.....							--	--	--
19.....							--	--	--
20.....							--	--	--
21.....							--	--	--
22.....							--	--	--
23.....							0	--	0
24.....							--	--	--
25.....							--	--	--
26.....							--	--	--
27.....							--	--	--
28.....							--	--	--
29.....							--	--	--
30.....							--	--	--
31.....							--	--	--
Total.	0	--	0	0	--	0	87.0	--	504.5
Day	April			May			June		
	Mean dis- charge (cfs)	Suspended sediment		Mean dis- charge (cfs)	Suspended sediment		Mean dis- charge (cfs)	Suspended sediment	
		Mean con- cen- tration (ppm)	Tons per day		Mean con- cen- tration (ppm)	Tons per day		Mean con- cen- tration (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.....	340	4,450	s 4,870	0	--	0	227	3,860	s 6,460
6.....	121	3,310	s 1,210	--	--	--	35	2,600	s 283
7.....	131	2,750	s 1,040	--	--	--	764	8,910	s 30,600
8.....	57	1,020	157	--	--	--	378	4,420	s 5,870
9.....	31	707	59	--	--	--	68	1,900	349
10.....	16	658	28	--	--	--	30	1,400	113
11.....	8.1	546	12	6.2	578	s 14	9.3	600	15
12.....	4.8	422	5.5	.6	260	.4	1.1	792	2.4
13.....	3.0	446	3.6	.2	206	.1	--	--	--
14.....	2.1	422	2.4	0	--	0	--	--	--
15.....	1.5	376	1.5	0	--	0	--	--	--
16.....	.9	400	1.0	.3	258	.2	--	--	--
17.....	.6	468	.8	.4	264	.3	--	--	--
18.....	.4	414	.4	.4	214	.2	--	--	--
19.....	--	--	--	.3	266	.2	--	--	--
20.....	--	--	--	--	--	--	--	--	--
21.....	--	--	--	--	--	--	--	--	--
22.....	--	--	--	--	--	--	--	--	--
23.....	--	--	--	--	--	--	0	--	0
24.....	0	--	0	0	--	0	--	--	--
25.....	--	--	--	--	--	--	--	--	--
26.....	--	--	--	--	--	--	--	--	--
27.....	--	--	--	--	--	--	--	--	--
28.....	--	--	--	--	--	--	--	--	--
29.....	--	--	--	--	--	--	--	--	--
30.....	--	--	--	--	--	--	--	--	--
31.....	--	--	--	--	--	--	--	--	--
Total.	717.4	--	7,391.2	8.4	--	15.4	1,512.4	--	43,692.4

s Computed by subdividing day.

## LOWER MISSISSIPPI RIVER BASIN

## RED RIVER BASIN--Continued

## NORTH FORK RED RIVER NEAR CARTER, OKLA.--Continued

Suspended sediment, water year October 1952 to September 1953--Continued

Day	July			August			September		
	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	0	--	0
2.....	--	--	--	0	--	0	0	--	0
3.....	--	--	--	0	--	0	.1	266	.1
4.....	--	--	--	6.5	654	s 71	.9	a 300	.1
5.....	--	--	--	28	1,720	s 149	--	--	--
6.....	--	--	--	33	2,350	s 285	--	--	--
7.....	--	--	--	156	7,320	s 4,050	--	--	--
8.....	--	--	--	50	2,750	s 401	--	--	--
9.....	--	--	--	24	650	42	--	--	--
10.....	0	--	0	22	574	34	--	--	--
11.....	--	--	--	44	1,640	s 309	--	--	--
12.....	--	--	--	58	1,900	298	--	--	--
13.....	--	--	--	17	1,100	50	--	--	--
14.....	--	--	--	10	220	5.9	--	--	--
15.....	--	--	--	7.8	227	4.8	--	--	--
16.....	83	5,150	s 1,950	4.8	a 200	2.6	0	--	0
17.....	10	2,300	62	204	5,080	s 4,380	--	--	--
18.....	.1	400	.1	735	8,790	s 22,100	--	--	--
19.....	943	4,950	s 17,900	157	3,720	s 1,760	--	--	--
20.....	1,560	13,000	s 63,900	120	10,600	s 3,860	--	--	--
21.....	280	8,300	6,270	37	4,300	s 470	--	--	--
22.....	72	4,700	914	16	1,000	43	--	--	--
23.....	302	9,560	s 10,200	5	228	3.0	--	--	--
24.....	567	6,040	s 14,700	1.5	304	1.2	--	--	--
25.....	52	1,500	211	.6	500	.8	--	--	--
26.....	6.5	500	8.8	.1	405	.1	--	--	--
27.....	1.8	214	1.0	0	--	0	--	--	--
28.....	0	--	0	0	--	0	--	--	--
29.....	0	--	0	0	--	0	--	--	--
30.....	0	--	0	0	--	0	--	--	--
31.....	0	--	0	0	--	0	--	--	--
Total.	3,877.4	--	116, 116.9	1,737.3	--	38,319.4	1.0	--	0.2

Total discharge for year (cfs-days) ..... 7,940.9

Total load for year (tons) ..... 206,040.0

s Computed by subdividing days.

a Computed from estimated concentration graph.

## RED RIVER BASIN--Continued

## NORTH FORK RED RIVER NEAR CARTER, OKLA.--Continued

Particle-size analyses of suspended sediment, water year October 1952 to September 1953  
 (Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water;  
 W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date of collection	Time	Water discharge (cfs)	Water temperature (°F)	Suspended sediment												Methods of analysis	
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters											
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.350	0.500		1.000
Mar. 2, 1953	8:00 a.m.	1.1		2,340	2,340	60	67	78	82	83	87	96	98	--	--	BWC	
Mar. 4	10:00 a.m.	9.9		1,380	1,380	71	86	91	93	96	98	99	--	--	--	BWC	
Mar. 5	5:00 p.m.	664		5,610	5,610	34	58	80	94	100	--	--	--	--	--	BWC	
June 5	3:00 p.m.	1,130		12,400	6,200	32	54	74	87	93	98	99	--	--	--	BWC	
June 5	7:30 p.m.	375		7,080	7,080	33	50	67	74	77	83	92	96	--	--	BWC	
June 6	8:40 a.m.	38		2,280	2,280	60	77	92	94	95	97	98	99	--	--	BWC	
June 7	10:30 a.m.	2,850		18,200	9,100	25	45	58	75	84	91	98	--	--	--	BWC	
June 8	9:20 a.m.	500		3,770	3,770	40	59	72	81	86	92	97	--	--	--	BWC	
June 9	7:00 a.m.	86		1,930	1,930	50	51	60	65	66	69	76	90	--	--	BWC	
July 19	2:00 p.m.	1,920		5,490	5,490	33	47	60	66	77	89	95	97	--	--	BWC	
July 21	10:45 a.m.	260		8,400	8,400	53	72	85	92	93	94	98	--	--	--	BWC	
Aug. 17	11:00 a.m.	80		8,770	8,770	46	63	81	94	96	98	99	--	--	--	BWC	
Aug. 18	6:30 a.m.	635		10,600	10,600	20	32	42	50	58	69	79	93	--	--	BWC	
Aug. 19	8:00 a.m.	280		4,650	4,650	45	62	72	84	89	92	97	99	--	--	BWC	

## RED RIVER BASIN--Continued

## CACHE CREEK NEAR WALTERS, OKLA.

LOCATION.--At gaging station at bridge on State Highway 53, 1 3/4 miles east of Walters, Cotton County, and 12.2 miles upstream from West Cache Creek.

DRAINAGE AREA.--675 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1951 to September 1953.

Water temperatures: October 1951 to September 1953.

EXTREMES, 1952-53.--Dissolved solids: Maximum, 1,420 ppm Mar. 10; minimum, 147 ppm June 28-30.

Hardness: Maximum, 568 ppm Mar. 11-14; minimum, 92 ppm June 28-30.

Specific conductance: Maximum, 2,140 microhos Mar. 11, 13-14; minimum, 243 microhos June 28, 30.

Water temperatures: Maximum, 85°F Aug. 18; minimum, 36°F Jan. 16.

EXTREMES, 1951-53.--Dissolved solids: Maximum, 1,420 ppm Mar. 10, 1953; minimum, 75 ppm May 18-19, 1952.

Hardness: Maximum, 568 ppm Mar. 11-14, 1953; minimum, 52 ppm Nov. 1-2, 1951.

Specific conductance: Maximum, 2,140 microhos Mar. 11, 13-14, 1953; minimum daily, 148 microhos May 18, 1952.

Water temperatures: Maximum, 85°F July 31, Aug. 1, 7-10, 22, 1952; Aug. 18, 1953; minimum, 36°F Dec. 20, 1951, Jan. 16, 1953.

REMARKS.--Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of discharge for water year October 1952 to September 1953 given in WSP 1281.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>4</sub> )	Iron (Fe)	Cal-cium (Ca)	Mag-ne-sium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Car-bonate (CO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Ni-trate (NO <sub>3</sub> )	Phos-phate (PO <sub>4</sub> )	Bo-ron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Per-cent adsorp-tion	Specific conduct-ance (micro-mhos at 25°C)	pH		
															(residue at 180°C)			Calcium, Non-carbon-ate						
															Parts per million	Tons per acre-foot	Tons per acre-day	Calcium, mg.	Non-carbon-ate					
Oct. 1-10, 1952	6.70	10	0.00	52	11	138	9.8	273	0	56	114	18	8.5	0.70	582	0.79	11	174	0	62	4.5	950	8.2	
Oct. 11-20	6.70	--	--	49	12	125	11	285	0	54	109	25	--	--	545	.74	9.9	172	0	61	4.2	921	8.0	
Oct. 21-31	6.10	10	.02	50	11	125	11	263	0	53	101	24	19	.72	550	.75	9.1	170	0	60	4.2	931	7.8	
Nov. 1-10	8.00	--	--	56	13	103	13	264	0	53	92	19	--	--	502	.68	11	193	0	54	3.2	869	7.3	
Nov. 11-20	11.8	12	.02	54	13	136	11.5	294	0	54	114	18	19	.76	514	.79	19	188	0	59	4.3	970	7.5	
Nov. 21-28	13.5	--	--	49	11	115	7.8	279	0	49	92	10	--	--	514	.70	19	188	0	60	3.9	848	8.2	
Nov. 27-30	14.2	--	--	44	9.4	78	--	202	0	43	82	25	--	--	401	.55	15	148	0	53	2.8	652	8.1	
Dec. 1-8	9.90	--	--	43	9.1	79	9.6	201	0	42	62	26	--	--	400	.54	11	145	0	54	2.8	652	8.2	
Dec. 9-20	9.50	8.8	.00	46	11	112	10.1	240	0	46	95	28	14	.76	491	.67	13	160	0	59	3.9	825	7.5	
Dec. 21-31	11.0	--	--	43	8.7	101	--	214	0	45	83	29	--	--	457	.62	14	144	0	60	3.7	759	7.6	
Jan. 1-10, 1953	7.90	5.2	.00	48	11	108	9.0	242	0	46	92	27	16	.51	483	.66	10	165	0	57	3.7	828	7.4	
Jan. 11-20	7.90	5.6	.00	54	12	102	9.6	251	0	47	88	30	16	--	56	502	.68	11	184	0	53	3.3	833	7.9
Jan. 21-31	8.10	--	--	51	12	103	--	247	0	45	89	31	--	--	492	.67	11	176	0	56	3.4	829	7.7	
Feb. 1-10	8.40	5.6	.02	50	11	109	10	256	0	46	90	23	16	--	56	493	.67	11	170	0	56	3.6	818	7.9
Feb. 11-12	72.5	--	0.00	52	11	106	--	251	0	47	93	24	--	--	498	.68	97	174	0	57	3.5	838	8.0	
Feb. 13-17	11.8	--	--	51	11	106	44	141	0	25	32	13	--	--	254	.35	8.1	102	0	48	1.9	400	7.6	
Feb. 18-20	7.10	--	--	38	6.8	60	--	177	0	31	44	16	--	--	313	.43	6.0	123	0	51	2.3	514	7.7	
Feb. 21-23	7.20	--	--	38	8.2	59	--	182	0	32	44	14	--	--	318	.43	6.2	128	0	50	2.2	514	7.9	
Feb. 24-28	7.50	--	--	52	11	93	--	233	0	45	82	28	--	--	459	.62	9.3	174	0	54	3.1	775	7.7	

## RED RIVER BASIN

197

Mar. 1-9, 1953	54.6	--	--	48	9.6	31	119	0	93	17	10	--	--	295	0.40	43	160	62	30	1.1	454	7.7
Mar. 10	13.0	--	--	156	43	203	171	0	86	540	21	--	--	1,420	1.83	50	566	426	44	3.7	2,120	7.9
Mar. 11-14	109	--	--	147	49	204	169	0	90	540	24	--	--	1,400	1.90	412	568	430	44	3.7	2,140	8.1
Mar. 15-20	369	--	--	56	12	51	194	0	61	46	15	--	--	388	1.92	385	189	30	37	1.6	600	7.9
Mar. 21-28	21.0	--	--	55	12	53	194	0	60	47	16	--	--	377	.51	21	186	28	31	1.7	595	8.2
Mar. 29-31	988	--	--	33	6.9	23	136	0	25	14	5.4	--	--	199	.27	531	111	0	31	1.0	316	8.0
Apr. 1-10	161	9.0	0.00	39	6.1	18	134	0	25	14	7.1	0.50	0.50	201	.27	87	122	12	24	.7	323	8.0
Apr. 11-17	28.6	--	--	54	11	47	--	0	43	44	16	--	--	334	.45	28	180	18	36	1.5	555	8.2
Apr. 18-20	22.0	--	--	63	12	66	--	0	46	59	15	--	--	400	.54	24	206	4	41	2.0	682	7.6
Apr. 21-30	23.8	8.4	.00	62	12	65	6.5	0	46	63	14	4.5	.51	414	.56	27	204	2	40	2.0	697	8.2
May 1-10	18.3	7.2	.00	62	12	87	7.2	10	48	79	13	6.0	.53	465	.63	23	204	0	47	2.6	787	8.4
May 11-12	18.0	--	--	56	15	98	--	6	51	84	11	--	--	480	.65	23	201	0	51	3.0	812	8.3
May 13-20	96.6	--	--	34	8.3	31	143	0	25	26	9.4	--	--	221	.30	58	119	2	36	1.2	377	8.2
May 21-31	12.7	7.2	.00	65	13	84	8.2	13	54	79	7.9	5.5	.41	480	.65	16	216	0	45	2.5	801	8.6
June 1	10.0	--	--	64	14	87	--	16	56	81	9.9	--	--	475	.65	13	216	0	47	2.6	791	8.7
June 2-10	962	--	--	40	5.8	18	147	0	18	13	6.0	--	--	196	.27	509	124	4	24	.7	328	8.2
June 11-14	44.0	--	--	41	6.7	17	154	0	19	12	4.9	--	--	196	.27	24	130	4	22	.6	327	7.9
June 15-20	30.0	--	--	55	9.0	70	236	0	41	56	9.7	--	--	381	.82	31	174	0	47	2.3	671	7.8
June 21-25	23.4	--	--	54	10	72	232	6	38	61	9.8	--	--	390	.53	25	176	0	47	2.4	655	8.4
June 26-27	17.5	--	--	62	12	109	261	9	55	102	12	--	--	516	.70	24	204	0	54	3.3	667	8.4
June 28-30	17.7	--	--	28	4.7	14	109	0	14	11	4.0	--	--	147	.20	7.0	92	2	25	.6	246	8.0
July 1-10	101	7.4	.14	20	5.2	13	4.4	0	16	11	4.8	.25	.43	153	.21	42	94	4	22	.8	251	7.7
July 11-14	26.0	--	--	29	5.2	17	107	0	21	12	5.9	--	--	151	.21	11	94	6	29	.8	263	8.1
July 15-20	41.0	--	--	42	7.3	32	151	0	35	26	7.8	--	--	247	.34	27	135	12	34	1.2	418	7.6
July 21-31	284	9.4	.00	46	7.4	18	4.9	0	20	20	7.6	1.0	.49	221	.30	158	146	13	20	.6	368	8.0
Aug. 1-2	14.0	--	--	44	7.5	22	150	5	21	21	8.3	--	--	220	.30	8.3	141	10	26	.8	366	8.4
Aug. 3-10	12.1	--	--	55	9.0	73	219	5	36	67	15	--	--	396	.54	13	174	0	48	2.4	677	8.4
Aug. 11-19	43.2	--	--	59	10	88	245	5	40	80	14	--	--	441	.60	51	188	0	50	2.7	751	8.3
Aug. 20-31	31.7	--	--	41	8.1	62	158	0	39	67	8.3	--	--	327	.44	28	138	6	50	2.3	567	7.6
Sept. 1-6	740	--	--	37	6.0	41	157	0	22	34	9.2	--	--	252	.34	5.0	117	0	43	1.7	420	7.9
Sept. 7-10	640	--	--	60	5.5	82	228	0	40	75	19	--	--	423	.68	7.3	172	0	51	2.7	719	7.6
Sept. 11-30	610	8.8	.02	50	10	85	8.7	0	40	77	24	11	.63	430	.58	7.1	166	0	51	2.9	719	8.2
Weighted average	70.2	--	--	45	8.3	a 35	b 162	--	30	36	9.1	--	--	274	0.37	52	146	14	34	1.2	448	--

b Includes equivalent of individual carbonate values shown above.

a Calculated from other weight average constituents.

## LOWER MISSISSIPPI RIVER BASIN

## RED RIVER BASIN--Continued

## CACHE CREEK NEAR WALTERS, OKLA.--Continued

Temperature (°F) of water, water year October 1952 to September 1953  
 /Once-daily temperature measurement at approximately 4 p.m. /

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

## RED RIVER BASIN--Continued

## LITTLE WICHITA RIVER NEAR ARCHER CITY, TEX.

LOCATION --At gaging station at bridge on State Highway 79, 1.5 miles downstream from confluence of North and Middle Forks, and 4.8 miles north of Archer City, Archer County.

DRAINAGE AREA --481 square miles.

RECORDS AVAILABLE --Chemical analyses: December 1952 to September 1953.

Water temperatures: December 1952 to September 1953.

EXTREMES 1952-53 --Dissolved solids: Maximum, 1,220 ppm Aug. 20 (6 a.m.-12 p.m.), 21-28.

Hardness: Maximum, 282 ppm Aug. 15-16, 17 (12 p.m.-6 a.m.); minimum, 79 ppm Aug. 20 (6 a.m.-12 p.m.), 21-28.

Specific conductance: Maximum daily, 2,600 micromhos July 20; minimum daily, 309 micromhos Mar. 18.

REMARKS --Values reported for dissolved solids concentrations less than 1,000 ppm are residues on evaporation and for concentrations more than 1,000 ppm are sums of determined constituents unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1952 to September 1953 given in WSP 1281.

Chemical analyses, in parts per million, December 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boiron (B)	Dissolved solids (Residue at 180°C)			Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium magnesium	Non-carbonate				
Dec. 30, 1952	0.1	8.0		--	--	--	--	108		--	150	--	2.5		--	--	--	108		--	--	681	8.2
Mar. 3-13, 1953	a 1.11	4.8		36	13	182		112		10	312	--	2.8		647	0.88	1.94	148	58	73	6.5	1,230	7.7
Mar. 14 (2 p.m.-6 p.m.)																							
Mar. 18-20	90.4	8.8		26	7.1	54		103		6.2	83	--	5.0		242	.63	59.1	94	10	56	2.4	465	7.7
Mar. 14 (6 p.m.-12 p.m.)																							
Mar. 15-17, 21-29	6.33	8.6		28	8.7	102		87		8.9	172	--	6.0		399	.54	6.82	106	34	68	4.3	739	7.6
Apr. 6-13	a 7.18	6.1		35	12	174		92		12	300	--	4.7		634	.86	12.3	137	62	73	6.5	1,170	7.5
Apr. 19	0	--		--	--	--		136		--	308	--	4.5		--	--	--	154	42	--	--	1,220	8.1
Apr. 24, 26-30, May 1	a 2.11	11		43	14	194		108		7.2	345	--	4.5		730	.99	4.16	165	76	72	6.6	1,340	8.0
Apr. 25, May 12-14, 17-20	10.0	12		26	7.8		86	104		7.4	134	--	4.0		343	.47	9.26	97	12	66	3.8	630	7.9
May 5	0	--		--	--	--	117	107		--	390	--	--		--	--	--	194	98	--	--	1,480	8.2
May 10	0	--		--	--	--	140	107		--	400	--	4.5		b 416	.57	71.5	211	96	--	--	1,540	8.2
May 15-16	63.7	12		34	10	109		107		5.8	188	--	--		--	--	--	126	38	65	4.2	827	7.9
May 26	0	--		--	--	--	139	139		--	170	--	--		--	--	--	124	10	--	--	795	8.2
May 31	0	--		--	--	--	167	167		--	180	--	--		--	--	--	139	2	--	--	855	8.2
June 7	0	--		--	--	--	200	200		--	204	--	--		--	--	--	164	0	--	--	964	--
June 14	0	--		--	--	--	212	212		--	230	--	--		--	--	--	184	10	--	--	1,090	--
June 21	0	--		--	--	--	247	247		--	272	--	--		--	--	--	214	12	--	--	1,260	--
June 28	0	--		--	--	--	226	226		--	325	--	--		--	--	--	207	22	--	--	1,410	--

a No flow Jan. 1 to Mar. 2, Mar. 30, 31, Apr. 1-5, 14-23, May 2-11, 21-31, June 1-30, July 12-18, Aug. 1-12, 29-31, Sept. 1-2, 10-30.

b Sum of determined constituents.

## RED RIVER BASIN--Continued

## LITTLE WICHITA RIVER NEAR ARCHER CITY, TEX.--Continued

Chemical analyses, in parts per million, December 1952 to September 1953--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids (Residue at 180°C)			Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH		
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate					
July 1 (2 p.m.-8 a.m.)	20.3	17		27	8.0	91		155		7.7	112	0.8	3.0		344	0.47	18.9	100	0	66	3.9	628	8.1
July 7-11, 25, 1953.....																							
July 11 (6 a.m.-12 p.m.)	58.1	16		22	6.2	57		120		5.3	68	.8	3.5		247	.34	38.7	80	0	61	2.8	433	8.0
July 19.....	6	--						200			153	--	--		--	--	--	126	0	--	--	816	8.2
July 20.....	2.48	13		56	21	328		136		12	578	.8	4.6		1,080	1.47	7.23	231	120	76	9.4	2,090	7.8
July 20-23.....	1.55	14		41	12	138		102		7.6	252	.8	4.0		6,519	.71	2.17	152	68	66	4.9	1,010	8.0
July 26-31.....																							
Aug. 9.....	0	--						161		--	248	--	--		--	--	--	180	0	--	--	1,080	8.2
Aug. 13-14, 18-19.....																							
Aug. 20 (12 p.m.-6 a.m.)	30.9	12		36	11	127		115		9.7	215	.8	3.8		6,472	.64	39.4	135	41	67	4.8	909	8.0
Aug. 15-16.....																							
Aug. 17 (12 p.m.-6 a.m.)	5.87	11		72	25	362		121		14	675	.8	2.8		1,220	1.66	19.3	282	184	74	9.4	2,360	8.0
Aug. 17 (6 a.m.-12 p.m.)	48	15		23	6.9	63		108		7.8	88	.6	4.5		6,260	.35	33.7	86	0	62	3.0	471	7.6
Aug. 20 (6 a.m.-12 p.m.)																							
Aug. 21-28.....	21.1	18		22	5.9	53		113		7.1	65	.5	2.5		6,230	.31	13.1	79	0	59	2.6	405	7.9
Sept. 3-9.....	a 7.53	16		31	8.6	106		106		8.1	174	.6	2.5		418	.57	8.50	113	26	67	4.4	748	7.7
Sept. 27.....	0	--						191			220	--	--		--	--	--	172	16	--	--	975	8.2
Weighted average ..	c 6.1	13		27	8.0	84		114		7.1	128	--	3.9		335	0.46	5.52	100	7	64	3.6	622	--

a No flow Jan. 1 to Mar. 30, Apr. 1-5, 14-23, May 2-11, 21-31, June 1-30, July 12-18, Aug. 1-12, 29-31, Sept. 1-2, 10-30.

b Sum of determined constituents.

c Mean discharge for water year October 1952 to September 1953 was 5.14 cfs. Runoff for period January to December 1953 was 89 percent of total for water year.

## RED RIVER BASIN--Continued

## LITTLE WICHITA RIVER NEAR ARCHER CITY, TEX.--Continued

Temperature (\*F) of water March to September 1953

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

## RED RIVER BASIN--Continued

## LITTLE WICHITA RIVER NEAR HENRIETTA, TEX.

LOCATION -- At gaging station at 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 September 1953.

Water temperatures: December 1952 to September 1953.

EXTREMES, 1952-53. -- Dissolved Solids: Maximum, 1,700 ppm Mar. 15 (12 m. - 12 p.m.); 16; minimum, 111 ppm Mar. 14 (12 p.m. - 12 m.),

17 (12m. - 12 p.m.), 18.

Hardness: Maximum, 700 ppm May 1; minimum, 46 ppm Mar. 27-30.

Specific conductance: Maximum daily, 5,910 micromhos May 1; minimum daily, 103 micromhos Mar. 14.

REMARKS -- Records of specific conductance of daily samples available in district office at Austin, Tex. Values reported for dissolved solids are sums

of determined constituents unless otherwise noted.

Records of discharge for water year October 1952 to September 1953 given in WSP 1281.

Chemical analyses, in parts per million, December 1952 to September 1953

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Mag-nesium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Car-bonate (CO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> )	Dissolved solids (sum)		Hardness as CaCO <sub>3</sub>		Per-cent so-lidum	So-lidum adsorp-tion ratio	Specific conductance (micro-mhos at 25°C)	pH
														Parts per million	Tons per acre-foot	Calcium	Non-carbonate				
Dec. 31, 1952.....	0	8.6	--	--	--	--	--	76	--	--	322	--	3.8	--	--	140	78	--	--	1,180	7.9
Jan. 3, 1953.....	0	--	--	--	--	--	--	79	--	--	305	--	--	--	--	136	0	--	--	1,160	7.9
Jan. 9, 14, 21, 22, 30..	0	8.6	--	36	11	159	--	101	12	12	270	--	6.3	a 589	0.80	135	52	72	6.0	1,080	7.9
Feb. 4.....	0	--	--	--	--	--	--	105	--	--	288	--	--	--	--	137	54	--	--	1,140	8.1
Feb. 11.....	0	--	--	--	--	--	--	109	--	--	282	--	--	--	--	137	52	--	--	1,170	8.1
Feb. 13.....	0	--	--	--	--	--	--	110	--	--	295	--	--	--	--	137	52	--	--	1,160	8.0
Feb. 18.....	0	--	--	--	--	--	--	124	--	--	300	--	--	--	--	146	57	--	--	1,210	8.2
Feb. 25.....	0	--	--	--	--	--	--	128	--	--	298	--	--	--	--	150	60	--	--	1,210	8.2
Mar. 6.....	0	--	--	--	--	--	--	143	--	--	310	--	--	--	--	161	44	--	--	1,260	8.2
Mar. 11.....	0	--	--	--	--	--	--	148	--	--	302	--	--	--	--	161	40	--	--	1,250	8.2
Mar. 14 (12 pm-12 m.)	0	--	--	--	--	--	--	59	--	5.0	27	--	3.5	111	.15	50	2	47	1.2	205	7.7
Mar. 17 (12m-12p.m.) <sup>a</sup>	b 137	9.4	--	13	4.3	20	20	97	--	6.0	70	--	6.1	a 227	.31	82	3	57	2.4	418	7.9
Mar. 18 (12m-12p.m.)	148.4	11	--	22	6.6	40	40	97	--	--	--	--	--	--	--	--	--	--	--	--	--
Mar. 19, 20.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mar. 15 (12p.m.-12m.)	153	8.0	--	28	9.3	99	99	99	--	9.5	160	--	7.3	a 390	.53	108	27	67	4.1	725	7.9
Mar. 17 (12p.m.-12m.)	103.3	14	--	94	31	514	81	81	15	15	988	--	6.5	1,700	2.31	362	296	76	12	3,290	8.0
Mar. 16.....	9.1	15	--	28	7.9	98	71	98	6.6	6.6	117	--	5.0	a 325	.44	102	22	60	3.0	573	8.0
Mar. 21-25.....	b 26.9	12	--	12	4.0	21	21	59	6.7	6.7	22	--	7.8	114	.16	8.23	46	0	50	200	7.8
Mar. 27-30.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

<sup>a</sup> Residue on evaporation at 180°C.

<sup>b</sup> No flow Jan. 1 to Mar. 13, Mar. 31 to May 11, May 24 to July 1, July 6-23, 31, Aug. 1-12, 28-31, Sept. 1-6, 10-30.



RED RIVER BASIN--Continued  
LITTLE WICHITA RIVER NEAR HENRIETTA, TEX.--Continued

Chemical analyses, in parts per million, December 1952 to September 1953--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boiron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	
															Parts per million	Tons per acre-foot	Tons per day	Calcium, mg./nestum	Non-carbonate				
Aug. 1, 1953	0	--	--	--	--	--	--	97	--	--	54	--	--	--	--	--	--	71	0	--	--	349	8.1
Aug. 4	0	--	--	--	--	--	--	99	--	--	52	--	--	--	--	--	--	72	0	--	--	349	8.1
Aug. 7	0	--	--	--	--	--	--	106	--	--	54	--	--	--	--	--	--	78	0	--	--	362	8.1
Aug. 13-19, 21 (12m-12 p.m.), 23-25	23.7	11		19	5.5	36		95	5.7		43	0.8	3.2		a181	0.25	11.6	70	0	53	1.9	310	7.9
Aug. 20	62	--	--	--	--	--	--	122	--	--	215	--	--	--	--	--	--	144	44	--	--	905	8.1
Aug. 21(12p.m.-12m), 22	130	11		24	7.1	65		103	7.0		95	.8	4.2		265	.36	93.0	89	5	61	3.0	469	8.1
Aug. 26-27, Sept. 7-9	b.3.36	19	22	22	6.6	45		107	7.8		56	.8	3.5		a230	.31	2.09	82	0	54	2.2	364	8.0
Aug. 29	0	--	--	--	--	--	--	77	--	--	33	--	--	--	--	--	--	56	0	--	--	239	8.1
Aug. 31	0	--	--	--	--	--	--	78	--	--	32	--	--	--	--	--	--	59	0	--	--	241	8.1
Sept. 4	0	--	--	--	--	--	--	90	--	--	31	--	--	--	--	--	--	63	0	--	--	249	8.1
Sept. 12	0	--	--	--	--	--	--	140	--	--	72	--	--	--	--	--	--	102	0	--	--	454	8.2
Sept. 15	0	--	--	--	--	--	--	140	--	--	74	--	--	--	--	--	--	104	0	--	--	463	8.2
Sept. 18	0	--	--	--	--	--	--	153	--	--	86	--	--	--	--	--	--	116	0	--	--	508	8.2
Sept. 24	0	--	--	--	--	--	--	161	--	--	91	--	--	--	--	--	--	120	0	--	--	539	--
Sept. 30	0	--	--	--	--	--	--	178	--	--	92	--	--	--	--	--	--	134	0	--	--	567	--
Weighted average...	12.6	12	23	7.5	73			90	6.4		116	--	4.8		314	0.43	10.7	88	14	64	3.4	542	--

a Residue on evaporation at 180°C.

b No flow Jan. 1 to Mar. 13, Mar. 31 to May 11, May 24 to July 1, July 6-23, 31, Aug. 1-12, 23-31, Sept. 1-6, 10-30.

## RED RIVER BASIN--Continued

## LITTLE WICHITA RIVER NEAR HENRIETTA, TEX.--Continued

Temperature (°F) of water, water year December 1952 to September 1953

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1				--	--	--		--		--	--	
2				--	--	--		--		--	--	
3				--	--	--		--		88	--	
4					56	--		--		92	--	
5				--	--	--		--		--	--	
6				--	--	57		--		85	--	
7				--	--	--		--		85	--	
8				--	--	--		--		--	--	
9				52	--	--		--		--	--	
10				--	--	--		--		--	--	80
11				--	52	61		--		--	--	
12				--	--	--		61		--	--	
13				--	55	--		55		--	--	
14				66	--	65		63		--	83	
15				--	--	63		62		--	91	
16				--	--	60		62		--	--	
17				--	--	66		64		--	--	
18				--	--	61		74		--	80	
19				--	56	63		75		--	78	
20				--	--	70		62		--	--	
21				52	--	--		84		--	80	
22				52	--	--		92		--	78	
23				--	--	--		89		--	82	
24				--	--	--		--		80	81	
25				--	52	57		--		83	--	
26				--	--	64		--		84	--	
27				--	--	62		--		81	--	
28				--	--	67		--		90	83	
29				--	--	71		--		86	--	
30				55	--	71		--		86	--	
31			47	--	--	--		--		--	--	
Average				--	--			--		--	--	

## RED RIVER BASIN--Continued

## RED RIVER NEAR GAINESVILLE, TEX.

LOCATION.--At gaging station at bridge on U. S. Highway 77, a quarter of a mile downstream from Gulf, Colorado and Santa Fe Railway bridge, 5 miles downstream from Fish Creek, and 7 miles north of Gainesville, Cooke County.

RECORDS AVAILABLE.--Chemical analyses: May 1944 to April 1946, October 1952 to September 1953.

EXTREMES, 1952-53.--Dissolved solids: Maximum, 6,480 ppm Apr. 11; minimum, 342 ppm July 22-23.

Hardness: Maximum, 1,510 ppm Apr. 11; minimum, 132 ppm July 22-23.

Specific conductance: Maximum daily, 9,890 microhms Apr. 11; minimum daily, 537 microhms July 23.

Water temperatures: Maximum, 90°F Aug. 2, Sept. 19; minimum, 37°F Jan. 17.

EXTREMES, 1944-46, 1952-53.--Dissolved solids: Maximum, 6,480 ppm Apr. 11, 1953; minimum, 250 ppm Sept. 30, Oct. 1-3, 1945.

Hardness: Maximum, 1,510 ppm Apr. 11, 1953; minimum, 120 ppm Sept. 30, Oct. 1-3, 1945.

Specific conductance: Maximum daily, 9,890 microhms Apr. 11, 1953; minimum, 403 microhms Sept. 30, Oct. 1-3, 1945.

REMARKS.--Records of specific conductance of daily samples for water year October 1952 to September 1953 available in district office at Oklahoma City, Okla.

Records of specific conductance of daily samples for period May 1944 to April 1946 available in district office at Austin, Tex. Records of discharge for water year October 1952 to September 1953 given in WSP 1281.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium	Specific conductance (microhms at 25°C)
															Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate		
Oct. 1-10, 1952.....	138	8.0	0.00	270	90	831	11	136	0	709	1,450	0.3	2.6	0.90	3,610	4.91	1,350	1,040	932	63	5,570
Oct. 11-20.....	117	7.5	0.00	279	96	860	11	153	0	703	1,520	.5	1.0	.86	3,710	5.05	1,170	1,090	965	63	5,810
Oct. 21-31.....	104	6.5	0.00	281	97	861	11	173	0	697	1,510	.3	.6	.83	3,580	5.00	1,030	1,100	958	63	5,770
Nov. 1-10.....	102	6.5	.30	268	94	836	9.6	181	0	650	1,440	.5	.7	.77	3,500	4.76	984	1,060	908	63	5,540
Nov. 11-20.....	112	7.5	0.00	264	96	826	775	178	0	642	1,440	.3	1.9	.78	3,450	4.68	1,040	1,050	907	63	5,500
Nov. 21-22.....	118	--	--	259	96	--	--	188	0	640	1,350	--	1.0	--	3,370	4.38	1,070	1,060	898	62	5,400
Nov. 23-30.....	235	--	--	216	78	613	--	176	0	491	1,080	--	1.3	--	2,650	3.60	1,060	1,060	718	61	4,350
Dec. 1-2, 5-9.....	105	--	--	196	76	543	--	200	0	424	975	--	2.2	--	2,400	3.26	1,260	802	638	60	3,900
Dec. 3-4, 10.....	127	--	--	213	82	614	9.0	204	0	473	1,090	--	1.7	--	2,710	3.69	1,440	868	702	61	4,410
Dec. 11-20.....	140	6.5	0.00	223	82	658	--	201	0	458	1,220	.3	1.0	.63	2,820	3.84	1,070	908	733	61	4,580
Dec. 21-26, 30-31.....	186	--	--	223	80	659	--	201	0	484	1,210	--	.8	--	2,900	3.94	1,460	942	778	60	4,730
Dec. 27-29.....	230	--	--	175	70	535	--	173	0	369	835	--	.7	--	2,270	3.09	1,410	724	582	61	3,780
Jan. 1-4, 1953.....	165	--	--	197	58	582	--	187	0	398	1,010	--	2.8	--	2,480	3.35	1,100	730	577	63	4,000
Jan. 5-7.....	138	--	--	229	68	681	--	186	0	536	1,150	--	.4	--	2,860	3.89	1,040	851	698	64	4,650
Jan. 8-9.....	130	--	--	235	70	781	--	196	0	568	1,260	--	--	--	3,110	4.23	1,090	874	714	65	5,020
Jan. 10.....	125	--	--	263	84	916	--	181	0	646	1,540	--	.5	--	3,710	5.05	1,250	1,000	853	67	5,870
Jan. 11-20.....	118	4.0	0.00	270	93	906	9.0	194	0	644	1,500	.3	1.2	.60	3,670	4.99	1,170	1,060	897	65	5,900
Jan. 21-26.....	115	--	--	272	101	847	--	202	0	629	1,590	--	.4	--	3,590	4.88	1,110	1,090	928	63	5,820
Jan. 27-31.....	116	--	--	281	98	800	--	214	0	604	1,410	--	.8	--	3,420	4.65	1,070	1,050	878	62	5,450

## RED RIVER BASIN

	110	4.0	.00	283	94	803	9.6	207	0	618	1,420	.5	.1	.89	3,500	4.76	1,040	1,040	873	62	11	5,420	8.1
Feb. 1-10, 1963....	190	--	--	257	101	826	--	168	0	697	1,440	--	.2	--	3,360	4.57	1,720	1,060	919	63	11	5,500	7.7
Feb. 11, 14-19 .....	134	--	--	226	86	692	--	191	0	551	1,200	--	.2	--	2,850	3.88	1,030	918	761	62	9.9	4,720	7.7
Feb. 20 .....	226	--	--	184	69	547	--	173	0	501	960	--	.2	--	2,320	3.16	1,420	742	600	62	8.7	3,770	7.8
Feb. 21-26 .....	169	--	--	177	62	509	--	178	0	392	865	--	1.0	--	2,220	3.02	1,010	696	550	61	8.4	3,630	7.7
Feb. 27-28 .....	142	--	--	204	71	638	--	191	0	418	1,150	--	.2	--	2,730	3.71	1,050	626	669	63	9.7	4,360	7.6
Mar. 1-4 .....	136	--	--	204	68	657	--	192	0	402	1,160	--	.6	--	2,680	3.64	984	708	695	64	10	4,450	7.6
Mar. 5-7 .....	123	--	--	221	80	574	--	210	0	394	1,110	--	1.4	--	2,650	3.63	874	700	568	62	8.0	4,020	7.7
Mar. 8-10 .....	207	--	--	224	81	718	--	217	0	524	1,240	--	1.4	--	2,690	4.23	1,870	902	765	63	10	5,260	7.7
Mar. 11-12 .....	308	--	--	246	90	778	--	123	0	626	1,280	--	2.2	--	3,470	7.2	2,590	904	991	63	11	5,260	7.9
Mar. 13-14 .....	252	--	--	183	74	603	--	103	0	404	1,110	--	1.3	--	2,660	3.46	1,830	761	676	63	9.5	4,230	7.7
Mar. 15-16 .....	1,525	--	--	112	35	325	--	134	0	205	570	--	2.9	--	1,440	1.96	5,930	424	314	63	6.9	2,370	8.0
Mar. 17 .....	980	--	--	71	22	260	--	103	0	148	325	--	5.7	--	921	1.25	2,460	268	183	62	5.3	1,470	7.8
Mar. 18 .....	5,070	--	--	87	26	248	--	117	0	179	410	--	4.4	--	1,140	1.55	15,610	324	238	62	6.0	1,830	7.9
Mar. 19-20 .....	3,345	--	--	60	17	123	--	108	0	109	200	--	3.1	--	837	1.87	5,750	220	131	55	3.6	1,030	7.8
Mar. 21 .....	1,270	--	--	76	19	168	--	108	0	148	285	--	5.7	--	860	1.17	2,950	268	179	58	4.4	1,330	8.1
Mar. 22-23, 28-29 .....	513	--	--	92	29	233	--	116	0	206	385	--	2.6	--	1,150	1.56	2,000	348	254	59	5.4	1,780	7.8
Mar. 24-25 .....	513	--	--	108	33	266	--	119	0	245	445	--	3.1	--	1,380	1.74	1,770	405	308	59	5.7	2,010	8.1
Mar. 26-27, 30-31 .....	464	--	--	127	39	350	--	128	0	281	595	--	2.4	--	1,600	2.18	1,750	478	372	61	6.9	2,550	7.8
Apr. 1-3, 9-10 .....	2,084	--	--	92	28	223	--	145	0	178	370	--	2.4	--	1,090	1.48	6,130	344	226	58	5.2	1,710	8.0
Apr. 2 .....	718	--	--	195	74	591	--	135	0	450	1,060	--	2.9	--	2,690	3.66	5,210	791	680	62	9.1	4,150	8.0
Apr. 4-6 .....	2,123	--	--	45	10	69	--	124	0	48	105	--	3.6	--	394	.54	2,260	154	52	49	2.4	628	7.7
Apr. 7-8 .....	704	--	--	72	21	169	--	123	0	127	282	--	2.4	--	830	1.13	1,580	266	165	58	4.5	1,330	7.7
Apr. 11 .....	2,740	--	--	450	94	1,730	--	153	0	1,190	2,750	--	7.0	--	6,480	8.81	47,940	1,510	1,380	71	19	9,890	7.4
Apr. 12-13 .....	1,550	--	--	326	66	1,240	--	127	0	896	1,980	--	7.8	--	4,650	6.32	19,520	1,060	981	71	16	7,250	7.8
Apr. 14-16 .....	757	--	--	315	83	1,130	--	125	0	859	1,800	--	6.3	--	4,400	5.96	8,990	1,040	942	70	15	6,780	7.9
Apr. 17-20 .....	374	--	--	297	62	1,992	--	150	0	775	1,560	--	5.7	--	3,940	5.36	3,980	996	873	68	17	6,120	7.9

## RED RIVER BASIN--Continued

## RED RIVER NEAR GAINESVILLE, TEX.--Continued

Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal-cium (Ca)	Mag-nesium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Car-bonate (CO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> )	Dissolved solids			Hardness as CaCO <sub>3</sub>		Per-cent so-dium adsorp-tion ratio	Specific conductance (micro-mhos at 25°C)		
														Bo-ron (B)	Parts per million	Tons per acre-foot	Tons per day	Total			Non-carbonate	
Apr. 21-22, 1953 ..	267	--	--	289	69	948	147	147	0	767	1,520	--	2.3	3,790	5.15	2,730	1,000	884	67	13	6,020	7.9
Apr. 23-24 .....	729	--	--	188	51	601	141	0	488	965	965	--	.6	2,420	3.29	4,760	678	583	66	10	3,970	7.8
Apr. 25 .....	1,020	--	--	94	24	280	119	0	158	450	450	--	1.7	1,100	1.50	3,030	333	238	63	6.2	1,880	7.9
Apr. 26-27, 29 .....	425	--	--	138	47	484	110	0	344	810	810	--	.6	1,880	2.56	2,160	538	448	66	9.1	3,270	7.7
Apr. 28 .....	316	--	--	116	34	372	117	0	271	610	610	--	1.3	1,490	2.03	1,270	430	334	65	7.8	2,520	7.9
Apr. 30 .....	360	--	--	208	65	720	133	0	555	1,180	1,180	--	1.3	2,880	3.92	2,800	786	678	67	11	4,640	8.0
May 1-4 .....	283	--	--	282	83	939	126	0	702	1,560	1,560	--	2.4	3,720	5.06	2,840	995	892	67	13	5,980	8.2
May 5-6 .....	288	--	--	288	93	1,010	136	0	722	1,720	1,720	--	1.4	4,150	5.64	2,320	1,100	988	67	13	6,170	8.1
May 7 .....	234	--	--	238	77	895	123	0	598	1,510	1,510	--	3.7	3,540	4.81	2,430	910	809	68	13	5,590	8.0
May 8-9 .....	235	--	--	304	98	1,110	163	0	945	1,780	1,780	--	2.2	4,230	5.75	2,680	1,120	986	68	14	6,570	8.2
May 10 .....	218	--	--	244	70	805	167	3	656	1,290	1,290	--	2.5	3,230	4.39	1,900	895	753	65	12	5,080	8.3
May 11-12 .....	231	--	--	202	59	600	165	0	510	980	980	--	1.4	2,550	3.47	1,590	745	610	64	9.6	4,170	7.9
May 13-14 .....	274	--	--	180	55	509	150	0	400	880	880	--	1.2	2,260	3.07	1,670	675	552	62	8.5	3,670	8.2
May 15 .....	925	--	--	216	70	696	116	0	514	1,210	1,210	--	2.9	3,020	4.11	7,540	825	730	65	11	4,720	8.1
May 16 .....	1,540	--	--	214	22	185	95	0	143	318	318	--	3.3	903	1.23	3,750	276	198	59	4.8	1,460	8.2
May 17 .....	2,550	--	--	112	31	280	123	0	198	495	495	--	5.9	1,380	1.88	9,500	405	300	60	6.0	2,160	8.3
May 18 .....	3,160	--	--	87	22	211	119	0	143	365	365	--	7.8	1,020	1.39	8,700	308	210	60	5.2	1,640	8.2
May 19 .....	3,460	--	--	66	16	144	113	2	115	228	228	--	7.3	727	.99	6,790	230	134	58	4.1	1,150	8.3
May 20 .....	2,950	--	--	92	19	203	142	4	141	335	335	--	8.5	986	1.34	7,850	308	185	59	5.0	1,580	8.4
May 21-22 .....	1,188	--	--	63	15	129	125	0	94	208	208	--	4.3	619	.84	1,990	218	116	56	3.8	1,070	7.5
May 23 .....	540	--	--	81	21	203	119	0	142	340	340	--	5.6	1,377	1.27	1,370	288	190	61	5.2	1,580	8.2
May 24-25 .....	381	--	--	114	33	334	131	4	224	565	565	--	3.1	1,450	1.97	1,490	420	306	63	7.1	2,520	8.3
May 26 .....	320	--	--	132	38	429	134	3	268	725	725	--	2.4	1,800	2.45	1,580	485	370	66	8.5	3,030	8.3
May 27 .....	288	--	--	142	41	514	112	0	315	865	865	--	3.8	2,080	2.83	1,620	525	433	68	9.8	3,800	8.2
May 28 .....	254	--	--	172	54	681	98	0	438	1,130	1,130	--	1.7	2,680	3.64	1,840	650	570	70	12	4,820	8.1
May 29-30 .....	212	--	--	272	73	1,050	118	0	718	1,720	1,720	--	2.2	4,130	5.62	2,360	980	884	70	15	6,860	8.2
May 31 .....	186	--	--	240	71	987	137	0	624	1,610	1,610	--	4.2	3,860	5.25	1,940	890	778	71	14	6,270	8.1

June 1, 1953	178	232	76	951	140	0	603	1,570	--	2.8	--	3,660	4.98	1,760	890	776	70	14	6,110	8.2
June 2-3	164	272	78	1,050	145	0	670	1,740	--	2.6	--	4,220	5.74	1,870	1,000	881	69	14	6,870	8.1
June 4-7	142	240	70	929	137	0	621	1,520	--	2.6	--	3,710	5.05	1,420	885	772	70	14	5,830	7.5
June 8	328	103	34	396	116	0	139	560	--	4.0	--	1,450	1.97	1,280	395	300	63	6.7	2,330	7.2
June 9	1,150	166	54	600	103	0	395	1,020	--	6.4	--	2,510	3.41	7,790	635	550	67	10	4,090	8.1
June 10	8,330	76	16	194	140	2	141	272	--	8.0	--	827	1.12	16,600	256	138	81	5.0	1,440	8.3
June 11-13	4,857	58	13	135	127	0	111	192	--	4.5	--	614	.84	8,050	200	96	60	4.2	1,060	7.9
June 14-15	1,485	70	16	178	118	0	150	265	--	3.7	--	786	1.07	3,150	242	146	62	5.0	1,340	7.8
June 16-18	731	82	18	202	133	0	165	308	--	3.6	--	899	1.22	1,770	280	171	61	5.2	1,500	8.2
June 19-20	389	100	25	250	142	3	205	398	--	1.8	--	1,140	1.55	1,200	354	232	61	5.8	1,870	8.3
June 21-24	271	116	32	316	152	0	245	515	--	3.2	--	1,370	1.86	1,000	420	296	62	6.7	2,280	8.2
June 25	790	137	37	416	134	0	319	675	--	5.4	--	1,720	2.34	3,670	495	385	65	8.1	2,910	7.3
June 26	628	188	62	649	94	0	533	1,060	--	7.8	--	2,670	3.63	4,530	750	673	65	10	4,360	8.1
June 27	360	222	71	749	88	0	581	1,270	--	7.1	--	3,030	4.12	2,950	845	773	66	11	4,990	8.0
June 28	248	140	48	515	58	0	366	875	--	4.0	--	2,040	2.77	1,370	545	498	67	9.6	3,460	7.8
June 29-30	208	126	40	433	79	0	285	750	--	3.3	--	1,750	2.38	.983	480	416	66	8.6	2,980	7.9
July 1-2	250	134	40	435	91	0	264	775	--	4.3	--	1,810	2.46	1,220	500	426	65	8.5	3,030	8.0
July 3-4	271	152	50	554	56	0	247	1,050	--	6.9	--	2,310	3.14	1,690	585	539	67	10	3,820	7.8
July 5-6	887	142	33	410	116	0	209	755	--	5.8	--	1,700	2.31	4,070	490	395	65	8.1	2,870	8.0
July 7	961	90	26	280	134	4	146	470	--	9.7	--	1,140	1.55	2,960	330	214	65	6.7	1,980	8.3
July 8-10	385	61	18	171	135	0	85	280	--	5.6	--	724	.98	753	226	116	62	5.0	1,270	8.1
July 11-12	247	64	23	233	139	0	128	398	--	3.8	--	990	1.35	660	304	190	63	5.8	1,710	8.2
July 13-15	263	98	29	277	141	0	172	475	--	2.3	--	1,180	1.60	838	365	250	62	6.3	2,040	8.2
July 16-19	285	128	45	417	106	0	280	730	--	5.0	--	1,760	2.39	1,260	505	418	64	8.1	2,910	7.8
July 20	1,180	90	28	298	197	0	189	500	--	4.3	--	1,200	1.63	3,820	340	260	65	7.0	2,070	8.1
July 21	2,880	73	18	170	117	0	104	295	--	6.2	--	789	1.07	6,140	258	160	59	4.6	1,330	8.1
July 22-23	3,090	39	8.4	66	105	0	42	101	--	4.2	--	.342	.427	2,850	132	46	52	2.5	584	8.0
July 24-29	4,702	186	32	320	109	0	506	475	--	7.1	--	1,650	2.24	20,950	595	506	54	5.7	2,500	8.0
July 30-31	2,335	244	34	552	104	0	655	835	--	6.6	--	2,470	3.36	15,570	750	685	62	8.8	3,500	7.9

## RED RIVER BASIN--Continued

## RED RIVER NEAR GAINESVILLE, TEX.--Continued

Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal-cium (Ca)	Mag-nesium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Car-bonate (CO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> )	Bo-ron (B)	Dissolved solids (sum)			Hardness as CaCO <sub>3</sub>		Per-cent so-dium	So-dium absorp-tion ratio	Specific conduct-ance (micro-mhos at 25°C)	pH
															Parts per mil-lion	Tons per acre-foot	Tons per day	Total	Non-carbon-ate				
Aug. 1-10, 1953....	660	12	0.00	272	44	624	12	109	0	718	988	0.5	2.9	0.73	2,820	3.84	5,050	860	770	61	9.3	4,330	7.8
Aug. 11-14.....	498	--	--	284	59	690	--	113	0	759	1,110	--	1.1	--	3,100	4.22	4,170	950	858	61	9.7	4,730	7.9
Aug. 15-17.....	500	--	--	176	40	418	--	100	0	446	685	--	1.8	--	1,840	2.64	2,520	605	523	60	7.4	3,020	7.5
Aug. 18-20.....	529	--	--	236	54	604	--	120	0	617	980	--	1.2	--	2,890	3.66	3,840	810	712	62	9.2	4,120	7.8
Aug. 21, 23-31....	2,283	--	--	284	42	682	--	107	0	799	1,040	--	3.6	--	3,050	4.15	16,800	905	818	62	9.9	4,520	7.6
Aug. 22.....	9,120	--	--	220	29	367	--	149	0	541	550	--	8.3	--	1,860	2.53	45,800	670	548	54	6.2	2,810	7.3
Sept. 1-10.....	413	--	--	254	42	598	--	103	0	665	940	--	2.5	--	2,690	3.66	3,000	805	720	62	9.2	4,110	7.5
Sept. 11-17.....	229	--	--	175	48	490	--	107	0	415	800	--	3.1	--	2,650	2.79	1,270	634	546	63	8.5	3,410	7.6
Sept. 18-19.....	158	--	--	208	55	600	--	106	0	518	950	--	4.8	--	2,470	3.36	1,050	753	653	64	9.6	4,040	7.9
Sept. 20.....	146	--	--	233	67	728	--	100	0	683	1,190	--	4.4	--	3,030	4.12	1,190	908	824	64	11	4,820	7.7
Sept. 21-25.....	118	--	--	260	69	762	--	112	0	679	1,240	--	3.3	--	3,160	4.30	1,010	932	840	64	11	5,020	7.7
Sept. 26-30.....	98.2	--	--	294	83	903	--	126	0	754	1,450	--	4.0	--	3,570	4.99	973	1,080	972	65	12	5,740	7.5
Weighted average.	651	--	--	189	38	a 434	--	b 127	--	412	698	--	4.6	--	1,910	2.60	3,360	578	474	62	7.8	3,010	--

a Calculated from other weighted average constituents.

b Includes equivalent of individual carbonate values shown above.

## RED RIVER BASIN--Continued

## RED RIVER NEAR GAINESVILLE, TEX.--Continued

Temperature (°F) of water, water year October 1952 to September 1953

/Once-daily temperature measurement at approximately 1 p. m./

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

## RED RIVER BASIN--Continued

## WASHITA RIVER NEAR DURWOOD, OKLA.

LOCATION.--At gaging station at bridge on State Highway 18, 1.3 miles downstream from Caddo Creek, and 4 miles north of Durwood, Carter County. DRAINAGE AREA.--7,202 square miles.

RECORDS AVAILABLE.--Chemical analyses: May 1944 to September 1953.

Water temperatures: April 1947 to September 1953.

EXTREMES, 1952-53.-- Dissolved solids: Maximum, 1,050 ppm June 1-2; minimum, 140 ppm May 13.

Hardness: Maximum, 541 ppm June 1-2; minimum, 99 ppm May 13.

Specific conductance: Maximum daily, 1,440 micromhos Jan. 25; minimum daily, 232 micromhos May 13.

Water temperatures: Maximum, 85°F. June 16; minimum, freezing point Jan. 17, 21, 24.

EXTREMES, 1944-53.-- Dissolved solids: Maximum, 1,050 ppm June 1-2, 1953; minimum, 70 ppm Nov. 2, 1951.

Hardness: Maximum, 628 ppm Jan. 21-31, 1951; minimum, 41 ppm Nov. 2, 1951.

Specific conductance: Maximum daily, 1,320 micromhos Sept. 13, 1947; minimum daily, 94.9 micromhos Nov. 2, 1951.

Water temperatures, 1947-53: Maximum, 87°F. Aug. 6, 1950; minimum, freezing point on many days during winter months.

REMARKS.--Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of discharge for water year October 1952 to September 1953 given in WSP 1281.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carb- onate (CO <sub>3</sub> )	Sul- fate (SO <sub>4</sub> )	Chlo- ride (Cl)	Fluo- ride (F)	Ni- trate (NO <sub>3</sub> )	Bo- ron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Per- cent sodium asorp- tion ratio	Specific conductance (micro- mhos at 25°C)	pH	
															Parts per mil- lion	Tons per acre- foot	Tons per day	Calcium	Non-carbon- ate				
Oct. 1-10, 1952	13.4	--	--	59	54	95	4.8	275	0	156	133	--	1.2	--	660	0.90	34	369	144	36	2.2	1,130	7.8
Oct. 11-20	12.6	7.8	--	00	65	52	108	315	4	123	157	0.1	.8	0.36	691	.94	24	376	112	38	2.4	1,190	8.3
Oct. 21-31	121	--	--	64	51	116	--	322	0	104	175	--	1.0	--	690	--	25	369	105	43	2.6	1,220	7.9
Nov. 1-10	22.2	--	--	62	49	123	5.1	324	0	92	185	--	.6	--	696	.95	42	356	90	43	2.8	1,210	8.1
Nov. 11-20	49.4	4.0	--	00	64	66	102	370	0	151	133	.3	1.1	.41	714	.97	95	431	128	34	2.1	1,190	8.0
Nov. 21-24, 26, 28-30	133	--	--	89	61	102	--	302	0	259	125	--	.6	--	849	1.15	305	473	236	32	2.0	1,280	7.8
Nov. 25, 27	229	--	--	75	43	70	--	234	0	205	79	--	.7	--	632	.86	391	364	172	30	1.6	970	7.8
Dec. 1-10	112	--	--	120	49	87	4.1	328	0	263	103	--	2.3	--	833	1.13	252	501	232	27	1.7	1,230	8.1
Dec. 11-20	109	12	--	00	106	50	85	290	0	244	111	.3	2.2	.36	780	1.06	230	470	232	28	1.7	1,190	8.0
Dec. 21-31	150	--	--	114	45	90	--	282	0	260	115	--	1.6	--	811	1.10	328	470	238	29	1.8	1,210	7.9
Jan. 1-10, 1953	129	--	--	122	48	102	3.3	281	0	296	131	--	1.7	--	892	1.21	311	502	272	31	2.0	1,330	8.1
Jan. 11-20	113	13	--	00	124	49	104	279	0	301	139	.1	1.0	.35	904	1.23	276	511	282	30	2.0	1,360	8.1
Jan. 21-31	131	--	--	126	48	104	--	289	0	300	133	--	.7	--	908	1.23	321	512	275	31	2.0	1,350	8.0
Feb. 1-10	116	--	--	116	50	107	3.0	259	0	318	131	--	.5	--	854	1.16	287	495	283	32	2.1	1,300	8.0
Feb. 11-20	153	6.5	--	00	119	46	81	275	0	291	109	.3	1.1	.31	814	1.11	384	486	260	26	1.6	1,200	8.2
Feb. 21-28	175	--	--	118	45	82	--	258	0	286	105	--	.5	--	788	1.07	372	480	268	27	1.6	1,190	8.0

## RED RIVER BASIN

213

Mar. 1-6, 8, 1953	329	104	42	77	219	0	269	97	--	3.0	--	725	0.99	644	432	252	26	1.6	1,090	8.2
Mar. 7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19	398	90	29	53	172	0	207	52	--	5.7	--	520	.71	545	375	178	27	1.3	797	8.0
Mar. 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31	537	74	22	39	158	0	159	44	--	3.9	--	439	.60	637	218	176	24	1.0	683	7.8
Mar. 1, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31	1,933	46	11	22	142	0	59	19	--	2.3	--	234	.32	1,220	160	44	23	1.7	385	7.6
Mar. 16, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31	918	112	33	60	210	0	254	74	--	5.1	--	666	.91	1,160	415	243	24	1.3	989	8.0
Mar. 21-22, 27-28, 29, 30, 31	332	86	25	46	199	0	169	53	--	3.6	--	495	.67	444	318	154	24	1.1	770	8.0
Mar. 23-24, 31	858	136	39	72	219	0	333	91	--	2.9	--	812	1.10	1,880	500	320	24	1.4	1,180	7.8
Mar. 25-26, 29-30	153	110	32	61	218	0	254	66	--	2.8	--	645	.88	266	406	228	25	1.3	971	7.6
Apr. 1, 5, 8, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31	1,588	77	25	36	168	0	177	34	--	5.1	--	447	.61	1,920	295	158	21	.9	695	8.1
Apr. 2-4, 6-7, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31	1,568	51	17	30	152	0	83	34	--	4.5	--	299	.41	1,270	197	72	25	.9	498	8.0
Apr. 11, 14-20	465	80	22	39	167	0	163	45	--	4.8	--	447	.61	561	290	153	22	1.0	693	8.2
Apr. 12-13	748	117	28	34	130	0	309	34	--	5.4	--	600	.82	1,210	407	300	15	.7	850	8.2
Apr. 21-23	550	98	29	52	209	5	198	63	--	3.1	--	559	.76	830	364	184	24	1.2	966	8.3
Apr. 24-27	2,842	45	12	29	163	0	48	28	--	2.6	--	245	.33	1,680	162	28	28	1.0	425	8.0
Apr. 28-30	348	69	21	36	195	0	105	47	--	2.0	--	380	.52	357	258	98	23	1.0	628	8.1
May 1-2	225	72	24	36	180	5	139	49	--	1.8	--	442	.60	269	278	122	22	0.9	693	8.3
May 3-10	186	92	35	52	163	0	244	75	--	1.0	--	649	.88	326	374	240	23	1.2	943	8.1
May 11-12	3,280	101	35	56	186	3	233	84	--	2.0	--	686	.93	6,080	396	238	24	1.2	968	8.3
May 13	3,410	32	46	12	111	2	17	6.5	--	3.8	--	140	.19	1,290	99	4	20	.5	232	8.3
May 14-15	1,315	52	12	29	150	6	47	38	--	2.5	--	304	.41	1,080	179	46	26	.9	463	8.4
May 16-20	2,843	46	11	18	149	2	42	22	--	3.5	--	252	.34	1,930	160	34	20	.6	398	8.3
May 21	646	62	16	23	165	8	74	30	--	2.4	--	308	.42	537	220	172	18	.7	507	8.5
May 22-23	566	77	20	31	173	6	134	43	--	1.8	--	440	.60	674	274	122	20	.8	656	8.4
May 24-25	446	91	26	42	185	4	199	54	--	1.6	--	574	.78	691	334	176	22	1.0	847	8.4
May 26-31	240	102	32	57	186	0	244	79	--	1.8	--	700	.95	454	386	234	24	1.3	963	8.2
June 1-2	148	136	49	103	137	0	431	144	--	1.0	--	1,050	1.43	422	541	438	29	1.9	1,410	8.2
June 3-5	121	98	40	66	130	0	310	88	--	.8	--	768	1.04	251	400	302	28	1.4	1,060	8.2
June 6-8	3,367	57	15	33	136	0	92	46	--	4.0	--	367	.30	3,400	203	34	20	1.0	552	8.3
June 9-10	1,106	39	11	17	133	0	38	26	--	2.6	--	225	.31	1,100	132	84	21	.6	365	8.2
June 11	826	52	15	24	138	7	66	34	--	2.0	--	313	.43	686	191	66	21	.7	468	8.5

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

Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued																							
Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	
															Parts per million	Tons per acre-foot	Tons per day	Calcium	Non-magnesium				
June 12, 1953.....	1,260	--	--	145	36	66		158	6	409	58	--	7.2	--	897	1.22	3,050	510	370	22	1.3	1,120	8.4
June 13-17.....	666	--	--	62	16	28	--	137	4	116	30	--	6.4	--	383	.52	689	220	102	22	1.3	853	8.3
June 18-20.....	244	--	--	120	28	31	--	149	4	291	38	--	7.6	--	698	.95	460	414	286	14	7	897	8.3
June 21-30.....	101	14	0.00	104	28	36	6.5	180	0	240	38	0.3	3.1	0.59	606	.82	165	374	227	17	8	844	8.1
July 1-12.....	105	--	--	78	32	56		167	0	210	64	--	2.0	--	586	.80	166	325	188	27	1.4	851	7.7
July 13-17.....	879	--	--	67	13	23		129	0	75	22	--	5.8	--	270	.37	641	170	64	22	8	431	8.1
July 18.....	978	--	--	40	17	58		147	3	53	114	--	7.0	--	426	.58	1,120	220	94	37	1.7	732	8.3
July 19-22.....	7,898	--	--	36	8.8	14		122	0	34	12	--	4.0	--	190	.26	4,050	126	26	19	.5	305	8.2
July 23.....	3,740	--	--	85	18	17		119	0	188	16	--	12	--	423	.58	4,270	288	190	11	.4	635	8.1
July 24-27.....	2,084	--	--	59	12	20		156	0	90	11	--	5.7	--	303	.41	1,700	198	70	18	.6	431	8.2
July 28-31.....	811	--	--	68	13	20		125	0	130	19	--	4.5	--	359	.49	786	224	122	17	.6	516	8.1
Aug. 1-5.....	306	--	--	60	14	18		137	5	87	22	--	3.9	--	321	.44	265	206	85	16	.6	484	8.4
Aug. 6-10.....	287	--	--	71	15	33		161	0	114	42	--	2.3	--	404	.55	313	240	106	23	.9	600	8.2
Aug. 11-15.....	371	--	--	51	13	30		145	0	65	41	--	2.4	--	316	.43	317	182	63	26	1.0	489	8.0
Aug. 16-19.....	382	--	--	70	18	36		181	0	108	46	--	1.6	--	430	.58	455	250	102	24	1.0	640	8.1
Aug. 20-23.....	610	--	--	47	11	24		134	0	71	21	--	3.3	--	258	.35	425	164	54	24	.8	424	7.8
Aug. 24-26.....	416	--	--	88	21	38		136	0	193	52	--	4.5	--	512	.70	575	306	194	21	1.0	767	8.1
Aug. 27-31.....	228	--	--	58	13	25		144	0	99	26	--	3.9	--	315	.43	194	196	78	22	1.8	494	7.8
Sept. 1-6.....	269	--	--	78	18	33		170	0	140	38	--	3.8	--	439	.60	319	270	130	21	.9	660	8.2
Sept. 7-10.....	196	--	--	69	11	22		140	0	68	22	--	3.7	--	267	.36	141	172	58	22	.7	428	8.1
Sept. 11-14.....	107	--	--	86	23	33		163	4	136	42	--	1.7	--	580	.52	103	232	92	24	.9	593	8.3
Sept. 15-20.....	67.5	--	--	86	22	51		203	0	156	62	--	.8	--	529	.72	96	306	140	27	1.3	769	8.2
Sept. 21-30.....	49.9	9.0	.00	90	31	59	5.8	242	0	177	72	.3	.7	.51	572	.76	77	352	154	26	1.4	898	8.2
Weighted average...	518	--	--	65	19	a 35		b 162	--	119	40	--	3.7	--	390	0.53	545	240	108	24	1.0	595	--

<sup>a</sup> Calculated from other weighted average constituents.

<sup>b</sup> Includes equivalent of individual carbonate values shown above.

## RED RIVER BASIN--Continued

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

Temperature (°F) of water, water year October 1952 to September 1953  
 /Once-daily temperature, measurement at approximately 7 a.m./

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

## RED RIVER BASIN--Continued

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

LOCATION.--Immediately below dam on Red River, 1.7 miles upstream from Sand Creek, 4 miles northwest of Denison, Grayson County, and 3 miles upstream from gaging station near Colbert, Bryan County, Okla.

DRAINAGE AREA.--39,719 square miles above dam, 39,777 square miles above gaging station, of which 5,936 square miles is probably noncontributing.

RECORDS AVAILABLE.--Chemical analyses: May 1944 to September 1953.

Water temperatures: October 1945 to September 1953.

EXTREMES, 1952-53.--Dissolved solids: Maximum, 995 ppm Aug. 1-31; minimum, 912 ppm Oct. 1-31.

Hardness: Maximum, 360 ppm June 1-30; minimum, 334 ppm Oct. 1-31.

Specific conductance: Maximum daily, 1,640 micromhos Sept. 18; minimum daily, 1,490 micromhos Nov. 17.

EXTREMES, 1944-53.--Dissolved solids: Maximum, 1,430 ppm Aug. 11-20, Sept. 1-10, 1944; minimum, 464 ppm Oct. 21-31, 1945.

Hardness: Maximum, 522 ppm Aug. 11-20, Sept. 1-10, 1944; minimum, 233 ppm Dec. 21-31, 1945, Jan. 11-20, 1946.

Specific conductance: Maximum daily, 3,520 micromhos Aug. 14, 1944; minimum daily, 656 micromhos Oct. 16, 1945.

REMARKS.--Values reported for dissolved solids are residues on evaporation unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for gaging station near Colbert, Okla., for water year October 1952 to September 1953 given in WSP 1281. No appreciable inflow between dam and gaging station except during periods of heavy local rains.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boiron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Percent adsorption	Specific conductance (micro-mhos at 25°C)	pH	Color
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
Oct. 1-31, 1952 ..	2,394	11	88	28	188	140	203	295	295	1.2	912	1.24	5,890	334	220	55	4.5	1,520	7.9			
Nov. 1-30 .....	1,516	11	91	29	184	142	205	295	295	1.2	921	1.25	3,770	346	230	54	4.3	1,550	7.7			
Dec. 1-31 .....	1,355	10	80	29	188	141	209	295	295	4.0	918	1.25	3,360	344	228	54	4.4	1,550	7.7			
Jan. 1-31, 1953 ..	1,503	6.4	90	29	192	144	211	298	298	4.5	961	1.31	3,900	344	226	55	4.5	1,550	7.9			
Feb. 1-29 .....	1,268	5.2	92	30	187	142	210	300	300	8	929	1.26	3,180	353	236	53	4.3	1,570	7.9			
Mar. 1-31 .....	711	4.5	93	30	187	140	207	305	305	1.0	934	1.27	1,790	356	241	53	4.3	1,560	7.3			
Apr. 1-30 .....	1,748	4.6	94	30	186	145	210	300	300	2.0	933	1.27	4,400	368	239	53	4.3	1,580	7.9			
May 1-31 .....	1,477	7.3	93	30	185	147	211	295	295	2.5	978	1.33	3,900	356	235	53	4.3	1,570	7.9			
June 1-30 .....	2,108	8.0	93	31	182	148	202	300	300	1.0	919	1.25	5,230	360	238	52	4.2	1,550	8.0			
July 1-31 .....	2,517	9.6	93	30	200	147	207	320	320	0.3	272	1.32	6,610	356	235	55	4.6	1,620	8.0			
Aug. 1-31 .....	2,932	11	92	28	197	140	205	315	315	1.0	995	1.35	7,880	344	230	55	4.6	1,620	8.0			
Sept. 1-30 .....	2,674	16	92	29	194	132	209	315	315	1.5	a 922	1.25	6,660	348	240	55	4.5	1,590	7.7			
Weighted average	1,855	9.5	92	29	190	142	207	305	305	1.9	944	1.28	4,720	348	232	54	4.4	1,570	--			

a Sum of determined constituents.



## RED RIVER BASIN--Continued

## RED RIVER AT FULTON, ARK.

LOCATION.--At bridge on U. S. Highway 67, at Fulton, Miller County, three-tenths of a mile downstream from Missouri Pacific Railroad bridge, and 2 1/2 miles downstream from Little River.

DRAINAGE AREA.--52,380 square miles.

RECORDS AVAILABLE.--Chemical analyses October 1946 to September 1947, October 1952 to September 1953.

Water temperatures: October 1946 to September 1947, October 1952 to September 1953.

EXTREMES, 1952-53.--Dissolved solids: Maximum, 922 ppm Oct. 21-31; minimum, 55 ppm Mar. 4-9.

Hardness: Maximum, 372 ppm Nov. 1-10; minimum, 20 ppm Dec. 6-12, Mar. 4-9.

Specific conductance: Maximum daily, 1,650 microhmhos Nov. 1; minimum daily, 48.8 microhmhos Mar. 8.

Water temperatures: Maximum, 87°F on several days during June; minimum, 42°F on several days during November and December.

REMARKS.--Records of specific conductance of daily samples are available in district office at Fayetteville, Ark. Records of discharge for water year October 1952 to September 1953 given in WSP 1281.

## Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue on evaporation at 180°C)	Hardness as CaCO <sub>3</sub>		Specific conductance (microhmhos at 25°C)	pH	Color
														Calcium magnesium	Non-carbonate			
Oct. 1-10, 1952.....	1,928	14	0.22	98	26	129	5.2	2,242	136	220	0.3	1.2	776	352	153	1,300	8.4	6
Oct. 11-20.....	2,624	11	.02	100	28	166	5.6	2,152	173	266	.4	.3	984	364	215	1,450	8.4	6
Oct. 21-31.....	2,760	12	.09	102	28	166	5.5	2,177	184	285	.4	.3	922	370	224	1,510	8.3	7
Nov. 1-10.....	2,360	13	.00	103	28	167	5.8	183	180	270	.4	.5	899	372	222	1,450	8.0	5
Nov. 11-17.....	2,407	9.7	.00	98	28	159	5.8	178	170	255	.4	.7	858	360	214	1,390	7.6	5
Nov. 18-24.....	2,737	9.0	.00	76	19	129	5.3	150	130	200	.4	1.0	742	268	144	1,140	7.4	7
Nov. 25-30.....	17,470	6.6	.23	11	2.4	7.6	2.4	30	12	14	.6	4.5	94	38	13	132	6.7	60
Dec. 1-5.....	20,540	--	--	12	2.1	11	--	29	15	16	--	2.7	106	39	15	135	7.1	80
Dec. 6-12.....	26,870	--	--	6.4	1.0	3.0	--	17	6.0	5.0	--	1.7	61	20	6	83.3	7.1	80
Dec. 13-19.....	5,608	--	--	43	6.8	51	--	87	62	79	--	1.3	306	135	64	518	7.9	50
Dec. 20-23.....	8,565	--	--	22	6.8	23	--	53	26	41	--	1.3	180	83	39	275	7.3	70
Dec. 24-26.....	8,327	--	--	34	7.3	55	--	64	64	82	--	.9	300	115	62	493	7.4	40
Dec. 27-31.....	5,536	--	--	23	5.0	38	--	59	46	45	--	1.0	185	78	30	318	7.4	40
Jan. 1-8, 1953.....	7,055	--	--	11	2.9	12	--	36	13	17	--	1.1	111	40	10	151	7.0	25
Jan. 9-15, 1953.....	4,140	10	0.5	36	9.2	53	2.5	89	52	85	.2	1.0	284	128	55	502	8.2	20
Jan. 16-17.....	4,110	--	--	44	11	63	--	102	68	100	--	1.0	396	156	72	619	7.4	18
Jan. 19-24.....	14,350	--	--	10	2.6	9.3	--	30	13	16	--	--	98	36	11	145	6.9	30
Jan. 25-27.....	18,630	--	--	8.0	1.5	5.9	--	24	7.9	8.0	--	1.6	85	26	6	88.7	7.0	45
Jan. 28-31.....	13,200	--	--	17	3.4	26	--	36	21	44	--	1.5	168	56	26	253	7.3	30
Feb. 1-7.....	17,590	7.8	.17	9.4	2.6	9.4	1.6	25	12	13	.2	1.2	67	34	14	110	6.9	50
Feb. 8-9, 13-14.....	10,820	--	--	13	3.7	15	--	38	17	24	--	1.2	118	48	17	179	7.0	35
Feb. 10-12.....	7,283	--	--	19	5.3	24	--	54	24	39	--	1.0	168	69	25	272	7.2	30

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

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

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

Feb. 15-17, 1953 .....	15,100	--	--	13	3.5	16	--	--	36	17	25	--	2.0	119	47	18	189	7.8	35
Feb. 18-23 .....	9,612	--	--	16	4.7	20	--	--	40	24	32	--	1.6	140	58	25	251	7.2	30
Feb. 24-28, Mar. 1-3 .....	8,490	--	--	16	4.2	20	--	--	42	22	32	--	1.0	142	57	23	227	7.1	25
Mar. 4-9 .....	18,830	--	--	4.3	2.0	3.7	--	--	20	5.1	5.2	--	.8	55	20	4	62.5	7.3	45
Mar. 10-11, 13-17 .....	17,200	--	--	9.4	2.6	6.7	--	--	34	9.6	9.5	--	1.2	81	34	6	106	7.1	50
Mar. 12, 18-23, 30-31 .....	29,040	--	--	15	3.7	8.4	--	--	50	10	12	--	2.0	122	52	12	142	7.5	50
Mar. 24-29 .....	33,280	--	--	9.9	1.9	4.2	--	--	36	5.8	5.0	--	1.2	88	33	3	90.5	7.6	50
Apr. 1-5, 10 .....	20,360	10	--	20	18	12	2.0	--	52	14	19	--	1.4	142	56	14	173	7.4	30
Apr. 6-9 .....	39,900	--	--	23	3.3	13	--	--	71	13	18	--	1.3	154	71	13	208	8.0	30
Apr. 11-16 .....	35,900	--	--	10	1.9	4.9	--	--	34	5.8	4.5	--	2.0	188	33	5	89.3	7.5	35
Apr. 17-21 .....	18,080	--	--	18	3.4	16	--	--	50	19	24	--	1.4	140	60	19	202	7.3	90
Apr. 22-27 .....	28,280	8.4	--	32	31	5.6	2.8	--	74	34	45	--	1.1	235	100	40	329	7.4	34
Apr. 28-30 .....	84,530	--	--	22	2.4	9.6	--	--	68	15	12	--	1.2	161	66	10	199	7.1	40
May 1-2 .....	115,500	--	--	29	2.7	14	--	--	88	18	19	--	3.8	168	83	11	284	7.8	50
May 3-4, 6, 12-14 .....	75,200	--	--	22	1.2	8.0	--	--	40	9.0	12	--	4.7	124	59	10	163	7.1	50
May 5-7, 9-11 .....	49,970	8.9	--	27	1.5	5.2	1.9	--	48	6.4	6.5	--	2.5	100	44	5	117	7.9	22
May 13-22 .....	108,450	9.0	--	30	1.3	4.9	1.9	--	54	6.1	6.0	--	.3	108	44	1	117	7.9	22
May 23, 26 .....	70,450	--	--	19	2.1	18	--	--	50	11	28	--	.8	107	56	9	190	7.5	50
May 28-29 .....	37,450	--	--	13	5.9	8.8	--	--	50	11	8.5	--	1.3	107	45	4	127	7.4	50
May 29-31 .....	7,877	--	--	38	5.9	31	--	--	106	33	48	--	1.2	276	119	33	383	7.8	35
June 1-4 .....	5,440	13	--	61	11	69	3.4	--	149	77	111	--	.7	477	198	76	722	8.1	12
June 5-8, 10 .....	3,850	14	--	70	14	84	3.7	--	178	91	132	--	.3	568	234	88	852	8.3	7
June 9, 11-20 .....	4,232	13	--	81	18	113	4.2	--	191	119	178	--	.9	688	278	121	1,060	8.3	5
June 21-30 .....	2,840	11	--	90	21	133	4.6	--	210	140	205	--	.2	807	313	141	1,210	8.1	6

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

RED RIVER BASIN--Continued  
RED RIVER AT FULTON, ARK.--Continued

Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue on evaporation at 180° C)	Hardness as CaCO <sub>3</sub>		Specific conductance (micro-mhos at 25° C)	pH	Color
														Calcium	Non-carbonate			
July 1-10, 1953	2,915	11	0.01	94	23	143	5.9	200	163	220	0.5	0.6	798	329	165	1,320	8.1	8
July 11-17	3,676	9.7	.02	92	23	154	5.6	c 182	173	240	.4	1.0	851	324	174	1,390	8.3	12
July 18-21	3,522	8.9	.01	74	19	116	4.6	167	150	165	.3	1.0	655	262	126	1,090	8.0	11
July 22-31	50,740	7.3	.19	21	2.2	12	2.8	66	13	16	.5	1.4	150	61	7	1,199	7.3	--
Aug 1-3	22,770	--	--	20	3.8	13	--	65	16	18	--	2.1	146	66	12	185	6.9	15
Aug 4-6	8,677	--	--	42	9.3	53	--	81	61	88	--	1.6	382	143	77	576	7.3	20
Aug 7-10	5,960	9.0	.01	63	14	101	4.6	118	110	159	.3	2.1	550	214	118	873	8.0	12
Aug 11-20	5,383	8.3	.00	78	19	139	5.0	d 137	154	219	.3	1.6	726	272	160	1,160	8.3	8
Aug 21-31	3,801	7.9	.02	77	18	125	4.8	160	127	197	.2	1.9	666	266	135	1,130	7.5	9
Sept 1-9	3,677	7.3	.01	83	21	144	5.2	160	150	229	.3	2.0	754	284	162	1,270	8.0	5
Sept 10-17	3,249	6.7	.01	49	12	67	3.5	c 128	65	104	.1	1.1	381	172	66	669	8.3	9
Sept 18-30	3,349	6.3	.01	92	23	171	5.6	161	178	270	.1	1.3	870	334	192	1,430	8.1	9
Average	16,780	--	--	40	9.3	55	--	92	61	87	--	1.4	344	138	63	538	--	29

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

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

## RED RIVER BASIN--Continued

## RED RIVER AT FULTON, ARK.--Continued

Temporary (°F) of water, water year October 1952 to September 1953

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	70	56	42	46	52	49	64	79	82	81	80	75
2	72	56	42	44	52	52	64	78	81	81	80	74
3	69	56	42	44	52	55	65	78	81	82	80	74
4	69	56	44	44	52	54	--	78	81	82	80	74
5	70	56	42	--	54	52	62	79	82	82	82	74
6	64	56	42	45	54	53	62	80	81	83	82	73
7	60	56	44	45	54	53	60	79	83	86	82	74
8	58	56	48	48	50	53	60	79	83	83	84	75
9	59	60	48	46	52	52	62	79	83	82	81	75
10	59	55	49	45	53	49	60	80	85	80	81	74
11	60	52	47	46	53	53	60	80	85	78	80	74
12	62	50	47	45	50	55	60	80	84	78	80	74
13	63	52	47	47	50	55	58	--	87	78	81	74
14	65	55	46	47	49	60	--	--	86	78	81	73
15	65	58	43	47	47	58	58	--	86	75	81	73
16	60	63	--	45	48	56	58	82	85	75	82	73
17	60	64	--	45	48	56	58	82	87	75	82	73
18	60	66	--	45	48	59	58	82	87	80	81	74
19	60	52	--	45	48	60	55	82	87	80	79	73
20	60	52	--	45	50	60	56	81	87	78	75	73
21	55	50	48	44	--	62	56	81	87	80	75	73
22	55	51	49	44	46	59	60	82	86	78	75	73
23	53	52	47	46	46	59	62	82	86	75	75	73
24	53	51	47	46	46	59	62	78	86	79	75	73
25	56	51	47	45	46	59	62	78	85	79	75	73
26	56	51	45	46	46	59	62	79	85	79	75	75
27	57	48	45	46	47	59	62	79	85	99	75	75
28	57	42	45	46	49	60	62	78	83	79	75	75
29	53	45	45	47	--	58	62	80	82	79	75	75
30	52	45	45	49	--	62	62	80	80	79	75	75
31	55	--	46	50	--	64	--	82	--	80	75	--
Average	60	54	45	46	50	57	60	80	84	79	79	74

## RED RIVER BASIN--Continued

## SALINE BAYOU NEAR CLARENCE, LA.

LOCATION --At gaging station at bridge on U. S. Highway '84, 1.8 miles downstream from Bayou Bourbeaux, 4.0 miles downstream from Saline Lake conservation dam, 4.6 miles east of Clarence, Natchitoches Parish, and 6.7 miles upstream from mouth.

DRAINAGE AREA --382 square miles.

RECORDS AVAILABLE --Chemical analyses: February to September, 1953.

Water temperatures: February to September 1953

EXTREMES, 1953 --Dissolved solids: Maximum 711 ppm Sept. 24-30; minimum 37 ppm May 15-22, 24-31.

Hardness: Maximum, 96 ppm Sept. 24-30; minimum 12 ppm May 15-22, 24-31.

Specific conductance: Maximum daily, 1,460 micromhos Sept. 29-30; minimum daily, 35.3 micromhos Apr. 29.

Water temperatures: Maximum observed, 89°F on several days during August

REMARKS --Values reported for dissolved solids are sums of 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 1952 to September 1953 given in WSP 1281.

## Chemical analyses, in parts per million, February to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (Sum)			Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	Color
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate					
Feb. 3, 1953.....	689	2.5	0.46	5.4	2.8	31	2.0	9	5.6	54		4.0		145	0.20	274	25	18	73	2.7	229	5.7	
Feb. 10-28.....	2,405	4.2	.60	4.4	2.2	24		13	6.4	40		2.0		114	.16	740	21	10	69	2.3	179	6.6	
Mar. 1-12, 14-16, 21, 24.....	4,941	7.5	.47	4.9	1.6	13		16	5.6	18		3.5		63	.09	840	19	6	60	1.3	112	7.2	
Mar. 13, 17-20, 22-23, 25-31....	6,056	7.1	.63	3.0	1.9	7.1	1.7	12	7.1	10		1.0		46	.06	752	15	5	45	.8	68.4	7.1	
Apr. 1-12, 14-15, 29-30.....	2,576	8.8	.73	3.2	1.4	6.8	1.7	14	4.9	9.0		4.2		48	.07	334	14	2	48	.8	70.4	7.2	
Apr. 13, 16-28....	1,119	10	.85	3.8	2.1	10	1.9	14	5.7	14		5.4		61	.08	184	18	7	51	1.0	95.2	7.2	
May 1-14, 23....	7,045	8.9	.73	3.8	1.9	8.6	--	16	3.7	13		3.8		52	.07	989	17	4	52	.9	82.7	7.1	
May 15-22, 24-31....	10,800	7.5	.44	2.9	1.2	5.9	12	12	2.3	8.0		2.8		37	.05	1,080	12	2	51	.7	58.9	7.0	
June 1-3, 5-6, 9, 11-18.....	7,466	7.4	.40	3.2	1.2	6.0	1.6	14	1.9	9.5		2.8		41	.06	826	13	2	47	.7	64.4	7.1	
June 4, 7-8, 10, 19-30.....	3,511	8.4	.68	4.4	1.6	8.4	1.9	19	2.1	13		3.2		53	.07	502	18	2	48	.9	85.8	7.2	
July 1-14.....	469	12	.42	5.8	2.3	15		28	2.6	21		2.2		75	.10	95.0	24	1	56	1.4	124	7.1	
July 15-31.....	142	9.4	.30	6.4	2.6	20		30	2.9	29		2.0		86	.12	33.7	27	2	62	1.7	134	7.3	

a. Residue on evaporation at 180°C.

Aug. 1-16, 1953.....	169	10	.22	6.8	2.6	26	30	2.7	99	2.2	105	0.14	47.9	28	4	66	2.1	191	7.4
Aug. 17-21, 23-31.....	76.7	10	.23	10	4.4	54	44	3.0	94	2.0	192	.26	39.8	43	7	73	2.6	352	7.5
Sept. 1-9.....	53.0	15	.13	11	4.6	75	49	3.6	116	2.5	268	-.56	38.4	47	7	70	4.7	480	7.2
Sept. 10-23.....	28.4	17	.13	17	7.0	113	70	3.4	116	2.0	293	-.56	32.8	71	14	79	6.3	765	7.6
Sept. 24-30.....	11.4	18	.14	23	9.3	213	91	6.4	396	3.0	711	.97	21.9	96	22	83	9.4	1,270	7.6
Average.....	b3,088	9.6	.45	7.2	3.0	39	28	4.2	60	2.9	149	0.20	1,250	30	7	74	3.1	258	--

b Represents 98 percent of runoff for water year October 1952 to September 1953.

RED RIVER BASIN--Continued  
 SALINE BAYOU NEAR CLARENCE, LA.--Continued

Temperature (°F) of water, February to September 1953

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

RED RIVER BASIN--Continued  
RED RIVER AT ALEXANDRIA, LA.

LOCATION.--at gaging station at old bridge on U. S. Highway 165 between Alexandria, Rapides Parish, and Pineville, 1.7 miles downstream from Bayou Rigolette. DRAINAGE AREA.--57,500 square miles, of which 5,936 square miles above Denison Dam is non-contributing.

RECORDS AVAILABLE.--Chemical analyses: October 1952 to September 1953.

Water temperatures: October 1952 to September 1953.

EXTRMS, 1952-53.--Dissolved solids: Maximum, 798 ppm Oct. 29-31, Nov. 1-10; minimum, 91 ppm June 1-9.

Sardness: Maximum, 365 ppm Nov. 1-10; minimum, 57 ppm June 1-9.

Specific conductance: Maximum daily, 140 micromhos Oct. 31; minimum daily, 133 micromhos June 2, 4.

Temperatures: Maximum observed, 90°F Aug. 8.

REMARKS. Values reported for dissolved solids are sums of 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 1952 to September 1953 given in WSP 1281.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids (Sum)			Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	
													Parts per million	Tons per acre-foot	Tons per acre-foot	Calcium, magnesium	Non-carbonate				
Oct. 29-31, 1952...	3,437	13		88	33	153		214	161	243		2.2	798	1.09	7,410	355	180	48	3.5	1,380	8.1
Nov. 1-10.....	3,168	13		92	33	150		234	155	238		2.5	781	1.09	6,830	365	174	47	3.4	1,370	8.1
Nov. 11-24.....	3,365	13		92	32	143		234	149	229		2.1	776	1.06	7,090	361	170	46	3.3	1,340	8.2
Nov. 25-30, Dec. 1	3,437	13		92	31	56		111	50	84		2.2	308	.42	4,830	142	52	46	2.0	573	7.7
Dec. 2-10.....	2,460	8.0		26	8.4	34		78	22	60		2.2	199	.27	13,240	99	38	43	1.5	374	7.6
Dec. 11-20.....	23,120	11		26	6.5	46		75	28	71		.8	226	.31	14,110	92	30	52	2.1	448	7.6
Dec. 21-31.....	16,850	13		26	6.6	47		77	28	72		.5	231	.31	10,510	92	29	53	2.1	424	7.4
Jan. 1-10, 1953...	16,490	15		28	6.8	48		81	29	73		2.8	243	.33	10,820	98	31	52	2.1	418	8.0
Jan. 11-20.....	12,080	10		25	5.9	41		70	26	64		1.0	207	.28	6,750	87	29	51	1.9	381	7.7
Jan. 21-31.....	23,440	8.8		22	5.4	32		58	26	50		.8	174	.24	11,010	77	30	47	1.6	323	7.6
Feb. 1-10.....	28,230	8.4		22	5.2	34		58	26	51		.8	175	.24	13,340	76	29	48	1.6	321	7.4
Feb. 11-19.....	28,360	11		19	5.2	31		54	19	50		1.2	163	.22	12,480	69	25	49	1.6	306	7.7
Feb. 20-28.....	39,240	9.2		19	5.4	29		61	21	43		1.0	158	.21	16,740	70	20	48	1.5	294	7.7
Mar. 1-8.....	28,600	8.6		18	4.7	17		57	16	27		1.0	120	.16	9,270	64	18	37	.9	219	7.7
Mar. 9-20.....	58,360	9.6		17	4.3	16		54	13	25		1.0	113	.15	17,810	60	16	36	.9	201	7.7
Mar. 21-31.....	67,570	10		21	4.8	15		69	12	25		1.0	123	.17	22,440	72	16	31	.8	223	7.6
Apr. 1-10.....	36,160	11		20	4.5	16		65	13	25		.8	122	.17	11,910	68	15	33	.8	217	7.6
Apr. 11-20.....	51,610	11		23	4.9	12	--	78	15	16		1.0	121	.16	16,860	78	14	25	.6	204	7.7
Apr. 21-30.....	45,070	20		26	4.9	21		81	19	31		2.0	164	.22	19,980	85	19	35	1.0	277	8.0

## RED RIVER BASIN--Continued

RED RIVER AT ALEXANDRIA, LA.--Continued<sup>a</sup>

Chemical analyses, in parts per million, water year October 1957 to September 1953--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
														Parts per million	Tons per acre-ft	Tons per day	Calcium, mg./l.	Non-carbonate				
May 1-9, 20, 1953	147,100	14		26	4.5		12	89	9.1	18		1.5		129	0.18	51,200	83	10	24	0.6	228	8.1
May 10-19	140,300	14		22	4.1	9.2	--	80	7.8	12		1.2		109	.15	41,290	72	6	22	.5	187	8.1
May 21-31	197,600	13		20	4.0	7.1	--	71	6.9	12		1.8		99	.13	44,800	66	8	19	.4	164	8.0
June 1-9	36,700	12		17	3.6	6.2	--	62	6.6	12		1.2		91	.12	23,730	57	6	24	.5	156	7.9
June 10-20	33,930	12		23	5.2	17	--	77	14	26		1.2		136	.18	12,460	79	16	32	.8	244	7.9
June 21-30	13,530	16		43	10	41	--	128	40	63		1.8		a 292	.40	10,570	148	44	37	1.5	490	8.0
July 1-9, 28	12,630	18		53	13	52	--	160	52	79		1.8		a 359	.49	12,240	186	54	38	1.7	604	8.0
July 10-20	6,762	17		68	16	72	--	210	71	109		1.5		a 492	.67	8,860	244	72	39	2.0	805	8.2
July 21-27	12,840	16		78	20	96	--	204	94	138		1.5		a 607	.83	19,800	274	110	37	2.9	997	8.1
July 28-31, Aug 1-11	41,840	17		28	4.9	24	--	94	20	31		2.0		a 186	.28	23,290	90	43	31	1.8	297	7.7
Aug. 12-20	10,010	16		44	9.1	51	--	122	48	76		1.2		a 332	.43	8,870	147	43	43	1.8	532	7.5
Aug. 21-31	7,965	16		72	19	112	--	176	112	170		1.8		390	.60	12,050	236	114	49	3.0	1,010	7.9
Sept. 1-7	6,601	14		77	20	115	--	b 208	104	172		1.8		a 625	.95	11,140	274	104	48	3.0	1,050	8.6
Sept. 8-14	6,017	19		62	16	68	--	c 194	69	123		2.2		a 477	.65	7,750	220	81	48	2.5	814	8.5
Sept. 15-30	5,397	14		76	21	119	--	b 216	99	180		1.8		a 622	.85	9,060	276	99	48	3.1	1,070	8.6
Weighted average	34,520	13		39	11	51	--	113	46	79		1.5		302	0.41	28,150	142	49	44	1.9	523	--

<sup>a</sup> Residue on evaporation at 180°C.<sup>b</sup> Includes equivalent of 10 parts per million of carbonate (CO<sub>3</sub>).<sup>c</sup> Includes equivalent of 8 parts per million of carbonate (CO<sub>3</sub>).

## RED RIVER BASIN--Continued

## RED RIVER AT ALEXANDRIA, LA.--Continued

Temperature (°F) of water, water year October 1952 to September 1953

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

## RED RIVER BASIN--Continued

## KIAMICHI RIVER NEAR BELZONI, OKLA.

LOCATION --At gaging station at bridge on State Highway 7, 1 3/4 miles northwest of Belzoni, Pushmataha County, 6 miles downstream from Cedar Creek, and 10 miles upstream from Possum Creek.

DRAINAGE AREA 1,423 square miles.

RECORDS AVAILABLE--Chemical analyses: October 1947 to September 1953.

Water temperatures: October 1947 to September 1953.

EXTREMES 1952-53 --Dissolved solids: Maximum 106 ppm Nov. 4-5, 22; minimum, 25 ppm Nov. 26-30.

Hardness: Maximum, 36 ppm Nov. 4-5, 22; minimum, 14 ppm Feb. 1-28, Apr. 1-30.

Specific temperatures: Maximum daily, 164 micromhos Nov. 4-5; minimum daily, 27.1 micromhos July 20.

Water specific conductance: Maximum, 96 $\mu$ S Aug. 6; no records collected during winter months.

EXTREMES 1947-53 --Dissolved solids: Maximum 106 ppm Nov. 4-5, 22, 1952; minimum, 25 ppm Nov. 26-30, 1952.

Hardness: Maximum, 46 ppm May 21-22, 28, 31, 1948; minimum, 11 ppm Feb. 11-20, 1949, Jan. 1-10, 1950.

Specific temperatures: Maximum daily, 223 micromhos Dec. 5, 1948; minimum daily, 22.5 micromhos Jan. 25, 1948.

Water temperatures: Maximum, 98 $^{\circ}$ F Aug. 17, 1951, July 3, 1952; minimum, freezing point on several days during winter months.

REMARKS--Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of discharge for water year October 1952 to September 1953 given in WSP 1281.

## Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (residue at 180 $^{\circ}$ C)			Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25 $^{\circ}$ C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, nesium	Non-carbonate			
Oct. 1-31, 1952.....	5.47	2.8	0.05	3.6	2.4	8.0	2.2	29	0	4.3	7.8	0.3	1.1	0.10	52	0.07	0.8	19	0	44	85.8	7.4
Nov. 1-3, 6-21, 23-25.....	27.0	--	--	4.0	2.4	10	10	31	0	5.3	7.5	--	.5	--	49	.07	3.6	20	0	53	1.0	6.8
Nov. 4-5, 22.....	2,216	--	--	7.5	4.1	16	16	43	0	13	15	--	1.0	--	106	.14	.3	36	0	90	1.2	7.3
Nov. 26-30.....	--	--	--	2.6	2.1	3.7	3.7	15	0	5.1	3.8	--	.2	--	25	.03	150	15	3	34	.4	6.6
Dec. 1-10.....	882	--	--	3.0	1.8	5.3	5.3	13	0	8.0	4.2	--	1.8	--	30	.04	72	15	4	43	6	6.8
Dec. 11-20.....	240	--	--	3.3	1.9	6.8	6.8	14	0	9.2	5.8	--	2.0	--	36	.05	23	16	5	48	.7	6.8
Dec. 21-31, 1953.....	597	--	--	3.5	2.0	6.0	6.0	16	0	7.7	5.8	--	1.0	--	34	.05	51	17	4	44	.6	6.9
Jan. 1-31, 1953.....	354	7.4	.55	3.2	1.7	5.3	1.7	14	0	7.0	7.0	1	.6	.16	56	.08	54	16	5	38	.6	6.8
Feb. 1-28.....	1,251	8.6	.70	3.2	1.5	5.8	1.5	12	0	7.4	5.5	.3	.9	.39	58	.08	251	14	4	43	.7	6.8
Mar. 1-31.....	3,183	8.5	.73	3.2	1.5	4.8	1.3	13	0	6.8	6.5	.1	1.7	.23	55	.07	185	14	4	40	.6	6.8
Apr. 1-30.....	4,588	8.2	.68	3.5	1.2	4.8	1.3	14	0	5.8	5.3	--	.6	.32	49	.07	148	14	2	40	.6	6.8
May 1-31.....	4,610	10	.68	3.0	1.2	4.4	1.2	17	0	4.8	4.0	1	1.1	.14	48	.07	597	15	1	37	.5	7.4
June 1-30.....	712	9.4	.68	4.6	2.2	6.8	1.5	28	0	4.9	5.0	1	1.1	.42	55	.07	106	21	0	40	.7	6.9
July 1-31.....	3,899	7.1	.45	3.5	1.7	5.5	1.9	22	0	3.9	4.8	3	1.0	.45	58	.08	590	17	0	38	.6	6.9
Aug. 1-31.....	182	9.4	.35	3.6	1.9	5.1	1.7	23	0	4.4	5.0	1	.7	.48	58	.08	24	18	0	36	.5	7.1
Sept. 1-30.....	35.4	6.3	.45	4.0	2.3	5.9	1.8	27	0	4.4	5.0	3	.7	.47	57	.08	5.4	21	0	36	.6	7.1
Weighted average ..	1,977	--	--	3.3	1.4	4.9	4.9	16	--	5.6	5.1	--	1.0	--	51	0.07	272	14	1	43	0.6	57.4

## RED RIVER BASIN--Continued

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

Temperature (°F) of water, water year October 1952 to September 1953  
 /Once-daily temperature measurement at approximately 5 a.m./

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

## RED RIVER BASIN--Continued

## LITTLE RIVER BELOW LUKFATA CREEK NEAR IDABEL, OKLA.

LOCATION --At gaging station at bridge on U. S. Highway 70, just downstream from Lukfata Creek, and 5 miles northeast of Idabel, McCurtain County. DRAINAGE AREA --1,239 square miles.

RECORDS AVAILABLE --Chemical analyses: October 1947 to September 1953.

Water temperatures: October 1947 to September 1953.

EXTREMES, 1952-53 --Dissolved solids: Maximum 444 ppm Nov. 1-17; minimum, 45 ppm Apr. 1-30.

Hardness: Maximum, 77 ppm Oct. 1-31, Nov. 1-17; minimum, 11 ppm July 21-31.

Specific conductance: Maximum daily, 939 microhos Oct. 31; minimum daily, 24.2 microhos Apr. 7.

Water temperatures: Maximum, 86°F June 24-25; minimum, 37°F Dec. 19.

EXTREMES, 1947-53 --Dissolved solids: Maximum, 444 ppm Nov. 1-17, 1952; minimum, 40 ppm July 21-31, 1950.

Hardness: Maximum, 77 ppm Oct. 1-31, Nov. 1-17, 1952; minimum, 9 ppm Apr. 21-30, 1948.

Specific conductance: Maximum daily, 939 microhos Oct. 31, 1952; minimum daily, 21.5 microhos Feb. 14, 1950.

Water temperatures: Maximum, 94°F Aug. 16, 1950; minimum, freezing point Feb. 26, 1948, Feb. 14, 1950, Feb. 2-3, 1951.

REMARKS --Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of discharge for water year October 1952 to September 1953 given in WSP 1281.

## Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Mag-nesium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Car-bonate (CO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> )	Bo-ron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>		Per-cent so-lids	So-lidum ratio	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate				
Oct. 1-31, 1952	7.71	7.9	0.03	20	6.6	127	2.4	61	0	12	212	0.1	0.6	0.18	432	0.59	77	27	77	6.3	808	7.5
Nov. 1-17	15.8	--	--	17	6.6	60	0	13	0	13	208	--	--	--	444	0.60	77	28	78	6.4	819	7.3
Nov. 18-24	54.6	--	--	17	5.2	70	54	0	11	114	114	--	--	--	278	0.38	64	20	71	3.8	490	7.1
Nov. 25	2,790	--	--	14	5.2	23	43	0	9.1	44	44	--	--	--	162	0.22	56	21	47	1.4	234	6.7
Nov. 26-30	2,624	--	--	4.3	1.4	5.6	5.6	18	0	5.2	4.8	--	2.3	--	52	0.07	16	2	43	0.6	59.5	6.7
Dec. 1-31	816	7.9	45	5.1	1.8	7.1	1.3	21	0	5.2	10	3	1.3	1.3	56	0.08	20	3	40	0.7	83.1	6.9
Jan. 1-31, 1953	869	8.1	38	4.6	1.5	5.8	1.0	20	0	4.9	7.8	1	0.6	0.16	49	0.07	115	2	39	0.6	66.4	6.9
Feb. 1-28	1,301	7.9	38	3.8	1.4	4.2	0.8	16	0	4.5	5.0	3	2.2	0.17	49	0.07	172	3	35	0.5	65.6	6.8
Mar. 1-31	3,758	8.7	0.2	4.2	1.3	3.8	0.9	17	0	4.8	4.5	1	1.0	0.33	46	0.06	16	2	33	0.4	50.8	6.8
Apr. 1-30	6,261	8.7	15	3.8	1.0	3.7	1.0	16	0	3.2	4.0	0	0.7	0.29	45	0.06	761	14	34	0.4	48.7	6.8
May 1-31	6,497	8.7	35	4.2	1.1	4.0	1.0	20	0	3.1	4.5	1	0.8	0.16	49	0.07	860	16	34	0.4	63.3	7.2
June 1-10	92	--	--	8.8	1.5	18	1.0	40	0	5.4	20	--	1.3	--	81	0.11	44	28	59	1.5	130	7.4
June 11-20	92.0	--	--	10	2.4	21	41	40	0	5.7	28	--	1.6	--	101	0.14	25	35	57	1.6	169	7.5
June 21-30	38.1	--	--	12	2.7	31	31	48	0	6.7	43	--	1.0	--	129	0.18	13	41	62	2.1	229	7.3
July 1-14	22.6	--	--	16	2.2	42	42	54	0	7.0	63	--	0.8	--	189	0.23	10	49	65	2.6	303	7.0
July 15-17	59.0	--	--	18	3.2	63	60	0	8.7	96	96	--	1.1	--	237	0.32	38	58	70	2.6	495	7.6
July 18-19	317	--	--	14	2.9	38	38	56	0	7.0	53	--	1.1	--	154	0.21	132	47	54	1.4	270	7.4
July 20	2,250	--	--	8.8	2.4	18	18	32	0	8.2	42	--	2.0	--	117	0.16	711	32	54	1.4	140	7.4
July 21-31	9,465	--	--	2.8	1.0	4.9	4.9	13	0	4.0	4.2	--	1.2	--	49	0.07	1,230	11	49	0.6	42.9	6.6

Aug. 1-10, 1953.....	257	--	--	5.6	1.7	12	25	0	5.8	14	--	1.1	--	67	.09	46	21	0	56	1.1	96.3	7.0
Aug. 11-20.....	124	--	--	7.6	2.2	20	33	0	6.5	26	--	.7	--	92	.13	31	28	1	61	1.6	149	7.1
Aug. 21-31.....	153	--	--	6.0	1.7	16	28	0	5.4	20	--	.7	--	77	.10	32	22	0	62	1.5	119	7.0
Sept. 1-11.....	88.1	--	--	7.2	2.4	21	34	0	4.6	30	--	.4	--	96	.13	23	28	0	62	1.7	164	7.3
Sept. 12-21.....	43.1	--	--	8.4	2.7	25	36	0	5.3	38	--	.1	--	114	.16	13	32	2	63	1.9	201	7.5
Sept. 22-30.....	23.3	--	--	10	3.2	39	38	0	6.2	62	--	.1	--	155	.21	9.8	38	7	69	2.8	284	7.3
Weighted average....	1,998	--	--	4.1	1.2	a 5.6	18	--	3.9	5.5	--	0.9	--	50	0.07	270	15	0	44	0.6'	58.6	--

a Calculated from other weighted average constituents.

## RED RIVER BASIN--Continued

## LITTLE RIVER BELOW LUKFATA CREEK NEAR IDABEL, OKLA.--Continued

Temperature (°F) of water, water year October 1952 to September 1953  
 Once-daily temperature measurement at approximately 8 a. m.

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

## RED RIVER BASIN--Continued

## OQUACHITA RIVER AT ARKADDELPHIA, ARK.

LOCATION.--At gaging station at bridge on State Highway 8 at Arkadelphia, Clark County, 800 feet upstream from Missouri Pacific Railway bridge. DRAINAGE AREA.--2,311 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1948 to September 1953.

Water temperatures: October 1948 to September 1953.

Hardness: Maximum, 52 ppm Oct. 1-5; minimum, 14 ppm May 11-20.

Specific conductance: Maximum daily, 175 micromhos Mar. 16; minimum, 35.2 micromhos May 12.

Water temperatures: Maximum daily, 90° F many days during summer months; minimum, 45° F Jan. 6, 17-18.

EXTREMES, 1952-53.--Dissolved solids: Maximum, 114 ppm Oct. 1-5, 1952; minimum, 33 ppm Jan. 11-20, 1950, Sept. 28-30, 1951.

Hardness: Maximum, 52 ppm Oct. 1-5, 1952; minimum, 11 ppm Jan. 25-31, 1949.

Specific conductance: Maximum daily, 175 micromhos Mar. 16, 1953; minimum daily, 26.7 micromhos Jan. 27, 1949.

Water temperatures: Maximum, 92° F Aug. 18-20, 1952; minimum, 36° F Jan. 30-31, Feb. 1-2, 1951.

REMARKS.--Records of specific conductance of daily samples available in district office at Fayetteville, Ark. Records of discharge for water year October 1952 to September 1953 furnished by District office, Corps of Engineers, Vicksburg, Miss.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue on evaporation at 180° C)	Hardness as CaCO <sub>3</sub>		Specific conductance (micro-mhos at 25° C)	pH	Color
														Calcium, magnesium	Non-carbonate			
Oct. 1-5, 1952	317	--	--	16	3.2	8.3	--	22	34	9.0	--	1.8	114	52	34	163	6.5	5
Oct. 6-14	168	--	--	11	2.2	7.1	--	34	9.2	8.5	--	1.0	76	37	9	110	7.3	6
Oct. 15-23	168	--	--	13	2.0	8.7	--	36	12	10	--	.8	84	40	10	124	7.7	4
Oct. 24-31	172	--	--	13	1.8	9.0	--	37	13	11	--	.8	85	39	9	133	7.1	12
Nov. 1-10	178	--	--	12	1.9	8.6	--	38	11	10	--	.6	82	39	8	128	7.2	10
Nov. 11-22	315	7.3	0.08	12	2.4	6.4	1.7	32	13	8.8	0.2	.8	68	40	14	123	7.1	10
Nov. 23-30	5,992	--	--	8.4	1.2	4.3	--	25	7.4	5.0	--	1.6	60	26	6	80.2	6.8	12
Dec. 1-10	13,790	5.1	.22	8.8	2.1	3.1	1.3	27	6.5	4.0	.1	1.4	45	31	8	71.5	7.3	30
Dec. 11-20	4,419	5.0	.27	7.9	2.2	2.2	1.3	26	4.5	6.5	.1	1.4	43	29	7	64.2	7.3	35
Dec. 21-31	2,355	6.8	.07	7.5	2.0	3.3	1.3	25	5.8	4.2	.1	1.6	52	27	6	67.3	7.1	35
Jan. 1-10, 1953	2,620	6.8	.07	6.4	1.5	2.8	1.4	21	5.6	4.0	.2	1.3	46	22	5	57.9	6.7	20
Jan. 11-20	3,243	--	--	5.2	1.2	2.7	--	18	5.4	3.5	--	.9	38	18	3	62.1	7.2	30
Jan. 21-24	12,930	--	--	4.8	1.5	3.4	--	14	5.9	5.8	--	1.3	38	18	7	69.0	6.2	30
Jan. 25-31	4,838	--	--	5.0	.9	3.5	--	14	5.8	4.8	--	1.5	42	16	5	60.8	6.4	25
Feb. 1-7	5,721	--	--	5.2	.8	3.5	--	16	4.8	4.5	--	.9	36	16	3	59.3	6.8	28
Feb. 8-12	4,478	--	--	6.4	1.2	3.9	--	21	5.9	5.8	--	1.0	49	21	4	69.3	7.4	20
Feb. 13-20	3,464	--	--	4.0	1.3	2.5	--	16	4.0	3.2	--	.7	39	15	2	50.6	7.0	27
Feb. 21-28	2,894	--	--	5.5	1.1	2.8	--	17	4.0	4.2	--	.8	45	18	4	56.9	6.7	30
Mar. 1-10	4,480	--	--	4.7	1.3	2.5	--	17	4.7	3.0	--	1.5	35	17	3	56.8	7.3	25
Mar. 11-20	8,176	--	--	3.6	1.5	2.3	--	16	4.2	2.8	--	.8	35	13	2	48.1	6.8	30
Mar. 21-22, 25-28	4,027	--	--	4.2	1.4	2.0	--	14	4.5	2.6	--	1.0	41	16	5	43.1	6.9	30
Mar. 23-24, 29-31	3,652	--	--	4.9	1.3	4.2	--	20	4.1	2.0	--	1.0	49	17	1	74.9	6.9	30

RED RIVER BASIN--Continued  
OUMCHITA RIVER AT ARKADLPHIA, ARK.--Continued

Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue on evaporation at 180°C)	Hardness as CaCO <sub>3</sub>		Specific conductance (micro-mhos at 25°C)	pH	Color
														Calcium, mg./l.	Non-carbonate			
Apr. 1-4, 1953	2,000	--	--	6.8	2.9	5.4	--	28	6.1	6.5	--	1.1	59	29	6	75.8	7.4	17
Apr. 5-12	8,244	--	--	4.8	1.7	4.4	--	20	4.7	3.2	--	1.0	47	19	3	49.7	7.0	32
Apr. 13-21	2,169	8.6	0.10	6.8	1.0	4.8	0.8	24	4.9	5.2	0.1	.9	52	21	1	66.7	7.2	22
Apr. 22-30	10,530	--	--	5.6	1.9	4.4	--	22	6.1	4.2	--	1.1	50	22	4	62.6	7.0	22
May 1-10	3,921	--	--	5.1	1.2	4.0	--	16	4.5	4.5	--	3.3	47	18	4	59.2	7.0	15
May 11-20	23,260	--	--	3.6	1.2	2.5	--	16	3.9	2.5	--	1.0	42	14	1	42.6	7.1	35
May 21-31	10,270	--	--	5.6	1.2	2.5	--	20	4.4	3.0	--	.7	43	19	3	51.4	7.1	20
June 1-10	1,060	--	--	7.7	1.3	6.1	--	26	6.0	8.8	--	1.2	53	24	3	87.0	7.5	15
June 11-20	419	--	--	7.6	1.3	6.6	--	27	7.0	8.0	--	1.2	53	24	2	87.9	7.6	15
June 21-30	417	--	--	8.0	1.5	6.9	--	26	6.8	9.8	--	.9	56	26	5	92.8	7.7	12
July 1-10	533	--	--	7.9	2.4	6.0	--	30	6.0	7.5	--	1.1	73	30	5	92.3	7.6	9
July 11-20	714	7.9	11	9.5	1.4	4.6	1.8	31	7.0	6.0	.2	2.3	53	29	4	95.2	7.6	20
July 21-26	5,093	--	--	6.0	1.1	5.4	--	23	3.6	3.8	--	2.1	62	19	1	58.5	6.9	35
July 27-31	2,087	--	--	7.8	1.5	4.6	--	27	2.6	7.2	--	2.2	68	26	4	78.5	7.0	10
Aug. 1-10	480	--	--	8.1	2.1	5.4	--	32	5.0	7.5	--	.8	58	29	3	94.2	7.3	15
Aug. 11-20	824	--	--	7.9	1.8	5.1	--	30	3.0	6.5	--	1.4	58	27	2	84.9	7.5	10
Aug. 21-31	318	--	--	8.3	1.9	5.0	--	32	5.6	6.5	--	1.1	58	28	2	88.8	7.2	15
Sept. 1-10	496	--	--	8.9	2.4	8.6	--	30	6.4	14	--	1.0	82	32	7	122	7.2	5
Sept. 11-21	521	--	--	7.7	2.0	3.8	--	29	5.8	5.0	--	.9	59	27	4	77.8	7.3	7
Sept. 22-30	270	--	--	7.9	2.0	5.8	--	30	7.2	7.5	--	.9	65	28	3	94.1	7.3	5
Average	3,722	--	--	7.4	1.7	4.7	--	24	6.7	6.0	--	1.2	56	25	6	79.6	--	20

## RED RIVER BASIN--Continued

## OUACHITA RIVER AT ARKADELPHIA, ARK.--Continued

Temperature (°F) of water, water year October 1952 to September 1953

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

## RED RIVER BASIN--Continued

## LITTLE MISSISSIPPI RIVER NEAR BOUGHTON, ARK.

LOCATION.--at gaging station at bridge on U. S. Highway 67, 2 miles northeast of Boughton, Nevada County, and 8.7 miles downstream from Antoine Creek.  
 DRAINAGE AREA--1,070 square miles.  
 RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1953.

TEMPERATURES--October 1947 to September 1953: Maximum, 71 ppm Dec. 19, 21-22, 24; minimum, 33 ppm June 1-6  
 EXTREMES, 1954: Dissolved solids: Maximum, 12 ppm June 1-6, minimum, 12 ppm June 1-6, Aug. 6-10, 11-20, Sept. 1-10, 21-30.  
 Hardness: Maximum, 26 ppm Mar. 21, 22-23, 30-31, Apr. 21-30; minimum, 12 ppm June 1-6, Aug. 6-10, 11-20, Sept. 1-10, 21-30.  
 Specific conductance: Maximum daily, 334 micromhos Aug. 1, minimum daily, 30.5 micromhos June 5.  
 Water temperature: Maximum daily, 33° F. July 2, 6; minimum daily, 41° F. Dec. 24-26; minimum, 41° F. Dec. 24-26.  
 EXTREMES 1947-53: Dissolved solids: Maximum, 12 ppm June 6-8, 1951; minimum, 25 ppm Feb. 2-3, 5, 9-11, 1950, Sept. 1-10, 21-30, 1952.  
 Hardness: Maximum, 96 ppm June 6-8, 1951; minimum, 12 ppm June 1-6, Aug. 6-10, 11-20, Sept. 1-10, 21-30, 1953.  
 Specific conductance: Maximum daily, 334 micromhos Aug. 1, 1953; minimum daily, 30.5 micromhos June 5, 1953.  
 Water temperature: Maximum, 94° F. July 29, 1948.

REMARKS.--Records of specific conductance of daily samples available in district office at Fayetteville, Ark. Records of discharge for water year October 1952 to September 1953 furnished by district office, Corps of Engineers, Vicksburg, Miss.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue on evaporation at 180° C)	Hardness as CaCO <sub>3</sub>		Specific conductance (micro-mhos at 25° C)	pH	Color
														Calcium	Non-carbonate			
Oct. 1-10, 1952.....	96.8	5.2	0.19	4.4	1.2	3.4	1.0	20	2.9	3.5	0.1	0.5	40	16	0	48.5	7.2	14
Oct. 11-20.....	106	8.9	.14	4.4	.7	3.4	1.2	19	3.1	3.5	.1	.4	39	14	0	47.4	7.5	10
Oct. 21-31.....	49.5	9.6	.28	5.4	.7	4.6	1.0	24	3.2	4.5	.1	.4	46	16	0	57.7	7.2	12
Nov. 1-10.....	49.6	10	.06	5.2	1.7	5.2	1.5	27	4.6	4.8	.0	.3	43	20	0	65.1	6.8	13
Nov. 11-20.....	78.5	--	.02	5.6	1.7	5.2	--	26	5.2	5.0	--	.5	56	21	0	68.0	7.3	17
Nov. 21-30.....	1,364	--	.31	6.4	1.2	3.7	--	21	5.0	4.2	--	1.9	59	21	0	64.5	6.8	30
Dec. 1-10.....	4,580	--	.32	7.6	.7	2.8	--	19	5.6	3.5	--	1.7	59	23	4	61.3	7.3	45
Dec. 11-18, 20.....	998	11	.08	5.7	1.4	4.5	1.2	19	6.2	4.2	.0	1.5	46	20	4	65.6	6.3	18
Dec. 19, 21-22, 24.....	1,605	--	.27	7.6	.7	4.3	--	22	5.1	5.5	.0	2.3	71	22	4	68.5	7.7	36
Dec. 23, 25-26, 28.....	1,582	--	.18	4.4	.7	2.7	--	16	2.0	3.0	--	1.2	63	14	1	44.0	7.1	17
Dec. 27, 29-31.....	848	--	.15	6.0	.9	3.6	--	20	4.0	4.5	--	.7	68	19	2	59.3	7.1	20
Jan. 1-10, 1953.....	865	9.4	.08	5.2	1.7	3.4	1.0	18	5.8	4.0	.0	1.2	47	20	5	60.5	6.8	17
Jan. 11-20.....	1,390	--	.05	6.4	1.2	3.0	--	18	6.3	4.5	--	1.4	46	21	6	63.9	7.2	23
Jan. 21-31.....	441	--	.08	6.0	1.2	2.2	--	19	4.0	2.8	--	2.0	48	20	4	57.0	7.3	35
Feb. 1-10.....	3,135	7.9	.08	6.4	1.0	3.3	1.3	22	6.0	3.0	.1	.8	46	20	2	61.9	6.6	23
Feb. 11-20.....	3,101	7.6	.08	6.4	1.0	2.9	1.2	20	5.2	3.5	.0	1.2	50	20	4	58.0	6.6	23
Feb. 21-24.....	2,128	--	.17	8.2	.5	3.2	--	25	5.3	4.0	--	1.0	52	22	2	68.4	7.1	35
Feb. 25-28.....	2,122	--	.06	5.6	1.2	1.8	--	19	4.0	2.8	--	.8	40	19	3	52.0	7.1	23

	23	6	25
Mar. 1-10, 1953	23	6	59.6
Mar. 11-20	22	3	69.3
Mar. 21, 24-25, 30-31	26	3	67.4
Mar. 22-23, 26-29	20	2	60.6
	17	2	61.0
Apr. 1-10	22	6	52.2
Apr. 11-20	26	4	62.8
Apr. 21-30	23	2	60.0
May 1-10	23	4	58.3
May 11-20	16	2	42.8
May 21-31	12	0	37.2
June 1-6	23	2	64.8
June 7-11	15	0	48.9
June 12-20	14	0	41.4
June 21-30	19	0	61.1
July 1-2, 4-5	15	0	46.9
July 3, 6-10	20	0	54.5
July 11-19	25	1	65.4
July 21-31	19	0	66.0
Aug. 1-5	12	0	40.2
Aug. 6-10	12	0	43.6
Aug. 11-20	14	0	37.6
Aug. 21-31	12	0	41.1
Sept. 1-10	13	0	40.2
Sept. 11-20	12	0	40.6
Sept. 21-30	19	2	55.7
Average	466		--
	649		--
	323		--
	2,432		--

~~Handwritten notes and scribbles:~~

- ~~5-9-81~~
- ~~7-2-4~~
- ~~5-3-52~~
- ~~5-3-52~~
- ~~5-3-52~~

## RED RIVER BASIN--Continued

## LITTLE MISSOURI RIVER NEAR BOUGHTON, ARK.--Continued

Temperature (°F) of water, water year October 1952 to September 1953

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

RED RIVER BASIN--Continued  
SMACKOVER CREEK NEAR NORPHLET, ARK.

LOCATION.--On County road, 3½ miles north of Norphlet, Union County.

RECORDS AVAILABLE.--Chemical analyses: October 1952 to September 1953.

Water temperatures: October 1952 to September 1953.

EXTREMES, 1952-53.--Dissolved solids: Maximum, 59,800 ppm Oct. 1-10; minimum, 285 ppm May 1-2.

Hardness: Maximum, 10,400 ppm Oct. 1-10; minimum, 44 ppm May 1-2.

Specific conductance: Maximum, 73,800 microhos Oct. 1-10; minimum daily, 396 microhos May 2.

Water temperatures: Maximum, 96°F June 18, 27; minimum, 44°F Jan. 17.

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

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Mag- nesium (Mg)	Sodium (Na)	Potas- sium (K)	Bicar- bonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue on evap- oration at 180°C)	Hardness as CaCO <sub>3</sub>		Specific conductance (micro-mhos at 25°C)	pH	Color
														Calcium, mg-nestum	Non-carbonate			
Oct. 1-10, 1952.....	15	0.04	2,930	750	16,200	185	78	0.9	32,100	0.1	0.7	59,800	✓ 10,400	✓ 10,300	✓ 73,500	7.6	5	
Oct. 11-20.....	14	.08	2,850	743	15,700	170	78	.9	31,400	.1	3.5	57,300	✓ 10,200	✓ 10,100	✓ 72,100	6.8	5	
Oct. 21-31.....	19	.08	2,800	716	15,100	172	75	.8	30,080	.0	2.5	54,700	9,830	9,870	68,200	7.1	6	
Nov. 1-7, 9.....	14	.00	2,650	842	14,700	151	73	4.9	29,400	.0	3.0	49,400	9,250	9,190	67,500	7.9	10	
Nov. 8.....	--	--	2,120	579	11,100	52	52	5.0	22,980	--	.3	42,400	7,670	7,630	54,200	7.5	16	
Nov. 10-12, 16.....	15	.08	2,694	231	4,910	59	2	12	9,930	.0	2.0	15,800	3,180	3,180	26,100	4.7	20	
Nov. 13-15.....	20	.10	1,757	197	4,140	54	3	10	8,370	.6	.0	14,300	2,700	2,700	22,300	5.2	15	
Nov. 17.....	--	--	1,150	315	6,140	--	2	6.0	12,500	--	.0	34,500	4,160	4,180	32,700	5.5	23	
Nov. 18-23.....	12	.10	383	119	1,900	30	1	15	4,000	.0	8.0	6,560	1,440	1,440	11,100	4.6	20	
Nov. 24-27.....	15	.08	719	201	3,640	50	7	14	7,400	.0	.0	12,400	2,620	2,610	19,700	6.1	15	
Nov. 28-30, Dec. 1.....	--	--	484	131	2,590	--	1	8.0	5,210	--	.0	9,860	1,750	1,750	15,000	4.7	17	
Dec. 2-3.....	--	--	371	110	1,980	--	0	7.0	3,980	--	.1	7,770	1,380	1,380	11,400	4.5	10	
Dec. 4-5.....	--	--	278	81	1,450	--	0	9.0	2,910	--	.0	5,910	1,030	1,030	8,710	4.48	9	
Dec. 6, 10.....	--	--	252	72	1,340	--	3	8.0	2,870	--	.0	5,370	924	924	7,900	5.4	12	
Dec. 7-9.....	14	.02	212	56	1,060	14	2	9.9	2,760	.0	2.4	3,810	758	758	6,470	4.8	10	
Dec. 11-14.....	--	--	379	122	1,980	--	3	7.0	4,070	--	.3	8,030	1,450	1,446	11,200	5.3	12	
Dec. 15-20.....	20	.09	733	199	3,730	47	15	11	7,630	.6	1.0	12,600	2,650	2,640	20,360	6.8	15	
Dec. 21-22.....	--	--	549	156	2,950	--	8	9.0	5,900	--	.0	10,900	2,010	2,000	16,100	6.2	7	
Dec. 23-26.....	18	.00	537	152	2,680	32	7	9.7	5,580	.0	.4	9,700	1,960	1,960	15,060	6.3	9	
Dec. 27-30.....	23	.05	879	181	3,470	42	10	15	7,110	.0	.0	11,700	2,440	2,430	18,900	6.3	10	
Dec. 31, Jan. 1-5, 1953.....	15	.00	212	58	1,120	14	2	10	2,200	--	1.8	3,920	768	768	6,630	5.0	10	
Jan. 6-9.....	17	.02	398	114	1,980	23	4	10	4,020	.0	2.2	7,480	1,480	1,480	11,300	5.1	5	
Jan. 10-14, 18.....	18	.04	522	132	2,480	27	2	9.6	5,090	.0	.6	9,370	1,850	1,840	13,900	4.9	8	
Jan. 15-17.....	17	.02	636	161	3,180	37	5	9.2	6,460	--	3.0	11,700	2,350	2,340	17,500	6.3	5	

RED RIVER BASIN--Continued  
 SMACKOVER CREEK NEAR NORPHLET, ARK.--Continued  
 Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue on evaporation at 180°C)	Hardness as CaCO <sub>3</sub>		Specific conductance (micro-mhos at 25°C)	pH	Color
														Calcium, mg./l.	Non-carbonate, mg./l.			
Jan. 19-22, 1953	17	12	0.02	224	56	1,130	14	1	12	2,270	0.1	0.2	3,900	789	788	6,740	5.2	5
Jan. 23-31	12	13	.04	74	19	342	7.0	2	9.9	720	.2	1.1	1,320	262	261	2,370	5.0	15
Feb. 1-4	14	.07	102	26	26	521	7.5	4	14	1,020	.2	.6	1,850	362	358	2,210	5.3	15
Feb. 5-6	13	.05	81	21	21	897	7.1	3	9.9	1,812	.2	.7	1,500	288	286	2,580	5.3	15
Feb. 7-9	15	.04	167	41	41	907	11	4	13	1,600	.2	1.2	2,840	582	582	4,850	5.4	15
Feb. 10-16	10	.14	68	18	18	296	5.5	2	9.9	605	.3	1.6	1,140	244	242	1,970	5.5	35
Feb. 17, 20-21	12	10	.10	74	20	358	5.8	4	14	712	.3	.5	1,310	266	263	2,280	5.5	30
Feb. 18-19, 24, 28	14	.06	124	33	33	673	6.4	3	14	1,320	.2	.5	2,340	445	442	4,020	5.7	15
Feb. 22-23, 25	11	.12	58	16	16	280	5.0	4	14	555	.3	.6	1,050	210	207	1,830	6.0	40
Feb. 26-27	15	.50	98	28	28	521	7.2	5	7.0	1,040	.1	.4	1,820	360	356	3,190	6.2	15
Mar. 1-3, 5, 7-9	17	.05	168	40	40	863	13	1	11	1,700	.0	1.3	3,330	584	582	5,140	4.8	13
Mar. 4, 10	14	.05	113	24	24	550	8.8	1	7.4	1,100	.0	1.5	2,170	380	380	3,440	4.8	16
Mar. 6, 11	--	--	--	67	16	333	--	4	8.2	655	--	1.4	1,290	233	230	2,140	5.4	30
Mar. 12, 14-17	--	--	--	23	6.2	117	--	4	12	232	--	1.7	474	82	79	821	5.9	50
Mar. 13, 18-19	--	--	--	43	12	222	--	4	7.0	428	--	1.7	834	157	154	1,420	5.5	40
Mar. 20-22, 29-31	14	.06	59	14	14	302	6.8	4	7.2	605	.1	3.2	1,230	206	202	2,020	5.1	25
Mar. 23-24, 26	--	--	--	23	5.7	120	--	5	4.7	236	--	1.4	474	80	76	815	5.7	50
Mar. 25, 27-28	--	--	--	40	9.6	183	--	5	5.4	362	--	1.8	717	140	136	1,200	5.5	50
Apr. 1, 15, 20	--	--	--	334	34	1,700	--	2	3.0	3,340	--	4.7	6,560	974	972	10,000	4.7	5
Apr. 2-5	--	--	--	184	42	857	--	2	13	1,720	--	2.5	3,160	632	630	5,280	5.0	23
Apr. 6, 9-13	--	--	--	103	26	553	--	3	6.8	1,080	--	1.5	2,020	364	362	3,480	5.6	32
Apr. 7-8	--	--	--	48	13	257	--	3	10	510	--	2.6	975	172	170	1,710	5.0	50
Apr. 11, 20	10	.04	218	44	44	1,130	14	3	6.0	2,250	0.0	1.6	4,170	725	722	6,800	5.1	17
Apr. 21-23	16	.18	369	58	58	2,010	21	1	5.0	3,890	.0	1.0	7,360	1,160	1,160	11,500	4.6	12
Apr. 24-26	--	--	--	62	14	330	--	3	3.9	655	--	4.3	1,400	212	210	2,100	5.2	22
Apr. 27-30	--	--	--	38	8.9	205	--	6	3.7	394	--	2.9	774	132	126	1,310	5.8	30

May 1-2, 1953	--	12	3.8	57	--	6	3.1	116	--	.9	285	44	40	407	6.3	50
May 3, 6-7	--	19	4.4	98	--	8	2.9	194	--	2.6	422	66	60	674	6.0	45
May 4, 8, 10, 12	--	24	6.1	129	--	5	4.3	252	--	2.6	534	85	81	846	5.9	35
May 13-22	8.6	--	4.1	92	2.9	7	4.5	175	.3	1.2	393	62	56	612	6.0	45
May 23-27	12	.01	57	310	5.8	8	4.1	598	.1	2.1	1,200	193	193	1,910	6.1	22
May 28-29	--	124	29	657	--	4	3.0	1,338	--	5.5	2,560	429	425	4,120	5.9	22
May 30-31	--	264	61	1,410	--	2	2.0	2,810	--	4.7	5,300	910	908	8,330	4.8	19
June 1-2	--	272	61	1,470	--	2	2.0	2,850	--	3.6	5,440	930	928	8,560	4.6	20
June 3-4	--	410	91	2,190	--	2	2.0	4,390	--	1.4	8,200	1,400	1,400	12,600	5.0	12
June 5-6, 8-14	16	.07	788	4,000	52	0	5.0	8,130	.0	.20	14,400	2,550	2,550	21,600	4.5	17
June 7, 19-20	16	.05	1,160	5,980	50	3	7.0	11,900	.0	.20	21,400	3,810	3,810	31,200	5.8	8
June 15-18	16	.11	827	176	56	1	6.0	8,870	.0	.21	16,400	2,790	2,790	23,900	4.7	15
June 21-22	16	.04	1,290	293	85	26	3.0	13,700	.0	.18	24,600	4,420	4,400	35,300	4.1	10
June 23-26	16	.08	1,450	327	7,740	2	4.0	13,600	.1	.18	21,600	4,960	4,960	38,200	4.1	13
June 27-30	13	.06	1,630	373	8,520	29	5.0	17,700	.2	.18	31,500	5,600	5,560	43,700	6.7	17
July 1-4	14	.06	1,600	350	8,590	97	7.0	16,900	.1	.18	30,100	5,430	5,430	42,400	4.8	17
July 5, 9, 14, 19, 21, 23	9.9	.06	1,462	111	2,630	30	8.0	15,120	.0	6.0	30,030	1,610	1,610	14,800	4.9	7
July 6, 7	12	.07	1,670	373	9,040	3	3.0	18,000	.0	.21	32,200	5,700	5,700	44,900	5.6	13
July 8, 10	11	.09	1,190	305	6,730	79	4.0	13,300	.0	.18	24,100	4,230	4,230	34,500	6.5	15
July 11-13	9.8	.04	1,190	291	6,740	78	4.0	13,100	.0	.4.9	23,300	4,120	4,120	34,700	4.6	10
July 15-18, 20	9.3	.04	884	183	4,790	57	6.0	9,410	.0	5.0	17,100	2,960	2,960	25,900	4.7	8
July 22-24	8.9	.05	336	71	1,940	23	9.0	3,740	.0	4.5	6,700	1,130	1,130	10,900	4.7	5
July 25-26	8.2	.02	1,220	299	7,160	81	7.0	13,900	.0	3.0	25,100	4,270	4,250	36,200	6.6	15
July 27-29	10	.04	400	82	2,240	2	5.0	4,430	.0	3.5	7,910	1,390	1,380	13,100	5.0	6
July 30-31	9.9	.07	689	165	3,870	27	7.0	7,580	.0	4.5	13,600	2,400	2,400	20,700	5.0	10
Aug. 1-3	11	.04	1,080	257	5,990	70	3.0	11,700	.0	3.9	20,400	3,750	3,750	31,200	5.4	15
Aug. 4-10	9.8	.02	1,370	287	7,470	87	4.0	14,600	.0	3.9	26,200	4,600	4,580	37,900	5.3	7
Aug. 11, 13-14, 16	9.2	.01	1,640	376	9,310	102	3.0	18,100	.0	4.4	32,700	5,640	5,580	45,800	7.3	10
Aug. 12, 15	--	--	1,340	304	7,570	16	14	14,600	--	4.5	25,700	4,590	4,580	37,300	6.4	7
Aug. 17, 19-20	--	--	1,240	299	7,210	25	10	14,000	--	3.0	24,700	4,320	4,300	36,400	6.6	5
Aug. 18, 25-31	9.7	.02	1,880	426	10,700	123	52	20,800	.0	4.9	38,200	6,440	6,400	51,300	7.3	10
Aug. 21-24	9.8	.01	1,690	395	9,710	105	4.0	18,900	.0	3.9	33,800	5,840	5,800	47,500	7.2	10
Sept. 1-10	10	.00	1,970	449	10,800	136	52	21,300	--	2.0	37,100	6,760	6,750	52,900	7.2	10
Sept. 11-21	7.7	.01	2,500	550	13,500	169	2.0	26,700	--	1.5	46,700	8,500	8,450	64,500	7.2	8
Sept. 22-24	--	--	2,440	524	13,500	59	1.0	26,100	--	2.0	46,500	8,240	8,190	68,100	7.6	5
Sept. 25-30	--	--	2,710	592	15,000	71	1.0	29,100	--	2.0	51,400	9,200	9,140	69,600	7.0	30
Average	--	--	748	179	4,080	13	6.9	8,050	--	3.9	14,500	2,600	2,590	20,800	--	18

5.7

## RED RIVER BASIN--Continued

## SMACKOVER CREEK NEAR NORPHLET, ARK.--Continued

Temperature (°F) of water, water year October 1952 to September 1953

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	78	70	45	51	57	62	68	--	90	93	89	91
2	--	75	47	47	55	60	--	68	89	94	89	89
3	83	68	48	59	50	60	68	70	78	--	89	79
4	75	62	59	48	55	59	69	67	87	94	93	78
5	95	64	49	50	56	59	65	68	89	86	95	77
6	86	65	49	51	52	59	64	68	88	--	96	88
7	--	66	55	53	53	60	67	73	89	90	97	86
8	66	72	59	54	54	59	70	73	92	89	91	89
9	--	67	58	50	55	54	70	73	92	89	83	89
10	75	55	54	48	57	55	69	73	94	89	82	87
11	59	62	50	49	56	56	89	69	--	85	90	89
12	--	58	55	47	55	64	67	70	94	82	92	90
13	80	59	50	49	54	63	--	--	94	79	96	90
14	79	61	47	55	50	65	66	64	94	78	95	90
15	69	66	45	53	51	67	67	68	90	79	96	90
16	71	69	46	50	50	63	62	69	90	83	91	90
17	73	68	52	44	51	64	65	71	92	85	90	90
18	70	64	58	53	50	66	58	73	98	85	89	86
19	71	61	55	54	53	65	60	75	91	85	86	87
20	67	55	54	52	50	60	58	74	97	82	85	86
21	69	51	51	49	50	67	66	75	91	84	83	83
22	68	51	51	52	51	65	65	76	95	82	81	85
23	66	56	50	59	50	64	68	78	94	84	86	85
24	61	57	50	52	51	60	--	79	95	84	85	84
25	61	51	50	53	51	60	66	79	97	85	85	84
26	62	53	48	55	51	65	68	--	97	86	85	90
27	69	50	48	67	53	63	--	81	98	87	84	94
28	65	47	49	56	55	65	--	83	89	87	84	90
29	63	46	47	60	--	64	--	90	90	87	85	92
30	61	45	49	55	--	67	--	83	95	87	89	91
31	68	--	49	56	--	68	--	82	--	88	90	--
Average	70	60	51	53	53	62	--	74	92	86	89	87

RED RIVER BASIN--Continued  
QUACHITA RIVER AT CALION, ARK.

LOCATION.--At Rock Island and Pacific Railway bridge in Calion, Union County.

DRAINAGE AREA.--6,570 square miles (approximately 1949 to September 1953).

RECORDS AVAILABLE.--Chemical analyses: October 1949 to September 1953.

EXTREMES 1952-53.--Dissolved solids: Maximum, 1,250 ppm July 19-22; minimum, 61 ppm Dec. 7-10.

Hardness: Maximum, 1,770 ppm Oct. 23, 1952; minimum, 61 ppm Dec. 7-10.

Specific conductance: Maximum, 1,900 micromhos daily, 46.4 micromhos May 18.

Water temperatures: Maximum 95°F Aug. 8; minimum 48°F Oct. 23, 1952; minimum daily, 46.4 micromhos May 18.

Water temperatures: Maximum 95°F Aug. 8; minimum 48°F Oct. 23, 1952; minimum daily, 46.4 micromhos May 18.

EXTREMES 1949-53.--Dissolved solids: Maximum, 1,250 ppm July 19-22, 1953; minimum, 61 ppm Dec. 7-10, 1952.

Hardness: Maximum, 1,770 ppm Oct. 23, 1952; minimum, 61 ppm Dec. 7-10, 1952.

Specific conductance: Maximum daily, 14,900 micromhos Oct. 23, 1952; minimum daily, 46.4 micromhos May 18, 1953.

Water temperatures: Maximum 95°F Aug. 8, 1953.

Water temperatures: Maximum 95°F Aug. 8, 1953.

REMARKS.--Once-daily sampling near surface. Records of specific conductance of daily samples available in district office at Fayetteville, Ark. No records of discharge available for this station.

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue on evaporation at 180°C)	Hardness as CaCO <sub>3</sub>		Specific conductance (micro-mhos at 25°C)	pH	Color
														Calcium, magnesium	Non-carbonate			
Oct. 1-4, 1952		8.6	0.06	12	2.7	28	1.7	27	11	49	0.2	0.8	132	41	19	229	7.1	17
Oct. 5-8, 9-11		7.3	0.04	14	3.7	41	1.7	23	16	74	0.3	0.6	180	50	31	311	6.7	15
Oct. 7-8		--	--	21	5.9	74	--	20	14	150	--	1.9	313	77	60	572	6.4	9
Oct. 12-20		8.9	0.15	11	2.7	29	1.8	30	14	47	0.3	0.5	136	39	13	249	7.0	12
Oct. 21-22, 24, 26-31		8.9	0.04	12	2.4	28	1.8	34	9.6	44	0.4	0.5	121	40	12	227	7.5	15
Nov. 1-4		6.6	0.11	13	2.8	33	1.8	42	8.7	52	0.2	0.9	135	44	10	250	7.7	20
Nov. 6-10		8.4	0.18	14	3.3	35	1.8	44	16	50	0.2	1.0	143	46	12	267	7.2	30
Nov. 11-13		11	0.08	19	3.8	46	2.0	44	24	74	0.2	1.0	186	63	27	335	7.5	15
Nov. 14, 16-18		8.2	0.08	24	4.9	40	2.2	40	22	130	0.2	1.7	298	80	47	438	6.9	15
Nov. 19, 23-24		7.7	0.07	27	9.4	154	--	40	22	285	--	3.1	620	131	96	1,036	6.9	30
Nov. 25-26, 28-30		6.8	0.10	29	14	279	5.0	23	18	320	0.2	8.3	1,070	224	176	1,780	6.9	20
		6.8	0.16	26	4.7	105	4.0	23	16	193	0.2	2.7	412	83	64	715	7.1	60
Dec. 1-4-5		--	--	24	7.5	95	--	19	9.3	188	--	2.9	396	91	76	677	6.8	22
Dec. 2-3		--	--	26	7.6	92	--	20	10.7	195	--	4.6	404	96	80	695	6.9	25
Dec. 6, 11-12		--	--	12	4.3	27	--	20	7.4	55	--	1.4	151	48	31	243	7.0	30
Dec. 7-10		--	--	6.8	3.1	5.2	--	21	5.1	12	--	1.6	61	30	12	78.0	7.0	20
Dec. 13-19		5.8	0.04	28	6.7	104	3.8	19	8.8	206	0.2	3.4	426	98	82	726	7.3	30
Dec. 20-22, 31		--	--	32	9.4	139	--	21	9.9	265	--	5.4	560	118	102	952	6.9	25
Dec. 23-30		8.2	0.07	24	6.0	89	2.8	20	10	175	0.3	2.8	360	84	68	630	6.7	20
Jan. 1-2, 1953		--	--	42	10	172	--	10	12	342	--	6.3	690	146	138	1,170	6.3	22
Jan. 3-10		8.0	0.08	26	5.9	98	3.8	14	11	192	0.3	3.1	382	90	78	687	6.8	30
Jan. 11-17		7.3	0.08	27	6.8	115	3.3	14	14	226	0.2	4.8	516	96	84	797	6.9	25

## RED RIVER BASIN--Continued

## OUACHITA RIVER AT CALION, ARK.--Continued

Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue on evaporation at 180°C)	Hardness as CaCO <sub>3</sub>		Specific conductance (micro-mhos at 25°C)	pH	Color
														Calcium	Non-carbonate			
Jan. 19-21, 1953.....		8.6	0.13	20	3.9	73	2.3	16	9.2	142	0.4	2.1	279	66	53	515	6.8	25
Jan. 22-24.....		--	--	17	4.5	49	--	14	9.7	106	--	1.8	263	61	49	400	6.3	35
Jan. 25-27.....		--	--	9.3	1.2	14	--	14	6.2	29	--	1.5	118	28	17	140	7.0	32
Jan. 28-31.....		7.3	.08	23	5.0	61	2.9	4	12	179	.3	5.2	354	78	74	618	5.6	35
Feb. 1-2.....		--	--	26	6.3	107	--	6	8.8	215	--	2.7	352	91	86	709	5.7	25
Feb. 3-7.....		7.2	.08	19	3.8	73	2.4	10	8.6	144	.3	2.8	288	63	55	515	6.5	35
Feb. 8-12.....		7.8	.08	27	6.4	121	3.0	5	10	238	.3	5.4	459	94	90	823	6.8	20
Feb. 13-14, 17, 22-23.....		7.8	.15	16	3.1	60	2.0	7	12	112	.3	5.9	229	53	47	414	6.3	35
Feb. 15-16, 18, 21, 25.....		8.2	.11	20	3.9	78	2.5	4	11	154	.3	5.8	293	66	63	535	6.1	35
Feb. 19-20, 24, 28-28.....		8.0	.16	24	5.9	105	2.8	2	14	208	.3	5.2	395	84	83	732	5.0	35
Mar. 1-4.....		8.2	.22	22	4.6	90	2.5	10	12	172	.3	3.1	336	74	66	611	6.7	30
Mar. 5-7.....		8.0	.15	14	3.1	40	1.7	13	9.4	78	.2	3.2	149	48	37	300	7.1	35
Mar. 8-9, 12, 15-17.....		8.4	.12	17	2.9	57	2.2	11	8.1	118	.1	2.2	294	54	45	471	6.6	45
Mar. 10-11, 13-14, 19-20.....		8.6	.13	23	4.9	106	3.1	3	9.7	208	.1	5.7	494	78	75	712	5.5	35
Mar. 18, 21, 26-27.....		--	--	34	9.2	178	--	3	7.8	342	--	2.2	759	123	120	1,140	5.3	50
Mar. 22-23, 25.....		--	--	13	2.7	53	--	13	6.2	99	--	1.1	258	43	32	372	7.0	40
Mar. 24, 29-30.....		--	--	24	6.3	104	--	11	9.1	205	--	1.2	478	86	77	704	6.2	40
Mar. 28, 31.....		--	--	18	5.1	74	--	13	6.2	145	--	1.2	364	66	55	532	6.9	50
Apr. 1-6.....		8.9	.32	22	5.6	100	2.5	16	5.8	196	.1	2.0	456	79	66	686	7.1	50
Apr. 7-11.....		--	--	7.8	1.8	21	--	13	5.1	41	--	1.6	128	27	16	172	7.1	50
Apr. 12-15.....		--	--	17	5.2	64	--	16	4.3	125	--	1.1	308	62	49	455	6.6	50
Apr. 16-18.....		--	--	23	7.2	103	--	16	5.8	201	--	1.6	452	87	74	700	6.4	35
Apr. 19-20.....		--	--	42	10	226	--	5	6.4	430	--	11	936	146	142	1,450	6.0	14
Apr. 21-29.....		--	--	23	5.3	109	--	16	5.9	211	--	4.4	469	80	67	789	6.6	12
Apr. 30, May 1-2.....		--	--	27	6.8	159	--	2	10	288	--	11	634	95	94	1,040	4.7	45

May 2-5, 7	5.6	.14	19	4.8	100	3.5	5	3.7	198	.0	2.0	438	68	64	708	5.9	45
May 5-10	--	--	25	5.9	136	--	1	5.4	272	--	13	586	88	86	913	4.7	50
May 11-14	--	--	27	6.2	144	--	1	5.6	278	--	17	594	92	92	978	4.5	45
May 15-19	--	--	17	2.5	99	--	3	5.3	184	--	8.2	427	53	50	648	4.9	55
May 20-27	7.6	.15	15	3.5	71	2.5	8	4.6	140	.3	2.1	328	52	45	522	6.0	35
May 28-31, June 1-3	8.0	.03	32	7.8	163	4.2	12	8.0	320	.3	4.1	608	112	102	1,100	6.7	28
June 4-10	6.5	.27	17	3.8	64	2.4	24	5.6	126	.3	1.8	276	58	38	478	6.7	26
June 11-17	9.1	.26	24	5.4	110	5.0	21	5.9	210	.3	3.2	474	82	65	749	7.2	28
June 18-20	10	.43	20	4.2	85	2.4	26	7.8	158	.3	2.4	352	67	46	591	7.5	35
June 21-23	--	--	30	7.0	138	--	23	9.0	268	--	4.4	565	104	85	846	6.5	15
June 24-30	9.1	.26	19	4.0	76	2.3	25	6.3	145	.3	1.9	336	64	43	539	7.2	30
July 4-10	5.0	.16	11	2.1	31	2.0	28	12	50	.3	1.3	138	36	13	243	6.7	23
July 11-13, 17-18	6.5	.03	26	8.0	117	3.0	25	10	220	.3	1.8	460	98	78	808	7.0	22
July 14-16	--	--	19	4.5	74	--	25	6.0	143	--	2.1	332	66	45	544	6.2	14
July 19-22	6.3	.01	67	16	353	5.6	13	15	675	.2	7.5	1,322	233	222	2,300	6.4	13
July 23-25	--	--	15	3.3	38	--	29	6.0	71	--	2.4	206	51	27	302	7.3	40
July 26-31	6.2	.14	20	3.6	79	2.7	24	11	151	.5	2.4	340	65	45	598	7.0	38
Aug. 1-8	8.4	.08	19	4.6	72	1.9	29	7.0	140	.1	1.6	306	66	43	525	7.5	14
Aug. 9-12, 16-17	7.3	.02	34	8.7	166	2.6	21	9.0	320	.1	4.0	641	121	104	1,120	6.6	6
Aug. 13-15, 18-20	6.7	.02	28	5.1	122	2.0	24	7.0	233	.1	1.5	452	91	72	827	6.9	6
Aug. 21-25-31	6.5	.01	18	4.4	80	1.9	23	7.2	149	.1	1.7	308	63	44	552	6.8	7
Aug. 22-24	--	--	31	6.4	141	--	22	6.8	267	--	4.8	544	104	86	975	6.8	10
Sept. 1-2, 5-9	7.0	.02	25	5.5	113	2.0	24	6.8	217	.1	1.8	434	85	66	777	6.8	8
Sept. 3-4, 10-11	6.4	.01	17	3.6	70	1.8	24	6.4	132	.1	1.4	286	57	38	506	6.7	6
Sept. 6-8	6.5	.01	31	7.9	157	2.5	21	6.8	295	.1	1.7	592	110	93	1,060	6.7	7
Sept. 12-20	6.2	.04	15	3.0	56	1.9	25	6.6	104	.1	.8	234	30	29	425	7.3	9
Sept. 21-30	5.5	.04	11	2.6	40	1.8	23	6.6	74	.1	1.1	173	38	19	302	7.1	7
Average	--	--	23	5.4	95	--	18	9.5	183	--	3.4	391	80	65	659	--	27

## RED RIVER BASIN--Continued

## OUACHITA RIVER AT CALION, ARK.--Continued

Temperature (°F) of water, water year October 1952 to September 1953

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	80	82	55	49	53	54	68	68	83	89	87	85
2	78	82	49	48	53	55	68	67	83	--	87	86
3	76	82	48	51	54	56	68	69	83	90	87	86
4	77	81	48	49	54	57	68	69	--	90	88	85
5	76	81	48	49	53	58	65	70	83	91	88	84
6	76	59	50	50	53	58	65	67	82	91	89	84
7	68	59	55	50	54	58	65	70	83	91	90	84
8	70	59	53	50	54	56	65	70	82	90	95	84
9	69	60	53	49	54	56	66	70	82	89	88	83
10	68	60	53	50	55	57	66	70	84	89	88	84
11	68	60	53	50	55	59	68	70	86	90	88	84
12	73	60	53	50	55	59	68	74	87	88	89	84
13	73	60	50	51	55	62	65	71	88	86	88	83
14	70	60	49	50	54	63	65	68	89	84	88	83
15	68	60	48	49	52	--	65	68	88	85	88	83
16	67	61	49	48	54	64	65	69	87	85	89	--
17	67	61	49	49	52	64	65	72	89	84	--	82
18	67	61	--	50	53	65	68	72	89	85	89	82
19	66	60	50	51	52	65	62	73	89	83	87	82
20	65	59	50	50	52	65	62	73	89	83	87	--
21	64	59	51	--	51	66	64	74	--	84	85	80
22	63	58	52	49	50	65	64	75	90	84	85	78
23	65	57	53	49	50	65	66	75	91	85	86	78
24	64	58	53	48	50	65	66	75	91	83	85	79
25	66	59	52	50	50	64	--	76	90	82	85	80
26	64	58	52	50	51	60	67	77	91	83	85	80
27	64	58	50	51	51	60	67	80	90	84	84	80
28	63	56	51	52	54	64	68	81	89	84	83	80
29	62	55	50	52	--	65	68	82	88	85	--	81
30	63	50	49	52	--	65	67	82	89	85	85	80
31	62	--	50	52	--	67	--	83	--	87	85	--
Average	68	59	51	50	53	61	66	73	87	86	87	82

RED RIVER BASIN--Continued  
SALINE RIVER NEAR BENTON, ARK.

LOCATION--At gaging station at bridge on U. S. Highway 67, 2 miles west of Benton, Saline County.

DRAINAGE AREA--369 square miles.

RECORDS AVAILABLE--Chemical analyses: October 1949 to September 1953.

EXTREMES: Maximum, 88 ppm Sept. 21-30; minimum, 31 ppm Jan. 24-26.

Water temperatures: October 1949 to September 1953.

Sardness: Maximum, 66 ppm Nov. 10-20; minimum, 25 ppm Jan. 24-26.

Specific conductance: Maximum daily, 204 microhos Dec. 5.

Water features: Maximum, 21-25 July 6; minimum, 10-14 Dec. 16, 29.

EXTREMES: Maximum, 96 ppm Nov. 1-11, 1950; minimum, 22-14 Mar. 12-14, 1950.

Hardness: Maximum, 74 ppm Oct. 21-31, 1950; minimum, 22-14 Mar. 12-14, 1950.

Specific conductance: Maximum daily, 204 microhos Apr. 11, 1953; minimum daily, 31.9 microhos Feb. 13, 1950.

Water temperatures: Maximum daily, 70° F. July 2-3, 1952; minimum, freezing point Dec. 16, 1949, Jan. 5, 1950, Jan. 30-31, Feb. 4, 1951.

REMARKS--Records of specific conductance of daily samples available in district office at Fayetteville, Ark. Records of discharge for water year October 1952 to September 1953 given in WSP 1281.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue on evaporation at 180°C)	Hardness as CaCO <sub>3</sub>		Specific conductance (microhos at 25°C)	pH	Color
														Calcium, magnesium	Non-carbonate			
Oct. 1-10, 1952.....	19.9	6.8	0.08	16	3.5	4.2	1.9	60	5.4	4.5	0.2	1.1	73	54	5	121	7.6	6
Oct. 11-20.....	22.0	--	--	15	2.9	2.9	--	63	4.3	4.0	--	1.0	83	37	4	127	7.2	7
Oct. 21-31.....	24.9	--	--	13	2.9	2.9	--	73	4.0	4.0	--	1.0	81	62	2	136	7.3	6
Nov. 1-10.....	33.7	--	--	20	3.8	3.0	--	74	4.9	3.0	--	1.1	81	66	5	142	8.0	8
Nov. 11-20.....	122	--	--	20	4.0	2.4	--	72	7.0	2.5	--	1.3	83	66	7	143	7.7	11
Nov. 21-30.....	1,597	--	--	18	3.6	2.4	--	62	7.7	3.5	--	1.4	76	59	8	139	7.7	12
Nov. 26-30.....	3,598	--	--	9.1	2.1	1.8	--	28	6.6	2.5	--	4.0	56	31	8	77.1	7.3	23
Dec. 1-10.....	5,405	--	--	9.6	1.9	1.9	--	32	6.1	2.5	--	2.1	48	32	6	76.1	7.6	23
Dec. 11-20.....	319	--	--	13	2.2	2.3	--	44	4.8	2.8	--	1.9	58	41	5	97.0	7.3	7
Dec. 21-31.....	265	--	--	15	2.9	2.5	--	52	6.3	3.0	--	1.3	64	50	7	111	7.2	8
Jan. 1-9, 1953.....	523	7.9	.04	13	2.5	1.7	.7	46	7.2	3.5	.2	1.5	70	44	6	97.2	7.4	20
Jan. 10-15.....	266	--	--	15	2.9	2.4	--	53	8.5	3.5	--	.6	67	49	6	108	7.2	7
Jan. 16-23.....	3,080	--	--	9.2	2.2	2.0	--	32	6.0	2.5	--	1.3	54	32	6	73.0	7.0	28
Jan. 24-26.....	3,867	--	--	7.3	1.7	1.4	--	26	5.8	2.5	--	1.2	31	21	4	57.0	7.3	21
Jan. 27-31.....	1,028	--	--	11	1.7	1.9	--	36	5.6	2.0	--	1.2	51	33	4	78.3	7.2	21
Feb. 1-10.....	1,142	--	--	9.0	2.4	2.2	--	34	5.4	2.5	--	1.4	52	32	5	77.1	7.1	15
Feb. 11-20.....	1,842	--	--	8.8	2.3	2.1	--	34	5.5	3.0	--	1.7	50	34	6	76.6	7.2	20
Feb. 21-28.....	1,210	--	--	8.8	2.4	1.4	--	34	5.1	2.2	--	1.3	48	32	4	75.8	7.1	20

RED RIVER BASIN--Continued  
SALINE RIVER NEAR BENTON, ARK.--Continued

Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue on evaporation at 180°C)	Hardness as CaCO <sub>3</sub>		Specific conductance (micro-mhos at 25°C)	pH	Color
														Calcium	Non-carbonate			
Mar. 1-10, 1953	1,590	--	--	9.7	2.2	1.4	--	35	4.5	3.0	--	0.9	57	33	5	78.7	7.4	18
Mar. 11-17, 21	1,976	--	--	12	2.4	2.3	--	45	5.3	3.0	--	1.7	67	40	4	96.3	7.0	13
Mar. 18-20, 22-26, 31	4,069	--	--	18.3	2.0	1.3	--	33	4.2	1.2	--	1.0	59	29	2	68.8	6.9	35
Mar. 27-30	861	--	--	12	2.7	1.9	--	44	6.1	3.0	--	1.2	70	41	5	90.3	7.2	10
Apr. 1-2, 6-10	3,697	--	--	8.8	2.4	1.7	--	34	4.4	2.0	--	1.1	56	32	4	72.8	7.4	30
Apr. 3-5, 11-16	956	--	--	11	3.4	3.5	--	44	5.1	5.5	--	1.1	65	42	6	99.2	7.9	15
Apr. 17-23, 27	697	--	--	12	2.7	3.0	--	46	4.2	4.8	--	1.0	63	41	3	96.8	7.2	15
Apr. 24-26, 28-30	4,948	--	--	9.6	2.4	2.2	--	36	4.1	3.0	--	2.7	61	34	4	78.8	7.4	35
May 1-10	1,393	7.6	0.09	11	2.5	2.8	1.3	44	3.5	4.0	0.0	1.0	55	37	1	90.1	7.6	17
May 11-20	7,340	--	--	8.0	1.8	1.9	--	32	3.1	2.8	--	1.3	53	27	1	65.0	7.2	32
May 21-26	904	--	--	12	3.0	2.3	--	48	3.6	2.8	--	1.3	63	43	3	89.2	7.3	16
May 27-31	304	--	--	12	5.4	2.3	--	53	3.9	2.0	--	3.8	71	52	9	104	7.7	12
June 1-10	150	--	--	16	3.2	2.3	--	64	3.9	2.0	--	1.2	75	53	1	116	7.7	10
June 11-20	70.9	--	--	17	3.6	2.6	--	68	3.0	2.5	--	1.9	79	57	2	129	7.3	15
June 21-30	32.3	--	--	18	3.8	3.0	--	72	3.0	3.5	--	1.5	84	60	2	133	7.5	8
July 1-10	115	--	--	18	3.6	2.2	--	73	1.6	2.5	--	1.4	79	60	0	131	7.5	10
July 11-20	149	7.6	.00	15	2.8	2.9	1.3	59	5.6	3.8	.3	2.4	80	49	1	119	7.7	9
July 21-31	143	--	--	16	3.3	2.5	--	65	3.6	4.0	--	1.5	78	53	0	125	7.6	15
Aug. 1-10	42.0	--	--	17	3.7	2.6	--	68	3.0	3.5	--	1.6	78	58	2	129	7.4	8
Aug. 11-20	21.8	--	--	17	3.8	2.2	--	70	3.6	3.0	--	1.2	80	58	1	131	7.8	12
Aug. 21-31	17.2	--	--	18	3.2	2.6	--	71	2.6	2.5	--	.8	79	58	0	131	7.8	15
Sept. 1-10	22.6	--	--	17	3.8	3.4	--	70	2.6	3.5	--	1.1	83	58	1	133	7.8	17
Sept. 11-20	14.9	--	--	18	3.6	2.5	--	71	4.0	3.5	--	1.2	86	60	2	132	8.0	7
Sept. 21-30	10.7	--	--	19	3.7	3.3	--	73	4.0	5.0	--	1.0	88	53	3	142	7.6	12
Average	1,136	--	--	13	3.1	2.4	--	52	4.7	3.1	--	1.5	68	45	3	104	--	15

## RED RIVER BASIN--Continued

## SALINE RIVER NEAR BENTON, ARK.--Continued

Temperature (°F) of water, water year October 1952 to September 1953

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

RED RIVER BASIN--Continued  
HURRICANE CREEK NEAR SHERIDAN, ARK.

LOCATION.--At bridge on U. S. Highway 270, 5 miles east of Sheridan, Grant County.

RECORDS AVAILABLE.--Chemical analyses: October 1949 to September 1953.

Water temperatures: October 1949 to September 1953.

EXTREMES, 1952-53.--Dissolved solids: Maximum 1,110 ppm July 20-21, 26127; minimum, 73 ppm Feb. 11-13.

Hardness: Maximum, 370 ppm Sept. 5-6; minimum, 16 ppm Apr. 24-25, 29-30.

Specific conductance: Maximum daily, 1,770 micromhos Sept. 13; minimum daily, 55.5 micromhos Mar. 18.

Water temperatures: Maximum, 86°F June 17, 18, 22; minimum, 39°F Dec. 1-2, 15.

EXTREMES, 1949-53.--Dissolved solids: Maximum, 1,170 ppm Sept. 23-26, 1952; minimum, 41 ppm May 3, 7-9, 1950.

Hardness: Maximum 370 ppm Sept. 5-6, 1953; minimum, 16 ppm Apr. 24-25, 29-30, 1953.

Specific conductance: Maximum daily, 1,910 micromhos Sept. 24, 1952; minimum daily, 33.6 micromhos Feb. 12, 1950.

Water temperatures: Maximum, 87°F on several days during summer months; minimum, 36°F Jan. 5, 1950.

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

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Mag- nesium (Mg)	Sodium (Na)	Potas- sium (K)	Bicar- bonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue on evap- oration at 180° C)	Hardness as CaCO <sub>3</sub>		Specific conductance (micro-mhos at 25° C)	pH	Color	
														Calcium nesium	Non-carbonate				
Oct. 1-10, 1952.....		3.4	0.07	66	8.5	180	10	124	444	19	3.6	0.4	814	200	98	1,200	7.9	5	
Oct. 11-13.....		2.3	.02	17	2.6	214	10	188	280	20	12	.5	939	53	0	1,080	8.2	10	
Oct. 14, 17-18.....		--	--	9.6	2.4	275	--	a286	341	21	--	8	845	34	0	1,270	8.6	12	
Oct. 15-16.....		--	--	--	8.6	2.2	--	a283	251	20	686	--	7	686	30	0	1,080	8.5	10
Oct. 18-20.....		--	--	--	8.8	2.0	220	b282	248	19	--	1.1	650	30	0	1,020	8.4	11	
Oct. 19-20.....		--	--	--	8.8	2.0	220	b282	248	19	--	1.1	650	30	0	1,020	8.4	11	
Oct. 21-27.....		2.0	.01	18	2.8	194	11	195	262	16	10	--	3	56	0	1,975	8.2	8	
Oct. 28-31.....		3.0	.01	46	8.0	212	12	150	428	15	5	.7	787	148	25	1,200	7.7	8	
Nov. 1-10.....		1.2	.04	16	2.1	245	12	c309	255	22	14	.6	726	48	0	1,150	8.6	10	
Nov. 11-12.....		--	--	7.8	1.9	267	--	c392	217	33	--	1.1	726	28	0	1,150	8.6	18	
Nov. 13-14, 18.....		--	--	--	8.0	2.3	149	d206	139	32	--	1.2	448	30	0	730	8.5	14	
Nov. 15-17, 19-20.....		8	.02	14	2.3	199	11	241	210	30	10	.4	578	44	0	936	8.1	12	
Nov. 21-26.....		14	.02	79	6.6	82	6.1	84	305	10	2.0	.2	540	224	155	800	7.0	10	
Nov. 27-30.....		5.4	.03	41	4.7	74	4.9	72	196	8.2	2.0	.8	352	122	63	565	7.3	7	
Dec. 1-4.....		--	--	32	5.1	64	--	52	181	10	--	1.5	332	101	58	498	7.7	13	
Dec. 5-9.....		6.2	.00	20	2.7	26	2.7	50	61	4.8	2.0	1.4	143	61	20	248	7.4	10	
Dec. 10-11, 14.....		--	--	--	3.4	44	--	68	89	8.2	--	2.1	220	64	8	336	7.4	14	
Dec. 12-13, 15-20.....		7.2	.00	33	3.8	51	3.7	82	111	17	2.0	1.2	258	98	31	439	7.9	10	
Dec. 21-23, 26.....		7.3	.00	39	5.0	70	4.2	62	180	17	3.0	1.6	402	118	67	558	6.8	5	
Dec. 24-25, 27-31.....		8.8	.01	25	4.2	53	3.2	56	117	13	2.0	1.5	286	80	34	402	7.6	5	

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

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

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

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

Jan. 1-3, 7-11, 1953....	6.2	.00	21	3.7	45	3.2	61	91	11	2.0	1.6	243	68	18	343	7.4	8
Jan. 4-6.....	--	--	24	3.3	38	--	58	65	8.5	--	2.1	175	73	26	281	7.9	9
Jan. 12-14, 18-20.....	6.4	.01	26	3.6	24	2.4	58	54	15	2.0	1.8	192	60	17	280	7.2	8
Jan. 15-17.....	--	--	26	3.6	44	--	58	100	12	--	2.0	230	80	32	380	7.2	10
Jan. 21-31.....	7.2	.13	12	2.9	16	1.6	37	38	5.5	1.0	1.4	132	42	12	188	7.4	15
Feb. 1-8.....	10	.32	11	2.8	13	1.6	30	34	5.0	1.0	1.1	117	39	14	143	7.3	35
Feb. 9-10.....	--	--	14	5.2	16	--	32	32	7.5	--	1.7	120	49	23	162	7.2	30
Feb. 11-13.....	--	--	7	7.6	--	--	19	21	3.2	--	1.7	73	24	9	92	6.7	40
Feb. 14-19, 23-28.....	10	.19	12	2.7	12	1.2	26	34	5.5	1.0	1.0	132	41	20	143	7.0	20
Feb. 20-22, 26-27.....	9.2	.29	8.2	2.3	11	1.2	26	25	4.0	1.0	.9	111	30	9	114	7.4	40
Feb. 24-25.....	--	--	7.4	1.5	42	--	63	47	8.5	--	.7	159	35	0	244	7.4	20
Mar. 1, 5-10.....	8.0	.07	12	2.6	20	1.6	42	37	5.0	1.0	.8	136	41	6	171	7.4	20
Mar. 2-4.....	--	--	--	9.6	1.4	10	25	25	3.2	--	.8	93	30	9	116	7.4	50
Mar. 11-20.....	9.2	.15	8.0	1.0	13	1.8	28	23	4.5	.4	.7	100	24	1	131	7.0	45
Mar. 21-31.....	9.2	.12	11	1.7	12	1.8	31	31	3.5	.5	.7	107	34	9	133	7.3	30
Apr. 1-8.....	--	--	16	2.0	17	--	26	54	5.0	--	2.2	136	49	28	190	7.1	15
Apr. 9-14, 26.....	--	--	11	1.7	37	--	64	52	4.5	--	.8	170	33	0	238	7.3	20
Apr. 15-20.....	8.0	.57	11	1.0	22	1.8	47	33	5.8	1.0	.8	122	32	0	187	7.3	40
Apr. 21-23, 27-28.....	8.4	.23	11	1.1	24	2.0	48	37	5.2	.8	.7	128	31	0	185	7.6	30
Apr. 24-25, 29-30.....	--	--	5.5	.5	11	--	23	16	3.2	--	1.3	81	16	0	939	6.9	55
May 1-10.....	10	.38	9.2	1.1	16	1.6	32	29	3.8	.6	1.6	109	27	1	143	7.2	40
May 11-17.....	7.8	.54	9.2	1.3	12	1.4	30	23	2.5	.5	.9	97	28	4	118	7.9	45
May 19-20, 25-26.....	5.0	.31	9.2	.6	42	3.1	84	36	4.0	2.0	4.0	173	25	0	246	7.0	60
May 21-24.....	--	--	13	1.3	25	--	56	35	3.5	--	6.4	138	38	0	196	7.5	27
May 27-31.....	4.8	.01	13	1.4	54	3.4	86	71	5.0	3.6	1.9	208	38	0	326	7.3	18

RED RIVER BASIN--Continued  
HURRICANE CREEK NEAR SHERIDAN, ARK.--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue on evaporation at 180°C)	Hardness as CaCO <sub>3</sub>		Specific conductance (micro-mhos at 25°C)	pH	Color
														Calcium, magnesium	Non-carbonate			
June 1-10, 1953		5.2	0.01	25	2.1	96	5.1	86	178	11	2.0	1.4	370	71	0	598	7.3	9
June 11-22		3.2	.00	16	2.3	103	5.2	114	153	12	3.0	1.9	358	54	0	561	7.5	9
June 23-25		2.8	.00	21	2.1	143	6.6	145	215	16	3.0	3.0	480	61	0	765	8.0	9
June 26-27		1.8	.02	17	2.0	221	7.9	183	324	18	5.0	.5	689	50	0	1,080	7.9	8
June 28-30		1.4	.00	13	1.2	197	7.7	185	273	14	5.0	1.0	586	38	0	957	7.9	14
July 1-10		1.8	.00	18	1.8	206	9.1	164	305	18	9.0	.8	628	52	0	1,040	7.9	14
July 11-19		1.0	.01	17	1.6	255	12	182	286	18	11	1.5	840	49	0	1,270	8.1	14
July 20-21, 26-27		2.6	.01	117	7.5	213	8.7	108	546	12	5.0	.4	1,110	323	234	1,530	7.2	15
July 22-25, 28-31		2.2	.01	61	5.2	224	8.6	96	539	11	5.0	.6	921	174	95	1,340	7.8	6
Aug. 1-5		3.6	.03	65	5.1	226	8.4	116	537	14	3.0	1.4	934	183	88	1,310	7.6	8
Aug. 6-13		3.2	.03	34	4.0	163	7.4	97	330	15	5.0	1.5	607	102	22	841	7.8	10
Aug. 14-20		1.2	.05	27	3.4	271	12	175	462	16	14	.7	874	82	0	1,340	8.1	10
Aug. 21-31		2.1	.06	26	6.9	194	9.6	123	361	14	7.0	.9	686	94	0	1,080	7.6	9
Sept. 1-4, 7-11		2.9	.07	63	2.9	196	9.0	124	441	14	4.0	.8	798	169	68	1,180	7.8	10
Sept. 5-6		--	--	133	9.2	196	--	97	669	14	--	.7	1,100	370	290	1,500	8.2	12
Sept. 12-20		1.0	.05	7.5	1.5	359	14	e 423	414	19	18	1.0	1,040	34	0	1,570	8.7	24
Sept. 21-23		2.7	.00	12	8	286	13	250	400	18	10	.9	876	34	0	1,350	8.1	10
Sept. 24-30		1.8	.01	14	1.1	233	12	f 207	326	18	9.0	.8	732	40	0	1,120	8.5	10
Average		--	--	24	3.0	116	--	115	199	12	--	1.2	438	73	26	660	--	18

e Includes equivalent of 26 parts per million of carbonate (CO<sub>3</sub>).  
f Includes equivalent of 4 parts per million of carbonate (CO<sub>3</sub>).

## RED RIVER BASIN--Continued

## HURRICANE CREEK NEAR SHERIDAN, ARK.--Continued

Temperature (°F) of water, water year October 1952 to September 1953

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

## RED RIVER BASIN--Continued

## SALINE RIVER NEAR RYE, ARK.

LOCATION.--At gaging station at bridge on State Highway 15, 4 miles southwest of Rye, Cleveland County, and 5 miles upstream from Hudgen Creek.  
DRAINAGE AREA.--2,062 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1946 to September 1947, October 1948 to September 1953.

Water temperatures: October 1946 to September 1953. Maximum, 145 ppm Nov. 26-28; minimum, 29 ppm May 11-19.

EXTREMES, 1952-53.--Dissolved solids: Maximum, 145 ppm Nov. 26-28; minimum, 29 ppm May 11-19.

Hardness: Maximum, 45 ppm Aug. 11-20; minimum, 11 ppm Dec. 9-15, 17. Daily, 35.1 micromhos May 6.

Specific conductance: Maximum daily, 250 micromhos Nov. 26; minimum, 42 micromhos Dec. 2.

Water temperatures: Maximum, 89° June 21, 30, Aug. 8; minimum, 42° Dec. 2, 1952; minimum, 18 ppm Jan. 11-14, 1950.

EXTREMES, 1946-47, 1948-53.--Dissolved solids: Maximum, 145 ppm Nov. 26-28, 1952; minimum, 18 ppm Jan. 11-14, 1950.

Hardness: Maximum, 77 ppm Jan. 24, 30, 1949; minimum, 8 ppm June 1-1, 9-10, 1947.

Specific conductance: Maximum daily, 334 micromhos Jan. 18, 1949; minimum daily, 19.7 micromhos June 24, 1947.

Water temperatures: Minimum, 36° Feb. 1, 1951.

REMARKS.--Records of specific conductance of daily samples available in district office at Fayetteville, Ark. Records of discharge for water year October 1952 to September 1953 given in WSP 1281.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue on evaporation at 180°C)	Hardness as CaCO <sub>3</sub>		Specific conductance (micro-mhos at 25°C)	pH	Color
														Calcium nesium	Non-carbonate			
Oct. 1-10, 1952.....	55.9	7.6	0.17	9.6	2.9	22	2.8	50	30	6.8	0.8	1.0	119	36	0	185	7.8	13
Oct. 11-20.....	37.6	37.6	9.2	11	2.5	21	2.8	42	36	8.2	.7	.3	109	38	0	177	7.9	15
Oct. 21-31.....	34.7	5.2	.16	11	3.0	18	2.8	40	37	6.0	.6	.3	112	40	7	176	7.8	9
Nov. 1-10.....	39.8	5.4	.12	10	2.3	16	2.8	38	30	4.8	.5	.5	100	34	3	156	7.6	12
Nov. 11-18, 29-30.....	291	6.0	.21	9.5	2.3	15	2.6	38	25	5.2	.4	.4	96	33	2	144	7.6	22
Nov. 19-22.....	442	442	1.0	6.7	1.4	6.8	2.6	20	15	4.2	..	1.4	83	22	6	87.4	7.1	40
Nov. 23-25.....	350	..	..	11	2.1	19	..	46	35	5.5	..	.4	114	36	0	174	7.1	22
Nov. 26-28.....	314	..	..	12	2.4	31	..	57	46	7.8	..	2.2	145	39	0	238	7.9	32
Dec. 1, 3, 5-6.....	2,498	..	..	6.3	1.8	4.5	..	14	15	3.2	..	1.4	57	23	12	75.5	6.5	35
Dec. 2, 4, 7-8.....	2,725	..	..	8.4	.9	7.4	..	20	20	3.0	..	1.4	62	25	8	92.9	6.7	28
Dec. 9-15, 17.....	6,014	5.2	.10	3.5	1.8	1.7	1.8	10	6.7	1.5	.1	1.3	47	11	3	42.2	6.9	50
Dec. 16, 18-24.....	2,075	9.2	.04	8.7	1.8	6.2	1.4	19	18	5.0	.1	2.6	76	29	14	93.2	6.5	20
Dec. 25-31.....	659	10	.04	12	1.8	9.0	1.4	25	26	5.0	.2	2.6	91	37	16	124	7.1	10
Jan. 1-10, 1953.....	1,128	10	.04	10	2.0	6.7	1.3	25	20	5.0	.2	1.9	84	34	13	108	7.0	20
Jan. 11-16.....	728	8.9	.12	12	1.8	7.1	1.3	30	21	5.2	..	1.0	85	36	12	113	7.2	20
Jan. 17-23.....	2,085	7.3	.10	9.1	1.8	6.6	1.5	27	16	4.8	.2	1.0	77	30	8	96.1	7.0	30
Jan. 24-27.....	4,485	..	..	6.0	1.5	3.7	..	16	12	2.8	..	1.0	56	21	8	83.2	6.6	32
Jan. 28-31.....	5,452	..	..	5.0	.8	2.8	..	12	8.1	2.2	..	1.1	51	16	6	41.9	6.7	45

Feb. 1-10, 1953.	6,828	7.3	.11	5.2	1.4	4.7	1.7	14	10	3.5	.1	1.7	56	18	7	60.0	6.3	45
Feb. 11-20	6,233	7.9	.11	5.5	.9	4.8	1.5	14	10	3.5	.1	.8	57	17	6	57.5	6.7	30
Feb. 21-28	6,194	8.0	.10	5.0	1.7	4.2	1.3	15	11	3.2	.2	.7	57	20	7	62.6	6.7	40
Mar. 1-10	4,445	8.0	.09	6.4	1.7	5.4	1.3	20	11	4.8	.2	.6	62	23	7	73.1	6.7	40
Mar. 11-20	7,423	7.6	.10	5.4	1.9	4.0	1.3	15	9.7	4.0	.1	.9	58	21	9	59.5	6.7	50
Mar. 21-31	13,240	7.4	.14	3.8	1.4	2.7	1.6	12	5.9	3.0	.1	1.7	50	13	6	47.1	6.6	50
Apr. 1-7, 9.	6,441	--	--	6.4	1.5	3.6	--	20	8.7	3.0	--	--	64	22	6	70.6	7.1	40
Apr. 8-10-11, 14-16, 20	7,616	6.4	.16	4.7	1.3	3.0	1.1	16	5.6	2.5	.0	1.7	56	17	4	54.4	6.8	40
Apr. 21-23, 17, 19-20	6,816	--	--	7.1	2.0	5.1	--	21	7.8	4.8	--	4.8	68	26	8	83.6	7.1	40
Apr. 21-23, 26	3,165	9.4	.43	7.1	2.1	5.8	1.4	24	8.8	4.8	.0	4.8	67	28	7	84.7	6.9	45
Apr. 26-27, 29-30	5,255	--	--	4.6	1.5	4.1	--	11	7.5	3.8	--	5.0	63	18	9	58.1	6.5	50
May 1-10	12,590	6.8	.16	4.4	.7	3.5	1.2	17	6.3	2.5	.3	.8	37	14	0	48.7	6.8	37
May 11-19	19,240	5.8	.23	3.2	1.0	2.6	1.2	13	4.7	3.0	.3	1.4	29	12	1	40.0	7.0	45
May 20-23-31	12,250	--	--	9.2	2.7	8.0	1.2	38	7.7	5.8	--	6.1	90	34	3	109	7.1	50
May 21-27	16,740	7.8	.18	6.3	.7	5.1	1.4	29	4.2	3.2	.3	1.5	69	18	0	67.3	7.1	45
June 1-10	681	12	1.1	9.9	2.6	7.4	1.8	40	11	4.0	.4	2.8	86	35	3	106	7.8	50
June 11-20	218	13	.46	11	2.6	11	1.8	44	17	5.0	.3	4.1	99	38	2	127	7.1	35
June 21-30	108	12	.29	11	2.8	12	1.8	48	17	7.5	.3	1.7	100	39	0	140	7.7	25
July 1-10	77.6	10	.09	11	2.6	11	1.6	48	16	6.8	.3	.7	94	38	0	133	7.9	17
July 11-20	204	7.7	.09	10	2.6	9.0	1.5	48	9.7	5.2	.3	3.1	83	36	0	119	7.6	20
July 21-31	286	8.3	.25	9.5	2.8	9.0	1.8	42	16	3.8	.2	2.1	86	35	1	118	7.7	25
Aug. 1-10	119	8.5	.15	11	2.4	16	1.9	42	29	4.5	.5	2.5	110	37	3	155	7.6	20
Aug. 11-20	65.2	7.9	.00	12	3.6	14	1.6	50	28	4.5	.2	2.4	107	45	4	162	7.7	7
Aug. 21-31	41.5	7.8	.00	12	3.1	11	1.5	52	18	4.8	.3	2.5	92	43	0	142	7.7	8
Sept. 1-10	35.0	8.0	.01	11	3.0	13	1.2	50	24	3.5	.3	.6	98	40	0	149	7.6	5
Sept. 11-18, 20	40.4	8.0	.01	13	2.8	22	1.6	51	43	5.2	.5	2.3	136	44	2	206	8.0	4
Sept. 19, 21-30	25.6	5.9	.04	12	3.0	20	1.9	50	34	5.2	.2	1.4	127	42	1	188	7.4	10
Average	3,519	--	--	8.4	2.0	9.5	--	31	18	4.5	--	1.8	81	29	4	109	--	30

## RED RIVER BASIN--Continued

## SALINE RIVER NEAR RYE, ARK.--Continued

Temperature (°F) of water, water year October 1952 to September 1953

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

RED RIVER BASIN--Continued  
BAYOU LAPILE NEAR STRONG, ARK.

LOCATION.--At bridge on County road about 1 mile north of Strong, Union County.  
RECORDS AVAILABLE.--Chemical analyses: October 1952 to September 1953.  
Water temperatures: October 1952 to September 1953.  
EXTREMES, 1952-53.--Dissolved solids: Maximum 65,100 ppm Oct. 21-31; minimum, 306 ppm Apr. 29-30.  
Hardness: Maximum, 11,900 ppm Oct. 11-20; minimum, 50 ppm Apr. 29-30.  
Specific conductance: Maximum daily, 80,800 micromhos Oct. 18; minimum daily, 441 micromhos Apr. 30.  
Water temperatures: Maximum, 98°F June 11, 15, 18; minimum, 40°F Dec. 1.  
REMARKS.--Records of specific conductance of daily samples available in district office at Fayetteville, Ark. No records of discharge available for this station.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Free acid (H)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue on evap- oration at 180°C)	Hardness as CaCO <sub>3</sub>		Specific conduct- ance (micro- mhos at 25°C)	pH	Color
														Calcium	Non-carbon- ate			
Oct. 1-3, 1952	18	0.18	1,820	377	9,060	94		0	1.0	18,100	0.0	1.0	32,800	6,090	6,090	45,200	4.5	10
Oct. 4-6	16	.18	2,380	494	11,400	112		1	1.0	22,900	.0	.0	41,100	7,970	7,970	55,000	4.6	7
Oct. 7-10	15	.16	2,900	608	13,900	129		1	1.0	27,900	.0	.0	51,800	9,740	9,730	65,600	4.8	10
Oct. 11-20	13	.06	3,570	729	17,200	160		1	.8	34,500	.0	.0	63,800	11,900	11,900	78,100	4.7	8
Oct. 21-31	13	.06	3,490	747	17,000	161		1	.4	34,100	.0	.0	66,100	11,800	11,800	77,300	4.9	7
Nov. 1-8	14	.04	3,350	697	16,500	154		2	.7	32,900	.0	2.5	61,200	11,200	11,200	74,800	4.9	7
Nov. 9-11	12	.12	2,850	576	13,500	127		2	1.0	27,200	.0	.0	46,600	9,480	9,480	33,500	5.0	8
Nov. 12-15, 19	28	.20	1,410	518	6,970	74		1	1.0	13,200	.0	2.7	24,500	4,830	4,820	36,100	4.7	13
Nov. 16-18	20	.28	1,230	302	6,030	67		2	1.0	12,200	.0	1.0	21,200	4,310	4,310	31,600	4.8	15
Nov. 20-22	16	.32	1,900	512	10,200	102	0.26	0	1.0	20,500	.0	.0	36,400	7,070	7,070	49,000	4.10	30
Nov. 23-24	39	.40	1,100	305	7,070	69	1.32	0	6.0	14,000	.0	.0	27,800	4,770	4,770	35,000	4.36	11
Nov. 25-30	31	.40	1,230	311	6,430	69	.26	0	1.0	13,100	.0	1.7	23,200	4,350	4,350	33,300	4.5	15
Nov. 27-29	14	.56	1,480	365	7,330	76	.26	0	1.0	14,800	.0	.7	26,300	5,220	5,220	37,400	4.30	10

RED RIVER BASIN--Continued  
BAYOU LAPILE NEAR JTRONG, ARK.--Continued

Chemical analyses, in parts per million, water year October 1952 to September 1953.--Continued

Date of collection	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal- cium (Ca)	Mag- nesium (Mg)	Sodium (Na)	Potas- sium (K)	Free acid (H)	Bicar- bonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue on evap- oration at 180°C)	Hardness as CaCO <sub>3</sub>		Specific conduct- ance (micro- mhos at 25°C)	pH	Color
														Calcium	Non- carbon- ate			
Dec. 1-3	--	--	1,000	203	4,880	--	1.56	C	4.0	9,746	--	.0	19,406	3,330	3,330	26,300	4.20	10
Dec. 4, 8-10	16	.14	851	212	4,060	48		C	7.0	8,370	.0	.0	14,200	3,000	3,000	22,300	4.5	15
Dec. 5-7	18	.23	813	208	3,300	40		C	12	7,040	.0	2.0	11,900	2,880	2,880	19,000	4.5	30
Dec. 11-13	16	.10	1,140	.276	5,370	57		C	10	11,206	.0	1.0	18,800	3,960	3,960	23,706	4.6	15
Dec. 14-17	20	.14	1,470	339	7,070	69		C	5.0	14,500	.0	2.0	24,400	5,060	5,060	36,100	4.7	15
Dec. 18-21	16	.11	1,660	369	7,830	75		C	2.0	16,200	.0	7.0	27,000	5,710	5,710	39,900	4.5	15
Dec. 22-25	14	.23	1,130	255	5,140	53		C	8.0	10,700	.0	.0	17,900	3,870	3,870	27,600	4.5	25
Dec. 26-31	14	.15	1,200	289	5,650	59		C	2.0	11,800	.0	.0	20,100	4,190	4,190	30,700	4.6	20
Jan. 1-3, 1953	12	.03	626	152	2,940	27		C	3.0	8,050	.0	.0	10,700	2,190	2,190	16,500	4.8	10
Jan. 4-7	13	.03	822	190	4,050	36		C	8.6	8,210	.0	2.0	14,400	2,830	2,830	21,800	4.6	10
Jan. 8-11	20	.04	1,210	271	3,680	40		C	7.3	11,600	.0	2.0	17,300	3,430	3,430	24,500	4.5	7
Jan. 12-15, 23	20	.01	1,360	221	4,810	45		C	8.2	9,100	.0	1.0	17,500	3,480	3,480	26,100	4.8	8
Jan. 16, 18, 22	26	.03	1,360	315	6,430	57		C	10	13,100	.0	1.0	22,900	4,690	4,690	33,300	4.5	6
Jan. 17, 19-21	26	.04	1,410	323	6,910	57		C	7.1	13,900	.0	1.0	25,200	4,850	4,850	35,000	4.7	5
Jan. 24-27	--	.04	458	125	2,190	22		C	11	4,510	.0	.8	8,750	1,660	1,660	12,700	5.0	10
Jan. 28, 30	--	--	636	152	3,210	--	.00	C	5.0	6,410	--	.0	12,700	2,210	2,210	18,200	4.44	13
Jan. 29, 31	--	--	780	187	3,720	--	--	C	6.0	7,500	--	.1	14,900	2,720	2,710	20,200	4.6	14
Feb. 1-3	--	--	443	93	2,200	--	--	C	6.0	4,390	--	.8	8,210	1,490	1,490	12,300	4.8	20
Feb. 4-5	--	--	550	115	2,770	--	--	C	5.0	5,430	--	.7	10,200	1,850	1,840	15,400	4.7	12
Feb. 6-10	13	.04	710	161	3,330	33		C	6.4	6,630	.0	2.0	12,700	2,430	2,430	18,500	4.5	15
Feb. 11, 13	--	--	50	16	276	--	--	C	3.7	540	--	1.4	1,040	192	189	1,720	5.6	50
Feb. 12, 14-15	--	--	180	25	870	--	--	C	5.8	1,740	--	1.2	3,160	577	576	5,220	4.8	12
Feb. 16-18	11	.07	283	66	1,400	13		C	9.5	2,770	.2	.4	5,130	978	976	8,130	4.7	15
Feb. 19-20, 24-25, 27	8.9	.05	204	48	998	9.8		C	7.4	1,980	.2	.4	3,680	706	704	5,980	4.9	20
Feb. 21-23, 26	8.0	.15	78	19	389	5.4		C	4.1	770	.3	.5	1,410	272	269	2,420	5.5	50
Feb. 28, Mar. 1-4, 10	12	.04	468	101	2,440	27		C	9.2	4,880	.0	1.0	9,400	1,630	1,630	13,600	4.7	15

Mar. 5-9	14	10	601	139	2,880	28	2	6.9	5,640	.0	1.0	10,900	2,070	2,070	16,300	4.7	15
Mar. 12-13, 24	--	--	27	8.5	142	--	6	3.7	2,278	--	.5	612	102	88	1,120	5.6	40
Mar. 11, 17-21	10	.06	268	57	1,300	15	2	6.1	2,650	.0	.6	5,390	903	902	7,770	5.0	20
Mar. 16, 22-23	--	--	108	24	525	--	3	4.5	1,080	--	.6	1,840	366	366	3,270	5.1	35
Mar. 14-15, 25	--	--	56	12	264	--	4	6.2	1,530	--	.4	1,070	189	186	1,740	5.3	30
Mar. 26-31	9.0	.11	134	35	750	9.8	5	5.1	1,550	.1	.5	3,070	528	524	4,630	5.4	30
Apr. 1, 8-9	8.9	.20	278	62	1,410	15	4	1.0	2,820	.0	1.0	5,420	948	945	7,640	5.6	17
Apr. 2, 10-12	--	--	265	131	1,560	--	1	4.0	3,440	.0	.4	7,170	1,340	1,340	11,200	4.6	20
Apr. 4, 10-12	10	.21	346	134	2,660	24	1	1.0	5,280	.0	1.2	10,300	1,910	1,910	14,700	4.6	15
Apr. 13, 15	--	--	146	33	734	--	4	5.4	1,450	--	.6	3,010	500	496	4,570	5.6	40
Apr. 16-18	--	--	300	67	1,480	--	1	4.0	2,950	--	.8	5,310	1,020	1,020	8,650	4.8	20
Apr. 19-21	8.4	.13	419	92	2,040	20	2	1.0	4,590	.0	1.0	8,150	1,420	1,420	11,800	4.7	12
Apr. 22-23	9.2	.21	677	150	3,300	28	0	2.0	6,620	.0	1.0	12,800	2,310	2,310	18,100	4.5	13
Apr. 24, 27-28	--	--	94	21	471	--	5	5.4	6,822	--	.5	1,890	321	317	2,990	5.5	40
Apr. 25-26	--	--	60	15	276	--	10	15	555	--	.5	1,210	211	203	1,840	6.2	50
Apr. 28-30	--	--	16	2.4	70	--	4	2.1	138	--	1.0	306	50	46	471	6.0	50
May 1-6, 13	6.2	.21	22	6.8	109	2.6	7	2.7	223	.0	1.9	473	82	76	748	6.2	50
May 7-8, 12	--	--	27	5.9	135	--	6	1.0	270	--	1.2	605	93	88	883	6.4	50
May 9-11	--	--	184	36	911	--	4	2.0	1,870	--	.8	3,620	608	604	5,550	6.2	17
May 14-17	4.2	.26	16	3.7	82	2.3	6	2.3	164	.0	1.7	359	55	50	559	6.3	55
May 20, 23	--	--	240	47	1,180	--	2	1.0	2,450	--	1.0	4,680	785	784	7,230	5.0	15
May 21, 26	--	--	356	59	1,800	--	2	1.0	3,550	--	1.2	6,610	1,130	1,130	9,650	4.8	15
May 22, 27-29	10	.21	463	92	2,280	23	0	1.0	4,610	.0	.8	8,310	1,540	1,540	12,600	+5	16
May 24-27	--	--	289	56	1,390	--	2	1.0	2,840	--	1.6	5,240	952	950	6,500	5.3	15
May 30-31	11	.23	613	111	3,030	30	1	1.0	6,160	--	1.2	10,900	1,980	1,980	17,000	4.6	14

RED RIVER BASIN--Continued  
BAYOU LAPILE NEAR STRONG, ARK.-- Continued

Date of collection	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Free acid (H)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue on evaporation at 180°C)	Hardness as CaCO <sub>3</sub>		Specific conductance (micro-mhos at 25°C)	pH	Color
														Calcium, magnesium	Non-carbonate			
June 1-2, 1953.....	8.9	0.12	809	120	3,850	40	0.10	0	4.0	7,850	0.0	2.5	13,700	2,510	2,510	21,800	4.00	8
June 3, 6.....	8.9	.33	901	146	4,470	46	.05	0	14	8,770	.0	2.0	15,200	2,850	2,850	24,300	4.15	10
June 4-5, 7.....	9.4	.22	1,010	193	5,020	58	.10	0	12	10,100	.0	2.0	17,400	3,310	3,310	27,600	3.95	9
June 8-10.....	9.7	.04	1,180	213	5,730	62	.10	0	4.0	11,600	.0	1.0	19,700	3,820	3,820	31,100	4.00	8
June 11, 13.....	11	.09	1,310	229	6,360	68	.10	0	4.0	13,000	.0	1.5	22,800	4,210	4,210	34,600	3.95	9
June 12, 14-16.....	11	.16	1,570	289	7,710	80	.20	0	2.0	15,500	.0	1.5	27,300	5,110	5,110	40,400	3.75	7
June 17-18.....	11	.13	1,660	322	8,370	82	.02	0	1.0	17,000	.0	2.9	28,700	5,520	5,520	42,700	4.35	6
June 19-20.....	12	.21	1,810	332	9,270	84	.10	0	1.0	18,400	.0	2.9	32,700	5,880	5,880	45,300	4.20	4
June 27-30.....	12	.21	1,970	365	10,100	98	--	1	1.0	19,800	.0	2.9	34,800	6,420	6,420	49,400	4.6	4
July 1-2.....	11	.24	2,190	382	11,000	111	.10	0	1.0	21,700	.0	2.9	38,500	7,030	7,030	53,600	4.10	5
July 3-5, 9.....	12	.20	2,440	443	12,400	118	.10	0	1.0	24,600	.0	2.9	43,100	7,910	7,910	59,400	4.10	7
July 6-8, 10-13.....	11	.06	2,300	422	11,800	119	--	2	1.0	23,200	.0	2.4	40,500	7,470	7,470	56,800	4.8	5
July 14-15.....	12	.07	2,500	450	12,800	121	--	1	1.0	25,100	.0	2.4	44,000	8,090	8,090	60,900	4.7	6
July 16-31.....	11	.13	1,170	203	5,980	59	--	0	4.0	11,700	.0	3.0	21,000	3,750	3,750	31,600	4.5	8
Aug. 1, 3, 5, 8-10.....	12	.10	1,270	218	6,380	65	.05	0	3.0	12,500	.0	2.5	22,700	4,060	4,060	33,100	4.30	5
Aug. 2, 4, 7.....	14	.11	1,780	339	9,020	86	.10	0	1.0	17,900	.0	2.0	32,500	5,840	5,840	45,200	4.25	7
Aug. 6, 11-15, 20.....	12	.14	1,980	360	10,100	96	.10	0	1.0	19,800	.0	2.9	35,800	6,420	6,420	49,500	4.10	8
Aug. 16-17, 27.....	8.7	.39	1,600	280	8,070	79	.10	0	1.0	15,900	.0	3.4	28,800	5,140	5,140	41,000	4.05	8
Aug. 18-19, 21-26.....	8.2	.12	1,060	223	5,630	57	.10	0	1.0	11,000	.0	3.0	20,100	3,560	3,560	28,700	4.35	7
Aug. 28, 31.....	9.6	.09	846	146	4,430	46	.10	1	2.0	8,520	.0	4.0	15,400	2,710	2,710	23,200	4.7	7
Aug. 29-30.....	9.5	.27	1,450	245	7,280	71	.10	0	1.0	14,300	.0	2.0	25,700	4,630	4,630	37,000	4.15	10
Sept. 1-10.....	9.2	.19	1,640	291	8,320	80	.10	0	2.0	16,400	.0	2.0	29,000	5,290	5,290	41,800	4.30	5
Sept. 11-19.....	9.8	.21	1,610	279	8,340	81	.10	0	1.0	16,300	.0	2.9	28,100	5,160	5,160	41,800	4.30	5
Sept. 20, 25-30.....	12	.27	2,760	482	14,200	131	.10	0	1.0	27,800	.0	3.4	49,000	8,870	8,870	66,000	4.30	6
Sept. 21-24.....	9.1	.29	2,390	403	12,100	115	.10	0	1.0	24,000	.0	3.4	42,700	7,620	7,620	57,800	4.25	3
Average.....	--	--	1,080	222	6,400	--	--	2	3.9	10,800	--	1.4	19,400	5,630	5,630	27,300	--	17

## RED RIVER BASIN--Continued

## BAYOU LAPILE NEAR STRONG, ARK.--Continued

Temperature (°F) of water, water year October 1952 to September 1953

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	78	58	40	51	--	58	73	68	87	97	91	85
2	73	64	43	44	56	60	69	70	89	96	90	88
3	69	64	50	49	59	68	73	72	91	94	93	90
4	71	52	45	50	57	61	73	70	90	96	90	89
5	73	55	50	50	60	60	69	68	92	90	89	86
6	64	58	48	54	53	63	72	67	93	89	90	88
7	62	54	--	58	53	56	70	70	91	88	93	87
8	66	54	62	55	49	59	70	68	86	89	92	86
9	59	59	62	50	51	58	71	70	89	86	93	84
10	64	52	54	56	59	58	69	69	89	83	94	86
11	62	55	43	46	--	60	71	74	98	80	92	86
12	63	51	52	49	55	56	68	74	95	87	91	85
13	67	52	48	50	54	67	71	74	94	78	91	84
14	69	58	42	53	52	59	68	73	97	89	93	85
15	68	65	45	49	55	67	65	73	98	86	90	89
16	61	69	45	48	53	64	66	74	97	91	90	90
17	59	68	48	47	52	61	63	74	97	86	90	88
18	60	62	54	49	50	70	64	74	98	89	93	85
19	59	59	50	55	49	71	68	75	94	90	91	87
20	59	50	53	56	53	69	70	78	96	87	92	92
21	54	50	51	54	50	73	69	83	96	91	92	91
22	56	49	51	55	48	55	72	81	93	94	93	93
23	56	53	50	52	49	67	74	80	97	91	94	90
24	55	56	55	54	47	67	69	81	93	93	92	93
25	54	57	48	50	49	68	68	83	95	92	93	94
26	60	57	45	59	61	65	68	85	96	89	92	94
27	59	51	47	--	60	62	72	83	94	92	92	92
28	57	46	51	59	59	71	74	85	96	92	91	93
29	55	45	47	57	--	71	69	85	95	88	90	92
30	52	46	49	59	--	72	70	87	96	92	89	94
31	50	--	50	53	--	73	--	86	--	89	92	--
Average	62	56	49	52	54	64	70	76	94	89	92	89

RED RIVER BASIN--Continued  
OUAICHTA 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 1953.

Water temperatures: October 1949 to September 1953.

EXTREMES, 1952-53 --Dissolved solids: Maximum, 2,430 ppm Nov. 20-30; minimum, 62 ppm June 1-5, 7-9.

Hardness: Maximum, 494 ppm Nov. 20-30; minimum, 16 ppm May 25-31.

Specific conductance: Maximum daily, 5,110 micromhos Nov. 27; minimum daily, 69.3 micromhos May 31.

Water temperatures: Maximum, 96°F June 9; minimum, 44°F Feb. 11, 13-15.

EXTREMES, 1949-53 --Dissolved solids: Maximum, 2,430 ppm Nov. 20-30, 1952; minimum, 44 ppm Jan. 23-31, Mar. 1-9, 1950.

Hardness: Maximum, 494 ppm Nov. 20-30, 1952; minimum, 15 ppm Jan. 23-31, Mar. 1-9, 1950.

Specific conductance: Maximum daily, 5,110 micromhos Nov. 27, 1952; minimum daily, 55.7 micromhos Mar. 4, 1950.

Water temperatures: Maximum, 96°F June 9, 1953; minimum, 35°F Feb. 3, 1951.

REMARKS --Once-daily sampling near surface. Records of specific conductance of daily samples available in district office at Fayetteville, Ark. No records of discharge available for this station.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue on evaporation at 180°C)	Hardness as CaCO <sub>3</sub>		Specific conductance (micro-mhos at 25°C)	pH	Color
														Calcium, magnesium	Non-carbonate			
Oct. 1-10, 1952.....		6.4	0.03	64	17	322	5.7	24	13	640	0.1	4.9	1,250	230	210	2,150	6.9	10
Oct. 11-20 .....		8.6	.06	54	13	283	5.0	26	12	528		3.2	988	188	167	1,780	7.0	6
Oct. 21-31 .....		9.6	.06	72	19	363	6.2	22	13	720		5.4	1,380	258	240	2,370	7.4	5
Nov. 1-10 .....		8.4	.05	78	20	392	7.7	20	12	805		6.5	1,500	276	260	2,590	7.2	9
Nov. 11-19 .....		8.6	.06	94	23	481	7.1	16	17	938		6.8	1,700	329	316	2,990	6.3	5
Nov. 20-30 .....		8.9	.02	140	35	681	9.6	7	26	1,350		17	2,430	494	488	4,240	6.3	8
Dec. 1-2 .....		--	--	16	3.4	61	--	14	12	110	--	2.3	268	54	43	413	6.6	19
Dec. 3-7 .....		6.3	.04	28	7.2	113	3.6	18	13	218		3.2	482	100	84	904	6.9	26
Dec. 8-15 .....		7.2	.09	8.1	1.4	11	1.8	19	7.6	23		1.0	29	26	11	127	7.3	46
Dec. 16-22 .....		8.6	.06	16	4.3	52	2.8	17	10.5	106		2.3	292	58	41	402	7.1	31
Dec. 23-24 .....		--	--	23	5.6	70	--	19	10	170		3.2	376	78	63	635	6.4	21
Dec. 25-28 .....		--	--	25	5.4	90	--	20	10	173		3.2	378	80	63	634	6.7	14
Dec. 29-31 .....		--	--	22	4.3	79	--	20	13	151		1.6	339	73	56	559	6.8	15
Jan. 1-4, 6-11, 1953		9.8	.08	24	5.9	98	2.2	16	10	190		1.6	402	84	72	708	6.9	20
Jan. 12-14, 16-17, 19		9.0	.10	23	5.9	95	2.2	16	9.5	182		2.2	397	82	69	656	7.1	20
Jan. 15, 18, 20 .....		--	--	26	5.8	112	--	16	13	215		1.7	446	90	446	771	6.8	19
Jan. 21-22, 25 .....		8.9	.13	23	6.0	89	2.2	17	8.1	176		2.3	378	82	68	625	7.2	25
Jan. 23-24, 26-31...		9.4	.16	18	4.9	62	1.6	16	8.2	128		3.1	280	65	52	449	7.3	25
Feb. 1-10 .....		8.4	.14	13	3.1	37	2.2	12	8.2	77		3.1	193	44	34	300	6.6	50
Feb. 11-14 .....		6.8	.09	14	4.3	45	1.6	11	7.2	94		3.1	226	53	44	322	6.4	40
Feb. 15-20 .....		7.8	.17	11	2.6	30	2.2	12	7.8	60		3.1	164	37	27	250	6.3	50
Feb. 21-28 .....		7.4	.18	11	3.0	36	1.8	11	8.9	69		3.1	144	40	31	265	6.9	50

Mar. 1-3, 6-8, 1953 .	8.0	.17	11	2.8	39	1.8	13	12	73	.3	1.4	161	39	28	293	7.1	40
Mar. 4-5 .	--	--	17	5.1	71	--	14	7.9	136	--	1.9	254	62	51	495	7.0	35
Mar. 9-13 .	7.8	.21	14	3.6	50	--	13	8.9	100	.3	1.0	194	50	39	369	6.9	40
Mar. 14-16 .	--	--	9.1	2.0	29	--	9	5.4	56	--	4.5	150	31	24	241	6.3	50
Mar. 17-20 .	6.6	.37	8.0	2.1	21	--	14	7.8	38	.3	.8	103	29	17	168	7.1	50
Mar. 21-31 .	7.2	.12	6.8	1.9	18	1.8	13	6.9	35	.1	1.1	100	25	14	147	6.9	45
Apr. 1-6 .	6.6	.16	7.0	1.8	17	1.8	13	5.8	33	.1	1.2	99	25	14	145	6.5	50
Apr. 7-12 .	--	--	11	2.7	33	--	17	6.3	64	--	.7	181	38	24	264	6.5	60
Apr. 13-20 .	4.8	.40	7.5	1.7	19	1.5	18	4.7	34	.1	1.0	111	25	11	149	6.8	40
Apr. 21, 28-30 .	--	--	9.1	1.6	24	--	14	8.4	46	--	1.2	141	29	18	196	6.7	50
Apr. 22-28 .	5.4	.28	13	2.6	47	1.9	18	7.2	87	.1	1.0	226	43	29	334	6.7	45
May 1-6 .	3.8	.20	6.9	2.1	20	2.0	12	12	36	.3	.5	114	26	16	180	6.1	40
May 7-20 .	4.8	.30	5.8	1.0	14	1.8	14	8.6	24	.3	1.2	70	19	7	121	6.3	55
May 21-24 .	--	--	5.8	1.2	15	--	11	4.0	28	--	1.6	97	19	10	131	6.9	50
May 25-31 .	4.2	.27	4.9	.8	7.5	1.6	14	7.4	10	.4	1.8	66	16	4	82	6.3	50
June 1-5, 7-9 .	3.8	.16	5.6	.8	6.8	1.8	17	4.1	12	.5	2.1	82	17	3	81.4	6.0	35
June 6, 10-20 .	4.4	.05	6.4	1.7	9.3	1.9	19	7.0	16	.5	2.5	64	23	7	104	6.2	40
June 21-24 .	--	--	7.5	2.1	11	--	24	1.0	2.0	--	2.9	27	8	1	118	6.8	25
June 25-29 .	--	--	8.6	2.5	15	--	26	1.0	29	--	2.3	110	42	10	157	7.2	35
June 30, July 1-3 .	--	--	12	3.2	30	--	28	1.0	59	--	2.0	172	43	20	257	6.7	22
July 4-8 .	--	--	15	3.2	48	--	27	1.6	92	--	2.6	240	51	28	371	6.5	18
July 9-11 .	--	--	16	4.5	94	--	21	5.4	120	--	1.4	284	63	38	463	7.3	24
July 12-20 .	11	.16	21	4.8	94	3.1	29	15.6	162	.3	1.4	348	72	48	610	7.9	27
July 21-25 .	--	--	14	21	440	--	11	14.8	872	--	10.6	1,680	296	237	2,810	6.4	7
July 26-29 .	--	--	14	3.3	86	--	21	4.6	103	--	1.7	257	40	35	409	6.7	40
July 30-31, Aug. 1-4 .	6.5	.13	22	4.1	86	2.9	22	9.4	168	.3	2.0	356	72	54	628	7.0	30
Aug. 5-8 .	8.3	.10	26	5.5	114	1.1	25	10	216	.5	2.2	446	88	67	792	7.5	20
Aug. 9-11 .	--	--	23	4.4	81	--	33	6.8	193	--	2.2	349	70	48	593	7.9	22
Aug. 12-19 .	7.8	.01	24	6.0	99	2.1	29	12	186	.3	1.6	400	84	60	701	7.5	8

RED RIVER BASIN--Continued  
 OUAICHTA RIVER NEAR FELSETHAL, ARK.--Continued

Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue on evaporation at 180°C)	Hardness as CaCO <sub>3</sub>		Specific conductance (micro-mhos at 25°C)	pH	Color
														Calcium, mg-nesium	Non-carbonate			
Aug. 20-23, 1952	...	8.3	0.01	39	10	198	3.1	22	9.6	382	0.2	5.0	744	138	120	1,340	6.8	7
Aug. 24-26	...	--	--	32	7.9	156	--	23	7.8	296	--	2.4	594	112	94	1,050	6.7	17
Aug. 27-31	...	6.7	.04	41	12	216	3.1	21	7.8	422	.1	4.9	818	152	135	1,440	6.9	7
Sept. 1-2	...	--	--	34	8.7	169	--	21	7.2	327	--	2.5	652	121	104	1,100	6.8	12
Sept. 3-5	...	7.4	.02	29	7.3	137	2.3	23	7.6	262	.1	1.8	532	102	84	944	7.0	7
Sept. 6-8	...	6.0	.01	47	12	237	3.4	20	9.8	482	.1	5.3	928	166	150	1,580	7.7	7
Sept. 9-13	...	6.2	.01	34	6.7	152	2.5	22	7.2	296	.1	1.9	561	112	94	1,050	7.1	7
Sept. 14-20	...	6.3	.01	43	9.4	208	3.0	21	9.0	405	.1	5.2	775	146	129	1,380	7.2	5
Sept. 21-24	...	7.4	.01	48	13	262	3.5	18	8.4	508	.1	4.2	965	174	158	1,720	7.0	6
Sept. 25-30	...	6.5	.02	34	7.6	157	2.4	25	8.6	310	.1	4.1	608	116	96	1,090	7.4	5
Average	.....	--	--	26	6.5	116	--	19	8.5	226	--	2.8	460	92	76	789	--	27

## RED RIVER BASIN--Continued

## OUACHITA RIVER NEAR FELSENTAL, ARK.--Continued

Temperature (°F) of water, water year October 1952 to September 1953

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

RED RIVER BASIN--Continued  
BARTHOLOMEW BAYOU NEAR WILMOT, ARK.

LOCATION.--At bridge on State Highway 52, about a mile northwest of Wilmot, Ashley County.

DRAINAGE AREA.--1,170 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1952 to September 1953.

EXTREMES, 1952-53.--Dissolved solids: Maximum, 197 ppm Nov. 21-26; minimum, 32 ppm May 11-31.

HARNESS: Maximum, 131 ppm Oct. 11-20; minimum, 14 ppm Feb. 17, 19-28, Mar. 1-10.

Specific conductance: Maximum daily, 353 micromhos Nov. 23; minimum daily, 44.4 micromhos Feb. 24.

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

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue on ignition at 180°C)	Hardness as CaCO <sub>3</sub>		Specific conductance (micro-mhos at 25°C)	pH	Color
														Calcium	Non-carbonate			
Oct. 1-10, 1952.....	18		0.04	34	6.8	18	2.7	142	6.9	20	0.1	0.8	171	113	0	287	7.7	10
Oct. 11-20.....	18		0.04	40	7.5	20	3.0	154	9.2	27	.1	.6	194	131	4	331	7.8	8
Oct. 21-31.....	20		0.02	36	7.9	20	3.0	158	6.7	22	.1	.5	194	122	0	323	7.6	8
Nov. 1-10.....	20		0.03	35	7.3	20	2.8	158	7.4	20	.1	.8	184	117	0	309	7.8	10
Nov. 11-20.....	21		0.05	35	7.5	20	2.7	164	7.1	18	.1	.4	184	118	0	303	8.4	8
Nov. 21-30.....	24		0.08	31	8.7	20	3.2	158	5.8	18	.3	1.0	197	113	0	306	8.0	10
Nov. 27-30.....	--		--	27	9.6	16	--	142	5.8	14	--	--	176	107	0	264	8.2	12
Dec. 1-5.....	23		.00	26	8.4	14	3.6	124	7.9	16	.3	.7	165	99	0	258	7.4	10
Dec. 7-10.....	14		--	14	5.4	8.2	--	54	10	14	--	.7	121	96	12	162	6.9	23
Dec. 11-20.....	14		.51	15	3.1	9.2	4.0	53	14	12	.3	2.6	116	51	8	131	7.7	23
Dec. 21-31, 1953.....	13		.61	13	2.9	9.6	4.0	70	10	11	.3	3.1	116	48	5	183	7.3	20
Jan. 1-10.....	17		--	18	3.6	13	3.6	71	10	11	.3	1.1	134	58	1	174	7.3	20
Jan. 11-20.....	16		--	17	4.7	12	3.6	70	11	13	.3	5.3	138	67	10	186	7.3	22
Jan. 21-23.....	--		--	17	4.7	11	--	70	13	--	--	1.4	55	21	3	76.5	7.2	35
Jan. 24-31.....	9.2		.50	6.9	1.0	5.3	4.2	22	9.7	5.5	.2	1.4	55	21	3	76.5	7.2	35
Feb. 1-10.....	9.4		41	6.6	1.1	5.6	4.2	21	8.6	6.0	.2	1.7	54	21	4	79.0	7.0	35
Feb. 11-16, 18.....	8.9		35	6.4	1.6	5.6	3.8	21	8.4	7.0	.2	1.2	53	22	5	78.0	7.0	35
Feb. 17, 19-28.....	7.6		.28	3.5	1.3	3.1	2.7	15	5.9	3.2	.2	.6	36	14	2	50.0	6.9	40
Mar. 1-10.....	5.8		.25	3.5	1.2	3.2	2.9	16	5.9	3.0	.2	.6	34	14	0	50.8	6.7	40
Mar. 11-20.....	6.8		.05	4.6	1.3	3.7	2.8	18	5.5	3.2	.1	1.3	39	17	2	59.1	6.5	45
Mar. 21-31.....	6.4		.07	4.4	1.6	3.2	2.6	19	4.9	3.2	.1	1.1	37	18	2	54.1	6.3	50
Apr. 1-10.....	5.2		.62	4.7	1.3	3.0	2.6	22	4.0	2.5	.1	1.5	36	17	0	55.0	6.8	45
Apr. 11-20.....	4.2		--	5.6	1.5	3.1	2.5	24	3.6	2.8	.1	1.5	38	20	0	57.2	6.7	45
Apr. 21-30.....	6.2		.64	5.4	1.7	3.1	2.4	24	3.2	2.2	.3	1.8	38	17	0	58.8	7.0	32
May 1-10.....	5.0		.42	4.8	1.0	2.2	2.9	22	2.2	2.5	.3	1.6	34	16	0	49.0	7.0	45
May 11-31.....	4.8		.42	4.0	1.4	2.0	2.7	21	2.2	2.5	.3	1.5	32	16	0	47.0	6.9	45

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

June 1-24, 1953 .....	5.7	.46	5.4	2.1	3.7	3.2	26	.8	3.8	.3	4.6	43	22	1	66.9	7.5	50
June 25-30 .....	--	--	14	4.0	8.4	--	68	1.0	8.0	--	5.1	107	51	0	152	7.1	35
July 1-6 .....	--	--	13	4.7	8.4	--	71	2.0	7.2	--	2.5	112	52	0	145	7.0	35
July 7-18 .....	5.3	.44	4.7	2.2	2.9	3.0	26	1.0	2.8	.3	3.6	39	21	0	82.5	6.6	50
July 19-31 .....	17	.02	20	6.3	14	2.8	109	3.8	10	.3	.8	136	76	0	211	7.3	11
Aug. 1-10 .....	17	.04	20	6.9	14	2.9	110	4.2	12	.2	1.0	140	78	0	219	7.2	13
Aug. 11-20 .....	16	.04	23	5.9	13	3.0	111	4.0	19	.1	2.0	156	82	0	250	7.9	17
Aug. 21-31 .....	20	.06	23	5.9	17	3.0	112	4.8	16	.1	2.1	135	82	0	241	8.1	15
Sept. 1-10 .....	18	.05	24	7.4	13	2.9	128	1.8	17	.1	1.6	163	90	0	261	8.2	14
Sept. 11-17 .....	--	--	28	7.9	21	--	b143	3.6	16	--	.9	176	102	0	295	8.4	10
Average .....	13	--	17	4.3	11	3.1	76	5.9	11	0.2	1.7	109	60	0	167	--	27

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

## RED RIVER BASIN--Continued

## BAYOU BARTHOLOMEW NEAR BEEKMAN, LA.

LOCATION.--At gaging station at bridge on State Highway 204, 0.8 mile downstream from Bayou De Glaize, 4 miles south of Beckman, Morehouse, Parish, and 7 miles north of Bastrop.

DRAINAGE AREA.--1,645 square miles.

RECORDS AVAILABLE.--Chemical analyses: August 1952 to September 1953.

REMARKS.--Records of discharge for water year October 1952 to September 1953 given in WSP 1281.

Chemical analyses, in parts per million, August 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (sum)			Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 23 C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium	Non-carbonate				
Aug. 28, 1952.....	149	20	0.00	28	8.4	20	1.2	152		3.2	16	0.2	0.2	0.25	172	0.23	69	104	0	29	0.9	297	7.4
Oct. 14 .....	206	17	.00	26	8.2	19		135		5.3	16	.1	.2	--	158	.21	88	99	0	23	.8	283	7.3
Nov. 20 .....	141	20	.01	28	8.6	19		145		7.0	15	.1	.0	--	169	.23	64	105	0	29	.8	286	7.3
Dec. 12 .....	513	15	.12	19	7.1	15		84		13	19	--	.4	--	130	.18	180	77	8	30	.8	217	7.3
Jan. 20, 1953.....	320	18	1.2	17	5.3	12		76		10	12	--	.4	--	113	.15	98	64	2	29	.6	196	7.3
Mar. 2 .....	3,860	5.8	.58	2.8	1.1	2.8	2.4	14	4.4	4.4	2.4	.3	.5	.09	30	.04	313	13	1	28	.4	44.3	6.5
Mar. 18 .....	4,870	6.2	.57	3.5	1.6	2.5	--	16	5.0	5.0	1.8	--	.5	--	30	.04	394	15	2	26	.3	48.2	6.2
Apr. 15 .....	3,970	5.4	.92	4.6	2.4	2.0	--	23	3.5	3.5	1.8	--	1.2	--	33	.04	354	21	2	17	.2	57.5	6.6
May 12 .....	6,080	5.5	.76	3.0	1.2	1.6	1.8	16	2.0	2.0	.8	.4	1.0	--	26	.04	427	12	0	19	.2	42.2	6.1
June 17 .....	6,220	4.8	.80	5.4	2.0	1.8	2.4	29	2.1	2.1	.8	.3	.8	--	35	.05	588	22	0	14	.2	57.1	6.5
July 21 .....	513	18	.60	12	4.2	10		68	3.7	3.7	6.8	--	1.5	--	90	.12	125	48	0	31	.6	150	7.2
Aug. 19 .....	189	21	.04	19	6.5	15		104	4.4	4.4	12	--	.8	--	130	.18	66	74	0	31	.8	210	7.7
Sept. 23 .....	157	23	.02	25	8.3	20		141	3.7	3.7	15	--	.2	--	164	.22	70	97	0	31	.9	274	7.8

## RED RIVER BASIN--Continued

## CORNIE CREEK NEAR JUNCTION CITY, ARK.

LOCATION.--At bridge on State Highway 15 about 13 miles west of Junction City, Union County, and about 20 miles southwest of El Dorado.  
 RECORDS AVAILABLE.--Chemical analyses: October 1952 to September 1953. (Specific conductance, chloride, and pH: May 1950 to September 1952.)  
 Water temperatures: May 1950 to September 1953.

EXTREMES, 1952-53.--Dissolved solids: Maximum, 9,050 ppm Nov. 16-27; minimum, 287 ppm Apr. 28-30.

Hardness: Maximum, 2,780 ppm Nov. 16-27; minimum, 62 ppm Apr. 28-30.

Specific conductance: Maximum daily, 13,700 micromhos Nov. 20; minimum daily, 359 micromhos Apr. 30.

Water temperatures: Maximum, 95°F July 8; minimum, 41°F Dec. 21.

EXTREMES, 1950-53.--Specific conductance: Maximum daily, 16,800 micromhos Oct. 18, 1951; minimum daily, 359 micromhos Apr. 30, 1953.

Water temperatures: Maximum, 95°F July 8, 1953; minimum, freezing point Jan. 30, 1951.

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

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Free acid (H)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue on evaporation at 180°C)	Hardness as CaCO <sub>3</sub>		Specific conductance (micro-mhos at 25°C)	pH	Color
														Calcium, nesium	Non-carbonate			
Oct. 1-10, 1952.....	--	--	--	--	528	--	--	0	12	1,300	--	0.0	2,280	720	720	4,080	4.5	15
Oct. 11-14.....	--	--	229	37	536	--	--	0	4.1	1,290	--	.1	2,310	724	724	4,060	4.5	8
Oct. 15-26.....	--	--	86	16	242	--	--	2	6.6	560	--	.3	1,080	280	279	1,880	5.2	21
Oct. 27-31.....	--	--	125	21	299	--	--	3	3.5	712	--	.3	1,300	398	396	2,300	5.5	15
Nov. 1-9.....	--	--	185	28	432	--	--	2	5.1	1,030	--	.2	1,840	576	575	3,260	5.0	8
Nov. 10-15.....	--	--	242	34	497	--	--	3	5.6	1,270	--	.2	2,260	744	742	3,970	5.3	8
Nov. 16-27.....	16	0.01	905	128	1,980	40	0.10	0	15	4,980	0.0	2.6	9,050	2,780	2,780	13,700	4.3	8
Nov. 28-30.....	--	--	416	60	874	--	--	2	20	2,200	--	.5	3,980	1,280	1,280	6,640	4.9	13
Dec. 1-10.....	19	.06	436	56	922	22	--	0	13	2,290	.1	.8	4,190	1,320	1,320	6,840	4.5	15
Dec. 11-14.....	--	--	422	62	963	--	.98	0	23	2,410	--	2.0	4,200	1,310	1,310	7,010	4.24	17
Dec. 15-22.....	25	.03	436	54	835	18	--	1	12	2,140	--	.4	3,780	1,310	1,310	6,280	4.6	5
Dec. 23-29.....	24	.06	588	80	1,270	24	--	0	14	3,150	.0	.6	5,660	1,800	1,800	9,200	4.5	5
Dec. 30-31.....	--	--	480	72	1,020	--	--	1	27	2,570	--	2.0	4,500	1,490	1,490	7,650	4.6	9
Jan. 1-6, 1953.....	--	--	368	56	815	--	--	0	27	2,080	--	2.0	3,990	1,150	1,150	6,220	4.6	7
Jan. 7-15.....	19	.09	408	60	908	19	--	1	18	2,780	.1	.6	3,870	1,260	1,260	6,650	4.5	5
Jan. 16-20.....	--	--	504	75	1,090	--	--	0	20	2,780	--	1.0	4,790	1,570	1,570	8,040	4.5	12
Jan. 21-27.....	--	--	162	29	336	--	--	1	13	850	--	.7	1,940	523	522	3,340	4.6	19
Jan. 28-31.....	--	--	226	41	491	--	--	1	12	1,240	--	.6	2,610	732	732	3,890	4.6	12
Feb. 1-7.....	--	--	307	33	656	--	.82	0	15	1,630	--	.6	3,000	900	900	5,040	4.32	6
Feb. 8-13.....	--	--	45	5.5	103	--	--	3	5.6	245	--	.4	497	135	132	3,20	5.1	23
Feb. 14-20.....	11	.09	60	11	114	4.6	--	11	8	308	.1	.8	616	194	191	1,060	5.4	25
Feb. 21-25.....	--	--	16	16	164	--	--	2	8.6	740	--	.4	1,480	306	306	2,420	4.9	10
Feb. 26-28.....	--	--	138	19	297	--	--	0	11	--	--	.5	--	423	423	2,420	4.3	7

RED RIVER BASIN--Continued  
CORNIE CREEK NEAR JUNCTION CITY, ARK.--Continued

Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

Date of collection	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Free acid (H)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue on evap- oration at 180°C)	Hardness as CaCO <sub>3</sub>		Specific conductance (micro- mhos at 25°C)	pH	Color
														Calcium mag- nesium	Non- carbon- ate			
Mar. 1-5, 1953	--	--	112	16	234	--	--	0	9.3	585	--	0.4	1,140	346	344	1,940	4.7	14
Mar. 6-8	--	--	207	31	440	--	--	0	8.6	1,100	--	--	2,130	644	644	3,540	4.5	19
Mar. 9-14	--	--	34	4.8	72	--	--	4	4.7	1,175	--	5	372	104	101	639	5.3	50
Mar. 15-21	13	0.04	64	9.4	132	5.5	--	2	9.3	340	0.1	3	766	198	196	1,120	5.2	50
Mar. 22-25	--	--	102	15	217	--	--	2	6.2	538	--	6	1,120	316	314	1,780	4.7	22
Mar. 26-31	--	--	134	19	268	--	--	1	9.9	720	--	4	1,520	412	412	2,330	4.6	12
Apr. 1-6	--	--	171	29	372	--	--	0	10	935	--	5	1,870	546	546	2,930	4.5	12
Apr. 7-13	--	--	117	21	252	--	--	1	9.9	642	--	3	1,460	378	378	2,100	4.6	13
Apr. 14-20	20	0.06	201	31	408	9.8	0.06	0	12	1,040	0	5	2,000	629	629	3,300	4.28	8
Apr. 21-27	--	--	74	13	149	--	--	3	8.2	388	--	6	770	238	236	1,300	5.4	30
Apr. 28-30	--	--	19	3.7	40	--	--	5	3.7	103	--	1.0	287	62	61	357	6.0	45
May 1-2	--	--	20	3.4	41	--	--	4	2.0	105	--	1.0	292	64	61	369	5.0	35
May 3-9	--	--	56	8.0	118	4.8	--	0	5.6	295	1	8	680	172	172	1,000	4.5	18
May 10-17	9.8	0.04	24	3.1	50	--	--	2	5.4	124	--	11	323	73	71	484	5.1	40
May 18-25	--	--	42	4.9	86	--	--	2	4.5	215	--	4	532	124	122	763	5.3	18
May 26-28	--	--	94	12	205	--	--	0	4.1	525	--	4	1,090	284	284	1,710	4.5	7
May 29-31	--	--	154	19	330	--	11	0	1.0	830	--	6	1,960	465	465	2,780	4.34	4
June 1-10	18	0.10	232	29	508	9.8	18	0	4.3	1,270	1	5	2,490	698	698	4,000	4.10	7
June 11-18	19	0.32	596	76	1,300	24	40	0	5.0	3,350	0	5	5,890	1,800	1,800	9,590	3.82	5
June 19-26	17	0.16	377	47	831	21	30	0	5.0	2,960	0	5.2	3,710	1,130	1,130	6,430	4.05	7
June 27-30	18	0.18	508	62	1,140	25	20	0	4.0	2,900	0	5.6	5,030	1,520	1,520	8,410	4.10	5
July 1-2, 4-5	18	0.09	516	57	1,120	25	30	0	4.0	2,880	0	5.2	5,030	1,520	1,520	8,390	4.20	6
July 3, 6-8	--	--	557	49	1,250	--	15	0	5.8	3,120	--	1.0	5,690	1,590	1,590	9,050	4.42	4
July 9-15	--	--	373	36	866	--	05	0	9.5	2,020	--	1.8	3,730	1,080	1,080	6,190	4.41	6
July 16-23	--	--	242	26	550	--	18	0	6.2	1,330	--	5	2,510	712	710	4,170	4.9	7
July 24-31	--	--	395	43	885	--	18	0	14	2,100	--	1.2	4,000	1,160	1,160	6,490	4.18	7
Aug. 1-10	12	0.04	368	38	836	20	10	0	7.6	2,020	--	1.2	3,680	1,070	1,070	6,110	4.30	4
Aug. 11-17	--	--	46	830	1,000	--	10	0	6.4	2,010	--	2	4,320	1,110	1,110	6,260	4.10	5
Aug. 18-31	--	--	451	58	1,000	--	3	14	2,460	2,460	--	6	4,620	1,360	1,360	7,320	4.9	7
Sept. 1-8	9.4	0.06	480	49	1,060	23	--	0	10	2,520	--	6	3,510	1,320	1,320	7,620	4.45	4
Sept. 9-15	--	--	357	41	842	--	--	4	8.4	2,010	--	6	3,510	1,060	1,060	6,170	5.0	5
Sept. 16-20	--	--	280	31	630	--	--	2	7.6	1,470	--	6	2,670	774	774	4,700	4.7	7
Sept. 21-30	--	--	268	29	630	--	--	1	8.6	1,900	--	6	2,690	788	788	4,700	4.7	4
Average	--	--	268	36	591	--	--	1	10	1,470	--	1.2	2,700	816	816	4,460	--	13

## RED RIVER BASIN--Continued

## CORNIE CREEK NEAR JUNCTION CITY, ARK.--Continued

Temperature (°F) of water, water year October 1952 to September 1953

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	70	52	59	--	53	56	65	65	79	86	86	80
2	71	--	57	43	55	56	65	65	80	85	86	79
3	70	50	52	44	55	53	64	67	79	86	87	79
4	68	49	52	46	54	56	66	67	86	86	86	77
5	65	50	50	46	56	60	65	65	80	88	85	79
6	65	48	51	45	55	57	65	67	82	88	87	78
7	63	50	52	46	55	56	66	66	83	90	87	79
8	61	50	49	48	54	58	67	67	82	95	86	79
9	60	52	47	47	54	60	66	67	83	90	86	78
10	61	55	47	48	56	61	64	69	83	86	87	79
11	62	55	45	46	54	60	63	67	85	88	87	79
12	61	57	46	48	55	60	65	65	86	86	85	77
13	61	59	44	46	56	62	64	66	88	83	87	78
14	64	60	43	46	52	62	63	65	88	86	86	78
15	59	50	44	44	51	65	62	66	89	82	86	77
16	60	56	46	--	50	54	63	65	88	83	87	76
17	59	54	45	--	49	66	61	75	87	83	88	76
18	57	53	46	--	49	65	61	67	88	85	80	75
19	56	54	43	48	50	68	60	67	88	85	85	76
20	52	52	42	50	48	67	61	68	89	84	84	76
21	52	54	41	50	46	68	63	70	89	82	84	75
22	50	57	43	48	47	66	63	70	88	83	83	76
23	48	59	45	47	50	68	61	72	89	85	82	74
24	48	56	44	--	49	68	62	76	87	85	82	70
25	50	52	46	--	50	67	63	74	88	87	82	71
26	50	50	47	50	54	65	63	77	86	85	80	70
27	50	51	--	--	54	65	63	78	85	85	81	70
28	52	54	--	52	55	67	65	78	85	86	80	71
29	53	52	--	54	--	65	64	81	85	85	82	71
30	54	52	45	52	--	66	65	83	85	85	84	72
31	54	--	45	52	--	65	--	82	--	86	82	--
Average	58	53	47	--	52	62	64	70	85	86	85	76

RED RIVER BASIN--Continued  
THREE CREEKS NEAR JUNCTION CITY, ARK.

LOCATION.--At bridge on State Highway 15, about 10 miles northwest of Junction City, Union County, and about 17 miles southwest of El Dorado.  
RECORDS AVAILABLE.--Chemical analyses: October 1952 to September 1953. (Specific conductance, chloride, and pH: May 1950 to September 1952).  
EXTREMES, 1952-53.--Dissolved solids: Maximum, 13,200 ppm July 29-31; minimum, 133 ppm Apr. 28-30.  
Water temperatures: May 1950 to September 1953.  
Hardness: Maximum, 4,390 ppm July 29-31; minimum, 30 ppm Apr. 28-30, May 12-15.  
Specific conductance: Maximum daily, 20,100 micromhos July 31; minimum daily, 142 micromhos Apr. 30.  
Water temperatures: Maximum, 89°F Aug. 4; minimum, freezing point Dec. 16.  
EXTREMES, 1950-53.--Specific conductance: Maximum daily, 20,300 micromhos Sept. 4, 1952; minimum daily, 45.7 micromhos Feb. 1, 1952.  
Water temperatures: Maximum, 89°F Sept. 1, 1951, Aug. 4, 1953; minimum, freezing point Dec. 16, 1952.  
REMARKS.--Records of specific conductance of daily samples available in district office at Fayetteville, Ark. No records of discharge available for this station.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue on evaporation at 180°C)	Hardness as CaCO <sub>3</sub>		Specific conductance (micro-mhos at 25°C)	pH	Color
														Calcium, magnesium	Non-carbonate			
Oct. 1-6, 1952		14	0.00	188	22	482	14	184	2.9	1,080	0.2	3.1	1,970	560	434	3,390	7.2	5
Oct. 7, 1952		--	--	187	187	187	--	182	7.0	305	--	1.1	1,706	188	338	1,260	8.1	13
Oct. 14-17		--	--	117	16	304	--	159	5.4	895	--	4.6	1,270	358	226	2,170	8.1	14
Oct. 18-23		--	--	180	14	436	--	160	8.0	895	--	1.9	1,870	545	416	3,170	7.9	13
Oct. 24-27		--	--	129	22	332	--	165	7.4	672	--	4.7	1,400	412	278	2,410	8.2	10
Oct. 28-31		--	--	93	13	251	--	174	17	495	--	.8	1,050	286	143	1,860	7.9	11
Nov. 1-4		--	--	191	23	462	--	159	6.8	1,000	--	1.1	1,940	571	440	3,370	7.5	16
Nov. 5-15		13	.00	616	70	1,210	36	113	16	3,000	1	1.0	5,660	1,820	1,730	8,900	7.5	15
Nov. 16-25		--	--	143	19	332	--	131	7.2	728	--	1.5	1,440	435	328	2,530	7.7	22
Nov. 26-30		--	--	286	40	557	--	94	14	1,380	--	1.1	2,620	878	801	4,550	7.4	17
Dec. 1-4		--	--	404	50	756	--	106	14	1,880	--	3.6	3,470	1,210	1,130	5,910	7.6	12
Dec. 5-11		--	--	314	43	623	--	95	19	1,540	--	3.4	2,760	960	882	4,840	8.1	17
Dec. 12-18		--	--	183	23	412	--	120	12	950	--	1.6	1,730	551	452	3,190	8.2	14
Dec. 19, 21-22		--	--	99	14	237	--	104	8.6	510	--	.8	1,010	304	220	1,820	8.0	19
Dec. 20, 23-28		14	.00	234	30	497	14	91	8.6	1,190	.2	1.7	2,200	708	633	3,760	7.5	15
Dec. 29-31		--	--	99	15	211	--	62	10	500	--	1.2	976	308	258	1,730	7.6	22
Jan. 1-3, 1953		--	--	432	58	779	--	18	20	2,090	--	3.0	3,680	1,320	1,300	6,230	7.3	17
Jan. 4-6		--	--	384	51	665	--	34	23	1,830	--	1.2	3,170	1,170	1,140	5,590	7.3	19
Jan. 7-9		--	--	169	23	372	--	69	13	870	--	1.6	1,580	512	456	2,890	7.9	17
Jan. 10-13		--	--	274	35	530	--	73	12	1,300	--	1.6	2,330	828	768	4,130	7.9	16
Jan. 14-15		--	--	360	46	672	--	59	14	1,700	--	1.8	2,990	1,090	1,040	5,190	7.8	19
Jan. 16-21		--	--	116	16	264	--	103	8.6	575	--	1.2	1,120	356	271	2,090	8.1	18
Jan. 22-25		--	--	45	4.6	97	--	18	5.1	220	--	1.9	472	132	117	802	6.8	40
Jan. 26-31		13	.00	152	21	304	8.6	30	9.1	760	.2	1.2	1,410	466	441	2,460	7.0	10

Feb. 1-2, 1953	322	42	608	--	12	14	1,550	--	2.0	2,880	976	966	4,820	6.4	9
Feb. 3-7	142	14	304	--	5	11	705	--	.7	1,380	410	370	2,400	7.1	10
Feb. 8-13	78	8.5	149	--	48	4.9	385	--	3.2	780	230	228	1,320	5.8	35
Feb. 14-19	12	18	248	7.7	8	8.6	608	1.2	1.1	1,120	356	350	1,930	6.7	25
Feb. 20-24	48	7.0	102	--	7	8.0	245	--	.6	480	149	144	854	6.1	22
Feb. 25-28	--	77	12	--	8	12	400	--	.6	831	240	234	1,370	6.0	22
Mar. 1-3, 8-11	7.8	3.1	69	3.7	8	5.9	175	1.1	.9	411	105	98	581	6.3	50
Mar. 4-7	--	88	11	--	10	12	438	--	1.1	874	264	256	1,470	6.3	22
Mar. 14-17	--	42	4.8	--	8	9.5	212	--	.7	446	124	118	749	6.8	30
Mar. 12-13, 18-23	--	34	4.6	--	8	6.4	150	--	.9	327	104	97	537	6.1	50
Mar. 24-28	--	64	7.2	--	9	8.4	330	--	.8	663	189	182	1,130	6.5	30
Mar. 29-31	--	110	16	--	7	8.8	560	--	1.1	1,070	340	335	1,860	6.0	23
Apr. 1-5, 7	--	118	17	--	14	10	620	--	.9	1,250	364	353	2,020	6.6	20
Apr. 6, 8-10	--	66	10	--	10	11	342	--	1.0	736	206	198	1,160	6.4	35
Apr. 11-18	14	126	18	7.7	24	4.9	650	.0	1.2	1,340	388	369	2,090	6.8	24
Apr. 19-23	--	164	27	--	22	9.5	915	--	.6	1,840	570	552	2,930	6.9	17
Apr. 24-27	--	39	6.1	--	8	7.0	150	--	.5	1,371	97	91	559	6.3	45
Apr. 28-30	--	8.2	2.2	--	8	4.7	40	--	1.0	133	30	23	159	6.4	50
May 1-2	--	30	4.0	--	6	6.4	152	--	1.2	402	92	87	530	6.1	22
May 3-6	--	13	1.9	--	6	2.5	58	--	1.5	200	40	36	234	5.7	55
May 7-11	--	48	6.4	--	7	5.9	260	--	2.3	590	147	141	887	6.1	17
May 12-15	--	--	8.8	--	6	3.5	41	--	2.6	160	30	25	177	5.9	45
May 16-18	--	15	2.4	--	8	3.5	71	--	.9	218	47	41	262	5.9	45
May 19-22	--	42	5.3	--	9	8.1	218	--	2.8	501	126	118	751	6.7	22
May 23-26	12	77	14	9.1	16	5.0	670	.0	1.1	1,400	365	352	2,230	6.4	20
May 27-31	--	121	8.4	--	43	3.9	422	--	4.4	1,040	228	192	1,470	6.8	22

RED RIVER BASIN--Continued  
THREE CREEKS NEAR JUNCTION CITY, ARK.--Continued

Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (on evaporation at 180° C)	Hardness as CaCO <sub>3</sub>		Specific conductance (micro-mhos at 25° C)	pH	Color
														Calcium, mg./l.	Non-carbonate, mg./l.			
June 1, 6-11, 1953		13	0.00	111	11	297	9.2	109	3.7	610	0.3	1.2	1,380	322	232	2,120	8.1	16
June 2-5		15	.01	58	6.4	173	5.8	104	5.1	325	.3	1.4	742	171	86	1,220	7.3	27
June 12-16		10	.01	208	19	488	17	98	4.5	1,140	.1	1.0	2,130	592	512	3,630	8.0	15
June 17-19		9.9	.02	437	43	856	25	84	6.0	2,170	.2	6.0	4,000	1,270	1,200	6,670	7.5	10
June 20-24		12	.00	209	21	514	17	125	4.7	1,140	.3	1.0	2,290	608	506	3,600	7.7	15
June 25-27		8.5	.02	111	12	320	11	150	5.8	640	.3	1.0	1,350	326	204	2,230	8.0	16
June 28-30		9.0	.05	1,010	95	1,870	68	66	7.0	4,980	.0	18	9,210	2,910	2,860	14,000	7.9	13
July 1, 3, 8, 10				639	69	1,300	--	86	3.0	3,200	--	1.2	6,340	1,880	1,810	9,470	7.5	13
July 2, 4-5, 15, 20				449	45	920	--	98	2.0	3,320	--	1.4	4,530	1,310	1,220	6,940	7.7	15
July 6-7				768	71	1,510	--	86	3.0	3,790	--	1.8	7,010	2,210	2,140	11,100	7.7	14
July 9, 16-19		8.6	.06	341	31	739	25	106	9.0	1,780	.1	6.5	3,400	978	892	5,810	7.8	12
July 11-12				615	62	1,240	--	94	2.0	3,150	--	.5	5,800	1,790	1,710	9,190	7.5	17
July 13-14, 25				665	123	1,560	--	76	8.0	3,840	--	.6	7,130	2,160	2,100	11,200	7.3	20
July 21-24				651	69	1,290	--	82	3.0	3,300	--	1.2	6,110	1,910	1,840	9,560	7.4	21
July 26-28				1,210	130	2,220	--	68	4.0	5,820	--	1.4	10,800	3,580	3,500	16,100	7.2	13
July 29-31				1,510	151	2,780	--	64	7.0	7,350	--	1.8	13,200	4,300	4,340	19,900	7.3	17
Aug. 1-5				1,230	115	2,410	--	62	28	6,080	--	1.4	10,800	3,540	3,490	17,000	6.7	7
Aug. 6-8				626	59	1,310	--	78	16	3,240	--	.8	5,790	1,800	1,740	9,760	6.7	5
Aug. 9-15				1,020	88	2,000	--	71	12	4,990	--	1.4	8,830	2,910	2,850	14,400	7.0	5
Aug. 16-20-31				1,340	116	2,630	--	58	1.0	6,620	--	2.0	11,890	3,770	3,770	18,600	6.7	5
Aug. 17-28		4.7	.01	793	71	1,630	56	79	13	4,060	--	1.6	7,390	2,270	2,210	11,800	7.0	8
Sept. 1-8, 10				1,330	124	2,640	--	65	15	6,600	--	2.0	11,800	3,830	3,780	18,700	7.8	7
Sept. 9, 11-20		4.5	.00	1,100	87	2,190	68	67	22	5,470	--	5.5	9,770	3,100	3,050	15,400	7.7	7
Sept. 21-24				819	81	1,730	--	81	16	4,320	--	1.2	7,750	2,380	2,310	12,600	7.5	9
Sept. 25-30				1,260	121	2,540	--	75	9.8	6,350	--	.8	11,500	3,640	3,560	17,900	7.4	7
Average N.E.S.				345	137	698	✓	66	9.0	1,730	✓	1.9	3,210	1,010	959	5,170	7.1	20

343

## RED RIVER BASIN--Continued

## THREE CREEKS NEAR JUNCTION CITY, ARK.--Continued

Temperature (°F) of water, water year October 1952 to September 1953

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

RED RIVER BASIN--Continued  
BAYOU D'ARBONNE NEAR DUBACH, LA.

LOCATION.--at gaging station at bridge on U. S. Highway 167, 1½ miles south of Dubach, Lincoln Parish, and 8 miles upstream from Middle Fork Bayou D'Arbonne.  
DRAINAGE AREA.--355 square miles.  
RECORDS AVAILABLE.--Chemical analyses: September 1952 to September 1953.  
REMARKS.--Records of discharge for water year October 1952 to September 1953 given in WSP 1281.

Chemical analyses, in parts per million, September 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonyl (CO <sub>2</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (sum)			Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, mg./l.	Non-carbonate, mg./l.				
Sept. 4, 1952	0	11	0.01	19	5.2	119	4.0	79		2.7	191	0.2	0.2	0.62	392	0.53	--	89	4	78	6.2	779	7.1
Oct. 15	0	12	.02	38	9.5	308	.4	146		3.8	480	.4	.5	.31	925	1.26	--	134	14	83	12	1,780	7.2
Nov. 6	0	11	.10	46	10	367	3.8	152		2.9	585	--	.4	--	1,100	1.50	--	156	32	84	13	2,170	7.1
Dec. 12	9.0	12	.12	14	3.7	41		32		11	75	.4	2.0	.07	179	.24	4.35	50	24	62	2.4	331	6.6
Jan. 15, 1953	27	16	.23	25	4.2	91	1.4	10		13	166	--	.0	--	310	.42	23	80	72	69	3.9	609	6.4
Feb. 23	1,580	12	.23	3.4	1.0	9.4		6		6.1	18	.1	1.0	.05	56	.08	240	13	8	58	1.2	90.9	5.9
Mar. 14	4,730	8.8	.57	2.4	1.0	3.8	--	8		4.8	5.2	--	.5	--	31	.04	396	10	4	45	.5	47.6	5.9
Apr. 13	804	12	.78	5.9	2.2	16		10		6.4	30	--	1.2	--	79	.11	171	24	16	59	1.4	152	6.1
May 13	1,200	13	.62	3.4	1.4	7.2	.8	10		4.9	12	2	.8	--	49	.07	159	14	6	51	.8	77.0	6.7
June 18	18	15	.57	12	3.3	37		23		4.5	70	.1	.5	--	154	.21	7.48	44	25	65	2.4	294	6.3
July 23	111	11	1.3	4.9	1.5	15		14		6.0	24	--	2.0	--	73	.10	22	21	9	61	1.5	130	6.4
Aug. 20	.8	14	.03	48	6.5	174		31		11	345	--	.8	--	614	.84	1.33	146	121	72	6.2	1,200	6.7
Sept. 24	0	12	.53	12	2.9	51		30		5.4	87	--	.8	--	187	.25	--	42	17	73	3.4	353	6.7

## RED RIVER BASIN--Continued

BAYOU MACON NEAR DELHI, LA.

LOCATION.--At gaging station at bridge on U. S. Highway 80, 150 feet upstream from Illinois Central Railroad bridge, and 1 mile east of Delhi, Richland Parish.  
 RECORDS AVAILABLE.--Chemical analyses: September 1952 to September 1953.  
 REMARKS.--Records of discharge for water year October 1952 to September 1953 given in WSP 1281.

Chemical analyses, in parts per million, September 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Mag- ne- sium (Mg)	So- dium (Na)	Po- tas- sium (K)	Bicar- bonate (HCO <sub>3</sub> )	Car- bonate (CO <sub>3</sub> )	Sul- fate (SO <sub>4</sub> )	Chlo- ride (Cl)	Fluo- ride (F)	Ni- trate (NO <sub>3</sub> )	Bo- ron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Per- cent so- dium adsorp- tion ratio	Specific conduct- ance (micro- mhos at 25°C)	pH	
															Parts per mil- lion	Tons per acre- foot	Tons per day	Calcium	Non- carbon- ate				
Sept. 5, 1952.....	114	18	0.01	62	23	44	2.4	298		22	55	0.3	0.2	0.10	374	0.51	115	249	5	27	1.2	660	7.7
Oct. 14.....	104	15	.02	63	24		43	298		23	57	.2	.2	--	372	.51	104	256	12	27	1.2	665	7.3
Nov. 20.....	112	16	.04	66	25		45	312		26	58	--	.4	--	389	.53	118	268	12	27	1.2	673	7.7
Dec. 11.....	173	13	.02	46	17	29	3.2	218		23	36	.3	2.0	.09	277	.38	129	185	3	25	.9	481	7.9
Jan. 19, 1953.....	238	10	.08	45	17		24	198		23	33	--	1.8	--	251	.34	161	182	20	22	.8	451	7.5
Feb. 26.....	3,310	5.8	.83	11	3.8	4.3	3.5	50		5.4	5.2	.1	1.5	.07	66	.09	590	45	4	16	.3	120	6.8
Mar. 14.....	3,270	5.0	.53	11	3.6	4.8	--	50		4.9	3.5	--	1.8	--	60	.08	530	43	2	20	.3	110	6.8
Apr. 14.....	1,350	8.4	1.0	14	5.1	4.8	--	62		4.2	4.2	--	1.8	--	74	.10	270	56	5	16	.3	128	7.0
May 6.....	3,100	8.0	.66	12	3.9	3.6	1.8	54		3.5	3.5	.3	2.2	--	66	.09	552	46	2	14	.2	124	6.6
May 23.....	3,420	7.7	.58	10	3.2	4.4	1.7	51		2.2	2.0	.3	1.5	--	59	.08	545	38	0	19	.3	102	7.3
June 16.....	1,930	7.8	.73	14	4.4	4.6	--	69		1.7	3.0	.3	1.0	--	72	.10	356	53	0	16	.3	127	7.1
July 21.....	513	9.8	.14	25	9.0	9.9	3.6	116		7.1	12	--	2.0	--	136	.18	188	100	5	17	.4	240	7.4
Aug. 19.....	200	15	.02	39	14	22		189		12	24	--	1.0	--	220	.30	119	155	0	23	.8	384	7.4
Sept. 22.....	164	16	.03	43	17	21		221		13	23	--	.5	--	245	.33	108	182	1	20	.7	431	7.8

## RED RIVER BASIN--Continued

## DUGDEMONA RIVER NEAR WINNFELD, LA.

LOCATION.--At gaging station at bridge on U. S. Highway 167, 300 feet upstream from Chicago, Rock Island & Pacific Railway Bridge, 2.4 miles downstream from Kyaiates Creek, and 3.5 miles north of Winnfield, Winn Parish.

DRAINAGE AREA.--648 square miles.

RECORDS AVAILABLE.--Chemical analyses: September 1952 to August 1953.

REMARKS.--Records of discharge for water year October 1952 to September 1953 given in WSP 1281.

Chemical analyses, in parts per million, September 1952 to August 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>	Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH		
															Parts per million	Tons per acre-foot	Tons per day						
Sept. 2, 1952	5.9	12	0.45	5.5	2.9	51	--	104		33	13	0.4	1.0	--	170	0.23	2.71	26	0	79	0.4	283	7.1
Oct. 16	5.6	17	1.6	6.7	3.8	82	2.4	152		56	20	.2	1.0	0.14	266	.36	4.02	32	0	83	6.3	431	7.5
Nov. 21	3.9	24	.96	7.4	4.0	84		155		67	15	--	.4	--	279	.38	2.94	35	0	64	6.2	435	7.4
Dec. 16	19	30	.93	7.4	3.3	61		130		32	18	--	.5	--	217	.30	11	32	0	81	4.7	326	7.3
Jan. 13, 1953	31	19	.60	4.7	1.3	23	3.0	38		24	11	.0	.5	.08	106	.14	8.87	17	0	70	2.4	154	6.9
Feb. 25	3,480	7.0	.30	3.2	.8	5.5	1.8	14		6.7	3.8	.4	1.0	.09	38	.05	357	12	0	46	.7	59.2	6.2
Mar. 18	5,610	7.0	.53	2.8	1.2	3.6	--	12		5.7	2.2	--	.5	--	30	.04	454	12	2	40	.5	48.2	6.3
Apr. 8	294	16	1.8	5.6	2.4	9.9	--	29		10	6.0	--	1.0	--	67	.09	53	24	0	47	.9	97.4	6.4
May 4	9,170	4.4	.16	1.9	.8	1.4	.4	9		1.9	1.0	.2	.2	--	16	.02	396	8	1	26	.2	28.0	5.7
May 18	24,200	6.8	.52	1.8	1.2	2.8	--	11		3.0	1.8	.3	.5	--	24	.03	1,570	9	0	39	.4	34.7	6.1
June 18	3.0	16	1.4	6.2	2.1	17	--	47		11	6.5	.3	1.0	--	84	.11	.68	24	0	60	1.5	132	6.6
July 15	3.0	10	1.0	6.6	2.1	19	--	58		9.5	7.8	--	1.0	--	86	.12	.70	27	0	61	1.7	150	7.0
Aug. 25	3.0	12	1.6	5.6	1.9	29	--	72		9.8	9.8	--	1.5	--	106	.14	.86	22	0	74	2.6	174	6.8

## MISCELLANEOUS ANALYSES OF STREAMS IN RED RIVER BASIN IN OKLAHOMA

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Dis-charge (cfs)	Tem-perature (° F)	Iron (Fe)	Cal-cium (Ca)	Mag-ne-sium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Car-bonate (CO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> ) (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Per-cent so-lu-sion ratio	Specific conductance (micro-mhos at 25°C)		
														Parts per million	Tons per acre-foot	Tons per day	Total	Non-carbonate				
LEBOS CREEK NEAR ELDORADO, JACKSON COUNTY																						
Nov. 13, 1952 .....				657	141			82	0		1,420						2,220	2,150		7,430	7.9	
SALT FORK RED RIVER NEAR VINSON, HARMON COUNTY																						
Mar. 11, 1953 .....	2.97	52		501	88			121	0		218						1,610	1,510		3,080	7.8	
SWEETWATER CREEK NEAR TEXAS LINE, BECKHAM COUNTY																						
Jan. 6, 1953 .....	2.06	38		57	30	76		116	0		50						264	169	38	2.0	852	8.1
Feb. 6 .....	7.11	57		68	31	80		175	2		56						296	149	37	2.0	913	8.3
LITTLE TURKEY CREEK NEAR ERICK, BECKHAM COUNTY																						
Dec. 9, 1952 .....	0.84			136	66	90		84	3		56						610	536	24	1.6	1,430	8.3
BIG TURKEY CREEK NEAR SAYRE, BECKHAM COUNTY																						
Dec. 9, 1952 .....	1.13			154	58	62		102	0		40						625	542	18	1.1	1,330	8.1
WEST CACHE CREEK NEAR COOKIETOWN, COTTON COUNTY																						
Apr. 14, 1953 .....	1.47	48		32	6.3	31		156	0		26						107	0	39	1.3	355	8.2
LITTLE BEAVER CREEK NEAR DUNCAN, STEPHENS COUNTY																						
Dec. 9, 1952 .....	1.26	56		144	46	26		286	0		19						550	316	9	0.5	1,010	7.9
Dec. 22 .....	2.34	44		140	35	21		210	0		16						485	323	8	.4	932	8.0
Feb. 3, 1953 .....	2.57	52		126	45	26		235	0		18						500	308	10	.5	931	8.2
Mar. 9 .....	5.73	50		147	41	28		238	0		26						535	340	10	.5	1,030	8.2
Apr. 13 .....	5.44	61		164	46	47		218	0		77						600	422	15	.8	1,230	8.1
June 1 .....	4.48	66		148	52	77		242	0		129						585	386	22	1.4	1,390	7.8
Aug. 16 .....	165	74		30	5.1	8.6		102	0		10						96	12	16	.4	235	7.9

## RED RIVER BASIN--Continued

## MISCELLANEOUS ANALYSES OF STREAMS IN RED RIVER BASIN IN OKLAHOMA--Continued

Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

Date of collection	Dis-charge (cfs)	Tem-perature (°F)	Iron (Fe)	Cal-cium (Ca)	Mag-nesium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Car-bonate (CO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> ) (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>		Per-cent so-lu-sion	So-lu-sion ratio	Specific conductance (micro-mhos at 25°C)	pH
														Parts per million	Tons per acre-foot	Total	Non-carbonate				

## BEAVER CREEK NEAR WAURIKA, JEFFERSON COUNTY

Mar. 31, 1953	1,340	33		42	9.0	19		108	0		30					142	54	23	0.7	374	7.4
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## MUD CREEK NEAR RINGLING, JEFFERSON COUNTY

Apr. 13, 1953	1.26	63		29	12	26		130	0		42					120	14	32	1.0	368	7.5
Aug. 18	5.66	76		12	4.9	9.6		61	0		10					50	0	30	.6	145	7.4

## LAKE MURRAY NEAR ARDMORE, LOVE COUNTY

Oct. 8, 1952		69		34	8.5	18		150	0		17					120	0	25	0.8	316	8.0
Nov. 17		66		35	8.3	17		153	0		17					122	0	23	.7	319	7.8
Dec. 22		47		36	7.8	16		153	0		17					122	0	22	.6	314	8.0
Feb. 3, 1953		53		36	8.0	16		155	0		16					123	0	22	.6	316	8.1
Mar. 10		50		36	8.5	16		155	0		16					123	0	22	.6	320	8.1
Apr. 13		64		36	8.5	16		145	5		15					123	0	22	.6	320	8.3
June 2		82		35	7.3	18		151	0		16					126	0	25	.7	327	7.7
June 23		82		38	7.1	18		157	0		16					126	0	24	.7	327	8.2
Aug. 19		81		32	8.3	18		145	0		16					114	0	24	.7	304	8.0
Sept. 24		72		34	9.0	18		154	0		16					121	0	24	.7	314	8.1

## WASHITA RIVER NEAR STATE LINE, ROGER MILLS COUNTY

Jan. 9, 1953	0.19	47		24	19	48		140	3		33					140	20	43	1.8	500	8.3
Feb. 6	3.45	54		27	20	48		151	4		34					148	18	41	1.7	510	8.4
Mar. 16	5.92	52		39	20	47		189	3		34					178	18	36	1.5	559	8.3
Apr. 14	6.44	65		43	22	49		203	3		36					196	24	35	1.5	589	8.3
May 22	6.14	--		32	19	46		152	6		35					160	26	38	1.6	521	8.4
June 19	.55	78		90	25	63		288	4		51					326	84	30	1.5	864	8.3

## WASHITA RIVER NEAR CHEYENNE, ROGER MILLS COUNTY

Mar. 2, 1953	6.92	53		99	44	113		232	6		52					425	225	37	2.4	1,240	8.4
Mar. 9	4.48	49		93	52	108		139	0		48					445	314	33	2.1	1,290	8.2
Apr. 13	5.25	61		82	53	108		164	7		53					420	282	36	2.3	1,290	8.3
May 22	7.65	--		91	33	197		274	7		47					353	140	34	2.0	1,030	8.4

## WASHITA RIVER AT CLINTON, CUSTER COUNTY

Oct. 8, 1952.....	0.02	57	521	173	38	182	0	18				2,010	1,867	4	0.4	2,860	7.9
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## RAINY MOUNTAIN CREEK NEAR MOUNTAIN VIEW, KIOWA COUNTY

May 18, 1953 .....	4.21	67	30	11	36	113	0	24				120	28	40	1.4	412	7.6
July 27.....	.10	85	44	13	26	142	0	18				165	48	26	.9	449	7.5
Aug. 25 .....	.05	72	53	16	42	183	4	32				198	42	32	1.3	562	8.3

## STINKING CREEK NEAR CARNEGIE, KIOWA COUNTY

Mar. 31, 1953 .....	0.05	58	156	58	59	623	0	25				630	120	17	1.0	1,290	7.9
May 18 .....	1.75	65	38	13	33	152	0	35				149	24	32	1.2	457	8.1
July 28 .....	1.33	76	57	17	37	197	0	46				210	48	28	.8	577	8.0
Aug. 25 .....	18.3	73	28	5.1	11	111	0	11				92	1	21	.5	236	8.0

## WASHITA RIVER NEAR CARNEGIE, CADDO COUNTY

Oct. 7, 1952 .....	3.10	63	166	38	108	231	0	126				570	380	29	2.0	1,460	7.6
Nov. 18 .....	8.44	55	232	55	190	304	0	258				805	556	34	2.9	2,170	7.8
May 19, 1953 .....	70.1	65	118	28	47	102	0	66				410	326	20	1.0	985	8.1
June 22 .....	21.1	85	101	24	35	182	0	24				350	201	18	.8	805	8.1
July 28 .....	98.8	82	67	11	26	122	0	12				212	112	21	.8	479	7.9
Aug. 25 .....	59.1	79	105	18	18	147	0	15				336	216	10	.4	702	8.1

## POND CREEK NEAR FT. COBB, CADDO COUNTY

Oct. 7, 1952.....	5.01	52	99	26	31	211	3	16				356	178	16	0.7	729	8.3
Nov. 5 .....	11.7	54	119	24	28	285	0	15				398	156	13	.6	785	8.0
May 19, 1953.....	25.6	64	99	23	31	282	3	15				340	96	17	.7	728	8.3
June 22 .....	4.94	78	100	21	36	234	0	19				360	168	18	.8	787	8.1
July 20 .....	665	73	44	6.3	5.7	123	0	3.5				136	53	8	.2	299	7.8
Aug. 25 .....	11.6	77	97	19	27	253	4	15				322	124	13	.6	690	8.3

## RED RIVER BASIN--Continued

## MISCELLANEOUS ANALYSES OF STREAMS IN RED RIVER BASIN IN OKLAHOMA--Continued

Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

Date of collection	Dis-charge (cfs)	Tem-perature (°F)	Iron (Fe)	Cal-cium (Ca)	Mag-nesium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Car-bonate (CO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> )	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>		Per-cent so-lid-ity	So-dium absorp-tion ratio	Specific conductance (micro-mhos at 25°C)	pH
														Parts per million	Tons per acre-foot	Total	Non-carbonate				

## SUGAR CREEK NEAR ANADARKO, CADDO COUNTY

Jan. 20, 1953	6.19	37		101	15	24			0							312	107	14	0.6	659	7.7
Mar. 3	19.0	47		92	15	22		189	0	13	11					290	135	14	6	639	7.6
Mar. 30	16.8	63		90	15	20		180	0	10						284	136	13	5	614	8.0
May 19	5.75	69		109	18	27		266	8	14						348	116	14	6	738	8.3
Aug. 25	4.84	82		104	39	79		130	0	26						620	514	22	1.4	1,360	8.0

## WASHITA RIVER NEAR CHICKASHA, GRADY COUNTY

Oct. 21, 1952	12.8	53		136	67	82		325	0	423	61		0.8	995	1.35	615	348	22	1.4	1,390	7.8
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## WEST BITTER CREEK NEAR CHICKASHA, GRADY COUNTY

Mar. 3, 1953	0.23	47		31	11	3.7		122	0		4.2					124	24	6	0.1	282	7.4
Mar. 30	3.90	62		82	63	44		388	0		19					465	147	17	9	861	8.2
July 28	.22	92		46	38	29		258	5		11					270	50	19	8	823	8.3

## WEST BITTER CREEK NEAR TABLER, GRADY COUNTY

Nov. 3, 1952	0.29	55		87	111	83		525	0		33					675	245	21	1.4	1,420	8.1
Jan. 20, 1953	1.91	45		106	72	53		412	0		24					560	222	17	1.0	1,140	7.9
May 19	2.32	76		59	33	26		250	9		10					282	62	17	7	611	8.5

## LITTLE WASHITA RIVER NEAR NINNEKAH, GRADY COUNTY

Oct. 7, 1952	0.05	56		509	114	145		261	0		111					1,740	1,530	15	1.5	2,940	8.1
Dec. 22	16.0	43		345	36	136		254	0		250					1,010	802	23	1.9	2,230	7.6
Feb. 3, 1953	13.2	45		333	44	131		222	0		205					1,010	828	22	1.8	2,170	7.8
Mar. 9	20.7	49		343	38	108		210	0		250					1,010	838	19	1.5	2,120	7.9
Apr. 13	22.2	59		377	41	126		230	0		230					1,110	905	20	1.6	2,370	7.8
June 1	5.52	79		385	44	215		137	0		418					1,030	1,140	29	2.8	2,880	7.4
June 22	1.77	60		433	36	149		145	0		235					1,230	1,110	21	1.8	2,590	8.0
Aug. 16	28.7	75		161	14	63		118	0		97					460	364	23	1.3	1,130	7.8

## FINN CREEK NEAR STORY, McCLAIN COUNTY

Oct. 10, 1952	0.01	57	70	44	38	401	6	18				354	16	19	0.9	756	8.3
Nov. 19	.27	60	77	58	55	603	0	18				430	0	22	1.2	936	7.8
Dec. 24	.66	38	57	45	29	406	0	13				328	0	16	.7	695	7.6
Feb. 5, 1953	.66	52	64	63	44	542	0	16				420	0	19	.9	854	8.0
Mar. 11	1.38	52	66	62	40	526	2	16				416	0	17	.8	835	8.3
Apr. 15	17.4	53	27	12	6.8	137	0	4.2				116	4	11	.3	249	7.6
June 3	.27	83	46	40	35	365	0	13				282	0	21	.9	626	8.2
Aug. 20	.83	73	24	9.2	6.3	125	0	2.5				97	0	12	.3	217	7.8

## WASHITA RIVER NEAR PAULS VALLEY, GARVIN COUNTY

Oct. 7, 1952	7.90	52	72	77	91	413	0	102				495	156	29	1.8	1,230	8.2
Nov. 18	45.5	62	111	72	88	335	0	77				595	320	24	1.6	1,380	8.0
Dec. 23	128	49	127	52	90	313	0	111				580	324	25	1.6	1,370	8.2
Jan. 30, 1953	113	50	132	51	80	279	0	100				540	312	24	1.5	1,280	7.9
Mar. 11	142	52	136	29	36	202	0	47				460	294	15	.7	989	8.2
Apr. 15	318	56	86	19	34	144	0	50				292	174	20	.9	710	8.0
June 2	68.7	83	152	44	76	197	0	97				560	398	23	1.4	1,320	7.7
June 24	47.5	80	99	27	34	105	0	30				358	272	17	.8	845	7.8
Aug. 20	361	72	67	16	25	170	0	29				232	92	19	.7	568	8.0

## RUSH CREEK NEAR RUSH SPRINGS, GRADY COUNTY

Sept. 23, 1953	0.24	77	67	18	15	220	0	18				240	60	13	0.4	513	8.2
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## RUSH CREEK NEAR PURDY, GARVIN COUNTY

Oct. 10, 1952	2.41	56	162	174	459	322	0	1,130				1,120	856	47	6.0	4,120	8.0
Nov. 17	8.20	68	108	81	152	305	0	350				605	355	35	2.7	1,850	8.0
Nov. 23	44.2	46	136	68	317	241	0	650				620	422	53	5.5	2,670	7.8
Dec. 24	8.43	37	117	70	102	323	0	255				560	316	28	1.8	1,530	7.8
Feb. 5, 1953	7.11	50	117	40	118	291	0	272				455	216	36	2.4	1,570	7.8
Mar. 4	19.7	49	101	34	69	205	0	139				390	222	28	1.5	1,100	7.8
Mar. 11	12.2	51	119	59	128	285	0	290				540	306	34	2.4	1,620	8.1
Apr. 15	9.96	55	104	52	93	239	0	190				475	279	30	1.9	1,330	8.2
June 3	1.87	80	136	83	185	221	0	410				680	499	37	3.1	2,110	8.0
Aug. 20	4.64	73	71	25	67	180	0	152				280	132	34	1.7	862	8.1

## RED RIVER BASIN--Continued

## MISCELLANEOUS ANALYSES OF STREAMS IN RED RIVER BASIN IN OKLAHOMA--Continued

Date of collection	Dis-charge (cfs)	Tem-perature (°F)	Iron (Fe)	Cal-cium (Ca)	Mag-nesium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Car-bonate (CO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> )	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>		Per-cent adsorp-tion ratio	Specific conductance (micro-mhos at 25°C)	pH
														Parts per million	Tons per acre-foot	Total	Non-carbonate			

Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

## RUSH CREEK NEAR PAULS VALLEY, GARVIN COUNTY

Feb. 4, 1953.....	7.99	61		101	69	106		275	0		220					535	310	30	2.0	1,470	7.9
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## WILDHORSE CREEK NEAR HOOVER, GARVIN COUNTY

Dec. 23, 1952.....	1.20	48		69	25	47		336	0		54					276	0	27	1.2	763	7.9
Apr. 14, 1953.....	11.6	66		59	9.7	10		201	0		15					186	22	10	.3	387	8.0
June 2.....	7.39	82		63	8.8	9.2		226	0		11					192	7	9	.3	399	7.7
June 23.....	4.63	88		61	10	14		225	0		20					194	10	14	.4	434	8.0
Aug. 18.....	243	74		26	7.3	9.2		108	0		15					95	6	17	.4	278	7.8

## HONEY CREEK NEAR DAVIS, MURRAY COUNTY

July 29, 1953.....	2.15	73		45	13	4.4		195	0		7.0					166	6	5	0.2	333	8.0
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## ROCK CREEK NEAR DOUGHERTY, MURRAY COUNTY

Oct. 7, 1952.....	6.39	51		67	40	287		271	4		458					332	104	64	6.5	1,930	8.3
Nov. 18.....	14.9	63		71	38	232		285	10		405					332	82	60	5.6	1,790	8.5
Dec. 23.....	10.4	48		74	32	156		285	0		278					316	32	52	3.8	1,360	8.2
Feb. 4, 1953.....	8.23	52		71	41	196		270	18		365					345	94	55	4.6	1,620	8.7
Mar. 10.....	13.7	52		68	32	174		286	0		298					302	68	56	4.4	1,410	8.2
Apr. 14.....	6.92	64		67	24	102		242	0		176					266	68	45	2.7	1,010	8.2
June 2.....	13.2	83		74	23	98		266	0		158					280	62	43	2.5	994	8.1
June 23.....	5.74	87		70	27	187		228	0		310					286	99	59	4.8	1,470	8.1
Aug. 19.....	15.5	78		64	19	119		213	0		195					238	64	52	3.3	1,040	8.1

## LAWRENCE SPRINGS NEAR DRAKE, MURRAY COUNTY

Mar. 18, 1953.....	3.28	69		77	37	8.2		401	0		12					346	18	5	0.2	634	7.9
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## MILL CREEK NEAR MILL CREEK, JOHNSTON COUNTY

Oct. 9, 1952	1.22	55	54	42	4.6	440	0	6.8	308	0	3	0.1	576	8.1
Nov. 18	2.01	61	67	42	4.7	401	0	6.0	340	12	3	.1	598	8.1
Dec. 23	2.06	48	64	39	4.8	375	0	6.5	320	12	3	.1	558	8.0
Jan. 4, 1953	1.28	55	63	41	4.8	386	0	5.8	326	10	3	.1	577	8.0
Mar. 10	2.92	50	43	39	4.1	327	3	3.5	274	1	3	.1	496	8.3
Apr. 14	2.09	51	53	38	4.8	366	0	7.1	314	14	3	.1	554	8.0
June 2	2.03	82	57	37	2.0	357	0	7.2	326	14	3	.1	554	8.0
June 23	3.68	80	57	37	2.0	355	3	7.1	296	0	4	.1	471	8.3
Aug. 19	6.28	70	40	37	5.4	297	6	6.5	254	0	4	.1	471	8.3
Sept. 30	2.01	72	33	38	5.4	278	8	7.2	238	0	5	.2	448	8.4

## PENNINGTON CREEK NEAR REAGAN, JOHNSTON COUNTY

Oct. 9, 1952	8.20	58	46	42	2.8	344	0	4.0	288	6	2	0.1	508	8.0
Nov. 18	7.41	59	62	42	3.9	386	0	4.8	328	12	3	.1	564	8.2
Dec. 23	7.48	52	61	40	2.5	376	0	4.0	316	8	2	.1	539	8.0
Jan. 4, 1953	8.99	55	55	39	2.7	357	0	3.8	298	6	2	.1	521	--
Mar. 10	13.4	62	51	40	2.7	318	0	4.2	280	30	2	.1	504	8.1
Apr. 14	23.1	79	53	38	2.7	352	0	3.8	280	2	2	.1	516	8.1
June 2	15.4	82	53	38	3.0	348	0	3.5	280	5	2	.1	530	7.9
June 23	15.4	82	53	38	3.0	348	0	3.5	280	5	2	.1	530	7.9
Aug. 19	20.4	77	34	36	2.6	286	0	3.0	234	0	2	.1	435	8.2
Sept. 30	13.9	73	31	37	2.9	265	10	4.8	230	0	3	.1	430	8.4

## BLUE CREEK AT CONNERVILLE, JOHNSTON COUNTY

Nov. 18, 1952	18.0	60	67	39	2.5	395	0	3.2	328	4	2	0.1	571	8.1
Dec. 23	16.4	51	46	39	2.7	339	0	3.0	282	4	2	.1	571	7.9
Jan. 4, 1953	15.0	55	75	39	2.6	410	0	2.5	326	10	2	.1	585	8.0
Mar. 10	19.6	75	70	34	2.7	390	0	2.2	324	9	2	.1	585	8.0
Apr. 14	20.7	85	74	34	2.7	390	0	2.2	324	9	2	.1	585	8.0
June 2	20.7	85	59	36	2.6	382	0	2.0	304	3	2	.1	547	7.8
June 23	24.6	73	59	36	2.3	383	0	2.2	294	0	2	.1	531	8.1
Aug. 19	24.6	73	59	36	2.3	383	0	2.2	294	0	2	.1	531	8.1
Sept. 30	24.4	72	69	28	2.6	345	0	2.5	286	6	2	.1	507	7.9

RED RIVER BASIN--Continued  
 MISCELLANEOUS ANALYSES OF STREAMS IN RED RIVER BASIN IN OKLAHOMA--Continued  
 Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

Date of collection	Dis-charge (cfs)	Tem-perature (° F)	Iron (Fe)	Cal-cium (Ca)	Mag-nesium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Car-bonate (CO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> )	Bo-ron (B)	Dissolved solids (residue at 180° C)		Hardness as CaCO <sub>3</sub>		Per-cent adsorp-tion	So-dium con-centration ratio	Specific conductance (micro-mhos at 25° C)	pH
															Parts per million	Tons per acre-foot	Total	Non-carbonate				
CHUCKWA CREEK NEAR DURANT, BRYAN COUNTY																						
Oct. 8, 1952.....	0.27	55		14	2.2	7.4		35	0		12						43	14	27	0.5	134	6.1
BLUE RIVER NEAR BLUE, BRYAN COUNTY																						
Nov. 12, 1952.....		50	23	54	37	11		239	12		11						208	0	10	0.3	416	8.6
Sept. 1, 1953.....		78	54		28	7.0		311	0		7.0						252	0	6	.2	484	8.0
CLEAR BOGGY CREEK NEAR CANEY, ATOKA COUNTY																						
Oct. 14, 1952.....	0.51	64		85	54	390		92	0		855						435	360	66	8.1	2,840	7.8
Nov. 25.....	31.0	49	42	42	38	190		137	0		400						264	152	61	5.1	1,520	8.0
Mar. 17, 1953.....	214	58	51	51	9.7	36		158	0		66						167	38	32	1.2	480	8.2
Aug. 25.....	29.9	81	51	51	11	32		183	0		52						172	22	29	1.1	495	7.6
MUDDY BOGGY CREEK NEAR FARRIS, ATOKA COUNTY																						
Nov. 25, 1952.....	78.3	52		8.8	3.9	8.7		44	0		7.0						38	2	33	0.6	122	7.6
Mar. 17, 1953.....	581	58		6.8	3.2	7.5		26	0		4.0						30	8	35	.6	103	7.0
July 16.....	37.6	79		19	6.8	17		95	0		16						76	0	33	.8	235	7.3
Sept. 1.....	--	83		56	12	82		168	0		139						188	50	49	2.6	766	7.5
LITTLE RIVER NEAR ALIKCHI, MCCURTAIN COUNTY																						
Oct. 31, 1952.....		60		3.8	2.9			9.2	32	0	3.3	8.0	0.5		62	0.08	21	0	48	0.9	123	7.0
LITTLE RIVER NEAR VALLIANT, MCCURTAIN COUNTY																						
Oct. 31, 1952.....		53		3.3	1.9			8.4	24	0	3.0	7.8	0.6		39	0.06	16	0	53	0.9	68.6	6.8
LITTLE RIVER NEAR MILLERTON, MCCURTAIN COUNTY																						
Oct. 31, 1952.....		54		12	4.0	30		35	0	7.1	54		0.5		138	0.19	46	18	59	1.9	253	6.8

## GLOVER CREEK NEAR GLOVER, McCURTAIN COUNTY

Oct. 31, 1952.....	55	7.0	2.5	5.9	39	0	3.6	3.2	0.5	44	0.06	28	0	32	0.5	79.5	7.0
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## LITTLE RIVER NEAR GARVIN, McCURTAIN COUNTY

Oct. 31, 1952 .....	53	13	4.2	33	51	0	8.1	50	0.5	142	0.19	50	8	59	2.0	266	6.9
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## LITTLE RIVER NEAR IDABEL, McCURTAIN COUNTY

Oct. 31, 1952.....	53	20	6.9	130	60	0	14	210	0.6	429	0.58	78	29	78	6.4	825	7.0
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## MOUNTAIN FORK RIVER NEAR EAGLETOWN, McCURTAIN COUNTY

Oct. 31, 1952.....	57	12	3.1	8.2	52	0	3.2	10	0.6	65	0.09	43	0	29	0.6	122	7.0
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RED RIVER BASIN--Continued  
MISCELLANEOUS ANALYSES OF STREAMS IN RED RIVER BASIN IN ARKANSAS  
Chemical analyses, in parts per million, water year October 1952 to September 1953

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (residue on evaporation at 180°C)	Hardness as CaCO <sub>3</sub>		Specific conductance (micro-mhos at 25°C)	pH	Color	
														Calcium, nesium	Non-carbonate				
RED RIVER AT INDEX																			
Oct. 31, 1952.....	2,100							a 162	214	290		2.2			355	222	1,530	8.4	
Apr. 3, 1953.....	5,500							111	65	74		3.3			143	52	527	8.2	
Sept. 17.....	2,820							b 176	151	265		2.0			327	183	1,390	8.3	
ROLLING FORK RIVER NEAR DE QUEEN																			
Nov. 3, 1952.....	0.2							37	35	160		0.3			92	62	623	7.9	
Mar. 27, 1953.....	277							11	2.0	2.5		1.2			9	0	33.4	7.2	
Sept. 16.....	2.4							17	2.0	5.5		1.3			12	0	50.6	7.4	
LITTLE RIVER NEAR HORATIO																			
Nov. 18, 1952.....	88							51	16	185		0.5			75	33	698	8.1	
Mar. 31, 1953.....	3,470							17	2.0	5.8		1.2			16	2	58.3	7.4	
Apr. 13.....	5,200							19	3.0	4.5		1.0			14	0	55.4	7.2	
Sept. 22.....	60							31	6.0	51		.9			32	7	244	7.6	
SALINE RIVER NEAR DIERKS																			
Mar. 26, 1953.....	208							5	2.0	3.5		5.4			9	5	53.4	7.0	
Sept. 18.....	.5							23	1.0	4.0		.7			12	0	49.7	7.5	
OUACHITA RIVER NEAR MOUNT IDA																			
Mar. 12, 1953.....	734							17	2.0	2.8		2.2			16	2	43.8	7.5	
Aug. 31.....	30							42	2.0	2.0		.6			34	0	76.4	7.5	
SOUTH FORK OUACHITA RIVER NEAR MOUNT IDA																			
Feb. 16, 1953.....	82							67	4.0	2.0		0.6			57	2	122	8.1	
Aug. 31.....	6.5							c 106	2.0	2.5		.4			89	2	179	8.3	

a includes equivalent of 6 parts per million of carbonate (CO<sub>3</sub>);  
b includes equivalent of 4 parts per million of carbonate (CO<sub>3</sub>);  
c includes equivalent of 2 parts per million of carbonate (CO<sub>3</sub>).

## MUDDY FORK CREEK AT MURFREESBORO DAM SITE NEAR MURFREESBORO

Nov. 3, 1952.....	0	68	2.0	5.5	0.3	50	0	134	8.0
Apr. 9, 1953.....	318	15	5.0	6.2		12	0	45.8	7.2
Sept. 23.....	0	25	2.0	1.5	1.3	21	1	62.6	7.7

## LITTLE MISSOURI RIVER AT MURFREESBORO DAM SITE NEAR MURFREESBORO

Mar. 31, 1953.....	192	14	2.0	3.2	1.0	12	1	65.8	7.1
Sept. 23.....	0	15	1.0	1.5	.7	10	0	30.9	7.0

## LITTLE MISSOURI RIVER NEAR MURFREESBORO

Nov. 3, 1952.....	8.0	65	1.0	2.2	0.2	51	0	112	8.1
Mar. 31, 1953.....	395	20	3.0	2.2	1.3	18	2	47.4	7.4
Sept. 23.....	39.6	14	2.0	2.0	.6	9	0	34.5	7.3

## MORO CREEK NEAR FORDYCE

Nov. 11, 1952.....	48	16	5.0	6.0	3.7	18	5	79.1	7.2
Feb. 17, 1953.....	640	6	3.0	6.2	1.3	16	11	47.2	6.8
Sept. 1.....	0	39	1.0	2.5	1.1	29	0	72.6	7.6

RED RIVER BASIN--Continued  
MISCELLANEOUS ANALYSES OF STREAMS IN RED RIVER BASIN IN TEXAS  
Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Water discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Bo-ron (B)	Dissolved solids (sum)		Hardness as CaCO <sub>3</sub>	Per-cent adsorp-tion	Specific conductance (micro-mhos at 25°C)				
															Parts per million	Tons per acre-foot							
																				Calcium	Non-carbonate		
SALT SPRINGS AT ESTELLINE																							
Oct. 6, 1952		31		1,520	312	18,100	140			4,280	28,200					52,500	71.4	5,080	4,960	89		69,000	7.8
BUCK CREEK NEAR WELLINGTON																							
Oct. 8, 1952	1.24	22		608	141	177	102			1,940	265		7.5			3,210	4.37	2,100	2,010	16	1.7	3,860	8.0
May 11, 1953	3.06	15		568	130	142	73			1,800	225		12			2,930	3.98	1,950	1,890	14	1.4	3,360	7.9
GROESBECK CREEK NEAR QUANAH																							
Jan. 13, 1953	6.50	14		586	117	307	84			1,830	448		5.4			3,350	4.56	1,940	1,870	26	3.0	4,050	7.9
May 11	.34	12		610	131	284	72			1,870	472		8.2			3,420	4.65	2,060	2,000	23	2.7	4,170	7.9
WANDERS CREEK AT ODELL																							
Jan. 13, 1953	2.04	18		139	74	158	384			446	148		10			1,180	1.60	652	337	35	2.7	1,770	7.8
May 14	1.15	24		90	50	104	321			237	92		21			840	1.14	430	166	35	2.2	1,200	
CARROLL CREEK 8 1/4 MILES NORTH OF CLARENDON																							
Jan. 13, 1953	1.29	32		31	20	23	190			31	13		2.8			a254	0.35	160	4	23	0.8	488	8.2
Aug. 24	.44	44		--	--	30	208			48	15		1.8					177	6	27	1.0	468	8.2
SALT FORK RED RIVER NEAR CLARENDON																							
Oct. 8, 1952	1.25	35		48	24	81	168			101	108		7.7			a526	0.72	218	81	45	2.4	841	8.1
Jan. 13, 1953	9.26	36		42	21	48	146			101	50		9.2			a397	.54	192	72	35	1.5	669	8.2
July 22	--	--		--	--	--	182			121	76		--			a493	.67	244	95	--	--	761	8.2
Aug. 24	1.05	60		50	21	78	123			123	108		3.2			a536	.73	212	110	45	2.4	801	8.0

<sup>a</sup> Residue on evaporation at 180°C.

## LELIA LAKE CREEK NEAR HEDLEY

Oct. 8, 1952.....	5.56	44	73	28	54	143	215	48	7.7	a601	0.82	297	180	28	1.4	830	8.0
Jan. 13, 1953.....	6.79	40	66	28	52	105	217	51	9.2	a542	.74	280	194	29	1.3	891	8.0
July 22.....	--	--	--	--	--	188	173	118	--	a625	.85	290	136	--	--	1,010	7.9
Aug. 12.....	8.22	50	51	17	32	170	89	23	3.2	a372	.51	197	58	26	1.0	523	8.1

## DOZIER CREEK A HALF MILE EAST OF DOZIER

Mar. 5, 1953.....		24	484	57	44	102	1,290	74	8.7	2,030	2.76	1,440	1,360	6	0.5	2,420	7.9
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## DOZIER CREEK 14 MILES NORTHWEST OF WELLINGTON

Mar. 5, 1953.....	0.23	34	584	82	65	110	1,660	78	8.7	2,560	3.48	1,790	1,700	7	0.7	2,820	8.0
Sept. 16.....	.23	34	586	84	66	99	1,690	76	9.0	2,500	3.94	1,810	1,730	8	.7	2,810	7.7

## SWEETWATER CREEK NEAR WHEELER

Jan. 16, 1953.....	1.69	34	70	16	37	326	26	18	1.5	a362	0.49	240	0	25	1.0	586	8.1
May 11.....	3.83	35	30	15	42	201	22	26	3.9	a272	.37	137	0	40	1.5	435	8.2
Sept. 8.....	.08	58	36	14	32	210	21	16	.5	a286	.39	147	0	32	1.2	423	8.2

## ELM CREEK NEAR SHAMROCK

May 11, 1953.....	1.67	34	129	32	73	102	373	97	5.0	a866	1.18	454	370	26	1.5	1,200	8.0
Sept. 8.....	1.35	60				90	308	121	1.5			360				1,130	7.9

## ROARING SPRINGS NEAR ROARING SPRINGS

June 10, 1953.....	1.47	44	77	31	73	294	77	95	28	a570	0.76	320	78	33	1.8	960	7.9
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NORTH FORK WICHITA RIVER 10 MILES SOUTHEAST OF PADUCAH<sup>a</sup>

Jan. 13, 1953.....	3.08	18	514	133	775	93	1,600	1,250	16	4,350	5.92	1,830	1,760	48	7.9	6,100	7.9
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<sup>a</sup> Residue on evaporation at 180°C.

## RED RIVER BASIN--Continued

## MISCELLANEOUS ANALYSES OF STREAMS IN RED RIVER BASIN IN TEXAS--Continued

Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

Chemical analyses, in parts per million, water year October 1952 to September 1953—Continued																					
Date of collection	Water discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (sum)		Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	
															Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate			
SALT CREEK 6½ MILES SOUTHEAST OF PADUCAH																					
Jan. 13, 1953	1.96	14		1,240	290	11,400	89			3,710	17,600				34,500	46.9	4,290	4,210	85	47,000	7.8
NORTH FORK WICHITA RIVER 14 MILES SOUTHEAST OF PADUCAH																					
Jan. 13, 1953	8.42	21		797	191	4,730	95			2,410	7,430				15,600	21.2	2,770	2,700	79	22,900	7.9
NORTH FORK WICHITA RIVER 4½ MILES NORTH OF TRUSCOTT																					
Jan. 13, 1953	12.8	14		870	212	4,250	105			2,650	6,690				14,700	20.0	3,040	2,960	75	21,200	7.9
SOUTH FORK WICHITA RIVER 6 MILES EAST OF GUTHRIE																					
Jan. 13, 1953	4.23	16		1,190	300	8,650	115			3,040	14,000				27,300	37.1	4,200	4,110	82	38,500	7.8
SOUTH FORK WICHITA RIVER 4 MILES NORTH OF BENJAMIN																					
Jan. 13, 1953	4.0	24		1,390	387	8,720	108			3,550	14,000				28,400	38.6	5,060	4,970	79	39,900	7.8
WICHITA RIVER AT HEAD OF LAKE KEMP 9 MILES NORTHWEST OF SEYMOUR																					
Jan. 13, 1953	8.0	18		792	207	3,550	85			2,320	5,710				12,600	17.1	2,830	2,760	73	18,400	7.8
CADDO LAKE NEAR KARNACK																					
Aug. 25, 1953		22	0.83	7.0	3.0	23	25			14	31	0.2	0.2		a125	0.17	30	9	62	178	6.9

a Residue on evaporation at 180°C.

MISSISSIPPI RIVER DELTA

AMITE RIVER NEAR DENHAM SPRINGS, LA.

LOCATION.--At gaging station at bridge on U. S. Highway 190, 1,000 feet downstream from Comite River, 3 miles southeast of town of Denham Springs, Livingston Parish, and 15 miles east of Baton Rouge.  
DRAINAGE AREA.--1,330 square miles.

RECORDS AVAILABLE.--Chemical analyses: September 1952 to September 1953.

REMARKS.--Records of discharge for water year October 1952 to September 1953 given in WSP 1281.

RED RIVER BASIN

293

Chemical analyses, in parts per million. September 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (sum)			Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25 C)	pH or Col.
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
Sept. 2, 1952	370	13	0.10	1.2	1.5	5.2	3.2	14	1.9	7.5	0.1	2.0		43	0.06	43	9	0	46	0.8	60.5	6.3
Sept. 15	353	13	.26	1.6	1.6	5.3	.0	15	1.3	6.5	.3	1.0	0.03	38	.05	36	11	0	52	.7	47.3	6.5
Oct. 10	306	11	.45	1.6	1.0	4.9	1.0	15	.5	5.2	.0	.2		33	.04	27	81	0	53	.7	45.3	7.0
Nov. 26	382	13	.47	1.8	1.7	5.9	--	16	1.0	7.2	--	.5		40	.05	41	12	0	53	.8	47.4	6.7
Jan. 9, 1953	665	13	.66	2.1	1.1	5.4	--	12	2.2	6.2	--	.5		37	.05	66	10	0	55	.8	49.7	6.6
Feb. 12	1,300	9.6	.48	2.0	1.1	3.0	--	11	1.6	4.2	--	.8		28	.04	98	10	0	41	.4	38.1	6.1
Mar. 17	11,000	7.0	.40	1.7	1.1	2.6	--	10	2.5	2.5	--	1.0		24	.03	713	9	1	39	.4	32.6	5.9
June 26	683	13	.21	2.1	1.1	5.8	--	14	1.4	6.0	.0	1.5		38	.05	70	10	0	56	.8	51.5	6.4
July 3	1,080	9.9	.53	1.6	1.3	3.0	1.9	12	1.9	3.5	--	1.5		31	.04	89	10	0	34	.4	38.0	6.6
Sept. 14	483	12	.25	1.9	1.2	6.3	1.3	18	.8	6.0	--	.8		40	.05	52	10	0	55	.9	48.0	6.8

## MISSISSIPPI RIVER DELTA--Continued

## ATCHAFALAYA RIVER AT KROTZ SPRINGS, LA.

LOCATION.--At gaging station at bridge on U. S. Highway 190 half a mile north of town of Krotz Springs, St. Landry Parish, 0.6 miles upstream from New Orleans, Texas & Mexico railroad bridge, 10 miles upstream from Bayou Courtaulieu, and 42 miles downstream from confluence of Red River and Old River (head of Atchafalaya).

RECORDS AVAILABLE.--Chemical analyses: August 1952 to September 1953.

water temperatures: August 1952 to September 1953. Maximum, 486 ppm Dec. 1-11; minimum, 115 ppm June 11-20.

EXTRIMES, 1952-53.--Dissolved solids: Maximum, 486 ppm Dec. 1-11; minimum, 115 ppm June 11-20.

Hardness: Maximum, 218 ppm Oct. 21-31; Nov. 1-10, 11-20, 21-31; minimum, 57 ppm June 11-20.

Specific conductance: Maximum daily, 187 micromhos Dec. 8; minimum daily, 14 micromhos June 18-19.

Water temperatures: Maximum observed, 87° F on several days during August; minimum observed, 46° F on several days during December and January.

REMARKS.--Values reported on dissolved solids are residues on evaporation; Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for period August to September 1952 given in WSP 1241. Records of discharge for water year October 1952 to September 1953 given in WSP 1281.

Chemical analyses, in parts per million, August 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	Color	
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate					
Aug. 8, 1952	76,600	7.8	--	48	16	30	30	173	50	38	0.3	3.0		292	0.40	60,390	186	44	26	1.0	510	7.8	
Aug. 21-31	85,020	14	--	45	16	29	29	166	52	35		2.2	2.2	278	.38	63,820	178	42	26	.9	470	7.9	
Sept. 1-10	77,990	14	--	44	15	34	34	158	56	39		2.2	2.2	288	.39	60,570	172	42	30	1.1	479	7.8	
Sept. 11-14, 16-20	63,420	18	--	44	15	35	35	158	54	42		2.2	2.2	300	.41	51,370	172	42	30	1.1	483	7.5	
Sept. 21-30	54,090	15	--	48	17	40	40	176	60	48		3.0		319	.43	46,590	190	46	31	1.3	539	8.1	
Oct. 1-10	46,940	13	--	49	17	40	40	182	59	47		2.2		316	.43	40,050	192	44	31	1.2	539	7.9	
Oct. 11-20	41,460	13	--	54	19	40	40	195	66	49		2.0		342	.47	38,280	212	52	29	1.2	577	8.1	
Oct. 21-31	41,030	13	--	56	19	45	45	203	69	53		1.8		372	.51	41,210	218	51	31	1.3	619	8.2	
Nov. 1-10	39,440	12	--	56	19	43	43	200	71	51		2.0		368	.50	39,190	218	54	30	1.3	612	8.0	
Nov. 11-20	33,730	11	--	56	19	48	48	198	74	58		1.8		382	.52	40,980	218	56	33	1.4	637	8.0	
Nov. 21-30	44,160	12	--	56	19	56	56	194	72	74		1.8		404	.55	46,170	218	58	36	1.7	682	8.2	
Dec. 1-11	79,080	10	--	50	15	86	86	141	61	136		2.2		486	.66	103,800	186	71	50	2.7	771	7.9	
Dec. 12-20	96,330	12	--	32	9.0	36	36	94	39	54		2.2		287	.36	69,440	177	40	40	1.5	402	7.6	
Dec. 21-24, 26-31	96,640	18	--	36	9.8	40	40	95	51	60		2.2		282	.38	73,580	130	52	40	1.5	447	7.5	
Jan. 1-10, 1953	74,260	17	--	37	11	47	47	106	47	73		2.5		306	.42	61,350	138	49	43	1.8	515	7.9	
Jan. 11-20	82,990	9.2	--	38	11	48	48	119	45	69		2.5		299	.41	67,000	140	43	43	1.8	512	7.8	
Jan. 21-31	137,100	15	--	34	9.9	36	36	99	43	53		3.0		260	.35	96,240	126	44	38	1.4	426	7.8	

Feb. 1-10 .....	162,400	9.6	--	30	7.9	21	83	35	34	1.0	196	.27	85,940	107	39	30	30	334	7.9
Feb. 11-19 .....	161,000	9.8	--	27	7.4	22	77	32	32	4.0	193	.26	83,900	98	35	32	30	309	7.9
Feb. 20-28 .....	202,800	8.8	--	24	7.2	20	74	27	29	3.0	182	.25	99,660	90	29	32	29	284	7.9
Mar. 1-10 .....	228,600	10	--	24	6.8	17	73	26	25	3.0	173	.24	106,800	88	28	29	28	287	7.9
Mar. 11-20 .....	283,600	12	--	22	6.3	17	69	25	24	3.0	161	.22	123,300	81	24	32	28	243	7.7
Mar. 21-31 .....	303,700	8.0	--	23	6.5	18	73	24	26	3.0	169	.23	138,600	84	24	32	29	252	7.7
Apr. 1-10 .....	295,300	11	--	25	7.5	15	79	28	22	2.5	173	.24	137,900	93	28	27	7	237	7.7
Apr. 11-20 .....	293,100	15	--	28	8.1	17	87	35	22	2.5	181	.26	151,200	103	32	27	7	277	7.7
Apr. 21-30 .....	251,900	14	--	10	27	19	85	31	26	3.5	185	.25	125,800	100	30	29	8	286	7.9
May 1-10 .....	317,100	8.2	.09	28	6.8	15	91	23	20	3.5	184	.22	140,400	98	23	24	6	271	8.0
May 11-20 .....	339,500	8.6	.23	23	5.8	11	79	17	16	2.0	146	.20	133,800	81	16	23	6	223	7.9
May 21-31 .....	393,800	7.2	.28	23	6.3	13	78	19	19	1.5	151	.21	160,600	83	19	25	6	231	7.9
June 1-10 .....	367,800	9.6	.32	21	4.9	11	74	14	14	1.8	136	.18	135,100	73	12	25	6	199	7.6
June 11-20 .....	252,600	8.6	.35	16	4.1	11	60	11	14	1.5	115	.16	78,430	57	8	30	7	175	7.2
June 21-30 .....	195,200	9.0	.34	17	4.5	13	63	14	15	1.5	116	.18	61,140	61	9	31	7	194	7.9
July 1-10 .....	149,200	9.0	.37	17	4.6	15	62	15	18	1.8	123	.17	49,550	61	10	34	8	201	8.0
July 11-20 .....	136,200	9.6	.10	28	7.6	23	95	39	22	2.0	169	.26	70,520	101	23	33	1.0	320	7.9
July 21-31 .....	117,600	11	.09	35	9.6	36	115	42	46	2.5	246	.34	76,660	127	33	36	1.4	420	8.1
Aug. 1-10 .....	108,300	16	.03	35	8.4	40	109	29	62	2.5	257	.35	75,150	122	33	42	1.6	438	8.0
Aug. 11 .....	85,900	18	--	--	--	15	86	13	16	2.2	127	.27	36,270	61	7	35	8	188	8.0
Aug. 12-20 .....	82,420	16	.03	37	11	--	136	10	26	2.2	222	.33	53,270	138	26	33	1.2	408	8.2
Aug. 21-30 .....	80,420	15	.04	42	13	35	145	49	25	2.3	278	.38	60,300	158	40	33	1.2	456	7.9
Sept. 1-10 .....	52,820	18	--	45	13	51	163	48	64	2.6	328	.45	57,050	166	33	40	1.7	534	8.5
Sept. 11-20 .....	52,880	16	--	47	15	46	172	48	59	2.0	320	.44	45,690	179	34	36	1.5	542	8.6
Sept. 21-30 .....	46,260	14	--	51	15	54	183	58	66	1.0	356	.46	44,460	188	36	38	1.7	569	8.6
Average .....	158,500	13	--	35	10	32	110	39	43	2.3	247	.0.34	--	128	33	35	1.2	402	--

a Includes equivalent of 6 ppm carbonate (CO<sub>3</sub>).b Includes equivalent of 7 ppm carbonate (CO<sub>3</sub>).c Includes equivalent of 8 ppm carbonate (CO<sub>3</sub>).

## LOWER MISSISSIPPI RIVER BASIN

## MISSISSIPPI RIVER DELTA--Continued

## ATCHAFALAYA RIVER AT KROTZ SPRINGS, LA.--Continued

Temperature (°F) of water, water year October 1952 to September 1953

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

MISSISSIPPI RIVER DELTA--Continued  
BAYOU COODRIE NEAR CLEARWATER, LA.

LOCATION.--At gaging station at bridge on State Highway 26, seven-eighths of a mile downstream from Chicago, Rock Island & Pacific Railroad bridge, 1 1/2 miles east of Clearwater, Evangeline Parish, 4 miles south of Meeker, and 5 miles downstream from Hurricane Creek.

DATE OF RECORDS AVAILABLE.--August 1952 to September 1953.

Water temperatures.--August 1952 to September 1953.

Sediment concentrations.--August 1952 to September 1953.

EXTREMES: Maximum dissolved solids, 134 ppm Apr. 26-27; minimum, 17 ppm May 8-9, 18-31.

Hardness: Maximum, 77 ppm Apr. 26-27; minimum, 6 ppm May 8-9, 18-31.

Specific conductance: Maximum daily, 300 micromhos Apr. 27; minimum daily, 15.0 micromhos May 24.

Water temperatures: Maximum observed, 86°F Aug. 20; minimum observed, 45°F Feb. 23-24.

Sediment loads: Maximum daily, 1,610 tons June 11, 1953; minimum daily, 4 tons Aug. 21, 1952.

REMARKS.--Values reported for dissolved solids are sums of determined constituents. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for period August to September 1952 given in WSP 1241. Records of discharge for water year October 1952 to September 1953 given in WSP 1281.

Chemical analyses in parts per million, August 1952 to September 1953.

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (sum)		Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)
															Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate		
Aug. 8, 1952	76	26	--	3.3	2.7	7.4	--	23	--	1.6	7.0	0.4	0.5	--	60	0.08	19	1	45	75.9
Aug. 21-31	63.3	28	--	2.8	1.7	10	--	30	--	1.6	6.0	--	.5	--	66	.09	11.3	14	0	61
Sept. 1-10	59	28	--	1.8	1.6	7.6	--	22	--	1.4	6.2	--	.5	--	58	.08	9.23	11	0	60
Sept. 11-20	58.2	30	--	1.9	1.7	9.0	--	24	--	1.3	6.5	--	.5	--	63	.09	9.90	12	0	62
Sept. 21-30	57.0	28	--	1.9	2.0	9.0	--	23	--	1.3	6.8	--	1.0	--	61	.08	9.30	13	0	60
Oct. 1-10	55.2	29	--	2.0	2.0	8.6	--	23	--	1.2	6.5	--	.8	--	61	.08	9.09	13	0	59
Oct. 11-20	53.5	30	--	2.0	2.0	8.8	--	23	--	1.3	6.0	--	.8	--	62	.08	8.96	13	0	59
Oct. 21-31	52.3	30	--	2.2	1.3	8.6	--	23	--	1.4	6.6	--	.5	--	62	.08	8.76	10	0	64
Nov. 1-10	55.2	30	--	2.2	1.3	9.0	9.0	24	--	1.5	6.3	--	.5	--	63	.09	9.39	11	0	64
Nov. 11-20	62.0	28	--	2.4	1.3	8.9	8.9	23	--	2.2	6.5	--	.5	--	61	.08	10.2	11	0	63
Nov. 21-30	71.2	30	--	3.2	1.8	9.3	--	21	--	6.7	7.3	--	.8	--	69	.09	13.3	15	0	57
Dec. 1-7	199	28	--	6.5	4.2	8.2	--	8	--	30	8.3	--	2.2	--	91	.12	48.9	33	35	129
Dec. 8-14	328	22	--	7.3	3.3	8.4	--	19	--	18	10	--	.8	--	79	.11	70.0	32	36	107
Dec. 15-23	186	24	0.57	4.9	3.0	8.1	--	14	--	15	9.0	--	.5	--	72	.10	36.2	25	42	89.9
Dec. 24-31	200	29	--	3.3	2.3	7.5	--	12	--	10	8.0	--	.5	--	66	.09	35.6	18	48	74.2

## LOWER MISSISSIPPI RIVER BASIN

MISSISSIPPI RIVER DELTA--Continued  
BAYOU COCODRIE NEAR CLEARWATER, LA.--Continued

Chemical analyses, in parts per million, August 1982 to September 1983--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boiron (B)	Dissolved solids		Hardness as CaCO <sub>3</sub>		Percent sodium-sulfate	So-dium adsorp-tion ratio	Specific conductance (micro-mhos at 25°C)		
															Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate					
Jan. 1-2, 28-31, 1933	331	20	0.36	6.9	2.2	6.4	--	26		5.7	8.0		0.8		63	0.09	56.3	26	5	35	0.5	79.3	7.4
Jan. 3-5, 23-25, 27	334	19	.28	16	3.2	6.8	--	58		6.2	7.8		.8		89	.12	80.3	53	6	22	.4	130	7.2
Jan. 7-22, 26	264	21	--	2.4	1.4	6.4	1.0	13		5.4	8.2		.5		52	.07	37.1	12	1	52	.8	58.8	6.4
Feb. 1-15	272	7.2	--	2.6	1.4	5.8	--	12		3.3	6.5		1.0		34	.05	25.0	12	2	51	.7	54.1	6.7
Feb. 16, 19-22, 26-27	700	11	--	9.0	3.5	4.5	--	38		3.2	6.0		1.5		58	.08	110	37	6	21	.3	91.5	7.4
Feb. 17-18, 23-25	654	12	--	4.8	2.1	3.8	--	21		2.5	5.0		1.0		41	.06	72.4	21	8	29	.4	59.0	7.2
Feb. 26, Mar. 1-3	983	11	--	19	6.8	3.8	--	86		2.1	5.0		3.0		93	.13	247	75	5	10	.2	166	7.7
Mar. 4-10, 13-17	919	6.3	--	1.8	1.1	3.4	1.1	12		1.9	3.5		1.0		26	.04	64.5	9	0	42	.5	38.6	7.0
Mar. 11-12, 25-27	853	9.0	--	5.0	1.8	3.1	3.1	24		2.3	4.2		3.0		44	.06	101	20	0	22	.3	62.8	7.4
Mar. 18-24, 28-31	831	8.4	--	2.6	1.4	3.6	1.2	16		1.7	3.8		1.0		32	.04	71.8	12	0	36	.5	65.8	7.2
Apr. 1-10	650	10	--	3.3	1.7	4.0	1.5	20		1.9	4.2		1.0		38	.05	66.7	15	0	34	.4	53.8	7.1
Apr. 11-20	458	16	--	3.4	1.7	5.3	2.4	24		1.8	4.8		1.5		49	.07	60.6	16	0	38	.6	60.8	7.4
Apr. 21-23, 28-30	462	15	--	3.6	1.8	5.5	1.9	20		2.7	5.8		1.5		48	.07	59.9	16	0	39	.6	60.3	7.2
Apr. 24-25	324	16	--	7.0	2.4	4.9	3.3	34		3.9	4.5		1.5		60	.08	52.5	27	0	25	.4	80.3	7.2
Apr. 26-27	444	20	--	20	6.7	16		117		4.1	7.5		1.5		134	.18	161	77	0	31	.8	284	8.0
May 1-3, 7	1,315	8.8	--	9.8	4.1	6.7	3.0	60		3.0	5.5		1.5		72	.10	256	41	0	24	.5	126	7.8
May 4-6, 13-14	1,814	5.6	--	5.5	2.0	4.0	3.0	26		2.3	4.5		1.5		41	.06	201	22	1	25	.5	168	7.7
May 8-9, 18-31	6,162	2.8	--	1.6	.6	2.1	1.6	8		1.2	2.2		1.0		17	.02	283	6	0	35	.4	24.6	6.5
May 10-12, 15-17	2,108	4.6	--	2.2	1.0	3.0	2.1	11		1.9	3.8		1.0		25	.03	142	10	1	35	.4	35.2	6.9
June 1-6, 8-10	1,388	5.6	.64	3.0	1.6	2.7	--	14		1.2	2.5		2.8		27	.04	101	14	3	29	.3	40.8	7.1
June 7, 11-18	1,071	12	.57	2.4	1.7	13		42		1.1	3.2		2.5		58	.08	168	13	0	69	1.6	86.0	7.6
June 19-30	789	11	.55	2.6	1.1	3.0	1.3	17		.8	2.8		2.2		33	.04	70.3	11	0	34	.4	44.2	7.3
July 1-15	511	18	--	2.6	1.5	7.9	1.7	28		1.4	4.0		1.8		53	.07	73.1	13	0	54	1.0	65.3	6.8
July 16-31	348	17	--	3.2	1.4	6.5	1.9	24		2.3	5.5		1.2		51	.07	47.9	14	0	47	.7	66.5	7.4
Aug. 1-10	337	17	2.2	3.0	1.6	6.2	1.6	20		1.3	7.0		1.5		51	.07	46.4	14	0	46	.7	57.4	7.1
Aug. 11-20	124	24	1.6	2.1	1.3	8.4	1.6	22		1.5	8.5		1.8		62	.08	20.8	11	0	54	1.1	56.6	7.2
Aug. 21-31	243	29	--	2.9	.7	6.6	1.7	20		1.4	5.8		1.0		59	.08	38.7	10	0	59	.9	55.7	7.4
Sept. 1-14	189	22	--	3.0	1.5	4.9	2.4	18		1.7	7.8		1.0		53	.07	27.0	14	0	39	.6	61.2	7.1
Sept. 15-30	91.9	28	.72	2.4	.9	6.3	3.3	24		.8	6.2		1.0		61	.08	15.1	10	0	50	.9	57.1	7.6
Average	705	18	--	4.8	2.1	8.3	--	29		4.0	5.9		1.3		59	0.08	112	21	0	47	0.8	770	--

## MISSISSIPPI RIVER DELTA--Continued

## BAYOU COCODRIE NEAR CLEARWATER, LA.--Continued

Temperature (°F) of water, water year October 1952 to September 1953

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

## MISSISSIPPI RIVER DELTA--Continued

## BAYOU COCODRIE NEAR CLEARWATER, LA.--Continued

Day	Suspended sediment, August to September 1952								
				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.....							60		
2.....							60		
3.....							60		
4.....							60		
5.....							59		
6.....							59	10	1.6
7.....							59		
8.....							59		
9.....							57		
10.....							57		
11.....							57		
12.....							57		
13.....							57		
14.....							57		
15.....							59		
16.....							59		
17.....							59		
18.....							59		
19.....							59	12	1.9
20.....							59		
21.....				64	4	0.7	59		
22.....				64			59		
23.....				62			57		
24.....				64			57		
25.....				66			57		
26.....				66	12	2.0	57		
27.....				64			56	13	2.0
28.....				64			56		
29.....				62			56		
30.....				60			56		
31.....				60					
Total.				696	--	20.7	1,742	--	54.0

Total discharge for period Aug. 21 to Sept. 30 (cfs-days) ..... 2,438

Total load for period Aug. 21 to Sept. 30 (tons) ..... 74.7

## MISSISSIPPI RIVER DELTA--Continued

## BAYOU COCODRIE NEAR CLEARWATER, LA.--Continued

Suspended sediment, water year October 1952 to September 1953

Day	October			November			December		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	56	12	1.8	54	8	1.2	98	4	1.1
2.....	56			54			102	13	3.6
3.....	56			54			108	13	3.8
4.....	55			54			155	27	11
5.....	55			54			231	13	8.1
6.....	55	10	1.5	54			328	9	8.0
7.....	55			56			368	17	17
8.....	55			56			378	15	15
9.....	55			56			368	13	13
10.....	54			60			358	15	14
11.....	54	9	1.3	62			328	9	7.2
12.....	54			62			309		
13.....	54			62			291		
14.....	54			60			264		
15.....	54			60			231		
16.....	53	10	1.4	60	5	.8	207	8	4.1
17.....	53			60			186		
18.....	53			62			163		
19.....	53			66			154		
20.....	53			66			163		
21.....	53	10	1.4	66	8	1.4	172	14	7.1
22.....	52			66			193		
23.....	52			66			207		
24.....	52			66			207		
25.....	52			66			215		
26.....	52	8	1.1	68	8	1.5	207	12	6.3
27.....	52			69			193		
28.....	52			69			186		
29.....	52			80			176		
30.....	52			96			188		
31.....	54	10	1.5		4	1.0	231	14	8.7
Total.	1,662	--	43.6	1,884	--	33.9	6,965	--	226.7
	January			February			March		
1.....	300	11	12	247	10	5.3	987	168	448
2.....	388			223			970	255	668
3.....	418			200			966	120	313
4.....	428			176			949		
5.....	418			160			925		
6.....	408	10	11	154	14	13	903	--	e 120
7.....	398	10	11	169			870		
8.....	378	14	14	231			848		
9.....	368	10	8.1	309			826		
10.....	348			338			815		
11.....	328			348			870	80	188
12.....	309			348			937	15	38
13.....	291			348			997		
14.....	273			388			997		
15.....	247			448	245	296	985		
16.....	223	6	2.6	519	600	841	961	6	16
17.....	200			560	168	254	949		
18.....	179			560	75	113	925		
19.....	166			550	80	119	903		
20.....	151			550	100	148	861		
21.....	139	102	51	591	110	176	848	19	43
22.....	134			633	52	89	783		
23.....	186			643	75	130	814		
24.....	231			633	68	116	840		
25.....	309			873	125	295	837		
26.....		12	10		1,230	815		75	165
27.....	348			1,020					
28.....	348			1,040			804	90	195
29.....	338			1,010			804	25	54
30.....	318			--			804	--	e 50
31.....	291			--			782	--	e 45
31.....	273						760	--	e 40
Total.	9,134	--	337.4	13,269	--	5,238.4	27,355	--	3,597

e Estimated.

## LOWER MISSISSIPPI RIVER BASIN

## MISSISSIPPI RIVER DELTA--Continued

## BAYOU COCODRIE NEAR CLEARWATER, LA.--Continued

## Suspended sediment, water year October 1952 to September 1953--Continued

Suspended sediment, water year October 1956 to September 1957—Continued										
Day	April			May			June			
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	
1.....	740			1,050	20	57	1,640	19	84	
2.....	719			1,080	22	64	1,560	19	80	
3.....	698			1,080	115	335	1,490	542	2,180	
4.....	679			1,360	120	441	1,430	690	2,660	
5.....	658			1,930	65	339	1,380	1,510	5,630	
6.....	639	20	35	2,080	70	393	1,340	1,150	4,160	
7.....	622			2,050	210	1,630	1,290	590	2,050	
8.....	602			1,900	430	2,210	1,250	1,530	5,160	
9.....	583			1,770	846	4,040	1,210	1,180	3,860	
10.....	561			1,660	398	1,780	1,180	1,410	4,490	
11.....	541	31	42	1,580	55	235	1,140	1,610	5,000	
12.....	525			1,530	54	223	1,110	1,030	3,090	
13.....	506			1,710	63	291				
14.....	487			1,990	54	290	1,060	1,060	3,030	
15.....	470			2,450	36	238	1,030	1,030	2,500	
16.....	450	20	20	2,630	35	249	999	1,040	2,810	
17.....	432			2,800	200	1,510	971	1,030	2,700	
18.....	412			16,600	85	3,810	945	1,230	3,140	
19.....	390			25,000	44	2,970	915	620	1,530	
20.....	368			15,100	64	2,610	890	1,120	2,690	
21.....	343	105	81	8,300	90	2,020	861	820	1,910	
22.....	314			5,470	100	1,480	841	685	1,560	
23.....	284			4,360	74	871	829	940	2,100	
24.....	284			3,660	92	909	807	230	501	
25.....	365			256	252	3,200	55	475	783	40
26.....	424	484	554	2,850	47	362	747			
27.....	464	335	420	2,510	40	271	722			
28.....	461	35	44	2,240			710	26	50	
29.....	538	20	29	2,040	37	197	698			
30.....	830	20	45	1,880			682			
31.....				1,740						
Total..	15,389	--	2,167	125,600	--	30,421	31,600	--	66,960	
	July			August			September			
1.....	661	66	118	395	350	373	325	352	309	
2.....	639	730	1,260	395	50	53	305	490	404	
3.....	617	460	766	395			267	628	453	
4.....	585	860	1,360	385			240	990	642	
5.....	565	665	1,010	375			222	795	477	
6.....	545	932	1,370	345	25	23	199	615	330	
7.....	525	712	1,010	325			185	718	359	
8.....	505	710	968	285			164	575	255	
9.....	485	645	845	258			149	615	247	
10.....	465	625	785	214			132	458	163	
11.....	455	765	940	185	1,200	649	124	610	204	
12.....	435	408	479	161	1,360	591	114	690	212	
13.....	415	320	359	137	1,010	374	109	505	149	
14.....	395	380	405	124	1,080	362	105	690	196	
15.....	375	610	618	114	1,170	360	103	850	236	
16.....	355	575	551	109	610	180	101	600	164	
17.....	325	840	737	105	930	264	99	280	75	
18.....	305	785	646	103	780	217	97	730	191	
19.....	276	602	449	101	780	213	95	580	149	
20.....	267	265	191	101	310	85	95	598	153	
21.....	258	1,090	759	101	240	65	65	530	133	
22.....	249	750	504	109	90	26	26	415	102	
23.....	276	820	611	124	14	7.5	89	30	7.2	
24.....	335	535	484	137			89			
25.....	385	1,360	1,410	168			87			
26.....	435	900	1,060	240			87	21		4.9
27.....	445	600	721	325			87			
28.....	435	740	869	365	185	182	87			
29.....	415	480	538	375	585	592	85			
30.....	405	810	886	375	520	526	85			
31.....		480	525	355	260	249				
Total..	13,238	--	23,234	7,286	--	6,050.5	4,110	--	5,644.5	
Total discharge for year (cfs-days) .....									257,492	
Total load for year (tons) .....									143,954	

MISSISSIPPI RIVER DELTA--Continued  
BAYOU COCODRIE NEAR CLEARWATER, LA.--Continued

Particle-size analyses of suspended sediment; water year October 1952 to September 1953

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

Date of collection	Time	Water discharge (cfs)	Water temperature (° F)	Suspended sediment										Methods of analysis	
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters									
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250		0.350
Feb. 16, 1953 . . . . .	(a)	b 519		668	1,550	80	89	92	95	96	100	--	--	BCW	
Apr. 26 . . . . .	(a)	b 424		480	1,320	69	74	80	87	90	98	100	--	BCW	
May 9-10 . . . . .	(a)	b 1,720		464	2,520	56	59	63	73	85	95	98	100	BCW	
June 5 . . . . .	5:00 p.m.	1,370		1,850	--	--	--	--	--	--	60	92	100	S	
June 13 . . . . .	5:00 p.m.	1,080		1,390	--	--	--	--	--	--	89	96	100	S	
June 18 . . . . .	5:00 p.m.	937		1,560	--	--	--	--	--	--	68	90	100	S	
July 4 . . . . .	(a)	b 585		991	2,300	36	39	47	60	75	94	100	--	BCW	
July 6 . . . . .	(a)	b 545		978	2,350	36	42	46	61	78	93	100	--	BCW	
July 19 . . . . .	(a)	b 276		670	1,650	32	37	40	53	75	100	--	--	BCW	
Aug. 12 . . . . .	(a)	b 161		1,470	2,890	25	27	31	38	59	83	99	100	BCW	

a Composite sample on days indicated.

b Average discharge for day or period.

## MISSISSIPPI RIVER DELTA--Continued

## VERMILION RIVER AT BANNER'S FERRY NEAR ABBEVILLE, LA.

LOCATION.--At Banner's Ferry about 6 miles south of Abbeville, Vermilion Parish.

RECORDS AVAILABLE.--Chemical analyses: January 1948 to September 1953.

Water temperatures: January 1949 to September 1953.

EXTREMES: 1952-53.--Specific conductance: 90°F July 10; Aug. 15; minimum observed, 47°F, Feb. 25.

Water temperatures: 1952-53.--Specific conductance: 90°F July 10; Aug. 15; minimum observed, 47°F, Feb. 25.

EXTREMES: 1949-53.--Specific conductance: Maximum daily, 140 micromhos; Sept. 14, 1952; minimum daily, 47.7 micromhos May 20, 1953.

Water temperatures: 1949-53.--Specific conductance: Maximum daily, 140 micromhos; Sept. 14, 1952; minimum daily, 47.7 micromhos May 20, 1953.

Water temperatures: 1949-53.--Specific conductance: Maximum daily, 140 micromhos; Sept. 14, 1952; minimum daily, 47.7 micromhos May 20, 1953.

REMARKS.--Values reported for dissolved solids are sums of determined constituents. No discharge records available for this station.

Chemical analyses, in parts per million, October 1952 to March 1953

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal-cium (Ca)	Mag-ne-sium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Car-bonate (CO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> ) (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Per-cent so-ad-sorp-tion ratio	Specific conductance (micro-mhos at 25°C)	pH		
														Parts per million	Tons per acre-foot	Tons per day	Calcium, mag-nesium	Non-carbonate					
Oct. 4-6, 10, 1952...		11		37	67	559	89		122	980			1.2		1,820	2.48		368	295	77	3,420	7.9	
Oct. 7-9.....		15		19	12	120	87		11	194			1.8		416	.57		97	26	73	500	7.9	
Dec. 11-20.....		12		9.5	4.4	34	40		10	50			1.5		141	.19		42	9	64	2.3	259	7.3
Mar. 11-25, 1953....		7.6		9.1	4.4	14	41		4.8	22			2.0		84	.11		41	7	43	1.0	153	7.6

## MISSISSIPPI RIVER DELTA--Continued

## VERMILION RIVER AT BANCER'S FERRY NEAR ABBEVILLE, LA.--Continued

Specific conductance (micromhos at 25°C) and chloride, in parts per million,  
water year October 1952 to September 1953

Day	October		November		December	
	Conductance	Chloride	Conductance	Chloride	Conductance	Chloride
1	1,880	--	6,900	2,150	3,840	1,140
2	2,110	585	9,010	2,900	4,350	1,310
3	1,240	310	9,060	2,920	2,420	662
4	3,680	--	7,660	2,400	3,230	--
5	3,410	--	8,380	2,650	1,210	302
6	4,190	--	7,680	2,400	1,340	--
7	844	--	7,750	2,420	1,030	265
8	751	--	9,010	2,900	749	191
9	769	--	9,010	2,880	389	85
10	2,060	--	8,010	2,550	249	48
11	3,150	880	2,290	595	249	--
12	3,150	--	4,190	1,260	284	--
13	3,490	--	5,050	1,540	264	--
14	4,110	--	7,000	2,200	223	--
15	4,110	1,240	7,900	2,480	205	--
16	2,600	722	8,700	2,720	231	--
17	3,530	1,050	9,640	3,100	249	--
18	3,830	--	10,100	3,250	253	--
19	2,880	--	6,760	2,070	264	--
20	2,830	810	1,920	492	272	--
21	1,870	512	889	203	178	29
22	4,210	1,270	4,530	1,370	194	40
23	3,440	1,000	4,129	1,220	174	--
24	3,940	1,160	5,810	1,790	184	--
25	4,330	1,290	8,890	2,850	197	--
26	4,350	1,330	4,790	1,400	206	46
27	3,820	1,130	3,170	900	173	--
28	3,320	990	3,110	900	376	92
29	1,660	435	7,300	2,300	266	53
30	5,360	1,660	2,710	725	254	--
31	6,120	1,900	--	--	225	42
January			February		March	
1	203	38	333	70	190	36
2	167	24	310	64	141	--
3	304	68	294	67	153	25
4	292	63	302	--	171	--
5	471	120	305	--	161	--
6	495	116	308	--	166	26
7	274	57	323	57	187	--
8	256	--	283	56	179	--
9	265	--	318	66	181	31
10	260	--	291	59	192	--
11	268	--	274	--	192	--
12	295	--	310	63	151	--
13	300	63	388	84	176	--
14	283	58	373	81	164	--
15	290	--	103	16	167	--
16	312	--	90.1	12	102	--
17	280	53	140	27	90.0	--
18	166	27	393	105	137	--
19	147	25	508	136	156	--
20	154	23	354	88	150	--
21	312	70	151	22	149	--
22	333	77	107	16	164	--
23	240	47	310	83	164	--
24	128	20	299	73	169	--
25	208	38	121	20	119	--
26	202	42	128	--	274	68
27	426	113	125	23	118	17
28	543	147	253	64	116	15
29	519	--	--	--	132	14
30	507	134	--	--	163	31
31	322	73	--	--	261	62

## MISSISSIPPI RIVER DELTA--Continued

## VERMILION RIVER AT BANNER'S FERRY NEAR ABBEVILLE, LA.--Continued

Specific conductance (micromhos at 25°C) and chloride, in parts per million,  
water year October 1952 to September 1953--Continued

Day	April		May		June	
	Conductance	Chloride	Conductance	Chloride	Conductance	Chloride
1	314	71	136	23	93.4	11
2	159	23	239	55	119	13
3	141	--	137	20	113	--
4	145	--	137	--	101	--
5	155	--	150	26	103	--
6	160	--	211	43	98.7	9.2
7	169	--	212	--	134	19
8	171	21	211	43	136	20
9	160	19	128	16	116	13
10	163	21	144	20	114	--
11	278	57	129	16	117	--
12	250	47	130	--	124	13
13	193	29	132	--	151	21
14	175	--	101	14	119	12
15	186	--	75.2	9.2	136	13
16	184	--	79.1	--	127	--
17	186	--	105	--	121	--
18	197	28	90.9	14	117	--
19	182	21	69.8	9.5	124	12
20	204	29	47.7	5.0	127	12
21	233	--	49.2	--	120	--
22	258	40	68.6	9.0	122	10
23	221	28	97.5	16	133	12
24	183	24	82.0	--	132	--
25	186	24	79.9	--	135	--
26	81.8	10	98.7	16	135	13
27	77.6	--	99.4	--	151	17
28	75.6	9.2	86.6	--	191	30
29	135	27	84.2	10	186	28
30	202	45	92.0	12	149	16
31	--	--	93.9	--	--	--
Day	July		August		September	
	Conductance	Chloride	Conductance	Chloride	Conductance	Chloride
1	213	34	137	20	--	--
2	171	24	392	92	148	--
3	174	--	113	16	153	20
4	181	--	212	39	169	21
5	197	34	178	22	175	25
6	166	23	172	22	136	16
7	175	--	161	18	133	--
8	177	--	152	--	146	--
9	179	--	152	--	171	24
10	169	22	161	--	166	22
11	213	38	162	--	198	31
12	205	--	168	--	184	--
13	210	--	171	--	199	--
14	192	28	177	24	210	--
15	185	29	196	24	219	36
16	223	37	199	30	242	42
17	182	22	198	29	240	43
18	244	40	202	--	282	54
19	185	26	196	--	285	--
20	315	65	196	--	262	--
21	201	32	190	--	248	42
22	173	23	202	31	215	31
23	191	30	175	29	215	31
24	339	80	244	58	256	46
25	175	27	107	10	304	58
26	166	--	125	20	282	54
27	154	--	223	49	882	226
28	159	--	124	18	1,290	340
29	149	18	123	18	625	147
30	162	19	156	25	826	207
31	162	--	173	33	--	--

## MISSISSIPPI RIVER DELTA--Continued

## VERMILION RIVER AT BANNER'S FERRY NEAR ABBEVILLE, LA.--Continued

Temperature (°F) of water, water year October 1952 to September 1953

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

## PART 8. WESTERN GULF OF MEXICO BASINS

## MERMENTAU RIVER BASIN

## MERMENTAU RIVER AT LAKE ARTHUR, LA.

LOCATION.--At bridge on State highway 14, about half a mile east of Lake Arthur, Jefferson Davis Parish.

RECORDS AVAILABLE.--Chemical analyses: January 1949 to September 1953.

Water temperatures: January 1949 to September 1952.

EXTREMES, 1952-53.--Specific conductance: Maximum daily, 628 micromhos Dec. 4; minimum daily, 37.6 micromhos May 19.

EXTREMES, 1949-53.--Specific conductance: Maximum daily, 6,330 micromhos June 30, 1952; minimum daily, 30.8 micromhos Aug. 10, 1951.

REMARKS.--Values reported for dissolved solids are sums of determined constituents. No discharge records available for this station.

Chemical analyses, in parts per million, October 1952 to March 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (sum)			Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	Color
														Parts per million	Tons per acre-foot	Tons per day	Calcium	Non-carbonate					
Oct. 11-20, 1952...		11		11	6.8	42		85	2.5	52		0.5		168	0.23		55	0	62	2.4	316	7.5	
Nov. 21-30, .....		13	13	13	7.4	51		88	4.9	68		1.2		202	.27		63	0	64	2.8	405	7.4	
Dec. 1-8, .....		13	13	14	7.3	78		81	5.8	115		1.2		274	.37		65	0	72	4.2	516	7.4	
Mar. 1-10, 1953...		5.0	5.0	3.4	1.7	7.3	--	16	4.0	10		1.8		41	.06		16	2	51	.8	72.5	6.7	

## MERMENTAU RIVER BASIN--Continued

## MERMENTAU RIVER AT LAKE ARTHUR, LA.--Continued

Specific conductance (micromhos at 25°C) and chloride, in parts per million,  
water year October 1952 to September 1953

Day	October		November		December	
	Conductance	Chloride	Conductance	Chloride	Conductance	Chloride
1	274	--	315	55	435	--
2	264	43	299	51	493	--
3	--	--	297	--	624	--
4	276	47	306	--	628	--
5	300	--	303	--	592	--
6	303	--	297	--	526	--
7	303	--	297	--	415	--
8	305	--	301	51	422	--
9	305	--	309	54	314	75
10	305	52	309	54	337	--
11	308	--	299	--	257	61
12	311	--	324	--	246	--
13	313	--	308	--	203	46
14	300	--	302	--	173	37
15	308	--	313	--	184	--
16	305	--	345	59	233	47
17	305	--	357	66	207	--
18	308	--	320	57	207	46
19	297	--	324	--	209	--
20	305	--	333	63	215	49
21	--	--	374	--	209	--
22	--	--	338	--	230	--
23	--	--	340	--	255	--
24	--	--	339	--	255	52
25	--	--	338	--	312	78
26	303	--	364	--	312	76
27	306	52	408	--	184	39
28	302	--	398	--	176	30
29	313	--	417	--	176	30
30	305	--	431	--	178	--
31	310	53	--	--	--	--

Day	January		February		March	
	Conductance	Chloride	Conductance	Chloride	Conductance	Chloride
1	162	29	231	42	83.5	--
2	188	--	227	--	79.6	--
3	174	--	240	48	74.5	--
4	172	35	222	44	74.5	--
5	272	65	227	--	64.0	--
6	268	--	216	--	62.8	--
7	270	--	216	43	61.8	--
8	272	64	198	37	78.8	--
9	185	40	198	--	69.7	--
10	185	--	209	--	64.7	--
11	185	--	212	41	78.3	12
12	183	--	223	--	97.4	15
13	191	40	231	--	75.7	--
14	186	--	219	43	76.1	11
15	210	45	309	72	84.6	14
16	199	--	312	--	85.6	--
17	241	51	306	71	70.7	10
18	183	39	128	19	68.5	10
19	181	--	128	--	73.0	--
20	199	--	140	--	72.3	--
21	297	69	138	27	76.9	--
22	--	--	107	19	74.6	12
23	193	39	106	--	81.1	--
24	202	--	106	--	77.4	10
25	--	--	108	17	97.4	12
26	210	48	126	23	80.4	12
27	240	52	112	16	116	14
28	209	48	82.8	12	111	--
29	232	52	--	--	107	12
30	226	52	--	--	134	19
31	222	--	--	--	147	22

## MERMENTAU RIVER BASIN--Continued

## MERMENTAU RIVER AT LAKE ARTHUR, LA.--Continued

Specific conductance (micromhos at 25°C) and chloride, in parts per million,  
water year October 1952 to September 1953--Continued

Day	April		May		June	
	Conductance	Chloride	Conductance	Chloride	Conductance	Chloride
1	138	--	87.8	14	73.6	--
2	145	--	167	29	78.6	8.5
3	129	21	97.5	14	96.0	9.0
4	95.0	12	84.2	--	84.9	8.8
5	121	20	82.6	--	82.6	--
6	126	--	86.3	--	82.6	--
7	132	--	92.2	--	93.6	7.2
8	138	--	91.2	--	81.3	8.8
9	138	23	91.2	10	89.3	--
10	128	22	59.3	6.0	80.7	--
11	130	--	58.0	--	81.7	9.8
12	135	--	58.9	--	104	12
13	136	24	58.3	6.0	84.4	10
14	147	26	74.6	9.5	110	12
15	142	--	77.6	--	112	--
16	131	--	68.1	--	84.2	--
17	133	--	69.4	7.5	83.5	10
18	--	--	87.8	9.5	141	19
19	127	21	37.6	3.5	80.3	10
20	133	23	70.7	8.8	87.0	--
21	169	31	42.5	4.2	--	--
22	144	22	83.5	--	--	--
23	140	--	63.1	8.5	76.5	--
24	136	--	48.3	6.0	82.6	11
25	127	--	56.2	8.0	88.7	--
26	101	--	61.8	--	83.7	11
27	103	14	51.5	5.5	93.9	12
28	79.4	9	64.9	8.5	91.2	--
29	64.5	6.8	72.0	8.0	84.3	--
30	86.8	13	70.7	--	87.3	--
31	--	--	71.9	--	--	--

Day	July		August		September	
	Conductance	Chloride	Conductance	Chloride	Conductance	Chloride
1	87.8	--	154	21	140	16
2	85.0	12	137	18	127	--
3	113	19	136	--	123	--
4	114	--	144	17	125	15
5	108	17	135	17	131	14
6	128	21	135	--	134	--
7	121	21	135	--	134	--
8	211	38	137	--	142	16
9	116	18	137	--	137	16
10	120	--	139	--	155	18
11	179	--	136	--	135	14
12	180	32	--	--	128	--
13	137	24	--	--	126	--
14	117	22	137	20	134	--
15	132	--	136	19	129	--
16	127	--	142	21	126	--
17	117	--	139	--	127	14
18	176	36	151	24	146	16
19	119	20	137	20	140	16
20	127	--	140	--	150	19
21	120	--	131	--	164	19
22	115	--	130	--	144	18
23	123	20	199	--	129	16
24	168	24	202	--	128	--
25	184	25	210	26	130	--
26	180	--	232	33	127	--
27	195	--	244	34	138	--
28	198	--	173	19	138	16
29	206	--	172	18	126	15
30	202	29	152	19	129	--
31	157	20	149	17	--	--

CALCASIEU RIVER BASIN

CALCASIEU RIVER NEAR GLENMORA, LA.

LOCATION.--At gaging station at bridge on State Highway 113, 1.0 mile upstream from Prairie Branch and 4.6 miles northwest of Glenmora, Rapides Parish.  
DRAINAGE AREA.--499 square miles.

RECORDS AVAILABLE.--Chemical analyses: August 1952 to September 1953.

REMARKS.--Records of discharge for water year October 1952 to September 1953 given in VSP 1282.

Chemical analyses, in parts per million, August 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boiron (B)	Dissolved solids (sum)			Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium absorption ratio	Specific conductance (micro-mhos at 25° C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium	Non-carbonate				
Aug. 26, 1952	26	26	0.05	3.3	2.1	7.7	2.4	26		2.5	8.2	0.1	1.5		67	0.09	4.70	17	0	46	0.8	92.9	6.3
Sept. 23	22	30	.17	4.2	2.0	8.0	.4	30		1.8	7.2	.3	.8	0.08	70	.10	4.16	19	0	48	.8	82.0	6.8
Oct. 28	19	30	.16	4.1	1.7	8.7	1.6	28		1.6	7.5	.0	.5		70	.10	3.59	17	0	49	.9	78.2	6.6
Dec. 15	100	18	.35	3.2	1.2	4.5	--	12		4.5	5.8	--	.8		44	.06	11.9	13	3	43	.5	54.7	6.4
Jan. 27, 1953	990	8.4	.55	1.6	.8	3.5	--	8		2.7	3.2	--	.5		25	.03	66.6	7	1	51	.6	31.9	6.0
Mar. 4	1,960	9.2	.26	2.1	.8	3.3	--	9		2.6	3.8	--	.2		26	.04	138	9	1	46	.5	37.7	6.0
Apr. 7	203	19	.50	3.8	1.5	4.1	--	18		1.5	5.0	--	1.2		46	.06	25.2	16	1	36	.5	55.8	6.8
July 7	70	17	.37	3.6	.8	4.6	1.5	20		1.9	5.2	--	.5		45	.06	8.51	13	0	40	.6	55.8	7.2
Aug. 4	133	10	.47	2.0	.8	2.8	1.3	10		1.7	3.5	--	1.5		29	.04	10.4	9	1	36	.4	41.8	6.8
Sept. 16	31	24	.37	3.8	1.6	7.2	1.6	26		1.3	6.2	--	1.2		60	.08	5.02	16	0	46	.8	67.6	6.7

## CALCASIEU RIVER BASIN--Continued

## CALCASIEU RIVER AT MOSS BLUFF, LA.

LOCATION.--At bridge on U.S. Highway 171 at Moss Bluff, Calcasieu Parish, 5 miles northeast of Lake Charles.  
 RECORDS AVAILABLE.--Chemical analyses: October 1951 to September 1953.

Water temperatures: October 1951 to September 1953.  
 EXEMES, 1952-53.--Specific conductance: Top samples--Maximum daily, 13,700 micromhos Nov. 3; minimum daily, 23,9 micromhos May 7-9. Bottom samples--Maximum daily 34,300 micromhos Nov. 3; minimum daily 26,8 micromhos May 5.

Water temperatures: Maximum observed, 88°F June 22, 25, July 9-10; minimum observed, 50°F on several days during winter months.  
 REMARKS.--Top and bottom samples collected at this station. Values reported for dissolved solids are sums of determined constituents. No discharge records available.

Chemical analyses, in parts per million, December 1952 to May 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal- cium (Ca)	Mag- ne- sium (Mg)	Sodium (Na)	Potas- sium (K)	Bicar- bonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chlo- ride (Cl)	Fluo- ride (F)	Ni- trate (NO <sub>3</sub> )	Bor- on (B)	Dissolved solids (sum)		Hardness as CaCO <sub>3</sub>		Per- cent so- dium ad- sorp- tion ratio	Specific conduct- ance (micro- mhos at 25°C)	pH	Col- or	
														Parts per million	Tons per acre- foot	Calcium, mag- nesium	Non-carbon- ate					
Dec. 9-15, 1952 (Top samples)...		7.8		3.0	3.3	23		11	8.0	38		0.4		88	0.12	21	12	70	2.2	167	7.0	
Jan. 1-3, 1953 (Top samples)...		15		4.5	8.4	67		16	17	114		1.0		235	.32	46	33	76	4.3	445	6.8	
Mar. 1-10 (Top & bottom samples)....		6.2		1.4	1.0	4.9	--	7	2.8	6.2		.5		26	.04	8	2	58	.8	48.1	6.6	
May 3-19 (Top & bottom samples)....		3.6		1.5	.7	2.9	0.9	7	1.4	4.0		1.0		19	.03	7	1	45	.5	32.8	6.8	

## CALCASIEU RIVER BASIN--Continued

## CALCASIEU RIVER AT MOSS BLUFF, LA.--Continued

Specific conductance (micromhos at 25°C) and chloride, in parts per million,  
water year October 1952 to September 1953

	October				November				December			
	Conductance		Chloride		Conductance		Chloride		Conductance		Chloride	
	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom
1	8,930	29,500	2,870	--	12,700	33,300	--	12,700	6,530	31,200	2,050	11,800
2	9,380	29,200	3,020	--	13,200	33,300	4,400	--	5,610	30,400	--	12,100
3	10,100	27,900	3,300	--	13,700	33,300	--	--	5,490	32,100	1,690	12,000
4	10,300	29,200	--	--	12,900	31,700	4,250	11,800	4,940	32,700	1,500	--
5	10,400	29,200	--	--	12,900	33,600	--	--	7,440	6,680	2,390	2,550
6	10,400	29,200	--	--	12,000	33,600	--	--	1,590	2,420	398	645
7	9,700	27,900	3,120	10,500	11,600	33,600	3,800	--	547	762	141	139
8	10,100	29,200	--	--	10,500	34,000	3,420	13,000	286	390	69	88
9	11,200	29,500	3,690	--	11,400	34,300	--	--	186	309	--	77
10	10,400	29,200	--	--	12,200	35,000	--	--	162	281	--	58
11	8,750	29,000	--	10,400	9,490	33,600	3,080	12,900	138	188	--	44
12	7,850	29,700	--	--	8,240	33,600	2,650	--	174	175	--	42
13	7,380	29,700	--	--	9,330	33,300	--	13,000	156	162	--	38
14	8,470	29,200	--	--	9,100	33,300	--	--	180	953	--	275
15	8,600	30,000	--	--	7,820	33,300	2,520	--	150	10,600	--	3,700
16	7,900	30,000	2,520	--	6,920	33,600	860	12,900	351	24,500	80	9,400
17	8,750	30,300	2,800	--	7,210	33,600	910	--	587	25,600	158	--
18	10,100	30,800	3,300	--	8,140	33,600	--	--	678	25,000	182	--
19	9,620	29,500	--	--	8,410	32,600	2,650	--	869	27,000	239	10,400
20	10,100	30,500	--	--	8,950	32,000	3,150	--	703	26,400	185	--
21	11,400	30,800	--	11,800	10,000	32,000	3,380	--	492	24,300	128	--
22	11,600	31,400	3,780	12,000	9,250	32,600	3,280	--	504	25,400	--	9,500
23	12,200	31,700	4,000	--	8,280	32,600	2,920	--	519	17,800	135	6,250
24	11,400	32,000	--	--	7,270	32,600	2,400	--	600	19,500	157	7,000
25	10,700	32,300	--	12,400	9,680	32,000	--	--	506	13,500	131	4,620
26	10,100	32,300	3,220	--	8,880	30,000	--	11,100	289	16,000	70	5,600
27	9,770	32,600	--	--	7,590	32,000	--	12,100	432	15,700	112	5,520
28	9,540	32,600	--	--	7,380	32,300	--	--	385	19,100	--	6,900
29	9,620	32,600	3,100	12,300	7,670	32,600	2,700	--	312	25,400	77	9,680
30	10,400	33,000	--	--	6,630	31,400	2,110	11,800	494	27,700	153	10,600
31	11,700	33,300	--	--	--	--	--	--	896	5,690	245	--
	January				February				March			
	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom
1	426	1,030	--	292	116	143	25	40	44.0	41.8	--	--
2	393	744	--	204	94.1	111	18	23	36.9	37.3	--	--
3	363	524	--	138	248	10,600	59	3,390	39.6	34.3	--	--
4	90.5	117	19	25	376	14,300	94	4,740	35.2	34.3	--	--
5	75.7	118	16	26	345	12,800	--	4,160	39.1	36.0	--	--
6	92.5	73.4	--	15	388	11,500	96	--	36.9	36.0	--	--
7	78.6	77.3	--	--	438	12,800	109	--	38.7	37.7	--	--
8	82.1	85.6	--	--	345	13,500	84	4,390	45.9	41.2	--	--
9	82.1	83.3	18	18	420	22,300	--	7,620	44.0	42.6	--	--
10	94.4	99.7	21	22	409	21,000	99	7,060	47.7	46.3	--	--
11	106	109	22	--	659	11,200	168	3,540	48.6	52.2	7.2	7.8
12	119	118	25	26	582	1,760	147	478	52.0	52.6	--	--
13	117	123	25	27	272	355	64	86	56.7	63.6	9.0	11
14	141	6,740	31	2,200	209	233	--	56	63.1	65.6	--	--
15	227	11,900	58	4,110	232	551	54	141	67.0	68.4	11	12
16	238	15,900	60	5,580	90.6	161	17	37	62.5	62.1	10	10
17	394	14,600	--	5,080	68.5	65.6	12	12	57.4	51.7	9.2	8.0
18	479	19,900	--	--	56.3	55.1	9.5	9.5	50.1	44.4	--	--
19	462	22,100	--	8,130	49.2	49.1	--	8.0	43.2	43.0	--	--
20	416	21,200	--	--	48.0	46.6	--	--	41.4	44.1	6.0	6.5
21	393	19,100	--	--	63.4	61.4	--	--	37.5	38.2	5.0	5.5
22	499	21,500	--	--	61.0	59.1	--	--	37.5	36.8	--	--
23	1,290	16,600	372	5,770	55.6	49.1	--	--	37.1	37.4	--	--
24	880	7,120	243	2,210	61.0	53.8	--	--	40.5	40.5	--	--
25	534	846	143	231	62.4	61.1	12	12	44.1	43.6	--	--
26	271	456	70	122	54.7	54.7	10	10	45.2	45.2	6.5	6.8
27	191	307	50	104	47.3	47.0	8.0	8.2	55.6	56.3	10	10
28	144	209	35	25	43.4	44.1	8.5	7.8	53.2	51.7	7.8	7.8
29	114	132	26	29	--	--	--	--	66.1	66.7	11	12
30	111	141	25	34	--	--	--	--	68.8	73.9	13	13
31	94.7	113	21	26	--	--	--	--	75.1	71.1	13	12

## CALCASIEU RIVER BASIN--Continued

## CALCASIEU RIVER AT MOSS BLUFF, LA.--Continued

Specific conductance (micromhos at 25°C) and chloride, in parts per million, water year October 1952 to September 1953--Continued

Day	April				May				June			
	Conductance		Chloride		Conductance		Chloride		Conductance		Chloride	
	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom
1	79.1	67.2	--	--	64.0	63.3	--	--	42.0	43.1	--	--
2	76.1	75.5	--	--	58.1	54.1	--	--	46.4	45.7	4.8	5.0
3	65.7	69.9	--	--	41.4	43.1	6.5	6.2	47.1	49.9	--	--
4	64.6	69.9	--	--	27.8	27.0	5.0	3.8	49.9	54.6	--	--
5	64.6	67.2	10	11	25.9	26.8	--	--	56.5	59.6	7.0	7.5
6	72.1	70.5	12	12	24.1	29.3	--	--	65.5	57.8	--	--
7	66.2	69.1	--	--	23.9	--	--	--	63.1	62.7	--	--
8	70.5	70.5	--	--	23.9	--	--	--	67.5	67.6	10	9.8
9	72.2	85.3	12	16	23.9	--	--	--	75.3	70.2	--	--
10	88.3	95.3	18	18	27.3	--	--	--	69.0	69.6	--	--
11	97.7	98.8	19	19	31.6	--	--	--	72.3	72.3	10	10
12	110	107	21	21	31.4	--	--	--	73.5	71.8	--	--
13	87.0	87.2	16	15	29.6	--	--	--	74.4	74.4	--	--
14	105	97.2	19	18	33.8	35.3	--	--	77.9	78.3	--	--
15	109	108	--	--	36.6	44.9	--	--	84.1	85.9	14	13
16	101	104	18	19	35.8	--	--	--	81.8	82.9	--	--
17	111	114	21	21	43.2	--	--	--	85.0	82.7	--	--
18	142	146	29	30	37.0	--	--	--	80.4	82.5	--	--
19	117	118	22	23	35.3	--	--	--	82.1	84.3	--	--
20	113	114	--	--	--	--	--	--	88.4	93.1	14	15
21	125	124	--	--	--	--	--	--	94.3	95.2	--	--
22	141	138	26	25	--	--	--	--	95.8	103	17	18
23	156	205	31	44	--	--	--	--	109	108	--	--
24	357	1,740	85	485	--	--	--	--	113	129	--	--
25	235	503	49	124	--	--	--	--	131	121	25	23
26	87.6	85.2	14	14	--	--	--	--	119	119	--	--
27	61.6	58.7	8.8	8.8	29.9	--	--	--	122	111	--	--
28	49.4	54.2	--	--	33.8	33.8	--	--	262	813	64	215
29	46.1	48.1	--	--	37.5	38.4	4.0	3.8	1,660	9,060	458	2,850
30	57.0	58.6	--	--	37.9	36.6	--	--	2,910	8,590	845	2,600
31	--	--	--	--	40.9	39.9	--	--	--	--	--	--
	July				August				September			
	Conductance		Chloride		Conductance		Chloride		Conductance		Chloride	
	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom
1	1,740	12,300	490	4,120	54.2	56.2	7.8	9.2	769	14,100	203	4,680
2	1,470	10,200	--	--	60.3	61.2	--	--	776	12,100	191	3,950
3	708	15,800	177	5,280	67.6	63.9	--	--	932	8,310	248	2,580
4	673	12,500	--	--	79.0	81.3	14	14	732	2,920	191	840
5	924	10,200	--	--	82.4	83.8	--	--	376	2,460	93	702
6	1,030	13,600	--	--	84.1	84.1	--	--	475	1,200	116	322
7	1,070	13,300	270	2,920	82.8	92.9	--	--	468	1,070	--	--
8	981	5,970	254	1,810	86.5	92.6	15	16	482	11,600	--	--
9	943	2,690	250	758	82.4	92.6	--	--	562	13,800	143	4,600
10	1,280	2,200	340	615	85.4	92.6	--	--	846	18,900	224	6,550
11	692	1,320	176	365	89.1	117	14	24	859	20,200	230	7,100
12	612	2,440	162	695	109	527	20	137	1,290	21,900	350	7,750
13	793	9,880	204	3,150	237	9,290	52	3,000	1,390	22,600	--	--
14	724	14,200	190	4,700	503	14,500	124	4,850	868	22,600	--	--
15	777	13,400	--	--	487	16,600	112	5,620	991	23,100	--	--
16	479	16,200	--	--	849	18,700	220	6,420	1,120	22,900	--	--
17	598	14,700	140	4,880	929	20,100	235	6,950	1,210	23,200	338	8,250
18	332	18,900	65	6,450	1,460	21,800	428	7,620	1,850	22,800	522	8,000
19	777	20,200	188	6,900	1,880	22,700	502	8,020	1,700	22,000	--	--
20	1,580	19,700	418	6,650	1,950	22,700	--	--	1,560	22,100	--	--
21	1,450	21,100	--	--	2,240	23,400	628	8,220	2,040	22,000	--	--
22	876	6,690	222	2,080	2,970	22,200	870	7,880	1,330	21,700	--	--
23	616	1,420	154	388	2,180	23,700	--	--	1,980	22,400	565	7,950
24	404	708	98	183	1,830	22,600	--	--	3,170	23,100	--	--
25	405	637	--	--	2,080	22,900	600	8,100	4,330	24,300	1,310	8,780
26	305	363	73	89	1,740	22,900	--	--	8,990	24,600	2,950	8,900
27	229	269	52	66	1,910	23,000	542	8,120	9,220	26,200	--	--
28	127	223	26	52	1,420	23,000	--	--	8,640	26,800	--	--
29	67.2	124	10	28	982	23,400	--	--	8,190	26,200	--	--
30	62.6	77.3	10	14	650	18,300	--	--	6,570	25,800	--	--
31	59.3	97.2	8.8	20	703	12,900	--	--	--	--	--	--

## CALCASIEU RIVER BASIN--Continued

## CALCASIEU RIVER AT MOSS BLUFF, LA.--Continued

Temperature (°F) of water, water year October 1952 to September 1953  
 /Once-daily temperature measurement usually at 8 a.m./

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

## SABINE RIVER BASIN

## SABINE RIVER NEAR EMORY, TEX.

LOCATION --At gaging station at bridge on State Highway 19, 3.0 miles upstream from Giladon Creek, 7.5 miles south of Emory, Rains County, 8.0 miles downstream from McBees Creek, and at mile 501.

DRAINAGE AREA --965 square miles.

RECORDS AVAILABLE --Chemical analyses: July 1952 to September 1953.

Water temperatures: July 1952 to September 1953.

EXTREMES: 1952-53. --Dissolved solids: Maximum, 238 ppm July 1-8, 15; minimum, 47 ppm Apr. 24, 29-30.

Hardness: Maximum, 156 ppm June 22-30; minimum, 23 ppm Dec. 19-20.

Specific conductance: Maximum daily, 442 micromhos July 8, 1953; minimum daily, 48.8 micromhos July 18, 1953.

Water temperatures: Maximum observed, 98°F June 11; minimum observed, 38°F Jan. 16.

REMARKS. --Records of specific conductance of daily samples available in district office at Austin, Tex. Values reported for dissolved solids are sums of determined constituents. Records of discharge for period July 1952 to September 1953 given in WSP 1392.

Chemical analyses, in parts per million, July 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (sum)		Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	Color
														Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate				
July 25-31, 1952	1.19	9.6		18	3.6	14		80	13	6.2		1.8		105	0.14	60	0	33	175	7.3	
Aug. 1-12	a. 10	12		24	3.2	13		98	11	5.0		1.8		118	0.16	03	73	0	27	210	7.5
Aug. 13-16, 30	a. 0	--	--	--	--	--	--	--	--	6	--	--	--	--	--	--	--	--	256	--	--
Sept. 6	a. 0	--	--	--	--	--	--	--	--	8	--	--	--	--	--	--	--	--	296	--	--
Nov. 20-30	938	7.0	7.0	20	3.2	13		73	17	7.0		4.2		107	0.15	63	3	31	176	7.2	
Dec. 1-10	966	7.6		14	2.8	7.5		50	13	5.5		3.5		81	0.11	46	5	26	127	7.1	
Dec. 11-16	13.8	11		22	3.0	12		72	18	10		1.8		113	0.15	4	82	8	28	195	7.6
Dec. 17-20	1,302	6.8		--	--	3.8		26	7.1	3.8		2.0		62	0.08	23	2	35	176.4	7.2	
Dec. 21-23, 31	1,995	9.6		17	2.5	8.1		59	13	3.8		1.8		85	0.12	457	53	4	25	194	7.5
Dec. 26-30	41.2	1.8		26	3.1	13		99	19	3.5		2.5		126	0.17	78	5	26	212	7.7	
Jan. 1-30, 1953	495.0	8.8		21	2.5	12		72	15	6.5		2.0		105	0.14	133	63	4	29	182	7.4
Jan. 31-30	95.0	8.2		21	2.8	15		71	15	14		1.2		111	0.15	61	3	35	182	7.3	
Jan. 21-31	281	8.6		22	2.8	13		76	22	7.8		3.0		118	0.16	66	4	33	205	7.3	

a Less than 0.05 second-foot flow Aug. 7-31, September 1952, October, Nov. 1-19, June 22-30, July 1-16, Aug. 11, Sept. 25-30, 1953.

Feb. 1-10, 1953..	23.7	10	22	3.3	15	82	16	11	1.8	119	.16	7.61	68	1	32	.8	206	7.7
Feb. 11-14, 22-23	22.0	9.4	25	3.8	15	88	21	10	2.0	129	.18	7.66	78	6	29	.7	228	7.5
Feb. 15-21, 24-28	22.5	8.0	35	4.5	22	118	32	16	2.5	178	.24	10.8	106	9	32	.9	317	7.4
Mar. 1-9.....	11.4	7.2	33	4.9	20	112	31	14	2.0	167	.23	5.14	102	11	30	.8	292	7.6
Mar. 10-12, 24..	794	8.6	19	3.2	10	66	15	6.5	2.5	97	.13	208	61	6	28	.6	164	7.5
Mar. 13-23.....	419	12	32	3.4	20	108	24	13	5.8	163	.22	184	94	5	31	.9	377	7.7
Mar. 25-31.....	397	10	30	3.4	15	107	15	11	2.8	140	.19	150	89	1	27	.7	244	7.8
Apr. 1-10.....	221	11	30	4.5	16	104	19	14	4.2	150	.20	89.5	93	8	27	.7	200	7.5
Apr. 11-12, 14-23	166	11	35	4.2	17	125	20	10	4.0	162	.22	72.6	105	2	26	.7	279	7.9
Apr. 13, 25-28...	2,560	9.6	18	3.2	8.4	67	11	5.0	3.0	91	.12	629	56	3	24	.5	153	7.0
Apr. 24, 28-30...	13,340	5.0	6.6	1.3	4.4	2.9	6.9	4.0	1.5	47	.06	1,690	27	4	27	.4	70.1	6.9
May 1-11, 20-28..	2,815	13	31	3.4	12	112	14	6.0	3.0	137	.19	1,040	91	0	22	.5	235	7.9
May 12-19.....	6,857	8.6	10	2.4	4.9	3.0	42	6.4	2.0	61	.08	1,130	35	0	22	.4	95.7	8.8
May 23-31.....	40.8	13	36	5.1	19	126	26	13	3.5	160	.24	13.8	111	8	27	.8	309	8.2
June 1-10.....	2.87	14	4.5	5.9	26	156	37	18	2.5	235	.31	1.74	137	9	30	1.0	366	7.8
June 11-21.....	2.87	12	49	6.5	25	180	30	16	2.6	230	.32	.16	149	2	26	.0	392	8.0
June 22-30.....	3.0	9.2	50	7.5	27	180	30	16	2.0	230	.32	.16	149	0	27	.9	422	7.8
July 1-8, 15.....	3.0	9.4	45	7.5	32	179	32	22	2.0	228	.32	.16	143	0	33	1.2	416	8.0
July 17-20, 22-24	349	7.8	13	2.4	8.5	3.1	4	4.8	3.2	142	.31	77.3	42	5	29	.6	132	7.1
July 21, 25-31...	26.6	11	28	4.5	16	95	32	5.8	4.0	148	.20	10.6	88	10	28	.7	249	7.5
Aug. 1-10.....	.68	17	32	4.3	23	126	32	7.0	2.5	180	.24	.33	98	0	34	1.0	286	7.8
Aug. 11-18, 28-31	a.1.30	14	28	4.2	17	110	24	5.8	1.5	148	.20	.52	87	0	30	.8	247	7.6
Aug. 19-27.....	22.3	11	16	3.9	10	73	13	3.8	2.0	98	.13	5.90	56	0	27	.6	159	7.6
Sept. 1-3, 25-29..	a.20	10	22	4.0	11	94	9.7	4.8	2.2	110	.15	.06	71	0	25	.6	186	7.8
Sept. 4-11.....	45.1	9.4	8.1	2.4	5.3	37	4.5	2.2	3.0	56	.08	6.8	30	0	26	.4	85.2	7.4
Sept. 12-24.....	.28	11	16	3.2	6.3	2.6	60	9.1	2.5	86	.12	.07	53	0	20	.4	131	7.6
b Weighted average	575	8.9	17	2.6	9.7	63	11	5.1	2.5	88	0.12	137	53	2	28	0.5	145	--

a Less than 0.05 second-foot flow Aug. 7-31, September 1952, October, Nov. 1-19, June 22-30, July 1-16, Aug. 11, Sept. 25-30, 1953.

b Water year October 1952 to September 1953.

## WESTERN GULF OF MEXICO BASINS

## SABINE RIVER BASIN--Continued

## SABINE RIVER NEAR EMORY, TEX.--Continued

Temperature (°F) of water, November 1952 to September 1953  
 /Once-daily temperature measurement usually between 1 p. m. and 6 p. m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1		--	44	52	--	67	70	69	87	92	87	84
2		--	--	--	57	60	71	74	82	92	86	85
3		--	--	--	52	70	65	70	88	92	87	--
4		--	48	51	--	58	68	67	86	91	90	74
5		--	52	51	62	60	68	70	86	89	86	74
6		--	47	54	63	60	68	72	88	80	90	75
7		--	52	58	59	56	71	75	87	90	89	77
8		--	57	53	61	62	72	77	92	86	94	79
9		--	58	49	55	55	76	79	95	--	86	78
10		--	54	54	57	63	72	75	89	--	76	79
11		--	53	48	51	56	75	77	98	--	93	73
12		--	52	53	55	65	62	67	96	--	85	77
13		--	48	59	51	73	59	66	95	--	85	76
14		--	43	62	58	71	60	62	94	--	85	77
15		--	45	54	53	64	62	66	94	84	79	76
16		--	45	38	53	62	63	69	88	--	88	75
17		--	--	45	54	63	68	73	90	82	88	81
18		--	57	--	47	67	62	75	89	79	84	77
19		--	55	--	50	69	63	--	--	78	77	83
20		--	54	51	54	73	66	80	72	77	77	--
21		57	47	50	49	--	70	--	95	83	75	76
22		55	47	52	52	69	71	81	96	85	73	74
23		55	49	--	47	69	70	83	96	--	81	74
24		--	52	48	46	61	69	85	84	86	80	75
25		52	52	50	55	62	69	84	94	85	80	84
26		49	48	48	57	68	71	85	94	83	81	84
27		46	50	60	60	67	71	86	95	86	82	84
28		42	56	57	60	67	70	84	86	88	--	86
29		44	52	55	--	66	69	87	82	87	77	84
30		43	55	58	--	68	67	88	87	89	80	--
31		--	52	60	--	69	--	86	--	90	85	--
Average		--	51	53	55	65	68	76	90	--	84	79

## SABINE RIVER BASIN—Continued

## SABINE RIVER NEAR TATUM, TEX.

LOCATION --At gaging station at bridge on State Highway 43, 5 miles upstream from Potter Creek, 5.2 miles northeast of Tatum, Rusk County, 7 miles downstream from Cherokee Bayou, and at mile 339.

DRAINAGE AREA --3 586 square miles.

RECORDS AVAILABLE --Chemical analyses: February 1952 to September 1953.

Water temperatures: February 1952 to September 1953.

EXTREMES, 1952-53 --Dissolved solids: Maximum, 667 ppm July 5-6, 8-9; minimum, 82 ppm May 10-20.

Hardness: Maximum, 91 ppm July 5-6, 8-9; minimum, 29 ppm Sept. 9-10, 12-18.

Specific conductance: Maximum daily, 1,190 microhos July 5-6; minimum daily, 123 microhos May 10, 11.

Water temperatures: Maximum observed, 94° F June 23; minimum observed, 47° F Feb. 25, 26.

EXTREMES (February 1952 to September 1953) --Dissolved solids: Maximum, 667 ppm July 5-6, 8-9, 1953; minimum, 82 ppm May 10-20, 1953.

Hardness: Maximum, 92 ppm June 22-30, 1952; minimum, 29 ppm Sept. 9-10, 12-18, 1953.

Specific conductance: Maximum daily, 1,190 microhos July 5, 6, 1953; minimum daily, 123 microhos May 10, 11, 1953.

Water temperatures: Maximum observed, 94° F June 23, 1953; minimum observed, 47° F Feb. 25, 26, 1953.

REMARKS --Values reported for dissolved solids are residues on evaporation unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1952 to September 1953 given in WSP 1282.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (residue at 180° C)		Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (microhmhos at 25° C)	pH	Color	
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium					Non-carbonate
Oct. 1-10, 1952 .....	22.9	15		22	8.5	117		83	11	188		0.8		406	0.55	25.1	90	22	74	5.4	767	7.7
Oct. 11-20 .....	24.0	14		21	8.7	122		71	15	198		.5		421	.57	27.3	88	30	75	5.6	783	7.6
Oct. 21-31 .....	24.5	11		20	8.3	148		59	20	238		.8		477	.65	31.6	84	36	79	7.0	887	7.3
Nov. 1-10 .....	36.2	10		20	7.8	145		59	20	232		.1		466	.63	45.5	82	34	79	6.9	874	7.5
Nov. 11-23 .....	13.2	10		16	6.6	136		55	21	210		.1		a 427	.58	15.2	67	22	82	7.2	792	7.3
Nov. 24-28 .....	458	13		17	7.6	156		32	27	255		.2		510	.69	631	74	48	82	7.9	921	6.9
Nov. 29-30, Dec. 3-10 .....	2,091	11		12	5.9	34		21	27	57		2.2		208	.28	1,170	54	37	57	2.0	300	6.9
Dec. 1-2, 21-22 .....	1,230	14		19	6.9	134		19	37	220		4.7		504	.69	1,670	76	60	79	6.7	871	6.9
Dec. 11-20, 29-31 .....	2,421	10		11	5.8	30		24	23	51		1.2		a 144	.20	941	51	32	56	1.8	278	6.9
Dec. 23-28 .....	2,063	13		13	6.3	52		13	35	87		1.2		a 214	.29	1,190	58	48	66	3.0	403	6.7
Jan. 1-5, 8-12, 30, 1953 .....	2,395	12		13	6.8	32		27	26	57		1.0		a 161	.22	1,010	60	38	54	1.8	305	7.0
Jan. 6-7, 18-20, 25-26, 28 .....	1,457	16		19	7.4	83		18	48	138		.5		364	.50	1,430	78	64	70	4.1	601	6.7
Jan. 13-17, 21-24, 27, 29, 31 .....	1,112	16		16	4.9	56		23	40	85		1.0		267	.36	802	60	41	67	3.1	420	6.9
Feb. 1-10 .....	924	16		14	6.5	64		24	42	102		.8		a 260	.35	649	69	50	67	3.3	482	7.1
Feb. 11-19 .....	928	16		16	6.6	67		19	40	109		1.0		a 265	.36	664	67	52	68	3.5	492	6.5
Feb. 20-28 .....	1,182	16		19	8.0	84		15	54	138		1.0		a 327	.44	1,040	80	68	70	4.1	610	6.9

Sum of determined constituents.

## SABINE RIVER BASIN--Continued

## SABINE RIVER NEAR TATUM, TEX.--Continued

Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids (residue at 180° C)			Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	Color or pH
													Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
Mar. 1-8, 1953...	912	15		20	8.5		82	17	61	132		0.5	364	0.50	896	65	71	68	3.9	618	7.1
Mar. 9-10, 25-31	1,505	14		18	6.6		56	35	44	84		1.2	269	.37	1,090	72	43	63	2.9	453	7.2
Mar. 11-24	5,162	11		12	4.5		37	21	30	57		1.0	187	.25	2,610	46	31	63	2.3	298	7.1
Apr. 1-12, 5-6, 12, 13-14, 15-16, 17-18, 19-20, 21-22, 23-26	1,798	13		17	5.7		42	39	28	68		1.5	1,194	.26	941	66	34	58	2.3	369	7.1
Apr. 15-16, 19-20, 21-22, 23-24, 27-30	1,690	15		19	7.1		62	33	40	100		1.2	2,260	.35	1,180	77	50	64	3.1	487	7.0
Apr. 22-24, 27-30	2,644	11		12	4.4		30	31	21	46		1.2	1,151	.19	1,080	49	23	57	1.9	262	7.2
May 1-9	6,768	8.2		8.9	3.6		19	24	15	30		2.0	899	.13	1,810	37	17	53	1.4	187	7.0
May 10-20	16,550	7.6		10	3.3		13	34	11	18		1.5	822	.11	3,660	38	11	42	9	148	7.1
May 21-31	20,150	9.6		9.6	2.6		17	36	10	21		1.8	1,118	.16	6,420	35	5	51	1.2	151	7.2
June 1-8	4,934	18		18	4.8		28	45	16	49		2.8	1,159	.22	2,120	65	28	48	1.5	303	7.6
June 9-22	311	32		20	6.5		75	53	25	120		1.0	324	.44	272	77	33	68	3.7	549	7.1
June 23-30	127	28		21	6.7		83	59	21	149		1.0	372	.51	128	80	32	72	4.5	648	7.3
July 1-4, 7, 10-18	376	22		16	5.9		88	36	20	160		1.5	372	.51	378	64	35	77	5.3	643	7.4
July 5-6, 8-9	152	23		22	8.7		186	37	22	312		1.8	667	.91	274	91	60	82	8.5	1,160	7.3
July 10-14	2,731	14		9	8.8		37	22	15	62		3.5	1,190	.26	1,400	41	23	66	2.5	281	7.2
Aug. 1-4, 25, 27, 29	514	20		12	4.0		41	31	18	63		3.5	1,195	.27	271	46	21	66	2.6	314	7.4
Aug. 5-14, 21-22, 26, 28, 30-31	275	29		15	5.4		64	44	20	100		1.2	263	.36	195	60	24	70	3.6	444	7.5
Aug. 15-20, 23-24	279	30		17	5.9		86	51	19	135		1.0	325	.44	245	67	25	74	4.6	563	7.7
Sept. 1-4, 26-30	296	17		15	5.9		106	34	17	175		1.0	380	.52	304	62	34	79	5.9	672	7.5
Sept. 5-6, 11, 19-24	453	16		12	4.5		75	28	15	121		1.8	283	.36	346	48	26	77	4.7	483	7.4
Sept. 9-10, 12-18	862	13		7	7.5		34	21	12	52		1.2	173	.24	403	29	12	72	2.8	241	7.3
Weighted average	2,420	11		12	4.2		31	31	19	48		1.6	157	0.21	1,030	48	22	59	2.0	260	--

a Sum of determined constituents.

## SABINE RIVER BASIN--Continued

## SABINE RIVER NEAR TATUM, TEX.--Continued

Temperature (°F) of water, water year October 1952 to September 1953.

/Once-daily measurement usually before 9 a. m./

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

## SABINE RIVER BASIN--Continued

## BAYOU ANACOCO NEAR ROSEPINE, LA.

LOCATION.--At gaging station at bridge on road from Rosepine to Evans, just downstream from Pocosin Creek, 4.8 miles northwest of Rosepine, Vernon Parish.  
DRAINAGE AREA.--360 square miles.

RECORDS AVAILABLE.--Chemical analyses: August 1952 to September 1953.

REMARKS.--Records of discharge for water year October 1952 to September 1953 given in WSP 1282.

Chemical analyses, in parts per million, August 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Mag- ne- sium (Mg)	So- dium (Na)	Po- tas- sium (K)	Bicar- bonate (HCO <sub>3</sub> )	Car- bonate (CO <sub>3</sub> )	Sul- fate (SO <sub>4</sub> )	Chlo- ride (Cl)	Fluo- ride (F)	Ni- trate (NO <sub>3</sub> )	Bo- ron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Per- cent so- dium ad- sorption ratio	Specific conductance (micro-mhos at 25°C)	pH	
															Parts per million	Tons per acre-foot	Tons per day	Calcium magnesium	Non-carbonate				
Aug. 22, 1952	28	16	0.08	4.9	1.8	5.5	2.8	26	2.4	7.0	0.1	0.1	0.2	0.02	54	0.07	4.08	20	0	34	0.5	79.8	6.4
Sept. 24	53	20	.12	2.2	1.0	4.1	1.6	14	2.3	5.5	.4	.5			45	.06	6.44	10	0	43	.6	42.5	6.6
Oct. 29	27	11	.44	5.2	1.2	4.5	2.0	24	1.2	5.7	.2	.5			44	.06	3.21	18	0	32	.5	63.1	6.6
Dec. 17	145	9.8	.40	4.2	1.0	4.5	--	20	1.7	4.2	--	--	1.2		37	.05	14.5	15	0	40	.5	53.1	6.3
Mar. 5, 1953	561	20	.44	2.2	1.0	4.3	--	9	3.7	4.8	--	--	.8		41	.06	62.1	10	2	49	.6	42.9	6.0
Apr. 8	227	9.0	.33	3.9	1.2	3.3	--	16	2.6	3.8	--	--	1.0		33	.04	20.2	15	2	33	.4	47.7	6.3
July 9	86	8.8	.23	4.0	.9	2.7	1.4	19	1.8	3.5	--	--	.5		33	.04	7.66	14	0	27	.3	46.9	6.5
Aug. 5	244	9.5	.35	3.4	.8	2.6	1.2	17	1.4	3.5	--	--	.5		31	.04	20.4	12	0	29	.3	43.0	6.5
Sept. 8	96	12	.18	3.9	1.2	4.0	1.3	20	1.1	4.5	--	--	1.2		39	.05	10.1	15	0	35	.5	47.4	7.1

## SABINE RIVER BASIN--Continued

## SABINE RIVER NEAR RULIFF, TEX.

LOCATION.--At gaging station at bridge on State Highway 235, 2.4 miles north of Ruliff, Newton County, 4.2 miles upstream from Kansas City--Southern Railway bridge, 4.5 miles downstream from Cypress Creek and at mile 40.

DRAINAGE AREA--3,440 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1953.

EXTREMES 1952-53.--Dissolved solids: October 1945 to September 1946, October 1947 to September 1953.

Hardness: Maximum, 232 ppm Feb. 3-5; minimum, 50 ppm Mar. 1-2, 14-26.

Specific conductance: Maximum daily, 417 micromhos Dec. 10, 11; minimum observed, 50 F Feb. 24.

Water temperature: Maximum daily, 47 micromhos Dec. 10, 11; minimum observed, 50 F Aug. 12; minimum, 35 ppm June 5-11, 1950.

EXTREMES 1945-46 1947-53.--Dissolved solids: Maximum, 411 ppm Dec. 26-27, 1948; minimum, 8 ppm May 20-24, 1953.

Hardness: Maximum, 64 ppm Aug. 11, 1948; minimum, 21-23, 1948; minimum daily, 32.9 micromhos May 22, 1953.

Specific conductance: Maximum daily, 774 micromhos Dec. 26, 1948; minimum observed, 95 F Aug. 12, 1953; minimum, 34 F Jan. 24, 1948.

Water temperatures (1947-53): Maximum observed, 95 F Aug. 12, 1953; minimum observed, 34 F Jan. 24, 1948.

REMARKS.--Values reported for dissolved solids are residues on evaporation unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1952 to September 1953 given in WSP 1282.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium magnesium	Non-carbonate				
Oct. 1-10, 1952	410	22		7.1	3.1	33	33	45		5.1	41		1.8		144	0.20	159	30	0	71	2.6	222	7.3
Oct. 11-20	391	22		7.5	3.0	32	45	45		5.3	41		1.2		144	.20	148	31	0	69	2.5	223	7.2
Oct. 21-31	347	21		7.8	2.9	36	44	44		5.0	48		2.2		146	.20	137	31	0	71	2.8	230	7.1
Nov. 1-10	355	21		7.2	3.2	37	43	37		6.0	49		2.0		154	.21	148	31	0	72	2.7	239	7.3
Nov. 11-20	673	18		6.5	3.0	35	39	39		6.7	46		1.5		142	.19	288	29	0	73	2.9	218	7.2
Nov. 21-30	930	14		7.1	2.9	42	42	39		9.1	56		.8		159	.22	399	30	0	76	3.4	265	7.1
Dec. 1-9, 16-20	3,804	11		6.8	2.8	24		22		12	35		1.5		104	.14	1,070	28	10	65	2.0	192	6.8
Dec. 10-15	4,022	12		9.8	3.9	49	16	20		20	78		2.2		164	.25	2,000	40	26	53	1.7	330	6.9
Dec. 16-31	3,964	12		7.3	3.3	22	22	13		33	73		1.5		103	.14	1,100	32	13	60	2.1	221	7.0
Jan. 1-10, 1953	6,886	12		7.7	3.5	29	16	17		17	54		1.8		124	.21	2,310	41	24	65	2.1	253	6.9
Jan. 11-20	3,627	13		9.8	3.9	20	23	9		23	50		1.3		144	.25	1,460	41	24	64	2.2	253	6.9
Jan. 21-31	6,937	13		7.0	3.1	25	17	17		17	36		1.5		111	.15	1,760	30	16	64	2.0	193	6.7
Feb. 1-9, 6-20, 23	8,507	12		6.5	2.8	20		15		17	28		1.2		94	.13	2,160	28	15	61	1.6	166	6.8
Feb. 21-23	5,427	15		5.1	2.8	55		15		36	85		1.2		232	.32	3,400	52	40	70	3.3	396	6.7
Feb. 24-28	20,140	8.6		4.2	1.7	13	13	12		12	16		1.5		82	.08	3,370	18	8	62	1.3	105	6.8
Mar. 1-2, 14-26	25,660	7.8		3.1	1.4	8.3	2.2	10		10	11		1.0		82	.07	3,460	14	6	51	1.0	82.1	6.5
Mar. 3-8, 27-31	22,920	11	0.57	5.6	2.1	16	2.3	12		14	24		1.0		82	.11	5,070	23	13	58	1.5	146	6.6
Mar. 9-13	6,436	15		7.2	3.5	27	2.0	15		17	42		1.0		123	.17	2,130	32	20	63	2.1	223	6.8

a Sum of determined constituents.

## SABINE RIVER BASIN--Continued

## SABINE RIVER NEAR RULIFF, TEX.--Continued

Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal-cium (Ca)	Mag-ne-sium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Car-bonate (CO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> )	Bo-ron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Per-cent so-lid ad-sorp-tion ratio	So-dium conduct-ance (micro-mhos at 25°C)	pH	
															Parts per mil-lion	Tons per acre-foot	Tons per day	Calcium, mag-nesium	Non-carbon-ate				
Apr. 1-8	13,770	14		8.2	2.6	24		23		20	29		2.0		127	.17	4,720	31	12	62	1.8	190	6.7
Apr. 9-23	4,543	18		12	3.2	37		33		25	30		1.5		186	.25	2,280	43	16	65	2.5	286	6.9
Apr. 24-30	7,384	11		7.3	2.5	21		21		14	30		1.5		a97	.13	1,930	28	11	62	1.7	178	7.0
May 1, 5-7, 10-13, 15	50,680	4.9			--					6.7	12		1.0		71	.10	9,720	14	4	54	1.0	84.0	6.6
May 2-4, 8-9, 26-27	65,700	4.6			--	8.9	2.1	12		4.9	8.0		1.0		73	.10	12,950	12	4	44	.6	59.1	6.7
May 10-13, 15, 17-19	62,330	6.8		5.6	2.3	11	2.0	10		9.1	15		3.0		a62	.08	10,430	23	9	51	1.0	115	6.6
May 14, 16, 25, 28-31	108,500	4.1			--	2.3	1.2	9		2.3	3.2		.2		52	.07	15,230	8	1	34	.4	33.3	6.9
May 20-24																							
June 1-9	40,090	8.4		7.5	2.7	12		30		9.7	15		1.5		a72	.10	7,790	30	5	48	1.0	121	7.1
June 10-30	12,260	14		11	3.7	17		44		8.2	24		1.5		a101	.14	3,340	43	7	47	1.1	180	7.6
July 1-9	3,920	16		7.7	2.7	19		31		9.4	24		1.2		a95	.13	1,010	30	4	57	1.5	154	7.1
July 10-18, 25, 30-31	3,518	18		9.4	3.5	40		40		11	41		.8		a134	.18	1,270	38	5	63	2.1	231	7.2
July 19-24, 26-29	5,470	14		6.6	2.5	19		26		8.5	26		1.2		a91	.12	1,340	27	6	60	1.6	150	7.4
Aug. 1-10	6,549	15		5.7	2.4	22		18		10	32		1.5		127	.17	2,250	24	9	66	1.9	165	7.3
Aug. 11-20	2,189	22		8.3	3.2	25		34		11	34		1.5		134	.18	762	34	6	62	1.9	198	7.2
Aug. 21-31	2,225	20		7.1	2.6	23		30		8.6	30		2.2		113	.15	679	28	4	64	1.9	167	7.0
Sept. 1-12, 29-30	2,183	16		6.4	2.5	18		30		6.3	29		1.2		112	.15	660	26	2	64	1.8	159	7.5
Sept. 13-22	1,926	19		11	3.8	42		36		12	65		1.2		181	.25	941	43	14	68	2.8	304	7.1
Sept. 23-28	1,525	17		10	3.8	55		32		12	85		.5		216	.29	889	40	14	75	3.7	356	7.2
Weighted average	12,340	8.7		5.3	2.1	13		18		9.5	18		1.3		81	0.11	2,700	22	7	57	1.2	119	--

a Sum of determined constituents.

## SABINE RIVER BASIN--Continued

## SABINE RIVER NEAR RULIFF, TEX.--Continued

Temperature (°F) of water, water year October 1952 to September 1953

/Once-daily temperature measurement usually between 4 and 5 p. m. (Oct.-June), (July-Sept.) /

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	80	61	52	52	59	55	70	70	70	85	83	85
2	80	61	--	52	59	56	70	70	70	84	83	86
3	79	60	52	52	58	56	70	70	68	83	84	86
4	79	60	52	52	58	57	71	71	68	86	85	85
5	78	61	--	52	57	58	71	71	68	85	84	85
6	76	61	--	51	57	59	70	71	--	88	85	85
7	74	62	--	51	57	59	71	71	70	88	86	85
8	71	62	--	51	57	62	72	71	69	88	86	82
9	69	62	57	52	57	62	72	72	70	86	90	84
10	69	62	57	52	57	64	73	--	70	88	90	84
11	69	61	56	52	56	65	74	--	72	87	93	84
12	69	61	56	52	56	--	74	--	73	86	95	86
13	68	61	55	53	56	65	76	72	74	85	89	83
14	68	61	54	53	56	65	71	73	76	80	91	86
15	68	61	54	54	56	66	72	73	76	80	86	82
16	87	60	53	54	55	66	70	73	76	81	90	81
17	87	61	53	53	54	66	--	73	--	83	88	81
18	85	61	53	54	55	67	68	--	78	84	89	81
19	84	60	52	54	55	67	68	--	80	85	88	89
20	83	60	52	54	54	67	67	--	80	84	88	90
21	83	60	52	55	54	68	66	--	82	83	85	90
22	83	59	--	55	52	68	67	--	84	83	85	86
23	82	58	52	56	51	68	68	--	--	84	--	87
24	82	58	52	56	50	69	70	--	84	82	82	85
25	82	57	52	56	52	69	69	70	--	81	85	84
26	61	57	53	57	52	69	70	70	--	81	83	82
27	60	55	52	57	53	69	70	70	--	79	84	85
28	60	55	52	57	54	69	71	70	--	80	82	84
29	60	54	52	57	--	69	70	70	--	82	81	85
30	60	53	52	58	--	69	71	70	--	83	81	86
31	61	--	52	58	--	--	--	70	--	81	80	--
Average	68	60	53	54	55	64	70	--	--	84	86	85

## SABINE RIVER BASIN--Continued

## COW BAYOU NEAR MAURICEVILLE, TEX.

LOCATION --At gaging station at bridge on State Highway 235, half a mile upstream from Kansas City Southern Railway Bridge, and 3 miles southwest of Mauriceville, Orange County, 127 square miles.

DRAINAGE AREA --127 square miles

RECORDS AVAILABLE --Chemical analyses: March 1952 to September 1953.

EXTREMES, 1952-53 --Dissolved solids: Maximum 1,030 ppm July 29-31; minimum 27 ppm Dec. 4-5, 19-23, 30-31.

Hardness: Maximum 186 ppm Nov. 1-9; minimum 9 ppm Dec. 4-5, 19-23, 30-31, Apr. 1-3, 23-30.

Specific conductance: Maximum daily, 2,190 micromhos Aug. 24; minimum daily, 26.7 micromhos Dec. 4.

Water temperatures: Maximum observed, 96° F Aug. 10; minimum observed, 47° F Nov. 29.

EXTREMES, March 1952 to September 1953 --Dissolved solids: Maximum 1,030 ppm July 29-31, 1953; minimum, 23 ppm Apr. 23-30, 1952.

Hardness: Maximum, 186 ppm Nov. 1-9, 1953; minimum, 9 ppm Dec. 4-5, 19-23, 30-31, Apr. 1-3, 23-30, 1953.

Specific conductance: Maximum observed, 96° F Aug. 10, 1953; minimum observed, 47° F Nov. 29, 1952.

Water temperatures: Maximum observed, 96° F Aug. 10, 1953; minimum observed, 47° F Nov. 29, 1952.

REMARKS --Values reported for dissolved solids are sums of determined constituents. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1952 to September 1953 given in WSP 1282.

## Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boiron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium carbonate	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	Color
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate					
Oct. 1-10, 1952 ..	0.10	27	--	37	21	172	112	112	24	310		0.8		648	0.88	1.75	179	87	68	5.6	1,230	7.9	
Oct. 11-20 .....	.10	30	--	38	21	167	117	117	25	300		.8		640	.87	.17	182	86	67	5.4	1,260	7.8	
Oct. 21-31 .....	.10	28	--	38	21	177	117	117	25	315		.8		663	.90	.18	182	86	68	5.7	1,270	7.7	
Nov. 1-9 .....	.10	28	--	38	22	174	119	119	24	312		.8		658	.89	.18	186	88	67	5.5	1,210	7.4	
Nov. 10-17 .....	.10	17	--	26	14	120	74	17	17	216		.8		447	.61	.12	122	62	68	4.7	882	7.5	
Nov. 18-20, 29-30 ..	.62	6.6	--	2.2	1.7	12	9	5.4	18	1.1		1.0		51	.07	.11	12	5	86	1.5	390.3	6.7	
Nov. 21-28 .....	.10	17	--	11	7.1	52	38	11	11	90		.8		208	.28	.06	57	26	67	3.0	376	7.5	
Dec. 1-3, 6-14, 24-29, 30-31 .....	2.84	8.0	--	3.1	2.7	11	9	5.9	20			.8		56	.08	.43	19	12	55	1.1	94.5	6.5	
Dec. 4-5, 19-23, 30-31 .....	27.7	4.6	--	1.8	1.1	4.0	--	8	4.7	6.0		1.0		27	.04	2.02	9	2	49	.6	45.7	6.5	
Dec. 15-18 .....	10.2	12	--	9.8	6.8	35	30	10	66			.5		155	.21	.704	58	28	59	2.1	284	7.2	
Jan. 1-2, 11-20, 1953 ..	23.1	8.0	--	4.2	2.3	14	9	7.9	24			.8		65	.09	1.79	20	13	60	1.3	119	6.4	
Jan. 3-10 .....	25.1	9.0	--	3.4	1.7	13	8	7.3	21			.8		69	.08	4.07	16	9	65	1.5	102	6.2	
Jan. 21-31 .....	2.83	9.4	--	3.4	1.9	7.7	--	9	8.8	11		.8		47	.06	.36	16	9	51	.8	78.9	6.3	

Feb. 1-10, 1953..	6.22	11	--	3.3	1.9	5.7	--	8	6.5	9.8	.8	43	-.06	.72	16	10	44	.6	65.7	6.2
Feb. 11-14, 22,																				
24, 26-28 .....	358	5.4	--	2.8	1.4	6.0	--	6	4.0	11	1.2	35	-.05	33.8	13	8	51	.7	78.1	5.8
Feb. 15-21, 23-25	239	5.8	--	3.5	1.5	15	--	5	4.2	27	1.0	62	-.08	40.0	15	11	86	1.7	120	5.6
Mar. 1-3, 25-31..	136	6.2	.66	2.1	1.1	5.0	1.6	1	6.0	6.6	1.0	34	-.05	12.5	11	4	45	.7	51.0	6.1
Mar. 4-12 .....	61.4		--	2.4	1.3	8.4	1.5	7	6.0	14	1.5	44	-.06	7.29	11	6	58	1.1	71.5	6.2
Mar. 13-24 .....	3.82	11	1.6	3.8	1.9	13	2.0	9	9.0	21	1.0	68	-.09	.70	20	13	55	1.4	99.4	6.2
Apr. 1-3, 23-30..	263	4.2	--	2.1	1.0	5.1	1.6	8	2.3	8.0	1.0	29	-.04	20.6	9	3	49	.7	51.3	6.3
Apr. 4-6, 14-19..	10.4	9.0	--	4.2	1.4	9.6	1.8	8	2.1	17	1.5	50	-.07	1.40	14	7	37	1.1	133.0	6.2
Apr. 7-9, 16-20..	4.63	17	--	3.8	2.2	4.4	1.5	10	2.2	29	2.0	71	-.10	.89	14	18	60	1.4	344	6.2
Apr. 21-22 .....	471	17	--	2.6	--	--	4.4	31	7.2	31	2.0	--	--	--	12	27	65	2.4	346	7.2
May 1-3, 5, 14-17	43	4.9	--	2.6	1.5	5.0	1.6	8	3.7	20	1.5	50	-.04	63.8	13	4	46	1.5	93.8	6.4
May 4, 6-13, 18-25	733	4.1	.45	2.1	1.2	7.8	1.7	7	2.6	14.0	1.5	31	-.04	6.4	11	4	46	1.7	52.5	6.6
May 15-16, 26-31.	165	6.5	1.4	2.2	1.2	7.8	1.7	7	2.9	14	2.0	43	-.06	19.2	13	7	53	1.0	69.3	6.2
June 1, 3-6, 15-17	1.41	11	--	6.2	3.4	24	2.4	14	6.5	43	2.5	104	-.14	.40	29	18	64	1.9	187	6.3
June 2, 12-14, 28-30																				
June 7-11, 18-20	8.93	6.3	--	3.0	1.6	7.1	2.2	8	5.3	12	3.5	45	-.06	1.08	14	8	48	.8	72.3	6.2
June 21-27 .....	.20	24	--	16	8.1	121	75	41	15	131	3.0	287	-.39	.19	73	40	69	3.8	517	7.8
July 1-6, 20-21..			--	27	15	121	121	81	18	217	2.0	482	-.66	.26	129	62	67	4.6	877	8.0
July 25-28 .....	5.38	5.5	--	9.1	3.5	49	49	12	7.5	89	1.5	171	-.23	2.48	37	27	74	3.5	335	6.9
July 7-19, 22-24..	36	12	--	19	9.2	102	5.3	35	9.4	190	1.5	360	-.49	.35	66	57	72	4.8	706	7.3
July 29-31 .....	2.63	8.3	--	43	17	325	5.3	8	5.4	620	1.0	1,030	1.40	7.31	178	171	79	11	2,110	6.4
Aug. 1, 19 .....	7.15	2.7	--	5.2	2.0	52	5.3	6	4.3	88	1.2	158	-.21	3.05	21	16	84	5.0	318	6.2
Aug. 2, 4-5, 16-18	7.38	9.5	--	24	9.4	228	2.8	20	8.6	402	1.8	693	-.94	13.8	98	82	83	10	1,360	6.8
Aug. 3, 20-21, 30-31 .....																				
Aug. 6-15, 22-29..	17.3	4.3	--	13	4.5	147	147	2	5.3	257	1.2	433	-.59	20.2	51	50	86	8.9	880	5.3
Sept. 1, 26-30 .....	2.01	7.2	--	31	11	329	106	10	7.7	582	2.0	975	1.33	5.29	122	114	85	13	1,930	6.7
Sept. 2, 23-22-25..	4.48	11	--	20	10	106	63	11	183	2.8	1.8	382	-.52	3.18	91	40	72	4.8	718	8.0
Sept. 4, 10-20 .....	11.9	7.4	--	9.8	5.3	55	31	5.7	95	95	1.0	198	-.27	2.40	46	21	72	3.5	373	7.8
Sept. 5-9, 21 .....	77.9	5.2	--	2.2	1.2	15	14	14	3.6	19	1.0	56	-.08	1.80	10	0	76	2.0	92.3	7.1
Weighted average	78.8	4.8	--	3.6	2.6	27	14	14	3.0	45	.8	43	-.13	19.8	20	8	75	2.7	174	6.8
			--	2.6	1.3	10	10	8	3.5	15	1.3	43	0.06	0.91	12	5	65	1.3	75	--

## SABINE RIVER BASIN--Continued

## COW BAYOU NEAR MAURICEVILLE, TEX.--Continued

Temperature (°F) of water, water year October 1952 to September 1953.

/Once-daily measurement usually about 5 p. m./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	84	72	53	58	64	64	78	75	84	86	--	83
2	85	73	54	56	65	68	72	73	88	85	--	83
3	80	76	58	54	64	70	74	--	88	87	--	81
4	78	68	61	52	67	66	74	71	89	87	--	78
5	81	58	49	51	66	64	75	70	87	89	--	78
6	75	68	58	59	64	64	72	--	88	90	87	75
7	--	67	56	63	61	64	77	74	88	91	--	76
8	66	69	64	64	58	--	75	76	87	92	95	77
9	67	73	68	56	60	64	76	78	89	93	94	--
10	71	60	63	55	64	67	78	80	91	85	96	78
11	73	65	58	54	64	68	75	80	81	93	94	76
12	74	65	60	56	61	--	--	79	--	89	91	78
13	76	72	59	57	58	70	70	74	88	83	91	--
14	76	75	--	64	50	74	70	73	93	--	92	79
15	77	76	52	66	57	74	79	72	89	88	89	81
16	73	75	54	57	--	67	74	75	89	92	--	--
17	75	66	58	54	56	71	75	72	91	--	94	79
18	76	64	68	58	54	75	73	73	92	86	94	85
19	--	64	60	60	58	74	71	75	92	87	77	87
20	74	60	58	66	56	76	73	79	94	80	81	86
21	65	61	55	62	55	78	72	79	93	--	82	84
22	69	63	60	60	54	75	76	80	--	91	84	82
23	68	--	54	55	49	78	65	83	90	91	84	78
24	67	--	54	--	48	74	71	--	91	83	81	79
25	69	--	52	59	49	73	72	84	91	81	86	80
26	74	59	54	63	56	73	--	83	92	82	87	81
27	70	55	55	65	60	70	70	86	90	84	--	84
28	68	--	59	63	63	--	71	87	80	--	83	--
29	65	47	54	59	--	73	72	89	81	88	77	83
30	63	50	59	63	--	72	76	89	85	85	--	81
31	71	--	--	62	--	75	--	89	--	--	81	--
Average	73	65	57	59	59	71	73	78	89	87	--	80

SABINE RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN SABINE RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Parts per million	Dissolved solids (residue at 180°C)	Hardness as CaCO <sub>3</sub>	Percent sodium	Specific conductance (micro-mhos at 25°C)
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DUCK CREEK AT U. S. HIGHWAY 69 NEAR LINDALE

Apr. 2, 1953	---	21	0.42	5.5	3.5	6.8	2.1	14	18	11	0.3	0.2	0.06	76	0.10	29	17	32	0.5	105
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TENAH CREEK 10 MILES NORTHEAST OF SHELBYVILLE

Jan. 21, 1953	35.4	16		9.0	7.9		29	49	30	1.2	0.24	180	0.24	55	31	53	1.7	273	6.7
June 11	24.4	16		--	--		19	46	16	2.0	132	1.18		38	0	52	1.3	104	7.1

BAYOU SIEP 10 MILES NORTHEAST OF PATROON

Oct. 13, 1952	0.4	40		--	--		20	65	22	0.2	0.19	141	0.19	47	0	49	1.3	191	7.2
Jan. 21, 1953	2.88	34		7.0	5.4		17	48	11	1.2	117	1.16		40	0	48	1.2	165	6.9
June 11	3.55	30		--	--		17	57	6.5	1.5	132	1.18		38	0	50	1.2	153	7.1

PATROON BAYOU AT COUNTY ROAD BRIDGE 7 MILES NORTHEAST OF MILAM

Jan. 21, 1953	10.5	18	11	8.5	18	42	40	18	0.2	133	0.18	62	28	39	1.0	226	7.2
June 11	17.3	18	--	--	14	44	18	11	.5	110	.15	40	4	43	1.0	152	7.6

PALO GAUCHO BAYOU 7 MILES EAST OF MILAM

Oct. 14, 1952	0.2	13					20	80	6.3	8.0	0.8	105	0.14	41	0	51	1.3	171	7.7
Apr. 17	64.4	18				5.5	1.4	26	10	6.5	5	70	1.1	26	5	30	1.5	88.0	7.5

HOUSEN BAYOU 9 MILES EAST OF YELLOWPINE

Apr. 17, 1953	11.0	25					20	33	27	16	0.2	137	0.19	35	8	55	1.4	175	7.5
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SABINE RIVER BASIN--Continued  
MISCELLANEOUS ANALYSES OF STREAMS IN SABINE RIVER BASIN IN TEXAS--Continued

Chemical analyses, in parts per million, water year October 1952 to September 1953.—Continued

Date of collection	Dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal-cium (Ca)	Mag-ne-sium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Car-bonate (CO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> )	Bo-ron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>		Per-cent sodium adsorp-tion ratio	Specific conduct- ance (micro- mhos at 25°C)			
															Parts per mil-lion	Tons per acre-foot	Calcium, mag-nesium	Non-carbon-ate					
SANDY CREEK 9½ MILES EAST OF YELLOWPINE																							
Oct. 14, 1952	1.2	21				6.0		15		3.9	5.0			0.8		54	0.07	11	0	54	0.8	57.0	6.5
Apr. 17, 1953	36.6	20				--		15		--	6.0			.2		63	.09	15	3	--	--	59.9	7.0
MILL CREEK 12 MILES SOUTHEAST OF YELLOWPINE																							
Oct. 14, 1952	4.85	18				5.0		10		2.6	4.0			0.5		36	0.05	6	0	65	0.9	37.7	6.6
Apr. 17, 1953	17.1	20			3.2	1.0	10	10		2.9	4.5			.2		47	.06	8	0	43	.5	41.0	6.6
INDIAN CREEK 12½ MILES NORTHEAST OF BURKEVILLE																							
Oct. 14, 1952	4.04	30				5.7	12			3.6	4.0			0.2		53	0.07	7	0	64	0.9	44.2	6.6
BUCK CREEK 12½ MILES NORTHEAST OF BURKEVILLE																							
Oct. 14, 1952	4.21	22				6.1		7.0		3.7	4.5			0.5		35	0.05	3	0	82	1.5	26.5	6.5
HICKMAN CREEK 8½ MILES NORTHEAST OF BURKEVILLE																							
Oct. 16, 1952	4.30	23				3.9		9.0		0.7	3.5			0.5		37	0.05	5	0	63	0.8	30.3	6.5
LITTLE COW CREEK 5 MILES SOUTHEAST OF BURKEVILLE																							
Oct. 16, 1952	46.2	19				4.6	12			2.6	4.5			0.2		40	0.05	9	0	53	0.7	42.6	6.7
CANEY CREEK 0.6 MILES EAST OF BON WIER																							
Oct. 17, 1952	4.66	18				5.8	17			1.8	6.0			0.5		45	0.06	12	0	51	0.7	58.0	6.6
Apr. 16, 1953	15.0	17			4.1	1.6	22			2.0	6.5			.5		58	.08	17	0	32	.4	64.9	7.3
DAVIS CREEK 3½ MILES SOUTHWEST OF BON WIER																							
Oct. 17, 1952	0.56	13				3.9	8.0			2.6	4.2			2.8		33	0.04	9	2	48	0.6	41.1	6.4

## DEMPSEY CREEK 5 MILES SOUTHWEST OF BON WIER

Oct. 17, 1952 .....	0.81	30				7.9	18	1.5	6.0	0.5	58	0.08	8	0	68	1.2	51.9	6.9
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## BIG COW CREEK 4.8 MILES EAST OF CALL

Oct. 17, 1952 .....	38.6	20				5.0	12	1.4	5.2	0.2	41	0.06	8	0	57	0.8	48.4	6.5
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## NECHES RIVER BASIN

## NECHES RIVER AT EVADALE, TEX.

LOCATION --At gaging station at bridge on U. S. Highway 96, 200 feet upstream from Gulf, Colorado & Santa Fe Railway bridge at Evadale, Jasper County, 600 feet downstream from Mill Creek, 15 miles upstream from Village Creek, and at mile 55.

DRAINAGE AREA --306 square miles.

RECORDS AVAILABLE --Chemical analyses: October 1947 to September 1953.

Water temperatures: October 1947 to September 1953.

EXTREMES 1952-53 --Dissolved solids: Maximum, 206 ppm Nov. 27-30, Dec. 1-3, minimum, 36 ppm May 5-12, 26-27.

Hardness: Maximum, 48 ppm June 21-30, July 11-20, minimum, 18 ppm May 5-12, 26-27, May 13-22, 24-25, 28-29.

Specific conductance: Maximum daily, 415 micromhos Nov. 29; minimum daily, 49 micromhos May 9.

Water temperatures: Maximum observed, 94° F June 29; minimum observed, 49° F Dec. 16.

EXTREMES 1947-53 --Dissolved solids: Maximum, 218 ppm Dec. 11-20, 1948; minimum, 36 ppm May 5-12, 26-27, 1953.

Hardness: Maximum, 70 ppm Nov. 1-10, 1947; minimum, 16 ppm Sept. 22-25, 27, 1950.

Specific conductance: Maximum daily, 415 micromhos Nov. 29, 1952; minimum daily, 49.3 micromhos May 9, 1953.

Water temperatures: Maximum observed, 94° F June 29, 1953; minimum observed, 37° F Jan. 30-31, 1948, Jan. 31, 1949.

REMARKS --Values reported for dissolved solids are sums of determined constituents. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1952 to September 1953 given in WSP 1282.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal-cium (Ca)	Mag-ne-sium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Car-bonate (CO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> )	Bo-ron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>	Per-cent ad-sorp-tion ratio	So-lidum	Specific conduct-ance (micro-mhos at 25°C)	pH
															Parts per mil-lion	Tons per acre-foot	Tons per day					
Oct. 1-10, 1952	184	25	11	4.2	37	70	7.6	40	0.4	1.8	161	0.22	80.0	45	0	64	2.4	2.4	261	7.6		
Oct. 11-20	171	23	12	4.0	35	65	8.3	40	.5	4.0	159	.22	73.4	47	0	61	2.2	2.65	285	6.9		
Oct. 21-31	184	23	11	4.2	30	67	8.6	45	.5	1.2	166	.23	82.5	44	0	66	2.6	2.85	285	7.4		
Nov. 1-10	196	23	11	3.8	42	70	8.1	47	.5	1.2	171	.23	90.5	43	0	68	2.8	282	7.3	7.3		
Nov. 11-26	220	23	11	3.4	36	66	9.0	39	.5	1.2	155	.21	92.1	41	0	66	2.5	253	7.8	7.8		
Nov. 27-30, Dec. 1-3	996	20	11	4.2	55	62	18	66	.5	1.0	206	.28	55.4	45	0	73	3.6	355	7.8	7.8		
Dec. 4-10	2,227	12	8.0	2.7	23	25	20	26	.5	1.2	105	.14	63.1	31	11	61	1.8	181	7.2	7.2		
Dec. 11-20	1,558	14	7.9	3.3	22	19	27	25	.5	1.0	110	.15	46.3	33	18	60	1.7	184	6.9	6.9		
Dec. 21-31	1,672	17	8.7	3.8	32	17	28	45	.5	.8	145	.20	65.5	40	26	64	2.2	251	6.9	6.9		
Jan. 1-10, 1953	3,857	15	8.2	3.0	24	16	23	33	.5	.5	115	.16	120.0	33	20	61	1.8	196	6.9	6.9		
Jan. 11-13, 25-29	6,560	11	5.7	2.5	17	22	17	22	.3	1.0	82	.11	145.0	24	14	60	1.5	247	7.0	7.0		
Jan. 14-24, 30-31	2,689	16	8.8	3.5	32	14	27	46	.3	1.2	142	.19	103.0	36	25	66	2.3	247	7.1	7.1		
Feb. 1-10	4,062	14	8.2	3.4	23	17	25	31	.4	1.0	114	.16	125.0	34	20	60	1.7	195	6.8	6.8		
Feb. 11-23	5,585	14	8.4	3.3	23	18	24	30	.3	1.0	113	.15	170.0	34	20	59	1.7	197	7.0	7.0		
Feb. 24-28, Mar. 1-4	14,630	9.6	4.7	1.9	12	13	14	14	.4	1.0	64	.09	2,530	20	9	58	1.2	104	6.9	6.9		
Mar. 5-10	7,830	13	7.4	3.3	19	15	24	24	.4	.5	99	.13	2,080	32	20	56	1.4	167	7.0	7.0		
Mar. 11-18	6,702	14	8.3	3.9	21	16	26	28	.5	.5	110	.15	1,990	37	24	55	1.5	195	7.0	7.0		
Mar. 19-31	20,880	9.8	4.6	2.1	8.3	2.9	13	10	.5	.8	58	.08	3,270	20	10	43	.8	91.9	6.5	6.5		

Apr. 1-10, 1953	16,140	12	7.1	3.3	15	19	17	20	.4	.5	84	.11	3,660	31	16	51	1.1	145	6.8
Apr. 11-16, 26-30	4,011	15	8.8	3.8	21	27	20	27	.3	2.2	111	.15	1,200	38	15	55	1.5	189	7.2
Apr. 17-25	1,907	18	11	4.8	27	36	25	34	.4	1.2	139	.19	716	47	18	55	1.7	227	7.2
May 1-4, 23, 30-31	40,430	8.2	5.0	2.0	10	16	9.2	12	.3	3.5	58	.08	6,330	21	8	53	1.0	109	6.7
May 5-12, 26-27	47,180	6.1	4.7	1.4	4.7	17	5.9	4.5	.3	.8	36	.05	4,590	18	4	36	.5	57.6	6.8
May 13-22, 24-25, 28-29	49,700	7.0	4.2	1.7	5.3	16	7.2	5.5	.2	.8	40	.05	5,370	18	4	40	.5	67.4	6.8
June 1-10	27,660	13	6.8	3.1	7.9	24	10	12	.3	1.5	69	.09	5,150	30	10	34	.6	102	6.5
June 11-20	4,939	15	9.9	4.0	13	40	12	16	.3	1.5	82	.13	1,150	41	8	41	.9	147	6.6
June 21-30	1,300	15	12	4.5	14	48	10	20	.3	1.5	101	.14	355	48	9	39	.9	171	6.9
July 1-10	2,319	20	11	4.6	17	50	9.6	21	.3	1.5	110	.15	689	46	6	44	1.1	177	7.5
July 11-20	1,437	22	12	4.3	20	53	10	24	.4	1.5	120	.16	472	48	4	47	1.2	197	7.1
July 21-31	2,966	20	11	3.8	18	46	10	23	.3	1.5	111	.15	899	43	6	48	1.2	177	7.4
Aug. 1-10	2,383	20	10	3.8	20	37	12	28	.4	1.5	114	.16	733	40	10	52	1.4	178	7.5
Aug. 11-20	1,532	18	9.4	3.5	19	35	12	26	.4	1.5	107	.15	443	38	10	52	1.3	178	7.5
Aug. 21-31	1,946	18	8.3	3.3	19	36	11	24	.4	1.2	104	.14	546	36	7	53	1.3	167	7.4
Sept. 1-10	1,393	23	9.2	3.0	21	43	10	24	.2	1.2	113	.15	423	35	0	56	1.5	179	7.5
Sept. 11-20	1,043	29	11	3.7	25	51	10	30	.2	.8	135	.18	360	43	1	56	1.6	211	7.5
Sept. 21-30	1,532	30	10	3.6	31	54	11	36	.2	.8	150	.20	377	41	0	62	2.1	234	7.8
Weighted average	8,177	10	5.8	2.4	11	19	11	13	0.3	1.5	66	0.09	1,480	24	9	49	1.0	109	--

## NECHES RIVER BASIN--Continued

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

Temperature (°F) of water, water year October 1952 to September 1953  
 (Once-daily temperature measurement, usually before 8 a. m.)

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

## TRINITY RIVER BASIN

## CLEAR FORK TRINITY RIVER AT FORT WORTH, TEX.

LOCATION.--Temperature recorder at gaging station at bridge on Vickery Boulevard, Fort Worth, Tarrant County, 100 feet upstream from East-West Expressway bridge, 310 feet downstream from Texas & Pacific Railway bridge, and 3 miles upstream from mouth.

DRAINAGE AREA.--526 square miles.

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

Water temperatures: October 1948 to September 1953.

EXTREMES, 1948-53.--Water temperatures: Maximum observed, 93°F May 31; minimum observed, 42°F Dec. 15, 28 Jan. 16, 24.

EXTRIMES, 1948-53.--Dissolved solids (1948-52): Maximum, 621 ppm Jan. 11-31, 1949; minimum, 124 ppm May 17, 1949.

Hardness (1948-52): Maximum, 327 ppm Dec. 10, 1950; minimum, 68 ppm May 17, 1949.

Specific conductance (1948-52): Maximum daily, 842 micromhos May 31, 1951; minimum daily, 201 micromhos May 24, 1952.

Water temperatures: Maximum observed, 97°F Aug. 6, 1952; minimum observed, freezing point on several days in January 1949.

REMARKS.--On days when no temperature records were given, there was no flow or water level was below gage intake. Records of discharge for water year October 1952 to September 1953 given in WSP 1282.

Temperature (°F) of water, water year October 1952 to September 1953

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

## TRINITY RIVER BASIN--Continued

## TRINITY RIVER NEAR OAKWOOD, TEX.

LOCATION --At gaging station at bridge on U. S. Highways 79 and 84, 1½ miles upstream from International-Great Northern Railroad bridge, 6 miles northeast of Oakwood, Leon County, and at mile 313.

DRAINAGE AREA --12,912 square miles.

RECORDS AVAILABLE --Chemical analyses: October 1947 to September 1953.

Water temperatures: October 1947 to September 1953.

EXTREMES, 1952-53.--Dissolved solids: Maximum, 4,500 ppm Sept. 7; minimum, 170 ppm May 15-23.

Hardness: Maximum, 365 ppm Sept. 7; minimum, 85 ppm May 15-23.

Specific conductance: Maximum daily, 7,820 micromhos Sept. 7; minimum observed, 38° F Jan. 16, 24.

Water temperatures: Maximum observed, 90° F June 13; minimum observed, 38° F Jan. 16, 24.

EXTREMES, 1947-53.--Dissolved solids: Maximum, 4,500 ppm Sept. 7, 1953; minimum, 165 ppm Feb. 11-19, 1950.

Hardness: Maximum, 365 ppm Sept. 7, 1953; minimum, 85 ppm May 15-23, 1953.

Specific conductance: Maximum daily, 7,820 micromhos Sept. 7, 1953; minimum daily, 198 micromhos May 17, 1953.

Water temperatures: Maximum observed, 90° F Aug. 14, 1952; June 13, 1953; minimum observed, freezing point Feb. 5, 1949, Dec. 15, 21-22, 1951.

REMARKS --Values reported for dissolved solids concentrations less than 1,000 ppm are residues on evaporation and for concentrations more than 1,000 ppm are

sums of determined constituents unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex.

Records of discharge for water year October 1952 to September 1953 given in WSP 1282.

## Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>	Percent sodium non-carbonate	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	Color or pH
														Parts per million	Tons per acre-foot	Tons per day				
Oct. 1-2, 4-6, 8, 10, 1952	156	17	65	9.6	389	165	211	470	38	539	202	66	81	1.74	539	202	66	81	2,250	7.6
Oct. 3, 7, 9, 14	133	18	70	12	522	176	184	765	52	723	224	80	85	1.75	723	224	80	85	3,140	7.4
Oct. 11-13, 15-20	136	18	67	9	405	176	200	498	43	488	208	64	81	1.81	488	208	64	81	2,300	7.6
Oct. 21-31	110	28	68	8.8	390	192	195	418	100	383	205	48	80	1.75	383	205	48	80	2,120	8.0
Nov. 1-10	126	18	68	10	403	184	204	465	96	456	203	68	81	1.82	456	203	68	81	2,240	7.6
Nov. 11-17	220	20	66	12	481	170	210	585	96	921	214	74	83	2.11	921	214	74	83	2,650	7.6
Nov. 19-24, 26-27	929	19	56	10	327	146	193	390	26	2,750	181	62	80	1.50	2,750	181	62	80	1,990	7.8
Nov. 25-29	522	21	90	23	1,620	1336	145	2,420	12	6,310	319	44	92	4.48	6,310	319	44	92	7,720	8.4
Nov. 30	6,455	80	54	4.6	55	141	65	57	12	5,960	154	38	44	342	5,960	154	38	44	574	7.8
Nov. 30, Dec. 1-10	5,541	14	53	6.3	134	115	76	186	16	77	380	64	65	.563	77	380	64	65	977	7.6
Dec. 11-17	5,873	13	90	6.8	128	132	74	167	14	539	834	45	65	.73	539	834	45	65	936	7.5
Dec. 18-31	5,097	11	49	5.2	70	127	56	91	5.8	368	.50	5,060	40	.50	5,060	144	40	51	629	7.5

a Sum of determined constituents.

b Includes equivalent of 8 ppm of carbonate (CO<sub>3</sub>).

Jan. 11-13, 15-23, 25-28, 31, 1953	1,462	12	55	7.0	117	130	92	146	15	555	.75	2,190	166	60	61	4.0	917	7.6
Jan. 2-6	6,686	11	39	4.1	36	108	44	37	7.5	261	.35	4,710	114	26	41	1.5	394	7.7
Jan. 7-10, 24, 29-30	1,115	13	50	6.4	84	117	87	96	16	449	.61	1,350	152	56	55	3.0	713	7.7
Jan. 14, 16-22	883	15	60	7.6	158	138	83	220	18	676	.92	1,610	180	68	66	5.1	1,110	7.8
Feb. 1-10	502	10	60	8.1	153	135	112	190	26	677	.92	918	183	72	65	4.9	1,090	7.4
Feb. 11-18, 25	675	14	60	9.8	214	128	119	282	36	830	1.13	1,510	190	85	71	6.8	1,480	7.9
Feb. 19-24, 26-28	687	13	52	8.5	156	110	124	178	42	643	.87	1,190	164	74	67	5.3	1,070	7.7
Mar. 1-8	555	14	55	8.8	157	117	131	178	37	666	.91	998	173	77	66	5.2	1,080	7.8
Mar. 9-10, 20-31	1,619	13	56	7.2	84	147	76	106	9.3	462	.63	2,020	174	54	51	2.8	761	7.7
Mar. 11-19	16,850	14	33	4.1	30	98	32	33	5.2	235	.32	10,690	99	19	40	1.3	343	7.7
Apr. 1-10	1,072	15	60	7.5	118	159	88	146	12	549	.75	1,590	180	50	59	3.8	934	8.1
Apr. 11-20	1,120	13	59	6.8	96	162	92	103	13	494	.67	1,490	175	42	54	3.2	803	7.9
Apr. 21-29	2,263	13	51	5.6	78	148	77	78	11	412	.56	2,520	150	28	53	2.8	669	7.9
Apr. 30, May 1-14, 24-27	15,180	15	41	3.6	22	125	31	19	5.0	214	.29	8,770	117	15	29	.9	336	8.1
May 15-23	38,340	13	29	3.1	16	91	20	16	3.5	170	.23	17,600	85	11	29	.8	252	8.0
May 28-31	8,895	15	51	5.4	36	154	36	44	3.5	294	.40	7,060	149	23	35	1.3	468	7.9
June 1-7	957	18	64	6.1	79	186	53	102	6.5	446	.61	1,150	164	32	48	2.5	736	7.9
June 8-12, 14-20	373	19	76	7.5	152	219	85	197	6.0	678	.92	653	220	41	60	4.5	1,150	8.2
June 13, 21-30	208	17	74	8.0	246	237	89	335	3.0	337	1.27	556	222	26	71	7.3	1,000	8.2
July 1-10	81	20	74	8.4	315	c287	81	420	2.5	1,060	1.44	372	223	4	75	0.1	1,000	8.5
July 11-20	150	21	76	8.0	356	c287	154	428	4.0	1,100	1.62	982	224	0	76	10.0	2,090	8.5
July 21-31	567	6.1	50	5.7	186	156	99	190	11	632	.86	986	148	19	71	5.9	1,090	8.0

c Includes equivalent of 9 ppm of carbonate (CO<sub>3</sub>).

a Sum of determined constituents.

## TRINITY RIVER BASIN--Continued

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

Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)		Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids (residue at 180° C)		Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH	Color	
						Parts per million	Tons per acre-foot						Calcium, magnesium	Non-carbonate							
Aug. 1-4, 11-12	195	12		52	6.3		165	171	90	195		7.0	636	0.86	335	16	70	5.7	1,130	8.2	
Aug. 5-6, 19-23	208	20		63	8.7		285	252	162	305		9.7	2,977	1.33	549	193	0	76	8.9	1,710	8.2
Aug. 29-31.....																					
Aug. 7-10, 13-16, 24-28.....	239	22		53	9.0		206	209	113	228		6.9	786	1.07	507	169	0	73	6.9	1,330	8.2
Sept. 1-6.....	290	23		53	6.8		296	238	103	350		10	993	1.35	778	160	0	80	10	1,710	8.2
Sept. 7.....	1,680	23		115	19		1,610	1,326	128	2,450		--	24,500	6.12	22,840	365	98	91	37	7,820	8.6
Sept. 8-13.....	755	17		32	4.0		118	129	60	428		5.8	454	62	925	96	0	73	5.2	758	7.9
Sept. 14-22.....	160	17		50	6.6		223	202	125	235		12	801	1.09	346	152	0	76	7.9	1,350	8.2
Sept. 23-30.....	159	12		69	8.5		356	233	146	448		5.8	2,160	1.58	498	207	16	79	11	2,210	8.2
Weighted average	3,164	14		41	4.4		52	117	42	62		7.0	303	0.41	2,590	120	24	48	2.1	487	--

a Sum of determined constituents.

d Includes equivalent of 19 ppm of carbonate (CO<sub>3</sub>).

## TRINITY RIVER BASIN--Continued

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

Temperature (°F) of water, water year October 1952 to September 1953  
 [Once-daily temperature measurement usually between 7 a. m. and 9 a. m.]

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

TRINITY RIVER BASIN--Continued  
TRINITY RIVER 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 & Santa Fe Railway bridge and at mile 94.

DRAINAGE AREA.--17,192 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1945 to November 1949, February 1950 to September 1951, April to September 1953.

Water temperatures: February 1950 to September 1951, April to September 1953.

EXTREMES, 1953.--Dissolved solids: Maximum, 1,410 ppm Sept. 28-30; minimum, 95 ppm Apr. 30, May 2-3, 14-22.

Hardness: Maximum, 242 ppm Sept. 28-30; minimum, 56 ppm Apr. 30, May 2-3, 14-22.

Specific conductance: Maximum daily, 2,720 micromhos Sept. 29; minimum daily, 132 micromhos May 19.

Water temperatures: Maximum observed, 98°F July 18, 27.

EXTREMES, 1945-50, 1953.--Dissolved solids: Maximum, 1,410 ppm Sept. 28-30, 1953; minimum, 95 ppm Apr. 30, May 2-3, 14-22, 1953.

Hardness: Maximum, 242 ppm Sept. 28-30, 1953; minimum, 48 ppm Oct. 3-8, 1949.

Specific conductance: Maximum daily, 2,720 micromhos Sept. 29, 1953; minimum daily, 103 micromhos Nov. 9, 1946.

REMARKS.--Values reported for dissolved solids concentrations less than 1,000 ppm are residues on evaporation and for concentrations more than 1,000 ppm are sums of determined constituents unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex.

Records of discharge for water year October 1952 to September 1953 given in WSP 1282.

Chemical analyses, in parts per million, April to September 1953

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal-cium (Ca)	Mag-nesium (Mg)	So-dium (Na)	Potas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Car-bonate (CO <sub>3</sub> )	Sol-uble sulfate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> ) (B)	Dissolved solids (Residue at 180°C)			Hardness as CaCO <sub>3</sub>		Per-cent so-lu-sion ratio	So-dium con-duc-tion (micro-mhos at 25°C)	pH
														Parts per mil-lion	Tons per acre-foot	Tons per day	Calcium, mg./nestum	Non-carbon-ate			
Apr. 1-10, 26-29, 1953	3,231	13	50	6.9	75	133	133	66	95			5.0	383	0.52	3,340	154	44	51	2.6	677	7.6
Apr. 11-25	1,786	15	58	8.3	105	150	150	80	139			6.1	488	.66	2,350	178	56	56	3.4	875	7.7
Apr. 30, May 2-3, 14-22	39,780	9.6	18	2.7	10	57	10	13	12			2.0	295	.13	10,200	56	10	29	.6	168	7.4
May 1, 4-13	21,700	13	32	3.6	17	92	95	25	18			4.0	160	.22	9,370	95	17	28	.8	282	7.8
May 23-31	37,340	12	34	3.4	15	107	107	24	12			2.5	156	.21	15,730	99	12	25	.7	277	7.7
June 1-8	15,750	21	42	4.9	24	136	136	29	25			1.5	232	.32	9,870	125	14	30	.9	361	7.7
June 9-19	1,031	23	52	5.5	43	164	164	31	55			1.5	317	.43	882	152	18	38	1.5	499	7.9
June 20-30	588	12	58	7.2	69	170	170	44	98			1.0	402	.55	638	174	34	46	2.3	681	7.6
July 1-2, 6, 10-22	616	22	59	6.9	86	171	171	44	123			1.0	450	.61	748	176	34	52	2.8	767	8.0
July 3-5, 7-9	570	22	46	5.8	65	133	133	42	91			2.0	364	.50	560	139	32	51	2.4	601	7.9
July 23-31	857	20	67	8.1	136	195	195	52	200			1.0	616	.84	1,430	200	40	60	4.2	1,070	8.1
Aug. 1-5, 23-31	586	24	56	7.1	169	203	203	79	202			1.8	663	.90	1,050	168	2	69	5.6	1,140	8.2
Aug. 6-16, 21-22	396	28	68	8.1	233	233	233	85	305			1.5	861	1.17	921	203	12	71	7.1	1,500	8.2
Aug. 17-20	343	23	78	9.5	374	374	374	75	540			2.8	1,220	1.86	1,330	234	30	78	11	2,250	8.0
Sept. 1-13	818	15	44	5.9	117	138	138	58	151			1.8	476	.66	1,060	134	22	65	4.4	813	7.8
Sept. 14-19	628	14	54	7.3	214	195	195	114	248			2.2	757	1.03	1,260	164	4	74	7.3	1,280	7.9
Sept. 20-27	311	10	48	8.1	226	226	226	82	362			1.5	915	1.24	1,063	193	8	75	8.5	1,600	8.1
Sept. 28-30	267	11	79	11	446	446	446	87	655			1.5	1,410	1.92	1,020	242	46	80	12	2,310	7.8
Weighted average...	b7, 220	13	31	3.7	24	95	95	25	28			2.6	178	0.24	3,470	92	14	36	1.1	309	--

a Sum of determined constituents.

b Represents 66 percent of runoff for water year October 1952 to September 1953.

## TRINITY RIVER BASIN--Continued

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

Temperature (°F) of water, water year April to September 1953

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1							--	68	80	85	95	85
2							--	70	80	90	85	85
3							--	70	80	90	85	80
4							--	68	80	90	90	80
5							--	68	85	90	91	80
6							--	70	80	90	93	75
7							--	70	80	95	88	85
8							70	75	85	95	90	--
9							70	72	85	95	90	80
10							75	75	85	95	90	90
11							80	76	90	95	95	85
12							70	75	80	90	90	87
13							65	72	85	90	95	85
14							65	70	85	80	93	80
15							70	68	85	90	90	80
16							68	70	85	85	85	85
17							70	70	85	87	90	80
18							70	70	85	98	90	80
19							65	70	90	90	90	85
20							64	70	95	90	90	90
21							65	75	90	90	90	85
22							66	75	90	90	85	80
23							72	80	95	95	85	80
24							72	80	90	90	85	80
25							76	80	90	90	85	80
26							70	75	90	90	85	78
27							68	75	90	98	90	80
28							75	70	90	90	85	80
29							68	80	90	90	68	80
30							68	80	85	90	80	80
31							--	75	--	90	80	--
Average							--	73	86	91	88	82

TRINITY RIVER BASIN--Continued  
TRINITY RIVER NEAR MOSS BLUFF, TEX.

LOCATION.--At Devers Pumping Plant Number One, one mile west of Moss Bluff, Liberty County.  
RECORDS AVAILABLE.--Chemical analyses, short periods during summers of 1946 to 1949, daily records October 1949 to September 1953.  
EXTREMES, 1952-53.--Dissolved solids: Maximum, 1,010 ppm Nov. 1-10; minimum, 130 ppm May 11-13, 13-20.

Hardness: Maximum, 250 ppm Nov. 1-10; minimum, 65 ppm Apr. 26-30.  
Acidic conductance: Maximum daily, 2,020 micromhos Nov. 13-27, 1952; minimum, 110 ppm Oct. 4-10, 1949.

EXTREMES, 1949-53.--Dissolved solids: Maximum daily, 1,690 micromhos May 19.  
Hardness: Maximum daily, 267 ppm Oct. 11-14, 26-27, 1949.  
Acidic conductance: Maximum daily, 2,630 micromhos May 19, 1952; minimum daily, 127 micromhos Oct. 7, 1949.

REMARKS.--Values reported for dissolved solids concentrations less than 1,000 ppm are residues on evaporation and for concentrations more than 1,000 ppm are sums of determined constituents unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. No discharge records available for this station.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (residue at 180° C)		Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH	Color
														Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate					
Oct. 1-10, 1952..	19			72	10	257	224	71	369			2.2		932	1.27	220	37	72	7.5	1,650	8.2	
Oct. 11-20.....	21			74	8.6	210	246	68	272			1.0		808	1.10	220	18	68	6.2	1,360	8.2	
Oct. 21-31.....	20			81	9.2	244	254	106	320			1.0		923	1.26	240	32	69	6.9	1,580	8.1	
Nov. 1-10.....	21			82	11	280	251	109	382			1.8		a 1,010	1.37	250	44	71	7.7	1,770	8.2	
Nov. 11-21.....	12	8.8		64	9.4	279	191	108	378			1.8		956	1.30	198	42	75	8.6	1,690	7.7	
Nov. 22-30.....				51	4.3	83	104	42	102			4.0		a 326	.44	95	10	66	3.7	583	7.4	
Dec. 1-6.....				37	4.6	80	130	51	87			5.8		a 336	.46	112	5	61	3.3	602	7.5	
Dec. 7-11.....	8.4			54	3.5	26	151	24	94			4.0		a 157	.21	174	19	43	1.3	265	7.5	
Dec. 12-20.....	9.6			53	4.1	26	161	24	97			4.2		a 157	.21	114	23	36	1.6	452	7.5	
Dec. 21-31.....	9.6			32	4.2	37	111	37	37			4.8		a 191	.26	88	38	36	1.6	437	7.3	
Jan. 1-10, 1953..	9.0			29	3.9	38	63	27	52			4.0		a 153	.23	93	20	43	1.2	377	7.3	
Jan. 11-25.....	9.6			34	3.7	39	87	25	52			4.0		a 146	.23	100	29	48	1.7	392	7.2	
Jan. 26-31, Feb. 1	12			39	5.9	81	89	49	120			5.9		368	.53	122	49	59	3.2	652	7.3	

a Sum of determined constituents.

Feb. 2-10, 1953...	11	44	71	38	58	4.5	266	.36	87	28	53	2.1	394	7.0
Feb. 11-19 .....	13	53	86	40	76	5.2	309	.42	108	37	52	2.2	492	7.9
Feb. 20-28, Mar.														
1-2 .....	8.8	38	55	26	56	3.0	241	.33	71	26	54	1.9	348	7.7
Mar. 3-10 .....	10	42	85	54	122	5.6	407	.55	132	47	58	3.2	695	7.9
Mar. 11-15, 31 ..	11	36	68	94	46	6.5	339	.46	113	36	57	2.8	570	7.6
Mar. 16-30 .....	11	35	97	35	43	4.3	250	.34	105	26	42	1.5	388	7.3
Apr. 1-10 .....	14	52	66	61	89	4.4	380	.52	156	48	48	2.3	634	7.5
Apr. 11-23 .....	18	58	108	77	138	3.0	a 489	.67	174	42	57	3.6	971	8.1
Apr. 26-30 .....	7.0	22	2.4	19	28	2.8	a 141	.19	65	7	46	1.4	283	7.5
May 1-10, 14 .....	8.6	31	3.1	96	21	2.5	a 160	.22	90	10	35	1.0	232	7.9
May 11-13, 15-20 ..	9.6	25	17	82	16	1.8	a 130	.18	73	6	34	1.0	223	7.9
May 21-31 .....	13	29	3.0	18	17	2.0	a 146	.20	85	6	31	.8	259	7.4
June 1-10 .....	18	41	3.8	24	25	3.2	a 203	.28	118	10	31	1.0	354	7.4
June 11-20 .....	17	51	5.2	38	51	2.5	284	.39	156	18	35	1.3	491	7.5
June 21-25 .....	20	50	5.0	51	64	1.8	326	.44	168	15	40	1.7	574	7.9
June 26-30 .....	11	28	2.5	30	38	1.5	174	.24	80	7	45	1.4	327	7.3
July 1-10 .....	17	58	5.2	65	86	1.0	356	.48	161	24	47	2.2	642	8.0
July 11-20 .....	20	56	5.4	62	83	1.2	358	.49	162	27	45	2.1	629	7.6
July 21-31 .....	24	63	7.4	88	128	2.0	472	.64	188	31	51	2.8	798	8.2
Aug. 1-4, 7-12, 15-20 .....	*													
Aug. 5-6, 13-14 ..	22	58	6.8	139	190	2.0	578	.79	172	14	64	4.6	1,020	7.9
Aug. 21-30 .....	20	44	5.1	95	147	1.8	404	.55	131	10	61	3.6	707	8.2
Aug. 31, Sept. 1-8 ..	23	72	7.8	202	238	1.5	804	1.09	212	16	67	6.1	1,370	7.8
Sept. 9-18 .....	18	34	4.3	84	123	1.5	368	.50	102	2	64	3.6	609	7.7
Sept. 19-30 .....	18	42	4.6	103	139	1.0	438	.60	124	10	64	4.0	745	7.7
Sept. 19-30 .....	20	57	9.0	184	207	2.2	703	.96	179	0	69	6.0	1,220	8.1

a Sum of determined constituents.

TRINITY RIVER BASIN--Continued  
OLD RIVER NEAR COVE, TEX.

LOCATION. --At Barber Hill Pumping Plant, 5 miles northwest of Cove, Chambers County.  
RECORDS AVAILABLE. --Chemical analyses: Short periods during summers of 1946 to 1949, daily records October 1949 to September 1953.  
EXTREMES, 1952-53. --Dissolved solids: Maximum, 1,230 ppm Oct. 11-22, 31; minimum, 199 ppm June 22-30.

Hardness: Maximum, 324 ppm Oct. 11-22, 31; minimum, 87 ppm Jan. 1-9.  
Specific conductance: Maximum daily, 2,830 microhos Sept. 25, 30; minimum daily, 320 microhos June 20.

EXTREMES, 1949-53. --Dissolved solids: Maximum, 3,430 ppm Aug. 18-19, 22, 1952; minimum, 156 ppm Jan. 26-31, Apr. 21-30, 1952.  
Hardness: Maximum, 701 ppm Aug. 18-19, 22, 1952; minimum, 57 ppm Jan. 26-31, 1952.

Specific conductance: Maximum daily, 7,710 microhos Aug. 22, 1952; minimum daily, 224 microhos Apr. 26, May 1, 1952.  
REMARKS. --Values reported for dissolved solids concentrations less than 1,000 ppm are residues on evaporation and for concentrations more than 1,000 ppm are sums of determined constituents unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. No discharge records available for this station.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (residue at 180° C)		Hardness as CaCO <sub>3</sub>		Percent sodium carbonate	Sodium adsorption ratio	Specific conductance (microhos at 25°C)	pH	Color
														Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate					
Oct. 11-22, 31, 1952	14			82	29	340		212	105	550		4.5		a 1.230	1.67	324	150	70	8.2	2,500	7.9	
Oct. 23-30	12			44	8.0	108		83	56	176		3.2		a 1.474	.64	143	75	62	3.9	837	7.5	
Nov. 1-15	9.2			66	24	328		194	93	508		5.6		a 1.130	1.54	263	104	73	8.8	2,100	7.8	
Nov. 16-19	10			38	8.1	89		75	54	144		1.0		a 1.408	.55	128	67	60	3.4	1,726	7.4	
Nov. 20-30, Dec. 1	7.6			60	23	301		174	86	470		5.0		a 1.040	1.41	244	102	73	8.4	1,930	7.8	
Dec. 2-10	17			26	6.2	52		102	19	71		.2		a 1.270	.37	90	7	56	2.4	448	7.5	
Dec. 11-23	16			33	6.2	64		104	23	98		.5		a 1.322	.44	108	23	56	2.7	543	7.6	
Dec. 24-31	17			29	4.7	39		97	18	55		.2		a 1.244	.33	92	12	48	1.8	381	7.6	
Jan. 1-9, 1953	19			27	4.8	46		101	16	61		1.0		a 1.254	.35	87	4	53	2.1	392	7.5	
Jan. 10-13, 15-20	16			37	6.8	63		119	21	96		.8		a 1.335	.46	119	22	53	2.5	537	7.5	
Jan. 21-31	13			31	6.8	66		128	26	100		1.0		a 1.358	.49	130	26	52	2.5	577	7.4	
Feb. 1-10	14			33	6.5	49		87	23	61		2.0		a 1.297	.40	107	36	50	2.1	482	7.6	
Feb. 11-19	14			30	5.5	46		85	20	79		1.2		a 1.274	.37	97	38	52	2.1	433	7.6	
Feb. 20-28	14			30	5.5	44		94	13	66		1.0		a 1.267	.36	97	20	49	1.9	404	7.6	

a Sum of determined constituents.



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

LOCATION --At Lone Star Pumping Plant in Anahuac, Chambers County.  
RECORDS AVAILABLE --Chemical analyses: Short periods during summers of 1946 to 1949, daily records December 1949 to September 1953.  
EXTREMES, 1952-53. --Dissolved solids: Maximum, 16,200 ppm Oct. 21-31; minimum, 193 ppm Apr. 30, May 1-12, 15-16.  
Hardness: Maximum, 3,550 ppm Oct. 21-31; minimum, 84 ppm Apr. 30, May 1-12, 15-16.  
Specific conductance: Maximum daily, 28,400 micromhos Oct. 21-22; minimum daily, 210 micromhos May 5.  
EXTREMES, 1949-53. --Dissolved solids: Maximum daily, 16,200 ppm Oct. 21-31, 1952; minimum, 184 ppm Mar. 1-10, 1950.  
Hardness: Maximum, 3,550 ppm Oct. 21-31, 1952; minimum, 52 ppm Dec. 25-31, 1949.  
Specific conductance: Maximum daily, 28,400 micromhos Oct. 21-22, 1952; minimum daily, 210 micromhos May 5, 1953.  
REMARKS --Values reported for dissolved solids concentrations less than 1,000 ppm are residues on evaporation and for concentrations more than 1,000 ppm are sums of determined constituents unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. No discharge records available for this station.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonyl (CO <sub>2</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boiron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>	Percent sodium carbonate	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium				
Oct. 1-10, 1952.....		13		245	533	4,360	121		1,120	7,810			--		14,100	19.2		2,800	2,700	36	22,500	7.5
Oct. 11-18, 20.....		12		350	513	4,600	123		1,180	8,260			--		15,000	20.4		2,980	2,880	77	23,700	7.6
Oct. 21-31.....		13		263	704	4,860	126		1,290	8,990			--		16,200	22.0		3,550	3,450	35	25,600	7.7
Nov. 1-11.....		11		252	677	4,710	137		1,230	8,700			--		15,600	21.2		3,410	3,300	75	24,600	7.6
Nov. 12-18.....		12		208	396	3,160	163		850	5,670			--		10,400	14.1		2,150	2,010	76	17,000	7.7
Nov. 19-21, 25-29.....		11		102	111	1,060	167		301	1,810		8.5			3,490	4.75		711	574	17	6,210	7.9
Nov. 22-24, 27-28, 30.....		11		60	32	385	138		140	605		7.8			1,310	1.78		281	168	10	2,430	7.9
Dec. 1-3, 6-10.....		7.0		46	22	226	86		74	388		3.8			899	1.22		206	135	71	1,550	7.6
Dec. 4-5, 11-20.....		8.2		32	8.4	96	76		401	152		1.5			a401	.55		114	52	65	3.9	7.6
Dec. 21-29, 31.....		10		30	8.4	97	68		36	160		3.0			a408	.55		110	54	66	4.0	7.6
Jan. 1-10, 1953.....		9.0		28	8.2	94	64		39	157		1.7			a399	.54		104	51	66	4.0	7.5
Jan. 11-20.....		8.6		27	7.5	88	66		27	147		1.2			a388	.53		98	44	66	3.9	7.4
Jan. 21-31.....		9.6		32	8.3	93	78		34	153		1.2			a421	.57		114	50	64	3.8	7.4

Feb. 1-10, 1953.....	12	98	9.5	35	34	163	1.8	397	54	126	54	63	3.8	760	7.4
Feb. 11-19.....	11	85	8.0	34	32	180	1.5	386	52	118	48	64	3.9	741	7.5
Feb. 20-28.....	9.6	97	7.9	30	26	181	1.2	370	.50	108	45	66	4.1	705	7.3
Mar. 1-2, 6, 9-14, 28.....	11	202	66	22	352	352	2.5	a 736	1.00	136	82	76	7.5	1,330	7.3
Mar. 3.....	11	396	54	24	700	700	6.0	1,240	1.69	201	157	81	12	2,350	7.7
Mar. 15-16, 26-27.....	14	77	6.6	41	108	108	3.8	351	.48	130	36	56	2.9	639	7.6
Mar. 17-25.....	14	29	4.5	32	30	35	3.8	194	.26	98	21	39	1.3	351	7.6
Apr. 1-13, 15.....	17	80	6.8	49	56	116	4.5	a 400	.54	150	50	54	2.9	694	7.8
Apr. 16, 18-22, 24-27.....	14	138	9.8	58	74	202	6.3	a 599	.81	185	67	62	4.4	1,050	8.0
Apr. 28.....	8.8	1,650	112	101	429	2,900	--	5,330	7.25	1,040	946	78	22	8,990	8.0
Apr. 14, 17, 29.....	10	599	66	62	176	1,020	6.0	2,000	2.72	426	324	75	13	3,680	7.7
Apr. 23.....	11	235	148	61	102	378	5.4	a 962	1.31	255	134	87	6.4	1,620	8.2
Apr. 30, May 1-12, 15-16.....	9.8	22	3.5	28	21	27	2.5	a 193	.26	84	14	36	1.0	280	7.7
May 13-14, 17-22.....	9.6	171	92	42	31	295	4.0	a 685	.93	154	79	71	6.0	1,210	7.7
May 23-31.....	8.8	107	8.7	30	21	186	2.0	a 452	.61	111	54	68	4.4	791	7.4
June 1-8.....	22	103	7.9	34	21	166	1.8	a 444	.60	118	33	66	4.1	758	8.2
Aug. 3, 6-7, 11-17.....	20	178	14	42	38	290	1.0	a 693	.94	162	64	70	6.1	1,230	8.1
Aug. 4-5, 8-13, 30-31.....	20	135	9.2	44	36	209	1.2	a 555	.75	148	40	66	4.8	964	8.1
Aug. 16, 20, 22, 26-29.....	16	484	50	56	117	830	1.8	1,620	2.20	345	241	75	11	3,000	7.9
Aug. 23-25.....	15	1,060	119	88	263	1,860	1.5	3,470	4.72	706	602	76	17	6,190	8.0
Sept. 1-9, 16.....	21	95	4.8	31	40	119	1.0	a 394	.54	97	5	68	4.2	654	8.1
Sept. 10-15, 17-21.....	22	127	7.3	42	51	180	.5	a 518	.70	135	32	67	4.7	898	8.0
Sept. 22-24, 26, 29-30.....	20	564	58	66	161	960	.5	5,890	2.57	403	284	75	12	3,500	7.9
Sept. 25, 27-28.....	19	1,750	207	109	446	3,060	--	5,680	7.72	1,120	1,010	77	23	9,910	7.8

a Residue at 180°C.

## TRINITY RIVER BASIN--Continued

## TRINITY BAY AT MOUTH OF TRINITY RIVER NEAR ANAHUAC, TEX.

LOCATION.--At seven sampling stations in Trinity Bay opposite mouth of Trinity River, near Anahuac, Chambers County, Station 1-- In upper reaches of New Navigation Channel at Ft. Anahuac. Station 2-- In Anahuac Channel immediately below delta, about half a mile west of Station 1. Station 3-- In Anahuac Channel about 1 1/2 miles southwest of Station 2. Station 4-- In Trinity Bay at mid-point between Station 3 and New Navigation Channel. Station 5-- In Trinity Bay at mid-point between Ash Point and South end of Anahuac Channel. Station 6-- In Anahuac Channel at south end. Station 7-- In Trinity Bay about 1 1/2 miles west of Station 6.

RECORDS AVAILABLE.--Chemical analyses: Biweekly October 1950 to September 1953.

Station Number	Specific conductance (micromhos at 25°C) and chloride in parts per million, water year October 1952 to September 1953					
	Specific Conductance	Chloride	Specific Conductance	Chloride	Specific Conductance	Chloride
	Oct. 1, 1952		Oct. 8, 1952		Oct. 15, 1952	
1 Top.....	28,300	10,200	28,500	10,200	29,300	10,800
1 Bottom.....	28,300	10,300	28,500	10,200	29,300	10,700
2 Top.....	23,300	8,280	23,600	8,330	24,400	8,580
2 Bottom.....	24,300	8,770	25,600	9,580	27,700	10,100
3 Top.....	23,500	8,430	23,600	8,430	28,600	10,400
3 Bottom.....	24,800	8,940	27,200	9,830	29,300	10,800
4 Shallow.....	24,600	8,970	26,800	9,630	28,600	10,500
4 Bottom.....	24,600	8,940	26,800	9,600	28,600	10,500
5 Shallow.....	--	--	27,000	9,780	28,600	10,600
5 Bottom.....	25,000	9,140	27,000	9,880	31,200	11,500
6 Top.....	24,500	8,970	26,800	9,780	28,600	10,500
6 Bottom.....	24,500	9,220	26,800	9,980	30,900	11,500
7 Top.....	24,500	9,220	26,800	9,980	30,900	11,500
7 Bottom.....	24,500	9,220	26,800	9,980	30,900	11,500
	Oct. 29, 1952		Nov. 12, 1952		Nov. 19, 1952	
1 Top.....	28,800	10,400	28,500	10,400	28,400	9,420
1 Bottom.....	28,800	10,400	28,500	10,400	28,400	9,420
2 Top.....	26,200	9,480	26,200	9,480	26,200	9,480
2 Bottom.....	26,200	9,480	26,200	9,480	26,200	9,480
3 Top.....	27,900	10,800	28,300	10,800	28,300	10,800
3 Bottom.....	28,300	10,800	28,300	10,800	28,300	10,800
4 Shallow.....	28,300	10,800	28,300	10,800	28,300	10,800
4 Bottom.....	28,300	10,800	28,300	10,800	28,300	10,800
5 Shallow.....	28,300	10,800	28,300	10,800	28,300	10,800
5 Bottom.....	28,300	10,800	28,300	10,800	28,300	10,800
6 Top.....	28,300	10,800	28,300	10,800	28,300	10,800
6 Bottom.....	28,300	10,800	28,300	10,800	28,300	10,800
7 Top.....	28,300	10,800	28,300	10,800	28,300	10,800
7 Bottom.....	28,300	10,800	28,300	10,800	28,300	10,800
	Dec. 3, 1952		Dec. 10, 1952		Dec. 17, 1952	
1 Top.....	10,100	3,220	11,300	3,570	11,100	3,590
1 Bottom.....	24,500	8,770	11,300	3,670	11,000	3,620
2 Top.....	1,820	415	362	55	468	62
2 Bottom.....	1,820	435	389	64	468	66
3 Top.....	1,740	415	394	66	468	71
	Dec. 24, 1952		Dec. 31, 1952		Dec. 31, 1952	
1 Top.....	12,500	4,110	12,500	4,110	12,500	4,110
1 Bottom.....	12,300	4,140	12,300	4,140	12,300	4,110
2 Top.....	669	102	669	102	669	102
2 Bottom.....	665	105	665	105	665	105
3 Top.....	679	107	679	107	679	107









TRINITY RIVER BASIN--Continued

MISCELLANEOUS ANALYSES OF STREAMS IN TRINITY RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal-cium (Ca)	Mag-nesium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Car-bonate (CO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> ) (B)	Dissolved solids (residue at 180° C)		Hardness as CaCO <sub>3</sub>		Per-cent so-sol-uble	So-dium adsorp-tion ratio	Specific conductance (micro-mhos at 25° C)	pH
														Parts per million	Tons per acre-foot	Calcium magnesium	Non-carbonate				

EAGLE MOUNTAIN LAKE NEAR FORTH WORTH

Aug. 3, 1953	--	--	--	--	--	--	--	146	--	--	24	--	--	--	--	126	--	--	--	350	7.9
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LAKE WORTH NEAR FORTH WORTH

Dec. 16, 1952	--	7.0	0.01	38	8.1	21	3.7	153		18	25	0.5	0.2	0.28	204	0.28	128	3	26	0.8	8.0
Jan. 12, 1953	--	3.0	.00	41	7.8	20	4.5	157		18	24	3	5.13	206	28	.28	134	6	24	.8	352
Apr. 25	--	7.2	.00	42	8.2	21	4.3	163		19	26	.4	.0	212	.29	.29	138	5	24	.8	373
June 2	--	--	--	--	--	--	--	162		--	25	--	--	--	--	--	140	--	--	--	374
																					7.8

TRINITY RIVER AT NORTH MAIN STREET BRIDGE IN FORTH WORTH

May 25, 1953	--	11	.01	70	6.8	31	5.1	211		45	34	.5	4.7	.18	312	0.29	202	30	24	0.9	553	7.1
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TRINITY RIVER 8.7 MILES UPSTREAM FROM LIBERTY

Nov. 1, 1952	229	--	--	--	--	--	--	249	--	--	345	--	--	--	--	--	220	--	--	--	1,670	8.2
Nov. 2	228	--	--	--	--	--	--	248	--	--	378	--	--	--	--	--	225	--	--	--	1,760	8.2
Nov. 8	235	--	--	--	--	--	--	238	--	--	455	--	--	--	--	--	218	--	--	--	1,970	8.2

## SAN JACINTO RIVER BASIN

## SAN JACINTO RIVER NEAR HUFFMAN, TEX.

LOCATION.--At Sheldon pumping plant of City of Houston, 5½ miles downstream from Huffman gaging station at Beaumont, Sour Lake & Western Railway bridge, 0.4 mile downstream from confluence of East and West Forks, and 3.4 miles southwest of Huffman, Harris County.

DRAINAGE AREA.--2,791 square miles (above gaging station).

RECORDS AVAILABLE.--Chemical analyses: September 1945 to September 1953.

Water temperatures: January 1949 to September 1953.

EXTREMES, 1952-53.--Dissolved solids: Maximum, 360 ppm Oct. 11-20; minimum, 60 ppm Apr. 30, May 1-7, 14-20.

Hardness: Maximum, 100 ppm Apr. 11-24; minimum, 26 ppm Apr. 30, May 1-7, 14-20.

Specific conductance: Maximum daily, 780 micromhos Nov. 28; minimum daily, 85.1 micromhos May 1.

Water temperatures: Maximum observed, 90° F June 22, 24, 26, Aug. 12; minimum observed, 40° F Jan. 18.

EXTREMES, 1945-53.--Dissolved solids: Maximum, 2,820 ppm Nov. 21-23, 28, 1951; minimum, 44 ppm Oct. 4-10, 1949.

Hardness: Maximum, 566 ppm Nov. 21-23, 28, 1951; minimum, 16 ppm Oct. 4-10, 1949.

Specific conductance: Maximum daily, 6,340 micromhos Nov. 23, 1951; minimum daily, 78.9 micromhos Sept. 1, 1945.

Water temperatures: Maximum observed, 92° F July 3, 1952; minimum observed, freezing point Feb. 2, 1951.

REMARKS.--Values reported for dissolved solids are sums of 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 Huffman for water year October 1952 to September 1953 given in WSP 1282. 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, 1952 to September, 1953																					
Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids (sum)			Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	Color	
													Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
Oct. 1-10, 1952...	58.1	20	23	23	5.5	87		81	4.9	140		0.8	328	0.45	51.5	80	14	70	4.2	596	7.5
Oct. 11-20 .....	53.8	16	24	24	5.0	101		78	4.7	164		.8	360	.49	52.3	80	16	73	4.9	678	7.4
Oct. 21-31 .....	51.3	15	23	23	5.5	94		72	5.8	155		.5	344	.47	47.6	80	21	72	4.6	640	7.6
Nov. 1-8, 11 .....	75.7	15	23	23	4.7	94		71	4.8	154		1.2	343	.47	70.1	77	19	73	4.7	615	7.6
Nov. 9-10, 12-26 .....	172	13	15	15	4.6	72		61	7.4	109		1.2	252	.34	117	56	6	73	4.1	469	7.4
Nov. 27-30 .....	218	13	20	20	5.7	99		58	6.6	166		.8	340	.46	200	74	26	75	5.0	646	7.4
Dec. 1-4, 21-22, 28-30 .....	446	15	22	22	4.9	80		59	7.6	135		1.0	295	.40	355	75	27	70	4.0	565	7.3
Dec. 5-9, 23, 31 .....	1,060	9.6	13	13	3.1	29		38	5.5	50		1.8	131	.18	375	45	14	58	1.9	257	7.2
Dec. 10-20, 24-27 .....	235	15	19	19	4.2	49		56	8.4	82		1.2	207	.28	131	66	19	62	2.6	397	7.2
Jan. 1-8, 26-27, 1953 .....	1,209	11	13	13	3.0	31		42	6.3	49		1.8	136	.18	444	45	10	60	2.0	246	7.2
Jan. 9-19, 28 .....	226	15	22	22	4.2	52		64	8.8	88		1.0	222	.30	135	70	20	61	2.7	410	7.4
Jan. 20-25, 29-31 .....	508	14	23	23	4.5	66		66	8.9	111		.8	260	.35	357	76	22	66	3.3	483	7.4

a Residue at 180° C.

Feb. 1-2, 22-28, 1953	3,810	9.6	15	2.5	*	23	44	6.5	39	1.0	119	0.16	1,220	48	12	52	1.5	219	7.1
Feb. 3-4, 8-15, 17-20	536	15	22	3.5	48	48	61	8.6	80	1.2	208	.28	301	69	19	60	2.5	380	7.4
Feb. 5-7, 13-16, 21	785	15	24	4.8	63	65	65	8.7	108	1.5	237	.35	531	80	26	63	3.0	481	7.3
Mar. 1-9, 21	988	16	21	4.1	29	59	59	8.6	52	1.2	161	.22	429	69	21	47	1.5	296	7.5
Mar. 10-19	632	19	27	4.4	44	74	74	8.8	78	1.0	218	.30	372	85	25	53	2.1	404	7.5
Mar. 20, 22-31	362	18	29	4.5	37	84	84	7.8	67	1.0	205	.28	200	91	22	47	1.7	384	7.7
Apr. 1-10	193	20	29	4.6	54	85	85	8.3	92	1.0	251	.34	131	91	22	56	2.4	469	7.7
Apr. 11-24	146	17	31	5.4	59	89	89	6.8	104	.8	a280	.38	110	100	27	56	2.6	510	7.7
Apr. 25-29	2,300	8.2	8.4	2.8	25	29	29	5.5	40	2.0	106	.14	658	32	9	53	1.9	202	6.9
Apr. 30, May 1-7	18,190	6.6	8.8	1.1	8.2	2.5	28	4.0	12	2.5	60	.08	2,950	26	4	38	.7	103	7.3
May 8-10, 21-25	7,592	9.4	13	2.4	11	42	42	4.9	16	2.0	92	.11	1,880	42	8	38	.7	180	7.4
May 11-15, 26-31	1,524	14	20	3.3	23	61	61	8.1	38	2.0	138	.19	568	63	13	44	1.3	280	7.1
June 1-10	354	23	27	4.9	38	87	87	8.9	62	2.0	a237	.32	227	88	16	49	1.8	361	7.7
June 11-20	297	23	26	5.1	47	84	84	8.8	78	1.5	a249	.34	200	86	17	54	2.2	406	7.9
June 21-28	192	24	27	4.7	46	90	90	7.2	75	1.0	a244	.33	126	87	14	54	2.2	402	8.0
June 29-30, July 1-5	706	11	12	2.5	22	44	44	6.3	31	2.5	109	.15	208	40	4	54	1.5	188	7.4
July 6-10	202	18	19	4.0	45	64	64	8.4	71	2.0	188	.27	108	64	12	61	2.5	355	7.9
July 11-19	136	18	26	4.7	56	84	84	7.7	91	1.0	a268	.36	98.4	84	16	59	2.7	450	7.8
July 20-31	163	17	25	5.0	60	83	83	6.5	98	1.5	a274	.37	121	83	15	61	2.9	471	8.1
Aug. 1-2, 11-20	128	23	23	2.6	61	79	79	5.5	91	1.5	a259	.35	88.5	68	3	66	3.2	430	7.6
Aug. 3-10	141	19	15	4.8	38	49	49	4.4	67	1.5	174	.24	66.2	57	17	59	2.2	313	7.4
Aug. 21-31	230	22	20	3.1	62	66	66	9.6	95	2.0	a273	.37	170	63	9	69	3.5	438	7.5
Sept. 1-4, 8-16	432	20	18	3.7	37	62	62	6.5	86	3.0	174	.24	203	60	9	57	2.1	306	7.4
Sept. 5-7, 24-30	237	22	22	3.2	58	78	78	6.0	88	1.2	a262	.36	168	68	4	65	3.1	423	7.5
Sept. 17-23	106	22	23	3.2	50	78	78	5.8	76	1.5	220	.30	163.0	71	7	60	2.6	388	7.5
Weighted average	1,372	9.4	13	2.1	20	39	39	5.2	30	2.1	102	0.14	378	41	9	51	1.4	181	--

a Residue at 180° C.

## SAN JACINTO RIVER BASIN--Continued

## SAN JACINTO RIVER NEAR HUFFMAN, TEX.--Continued

Temperature (°F) of water, water year October 1952 to September 1953  
 [Once-daily temperature measurement usually at 9 a. m. (Oct. -June); 3 p. m. (July-Sept.)]

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

## BRAZOS RIVER BASIN

## CLEAR FORK BRAZOS RIVER AT NUGENT, TEX.

LOCATION.--At gaging station at county road bridge in Nugent, Jones County, 4 miles upstream from Deadman Creek.

DRAINAGE AREA.--2,220 square miles.

RECORDS AVAILABLE.--Chemical analyses: August 1948 to September 1953.

Water temperatures: August 1948 to September 1953.

EXTREMES, 1952-53.--Dissolved solids: Maximum, 1,330 ppm Feb. 11-22; minimum, 179 ppm July 15-22.

Hardness: Maximum, 610 ppm Feb. 1-10; minimum, 110 ppm July 15-22.

Specific conductance: Maximum daily, 2,620 micromhos Mar. 7; minimum observed, 39° F Jan. 16.

Water temperatures: Maximum observed, 93° F Aug. 8; minimum observed, 39° F Jan. 16.

EXTREMES, 1948-53.--Dissolved solids: Maximum, 3,910 ppm Mar. 21-31, 1949; minimum, 158 ppm Sept. 15-16, 1949.

Hardness: Maximum, 1,520 ppm Feb. 11-19, 1951; minimum, 89 ppm Sept. 15-16, 1949.

Specific conductance: Maximum daily, 6,260 micromhos May 29, 1952; minimum daily, 215 micromhos May 27, 1950.

Water temperatures: Maximum observed, 95° F Aug. 16, 1952; minimum observed, freezing point, Jan. 29, 1949.

REMARKS.--Values reported for dissolved solids concentrations less than 1,000 ppm are residues on evaporation and for concentrations more than 1,000 ppm are sums of determined constituents unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex.

Records of discharge for water year October 1952 to September 1953 given in WSP 1282.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (residue at 180° C)		Hardness as CaCO <sub>3</sub>		Percent sodium carbonate	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	Color	
														Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate						
Oct. 1-3, 11, 1952	a 0	15		92	24		117	132	233	160		7.8		767	1.04	--	328	220	44	2.8	1,170	7.9	
Oct. 18, 25, Nov. 1-9	a .13	22		102	55	194		191	287	315		4.2		41,070	1.46	0.38	480	324	47	3.9	1,810	8.1	
Nov. 10-20	29.3	9.6		52	9.9	22		90	103	25		2.8		294	.40	23.3	170	97	22	.7	446	7.7	
Nov. 21-30	16.7	9.8		54	15	51		114	99	77		1.8		406	.55	18.3	196	102	36	1.6	633	7.8	
Dec. 1-10	1.20	10		55	19	62		134	103	94		1.5		455	.62	1.47	215	105	39	1.8	717	7.9	
Dec. 11-20	5.98	13		64	27	87		174	121	135		1.0		586	.80	9.46	270	126	41	2.3	928	8.0	
Dec. 21-31	1.25	10		94	32	105		163	223	160		3.5		773	1.05	2.61	366	232	38	2.4	1,170	8.0	
Jan. 1-10, 1953	.11	12		116	47	135		193	319	200		4.3		953	1.30	2.83	483	325	38	2.7	1,550	8.1	
Jan. 11-20	.10	8.0		112	59	170		195	342	265		1.2		41,050	1.43	.28	522	362	41	3.2	1,730	8.1	
Jan. 21-31	.10	7.0		108	68	204		196	357	325		1.0		41,170	1.59	.32	549	388	45	3.8	1,940	8.1	

a. Flow less than 0.05 cfs Oct. 1-31, Nov. 1-4, Apr. 19-22, May 1-10, 27-31, June 1-29, July 6-14, 27, Aug. 14-17, Sept. 9-30.

d Sum of determined constituents.

BRAZOS RIVER BASIN--Continued  
CLEAR FORK BRAZOS RIVER AT NUGENT, TEX.--Continued

Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Bo-ron (B)	Dissolved solids (residue at 180° C)		Hardness as CaCO <sub>3</sub>		Per-centage sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH	Col- or	
														Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate					
Feb. 1-10, 1953...	0.13	7.6		114	79		238	225	370	395		0.8		d1,320	1.80	0.46	610	425	46	2,190	8.0	
Feb. 11-26.....	.22	12		82	86		262	131	353	436		4.0		d1,330	1.81	.79	558	430	4.8	2,230	8.2	
Mar. 1-8, 13, 18.....	.86	12		92	73		258	178	370	395		4.0		d1,290	1.75	3.00	530	364	91	2,160	8.2	
Mar. 9-12, 19-20.....																						
Mar. 21-26.....	4.49	8.2		86	34		132	b194	176	174		5.0		751	1.02	9.10	304	154	49	3.3	1,190	8.4
	.23	8.8		68	22		120	158	97	168		4.0		570	.78	.35	210	81	55	3.6	988	8.2
Apr. 1-10.....	.21	12		68	46		160	b214		255		3.5		855	1.16	.48	358	192	49	3.7	1,450	8.4
Apr. 11-20.....	a.09	17		78	55		194	a244	191	312		4.0		d971	1.32	.24	420	220	50	4.1	1,700	8.4
Apr. 21-30.....	a.08	17		80	63		221	b254	212	360		3.0		d1,080	1.47	.23	458	250	51	4.5	1,890	8.3
May 1-10.....		18		78	71		245	252	230	405		3.0		d1,170	1.59	---	488	280	52	4.8	2,070	8.2
May 11-15.....	17.2	12		72	27		106	121	146	191		2.0		704	.96	32.7	290	192	44	2.7	1,100	7.8
May 16-23.....	77.0	21		34	8.5		26	129	29	27		4.2		d213	.29	44.3	120	14	32	1.0	349	8.2
May 24-26.....	.1	19				29	6.8	154	37	49		4.2		284	.39	.08	154	28	28	1.0	463	8.1
May 29.....	a.0	--		--	--	--	--	166	--	75		--		--	--	--	190	54	--	--	591	8.2
June 7.....	a.0	--		--	--	--	--	b186	--	215		--		--	--	--	290	138	--	--	1,170	8.4
June 14.....	a.0	--		--	--	--	--	b162	--	164		--		--	--	--	228	96	--	--	937	8.2
June 21.....	a.0	--		--	--	--	--	b197	--	228		--		--	--	--	290	128	--	--	1,220	8.3
June 29.....	a.0	--		--	--	--	--	b199	--	278		--		--	--	--	332	169	--	--	1,410	8.4
June 30, July 1-5.....	17.2	13		31	11		31	121	30	41		2.5		231	.31	10.7	123	23	36	1.2	395	7.8
July 13.....	a.0	--		--	--	--	--	156	--	83		--		--	--	--	172	44	--	--	602	8.2
July 15-22.....	203	14		32	7.3		15	111	22	17		4.7		179	.24	98.1	110	19	22	.6	301	8.1
July 23-31.....	a2.36	18		35	9.4		21	139	27	20		2.8		212	.29	1.35	126	12	27	8.1	349	8.1
Aug. 1-10.....	2.29	19		48	15		36	168	56	44		2.8		317	.43	1.96	182	44	30	1.2	525	8.2
Aug. 11-18.....	a6.42	22		54	15		33	160	81	35		4.0		343	.47	5.97	196	65	27	1.0	522	8.2
Aug. 21-31, Sept. 1-3.....	30.5	19		49	11		45	134	72	56		2.2		340	.46	28.0	168	58	37	1.5	545	8.1
Aug. 19-20, Sept. 4-8.....	136	15		40	9.5		22	139	34	26		2.0		234	.32	85.9	139	25	26	.8	366	8.1
Sept. 13.....	a.0	--		--	--	--	--	173	--	--		--		--	--	--	174	32	--	--	509	8.2
Sept. 20.....	a.0	--		--	--	--	--	145	--	56		--		--	--	--	155	36	--	--	526	8.1
Weighted average	12.4	15		40	10		29	124	48	37		3.4		260	.35	8.7	141	40	31	1.1	419	--

a Flow less than 0.05 cfs Oct. 1-31, Nov. 1-4, Apr. 19-22, May 1-10, 27-31, June 1-29, July 6-14, 27, Aug. 14-17, Sept. 9-30.

b Includes equivalent of 5 ppm of carbonate (CO<sub>3</sub>).

c Includes equivalent of 7 ppm of carbonate (CO<sub>3</sub>).

d Sum of determined constituents.

## BRAZOS RIVER BASIN--Continued

## CLEAR FORK BRAZOS RIVER AT NUGENT, TEX.--Continued

Temperature (°F) of water, water year October 1952 to September 1953

/Once-daily temperature measurement usually after 5 p. m. 7

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

## BRAZOS RIVER BASIN--Continued

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

LOCATION: --Immediately below dam on Brazos River, 2.6 miles upstream from Loving Creek, 11.3 miles southwest of Graford, Palo Pinto County, and 20 miles upstream from gaging station near Palo Pinto.

DRAINAGE AREA: 2,550 square miles, approximately of which 9,240 square miles is probably noncontributing.

RECORDS AVAILABLE: --Chemical analyses: January 1942 to September 1953.

EXTREMES: 1952-53: --Dissolved solids (Mg): maximum, 1,710 ppm June 1-30; minimum, 1,480 ppm Sept. 1-30.

Hardness: 1952-53: --Dissolved solids (Mg): maximum, 1,710 ppm June 1-30; minimum, 1,480 ppm Sept. 1-30.

Specific conductance: 1952-53: --Dissolved solids (Mg): maximum, 1,710 ppm June 1-30; minimum, 1,480 ppm Sept. 1-30.

Water temperatures: Maximum observed, 74°F on several days during July; minimum observed, 50°F on many days during January, February, and March.

EXTREMES: 1942-53: --Dissolved solids: Maximum, 2,130 ppm Feb. 2-9, 1942; minimum, 829 ppm Sept. 1-10, 1942.

Hardness: Maximum, 661 ppm Feb. 2-9, 1942; minimum, 318 ppm Dec. 21-31, 1942.

Specific conductance: Maximum daily, 3,750 microhos June 11, 1942; minimum daily, 1,100 microhos June 20, 1942.

Water temperatures (1949-53): Maximum observed, 76°F Sept. 27-30, 1950; minimum observed, 45°F on several days in February 1951.

REMARKS: --Values reported for dissolved solids are sums of determined constituents. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for gaging station near Palo Pinto for water year October 1952 to September 1953 given in WSP 1282. No appreciable inflow between dam and gaging station except during periods of heavy local rains.

## Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boiron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (microhm-cm at 25°C)	pH	
															Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate					
Oct. 1-31, 1952.....	22.6	13		148	28	367		140		301	605	--	1.8		1,530	2.08	93	484	370	62	7.2	2,620	7.3
Nov. 1-30.....	34.1	18		152	27	401		129		327	648	--	1.5		1,640	2.23	151	490	384	64	7.9	2,770	7.6
Dec. 1-31.....	50.8	16		154	30	400		125		341	650	--	4.8		1,660	2.26	228	508	405	63	7.7	2,820	7.5
Jan. 1-31, 1953.....	25.7	11		156	30	403		127		330	665	--	4.4		1,660	2.26	115	512	408	63	7.8	2,850	7.7
Feb. 1-28.....	13.8	11		159	31	404		129		338	668	--	4.5		1,680	2.28	63	524	418	63	7.7	2,880	7.7
Mar. 1-31.....	24.5	11		157	31	397		129		339	652	--	4.0		1,650	2.24	109	519	413	62	7.6	2,870	7.6
Apr. 1-30.....	36.5	13		158	30	405		131		345	660	--	2.5		1,680	2.28	166	518	410	63	7.7	2,910	7.7
May 1-31.....	113	12		159	31	406		132		355	658	0.4	1.0		1,690	2.30	516	524	416	63	7.7	2,910	7.6
June 1-30.....	334	14		158	31	417		137		344	678	3	1.0		1,710	2.33	1,540	522	409	63	8.0	2,940	7.6
July 1-31.....	632	13		158	30	411		132		340	672	3	8		1,690	2.30	2,880	518	410	63	7.8	2,890	7.7
Aug. 1-31.....	580	14		154	26	379		129		314	625	--	8		1,580	2.15	2,520	491	386	63	7.4	2,740	7.6
Sept. 1-30.....	748	13		139	29	356		127		295	568	--	8		1,480	2.01	2,990	466	362	62	7.2	2,570	7.4
Weighted average..	220	13		152	29	388		130		322	636	--	1.0		1,610	2.19	956	498	392	63	7.5	2,770	--

## BRAZOS RIVER BASIN--Continued

BRAZOS RIVER AT POSSUM KINGDOM DAM NEAR GRAFORD, TEX.--Continued

Temperature (°F) of water, water year October 1952 to September 1953

Once-daily temperature measurement usually before 9 a. m./

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

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

LOCATION --At Whitney Dam, on State Highway 22, 3.4 miles upstream from gaging station which is 1.0 mile downstream from Coon Creek, 7.5 miles south of Whitney, Hill County, and at mile 439.

DRAINAGE AREA --26,190 square miles, approximately above gaging station, of which 9,240 square miles is probably noncontributing.

RECORDS AVAILABLE --Chemical analyses: October 1947 to May 1948, October 1948 to September 1953.

Water temperatures: October 1947 to May 1948, October 1948 to September 1953.

EXTREMES, 1952-53 -- Dissolved solids: Maximum, 1,160 ppm Oct. 21-31, Nov. 1-10; minimum, 547 ppm June 21-30.

Hardness: Maximum, 393 ppm Nov. 11-20; minimum, 190 ppm July 11-20.

Specific conductance: Maximum daily, 2,100 micromhos Oct. 21; minimum daily, 865 micromhos July 27, 28.

Water temperatures: Maximum observed, 84°F on several days during July and August; minimum observed, 40°F Jan. 17.

EXTREMES, 1947-53 -- 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 observed, 87°F July 12, 1949; minimum observed, freezing point, Jan. 28-29, 1948.

REMARKS --Values reported for dissolved solids concentrations less than 1,000 ppm are residues on evaporation and for concentrations more than 1,000 ppm are sums of 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 1952 to September 1953 given in WSP 1282.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boiron (B)	Dissolved solids (Residue at 180° C)		Hardness as CaCO <sub>3</sub>		Percent sodium	Specific conductance (micro-mhos at 25° C)	pH		
															Parts per million	Tons per acre-foot	Calcium	Non-carbonate					
Oct. 1-10, 1952.....	65.5	8.8		112	23	251		154		205	408	--	5.9		1,090	1.48	193	374	248	59	5.6	1,910	7.8
Oct. 11-20.....	34.8	8.4		118	23	265		147		238	428	--	4.0		1,150	1.56	108	389	268	60	5.8	1,980	7.7
Oct. 21-31.....	4.02	9.9		118	23	268		150		232	428	--	4.5		1,160	1.58	12.6	389	268	60	5.9	1,990	7.8
Nov. 1-10.....	42.9	8.8		120	22	269		151		233	430	--	2.5		1,160	1.58	134	390	266	60	5.8	2,020	7.8
Nov. 11-20.....	48.5	7.1		118	24	265		157		222	430	--	3.5		1,150	1.56	141	393	264	59	5.8	2,010	7.8
Nov. 21-30.....	36.8	5.8		118	22	262		162		216	422	--	4.0		1,130	1.54	112	385	252	60	5.8	1,990	7.8
Dec. 1-10.....	15.1	7.5		114	22	248		142		219	402	--	4.0		1,090	1.48	44.4	375	258	59	5.6	1,920	8.0
Dec. 11-20.....	70.0	6.0		102	21	221		133		192	360	--	4.8		a972	1.32	184	341	232	58	5.2	1,740	7.8
Dec. 21-31.....	26.5	5.8		92	18	190		123		170	310	--	2.2		902	1.23	64.5	304	202	58	4.7	1,530	7.9
Jan. 1-10, 1953.....	15.5	8.4		84	16	175		124		149	280	--	5.1		824	1.12	34.5	276	174	58	4.6	1,380	7.9
Jan. 11-20.....	8.78	7.4		82	15	168		122		141	270	--	5.5		792	1.08	18.8	266	166	58	4.5	1,330	7.9
Jan. 21-31.....	5.89	6.3		82	15	168		122		143	268	--	5.0		774	1.05	12.3	266	166	58	4.5	1,320	7.9

a Sum of determined constituents.

Feb. 1-10, 1953	7.79	166	126	140	270	--	2.2	781	1.06	16.4	270	168	57	4.4	1,310	7.9
Feb. 11-19	30.7	164	128	143	265	--	2.2	766	1.04	63.5	270	168	57	4.3	1,300	7.8
Feb. 20-28	27.9	162	128	141	265	--	2.0	771	1.05	58.1	273	170	56	4.2	1,300	7.8
Mar. 1-10	41.0	160	131	137	250	--	4.8	786	1.07	87.0	258	150	57	4.3	1,300	8.1
Mar. 11-20	30.6	162	128	136	250	--	4.8	777	1.06	64.2	249	146	59	4.5	1,290	8.0
Mar. 21-31	10.2	160	126	136	250	--	4.5	778	1.06	21.4	253	150	58	4.4	1,290	8.0
Apr. 1-10	6.72	155	131	138	242	--	4.0	767	1.04	13.9	260	152	56	4.2	1,280	7.6
Apr. 11-20	3.85	150	133	136	240	--	3.0	769	1.05	7.99	268	157	55	4.0	1,280	7.6
Apr. 21-30	27.0	152	136	139	238	--	5.4	770	1.02	56.1	266	154	55	4.1	1,260	7.7
May 1-10	9.98	144	136	131	230	0.2	1.5	748	1.02	1.98	262	150	54	3.9	1,250	8.0
May 11-20	92.1	139	138	125	218	.2	2.0	705	.96	175	250	138	55	3.8	1,180	8.0
May 21-31	11.8	136	159	113	182	.3	2.5	623	.85	19.8	212	82	58	4.1	1,080	8.2
June 1-10	98.1	129	136	109	202	--	2.2	616	.84	163	232	120	55	3.7	1,080	8.2
June 11-20	346	118	143	98	185	--	1.2	567	.77	530	224	108	53	3.4	1,010	8.1
June 21-30	808	112	143	93	178	--	1.2	547	.74	1,190	222	105	52	3.3	985	8.0
July 1-10	346	108	149	90	170	--	1.2	591	.80	552	222	100	51	3.2	966	8.1
July 11-20	848	126	195	93	145	--	2.0	571	.78	310	190	30	59	4.0	975	8.2
July 21-31	315	105	154	87	165	--	1.2	583	.79	496	222	96	51	3.1	975	8.0
Aug. 1-10	621	132	150	109	210	--	1.5	a 627	.85	1,050	246	134	54	3.7	1,150	8.1
Aug. 11-20	581	143	153	116	225	--	1.0	a 662	.90	1,040	254	128	55	3.9	1,200	8.1
Aug. 21-31	115	154	149	122	240	--	1.0	711	.97	221	253	131	57	4.2	1,230	7.8
Sept. 1-10	9.4	158	140	132	258	--	1.2	a 727	.99	198	273	158	56	4.1	1,310	7.8
Sept. 11-20	109	159	140	128	255	--	2.0	750	1.02	221	262	148	57	4.3	1,280	7.9
Sept. 21-30	110	173	146	137	275	--	2.0	a 770	1.05	229	276	156	58	4.5	1,360	7.8
Weighted average	141	137	154	112	209	--	1.8	651	0.89	248	239	113	55	3.8	1,140	--

a Sum of determined constituents.

## BRAZOS RIVER BASIN--Continued

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

Temperature (°F) of water, water year October 1952 to September 1953

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

## BRAZOS RIVER BASIN--Continued

## LEON RIVER NEAR EASTLAND, TEX.

LOCATION.--At bridge on county road, 4.2 miles upstream from Colony Creek, 6.2 miles downstream from Texas Electric Service Company dam forming Olden Lake, and 6.6 miles southeast of Eastland, Eastland County.

RECORDS AVAILABLE.--279 square miles.

WATER TEMPERATURES.--Chemical analyses: September 1950 to September 1953.

EXTREMES, 1952-53.--Dissolved solids: Maximum, 259 ppm Apr. 6, 8-9; minimum, 77 ppm Nov. 24-26, 28-29.

HARDNESS: Maximum, 152 ppm Apr. 6, 8-9; minimum, 66 ppm Sept. 3-6.

SPECIFIC CONDUCTANCE: Maximum daily, 457 microhos Apr. 9; minimum daily, 102 microhos Sept. 3.

EXTREMES, 1950-53.--Dissolved solids: Maximum, 316 ppm Jan. 21-31, Feb. 1-10, 1951; minimum, 77 ppm Nov. 24-26, 28-29, 1952.

HARDNESS: Maximum, 200 ppm Feb. 1-10, 1951; minimum, 66 ppm Sept. 3-6, 1953.

SPECIFIC CONDUCTANCE: Maximum daily, 636 microhos Mar. 24, 1951; minimum daily, 102 microhos Sept. 3.

REMARKS.--Values reported for dissolved solids are residues on evaporation unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. No discharge records available for this station.

## BRAZOS RIVER BASIN

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)		
															Parts per million	Tons per acre-foot	Tons per day	Calcium magnesium	Non-carbonate				
Nov. 24-26, 1952	5.1			21	3.6	2.7	--	69		4.4	4.8		2.8		a.77	0.10		67	11	8	0.1	139	7.3
Apr. 6, 8-9, 1953	6.6			51	6.1	29		164		13	47		1.0		259	.35		152	18	29	1.0	437	7.5
Apr. 7, 10-11	13			40	3.4	2.2	5.2	140		5.9	3.0		2.0		153	.21		114	0	4	.1	248	7.7
May 12, 16-26	12			28	3.6	6.5	4.7	94		8.1	11		3.5		a.123	.17		85	8	14	.3	212	8.0
May 13-15	9.8			44	6.8	27		151		17	38		2.5		245	.33		138	14	30	1.0	400	7.9
May 27-28, July 3-5	13			38	4.5	13		134		9.5	14		2.5		187	.25		113	4	20	.5	290	7.6
July 18-25	20			34	4.1	5.3	5.7	114		16	6.0		3.5		163	.22		102	8	10	.2	243	8.1
Aug. 19-27	11			23	3.0	3.9	5.6	87		5.1	5.8		2.5		151	.21		70	0	10	.2	176	7.7
Sept. 3-6	11			22	2.6	4.0	4.9	84		3.8	6.2		2.5		138	.19		66	0	11	.2	172	7.5

a Sum of determined constituents.

## BRAZOS RIVER BASIN--Continued

## BRAZOS RIVER AT RICHMOND, TEX.

LOCATION.--At gaging station at bridge on U. S. Highway 59 in Richmond, Fort Bend County, 995 feet downstream from Texas and New Orleans Railroad bridge, and at mile 93.

DRAINAGE AREA.--44,050 square miles, approximately, of which 9,240 square miles is probably noncontributing.

RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1953.

EXTREMES, 1952-53.--Dissolved solids: Maximum, 739 ppm Oct. 1-10; minimum, 160 ppm Jan. 1-10.

Hardness: Maximum, 285 ppm Oct. 1-10; minimum, 83 ppm Jan. 1-10.

Specific conductance: Maximum daily, 1,540 microhos Oct. 1-10; minimum observed, 45 $^{\circ}$ F Nov. 30, Dec. 1, 16, Jan. 17.

Water temperatures: Maximum, 88 $^{\circ}$ F Aug. 11, 13; minimum observed, 45 $^{\circ}$ F Nov. 30, Dec. 1, 16, Jan. 17.

EXTREMES, 1945-53.--Dissolved solids: Maximum, 740 ppm Sept. 1-10, 1948; minimum, 133 ppm Aug. 27-31, 1947.

Hardness: Maximum, 446 ppm Sept. 1-10, 1948; minimum, 74 ppm Jan. 13-14, 18-29, 1950.

Specific conductance: Maximum daily, 1,540 microhos Sept. 4, 1951; minimum observed, 42 $^{\circ}$ F Dec. 6, 1950.

Water temperatures: Maximum, 88 $^{\circ}$ F Aug. 11, 13; minimum observed, 45 $^{\circ}$ F Nov. 30, Dec. 1, 16, Jan. 17.

REMARKS.--Values reported for dissolved solids are residues on evaporation unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1952 to September 1953 given in WSP 1282.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonyl (CO <sub>2</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (residue at 180 $^{\circ}$ C)			Hardness as CaCO <sub>3</sub>	Percent sodium carbonate	Specific conductance (microhos at 25 $^{\circ}$ C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium magnesium			
Oct. 1-10, 1952.....	142	17	0.00	83	19	138	5.2	216	113	113	214	0.2	1.5	0.13	739	1.01	283	285	51	1,210	8.2
Oct. 11-20.....	202	20	--	55	24	133	--	162	106	106	199	.2	4.0	.36	636	.86	347	236	55	1,090	7.7
Oct. 21-31.....	258	18	--	69	25	132	--	217	109	109	195	.2	4.5	.42	703	.96	490	275	51	1,140	7.6
Nov. 1-10.....	250	18	--	66	22	113	--	232	89	89	158	.3	4.0	.29	607	.83	410	265	49	1,010	7.7
Nov. 11-20.....	303	21	--	42	20	107	--	162	79	79	141	.3	1.8	.31	509	.69	416	187	54	857	7.9
Nov. 21-30.....	696	20	--	68	21	106	--	240	82	82	145	.4	1.0	.17	585	.90	1,100	256	47	978	8.1
Dec. 1-3, 16, 21-22....	3,162	13	--	46	8.1	58	--	136	48	48	81	.4	3.0	.18	348	.47	2,970	148	37	582	7.8
Dec. 4-12, 25-31.....	4,218	9.8	--	34	4.7	25	--	110	25	25	28	.5	3.8	.21	200	.27	2,280	104	34	321	7.7
Dec. 13-15, 17-20, 23-24.....	3,278	13	--	42	6.4	43	--	126	39	39	54	.5	3.0	.28	282	.38	2,500	131	28	459	7.8
Jan. 1-10, 1953.....	9,914	11	--	31	3.7	17	3.2	99	21	21	20	.5	3.2	.25	160	.22	4,180	93	11	276	7.6
Jan. 11-20.....	2,682	13	--	32	4.4	32	3.9	103	23	23	42	.5	2.5	.32	205	.29	1,480	98	14	351	7.9
Jan. 21-31.....	1,195	13	.15	49	7.1	39	3.7	160	40	40	50	.2	2.2	.22	300	.41	968	151	35	496	7.7

a Sum of determined constituents.

Feb. 1-3, 56, 1748, 1953.	2,009	12	18	49	7.8	42	3.4	160	44	54	.3	1.5	.17	309	.42	1,680	154	24	37	1.5	513	7.7
Feb. 4, 7-16	1,574	13	20	36	5.6	29	3.0	118	27	39	.3	2.2	.22	230	.31	977	113	16	35	1.2	377	7.9
Feb. 20-25	2,230	14	--	50	7.2	34	3.4	147	43	50	.3	4.5	.11	301	.41	1,810	154	34	32	1.2	475	8.0
Feb. 26-28, Mar. 1-7	2,888	13	--	34	5.0	22	3.4	106	22	33	.3	2.0	.12	229	.31	1,790	106	18	30	.9	325	7.8
Mar. 8-16	2,750	15	--	55	9.6	39	3.5	171	47	54	.3	3.5	.14	346	.47	2,570	176	36	32	1.3	530	8.0
Mar. 17-31	5,653	12	--	36	6.0	25	4.2	111	26	38	.3	4.0	.12	254	.35	3,860	114	24	31	1.0	357	7.7
Apr. 1-4, 28-29	1,890	11	--	37	6.2	27	4.4	122	26	35	.3	3.0	.11	233	.32	1,190	113	18	32	1.1	372	7.9
Apr. 5-14, 30	1,686	10	--	49	8.8	40	4.1	150	50	49	.3	2.5	.09	308	.42	1,400	168	36	35	1.4	501	7.8
Apr. 15-25	1,778	11	--	67	12	51	4.1	221	61	63	.3	3.5	.10	394	.54	4,402	216	36	33	1.5	549	7.9
May 1-10	11,410	13	--	31	4.5	11	3.6	100	17	12	.2	4.6	.13	162	.22	4,250	89	14	24	.8	285	7.8
May 11-20	44,970	13	--	33	4.5	15	3.6	104	16	20	.2	4.5	.13	173	.24	21,280	163	14	24	.8	285	7.8
May 21-31	24,200	13	--	31	5.2	11	3.9	105	15	14	.2	4.0	.09	175	.24	11,430	99	13	19	.5	252	7.9
June 1-10	4,154	18	--	36	6.2	18	5.1	130	20	24	.3	1.8	.12	203	.28	2,280	116	9	24	.7	324	7.7
June 11-20	991	9, 6	--	48	6.5	29	4.8	165	37	39	.3	2.2	.14	263	.36	717	159	24	28	1.0	456	7.6
June 21-30	594	12	--	53	15	39	4.6	188	46	48	.3	1.2	.19	317	.43	508	179	25	31	1.3	532	7.9
July 1-6, 12	1,293	14	--	50	11	57	5.3	156	57	79	.3	1.2	.13	362	.49	1,270	170	42	41	1.9	645	8.2
July 6-6, 23-31	1,193	13	--	62	13	81	5.7	178	73	119	.3	1.2	.17	473	.64	1,520	208	62	45	2.4	815	8.2
July 13-22	471	15	--	56	10	49	5.4	188	44	66	.3	1.2	.11	346	.47	440	180	26	36	1.6	593	8.2
Aug. 1-17	396	18	--	50	14	82	4.6	154	70	117	.3	1.2	.18	441	.60	472	183	56	49	2.6	773	7.8
Aug. 18-24, 30-31	1,356	16	--	52	12	70	4.5	160	60	102	.3	1.2	.17	402	.55	1,470	179	48	45	2.3	709	7.9
Aug. 25-29	1,175	13	--	66	14	107	4.9	160	91	167	.3	1.5	.15	558	.76	1,770	232	91	50	3.1	971	7.9
Sept. 1-2, 4, 11, 15, 17-23	1,568	16	--	46	8.0	39	3.9	147	43	53	.4	1.8	.16	294	.39	1,200	148	28	36	1.4	491	7.9
Sept. 3, 5-8, 12-14	3,219	18	--	36	5.6	28	3.8	117	26	38	.4	3.8	.08	227	.31	1,970	113	17	34	1.1	369	7.9
Sept. 9-10, 16, 24-30	1,391	18	--	54	9.1	45	4.4	181	40	62	.4	1.8	.18	324	.44	1,220	172	24	36	1.5	560	8.1
Weighted average	4,105	13	--	36	5.7	23	3.8	115	25	31	0.3	3.6	0.14	215	0.29	2,380	114	20	30	0.9	342	--

## BRAZOS RIVER BASIN--Continued

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

Temperature (°F) of water, water year October 1952 to September 1953  
 /Once-daily temperature measurement usually before 8 a. m. /

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

BRAZOS RIVER BASIN--Continued  
MISCELLANEOUS ANALYSES OF STREAMS IN BRAZOS RIVER BASIN IN TEXAS  
Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Water discharge (cfs)	Silica (SiO <sub>2</sub> ) (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids (sum)		Hardness as CaCO <sub>3</sub>		Percent sodium	Specific conductance (micro-mhos at 25° C)
													Parts per million	Tons per acre-foot	Calcium, mg./nestum	Non-carbonate		

DOUBLE MOUNTAIN FORK BRAZOS RIVER NEAR LUBBOCK SEWAGE PLANT

Mar. 4, 1953	0.17	30	60	100	156	278	14	277	238	--	29	1,040	1.41	560	309	38	2.9	1,800	8.5
Aug. 3	.09	36	60	87	152	274	12	272	202	3.6	18	978	1.33	507	262	39	2.9	1,570	8.4
Sept. 10	.06	48	52	135	232	354	12	402	302	4.0	29	1,390	1.89	684	374	42	3.9	2,180	8.4

DOUBLE MOUNTAIN FORK BRAZOS RIVER ON STATE HIGHWAY 835, 4.3 MILES SOUTHEAST OF LUBBOCK

Nov. 5, 1952	1.99	60	91	175	302	439	13	565	425	--	44	1,890	2.57	946	566	41	4.3	2,960	8.3
Dec. 2	2.10	62	90	172	310	420	24	553	428	--	52	1,900	2.58	932	548	42	4.4	2,950	8.5
Mar. 4, 1953	2.26	52	88	164	288	394	24	527	398	--	58	1,790	2.43	894	531	41	4.2	2,800	8.5
Apr. 14	1.80	54	99	145	307	341	19	549	410	--	62	1,810	2.46	843	532	44	4.6	2,780	8.4
June 10	1.92	50	99	160	303	441	19	537	405	--	50	1,840	2.50	905	512	42	4.4	2,860	8.4
Aug. 3	1.21	60	58	154	290	333	18	503	380	--	56	1,680	2.28	778	474	45	4.5	2,570	8.5
Sept. 10	1.74	71	90	168	318	433	32	538	412	4.8	55	1,900	2.58	916	507	43	4.6	2,830	8.5

DOUBLE MOUNTAIN FORK BRAZOS RIVER ON STATE HIGHWAY 835, 7.8 MILES SOUTHEAST OF LUBBOCK

Oct. 6, 1952	1.65	13	56	147	280	370	9	491	368	--	7.0	1,550	2.11	744	426	45	4.5	2,510	8.4
Nov. 5	2.93	18	60	157	286	425	11	505	370	--	9.5	1,630	2.22	795	428	44	4.4	2,600	8.4
Dec. 2	3.92	33	57	160	285	388	16	513	372	--	19	1,850	2.24	800	456	44	4.4	2,700	8.5
Mar. 4, 1953	4.32	20	48	158	283	360	18	516	362	--	16	1,600	2.18	770	444	44	4.4	2,550	8.5
June 10	1.13	16	50	132	255	367	9	443	312	--	6.9	1,400	1.90	688	352	45	4.3	2,320	8.4
Aug. 3	2.47	26	52	114	247	293	9	428	300	4.0	5.0	1,330	1.81	598	343	47	4.4	2,100	8.4
Sept. 10	.88	22	50	135	288	332	13	473	358	4.4	3.5	1,510	2.05	680	385	48	4.8	2,420	8.4

DOUBLE MOUNTAIN FORK BRAZOS RIVER, 7.5 MILES NORTHWEST OF SLATON

Oct. 6, 1952	0.50	29	62	127	248	423	14	375	320	--	5.6	1,390	1.89	676	306	44	4.2	2,240	8.4
Nov. 5	.61	30	62	128	247	426	16	373	318	--	5.8	1,390	1.89	681	306	44	4.1	2,230	8.4
Dec. 2	3.20	12	42	144	282	344	18	475	355	--	4.8	1,500	2.04	697	385	47	4.7	2,400	8.5
Mar. 4, 1953	4.37	6.0	48	153	299	367	22	494	370	--	9.0	1,570	2.14	749	412	46	4.6	2,560	8.6
Apr. 14	2.02	7.7	45	158	296	375	22	516	375	--	11	1,620	2.20	774	430	45	4.6	2,620	8.5
June 10	.25	28	113	129	266	473	17	430	372	--	4.5	1,590	2.16	812	396	42	4.1	2,570	8.4
Aug. 3	.21	19	52	189	371	406	24	645	460	6.4	5.8	1,970	2.68	906	534	47	5.4	3,040	8.5
Sept. 10	.13	36	58	147	287	471	18	371	388	5.2	12	1,550	2.11	749	333	45	4.5	2,490	8.4

## BRAZOS RIVER BASIN--Continued

## MISCELLANEOUS ANALYSES OF STREAMS IN BRAZOS RIVER IN TEXAS--Continued

Chemical analyses, in parts per million, water year October 1932 to September 1953--Continued

Date of collection	Water discharge (cfs)	Silica (SiO <sub>2</sub> ) (Fe)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> ) (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids (sum)		Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (microhmhos at 25°C)	pH		
													Parts per million	Tons per acre-foot	Calcium	Non-magnesium					
Nov. 5, 1952.....	0.98	33		53	113	217		435	23	303		4.2	1.230	1.67		609	214	44	3.8	1,990	8.6
Dec. 2.....	4.36	30		56	122	235		400	24	359		5.2	1.320	1.80		641	273	44	4.0	2,100	8.6
Mar. 4, 1953.....	.47	52		66	93	170		448	31	209		7.7	1.040	1.41		547	128	40	3.2	1,710	8.6
Apr. 14.....	2.06	20		59	138	254		396	30	416		13	1.440	1.96		714	340	44	4.1	2,420	8.6
June 10.....	.28	60		66	78	121		475	15	132		3.5	.846	1.15		485	71	35	2.4	1,410	8.4
Aug. 3.....	.09	77		46	85	153		424	12	157		4.8	.923	1.26		464	97	42	3.1	1,470	8.4
Sept. 10.....	.22	60		26	88	121		350	18	82		.5	.787	1.04		427	110	38	2.6	1,460	8.5

DOUBLE MOUNTAIN FORK BRAZOS RIVER, A QUARTER OF A MILE BELOW LOWER BUFFALO LAKES DAM, NEAR SLATON

## DOUBLE MOUNTAIN FORK BRAZOS RIVER, A QUARTER OF A MILE BELOW LOWER BUFFALO LAKES DAM, NEAR SLATON

## DOUBLE MOUNTAIN FORK BRAZOS RIVER ON STATE HIGHWAY 400, 5.5 MILES NORTH OF SLATON

Nov. 5, 1952.....	0.71	33		51	119	226		440	19	317		3.8	1.260	1.71		616	224	44	4.0	2,080	8.5
Dec. 2.....	2.91	26		56	124	246		418	27	363		5.0	1.350	1.84		650	264	45	4.2	2,140	8.6
Mar. 4, 1953.....	.80	14		80	136	258		450	29	388		9.3	1.430	1.94		708	292	44	4.2	2,350	8.6
Apr. 14.....	1.82	18		50	142	267		426	30	414		7.5	1.460	1.99		709	310	45	4.4	2,400	8.6

## DOUBLE MOUNTAIN FORK BRAZOS RIVER 4.2 MILES NORTHEAST OF SLATON

Dec. 2, 1952.....	1.80	28		58	127	262		407	31	394		5.1	1.420	1.93		667	282	46	4.4	2,250	8.6
Mar. 4, 1953.....	.70	9.6		61	155	349		508	36	520		6.6	1.760	2.39		790	313	49	5.4	2,790	8.6
Apr. 14.....	1.65	15		46	144	309		406	36	465		11	1.580	2.15		707	314	49	5.1	2,590	8.7

## WHITE RIVER AT COUNTY ROAD CROSSING ABOUT 4½ MILES EAST OF CROSBYTON

June 10, 1952.....	1.08	34		--	--	70		349	22	44		0.8	a450	0.61		250	0	38	1.9	744	8.6
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## WHITE RIVER AT U. S. HIGHWAY 82, 4½ MILES EAST OF CROSBYTON

June 10, 1953.....	0.23	23		--	--	69		315	21	46		3.0	a412	0.56		228	0	40	2.0	702	8.7
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## LAMPASAS RIVER AT FORT HOOD

July 28, 1953.....	--	7.0		51	29	134		172	0	20		1.5	593	0.81		246	105	54	3.7	1,170	7.6
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a Residue on evaporation at 180°C.

# COLORADO RIVER BASIN

## BULL CREEK NEAR IRA, TEX.

LOCATION --At gaging station 267 feet upstream from highway crossing, 1.5 miles upstream from Colorado River, 5.5 miles upstream from Chimney Creek, 5.8 miles upstream from Ira Seery County, and 6.9 miles northwest of Cuthbert.

DRAINAGE AREA --388 square miles.

RECORDS AVAILABLE --Chemical analyses approximately 1950 to September 1953.

Water temperatures: April 1950 to September 1951.

EXTREMES, 1952-53 --Specific conductance: Maximum daily, 10,400 micromhos July 13, minimum daily, 277 micromhos Nov. 26.

EXTREMES, 1950-53 --Specific conductance: Maximum daily, 10,400 micromhos July 13, 1953; minimum daily, 232 micromhos Sept. 6, 1950, Sept. 26, 1952.

REMARKS --Values reported for dissolved solids are residues on evaporation unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1952 to September 1953 given in WSP 1262.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal-ium (Ca)	Mag-nesium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Car-bonate (CO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> ) (B)	Bo-ron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>	Per-cent so-dium	So-dium adsorp-tion ratio	Specific conduct-ance (micro-mhos at 25°C)	pH
															Parts per mil-lion	Tons per acre-foot	Tons per day	Calcium, mag-nesium	Non-carbon-ate			
Oct. 1-31, 1952	0	--	--	--	--	--	--	--	--	--	78	--	--	--	--	--	--	--	--	--	587	--
Nov. 1-30	.38	--	--	--	--	--	--	--	--	--	112	--	--	--	--	--	--	--	--	--	722	--
Dec. 1-17	0	--	--	--	--	--	--	--	--	--	70	--	--	--	--	--	--	--	--	--	459	--
Dec. 18-31	a1.01	11	26	43	5.2	37	108	108	24	69	36	--	4.0	4.5	210	0.29	0.57	86	0	49	1.7	8.1
Jan. 1-17, 1953	0	10	10	72	9.6	95	113	113	69	131	310	--	3.5	3.5	b418	.97	.19	147	54	58	3.4	7.64
Jan. 18-21, Feb. 5-28	.08	10	10	72	18	219	184	184	134	310	310	--	3.5	3.5	860	1.17	--	234	102	65	6.0	8.2
Mar. 1-31	a.15	6.2	98	98	38	286	207	207	304	304	378	--	3.5	3.5	b 1,220	1.86	.49	400	231	61	6.2	8.2
Apr. 1-13	1.27	14	98	27	4.3	43	162	162	63	101	378	--	3.5	3.5	113	.56	1.42	131	0	62	3.7	7.20
Apr. 23-30	a7.35	9.2	14	27	4.3	43	142	142	33	13	18	--	4.0	4.0	220	.30	4.37	85	0	53	2.1	7.6
May 9	0	--	--	--	--	--	--	--	--	--	79	--	--	--	--	--	--	118	0	--	630	8.2
May 10-20	a3.96	36	34	34	5.3	36	159	174	22	22	18	--	7.7	7.7	246	.33	2.63	107	0	42	1.5	--
May 26	0	--	--	--	--	--	186	186	--	--	52	--	--	--	--	--	--	134	0	--	515	--
June 2	0	--	--	--	--	--	--	184	--	--	78	--	--	--	--	--	--	127	0	--	586	--
June 6	0	--	--	--	--	--	--	232	--	--	130	--	--	--	--	--	--	167	0	--	861	--
June 10	0	--	--	--	--	--	--	216	--	--	149	--	--	--	--	--	--	167	0	--	921	--
June 16	0	--	--	--	--	--	--	226	--	--	192	--	--	--	--	--	--	184	0	--	1,100	--
June 22	0	--	--	--	--	--	--	262	--	--	560	--	--	--	--	--	--	305	0	--	2,480	--
June 29	0	--	--	--	--	--	--	158	--	--	2,420	--	--	--	--	--	--	630	0	--	8,500	8.2

a Includes days of less than 0.05 second-foot flow.

b Sum of determined constituents.

## COLORADO RIVER BASIN--Continued

## BULL CREEK NEAR IBA, TEX.--Continued

Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate			
July 5.....	0	--	--	--	--	--	--	187	--	--	1,600	--	--	--	--	--	660	507	--	6,100	8.2
July 13.....	0	--	--	--	--	--	--	124	--	--	3,100	--	--	--	--	--	760	658	--	10,400	8.1
July 27.....	0	--	--	--	--	--	--	186	--	--	2,220	--	--	--	--	--	645	492	--	7,890	8.2
Aug. 1-31.....	24.9	20	--	30	5.0	40	40	131	--	27	32	--	3.2	--	228	15.3	95	0	48	377	7.9
Sept. 1-30.....	a. 53	19	--	28	4.5	52	52	142	--	30	33	--	3.5	--	248	34	83	0	58	399	7.8

a Includes days of less than 0.05 second-foot flow.

## COLORADO RIVER BASIN--Continued

DEEP CREEK NEAR DUNN, TEX.

LOCATION.--At gaging station at bridge on Farm to Market Highway 1606, 2.0 miles northwest of Dunn, Scurry County, 3.0 miles upstream from Sulphur Draw, and 8.0 miles upstream from mouth.  
DRAINAGE AREA.--178 square miles.

RECORDS AVAILABLE.--Chemical analyses: March to September 1953.

Water temperatures: March to September 1953.

REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex. Values reported for dissolved solids are residues on evaporation unless otherwise noted. Records of discharge for period April to September 1953 given in WSP 1342.

Chemical analyses, in parts per million, March to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	
															Parts per million	Tons per acre-foot	Tons per day	Calcium magnesium	Non-carbonate				
Mar. 26, 1953	--	11		54	14	101	334		28	75			3.5		474	0.64	--	192	0	53	3.2	828	7.5
Apr. 2, 12	0	14		84	18	111	466		23	83			3.0		592	.81	--	284	0	46	2.9	1,000	8.1
Apr. 23-26	109	14		34	4.8	22	138		13	14			6.9		191	.26	56.2	105	0	31	.9	312	7.9
May 9	0	--		--	--	--	154		--	18			--		--	--	--	109	--	--	--	318	8.2
May 13, 16-18	15.8	18		32	3.1	6.0	121		5.5	3.0			6.0		146	.20	6.23	93	0	12	.3	222	7.9
July 15-17	16.4	--		--	--	--	109		--	5.5			--		--	--	--	83	--	--	--	201	8.2
Aug. 4-6, 16-18	93.4	16		33	4.0	14	122		9.8	9.5			6.1		160	.22	40.3	99	0	23	.6	262	7.7
Aug. 19-23, 31	124	12		29	3.3	5.4	108		6.7	3.5			4.5		135	.17	41.8	86	0	11	.3	203	7.7
Sept. 1, 3-5	7.35	9.2		26	3.9	9.7	92		8.5	7.0			6.5		121	.16	2.40	81	6	19	.5	198	7.7

a Sum of determined constituents.

COLORADO RIVER BASIN--Continued  
COLORADO RIVER AT COLORADO CITY, TEX.

LOCATION.--At gaging station at Colorado City, Mitchell County, 3.517 feet upstream from bridge on U. S. Highway 80, 4,100 feet upstream from Texas & Pacific Railway bridge, 1.6 miles upstream from Lone Wolf Creek, and at mile 796.

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

RECORDS AVAILABLE.--Chemical analyses: May 1946 to September 1953.

Water temperatures: November 1952 to September 1953.

EXTREMES, 1952-53.--Dissolved solids: Maximum, 26,900 ppm Apr. 1-14; minimum, 443 ppm Aug. 19-22.

Hardness: Maximum, 3,260 ppm Apr. 1-14; minimum, 120 ppm Aug. 19-22.

Specific conductance: Maximum daily, 38,800 micromhos Mar. 31, Apr. 1-5; minimum daily, 680 micromhos Aug. 20.

Water temperatures: Maximum observed, 95°F July 25, Aug. 3; minimum observed, 42°F Dec. 24.

EXTREMES, 1946-53.--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, 45,800 micromhos Apr. 1-10, 1952; minimum daily, 272 micromhos Oct. 26, 1947.

REMARKS.--Values reported for dissolved solids are sums of 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 1952 to September 1953 given in WSP 1282.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal- cium (Ca)	Mag- ne- sium (Mg)	So- dium (Na)	Po- tas- sium (K)	Bicar- bonate (HCO <sub>3</sub> )	Car- bonate (CO <sub>3</sub> )	Sul- fate (SO <sub>4</sub> )	Chlo- ride (Cl)	Fluo- ride (F)	Ni- trate (NO <sub>3</sub> )	Bo- ron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Per- cent so- lution	So- lution ratio	Specific conduct- ance (micro- mhos at 25°C)
															Parts per million	Tons per acre- foot	Tons per day	Calcium mag- nesium	Carbon- ate			
Nov. 24-30, 1952	a 10.8	5.2		402	159	4,380		97		1,100	7,060		--		13,200	18.0	385	1,680	1,580	85	47	20,500
Dec. 1-10	1.22	6.0	415	415	162	4,840		101		1,160	7,780		--		14,400	19.6	47.4	1,700	1,620	86	51	22,400
Dec. 11-17, 19	2.33	1.1	480	192	5,410	5,410		93		1,300	8,680		--		16,100	21.9	101	1,910	1,840	86	54	24,700
Dec. 18	4.2	3.9	96	31	96	778		88		224	1,240		--		2,420	3.28	27.4	367	367	82	16	24,180
Dec. 20-31	a 4.28	2.9	306	128	3,330			108		863	5,350		--		10,000	13.6	116	1,280	1,200	85	40	16,300
Jan. 1-10, 1953	a 3.1	2.5	413	178	4,890			101		1,210	7,840		--		14,600	19.9	12.2	1,760	1,690	86	51	22,600
Jan. 11-21	a 1.3	2.9	455	209	7,100			91		1,460	9,740		--		18,100	24.6	6.35	2,100	2,020	86	58	27,700
Jan. 22-31	a 3.2	2.4	537	237	7,100			91		1,460	11,000		--		20,800	28.3	18.0	2,410	2,330	86	62	31,000
Feb. 1-10	a 2.8	3.7	819	237	7,830			92		1,740	12,800		--		23,200	31.6	11.9	2,720	2,650	86	65	33,900
Feb. 11-18	a 2.8	4.0	877	305	8,620			93		2,060	13,800		--		25,500	34.7	19.3	2,940	2,870	86	69	36,800
Feb. 20-28	a 4.6	2.0	667	295	8,270			96		1,950	13,300		--		24,500	33.3	52.0	2,880	2,800	86	67	35,100
Mar. 1-7		6.0	690	303	8,280			81		1,930	13,400		--		24,600	33.5	51.1	2,970	2,900	86	66	35,900
Mar. 8-11		9.45	350	144	3,700			85		1,910	9,580		--		11,200	15.2	286	1,470	1,400	85	42	18,200
Mar. 12-20	2.08	3.1	511	229	5,950			79		1,510	9,580		--		17,800	24.2	100	2,220	2,150	85	55	27,500
Mar. 21-31	a 2.9	8.8	646	300	7,850			58		2,290	12,600		--		23,500	32.0	18.4	2,850	2,800	86	64	34,500
Apr. 1-14	a 2.1	5.4	755	348	9,020			58		2,290	14,500		--		26,900	36.6	15.3	3,260	3,220	86	69	38,800
Apr. 23	169	4.3	648	253	6,820			67		1,940	11,000		--		20,600	28.0	9.40	2,660	2,600	85	57	30,700
Apr. 24-25	118	8.0	98	27	677			104		213	1,074		--		2,160	2.94	682	356	356	81	16	3,840
Apr. 26-30	8.60	4.7	348	141	3,780			90		963	6,080		--		11,400	15.5	265	1,450	1,380	85	43	18,400

a Flow less than 0.05 cfs Oct. 4-31, Nov. 1-25, Jan. 9-10, 14, 16, 21, Feb. 9, 18-19, 21-23, Mar. 28-31, Apr. 1-10, 15-22, May 5-10, 27-31, June, July 1-14, 28-31, Aug. 1, Sept. 14-30.

May 1-4, 1953.....	6.7	488	188	5,470	93	1,320	8,820	--	16,300	22.2	13.2	1,990	1,910	86	53	25,300	7.4
May 11-15, 20.....	5.9	148	46	1,280	85	328	2,090	--	3,950	5.37	232	558	489	83	24	7,040	7.4
May 16-19.....	8.2	90	22	601	105	185	950	4.0	1,910	2.60	1,040	315	229	81	15	3,520	7.4
May 21-22.....	6.1	130	45	1,210	78	333	1,930	5.0	3,700	5.03	41.0	510	446	84	23	6,530	7.6
May 23-31.....	5.4	200	76	2,160	54	544	3,470	--	6,480	8.81	6.65	812	768	85	33	10,900	7.4
July 15, 17-18, 20-22, 24.....	11	98	21	582	104	178	940	3.5	1,880	2.56	109	331	246	79	14	3,340	8.0
July 16, 19, 23, 25-27.....	11	144	33	1,020	124	282	1,640	2.5	2,190	4.34	48.4	495	394	82	20	5,590	8.2
July 28-30.....	8.4	191	55	1,830	75	404	2,980	--	5,510	7.49	--	702	641	85	30	9,510	7.5
Aug. 1-2, 4-5, 10-14.....	8.2	108	33	1,080	85	236	1,820	1.5	3,130	4.26	179	405	338	85	23	5,530	7.5
Aug. 8-9.....	7.5	74	20	519	99	149	820	3.0	1,640	2.23	125	286	186	91	14	3,450	7.5
Aug. 9-10.....	7.5	50	14	184	129	61	272	4.5	6,666	9.91	139	596	50	15	26.4	7,570	7.5
Aug. 19-20, 26-31.....	7.0	152	45	1,450	102	344	2,320	--	4,370	5.84	821.2	524	480	95	24	7,776	8.0
Aug. 19-22.....	9.8	39	8	1,454	123	163	1,057	3.0	2,030	2.76	133	320	238	92	16	3,720	8.2
Aug. 23-25.....	9.2	82	23	654	83	181	1,050	5	4,590	6.24	153	327	458	86	29	8,050	7.6
Sept. 3-5, 13.....	5.7	152	36	1,550	84	321	2,490	--	786	1.07	161	156	78	76	8.1	1,430	8.0
Sept. 4.....	14	14	10	232	85	89	345	3.2	2,480	3.39	100	368	278	82	18	4,080	--
Weighted average.....	14.9	100	29	795	111	213	1,260	--									

a Flow less than 0.05 cfs Oct. 4-31, Nov. 1-23, Jan. 9-10, 14, 16, 21, Feb. 9, 18-19, 21-23, Mar. 28-31, Apr. 1-10, 15-22, May 5-10, 27-31, June, July 1-10, 28-31, Aug. 1, Sept. 14-30.

b Residue on evaporation at 180°C.

## WESTERN GULF OF MEXICO BASINS

## COLORADO RIVER BASIN--Continued

## COLORADO RIVER AT COLORADO CITY, TEX.--Continued

Temperature (°F) of water, November 1952 to September 1953

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1		--	66	66	70	54	79	70	93	--	75	--
2		--	60	65	71	55	78	68		--	74	80
3		--	60	57	70	75	80	71		--	95	86
4		--	55	55	65	75	89	72		--	80	79
5		--	57	54	66	76	88	--		--	92	75
6		--	59	49	60	74	--	--		--	77	71
7		--	56	48	62	75	--	--		--	70	82
8		--	56	69	65	72	--	--		--	74	84
9		--	65	68	64	73	--	--		--	86	81
10		--	44	75	66	74	--	--		--	75	76
11		--	57	76	58	73	--	--		--	87	--
12		--	64	65	58	67	--	74		--	88	--
13		--	56	48	60	62	--	70		--	85	--
14		--	56	48	59	60	--	67		--	75	--
15		--	45	59	60	75	--	70		73	--	--
16		--	47	58	59	78	--	74		75	--	--
17		--	--	48	56	76	--	78		85	82	--
18		--	67	48	53	70	--	68		78	85	--
19		--	52	57	63	69	--	80		81	78	--
20		--	--	58	65	69	--	79		76	85	--
21		--	48	56	54	70	--	80		89	84	--
22		--	50	54	58	69	--	--		72	86	--
23		--	45	61	68	73	70	74		90	88	--
24		--	42	59	66	74	71	76		84	84	--
25		55	55	74	66	73	80	77		95	82	--
26		57	43	75	83	72	86	77		90	87	--
27		52	45	--	80	70	92	82		90	85	--
28		54	47	65	57	68	70	83		94	90	--
29		55	56	--	--	72	72	88		94	--	--
30		50	52	62	--	71	65	91		94	75	--
31		--	56	63	--	78	--	93		--	74	--
Average		--	54	60	64	71	--	--	--	--	82	--

COLORADO RIVER BASIN--Continued  
COLORADO RIVER NEAR SAN SABA, TEX.

LOCATION.--At gaging station at bridge on U.S. Highway 190, 5.2 miles downstream from San Saba River, 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 1953.

Water temperatures: 1947, 1948, 1949, 1950, 1951, 1952, 1953.

EXTREMES 1953:--Dissolved solids: Maximum, 1,100 ppm Aug. 22-23, 25-27.

Hardness: Maximum, 124 ppm Aug. 22-23, 25-27.

Sediment concentrations: Maximum daily, 2.010 micrograms July 19; minimum daily, 226 micrograms Mar. 10.

Water temperatures: Maximum daily, 43° F June 14; minimum observed, 42° F Jan. 17.

Sediment loads: Maximum daily, 5,930 tons Aug. 21; minimum daily, 32 ppm Jan. 11.

EXTREMES 1947-53:--Dissolved solids: Maximum, 1,530 ppm Oct. 15-19, 1947; minimum, 127 ppm Sept. 11-13, 1952.

Hardness: Maximum, 522 ppm Aug. 20, 1947; minimum daily, 161 micrograms Sept. 11, 1952.

Specific conductance: Maximum daily, 3,420 micrograms Sept. 20, 1947; minimum observed, freezing point Jan. 29, 1948, Jan. 30, 1951.

Sediment concentrations (1950-53): Maximum daily, 10,200 ppm May 24, 1951 (revised); minimum daily, 22 ppm Aug. 13, 1951 (revised).

Sediment loads (1950-53): Maximum daily, 394,000 tons Sept. 11, 1952; minimum daily, 0.1 tons for composite period Aug. 20-25, 1952.

REMARKS.--Values reported for dissolved solids are residues on evaporation unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1952 to September 1953 given in WSP 1282.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)		Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Percent adsorption ratio	Specific conductance (micro-mhos at 25°C)	
						Sodium (Na)	Magnesium (Mg)									Parts per million	Tons per acre-foot	Tons per day	Calcium	Non-carbonate			
Oct. 1-10, 1952	161	14		61	17	29		234		22		40		6.9		314	0.43	136	222	23	22	0.8	551
Oct. 11-20	91.9	14		66	24	33		288		24		47		8.0		360	.49	89.3	263	27	21	.9	643
Oct. 21-31	70.6	15		62	28	37		297		24		53		8.8		374	.51	71.3	270	26	23	1.0	663
Nov. 1-10	94.0	14		60	30	40		304		24		56		9.0		387	.53	98.2	273	24	24	1.1	683
Nov. 11-20	132	12		66	22	54		268		28		84		5.9		412	.56	147	255	36	31	1.5	724
Nov. 21-24	310	14		62	24	55		270		29		83		5.5		406	.55	340	253	32	32	1.5	734
Nov. 25-30	1,428	9.2		44	10	26		157		26		34		3.8		230	.31	887	151	22	27	1.9	403
Dec. 1-10	145	12		56	18	28		227		24		42		4.5		296	.40	116	214	28	22	.8	515
Dec. 11-20	226	14		62	22	34		235		28		45		5.0		334	.45	204	246	34	20	.8	576
Dec. 21-30	368	12		58	20	37		235		33		54		4.0		334	.45	332	226	34	26	1.1	584
Dec. 31, Jan. 1-4, 1953	1,096	11		38	11	24		150		17		35		2.8		213	.29	630	140	17	27	.9	351
Jan. 5-10	191	12		56	17	29		226		23		43		4.0		295	.40	152	210	24	23	.9	523
Jan. 11-22	114	13		63	24	33		280		23		50		5.0		368	.50	113	256	26	22	.9	629
Jan. 23-31	93.2	11		64	27	32		289		21		50		4.5		372	.51	93.6	270	26	21	.9	650

a Sum of determined constituents.

## COLORADO RIVER BASIN--Continued

## COLORADO RIVER NEAR SAN SABA, TEX.--Continued

Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal-cium (Ca)	Mag-ne-sium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Car-bonate (CO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> )	Bo-ron (B)	Dissolved solids (residue at 100° C)			Hardness as CaCO <sub>3</sub>		Per-cent so-dium	So-dium adsorp-tion ratio	Specific conduct-ance (micro-mhos at 25° C)	pH		
															Parts per mil-lion	Tons per acre-foot	Tons per day	Calcium	Non-carbon-ate						
Feb. 1-10, 1953	91.7	16		64	28	38		303		24	57		4.2		393	0.53	97.3	274	26	23	1.0		679	7.9	
Feb. 11-20	80.9	13		64	28	35		303		23	52		4.8		382	.52	83.4	274	26	22	1.0		662	8.0	
Feb. 21-28	71.6	8.8		64	29	39		302		26	61		4.5		405	.55	78.3	278	31	23	1.0		693	8.0	
Mar. 1-6	69.6	8.2		62	29	39		299		26	59		3.8		366	.52	72.5	274	28	24	1.0		678	8.0	
Mar. 9-11	7.773	9.6		44	6.9	17		120		35	27		2.8		213	.29	4,470	138	40	21	1.6		350	7.8	
Mar. 12-20	740	9.8		48	12	39		154		39	60		2.8		306	.42	611	170	44	33	1.3		514	7.9	
Mar. 21-31	801	11		54	22	32		236		29	48		2.8		329	.45	58.7	225	32	23	1.9		586	8.0	
Apr. 1-10	58.3	16		53	27	41		271		27	56		3.0		370	.50	56.2	243	21	27	1.1		652	8.2	
Apr. 11-20	46.4	15		54	31	44		296		25	62		2.8		360	.52	46.6	262	20	27	1.2		677	8.0	
Apr. 21-28	38.6	13		53	25	43		272		24	55		2.8		362	.49	135	235	12	28	1.2		634	8.4	
Apr. 29-30	35.5	13		36	9.2	19		136		19	24		3.5		204	.28	1,740	128	13	25	1.7		337	7.6	
May 1-5	253	9.6		40	11	21		183		16	24		3.5		213	.29	146	145	8	24	1.7		369	8.1	
May 6-10	67.8	9.6		49	18	25		227		16	33		2.0		272	.37	49.8	196	10	22	1.8		474	8.0	
May 11, 15, 17, 21-22, 28-31	1,826	15		49	12	29		179		29	39		3.0		290	.39	1,190	172	25	27	1.0		475	7.9	
May 12-14, 16, 18-20																									
23-27	2,309	15		41	8.3	19		146		21	24		3.5		226	.31	1,420	136	17	23	7		361	8.0	
June 1-10	64.9	17		46	20	28		218		19	42		1.5		308	.42	54.0	197	18	24	9		505	8.2	
June 11-20	39.9	19		44	26	40		245		19	58		2.0		359	.49	38.7	217	16	29	1.2		586	8.2	
June 21-30	29.1	18		42	29	44		252		18	66		1.0		377	.51	29.6	224	18	30	1.3		617	8.2	
July 1-5, 10-12																									
July 14-18	67.9	22		45	25	52		241		22	75		1.2		378	.51	69.3	216	18	34	1.5		656	8.2	
July 6-9, 13, 25-31	339	20		38	12	35		165		34	48		3.0		298	.41	273	164	29	32	1.2		495	7.9	
July 19	1,340	18		97	22	275		137		147	470		3.0		1,100	1.50	3,980	332	220	64	6.6		2,010	8.2	
July 20-24	915	17		58	11	87		144		74	128		3.0		460	.65	1,190	190	72	50	2.7		815	8.0	

a. Sum of determined constituents.

b. Includes equivalent of 6 ppm of carbonate (CO<sub>3</sub>).

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## COLORADO RIVER BASIN--Continued

## COLORADO RIVER NEAR SAN SABA, TEX.--Continued

Temperature (°F) of water, water year October 1952 to September 1953

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

## COLORADO RIVER BASIN--Continued

## COLORADO RIVER NEAR SAN SABA, TEX.--Continued

Suspended sediment, water year October 1952 to September 1953

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.....	290	48	27	64	102	18	214	163	94
2.....	246			62			222	156	94
3.....	202			62			190	172	88
4.....	166			62			158	133	57
5.....	143			62			134	145	52
6.....	131	58	18	65	--	b210	120	148	48
7.....	118			69			110	134	40
8.....	108			67			105	127	36
9.....	105			65			102	106	29
10.....	102			362			98	142	38
11.....	98	64	17	523	--	b400	96	108	26
12.....	100			200			91		
13.....	98			110			87		
14.....	98			85			82		
15.....	93			74			82		
16.....	91	72	17	73	88	20	82	92	20
17.....	89			69			82		
18.....	87			64			134	184	s 120
19.....	85			60			718	600	s 1,300
20.....	80			62			811	410	898
21.....	76	73	15	64	102	17	455	210	258
22.....	74			62			286	180	139
23.....	73			73	104	20	234	130	82
24.....	73			1,040	463	s 2,810	172	98	45
25.....	71			3,520	2,380	s 26,000	137	108	40
26.....	71	98	18	2,570	3,250	22,600	122	85	28
27.....	71			1,190	2,400	7,710	112	99	30
28.....	69			638	750	1,290	105	74	21
29.....	67			386	294	306	102	74	20
30.....	67			262	208	147	1,950	1,750	s 11,800
31.....	65						2,770	1,180	8,830
Total.	3,307	--	581	12,065	--	61,872	10,163	--	24,357
Day	January			February			March		
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1.....	1,250	525	1,770	91	103	26	74	105	20
2.....	699	275	519	89			73		
3.....	445	225	270	91			73		
4.....	314	154	131	93			69		
5.....	246	114	76	96			69		
6.....	210	72	41	93	80	17	67	86	15
7.....	222	54	32	91			67		
8.....	166	52	23	91			64		
9.....	155	52	22	91			3,000	2,710	s 58,700
10.....	146	48	19	91			12,000	4,900	s 157,000
11.....	140	32	12	93	46	8.8	8,320	2,400	53,900
12.....	131	60	21	89			2,580	2,850	19,900
13.....	128	54	19	82			1,270	1,600	5,490
14.....	122	119	34	82			765	750	1,550
15.....	115			82			545	400	589
16.....	108			80			425	265	304
17.....	105			78			364	236	232
18.....	105			76			282	149	113
19.....	105			74	93	18	234	117	74
20.....	105			73			198	124	66
21.....	100	116	29	71			162	84	26
22.....	100			71			140		
23.....	96			71			125		
24.....	93			71			115		
25.....	93			71			100		
26.....	93	116	29	71	93	18	89	74	15
27.....	91			73			85		
28.....	89			74			78		
29.....	100						76		
30.....	93						74		
31.....	91						71		
Total.	6,056	--	3,527	2,299	--	537.2	31,655	--	298,306

s Computed by subdividing day.

b Computed from water-Sediment discharge relation curve.

## COLORADO RIVER BASIN--Continued

## COLORADO RIVER NEAR SAN SABA, TEX.--Continued

## Suspended sediment, water year October 1952 to September 1953--Continued

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	65			618	1,400	2,340	87		
2.....	65	89	15	288	400	311	80		
3.....	64			162	200	82	74		
4.....	60			115	168	52	67		
5.....	58			91	134	33	62		
6.....	57			82	103	23	60	59	10
7.....	56			76	94	19	58		
8.....	56			65	71	12	57		
9.....	52			60	78	13	54		
10.....	50	108	15	56	102	15	50		
11.....	48			54	89	13	44	78	8.4
12.....	48			539	702	s 3,170	42		
13.....	46			7,670	4,660	s 94,900	45		
14.....	46			8,830	3,700	s 93,200	44		
15.....	46			9,450	4,660	s 125,000	42		
16.....	46	92	11	3,010	3,840	s 30,700	42	71	5.6
17.....	46			1,700	2,300	10,600	41		
18.....	45			2,780	2,650	20,000	37		
19.....	42			1,610	1,700	7,390	32		
20.....	41			1,320	1,600	5,700	30		
21.....	41	402	s 265	1,040	1,030	2,890	30	71	5.6
22.....	41			910	850	2,090	31		
23.....	42			644	500	869	30		
24.....	213			470	350	444	27		
25.....	62			346	250	234	25		
26.....	57	100	15	319	200	172	24	71	5.6
27.....	51	120	17	282	135	103	25		
28.....	597	638	s 2,240	210	108	61	27		
29.....	2,610	2,660	s 30,700	152	82	34	32		
30.....	3,690	3,020	s 32,500	122	92	30	40		
31.....				96	74	19			
Total..	8,441	--	66,066	43,167	--	400,519	1,339	--	240.0
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.....	44			194			254	170	117
2.....	44	64	13	166	100	44	262	130	92
3.....	41			162			258	140	98
4.....	38			149			431	143	s 154
5.....	181			142			250	140	95
6.....	148			611			997	482	s 2,030
7.....	91	--	e 11	278	200	a 150	1,320	933	s 3,350
8.....	67			332	150	a 130	743	350	702
9.....	54			180	122	49	530	220	315
10.....	45			115			410	150	166
11.....	38			131	56	14	319	160	138
12.....	54			115			230	130	81
13.....	90			96			176	125	59
14.....	41			71			149	117	47
15.....	38			73			131	105	37
16.....	36	--	b 150	80	100	30	118	81	26
17.....	37			80			102	85	23
18.....	246			73			98		
19.....	1,340	1,100	3,980	111			93		
20.....	1,000	700	1,890	1,150	754	s 4,960	89	84	18
21.....	940	550	1,400	7,800	5,930	s 142,000	76		
22.....	850	250	574	17,000	4,480	s 201,000	69		
23.....	754	250	509	17,800	1,920	s 92,000	64		
24.....	1,030	720	s 2,570	3,130	3,870	s 30,300	57		
25.....	1,080	475	s 1,490	1,280	2,000	6,910	54	51	7.0
26.....	666	250	450	880	850	2,020	51		
27.....	319	150	129	792	740	1,580	50		
28.....	344	330	s 400	600	510	826	50		
29.....	530	250	358	368	260	258	48		
30.....	400	150	162	294	210	167	48		
31.....	278	128	96	278	170	128			
Total..	10,864	--	14,365	54,531	--	484,439	7,527	--	7,687

Total discharge for year (cfs-days) ..... 19,414  
 Total load for year (tons) ..... 1,362,496.2

e Estimated.

s Computed by subdividing day.

a Sum of determined constituents.

b Computed from water-Sediment discharge relation curve.

COLORADO RIVER BASIN--Continued  
COLORADO RIVER NEAR SAN SABA, TEX.--Continued

Particle-size analyses of suspended sediment, water year October 1952 to September 1953  
(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date of collection	Time	Water discharge (cfs)	Water temperature (° F)	Suspended sediment										Methods of analysis	
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters									
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250		0.350
Nov. 25, 1952. . . . .	6:00 p. m.	4,910		3,740	3,200	--	62	67	81	92	99	100			SFPCW
Nov. 26. . . . .	11:00 a. m.	2,740		3,240	1,740	--	62	73	87	92	100	--			SFPCW
Nov. 26. . . . .	1:10 p. m.	12,600		4,160	1,570	51	59	72	83	92	99	100			SFPCW
Mar. 10, 1953. . . . .	1:10 p. m.	12,600		4,160	1,380	--	29	42	73	93	98	100			SBN
Mar. 10. . . . .	10:55 a. m.	8,780		2,810	1,740	59	74	79	90	98	99	100			SFPCW
Mar. 11. . . . .	8:30 a. m.	5,040		3,240	2,230	--	74	83	88	96	100	--			SFPCW
Apr. 30. . . . .	2:00 p. m.	9,740		4,080	3,380	--	69	77	87	93	100	--			SFPCW
May 13. . . . .	3:45 p. m.	10,700		3,860	2,470	--	64	71	78	84	99	99	100		SFPCW
May 14. . . . .	11:40 a. m.	10,400		4,340	2,780	--	80	90	94	96	99	100			SFPCW
May 15. . . . .	1:40 p. m.	1,520		1,720	1,090	64	77	94	98	99	100	--			SFPCW
May 22. . . . .	8:00 a. m.	972		910	607	59	78	95	99	100	--	--			BCW
Aug. 21. . . . .	7:00 a. m.	4,910		5,280	1,920	66	81	88	97	100	--	--			BCW
Aug. 21. . . . .	7:00 a. m.	4,910		5,280	1,740	--	19	40	95	96	100	--			BCW
Aug. 22. . . . .	1:15 p. m.	13,700		6,730	6,350	--	76	86	92	96	100	--			SFPCW
Aug. 22. . . . .	11:15 p. m.	19,600		2,890	2,420	--	74	77	87	90	100	--			SFPCW
Aug. 23. . . . .	6:05 p. m.	15,300		1,510	1,700	91	94	96	100	--	--	--			BCW

COLORADO RIVER BASIN--Continued  
COLORADO RIVER AT AUSTIN, TEX.

LOCATION.--At raw water intake of Austin City Water Plant 4 1/2 miles upstream from gaging station which is at Montopolis Bridge on U.S. Highway 183 at South-east edge of Austin, Travis County, 2.8 miles upstream from Walnut Creek, 3.8 miles downstream from Waller Creek, 5 miles downstream from Barton Creek, and at mile 290.0 on U.S. Highway 183, 160 Square miles, approximately, of which 11,900 is probably noncontributing.

DRAINAGE AREA.--160 Square miles, approximately, of which 11,900 is probably noncontributing.

RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1953.

EXTREMES, 1952-53.--Dissolved solids: Maximum, 250 ppm Oct. 1-31; minimum, 214 ppm July 1-31.

Sulfates: Maximum, 168 ppm Dec. 1-31; Mar. 1-31; minimum, 144 ppm June 1-30.

Specific conductance: Maximum daily, 448 micromhos Feb. 17-18; minimum daily, 294 micromhos Apr. 29.

Water temperatures: Maximum observed, 78°F Aug. 13-14, Sept. 4; minimum observed, 52°F Dec. 16, Jan. 16.

EXTREMES, 1947-53.--Dissolved solids: Maximum, 340 ppm Nov. 1-30, 1951; minimum, 214 ppm July 1-31, 1953.

Hardness: Maximum, 197 ppm Jan 1-31, 1948; minimum, 144 ppm June 1-30, 1953.

Specific conductance: Maximum daily, 591 micromhos July 1, 1948; minimum daily, 294 micromhos Apr. 29, 1953.

Water temperatures: Maximum observed, 87°F on several days during summer months; minimum observed, 43°F Jan. 28, 1948, Feb. 4, 1949.

REMARKS.--Values reported for dissolved solids are residues on evaporation. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge of water year October 1952 to September 1953 given in WSP 1282. 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 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH		
															Parts per million	Tons per acre-foot	Tons per day	Calcium				Non-carbonate	
Oct. 1-31, 1952	284	12		45	13	25		178		20	35	0.3	3.0		250	0.34	192	166	20	25	0.8	431	8.2
Nov. 1-30	428	10		44	12	23		171		20	32	.3	2.2		236	.32	273	159	19	24	.8	411	7.9
Dec. 1-31	301	9.6		46	13	20		176		22	30	.4	2.8		232	.32	199	168	24	21	.7	417	7.9
Jan. 1-31, 1953	781	9.8		47	12	19		176		22	28	.3	4.2		242	.33	510	167	22	20	.6	400	7.9
Feb. 1-28	983	10		43	11	17		158		15	28	.3	4.5		230	.31	610	153	23	19	.6	383	7.9
Mar. 1-31	272	9.4		46	13	19		177		20	28	.2	4.0		232	.32	170	168	23	19	.6	394	8.1
Apr. 1-30	970	10		43	12	19		164		19	29	.2	3.0		216	.29	566	157	22	21	.7	387	7.8
May 1-31	1,374	11		43	11	17		161		17	26	.3	3.0		226	.31	838	153	21	20	.6	385	7.9
June 1-30	1,985	11		41	10	21		158		17	27	.3	3.0		223	.30	1,200	144	14	24	.8	370	7.9
July 1-31	1,893	10		42	11	18		161		17	26	.3	3.2		214	.29	1,090	150	18	21	.6	379	7.9
Aug. 1-31	1,307	9.8		42	10	20		162		17	26	.3	2.0		219	.30	773	146	13	23	.7	376	7.9
Sept. 1-30	490	15		46	12	16		178		15	24	.2	2.5		231	.31	306	164	18	17	.5	378	8.1
Weighted average	921	11		43	11	19		164		17	27	0.3	3.1		225	0.31	560	152	18	21	0.7	384	--

## COLORADO RIVER BASIN--Continued

## COLORADO RIVER AT AUSTIN, TEX.--Continued

Temperature (°F) of water, water year October 1952 to September 1953

Once-daily temperature measurement usually before 10 a. m.

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

COLORADO RIVER BASIN--Continued  
COLORADO RIVER AT WHARTON, TEX.

LOCATION.--At gaging station at bridge on U. S. Highway 59 in Wharton, Wharton County, 1,000 feet downstream from Texas and New Orleans Railroad bridge, 12 miles upstream from Jones Creek, and at mile 67.

DRAINAGE AREA.--41,150 square miles, approximately, of which 11,900 square miles is probably noncontributing.

RECORDS AVAILABLE.--Chemical analyses: April 1944 to September 1953.

Water temperatures: October 1945 to September 1948, March 1950 to September 1952.

EXTREMES, 1952-53.--Dissolved solids: Maximum, 331 ppm Oct. 1-31; minimum, 170 ppm Nov. 1-30.

Hardness: Maximum, 211 ppm Oct. 1-31; minimum, 102 ppm Nov. 1-30.

Specific conductance: Maximum daily, 721 micromhos Oct. 3; minimum daily, 211 micromhos Nov. 25.

EXTREMES, 1944-53.--Dissolved solids: Maximum, 386 ppm Apr. 1-10, 1948; minimum, 144 ppm Feb. 24-28, 1949.

Hardness: Maximum, 231 ppm Feb. 1-10, 1947; minimum, 87 ppm Feb. 24-28, 1949.

Specific conductance: Maximum daily, 721 micromhos Oct. 3, 1952; minimum daily, 186 micromhos Feb. 27, 28, 1949.

REMARKS.--Values reported for dissolved solids are residues on evaporation unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1952 to September 1953 given in WSP 1282.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>		Percent sodium-sulfate ratio	Specific conductance (micro-mhos at 25°C)	pH		
															Parts per million	Tons per acre-foot	Tons per day	Calcium				Non-carbonate	
Oct. 1-31, 1952	383	9.0		55	18	42	--	228		34	54	0.4	1.0	0.11	331	0.45	342	211	24	30	1.3	579	7.7
Nov. 1-30	659	8.4		31	5.9	10	--	101		19	11	.4	3.8	.10	170	.23	302	102	19	18	.4	251	7.7
Dec. 1-31	1,864	11		36	6.0	17	--	113		35	13	.5	2.8	.27	192	.26	966	114	22	24	.7	302	7.5
Jan. 1-31, 1953	1,391	5.0		40	12	31	--	161		30	35	.3	1.8	.25	243	.33	913	150	18	31	1.1	421	7.8
Feb. 1-28	1,845	6.5	0.15	38	9.5	23	2.1	140		28	31	.2	2.2	.13	226	.31	1,130	134	20	27	.9	379	7.7
Mar. 1-31	749	5.0		42	12	26	4.1	164		31	37	.3	1.5	.05	240	.33	485	154	20	26	.9	440	7.9
Apr. 1-30	1,202	13		41	11	22	4.0	158		24	32	.3	3.5	.09	236	.32	766	148	18	24	.8	406	8.1
May 1-31	3,849	15		37	5.6	14	3.8	131		14	17	.3	2.5	.04	189	.26	1,960	116	8	20	.6	298	8.1
June 1-30	950	12		39	9.3	18	4.7	148		18	29	.4	1.5	.14	214	.29	549	136	14	22	.7	365	8.0
July 1-31	1,162	12		40	11	20	4.1	162		18	29	.4	1.2	.13	220	.30	690	145	12	22	.7	395	7.9
Aug. 1-31	879	10		33	7.0	14	6.4	129		12	22	.3	1.8	.05	176	.24	418	112	6	20	.6	300	7.8
Sept. 1-30	1,210	16		42	9.4	17	3.8	160		18	22	.4	1.8	.07	209	.28	683	144	12	20	.6	359	7.9
Weighted average	1,345	11		38	8.6	19	3.8	142		22	25	0.3	2.2	0.12	211	0.29	766	130	14	23	0.7	353	--

a Sum of determined constituents.

COLORADO RIVER BASIN--Continued  
MISCELLANEOUS ANALYSES OF STREAMS IN COLORADO RIVER BASIN IN TEXAS

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>		Percent sodium	Sorption ratio	Specific conductance (micro-mhos at 25°C)	
															Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate				
LAKE J. B. THOMAS NEAR IRA																						
Dec. 31, 1952.....		7.8	0.16	18	3.4	61	2.2	124		53	25	1.0	3.0	0.18	248	0.34	59	0	68	3.5	386	8.0
Mar. 23, 1953.....		7.0	.10	20	4.6	59	2.8	112		59	28	1.0	3.5	.24	a240	.33	69	0	64	3.1	--	7.5
May 28.....		10	.18	22	5.3	70	3.2	147		61	29	.6	4.0	.16	282	.38	77	0	65	3.5	472	7.6
Aug. 13.....		11	.05	30	8.1	92	4.1	207		76	40	1.1	1.0	.30	374	.51	108	0	64	3.8	621	7.9
CANYON CREEK NEAR IRA																						
Mar. 26, 1953.....		0.7	--	52	18	31		172		102	16	--	0.8	--	324	0.44	204	62	25	0.9	--	8.1
SULPHUR CREEK NEAR IRA																						
Mar. 25, 1953.....		2.7	--	117	66	105		180		514	78	--	0.2	--	1,080	1.47	564	416	29	1.9	1,480	8.2
LAKE COLORADO CITY NEAR COLORADO CITY																						
Oct. 13, 1952.....			0.18	25	10	55	1.2	120		61	48	0.8	1.0	0.15	a266	0.36	104	5	53	3.8	470	7.7
MOUNTAIN CREEK RESERVOIR NEAR ROBERT LEE																						
Dec. 31, 1952.....		1.7	0.02	39	6.4	6.1	6.4	146		20	4.2	0.4	0.5	0.12	166	0.35	124	4	9	0.2	274	7.3
Sum of determined constituents.																						

a Sum of determined constituents.

## GUADALUPE RIVER BASIN

## GUADALUPE RIVER AT VICTORIA, TEX.

LOCATION.--At gaging station at bridge on U. S. Highway 59 in Victoria, Victoria County, 1,300 feet upstream from Texas and New Orleans Railroad bridge, 10 miles upstream from Coletto Creek, and at mile 51.

DRAINAGE AREA.--5,311 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1946, October 1948 to September 1953.

Water temperatures: November 1950 to September 1953.

EXTREMES, 1952-53.--Dissolved solids: Maximum, 606 ppm July 14-17, 28-30; minimum, 187 ppm Aug. 31, Sept. 1-10.

Hardness: Maximum, 270 ppm Nov. 1-10; minimum, 114 ppm Aug. 31, Sept. 1-10.

Specific conductance: Maximum daily, 850 micromhos July 15; minimum daily, 201 micromhos Sept. 1

EXTREMES, 1945-46.--Dissolved solids: Maximum, 1,040 ppm Jan. 27-31, 1952; minimum, 175 ppm June 4, 6, 15, 1951.

Hardness: Maximum, 103 ppm Jan. 17, 1946; minimum, 48 ppm Jan. 17, 1946.

Specific conductance: Maximum, 1,117 ppm Jan. 17, 1946; minimum, 201 micromhos Sept. 1, 1953.

Water temperatures: Maximum observed, 90° F Aug. 4, 27, 1952; minimum observed, 40° F Feb. 1-2, 1951.

REMARKS.--Values reported for dissolved solids are residues on evaporation unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1952 to September 1953 given in WSP 1282.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Percent sodium in total	Specific conductance (micro-mhos at 25°C)	pH	
															Parts per million	Tons per acre-foot	Tons per day	Calcium, mg./nesium	Non-carbonate				
Oct. 1-10, 1952	910	19	0.02	74	16	32	3.2	256	32		57	0.3	4.5	0.16	394	0.54	968	250	40	21	0.9	627	7.8
Oct. 11-20	687	15	--	61	21	40	--	217	36		70	.2	6.1	.23	394	.54	710	238	60	27	1.1	643	7.9
Oct. 21-31	557	17	--	50	21	43	--	193	36		70	.3	5.4	.25	371	.50	558	212	54	31	1.3	632	7.8
Nov. 1-10	512	14	--	72	22	49	--	256	38		84	.2	4.5	.15	446	.61	617	270	60	28	1.3	622	7.5
Nov. 11-20	503	20	--	48	18	47	--	195	34		72	.4	4.2	.28	363	.49	493	196	36	34	1.5	601	7.9
Nov. 21-29	1,675	17	--	53	14	43	--	202	29		61	.4	3.8	.22	333	.45	1,510	190	24	33	1.4	551	7.9
Nov. 30, Dec. 1-6, 25-28	2,493	13	--	37	6.9	19	--	117	21		30	.5	3.2	.17	a 189	.26	1,270	121	25	26	.8	346	7.8
Dec. 7-9, 23-24, 30-31	2,471	17	--	53	9.8	40	--	172	29		60	.5	4.0	.24	a 299	.41	1,990	172	32	34	1.3	524	8.0
Dec. 10-22	1,146	18	--	70	17	46	--	242	38		76	.4	4.0	.08	a 388	.53	1,200	244	46	29	1.3	684	8.1
Jan. 1, 7-20, 1953	1,486	19	.09	62	16	36	1.6	219	33		58	.2	4.3	.22	364	.50	1,470	220	41	26	1.1	580	7.9
Jan. 2-6	3,794	12	--	36	6.9	23	3.6	118	21		37	.5	3.2	.21	302	.50	2,240	118	22	29	.9	360	7.8
Jan. 21-31	891	14	.03	96	19	44	1.5	236	38		77	.2	4.3	.26	a 380	.52	914	242	49	28	1.2	676	8.0
Feb. 1-10	820	13	.06	65	19	38	2.2	246	36		62	.2	4.8	.20	a 361	.49	799	240	38	25	1.1	634	7.8
Feb. 11-19	745	14	--	44	21	48	2.7	156	41		93	.2	4.5	.23	361	.49	726	196	68	34	1.5	649	8.2
Feb. 20-28	936	11	--	59	21	49	2.6	214	40		87	.3	4.5	.10	399	.54	1,010	234	58	31	1.4	692	8.2

a Sum of determined constituents.

Mar. 1-10, 1953.....	704	13	--	64	19	50	3.1	217	41	92	.3	3.8	.11	418	.56	795	238	60	31	1.4	704	8.2
Mar. 11-20.....	661	11	--	59	22	54	3.0	216	39	100	.3	3.5	.25	423	.58	755	238	60	33	1.5	741	8.2
Mar. 21-31.....	592	25	--	64	22	57	--	232	40	99	.3	3.0	.16	454	.62	726	250	60	33	1.6	806	7.9
Apr. 1-10.....	573	18	--	62	21	46	--	234	37	80	.3	3.8	.21	417	.57	645	241	50	30	1.3	695	8.0
Apr. 11-20.....	541	34	--	53	22	56	--	228	40	105	.3	4.5	.33	476	.95	685	248	60	34	1.6	766	8.0
Apr. 21-30.....	1,079	20	--	55	22	59	3.6	202	37	112	.2	4.0	.21	436	.99	1,210	228	62	36	1.7	753	8.2
May 1, 10-11, 13-17, 30	1,991	21	--	66	15	52	4.8	212	35	96	.3	4.0	.25	430	.58	2,310	226	52	33	1.5	716	8.1
May 2, 8-9, 12, 23-25,																						
May 26-29, 31.....	1,562	21	--	48	11	35	5.0	181	28	58	.3	3.0	.16	310	.42	1,310	165	33	31	1.0	502	8.1
May 30-31.....	3,998	16	--	38	6	19	4.7	125	19	28	.3	4.0	.29	220	.30	2,370	122	20	25	1.8	343	8.1
June 1-12.....	3,410	23	--	57	18	50	5.1	214	33	85	.3	1.5	.17	392	.53	434	216	40	33	1.5	671	7.8
June 13-20.....	301	18	--	62	22	72	5.2	224	41	124	.3	1.0	.24	471	.64	383	245	62	38	2.0	820	7.8
June 21-30.....	277	18	--	56	21	66	4.7	212	40	115	.3	1.2	.22	445	.61	333	226	52	38	1.9	772	7.8
July 1-6, 13, 18, 20-24,																						
July 26-27, 31.....	364	21	--	48	20	77	4.5	175	43	130	.4	1.8	.27	445	.61	437	202	58	45	2.4	789	7.9
July 7-12, 19, 25.....	275	22	--	39	19	64	3.9	159	40	102	.4	1.8	.23	375	.51	278	176	45	44	2.1	668	7.8
July 14-17, 28-30.....	269	20	--	56	23	119	5.7	159	54	225	.4	1.8	.32	606	.82	440	234	104	52	3.4	1,080	7.9
Aug. 1-10.....	255	30	--	34	22	76	3.8	153	42	122	.4	.5	.24	a406	.55	280	176	50	48	2.5	706	7.9
Aug. 11-19.....	166	30	--	45	21	66	3.6	193	38	100	.5	.8	.20	a400	.54	179	199	41	41	2.0	681	8.0
Aug. 20-30.....	748	23	--	44	18	54	3.6	188	33	86	.4	.8	.19	a355	.48	717	194	30	38	1.7	615	8.0
Aug. 31, Sept. 1-10.....	3,740	16	--	35	6	18	4.1	128	18	22	.4	2.8	.14	137	.25	1,890	114	9	25	.7	313	7.8
Sept. 11-20.....	837	18	--	49	10	18	3.4	187	19	24	.4	2.8	.08	a237	.32	536	163	10	19	.6	396	8.1
Sept. 21-30.....	516	18	--	54	14	28	3.5	209	22	41	.3	3.8	.11	a288	.39	401	192	20	24	.9	483	8.0
Weighted average ...	1,074	17	--	51	14	37	3.7	179	29	61	0.3	3.5	0.21	319	0.43	925	184	38	30	1.2	538	--

a Sum of determined constituents.

GUADALUPE RIVER BASIN--Continued  
 GUADALUPE RIVER AT VICTORIA, TEX.--Continued

Temperature (°F) of water, water year October 1952 to September 1953  
 /Once-daily temperature measurement usually at 9 a. m. /

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

NUECES RIVER BASIN

NUECES RIVER NEAR MATHIS, TEX.

LOCATION --At intake tower at Lake Corpus Christi, 0.8 miles upstream from racing station at bridge on U.S. Highway 59, 200 feet downstream from Texas & N. Orleans Railroad bridge and 4 miles southwest of Mathis, San Patricio County, and at mile 47.

DRAINAGE AREA --16,660 square miles.

RECORDS AVAILABLE --Chemical analyses: October 1947 to September 1953.

Water temperatures: October 1947 to September 1953.

EXTRAMES 1952-53 --Dissolved solids: Maximum, 530 ppm May 1-20; minimum, 207 ppm Sept. 1-30.

Hardness: Maximum, 166 ppm Mar. 1-31; minimum, 95 ppm May 21-31.

Specific conductance: Maximum daily, 894 microhmhos May 16; minimum observed, 53 $^{\circ}$ F Dec. 25.

Water temperatures: Maximum observed, 88 $^{\circ}$ F June 26; minimum observed, 53 $^{\circ}$ F Dec. 25, Feb. 25.

EXTRAMES, 1947-53 --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 microhmhos July 1, 1948; minimum observed, 38 $^{\circ}$ F Jan. 1948.

Water temperatures: Maximum observed, 94 $^{\circ}$ F July 27, 1948; minimum observed, 38 $^{\circ}$ F Jan. 1948.

REMARKS --Values reported for dissolved solids are residues on evaporation unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1952 to September 1953 given in WSP 1282.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal-cium (Ca)	Mag-ne-sium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Car-bonate (CO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> )	Bo-ron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Per-cent so-lidum	Specific conductance (microhmhos at 25°C)	pH	
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
Oct. 1-31, 1952	53.3	22	--	42	4.0	50	--	175		29	36	0.4	1.0	0.24	274	0.37	39.4	121	0	47	2.0	446	7.6
Nov. 1-30	45.5	18	--	44	5.4	47	--	183		31	38	.9	.8	.37	286	.39	35.1	132	0	44	1.8	468	7.8
Dec. 1-31	44.1	26	0.05	46	4.7	50	6.1	198		32	41	.3	1.2	.43	319	.43	38.0	134	0	43	1.9	492	8.4
Jan. 1-31, 1953	51.2	22	.10	48	5.1	55	6.2	202		36	47	.3	.8	.62	332	.45	45.9	141	0	45	2.0	522	7.9
Feb. 1-28	46.2	22	.12	51	5.0	69	6.7	219		40	62	.4	.2	.65	b365	.50	45.5	148	0	49	2.5	600	8.1
Mar. 1-31	52.8	20	--	54	7.5	82	7.3	239		43	76	.4	.5	.41	414	.56	59.0	166	0	50	2.8	699	7.9
Apr. 1-30	70.0	23	--	52	7.2	119	7.6	264		56	103	.4	.5	.33	b499	.68	94.3	159	0	61	4.1	852	8.1
May 1-20	531	22	--	48	5.9	120	7.6	247		58	112	.4	1.0	.51	530	.72	760	144	0	63	4.3	880	8.2
May 21-31	2,754	16	--	33	3.1	40	5.6	128		34	30	.3	3.0	.18	250	.34	1,860	95	0	46	1.8	385	7.6
June 1-30	73.4	25	--	38	4.0	46	6.9	162		36	32	.5	1.5	.24	280	.38	55.5	112	0	45	1.9	436	8.2
July 1-31	82.4	27	--	46	5.2	54	7.2	c202		38	37	.5	.8	.23	326	.44	72.5	136	0	45	2.0	512	8.4
Aug. 1-31	386	40	0.5	52	5.2	66	6.7	d226		42	51	.5	1.0	.41	377	.51	393	151	0	47	2.3	579	8.3
Sept. 1-30	6,725	20	--	40	4.0	18	3.5	148		20	10	.3	2.0	.15	207	.28	3760	116	0	24	.7	311	8.0
Weighted average	741	21	--	40	4.1	29	4.2	156		25	21	0.3	2.0	0.19	240	0.33	480	117	0	34	1.2	368	--

a Includes equivalent of 1 ppm of carbonate (CO<sub>3</sub>).

b Sum of determined constituents.

c Includes equivalent of 4 ppm of carbonate (CO<sub>3</sub>).

d Includes equivalent of 5 ppm of carbonate (CO<sub>3</sub>).

## NUECES RIVER BASIN--Continued

## NUECES RIVER NEAR MATHIS, TEX.--Continued

Temperature (°F) of water, water year October 1952 to September 1953  
 /Once-daily temperature measurement usually before 10 a.m./

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

## RIO GRANDE BASIN

## RIO GRANDE ABOVE CULEBRA CREEK NEAR LOBATOS, COLO.

LOCATION.--Half a mile southeast of La Sauses, 7 miles upstream from Culebra Creek, and 15 miles upstream from gaging station near Lobatos, Conejos County. DRAINAGE AREA.--7,700 square miles above gaging station (includes 2,940 square miles in closed basin in northern part of San Luis Valley, Colo.). RECORDS AVAILABLE.--Chemical analyses: October 1946 to September 1953.

EXTREMES, 1952-53.--Dissolved solids: Maximum, 684 ppm June 9-14; minimum, 154 ppm May 2-10.

Hardness: Maximum, 346 ppm June 9-14; minimum, 80 ppm May 2-10.

Specific conductance: Maximum observed, 966 micromhos June 27; minimum observed, 178 micromhos May 6.

Hardness: Maximum, 346 ppm June 9-14; minimum, 80 ppm May 2-10.

Specific conductance: Maximum observed, 966 micromhos June 27; minimum observed, 178 micromhos May 6.

Hardness: Maximum, 346 ppm June 9-14; minimum, 80 ppm May 2-10.

Specific conductance: Maximum observed, 966 micromhos June 27; minimum observed, 178 micromhos May 6.

Hardness: Maximum, 346 ppm June 9-14; minimum, 80 ppm May 2-10.

Specific conductance: Maximum observed, 966 micromhos June 27; minimum observed, 178 micromhos May 6.

Hardness: Maximum, 346 ppm June 9-14; minimum, 80 ppm May 2-10.

Specific conductance: Maximum observed, 966 micromhos June 27; minimum observed, 178 micromhos May 6.

Hardness: Maximum, 346 ppm June 9-14; minimum, 80 ppm May 2-10.

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Hardness: Maximum, 346 ppm June 9-14; minimum, 80 ppm May 2-10.

Specific conductance: Maximum observed, 966 micromhos June 27; minimum observed, 178 micromhos May 6.

Hardness: Maximum, 346 ppm June 9-14; minimum, 80 ppm May 2-10.

Specific conductance: Maximum observed, 966 micromhos June 27; minimum observed, 178 micromhos May 6.

Hardness: Maximum, 346 ppm June 9-14; minimum, 80 ppm May 2-10.

Specific conductance: Maximum observed, 966 micromhos June 27; minimum observed, 178 micromhos May 6.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium	Non-carbonate				
Oct. 1-10, 1952	149	33	0.01	44	10	35	5.7	146	0	91	11	0.5	0.9	0.10	304	0.41	123	151	32	32	1.2	448	7.6
Oct. 11-18	116	--	--	54	12	42	--	--	--	--	--	--	--	--	386	50	115	184	--	33	1.3	533	--
Oct. 19-21	114	--	--	34	7.4	22	--	--	--	--	--	--	--	--	229	31	70.5	116	--	29	9	323	--
Oct. 22-31	109	--	--	52	11	44	--	--	--	--	--	--	--	--	360	49	106	174	--	35	1.4	526	--
Nov. 1-8	118	--	--	50	11	40	--	--	--	--	--	--	--	--	344	47	110	170	--	34	1.3	499	--
Nov. 9-20	199	--	--	36	7.6	23	--	--	--	--	--	--	--	--	235	32	126	121	--	29	9	342	--
Nov. 21-30	286	--	--	40	8.6	26	--	--	--	--	--	--	--	--	268	36	207	136	--	29	1.0	383	--
Dec. 1-10	282	--	--	41	8.5	26	--	--	--	--	--	--	--	--	270	37	206	138	--	29	1.0	385	--
Dec. 11-20	313	--	--	37	7.0	21	--	--	--	--	--	--	--	--	230	31	194	122	--	27	8	330	--
Dec. 21-31	307	--	--	32	5.7	15	--	--	--	--	--	--	--	--	192	26	159	104	--	24	6	277	--
Jan. 1-10, 1953	308	32	.04	29	5.9	19	4.8	102	0	50	6.5	.3	.10	.10	214	29	178	97	14	29	8	294	7.3
Jan. 11-20	339	--	--	29	5.6	16	--	--	--	--	--	--	--	--	181	25	166	96	--	27	7	262	--
Jan. 21-31	358	--	--	30	5.9	16	--	--	--	--	--	--	--	--	183	25	177	100	--	26	7	266	--
Feb. 1-10	397	--	--	30	5.6	16	--	--	--	--	--	--	--	--	192	26	206	98	--	26	7	274	--
Feb. 11-20	320	--	--	31	5.0	16	--	--	--	--	--	--	--	--	192	26	166	98	--	26	7	272	--
Feb. 21-28	290	--	--	30	4.5	16	--	--	--	--	--	--	--	--	188	26	147	94	--	27	7	269	--
Mar. 1-10	270	--	--	30	5.0	16	--	--	--	--	--	--	--	--	189	26	138	96	--	27	7	271	--
Mar. 11-20	213	--	--	46	7.9	31	--	--	--	--	--	--	--	--	286	40	170	148	--	31	1.1	436	--
Mar. 21-31	192	--	--	42	7.3	27	--	--	--	--	--	--	--	--	275	37	143	135	--	30	1.0	399	--

REMARKS.--Records of specific conductance of daily samples available in district office at Albuquerque, N.Mex. Values reported for dissolved solids are based on evaporation. Records of discharge or gaging station near Lobatos for water year October 1952 to September 1953 given in WSP 1282. Culebra Creek which enters Rio Grande between the sampling point and the gaging station is usually dry at its mouth. Inflow from other sources between sampling point and gaging station occurs only at times of heavy local rainfall.

## RIO GRANDE BASIN--Continued

## RIO GRANDE ABOVE CULEBRA CREEK NEAR LOBATOS, COLO.--Continued

Chemical analyses, in parts per million, water year October 1962 to September 1963--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boiron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	
															Parts per million	Tons per acre-foot	Tons per acre-day	Calcium, magnesium	Non-carbonate				
Apr. 1-10, 1953	198	32	0.01	50	11	39	5.6	160	0	101	13	.5	1.4	.08	341	.46	182	170	39	32	1.3	499	7.4
Apr. 11-20	141	--	--	42	9.7	30	--	--	--	--	--	--	--	--	192	.26	73.1	145	--	31	1.1	405	--
Apr. 21-22, 24, 26-27, 29-30	279	--	--	23	6.8	13	--	--	--	--	--	--	--	--	164	.22	124	86	--	25	.6	218	--
Apr. 23, 25, 28, May 1	303	--	--	48	10	35	--	--	--	--	--	--	--	--	316	.43	259	161	--	32	1.2	453	--
May 2-10	121	--	--	23	5.4	11	--	--	--	--	--	--	--	--	154	.21	50.3	80	--	23	.5	210	--
May 11-19	101	--	--	39	8.7	27	--	--	--	--	--	--	--	--	297	.40	81.0	134	--	30	1.0	378	--
May 20	129	--	--	52	13	50	--	--	--	--	--	--	--	--	404	.55	141	183	--	37	1.6	561	--
May 21-31	283	--	--	28	6.3	19	--	--	--	--	--	--	--	--	202	.27	154	96	--	30	.8	280	--
June 1-6	263	--	--	38	8.3	25	--	--	--	--	--	--	--	--	215	.29	153	129	--	30	1.0	359	--
June 7-8	160	--	--	65	15	46	--	--	--	--	--	--	--	--	429	.58	185	224	--	31	1.3	592	--
June 9-14	114	--	--	99	24	74	--	--	--	--	--	--	--	--	684	.93	211	346	--	32	1.7	932	--
June 15-24	309	--	--	46	11	35	--	--	--	--	--	--	--	--	320	.44	287	160	--	32	1.2	458	--
June 25-30	117	--	--	88	24	74	--	--	--	--	--	--	--	--	625	.85	197	318	--	34	1.8	866	--
July 1-10	46.1	35	08	67	17	70	8.7	197	0	198	21	1.0	1.1	.26	531	.72	66.1	237	76	38	2.0	751	7.6
July 11-19	41.7	--	--	32	7.0	22	--	--	--	--	--	--	--	--	217	.30	24.4	109	--	31	.9	303	--
July 20-21, 27-31	57.0	--	--	58	14	61	--	--	--	--	--	--	--	--	432	.59	86.5	202	--	40	1.9	623	--
July 22-26	79.8	--	--	30	6.3	23	--	--	--	--	--	--	--	--	216	.29	46.5	101	--	33	1.0	296	--
Aug. 1-2, 4-10	24.4	--	--	35	7.4	27	--	--	--	--	--	--	--	--	255	.35	16.8	91	--	33	1.1	352	--
Aug. 3	38.0	--	--	64	16	69	--	--	--	--	--	--	--	--	488	.66	50.1	226	--	40	2.0	711	--
Aug. 11-20	20.1	--	--	40	7.6	32	--	--	--	--	--	--	--	--	272	.37	14.8	131	--	35	1.2	393	--
Aug. 21-31	43.4	--	--	40	9.0	44	--	--	--	--	--	--	--	--	295	.40	34.6	137	--	41	1.6	421	--
Sept. 1-10	30.5	--	--	40	8.5	47	--	--	--	--	--	--	--	--	306	.42	25.2	135	--	43	1.8	440	--
Sept. 11-20	32.3	--	--	34	7.6	40	--	--	--	--	--	--	--	--	278	.38	24.2	116	--	43	1.6	399	--
Sept. 21-30	27.3	--	--	34	7.9	44	--	--	--	--	--	--	--	--	280	.38	20.6	118	--	45	1.8	404	--
Weighted average	186	--	--	38	7.8	25	--	--	--	--	--	--	--	--	248	0.34	125	127	--	43	1.0	358	--

## RIO GRANDE BASIN--Continued

## RIO GRANDE AT EMBUDO, N. MEX.

LOCATION.--At gaging station a quarter of a mile downstream from bridge at Embudo, Rio Arriba County, and 2½ miles downstream from Embudo Creek.  
 DRAINAGE AREA.--10,400 square miles, approximately (includes 2,940 square miles in closed basin in northern part of San Luis Valley, Colo.).  
 RECORDS AVAILABLE.--Water temperatures: October 1948 to September 1953.  
 Sediment records: January 1948 to September 1953.  
 EXTREMES, 1952-53.--Water temperatures: Maximum observed, 78°F Aug. 4; minimum, freezing point on many days November, December, January.  
 Sediment concentrations: Maximum daily, 2,450 ppm July 30; minimum daily, 14 ppm Oct. 13, Mar. 21.  
 Sediment loads: Maximum daily, 4,780 tons May 29; minimum daily, 13 tons Oct. 13, July 13.  
 EXTREMES, 1948-53, Water temperatures: Maximum observed, 78°F Aug. 4, 1953; minimum, freezing point on many days during winter months.  
 Sediment concentrations: Maximum daily, 10,200 ppm Aug. 5, 1948; minimum, 8 ppm average for period Nov. 30-Dec. 9, 1948.  
 Sediment loads: Maximum daily, 51,000 tons May 25, 1948; minimum daily, 8 tons average for periods Oct. 11-20, Nov. 1-20, 1951.  
 REMARKS.--Records of discharge for water year October 1952 to September 1953 given in WSP 1282.

Temperature (°F) of water, water year October 1952 to September 1953  
 (Once-daily temperature measurement generally taken after 6 p.m.)

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

a Measurement obtained before 11 a. m.

b Measurement obtained between 11 a. m. and 6 p. m.

## RIO GRANDE BASIN--Continued

## RIO GRANDE AT EMBUDO, N. MEX.--Continued

Suspended sediment, water year October 1952 to September 1953

Day	October			November			December		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	416	36	40	343			545		
2.....	416	33	37	332			535		
3.....	411	34	38	335			515		
4.....	398	91	98	339			525		
5.....	388	72	75	347			525		
6.....	388	28	29	351	16	15	555	39	59
7.....	388	29	30	355			587		
8.....	380	38	39	355			604		
9.....	375	26	26	402			592		
10.....	375	66	67	393			576		
11.....	375	80	81	384			576		
12.....	363	15	15	380			576		
13.....	355	14	13	388			604		
14.....	351	18	17	398			604		
15.....	351	26	25	420			614		
16.....	351	34	32	485	21	26	614	41	68
17.....	355	28	27	550			614		
18.....	351	36	34	515			636		
19.....	351	22	21	495			636		
20.....	351	27	26	540			636		
21.....	355			555			653		
22.....	355			565			653		
23.....	359			598			631		
24.....	363			604			626		
25.....	363			609			592		
26.....	355			510	82	117	576		
27.....	351	15	14	328			576	26	42
28.....	347			465			555		
29.....	343			475			545		
30.....	335			582			550		
31.....	335			--	--	--	570		
Total.	11,350	--	924	13,398	--	1,580	18,196	--	1,732
Day	January			February			March		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	560			658			686		
2.....	540			670			708		
3.....	540			686			675		
4.....	555			692			636		
5.....	560			692			570		
6.....	565	26	40	702	32	60	631	44	83
7.....	587			708			730		
8.....	582			702			754		
9.....	587			730			820		
10.....	582			742			778		
11.....	592			702			730		
12.....	604			658			697		
13.....	614			680			664		
14.....	620			648			626		
15.....	620			675			598		
16.....	620	22	37	692	25	45	576	26	43
17.....	614			664			565		
18.....	626			631			550		
19.....	648			675			540		
20.....	636			664			530		
21.....	648			530			520	14	20
22.....	642			530			505	20	27
23.....	631			614			505	40	55
24.....	653			626	19	31	485	220	288
25.....	653			631			475	250	321
26.....	658	25	44	614			525	165	234
27.....	675			642			560	128	194
28.....	664			653			525	90	128
29.....	664			--	--	--	520	82	115
30.....	664			--	--	--	515	49	68
31.....	664			--	--	--	510	50	69
Total.	19,068	--	1,254	18,511	--	1,298	18,709	--	2,779

a Computed from estimated concentration graph.

## RIO GRANDE BASIN--Continued

## RIO GRANDE AT EMBUDO, N. MEX.--Continued

Suspended sediment, water year October 1952 to September 1953--Continued

Day	April			May			June		
	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.....	515			766	200	414	1,640	625	2,770
2.....	515			642	132	229	1,370	601	2,220
3.....	520			565	58	88	1,250	440	1,480
4.....	525			520	59	83	1,250	395	1,330
5.....	520			480	44	57	1,130	250	763
6.....	510	58	80	447	38	a 46	1,020	215	592
7.....	515			438	31	37	980	172	455
8.....	505			429	33	38	880	163	387
9.....	485			424	33	38	820	83	184
10.....	495			442	32	38	778	98	206
11.....	500	29	34	438	37	44	760	87	179
12.....	465			442	20	24	760	94	193
13.....	447			465	20	25	760	83	170
14.....	429			452	36	44	760	95	195
15.....	420			452	27	33	748	68	137
16.....	406	44	48	480	30	39	697	70	132
17.....	402			505	45	61	754	89	181
18.....	406			520	45	63	850	107	246
19.....	406			598	89	144	820	175	387
20.....	402			697	250	470	880	150	a 360
21.....	402	98	116	772	395	823	980		
22.....	438	60	75	850	510	1,170	945		
23.....	460	55	80	945	513	1,310	850		
24.....	540	102	185	980	340	a 900	754		
25.....	670			980	215	569	653		
26.....	658	133	236	980	405	1,070	576		
27.....	658	152	270	1,170	620	1,960	490		
28.....	719	181	351	1,330	930	3,340	434		
29.....	820	237	525	1,500	1,180	4,780	402		
30.....	820	270	598	1,640	980	4,340	375		
31.....	--	--	--	1,820	580	2,850	--		
Total.	15,573	--	3,624	23,169	--	25,127	25,366	--	14,307
Day	July			August			September		
	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.....	351	19	18	347	600	a 560	235	48	30
2.....	335	16	14	318	280	a 240	241	31	20
3.....	321	24	21	282	36	27	241	32	21
4.....	307	35	29	265	50	36	241	53	34
5.....	304	18	15	253	29	20	232	38	24
6.....	314	34	29	250	53	36	229	35	22
7.....	310	66	55	247	108	72	223	35	21
8.....	314	43	36	247	85	57	223	51	31
9.....	314	47	40	238	93	60	220	46	27
10.....	290	23	18	238	40	26	220	29	17
11.....	279	29	22	247	26	17	220	40	24
12.....	286	19	15	250	26	18	226	53	32
13.....	290	16	13	262	21	15	232	64	40
14.....	272	27	20	256	20	14	229	75	46
15.....	272	30	22	268	19	14	226	47	29
16.....	268	35	25	265	19	14	223	37	22
17.....	307	42	35	262	95	a 67	223	45	27
18.....	359	67	65	296	200	sa 220	220	45	27
19.....	475	270	346	250	290	196	214	48	28
20.....	406	350	384	238	57	37	211	55	31
21.....	355	135	129	235	49	31	211		
22.....	335	86	78	232	42	26	217		
23.....	343	80	74	253	97	66	211		
24.....	359	67	65	262	102	72	208		
25.....	355	76	73	256	57	39	208		
26.....	324	129	113	247	52	35	208		
27.....	304	232	190	244	64	42	205		
28.....	286	143	110	244	57	38	202		
29.....	378	471	s 1,100	241	39	25	202		
30.....	576	2,450	s 4,260	241	33	21	205		
31.....	300	1,000	a 810	238	58	37	--	--	--
Total.	10,289	--	8,224	7,972	--	2,178	6,606	--	843

Total discharge for year (cfs-days) ..... 188,207

Total load for year (tons) ..... 63,870

s Computed by subdividing day.

a Computed from estimated concentration graph.

## RIO GRANDE BASIN--Continued

## RIO CHAMA NEAR ABIQUIU, N. MEX.

LOCATION.--At gaging station at bridge on State Highway 96, 1 3/4 miles upstream from El Rito Creek, 5 miles downstream from Abiquiu, Rio Arriba County, and 13.5 miles downstream from Abiquiu dam site.

DRAINAGE AREA.--2,170 square miles approximately.

RECORDS AVAILABLE.--Sediment records: January 1948 to September 1953.

EXTREMES, 1952-53.--Sediment concentrations: Maximum daily, 53,000 ppm July 30; minimum daily, 4 ppm Sept. 25.

Sediment loads: Maximum daily, 53,000 tons July 30; minimum daily, less than 0.50 ton on several days.

EXTREMES, 1948-53.--Sediment concentrations: Maximum daily, 53,000 ppm July 30, 1953; minimum daily 3 ppm Mar. 30, 1951.

Sediment loads: Maximum daily, 113,000 tons July 28, 1952; minimum daily, less than 0.50 ton on many days.

REMARKS.--The record of once-daily temperature measurements is not sufficiently accurate for publication. Stage-discharge relation affected by ice Jan. 6-9, Feb. 11-13. Records of discharge for water year October 1952 to September 1953 given in WSP 1282.

## Suspended sediment, water year October 1952 to September 1953

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.....	36	61	6	27	38	3	15	82	3
2.....	25	105	7	29	42	3	15	70	3
3.....	26	60	4	35	68	6	15	28	1
4.....	27	55	4	60	110	18	15	28	1
5.....	27	66	5	70	161	30	15	26	1
6.....	28	72	5	50	268	36	15	44	2
7.....	29	61	5	44	352	42	15	28	1
8.....	29	52	4	44	198	24	15	20	1
9.....	31	52	4	65	317	56	15	--	e 1
10.....	26	50	4	55	110	16	15	24	1
11.....	27	46	3	50	130	18	15	34	1
12.....	28	43	3	45	95	12	15	35	1
13.....	28	36	3	40	102	11	16	26	1
14.....	25	75	5	40	--	e 11	18	58	3
15.....	26	56	4	45	146	18	20	36	2
16.....	31	34	3	50	110	15	25	34	2
17.....	29	40	3	50	108	15	25	19	1
18.....	28	74	6	50	80	11	25	16	1
19.....	34	48	4	50	72	10	25	11	1
20.....	32	33	3	45	132	16	25	35	2
21.....	31	48	4	45	74	9	25	36	2
22.....	31	52	4	45	117	14	25	36	2
23.....	31	42	4	45	110	13	25	26	2
24.....	28	48	4	40	49	5	20	27	1
25.....	27	42	3	40	31	3	20	26	1
26.....	29	31	2	35	73	7	15	32	1
27.....	28	37	3	35	63	6	15	111	4
28.....	26	40	3	30	58	5	15	84	3
29.....	29	30	2	25	44	3	15	102	4
30.....	28	51	4	15	58	2	15	69	3
31.....	27	66	5	--	--	--	15	69	3
Total.	887	--	123	1,299	--	438	564	--	56

e Estimated.

## RIO GRANDE BASIN--Continued

## RIO CHAMA NEAR ABIQUIU, N. MEX.--Continued

## Suspended sediment, water year October 1952 to September 1953--Continued

Day	January			February			March		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day
1.....	15	39	2	14	38	1	387	1,140	1,190
2.....	15	56	2	15	38	2	332	1,340	1,200
3.....	15	40	2	14	39	1	308	450	374
4.....	15	63	3	14	66	2	308	130	108
5.....	15	55	2	14	59	2	303	125	102
6.....	15	--	e2	14	39	1	314	210	178
7.....	15	50	2	14	37	1	421	2,680	s 3,410
8.....	16	84	4	15	42	2	452	3,780	s 4,810
9.....	17	85	4	17	62	3	349	2,100	1,980
10.....	16	86	4	20	48	3	380	1,000	1,030
11.....	15	46	2	16	51	2	343	2,190	2,030
12.....	15	78	3	17	63	3	314	3,000	2,540
13.....	15	43	2	18	31	2	565	3,300	s 5,220
14.....	17	54	2	18	38	2	515	1,130	1,570
15.....	11	11	(t)	17	46	2	246	390	259
16.....	14	--	e1	15	32	1	204	1,150	633
17.....	14	32	1	14	33	1	217	1,350	791
18.....	14	37	1	403	1,400	sa 1,600	250	920	621
19.....	17	60	3	413	1,290	1,440	271	2,150	1,570
20.....	16	42	2	387	710	742	246	3,300	2,190
21.....	17	48	2	374	260	263	217	4,400	2,580
22.....	18	33	2	367	240	238	179	3,100	1,500
23.....	14	35	1	380	310	318	136	2,220	815
24.....	16	50	2	374	320	323	132	1,720	613
25.....	17	44	2	343	195	181	146	1,130	445
26.....	17	27	1	338	155	141	150	1,180	478
27.....	17	29	1	349	140	132	175	1,480	699
28.....	13	49	2	380	400	410	204	1,920	1,060
29.....	13	45	a2	--	--	--	222	2,300	1,380
30.....	15	42	2	--	--	--	276	2,700	2,010
31.....	14	--	e1	--	--	--	271	2,400	1,760
Total.	473	--	62	4,374	--	5,819	8,833	--	45,146
Day	April			May			June		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day
1.....	250	1,740	1,170	1,030	2,100	a 5,800	1,270	980	3,360
2.....	227	1,350	827	737	1,350	s 2,940	1,270	740	2,540
3.....	227	1,060	650	230	450	279	1,270	1,300	4,460
4.....	241	1,100	716	190	250	128	1,260	1,200	4,080
5.....	276	1,480	1,100	171	205	95	1,260	650	2,210
6.....	271	1,130	827	153	180	74	1,240	620	a 2,100
7.....	314	1,380	1,170	98	190	50	1,220	400	1,320
8.....	314	1,570	1,330	89	125	30	1,200	450	1,460
9.....	260	1,050	737	89	180	43	1,180	580	a 1,800
10.....	222	1,150	689	91	150	37	1,170	670	2,120
11.....	245	1,310	s 874	86	190	44	1,150	500	1,550
12.....	260	1,370	962	96	250	65	1,120	500	1,510
13.....	204	1,030	567	109	220	65	1,120	420	1,270
14.....	196	980	519	93	170	43	1,110	390	1,170
15.....	204	800	441	98	140	37	1,080	520	1,520
16.....	208	530	298	103	100	28	1,080	370	1,080
17.....	255	670	461	123	200	66	1,110	330	989
18.....	374	1,690	1,700	126	490	167	1,070	450	1,300
19.....	361	1,360	1,330	120	500	162	1,030	350	973
20.....	393	950	1,010	101	470	128	1,010	260	709
21.....	492	1,950	2,590	91	295	72	1,010	390	1,060
22.....	599	2,900	4,690	101	295	80	988	500	1,330
23.....	705	3,100	5,900	123	310	a 100	962	510	1,320
24.....	779	3,400	7,150	129	250	a 87	949	430	1,100
25.....	814	2,950	6,480	112	215	65	936	250	a 630
26.....	874	2,700	6,370	98	340	90	898	430	1,040
27.....	936	2,900	a 7,300	93	465	117	388	127	s 164
28.....	1,030	2,800	7,790	486	1,910	s 4,820	179	85	41
29.....	1,050	2,400	6,800	1,300	4,100	14,400	179	65	31
30.....	1,040	2,200	a 6,200	1,320	3,200	11,400	179	60	29
31.....	--	--	--	1,280	1,250	4,320	--	--	--
Total.	13,621	--	78,648	9,066	--	45,832	29,888	--	44,266

e Estimated.

s Computed by subdividing day.

t Less than 0.50 ton.

a Computed from estimated concentration graph.

## WESTERN GULF OF MEXICO BASINS

## RIO GRANDE BASIN--Continued

## RIO CHAMA NEAR ABIQUIU, N. MEX.--Continued

Suspended sediment, water year October 1952 to September 1953--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.....	175	40	19	177	20,900	s 11,300	14	156	6
2.....	164	46	20	157	21,800	s 10,100	13	100	4
3.....	160	50	22	93	13,200	3,310	10	88	2
4.....	160	58	25	61	8,000	1,320	7.5	77	2
5.....	160	70	30	52	1,310	184	6.5	65	1
6.....	187	2,800	1,260	47	669	85	5.3	85	1
7.....	153	1,400	578	44	432	51	4.4	55	1
8.....	112	1,070	s 341	42	476	54	3.5	75	1
9.....	42	85	10	44	347	41	4.1	40	(t)
10.....	35	55	5	116	11,000	s 8,530	3.3	62	1
11.....	32	47	4	77	6,600	1,370	3.0	64	1
12.....	32	28	2	69	1,700	317	2.8	74	1
13.....	32	46	4	120	12,400	s 5,150	2.6	85	1
14.....	32	300	26	63	3,600	612	2.6	17	(t)
15.....	38	1,900	195	588	19,000	s 37,900	2.0	19	(t)
16.....	45	1,200	146	599	5,700	9,220	2.2	74	(t)
17.....	59	1,450	231	582	3,200	5,030	2.4	39	(t)
18.....	123	7,180	s 3,640	565	3,000	4,580	1.9	8	(t)
19.....	148	25,500	s 10,000	618	6,000	10,000	2.0	66	(t)
20.....	96	10,900	s 3,390	532	4,900	7,040	1.9	33	(t)
21.....	65	1,400	246	507	2,500	3,420	2.6	34	(t)
22.....	59	800	127	485	1,700	2,230	2.2	54	(t)
23.....	67	750	136	300	2,200	s 1,940	2.2	38	(t)
24.....	77	700	146	73	460	91	3.0	60	(t)
25.....	54	500	73	44	160	19	2.8	4	(t)
26.....	54	550	80	35	105	10	2.4	20	(t)
27.....	54	500	73	28	135	10	2.6	27	(t)
28.....	49	500	66	34	125	11	3.3	22	(t)
29.....	71	4,420	s 7,470	27	440	32	3.8	74	(t)
30.....	363	53,000	s 53,000	24	260	17	3.5	34	(t)
31.....	154	29,000	s 18,000	20	150	8	--	--	--
Total.	3,032	--	99,365	6,223	--	123,982	123.4	--	27

Total discharge for year (cfs-days) ..... 78,383.4

Total load for year (tons) ..... 443,764

s Computed by subdividing day.

t Less than 0.50 ton.

## RIO GRANDE BASIN--Continued

## RIO CHAMA NEAR ABIQUIU, N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1952 to September 1953

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

Date of collection	Time	Water discharge (cfs)	Water temperature (° F)	Suspended sediment												Methods of analysis	
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters											
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.350	0.500		1.000
Nov. 12, 1952	2:40 p. m.	45	47	100	--		--		--		86	91	97		98	100	S
Feb. 25, 1953	1:45 p. m.	355	40	182	--		--		--		83	91	97		98	100	S
Mar. 11	4:30 p. m.	349	45	3,200	5,310		73		96		99	100	--		--	--	SPWCM
Mar. 11	4:30 p. m.	349	45	3,200	5,330		47		95		99	100	--		--	--	SPN
Apr. 1	1:15 p. m.	250	54	1,700	3,480		85		98		100	--	--		--	--	SPWCM
Apr. 29	3:35 p. m.	1,040	52	2,220	5,150		42		58		83	93	96		99	100	SPWCM
May 28	4:30 p. m.	1,040	68	7,570	4,360		38		55		88	98	99		100	--	VPWCM
June 10	5:35 p. m.	1,140	70	698	2,420		19		25		50	80	95		99	100	VPWCM
July 29	2:50 p. m.	36	74	1,010	4,330		91		97		98	99	100		--	--	SPWCM
July 29	2:50 p. m.	36	74	1,010	4,580		5		97		98	99	100		--	--	SPN
Aug. 12	4:55 p. m.	61	73	569	4,740		82		92		99	100	--		--	--	SPWCM
Aug. 19	11:15 a. m.	609	69	6,250	3,790		31		51		95	99	99		100	--	SPWCM
Aug. 19	11:15 a. m.	609	69	6,250	3,910		10		47		95	99	99		100	--	SPN

## RIO GRANDE BASIN--Continued

## RIO CHAMA NEAR CHAMITA, N. MEX.

LOCATION.--At gaging station 200 feet downstream from bridge on U. S. Highway 285, 2½ miles upstream from mouth, and 2½ miles northwest of Chamita, Rio Arriba County.

DRAINAGE AREA.--3,200 square miles, approximately.

RECORDS AVAILABLE.--Water temperatures: October 1950 to September 1953.

Sediment records: October 1947 to September 1953.

EXTREMES, 1952-53.--Water temperatures: Maximum observed, 86°F Aug. 29; minimum freezing point on many days during winter months.

Sediment concentrations: Maximum daily, 30,500 ppm July 31; minimum daily, no flow Sept. 18-22.

Sediment loads: Maximum daily, 36,300 tons Aug. 15; minimum daily, 0 tons Sept. 18-22. EXTREMES, 1947-53.--Water temperatures (1950-53): Maximum observed, 89°F July 19, 1951; minimum, freezing point on many days during winter months.

Sediment concentrations: Maximum daily, 40,100 ppm Aug. 3, 1950; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 139,000 tons Mar. 17, 1952; minimum daily 0 tons on many days.

REMARKS.--No flow Sept. 18-22. Stage-discharge relation affected by ice, Nov. 25-30, Dec. 1-16, 25-31, Jan. 1-19, 21-25. Records of discharge for water year October 1952 to September 1953 given in WSP 1282.

Temperature (°F) of water, water year October 1952 to September 1953  
[Once-daily temperature measurement, generally between 11 a.m. and 6 p.m.]

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

a Reading obtained before 11 a.m.

b Reading obtained after 6 p.m.

## RIO GRANDE BASIN

403

## RIO GRANDE BASIN--Continued

## RIO CHAMA NEAR CHAMITA, N. MEX.--Continued

Suspended sediment, water year October 1952 to September 1953

Day	October			November			December		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day
1.....	27	72	5	25	29	2	30	140	11
2.....	25	52	4	25	26	2	30	109	9
3.....	22	45	3	31	53	4	30	103	8
4.....	25	55	4	35	52	5	30	30	2
5.....	31	56	5	66	171	30	30	56	5
6.....	31	47	4	46	127	16	30	61	5
7.....	32	38	3	37	180	18	30	68	6
8.....	31	37	3	39	168	18	30	122	10
9.....	29	30	2	62	225	38	30	118	10
10.....	29	25	2	62	132	22	33	100	9
11.....	28	34	3	48	92	12	36	31	3
12.....	27	36	3	46	80	10	39	71	7
13.....	29	25	2	44	86	10	42	69	8
14.....	27	26	2	44	60	7	45	75	9
15.....	25	35	2	42	77	9	49	97	13
16.....	22	47	3	48	66	9	52	80	11
17.....	27	56	4	53	85	12	55	81	12
18.....	28	41	3	55	67	10	60	107	17
19.....	32	46	4	53	61	9	53	56	8
20.....	34	50	5	49	52	7	51	127	17
21.....	35	48	5	49	47	6	53	104	15
22.....	34	34	3	49	41	5	51	74	10
23.....	31	31	3	48	36	5	51	73	10
24.....	25	37	3	48	41	5	44	74	9
25.....	29	38	3	45	126	15	40	85	a 9
26.....	31	32	3	42	123	14	40	95	10
27.....	37	38	4	39	102	11	40	74	8
28.....	37	28	3	36	94	9	40	54	6
29.....	34	23	2	33	38	3	40	68	7
30.....	34	31	3	30	48	4	40	54	6
31.....	29	20	2	--	--	--	40	27	3
Total.	917	--	100	1,329	--	327	1,264	--	273
Day	January			February			March		
	Mean dis-charge (cfs)	Mean concen-tration (ppm)	Tons per day	Mean dis-charge (cfs)	Mean concen-tration (ppm)	Tons per day	Mean dis-charge (cfs)	Mean concen-tration (ppm)	Tons per day
1.....	40	76	8	37	37	4	437	1,830	2,160
2.....	42	86	10	35	38	4	382	1,460	1,510
3.....	36	42	4	40	43	5	358	770	744
4.....	38	72	7	49	39	5	328	690	611
5.....	39	74	8	49	28	4	352	800	760
6.....	41	93	10	49	29	4	358	630	609
7.....	44	90	11	48	95	12	451	2,120	2,580
8.....	50	108	15	48	103	13	479	4,550	5,880
9.....	54	58	8	55	111	16	388	3,520	3,690
10.....	47	122	15	62	39	7	412	2,250	2,500
11.....	47	134	17	66	68	12	388	4,300	4,500
12.....	49	85	11	68	81	15	352	3,100	2,950
13.....	50	94	a 15	66	70	12	567	4,420	s 7,410
14.....	52	102	14	60	45	7	628	2,700	4,580
15.....	54	54	8	57	50	8	240	800	518
16.....	51	142	20	55	39	6	148	400	160
17.....	47	153	19	53	38	5	163	1,450	638
18.....	44	95	11	237	2,580	s 2,310	230	1,290	801
19.....	48	73	9	394	2,500	2,660	280	1,630	1,230
20.....	53	48	7	329	1,500	1,330	250	1,950	1,320
21.....	46	39	5	322	1,100	956	215	3,030	1,760
22.....	49	49	6	310	800	670	194	3,000	1,570
23.....	45	59	7	310	700	586	148	2,000	799
24.....	43	64	7	328	850	753	134	1,300	470
25.....	47	64	8	334	800	721	156	1,120	472
26.....	48	55	7	346	600	561	163	1,180	519
27.....	40	59	6	352	450	428	174	1,300	611
28.....	40	139	15	400	525	567	215	1,430	830
29.....	35	74	7	--	--	--	285	1,780	1,370
30.....	37	51	5	--	--	--	394	2,460	2,620
31.....	37	50	5	--	--	--	376	2,420	2,460
Total.	1,393	--	305	4,558	--	11,681	9,645	--	58,632

a Computed by subdividing day.

a Computed from partly estimated concentration graph.

## RIO GRANDE BASIN--Continued

## RIO CHAMA NEAR CHAMITA, N. MEX.--Continued

Suspended sediment, water year October 1952 to September 1953--Continued

Day	April			May			June		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	280	1,750	1,320	1,070	2,010	5,810	1,200	2,880	9,330
2.....	235	1,370	869	923	1,680	s4,310	1,200	2,300	7,450
3.....	220	1,140	877	305	500	412	1,170	1,900	6,000
4.....	265	1,250	894	215	202	117	1,150	1,900	5,900
5.....	340	1,610	1,480	194	152	80	1,160	1,950	6,110
6.....	364	1,300	1,280	194	159	83	1,140	1,700	5,230
7.....	424	1,450	1,660	152	116	48	1,150	1,600	4,970
8.....	451	1,580	1,920	121	72	24	1,120	1,380	4,170
9.....	358	1,210	1,170	134	71	28	1,080	1,400	4,080
10.....	290	950	744	152	68	28	1,080	1,330	3,880
11.....	328	1,530	1,350	131	78	28	1,070	1,320	3,810
12.....	412	1,570	1,750	128	83	29	1,060	1,400	4,010
13.....	300	1,160	940	170	155	71	1,050	1,400	3,970
14.....	235	1,040	660	163	119	52	1,060	1,320	3,780
15.....	215	950	551	152	105	43	1,040	1,250	3,510
16.....	230	780	484	166	99	44	1,020	1,400	3,860
17.....	305	1,130	931	170	99	45	1,060	1,600	4,580
18.....	500	1,950	2,630	202	324	177	1,060	1,460	4,180
19.....	588	2,030	3,220	190	308	158	1,020	1,160	3,190
20.....	588	1,930	3,060	170	265	122	984	1,120	2,980
21.....	777	2,700	5,660	163	194	85	984	1,480	3,930
22.....	940	4,140	10,500	163	211	93	951	1,000	2,570
23.....	973	3,360	8,830	166	120	54	930	810	2,030
24.....	962	3,280	8,520	166	165	63	920	770	1,910
25.....	995	2,760	7,410	152	162	66	890	920	2,210
26.....	1,070	2,650	7,660	112	138	42	860	670	1,560
27.....	1,130	2,450	7,470	86	180	42	546	420	619
28.....	1,170	2,470	7,800	247	1,350	42	s2,690	235	159
29.....	1,170	2,460	7,770	1,230	3,710	12,300	176	43	21
30.....	1,120	2,210	6,680	1,150	2,700	8,380	163	44	19
31.....	--	--	--	1,130	2,620	8,600	--	--	--
Total.	17,235	--	105,890	9,867	--	44,142	26,531	--	110,018
Day	July			August			September		
	Mean dis-charge (cfs)	Mean concentration (ppm)	Tons per day	Mean dis-charge (cfs)	Mean concentration (ppm)	Tons per day	Mean dis-charge (cfs)	Mean concentration (ppm)	Tons per day
1.....	156	37	16	306	24,600	s22,800	17	238	s28
2.....	156	40	17	190	17,600	9,030	19	408	s26
3.....	145	41	16	170	14,500	6,680	7.0	86	2
4.....	141	31	12	60	13,500	2,190	5.7	57	1
5.....	163	69	30	34	5,000	459	3.0	48	(t)
6.....	174	1,400	658	24	1,500	97	2.0	45	(t)
7.....	152	1,520	824	15	500	20	1.2	36	(t)
8.....	124	500	167	7.0	300	6	.9	23	(t)
9.....	51	170	23	8.4	500	11	1 1.2	18	(t)
10.....	31	42	4	48	3,660	s4,040	.9	25	(t)
11.....	25	84	6	133	13,900	s7,680	.9	30	(t)
12.....	25	20	1	100	2,500	675	1.6	56	(t)
13.....	22	20	1	125	13,600	s5,120	.6	44	(t)
14.....	20	16	1	90	17,000	4,130	.3	24	(t)
15.....	29	338	s62	403	24,900	s36,300	.3	31	(t)
16.....	38	4,290	s579	644	11,000	19,100	.3	26	(t)
17.....	140	3,250	s1,320	556	4,400	6,610	.3	19	(t)
18.....	220	10,100	s8,670	516	3,500	4,880	0	--	0
19.....	420	17,800	s23,400	588	10,200	16,200	0	--	0
20.....	180	17,600	s10,700	532	7,800	11,200	0	--	0
21.....	42	4,800	544	500	2,820	3,810	0	--	0
22.....	34	2,200	202	516	2,270	3,160	0	--	0
23.....	32	681	76	493	4,750	6,320	.3	47	(t)
24.....	27	555	40	140	1,360	514	.6	16	(t)
25.....	22	539	32	30	320	26	.3	18	(t)
26.....	27	536	39	10	130	4	.3	20	(t)
27.....	17	494	23	5.1	80	1	.9	24	a(t)
28.....	12	427	14	3.0	70	1	1.2	26	(t)
29.....	9.7	700	18	6.4	250	4	1.2	18	(t)
30.....	294	29,300	s28,100	7.0	220	4	.6	14	(t)
31.....	296	30,500	s32,800	2.3	140	1	--	--	--
Total.	3,224.7	--	108,195	6,262.2	--	171,053	67.6	--	59

Total discharge for year (cfs-days)..... 84,293.5

Total load for year (tons)..... 610,675

s Computed by subdividing day.

t Less than 0.50 ton.

a Computed from partly estimated concentration graph.

RIO GRANDE BASIN--Continued

RIO CHAMA NEAR CHAMITA, N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1952 to September 1953  
(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water;  
W, in distilled water. C, chemically dispersed; M, mechanically dispersed; V, visual accumulation tube)

Date of collection	Time	Water discharge (cfs)	Water temperature (°F)	Suspended sediment										Methods of analysis	
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters									
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250		0.350
Nov. 12, 1952	3:20 p.m.	46	49	80	--	--	--	--	--	--	97	98	98	100	S
Dec. 1, 1952	9:50 a.m.	352	32	3,540	3,690	26	41	41	63	63	84	88	100	100	SPWCM
Feb. 16, 1953	9:50 a.m.	352	32	3,540	4,180	7	7	40	63	63	84	88	100	100	SPN
Feb. 25, 1953	1:00 p.m.	322	41	2,775	2,230	18	18	26	39	39	55	88	99	100	SPWCM
Mar. 10, 1953	3:05 p.m.	508	52	2,570	3,990	59	79	79	86	86	92	97	100	100	SPWCM
Mar. 20, 1953	9:15 a.m.	210	45	1,380	4,620	82	82	92	96	96	97	98	100	100	SPWCM
Apr. 1, 1953	2:25 p.m.	265	58	1,650	3,280	85	85	93	97	97	98	100	100	100	SPWCM
Apr. 1, 1953	2:25 p.m.	265	58	1,650	3,540	44	44	91	97	97	98	100	100	100	SPN
Apr. 10, 1953	3:50 p.m.	316	54	1,768	6,230	74	74	87	91	91	95	99	100	100	SPWCM
Apr. 20, 1953	2:05 p.m.	644	57	1,890	5,530	49	49	68	82	82	90	97	100	100	SPWCM
May 1, 1953	4:40 p.m.	1,070	53	2,100	4,660	42	42	51	64	64	74	91	98	100	SPWCM
June 10, 1953	4:35 p.m.	1,080	71	1,220	3,390	13	13	18	38	38	59	88	100	100	VPWCM
July 18, 1953	7:10 p.m.	138	72	23,500	5,290	88	88	98	100	100	--	--	--	--	SPWCM
July 18, 1953	7:10 p.m.	138	72	23,500	5,260	5	5	97	97	100	--	--	--	--	SPN
Aug. 1, 1953	8:20 a.m.	364	67	20,900	4,460	61	61	88	98	98	100	100	100	100	VPWCM
Aug. 11, 1953	6:40 p.m.	97	70	6,130	3,750	81	81	96	99	99	99	100	100	100	VPWCM
Aug. 15, 1953	2:20 p.m.	636	75	36,100	5,130	50	50	82	95	95	97	100	100	100	SPWCM
Aug. 15, 1953	2:20 p.m.	636	75	36,100	4,380	5	5	80	95	95	97	100	100	100	SPN
Aug. 15, 1953	4:35 p.m.	714	75	34,800	3,190	43	43	80	97	97	98	100	100	100	VPWCM
Aug. 17, 1953	10:15 a.m.	572	69	4,620	3,490	32	32	50	76	76	86	96	100	100	VPWCM
Aug. 19, 1953	1:25 p.m.	644	74	11,800	5,230	44	44	64	93	93	97	100	100	100	VPWCM
Aug. 25, 1953	10:10 a.m.	68	68	332	1,890	72	72	79	79	79	79	84	99	100	VPWCM

## RIO GRANDE BASIN--Continued

## RIO GRANDE AT OTOWI BRIDGE NEAR SAN ILDEFONSO, N. MEX.

LOCATION.--At gaging station on downstream side of pier of former railway bridge (now removed), 400 feet downstream from bridge on State Highway 4, 1½ miles southwest of San Ildefonso Pueblo, San Ildefonso Pueblo Grant, 2½ miles downstream from Rio Pojoaque, and 7 miles west of Pojoaque, Santa Fe County. DRAINAGE AREA.--14,300 square miles, approximately (includes 2,940 square miles in closed basin in northern part of San Luis Valley, Colo.). RECORDS AVAILABLE.--Chemical analyses: October 1946 to September 1953.

Water temperatures: October 1948 to September 1953.

Sediment records: October 1947 to September 1953.

EXTREMES, 1952-53.--Dissolved solids: Maximum, 628 ppm July 31; minimum, 141 ppm June 1-10.

Hardness: Maximum, 398 ppm July 31; minimum, 92 ppm June 1-10.

Specific conductance: Maximum observed, 876 micromhos July 31; minimum observed, 201 micromhos June 3, 5.

Water temperatures: Maximum observed, 80°F July 25, Aug. 9; minimum, freezing point on several days during November, December, January, and February.

Sediment concentrations: Maximum daily, 20,400 ppm July 31; minimum daily, 18 ppm Sept. 24, 26.

Sediment loads: Maximum daily, 37,200 tons July 31; minimum daily, 9 tons Sept. 22, 24, 26.

EXTREMES, 1946-53.--Dissolved solids: Maximum, 884 ppm Aug. 26, 1951; minimum, 137 ppm June 11-20, 1952.

Hardness: Maximum, 572 ppm Aug. 26, 1951; minimum, 85 ppm June 21-30, 1949.

Specific conductance: Maximum observed, 1,230 micromhos Aug. 26, 1951; minimum observed, 165 micromhos June 13, 1952.

Water temperatures (1948-53): Maximum observed, 84°F July 14, 16, 18, 1951; minimum, freezing point on many days during winter months.

Sediment concentrations (1947-53): Maximum daily, 32,200 ppm July 14, 1950; minimum daily, 18 ppm Sept. 24, 26, 1953.

Sediment loads (1947-53): Maximum daily, 184,000 tons July 14, 1950; minimum daily, 9 tons Sept. 22, 24, 26, 1953.

REMARKS.--Val reports for dissolved solids are sums of determined constituents. Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Storage discharge relation affected by ice Nov. 28-30, Dec. 27-Jan. 1. Records of discharge for water year October 1952 to September 1953 given in WSP 1282.

## Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	
															Parts per million	Tons per acre-foot	Tons per day	Calcium	Non-carbonate				
Oct. 1-10, 1952.....	434	28	--	46	9.5	29	--	160	--	73	10	--	0.7	--	275	0.37	322	154	23	29	1.0	428	7.9
Oct. 11-20.....	386	25	--	45	9.6	30	--	162	--	73	12	--	.4	--	275	.37	287	152	20	30	1.1	427	8.0
Oct. 21-31.....	388	27	--	47	9.7	31	--	164	--	77	12	--	.3	--	285	.39	299	158	23	30	1.1	443	7.9
Nov. 1-10.....	414	27	--	50	11	33	--	165	--	85	12	--	.5	--	300	.41	335	170	35	30	1.1	462	7.9
Nov. 11-20.....	526	28	--	49	12	36	--	169	--	93	14	--	.6	--	316	.43	449	172	34	31	1.2	484	7.9
Nov. 21-30.....	586	32	0.02	46	10	30	3.3	156	--	79	10	0.5	1.5	--	289	.39	457	156	28	29	1.0	432	7.9
Dec. 1-10.....	653	32	.02	43	9.3	26	3.3	153	--	65	9.8	.5	1.4	--	285	.36	497	146	20	27	.9	396	7.8
Dec. 11-20.....	681	31	--	37	8.7	23	--	146	--	47	9.5	--	1.3	--	230	.31	432	128	9	28	.9	355	7.8
Dec. 21-31.....	635	29	--	37	7.9	21	--	141	--	45	10	--	1.4	--	220	.30	377	125	10	27	.8	339	7.9
Jan. 1-10, 1953.....	634	31	--	37	7.9	22	--	146	--	46	8.0	--	1.5	--	225	.31	385	125	6	28	.9	346	7.9
Jan. 11-20.....	698	32	--	38	7.6	21	--	140	--	44	8.5	--	1.4	--	222	.30	418	126	12	27	.8	331	7.7
Jan. 21-31.....	718	30	--	37	7.6	21	--	134	--	45	8.0	--	1.7	--	216	.29	419	124	14	27	.8	331	7.7
Feb. 1-10.....	701	33	--	38	7.8	22	--	138	--	49	8.8	--	1.6	--	233	.31	468	137	14	27	.9	341	7.6
Feb. 11-18.....	742	30	--	37	7.9	22	--	136	--	49	9.0	--	1.1	--	228	.30	447	125	14	28	.9	340	7.9
Feb. 19-28.....	1,032	26	--	49	15	30	--	145	--	122	7.8	--	1.6	--	322	.44	897	184	65	26	1.0	494	7.9
Mar. 1-10.....	1,163	26	--	44	10	23	--	141	--	75	6.0	--	1.6	--	255	.35	814	151	36	25	.8	393	7.7
Mar. 11-20.....	987	25	--	50	11	28	--	146	--	99	7.5	--	1.5	--	296	.40	789	170	48	27	1.0	452	7.8
Mar. 21-31.....	724	24	--	49	12	29	--	154	--	90	8.8	--	1.4	--	290	.39	567	172	46	27	1.0	446	7.6

Apr. 1-10, 1953..	811	25	--	45	11	25	--	152		73	8.0	--	1.1	263	.36	576	158	33	26	.9	407	7.8
Apr. 11-20.....	721	23	--	47	11	27	--	154		76	9.5	--	.9	270	.37	526	162	36	26	.9	423	7.8
Apr. 21-30.....	1,575	18	--	42	7.9	15	--	140		43	5.8	--	1.7	202	.27	859	138	23	19	.6	323	7.7
May 1-10.....	898	20	--	38	7.9	18	--	134		48	6.8	--	.8	206	.28	499	128	18	23	.7	321	7.3
May 11-20.....	684	21	--	41	9.3	25	--	142		62	8.8	--	.6	238	.32	440	140	24	28	.9	380	7.6
May 21-31.....	1,607	18	--	38	7.1	17	--	122		48	7.2	--	.4	196	.27	850	124	24	23	.7	309	7.4
June 1-10.....	2,441	17	--	28	5.2	9.5	--	100		29	3.2	--	.4	141	.19	929	92	10	18	.4	220	7.7
June 11-20.....	1,959	20	--	36	6.6	11	--	114		38	5.0	--	.6	173	.24	920	117	24	17	.4	269	7.5
June 21-30.....	1,402	22	--	42	8.6	21	--	129		70	8.0	--	.4	235	.32	869	140	35	24	.8	365	7.4
July 1-10.....	425	25	--	46	10	27	--	148		83	9.5	--	.7	274	.37	314	136	34	21	.9	421	7.6
July 11-20.....	417	29	--	51	10	34	--	187		76	10	--	.7	303	.41	341	168	13	21	.9	467	7.5
July 21-30.....	383	29	--	51	10	32	--	175		80	10	--	1.2	299	.41	309	168	24	28	1.1	461	7.5
July 31.....	607	25	--	128	19	46	--	207		300	8.0	--	.4	628	.85	1,030	398	228	20	1.0	876	--
Aug. 1-10.....	311	25	--	54	10	33	--	174		94	10	--	.8	313	.43	263	176	33	29	1.1	432	7.6
Aug. 11-20.....	539	23	--	61	12	28	--	190		92	9.5	--	1.6	320	.44	466	202	46	23	.9	494	--
Aug. 21-31.....	385	27	--	47	11	28	--	169		68	9.0	--	.9	274	.37	270	162	24	27	1.0	430	7.5
Sept. 1-10.....	201	27	--	39	9.0	28	--	164		44	10	--	.6	239	.33	130	134	0	31	1.1	368	7.6
Sept. 11-20.....	191	28	--	37	7.7	27	--	166		39	9.0	--	.4	230	.31	119	124	0	32	1.1	363	8.0
Sept. 21-30.....	182	31	--	38	7.7	27	--	168		39	8.5	--	.5	235	.32	115	126	0	32	1.0	368	7.9
Weighted average	758	24	--	42	8.9	22	--	141		62	7.8	--	1.0	237	0.32	485	142	27	25	0.8	367	--

## RIO GRANDE BASIN--Continued

## RIO GRANDE AT OTOWI BRIDGE NEAR SAN ILDEFONSO, N.MEX.--Continued

Temperature (°F) of water, water year October 1952 to September 1953  
 (Once-daily temperature measurement generally before 11 a.m.)

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

a Observations made between 11 a. m. and 6 p. m.

b Observations made after 6 p. m.

## RIO GRANDE BASIN--Continued

## RIO GRANDE AT OTOWI BRIDGE NEAR SAN ILDEFONSO, N. MEX.--Continued

Suspended sediment, water year October 1952 to September 1953

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.....	447	172	208	389	92	97	665	220	395
2.....	442	153	183	378	75	77	659	238	423
3.....	442	121	144	386	68	69	647	280	489
4.....	434	129	151	393	76	81	613	200	a 330
5.....	434	134	157	422	94	107	586	160	253
6.....	434	100	117	413	88	98	635	190	a 330
7.....	434	113	132	405	87	95	677	210	384
8.....	434	137	161	405	101	110	708	200	a 380
9.....	422	106	121	460	182	226	695	194	364
10.....	413	92	103	487	233	306	647	196	342
11.....	401	98	104	460	152	189	618	172	287
12.....	397	105	113	447	116	140	653	197	347
13.....	397	104	111	456	88	108	641	152	263
14.....	382	96	99	460	111	138	671	163	295
15.....	370	82	82	487	125	164	671	203	368
16.....	378	98	100	534	122	176	677	242	442
17.....	389	81	85	624	172	290	695	217	407
18.....	386	84	88	624	192	323	721	214	417
19.....	374	80	81	575	139	216	734	243	462
20.....	382	57	59	591	146	233	728	299	588
21.....	389	65	68	647	150	262	740	289	577
22.....	393	95	101	659	170	302	734	305	604
23.....	386	77	80	683	151	278	702	239	453
24.....	382	99	102	734	229	454	695	135	253
25.....	386	91	95	702	229	434	641	140	a 240
26.....	393	90	95	613	220	364	591	180	287
27.....	389	83	86	422	86	98	600	182	295
28.....	386	102	106	380	100	103	560	180	272
29.....	386	87	70	500	86	116	540	165	241
30.....	389	65	68	520	90	126	580	190	298
31.....	389	60	63	--	--	--	600	207	335
Total.	12,460	--	3,313	15,256	--	5,780	20,324	--	11,441
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.....	640	210	363	721	170	331	1,260	560	1,910
2.....	613	173	286	721	180	311	1,250	685	2,310
3.....	591	200	319	734	158	313	1,170	575	1,820
4.....	596	199	320	754	159	324	1,080	450	1,310
5.....	602	186	302	754	212	432	1,010	290	791
6.....	603	149	245	767	225	466	1,010	425	1,160
7.....	665	159	285	774	266	556	1,200	850	2,750
8.....	683	182	336	774	300	627	1,290	1,380	4,810
9.....	671	195	353	788	180	383	1,280	1,990	6,880
10.....	671	210	a 380	823	157	349	1,280	1,500	5,180
11.....	671	175	317	781	160	337	1,190	988	3,170
12.....	683	155	286	747	155	313	1,120	1,430	4,320
13.....	708	205	392	738	178	350	1,180	1,780	5,670
14.....	728	221	434	721	172	335	1,340	1,900	6,870
15.....	714	173	334	683	145	267	1,010	510	1,390
16.....	689	149	277	754	145	295	802	210	455
17.....	671	151	274	714	135	260	767	235	487
18.....	683	162	299	811	554	s 1,490	809	430	939
19.....	721	180	350	* 1,120	1,320	3,990	837	520	1,180
20.....	714	175	337	1,080	730	2,130	816	820	1,810
21.....	708	147	281	988	760	2,030	781	1,150	2,430
22.....	721	153	298	851	565	1,300	740	1,040	2,080
23.....	689	163	303	1,000	445	1,200	671	710	1,290
24.....	708	161	308	1,020	415	1,140	647	425	742
25.....	714	148	285	1,060	415	1,190	630	550	936
26.....	721	140	273	1,030	330	918	653	350	617
27.....	734	155	307	1,050	350	992	708	440	841
28.....	728	191	375	1,120	520	1,570	714	615	1,190
29.....	721	202	393	--	--	--	754	680	1,380
30.....	734	233	462	--	--	--	830	885	1,980
31.....	721	180	350	--	--	--	837	920	2,080
Total.	21,221	--	10,124	23,868	--	24,199	29,666	--	70,778

s Computed by subdividing day.

a Computed from estimated concentration graph.

## WESTERN GULF OF MEXICO BASINS

## RIO GRANDE BASIN--Continued

## RIO GRANDE AT OTOWI BRIDGE NEAR SAN ILDEFONSO, N. MEX.--Continued

Suspended sediment, water year October 1952 to September 1953--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.....	781	830	1,750	1,830	1,440	7,120	3,010	1,770	14,400
2.....	740	550	1,100	1,620	1,280	5,600	2,800	1,300	9,830
3.....	721	430	837	996	620	1,670	2,600	1,370	9,620
4.....	747	430	867	802	280	606	2,600	1,330	9,340
5.....	823	570	1,270	740	210	420	2,480	1,370	9,170
6.....	865	630	1,470	877	200	366	2,350	1,250	7,930
7.....	893	630	1,520	608	175	287	2,290	850	5,260
8.....	956	740	1,910	570	130	200	2,230	600	3,610
9.....	837	715	1,620	554	100	150	2,050	960	5,310
10.....	747	580	1,170	580	140	219	2,000	775	4,180
11.....	740	475	949	575	125	194	1,940	700	3,670
12.....	774	590	1,230	560	115	174	1,940	725	3,800
13.....	714	570	1,100	659	175	311	1,940	645	3,380
14.....	624	375	632	653	140	247	2,000	875	3,640
15.....	586	375	593	635	135	231	1,940	860	4,500
16.....	575	275	427	689	180	335	1,830	710	3,510
17.....	618	275	459	695	180	338	1,940	700	3,670
18.....	795	575	1,230	754	240	489	2,110	940	5,360
19.....	893	1,000	2,410	767	250	518	2,000	740	4,000
20.....	893	880	2,120	851	345	793	2,050	650	3,600
21.....	1,040	1,500	4,210	908	380	932	2,110	730	4,160
22.....	1,270	2,500	8,570	964	440	1,150	2,110	630	3,590
23.....	1,410	2,530	9,630	1,070	700	2,020	1,880	580	2,940
24.....	1,470	2,780	11,000	1,130	570	1,740	1,780	525	2,520
25.....	1,570	2,200	9,330	1,140	550	1,690	1,620	725	3,170
26.....	1,670	1,820	8,210	1,080	300	875	1,520	910	3,730
27.....	1,720	2,170	10,100	1,150	720	2,240	1,240	400	1,340
28.....	1,780	2,070	9,950	1,470	1,030	4,090	665	180	323
29.....	1,940	2,020	10,600	2,740	3,870	28,600	580	120	188
30.....	1,880	1,570	7,979	2,940	2,880	22,900	510	96	132
31.....	--	--	--	3,080	2,490	20,700	--	--	--
Total.	31,072	--	114,234	33,487	--	107,205	58,115	--	139,873
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.....	487	71	93	490	15,600	s 22,000	221	76	45
2.....	460	68	84	442	6,800	8,120	226	246	150
3.....	434	72	84	397	5,700	6,110	211	75	43
4.....	434	55	64	305	3,700	3,050	196	52	28
5.....	438	56	66	271	2,000	1,460	201	44	24
6.....	460	56	70	250	594	401	198	36	19
7.....	469	68	86	250	204	138	203	44	25
8.....	422	188	214	240	106	69	189	32	16
9.....	350	111	105	240	80	52	182	31	15
10.....	300	55	45	224	1,200	726	182	35	17
11.....	270	37	27	324	14,100	s 13,200	182	28	14
12.....	320	40	35	295	3,000	2,390	189	32	16
13.....	289	41	32	331	1,750	1,560	196	36	19
14.....	259	37	26	305	2,200	1,810	198	39	21
15.....	256	30	21	368	7,610	s 12,400	194	29	15
16.....	283	100	76	851	10,700	24,600	191	30	15
17.....	403	621	s 852	734	3,200	6,340	194	33	17
18.....	599	2,380	s 3,900	671	2,100	3,800	194	32	17
19.....	795	8,800	18,900	809	4,200	9,170	184	26	13
20.....	694	12,300	s 25,300	702	4,500	8,530	184	28	14
21.....	464	2,600	3,260	671	3,700	6,700	182	28	14
22.....	401	1,150	1,250	635	2,250	3,860	180	19	9
23.....	397	468	502	613	2,150	3,580	180	21	10
24.....	386	310	323	397	1,100	1,180	175	18	9
25.....	378	215	219	283	269	206	180	23	11
26.....	356	378	363	265	185	132	180	18	9
27.....	328	161	143	250	125	84	180	20	a 10
28.....	280	130	98	234	96	61	184	37	a 18
29.....	262	500	354	226	82	50	186	24	12
30.....	581	5,100	s 8,860	221	84	50	189	24	12
31.....	607	20,400	s 37,200	218	77	45	--	--	--
Total.	12,862	--	102,652	12,512	--	141,854	5,731	--	656

Total discharge for year (cfs-days) ..... 276,574

Total load for year (tons) ..... 732,109

s Computed by subdividing day.

a Computed from estimated concentration graph.

RIO GRANDE AT OTOWI BRIDGE NEAR SAN ILDEFONSO, N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1952 to September 1953  
(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed; V, visual accumulation tube)

Date of collection	Time	Water discharge (cfs)	Water temperature (° F)	Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Suspended sediment										Methods of analysis	
						Percent finer than indicated size, in millimeters											
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000		2.000
Nov. 26, 1952 ...	1:00 p. m.	665	34	251	--	--	--	--	--	--	31	44	69	98	100	--	S
Jan. 20, 1953 ...	12:30 p. m.	708	40	212	--	--	--	--	--	--	16	26	41	89	100	--	S
Feb. 18, ..... Feb. 25, ..... Feb. 25, .....	4:15 p. m. 3:30 p. m. 3:30 p. m.	1,130 1,100 1,100	43 41 41	633 500 500	2,580 -- --	10 -- --	15 -- --	15 -- --	15 -- --	15 -- --	48 30 42	64 61 61	81 89 89	94 98 98	100 98 98	-- -- --	VPWCM S S
Mar. 10, .....	9:10 a. m.	1,280	45	1,550	2,760	66	77	77	83	86	92	99	100	100	100	--	SPWCM
Mar. 10, .....	9:10 a. m.	1,280	45	1,550	2,930	18	77	77	83	86	92	99	100	100	100	--	SPN
Mar. 20, .....	10:10 a. m.	837	47	812	6,410	76	83	83	89	91	95	100	--	--	--	--	SPWCM
May 1, .....	9:25 a. m.	1,870	46	1,420	6,680	30	40	40	55	70	89	98	100	100	100	--	SPWCM
June 10, .....	2:20 p. m.	1,980	69	730	2,120	14	20	20	38	55	87	99	100	100	100	--	VPWCM
July 19, .....	9:15 a. m.	760	71	12,900	5,000	76	91	91	97	98	99	99	99	99	99	100	SPWCM
July 19, .....	9:15 a. m.	760	71	12,900	5,470	7	90	90	97	98	99	99	99	99	99	100	SPN
July 24, .....	1:10 p. m.	401	80	387	5,110	57	75	75	88	95	99	99	100	--	--	--	VPWCM
Aug. 1, .....	9:35 a. m.	689	67	10,400	4,120	73	94	94	98	99	100	--	--	--	--	--	VPWCM
Aug. 11, .....	3:45 p. m.	338	68	20,400	3,540	70	85	85	88	88	88	96	100	100	100	--	VPWCM
Aug. 15, .....	10:20 a. m.	278	72	3,110	4,050	90	97	97	100	--	--	--	--	--	--	--	SPWCM
Aug. 16, .....	10:50 a. m.	893	71	9,930	4,970	51	82	82	97	98	99	100	100	100	100	--	SPWCM
Aug. 16, .....	10:50 a. m.	893	71	9,930	4,820	10	80	80	97	98	99	100	100	100	100	--	SPN
Aug. 19, .....	3:50 p. m.	1,000	72	3,810	3,320	37	58	58	89	97	99	99	100	100	100	--	SPWCM

## RIO GRANDE BASIN--Continued

## GALISTEO CREEK AT DOMINGO, N. MEX.

LOCATION.--At gaging station in Santo Domingo Pueblo Grant, at highway bridge 0.3 miles northeast of Domingo, Sandoval County, 2½ miles east of Santo Domingo Pueblo, and 4 miles upstream from mouth.

DRAINAGE AREA.--640 square miles, approximately.

RECORDS AVAILABLE.--Sediment records: January 1948 to September 1953.

EXTREMES, 1952-53.--Sediment concentrations: Maximum daily, 71,500 ppm Aug. 13; minimum, no flow on many days.

Sediment loads: Maximum daily, 310,000 tons July 17; minimum daily, 0 tons on many days.

EXTREMES, 1948-53.--Sediment concentrations: Maximum daily, 88,800 ppm July 4, 1952; minimum, no flow on many days.

Sediment loads: Maximum daily, 360,000 tons Aug. 11, 1952; minimum daily, 0 tons on many days.

REMARKS.--Maximum observed sediment concentration during year, 224,000 ppm July 30. Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of discharge for water year October 1952 to September 1953 given in WSP 1282.

Suspended sediment, water year October 1952 to September 1953

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....				0			0	--	0
2.....				0			0	--	0
3.....				0			0	--	0
4.....				0			0	--	0
5.....				0			0	--	0
6.....				0			0	--	0
7.....				0			0	--	0
8.....				0			0	--	0
9.....				.3			0	--	0
10.....				0			.8	--	b3
11.....				0			.3	--	b1
12.....				0			.4	--	s1
13.....				0			.3	174	b1
14.....				0			.2	--	b1
15.....				0			.1	--	b (t)
16.....				.3			.1	--	b (t)
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			.1	--	b (t)
24.....				0			.8	--	b3
25.....				0			.6	--	b2
26.....				0			.8	--	b3
27.....				0			.9	--	b3
28.....				0			.9	--	b3
29.....				0			1	--	b4
30.....				0			.8	261	s4
31.....							.5	--	b2
Total.	0		0	.6		b2	8.6	--	31

b Computed from water-sediment curve.

s Computed from estimated concentration graph.

t Less than 0.50 ton.

## RIO GRANDE BASIN--Continued

## GALISTEO CREEK AT DOMINGO, N. MEX.--Continued

Suspended sediment, water year October 1952 to September 1953--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.....	0.8	--	b 3	0			0.5		
2.....	1	312	s 3	0			0		
3.....	.6	--	b 2	0			0		
4.....	.5	--	b 2	0			0		
5.....	.5	--	b 2	0			0		
6.....	.5	174	s 1	0			0		
7.....	0	--	0	0			0		
8.....	0	--	0	0			.8		
9.....	0	--	0	0			0		
10.....	0	--	0	0			0		
11.....	0	--	0	.2			0		
12.....	0	--	0	.1			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	.3			0		
25.....	0	--	0	.2			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.	3.9		13	0.8	b	2	1.3	b	5
Day	April			May			June		
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.....							15	--	b 3,000
14.....							9	--	b 1,000
15.....							.3	--	b 2
16.....							0	--	0
17.....							4	9,390	s 478
18.....							13	48,500	s 2,550
19.....							.8	3,890	s 14
20.....							.5	--	b 6
21.....							.1	--	b 1
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.....							0	--	0
Total.	0		0	0		0	42.7		7,051

b Computed from water-sediment discharge curve.

s Computed by subdividing day.

## RIO GRANDE BASIN--Continued

## GALISTEO CREEK AT DOMINGO, N. MEX.--Continued

Suspended sediment, water year October 1952 to September 1953--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	52	34,300	s 8,400	7	4,300	a 2,000
2.....	0	--	0	4	9,500	a 100	18	31,200	3,640
3.....	0	--	0	.2	4,000	a 2	.1	4,100	a 2
4.....	0	--	0	0	--	0	0	--	0
5.....	0	--	0	0	--	0	0	--	0
6.....	0	--	0	0	--	0	0	--	0
7.....	13	49,500	s 2,270	0	--	0	0	--	0
8.....	.9	--	b 12	0	--	0	0	--	0
9.....	.1	--	b 1	0	--	0	0	--	0
10.....	0	--	0	2	--	b 60	0	--	0
11.....	0	--	0	38	--	b 8,000	0	--	0
12.....	33	--	b 7,000	24	--	b 6,500	0	--	0
13.....	.5	8,000	11	104	71,500	s 29,400	0	--	0
14.....	.1	--	b 1	2	8,530	s 60	0	--	0
15.....	.1	--	b 1	.1	--	b 1	0	--	0
16.....	.1	3,750	1	0	--	0	0	--	0
17.....	800	43,600	s 310,000	.1	--	b 1	0	--	0
18.....	1,030	55,900	s 276,000	0	--	0	0	--	0
19.....	82	8,900	1,970	.1	--	b 1	0	--	0
20.....	20	1,400	76	110	--	b 30,000	0	--	0
21.....	5	900	a 12	1	--	b 15	0	--	0
22.....	14	8,500	sc 460	75	--	b 20,000	0	--	0
23.....	5	6,000	a 81	35	--	b 7,000	0	--	0
24.....	3	8,500	69	1	--	b 10	0	--	0
25.....	.5	1,600	2	.2	--	b 2	0	--	0
26.....	.2	--	b 2	.1	--	b 1	0	--	0
27.....	.1	--	b 1	0	--	0	0	--	0
28.....	0	--	0	0	--	0	0	--	0
29.....	0	--	0	0	--	0	0	--	0
30.....	393	59,000	s 108,000	0	--	0	0	--	0
31.....	234	52,200	s 77,800	0	--	0	--	--	--
Total.	2,634.6		763,770	446.8	--	109,553	25.1	--	5,642

Total discharge for year (cfs - days) ..... 3,166.4

Total load for year (tons) ..... 906,069

s Computed by subdividing day.

b Computed from water-sediment discharge curve.

a Computed from estimated concentration graph.

c Computed from partly estimated concentration graph.

RIO GRANDE BASIN--Continued  
GALISTEO CREEK AT DOMINGO, N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1952 to September 1953

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

Date of collection	Time	Water discharge (cfs)	Water temperature (° F)	Suspended sediment										Methods of analysis		
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters										
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250		0.500	1.000
Dec. 12, 1952.....	12:45 p. m.	9	37	1,820	3,130	--	44	--	69	--	92	98	100	--	--	SPWCM
Dec. 12.....	2:10 p. m.	1	40	809	1,210	58	70	84	93	96	99	100	--	--	--	SPWCM
June 16, 1953.....	11:20 a. m.	24	--	68,400	3,440	--	80	--	96	--	99	100	--	--	--	SPWCM
July 7.....	2:15 a. m.	39	65	120,000	3,910	--	74	--	96	--	99	99	100	--	--	SPWCM
July 7.....	2:15 a. m.	39	65	120,000	4,560	--	15	--	56	--	99	99	100	--	--	SPN
July 17.....	11:45 p. m.	11,000	--	99,700	4,120	32	38	45	51	65	78	89	98	100	--	SPWCM
July 18.....	12:15 a. m.	8,760	--	98,100	4,560	32	38	44	52	63	78	91	99	100	100	SPWCM
July 18.....	1:15 a. m.	4,940	--	109,000	4,460	29	35	42	50	60	71	83	94	99	100	SPWCM
July 19.....	1:15 a. m.	4,940	--	109,000	4,460	29	35	42	51	60	71	83	94	99	100	SPN
July 19.....	4:00 p. m.	68	90	6,130	1,640	--	1	9	71	--	60	71	73	84	100	VPWCM
July 30.....	1:40 a. m.	2,910	64	215,000	5,020	--	23	--	38	--	64	75	94	100	--	SPWCM
July 30.....	2:05 a. m.	2,230	63	132,000	3,590	--	35	--	49	--	70	82	95	100	--	SPWCM
Sept. 2.....	11:15 a. m.	6	78	21,700	5,180	--	85	--	98	--	100	--	--	--	--	SPWCM

## RIO GRANDE BASIN--Continued

## JEMEZ RIVER NEAR BERNALILLO, N. MEX.

LOCATION.-- At gaging station, three-quarters of a mile downstream from Jemez Canyon Dam, 1 1/2 miles upstream from mouth, and 6 miles north of Bernalillo, Sandoval County.

DRAINAGE AREA.--1,040 square miles, approximately.

RECORDS AVAILABLE.--Water temperatures: October 1950 to September 1953.

Sediment records: April 1948 to September 1953.

EXTREMES, 1952-53.--Water temperatures: Maximum observed, 93°F July 19; minimum observed, freezing point on several days during December, January, and February.

Sediment concentrations: Maximum daily, not determined; minimum daily, no flow on many days.

Sediment loads: Maximum daily, not determined, probably occurred on Aug. 22; minimum daily, 0 tons on many days.

EXTREMES, 1948-53.--Water temperatures (1950-53): Maximum observed, 93°F July 19, 1953; minimum observed, freezing point on many days during winter months.

Sediment concentrations: Maximum daily, 66,700 ppm Sept. 20, 1950; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 167,000 tons July 25, 1951; minimum daily, 0 tons on many days.

REMARKS.-- Maximum observed sediment concentration during water year, 46,700 ppm July 18.

Records of discharge for water year October 1952 to September 1953 given in WSP 1282.

Temperature (°F) of water, water year October 1952 to September 1953  
 /Once-daily temperature measurement, generally between 11 a.m. and 6 p.m.  
 No flow on most days where temperature is not shown./

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1		--	--	--	--	--	65	48	67	80	74	
2			33	32	41	39	49	54	73	--	--	
3	-	--	33	--	55	41	67	--	77	a 69	85	
4		--	33	--	45	33	64	52	78	--	73	
5		--	32	32	52	41	--	52	78	--	80	
6		--	a 32	33	51	55	63	62	--	a 70	--	
7		--	--	40	49	62	53	65	--	--	--	
8		--	34	40	--	--	54	66	73	a 80	--	
9		--	34	35	53	56	48	62	83	86	--	
10		--	34	--	34	62	59	--	80	91	--	
11		--	35	--	36	55	60	62	75	--	--	
12		--	33	50	35	60	--	55	73	--	--	
13		--	33	55	32	55	63	56	80	--	--	
14		52	--	46	47	46	62	56	--	--	--	
15		--	47	33	--	--	58	57	--	--	--	
16		--	33	32	45	51	68	62	73	90	--	
17		40	40	39	36	58	60	--	73	a 75	--	
18		51	45	--	53	63	67	63	--	76	--	
19		51	36	44	38	60	--	64	--	93	--	
20		--	--	42	32	55	--	61	--	--	--	
21		46	--	45	36	49	58	70	--	--	--	
22		56	33	46	--	--	63	74	81	--	--	
23		--	a 33	34	32	56	60	--	--	--	--	
24		--	--	41	32	60	59	--	81	a 66	--	
25		33	--	--	32	63	58	79	--	--	--	
26		a 33	33	46	34	65	--	74	--	--	--	
27		33	--	49	58	63	65	--	--	82	--	
28		--	--	33	a 45	67	53	66	--	--	--	
29		--	33	35	--	--	50	65	--	--	--	
30		--	32	41	--	51	51	--	82	--	--	
31		--	33	--	--	60	--	--	--	76	--	
Average		--	--	--	42	55	59	62	77	--	--	

a Reading obtained before 11 a.m.

## RIO GRANDE BASIN--Continued

## JEMEZ RIVER NEAR BERNALILLO, N. MEX.--Continued

Suspended sediment, water year October 1952 to September 1953

Day	October			November			December		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	2			0	--	0	4	--	b 10
2.....	0			0	--	0	15	--	b 60
3.....	0			0	--	0	20	2,040	110
4.....	0			0	--	0	22	2,300	137
5.....	0			0	--	0	11	1,100	33
6.....	0			0	--	0	15	1,650	67
7.....	0			0	--	0	20	2,000	a 110
8.....	0			0	--	0	26	3,720	s 443
9.....	0			0	--	0	25	8,900	601
10.....	0			2	--	b 30	4	7,900	85
11.....	0			3	--	b 40	20	6,700	362
12.....	0			4	--	b 60	28	8,700	658
13.....	0			13	--	b 190	15	6,200	251
14.....	0			8	5,400	117	11	6,400	a 190
15.....	0			11	4,000	a 120	15	8,000	324
16.....	0			13	5,500	a 190	20	8,700	470
17.....	0			10	6,200	167	22	7,900	469
18.....	0			8	6,700	145	25	6,100	412
19.....	0			6	5,350	87	22	5,700	339
20.....	0			10	4,600	a 120	20	--	b 320
21.....	0			15	6,050	245	22	--	b 340
22.....	0			17	5,500	a 250	15	--	b 250
23.....	0			5	--	b 70	6	--	b 100
24.....	0			0	--	0	6	--	b 40
25.....	0			15	2,000	s 220	5	--	b 15
26.....	0			2	--	b 30	6	--	b 20
27.....	0			0	--	0	5	--	b 15
28.....	0			1	--	b 2	8	--	b 30
29.....	0			1	--	b 2	5	1,100	15
30.....	0			2	--	b 5	6	900	15
31.....	0			--	--	--	8	1,300	28
Total.	2		b 30	146	--	2,090	454	--	6,319
Day	January			February			March		
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1.....	11	1,200	a 40	20	--	b 180	37	4,500	a 450
2.....	15	800	32	21	3,280	s 189	25	3,670	248
3.....	11	500	a 15	18	3,750	182	20	4,480	242
4.....	15	1,100	a 40	20	3,460	187	8	2,520	s 88
5.....	17	1,510	115	20	3,720	201	22	3,980	s 256
6.....	26	1,750	s 170	19	4,540	s 249	20	4,270	s 254
7.....	20	4,100	221	13	4,600	s 178	20	4,650	s 262
8.....	25	4,810	325	18	4,600	a 220	50	4,650	s 625
9.....	20	3,900	211	24	3,530	s 253	40	3,950	427
10.....	15	3,500	a 140	17	3,480	s 148	40	3,520	380
11.....	20	3,500	a 190	45	3,650	s 530	28	3,940	298
12.....	25	4,150	280	20	3,780	s 217	24	3,370	218
13.....	20	4,150	224	29	3,440	s 373	23	2,750	171
14.....	22	4,700	279	22	3,440	s 226	23	3,150	196
15.....	20	4,670	252	20	2,900	sa 160	27	3,600	sa 280
16.....	18	4,840	s 265	17	3,270	s 158	26	2,900	204
17.....	12	3,290	s 114	13	3,020	s 130	26	2,800	197
18.....	23	3,300	sa 220	17	3,120	s 161	26	2,650	186
19.....	22	4,480	266	13	2,440	s 93	28	1,900	144
20.....	19	4,240	s 230	6	1,150	19	27	3,050	222
21.....	20	5,400	292	14	1,920	s 101	37	4,360	s 454
22.....	13	4,000	140	20	2,030	s 134	27	3,700	sa 290
23.....	13	2,280	s 73	6	1,960	s 43	23	2,700	s 170
24.....	18	2,800	sa 140	5	1,280	17	24	1,700	110
25.....	20	2,800	a 150	48	2,350	s 386	33	1,750	156
26.....	21	3,200	181	21	3,660	s 262	41	1,870	s 209
27.....	17	3,520	162	18	4,440	s 245	50	2,250	304
28.....	12	2,370	s 81	22	4,180	s 252	46	1,600	199
29.....	18	2,950	s 156	--	--	--	62	3,200	sa 580
30.....	17	3,200	147	--	--	--	60	3,050	494
31.....	18	--	b 150	--	--	--	43	2,150	s 249
Total.	563	--	5,301	546	--	5,494	986	--	8,563

s Computed by subdividing day.

a Computed from estimated concentration graph.

b Computed from water-sediment discharge curve.

## RIO GRANDE BASIN--Continued

## JEMEZ RIVER NEAR BERNALILLO, N. MEX.--Continued

Suspended sediment, water year October 1952 to September 1953--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.....	27	1,630	s 121	18	550	27	0.4	--	b 1
2.....	23	1,380	s 89	14	500	19	.1	--	b (t)
3.....	25	1,080	73	20	800	a 40	.1	150	s (t)
4.....	27	970	71	11	544	16	.4	180	s 1
5.....	24	650	a 40	16	235	10	.6	70	s 1
6.....	24	1,000	65	15	160	6	0	--	0
7.....	26	1,800	s 131	7	90	2	0	--	0
8.....	29	2,510	s 214	8	70	2	1	130	s 1
9.....	21	1,100	62	5	92	1	.4	60	s 1
10.....	24	783	s 54	1	80	(t)	.7	60	s 1
11.....	15	800	s 28	.5	75	(t)	.6	110	s 2
12.....	13	410	s 19	.6	72	(t)	.7	70	s 2
13.....	11	625	s 21	.4	128	(t)	.7	30	s 1
14.....	5	850	11	5	170	2	0	--	0
15.....	2	950	5	20	480	s 45	0	--	0
16.....	2	440	2	25	195	13	1	148	(t)
17.....	2	420	2	22			.6	388	1
18.....	.2			31			0	--	0
19.....	.1	--	b (t)	23			0	--	0
20.....	.3			10	--	b 7	0	--	0
21.....	10	780	s 25	1			0	--	0
22.....	20	1,020	s 77	.2			1	40	s 3
23.....	72	1,400	s 287	0	--	0	0	--	0
24.....	66	1,400	s 269	0	--	0	1	160	(t)
25.....	38	300	31	1	517	s 2	0	--	0
26.....	40	200	a 20	.7	325	s 1	.7	--	b 1
27.....	44	375	45	0	--	0	0	--	0
28.....	31	1,200	s 105	1	270	s 3	0	--	0
29.....	26	1,120	s 81	.4	1,300	1	0	--	0
30.....	15	1,050	s 34	3	500	a 4	.7	160	s 1
31.....	--	--	--	4	350	a 4	--	--	--
Total.	662.6	--	1,983	263.8	--	240	10.7	--	18
	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.....	0.7	110	s 2	3	152		0		
2.....	0	--	0	5	--		0		
3.....	.7	--	b 2	9	204		0		
4.....	0	--	0	4	136	2	0		
5.....	0	--	0	2	132		0		
6.....	.8	--	b 3	.2	--		0		
7.....	0	--	0	0	--	0	0		
8.....	.4	180	s 2	0	--	0	0		
9.....	.2	--	b 1	0	--	0	0		
10.....	1	--	b 6	0	--	0	0		
11.....	0	--	0	0	--	0	.2		
12.....	0	--	0	0	--	0	0		
13.....	0	--	0	0	--	0	0		
14.....	0	--	0	0	--	0	0		
15.....	0	--	0	0	--	0	0		
16.....	.2	350	(t)	0	--	0	0		
17.....	.2	360	s 1	0	--	0	0		
18.....	35	23,900	s 3,090	0	--	0	0		
19.....	24	21,400	s 1,470	4	--	0	0		
20.....	.6	3,000	s 15	.5	--	b 4	0		
21.....	0	--	0	.7	--		0		
22.....	0	--	0	95	--		0		
23.....	0	--	0	20	--	b 9,000	0		
24.....	.4	--	b 5	1	--		0		
25.....	1	--	b 15	0	--	0	0		
26.....	0	--	0	0	--	0	0		
27.....	5	--	0	0	--	0	0		
28.....	1	--	0	0	--	0	0		
29.....	1	--	b 4	0	--	0	0		
30.....	1	--	0	0	--	0	0		
31.....	2	--	0	0	--	0	--		
Total.	75.2	--	4,632	144.4	--	27,024	0.2		b 1
Total discharge for year (cfs-days) .....									
Total load for year (tons) .....									
s Computed by subdividing day.									
t Less than 0.50 ton.									
a Computed from estimated concentration graph.									
b Computed from water-sediment discharge curve.									

Total discharge for year (cfs-days) ..... 3,853.9

Total load for year (tons) ..... 61,695

s Computed by subdividing day.

t Less than 0.50 ton.

a Computed from estimated concentration graph.

b Computed from water-sediment discharge curve.

## RIO GRANDE BASIN--Continued

## JEMEZ RIVER NEAR BERNALILLO, N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1952 to September 1953

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

Date of collection	Time	Water discharge (cfs)	Water temperature (° F)	Suspended sediment											Methods of analysis	
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters										
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.350		0.500
Nov. 14, 1952.....	2:30 p.m.	25	51	13,100	3,910		68		82		90	98	100			SPWCM
Nov. 25.....	2:30 p.m.	10	33	1,640	3,010		86		93		99	100				SPWCM
Dec. 1.....	2:20 p.m.	62	35	4,970	4,110		65		85		98	100				SPWCM
Dec. 19.....	1:50 p.m.	62	36	5,890	4,390		71		94		98	99	100			SPWCM
Jan. 2, 1953.....	1:20 p.m.	15	32	729	1,040		32		47		78	90	100			VPWCM
Jan. 9.....	11:20 a.m.	20	37	4,930	4,850		63		89		97	99	100			SPWCM
Jan. 16.....	2:05 p.m.	36	38	6,150	5,700		59		84		95	99	100			SPWCM
Jan. 23.....	1:15 p.m.	10	47	4,160	3,780		48		65		84	98	100			VPWCM
Jan. 30.....	1:00 p.m.	14	47	3,530	3,770		52		67		88	99	100			SPWCM
Feb. 6.....	1:10 p.m.	22	51	5,360	3,990		50		73		91	99	100			SPWCM
Feb. 21.....	1:08 p.m.	34	36	2,270	2,300		36		47		69	92	100			SPWCM
Feb. 25.....	3:00 p.m.	134	42	2,620	3,540		61		89		97	98	99	100		SPWCM
Mar. 14.....	2:30 p.m.	28	57	3,920	3,960		43		64		83	98	100			SPWCM
Mar. 14.....	2:30 p.m.	28	57	3,920	3,870		4		61		83	98	100			SPN
Mar. 21.....	10:35 a.m.	53	--	3,720	3,840		64		84		97	99	100			SPWCM
Mar. 21.....	3:30 p.m.	45	50	5,320	5,000		65		90		100	--	--			SPWCM
Mar. 30.....	11:00 a.m.	64	51	3,700	4,290		58		84		100	--	--			SPWCM
Apr. 8.....	11:00 a.m.	24	54	1,220	2,730		73		91		94	96	98	100		SPWCM
Apr. 15.....	3:00 p.m.	6	65	1,590	3,570		78		90		95	97	99	100		SPWCM
Apr. 24.....	2:30 p.m.	62	67	1,660	4,210		77		96		100	--	--			SPWCM
Apr. 24.....	2:30 p.m.	62	67	1,660	4,570		5		97		100	--	--			SPN
Apr. 28.....	11:00 a.m.	13	53	579	--		--		--		95	99	99	100		S
June 10.....	3:00 p.m.	1	75	635	--		--		--		94	97	100			S
July 1.....	2:30 p.m.	10	83	572	--		--		--		90	95	98	100		S
July 10.....	2:10 p.m.	8	91	283	1,320		60		67		90	100	--			SPWCM
July 18.....	12:15 p.m.	40	74	20,300	3,650		72		98		100	--	--			SPWCM
July 19.....	3:00 p.m.	20	93	25,000	4,680		93		98		100	--	--			SPWCM
Aug. 3.....	3:00 p.m.	10	85	218	470		84		93		96	100	--			SPWCM

## RIO GRANDE BASIN--Continued

## RIO GRANDE NEAR BERNALILLO, N. MEX.

LOCATION.--At gaging station 2 miles northwest of Sandia Pueblo, 3 miles southwest of Bernalillo, Sandoval County, 3.5 miles downstream from State Highway 44, and 8.5 miles downstream from Jemez River.

DRAINAGE AREA.--17,300 square miles, approximately (includes 2,940 square miles in closed basin in northern part of San Luis Valley, Colo.).

RECORDS AVAILABLE.--Water temperatures: October 1948 to September 1953.

Sediment records: November 1947 to September 1953.

EXTREMES, 1952-53.--Water temperatures: Maximum observed, 82°F June 28; minimum, freezing point many days during winter months.

Sediment concentrations: Maximum daily, 39,100 ppm July 18; minimum daily, 44 ppm Nov. 4.

Sediment loads: Maximum daily, 299,000 tons July 18; minimum daily, less than 0.50 ton Sept. 25.

EXTREMES, 1947-53.--Water temperatures (1948-53): Maximum observed, 93°F Aug. 18, 1951; minimum, freezing point on many days during winter months.

Sediment concentrations: Maximum daily, 50,300 ppm Aug. 2, 1950; minimum daily, 18 ppm May 13, 17, 1950.

Sediment loads: Maximum daily, 320,000 tons July 24, 1949; minimum daily, less than 0.50 ton Sept. 25, 1953.

REMARKS.--Maximum observed sediment concentration during water year, 75,900 ppm July 18.

Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Stage discharge relation affected by ice Nov. 27, 28, Dec. 26-31, Jan. 1-3. Records of discharge for water year October 1952 to September 1953 given in WSP 1282.

Temperature (°F) of water, water year October 1952 to September 1953  
/Once-daily temperature measurement generally taken before 11 a. m./

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

a Temperature measurement taken between 11 a. m. and 6 p. m.

b Temperature measurement taken after 6 p. m.

RIO GRANDE BASIN

421

RIO GRANDE BASIN--Continued

RIO GRANDE NEAR BERNALILLO, N. MEX.--Continued

Suspended sediment, water year October 1952 to September 1953--Continued

Day	October			November			December		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	75	190	38	80	54	12	551	750	1,120
2.....	80	135	29	70	62	12	656	1,070	1,900
3.....	85	130	30	65	48	8	640	900	1,560
4.....	100	112	s34	60	44	7	608	820	1,350
5.....	339	425	s413	70	73	14	579	825	1,290
6.....	362	404	395	184	208	s145	600	750	1,220
7.....	334	362	326	341	390	359	624	750	1,260
8.....	75	118	24	362	270	264	680	1,180	2,170
9.....	70	188	36	383	323	334	689	1,290	2,400
10.....	70	189	36	400	560	605	672	775	1,410
11.....	65	115	20	430	660	766	648	890	1,560
12.....	255	542	s392	436	483	569	664	1,150	2,060
13.....	278	408	306	418	410	463	707	1,210	2,310
14.....	272	375	275	412	585	651	725	1,090	2,130
15.....	65	90	16	418	550	621	752	1,120	2,270
16.....	50	65	9	448	600	726	725	920	1,800
17.....	60	62	10	488	665	876	698	950	1,790
18.....	80	55	9	565	740	1,130	707	1,000	1,910
19.....	272	408	s302	579	700	1,090	716	1,120	2,170
20.....	234	290	183	565	650	992	725	1,080	2,110
21.....	272	275	202	551	760	1,130	725	1,150	2,250
22.....	75	76	15	586	735	1,180	725	1,180	2,310
23.....	80	60	13	616	685	1,140	718	975	1,880
24.....	70	83	16	648	730	1,280	698	1,370	2,580
25.....	80	110	24	689	800	1,490	680	1,250	2,300
26.....	290	600	470	698	790	1,490	650	1,000	1,760
27.....	290	300	235	550	1,100	1,630	600	755	1,220
28.....	278	266	200	500	830	1,120	550	790	1,170
29.....	75	88	18	442	550	656	530	805	1,150
30.....	60	68	11	530	660	944	570	825	1,270
31.....	75	72	15	--	--	--	620	880	1,470
Total..	4,846	--	4,102	12,584	--	21,684	20,430	--	55,150
Day	January			February			March		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	660	775	1,380	725	980	1,920	1,120	1,250	3,780
2.....	700	1,060	2,000	725	810	1,590	1,160	1,200	3,760
3.....	650	900	1,580	725	750	1,470	1,080	1,600	4,670
4.....	640	1,080	1,870	725	700	1,370	997	1,400	3,770
5.....	656	820	1,450	770	690	1,430	919	980	2,430
6.....	680	900	1,650	734	700	1,390	825	800	1,780
7.....	698	1,200	2,260	725	770	1,510	761	820	1,730
8.....	656	890	1,580	792	800	1,710	1,180	2,320	s7,540
9.....	664	910	1,630	814	880	1,930	947	1,840	4,600
10.....	707	1,060	2,020	847	970	2,220	1,010	2,620	7,140
11.....	716	960	1,860	847	980	2,240	1,020	2,280	6,280
12.....	707	790	1,510	761	1,100	2,320	860	1,680	3,990
13.....	707	750	1,430	752	800	1,620	792	2,360	5,050
14.....	725	830	1,620	725	730	1,430	880	2,360	s5,800
15.....	680	860	1,580	689	900	1,870	1,120	2,950	8,920
16.....	689	875	1,630	707	910	1,740	858	1,490	3,450
17.....	680	790	1,450	725	1,030	2,020	803	930	2,020
18.....	689	650	1,210	761	630	1,290	467	670	845
19.....	689	735	1,370	839	1,070	s2,610	495	720	962
20.....	716	800	1,550	1,070	2,060	5,950	618	1,100	s2,040
21.....	734	800	1,590	1,070	1,580	4,560	847	1,650	3,770
22.....	725	845	1,650	958	1,530	3,960	743	1,370	2,750
23.....	707	775	1,480	971	1,180	3,090	476	1,410	1,810
24.....	680	770	1,410	1,020	1,330	3,660	424	1,200	1,370
25.....	680	820	1,510	1,020	1,490	4,100	418	890	1,000
26.....	725	730	1,430	1,060	1,280	3,660	400	870	940
27.....	716	680	1,310	1,060	1,180	3,380	362	1,040	1,020
28.....	707	640	1,220	984	1,120	2,980	430	1,050	1,220
29.....	707	875	1,670	--	--	--	716	1,170	1,670
30.....	716	800	1,550	--	--	--	530	1,170	1,670
31.....	725	800	1,570	--	--	--	551	1,180	1,760
Total..	21,531	--	49,020	23,621	--	68,820	23,859	--	100,327

## RIO GRANDE BASIN--Continued

## RIO GRANDE NEAR BERNALILLO, N. MEX.--Continued

Suspended sediment, water year October 1952 to September 1953--Continued

Day	Mean discharge (cfs)	April		Mean discharge (cfs)	May		Mean discharge (cfs)	June	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	523	1,170	1,650	1,500	2,120	8,590	2,680	3,150	22,800
2.....	495	1,110	1,480	1,340	1,900	6,870	2,360	2,600	16,600
3.....	467	1,150	1,450	1,520	1,780	s 7,530	2,300	1,880	11,700
4.....	481	770	1,000	700	783	s 1,510	2,270	1,600	9,810
5.....	725	1,070	2,090	551	520	774	2,210	1,570	9,370
6.....	460	730	907	488	380	501	2,150	1,480	8,590
7.....	523	850	1,200	436	417	491	2,240	1,600	9,680
8.....	537	1,100	1,590	380	313	321	1,620	1,130	4,940
9.....	572	1,030	1,590	325	390	342	1,580	1,100	4,690
10.....	509	880	1,210	481	675	877	1,460	960	3,780
11.....	454	770	944	303	375	s 312	1,460	930	3,670
12.....	680	830	1,520	272	620	455	1,500	810	3,280
13.....	430	700	813	272	330	242	1,600	1,040	4,490
14.....	385	715	743	310	250	209	1,850	1,670	8,340
15.....	330	600	535	330	352	314	1,720	1,000	s 4,260
16.....	310	460	385	345	425	396	1,410	825	3,140
17.....	300	510	413	616	735	1,220	1,320	700	2,490
18.....	320	480	415	523	460	650	1,500	1,020	4,130
19.....	681	1,200	s 2,120	572	350	541	1,600	1,500	6,480
20.....	523	950	1,340	436	405	477	1,540	1,020	4,240
21.....	488	1,020	1,340	442	410	489	1,880	1,080	5,480
22.....	632	1,200	2,050	430	530	615	1,850	1,220	6,090
23.....	934	1,900	s 4,880	488	500	659	1,450	775	3,030
24.....	1,070	2,450	7,080	762	767	s 1,680	1,320	800	2,850
25.....	1,130	2,260	6,900	624	660	1,110	1,210	660	2,160
26.....	1,740	3,650	s 17,400	640	485	838	1,020	550	1,510
27.....	1,480	2,400	9,590	608	400	657	945	485	1,240
28.....	1,500	2,340	9,480	672	410	744	738	471	s 965
29.....	1,560	2,440	10,300	1,340	2,530	s 12,200	406	275	301
30.....	1,600	2,150	9,290	2,000	4,600	24,800	337	258	s 248
31.....				2,880	3,800	29,500	--	--	--
Total.	21,839	--	101,705	22,586	--	105,914	47,526	--	170,354
Day	Mean discharge (cfs)	July		Mean discharge (cfs)	August		Mean discharge (cfs)	September	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	276	175	130	468	26,200	s 34,300	30	215	17
2.....	244	130	86	409	21,800	s 23,800	29	470	37
3.....	216	130	76	400	14,400	15,600	26	3,350	235
4.....	202	100	55	210	7,000	3,970	23	1,300	81
5.....	302	683	s 600	142	5,300	2,030	22	860	51
6.....	330	900	802	69	2,220	414	20	580	31
7.....	232	375	235	37	2,380	238	24	700	45
8.....	216	850	496	45	1,820	221	24	570	37
9.....	167	310	a 140	102	1,900	523	23	410	25
10.....	152	275	113	126	1,340	456	14	290	11
11.....	133	185	66	60	920	149	16	275	12
12.....	167	357	161	80	1,700	367	14	230	9
13.....	268	7,500	5,430	197	12,600	s 9,650	16	245	11
14.....	150	2,100	850	130	19,800	s 8,200	20	275	15
15.....	133	390	140	72	5,000	s 1,050	24	295	19
16.....	121	520	170	233	6,580	s 5,210	22	235	14
17.....	128	410	142	600	17,700	s 29,600	24	210	14
18.....	2,020	39,100	s 289,000	416	5,850	6,570	14	175	7
19.....	680	12,500	23,000	519	11,800	s 19,400	13	170	6
20.....	725	8,900	17,200	548	24,100	s 47,300	16	200	9
21.....	448	9,500	11,500	364	9,000	8,850	20	235	13
22.....	230	9,000	5,590	425	11,400	s 13,900	44	338	s 51
23.....	173	3,000	1,400	540	6,800	9,910	26	205	14
24.....	150	1,530	620	500	4,420	s 6,170	4	85	1
25.....	128	1,020	353	192	1,400	s 764	1	54	s (t)
26.....	325	1,600	1,400	68	1,080	s 215	2	62	s 1
27.....	312	1,170	s 1,000	40	721	s 87	2	75	s 1
28.....	100	720	194	37	542	s 45	10	148	4
29.....	68	720	s 138	23	370	23	17	160	7
30.....	351	29,500	s 43,000	116	883	s 300	8	112	3
31.....	393	24,100	s 27,900	152	883	s 370	--	--	--
Total.	9,540	--	441,987	7,320	--	249,682	548	--	781

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

216,230

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

1,369,526

s Computed by subdividing day.

a Computed from estimated concentration graph.

t Less than 0.50 ton.

RIO GRANDE BASIN--Continued

RIO GRANDE NEAR BERNALILLO, N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1952 to September 1953

(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water;

W, in distilled water; C, chemically dispersed; M, mechanically dispersed; V, visual accumulation tube)

Date of collection	Time	Water discharge (cfs)	Water temperature (° F)	Suspended sediment												Methods of analysis
				Concentration of sample (ppm)	Concentration of suspension analysed (ppm)	Percent finer than indicated size, in millimeters										
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.350	0.500	
Nov. 19, 1952....	8:40 p.m.	572	43	650	--	--	--	--	--	--	70	84	96		100	S
Nov. 20.....	5:45 p.m.	558	45	644	1,570	18	19	24	27	39	62	79	97		99	SPWCM
Dec. 1.....	8:20 p.m.	495	32	798	--	--	--	--	--	--	41	57	83		99	S
Dec. 10.....	6:50 p.m.	640	35	647	1,990	--	12	--	26	--	60	79	96		100	SPWCM
Dec. 20.....	10:00 a.m.	743	37	1,260	2,240	--	7	--	14	--	35	52	75		95	SPWCM
Jan. 10, 1953....	9:40 a.m.	707	37	1,070	--	--	--	--	--	--	40	64	96		100	S
Jan. 23.....	11:15 a.m.	718	38	740	--	--	--	--	--	--	38	65	95		100	S
Feb. 1.....	9:30 a.m.	725	35	1,220	1,590	--	11	--	12	--	29	52	87		100	VPWCM
Feb. 10.....	9:45 a.m.	858	37	848	--	--	--	--	--	--	41	72	96		100	S
Feb. 19.....	12:00 p.m.	761	37	935	1,620	--	8	--	11	--	31	58	88		98	SPWCM
Feb. 19.....	3:00 p.m.	1,020	38	1,880	5,120	--	7	--	14	--	48	72	91		99	SPWCM
Feb. 19.....	5:50 p.m.	1,020	39	1,440	1,940	--	9	--	16	--	50	80	97		100	SPWCM
Feb. 27.....	8:10 a.m.	1,080	36	1,210	--	--	--	--	--	--	42	68	94		100	S
Mar. 1.....	9:55 a.m.	1,100	40	1,450	--	--	--	--	--	--	42	67	92		100	S
Mar. 10.....	9:35 a.m.	1,020	45	2,800	3,540	--	55	--	65	--	73	84	93		100	SPWCM
Mar. 14.....	8:30 a.m.	743	39	2,290	3,700	--	59	--	70	--	75	85	98		100	SPWCM
Mar. 20.....	5:09 a.m.	509	44	606	--	--	--	--	--	--	75	86	96		100	S
Apr. 10.....	8:10 a.m.	509	42	925	--	--	--	--	--	--	66	78	97		100	S
Apr. 20.....	8:10 a.m.	565	46	1,010	2,980	--	35	--	47	--	56	71	92		100	SPWCM
Apr. 26.....	9:45 a.m.	1,850	55	4,310	7,710	--	31	--	46	--	74	91	98		100	SPWCM
May 4.....	7:15 a.m.	725	47	999	1,480	--	32	--	39	--	51	75	95		99	SPWCM
May 29.....	3:45 p.m.	1,040	66	1,230	--	--	--	--	--	--	62	76	96		100	V
June 1.....	10:00 a.m.	2,450	61	3,000	4,400	--	22	--	31	--	59	82	95		100	SPWCM
June 15.....	10:50 a.m.	1,660	74	994	--	--	--	--	--	--	44	68	92		99	S
June 20.....	9:10 a.m.	1,560	63	884	1,980	--	19	--	27	--	47	68	94		100	SPWCM
July 1.....	8:45 p.m.	276	78	118	--	--	--	--	--	--	62	83	98		100	S
July 10.....	6:15 p.m.	147	88	199	703	58	71	76	79	81	83	92	97		100	SPWCM
July 18.....	5:00 a.m.	8,020	--	74,700	4,140	--	50	--	72	--	93	97	100		--	SPWCM
July 18.....	5:00 a.m.	8,020	--	74,700	4,610	--	5	--	72	--	93	97	100		--	SPN
July 18.....	1:30 p.m.	1,370	74	42,400	3,620	--	67	--	90	--	96	99	100		--	SPWCM

## RIO GRANDE BASIN--Continued

## RIO GRANDE NEAR BERNALILLO N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1952 to September 1953--Continued

(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water;

W, in distilled water; C, chemically dispersed; M, mechanically dispersed; V, visual accumulation tube)

Date of collection	Time	Water discharge (cfs)	Water temperature (° F)	Suspended sediment												Methods of analysis	
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters											
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.350	0.500		1.000
July 30, 1953	8:15 a.m.	1,430	67	29,200	3,910	--	51	--	78	--	95	97	99		100	--	SPWCM
Aug. 3	7:35 p.m.	412	74	9,080	4,160	--	77	--	94	--	98	99	100		--	--	SPWCM
Aug. 10	9:40 a.m.	131	70	1,160	2,750	--	68	--	86	--	92	95	100		--	--	VPWCM
Aug. 17	6:35 p.m.	594	80	13,800	3,780	--	64	--	89	--	97	98	100		--	--	VPWCM
Aug. 20	9:30 a.m.	402	69	2,300	5,800	--	49	--	78	--	94	97	100		--	--	SPWCM
Sept. 1	9:05 a.m.	31	70	175	410	--	86	--	95	--	98	100	--		--	--	SPWCM
Sept. 3	9:20 a.m.	29	62	5,140	5,550	--	91	--	89	--	100	--	--		--	--	SPWCM
Sept. 10	9:05 a.m.	19	60	332	1,700	--	84	--	96	--	100	--	--		--	--	SPWCM

## RIO GRANDE BASIN--Continued

## RIO GRANDE NEAR BERNARDO, N. MEX.

LOCATION.--At gaging station at bridge on U. S. Highway 60, 2 miles east of Bernardo, Socorro County, and 3½ miles upstream from Rio Puerco. Gage is on a conveyance channel, 5 miles downstream from heading, formerly San Francisco riverside drain.

DRAINAGE AREA.--19,230 square miles, approximately, (includes 2,940 square miles in closed basin in northern part of San Luis Valley, Colo.).

RECORDS AVAILABLE.--Sediment records: October 1947 to September 1953.

EXTREMES, 1952-53.--Sediment concentrations: Maximum daily, 37,300 ppm July 19; maximum observed, 48,700 ppm July 19; flow in conveyance channel only. Minimum, no river flow on many days.

Sediment loads: Maximum daily, 78,700 tons July 19; minimum, no river flow on many days, less than 0.50 ton in drainage flow on many days.

EXTREMES, 1947-53.--Sediment concentrations: Maximum daily, 42,400 ppm Aug. 3, 1950; minimum, no river flow on many days.

Sediment loads: Maximum daily, 240,000 tons July 24, 1949; minimum, no river flow on many days, less than 0.50 ton in drainage flow on many days.

REMARKS.--Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records are a summation of water and sediment discharge in floodway (formerly called main channel), conveyance channel (formerly called San Francisco riverside drain), and Bernardo interior drain. Particle-size analyses for each channel are published separately and show instantaneous discharges and concentrations in those channels at the time of sampling. Records of discharge for water year October 1952 to September 1953 given in WSP 1282.

## Suspended sediment, water year October 1952 to September 1953

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.....	71		13	41		2	606		2,430
2.....	69		11	41		3	645		3,020
3.....	98		37	46		5	625		2,340
4.....	72		14	50		a 5	685		3,760
5.....	67		32	71		8	705		2,780
6.....	59		7	73		10	725		3,270
7.....	46		7	77		10	665		2,670
8.....	42		5	82		a 20	665		2,760
9.....	49		5	108		31	705		3,380
10.....	84		24	133		41	726		3,690
11.....	60		12	187		147	725		4,280
12.....	84		16	233		277	705		3,870
13.....	89		18	319		636	685		3,160
14.....	88		13	323		627	666		3,490
15.....	85		15	313		665	686		3,670
16.....	99		22	356		803	706		4,060
17.....	96		21	416		1,530	726		3,930
18.....	81		9	446		1,730	706		3,800
19.....	60		4	477		1,850	726		3,890
20.....	50		3	553		2,380	726		3,690
21.....	42		2	586		2,630	766		3,900
22.....	37		a 2	606		2,750	786		4,360
23.....	33		1	645		3,540	806		5,360
24.....	37		a 1	645		2,560	846		5,260
25.....	36		2	665		3,390	866		5,040
26.....	39		2	665		3,690	826		a 4,800
27.....	42		5	705		4,720	806		4,540
28.....	47		4	665		4,280	726		3,890
29.....	39		2	605		4,780	686		3,580
30.....	41		2	558		3,580	686		3,470
31.....	41		a 2	558		3,580	666		2,870
Total.	1,883		a 313	10,690		46,700	22,275		114,810

## WESTERN GULF OF MEXICO BASINS

## RIO GRANDE BASIN--Continued

## RIO GRANDE NEAR BERNARDO, N. MEX.--Continued

Suspended sediment, water year October 1952 to September 1953--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.....	666		3,100	746		2,340	1,100		5,940
2.....	685		3,120	766		3,160	1,230		7,640
3.....	705		3,020	766		2,610	1,140		6,750
4.....	726		3,210	746		3,200	1,130		7,110
5.....	686		3,120	746		2,480	1,060		6,240
6.....	706		3,020	746		2,480	906		4,740
7.....	726		2,070	746		2,520	826		3,650
8.....	746		3,600	708		2,400	926		4,600
9.....	746		3,340	746		3,040	1,370		12,300
10.....	746		3,700	826		2,940	1,030		5,760
11.....	746		3,540	906		3,520	1,070		6,580
12.....	726		3,110	926		4,220	1,020		6,140
13.....	726		2,880	966		4,110	971		5,470
14.....	706		3,210	846		3,290	918		5,040
15.....	686		2,860	806		2,670	946		6,220
16.....	726		3,210	786		2,800	1,380		14,300
17.....	746		3,240	726		2,620	830		4,000
18.....	746		3,000	766		2,670	608		2,270
19.....	746		2,960	766		2,420	491		1,570
20.....	726		2,640	746		2,500	329		869
21.....	726		2,840	1,170		7,520	637		2,880
22.....	766		2,770	1,100		7,210	1,020		4,930
23.....	746		2,340	1,030		5,980	866		4,460
24.....	746		2,800	947		4,950	526		1,920
25.....	767		2,910	1,060		6,950	374		1,190
26.....	747		2,600	1,010		6,340	207		472
27.....	746		2,380	1,030		5,780	173		271
28.....	746		2,560	1,030		5,840	131		128
29.....	746		2,560	--		--	145		169
30.....	726		2,590	--		--	215		341
31.....	726		2,350	--		--	331		834
Total.	22,806		92,150	24,157		108,750	23,906		134,784
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.....	217		431	1,250		b 13,300	1,810		19,700
2.....	221		412	1,140		9,750	1,540		12,200
3.....	254		556	1,330		10,900	1,550		11,000
4.....	278		676	1,430		12,300	1,340		8,550
5.....	251		542	674		2,790	1,240		6,340
6.....	470		2,000	460		1,370	1,260		7,060
7.....	558		2,330	259		418	1,430		10,100
8.....	266		646	181		222	1,560		11,500
9.....	216		397	142		147	1,030		4,680
10.....	261		516	205		279	967		4,280
11.....	241		425	177		240	907		3,280
12.....	303		722	145		113	1,010		4,050
13.....	446		1,310	126		49	985		3,310
14.....	369		975	111		51	1,100		4,120
15.....	207		296	99		25	1,440		4,580
16.....	205		258	97		37	1,080		4,490
17.....	151		117	164		142	967		4,150
18.....	193		279	102		52	1,150		8,000
19.....	313		665	119		71	1,060		8,370
20.....	271		546	114		56	1,150		6,000
21.....	385		978	114		59	1,280		6,700
22.....	221		392	114		44	1,430		7,410
23.....	100		100	102		40	1,150		5,240
24.....	318		b 2,600	96		32	1,000		2,970
25.....	646		6,240	78		28	744		1,800
26.....	862		b 5,290	101		26	528		1,340
27.....	1,350		b 16,900	85		33	323		614
28.....	976		8,530	91		61	345		656
29.....	1,100		b 11,800	108		61	328		412
30.....	1,170		14,700	180		a 990	233		180
31.....	--		--	1,390		12,400	--		--
Total.	12,619		81,629	10,784		66,086	31,942		173,082

## RIO GRANDE BASIN--Continued

## RIO GRANDE NEAR BERNARDO, N. MEX.--Continued

## Suspended sediment, water year October 1952 to September 1953--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.....	123		a 60	202		6,660	7		2
2.....	86		14	29		24	5		1
3.....	93		23	46		97	3		
4.....	68		14	29		24	3		
5.....	57		15	44		56	3		
6.....	49		5	20		12	2		
7.....	35		2	11		3	2		
8.....	35		2	7		1	2		
9.....	31		1	6		a 1	2		
10.....	32		2	8		2	2		
11.....	28		2	8		1	2		
12.....	35		a 4	6		1	2		
13.....	76		120	11		2	2		
14.....	48		51	4		2	2		
15.....	32		13	3		t	2		
16.....	60		106	3			1		t
17.....	44		68	3			1		
18.....	184		14,800	5		a 3	1		
19.....	666		78,700	54		175	2		
20.....	232		12,100	155		5,810	1		
21.....	161		3,430	44		105	1		
22.....	257		a 9,000	24		21	1		
23.....	99		2,080	24		20	.9		
24.....	7		12	25		15	1		
25.....	5		3	19		9	.9		
26.....	5		a 1	30		16	.9		
27.....	4			30		15	.9		
28.....	4		t	25		12	.9		
29.....	5			18		6	1		
30.....	5			9		2	1		
31.....	40		a 950	10		3			
Total.	2,806		121,559	912		13,097	56.5		6

Total discharge for year (cfs-days) ..... 164,636.5  
 Total load for year (tons) ..... 952,966

t Less than 0.50 ton.

a Computed from estimated concentration graph.

b Computed from partially estimated concentration graph.

Note: The discharge and loads published are the sums of daily discharges and loads of the three channels. Composite concentration for many days would be meaningless because of the varying conditions in the three channels. Thus no mean concentrations have been shown.

## RIO GRANDE BASIN--Continued

## RIO GRANDE NEAR BERNARDO, N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1952 to September, 1953

(Methods of analysis: B, Bottom withdrawal tube; D, decantation; F, pipette; S, sieve; N, in native water;

W, in distilled water; C, chemically dispersed; M, mechanically dispersed; V, visual accumulation tube)

Date of collection	Time	Water discharge (cfs)	Water temperature (° F)	Suspended sediment										Methods of analysis				
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters												
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.350	0.500	1.000		
CONVEYANCE CHANNEL NEAR BERNARDO, N. MEX.																		
Nov. 17, 1952.....	4:00 p.m.	640	--	1,530	1,970		32			46		51	64	93		100	--	SPWCM
Nov. 28.....	2:00 p.m.	652	--	2,210	2,750		24			35		44	63	95		100	--	SPWCM
Dec. 10.....	3:00 p.m.	772	--	2,040	--		--			--		45	64	96		100	--	S
Dec. 21.....	4:00 p.m.	760	--	1,870	1,920		17			29		41	63	96		100	--	SPWCM
Dec. 24.....	2:30 p.m.	848	--	2,290	2,460		17			23		36	56	96		100	--	SPWCM
Jan. 6, 1953.....	3:00 p.m.	696	--	1,540	--		--			--		43	61	97		100	--	S
Jan. 12.....	3:00 p.m.	708	--	1,590	--		--			--		43	63	95		100	--	S
Jan. 25.....	10:30 a.m.	752	--	1,450	1,400		17			22		34	53	98		100	--	VPWCM
Feb. 1.....	4:30 p.m.	732	42	1,420	3,560		17			27		36	50	84		98	100	SPWCM
Feb. 13.....	2:00 p.m.	976	--	1,480	1,720		17			24		44	66	94		100	--	VPWCM
Feb. 21.....	5:00 p.m.	1,310	--	2,640	4,460		16			35		60	77	95		100	--	SPWCM
Feb. 27.....	4:00 p.m.	960	--	1,870	2,890		28			40		56	78	97		100	--	SPWCM
Mar. 2.....	2:30 p.m.	1,220	--	2,570	3,360		21			30		46	70	94		100	--	SPWCM
Mar. 5.....	10:30 a.m.	980	52	2,510	3,970		15			28		51	72	94		100	--	SPWCM
Mar. 8.....	10:30 a.m.	980	52	2,510	3,170		12			31		51	72	94		100	--	SPN
Mar. 22.....	1:00 p.m.	1,070	48	1,640	4,160		32			40		51	69	95		100	--	SPWCM
Mar. 31.....	4:30 p.m.	297	--	1,951	--		--			--		59	73	94		100	--	S
Apr. 6.....	2:30 p.m.	460	--	1,910	--		--			--		33	41	58		88	100	S

CONVEYANCE CHANNEL NEAR BERNARDO, N. MEX.--Continued

Apr. 13, 1953.....	1:30 p.m.	512	--	1,130	1,520	38	39	45	48	54	57	70	95	100	--	SBWCM
Apr. 23.....	4:30 p.m.	928	--	3,300	5,780	37	37	48	48	62	62	77	93	100	--	SPWCM
May 1.....	4:30 p.m.	1,310	--	3,460	3,150	35	35	49	49	65	65	82	98	100	--	SPWCM
May 31.....	5:00 p.m.	1,240	--	3,350	5,830	35	35	50	50	66	66	81	97	100	--	SPWCM
June 8.....	9:30 a.m.	1,780	66	3,060	3,910	21	21	38	38	70	70	83	99	100	--	SPWCM
June 8.....	9:30 a.m.	1,780	66	3,060	4,000	12	12	31	31	70	70	83	99	100	--	SPN
June 15.....	4:30 p.m.	1,490	--	1,010	--	--	--	--	--	29	29	55	90	99	100	S
June 22.....	6:00 p.m.	1,540	--	1,860	3,310	23	23	38	38	65	65	76	97	100	--	SPWCM
July 1.....	3:00 p.m.	38	--	682	--	--	--	--	--	97	97	98	99	100	--	SPWCM
July 18.....	2:00 p.m.	161	--	39,100	4,390	68	68	85	85	96	96	98	100	--	--	SPWCM
July 19.....	6:00 a.m.	1,380	--	47,700	3,580	68	68	91	91	96	96	98	100	--	--	SPN
July 19.....	6:00 a.m.	1,380	--	47,700	3,510	4	4	90	90	99	99	99	99	100	--	SPWCM
July 25.....	4:30 p.m.	5	--	963	2,890	57	57	90	90	99	99	99	99	100	--	S
Aug. 24.....	5:00 p.m.	3	--	88	--	--	--	--	--	82	82	99	100	--	--	S
Sept. 22.....	5:30 p.m.	.3	--	250	--	--	--	--	--	82	82	96	100	--	--	S

FLOODWAY NEAR BERNARDO, N. MEX.

Aug. 2, 1953.....	8:30 a.m.	28	--	365	895		67		87		87	100	--	--	--	SPWCM
Aug. 7.....	8:30 a.m.	6	--	206	560		96		97		98	100	--	--	--	SPWCM
Aug. 20.....	8:30 a.m.	280	--	18,700	5,520		58		92		97	99	100	--	--	VPWCM

## RIO GRANDE BASIN--Continued

## RIO PUERCO BELOW CABEZON, N. MEX..

LOCATION.--One-fourth mile upstream from mouth of Chico Arroyo,  $4\frac{1}{2}$  miles southwest of Cabezon, Sandoval County, and  $1\frac{1}{4}$  miles downstream from gaging station above Chico Arroyo near Guadalupe.

DRAINAGE AREA.--420 square miles, at gaging station above Chico Arroyo near Guadalupe. RECORDS AVAILABLE.--Sediment records: April 1948 to September 1953.

EXTREMES, 1952-53.--Sediment concentrations: Maximum daily, 166,000 ppm July 31; maximum observed, 246,000 ppm July 31; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 219,000 tons Aug. 1; minimum daily 0 tons on many days. EXTREMES, 1948-53.--Sediment concentrations: Maximum daily, 166,000 ppm July 31, 1953; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 219,000 tons Aug. 1, 1953; minimum daily, 0 tons on many days.

REMARKS.--Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. No flow Oct. 1, 1952 - Apr. 22, 1953. No appreciable inflow between sampling point and gaging station except during periods of heavy local runoff.

Records of discharge for water year October 1952 to September 1953 given in WSP 1282.

Suspended sediment, water year October 1952 to September 1953

Day	April			May			June		
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1.....	0			0					
2.....	0			.2					
3.....	0			0					
4.....	0			0					
5.....	0			0					
6.....	0			0					
7.....	0			0					
8.....	0			0					
9.....	0			0					
10.....	0			0					
11.....	0			0					
12.....	0			0					
13.....	0			0					
14.....	0			0					
15.....	0			0					
16.....	0			0					
17.....	0			0					
18.....	0			0					
19.....	0			0					
20.....	0			0					
21.....	0			0					
22.....	0			0					
23.....	3			0					
24.....	11			0					
25.....	4			0					
26.....	6			0					
27.....	7			0					
28.....	3			0					
29.....	2			0					
30.....	.5			0					
31.....				0					
Total.	36.5		b3,800	.2		b4	0		0

b Computed from water-sediment discharge relation curve.

## RIO GRANDE BASIN--Continued

## RIO PUERCO BELOW CABEZON, N. MEX.--Continued

## Suspended sediment, water year October 1952 to September 1953--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	416	154,000	s 219,000			
2.....	0	--	0	313	134,000	s 155,000			
3.....	0	--	0	24	53,700	s 3,910			
4.....	0	--	0	6	34,000	a 570			
5.....	0	--	0	3	19,000	a 150			
6.....	0	--	0	1	5,000	14			
7.....	0	--	0	.1	--	b 2			
8.....	0	--	0	.1	--	b 1			
9.....	0	--	0	.1	--	b 1			
10.....	0	--	0	.1	--	b 1			
11.....	0	--	0	.3	--	b 4			
12.....	0	--	0	0	--	0			
13.....	18	130,000	s 10,900	0	--	0			
14.....	.3	60,000	56	0	--	0			
15.....	0	--	0	2	--	b 100			
16.....	5	9,190	s 697	.1	--	b 2			
17.....	110	66,000	s 35,900	0	--	0			
18.....	150	92,800	s 44,300	60	16,100	s 28,100			
19.....	1	--	b 90	70	72,000	s 22,800			
20.....	.2	--	b 10	19	34,800	s 4,410			
21.....	0	--	0	130	95,700	s 45,200			
22.....	0	--	0	4	39,300	s 538			
23.....	323	116,000	s 173,000	1	17,000	46			
24.....	14	82,500	s 3,350	.1	3,500	1			
25.....	3	37,500	315	0	--	0			
26.....	1	11,000	a 30	0	--	0			
27.....	25	76,300	s 7,780	0	--	0			
28.....	3	33,000	277	0	--	0			
29.....	1	7,900	21	0	--	0			
30.....	50	103,000	s 27,600	0	--	0			
31.....	325	166,000	s 197,000	0	--	0			
Total.	1,029.5	--	501,320	1,049.9	--	479,850	0		0

Total discharge for year (cfs-days) ..... 2,116.1  
 Total load for year (tons) ..... 984,974

s Computed by subdividing day.

a Computed from estimated concentration graph.

b Computed from water-sediment discharge relation curve.

RIO GRANDE BASIN--Continued  
RIO PUERTO BELOW CABEZON, N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1952 to September 1953

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

Date of collection	Time	Water discharge (cfs)	Water temperature (° F)	Suspended sediment											Methods of analysis		
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters											
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500		1.000	2.000
Apr. 24, 1953	12:50 p. m.	7	63	72,000	3,790		83		98		99	99	100				SPWCM
Apr. 24	8:45 a. m.	150	61	196,000	3,210		42		56		84	93	98	100			SPWCM
July 30	10:00 a. m.	186	65	225,000	5,080		42		56		86	94	98	100			SPWCM
July 31	9:05 a. m.	475	--	246,000	3,800		32		43		70	86	97	100			SPWCM
Aug. 2	1:00 a. m.	512	63	171,000	3,470		37		49		74	90	99	100			SPWCM
Aug. 21	9:50 a. m.	95	62	107,000	4,360		59		76		92	97	99	100			VPWCM
Aug. 21	9:50 a. m.	95	62	107,000	--		--		--		93	97	99	100			S
Aug. 21	5:45 p. m.	28	70	66,900	3,170		74		92		98	99	100	--			SPWCM

## RIO GRANDE BASIN--Continued

## CHICO ARROYO NEAR GUADALUPE, N. MEX.

LOCATION.--At gaging station a quarter of a mile upstream from mouth, 4½ miles northwest of Guadalupe, Sandoval County, and 5½ miles southwest of Cabezón.

DRAINAGE AREA.--1,390 square miles, approximately.

RECORDS AVAILABLE.--Sediment records: July 1948 to September 1953.

EXTREMES, 1952-53.--Sediment concentrations: Maximum daily, 111,000 ppm July 17, maximum observed, 177,000 ppm July 29; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 1,220,000 tons July 17; minimum daily 0 tons on many days.

EXTREMES, 1948-53.--Sediment concentrations: Maximum daily, 113,000 ppm July 23, 1949; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 1,220,000 tons July 17, 1953; minimum daily, 0 tons on many days.

REMARKS.--No flow October 1, 1952 - June 12, 1953. Records of discharge for water year October 1952 to September 1953 given in WSP 1282.

REVISIONS.--Revised figures of discharge in cfs for water years 1948-50 given in WSP 1282. Revised figures of suspended sediment resulting from revisions of discharge given in WSP 1199.

Suspended sediment, water year October 1952 to September 1953

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		
2.....							0		
3.....							0		
4.....							0		
5.....							0		
6.....							0		
7.....							0		
8.....							0		
9.....							0		
10.....							0		
11.....							0		
12.....							0		
13.....							46		
14.....							0		
15.....							0		
16.....							0		
17.....							185		
18.....							6		
19.....							.4		
20.....							0		
21.....							0		
22.....							0		
23.....							0		
24.....							0		
25.....							0		
26.....							0		
27.....							0		
28.....							0		
29.....							0		
30.....							0		
31.....									
Total.	0		0	0		0	237.4		b 53,000

b Computed from water-sediment discharge relation curve.

## RIO GRANDE BASIN--Continued

## CHICO ARROYO NEAR GUADALUPE, N. MEX.--Continued

Suspended sediment, water year October 1952 to September 1953--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	540	80,300	s 153,000			
2.....	0	--	0	402	79,500	s 125,000			
3.....	0	--	0	33	27,000	a 2,410			
4.....	0	--	0	19	11,000	a 564			
5.....	0	--	0	12	4,000	130			
6.....	0	--	0	5	--	b 80			
7.....	0	--	0	0	--	0			
8.....	0	--	0	0	--	0			
9.....	0	--	0	0	--	0			
10.....	0	--	0	0	--	0			
11.....	0	--	0	1,330	83,600	s 379,000			
12.....	79	19,000	s 27,800	357	52,800	s 65,200			
13.....	140	64,000	s 26,600	206	46,000	26,500			
14.....	2	42,700	s 220	285	15,200	s 71,400			
15.....	41	6,950	s 9,540	81	--	b 17,000			
16.....	520	60,800	s 136,000	20	--	b 1,000			
17.....	2,970	111,000	s 1,220,000	4	--	b 55			
18.....	800	76,000	s 191,000	40	--	b 4,000			
19.....	264	58,400	s 51,600	43	33,500	s 4,380			
20.....	20	22,000	1,190	2	8,000	43			
21.....	5	8,000	108	.4	--	b 3			
22.....	143	13,700	s 50,800	.1	--	b 1			
23.....	780	85,500	s 237,000	0	--	0			
24.....	42	44,000	5,170	0	--	0			
25.....	12	18,000	583	0	--	0			
26.....	4	4,300	46	0	--	0			
27.....	2	700	4	0	--	0			
28.....	.3	--	b 2	190	66,600	s 41,300			
29.....	114	16,700	s 40,600	50	33,300	s 4,990			
30.....	460	71,500	s 111,000	2	17,500	94			
31.....	390	65,900	s 98,300	.1	--	b 1			
Total.	6,768.3	--	2,207,563	3,621.6	--	896,151	0		0

Total discharge for year (cfs-days)..... 10,627.3  
 Total load for year (tons)..... 3,156,714

s Computed by subdividing day.

a Computed from estimated concentration graph.

b Computed from water-sediment discharge relation curve.

RIO GRANDE BASIN--Continued  
CHICO ARROYO NEAR GUADALUPE, N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1952 to September 1953

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

Date of collection	Time	Water discharge (cfs)	Water temperature (° F)	Suspended sediment											Methods of analysis
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters									
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	
July 12, 1953.....	8:30 p. m.	800	64	164,000	3,740		40		56		75	85	97	100	SPWCM
July 13.....	3:30 p. m.	66	81	60,700	4,390		79		92		96	98	100	--	VPWCM
July 15.....	10:50 p. m.	530	64	105,000	3,720		44		63		85	94	99	100	SPWCM
July 16.....	9:15 p. m.	2,890	--	96,300	4,940		42		58		81	95	100	--	SPWCM
July 17.....	5:00 p. m.	1,260	--	102,000	4,060		33		45		64	83	100	100	SPWCM
July 18.....	4:30 a. m.	1,690	--	81,400	4,480		39		53		66	85	99	100	SPWCM
July 22.....	9:50 p. m.	770	62	105,000	5,050		46		63		82	92	99	100	SPWCM
July 23.....	12:10 a. m.	3,400	62	100,000	4,160		34		47		80	94	99	100	SPWCM
July 29.....	9:40 p. m.	820	64	166,000	3,870		32		44		60	75	97	100	SPWCM
July 30.....	5:00 p. m.	356	--	66,800	3,880		47		63		81	90	99	100	SPWCM
Aug. 1.....	6:40 p. m.	1,460	--	83,800	3,840		41		56		77	91	99	100	SPWCM
Aug. 2.....	1:30 a. m.	1,770	63	153,000	3,720		29		41		59	77	97	100	SPWCM
Aug. 11.....	5:20 a. m.	2,920	57	116,000	3,230		35		47		68	87	98	100	SPWCM
Aug. 12.....	5:10 a. m.	3,500	60	88,800	3,630		40		54		71	90	99	100	SPWCM
Aug. 12.....	5:55 p. m.	2,480	65	82,500	3,780		35		48		71	86	97	100	SPWCM
Aug. 28.....	5:00 a. m.	530	60	122,000	3,290		33		50		80	89	98	100	SPWCM
Aug. 28.....	6:15 p. m.	112	70	55,700	3,970		59		75		85	95	100	100	VPWCM

## RIO GRANDE BASIN--Continued

## SAN JOSE RIVER AT CORREO, N. MEX.

LOCATION.--At gaging station 0.6 mile upstream from U.S. Highway 66, 0.7 mile northeast of Correo, Valencia County, and 13 miles upstream from mouth.

DRAINAGE AREA.--2,610 square miles, approximately.

RECORDS AVAILABLE.--Sediment records: July 1948 to September 1953.

EXTREMES, 1952-53.--Sediment concentrations: Maximum daily, 53,400 ppm Aug. 12; maximum observed, 81,200 ppm Aug. 12; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 136,000 tons July 13; minimum daily, 0 tons on many days.

EXTREMES, 1948-53.--Sediment concentrations: Maximum daily, 58,800 ppm Aug. 29, 1952; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 136,000 tons July 13, 1953; minimum daily, 0 tons on many days.

REMARKS.--No flow Oct. 1 - June 11. Records of discharge for water year October 1952 to September 1953 given in WSP 1282.

Suspended sediment, water year October 1952 to September 1953

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.....							0	--	0
7.....							0	--	0
8.....							0	--	0
9.....							0	--	0
10.....							0	--	0
11.....							0	--	0
12.....							32	1,830	sa 2,000
13.....							16	13,000	sa 700
14.....							8	6,800	sa 200
15.....							2	800	sb 6
16.....							0	--	0
17.....							5	4,700	sa 180
18.....							165	22,900	s 12,300
19.....							7	8,580	s 195
20.....							.5	3,200	a 4
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.....							--	--	0
Total.							235.5	--	15,565

s Computed from subdividing day.

a Computed from estimated concentration graph.

b Computed from partly estimated concentration graph.

## RIO GRANDE BASIN--Continued

## SAN JOSE RIVER AT CORREO, N. MEX.--Continued

Suspended sediment, water year October 1952 to September 1953--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	128	37,700	s 17,700			
2.....	0	--	0	88	22,600	s 6,800			
3.....	0	--	0	34	1,700	s 194			
4.....	0	--	0	5	--	e 5			
5.....	0	--	0	.2	--	e(t)			
6.....	0	--	0	0	--	0			
7.....	0	--	0	0	--	0			
8.....	0	--	0	0	--	0			
9.....	0	--	0	0	--	0			
10.....	0	--	0	13	3,900	sa 1,100			
11.....	0	--	0	44	13,000	s 7,070			
12.....	0	--	0	34	53,400	s 7,740			
13.....	1,360	36,500	s 136,000	210	32,400	s 18,000			
14.....	36	18,600	s 1,970	49	11,600	s 1,900			
15.....	7	3,000	sb 95	137	13,900	s 5,430			
16.....	.1	--	e 1	53	6,510	sa 1,300			
17.....	156	7,430	s 8,960	4	1,200	a 13			
18.....	322	14,000	s 13,000	.2	500	a(t)			
19.....	98	10,300	s 3,250	36	18,000	sa 2,900			
20.....	18	2,600	sb 140	6	7,000	sa 150			
21.....	2	1,200	sa 10	.2	2,600	1			
22.....	7	2,390	s 80	25	9,500	s 1,000			
23.....	2	5,350	s 26	4	--	e 20			
24.....	.4	3,700	4	.7	--	e 2			
25.....	.1	620	(t)	0	--	0			
26.....	0	--	0	0	--	0			
27.....	0	--	0	0	--	0			
28.....	0	--	0	0	--	0			
29.....	0	--	0	0	--	0			
30.....	4	1,230	sb 40	0	--	0			
31.....	28	10,100	s 3,090	0	--	0			
Total.	2,040.6	--	166,666	871.3	--	71,326	0		0

Total discharge for year (cfs-days) ..... 3,147.4

Total load for year (tons) ..... 253,577

e Estimated.

t Less than 0.50 ton.

s Computed by subdividing day.

a Computed by subdividing day.

b Computed from partly estimated concentration graph.

RIO GRANDE BASIN--Continued  
SAN JOSE RIVER AT CORREO, N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1952 to September 1953

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

Date of collection	Time	Water discharge (cfs)	Water temperature (° F)	Suspended sediment										Methods of analysis	
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters									
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250		0.350
June 18, 1953 . . .	11:00 a. m.	425	65	29,100	6,900		78		88		95	98	100	SPWCM	
June 18, . . .	3:15 p. m.	130	75	22,100	4,100		84		92		98	99	100	SPWCM	
July 13, . . .	12:00 p. m.	2,260	74	19,100	4,480		87		94		96	97	100	VPNCM	
July 13, . . .	9:30 p. m.	175	77	25,900	3,060		73		82		88	95	99	VPWCM	
July 17, . . .	5:30 p. m.	750	66	25,000	3,370		61		75		85	93	99	VPWCM	
July 18, . . .	2:15 a. m.	680	--	15,300	3,480		69		80		86	94	99	VPWCM	
July 22, . . .	2:40 p. m.	26	84	3,700	3,700		94		97		98	99	100	SPWCM	
July 30, . . .	4:30 p. m.	17	78	3,340	3,580		90		96		96	98	100	SPWCM	
July 31, . . .	9:45 p. m.	150	65	42,600	3,980		70		89		100	--	--	VPWCM	
Aug. 1, . . .	9:05 p. m.	508	69	51,800	3,260		59		77		95	98	100	VPWCM	
Aug. 2, . . .	5:00 a. m.	96	64	33,000	4,210		70		89		99	100	--	VPWCM	
Aug. 12, . . .	2:50 a. m.	92	60	81,200	3,580		68		91		100	--	--	VPWCM	
Aug. 14, . . .	4:00 p. m.	94	80	8,100	3,920		76		86		91	96	100	VPWCM	
Aug. 15, . . .	2:30 a. m.	205	69	20,000	5,240		54		70		95	99	100	VPWCM	

## RIO GRANDE BASIN--Continued

## RIO PUERCO AT RIO PUERCO, N. MEX.

LOCATION.--At gaging station at Atchison, Topeka and Santa Fe Railway bridge, 7 miles downstream from San Jose River, and 15 miles west of Los Lunas, Valencia County.

DRAINAGE AREA.--5,160 square miles, approximately.

RECORDS AVAILABLE.--Water temperatures: October 1949 to September 1953.

Sediment records: July 1948 to September 1953.

EXTREMES, 1952-53.--Water temperatures: Maximum observed, 91°F June 15; minimum observed, 65°F June 19.

Sediment concentrations: Maximum daily, 170,000 ppm Aug. 2; maximum observed 266,000 ppm July 23; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 1,120,000 tons July 18; minimum daily, 0 tons on many days.

EXTREMES, 1948-53.--Water temperature (1949-53): Maximum observed, 91°F June 15, 1953; minimum observed, 33°F Jan. 12, 1950.

Sediment concentrations: Maximum daily, 195,000 ppm Aug. 8, 1949; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 1,120,000 tons July 18, 1953; minimum daily, 0 tons on many days.

REMARKS.--Once-daily temperature record not published owing to comparatively few days of flow.

See particle-size analyses for supplementary temperature data. Records of suspended sediment October to January omitted; no flow during this period. Records of discharge for water year October 1952 to September 1953 given in WSP 1282.

## Suspended sediment, water year October 1952 to September 1953

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		
2.....							0		
3.....							0		
4.....							0		
5.....							0		
6.....							0		
7.....							0		
8.....							0		
9.....							60		
10.....							29		
11.....							8		
12.....							.1		
13.....							0		
14.....							0		
15.....							0		
16.....							0		
17.....							0		
18.....							0		
19.....							0		
20.....							0		
21.....							0		
22.....							0		
23.....							0		
24.....							0		
25.....							0		
26.....							0		
27.....							0		
28.....							0		
29.....							0		
30.....							0		
31.....							0		
Total.	0		0	0		0	97.1		e 7,200

## RIO GRANDE BASIN--Continued

## RIO PUERCO AT RIO PUERCO, N. MEX.--Continued

## Suspended sediment, water year October 1952 to September 1953--Continued

Day	April			May			June		
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1.....							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.....							150	66,000	sa 39,000
14.....							80	64,000	sa 16,000
15.....							17	14,000	sa 1,000
16.....							1	1,800	5
17.....							0	--	0
18.....							133	22,500	s 20,200
19.....							57	74,300	12,200
20.....							12	44,000	sa 1,900
21.....							2	--	e 150
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	452	--	90,455
Day	July			August			September		
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1.....	0	--	0	1,050	167,000	s 560,000	160	84,000	sa 71,000
2.....	0	--	0	1,160	170,000	s 680,000	36	30,000	s 4,400
3.....	0	--	0	637	125,000	s 281,000	.8	--	e 50
4.....	0	--	0	67	53,000	a 9,900	0	--	0
5.....	0	--	0	17	31,000	a 1,400	0	--	0
6.....	0	--	0	6	15,000	a 240	0	--	0
7.....	0	--	0	2	--	e 70	0	--	0
8.....	0	--	0	0	--	0	0	--	0
9.....	0	--	0	0	--	0	0	--	0
10.....	0	--	0	0	--	0	0	--	0
11.....	0	--	0	776	81,000	sa 400,000	0	--	0
12.....	1	6,900	sa 190	1,050	127,000	s 489,000	0	--	0
13.....	2,040	64,000	sa 480,000	442	110,000	s 179,000	0	--	0
14.....	214	56,600	s 34,100	282	78,000	sa 88,000	0	--	0
15.....	33	62,200	5,750	337	65,000	sa 68,000	0	--	0
16.....	21	59,100	3,480	117	54,000	a 18,000	0	--	0
17.....	794	110,000	sa 500,000	31	31,500	2,640	0	--	0
18.....	3,360	120,000	s 1120,000	220	40,000	sa 110,000	0	--	0
19.....	1,370	111,000	e 481,000	254	120,000	sa 110,000	0	--	0
20.....	363	88,000	s 94,800	258	130,000	sa 110,000	0	--	0
21.....	21	--	e 3,500	37	79,000	8,180	0	--	0
22.....	19	60,200	3,030	68	73,200	s 15,500	0	--	0
23.....	670	98,900	s 387,000	29	85,000	a 6,900	0	--	0
24.....	516	151,000	s 254,000	9	71,200	1,790	0	--	0
25.....	64	99,800	s 18,800	2	53,000	sa 260	0	--	0
26.....	21	42,000	a 2,500	.3	19,000	sa 30	0	--	0
27.....	8	37,000	a 830	0	--	0	0	--	0
28.....	3	31,800	258	0	--	0	0	--	0
29.....	4	56,000	sa 950	0	--	0	0	--	0
30.....	18	67,000	s 4,200	52	110,000	sa 18,000	0	--	0
31.....	371	147,000	165,000	13	81,800	2,980	--	--	--
Total.	9,910	--	3,559,388	6,916.3	--	3,160,890	196.8	--	75,450

Total discharge for year (cfs)..... 17,572.2

Total load for year (tons)..... 6,893,383

e Estimate.

s Computed by subdividing day.

a Computed from estimated concentration graph.

RIO GRANDE BASIN--Continued  
RIO PUERCO AT RIO PUERCO, N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1952 to September 1953  
(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water;  
W, in distilled water, C, Chemically dispersed, M, mechanically dispersed, V, visual accumulation tube)

Date of collection	Time	Water discharge (cfs)	Water temperature (° F)	Suspended sediment										Methods of analysis	
				Concentration of sample (ppm)	Concentration of suspension analysed (ppm)	Percent finer than indicated size, in millimeters									
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250		0.350
June 18, 1953 . . .	6:15 p.m.	480	--	56,500	3,620	70			87		97	99	100		SPWCM
June 18 . . .	6:15 p.m.	480	--	56,500	3,750	1			89		97	99	100		SPN
July 13 . . .	12:20 p.m.	3,910	69	58,600	3,800	56			70		86	94	99	100	SPWCM
July 17 . . .	7:15 p.m.	2,280	68	208,000	3,580	40			54		72	86	98	100	SPWCM
July 18 . . .	5:20 p.m.	6,400	70	93,000	3,530	62			82		92	96	99	100	VPWCM
July 19 . . .	12:10 a.m.	1,650	69	138,000	3,900	46			61		84	94	100		SPWCM
July 20 . . .	2:30 p.m.	252	80	86,900	4,470	66			86		96	99	100		VPWCM
July 23 . . .	3:50 p.m.	277	85	75,700	4,380	70			84		95	100	--		VPWCM
July 23 . . .	8:00 p.m.	3,100	73	194,000	4,520	40			50		71	87	99	100	SPWCM
July 24 . . .	12:30 p.m.	388	74	147,000	4,960	55			74		90	96	100		SPWCM
July 30 . . .	9:00 p.m.	136	68	107,000	3,430	66			85		94	97	99	100	VPWCM
July 31 . . .	3:00 a.m.	448	68	224,000	3,650	47			62		80	89	98	100	SPWCM
July 31 . . .	7:40 p.m.	830	71	137,000	3,960	46			61		82	93	100		SPWCM
Aug. 1 . . .	3:00 a.m.	2,120	64	218,000	3,620	34			45		65	78	93	100	SPWCM
Aug. 11 . . .	6:20 a.m.	1,120	66	166,000	3,960	43			57		70	86	99	100	SPWCM
Aug. 11 . . .	10:50 p.m.	3,550	65	204,000	3,250	37			49		70	86	99	100	VPWCM
Aug. 13 . . .	3:15 p.m.	244	76	78,200	4,700	69			86		93	99	100		VPWCM
Aug. 21 . . .	12:00 m.	40	74	74,600	4,740	80			99		100	--	--		SPWCM

## RIO GRANDE BASIN--Continued

## RIO PUERCO NEAR BERNARDO, N. MEX.

LOCATION.--At gaging station at bridge on U. S. Highway 85, 1.2 miles southwest of Bernardo, Socorro County, 3 miles upstream from mouth, and 16 miles south of Belen.

DRAINAGE AREA.--5,860 square miles, approximately.

RECORDS AVAILABLE.--Sediment records: October 1947 to September 1953.

EXTREMES, 1952-53.--Sediment concentrations: Maximum daily, 205,000 ppm Aug. 2; maximum observed, 237,000 ppm July 24; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 1,160,000 tons July 19; minimum daily, 0 tons on many days.

EXTREMES, 1947-53.--Sediment concentrations: Maximum daily, 215,000 ppm July 22, 1949; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 1,160,000 tons July 19, 1953; minimum daily, 0 tons on many days.

REMARKS.--No flow Oct. 1, 1952 - June 11, 1953. Records of discharge for water year October 1952 to September 1953 given in WSP 1282.

## Suspended sediment, water year October 1952 to September 1953

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.....							0	--	0
7.....							0	--	0
8.....							0	--	0
9.....							0	--	0
10.....							0	--	0
11.....							0	--	0
12.....							7	6,330	sa 569
13.....							0	--	0
14.....							0	--	0
15.....							0	--	0
16.....							0	--	0
17.....							23	18,400	s 6,890
18.....							14	8,950	s 770
19.....							49	51,600	s 12,800
20.....							33	58,400	s 5,490
21.....							8	31,700	s 790
22.....							.2	18,000	10
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.....							0	--	0
Total.	0		0	0		0	134	--	27,319

s Computed by subdividing day.

a Computed from partially estimated concentration graph.

## RIO GRANDE BASIN--Continued

## RIO PUERCO NEAR BERNARDO, N. MEX.--Continued

Suspended sediment, water year October 1952 to September 1953--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	746	197,000	s 506,000	16	112,000	5,200
2.....	0	--	0	1,120	205,000	s 739,000	221	99,600	s 73,500
3.....	0	--	0	874	170,000	s 453,000	27	52,000	3,930
4.....	0	--	0	200	115,000	s 71,500	3	23,100	187
5.....	0	--	0	49	89,900	s 12,900	0	--	0
6.....	0	--	0	22	82,000	5,050	0	--	0
7.....	0	--	0	10	81,000	2,270	0	--	0
8.....	0	--	0	2	52,000	291	0	--	0
9.....	0	--	0	1	14,000	4	0	--	0
10.....	0	--	0	28	14,200	s 5,390	0	--	0
11.....	0	--	0	80	29,400	s 37,300	0	--	0
12.....	54	18,200	s 14,300	1,130	167,000	s 681,000	0	--	0
13.....	1,160	98,400	s 376,000	350	102,000	s 105,000	0	--	0
14.....	1,210	69,100	s 225,000	440	89,600	s 119,000	0	--	0
15.....	87	71,800	s 17,600	196	61,000	s 34,900	0	--	0
16.....	29	55,300	s 4,930	219	69,100	s 43,800	0	--	0
17.....	22	71,000	s 4,450	74	51,000	10,600	0	--	0
18.....	1,650	169,000	s 885,000	130	45,000	s 23,400	0	--	0
19.....	3,380	123,000	s 1,160,000	1,110	77,200	s 290,000	0	--	0
20.....	670	111,000	s 213,000	140	45,100	s 22,500	0	--	0
21.....	153	90,700	40,200	133	114,000	s 42,500	0	--	0
22.....	47	76,200	10,000	25	90,500	6,560	0	--	0
23.....	15	68,000	2,860	46	100,000	s 16,800	0	--	0
24.....	845	160,000	s 483,000	18	83,000	4,180	0	--	0
25.....	180	136,000	s 74,300	9	81,000	2,040	0	--	0
26.....	48	114,000	15,900	3	53,000	445	0	--	0
27.....	15	104,000	s 4,570	3	9,060	7	0	--	0
28.....	4	86,500	969	0	--	0	0	--	0
29.....	2	58,000	325	0	--	0	0	--	0
30.....	7	85,700	s 1,970	0	--	0	0	--	0
31.....	53	101,000	s 61,800	32	93,200	sa 11,500	0	--	0
Total.	9,631	--	3,596,174	7 186.4	--	3,246,937	267	--	82,817

Total discharge for year (cfs-days) ..... 17,218.6  
 Total load for year (tons) ..... 6,953,247

s Computed by subdividing day.

a Computed from partially estimated concentration graph.

RIO GRANDE BASIN--Continued  
RIO PUERCO NEAR BERNARDO, N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1952 to September 1953

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

Date of collection	Time	Water discharge (cfs)	Water temperature (° F)	Suspended sediment										Methods of analysis	
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters									
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250		0.500
June 19, 1953.....	5:00 p. m.	92	--	79,800	4,560		83		95	100	--	--	--	--	SPWCM
July 13.....	9:15 p. m.	2,660	70	104,000	3,880		63		81	91	100	--	--	--	VPWCM
July 14.....	3:15 a. m.	3,550	67	55,600	4,060		69		87	95	100	--	--	--	VPWCM
July 14.....	8:00 a. m.	1,010	--	76,000	4,540		62		80	95	100	--	--	--	VPWCM
July 18.....	8:30 a. m.	1,580	--	189,000	4,660		38		53	78	95	100	--	--	SPWCM
July 18.....	11:40 p. m.	3,250	70	142,000	3,730		50		67	85	95	100	--	--	SPWCM
July 19.....	9:15 a. m.	5,550	70	90,500	4,520		49		65	97	99	100	--	--	VPWCM
July 19.....	4:30 p. m.	2,570	--	165,000	6,060		45		58	87	98	100	--	--	VPWCM
July 24.....	8:00 a. m.	1,580	--	197,000	4,440		43		58	80	94	99	100	--	SPWCM
Aug. 1.....	7:30 a. m.	372	--	162,000	2,400		50		68	86	95	100	--	--	VPWCM
Aug. 2.....	5:30 p. m.	1,310	--	184,000	4,580		36		49	73	93	99	100	--	SPWCM
Aug. 3.....	7:00 a. m.	1,400	--	188,000	3,460		37		48	75	92	100	--	--	SPWCM
Aug. 4.....	1:30 p. m.	141	--	106,000	2,460		71		91	95	98	100	--	--	VPWCM
Aug. 10.....	6:00 p. m.	174	--	38,100	4,880		68		84	96	99	100	--	--	VPWCM
Aug. 12.....	10:10 a. m.	2,140	74	209,000	3,440		34		45	72	87	99	100	--	SPWCM
Aug. 12.....	3:00 p. m.	1,340	75	182,000	2,930		47		64	73	90	99	99	--	SPWCM
Aug. 14.....	8:45 a. m.	745	--	139,000	3,830		41		55	81	96	100	--	--	SPWCM
Aug. 15.....	1:00 p. m.	127	--	57,600	3,800		83		97	98	100	--	--	--	VPWCM
Aug. 16.....	7:30 a. m.	315	--	87,100	3,480		56		76	91	98	--	--	--	VPWCM
Aug. 19.....	7:00 a. m.	2,390	--	102,000	3,700		52		66	89	99	100	--	--	VPWCM
Aug. 19.....	11:30 a. m.	1,190	--	95,300	5,010		44		61	84	97	100	--	--	VPWCM
Sept. 2.....	4:30 p. m.	258	--	110,000	3,760		62		83	96	99	100	--	--	VPWCM

## RIO GRANDE BASIN--Continued

## RIO SALADO NEAR SAN ACACIA, N. MEX.

LOCATION.--At gaging station 1 mile upstream from mouth, 2 miles northeast of San Acacia, Socorro County, 1.7 miles downstream from bridge on U. S. Highway 85, and 15 miles north of Socorro.

DRAINAGE AREA.--1,380 square miles, approximately.

RECORDS AVAILABLE.--Sediment records: July 1948 to September 1953.

EXTREMES, 1952-53.--Sediment concentrations: Maximum daily, 182,000 ppm Aug. 13; maximum observed, 405,000 ppm Aug. 13; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 793,000 tons Aug. 13; minimum daily, 0 tons on many days.

EXTREMES, 1948-53.--Sediment concentrations: Maximum daily, 182,000 ppm Aug. 13, 1953; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 793,000 tons Aug. 13, 1953; minimum daily, 0 ton on many days.

REMARKS.--Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. No flow Oct. 1, 1952 - Apr. 23, 1953. Records of discharge for water year October 1952 to September 1953 given in WSP 1282.

## Suspended sediment, water year October 1952 to September 1953

Day	April			May			June		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	0	--	0				0		
2.....	0	--	0				0		
3.....	0	--	0				0		
4.....	0	--	0				0		
5.....	0	--	0				0		
6.....	0	--	0				0		
7.....	0	--	0				0		
8.....	0	--	0				0		
9.....	0	--	0				0		
10.....	0	--	0				0		
11.....	0	--	0				0		
12.....	0	--	0				0		
13.....	0	--	0				40		
14.....	0	--	0				2		
15.....	0	--	0				0		
16.....	0	--	0				0		
17.....	0	--	0				172		
18.....	0	--	0				.5		
19.....	0	--	0				.8		
20.....	0	--	0				0		
21.....	0	--	0				0		
22.....	0	--	0				0		
23.....	0	--	0				0		
24.....	67	71,400	s 23,000				0		
25.....	6	55,000	a 920				0		
26.....	0	--	0				0		
27.....	0	--	0				0		
28.....	0	--	0				0		
29.....	0	--	0				0		
30.....	0	--	0				0		
31.....	0	--	0				0		
Total.	73	--	23,920	0		0	215.3		b 130,000

s Computed by subdividing day.

a Computed from estimated concentration graph.

b Computed from water-sediment discharge relation curve.

## WESTERN GULF OF MEXICO BASINS

## RIO GRANDE BASIN--Continued

## RIO SALADO NEAR SAN ACACIA, N. MEX.--Continued

Suspended sediment, water year October 1952 to September 1953--Continued

Day	July			August			September		
	Mean dis- charge (cfs)	Suspended sediment		Mean dis- charge (cfs)	Suspended sediment		Mean dis- charge (cfs)	Suspended sediment	
		Mean concen- tration (ppm)	Tons per day		Mean concen- tration (ppm)	Tons per day		Mean concen- tration (ppm)	Tons per day
1.....	0	--	0	45	85,900	s18,700	0	--	0
2.....	0	--	0	17	92,100	s6,250	19	41,200	5,930
3.....	0	--	0	2	--	b280	0	--	0
4.....	6	--	b120	.7	--	b60	0	--	0
5.....	0	--	0	0	--	0	0	--	0
6.....	0	--	0	0	--	0	0	--	0
7.....	43	117,000	s61,200	0	--	0	0	--	0
8.....	8	120,000	s2,960	0	--	0	0	--	0
9.....	1	61,000	171	0	--	0	0	--	0
10.....	45	62,000	sa25,000	12	16,200	s5,310	0	--	0
11.....	19	131,000	s7,510	3	17,000	sa470	0	--	0
12.....	15	61,700	s1,460	80	163,000	s52,300	0	--	0
13.....	14	44,000	s2,350	1,070	182,000	s793,000	0	--	0
14.....	0	--	0	455	97,800	s141,000	0	--	0
15.....	27	9,330	6,110	60	68,800	s13,500	0	--	0
16.....	28	41,500	s13,400	50	92,400	s14,900	0	--	0
17.....	318	94,400	s166,000	7	48,000	sa1,200	0	--	0
18.....	401	114,000	s171,000	186	43,500	s79,200	0	--	0
19.....	15	59,000	2,480	86	70,900	s24,400	0	--	0
20.....	62	89,900	s26,200	9	78,000	2,190	0	--	0
21.....	1	--	b60	3	--	b360	0	--	0
22.....	.3	--	b15	224	87,900	s76,700	0	--	0
23.....	4	--	b500	68	46,700	s16,900	0	--	0
24.....	1	--	b60	.5	--	b30	0	--	0
25.....	.2	--	b10	0	--	0	0	--	0
26.....	0	--	0	0	--	0	0	--	0
27.....	0	--	0	0	--	0	0	--	0
28.....	0	--	0	0	--	0	0	--	0
29.....	76	51,000	s46,000	0	--	0	0	--	0
30.....	160	157,000	s103,000	0	--	0	0	--	0
31.....	72	83,700	s23,900	0	--	0	0	--	0
Total.	1,311.1	--	659,506	2,378.2	--	1,246,750	19	--	5,930

Total discharge for year (cfs-days) ..... 3,996.6  
 Total load for year (tons) ..... 2,066,106

s Computed by subdividing day.

a Computed from estimated concentration graph.

b Computed from water-sediment discharge relation curve.

RIO GRANDE BASIN--Continued  
RIO SALADO NEAR SAN ACACIA, N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1952 to September 1953

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

Date of collection	Time	Water discharge (cfs)	Water temperature (°F)	Suspended sediment										Methods of analysis	
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters									
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250		0.500
Apr. 24, 1953	1:30 p. m.	160	--	99,000	3,110		60		84	92	95	100	--	SPWCM	
July 7	8:15 a. m.	950	72	271,000	4,460		61		86	97	98	98	100	SPWCM	
July 7	2:15 p. m.	95	70	168,000	4,340		69		92	97	98	99	100	SPWCM	
July 8	11:45 a. m.	5.4	88	119,000	4,260		87		98	99	100	--	--	SPWCM	
July 12	10:00 p. m.	76	65	24,700	4,050		70		88	95	99	100	--	VPWCM	
July 15	10:00 p. m.	570	66	112,000	3,820		38		55	75	85	95	100	SPWCM	
July 17	9:00 p. m.	870	70	150,000	3,770		54		74	89	96	100	--	VPWCM	
July 17	10:00 p. m.	2,240	69	228,000	3,300		31		42	55	64	92	100	SPWCM	
July 17	12:00 p. m.	970	65	197,000	3,740		38		53	74	91	99	100	VPWCM	
July 18	7:00 a. m.	467	67	98,400	3,810		49		65	81	90	98	100	SPWCM	
July 29	7:30 p. m.	2,070	71	262,000	4,720		36		55	75	84	95	100	SPWCM	
July 29	8:30 p. m.	630	68	244,000	4,830		43		63	84	91	98	100	SPWCM	
Aug. 10	8:40 p. m.	295	71	213,000	3,740		41		67	87	91	97	100	SPWCM	
Aug. 10	10:40 p. m.	43	70	100,000	3,780		58		76	93	97	99	100	VPWCM	
Aug. 13	2:00 a. m.	5,680	68	405,000	3,880		16		24	41	53	79	98	SPWCM	
Aug. 13	10:00 p. m.	6,400	67	293,000	4,680		22		31	46	63	87	99	SPWCM	
Aug. 18	10:30 p. m.	1,860	63	121,000	4,030		30		46	73	85	96	100	SPWCM	
Aug. 22	1:40 a. m.	870	66	181,000	3,500		36		56	78	88	98	100	SPWCM	
Aug. 22	7:00 p. m.	112	62	61,400	4,240		67		83	92	95	99	100	VPWCM	
Aug. 23	3:00 a. m.	600	60	124,000	3,690		41		60	82	93	99	100	VPWCM	
Aug. 23	9:30 a. m.	49	69	53,000	3,820		69		89	96	98	100	--	VPWCM	
Sept. 2	7:40 a. m.	118	67	122,000	4,580		61		88	95	97	99	100	VPWCM	

## RIO GRANDE BASIN--Continued

## SOCORRO MAIN CANAL, NORTH AT SAN ACACIA, N. MEX.

LOCATION.--At San Acacia Diversion Dam, half a mile upstream from canal gaging station, and 0.7 mile east of San Acacia, Socorro County.

RECORDS AVAILABLE.--Sediment records: October 1947 to September 1953.

EXTREMES, 1952-53.--Sediment loads: Maximum daily, 47,900 tons Aug. 12; minimum daily, 0 tons on many days.

EXTREMES, 1947-53.--Sediment loads: Maximum daily, 47,900 tons Aug. 12, 1953; minimum daily, 0 tons on many days.

REMARKS.--Records of discharge for water year October 1952 to September 1953 given in WSP 1282.

## Monthly and annual summary of suspended-sediment discharge, water year October 1952 to September 1953

Month	Water discharge (cfs-days)	Suspended Sediment (tons)
1952		
October .....	1,849	2,743
November .....	1,306	4,206
December .....	805	5,571
1953		
January .....	0	0
February .....	0	0
March .....	2,279	7,231
April .....	3,905	17,974
May .....	3,864	7,665
June .....	4,078	24,487
July .....	2,416	232,734
August .....	2,027	350,673
September .....	330	29,484
Total for year .....	22,859	a 682,768

a Total suspended load for Rio Grande at San Acacia diversion dam is the sum of the load for the Rio Grande at San Acacia and the load for Socorro Main Canal North, or 8,142,117 tons. Suspended sediment records for Rio Grande at San Acacia are given on page 452.

## RIO GRANDE BASIN--Continued

## RIO GRANDE AT SAN ACACIA, N. MEX.

LOCATION.--At San Acacia diversion dam, 0.7 mile above gaging station, 0.7 mile east of San Acacia, Socorro County, and 1.8 miles downstream from Rio Salado. From Mar. 21, 1953, gaging station was located half mile upstream.

DEATH REEF.--26,770 square miles, approximately (includes 2,940 square miles in closed basin in northern part of San Luis Valley, Colo.).

RECORDS AVAILABLE.--Climatic analyses: July to September 1957, March 1959 to September 1953.

Sediment temperatures: Oct. 194 to September 1953.

Specific conductance: July 1946 to September 1953.

EXTREMES: 1952-53.--Dissolved solids: Maximum, 2,410 ppm July 13; minimum, 276 ppm May 31-June 10.

Hardness: Maximum, 1,360 ppm July 13; minimum, 154 ppm May 31-June 10.

Specific conductance: Maximum observed, 2,930 micromhos July 13; minimum observed, 387 micromhos June 6.

Water temperatures: Maximum observed, 84° F July 23; minimum observed, 33° F Nov. 28, 29, Dec. 1, 26, Feb. 21.

Sediment concentrations: Maximum daily, 129,000 ppm Aug. 12; maximum observed, 195,000 ppm July 30; minimum daily no flow on many days.

Sediment loads: Maximum daily, 1,490,000 tons July 19; minimum daily, 0 tons on many days.

EXTREMES: 1937, 1939-53.--Dissolved solids: Maximum, 2,470 ppm July 18, 1946; minimum, 183 ppm June 1-10, 1942.

Hardness: Maximum, 1,360 ppm July 13, 1953; minimum, 101 ppm June 11-20, 1942.

Specific conductance: Maximum observed, 3,700 micromhos July 14, 1940; minimum observed, 236 micromhos May 17, 1942.

Water temperatures (1947-53): Maximum observed, 87° F July 11, 1948; minimum observed, freezing point on several days during winter months in most years.

Sediment concentrations (1946-53): Maximum daily, 196,000 ppm Aug. 11, 1946; minimum daily, 0 tons on many days.

Sediment loads (1946-53): Maximum daily, 1,570,000 tons Aug. 17, 1947; minimum daily, 0 tons on many days.

REMARKS.--Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Values reported for dissolved solids are sums of determined constituents. Socorro Main Canal North heads at San Acacia diversion dam and by-passes gaging station. Data reported do not include flow in canal. Monthly sediment records for the canal are given on page 448. No appreciable inflow between sampling point and gaging station except during periods of heavy local rains. No flow Sept. 5-21, 23, 28-30. Records of discharge for water year October 1952 to September 1953 given in WSP 1282.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boiron (B)	Dissolved solids (sum)		Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
														Parts per million	Tons per acre-foot	Calcium, mg. per gallon	Non-carbonate				
Oct. 1-10, 1952 ...	14.5	39	82	17	96	228	8	207	45	0.8	0.8	0.8	0.8	607	0.83	23.8	274	74	43	2.5	899
Oct. 11-20 " " " "	8.20	39	85	18	99	236	8	218	47	.7	.7	.7	.7	631	.86	14.0	286	80	43	2.5	831
Oct. 21-31 " " " "	11.5	37	88	20	116	256	0	232	58	.4	.4	.4	.4	697	.85	21.6	302	92	46	2.9	1,030
Nov. 1-10 " " " "	14.1	36	92	19	114	232	8	248	36	1.3	1.3	1.3	1.3	519	.71	36.5	306	86	45	2.8	1,030
Nov. 11-20 " " " "	259	32	76	15	75	224	0	177	33	1.9	1.9	1.9	1.9	419	.57	712	231	66	39	2.1	779
Nov. 21-30 " " " "	629	32	64	12	57	202	0	127	26	2.5	2.5	2.5	2.5	400	.54	659	204	40	35	1.7	641
Dec. 1-10 " " " "	610	22	62	12	51	201	0	118	24	2.4	2.4	2.4	2.4	374	.51	677	190	36	35	1.6	615
Dec. 11-20 " " " "	870	31	58	11	40	190	0	108	24	2.2	2.2	2.2	2.2	368	.50	754	187	36	35	1.5	583
Dec. 21-31 " " " "	763	30	57	11	47	141	0	102	23	2.3	2.3	2.3	2.3	371	.50	711	190	33	36	1.5	570
Jan. 1-10, 1953 " " " "	710	30	58	11	48	191	0	104	24	2.5	2.5	2.5	2.5	368	.50	705	192	36	34	1.4	566
Jan. 11-20 " " " "	710	33	58	11	46	191	0	99	24	2.3	2.3	2.3	2.3	353	.48	699	186	36	34	1.4	548
Jan. 21-31 " " " "	733	31	58	10	44	182	0	96	23	2.3	2.3	2.3	2.3	353	.48	699	186	36	34	1.4	548

RIO GRANDE BASIN--Continued  
RIO GRANDE AT SAN ACACIA, N. MEX.--Continued

Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal-cium (Ca)	Mag-nes-ium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Car-bonate (CO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> ) (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Per-centage of So-dium	Specific conduct-ance (micro-mhos at 25°C)	pH	
														Parts per million	Tons per acre-foot	Tons per day	Calcium	Non-carbonate				
Feb. 1-10, 1953. . . . .	756	31		55	10	44		177	0	95	24		1.7	348	.47	710	178	33	35	1.4	541	8.0
Feb. 11-20, . . . . .	832	31		35	10	49		177	0	100	28		1.6	362	.49	813	178	33	37	1.6	562	7.9
Feb. 21-28, . . . . .	1,038	28		64	12	49		174	0	134	24		2.3	399	.84	1,120	209	66	34	1.5	608	7.8
Mar. 1-10, . . . . .	1,081	28		57	12	51		168	0	116	20		2.0	380	.82	1,110	192	54	37	1.6	603	7.3
Mar. 11-20, . . . . .	823	27		59	13	53		174	0	124	26		2.8	393	.83	973	206	58	36	1.6	608	7.7
Mar. 21-31, . . . . .	312	29		68	14	64		199	0	146	32		4.0	457	.62	385	227	64	38	1.9	704	7.7
Apr. 1-10, . . . . .	160	29		69	14	68		211	0	154	35		1.4	474	.64	205	230	56	39	2.0	731	7.9
Apr. 11-20, . . . . .	159	31		69	15	75		218	0	165	36		1.6	499	.68	214	234	55	41	2.1	758	7.9
Apr. 21-30, . . . . .	569	24		56	12	54		177	0	123	26		1.9	383	.52	588	189	44	38	1.7	598	7.8
May 1-7, . . . . .	869	30		62	12	51		196	0	122	27		1.5	402	.55	943	204	44	35	1.6	638	7.3
May 8-20, . . . . .	44.1	33		80	16	83		242	0	185	44		1.2	561	.76	66.8	266	67	40	2.2	854	7.5
May 21-30, . . . . .	15.1	32		76	15	83		228	0	184	42		1.7	546	.74	22.3	251	64	42	2.3	837	7.5
May 31, June 10 . . . . .	1,211	26		48	8	30		160	0	67	15		2.2	276	.38	902	154	24	30	1.0	423	7.5
June 11-20, . . . . .	972	25		64	11	38		201	0	95	18		1.5	352	.48	924	204	40	29	1.2	551	7.5
June 21-30, . . . . .	588	29		62	11	47		191	0	111	21		1.2	376	.51	597	200	43	34	1.4	576	7.6
July 1-10, . . . . .	10.1	35		82	19	91		244	0	201	47		1.3	596	.81	16.3	282	82	41	2.4	895	7.8
July 11-12, 14-20, . . .	1,008	22		113	25	124		232	0	365	61		5.0	822	1.12	2,240	385	207	41	2.7	1,200	7.9
July 13-22, . . . . .	1,420	27		438	66	232		237	0	330	193		6.9	2,410	3.28	9,240	1,360	207	41	2.7	2,930	--
July 21-23, 26-31, . . .	73.1	24		144	30	138		262	0	495	43		1.2	1,000	1.36	197	483	268	38	2.7	1,390	7.8
July 24-25, Aug. 1-3	746	18		240	53	220		295	0	938	45		1.9	1,660	2.26	3,340	817	576	37	3.4	2,120	7.8
Aug. 4-5, 12-19 . . . . .	612	19		184	37	168		222	0	664	65		3.3	1,250	1.70	2,070	611	429	37	3.0	1,690	7.7
Aug. 6-11, . . . . .	2.32	30		83	21	118		215	0	298	50		3.1	709	.96	4.44	294	118	47	3.0	1,040	7.9
Aug. 20, . . . . .	293	18		138	24	78		163	0	395	42		5.8	781	1.06	618	443	310	28	1.6	1,100	7.8
Aug. 21, 23-25, 31, . . .	56.8	21		208	41	194		247	0	767	75		1.9	1,430	1.94	219	688	485	38	3.2	1,910	7.7
Aug. 22, 26-30, . . . . .	35.7	35		88	21	106		247	0	255	56		2.9	674	.92	65.0	306	120	43	2.6	1,010	7.9
Sept. 1-4, . . . . .	14.6	20		141	33	191		212	0	283	80		3.7	1,160	1.58	45.7	488	314	46	3.8	1,630	7.9
Sept. 22, 24-27, . . . . .	12	53		80	18	116		241	0	236	58		1.9	681	.93	22	274	76	48	3.0	991	7.2
Weighted average . . . . .	b-483	28		75	15	63		189	--	177	30		2.3	483	0.66	630	248	94	36	1.7	718	--

a. No flow Sept. 5-21, 23, 28-30.

b. Average for 344 days of flow.

## RIO GRANDE BASIN--Continued

## RIO GRANDE AT SAN ACACIA, N. MEX.--Continued

Temperature (°F) of water, water year October 1952 to September 1953  
 /Once-daily temperature measurement generally before 11 a. m./

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

a Reading obtained between 11 a. m. and 6 p. m.

b Reading obtained after 6 p. m.

## WESTERN GULF OF MEXICO BASINS

## RIO GRANDE BASIN--Continued

## RIO GRANDE AT SAN ACACIA, N. MEX.--Continued

Suspended sediment, water year October 1952 to September 1953

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.....	11	1,200	36	10	241	7	536	4,000	5,790
2.....	10	858	23	10	304	8	549	4,350	6,450
3.....	6	830	13	10	330	9	562	3,000	4,550
4.....	5	829	11	10	306	8	601	4,500	7,300
5.....	21	700	a 40	10	316	9	640	2,450	4,230
6.....	50	570	77	13	380	13	627	2,900	4,910
7.....	11	566	17	13	400	14	614	2,200	a 3,600
8.....	10	544	15	14	450	a 17	627	2,400	4,060
9.....	13	524	18	16	500	a 22	656	2,750	4,870
10.....	8	557	12	35	700	a 66	688	2,450	4,550
11.....	8	524	11	68	820	151	704	2,500	4,750
12.....	7	480	a 9	92	1,100	273	688	1,100	2,040
13.....	7	511	10	187	1,450	732	656	1,000	1,770
14.....	7	490	9	235	1,700	1,080	640	950	a 1,600
15.....	7	401	8	229	1,700	a 1,100	614	1,750	2,900
16.....	7	382	7	265	1,600	1,140	614	2,400	3,980
17.....	7	425	8	328	1,900	1,680	672	2,350	4,260
18.....	12	474	15	373	2,450	2,470	688	2,000	3,720
19.....	10	500	a 14	382	1,900	1,960	704	1,800	3,420
20.....	10	386	10	433	2,200	2,570	720	1,600	3,110
21.....	9	292	7	536	2,400	3,470	704	1,500	a 2,900
22.....	9	284	7	562	2,850	4,320	752	1,550	3,150
23.....	8	255	6	575	2,400	a 3,700	768	1,700	3,530
24.....	8	265	6	656	2,650	4,690	820	1,950	4,320
25.....	18	738	36	640	2,800	4,840	840	2,100	a 4,800
26.....	22	500	a 30	614	2,150	3,560	820	2,350	5,200
27.....	11	294	8	672	2,000	a 3,600	800	2,650	5,720
28.....	11	306	9	736	1,850	3,680	784	2,200	a 4,700
29.....	10	356	10	656	1,400	2,480	736	1,950	3,880
30.....	9	350	a 9	640	2,330	4,030	692	3,180	5,940
31.....	12	200	6	--	--	--	672	3,400	6,170
Total.	354	--	498	9,020	--	51,699	21,188	--	132,170
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.....	672	2,100	a 3,800	720	1,500	2,920	1,020	2,000	a 5,500
2.....	656	2,600	4,610	736	1,100	2,190	1,240	2,150	7,200
3.....	688	2,450	4,550	768	1,100	2,280	1,170	1,920	6,070
4.....	736	2,700	5,370	752	1,500	3,050	1,120	1,120	3,390
5.....	720	3,950	7,680	720	1,150	2,240	1,100	1,400	4,160
6.....	688	2,900	5,390	736	950	1,890	1,020	1,380	3,800
7.....	736	3,250	6,460	752	1,100	2,230	940	1,250	3,170
8.....	752	3,150	6,400	768	2,000	4,150	900	1,550	3,770
9.....	720	2,150	4,180	768	1,650	3,420	1,060	2,650	a 8,610
10.....	736	2,500	4,970	840	950	2,150	1,240	2,700	9,040
11.....	736	1,850	a 3,700	880	1,900	4,510	1,050	1,300	3,690
12.....	720	2,750	5,350	960	1,650	4,280	920	1,500	3,730
13.....	688	3,200	5,940	980	1,450	3,840	900	1,800	4,370
14.....	656	4,100	7,260	900	1,150	2,790	860	1,600	3,720
15.....	688	3,350	6,220	820	850	a 1,900	860	1,100	a 2,600
16.....	704	2,200	4,180	784	1,650	3,490	1,320	2,600	9,270
17.....	720	2,100	4,080	768	1,100	2,280	920	1,400	3,480
18.....	720	1,850	a 3,600	752	1,300	2,640	588	1,050	1,670
19.....	736	1,600	3,180	736	1,000	1,990	455	1,000	1,230
20.....	736	1,450	2,880	736	1,950	3,880	355	1,150	1,100
21.....	736	1,500	2,980	980	3,200	8,470	340	1,400	1,290
22.....	736	1,150	2,290	1,140	3,100	a 9,500	850	1,350	3,100
23.....	752	1,550	3,150	1,100	2,300	6,830	730	1,400	2,760
24.....	752	1,700	3,450	1,000	2,350	6,340	440	1,200	1,430
25.....	752	1,450	2,940	1,050	1,550	4,390	340	1,150	1,060
26.....	736	1,580	3,140	1,000	1,000	2,700	182	750	369
27.....	736	1,100	2,190	1,050	1,500	4,250	106	550	157
28.....	704	1,600	3,040	980	1,200	3,180	57	400	62
29.....	704	1,300	2,470	--	--	--	47	350	a 44
30.....	736	1,250	2,480	--	--	--	63	500	85
31.....	720	1,300	2,530	--	--	--	279	650	490
Total.	22,272	--	130,460	24,176	--	103,780	22,472	--	100,417

s Computed by subdividing day.

a Computed from partly estimated concentration graph.

## RIO GRANDE BASIN--Continued

## RIO GRANDE AT SAN ACACIA, N. MEX.--Continued

## Suspended sediment, water year October 1952 to September 1953--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.....	145	700	274	1,210	3,600	11,800	1,750	3,900	18,400
2.....	106	590	169	1,140	2,400	7,390	1,390	3,100	11,600
3.....	125	600	202	1,330	2,500	a 9,000	1,450	2,700	10,600
4.....	150	650	263	1,310	2,700	9,550	1,210	2,600	8,490
5.....	155	720	a 300	540	1,550	2,260	1,140	2,100	6,460
6.....	188	750	381	356	850	817	1,050	2,250	6,380
7.....	348	900	846	194	460	241	1,160	2,400	a 7,500
8.....	150	650	263	99	450	120	1,470	2,850	11,300
9.....	110	500	148	68	400	73	999	2,000	5,400
10.....	120	500	162	57	320	a 49	805	1,250	2,720
11.....	155	480	201	66	250	45	745	1,000	2,010
12.....	218	600	a 350	56	215	33	805	5,800	12,600
13.....	279	700	527	43	216	25	835	6,950	15,700
14.....	265	750	537	36	198	19	760	2,500	5,100
15.....	140	400	151	27	191	14	1,180	2,400	7,650
16.....	85	500	115	26	348	24	1,020	2,600	7,160
17.....	50	450	61	26	300	a 21	1,110	3,480	s 11,700
18.....	57	600	92	26	184	13	1,230	4,400	14,600
19.....	176	900	428	22	161	10	982	3,800	10,100
20.....	165	400	178	21	141	8	1,050	3,000	8,500
21.....	200	500	270	19	174	9	1,180	1,600	a 5,100
22.....	188	600	305	20	185	10	1,180	1,350	4,300
23.....	110	1,200	356	20	166	9	1,050	1,450	4,110
24.....	120	20,700	s 7,840	18	180	a 9	790	1,150	2,450
25.....	372	2,800	2,810	18	121	6	564	1,000	1,520
26.....	639	1,400	2,420	17	114	5	430	750	871
27.....	1,140	3,520	s 12,200	17	115	5	212	400	230
28.....	884	3,620	s 9,200	14	132	5	188	400	a 200
29.....	965	3,360	8,750	12	171	6	160	300	130
30.....	1,070	3,300	9,530	11	142	4	130	340	119
31.....	--	--	--	894	3,030	s 7,830	--	--	--
Total.	8,875	--	59,329	7,713	--	49,410	28,025	--	203,000
	July			August			September		
1.....	27	300	22	866	107,000	s 289,000	0.3	88,600	77
2.....	14	150	6	1,070	--	e 320,000	46	59,700	s 12,200
3.....	9	178	4	1,170	116,000	s 416,000	12	51,100	2,840
4.....	12	170	a 6	267	56,700	s 46,400	.1	17,000	5
5.....	13	160	a 6	25	49,800	s 3,870	0	--	0
6.....	15	144	6	.5	23,000	31	0	--	0
7.....	8	47,800	s 1,190	.1	8,000	2	0	--	0
8.....	1	23,000	62	.1	2,200	1	0	--	0
9.....	1	2,500	7	.1	1,000	a(t)	0	--	0
10.....	1	11,900	32	.1	900	(t)	0	--	0
11.....	1	34,500	97	13	26,100	s 2,790	0	--	0
12.....	221	34,400	s 72,900	1,000	129,000	s 428,000	0	--	0
13.....	1,420	70,200	s 352,000	1,060	109,000	s 497,000	0	--	0
14.....	1,350	59,100	s 283,000	1,420	100,000	s 582,000	0	--	0
15.....	73	28,500	s 5,990	71	56,200	s 13,900	0	--	0
16.....	31	25,900	s 4,330	203	70,800	s 41,100	0	--	0
17.....	240	41,900	s 87,100	7	37,800	s 891	0	--	0
18.....	2,000	116,000	s 673,000	66	30,900	s 22,500	0	--	0
19.....	4,130	123,000	1,490,000	2,000	59,200	s 347,000	0	--	0
20.....	1,030	73,300	s 214,000	293	28,000	22,200	0	--	0
21.....	371	46,700	s 51,800	194	57,000	31,000	0	--	0
22.....	66	34,000	6,280	196	69,500	s 48,800	.2	447	(t)
23.....	129	30,200	s 14,500	75	56,900	s 12,600	0	--	0
24.....	483	71,500	s 170,000	9	38,700	975	.1	384	(t)
25.....	140	75,500	s 33,400	5	25,500	344	.1	384	(t)
26.....	2	48,000	269	5	16,000	216	.1	386	(t)
27.....	.6	35,000	59	5	3,000	40	.1	240	a(t)
28.....	.5	17,500	24	4	1,980	21	0	--	0
29.....	17	39,100	s 5,410	3	1,160	9	0	--	0
30.....	24	109,000	s 11,000	1	900	a 2	0	--	0
31.....	48	70,100	s 10,200	1	26,000	70	--	--	--
Total.	11,878.1	--	3,486,700	10,029.9	--	3,126,763	59.0	--	15,123

Total discharge for year (cfs-days) ..... 166,062.0

Total load for year (tons) ..... 7,459,349

e Estimated.

t Less than 0.50 ton.

s Computed by subdividing day.

a Computed from partly estimated concentration graph.

RIO GRANDE BASIN--Continued  
RIO GRANDE AT SAN ACACIA, N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1952 to September 1953

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

Date of collection	Time	Water discharge (cfs)	Water temperature (° F)	Suspended sediment										Methods of analysis	
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters									
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250		0.350
Nov. 18, 1952 . . . . .	10:00 a. m.	382	42	2,400	2,870	49			68		99	99	100		SPWCM
Dec. 1 a . . . . .	8:00 a. m.	536	33	4,140	4,090	27			34		67	91	100		SPWCM
Dec. 10 a . . . . .	4:00 p. m.	400	42												
Dec. 10 a . . . . .	8:00 a. m.	575	35	2,480	3,920	36			52		92	99	100		SPWCM
Dec. 10 a . . . . .	4:00 p. m.	1,000	45												
Dec. 22 . . . . .	8:00 a. m.	784	36	1,700	2,720	33			50		85	99	100		SPWCM
Jan. 5, 1953 . . . . .	10:30 a. m.	720	--	3,530	3,500	14			21		43	69	97	100	SPWCM
Jan. 26 . . . . .	9:30 a. m.	736	39	3,270	3,190	13			20		44	67	93	100	SPWCM
Jan. 26 . . . . .	9:30 a. m.	736	39	3,270	2,760	8			20		44	67	93	100	SPN
Feb. 1 . . . . .	5:30 p. m.	784	42	1,800	3,000	16			26		47	66	92	100	SPWCM
Feb. 11 . . . . .	4:30 p. m.	920	47	2,860	3,740	17			26		53	77	97	100	SPWCM
Feb. 23 . . . . .	5:00 p. m.	1,070	--	1,960	2,240	30			43		75	94	100		SPWCM
Mar. 8 . . . . .	10:00 a. m.	940	50	1,800	5,550	21			32		60	83	100		SPWCM
Mar. 16 . . . . .	8:00 a. m.	1,400	48	3,290	2,385	45			62		85	99	100		SPWCM
Mar. 22 . . . . .	3:00 p. m.	850	45	1,290	3,270	46			64		85	98	100		SPWCM
Apr. 7 . . . . .	8:30 a. m.	380	--	1,060	1,620	54			68		89	98	100		SPWCM
Apr. 24 . . . . .	9:30 a. m.	38	--	54,700	5,080	73			93		100	--	--		SPWCM
Apr. 25 . . . . .	6:30 a. m.	244	45	3,400	4,870	68			88		97	99	99	100	SPWCM
June 1 . . . . .	5:00 a. m.	2,280	60	4,350	3,040	36			55		87	98	100		SPWCM
June 3 . . . . .	12:00 m.	1,420	75	2,810	3,550	35			48		77	93	100		SPWCM
June 3 . . . . .	12:00 m.	1,420	75	2,810	3,140	24			45		77	93	100		SPN
June 13 . . . . .	5:45 a. m.	865	64	6,530	4,560	63			78		91	99	100		SPWCM
June 17 . . . . .	8:00 p. m.	3,600	78	4,870	3,990	60			81		98	100			SPWCM
July 7 . . . . .	11:30 a. m.	8.2	63	141,000	8,720	64			92		98	99	99	100	SPWCM
July 13 . . . . .	10:30 p. m.	1,560	76	86,000	4,270	63			88		97	99	100		SPWCM
July 14 . . . . .	6:00 a. m.	3,020	69	59,300	4,020	73			90		97	99	100		VPWCM
July 16 . . . . .	6:30 p. m.	14	84	16,500	4,420	81			96		100				SPWCM
July 24 . . . . .	6:30 a. m.	9.6	70	8,890	3,200	90			100		--	--	--		SPWCM

a Samples composited and analyzed as one.

July 24, 1953	3:00 p. m.	639	86	114,000	2,930	63	85	99	100	--	--	VPWCM
July 30	8:00 a. m.	88	64	132,000	4,260	52	75	96	88	99	99	SPWCM
Aug. 13	8:00 a. m.	1,330	68	136,000	2,990	55	74	92	88	100	--	VPWCM
Aug. 19	6:00 a. m.	3,400	62	45,700	4,400	58	74	92	99	100	--	VPWCM
Aug. 19	4:00 p. m.	1,960	78	51,900	4,060	72	88	99	100	--	--	VPWCM
Aug. 20	6:00 p. m.	372	--	19,500	3,030	70	91	100	--	--	--	SPWCM
Sept. 3	7:00 a. m.	4.5	65	63,700	5,300	78	92	96	97	100	--	SPWCM

## RIO GRANDE BASIN--Continued

## RIO GRANDE AT SAN ANTONIO, N. MEX.

LOCATION.--At gaging station at bridge on U. S. Highway 380, about 0.9 mile east of San Antonio, Socorro County.

DRAINAGE AREA.--27,400 square miles, approximately (includes 2,940 square miles in closed basin in northern part of San Luis Valley, Colo.).

RECORDS AVAILABLE.--Water temperatures: August 1951 to September 1953.

Sediment records: August 1951 to September 1953.

EXTREMES, 1952-53.--Water temperatures: Maximum observed 95°F July 1; minimum, freezing point, Dec. 25.

Sediment concentrations: Maximum daily, 119,000 ppm Aug. 13; maximum observed, 142,000 ppm Aug. 1; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 965,000 tons July 19; minimum daily, 0 tons on many days. EXTREMES, 1951-53.--Water temperatures: Maximum observed 95°F July 1, 1953; minimum, freezing point Feb. 2, Dec. 25, 1952.

Sediment concentrations: Maximum daily, 119,000 ppm Aug. 13, 1953; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 965,000 tons July 19, 1953; 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 1952 to September 1953 given in #SP 1282.

Temperature (°F) of water, water year October 1952 to September 1953  
/Once-daily temperature measurement, generally between 11 a.m. and 6 p.m.7

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1		--	40	41	43	52	69	b 59	71	95	b 74	
2		--	37	40	50	46	73	54	a 60	--	b 74	
3		--	41	42	51	46	71	62	b 73	--	82	
4		--	a 35	44	a 40	46	68	63	76	--	83	
5		--	40	44	51	49	--	67	76	--	74	
6		--	39	46	53	48	63	b 71	71	--	b 76	
7		--	45	41	50	56	67	74	79	--	b 74	
8		58	46	43	48	56	65	74	b 86	--	--	
9		a 60	46	51	48	55	69	b 71	81	--	--	
10		a 39	42	55	44	61	61	--	b 82	--	--	
11		a 35	46	53	49	62	56	63	82	--	--	
12		a 35	43	52	46	54	61	70	81	--	a 65	
13		a 39	46	53	48	56	59	64	72	89	b 79	
14		50	44	56	49	57	56	65	72	89	77	
15		51	44	44	52	55	69	67	85	88	b 82	
16		51	a 42	44	46	55	69	64	79	84	80	
17		48	41	44	52	66	65	71	85	a 59	76	
18		49	42	49	46	64	79	76	85	78	67	
19		40	48	51	47	65	69	78	b 81	79	81	
20		39	42	52	45	58	72	80	b 83	a 71	77	
21		39	43	53	46	61	70	--	b 85	a 69	72	
22		a 37	45	53	45	63	62	--	b 88	a 79	b 72	
23		a 40	44	51	42	61	71	--	b 88	b 86	73	
24		41	41	a 50	46	64	74	--	b 85	b 71	--	
25		40	a 32	49	49	59	a 64	--	85	a 71	--	
26		40	45	51	51	60	b 62	--	80	b 84	--	
27		39	37	52	46	73	74	--	b 86	84	--	
28		37	42	53	49	72	60	--	b 88	a 84	--	
29		40	39	54	--	59	62	--	a 76	b 74	--	
30		35	38	53	--	57	b 60	--	b 87	b 74	--	
31		--	40	52	--	69	--	--	--	77	--	
Average		43	42	49	48	58	66	68	80	79	76	

a Reading obtained before 11 a.m.

b Reading obtained after 6 p.m.

## RIO GRANDE BASIN--Continued

## RIO GRANDE AT SAN ANTONIO, N. MEX.--Continued

Suspended sediment, water year October 1952 to September 1953

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			0	--	0	547	4,550	6,720
2.....	22			1	--	b1	505	4,750	6,480
3.....	21			4	--	b2	512	6,400	8,850
4.....	26			5	--	b3	536	6,600	9,550
5.....	21			8	--	b6	584	8,400	a13,000
6.....	5			12	--	b15	596	5,500	8,850
7.....	13			14	--	b18	572	4,150	6,410
8.....	22			12	400	13	560	4,300	6,500
9.....	8			12	520	17	560	8,400	a13,000
10.....	15			15	500	20	572	9,300	14,400
11.....	25			15	410	17	632	4,200	7,170
12.....	17			27	1,000	73	656	5,600	9,920
13.....	12			54	2,900	423	620	5,900	9,880
14.....	10			82	4,670	1,030	608	5,850	9,600
15.....	11			90	4,440	1,080	596	4,700	7,560
16.....	9			142	4,500	1,730	584	6,550	10,300
17.....	8			183	4,750	2,350	620	5,450	9,120
18.....	12			225	5,050	3,070	668	5,400	9,740
19.....	6			254	4,750	3,260	632	5,300	9,040
20.....	7			290	4,600	3,600	632	5,600	9,560
21.....	5			350	5,250	4,960	620	6,150	10,300
22.....	2			397	4,950	5,310	656	4,500	7,970
23.....	1			433	5,300	6,200	668	5,900	10,600
24.....	0			505	6,150	8,390	728	5,800	11,400
25.....	0			574	7,100	11,000	740	5,000	9,990
26.....	0			556	6,550	9,830	728	6,750	13,300
27.....	0			592	5,900	9,430	668	7,400	13,300
28.....	0			610	5,800	9,550	740	6,700	13,400
29.....	0			632	5,150	8,790	692	6,650	12,400
30.....	.5			600	4,700	7,610	644	6,100	10,600
31.....	.5			--	--	--	596	4,400	7,080
Total.	314.0		b660	6,694	--	97,798	19,272	--	305,990
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.....	560	5,200	7,860	692	2,900	a5,400	1,030	5,200	14,500
2.....	560	5,950	9,000	692	3,000	a5,600	1,020	6,950	19,100
3.....	560	5,250	7,940	704	3,000	5,700	1,120	7,800	23,600
4.....	572	3,550	5,480	704	3,100	5,890	1,090	6,400	18,800
5.....	596	4,850	7,800	692	2,700	5,040	1,030	5,350	14,900
6.....	620	5,350	8,960	692	3,050	5,700	964	3,650	9,500
7.....	632	6,200	10,600	704	3,200	6,080	899	3,700	8,980
8.....	644	6,100	10,600	716	3,300	6,380	812	3,500	7,670
9.....	620	5,900	9,880	764	3,300	a6,800	764	3,600	7,430
10.....	680	5,300	9,730	776	3,400	7,120	1,120	6,120	s19,000
11.....	704	4,450	8,460	836	6,200	14,000	990	5,000	13,400
12.....	692	4,850	9,060	848	7,150	16,400	938	4,500	11,400
13.....	668	4,750	8,570	873	5,800	13,700	938	3,950	10,000
14.....	632	4,900	8,360	848	5,700	13,100	848	4,100	9,390
15.....	668	5,000	9,020	824	4,100	9,120	800	4,150	8,960
16.....	680	5,150	9,460	752	4,150	8,430	1,090	5,080	s15,300
17.....	680	4,800	8,810	728	3,750	7,370	1,100	4,380	s14,000
18.....	680	5,400	9,910	716	2,950	5,700	620	2,750	4,600
19.....	704	5,600	10,600	716	4,300	8,310	435	2,700	3,170
20.....	716	3,900	7,540	704	4,750	9,030	310	2,050	1,720
21.....	704	3,950	7,510	716	4,600	a8,900	220	2,100	1,250
22.....	716	4,100	7,930	1,040	6,600	18,500	500	2,800	3,780
23.....	716	3,400	6,570	1,020	7,200	19,800	752	3,000	6,090
24.....	728	4,800	9,430	990	5,600	15,000	474	3,700	4,740
25.....	728	3,500	6,880	964	4,600	12,000	220	2,050	1,220
26.....	740	3,050	6,090	951	6,900	17,700	162	1,000	437
27.....	728	3,050	6,000	990	5,200	13,900	114	900	277
28.....	704	4,550	8,650	1,040	4,250	11,900	89	650	156
29.....	704	3,200	6,080	--	--	--	51	550	76
30.....	704	2,800	5,320	--	--	--	45	500	61
31.....	704	2,900	5,510	--	--	--	58	775	a166
Total.	20,744	--	253,610	22,692	--	282,570	20,603	--	253,673

s Computed by subdividing day.

a Computed from estimated concentration graph.

b Computed from water-sediment discharge curve.

## WESTERN GULF OF MEXICO BASINS

## RIO GRANDE BASIN--Continued

## RIO GRANDE AT SAN ANTONIO, N. MEX.--Continued

## Suspended sediment, water year October 1952 to September 1953--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.....	130	1,400	491	1,120	6,400	19,400	1,100	6,450	s 18,500
2.....	90	650	158	1,200	7,550	24,500	1,340	6,400	23,200
3.....	91	650	160	1,080	6,350	18,500	1,300	6,800	23,900
4.....	94	600	152	1,390	6,800	25,500	1,190	5,650	18,200
5.....	114	950	292	970	5,850	s 16,100	1,030	3,500	9,730
6.....	115	750	233	370	2,300	2,300	899	3,500	8,500
7.....	128	900	311	192	3,100	1,610	1,040	3,800	10,700
8.....	295	1,450	1,150	148	1,900	759	1,270	5,400	18,500
9.....	136	800	294	90	300	73	1,240	5,050	s 18,000
10.....	104	550	154	55	300	45	644	2,250	3,910
11.....	94	450	114	56	314	48	632	2,850	4,860
12.....	114	500	154	60	343	56	704	3,800	7,220
13.....	150	1,200	486	47	342	43	704	3,150	5,990
14.....	220	1,450	861	33	317	28	668	5,000	9,020
15.....	235	950	603	22	300	18	716	6,100	11,800
16.....	132	600	214	16	260	11	1,160	6,200	19,400
17.....	89	350	84	12	450	15	956	9,310	s 26,800
18.....	52	350	49	14	567	s 23	1,330	6,310	s 27,800
19.....	47	300	38	11	800	s 25	964	3,600	9,370
20.....	115	925	s 302	4	550	6	964	6,300	16,400
21.....	134	750	271	5	750	10	977	6,200	16,400
22.....	136	1,000	367	9	258	s 2	1,060	3,400	9,730
23.....	204	1,150	633	0	--	0	1,130	3,500	10,700
24.....	280	2,000	1,510	0	--	0	788	1,700	3,620
25.....	128	12,400	s 4,470	0	--	0	584	1,050	1,660
26.....	579	6,860	s 10,600	0	--	0	370	1,400	1,400
27.....	873	5,350	12,600	0	--	0	220	1,100	653
28.....	1,420	7,530	s 29,300	0	--	0	160	1,600	691
29.....	899	6,300	15,300	0	--	0	134	710	257
30.....	1,040	6,400	18,000	0	--	0	72	450	87
31.....	--	--	--	22	670	sa 470	--	--	--
Total.	8,238	--	99,351	6,917.9	--	109,542	25,346	--	336,998
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.....	48	350	45	386	61,800	s 111,000	0		
2.....	7	113	s 4	937	94,500	s 258,000	0		
3.....	0	--	0	840	104,000	s 260,000	20		
4.....	0	--	0	475	95,500	s 135,000	7		
5.....	0	--	0	190	72,800	s 38,800	.5		
6.....	0	--	0	50	51,000	7,140	0		
7.....	0	--	0	6	13,000	211	0		
8.....	0	--	0	1	--	b 9	0		
9.....	0	--	0	0	--	0	0		
10.....	0	--	0	0	--	0	0		
11.....	0	--	0	0	--	0	0		
12.....	0	--	0	187	37,400	s 59,100	0		
13.....	894	44,300	s 129,000	1,000	119,000	s 362,000	0		
14.....	1,290	53,200	s 263,000	1,050	92,200	s 329,000	0		
15.....	373	39,900	s 43,900	230	58,000	37,400	0		
16.....	122	35,000	12,000	178	57,600	s 30,800	0		
17.....	96	19,200	s 5,460	142	63,000	sa 26,000	0		
18.....	1,720	72,300	s 362,000	37	42,000	s 4,660	0		
19.....	3,320	93,500	s 965,000	1,690	65,100	s 314,000	0		
20.....	1,690	69,000	sa 380,000	547	53,300	s 84,600	0		
21.....	518	59,100	85,700	274	37,300	s 29,100	0		
22.....	180	48,800	s 26,100	233	81,200	s 58,300	0		
23.....	154	40,700	s 19,300	165	63,000	s 29,400	0		
24.....	251	48,400	s 62,100	100	36,000	s 10,000	0		
25.....	334	92,800	s 90,900	30	18,000	a 1,500	0		
26.....	153	80,000	34,300	2	8,000	a 43	0		
27.....	57	54,000	a 8,600	1	--	b 10	0		
28.....	16	--	b 1,700	0	--	0	0		
29.....	4	--	b 300	0	--	0	0		
30.....	33	--	b 3,800	0	--	0	0		
31.....	63	--	b 7,100	0	--	0	--		
Total.	11,323	--	2,500,309	8,751	--	2,186,073	27.5		b 2,300

Total discharge for year (cfs-days)..... 150,922.4

Total load for year (tons)..... 6,428,874

s Computed by subdividing day.

a Computed from estimated concentration graph.

b Computed from water-sediment discharge curve.

RIO GRANDE BASIN--Continued  
RIO GRANDE AT SAN ANTONIO, N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1952 to September 1953

(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water;

W, in distilled water; C, chemically dispersed; M, mechanically dispersed; V, visual accumulation tube)

Date of collection	Time	Water discharge (cfs)	Water temperature (° F)	Suspended sediment												Methods of analysis
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters										
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.350	0.500	
Nov. 13, 1952	7:00 a. m.	42	39	2,360	5,620	--	80	--	95	--	96	97	100	--	--	SPWCM
Nov. 30	12:00 a. m.	512	35	4,200	3,080	--	43	--	60	--	71	85	100	--	--	SPWCM
Nov. 30	12:00 p. m.	512	35	4,200	2,830	--	10	--	56	--	71	85	100	--	--	SPN
Nov. 30	4:30 p. m.	632	42	9,690	3,910	--	17	--	28	--	42	78	99	100	--	SPWCM
Dec. 10	4:00 p. m.	630	46	5,670	2,930	--	29	--	44	--	53	81	99	100	--	SPWCM
Dec. 24	5:00 p. m.	728	41	5,210	3,130	--	24	--	41	--	70	93	99	100	--	SPWCM
Jan. 2, 1953	4:45 p. m.	668	40	6,000	3,800	--	21	--	29	--	54	75	97	100	--	SPWCM
Jan. 11	4:00 p. m.	752	53	4,210	4,000	--	25	--	41	--	66	89	100	--	--	SPWCM
Jan. 25	11:00 a. m.	728	41	3,260	3,660	--	23	--	36	--	60	85	100	--	--	SPWCM
Jan. 25	11:00 a. m.	728	41	3,260	3,580	--	4	--	35	--	60	85	100	--	--	SPN
Feb. 10	5:00 p. m.	824	44	3,780	4,480	--	16	--	29	--	56	85	100	--	--	SPWCM
Feb. 20	5:00 p. m.	692	45	4,010	4,600	--	18	--	29	--	55	83	99	100	--	SPWCM
Feb. 22	7:30 a. m.	1,260	--	8,470	3,880	--	12	--	21	--	47	73	99	100	--	SPWCM
Mar. 1	5:30 p. m.	1,040	52	5,360	3,460	--	15	--	26	--	55	85	99	100	--	SPWCM
Mar. 4	5:30 p. m.	1,290	46	5,630	2,980	--	4	--	20	--	54	81	98	100	--	SPWCM
Mar. 28	4:00 p. m.	852	72	852	2,580	29	36	40	44	46	58	72	99	100	--	SPWCM
Mar. 28	4:00 p. m.	89	72	852	2,490	6	7	56	56	57	58	72	99	100	--	SPN
Apr. 1	5:30 p. m.	1,050	69	1,050	--	--	--	--	--	--	63	89	100	--	--	S
Apr. 8	5:00 p. m.	310	65	1,290	2,940	--	57	--	74	--	92	99	100	--	--	SPWCM
Apr. 20	4:30 p. m.	136	72	880	3,090	--	51	--	62	--	78	96	100	--	--	SPWCM
May 1	6:30 p. m.	1,000	59	5,390	5,780	--	30	--	42	--	64	83	99	100	--	SPWCM
May 2	8:00 a. m.	1,400	50	8,430	9,310	--	21	--	31	--	51	74	97	100	--	SPWCM
May 2	3:30 p. m.	1,150	54	7,310	6,350	--	22	--	29	--	48	71	94	100	--	SPWCM
May 7	5:00 p. m.	160	74	3,440	3,860	--	20	--	23	--	50	82	99	100	--	SPWCM
June 7	10:00 a. m.	1,200	68	4,010	3,400	--	21	--	34	--	64	90	100	--	--	SPWCM
June 7	10:00 a. m.	1,200	68	4,010	2,570	--	4	--	25	--	64	90	100	--	--	SPN
June 20	7:00 a. m.	1,070	86	7,200	5,600	--	57	--	66	--	76	90	100	--	--	SPWCM
June 23	6:30 a. m.	1,150	72	3,720	6,000	--	30	--	41	--	66	87	100	--	--	SPWCM

## RIO GRANDE BASIN--Continued

## RIO GRANDE AT SAN ANTONIO, N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1952 to September 1953--Continued  
(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed; V, visual accumulation tube)

Date of collection	Time	Water discharge (cfs)	Water temperature (°F)	Suspended sediment												Methods of analysis
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters										
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.350	0.500	
July 14, 1953	8:00 a. m.	938	72	46,200	4,840	--	68	--	81	--	87	96	100	--	--	VPWCM
July 14	12:00 m.	2,360	79	106,000	3,280	--	59	--	75	--	--	--	--	--	--	PWCM
July 14	4:00 p. m.	2,520	89	75,400	4,600	--	66	--	82	--	88	95	100	--	--	VPWCM
July 18	10:30 a. m.	1,960	74	81,900	3,670	--	67	--	90	--	94	97	100	--	--	VPWCM
July 19	12:00 m.	2,710	75	92,900	3,540	--	63	--	80	--	87	94	100	--	--	VPWCM
July 20	5:30 a. m.	2,280	71	86,600	3,600	--	66	--	81	--	92	98	100	--	--	VPWCM
Aug. 19	5:10 p. m.	2,660	81	80,300	3,290	--	56	--	75	--	92	97	100	--	--	VPWCM
Aug. 20	11:30 a. m.	368	76	50,900	3,140	--	73	--	92	--	96	98	100	--	--	VPWCM

RIO GRANDE BASIN--Continued  
RIO GRANDE TIFFANY CHANNEL AT SAN MARCIAL, N. MEX.

LOCATION.--At water-stage recorder at Atchison, Topeka & Santa Fe Railway bridge over Tiffany Channel, 3 miles northeast of San Marcial, Socorro County. Tiffany Channel is a bypass channel carrying water around the main channel gaging station at San Marcial.

RECORDS AVAILABLE.--Chemical analyses: April 1950 to September 1955.

Water temperatures: October 1950 to September 1955.

EXTREMES, 1952-53.--Dissolved solids: Maximum, 1,380 ppm June 11-20; minimum, 645 ppm Dec. 1-10.

Hardness: Maximum, 1,380 ppm June 11-20; minimum, 645 ppm Dec. 1-10.

Specific conductance: Maximum observed, 2,990 micromhos June 19; minimum observed, 913 micromhos Dec. 1.

Water temperatures: Maximum observed, 85°F July 13; minimum observed, 33°F Dec. 26.

Sediment concentrations: Maximum daily, 20,700 ppm Aug. 6; minimum daily, 40 ppm Nov. 24.

Sediment loads: Maximum daily, 6,040 tons Aug. 6; minimum daily, less than 0.50 ton on many days.

EXTREMES, 1950-53.--Dissolved solids: Maximum, 1,730 ppm Aug. 23-24, 1951; minimum, 220 ppm June 9-10, 1952.

Hardness: Maximum, 849 ppm Aug. 23-24, 1951; minimum, 120 ppm June 9-10, 1952.

Specific conductance: Maximum observed, 2,990 micromhos June 19, 1953; minimum observed, 294 micromhos June 12, 1952.

Water temperatures: Maximum observed, 94°F July 10, 18, 29, 1951; minimum observed, 33°F Jan. 6, Dec. 26, 1952.

Sediment concentrations: Maximum daily, 41,700 ppm Sept. 22, 1950; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 40,800 tons Aug. 24, 1952; minimum daily, 0 tons many days.

REMARKS.--Values reported for dissolved solids are residues on evaporation. Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of discharge for water year October 1952 to September 1953 furnished by Santa Fe district office of Surface Water Branch; records for composite discharge of Tiffany Channel and main channel given under Rio Grande at San Marcial in WSP 1282. Quality of water records for Rio Grande at San Marcial given on page 467.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (residue at 180°C)		Hardness as CaCO <sub>3</sub>	Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH			
															Parts per million	Tons per acre-foot					Tons per day	Calcium, magnesium	Non-carbonate
Oct. 1-10, 1952	26.4	40	0.07	84	17	174	7.4	258	0	246	149	0.5	0.3	0.32	865	1.18	61.7	280	68	57	4.5	1,320	7.8
Oct. 11-20	23.7	--	--	88	20	186	--	--	--	--	--	--	--	--	868	1.18	55.5	302	--	57	4.7	1,380	--
Oct. 21-31	25.5	--	--	88	20	190	--	--	--	--	--	--	--	--	873	1.19	60.1	302	--	58	4.8	1,390	--
Nov. 1-10	16.4	--	--	96	21	195	--	--	--	--	--	--	--	--	920	1.25	40.7	326	--	57	4.7	1,450	--
Nov. 11-20	12.9	--	--	98	21	182	--	--	--	--	--	--	--	--	878	1.19	30.6	326	--	55	4.4	1,380	--
Nov. 21-30	15.0	--	--	98	21	198	--	--	--	--	--	--	--	--	944	1.28	38.2	331	--	57	4.7	1,470	--
Dec. 1-10	57.1	--	--	86	16	114	--	--	--	--	--	--	--	--	645	.88	99.4	280	--	47	3.0	1,010	--
Dec. 11-20	54.7	--	--	86	19	160	--	--	--	--	--	--	--	--	787	1.07	116	292	--	54	4.1	1,250	--
Dec. 21-31	59.9	--	--	94	21	182	--	--	--	--	--	--	--	--	902	1.23	146	321	--	55	4.4	1,370	--

RIO GRANDE BASIN--Continued  
RIO GRANDE TIFFANY CHANNEL AT SAN MARCIAL, N. MEX.--Continued

Chemical analyses, in parts per million, water year October 1952 to September 1953.--Continued.

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	
															Parts per million	Tons per acre-foot	Tons per day	Calcium magnesium	Non-carbonate				
Jan. 1-10, 1953	87.6	31	0.01	92	20	184	7.7	276	0	273	151	0.5	0.3	0.29	908	1.23	215	312	86	55	4.5	1,390	7.9
Jan. 11-20	60.2	--	--	96	22	190	--	--	--	--	--	--	--	--	925	1.26	180	330	--	56	4.5	1,410	--
Jan. 21-31	77.5	--	--	91	21	184	--	--	--	--	--	--	--	--	890	1.21	186	314	--	56	4.5	1,370	--
Feb. 1-9	71.9	--	--	101	18	190	--	--	--	--	--	--	--	--	887	1.21	172	326	--	56	4.5	1,380	--
Feb. 10-28	82.9	--	--	145	36	182	--	--	--	--	--	--	--	--	1,070	1.46	84	510	--	44	3.5	1,620	--
Mar. 1-10	82.9	--	--	134	28	186	--	--	--	--	--	--	--	--	1,020	1.39	228	450	--	47	3.8	1,550	--
Mar. 11-20	117	--	--	93	18	194	--	--	--	--	--	--	--	--	890	1.21	281	306	--	58	4.8	1,390	--
Mar. 21-31	112	--	--	94	21	176	--	--	--	--	--	--	--	--	854	1.16	236	321	--	54	4.3	1,330	--
Apr. 1-10	66.7	23	0.0	88	23	182	6.7	268	0	266	148	.5	.4	.23	872	1.19	157	314	94	55	4.5	1,360	8.0
Apr. 11-20	79.2	--	--	97	20	170	--	--	--	--	--	--	--	--	832	1.13	178	324	--	53	4.1	1,280	--
Apr. 21-30	93.3	--	--	88	20	160	--	--	--	--	--	--	--	--	795	1.08	200	302	--	54	4.0	1,250	--
May 1-10	116	--	--	90	21	186	--	--	--	--	--	--	--	--	861	1.17	270	311	--	57	4.6	1,380	--
May 11-20	3.62	--	--	150	41	203	--	--	--	--	--	--	--	--	1,140	1.55	11.1	543	--	45	3.8	1,790	--
May 21-31	.80	--	--	163	45	219	--	--	--	--	--	--	--	--	1,250	1.70	2.70	592	--	45	3.9	1,910	--
June 1-10	55	--	--	182	49	196	--	--	--	--	--	--	--	--	1,260	1.71	1.87	656	--	39	3.3	1,890	--
June 11-20	25	--	--	175	47	238	--	--	--	--	--	--	--	--	1,360	1.88	.93	630	--	45	4.1	2,050	--
June 21-30	.20	--	--	107	49	187	10	--	--	--	--	--	--	--	1,090	1.48	.59	468	--	46	3.7	1,600	--
July 1-10	20	48	.01	70	48	189	9.5	302	0	330	138	.8	.1	.33	977	1.33	.53	372	124	52	4.3	1,470	8.0
July 11-20	10	--	--	130	49	186	--	--	--	--	--	--	--	--	1,120	1.52	.30	526	--	43	3.5	1,670	--
July 21-31	5.12	--	--	176	48	183	--	--	--	--	--	--	--	--	1,230	1.67	16.9	536	--	38	3.2	1,790	--
Aug. 1-10	108	--	--	101	21	190	--	--	--	--	--	--	--	--	951	1.29	277	338	--	55	4.5	1,440	--
Aug. 11-20	45.7	--	--	90	20	208	--	--	--	--	--	--	--	--	962	1.31	119	306	--	60	5.2	1,470	--
Aug. 21-31	55.2	--	--	91	20	193	--	--	--	--	--	--	--	--	916	1.25	137	309	--	58	4.8	1,400	--
Sept. 1-10	26.9	--	--	86	22	189	--	--	--	--	--	--	--	--	879	1.20	63.8	305	--	57	4.7	1,360	--
Sept. 11-20	21.7	--	--	88	22	190	--	--	--	--	--	--	--	--	883	1.20	51.7	310	--	57	4.7	1,380	--
Sept. 21-30	16.1	--	--	88	21	203	--	--	--	--	--	--	--	--	934	1.27	40.6	306	--	59	5.1	1,470	--
Weighted Average	43.0	--	--	95	21	181	--	--	--	--	--	--	--	--	882	1.20	102	324	--	55	4.4	1,370	--

## RIO GRANDE BASIN--Continued

## RIO GRANDE TIFFANY CHANNEL AT SAN MARCIAL, N. MEX.--Continued

Temperature (°F) of water, water year October 1952 to September 1953  
 /Once-daily temperature measurement, generally taken between 11 a. m. and 6 p. m. /

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

a Reading obtained before 11 a. m.

## RIO GRANDE BASIN--Continued

## RIO GRANDE TIFFANY CHANNEL AT SAN MARCIAL, N. MEX.--Continued

Suspended sediment, water year October 1952 to September 1953

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.....	32	325	28	28	201	15	87	716	s 272
2.....	29	348	27	26	180	a 10	51	1,250	172
3.....	25	313	21	24	159	10	50	1,860	254
4.....	22	347	21	20	140	8	50	2,525	341
5.....	25	340	a 20	19	128	7	55	2,500	371
6.....	28	302	23	19	175	9	56	2,300	a 350
7.....	28	285	22	8	245	5	57	2,200	a 340
8.....	26	278	20	6	205	3	57	1,980	305
9.....	25	273	18	6	210	a 3	55	1,280	180
10.....	24	280	18	8	228	5	53	1,120	160
11.....	23	218	14	11	189	5	63	1,300	a 220
12.....	23	240	a 10	13	185	6	65	1,600	a 280
13.....	24	280	18	14	158	6	59	1,700	271
14.....	24	290	19	15	150	a 6	53	1,230	176
15.....	22	285	17	17	160	a 7	51	980	135
16.....	23	256	16	17	162	7	48	930	121
17.....	24	288	17	18	102	5	50	900	122
18.....	24	243	16	8	86	2	57	930	143
19.....	25	286	19	6	100	a 2	51	720	a 100
20.....	25	250	a 20	10	135	4	50	520	70
21.....	25	215	15	14	125	5	53	540	a 80
22.....	26	213	15	15	88	4	50	562	76
23.....	26	228	16	21	60	3	50	585	79
24.....	26	260	18	24	40	3	63	520	a 90
25.....	26	207	15	21	65	4	65	410	a 70
26.....	25	190	a 10	10	127	3	59	320	51
27.....	24	193	13	8	120	3	57	440	68
28.....	24	205	13	10	120	a 3	61	450	a 70
29.....	25	295	20	12	120	a 4	61	450	a 70
30.....	26	300	a 20	15	130	a 5	69	460	a 90
31.....	28	240	18				71	330	63
Total.	782	--	557	443	--	162	1,777	--	5,200
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.....	67	340	60	80	43	9	0.2	--	
2.....	73	348	69	52	43	a 6	.2	--	
3.....	69	227	42	59	123	s 26	.3	--	e (t)
4.....	67	282	51	73	113	s 26	.2	--	
5.....	73	165	33	82	94	21	150	130	a 50
6.....	105	228	65	87	85	a 20	139	122	46
7.....	114	110	34	87	73	17	136	130	a 48
8.....	114	95	a 30	82	85	19	132	140	50
9.....	100	102	28	45	110	sa 10	139	162	61
10.....	94	77	20	.5	153		132	189	67
11.....	92	113	28	.8	114		123	227	75
12.....	87	73	17	.5	143	(t)	114	270	83
13.....	82	232	51	.3	156		114	263	81
14.....	32	294	25	.3	172		108	247	72
15.....	37	132	13	.2	160		111	224	67
16.....	46	83	10	.3	--		108	200	58
17.....	55	97	14	.3	--		114	198	61
18.....	59	90	14	.1	--		123	210	70
19.....	59	58	9	.1	--		129	254	88
20.....	53	76	sa 15	.2	--		129	270	a 90
21.....	73	112	22	.3	--		129	267	93
22.....	75	98	20	.2	--	e (t)	123	253	84
23.....	77	82	17	.2	--		120	292	95
24.....	80	62	13	.3	--		117	313	99
25.....	80	54	12	.3	--		117	268	85
26.....	80	50	11	.2	--		114	298	92
27.....	77	59	12	.3	--		111	280	a 80
28.....	77	48	10	.2	--		111	260	a 80
29.....	77	48	10				105	243	69
30.....	77	56	12				97	217	57
31.....	80	47	10				92	216	54
Total.	2,331	--	777	652.6		152	3,237.9	--	1,955

e Estimated.

s Computed by subdividing day.

t Less than 0.50 ton.

a Computed from estimated concentration graph.

## RIO GRANDE BASIN--Continued

## RIO GRANDE TIFFANY CHANNEL AT SAN MARCIAL, N. MEX.--Continued

Suspended sediment, water year October 1952 to September 1953--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.....	87	280	66	146	227	89	1	270	1
2.....	80	243	52	129	180	a 60	1	230	1
3.....	73	210	41	105	162	46	1	200	1
4.....	65	243	43	100	220	59	.5	--	
5.....	59	227	36	126	230	78	.4	--	
6.....	59	240	a 40	129	374	130	.4	--	
7.....	61	227	37	114	383	118	.4	246	
8.....	61	216	36	105	308	87	.3	425	(t)
9.....	61	247	41	105	255	72	.3	352	
10.....	61	188	31	100	209	56	.2	253	
11.....	63	207	35	34	198	s 19	.2	--	
12.....	71	210	a 40	.2	145		.2	635	
13.....	80	210	45	.3	140		.2	450	
14.....	97	235	62	.2	162		.2	223	
15.....	97	213	56	.2	225		.2	--	
16.....	92	262	65	.2	--		.3	287	
17.....	87	326	77	.2	--	(t)	.4	270	
18.....	77	258	54	.3	258		.4	--	(t)
19.....	67	298	54	.3	--		.2	149	
20.....	61	277	46	.3	310		.2	218	
21.....	59	270	a 40	.3	350		.2	--	
22.....	59	288	46	.1	490		.2	314	
23.....	75	220	45	.5	390	1	.2	--	
24.....	82	248	55	.9	230	a 1	.2	206	
25.....	87	257	60	1	140	(t)	.2	163	
26.....	94	300	a 80	1	230	a 1	.2	298	(t)
27.....	100	333	90	1	309	1	.2	202	
28.....	102	339	93	1	280	a 1	.2	195	
29.....	132	350	a 120	1	201	1	.2	--	
30.....	143	288	111	1	160	(t)	.2	167	
31.....				1	220	a 1			
Total.	2,392	--	1,697	1,204.0	--	824	10.0	--	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.....	0.2	--		137	6,070	2,250	33	553	49
2.....	.2	142		149	4,180	1,680	28	520	39
3.....	.2	--		147	1,800	714	27	482	35
4.....	.2	--		124	3,990	1,340	27	443	32
5.....	.2	458	t	113	19,500	5,950	29	458	36
6.....	.2	318		108	20,700	6,040	28	470	a 40
7.....	.2	--		102	11,100	3,060	26	457	32
8.....	.2	220		86	4,700	a 1,100	25	518	35
9.....	.2	--		62	1,510	253	24	468	30
10.....	.2	--		55	1,050	156	22	450	a 30
11.....	.1	232	t	58	849	133	24	460	a 30
12.....	.1	453		49	840	a 110	23	470	29
13.....	.1	335		36	800	a 80	23	480	30
14.....	.1	--		40	820	89	23	453	28
15.....	.1	195		48	1,380	179	21	423	24
16.....	.1	--		61	3,100	a 510	23	454	28
17.....	.1	--		65	4,390	s 781	22	415	25
18.....	.1	--		36	1,680	163	20	402	22
19.....	.1	--		30	1,310	106	19	405	21
20.....	.1	370		34	1,270	117	19	410	a 20
21.....	.1	--	t	38	1,200	a 120	18	430	21
22.....	.1	--		41	1,020	113	19	373	19
23.....	.1	--		46	890	111	19	354	18
24.....	.1	--		75	1,600	sa 340	18	308	15
25.....	.1	163		106	4,400	a 1,300	16	290	13
26.....	.1	198		84	5,500	1,260	16	286	12
27.....	.1	288	t	59	1,900	303	15	274	11
28.....	.2	284		46	910	113	15	260	a 10
29.....	.2	360		40	800	a 90	14	245	9
30.....	.2	--		37	735	73	11	256	8
31.....	55	3,400	s 1,490	35	640	60			
Total.	59.3	--	1,493	2,147	--	28,694	647	--	751
Total discharge for year (cfs-days).....									15,682.8
Total load for year (tons).....									42,270

e Estimated

s Computed by subdividing day.

t Less than 0.50 ton.

a Computed from estimated concentration graph.

## RIO GRANDE BASIN--Continued

## RIO GRANDE TIFFANY CHANNEL AT SAN MARCIAL, N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1952 to September 1953

(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water;

W, in distilled water; C, chemically dispersed; M, mechanically dispersed; V, visual accumulation tube)

Date of collection	Time	Water discharge (cfs)	Water temperature (° F)	Suspended sediment										Methods of analysis	
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters									
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250		1.000
Oct. 16, 1952	1:15 p.m.	23	60	236	1,130	86	86	96	98	99	100	--	--	SBWCM	
Dec. 1	3:25 p.m.	123	36	742	1,590	77	85	91	97	98	99	99	100	SBWCM	
Dec. 5	4:00 p.m.	53	37	2,430	3,930	--	72	--	93	--	100	--	--	SPWCM	
Dec. 10	3:15 p.m.	55	41	1,120	3,050	--	72	--	93	--	99	100	--	SPWCM	
Dec. 13	4:15 p.m.	61	42	1,880	4,470	--	63	--	89	--	98	100	--	SPWCM	
Dec. 20	2:45 p.m.	50	44	477	920	63	73	83	95	99	99	100	--	SBWCM	
Jan. 13, 1953	3:55 p.m.	87	52	273	--	--	--	--	--	--	99	100	--	S	
Jan. 22	3:30 p.m.	75	--	88	607	62	76	86	91	--	94	98	99	SBWCM	
Mar. 10	12:05 p.m.	154	56	179	--	--	--	--	--	--	90	98	100	S	
Mar. 22	12:10 p.m.	123	58	249	948	63	70	82	92	96	97	99	99	SBWCM	
Mar. 29	10:00 a.m.	108	58	233	--	--	--	--	--	--	99	100	--	S	
Apr. 2	12:30 p.m.	80	67	238	--	--	--	--	--	--	99	99	100	S	
Apr. 19	12:30 p.m.	67	--	339	2,820	--	66	--	88	--	98	100	--	SPWCM	
Aug. 3	12:30 p.m.	149	78	1,830	2,850	--	86	--	96	--	99	100	--	SPWCM	
Aug. 5	11:55 a.m.	113	74	21,100	3,540	--	88	--	99	--	100	--	--	SPWCM	
Aug. 23	10:55 a.m.	46	70	773	1,470	73	89	96	--	--	96	99	100	SBWCM	
Sept. 1	11:05 a.m.	33	69	529	--	--	--	--	--	--	99	100	--	S	
Sept. 12	3:55 p.m.	22	69	468	1,300	--	89	--	96	--	96	97	97	SPWCM	
Sept. 21	12:50 p.m.	18	64	446	2,420	--	81	--	91	--	100	--	--	SPWCM	

RIO GRANDE BASIN--Continued  
RIO GRANDE AT SAN MARCIAL, N. MEX.

LOCATION.--At gaging station at Archison, Topeka & Santa Fe Railway bridge, 1.1 miles downstream from the former site of San Marcial, Socorro County, and 19 miles (revised) southwest of San Antonio.  
DRAINAGE AREA.--27,700 square miles, approximately. (includes 2,940 square miles in closed basin in northern part of San Luis Valley, Colo.).  
RECORDS AVAILABLE.--Chemical analyses: July 1946 to September 1953.  
Water temperatures: January 1948 to September 1953.

EXTRIMES: 1952-53: Dissolved solids: Maximum, 1,640 ppm Aug. 1-10; minimum, 396 ppm Jan. 21-31.  
Hardness: Maximum, 710 ppm Aug. 8-20; minimum, 194 ppm June 8-20.  
Specific conductance: Maximum observed, 2,730 micromhos Apr. 8; minimum observed, 486 micromhos June 10.  
Water temperatures: Maximum observed, 86° F July 3, 7; minimum freezing point Dec. 31, Jan. 2.  
Sediment concentrations: Maximum daily, 67,800 ppm Aug. 2; minimum daily, no flow on many days.  
Sediment loads: Maximum daily, 199,000 tons July 21; minimum daily, 0 tons on many days.  
EXTRIMES: 1946-53: Dissolved solids: Maximum, 1,670 ppm Aug. 11-16, 19-22, 1946; minimum, 233 ppm June 11-20, 1952.  
Hardness: Maximum, 820 ppm Aug. 11-16, 19-22, 1946; minimum, 138 ppm June 11-20, 1952.  
Specific conductance: Maximum observed, 2,730 micromhos Apr. 8, 1953; minimum observed, 311 micromhos June 14, 1952.

Water temperatures (1949-53): Maximum observed, 97° F Aug. 11, 1951; minimum, freezing point on several days.  
Sediment concentrations: Maximum daily, 93,600 ppm Aug. 11, 1946; minimum daily, 0 tons on many days.

Sediment loads: Maximum daily, 366,000 tons July 25, 1949; minimum daily, 0 tons on many days.  
REMARKS.--Values reported for dissolved solids are residues on evaporation. Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of chemical analyses and sediment loads for year prior to 1946 have been published in Water Bulletins of International Boundary and Water Commission. Records of discharge for water year October 1952 to September 1953 furnished by Santa Fe district office of Surface Water Branch. Record given in WSP 1282 is composite of main channel and Rio Grande Tiffany Channel. Chemical analyses for Tiffany Channel given on page 461.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (residue at 180° C)			Hardness as CaCO <sub>3</sub>	Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH		
															Parts per million	Tons per acre-foot	Tons per day						
Oct. 1-3, 1952 a	4.0	30	0.01	82	16	87	6.2	217	0	209	50	--	1.9	--	597	0.81	6.45	270	92	40	2.3	887	7.7
Nov. 22-30 a	230	--	--	84	16	73	--	--	--	--	--	--	--	--	534	.73	332	276	--	37	1.9	805	--
Dec. 1-10	530	--	69	12	57	--	--	--	--	--	--	--	--	--	434	.59	621	222	--	36	1.7	663	--
Dec. 11-20	547	--	--	67	12	54	--	--	--	--	--	--	--	--	420	.57	620	216	--	35	1.6	640	--
Dec. 21-31	594	--	--	65	12	49	--	--	--	--	--	--	--	--	404	.55	647	212	--	33	1.5	612	--
Jan. 1-10, 1953	542	26	.02	62	11	53	4.3	193	0	119	29	0.5	1.8	0.18	414	.56	606	200	42	36	1.6	619	7.7
Jan. 11-20	512	--	67	12	55	--	--	--	--	--	--	--	--	--	415	.56	574	216	--	36	1.6	630	--
Jan. 21-31	616	--	--	61	11	53	--	--	--	--	--	--	--	--	396	.54	659	197	--	37	1.6	602	--
Feb. 1-10	624	--	--	61	11	53	--	--	--	--	--	--	--	--	448	.61	755	197	--	37	1.6	610	--
Feb. 11-20	752	--	--	62	12	69	--	--	--	--	--	--	--	--	465	.61	904	204	--	42	2.1	700	--
Feb. 21-28	902	--	--	66	13	66	--	--	--	--	--	--	--	--	468	.64	1,140	218	--	40	1.9	706	--

a No flow Oct. 4 - Nov. 21, Aug. 30 - Sept. 30.

## RIO GRANDE BASIN--Continued

## RIO GRANDE AT SAN MARCIAL, N. MEX.--Continued

Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (residue at 180° C)			Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH	
															Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium, sodium	Non-carbonate				
Mar. 1-10 .....	904	--	--	65	12	68	--	--	--	--	--	--	--	--	450	61	1,100	212	--	41	2.0	685	--
Mar. 11-20 .....	805	--	--	61	12	62	--	--	--	--	--	--	--	--	420	57	913	202	--	40	1.9	628	--
Mar. 21-31 .....	244	--	--	80	16	74	--	--	--	--	--	--	--	--	510	69	336	266	--	38	2.0	763	--
Apr. 1-5 .....	30.2	28	.01	84	20	93	6.0	240	0	201	60	.6	1.0	.20	613	83	50.0	292	95	40	2.4	919	7.8
Apr. 6-10 .....	90.0	33	--	153	49	281	9.3	244	0	516	329	.4	1.2	.30	1,520	2.07	369	583	383	51	5.1	2,270	7.9
Apr. 11-20 .....	77.7	--	--	119	28	156	--	--	--	--	--	--	--	--	884	1.20	165	412	--	45	3.3	1,370	--
Apr. 21-28 .....	121	--	--	108	25	144	--	--	--	--	--	--	--	--	810	1.10	265	372	--	46	3.3	1,250	--
Apr. 29-May 10 .....	720	--	--	66	12	63	--	--	--	--	--	--	--	--	415	.56	807	214	--	39	1.9	644	--
May 11-23 .....	93.0	--	--	88	19	156	--	--	--	--	--	--	--	--	748	1.02	188	298	--	63	3.9	1,220	--
May 24-June 2 .....	114	--	--	108	25	260	--	--	--	--	--	--	--	--	1,140	1.55	351	372	--	60	5.9	1,860	--
June 3-7 .....	898	--	--	72	15	108	--	--	--	--	--	--	--	--	585	.80	1,420	241	--	49	3.0	939	--
June 8-20 .....	933	--	--	60	11	61	--	--	--	--	--	--	--	--	400	.54	1,010	194	--	41	1.9	641	--
June 21-30 .....	668	--	--	64	12	72	6.2	--	--	--	--	--	--	--	469	.64	846	209	--	42	2.2	725	--
July 1-10 .....	63.1	32	.02	82	19	152	7.1	263	0	224	120	.7	.8	.23	765	1.04	130	282	67	53	4.0	1,200	7.6
July 11-19 .....	237	--	--	148	28	180	--	--	--	--	--	--	--	--	1,150	1.56	736	484	--	45	3.6	1,610	--
July 20-31 .....	523	--	--	160	32	192	--	--	--	--	--	--	--	--	1,250	1.70	1,770	530	--	44	3.6	1,690	--
Aug. 1-10 .....	187	--	--	215	43	227	--	--	--	--	--	--	--	--	1,640	2.23	828	714	--	41	3.7	2,060	--
Aug. 11-20 .....	291	--	--	209	40	183	--	--	--	--	--	--	--	--	1,450	1.97	1,140	686	--	37	3.0	1,880	--
Aug. 21-29 a .....	132	--	--	190	39	180	--	--	--	--	--	--	--	--	1,380	1.88	492	634	--	38	3.1	1,820	--
Weighted average	b 454	--	--	79	15	82	--	--	--	--	--	--	--	--	538	0.76	684	258	--	41	2.2	824	--

a No flow Oct. 4 - Nov. 21, Aug. 30 - Sept. 30.

b Average for 284 days of flow.

## RIO GRANDE BASIN--Continued

## RIO GRANDE AT SAN MARCIAL, N. MEX.--Continued

Temperature (°F) of water, water year October 1952 to September 1953  
 /Once-daily temperature measurement, generally between 11 a. m. and 6 p. m. /

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

a Temperature measurement before 11 a. m.

## RIO GRANDE BASIN--Continued

## RIO GRANDE AT SAN MARCIAL, N. MEX.--Continued

REVISION . -- Sediment record: The following changes should be made in sediment data previously published for the Rio Grande at San Marcial, New Mex. for water year 1951-52 (WSP 1252):

Date	Mean Concentration ppm	Tons per day
Dec. 21, 1951 .....	6,160	b 2,000
Dec. 22, 1951 .....	2,720	sb 817
Dec. 23, 1951 .....	2,290	748
Dec. 24, 1951 .....	3,020	s 2,100
December total .....	--	68,935
Annual total .....	--	5,444,357

s Computed by subdividing day.

b Computed from partly-estimated concentration graph.

## Suspended sediment, water year October 1952 to September 1953

Day	October			November			December		
	Mean dis-charge (cfs)	Mean concen-tration (ppm)	Tons per day	Mean dis-charge (cfs)	Mean concen-tration (ppm)	Tons per day	Mean dis-charge (cfs)	Mean concen-tration (ppm)	Tons per day
1.....	6	900	15	0	--	0	610	4,240	s 7,540
2.....	6	500	8	0	--	0	670	5,150	9,320
3.....	.1	--	e 1	0	--	0	602	5,000	8,130
4.....	0	--	0	0	--	0	520	5,700	8,000
5.....	0	--	0	0	--	0	490	6,200	8,200
6.....	0	--	0	0	--	0	520	6,900	a 9,700
7.....	0	--	0	0	--	0	505	7,000	9,540
8.....	0	--	0	0	--	0	475	6,500	8,340
9.....	0	--	0	0	--	0	445	6,250	7,510
10.....	0	--	0	0	--	0	460	6,000	7,450
11.....	0	--	0	0	--	0	490	6,150	8,140
12.....	0	--	0	0	--	0	550	6,600	a 9,800
13.....	0	--	0	0	--	0	568	6,500	9,970
14.....	0	--	0	0	--	0	520	5,150	7,230
15.....	0	--	0	0	--	0	520	5,000	7,020
16.....	0	--	0	0	--	0	520	5,650	7,930
17.....	0	--	0	0	--	0	550	5,800	8,610
18.....	0	--	0	0	--	0	602	6,300	a 10,000
19.....	0	--	0	0	--	0	585	6,300	a 10,000
20.....	0	--	0	0	--	0	568	5,750	8,820
21.....	0	--	0	0	--	0	568	5,000	a 7,700
22.....	0	--	0	4	450	s 10	568	4,250	6,520
23.....	0	--	0	38	1,390	s 153	602	4,600	a 7,500
24.....	0	--	0	100	2,160	583	620	5,100	8,540
25.....	0	--	0	179	3,000	a 1,400	640	6,400	a 11,000
26.....	0	--	0	268	3,360	2,430	640	7,100	12,300
27.....	0	--	0	296	3,400	a 2,700	640	7,100	12,300
28.....	0	--	0	324	2,650	2,320	620	6,800	a 11,000
29.....	0	--	0	435	3,400	3,990	585	5,700	9,000
30.....	0	--	0	430	3,400	a 3,900	535	5,600	a 8,000
31.....	0	--	0	--	--	--	520	5,100	7,160
Total.	12.1	--	24	2,074	--	17,486	17,308	--	272,270

RIO GRANDE BASIN

471

RIO GRANDE BASIN--Continued

RIO GRANDE AT SAN MARCIAL, N. MEX.--Continued

Suspended sediment, water year October 1952 to September 1953--Continued

Day	January			February			March		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	505	5,000	a 6,800	585	1,050	1,660	1,040	328	921
2.....	490	4,600	6,090	620	1,100	a 1,800	1,010	363	990
3.....	505	3,100	4,230	640	1,300	a 2,200	1,010	320	a 870
4.....	550	5,100	7,570	620	994	1,660	1,090	350	a 1,000
5.....	568	5,300	8,130	620	1,000	a 1,700	985	321	854
6.....	535	4,800	6,930	585	1,000	a 1,600	935	315	795
7.....	568	5,600	8,590	585	900	1,420	800	350	a 760
8.....	568	5,700	8,740	585	920	1,450	720	380	739
9.....	568	5,500	8,430	640	1,000	a 1,700	680	320	a 590
10.....	568	5,300	8,130	760	1,400	a 2,900	766	342	s 721
11.....	585	5,200	8,210	800	1,600	3,460	1,060	650	1,860
12.....	602	4,700	7,640	800	1,260	2,720	935	480	1,210
13.....	550	3,620	5,380	820	1,120	2,480	840	350	794
14.....	560	3,700	a 5,600	840	927	2,100	820	480	1,060
15.....	568	4,200	6,440	815	738	1,620	740	450	899
16.....	585	4,450	7,030	740	350	699	740	550	1,100
17.....	602	4,500	7,310	700	250	472	1,000	658	1,780
18.....	277	3,150	s 3,190	700	344	650	968	554	s 1,480
19.....	260	1,030	s 839	660	350	624	568	460	705
20.....	535	2,250	3,250	640	253	437	375	390	a 390
21.....	620	2,000	3,350	660	310	a 550	268	364	263
22.....	640	2,300	3,970	692	312	s 593	263	370	263
23.....	620	2,000	3,350	1,060	429	1,230	428	638	s 765
24.....	620	1,400	2,340	1,060	379	1,080	620	510	854
25.....	640	900	1,560	960	347	899	419	410	a 460
26.....	640	1,150	1,990	910	300	a 740	274	390	289
27.....	640	1,300	2,250	935	309	780	185	360	a 180
28.....	602	1,270	2,060	935	275	694	108	340	a 100
29.....	585	1,220	1,930	--	--	--	65	430	75
30.....	585	1,270	2,010	--	--	--	30	480	39
31.....	583	1,170	1,840	--	--	--	19	292	15
Total.	17,324	--	155,179	20,967	--	39,918	9,761	--	22,821
Day	April			May			June		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1.....	11	190	6	800	370	799	88	430	102
2.....	53	360	52	935	340	858	93	410	103
3.....	40	300	32	1,040	335	941	491	800	s 1,160
4.....	26	435	31	1,010	365	995	960	700	a 1,800
5.....	21	240	14	1,090	295	868	1,090	466	1,370
6.....	23	140	9	1,060	320	916	1,040	305	856
7.....	52	220	31	610	292	481	910	370	909
8.....	81	217	47	305	329	271	910	310	762
9.....	133	315	113	132	400	143	1,010	360	982
10.....	161	280	122	83	393	88	1,180	430	1,370
11.....	109	265	78	45	380	46	935	496	1,250
12.....	70	240	a 45	68	320	a 60	720	670	1,300
13.....	57	236	36	80	270	58	660	615	1,100
14.....	65	270	47	83	296	66	660	620	1,100
15.....	94	375	95	82	291	64	700	660	a 1,200
16.....	135	430	157	96	340	88	720	560	1,090
17.....	109	307	90	102	330	a 90	935	474	1,200
18.....	75	255	52	107	310	90	1,120	470	1,420
19.....	42	219	25	109	340	a 100	1,340	340	1,230
20.....	21	240	14	116	365	114	1,240	375	1,260
21.....	14	220	8	112	315	95	1,060	490	a 1,400
22.....	32	300	26	105	350	99	960	440	1,140
23.....	73	290	57	104	445	125	935	510	1,290
24.....	127	305	105	107	460	a 140	960	430	1,110
25.....	166	260	117	112	530	160	885	560	1,340
26.....	135	190	a 70	116	510	a 160	680	680	1,250
27.....	128	262	s 94	115	520	a 160	490	570	754
28.....	293	329	260	112	530	160	325	400	351
29.....	775	350	a 730	101	410	112	217	530	311
30.....	800	305	659	93	480	121	163	469	206
31.....	--	--	--	88	500	a 120	--	--	--
Total.	3,921	--	3,222	9,118	--	8,568	23,477	--	30,716

s Computed by subdividing day.

a Computed from estimated concentration graph.

## WESTERN GULF OF MEXICO BASINS

## RIO GRANDE BASIN--Continued

## RIO GRANDE AT SAN MARCIAL, N. MEX.--Continued

Suspended sediment, water year October 1952 to September 1953--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.....	122	420	a 140	52	52,500	7,640			
2.....	101	404	110	202	67,800	s 37,300			
3.....	88	448	106	566	50,500	s 79,500			
4.....	77	520	a 110	570	52,400	83,600			
5.....	69	500	93	323	49,600	44,900			
6.....	62	460	77	96	41,000	11,000			
7.....	46	371	46	35	27,000	2,550			
8.....	24	280	18	13	3,000	a 110			
9.....	21	250	a 15	6	550	9			
10.....	21	240	a 15	6	600	10			
11.....	19	271	14	5	852	12			
12.....	19	290	a 15	11	800	a 24			
13.....	18	237	12	126	25,300	s 18,200			
14.....	126	2,420	s 1,270	521	56,100	81,800			
15.....	322	28,800	s 26,600	708	53,600	106,000			
16.....	443	8,200	s 12,900	268	53,100	s 41,300			
17.....	142	2,000	767	218	52,000	31,700			
18.....	159	3,000	a 1,300	105	39,600	s 12,600			
19.....	886	11,400	s 29,800	108	36,700	s 10,000			
20.....	1,660	35,900	s 72,000	840	24,900	s 56,900			
21.....	1,990	35,500	s 99,000	649	23,400	s 40,300			
22.....	825	24,600	54,800	221	15,200	s 9,370			
23.....	332	14,000	a 13,000	165	52,400	24,200			
24.....	258	5,000	a 3,500	99	52,000	a 14,000			
25.....	281	23,100	s 20,200	40	42,000	4,700			
26.....	301	40,200	33,900	10	6,900	186			
27.....	173	42,000	20,300	1	450	1			
28.....	112	20,000	6,050	.7	330	1			
29.....	97	4,000	1,050	.4	270	a (t)			
30.....	99	3,000	a 800	0	--	0			
31.....	144	3,000	1,170	0	--	0			
Total.	9,037	--	599,178	5,965.1	--	717,913	0	0	0

Total discharge for year (cfs-days) ..... 128,964.2

Total load for year (tons) ..... 1,867,315

s Computed by subdividing day.

t Less than 0.50 ton

a Computed from estimated concentration graph.

RIO GRANDE BASIN--Continued  
RIO GRANDE AT SAN MARCIAL, N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1952 to September 1953

(Methods of analysis: B, bentonite slurry; C, chemically dispersed; M, mechanically dispersed; V, visual accumulation tube);  
P, pipette; S, sediment; N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed; V, visual accumulation tube)

Date of collection	Time	Instantaneous discharge (cfs)	Water temperature (° F)	Suspended sediment												Methods of analysis
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters										
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.350	0.500	
Nov. 23, 1952...	10:30 a. m.	30	42	1,320	3,160	--	34	--	66	--	95	98	100	--	--	SPWCM
Dec. 3 .....	12:45 p. m.	640	37	6,320	3,080	--	36	--	50	--	60	86	100	--	--	SPWCM
Dec. 11 .....	3:30 p. m.	535	37	7,200	4,110	--	34	--	59	--	73	90	100	--	--	SPWCM
Dec. 20 .....	11:50 a. m.	568	39	5,550	4,360	--	30	--	45	--	59	86	100	--	--	SPWCM
Dec. 20 .....	11:50 a. m.	568	39	5,550	5,250	27	32	42	48	52	59	86	100	--	--	SBWCM
Jan. 4, 1953 .....	12:00 m.	620	37	6,530	3,950	--	25	--	39	--	58	87	100	--	--	SPWCM
Jan. 4 .....	12:00 m.	620	37	6,530	4,200	--	6	--	39	--	58	87	100	--	--	SPN
Jan. 4 .....	12:00 m.	620	37	6,530	5,050	19	24	28	39	45	58	87	100	--	--	SBWCM
Jan. 4 .....	12:00 m.	620	37	6,530	4,370	2	4	27	41	45	58	87	100	--	--	SBN
Jan. 13 .....	1:25 p. m.	568	46	3,500	4,720	--	35	--	48	--	66	91	100	--	--	SPWCM
Jan. 22 .....	3:00 p. m.	680	40	2,410	3,680	--	8	--	14	--	34	83	100	--	--	SPWCM
Jan. 22 .....	3:00 p. m.	680	40	2,410	3,100	--	4	--	10	--	34	83	100	--	--	SPN
Feb. 1 .....	11:30 a. m.	585	44	1,050	866	13	15	18	17	18	21	51	99	100	--	SBWCM
Feb. 22 .....	10:00 a. m.	585	37	278	--	--	--	--	--	--	78	86	100	--	--	S
Feb. 23 .....	11:50 a. m.	1,060	36	429	--	--	--	--	--	--	70	83	99	100	--	S
Mar. 10 .....	12:00 m.	720	56	291	--	--	--	--	--	--	86	91	100	--	--	S
Mar. 22 .....	9:45 a. m.	274	48	365	--	--	--	--	--	--	92	97	100	--	--	S
Mar. 29 .....	11:00 a. m.	349	59	349	2,260	--	86	--	96	--	100	--	100	--	--	SPWCM
Apr. 2 .....	10:30 a. m.	60	60	405	--	--	--	--	--	--	92	96	100	--	--	S
Apr. 20 .....	11:15 a. m.	22	63	259	--	--	--	--	--	--	97	99	99	100	--	S
May 2 .....	12:50 p. m.	935	60	339	--	--	--	--	--	--	62	84	99	99	100	S
May 7 .....	12:15 p. m.	585	63	281	--	--	--	--	--	--	81	94	99	100	--	S
May 20 .....	4:10 p. m.	115	70	370	--	--	--	--	--	--	76	83	99	100	--	S
June 1 .....	10:40 a. m.	89	70	404	--	--	--	--	--	--	71	90	99	100	--	S
June 10 .....	10:05 a. m.	1,210	71	426	1,820	36	38	40	44	55	74	95	100	--	--	SBWCM

RIO GRANDE BASIN--Continued  
RIO GRANDE AT SAN MARCIAL, N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1952 to September 1953.--Continued  
(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed; V, visual accumulation tube)

Date of collection	Time	Instantaneous discharge (cfs)	Water temperature per-discharge (° F)	Suspended sediment										Methods of analysis			
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters											
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250		0.350	0.500	1.000
June 20, 1953	10:55 a.m.	1,240	72	364	--	--	--	--	--	--	54	86	100	--	S		
June 27	10:50 a.m.	490	77	581	--	--	--	--	--	--	64	90	99	100	S		
July 6	10:50 a.m.	62	80	473	--	--	--	--	--	--	88	97	99	100	S		
July 20	10:30 a.m.	1,520	74	36,600	5,120	--	85	--	98	--	98	100	--	--	SPWCM		
July 20	10:30 a.m.	1,520	74	36,600	3,900	--	4	--	97	--	100	100	--	--	SPN		
July 28	9:40 a.m.	116	77	20,700	4,000	--	90	--	96	--	98	99	100	--	SPWCM		
Aug. 3	10:10 a.m.	600	78	48,200	3,730	--	88	--	96	--	97	98	100	--	VPWCM		
Aug. 23	9:20 a.m.	228	70	57,900	6,180	--	85	--	97	--	98	99	100	--	VPWCM		
Aug. 27	9:30 a.m.	2	73	517	--	--	--	--	--	--	100	--	--	--	S		

## RIO GRANDE BASIN--Continued

## PECOS RIVER AT PUERTO DE LUNA, N. MEX.

LOCATION.--At bridge at Puerto de Luna, Guadalupe County, 17½ miles upstream from gaging station near Puerto de Luna which is 17½ miles upstream from Alamogordo Dam (revised).

DRAINAGE AREA.--3,970 square miles, approximately (contributing area above gaging station).

RECORDS AVAILABLE.--Chemical analyses: July 1939 to September 1941. November 1946 to September 1953.

Water temperatures: June 1949 to September 1953.

Sediment records: January 1949 to September 1953.

EXTREMES, 1952-53.--Dissolved solids: Maximum, 2,660 ppm Apr. 11-20; minimum, 528 ppm Aug. 20-21.

Hardness: Maximum, 1,880 ppm Apr. 11-20, May 1-10; minimum, 413 ppm Aug. 20-21.

Specific conductance: Maximum observed, 3,120 micromhos May 8-10; minimum observed, 752 micromhos Aug. 20.

Water temperatures: Maximum observed, 89°F July 24, 27, Aug. 7, 9, 11; minimum observed, freezing point Nov. 11, 18.

Sediment concentrations: Maximum daily, 47,100 ppm July 20; maximum observed, 154,000 ppm Aug. 21; minimum daily, 47 ppm Feb. 19.

Sediment loads: Maximum daily, 700,000 tons Aug. 21; minimum daily, 12 tons Feb. 19.

EXTREMES, 1939-41.--Dissolved solids: Maximum, 2,670 ppm Mar. 11-20, 1952; minimum 287 ppm May 11-16, 18-20, 1941.

Hardness: Maximum, 1,880 ppm July 1-10, 1951; minimum, 200 ppm May 11-16, 18-20, 1941.

Specific conductance: Maximum observed, 3,810 micromhos Dec. 14, 1951; minimum observed, 344 micromhos Sept. 21, 1941.

Water temperatures: Maximum observed, 98°F July 5, 19, 1951; minimum observed, freezing point Jan. 5, 1950, Nov. 11, 18, 1952.

Sediment concentrations (1949-53): Maximum daily, 47,100 ppm July 20, 1953; minimum daily, 24 ppm May 22, 1950.

Sediment loads (1949-53): Maximum daily, 700,000 tons Aug. 21, 1953; minimum daily, 5 tons Sept. 21-30, 1951.

REMARKS.--Records of specific conductance of daily samples available in district offices at Albuquerque, N. Mex. Values reported for dissolved solids are sums of determined constituents. Records of discharge for gaging station near Puerto de Luna for water year October 1952 to September 1953 given in WSP 1282.

Appreciable inflow between sampling point and gaging station except during periods of heavy local runoff.

REVISIONS.--Revised figures of sediment load for month of July 1949 and total for period January to September 1949 as published in WSP 1163 are revised as follows: July 1949, 1,272,000 tons; period Jan. 11 to Sept. 30, 1949, 3,558,000 tons.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Carbonate (CO <sub>3</sub> )	Nitrate (NO <sub>3</sub> )	Boiron (B)	Dissolved solids (sum)		Hardness as CaCO <sub>3</sub>		Per cent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	Color
														Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate					
Oct. 1-10, 1952 ..	91.8	20		541	70	101	--	175	1,460	141	0	0.2		2,420	3.29	1,640	1,490	12	1.1	2,770	7.7	
Oct. 11-20 .....	90.8	17		554	70	101	--	177	1,460	138	0	.4		2,450	3.33	1,670	1,520	12	1.1	2,770	7.8	
Oct. 21-31 .....	86.5	17		562	71	100	--	178	1,460	133	0	1.3		2,460	3.35	1,690	1,550	11	1.1	2,750	7.9	
Nov. 1-10 .....	97.1	16		541	69	100	--	175	1,470	134	0	.5		2,420	3.29	1,630	1,490	12	1.1	2,730	7.9	
Nov. 11-20 .....	95.1	17		558	73	100	--	179	1,460	136	0	.2		2,460	3.35	1,690	1,550	11	1.1	2,740	7.9	
Nov. 21-30 .....	103	18		550	70	102	--	181	1,450	145	0	2.7		2,430	3.30	1,660	1,510	12	1.1	2,770	7.7	
Dec. 1-10 .....	96.5	17		552	72	106	--	185	1,450	149	0	3.0		2,440	3.32	1,670	1,520	12	1.1	2,770	7.9	
Dec. 11-20 .....	107	17		555	68	101	--	177	1,460	142	0	2.8		2,450	3.32	1,680	1,510	12	1.1	2,770	7.7	
Dec. 21-31 .....	112	16		548	70	102	--	182	1,470	143	0	2.0		2,440	3.32	1,680	1,550	11	1.1	2,770	7.8	
Jan. 1-10, 1953 ..	122	18		546	76	100	--	186	1,470	146	0	.5		2,450	3.33	1,690	1,560	12	1.1	2,820	7.8	
Jan. 11-20 .....	120	17		552	76	102	--	172	1,470	146	0	.5		2,450	3.33	1,690	1,560	12	1.1	2,820	7.8	
Jan. 21-31 .....	118	16		554	75	101	--	186	1,490	144	0	.4		2,460	3.35	1,690	1,560	11	1.1	2,820	7.8	

RIO GRANDE BASIN--Continued  
PECOS RIVER AT PUERTO DE LUNA, N. MEX.--Continued

Chemical analyses, in parts per million, water year October 1952 to September, 1953--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boiron (B)	Dissolved solids (sum)		Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	Color
														Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate				
Feb. 1-10, 1953...	109	18		576	73	103	--	174	1,520	150	0	0.5		2,530	3.44	1,740	1,590	11	2,840	7.6	
Feb. 11-20.....	106.5	16		572	77	103	--	174	1,530	149	0	.5		2,530	3.44	1,740	1,600	11	2,840	7.7	
Feb. 21-28.....	89.5	17		568	74	103	--	168	1,510	149	0	.4		2,500	3.40	1,720	1,360	12	2,820	7.7	
Mar. 1-10.....	87.4	16		572	78	103	--	170	1,550	148	0	.4		2,530	3.47	1,720	1,310	11	2,800	7.7	
Mar. 11-20.....	87.6	18		568	78	104	--	168	1,570	148	0	.5		2,530	3.51	1,720	1,350	11	2,890	7.6	
Mar. 21-31.....	81.2	18		568	79	101	--	177	1,590	148	0	1.0		2,610	3.55	1,790	1,650	11	2,910	7.6	
Apr. 1-10.....	75.5	18		591	79	102	--	172	1,590	150	0	.5		2,620	3.56	1,800	1,660	11	2,920	7.8	
Apr. 11-20.....	77.2	19		583	81	108	--	172	1,610	160	0	.7		2,660	3.62	1,810	1,670	12	2,970	7.8	
Apr. 21-30.....	79.7	19		584	78	108	--	158	1,620	154	0	2.1		2,640	3.59	1,780	1,650	12	2,960	7.5	
May 1-10.....	81.7	17		566	85	109	--	170	1,610	158	0	2.1		2,650	3.60	1,810	1,670	12	2,960	7.7	
May 11-24.....	89.1	18		572	84	110	--	162	1,580	156	0	1.9		2,600	3.54	1,770	1,640	12	2,940	7.9	
May 25-31.....	261	17		220	31	35	--	155	532	46	0	2.1		959	1.30	676	550	10	1,270	7.5	
June 1-10.....	238	12		230	31	37	--	132	583	52	0	1.4		1,010	1.37	649	702	10	1,340	7.6	
June 11-20.....	160	18		288	41	49	--	165	724	70	0	2.0		1,270	1.73	549	887	11	1,640	7.5	
June 21-30.....	169	17		308	41	53	3.2	154	785	72	0	1.9		1,360	1.85	621	937	11	1,720	7.6	
June 24-30.....	86.3	20		536	72	100	--	163	1,450	146	0	0.8		2,400	3.26	1,630	1,500	12	2,800	7.7	
July 1-6, 9-10.....	85.1	19		540	73	106	--	154	1,490	151	0	4.9		2,460	3.35	1,650	1,520	12	2,830	7.7	
July 7-8.....	162	20		252	37	35	3.4	188	632	52	0	.8		1,140	1.55	780	626	12	1,500	7.6	
July 11-18.....	172	19		528	68	88	--	150	1,430	121	0	.8		2,330	3.17	1,080	1,470	11	2,660	7.8	
July 19-20.....	1,002	18		282	42	43	--	206	721	58	0	.8		1,280	1.74	902	732	9	1,630	--	
July 21-31.....	153	18		530	70	82	--	154	1,410	116	0	1.5		2,300	3.13	1,610	1,480	10	2,640	7.9	

	Aug. 5-6	19	560	64	98	--	162	1,470	139	0	1.5	2,430	598	1,660	1,530	11	1.0	2,810	7.9	
Aug. 1-10, 1953	98.7	21	512	99	99	--	191	1,420	138	0	1.8	2,307	602	1,580	1,480	12	1.1	2,680	7.9	
Aug. 11-22, 1953	98.4	22	518	73	28	--	267	532	30	0	3.0	1,930	1,440	1,900	1,480	7	1.4	1,360	7.1	
Aug. 13-15, 1953	98.4	22	518	73	13	--	267	532	30	0	3.0	1,930	1,440	1,900	1,480	7	1.4	1,360	7.1	
Aug. 16-17, 1953	98.4	22	518	73	13	--	267	532	30	0	3.0	1,930	1,440	1,900	1,480	7	1.4	1,360	7.1	
Aug. 20-21, 1953	98.4	22	518	73	13	--	267	532	30	0	3.0	1,930	1,440	1,900	1,480	7	1.4	1,360	7.1	
Aug. 22-24, 1953	98.4	22	518	73	13	--	267	532	30	0	3.0	1,930	1,440	1,900	1,480	7	1.4	1,360	7.1	
Aug. 25-26, 1953	98.4	22	518	73	13	--	267	532	30	0	3.0	1,930	1,440	1,900	1,480	7	1.4	1,360	7.1	
Aug. 27-28, 1953	98.4	22	518	73	13	--	267	532	30	0	3.0	1,930	1,440	1,900	1,480	7	1.4	1,360	7.1	
Aug. 29-30, 1953	98.4	22	518	73	13	--	267	532	30	0	3.0	1,930	1,440	1,900	1,480	7	1.4	1,360	7.1	
Sept. 1-4, 1953	98.4	22	518	73	13	--	267	532	30	0	3.0	1,930	1,440	1,900	1,480	7	1.4	1,360	7.1	
Sept. 5-8, 1953	98.4	22	518	73	13	--	267	532	30	0	3.0	1,930	1,440	1,900	1,480	7	1.4	1,360	7.1	
Sept. 9-10, 1953	98.4	22	518	73	13	--	267	532	30	0	3.0	1,930	1,440	1,900	1,480	7	1.4	1,360	7.1	
Sept. 11-20, 1953	98.4	22	518	73	13	--	267	532	30	0	3.0	1,930	1,440	1,900	1,480	7	1.4	1,360	7.1	
Sept. 21-30, 1953	98.7	21	578	76	110	--	164	1,560	152	0	1.4	2,570	3,500	468	1,740	1,610	12	1.1	2,910	7.9
Weighted average	98.7	21	578	76	110	--	174	1,570	151	0	1.4	2,590	3,520	480	1,760	1,610	12	1.1	2,900	7.8
Weighted average	98.7	21	578	76	110	--	174	1,570	151	0	1.4	2,590	3,520	480	1,760	1,610	12	1.1	2,900	7.8
Weighted average	98.7	21	578	76	110	--	174	1,570	151	0	1.4	2,590	3,520	480	1,760	1,610	12	1.1	2,900	7.8
Weighted average	98.7	21	578	76	110	--	174	1,570	151	0	1.4	2,590	3,520	480	1,760	1,610	12	1.1	2,900	7.8
Weighted average	98.7	21	578	76	110	--	174	1,570	151	0	1.4	2,590	3,520	480	1,760	1,610	12	1.1	2,900	7.8
Weighted average	98.7	21	578	76	110	--	174	1,570	151	0	1.4	2,590	3,520	480	1,760	1,610	12	1.1	2,900	7.8
Weighted average	98.7	21	578	76	110	--	174	1,570	151	0	1.4	2,590	3,520	480	1,760	1,610	12	1.1	2,900	7.8
Weighted average	98.7	21	578	76	110	--	174	1,570	151	0	1.4	2,590	3,520	480	1,760	1,610	12	1.1	2,900	7.8</

## RIO GRANDE BASIN--Continued

## PECOS RIVER AT PUERTO DE LUNA, N. MEX.--Continued

Temperature (°F) of water, water year October 1952 to September 1953  
 /Once-daily temperature measurement, generally between 11 a. m. and 6 p. m./

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

a Temperature taken before 11 a. m.

b Temperature taken after 6 p. m.

## RIO GRANDE BASIN--Continued

PECOS RIVER AT PUERTO DE LUNA, N. MEX.--Continued

Suspended sediment, water year October 1952 to September 1953

Day	October			November			December		
	Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment		Mean dis-charge (cfs)	Suspended sediment	
		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day		Mean concen-tration (ppm)	Tons per day
1.....	87	216	51	93	395	99	105	341	97
2.....	91	294	72	91	229	56	103	191	53
3.....	91	262	64	93	298	75	105	136	39
4.....	91	227	56	110	293	87	91	540	133
5.....	91	271	67	105	255	72	87	481	113
6.....	85	392	90	100	397	107	91	274	67
7.....	89	294	71	98	274	73	95	299	77
8.....	98	466	123	95	--	e 64	98	377	100
9.....	100	380	103	91	241	59	95	271	70
10.....	95			95	367	94	95	100	26
11.....	93	--	e 90	91	304	75	93	118	30
12.....	89			95	469	120	100	199	54
13.....	89			89	475	114	103	101	28
14.....	87	350	82	93	220	55	100	111	30
15.....	87	314	74	98	158	42	107	137	40
16.....	87	234	55	93	447	112	110	153	45
17.....	89	148	36	98	327	87	105	159	45
18.....	97	173	45	98	417	110	112	381	115
19.....	95	229	59	98	267	71	117	408	129
20.....	95	305	78	98	456	121	122	440	145
21.....	93	157	39	100	251	68	120	91	29
22.....	89	279	67	100	474	128	112	262	79
23.....	89	259	62	105	204	58	98	136	36
24.....	89	326	78	107	366	106	98	184	49
25.....	93	247	62	122	832	274	103		
26.....	87	247	58	105	875	248	112		
27.....	78	367	77	98	154	41	112	168	52
28.....	80	182	39	98	187	49	117		
29.....	80	381	82	98	139	37	128		
30.....	85	133	31	100	286	77	115		
31.....	89	118	28	--	--	--	115		
Total.	2, 778	--	2, 108	2, 955	--	2, 779	3, 264	--	1, 993
Day	January			February			March		
	Mean dis-charge (cfs)	Mean concen-tration (ppm)	Tons per day	Mean dis-charge (cfs)	Mean concen-tration (ppm)	Tons per day	Mean dis-charge (cfs)	Mean concen-tration (ppm)	Tons per day
1.....	125			117	155	49	103		
2.....	117			117	172	54	103		
3.....	120			115			98		
4.....	122			112	100	30	95		
5.....	128			107			98		
6.....	125	207	68	100	84	23	98	258	68
7.....	120			100	74	20	93		
8.....	117			105	240	68	93		
9.....	122			107	94	27	98		
10.....	128			107	288	83	95		
11.....	122			115	216	67	89		
12.....	130			110	72	21	91		
13.....	120			110	239	71	93		
14.....	110			112	65	20	87		
15.....	117	165	53	112	108	33	89	202	48
16.....	117			110	174	52	91		
17.....	107			110	360	107	87		
18.....	128			95	366	94	85		
19.....	128			91	47	12	82		
20.....	120			93	191	48	82		
21.....	107			95			82		
22.....	120	243	77	95			80	184	41
23.....	117			95			85		
24.....	125			103	369	96	87		
25.....	125	193	65	98			82		
26.....	122	221	73	91			76		
27.....	115	99	31	95			80		
28.....	112	91	28	100			82	234	50
29.....	112	165	50	--			78		
30.....	125	182	61	--			87		
31.....	120	134	43	--			74		
Total.	3, 723	--	1, 869	2, 917		1, 707	2, 743		1, 605

## RIO GRANDE BASIN--Continued

## PECOS RIVER AT PUERTO DE LUNA, N. MEX.--Continued

Suspended sediment, water year October 1952 to September 1953--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.....	72	167	34	76	166	37	304	2,920	2,400
2.....	74			70			292	1,970	1,550
3.....	74			78			275	1,950	1,450
4.....	80			93			269	1,480	1,070
5.....	74			93			258	1,350	940
6.....	87	98	20	85	104	26	249	1,250	840
7.....	76			91			221	999	596
8.....	76			85			197	578	307
9.....	72			74			166	1,160	520
10.....	70			72			151	1,070	s453
11.....	72	90	20	78	109	23	139	533	200
12.....	74			80			236	2,720	s 1,990
13.....	80			80			197	2,000	a 1,100
14.....	76			87			175	1,970	931
15.....	80			95			169	2,150	981
16.....	72	215	45	110	1,460	s498	144	2,190	851
17.....	82			100			125	846	286
18.....	82			107			115	1,000	a 310
19.....	74			105			120	1,140	369
20.....	80			93			179	1,340	648
21.....	80	90	20	87	109	23	190	3,130	1,610
22.....	80			80			166	3,490	1,560
23.....	87			78			150	277	112
24.....	80			68			125	729	246
25.....	72			110			100	479	129
26.....	85	215	45	186	2,700	1,360	89	213	51
27.....	89			205	2,600	1,440	74	--	--
28.....	78			253	2,990	s 2,110	78	280	54
29.....	76			388	6,020	s 6,470	70	--	--
30.....	70			350	7,000	6,620	68	--	--
31.....	--			336	4,800	4,350	--	--	--
Total.	2,324	--	890	3,893	--	23,570	5,091	--	21,716
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.....	72	169	35	136	9,230	s 3,900	98	385	102
2.....	70			91	900	221	93	380	a 95
3.....	80			91	836	205	158	7,250	s3,869
4.....	93			105	1,380	s 632	141	3,700	1,410
5.....	74			74	579	116	110	961	285
6.....	72	3,490	s 3,350	114	3,590	s 1,350	100	1,910	516
7.....	124			100	3,420	923	80	1,870	404
8.....	201			65	1,240	218	78	466	98
9.....	133			59	1,360	217	74	458	92
10.....	87			61	1,050	173	72	754	147
11.....	82	239	46	63	651	111	78	292	61
12.....	72			74	672	134	74	--	--
13.....	72			153	10,000	s 7,020	72	--	--
14.....	67			477	30,300	s 45,600	72	--	--
15.....	65			205	14,000	7,750	67	336	61
16.....	210	5,340	s24,300	150	7,000	2,840	63	--	--
17.....	550	32,200	s67,500	124	10,600	s 4,320	67	--	--
18.....	254	17,100	s15,800	487	44,900	s 60,000	63	--	--
19.....	405	24,200	s28,200	2,660	42,100	s 350,000	59	--	--
20.....	1,600	47,100	357,000	1,500	14,800	s 64,000	59	--	--
21.....	635	40,000	s97,200	2,500	37,400	s 700,000	61	--	--
22.....	117	6,800	2,150	1,500	46,100	s 570,000	68	--	--
23.....	100	2,540	686	461	19,800	s 13,000	70	--	--
24.....	96	3,160	817	200	8,000	4,320	72	--	--
25.....	94	2,180	553	125	2,260	763	72	417	76
26.....	110	823	244	115	1,970	612	67	--	--
27.....	105	361	102	107	928	268	67	--	--
28.....	100	599	162	105	822	233	68	--	--
29.....	100	1,360	367	103	657	183	74	--	--
30.....	100	1,060	286	95	685	176	68	--	--
31.....	124	1,800	603	100	565	153	--	--	--
Total.	6,064	--	615,936	12,200	--	1,839,438	2,365	--	8,394

Total discharge for period (cfs-days).....50,317  
 Total load for year (tons).....2,522,066

e Estimated.

s Computed by subdividing day.

a Computed from estimated concentration graph.

RIO GRANDE BASIN--Continued  
 PECOS RIVER AT PUERTO DE LUNA, N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1952 to September 1953

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

Date of collection	Time	Discharge (cfs)	Water temperature (° F)	Suspended sediment											Methods of analysis		
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters											
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.350		0.500	1.000
June 1, 1953	3:10 p.m.	300	80	2,740	3,730		45		63		84	92	96		99	100	SPWCM
	3:10 p.m.		80	1,160	3,020		77		81		85	90	97		100		SPWCM
	11:15 a.m.	300	80	20,200	4,340		23		83		93	99	99		100		SPWCM
	7:45 a.m.	360	--	--	4,080		49		78		94	99	100		--		SPWCM
	6:45 p.m.	160	--	12,800	5,260		16		71		88	98	99		100		SPWCM
	6:45 p.m.	160	--	12,800	4,460		12		71		88	98	99		100		SPN
	6:45 a.m.	150	--	10,400	3,940		17		69		82	90	97		100		SPWCM
	6:45 a.m.	150	--	10,400	3,510		10		73		82	90	97		100		SPN
	5:10 p.m.	480	--	45,300	3,440		44		71		84	96	98		99	100	SPWCM
	5:10 p.m.	480	--	45,300	3,750		10		69		84	96	98		99	100	SPN
	11:50 a.m.	7,900	--	48,200	4,200		37		61		86	96	99		99	100	SPWCM
	11:50 a.m.	7,900	--	48,200	4,860		12		60		86	96	99		99	100	SPN
	9:10 a.m.	1,900	69	15,900	5,630		35		55		78	93	98		99	100	SPWCM
	9:10 a.m.	1,900	69	15,900	5,490		6		46		78	93	98		99	100	SPN
	7:30 a.m.	e 7,600	--	59,700	4,440		26		42		65	92	99		100	--	SPWCM
	7:30 a.m.	e 6,800	69	97,800	5,050		28		48		66	87	95		99	100	SPWCM

e Estimated.

a Discharges computed from record at gaging station with allowance for time of travel.

## RIO GRANDE BASIN--Continued

PECOS RIVER BELOW ALAMOGORDO DAM, N. MEX.

LOCATION.--At gaging station 1,200 feet downstream from Alamogordo Dam, 1½ miles downstream from Alamogordo Creek, and 4½ miles northeast of Guadalupe, De Baca County.

DRAINAGE AREA.--4,390 square miles, approximately, (contributing area).

RECORDS AVAILABLE.--Chemical analyses: June 1937 to September 1953.

EXTREMES.--Dissolved solids: Maximum, 2,710 ppm May 11-20; minimum, 1,170 ppm Aug. 21-31.

Hardness: Maximum, 1,830 ppm May 11-20; minimum, 854 ppm Aug. 21-31; 22-23; minimum observed, 1,320 micromhos Aug. 29.

Specific conductance: Maximum observed, 3,050 micromhos May 19-20; minimum, 435 ppm Oct. 1-8, 1941.

EXTREMES.--Dissolved solids: Maximum, 2,710 ppm May 11-20; minimum, 294 ppm Oct. 1-8, 12-20 1941.

Hardness: Maximum, 1,830 ppm May 11-20; minimum, 854 ppm Aug. 21-31; 22-23; minimum observed, 1,320 micromhos July 22, 1937.

Specific conductance: Maximum observed, 3,200 micromhos Jan. 1-8, 1948; minimum, 435 ppm Oct. 1-8, 12-20 1941.

REMARKS.--Records of specific conductance of daily samples available in District Office at Albuquerque, N. Mex. Values reported for dissolved solids are sums of determined constituents. Records of discharge for water year October 1952 to September 1953 given in WSP 1282.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boiron (B)	Dissolved solids (sum)			Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, mg./l.	Non-carbonate, mg./l.			
Oct. 1-10, 1952	102	13		333	44	55	--	157	0	858	70		1.4	1,450	1.97	399	1,010	884	11	0.8	1,810	7.7
Oct. 11-20	84.4	13		354	49	63	--	156	0	966	77		1.0	1,610	2.19	367	1,110	982	11	8	1,950	7.7
Oct. 21-31	102	12		384	52	66	--	154	0	1,040	85		2	1,720	2.34	474	1,170	1,050	11	8	2,060	7.7
Nov. 1-10	5.00	13		364	54	72	--	149	0	1,010	84		2	1,670	2.27	23	1,170	1,010	12	9	2,010	7.8
Nov. 11-17 a	.14	14		372	59	78	--	163	0	1,040	89		2	1,730	2.35	.84	1,170	1,040	12	1.0	2,070	7.8
Nov. 21-26, 30 a	.14	15		374	61	79	--	162	0	1,040	92		5	1,740	2.37	.66	1,180	1,050	13	1.0	2,110	7.6
Dec. 1-7 a	.13	15		381	61	81	--	176	0	1,050	96		3	1,770	2.41	.62	1,200	1,060	13	1.0	2,150	7.8
Dec. 19-20 a	.09	14		368	64	84	--	170	0	1,040	96		3	1,750	2.38	.43	1,180	1,040	13	1.1	2,130	7.8
Dec. 21-31	.25	16		377	66	85	--	179	0	1,060	100		3	1,790	2.43	1.21	1,210	1,070	13	1.1	2,170	7.7
Jan. 1-10, 1953	.14	18		362	78	89	--	176	0	1,070	102		4	1,810	2.46	.68	1,220	1,080	14	1.1	2,190	7.7
Jan. 11-20	.36	17		378	73	88	--	181	0	1,080	104		4	1,830	2.49	1.78	1,240	1,090	13	1.1	2,210	7.7
Jan. 21-31	.39	18		374	76	90	--	182	0	1,080	107		6	1,830	2.49	1.93	1,250	1,100	14	1.1	2,230	7.6
Feb. 1-10	.35	18		383	76	89	--	182	0	1,100	102		8	1,860	2.53	1.76	1,270	1,120	13	1.1	2,220	7.6
Feb. 11-20	.29	17		392	77	90	--	194	0	1,120	109		1	1,900	2.58	1.49	1,290	1,140	13	1.1	2,270	7.6
Feb. 21-24, 27 a	.06	18		389	77	91	--	179	0	1,130	109		1	1,900	2.58	.31	1,290	1,140	13	1.1	2,260	7.6
Mar. 1-10	101	14		511	69	88	--	154	0	1,390	121		4	2,270	3.09	619	1,560	1,430	11	1.0	2,590	7.7
Mar. 11-20	95.4	15		515	69	90	--	144	0	1,410	123		2	2,290	3.11	590	1,570	1,450	11	1.0	2,610	7.7
Mar. 21-31	434	15		523	72	94	--	152	0	1,420	128		9	2,330	3.17	2,730	1,600	1,480	11	1.0	2,660	7.7
Apr. 1-10	996	14		541	73	97	--	153	0	1,460	132		1.0	2,390	3.25	6,430	1,650	1,520	11	1.0	2,720	7.7
Apr. 11-20	76.3	16		565	77	103	--	154	0	1,540	137		8	2,510	3.41	517	1,730	1,600	11	1.1	2,830	7.7
Apr. 21-30	41.5	14		558	80	106	--	147	0	1,570	139		1.1	2,540	3.45	285	1,720	1,600	12	1.1	2,830	7.7

a No flow Nov. 18-20, 27-29, Dec. 8-18, 1952 and Feb. 25-26, 28, 1953.

May 1-10, 1953.....	106	16	588	87	108	--	141	0	1,650	148	1.6	2,670	3.63	764	1,820	1,710	11	1.1	2,990	7.7
May 11-20.....	84.9	16	590	88	109	--	122	0	1,690	154	1.0	2,710	3.69	621	1,830	1,730	11	1.1	3,020	7.7
May 21-31.....	87.0	16	574	87	110	--	130	0	1,650	150	1.9	2,650	3.60	622	1,790	1,680	12	1.1	2,960	7.7
June 1-10.....	86.1	14	464	71	88	--	128	0	1,300	116	1.5	2,120	2.88	493	1,450	1,340	12	1.0	2,450	7.7
June 11-20.....	114	17	364	58	67	--	109	0	1,030	90	.5	1,680	2.28	517	1,150	1,060	11	.9	2,020	7.3
June 21-30.....	109	16	336	53	62	4.0	111	0	943	82	.4	1,550	2.11	456	1,060	966	11	.8	1,910	7.6
July 1-10.....	96.7	15	362	55	64	4.1	133	0	979	86	.7	1,630	2.22	426	1,130	1,020	11	.8	2,010	7.6
July 11-20.....	71.6	16	378	57	67	--	119	0	1,040	89	.5	1,710	2.33	331	1,180	1,080	11	.8	2,060	7.8
July 21-31.....	70.7	18	371	37	62	--	113	0	971	67	1.7	1,580	2.15	302	1,080	985	11	.8	1,930	7.6
Aug. 1-10.....	737	17	368	53	60	--	113	0	1,020	66	1.6	1,640	2.23	3,260	1,140	1,040	10	.8	1,960	7.7
Aug. 11-20.....	202	19	361	43	64	--	190	0	927	69	4.4	1,580	2.15	862	1,080	922	11	.8	1,960	7.5
Aug. 21-31.....	696	17	306	22	23	--	220	0	672	21	5.6	1,170	1.59	2,420	854	674	6	.3	1,490	7.4
Sept. 1-10.....	139	14	306	34	38	--	121	0	793	42	2.3	1,290	1.75	484	904	804	8	.5	1,620	7.5
Sept. 11-20.....	83.0	13	383	37	56	--	140	0	981	66	.9	1,610	2.19	361	1,110	993	10	.7	1,950	7.5
Sept. 21-30.....	77.6	16	365	54	62	--	142	0	1,050	72	1.4	1,710	2.33	358	1,180	1,070	10	.8	2,070	7.6
Weighted average...	b143		429	56	71	--	152	0	1,150	90	1.9	1,890	2.57	783	1,300	1,180	11	0.9	2,220	--

b Average for 345 days of flow.

## RIO GRANDE BASIN--Continued

PECOS RIVER NEAR ACME, N. MEX.

LOCATION.--At gaging station 1 mile southeast of Melena railroad station, 3½ miles downstream from Salt Creek, 5 miles southwest of Acme, Chaves County, and 13 miles northeast of Roswell.

DRAINAGE AREA.--11,380 square miles, approximately (contributing area).

RECORDS AVAILABLE.--Chemical analyses: July 1937 to September 1953.

Water temperatures: May 1952 to September 1953.

EXTREMES, 1952-53.--Dissolved solids: Maximum, 4,890 ppm Jan. 23-24, 26-30; minimum, 1,280 ppm Aug. 18-31.

Hardness: Maximum, 2,500 ppm May 1-12; minimum, 814 ppm Aug. 18-31.

Specific conductance: Maximum observed, 7,880 micromhos Jan. 26; minimum observed, 1,180 micromhos Aug. 21.

Water temperatures: Maximum observed, 89°F July 21-22, 26 Aug. 5; minimum observed, 33°F Jan. 4.

EXTREMES, 1937-53.--Dissolved solids: Maximum, 19,870 ppm May 23-June 2, 1938; minimum, 806 ppm May 24, 1941.

Hardness: Maximum, 5,320 ppm May 23-June 2, 1938; minimum, 528 ppm May 24, 1941.

Specific conductance: Maximum observed, 39,300 micromhos Aug. 9, 1945; minimum observed, 955 micromhos Aug. 21, 1941.

Water temperatures, 1952-53: Maximum observed, 89°F July 21-22, 26 Aug. 5; minimum observed, 33°F Jan. 4.

REMARKS.--Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Values reported for dissolved solids are sums of determined constituents. Records of discharge for water year October 1952 to September 1953 given in WSP 1282.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium adsorption at 25°C	Specific conductance (micro-mhos at 25°C)	pH
														Parts per million	Tons per acre-foot	Tons per acre-foot	Calcium, mg./l.	Non-carbonate			
Oct. 1-10, 1952.....	25.3	14		420	83	136	103	0	1,280	190		1.4		2,180	2.96	1,390	1,300	18	1.6	2,670	7.2
Oct. 11-20.....	17.4	13		432	88	147	104	0	1,320	212		1.4		2,260	3.07	1,440	1,360	18	1.7	2,810	7.6
Oct. 21-31.....	4.35	12		486	108	219	106	0	1,550	322		1.4		2,760	3.75	1,680	1,590	22	2.3	3,370	7.3
Nov. 1-10.....	13.7	12		492	104	233	113	0	1,580	302		1.4		2,780	3.78	1,660	1,560	23	2.5	3,370	7.5
Nov. 11-20.....	3.75	13		516	115	331	118	0	1,660	465		1.3		3,160	4.30	1,760	1,660	29	3.4	3,950	7.5
Nov. 21-30.....	4.25	14		506	120	361	134	0	1,610	535		.9		3,210	4.37	1,760	1,650	31	3.7	4,120	7.7
Dec. 1-10.....	7.17	13		492	112	330	142	0	1,520	500		1.3		3,040	4.13	1,690	1,570	30	3.5	3,980	7.7
Dec. 11-20.....	2.90	12		530	120	415	140	0	1,680	605		1.5		3,430	4.66	1,820	1,700	33	4.2	4,420	7.7
Dec. 21-31.....	3.18	10		532	122	427	134	0	1,690	630		.5		3,480	4.73	1,830	1,720	34	4.3	4,480	7.7
Jan. 1-10, 1953.....	2.4	15		586	145	506	145	0	1,820	810		2.4		3,960	5.39	2,060	1,940	35	4.8	5,210	7.5
Jan. 11-14 a.....	1.0	12		626	167	663	142	0	1,980	1,070		3.0		4,590	6.24	2,250	2,130	39	6.1	6,090	7.6
Jan. 23-24, 26-30 a	1.4	11		656	163	746	128	0	2,060	1,190		2.1		4,890	6.65	2,310	2,200	41	6.8	6,500	7.6
Mar. 8-20.....	32.1	13		600	113	226	116	0	1,810	335		1.4		3,160	4.30	1,960	1,870	20	2.2	3,750	7.7
Mar. 21-30.....	24.8	13		640	121	243	130	0	1,910	374		1.1		3,370	4.58	2,090	1,990	20	2.3	3,950	7.6
Mar. 31-Apr. 10.....	969	12		578	86	93	147	0	1,550	186		1.7		2,580	3.51	1,800	1,680	10	1.0	3,020	7.6
Apr. 11-20.....	56.1	16		666	103	145	122	0	1,830	280		1.3		3,100	4.22	2,080	1,980	13	1.4	3,550	7.7
Apr. 21-30.....	19.0	16		588	129	428	116	0	2,000	550		1.6		3,780	5.14	2,020	1,930	14	1.4	4,600	7.5
May 1-12 a.....	1.8	21		750	153	552	120	0	2,320	840		1.8		4,700	6.39	2,500	2,400	32	4.8	5,800	7.7
May 30-31.....	70	13		512	85	205	98	0	1,520	290		1.8		2,670	3.63	1,630	1,550	22	2.2	3,280	7.7

a No flow Jan. 15-22, 25, 31-Mar. 7, May 13-29, June 5-17, 22-July 16, Sept. 11-30.

June 1-4, 1953 a...	10.2	14	556	96	207	--	85	0	1,670	300	.8	2,890	3.93	79.6	1,780	1,710	20	2.1	3,440	7.8
June 18-21 a.....	18.8	20	234	67	168	--	79	0	917	152	.5	1,600	2.18	81.2	859	794	30	2.5	2,140	7.3
July 17-20.....	1,610	14	384	46	119	--	126	0	1,030	162	3.4	1,820	2.48	7,910	1,150	1,040	18	1.5	2,280	7.6
July 21-28.....	101	14	301	46	125	--	100	0	806	204	3.3	1,550	2.11	423	940	858	22	1.8	2,150	7.6
July 29-Aug. 6....	9.7	22	538	114	423	--	112	0	1,640	660	1.4	3,450	4.69	90.4	1,810	1,720	34	4.3	4,490	7.6
Aug. 7-17.....	609	19	430	57	95	--	121	0	1,190	124	2.1	1,980	2.69	3,260	1,310	1,210	14	1.1	2,360	7.6
Aug. 18-31.....	516	15	264	38	79	--	127	0	725	89	3.6	1,280	1.74	1,780	814	710	17	1.2	1,680	7.6
Sept. 1-10 a.....	312	16	373	46	86	--	112	0	1,020	107	2.1	1,710	2.33	1,440	1,120	1,030	14	1.1	2,090	7.4
Weighted average b	153	15	434	62	105	--	129	0	1,190	158	2.3	2,030	2.76	839	1,340	1,230	15	1.3	2,460	--

a No flow Jan. 15-22, 25, 31-Mar. 7, May 13-29, June 5-17, 22-July 16, Sept. 11-30.

b Average for 245 days of flow.

## RIO GRANDE BASIN--Continued

## PECOS RIVER NEAR ACME, N. MEX.--Continued

Temperature (°F) of water, water year October 1952 to September 1953  
 /Once-daily temperature measurement, generally between 4 p. m. and 8 p. m. No flow  
 Jan. 15-22, 25, Jan. 31-Mar. 7, May 13-29, June 5-17, June 22-July 16, Sept. 11-30/

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

a Temperature measurement between 6 a. m. and 12 m.

b Temperature measurement between 12 m. and 4 p. m.

## RIO GRANDE BASIN--Continued

## RIO HONDO AT DIAMOND A RANCH, NEAR ROSWELL, N. MEX.

LOCATION.--At gaging station on downstream side of road bridge at Diamond A Ranch, 8 miles upstream from Rocky Arroyo, and 18 miles west of Rosewell, Chaves County.

DRAINAGE AREA.--960 square miles, (contributing area).

RECORDS AVAILABLE.--Water temperatures: September 1951 to September 1953.

Sediment records: September 1951 to September 1953.

EXTREMES, 1952-53.--Water temperatures: Maximum observed, 85°F July 16; minimum observed, not determined.

Sediment concentrations: Maximum daily, not determined; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 160,000 tons (estimated) July 13; minimum daily, 0 tons on many days.

EXTREMES, 1951-53.--Water temperatures: Maximum observed, 86°F July 24, 25, 1952; minimum observed, not determined.

Sediment concentrations: Maximum daily, not determined; minimum daily, no flow on many days.

Sediment loads: Maximum daily, 160,000 tons (estimated) July 13, 1953; minimum daily, 0 tons on many days.

REMARKS.--No flow during period October to December; Tabulation deleted for this period.

Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of discharge for water year October 1952 to September 1953 given in WSP 1282.

Temperature (°F) of water, water year October 1952 to September 1953  
/Once-daily temperature measurement, generally between 11 a. m. and 6 p. m.  
no flow on most days when no temperature is shown/

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1										--	72	74
2										--	76	--
3										--	74	--
4										--	72	--
5										--	--	--
6										--	74	--
7										--	74	--
8										--	--	--
9										--	--	--
10										--	--	--
11										--	b 72	--
12										--	a 72	--
13										--	b 75	--
14										--	--	--
15										--	--	--
16										85	--	--
17										79	78	--
18										80	74	--
19										79	74	--
20										74	70	--
21												
22										a 70	a 68	--
23										b 79	73	--
24										b 74	b 71	--
25										b 79	74	--
26										74	79	--
27										72	--	--
28										82	--	--
29										82	--	--
30										78	--	--
31										b 74	--	--
Average										a 69	b 74	--

a Temperature measurement before 11 a. m.

b Temperature measurement after 6 p. m.

## RIO GRANDE BASIN--Continued

RIO HONDO AT DIAMOND A RANCH, NEAR ROSWELL, N. MEX.--Continued

Suspended sediment, water year October 1952 to September 1953

Day	January			February			March		
	Mean dis-charge (cfs)	Mean concentration (ppm)	Tons per day	Mean dis-charge (cfs)	Mean concentration (ppm)	Tons per day	Mean dis-charge (cfs)	Mean concentration (ppm)	Tons per day
1.....	0						0		
2.....	0						0		
3.....	0						0		
4.....	0						0		
5.....	0						8		
6.....	0						2		
7.....	0						0		
8.....	0						0		
9.....	0						0		
10.....	0						0		
11.....	0						0		
12.....	0						0		
13.....	0						0		
14.....	0						0		
15.....	0						0		
16.....	0						0		
17.....	0						0		
18.....	0						0		
19.....	0						0		
20.....	1						0		
21.....	2						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.....	0						0		
Total.	3	--	e (t)	0	--	0	10	--	e 5
April				May			June		
1.....				0			81		
2.....				0			471		
3.....				0			30		
4.....				0			6		
5.....				0			0		
6.....				0			0		
7.....				0			0		
8.....				0			0		
9.....				0			0		
10.....				0			0		
11.....				0			0		
12.....				0			4		
13.....				0			2		
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.....				65			0		
29.....				4			0		
30.....				0			0		
31.....				0			--		
Total.	0	--	0	69	--	e 6,100	594	--	e 186,000

e Estimated.

t Less than 0.50 ton.

## RIO GRANDE BASIN--Continued

## RIO HONDO AT DIAMOND A RANCH, NEAR ROSWELL, N. MEX.--Continued

Suspended sediment, water year October 1952 to September 1953--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	46	6,800	sa 960	2	13,600	133
2.....	0	--	0	11	1,000	30	0		0
3.....	0	--	0	0	--	0	0		0
4.....	0	--	0	0	--	0	0		0
5.....	0	--	0	0	--	0	0		0
6.....	14	--	e 1,000	116	21,600	s 8,130	0		0
7.....	0	--	0	11	2,500	74	0		0
8.....	114	--	e 13,000	3	--	e 2	0		0
9.....	5	--	e 100	0	--	0	0		0
10.....	0	--	0	0	--	0	0		0
11.....	0	--	0	11	1,280	s 637	0		0
12.....	0	--	0	42	10,300	1,710	0		0
13.....	538	--	e 160,000	0	--	0	0		0
14.....	34	--	e 960	0	--	0	0		0
15.....	2	--	e 30	0	--	0	0		0
16.....	0	--	0	8	2,100	sa 110	0		0
17.....	0	--	0	49	7,620	s 1,150	0		0
18.....	144	29,200	s 19,300	52	13,900	s 2,340	0		0
19.....	105	16,000	s 5,380	123	18,800	s 9,130	0		0
20.....	42	5,900	s 1,100	38	7,000	s 729	0		0
21.....	115	15,100	s 5,070	22	21,900	s 1,870	0		0
22.....	48	9,200	1,190	0	--	0	0		0
23.....	30	7,200	583	0	--	0	0		0
24.....	38	18,100	s 2,780	0	--	0	0		0
25.....	30	18,000	sa 2,500	0	--	0	0		0
26.....	0	--	0	0	--	0	0		0
27.....	0	--	0	0	--	0	0		0
28.....	0	--	0	0	--	0	0		0
29.....	0	--	0	0	--	0	0		0
30.....	13	7,850	s 1,770	0	--	0	0		0
31.....	38	18,900	s 2,290	17	8,010	s 2,170	--		--
Total.	1,310	--	217,053	549	--	29,042	2	--	133

Total discharge for year (cfs-days)..... 2,537

Total load for year (tons)..... 438,333

e Estimated.

s Computed by subdividing day.

t Less than 0.50 ton.

a Computed from partly estimated concentration graph.

## RIO GRANDE BASIN--Continued

## PECOS RIVER NEAR ARTESIA, N. MEX.

LOCATION.--At aging station at bridge on State Highway 83, 4.3 miles east of Artesia, Eddy County, 7.0 miles north of mouth of Rio Pecos, and 17 miles north of McMillan Dam.

DRAINAGE AREA.--15,300 square miles, approximately (contributing area).

RECORDS AVAILABLE.--Chemical analyses: July 1937 to September 1953.

Water temperatures: April 1949 to September 1953.

Sediment records: January 1949 to September 1953.

EXTREMES, 1952-53.--Dissolved solids: Maximum, 8,270 ppm July 1-2; minimum, 1,690 ppm Sept. 1-7.

Hardness: Maximum, 3,040 ppm July 1-2; minimum, 1,060 ppm Sept. 1-7.

Specific conductance: Maximum observed, 13,800 micromhos June 21; minimum observed, 1,650 micromhos Sept. 2.

Water temperatures: Maximum observed, 92°F June 30; minimum observed, 33°F Dec. 30.

Sediment concentrations: Maximum daily, 13,200 ppm Aug. 22; minimum daily, no flow during several days in July.

Sediment loads: Maximum daily, 67,400 tons July 19; minimum daily, 0 tons several days during July.

EXTREMES, 1937-53.--Dissolved solids: Maximum, 10,900 ppm Aug. 11-13, 17-21, 1945; minimum, 653 ppm July 25, 27, 1950.

Hardness: Maximum, 3,430 ppm Aug. 11-13, 17-21, 1945; minimum, 326 ppm June 6, 1949.

Specific conductance: Maximum observed, 17,200 micromhos Aug. 20, 1945; minimum observed, 898 micromhos Sept. 22, 1941.

Water temperatures: Maximum observed, 92°F June 30, 1953; minimum observed, 33°F Jan. 30-31, Feb. 1, 1951, Dec. 30, 1952.

Sediment concentrations (1949-53): Maximum daily, 14,600 ppm Oct. 6, 1950; minimum daily, no flow several days during July 1953.

Sediment loads (1949-53): Maximum daily, 116,000 tons July 23, 1950; minimum daily, 0 tons on several days during July 1953.

REMARKS.--Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Values reported for dissolved solids are sums of determined constituents. Records of discharge for water year October 1952 to September 1953 given in WSP 1282.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boiron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percent sodium adsorption	Specific conductance (micro-mhos at 25°C)	pH	
															Parts per million	Tons per acre-foot	Tons per day	Calcium	Non-carbonate				
Oct. 1-10, 1952	38.2	18		560	203	1,080		141	0	1,930	1,690		3.2		5,550	7.55	572	2,230	2,120	51	9.9	7,850	7.3
Oct. 11-20	45.4	17		540	185	940		139	0	1,870	1,460		3.2		5,080	6.91	623	2,110	1,990	49	8.9	6,930	7.3
Oct. 21-31	49.6	18		532	200	988		147	0	1,830	1,570		4.4		5,210	7.09	688	2,150	2,030	50	9.3	7,270	7.3
Nov. 1-10	56.7	17		530	208	1,050		161	0	1,850	1,670		4.3		5,410	7.36	828	2,180	2,050	51	9.8	7,510	7.3
Nov. 11-20	57.1	18		552	193	880		188	0	1,810	1,430		5.5		4,980	6.77	768	2,170	2,020	47	8.2	6,960	7.6
Nov. 21-30	67.1	18		554	204	980		206	0	1,780	1,600		4.9		5,240	7.13	949	2,220	2,050	49	9.0	7,380	7.7
Dec. 1-10	77.9	19		524	202	960		208	0	1,760	1,540		8.5		5,120	6.96	1,080	2,140	1,970	49	9.0	7,230	7.7
Dec. 11-20	64.4	16		534	212	1,040		199	0	1,840	1,680		10		5,430	7.38	944	2,200	2,040	51	9.6	7,720	7.7
Dec. 21-31	63.4	18		538	211	1,080		195	0	1,840	1,710		7.5		5,500	7.48	941	2,210	2,050	52	10	7,990	7.6
Jan. 1-10, 1953	58.3	17		550	219	1,130		185	0	1,900	1,840		5.5		5,750	7.82	905	2,270	2,120	52	10	8,170	7.6
Jan. 11-20	47.6	16		566	233	1,250		183	0	1,960	2,020		4.7		6,160	8.38	792	2,370	2,220	53	11	8,710	7.6
Jan. 21-31	51.0	14		542	227	1,150		174	0	1,920	1,880		5.0		5,820	7.92	801	2,290	2,140	52	10	8,290	7.5
Feb. 1-10	50.6	13		552	224	1,180		151	0	1,970	1,870		6.0		5,890	8.01	805	2,300	2,170	53	11	8,340	7.4
Feb. 11-20	51.3	13		552	227	1,140		167	0	1,950	1,880		6.8		5,850	7.95	810	2,310	2,170	52	10	8,260	7.3
Feb. 21-28	54.4	15		548	230	1,150		167	0	1,960	1,820		5.9		5,810	7.90	853	2,310	2,180	52	10	8,220	7.3
Mar. 1-10	50.5	11		554	239	1,210		156	0	2,000	1,920		5.6		6,020	8.19	821	2,360	2,240	53	11	8,480	7.3
Mar. 11-20	61.7	12		578	215	1,000		146	0	2,050	1,590		4.5		5,520	7.51	920	2,320	2,210	48	9.0	7,620	7.4
Mar. 21-31	38.8	11		638	233	1,130		130	0	2,220	1,810		5.0		6,110	8.31	640	2,550	2,440	49	9.7	8,330	7.2

Apr. 1-13, 1953.....	679	16	550	94	218	145	0	1,880	315	3.6	2,990	4.07	5,480	1,860	1,740	20	2.2	3,520	7.6
Apr. 14-20 .....	70.0	16	632	152	554	141	0	1,950	860	4.0	4,240	5.77	801	2,200	2,090	35	5.1	5,400	7.4
Apr. 21-30 .....	64.5	15	622	204	988	110	0	2,100	1,570	3.4	5,560	7.56	968	2,390	2,300	47	8.8	7,520	7.3
May 1-10 .....	38.2	17	634	241	1,240	146	0	2,250	1,970	3.6	6,430	8.74	663	2,570	2,450	51	11	8,320	7.3
May 11-20 .....	36.7	14	624	269	1,420	163	0	2,270	2,300	6.9	6,980	9.49	692	2,660	2,530	54	13	9,760	7.5
May 21-31 .....	29.6	16	626	274	1,510	160	0	2,310	2,470	--	7,310	9.94	584	2,690	2,560	55	13	10,200	7.2
June 1-10 .....	42.1	13	610	203	960	134	0	2,120	1,540	3.9	5,510	7.49	626	2,360	2,260	47	8.6	7,420	7.4
June 11-20 .....	18.1	18	626	274	1,440	137	0	2,330	2,380	--	7,140	9.71	349	2,680	2,580	54	12	10,100	7.5
June 21-30 .....	11.2	18	666	254	1,510	128	0	2,430	2,350	--	7,290	9.91	220	2,710	2,600	55	13	10,200	7.6
July 1-2 a .....	20	16	756	280	1,690	116	0	2,850	2,620	--	8,270	11.2	447	3,040	2,940	55	13	11,200	6.8
July 18 .....	302	13	394	92	730	106	0	1,200	1,120	12	3,610	4.91	940	1,360	1,270	54	8.6	5,450	--
July 19-26 .....	531	15	494	71	309	114	0	1,410	432	5.8	2,790	3.79	4,000	1,530	1,440	30	3.3	3,990	7.6
July 27-31 .....	42.0	15	544	108	495	95	0	1,610	780	3.3	3,600	4.90	408	1,780	1,700	38	5.1	4,610	7.8
Aug. 1-8 .....	10.3	15	564	152	847	107	0	1,850	1,350	7.0	4,860	6.61	135	2,080	1,980	47	8.1	6,700	7.8
Aug. 9-20 .....	412	15	484	70	166	122	0	1,380	244	6.1	2,410	3.28	2,680	1,500	1,400	19	1.9	2,920	7.8
Aug. 21-31 .....	393	17	339	56	206	126	0	956	302	5.6	1,940	2.64	2,060	1,070	969	29	2.7	2,650	7.8
Sept. 1-7 .....	581	16	361	40	408	119	0	1,398	346	4.4	3,690	2.30	2,660	1,060	968	18	1.5	2,150	7.4
Sept. 8-10 .....	58.0	13	437	140	440	100	0	1,370	866	5.2	3,690	4.20	2,660	1,430	1,330	39	4.9	4,210	7.4
Sept. 11-20 .....	15.1	19	619	168	1,150	126	0	1,970	1,820	6.7	5,820	7.92	237	2,740	2,740	53	11	8,110	6.3
Sept. 21-30 .....	10.6	18	694	260	1,690	127	0	2,470	2,680	--	7,870	10.7	225	2,500	2,700	57	14	11,000	7.0
Weighted average	115 b	16	508	119	495	140	0	1,550	772	5.1	3,530	4.81	1,100	1,760	1,640	37	5.1	4,740	--

a No flow July 3-17.

b Average for 350 days of flow.

## WESTERN GULF OF MEXICO BASINS

## RIO GRANDE BASIN--Continued

## PECOS RIVER NEAR ARTESIA, N. MEX.--Continued

Temperature (°F) of water, water year October 1952 to September 1953

/Once-daily temperature measurement, generally taken between 11 a. m. and 6 p. m. No flow July 3-17/

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

a Measurement obtained before 11 a. m.

b Measurement obtained after 6 p. m.

## RIO GRANDE BASIN--Continued

## PECOS RIVER NEAR ARTESIA, N. MEX.--Continued

Suspended sediment, water year October 1952 to September 1953

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.....	37	137	14	52	81	12	80	73	15
2.....	38			56			79		
3.....	41			55			80		
4.....	39			52			80		
5.....	38			52			77		
6.....	38	176	22	55	89	14	77	43	7
7.....	40			57			78		
8.....	44			59			77		
9.....	36			64			77		
10.....	31			65			74		
11.....	31	64	9	66	56	10	69	74	13
12.....	44			65			68		
13.....	52			63			67		
14.....	53			57			64		
15.....	49			55			65		
16.....	43	70	10	55	79	10	64	49	8
17.....	45			51			61		
18.....	47			50			62		
19.....	45			55			62		
20.....	45			54			62		
21.....	45	51	9	57	65	10	60	74	13
22.....	46			62			62		
23.....	45			60			64		
24.....	44			61			63		
25.....	51			65			63		
26.....	55	70	10	65	79	10	64	49	8
27.....	55			72			72		
28.....	53			73			66		
29.....	52			77			60		
30.....	51			79			63		
31.....	49			--			60		
Total.	1,382	--	462	1,809	--	360	2,120	--	343
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.....	58	51	8	50	85	12	55	23	3
2.....	55			56			59		
3.....	56			55			57		
4.....	56			50			52		
5.....	61			49			50		
6.....	65	34	4	49	31	4	38	30	5
7.....	62			44			43		
8.....	61			46			50		
9.....	57			52			51		
10.....	52			55			50		
11.....	47	48	7	50	41	6	69	46	6
12.....	47			53			70		
13.....	49			52			69		
14.....	44			54			68		
15.....	42			53			67		
16.....	43	51	8	53	34	5	67	29	3
17.....	48			50			60		
18.....	48			48			51		
19.....	51			50			51		
20.....	57			50			45		
21.....	45	51	8	50	41	6	42	46	6
22.....	43			55			46		
23.....	50			52			51		
24.....	55			59			50		
25.....	50			57			40		
26.....	57	51	8	59	34	5	34	29	3
27.....	57			53			30		
28.....	52			50			32		
29.....	51			--			30		
30.....	51			--			32		
31.....	50			--			40		
Total.	1,620	--	197	1,454	--	204	1,549	--	122

## WESTERN GULF OF MEXICO BASINS

## RIO GRANDE BASIN--Continued

## PECOS RIVER NEAR ARTESIA, N. MEX.--Continued

Suspended sediment, water year October 1952 to September 1953--Continued

Day	April			May			June		
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1.....	251	1,580	s 2,040	50			100		
2.....	735	4,100	8,140	45			79		
3.....	882	3,950	9,410	41			56		
4.....	830	3,550	7,960	40			40		
5.....	848	3,350	7,670	41			39		
6.....	918	3,550	8,800	39	92	9	32	113	13
7.....	848	3,500	8,010	33			21		
8.....	830	3,080	6,900	29			19		
9.....	848	3,020	6,910	32			21		
10.....	848	2,780	6,370	32			14		
11.....	604	2,270	s 3,840	32			17		
12.....	232	1,680	1,050	35			20		
13.....	158	1,050	448	29			24		
14.....	93	580	146	33			21		
15.....	60			32			20		
16.....	67			43	79	8	18	52	3
17.....	71			42			15		
18.....	71			45			13		
19.....	65			43			18		
20.....	63	164	28	33			15		
21.....	58			28			21		
22.....	52			22			31		
23.....	61			21			27		
24.....	64			22	64	4	15		
25.....	70			26			11		
26.....	79			28			4.0	57	2
27.....	80			25			1.5		
28.....	70			25			.8		
29.....	57	105	19	38			6		
30.....	54			42	127	13	.5	38	(t)
31.....	--	--	--	49			--	--	--
Total..	9,967	--	78,097	1,075	--	250	714.4	--	178
Day	July			August			September		
	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day	Mean discharge (cfs)	Mean concentration (ppm)	Tons per day
1.....	0.3	100	(t)	30			1,320	7,050	s 28,700
2.....	.1	39	(t)	14	160	7	900	6,000	14,600
3.....	0	--	0	13			882	3,900	9,290
4.....	0	--	0	11			570	2,850	4,560
5.....	0	--	0	6.6			196	1,700	900
6.....	0	--	0	4.0	218	2	130	1,400	496
7.....	0	--	0	2.6			108	700	204
8.....	0	--	0	1.4			66	650	116
9.....	0	--	0	242	2,120	s 2,640	54	350	51
10.....	0	--	0	630	6,000	10,200	43	180	21
11.....	0	--	0	890	4,600	8,570	32		
12.....	0	--	0	645	3,850	6,700	21	100	5
13.....	0	--	0	675	3,421	6,230	12		
14.....	0	--	0	645	3,480	6,060	12		
15.....	0	--	0	474	2,860	s 3,790	20		
16.....	0	--	00	162	1,920	s 864	18	398	20
17.....	0	--	0	105	1,050	298	19		
18.....	302	2,320	s 6,500	137	580	215	17		
19.....	2,500	10,100	s 67,400	389	2,620	s 2,100	11		
20.....	916	4,830	s 12,900	154	5,700	s 2,520	8.5	91	2
21.....	272	2,850	2,090	175	2,490	s 2,790	7.0		
22.....	160	1,300	561	850	13,200	s 30,800	10		
23.....	207	1,050	s 600	362	10,400	s 10,400	8.0		
24.....	99	600	160	205	6,500	3,600	7.0		
25.....	38			132	3,100	1,100	6.5		
26.....	58			79	800	171	6.5	97	3
27.....	110			52	350	49	11		
28.....	36	309	36	297	3,820	s 4,910	16		
29.....	18			630	12,900	21,900	16		
30.....	24			750	7,000	14,200	18		
31.....	22			795	5,600	12,000			
Total..	4,762.4	--	90,463	9,357.6	--	152,143	4,545.5	--	59,065
Total discharge for year (cfs-days).....									40,355.9
Total load for year (tons).....									381,884

s Computed by subdividing day

t Less than 0.50 ton.

## RIO GRANDE BASIN--Continued

## PECOS RIVER NEAR ARTESIA, N. MEX.--Continued

Particle-size analyses of suspended sediment, water year October 1952 to September 1953  
(Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water;  
W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date of collection	Time	Dis-charge (cfs)	Water-tem-perature (° F)	Suspended sediment										Methods of analysis			
				Concentration of sample (ppm)		Concentration of suspension analyzed (ppm)		Percent finer than indicated size, in millimeters									
								0.002	0.004	0.008	0.016	0.031	0.062		0.125	0.250	0.350
July 19, 1953	12:30 p. m.	2,760	80	10,500	3,830		56		79		93	99	100				SPWCM
July 19	6:55 p. m.	3,280	80	8,510	3,520		54		72		87	98	100				SPWCM
July 19	6:55 p. m.	3,280	80	8,510	3,440		7		69		87	98	100				SPN
July 19	10:15 p. m.	3,200	76	7,070	4,280		51		70		86	98	100				SPWCM
July 21	7:50 a. m.	288	78	3,050	3,700		66		86		91	98	100				SPWCM
Aug. 9	10:50 p. m.	510	75	8,160	4,680		68		90		94	99	100				SPWCM
Aug. 10	7:00 p. m.	645	79	4,380	1,700		70		89		90	98	100				SPWCM
Aug. 12	8:00 a. m.	645	75	3,980	2,640		3		67		82	93	99		100		SPN
Aug. 13	5:45 p. m.	645	78	3,420	3,360		50		72		82	92	100				SPWCM
Aug. 14	5:30 p. m.	630	82	2,850	3,080		56		76		86	95	100				SPWCM
Aug. 15	4:10 p. m.	390	84	1,950	4,460		61		80		88	96	100				SPWCM
Aug. 20	6:30 p. m.	119	78	3,770	3,460		70		76		79	82	99		100		SPWCM
Aug. 22	1:00 p. m.	918	79	12,100	3,730		61		87		95	99	100				SPWCM
Aug. 23	6:50 p. m.	285	76	8,270	4,170		81		88		98	99	100				SPWCM
Aug. 29	6:00 p. m.	645	80	8,880	4,320		69		92		96	99	100				SPWCM
Aug. 31	8:30 a. m.	830	75	5,410	3,840		60		84		93	98	100				SPWCM
Sept. 1	1:15 p. m.	1,470	77	5,750	4,100		45		64		82	97	99		100		SPWCM
Sept. 1	5:15 p. m.	2,420	77	8,810	3,120		44		67		88	98	100				SPWCM
Sept. 1	5:15 p. m.	2,420	77	8,810	3,360		8		59		88	98	100				SPN
Sept. 4	6:00 p. m.	415	73	2,420	3,380		66		84		89	97	99		100		SPWCM

## RIO GRANDE BASIN--Continued

## RIO PENASCO NEAR DAYTON, N. MEX.

LOCATION.--At gaging station 3 feet upstream from crest of abandoned diversion dam, 1 mile northeast of old Dayton railway station,  $3\frac{1}{2}$  miles upstream from mouth, and 7 miles southeast of Artesia, Eddy County.

DRAINAGE AREA --1,070 square miles, approximately.

RECORDS AVAILABLE.--Water temperatures: September 1951 to September 1953.

Sediment records: September 1951 to September 1953.

EXTREMES, 1952-53.--Sediment concentrations: Maximum daily, 15,500 ppm June 18; maximum observed 82,600 ppm June 18; minimum, no flow on many days.

Sediment loads: Maximum daily, 36,000 tons June 18; minimum daily, 0 ton on many days.

EXTREMES, 1951-53.--Sediment concentrations: Maximum daily, 15,500 ppm June 18, 1953; minimum, no flow on many days.

Sediment loads: Maximum daily, 36,000 tons June 18, 1953; minimum daily, 0 tons on many days.

REMARKS.--Records of specific conductance and temperature (°F) for frequent samples June 18, 19, July 13, 14, available in district office at Albuquerque, N. Mex. Records of discharge for water year October 1952 to September 1953 given in WSP 1282.

Suspended sediment and temperature (°F) of water, for water year October 1952 to September 1953  
/Once-daily temperature measurement at approximately 1:30 p. m./

Day	Mean discharge (cfs)	Suspended Sediment		Temperature (°F)
		Mean Concentration (ppm)	Tons per day	
May 28, 1953.....	1.6	--	e 40	--
MAY TOTAL .....	1.6	--	40	--
June 11.....	1.5	--	e 80	--
June 12.....	3.3	--	e 80	--
June 18.....	256	15,500	s 36,000	74
June 19.....	37	7,320	s 979	74
June 20.....	2.3	2,400	a 15	--
June 21.....	.8	1,900	a 4	--
June 22.....	.3	1,500	a 1	--
JUNE TOTAL .....	301.2	--	37,159	--
July 13.....	340	8,960	s 19,100	74
July 14.....	26	6,100	s 445	b 72
July 15.....	1.2	--	e 20	--
July 16.....	.1	--	e 1	--
July 18.....	4.7	--	e 90	--
July 19.....	2.6	--	e 30	--
JULY TOTAL .....	374.6	--	19,686	--
Aug. 12.....	1.2	--	e 60	--
Aug. 13.....	1.0	--	e 25	--
AUGUST TOTAL .....	2.2	--	85	--

Total discharge for year (cfs-days).....679.6  
Total load for year (tons).....56,970

e Estimated.

s Computed by subdividing day.

a Computed from estimated concentration graph.

b Temperature measurement at 1:00 a. m.

Flow occurred only on days indicated.

## RIO GRANDE BASIN

RIO PENASCO NEAR DAYTON, N. MEX. --Continued

Particle size analyses of suspended sediment, water year October 1952 to September 1953  
 (Methods of analysis: B, bottom withdrawal tube; D, decantation; P, pipette; S, sieve; N, in native water;  
 W, in distilled water; C, chemically dispersed; M, mechanically dispersed)

Date of collection	Time	Water discharge (cfs)	Water temperature (°F)	Suspended sediment											Methods of analysis	
				Concentration of sample (ppm)	Concentration of suspension analyzed (ppm)	Percent finer than indicated size, in millimeters										
						0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.350		0.500
June 18, 1953 . . . . .	2:00 p.m.	810	74	46,400	3,540	10			93		100	--	--		--	SPN
June 18 . . . . .	2:00 p.m.	810	74	46,400	4,060	63			91		100	--	--		--	SPWCM
June 18 . . . . .	3:30 p.m.	478	72	30,900	5,650	54			95		98	99	100		--	SPWCM
June 18 . . . . .	9:30 p.m.	149	74	15,400	4,750	12			91		98	100			--	SPN
June 18 . . . . .	9:30 p.m.	149	74	15,400	3,900	81			97		98	100			--	SPWCM
June 18 . . . . .	11:30 p.m.	102	72	9,260	3,350	91			99		100	--	--		--	SPWCM
June 19 . . . . .	1:30 a.m.	94	71	9,090	3,900	88			97		99	100	--		--	SPWCM
June 19 . . . . .	3:30 a.m.	80	70	8,430	3,420	90			98		100	--	--		--	SPWCM
June 19 . . . . .	5:30 a.m.	72	70	8,600	4,020	21			92		97	99	99		99	SPN
June 19 . . . . .	5:30 a.m.	72	70	8,600	5,950	87			89		97	99	99		99	SPWCM
June 19 . . . . .	7:30 a.m.	54	70	7,740	4,650	89			98		99	99	99		100	SPWCM
June 19 . . . . .	9:30 a.m.	40	69	8,700	3,640	90			96		99	100	--		--	SPWCM
June 19 . . . . .	11:30 a.m.	26	69	7,350	3,900	89			98		100	--	--		--	SPWCM
June 19 . . . . .	12:30 p.m.	25	68	7,480	3,040	12			97		99	100	--		--	SPN
June 19 . . . . .	12:30 p.m.	25	68	7,480	3,400	93			99		99	100	--		--	SPWCM
June 19 . . . . .	5:30 p.m.	5.8	77	3,320	3,840	51			81		88	95	97		99	SPWCM
July 13 . . . . .	9:00 a.m.	2,320	72	30,100	3,720	6			73		92	99	99		100	SPN
July 13 . . . . .	9:00 a.m.	2,320	72	30,100	4,660	59			87		92	99	99		100	SPWCM
July 13 . . . . .	3:00 p.m.	242	76	13,200	3,560	17			86		99	100	--		--	SPN
July 13 . . . . .	3:00 p.m.	242	76	13,200	4,500	74			96		99	100	--		--	SPWCM
July 13 . . . . .	5:00 p.m.	160	76	10,200	5,010	86			97		100	--	--		--	SPWCM
July 13 . . . . .	7:00 p.m.	115	74	9,120	4,760	84			92		100	--	--		--	SPWCM
July 14 . . . . .	1:00 a.m.	72	72	8,480	2,900	10			97		99	100	--		--	SPN
July 14 . . . . .	1:00 a.m.	72	72	8,480	4,060	81			86		99	100	--		--	SPWCM
July 14 . . . . .	2:00 a.m.	66	72	8,320	3,940	84			96		98	100	--		--	SPWCM
July 14 . . . . .	4:00 a.m.	54	72	5,460	4,200	99			100		--	--	--		--	SPWCM
July 14 . . . . .	6:00 a.m.	35	70	5,460	1,810	89			95		100	--	--		--	SPWCM

## RIO GRANDE BASIN--Continued

## PECOS RIVER AT DAM SITE 3, NEAR CARLSBAD, N. MEX.

LOCATION.--At gaging station at dam site 3 of Carlsbad project of Bureau of Reclamation, about 1 mile upstream from flow line of Lake Avalon, 1.3 miles downstream from Rocky Arroyo, and 8 miles northwest of Carlsbad, Eddy County.

DRAINAGE AREA.--17,620 square miles, approximately (contributing area).

RECORDS AVAILABLE.--Chemical analyses: July 1951 to September 1953.

REMARKS.--Samples collected at approximately weekly intervals. Records of discharge for water year October 1952 to September 1953 given in WSP 1282.

Chemical analyses in parts per million, and water temperatures, water year October 1952 to September 1953

Date of Collection	Mean discharge (cfs)	Water Temp °F	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Chloride	Specific conductance (micromhos at 25°C)
Oct. 1, 1952	41	77	134	0	1,080	6,070
Oct. 8	42	68	121	0	1,480	7,370
Oct. 13	44	68	122	0	1,120	6,220
Oct. 15	51	68	129	0	1,140	6,450
Oct. 22	28	60	134	0	930	5,570
Oct. 29	24	--	139	0	780	5,130
Nov. 5	29	52	137	0	750	5,050
Nov. 14	52	59	143	0	770	5,120
Nov. 20	54	--	141	0	780	5,110
Nov. 24	54	45	135	0	730	4,890
Nov. 26	58	49	140	0	770	5,050
Dec. 3	68	58	140	0	780	5,070
Dec. 11	73	50	145	0	770	5,070
Dec. 17	71	--	143	0	770	5,040
Dec. 23	71	47	142	0	780	5,080
Jan. 3, 1953	72	--	143	0	760	5,020
Jan. 5	67	49	141	0	750	5,010
Jan. 9	70	55	140	0	740	4,990
Jan. 14	59	55	141	0	750	5,010
Jan. 21	54	57	140	0	740	4,980
Jan. 28	78	57	140	0	1,180	6,330
Feb. 4	70	53	128	0	1,500	7,300
Feb. 9	49	55	119	0	1,580	7,610
Feb. 11	59	52	122	0	1,460	7,250
Feb. 18	55	52	132	0	1,650	7,710
Feb. 25	24	52	130	0	1,140	6,510
Mar. 4	45	53	122	0	980	5,760
Mar. 6	57	69	136	0	1,260	6,650
Mar. 12	54	--	109	0	910	5,650
Mar. 18	57	66	130	0	1,390	7,080
Mar. 25	55	62	133	0	1,290	6,980
Apr. 3	308	69	131	0	555	4,460
Apr. 7	462	60	130	0	360	3,730
Apr. 25	57	62	140	0	730	4,980
Apr. 28	48	65	140	0	750	5,040
May 1	67	63	139	0	760	5,070
May 6	197	69	119	0	1,710	8,500
May 16	27	70	131	0	740	5,030
May 23	28	79	124	0	2,220	10,000
May 26	23	83	140	0	1,220	6,660

## RIO GRANDE BASIN--Continued

## PECOS RIVER AT DAM SITE 3, NEAR CARLSBAD, N. MEX.--Continued

Chemical analyses in parts per million, and water temperatures, water year October 1952 to September 1953--Continued

Date of Collection	Mean dis- charge (cfs)	Water Temp °F	Bicar- bonate (HCO <sub>3</sub> )	Car- bon- ate (CO <sub>3</sub> )	Chloride (Cl)	Specific conductance (micromhos at 25°C)
June 3, 1953 .....	20	81	141	0	730	4,740
June 10. ....	56	85	117	0	1,760	8,500
June 15. ....	23	86	145	0	930	5,290
June 17. ....	20	81	153	0	820	5,230
June 26. ....	16	85	123	0	790	5,200
July 2. ....	11	81	131	0	810	5,250
July 8. ....	8.3	87	120	0	815	5,330
July 17. ....	6.7	84	125	0	345	2,620
July 25. ....	369	84	80	0	490	4,010
July 30. ....	79	79	90	14	830	5,310
Aug. 3. ....	54	74	122	0	140	1,700
Aug. 6. ....	40	92	131	0	740	5,040
Aug. 14. ....	690	84	106	0	230	3,040
Aug. 21. ....	167	75	82	0	480	4,000
Aug. 28. ....	51	85	86	0	450	3,360
Sept. 10. ....	89	71	139	0	750	4,960
Sept. 11. ....	175	72	146	0	750	5,000
Sept. 16. ....	69	74	123	11	740	4,960
Sept. 24. ....	41	84	135	0	750	5,010
Sept. 29. ....	30	78	132	0	770	5,060

## RIO GRANDE BASIN--Continued

## CARLSBAD MAIN CANAL AT HEAD, NEAR CARLSBAD, N. MEX.

LOCATION.--At gaging station 220 feet downstream from headgates in Avalon Dam and 5.0 miles north of Carlsbad, Eddy County. RECORDS AVAILABLE.--Chemical analyses: February 1939 to September 1953.

EXTREMES, 1952-53.--Dissolved solids: Maximum, 5,400 ppm Mar. 28-Apr. 5; minimum, 737 ppm July 19-24.

Hardness: Maximum, 2,570 ppm Mar. 28-Apr. 5; minimum, 427 ppm July 19-24.

Specific conductance: Maximum observed, 7,370 micromhos Apr. 3; minimum observed, 1,010 micromhos July 22.

EXTREMES, 1939-53.--Dissolved solids: Maximum, 6,310 ppm Apr. 11-12, 1949; minimum, 737 ppm July 19-24, 1953.

Hardness: Maximum, 2,810 ppm June 1-10, 1945; minimum, 427 ppm July 19-24, 1953.

Specific conductance: Maximum observed, 9,730 micromhos June 5, 1945; minimum observed, 401 micromhos June 3, 1948.

REMARKS.--Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Values reported for dissolved solids are sums of determined constituents. Values shown as extremes relate to canal samples only. Samples collected from canal when there was flow, otherwise from Lake Avalon at the headgates and are those for which specific conductance values only are given. Records of discharge furnished by Surface Water Branch, Santa Fe District for water year October 1952 to September 1953. Monthly diversions to canal below Lake Avalon for water year October 1952 to September 1953 given in WSP 1282.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonyl (CO <sub>2</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids (sum)			Hardness as CaCO <sub>3</sub>	Percent sodium chloride	Sodium chloride ratio	Specific conductance (micro-mhos at 25 C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium magnesium	Non-carbonate			
Oct. 1-10, 1952.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5,450	--
Oct. 11-20 .....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6,340	--
Oct. 21-31 .....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6,660	--
Nov. 1-10 .....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6,450	--
Nov. 11-20 .....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6,090	--
Nov. 21-30 .....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5,860	--
Dec. 1-10 .....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5,660	--
Dec. 11-20 .....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5,530	--
Dec. 21-31 .....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5,470	--
Jan. 1-10, 1953 .....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5,460	--
Jan. 11-17 .....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5,450	--
Jan. 18-20 .....	119	14	652	155	515	515	132	0	1,980	860	--	--	3.2	--	4,240	5.77	1,360	2,280	2,160	33	4.7	7.8
Jan. 21-28 .....	170	14	644	162	592	592	133	0	2,000	970	--	--	2.3	--	4,450	6.05	2,040	2,270	2,160	36	5.4	7.8
Jan. 29-31 .....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6,120	--
Feb. 1-10 .....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6,440	--
Feb. 11-20 .....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6,730	--
Feb. 21-28 .....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6,950	--
Mar. 1-10 .....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6,980	--
Mar. 11-20 .....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6,980	--
Mar. 21-27 .....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7,100	--
Mar. 28-Apr. 5 .....	267	10	684	211	826	826	136	0	2,220	1,380	--	--	1.9	--	5,400	7.34	3,890	2,570	2,460	41	7.1	7.7
Apr. 6-10 .....	434	12	620	133	362	362	133	0	1,870	585	--	--	1.5	--	3,650	4.96	4,280	2,090	1,980	27	3.4	7.5
Apr. 11-20 .....	338	12	630	123	258	258	131	0	1,840	440	--	--	1.2	--	3,370	4.58	3,080	2,080	1,980	21	2.5	7.6
Apr. 21-30 .....	109	16	636	149	418	418	132	0	1,920	710	--	--	1.7	--	3,920	5.33	1,150	2,200	2,090	29	3.9	7.7

May 1-4, 1953	51.0	16	604	149	492	--	138	0	1,910	775	0.7	4,010	5.45	552	2,120	2,010	34	4.6	5,080	7.6
May 5-10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5,890	--
May 11-20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7,310	--
May 21-31	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6,880	--
June 1-10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5,040	--
June 11-20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6,440	--
June 21-30	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6,940	--
July 1-10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7,380	--
July 11-13	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7,610	--
July 14-18	238	10	270	69	259	90	814	422	1,890	2,577	3.7	1,890	2,577	1,210	957	884	37	3.6	2,770	7.1
July 19-24	385	13	125	28	77	109	312	126	1,900	1,000	1.9	1,900	1,000	1,286	427	338	28	1.9	1,130	7.1
July 25	326	15	254	59	126	125	649	282	1,430	1,940	3.2	1,430	1,940	1,280	876	774	24	1.9	2,140	7.9
July 26-31	306	14	518	96	343	105	1,530	534	3,080	4,200	1.3	3,080	4,200	2,550	1,680	1,600	31	3.6	4,000	7.6
Aug. 1-10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5,320	--
Aug. 11-14	285	19	632	145	515	114	1,940	835	4,140	5,630	1.5	4,140	5,630	2,960	2,170	2,080	34	4.8	5,360	7.5
Aug. 15-22	342	17	540	88	200	108	1,540	320	2,760	3,715	1.5	2,760	3,715	2,550	1,710	1,620	20	2.1	3,400	7.8
Aug. 23-26	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3,640	--
Aug. 27-31	328	14	432	78	267	98	1,260	414	2,520	3,430	2.3	2,520	3,430	2,230	1,400	1,320	29	3.1	3,310	7.9
Sept. 1-10	291	15	376	57	135	103	1,050	204	1,890	2,577	2.4	1,890	2,577	1,480	1,170	1,080	20	1.7	2,380	7.8
Sept. 11-16	210	22	468	89	258	104	1,380	406	2,680	3,640	1.3	2,680	3,640	1,520	1,530	1,450	27	2.9	3,320	7.8
Sept. 17-20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3,820	--
Sept. 21-31	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4,420	--
Weighted average <sup>a</sup>	281	14	506	108	329	117	1,510	537	3,080	4,160	1.8	3,080	4,160	2,160	1,710	1,610	30	3.5	3,920	--

<sup>a</sup> Average for 100 days of flow.

## RIO GRANDE BASIN--Continued

## PECOS RIVER AT CARLSBAD, N. MEX.

LOCATION --At gaging station at Green Street Bridge in Carlsbad, Eddy County, half a mile upstream from Dark Canyon.

DRAINAGE AREA --18,100 square miles, approximately, (contributing area).

RECORDS AVAILABLE --Chemical analyses: May 1937 to September 1946, July 1951 to September 1953.

Water temperatures: July 1951 to September 1953

EXTREMES 1952-53 --Dissolved solids: Maximum, 2,630 ppm Apr. 21 - May 10; minimum, 2,160 ppm Nov. 21-30.

Hardness: Maximum, 1,620 ppm May 1-10; minimum, 1,220 ppm Dec. 1-10.

Specific conductance: Maximum observed, 3,750 micromhos May 5; minimum observed, 2,900 micromhos Nov. 24.

Water temperatures: Maximum observed, 92°F July 21; minimum observed, 51°F Nov. 28, Jan. 6.

EXTREMES 1957-46, 1951-53 --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 observed, 5,870 micromhos Apr. 25, 1942; minimum observed, 649 micromhos May 22, 1941.

Water temperatures 1951-53: Maximum observed, 92°F July 21, 1953; minimum observed, 51°F Nov. 28, 1952, Jan. 6, 1953.

REMARKS --Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Values reported for dissolved solids are sums of determined constituents. Records of discharge for water year October 1952 to September 1953 given in WSP 1282.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boron (B)	Dissolved solids		Hardness as CaCO <sub>3</sub>		Percent sodium	Specific conductance (micro-mhos at 25°C)	pH
														Parts per million	Tons per acre-foot	Calcium, magnesium	Non-carbonate			
Oct. 1-10, 1952	50.7	19		360	110	274	213	213	1,110	435		3.4		2,420	3.29	1,350	1,180	31	3,260	7.5
Oct. 11-20	47.2	18		352	110	262	218	218	1,080	420		5.1		2,350	3.20	1,330	1,150	30	3,170	7.5
Oct. 21-31	45.8	16		356	110	260	218	218	1,080	425		3.5		2,360	3.21	1,340	1,160	30	3,200	7.5
Nov. 1-10	42.8	17		336	105	257	222	222	1,030	405		4.2		2,260	3.07	1,270	1,090	31	3,070	7.5
Nov. 11-20	39.4	17		332	102	259	214	214	1,020	405		4.4		2,240	3.05	1,250	1,070	31	3,040	7.6
Nov. 21-30	41.4	20		324	103	235	202	202	965	390		2.6		2,160	2.94	1,230	1,070	29	2,990	7.9
Dec. 1-10	34.7	17		328	97	254	230	230	984	392		3.5		2,190	2.98	1,220	1,030	31	3,030	7.9
Dec. 11-20	30.4	18		321	102	230	232	232	994	392		2.7		2,200	2.96	1,240	1,050	30	3,010	7.7
Dec. 21-31, 1953	42.8	18		332	102	256	219	219	1,000	398		3.0		2,210	3.01	1,250	1,130	29	3,060	7.7
Jan. 1-10	43.3	16		345	103	243	206	206	1,030	420		3.9		2,270	3.09	1,310	1,140	29	3,150	7.5
Jan. 11-20	43.3	16		342	103	243	206	206	1,030	420		3.9		2,270	3.09	1,310	1,140	29	3,150	7.5
Jan. 21-31	39.4	18		370	108	252	208	208	1,090	430		3.9		2,370	3.22	1,370	1,200	29	3,260	7.5
Feb. 1-10	41.2	17		378	105	256	212	212	1,090	440		3.1		2,390	3.25	1,370	1,200	29	3,280	7.5
Feb. 11-20	37.3	19		374	108	272	210	210	1,130	438		3.5		2,450	3.33	1,380	1,200	30	3,300	7.7
Feb. 21-28	40.0	18		374	108	266	213	213	1,120	434		4.2		2,430	3.30	1,380	1,200	30	3,300	7.8
Mar. 1-10	40.8	18		374	108	274	205	205	1,130	444		3.7		2,450	3.33	1,380	1,210	30	3,320	7.8
Mar. 11-20	39.8	18		380	114	260	204	204	1,140	444		3.4		2,460	3.35	1,420	1,250	29	3,330	7.8
Mar. 21-31	40.1	19		380	107	264	199	199	1,150	424		3.6		2,450	3.33	1,390	1,220	29	3,330	7.5

Apr. 1-10, 1953	38.9	19	392	121	259	206	1,170	460	3.6	2,530	3.44	266	1,480	1,310	28	2.9	3,420	7.7
Apr. 11-20	41.2	18	404	116	270	199	1,200	466	3.3	2,580	3.51	287	1,480	1,320	28	3.0	3,450	7.7
Apr. 21-30	49.7	18	416	119	271	183	1,240	472	2.9	2,630	3.58	353	1,530	1,370	28	3.0	3,510	7.6
May 1-10	36.9	17	440	128	232	194	1,230	488	2.5	2,630	3.58	262	1,620	1,470	24	2.5	3,560	7.7
May 11-20	36.5	18	424	121	232	183	1,190	468	2.8	2,550	3.47	251	1,560	1,400	24	2.6	3,450	7.8
May 21-31	32.9	19	364	121	292	188	1,170	466	2.9	2,530	3.44	225	1,410	1,240	31	3.4	3,410	7.4
June 1-10	32.7	16	348	111	267	186	1,080	440	2.0	2,360	3.21	208	1,320	1,160	31	3.2	3,270	7.5
June 11-20	28.7	18	374	114	249	196	1,100	450	2.5	2,400	3.26	186	1,400	1,240	28	2.9	3,340	7.5
June 21-30	26.9	22	384	119	258	174	1,170	458	2.8	2,500	3.40	182	1,450	1,300	28	2.9	3,360	7.6
July 1-10	21.6	22	372	118	276	169	1,170	465	2.9	2,510	3.41	146	1,410	1,270	30	3.2	3,370	7.6
July 11-20	26.1	21	372	115	269	183	1,140	458	2.9	2,470	3.36	174	1,400	1,250	29	3.1	3,350	7.7
July 21-31	29.2	21	372	111	254	190	1,110	442	2.8	2,410	3.28	190	1,380	1,230	29	3.0	3,260	7.7
Aug. 1-10	27.4	23	364	119	259	167	1,140	450	1.6	2,440	3.32	181	1,400	1,260	29	3.0	3,310	7.7
Aug. 11-20	28.9	23	362	113	264	147	1,140	450	1.5	2,430	3.30	190	1,370	1,250	30	3.1	3,280	7.7
Aug. 21-31	32.5	23	376	112	280	172	1,180	450	3.2	2,510	3.41	220	1,400	1,260	30	3.3	3,350	7.7
Sept. 1-10	43.3	21	378	104	233	177	1,110	406	3.8	2,340	3.18	274	1,370	1,230	27	2.7	2,160	7.7
Sept. 11-20	40.4	19	376	108	247	183	1,130	418	3.2	2,390	3.25	261	1,380	1,230	28	2.9	3,300	7.6
Sept. 21-30	32.3	19	376	113	279	192	1,170	448	2.8	2,500	3.40	218	1,400	1,240	30	3.2	3,300	7.5
Weighted average..	37.3	19	368	110	258	200	1,110	434	3.3	2,400	3.26	242	1,370	1,210	29	3.0	3,260	--

## RIO GRANDE BASIN--Continued

## PECOS RIVER AT CARLSBAD, N. MEX.--Continued

Temperature (°F) of water, water year October 1952 to September 1953  
 [Once-daily temperature measurement, generally between 4 p. m. and 8 p. m.]

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	76	70	59	--	b61	--	73	70	82	89	83	84
2	76	b72	58	55	60	64	--	71	82	89	--	81
3	74	65	55	54	68	62	73	67	80	88	--	80
4	--	65	--	55	63	62	75	70	79	87	--	78
5	79	68	55	56	63	64	68	73	81	80	--	81
6	70	68	56	51	64	64	70	75	82	88	--	81
7	70	b69	58	56	62	63	73	76	74	84	--	87
8	--	66	57	59	62	63	71	78	80	80	85	84
9	71	63	58	59	63	66	70	73	83	89	--	84
10	71	62	54	60	61	65	71	74	84	85	--	--
11	73	63	58	58	59	65	75	76	82	85	--	84
12	73	64	58	59	62	71	67	74	84	84	86	83
13	71	64	56	60	56	67	71	73	84	86	85	80
14	70	65	--	59	60	68	75	70	86	84	86	84
15	70	65	55	55	58	68	72	69	84	85	84	82
16	74	65	58	60	--	69	75	75	a84	85	84	82
17	--	62	58	58	60	71	75	77	85	--	83	80
18	70	61	54	59	60	70	69	76	84	83	84	--
19	72	61	58	60	--	71	70	--	--	88	82	84
20	a65	60	60	58	60	69	74	77	80	90	80	--
21	a65	b66	57	63	57	68	75	74	85	92	80	80
22	68	60	58	58	55	71	73	85	84	85	--	81
23	78	--	61	58	55	74	69	83	85	86	81	82
24	68	54	56	59	56	74	75	79	83	85	81	84
25	70	52	--	61	60	76	75	80	84	88	83	82
26	69	53	57	62	60	74	75	81	85	86	82	83
27	71	52	54	65	61	74	78	81	85	85	84	81
28	68	51	54	60	62	71	74	--	85	83	86	80
29	69	57	53	62	--	70	70	81	87	85	85	79
30	68	b57	54	63	--	70	73	82	86	85	--	78
31	75	--	54	58	--	71	--	80	--	85	83	--
Average	71	62	57	59	60	68	73	76	83	86	--	82

a Temperature reading obtained between 7 a. m. and 11 a. m.

b Temperature reading obtained between 1 p. m. and 3 p. m.

## RIO GRANDE BASIN--Continued

## REFINERY INTAKE CANAL NEAR LOVING, N. MEX.

(Weekly samples taken from canal in sec. 13, T. 23 S., R. 28 E., representing water in Harroun Canal diverted from Pecos River at dam in sec. 11, T. 23 S., R. 28 E.,)

Date of Collection	Specific Conductance (micromhos at 25° C)	Chloride (Cl) ppm
Oct. 2, 1952 .....	4,380	670
Oct. 9 .....	4,380	680
Oct. 16 .....	4,310	660
Oct. 23 .....	4,320	650
Oct. 30 .....	4,310	660
Nov. 6 .....	4,280	640
Nov. 13 .....	4,230	640
Nov. 20 .....	4,200	640
Nov. 27 .....	4,200	640
Dec. 4 .....	4,150	630
Dec. 11 .....	4,170	630
Dec. 18 .....	4,170	620
Jan. 1, 1953 .....	4,100	600
Jan. 8 .....	4,160	620
Jan. 15 .....	4,090	620
Jan. 22 .....	3,990	590
Jan. 30 .....	4,020	600
Feb. 5 .....	4,220	640
Feb. 12 .....	4,220	620
Feb. 19 .....	4,210	630
Feb. 26 .....	4,160	610
Mar. 5 .....	4,150	610
Mar. 12 .....	4,140	630
Mar. 19 .....	4,080	625
Mar. 26 .....	4,150	635
Apr. 2 .....	4,180	630
Apr. 9 .....	4,180	635
Apr. 16 .....	4,250	640
Apr. 23 .....	4,290	650
Apr. 30 .....	4,390	670
May 7 .....	4,340	660
May 14 .....	4,380	655
May 21 .....	4,470	670
May 28 .....	4,380	660
June 4 .....	4,290	650
June 11 .....	4,320	660
June 18 .....	4,410	680
June 25 .....	4,410	680
July 2 .....	4,520	710
July 9 .....	4,530	705
July 16 .....	3,880	580
July 23 .....	3,610	520
July 30 .....	3,500	510
Aug. 6 .....	4,010	600
Aug. 13 .....	4,270	655
Aug. 20 .....	4,230	660
Aug. 27 .....	4,390	690
Sept. 3 .....	4,260	655
Sept. 10 .....	4,080	600
Sept. 17 .....	4,100	605
Sept. 24 .....	4,140	615

## RIO GRANDE BASIN--Continued

## PECOS RIVER EAST OF MALAGA, N. MEX.

LOCATION--One and one-half miles upstream from gaging station near Malaga, which is 3 miles southeast of Malaga, Eddy County, and 3 miles downstream from Black River.

DRAINAGE AREA--19,190 square miles, approximately, (contributing area above gaging station).

RECORDS AVAILABLE--Chemical analyses: July 1937 to September 1953.

EXTREMES 1952-53--Dissolved solids: Maximum 7,270 ppm Aug. 21-31; minimum, 3,760 ppm Jan. 21-31.

Hardness: Maximum 2,740 ppm Aug. 21-31; minimum, 1,850 ppm Jan. 21-31.

Specific conductance: Maximum observed, 10,500 micromhos Aug. 23; minimum observed, 4,290 micromhos June 12.

EXTREMES 1937-53--Dissolved solids: Maximum 7,270 ppm Aug. 21-31, 1953; minimum, 384 ppm Sept. 21-22, 1941.

Hardness: Maximum, 2,740 ppm Aug. 21-31, 1953; minimum, 254 ppm Sept. 21-22, 1941.

Specific conductance: Maximum observed, 10,500 micromhos Aug. 23, 1953; minimum observed, 450 micromhos Sept. 21, 1941.

REMARKS--Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Values reported for dissolved solids are sums of determined constituents. Records of discharge for gaging station near Malaga for water year October 1952 to September 1953 given in WSP 1282. No appreciable inflow between sampling point and gaging station.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Mag- ne- sium (Mg)	Sodium (Na)	Potas- sium (K)	Bicar- bonate (HCO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chlo- ride (Cl)	Fluo- ride (F)	Ni- trate (NO <sub>3</sub> )	Bo- ron (B)	Dissolved solids (sum)			Hardness as CaCO <sub>3</sub>		Per- cent so- dium ad- sorpti- on ratio	Specific conductance (micro-mhos at 25°C)	pH	
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
Oct. 1-10, 1952	54.9	21	534	198	747	171	1,830	1,220	1,830	1,220	5.3	5.3	4,640	6.31	688	2,150	2,010	43	7.0	6,370	7.9	7.9
Oct. 11-20	70.8	18	506	187	627	165	1,690	1,060	1,690	1,060	6.6	6.6	4,180	5.68	799	2,030	1,900	40	6.0	5,780	7.9	7.9
Oct. 21-31	64.9	19	510	184	636	182	1,680	1,070	1,680	1,070	5.9	5.9	4,190	5.70	734	2,050	1,860	41	6.1	5,780	7.9	7.9
Nov. 1-10	53.8	17	512	188	678	179	1,710	1,130	1,710	1,130	6.3	6.3	4,330	5.69	629	2,060	1,900	42	6.5	6,020	7.8	7.8
Nov. 11-20	53.4	17	512	186	685	183	1,700	1,140	1,700	1,140	6.3	6.3	4,340	5.90	626	2,040	1,890	42	6.6	6,000	7.7	7.7
Nov. 21-30	54.1	20	506	185	677	201	1,690	1,110	1,690	1,110	7.5	7.5	4,290	5.83	627	2,020	1,860	42	6.5	5,930	7.8	7.8
Dec. 1-10	53.3	23	498	185	676	197	1,670	1,110	1,670	1,110	8.0	8.0	4,270	5.81	614	2,000	1,840	42	6.6	5,890	7.7	7.7
Dec. 11-20	77.4	20	496	183	653	210	1,640	1,080	1,640	1,080	8.6	8.6	4,160	5.68	648	1,980	1,820	42	6.4	5,810	7.7	7.7
Dec. 21-31	71.6	18	484	177	584	215	1,570	985	1,570	985	8.3	8.3	3,930	5.84	760	1,940	1,760	40	5.8	5,460	7.7	7.7
Jan. 1-10, 1953	67.0	16	478	170	582	211	1,560	960	1,560	960	7.9	7.9	3,860	5.29	702	1,890	1,720	40	5.8	5,420	7.7	7.7
Jan. 11-20	66.4	15	484	172	574	204	1,580	955	1,580	955	6.5	6.5	3,890	5.29	697	1,910	1,750	40	5.7	5,380	7.8	7.8
Jan. 21-31	66.3	12	468	166	557	167	1,540	935	1,540	935	3.9	3.9	3,760	5.11	673	1,850	1,710	40	5.6	5,240	7.7	7.7
Feb. 1-10	61.1	13	482	175	581	192	1,590	970	1,590	970	4.2	4.2	3,910	5.32	645	1,920	1,760	40	5.8	5,400	7.7	7.7
Feb. 11-20	60.2	15	488	176	565	173	1,600	960	1,600	960	4.7	4.7	3,900	5.30	634	1,940	1,800	39	5.6	5,400	7.8	7.8
Feb. 21-28	67.4	15	498	170	529	173	1,610	900	1,610	900	4.8	4.8	3,810	5.18	693	1,940	1,800	37	5.2	5,200	7.7	7.7
Mar. 1-10	34.0	16	490	167	624	177	1,600	1,030	1,600	1,030	6.2	6.2	4,420	6.42	369	2,120	1,990	43	7.0	6,320	7.7	7.7
Mar. 11-20	36.8	16	528	196	744	167	1,790	1,290	1,790	1,290	6.4	6.4	4,590	6.24	325	2,150	2,010	44	7.3	6,500	7.5	7.5
Mar. 21-31	25.5	15	534	198	782	169	1,810	1,290	1,810	1,290	6.4	6.4	4,720	6.42	325	2,150	2,010	44	7.3	6,500	7.5	7.5

Apr. 1-10, 1953	12.8	17	592	207	1,030	180	1,970	1,680	6.3	5,590	7.60	193	2,330	2,180	49	9.3	7,780	7.6
Apr. 11-20	17.1	17	608	225	1,060	183	2,050	1,750	5.4	5,810	7.90	268	2,440	2,290	49	9.4	8,000	7.6
Apr. 21-30	24.4	16	626	226	1,050	181	2,130	1,700	4.2	5,840	7.94	385	2,490	2,340	48	9.1	7,950	7.5
May 1-10	44.5	--	566	207	724	171	1,910	1,210	3.9	4,700	6.39	565	2,260	2,120	41	6.6	6,500	7.3
May 11-20	46.1	--	522	187	652	160	1,760	1,080	2.4	4,280	5.82	533	2,070	1,940	41	6.2	5,870	7.5
May 21-30	18.5	--	550	198	842	166	1,870	1,370	2.4	4,910	6.68	245	2,190	2,050	46	7.8	6,860	7.5
May 31, June 1-10	26.4	20	500	184	839	162	1,690	1,370	4.6	4,690	6.38	334	2,000	1,870	48	8.1	6,640	7.6
June 11-20	18.7	24	526	180	908	178	1,760	1,450	5.0	4,940	6.72	249	2,050	1,910	49	8.7	6,950	7.6
June 21-30	12.4	28	620	232	1,260	164	2,120	2,060	3.6	6,400	8.70	214	2,500	2,370	52	11	9,000	7.4
July 1-10	11.5	29	656	245	1,280	152	2,250	2,090	3.8	6,630	9.02	206	2,640	2,520	51	11	9,190	7.5
July 11-20	14.1	25	646	227	1,200	156	2,190	1,940	3.2	6,310	8.58	240	2,550	2,420	51	10	8,710	7.5
July 21-31	11.2	31	636	239	1,310	153	2,180	2,140	--	6,610	8.99	200	2,570	2,440	53	11	9,390	7.4
Aug. 1-10	11.5	31	662	252	1,410	152	2,270	2,310	--	7,010	9.53	218	2,690	2,560	53	12	9,770	7.5
Aug. 11-20	11.7	29	668	250	1,430	160	2,270	2,350	--	7,080	9.63	224	2,690	2,560	54	12	9,910	7.5
Aug. 21-31	11.7	30	687	250	1,480	167	2,320	2,420	--	7,270	9.89	220	2,740	2,600	54	12	10,200	7.5
Sept. 1-10	12.0	29	670	243	1,450	178	2,270	2,350	--	7,100	9.66	233	2,670	2,520	54	12	9,910	7.5
Sept. 11-20	14.1	30	674	253	1,360	183	2,270	2,240	--	6,920	9.41	263	2,720	2,570	52	11	9,660	7.4
Sept. 21-30	14.7	29	658	246	1,310	180	2,220	2,160	--	6,710	9.13	266	2,650	2,510	52	11	9,500	7.4
Weighted average	37.4	18	510	189	727	195	1,730	1,200	5.8	4,480	6.09	452	2,050	1,890	44	7.0	6,230	--

## RIO GRANDE BASIN--Continued

## PECOS RIVER AT PIERCE CANYON CROSSING, NEAR MALAGA, N. MEX.

LOCATION --At Pierce Canyon Crossing, one quarter mile downstream from gaging station which is 6 miles southeast of Malaga, Eddy County. DRAINAGE AREA --19,260 square miles, approximately (contributing area above gaging station).

RECORDS AVAILABLE --Chemical analyses: March 1933 to September 1941, October 1951 to September 1953.

Water temperatures: October 1952 to September 1953.

EXTRMS: 1952-53 --Dissolved solids: Maximum, 19,600 ppm Sept. 1-10; minimum, 5,720 ppm Jan. 21-31.

Hardness: Maximum, 3,400 ppm Sept. 1-10; minimum, 1,530 ppm June 2-5.

Specific conductance: Maximum observed, 29,700 microhm/cm Sept. 5; minimum observed, 7,460 microhm/cm Mar. 3.

Water temperatures: Maximum observed, 90°F Aug. 3; minimum observed, 41°F Dec. 26.

EXTRMS: 1938-41, 1951-53 --Dissolved solids: Maximum, 19,600 ppm Sept. 1-10, 1953; minimum, 280 ppm Sept. 21, 1941.

Hardness: Maximum, 3,400 ppm Sept. 1-10, 1953; minimum, 202 ppm Sept. 21, 1941.

Specific conductance: Maximum observed, 29,700 microhm/cm Sept. 5, 1953; minimum observed, 433 microhm/cm Sept. 21, 1941.

REMARKS --Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Values reported for dissolved solids are sums of determined constituents. Records of discharge for water year October 1952 to September 1953 given in WSP 1282. 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 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl) <sub>5</sub>	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Boron (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>	Percent sodium chloride	Specific conductance (microhm-cm at 25°C)	pH		
															Parts per million	Tons per acre-foot	Tons per day						
Oct. 1-10, 1952	82.7	22	540	516	232	1,760	1,460	177	0	1,970	2,790				7,400	10.1	1,250	2,300	2,160	62	11,000	7.3	
Oct. 11-20	73.6	19	516	516	219	1,460	1,460	177	0	1,860	2,330				6,490	8.83	1,290	2,190	2,040	59	14	9,560	7.3
Oct. 21-31	70.8	17	510	510	212	1,420	1,420	181	0	1,800	2,260				6,330	8.61	1,210	2,140	2,000	59	13	9,350	7.3
Nov. 1-10	68.2	17	507	507	215	1,380	1,380	196	0	1,820	2,520				6,760	9.19	1,240	2,150	1,980	62	15	10,100	7.4
Nov. 11-20	64.7	17	504	504	217	1,580	1,580	189	0	1,830	2,500				6,740	9.17	1,180	2,150	2,000	62	15	9,970	7.4
Nov. 21-30	60.2	17	510	510	217	1,600	1,600	198	0	1,810	2,550				6,800	9.25	1,110	2,160	2,000	62	15	10,100	7.4
Dec. 1-10	82.2	15	502	498	210	1,550	1,550	185	0	1,780	2,460				6,610	8.98	1,110	2,120	1,960	61	15	9,800	7.4
Dec. 11-20	64.5	20	496	496	206	1,450	1,450	209	0	1,740	2,300				6,320	8.60	1,100	2,060	1,910	60	14	9,380	7.7
Dec. 21-31	69.7	21	498	498	199	1,330	1,330	209	0	1,700	2,130				5,980	8.13	1,130	2,060	1,890	58	13	8,980	7.7
Jan. 1-10, 1953	61.8	14	484	484	196	1,340	1,340	213	0	1,680	2,130				5,950	8.09	1,110	2,010	1,840	59	13	8,830	7.6
Jan. 11-20	71.3	12	488	488	197	1,330	1,330	192	0	1,690	2,130				5,940	8.08	1,140	2,030	1,870	59	13	8,880	7.7
Jan. 21-31	66.6	14	480	480	186	1,270	1,270	173	0	1,670	2,010				5,720	7.78	1,060	1,960	1,820	58	12	8,450	7.7
Feb. 1-10	83.0	14	490	490	199	1,400	1,400	175	0	1,710	2,240				6,140	8.35	1,040	2,040	1,900	60	13	9,130	7.6
Feb. 11-20	63.0	12	492	492	195	1,340	1,340	163	0	1,730	2,130				5,980	8.13	1,020	2,030	1,900	59	13	8,950	7.5
Feb. 21-28	72.6	13	500	500	192	1,250	1,250	173	0	1,740	1,980	0.6			5,770	7.85	1,130	2,040	1,900	57	12	8,550	7.6
Mar. 1-10	56.4	13	468	468	180	1,360	1,360	166	0	1,640	2,140				5,880	8.00	895	1,910	1,770	61	14	8,810	7.5
Mar. 11-20	48.6	13	508	508	206	1,590	1,590	160	0	1,820	2,510				6,730	9.15	883	2,110	1,980	62	15	9,940	7.5
Mar. 21-31	32.5	14	542	542	236	2,020	2,020	166	0	1,990	3,190				8,070	11.0	708	2,320	2,190	65	18	12,300	7.4
Apr. 1-10	19.0	12	557	557	255	2,890	2,890	161	0	2,120	4,530				10,400	14.1	533	2,440	2,310	72	25	15,900	7.4
Apr. 11-20	17.1	13	615	615	298	3,950	3,950	165	0	2,440	6,150				13,500	18.4	623	2,760	2,620	76	33	20,400	7.5
Apr. 21-30	27.6	13	622	622	282	3,270	3,270	170	0	2,380	5,120				11,900	16.0	879	2,710	2,570	72	27	17,500	7.6

May 1-10, 1955	47.2	17	527	296	1,990	171	0	2,240	3,290				8,540	11.6	1,090	2,780	2,640	61	17	12,500	7.5
May 11-20	49.6	15	568	235	1,840	162	0	2,000	3,020				7,780	10.6	1,040	2,470	2,330	92	16	11,600	7.5
May 21-31	26.8	15	577	283	3,270	133	0	2,170	3,220				11,600	15.8	639	2,640	2,320	73	28	17,300	7.5
June 1	114	13	508	233	2,370	144	0	1,810	3,810				8,820	12.0	2,710	2,230	2,110	70	22	13,300	7.5
June 2-5	27.0	12	386	142	1,530	118	0	1,290	2,430				5,820	7.93	435	1,530	1,440	68	17	19,050	7.4
June 6-10	19.0	14	657	246	2,850	149	0	1,740	4,900				10,500	14.1	581	2,650	2,530	70	24	15,900	7.5
June 11-20	22.9	26	620	272	3,020	159	0	2,180	4,870				11,100	15.1	686	2,690	2,580	71	25	16,800	7.4
June 21-30	14.1	29	614	329	4,950	158	0	2,480	7,780				16,200	22.0	617	2,880	2,780	79	40	23,800	7.4
July 1-10	12.7	31	703	372	5,390	141	0	2,840	8,480				17,900	24.3	614	3,280	3,170	78	41	26,000	7.6
July 11-20	19.3	25	688	365	5,190	135	0	2,780	8,150				17,300	23.5	901	3,230	3,110	78	40	24,900	7.8
July 21-31	13.1	24	664	338	4,680	135	0	2,590	7,400				15,800	21.5	559	3,050	2,940	77	37	23,100	7.7
Aug. 1-10	9.9	34	711	377	6,010	142	0	2,850	9,440				19,500	26.5	521	3,320	3,210	80	45	28,100	7.5
Aug. 11-20	11.8	30	712	385	5,810	129	0	2,870	9,150				19,000	25.8	605	3,350	3,250	79	44	27,500	--
Aug. 21-31	12.7	32	673	376	5,620	131	0	2,810	8,800				18,400	25.0	631	3,220	3,120	79	43	26,600	7.8
Sept. 1-10	13.8	30	717	392	6,030	150	0	2,950	9,450				19,600	26.7	730	3,400	3,280	79	45	28,300	7.9
Sept. 11-20	20.8	26	697	354	5,140	163	0	2,760	8,060				17,100	23.3	931	3,190	3,060	78	40	24,900	7.7
Sept. 21-30	21.2	27	704	338	4,320	161	0	2,630	6,850				14,900	20.3	853	3,150	3,010	75	33	21,700	7.6
Weighted average	42.4	17	533	231	2,010	177	0	1,920	3,190				7,990	10.9	915	2,280	2,140	66	18	11,800	--

## RIO GRANDE BASIN--Continued

## PECOS RIVER AT PIERCE CANYON CROSSING, NEAR MALAGA, N. MEX.--Continued

Temperature (°F) of water, water year October 1952 to September 1953  
/Once-daily temperature measurement, generally before 12 m./

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

a Temperature reading obtained between 12 m. and 4 p. m.

b Temperature reading obtained after 4 p. m.

## RIO GRANDE BASIN--Continued

## PECOS RIVER NEAR RED BLUFF, N. MEX.

LOCATION.--At pipeline bridge, 2½ miles downstream from gaging station at Red Bluff, Eddy County, which is 0.2 mile downstream from Red Bluff Creek, and 5.5 miles upstream from Delaware River.

DRAINAGE AREA.--19,540 square miles, approximately, (contributing area above gaging station).

RECORDS AVAILABLE.--Chemical analyses: July 1937 to September 1953.

Water temperatures: October 1952 to September 1953.

EXTREMES, 1952-53.--Dissolved solids: Maximum, 22,800 ppm Sept. 1-20; minimum, 4,810 ppm June 1.

Hardness: Maximum, 3,860 ppm Sept. 1-10; minimum, 1,830 ppm June 1.

Specific conductance: Maximum observed, 33,200 microhos Sept. 18; minimum observed, 6,910 microhos June 1.

Water temperatures: Maximum observed, 90°F Aug. 3; minimum observed, 43°F Nov. 28, Dec. 25.

EXTREMES, 1957-58.--Dissolved solids: Maximum, 22,800 ppm Sept. 1-20, 1953; minimum, 436 ppm June 3, 1948.

Hardness: Maximum, 3,860 ppm Sept. 1-10, 1953; minimum, 236 ppm June 3, 1948.

Specific conductance: Maximum observed, 33,200 microhos Sept. 18, 1953; minimum observed, 268 microhos Sept. 19, 1946.

REMARKS: Correction: Dissolved solids for period Dec. 21-31, 1946, p. 534, NSR 1102, should read 4,940 instead of 4,490 m. Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Values reported for dissolved solids are sums of determined constituents. Records of discharge for gaging station at Red Bluff for water year October 1952 to September 1953 given in NSP 1282. 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 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carb. bicarbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Boiron (B)	Dissolved solids (sum)			Hardness as CaCO <sub>3</sub>		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium-magnesium	Non-carbonate			
Oct. 1-10, 1952	57.6	19	562	251	1,870	133	0	2,070	3,010	7,850	10.7	1,220	2,430	2,320	63	17	11,500	7.6				
Oct. 11-20	68.1	16	540	230	1,510	143	0	1,900	2,470	6,740	9.17	1,240	2,290	2,180	59	14	10,500	7.6				
Oct. 21-31	67.5	13	512	216	1,460	144	0	1,810	2,360	6,440	8.76	1,170	2,170	2,050	59	14	9,570	7.7				
Nov. 1-10	65.7	13	503	210	1,610	155	0	1,810	2,370	6,800	9.25	1,210	2,140	2,020	62	15	10,200	7.7				
Nov. 11-20	62.8	12	514	221	1,600	155	0	1,830	2,600	6,830	9.29	1,160	2,190	2,060	61	15	10,200	7.8				
Nov. 21-30	60.5	15	510	221	1,690	170	0	1,850	2,680	7,060	9.60	1,150	2,180	2,040	63	16	10,800	7.6				
Dec. 1-10	62.9	13	506	218	1,620	174	0	1,820	2,590	6,850	9.32	1,160	2,160	2,020	62	15	10,300	7.8				
Dec. 11-20	66.2	14	494	211	1,540	181	0	1,780	2,450	6,580	8.95	1,180	2,100	1,950	62	15	9,860	7.9				
Dec. 21-31	74.4	12	482	208	1,440	184	0	1,740	2,300	6,280	8.54	1,260	2,080	1,850	60	14	9,380	7.9				
Jan. 1-10, 1953	71.1	13	488	198	1,370	193	0	1,690	2,200	6,050	8.23	1,160	2,030	1,870	60	13	9,080	7.7				
Jan. 11-20	70.7	13	486	200	1,420	173	0	1,730	2,250	6,180	8.40	1,180	2,040	1,890	60	14	9,190	7.7				
Jan. 21-31	71.5	7.8	478	198	1,350	160	0	1,710	2,120	5,920	8.05	1,140	2,010	1,880	59	13	8,880	7.7				
Feb. 1-10	62.0	9.9	482	199	1,450	150	0	1,730	2,310	6,250	8.50	1,050	2,020	1,900	61	14	9,380	7.8				
Feb. 11-20	63.6	8.6	490	201	1,420	142	0	1,760	2,260	6,210	8.45	1,070	2,050	1,930	60	14	9,230	7.8				
Feb. 21-28	70.8	8.9	500	204	1,400	155	0	1,780	2,230	6,200	8.43	1,190	2,080	1,960	59	13	9,160	7.8				
Mar. 1-10	54.2	6.5	484	192	1,280	146	0	1,720	2,040	5,790	7.87	847	2,000	1,880	58	12	8,580	7.8				
Mar. 11-20	49.8	6.2	480	206	1,650	150	0	1,770	2,620	6,820	9.28	917	2,070	1,950	63	16	10,200	7.7				
Mar. 21-31	33.6	7.4	548	239	2,020	148	0	2,040	3,180	8,110	11.0	736	2,350	2,230	65	18	12,200	7.5				
Apr. 1-10	19.7	7.9	574	256	2,420	139	0	2,150	3,880	9,310	13.7	495	2,480	2,370	68	21	13,700	7.4				
Apr. 11-20	15.3	7.4	608	291	3,430	122	0	2,390	5,370	12,200	16.6	504	2,710	2,610	73	29	18,100	7.4				
Apr. 21-30	22.4	9.8	652	331	4,260	127	0	2,610	6,690	14,600	19.9	883	2,990	2,880	76	34	22,000	7.5				

RIO GRANDE BASIN--Continued  
PECOS RIVER NEAR RED BLUFF, N. MEX.--Continued

Chemical analyses, in parts per million, water year October 1952 to September 1953--Continued

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal-cium (Ca)	Mag-ne-sium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Car-bonate (CO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> )	Bo-ron (B)	Dissolved solids (sum)			Hardness as CaCO <sub>3</sub>		Per-cent so-lidum	So-dium ad-sorp-tion ratio	Specific conductance (micro-mhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium	Non-carbonate				
May 1-10, 1953	40.6	9.7		675	255	3,060		139	0	2,530	4,830				11,800	15.6	1,280	2,900	2,780	70	25	16,600	7.6
May 11-20	45.1	9.3		597	250	2,050		129	0	2,180	3,260				8,410	11.4	1,020	2,520	2,410	64	18	12,300	7.6
May 21-31	20.9	11		602	254	2,410		125	0	2,150	3,860				9,350	12.7	528	2,550	2,440	67	21	13,800	7.4
June 1	188	12		572	97	949		111	0	1,640	1,480				4,810	6.54	2,440	1,830	1,740	53	9.7	6,910	7.2
June 2-10	22.3	14		591	271	3,260		120	0	2,340	5,070				11,600	15.8	688	2,580	2,490	73	28	17,100	7.4
June 11-20	15.6	17		522	237	3,140		98	0	1,990	4,930				10,900	14.8	577	2,280	2,200	75	29	16,300	7.3
June 21-30	9.18	22		628	321	3,650		79	0	2,550	5,740				12,900	17.5	320	2,880	2,820	73	30	18,600	7.5
July 1-10	12.2	20		719	338	4,270		75	0	2,470	6,770				14,900	20.3	431	3,180	3,120	74	33	21,900	7.3
July 11-20	23.3	13		610	331	5,030		78	0	2,500	7,900				16,400	22.3	1,030	2,880	2,820	79	41	24,300	7.5
July 21-31	10.2	10		595	318	4,760		76	0	2,460	7,460				15,600	21.2	430	2,780	2,730	79	39	23,200	7.5
Aug. 1-10	9.44	6.1		694	349	4,820		63	0	2,770	7,750				16,500	22.4	421	3,170	3,120	77	38	24,200	7.5
Aug. 11-20	11.6	3.5		722	376	5,430		55	0	2,770	9,100				19,200	26.1	604	3,400	3,350	79	43	27,600	7.4
Aug. 21-31	9.29	3.3		752	406	5,430		65	0	3,030	10,600				21,200	28.2	540	3,600	3,540	80	49	31,400	7.4
Sept. 1-10	12.7	4.0		789	455	7,040		66	0	3,070	11,000				22,800	31.0	782	3,860	3,810	80	49	32,400	7.0
Sept. 11-20	22.4	4.2		769	457	7,090		66	0	3,170	11,100				22,800	31.0	1,380	3,800	3,740	80	50	32,200	7.2
Sept. 21-30	26.8	7.3		766	404	6,010		65	0	3,140	9,440				19,800	26.9	1,430	3,570	3,520	79	44	28,300	7.5
Weighted average	41.6	11		539	236	2,110		146	0	1,980	3,350				8,300	11.3	932	2,320	2,200	66	19	12,300	--

## RIO GRANDE BASIN--Continued

## PECOS RIVER NEAR RED BLUFF, N. MEX.--Continued

Temperature (°F) of water, water year October 1952 to September 1953

/Once-daily temperature measurement, generally between 4 p. m. and 10 p. m. /

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

a Temperature measurement between 8 a. m. and 12 m.

b Temperature measurement between 12 m. and 4 p. m.

## RIO GRANDE BASIN--Continued

## PECOS RIVER BELOW RED BLUFF DAM, NEAR ORLA, TEX.

LOCATION.--Just below dam, 3 miles upstream from Salt (Screwbeam) Draw, 5 miles northwest of Orla, Reeves County, and 14 miles upstream from gaging station near Orla. During period October to November 1952, samples were collected at gaging station, which is 14 miles downstream from Red Bluff Dam. DRAINAGE AREA.--21,300 square miles, approximately (contributing area), above gaging station.

RECORDS AVAILABLE.--Chemical analyses: July 1937 to September 1953.

Water temperatures: March to September 1953.

EXTREMES, 1952-53.--Dissolved solids: Maximum, 15,600 ppm Sept. 17-30; minimum, 7,570 ppm Mar. 19-31.

Hardness: Maximum, 3,430 ppm July 1-3; minimum, 2,380 ppm Mar. 19-31.

Sulfate: Maximum, 3,430 ppm July 1-3; minimum, 2,380 ppm Mar. 19-31.

Specific conductance: Maximum, 602 micromhos Sept. 17-30; minimum, 1,090 ppm June 1-2, 1948.

Hardness: Maximum, 3,430 ppm July 1-3; minimum, 2,380 ppm Mar. 19-31.

Specific conductance: Maximum, 602 micromhos Sept. 17-30; minimum, 1,090 ppm June 1-2, 1948.

REMARKS.--Values reported for dissolved solids are sums of determined constituents. 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 1952 to September 1953 given in WSP 1282.

No appreciable inflow between sampling point and gaging station except during periods of heavy local rains.

REVISION.--Dissolved solids for the period December 21-31, 1946 (WSP 1102, p. 554.) should read 4,940 ppm instead of 4,490 ppm.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> ) (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Percentage sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)		
														Parts per million	Tons per acre-foot	Tons per day	Calcium, mg./l.	Non-carbonate				
Oct. 1-31, 1952	4.61	19		710	287	2,840	100			2,600	4,500			11,000	15.0	137	2,950	2,870	68	23	15,900	7.5
Nov. 1-30	3.59	16		685	252	2,050	108			2,420	3,260			8,740	11.9	84.7	2,740	2,660	62	17	12,300	7.7
Mar. 19-31, 1953	10.2	9.0		570	233	1,790	123			2,070	2,840			7,570	10.3	208	2,380	2,280	62	16	11,100	7.8
Apr. 1-30	8.67	6.4		586	237	1,850	118			2,150	2,920			7,810	10.6	183	2,440	2,340	62	16	11,300	7.6
May 1-4, 12-13, 28-31	7.88	5.9		625	263	2,130	126			2,300	3,380			8,770	11.9	187	2,640	2,540	64	18	12,800	7.6
May 5-11, 14-27	8.62	10		646	298	2,930	142			2,440	4,650			11,000	15.0	266	2,840	2,720	69	24	16,100	7.7
June 1-30	17.2	12		657	266	2,180	136			2,380	3,460			9,020	12.3	419	2,730	2,620	63	18	13,200	7.6
July 1-31	40.1	12		699	409	2,120	124			2,460	3,810			9,570	13.0	1,040	3,430	3,320	57	16	14,300	7.8
Aug. 1-31	26.7	10		716	294	2,470	111			2,630	3,930			10,100	13.7	728	3,000	2,900	64	20	14,600	7.7
Sept. 1-16	8.22	50		779	300	2,770	115			2,710	4,450			11,100	15.1	246	3,180	2,980	65	21	15,900	7.7
Sept. 17-30	9.25	23		769	360	4,440	111			2,990	6,990			15,600	21.2	389	3,400	3,220	74	33	22,500	7.6
Weighted average	a14.6	13		686	316	2,340	121			2,480	3,870			9,760	13.3	385	3,010	2,910	64	19	14,300	--

a Represents 79 percent of runoff for water year October 1952 to September 1953.

## RIO GRANDE BASIN--Continued

## PECOS RIVER BELOW RED BLUFF DAM, NEAR ORLA, TEX.--Continued

Temperature (°F) of water, March to September 1953

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

RIO GRANDE BASIN--Continued  
PECOS RIVER BELOW GRANDFALLS, TEX.

LOCATION.--At gaging station at bridge on State Farm-to-Market Road 11 between Grandfalls and Imperial, 7.1 miles southeast of Grandfalls, Ward County, and 10 miles downstream from Chacatori Draw.

DRAINAGE AREA.--27,820 square miles, approximately (contributing area).

RECORDS AVAILABLE.--Chemical analyses: April 1939 to June 1942, October 1946 to September 1953.

EXTREMES AVAILABLE.--Dissolved solids: Maximum, 25,100 ppm Feb. 9-10, 14-15, 18-20; minimum, 10,600 ppm Oct. 1-31.

Hardness: Maximum, 4,460 ppm Mar. 1-31; minimum, 3,320 ppm June 1-30.

Specific conductance: Maximum daily, 35,700 micromhos Feb. 9, 10, 15, 19, 20; minimum, 13,700 micromhos Oct. 10-12, 15.

EXTREMES, 1939-42, 1946-53.--Dissolved solids: Maximum, 25,100 ppm Feb. 9-10, 14-15, 18-20, 1953; minimum, 776 ppm June 5, 1947.

Hardness: Maximum, 4,460 ppm Mar. 1-31, 1953; minimum, 316 ppm Apr. 2-4, 1952.

Specific conductance: Maximum daily, 35,700 micromhos Feb. 9, 10, 15, 19, 20, 1953; minimum daily, 1,220 micromhos May 27, 1941.

REMARKS.--Values reported for dissolved solids are sums of determined constituents. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1952 to September 1953 given in WSP 1282.

Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean discharge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO <sub>3</sub> )	Carbonate (CO <sub>3</sub> )	Sulfate (SO <sub>4</sub> )	Chloride (Cl)	Fluoride (F)	Nitrate (NO <sub>3</sub> )	Dissolved solids (sum)			Hardness as CaCO <sub>3</sub>		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
														Parts per million	Tons per acre-foot	Tons per day	Calcium, magnesium	Non-carbonate				
Oct. 1-31, 1952	13.5	23		777	389	2,420		134		3,070	3,900			10,600	14.4	386	3,540	3,430	60	18	15,100	7.4
Nov. 1-30	14.7	22		746	395	2,560		158		3,020	4,100			10,900	14.8	433	3,490	3,360	62	19	15,300	7.4
Dec. 1-31	18.8	18		751	396	2,730		185		3,000	4,370			11,400	15.5	579	3,500	3,350	63	20	16,000	7.5
Jan. 1-31, 1953	18.3	18		765	390	2,990		193		2,970	4,800			12,000	16.3	593	3,510	3,350	65	22	16,700	7.4
Feb. 1-8, 11-13, 16-17, 21-28	20.0	14		786	407	3,360		187		3,030	5,410			13,100	17.8	707	3,630	3,480	67	24	18,700	7.7
Feb. 9-10, 14-15, 18-20	19.4	14		880	514	7,770		187		3,290	12,500			25,100	34.1	1,310	4,310	4,160	80	51	35,200	7.8
Mar. 1-31	18.2	9.2		940	513	3,650		145		3,790	5,900			14,900	20.3	732	4,480	4,340	64	24	20,400	7.8
Apr. 1-30	13.0	15		800	424	2,910		163		3,180	4,700			12,100	16.5	425	3,740	3,610	63	21	17,100	8.0
May 1-31	10.6	13		883	470	3,270		134		3,560	5,260			13,500	18.4	386	4,140	4,030	63	22	18,600	7.5
June 1-30	8.15	31		868	281	3,160		85		3,360	4,690			12,400	16.9	273	3,320	3,250	67	24	17,000	7.4
July 1-31	6.87	22		861	419	2,780		64		3,320	4,550			12,000	16.3	223	3,870	3,820	61	19	16,700	7.3
Aug. 1-31	6.70	14		838	407	2,680		75		3,200	4,400			11,600	15.8	210	3,780	3,700	61	19	16,200	7.1
Sept. 1-30	8.16	20		817	394	2,620		90		3,090	4,300			11,300	15.4	249	3,660	3,510	61	19	15,700	7.3
Weighted average	13.0	17		799	416	3,090		149		3,210	4,970			12,600	17.1	442	3,700	3,580	64	22	17,600	--

RIO GRANDE BASINS--Continued  
MISCELLANEOUS ANALYSES OF STREAMS IN RIO GRANDE BASIN IN NEW MEXICO  
Chemical analyses, in parts per million, water year October 1952 to September 1953

Date of collection	Mean dis-charge (cfs)	Silica (SiO <sub>2</sub> )	Iron (Fe)	Cal-cium (Ca)	Mag-ne-sium (Mg)	So-dium (Na)	Po-tas-sium (K)	Bicar-bonate (HCO <sub>3</sub> )	Car-bonate (CO <sub>3</sub> )	Sul-fate (SO <sub>4</sub> )	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO <sub>3</sub> ) (B)	Dissolved solids			Hardness as CaCO <sub>3</sub>		Per-cent so-dium ad-sorp-tion ratio	Specific conductance (micro-mhos at 25°C)	
														Parts per mil-lion	Tons per acre-foot	Tons per day	Calcium-mag-nesium	Non-carbonate			
HAGERMAN CANAL AT DEXTER																					
Oct. 13, 1952								226	0		1,450									6,310	
Nov. 24								261	0		1,010									5,200	
Jan. 5, 1953								222	0		1,040									5,010	
Feb. 9								237	0		1,140									5,260	
Mar. 24								239	0		1,060									5,340	
May 2								253	0		1,220									5,700	
June 15								246	0		1,140									5,800	
July 28								252	0		1,320									6,020	
Sept. 9								247	0		1,330									6,010	
LAKE McMILLAN AT McMILLAN DAM NEAR LAKEWOOD																					
Nov. 24, 1952								102	0		1,820									8,460	
Jan. 5, 1953								117	0		1,860									8,470	
May 1								107	0		1,850									8,830	
June 15								144	0		2,610									11,600	
July 30								59	0		1,160									6,490	
Sept. 10								55	0		172									2,410	
PECOS RIVER BELOW LAKE McMILLAN DAM NEAR LAKEWOOD																					
Oct. 13, 1952								85	0		1,700									7,590	
Feb. 13, 1953								142	0		1,840									8,250	
Mar. 25								114	0		2,020									9,280	



# INDEX

## A

	Page
Abbeville, La., Vermillion River near .....	304-307
Abiquiu, N. Mex., Rio Chama near .....	398-401
Acme, N. Mex., Pecos River near .....	484-486
Alamogordo Dam, N. Mex., Pecos River below .....	482-483
Alexandria, La., Red River at .....	225-227
Alpine, Ark., Fourche La Fave River near...	149-151
Aluminum .....	9
Amarillo, Tex., Canadian River near .....	114-116
Amite River near Denham, Springs, La. ....	293
Anahuac, Tex., Trinity Bay near .....	348-352
Anahuac, Tex., Trinity River at .....	346-347
Archer City, Tex., Little Wichita River near.	199-201
Arkadelphia, Ark., Ouachita River at .....	233-235
Arkansas City, Kans., Arkansas River at .....	57-60
Arkansas River at Arkansas City, Kans. ....	57-60
at Dardanelle, Ark. ....	145-148
at Little Rock, Ark. ....	152-155
at Ralston, Okla. ....	61-64
at Sand Springs Bridge near Tulsa, Okla. .	76-80
at Van Buren, Ark. ....	141-144
below John Martin Reservoir, at Caddoa, Colo. ....	54-56
Arkansas River basin .....	54-188
Artesia, N. Mex., Pecos River near .....	490-495
Atchafalaya River at Krotz Springs, La. ....	294-296
Austin, Tex., Colorado River at .....	384-385

## B

Bartholomew Bayou near Willmot, Ark. ....	266-267
Bayou Anacoco near Rosepine, La. ....	322
Bayou Bartholomew near Beekman, La. ....	268
Bayou Cocodrie near Clearwater, La. ....	297-303
Bayou D'Arbonne near Dubach, La. ....	56
Bayou De View near Morton, Ark. ....	53
Bayou Lapile near Strong, Ark. ....	257-261
Bayou Macon near Delhi, La. ....	277
Bayou near Stuttgart, Ark. ....	158
Bayou Siep 10 miles northeast of Patroon, Tex.	329
Beaver, Ark., White River at .....	32-34
Beaver Creek near Waurika, Jefferson County Okla. ....	280
Beekman, La., Bayou Bartholomew near .....	268
Beggs, Okla., Deep Fork River near .....	130-134
Belcow Creek at Chandler, Lincoln County, Okla. ....	186
Belzoni, Okla., Kiamichi River near .....	228-229
Benton, Ark., Saline River near .....	247-249
Bernalillo, N. Mex., Jemez River near .....	416-419
Bernalillo, N. Mex., Rio Grande near .....	420-424
Bernardo, N. Mex., Floodway near .....	429
Bernardo, N. Mex., Rio Grande conveyance channel near .....	428, 429
Bernardo, N. Mex., Rio Grande near .....	425-429
Bernardo, N. Mex., Rio Puerco near .....	442-444
Big Cabin Creek near Big Cabin, Craig County, Okla. ....	177
Big Cow Creek 4.8 miles east of Call, Tex. ..	331
Big Creek near Nowata County, Okla. ....	170
Big Turkey Creek near Sayre, Beckham County, Okla. ....	279
Bird Creek near Barnsdall, Osage County, Okla.	174
near Owasso, Tulsa County, Okla. ....	175
near Pawhuska, Osage County, Okla. ....	173
near Skiatook, Tulsa County, Okla. ....	174
near Sperry, Okla. ....	88-91
Black Bear Creek at Pawnee, Pawnee County, Okla. ....	162
Black River at Black Rock, Ark. ....	38-40
at Harkey Crossing, near Malaga, N. Mex. ....	518
at Pochontas, Ark. ....	51

Black River near Corning, Ark. ....	51
Black Rock, Ark. Black River at .....	38-40
Blue River near Blue, Bryan County, Okla. .	286
near Connerville, Johnston County, Okla. ....	285
Bois D'Arc Creek near Ponca City, Kay County, Okla. ....	161
Boron .....	12
Boughton, Ark., Little Missouri River near ..	236-238
Brazos River at Possum Kingdom Dam near Grafado, Tex. ....	360-361
at Richmond, Tex. ....	366-368
near Whitney, Tex. ....	362-364
Brazos River basin .....	357-370
Bridgeport, Okla., Canadian River at .....	117-120
Buck Creek near Wellington, Tex. ....	290
Bueyeros, N. Mex. Ute Creek near .....	104-109
Buffalo River near Rush, Ark. ....	50
near St. Joe, Ark. ....	50
Bull Creek near Ira, Tex. ....	371-372
Byrd's Mill Spring at Ada, Pontotoc County, Okla. ....	181

## C

Cabezon, N. Mex., Rio Puerco below .....	430-432
Cache Creek near Walters, Okla. ....	196-198
Cache River at Patterson, Ark. ....	44-46, 52
Caddoa, Colo., Arkansas River at .....	54-56
Caddo Lake near Karnack, Tex. ....	292
Calcasieu River at Moss Bluff, La. ....	312-315
near Glenmora, La. ....	311
Calcasieu River basin .....	311-331
Calcium .....	10
California Creek near Nowata, Nowata County, Okla. ....	169
Calion, Ark., Ouachita River at .....	243-246
Canadian River at Bridgeport, Okla. ....	117-120
at Bridgeport, Caddo County, Okla. ....	180
near Amarillo, Tex. ....	114-116
near Asher, Pottawatomie County, Okla. ....	180
near Calvin, Hughes County, Okla. ....	183
near Camargo, Dewey County, Okla. ....	179
near Eufula, McIntosh County, Okla. ....	183
near Konawa, Seminole County, Okla. ....	181
near Purcell, McClain County, Okla. ....	180
near Roll, Roger Mills County, Okla. ....	179
near Tascosa, Tex. ....	111-113
near Thomas, Custer County, Okla. ....	179
near Union, Canadian County, Okla. ....	180
near Whitefield, Okla. ....	135-140
near Whitefield, Haskell County, Okla. ....	187
Caney Creek 0.6 miles east of Bon Wier, Tex. ....	330
Caney River near Bartlesville, Washington County, Okla. ....	172
near Boulanger, Osage County, Okla. ....	171
near Collinsville, Tulsa County, Okla. ....	173
near Hulah, Osage County, Okla. ....	171
near Ramona, Washington County, Okla. ....	173
Canton, Okla., North Canadian River near ..	125-126
Canyon Creek near Ira, Tex. ....	387
Carbonate and bicarbonate .....	11
Carlsbad main canal at head near Carlsbad, N. Mex. ....	500-501
Carlsbad, N. Mex., Carlsbad main canal near .....	500-501
Carlsbad, N. Mex., Pecos River at .....	502-504
Carlsbad, N. Mex., Pecos River near .....	498-499
Carrol Creek 8½ miles north of Clarendon, Tex. ....	290
Carter, Okla., North Fork Red River near ..	192-195
Cedar Creek near Cleveland, Pawnee County, Okla. ....	163
Chamita, N. Mex., Rio Chama near .....	402-405

	Page		Page
Chemical quality .....	3	Double Mountain Fork Brazos River 7.5 miles northwest of Slaton, Tex. ....	369
Chico Arroyo near Guadalupe, N. Mex. ....	433-435	5.5 miles north of Slaton, Tex. ....	370
Chikaskia River at Blackwell, Kay County, Okla. ....	160-161	4.2 miles northeast of Slaton, Tex. ....	370
near Tonkawa, Kay County, Okla. ....	161	Double Mountain River, a quarter of a mile below lower Buffalo Lakes Dam, near Slaton, Tex. ....	370
Chloride .....	11	Double Spring Creek near Ada, Pontotoc County, Okla. ....	181
Chuckwa Creek near Durant, Bryan County, Okla. ....	286	Dozier Creek a half mile east of Dozier, Tex. ....	291
Cimarron River at Perkins, Okla. ....	69-75	Dozier Creek 14 miles northwest of Wellington, Tex. ....	291
near Buffalo, Harper County, Okla. ....	164	Dubach, La., Bayou D'Arbonne near ...	276
near Cleo Springs, Major County, Okla. ....	166	Duck Creek at U. S. Highway 69 near Lindale, Tex. ....	329
near Crescent, Logan County, Okla. ....	168	near Tonkawa, Kay County, Okla. ....	160
near Dover, Kingfisher County, Okla. ....	168	Dugdemona River near Winnfield, La. ....	278
near Guthrie, Logan County, Okla. ....	169	Dunn, Tex., Deep Creek near ....	373
near Kenton, Cimarron County, Okla. ....	163	Durwood, Okla., Washita River near ..	212-215
near Mocane, Beaver County, Okla. ....	163	Dutch Creek at Waiatreak, Ark. ....	157
near Okeene, Blain County, Okla. ....	166		
near Rosston, Harper County, Okla. ....	163	E	
near Waynoka, Woods County, Okla. ....	164-165	Eagle Chief Creek at Cleo Springs, Major County, Okla. ....	166
Claremore, Okla., Verdigris River near ..	85-87	near Aline, Alfalfa County, Okla. ....	165
Clarence, La., Saline Bayou near ....	222-224	near Carmen, Alfalfa County, Okla. ....	165
Clarendon, Ark., White River at ....	47-49	Eagle Mountain Lake near Fort Worth, Tex. ....	353
Clear Boggy Creek near Caney, Atoka County, Okla. ....	286	Eastland, Tex., Leon River near ....	365
Clear Creek near Elmwood, Beaver County Okla. ....	184	Eleven Point River near Ravendon Springs, Ark. ....	52
Clear Fork Brazos River at Nugent, Tex. ....	357-359	Elk River near Tiff City, McDonald County, Mo. ....	176-177
Clear Fork Trinity River at Fort Worth, Tex. ....	335	Embudo, N. Mex., Rio Grande at ....	395-397
Clearwater, La., Bayou Cocodrie near ....	297-303	Emory, Tex., Sabine River near ....	316-318
Coldwater Creek near Hardesty, Texas County, Okla. ....	184	Evadale, Tex., Neches River at ....	332-334
Collection and examination of samples ....	3-6	Expression of results .....	6-8
Color .....	13		
Colorado City, Tex., Colorado River at ....	374-376	F	
Colorado River at Austin, Tex. ....	384-385	Felsenthal, Ark., Ouachita River near Finn Creek near Story, Garvin County, Okla. ....	262-265
at Colorado City, Tex. ....	374-376	.....	283
at Wharton, Tex. ....	386	Floodway near Bernardo, N. Mex. ....	429
near San Saba, Tex. ....	377-383	Fluoride .....	11-12
Colorado River basin .....	371-387	Fort Gibson, Okla., Neosho River near Fort Supply Reservoir near Fort Supply, Woodward County, Okla. ....	102-103
Commerce, Okla., Neosho River near ....	96-99	Fort Supply Reservoir near Fort Supply, Woodward County, Okla. ....	184
Composition of surface waters .....	8-16	Fort Worth, Tex., Clear Fork Trinity River at ....	335
Coon Creek near Dewey, Washington County, Okla. ....	172	Fourche La Fave River near Alpin, Ark. ....	149-151
Cooperation .....	18-21	near Gravelly, Ark. ....	157
Cornie Creek near Junction City, Ark. ....	269-271	near Nimrod, Ark. ....	157
Corroo, N. Mex., San Jose River at ....	436-438	Frog Bayou near Rudy, Ark. ....	156
Corrosiveness .....	15	Fulton, Ark., Red River at ....	218-221
Cotter, Ark., White River at ....	35-37		
Cotton Creek near Copan, Washington County, Okla. ....	171	G	
Cottonwood Creek near Guthrie, Logan County, Okla. ....	168	Gainesville, Tex., Red River near ....	206-211
Cove Creek near Lee Creek, Ark. ....	156	Galisteo Creek at Domingo, N. Mex. ....	412-415
Cove, Tex., Old River near ....	344-345	Glenmora, La., Calcasieu River near ...	311
Cow Bayou near Mauriceville, Tex. ....	326-328	Glover Creek near Glover, McCurtain County, Okla. ....	287
Crooked Creek near Humphrey, Ark. ....	158	Grafoord, Tex., Brazos River near ....	360-361
		Grandfalls, Tex., Pecos River below ..	516
D		Greenleaf Creek near Braggs, Muskogee County, Okla. ....	178
Dardanelle, Ark., Arkansas River at ....	145-158	Groesbeck Creek near Quanah, Tex. ....	290
Davis Creek $3\frac{1}{2}$ miles southwest of Bon Wier, Tex. ....	330	Guadalupe, N. Mex., Chico Arroyo near Guadalupe River at Victoria, Tex. ....	388-390
Dayton, N. Mex., Rio Penasco at ....	496-497	Guadalupe River basin .....	388-390
Deep Creek near Dunn, Tex. ....	373		
Deep Fork River near Beggs, Okla. ....	130-134	H	
Deer Creek near Hydro, Caddo County, Okla. ....	179	Hagerman Canal at Dexter, N. Mex. ....	517
Delaware Creek near Sperry, Tulsa County, Okla. ....	175	Hardness .....	14
Delhi, La., Bayou Macon near ....	271	Henrietta, Tex., Little Wichita River near ....	202-205
Dempsey Creek 5 miles southwest of Bon Wier, Tex. ....	331	Hickam Creek, $8\frac{1}{2}$ miles northeast of Burkeville, Tex. ....	330
Denham Springs, La., Amite River near ..	293	Hog Creek near Norman, Cleveland County, Okla. ....	181
Denison, Tex., Red River near ....	216-217		
Dissolved solids .....	12-13		
Division of work .....	18, 21		
Dog Creek near Claremore, Rogers County, Okla. ....	175		
Domingo, N. Mex., Galisteo Creek at ....	412-415		
Double Mountain Fork Brazos River near Lubbock Sewage Plant, Tex. ....	369		
4.3 miles southeast of Lubbock, Tex. ....	369		
7.8 miles southeast of Lubbock, Tex. ....	369		

	Page		Page
Hominy Creek near Hominy, Osage County		Little River near Alikchi, McCurtain	
Okla. ....	174	County, Okla. ....	286
near Skiatook, Tulsa County, Okla. ....	174	near Dewright, Seminole County, Okla. ....	182
near Sperry, Tulsa County, Okla. ....	174	near Garvin, McCurtain County, Okla. ....	287
Honey Creek near Davis, Murray County,		near Horatio, Ark. ....	288
Okla. ....	284	near Millerton, McCurtain County, Okla. ....	286
House Creek near Terilton, Pawnee, County,		near Norman, Okla. ....	121-124
Okla. ....	169	near Norman, Cleveland County, Okla. ....	181
Housen Bayou 9 miles east of Yellowpine,		near Saskwa, Seminole County, Okla. ....	183
Tex. ....	329	near Tecumseh, Pottawatomie County,	
Hoyle Creek near Ames, Major County, Okla.	166	Okla. ....	182
Huffman, Tex., San Jacinto River near	354-356	near Valliant, McCurtain County, Okla. ....	286
Hurricane Creek near Sheridan, Ark. ....	250-253	Little Rock, Ark., Arkansas River at ....	152-155
Hydrogen-ion concentration ....	13-14	Little Turkey Creek near Erick, Beckham	
I		County, Okla. ....	279
Idabel, Okla., Little River near ....	230-232	Little Washita River near Ninnekah, Grady	
Illinois Bayou near Scottsville, Ark. ....	157	County, Okla. ....	282
Indian Creek 12½ miles northeast of		Little Wichita River near Archer City, Tex. ....	199-201
Burkeville, Tex. ....	330	near Henrietta, Tex. ....	202-205
near Woodward, Woodward County, Okla. ....	185	Lobatos, Colo., Rio Grande near ....	393-394
Inola, Okla., Verdigris River near ....	92-95	Logan, N. Mex., Ute Creek near ....	110
Introduction ....	1-3	Longtown Creek near Enterprise, Haskell	
Ira, Tex., Bull Creek near ....	371-372	County, Okla. ....	186
Iron ....	9	Lost Creek near Seneca, McDonald County,	
J		Mo. ....	176
Jemez River near Bernalillo, N. Mex. ..	416-419	Lovell, Okla., Skeleton Creek near ....	65-68
John Martin Reservoir, Arkansas River		Loving, N. Mex., Refinery Intake Canal	
below, at Caddo, Colo. ....	54-56	near ....	505
Junction City, Ark., Cornie Creek near ..	269-271	Lower Mississippi River basin ....	23-307
Junction City, Ark., Three Creeks near ..	272-275		
K		M	
Kiamichi River near Belzoni, Okla. ....	228-229	Magnesium ....	10
Kiowa Creek near Slapout, Beaver County,		Malaga, N. Mex., Pecos River east of ...	506-507
Okla. ....	184	Malaga, N. Mex., Pecos River near ....	508-510
Kings River near Berryville, Ark. ....	50	Manganese ....	9
Krotz Springs, La., Atchafalaya River at.	294-296	Marked Tree, Ark., St. Francis River at.	28-30
L		Mathis, Tex., Nueces River near ....	391-392
Laguer Bayou near Stuttgart, Ark. ....	53	Mauriceville, Tex., Cow Bayou near ....	326-328
Lake Arthur, La., Mermentau River at ..	308-310	Mermentau River at Lake Arthur, La. ....	308-310
Lake Colorado City near Colorado City,		Mermentau River basin ....	308-310
Tex. ....	387	Mill Creek near Mill Creek, Johnston	
Lake J. B. Thomas near Ira, Tex. ....	387	County, Okla. ....	285
Lake McMillan at McMillan Dam near		12 miles southeast of Yellowpine, Tex. ....	330
Lakewood, N. Mex. ....	517	Mineral constituents in solution ....	9-13
Lake Murray near Ardmore, Love County,		Mississippi River at St. Louis, Mo. ....	23-27
Okla. ....	280	Mississippi River Delta ....	293-307
Lake Worth near Fort Worth, Tex. ....	353	Moro Creek near Fordyce, Ark. ....	289
Lampasas River at Fort Hood near Belton,		Moss Bluff, La., Calcasieu River at ....	312-315
Tex. ....	370	Moss Bluff, Tex., Trinity River near ...	342-343
Langley, Okla., Neosho River at ....	100-101	Mountain Creek Reservoir near Robert	
Lawrence Springs near Drake, Murray		Lee, Tex. ....	387
County, Okla. ....	284	Mountain Fork River near Eagletown,	
Lebos Creek near Eldorado, Jackson		McCurtain County, Okla. ....	287
County, Okla. ....	279	Mud Creek near Ringling, Jefferson	
Lee Creek near Van Buren, Ark. ....	156	County, Okla. ....	280
Lelia Lake Creek near Hedley, Tex. ....	291	Muddy Boggy Creek near Farris, Atoka	
Lenaph, Okla., Verdigris River near ...	81-84	County, Okla. ....	286
Leon River near Eastland, Tex. ....	365	Muddy Fork Creek at Murfreesboro Dam	
Lightning Creek near Alluwe, Nowata		Site near Murfreesboro, Ark. ....	289
County, Okla. ....	170	Mulberry River near Mulberry, Ark. ....	156
Literature cited ....	22		
Little Beaver Creek near Duncan, Stephens		N	
County, Okla. ....	279	Neches River at Evadale, Tex. ....	332-334
Little Cow Creek, 5 miles southeast of		Neches River basin ....	332-334
Burkeville, Tex. ....	330	Neosho River at Fort Gibson Reservoir	
Little Deep Fork Creek near Edna, Creek		near Fort Gibson, Okla. ....	102-103
County, Okla. ....	186	at Pensacola Reservoir at Langley,	
Little Missouri River at Murfreesboro		Okla. ....	100-101
Dam Site near Murfreesboro, Ark. ....	289	near Choteau, Mayes County, Okla. ....	178
near Boughton, Ark. ....	236-238	near Commerce, Okla. ....	96-99
near Murfreesboro, Ark. ....	289	Newport, Ark., White River at ....	41-43
Little Red River near Heber Springs, Ark.	52	Nitrate ....	12
Little River below Hog Creek near Norman,		Norman, Okla., Little River near ....	121-124
Cleveland County, Okla. ....	182	Norphlet, Ark., Smackover Creek near ..	239-242
below Lukata Creek, near Idabel, Okla. ....	230-232	North Canadian River at Canton	
		Reservoir, near Canton, Okla. ..	125-126
		near El Reno, Canadian County,	
		Okla. ....	185
		near Eufula, McIntosh County, Okla. ....	186
		near Guymon, Texas County, Okla. ....	183
		near Seiling, Major County, Okla. ..	185

	Page
North Canadian River near Yukon, Okla.	127-129
North Fork Red River near Carter, Okla.	192-195
North Fork Wichita River 10 miles south- east of Paducah, Tex.	291
14 miles southeast of Paducah, Tex.	292
4½ miles east of Truscott, Tex.	292
Nueces River near Mathis, Tex.	391-392
Nueces River basin	391-392
Nugent, Tex., Clear Fork Brazos River	357-359

## O

Oakwood, Tex., Trinity River near	336-339
Old River near Cove, Tex.	344-345
Orla, Tex., Pecos River near	514-515
Osage Creek near Elm Springs, Ark.	156
Ouachita River at Arkadelphia, Ark.	233-235
at Calion, Ark.	243-246
near Felsenthal, Ark.	262-265
near Mount Ida, Ark.	288
Oxygen consumed	13

## P

Palo Duro Creek near Range, Texas County, Okla.	184
Palo Gaucho Creek 7 miles east of Milam, Tex.	329
Patroon Bayou at County Road Bridge 7 miles northeast of Milam, Tex.	329
Patterson, Ark., Cache River at	44-46
Pecos River at Carlsbad, N. Mex.	502-504
at Carlsbad Flume, N. Mex.	518
at Dam Site 3, near Carlsbad, N. N. Mex.	498-499
at ford crossing in Major Johnson Spring area near Lakewood, N. Mex.	518
at Pierce Canyon Crossing near Malaga, N. Mex.	508-510
at Puerto de Luna, N. Mex.	475-481
below Alamogordo Dam, N. Mex.	482-483
below Grandfalls, Tex.	516
below McMillam Dam near Lakewood, N. Mex.	517
below Red Bluff Dam near Orla, Tex.	514-515
east of Malaga, N. Mex.	506-507
near Acme, N. Mex.	484-486
near Artesia, N. Mex.	490-495
near Red Bluff, N. Mex.	511-513
Petit Jean Creek near Booneville, Ark.	157
near Waveland, Ark.	157
Pennington Creek near Reagan, Johnston County, Okla.	285
Percent sodium	15
Perkins, Okla., Cimarron River at	69-75
Piney Creek near Dover, Ark.	157
Piney Fork Strawberry River at Evening Shade, Ark.	52
Polecat Creek near Heyburn, Creek County, Okla.	169
Pond Creek near Fort Cobb, Caddo County, Okla.	281
near Lamont, Grant County, Okla.	160
Poteau River at Cauthron, Ark.	156
Preacher Creek near Dover, Kingfisher County, Okla.	167
near Hennessey, Kingfisher County, Okla.	167
Properties and characteristics of water	13-16
Pryor Creek near Pryor, Mayes County, Okla.	178
Publications	17-18
Puerto de Luna, N. Mex., Pecos River at	475-481

## R

Rainey Mountain Creek near Mountain View, Kiowa County, Okla.	281
Ralston, Okla., Arkansas River at	61-64
Red Bluff, N. Mex., Pecos River near	511-513
Red River at Alexandria, La.	225-227
at Denison Dam near Denison, Tex.	216-217
at Fulton, Ark.	218-221

Red River at Index, Ark.	Page 288
near Gainesville, Tex.	206-211
Red River basin	189-292
Red Rock Creek near Red Rock, Noble County, Okla.	162
Refinery Intake Canal near Loving, N. Mex.	505
Richmond, Tex., Brazos River at	366-368
Right Hand Chute of Little River at Riverdale, Ark.	31
Rio Chama near Abiquiu, N. Mex.	398-401
near Chamita, N. Mex.	402-405
Rio Grande above Culebra Creek near Lobatos, Colo.	393-394
at Embudo, N. Mex.	395-397
at Otowi Bridge near San Ildefonso, N. Mex.	406-411
at San Acacia, N. Mex.	449-455
at San Antonio, N. Mex.	456-460
at San Marcial, N. Mex.	467-474
conveyance channel near Bernardo, N. Mex.	428, 429
near Bernalillo, N. Mex.	420-424
near Bernardo, N. Mex.	425-429
Tiffany Channel at San Marcial, N. Mex.	461-466
Rio Grande basin	393-518
Rio Hondo at Diamond A Ranch near Roswell N. Mex.	487-489
Rio Penasco at Dayton, N. Mex.	496-497
Rio Puerco below Cabezon, N. Mex.	430-432
at Rio Puerco, N. Mex.	439-441
near Bernardo, N. Mex.	442-444
Rio Puerco, N. Mex., Rio Puerco at	439-441
Rio Salado near San Acacia, N. Mex.	445-447
Rock Creek near Dougherty, Murray County, Okla.	284
Rolling Fork River near De Queen, Ark.	288
Romayor, Tex., Trinity River at	340-341
Rosepine, La., Bayou Anacoco near	322
Roswell, N. Mex., Rio Hondo near	487-489
Ruliff, Tex., Sabine River near	323-325
Rush Creek near Pauls Valley, Garvin County, Okla.	284
near Purdy, Garvin County, Okla.	283
near Rush Springs, Grady County, Okla.	283
Rye, Ark., Saline River near	254-256

## S

Sabine River near Emory, Tex.	316-318
near Ruliff, Tex.	323-325
near Tatum, Tex.	319-321
Sabine River basin	316-331
St. Francis Bay near Riverfront, Ark.	31
St. Francis River at Lake City, Ark.	31
at Marked Tree, Ark.	28-30
at Parkin, Ark.	31
at St. Francis, Ark.	31
Floodway near Marked Tree, Ark.	31
St. Francis River basin	28-31
St. Louis, Mo., Mississippi River at	23-27
Saline Bayou near Clarence, La.	222-224
Salina Creek near Salina, Mayes County, Okla.	177
6½ miles southeast of Paducah, Tex.	292
Saline River near Benton, Ark.	247-249
near Dierks, Ark.	288
near Rye, Ark.	254-256
Sallisaw Creek near Sallisaw, Sequoyah County, Okla.	187
Salt Creek near Alluwe, Nowata County, Okla.	170
near Dewright, Seminole County, Okla.	182
Salt Fork Arkansas River at Tonkawa, Kay County, Okla.	160
near Alva, Woods County, Okla.	159
near Jet, Alfalfa County, Okla.	159
near Ponca City, Kay County, Okla.	162
Salt Fork Red River near Clarendon, Tex. near Vinson, Harmon County, Okla.	290 279
near Wellington, Tex.	189-191
Salt Springs at Estelline, Tex.	290
San Acacia, N. Mex., Rio Grande at	449-455
San Acacia, N. Mex., Rio Salado near	445-447

	Page		Page
San Acacia, N. Mex., Socorro Main Canal north, at .....	448	U	
San Antonio, N. Mex., Rio Grande at .....	456-460	Ute Creek at Gallegos, N. Mex. ....	188
Sand Creek near Bartlesville, Washington County, Okla. ....	172	near Bueyeros, N. Mex. ....	104-109
near Okesa, Osage County, Okla. ....	172	near Logan, N. Mex. ....	110
near Pawhuska, Osage County, Okla. ....	172	V	
Sandy Creek $\frac{3}{4}$ miles east of Yellowpine, Tex. ....	330	Van Buren, Ark., Arkansas River at... ..	141-144
San Ildefonso, N. Mex., Rio Grande near .....	406-411	Verdigris River near Claremore, Okla. ....	85-87
San Jacinto River near Huffman, Tex. ....	354-356	near Claremore, Rogers County, Okla. (State Highway 88 Bridge) .....	171
San Jose River at Correo, N. Mex. ....	436-438	near Claremore, Rogers County, Okla. (State Highway 20 Bridge) .....	173
San Marcial, N. Mex., Rio Grande at .....	467-474	near Claremore, Rogers County, Okla. (U. S. Highway 66 Bridge) .....	175
San Marcial, N. Mex., Rio Grande Tiffany Channel at .....	461-466	near Inola, Okla. ....	92-95
San Saba, Tex., Colorado River near .....	377-383	near Lenapah, Okla. ....	81-84
Sediment .....	16-17	near Nowata, Nowata County, Okla. ....	170
Sheridan, Ark., Hurrican Creek near .....	250-253	near Okay, Wagoner County, Okla. ....	175
Silica .....	9	near South Coffeyville, Nowata County, Okla. ....	169
Skedee Creek near Pawnee, Pawnee County, Okla. ....	162	near Talala, Rogers County, Okla. ....	170
Skeleton Creek near Lovell, Okla. ....	65-68	near Wagoner, Wagoner County, Okla. ....	175
Smackover Creek near Norphlet, Ark. ....	239-242	Vermilion River at Bancker's Ferry near Abbeville, La. ....	304-307
Socorro Main Canal north at San Acacia, N. Mex. ....	448	Victoria, Tex., Guadalupe River at ....	388-390
Sodium-adsorption-ratio .....	15-16	W	
Sodium and potassium .....	10	Walnut Creek at Purcell, McClain County, Okla. ....	180
South Fork of Ouachita River near Mount Ida, Ark. ....	288	Walters, Okla., Cache Creek near .....	196-198
South Fork Wichita River 4 miles north of Benjamin, Tex. ....	292	Wanderers Creek at Odell, Tex. ....	290
6 miles east of Guthrie, Tex. ....	292	War Eagle Creek near Hindsville, Ark. ....	50
South Fourche La Fave near Hollis, Ark. ....	158	Washita River at Clinton, Custer County, Okla. ....	281
Spadra Creek near Clarksville, Ark. ....	156	near Carnegie, Caddo County, Okla. ....	281
Specific conductance .....	14	near Cheyenne, Roger Mills County, Okla. ....	280
Sperry, Okla., Bird Creek near .....	88-91	near Chickasha, Grady County, Okla. ....	282
Spring Creek near Ada, Pontotoc County, Okla. ....	181	near Durwood, Okla. ....	212-215
Spring River at Imboden, Ark. ....	51	near Pauls Valley, Garvin County, Okla. ....	293
near Quapaw, Ottawa County, Okla. ....	176	near State Line, Roger Mills County, Okla. ....	280
Stinking Creek near Carnegie, Kiowa County, Okla. ....	281	Wellington, Tex., Salt Fork Red River near .....	189-191
Strawberry River near Evening Shade, Ark. ....	52	West Bitter Creek near Chickasha, Grady County, Okla. ....	282
near Poughkeepsie, Ark. ....	52	near Tabler, Grady County, Okla. ....	282
Stream flow .....	21	West Cache Creek near Cookietown, Cotton County, Okla. ....	279
Strong, Ark., Bayou Lapile near .....	257-261	West Fork White River near Greenland, Ark. ....	50
Sugar Creek near Anadarko, Caddo County, Okla. ....	282	Western Gulf of Mexico basins .....	308-518
Sulfate .....	11	Wewoka, Creek near Wetumka, Hughes County, Okla. ....	185
Sulphur Creek near Ira, Tex. ....	387	Wharton, Tex., Colorado River at .....	386
Suspended sediment .....	4-5	Whitefield, Okla., Canadian River near .....	135-140
Sweetwater Creek near Texas line, Beckham County, Okla. ....	279	White River at Batesville, Ark. ....	51
T		at Beaver, Ark. ....	32-34, 50
Tascosa, Tex., Canadian River near ..	111-113	at Calico Rock, Ark. ....	51
Tatum, Tex., Sabine River near .....	319-321	at Clarendon, Ark. ....	47-49
Temperature .....	86	at Cotter, Ark. ....	35-37
Tenaha Creek 10 miles northeast of Shelbyville, Tex. ....	329	at county road crossing, $\frac{1}{2}$ miles east of Crosbyton, Tex. ....	370
Three Creeks near Junction City, Ark. ....	272-275	at De Valls Bluff, Ark. ....	52
Total Acidity .....	14-15	at Newport, Ark. ....	41-43
Trinity Bay at mouth of Trinity River, near Anahuac, Tex. ....	348-352	at U. S. Highway 82, $\frac{1}{2}$ miles east of Crosbyton, Tex. ....	370
Trinity River at Anahuac, Tex. ....	346-347	near Rogers, Ark. ....	50
at North Main Street Bridge in Fort Worth, Tex. ....	353	White River basin .....	32-53
at Romayor, Tex. ....	340-341	Whitney, Tex., Brazos River near .....	362-364
8.7 miles upstream from Liberty, Tex. ....	353	Wichita River at head of Lake Kemp 9 miles northwest of Seymour, Tex. ....	292
near Moss Bluff, Tex. ....	342-343	Tex. ....	292
near Oakwood, Tex. ....	336-338	Wildhorse Creek near Hoover, Garvin County, Okla. ....	284
Trinity River basin .....	335-353		
Tulsa, Okla., Arkansas River near ..	76-80		
Turkey Creek near Dover, Kingfisher County, Okla. ....	168		
near Drummond, Garfield County, Okla. ....	167		

	Page		Page
Wilmot, Ark., Bartholomew, Bayou			
near .....	266-267	Y	
Winnfield, La., Dugemona River near...	278		
Wolf Creek near Fort Supply, Woodward		Yukon, Okla., North Canadian River	
County, Okla. ....	185	near .....	127-129



