

Quality of Surface Waters for Irrigation Western United States 1955

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

GEOLOGICAL SURVEY WATER-SUPPLY PAPER 1465



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PREFACE

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QUALITY OF SURFACE WATERS FOR IRRIGATION, WESTERN UNITED STATES, 1955

INTRODUCTION

The records of chemical analyses, other physical measurements, and discharge given in this report comprise the fifth annual compilation of data for 78 irrigation network stations in operation west of the Mississippi River.

Geological Survey Water Supply Papers 1264 and 1362, the annual compilations for water years 1951 and 1952, respectively, describe briefly the development of this series of reports. In summary, there is an expressed need for comprehensive continuing information about the chemical quality of surface waters used for irrigation and the changes resulting from the drainage of irrigated lands.

In recognition of this problem the Subcommittee on Hydrology, Federal Interagency River Basin Committee (now called Interagency Committee on Water Resources) on February 6, 1950, approved a list of 106 network stations on streams in Western United States at which water samples were to be collected and analyzed with particular reference to the use of these stream waters for irrigation. These stations, with pertinent information about periods of operation, are shown in the following table. Of the 106 stations selected, 39 were already being operated by the Geological Survey and 7 by the International Boundary and Water Commission. From the remaining stations on the list, 30 were selected for activation by the U. S. Geological Survey during the fiscal year 1951. In addition, 3 stations previously operated in connection with other programs and scheduled to be discontinued were to be included in the list to be operated by the Geological Survey (the Subcommittee amended the list on October 2, 1952, to include the three additional stations, bringing the recommended number of irrigation network stations to a total of 109).

It was contemplated that the network stations would be located at stream-flow gaging stations and that the program of collecting and analyzing the samples and reporting the findings would be the

Irrigation-Quality Network Stations in Western United States

[Selected by Subcommittee on Hydrology, Federal Interagency River Basin Committee, 1950]

No.	Geo- logical Survey Part No.	Stream	Location	Date established
1	5	Souris River.....	near Westhope, N. Dak.....	June 1954
2	6	Missouri River.....	near Williston, N. Dak.....	Dec. 5, 1954
3		Missouri River.....	at Pierre, S. Dak.....	Oct. 3, 1950
4		Missouri River.....	at Nebraska City, Nebr.....	Jan. 4, 1951
5		Yellowstone River.....	at Billings, Mont.....	Dec. 15, 1950
6		Yellowstone River.....	near Sidney, Mont.....	Jan. 3, 1951
7		Bighorn River ^a	at Thermopolis, Wyo.....	Jan. 1, 1951
7a		Wind River ^b	below Boysen Dam, Wyo.....	Nov. 24, 1953
8		Bighorn River.....	at Bighorn, Mont.....	Oct. 2, 1950
9		Tongue River.....	at Miles City, Mont.....	Jan. 4, 1951
10		Powder River.....	near Locate, Mont.....	Jan. 4, 1951
11		Grand River ^c	near Wapala, S. Dak.....	Jan. 17, 1951
12		Moreau River.....	at Promise, S. Dak.....	.....
13		Cheyenne River ^d	near Eagle Butte, S. Dak.....	Jan. 17, 1951
14		White River.....	near Oacoma, S. Dak.....	.....
15		James River.....	near Huron, S. Dak.....	.....
16		N. Platte River.....	below Alcona Dam, Wyo.....	.....
17		N. Platte River.....	below Guernsey Reservoir, Wyo.....	Dec. 7, 1950
18		Platte River.....	at Brady, Nebr.....	Feb. 28, 1951
18a		Supply Canal (Tri-County Diversion).....	near Maxwell, Nebr.....	Mar. 1, 1951
19		South Platte River.....	at Julesburg, Colo.....	Oct. 1, 1945
20		Republican River.....	above Medicine Creek at Cambridge, Nebr.....	Dec. 22, 1950
21		Republican River.....	near Hardy, Nebr.....	.....
22		Smoky Hill River.....	near Langley, Kans.....	.....
23		Saline River ^e	near Wilson (or Russell), Kans.....	.....
23a		Saline River ^f	at Tescott, Kans.....	Apr. 3, 1950
24	7	Arkansas River.....	below John Martin Reservoir, Colo.....	Jan. 10, 1951
25		Arkansas River.....	at Arkansas City, Kans.....	Oct. 8, 1951
26		Arkansas River.....	at Ralston, Okla.....	Jan. 1, 1950
27		Arkansas River.....	at Van Buren, Ark.....	Oct. 1, 1945
28		Cimarron River ^g	at Mannford, Okla.....	Oct. 1, 1949
29		Canadian River ^h	near Perkins, Okla.....	Oct. 1, 1952
30		Canadian River.....	near Tascosa, Tex.....	June 2, 1948
31		Canadian River.....	near Whitefield, Okla.....	Sept. 1, 1946
32		Red River.....	at Denison Dam, near Denison, Tex.....	May 1, 1944
33	8	Washita River ⁱ	near Tabler, Okla.....	Sept. 10, 1946
34		Sabine River.....	near Ruliff, Tex.....	Oct. 1, 1947
35		Neches River.....	at Evadale, Tex.....	Oct. 1, 1947
36		Trinity River.....	at Romayor, Tex.....	Sept. 1, 1945
37		San Jacinto River ^j	near Huffman, Tex.....	Sept. 1, 1945
38		Brazos River.....	at Richmond, Tex.....	Sept. 1, 1945
39		Colorado River ^k	at Robert Lee, Tex.....	Oct. 1, 1947
40		Colorado River.....	at Austin, Tex.....	Oct. 1, 1947
41		Colorado River.....	at Wharton, Tex.....	Apr. 11, 1944
42		Guadalupe River.....	at Victoria, Tex.....	Sept. 1, 1945
43		Nueces River.....	near Mathis, Tex.....	Oct. 1, 1947
44		Rio Grande.....	above Culebra Creek near Lobatos, Colo.....	Oct. 11, 1946
45		Rio Grande.....	at Otowi Bridge near San Ildefonso, N. Mex.....	Oct. 23, 1947
46		Rio Grande.....	at San Marcial, N. Mex.....	July 1, 1948
47		Rio Grande ^m	below Elephant Butte Outlet, N.M.....	1933
48		Rio Grande ^m	near El Paso, Tex.....	1930
49		Rio Grande ^m	below Old Fort Quitman, Tex.....	1930
50		Rio Grande ^m	at Upper Presidio, Tex.....	1935
51		Rio Grande ^m	at Langtry, Tex.....	1945
51a		Rio Grande ^m	at Eagle Pass, Tex.....	1938
52		Rio Grande ^{m, o}	at Laredo, Tex.....	July 1, 1955
52a		Rio Grande ^m	at Roma, Tex.....	1944
		Rio Grande ^m	at Chapeno, Tex.....	July 1955

Irrigation-Quality Network Stations in Western United States—Continued

No.	Geo- logical Survey Part No.	Stream	Location	Date established
53	9	Pecos River ^m	below Alamogordo Dam, N. Mex.	June 26, 1937
54		Pecos River.....	near Artesia, N. Mex.....	July 1, 1937
55		Pecos River.....	near Orla, Tex.....	July 1, 1937
56		Pecos River ^{m, p}	near Comstock, Tex.....	1935
56a		Pecos River ^m	near Shumla, Tex.....	Jan. 1, 1955
57		Colorado River.....	near Glenwood Springs, Colo.....	Oct. 1941
58		Colorado River.....	near Cisco, Utah.....	Oct. 1928
59		Colorado River.....	at Lees Ferry, Ariz.....	Oct. 1, 1947
60		Colorado River.....	near Grand Canyon, Ariz.....	Oct. 1925
61		Colorado River.....	below Hoover Dam, Ariz. - Nev.....	Oct. 1939
62		Colorado River.....	below Parker Dam, Calif.....	.....
63		Colorado River (Yuma Main Canal)	below Colorado River Siphon at Yuma, Ariz.	Oct. 1942
64		Gunnison River.....	near Grand Junction, Colo.....	Oct. 1931
65		Green River.....	near Linwood, Utah.....	.....
66		Green River.....	at Green River, Utah.....	Oct. 1928
67		San Juan River ^q	near Blanco, N. Mex.....	Oct. 1, 1945
67a		San Juan River.....	near Archuleta, N. Mex.....	Dec. 31 1954
68		San Juan River.....	near Bluff, Utah.....	Oct. 1929
69		Little Colorado River.....	at Cameron, Ariz.....	Jan. 17, 1951
70		Gila River.....	at Kelvin, Ariz.....	Dec. 1, 1950
71		Gila River.....	below Gillespie Dam, Ariz.....	Dec. 1, 1950
72		Salt River.....	at Stewart Mountain Dam, Ariz.....	Dec. 9, 1950
73		Verde River.....	below Barlett Dam, Ariz.....	Dec. 9, 1950
74		Agua Fria River.....	below Lake Pleasant Dam, Ariz.....	Dec. 1, 1950
75	10	Bear River.....	near Collinston, Utah.....	.....
76		Sevier River.....	near Marysville, Utah.....	.....
77		Sevier River.....	near Lynndyl, Utah.....	Mar. 22, 1951
78	11	Humboldt River.....	at Palisade, Nev.....	.....
79		Humboldt River.....	near Rye Patch, Nev.....	Dec. 10, 1951
80		San Joaquin River.....	below Friant Dam, Calif.....	.....
81	12	San Joaquin River.....	near Mendota, Calif.....	.....
82		San Joaquin River.....	near Vernalis, Calif.....	Mar. 1, 1951
83		San Joaquin River.....	at Antioch, Calif.....	.....
84		Calaveras River (Stockton Diverting Canal) ^f	at Stockton, Calif.....	Mar. 1, 1951
84a	14	San Joaquin River.....	near Biola, Calif.....	Nov. 1952
85		Mokelumne River.....	at Woodbridge, Calif.....	Mar. 1, 1951
86		Sacramento River.....	near Red Bluff, Calif.....	.....
87		Sacramento River.....	at Knights Landing, Calif.....	Feb. 26, 1951
88		Feather River.....	at Nicolaus, Calif.....	Feb. 26, 1951
89		American River.....	at Fair Oaks, Calif.....	May 1, 1951
90		Columbia River.....	at International Boundry.....	Nov. 15, 1951
91		Columbia River.....	at Grand Coulee Dam, Wash.....	Nov. 25, 1950
92		Kootenai River.....	at Porthill, Idaho.....	.....
93		Pend Oreille, River.....	near Metaline Falls, Wash.....	.....
94		Yakima River.....	at Kiona, Wash.....	Dec. 30, 1952
95		Snake River.....	near Heise, Idaho.....	Jan. 8, 1953
96		Snake River.....	near Minidoka, Idaho.....	.....
97		Snake River.....	at King Hill, Idaho.....	Mar. 27, 1951
98		Snake River.....	at Weiser, Idaho.....	.....
99		Snake River.....	near Clarkston, Wash.....	Nov. 14, 1951
100	14	Boise River.....	near Arrowrock, Idaho.....	.....
101		Boise River.....	at Notus, Idaho.....	Nov. 21, 1950
102		Columbia River.....	at Maryhill Ferry near Rufus, Oreg.	Dec. 1, 1950
103		Dischutes River ^s	at Moody near Biggs, Oreg.....	Dec. 1952
104	5	Willamette River.....	at Salem, Oreg.....	Feb. 1, 1951
105		Rogue River.....	at Grants Pass, Oreg.....	Jan. 5, 1953
106		Sheneyne River.....	near Warwick, N. Dak.....	Jan. 8, 1951

Irrigation-Quality Network Stations in Western United States—Continued

No.	Geo- logical Survey Part No.	Stream	Location	Date established
Stations added by Subcommittee, October 2, 1952				
107	6	North Platte River.....	at Lewellen, Nebr.....	.....
108		Platte River.....	near Louisville, Nebr.....	.....
109	9	Virgin River.....	at Little Field, Ariz.....	July 1949

^a Dropped from list Jan. 21, 1954. Replaced by station Wind River below Boysen Dam.

^b Discontinued Sept. 30, 1954.

^c Discontinued Nov. 20, 1953.

^d Discontinued Nov. 20, 1953.

^e Dropped from list Oct. 3, 1952. Replaced by station at Tescott.

^f Discontinued Sept. 30, 1953.

^g Discontinued Sept. 30, 1952. Replaced by station at Perkins.

^h Discontinued Sept. 30, 1953.

ⁱ Dropped from list Oct. 3, 1952.

^j Dropped from list Apr. 5, 1954.

^k Discontinued Sept. 30, 1951.

^m Operated by International Boundary and Water Commission.

ⁿ Discontinued June 30, 1955. Replaced by station at Laredo.

^o Discontinued Jan. 31, 1955. Replaced by station at Chapeno.

^p Discontinued Dec. 1954. Replaced by station near Shumla.

^q Discontinued Dec. 31, 1954. Replaced by station near Archuleta, N. Mex.

^r Dropped from list Oct. 3, 1952. Replaced by station, San Joaquin River near Biola.

^s Discontinued Feb. 15, 1954.

responsibility of the Geological Survey. The scope of the chemical analyses would provide for the calculation of the salt burden of streams and in general would conform with the current Geological Survey standards for the comprehensive investigation of the chemical quality of surface waters.

The following criteria were recommended in the selection of the key network stations.

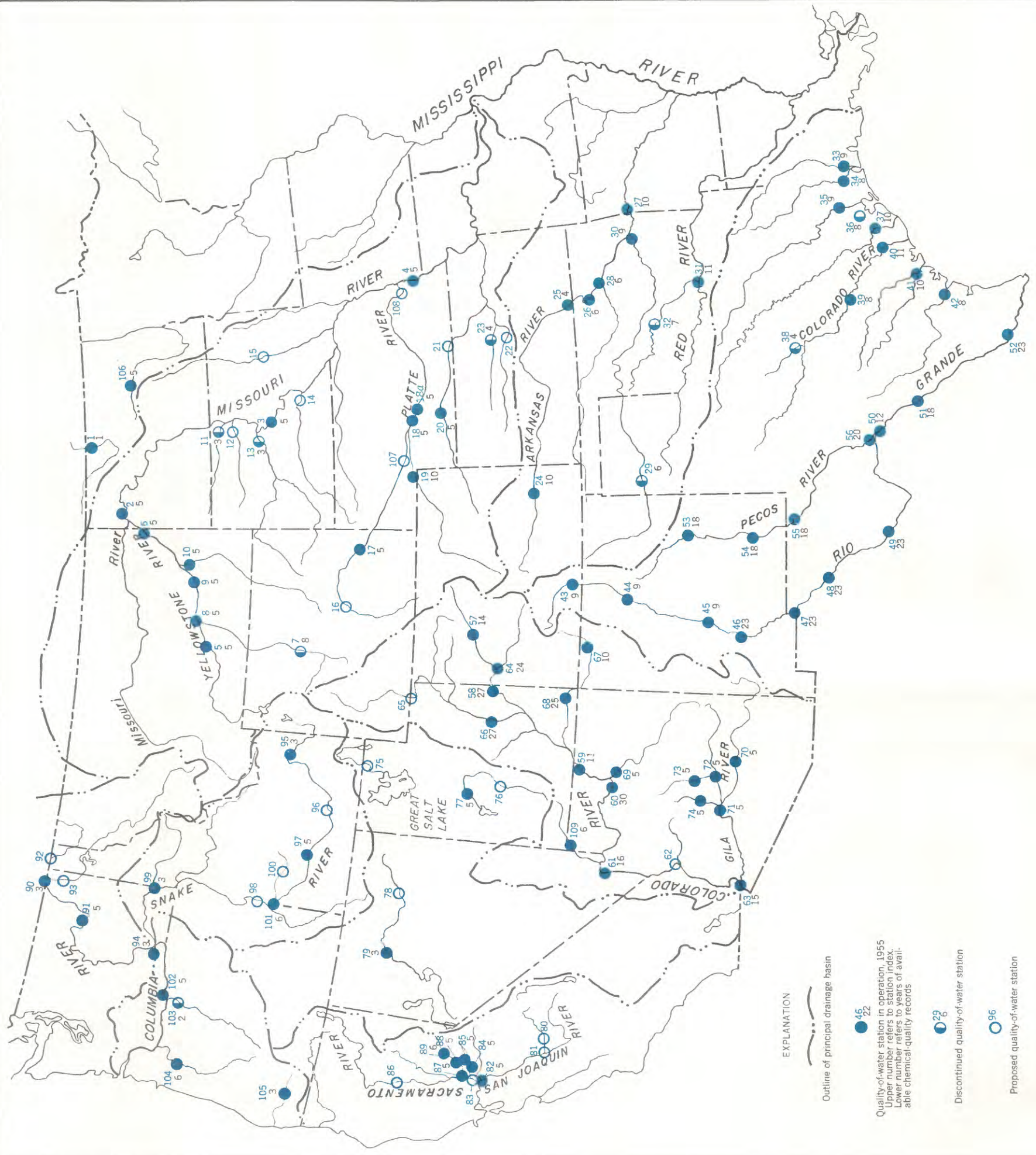
1. All recommended stations should be located on streams west of the main stem of the Mississippi River.

2. All proposed stations should relate primarily to irrigation although multiple-purpose needs which include irrigation may be considered.

3. All stations should be located at or near stream-flow gaging stations. The most nearly up-to-date list of gaging stations currently operated by the U. S. Geological Survey (which comprises all but a small percentage of all gaging stations) will be found in the most recently published Geological Survey water-supply papers for the areas involved.

4. Consideration should be given to the location of irrigation development areas that are now affecting or are likely to affect the chemical quality of the river water.

5. Only those stations should be proposed that are likely to reflect important changes in chemical quality over a period of years. Stations operated for relatively short periods (5 years or less),



EXPLANATION

Outline of principal drainage basin

● 45 22
Quality-of-water station in operation, 1955
Upper number refers to station index.
Lower number refers to years of available chemical-quality records

○ 29 6
Discontinued quality-of-water station

○ 96
Proposed quality-of-water station

RECOMMENDED STATIONS FOR IRRIGATION-QUALITY NETWORK IN WESTERN UNITED STATES

as would be required for intensive studies of specific projects, should not in general be included.

Plate 1 is a plot of the recommended list of 109 network stations on streams in Western United States. The 78 stations in operation in 1955 are identified by a solid circle. The period of record, in years, is also shown at each of these stations. In a few instances the period of record differs from that obtained from the date established by the Subcommittee, as earlier records were included also. Proposed stations are identified by an open circle.

During the 1955 water year five network stations were started. They were the Souris River near Westhope, N. Dak., Rio Grande at Laredo, Tex., Rio Grande at Chapino, Tex., Pecos River near Shulma, Tex. and San Juan River near Archuleta, N. Mex. Seven network stations were discontinued during the year including the Bighorn River at Thermopolis, Wyo., Wind River below Boysen Dam, Wyo., Rio Grande at Eagle Pass, Tex., Rio Grande at Roma Tex., Pecos River near Comstock, Tex., Deschutes River at Moody near Biggs, Oreg., and San Juan River near Blanco, N. Mex.

ACKNOWLEDGMENTS

Agencies that have each contributed to some part of the data published herein include: The Agriculture Research Service, and the Soil Conservation Service, U. S. Department of Agriculture; the Bureau of Reclamation, U. S. Department of the Interior; the Corps of Engineers, U. S. Department of the Army; the State engineers for each of the 17 Western States and for Louisiana and Arkansas, the State Boards of Health, the El Paso, Tex., Department of Water and Sewage; the Ministry of Hydraulic Resources of Mexico.

During 1954-55, the United States Section of the International Boundary and Water Commission operated the stream gaging stations for the following Rio Grande stations included in this report: El Paso, Fort Quitman, Upper Presidio, Langtry, Laredo, Chapeno and it operated the station Pecos River near Shulma, also. The Mexican Section operated the stream gaging stations on the main stem at Eagle Pass. Each section operated the gaging stations on tributary streams, floodways, and diversions within its own country.

Descriptive headings and discharge data for the seven stations operated by the International Boundary and Water Commission, were obtained from Water Bulletins 24 and 25 prepared jointly by the United States and Mexican Sections of the International Boundary and Water Commission. These publications contain stream

discharge and related data for 1954 and 1955. Analyses for seven Rio Grande main stem stations and for the Pecos River near Shulma, Tex., were obtained from the U. S. Salinity Laboratory, Riverside, Calif.

Additional contributions of data have been made by individuals, corporations, and other State and Federal agencies, and their cooperation is acknowledged with appreciation.

COLLECTION OF SAMPLES

In accordance with the recommendation of the Subcommittee, where practicable, one sample was collected each day throughout the water year. In general, each sample was taken in an 8- or 12-ounce glass bottle provided with a pressure-type or positive-seal closure to prevent escape of dissolved gases. Each sample was integrated in the vertical section of a stream usually at about midpoint of flow by lowering the open sample bottle to the bottom and returning it to the surface during the filling process.

At most stations the samples were collected by local residents hired for the purpose. The local sample collector recorded on each bottle the name of the stream, location, gage height (if practicable), water temperature, time of day, date, and collector's name or initials. Samples were shipped to the laboratory or picked up by technical personnel on a predetermined schedule. Visits were made periodically by technical personnel to check on sampling procedures.

EXAMINATION OF SAMPLES

Upon receipt of samples in the laboratory, they were recorded and stored away from direct sunlight until opened for analysis. Specific conductance was determined with a conductance bridge on each sample as soon as opened. These data provided a basis for compositing a series of daily samples, for complete analysis. In general, a minimum of three composites a month consisting of equal volumes of approximately 10 daily samples, were prepared for chemical analysis. Individual samples that showed differences in conductance of more than 30 percent of the mean for the period were not included in the composite, but were grouped separately for additional composite samples—or analysis of the individual sample was made. For those stations where acceptable discharge values were reported with the samples, or could be obtained promptly from rating tables, samples were prepared by mixing volumes of individual samples in proportion to water discharge.

The following series of 15 determinations (schedule 1) were made on all composite samples for all new network stations during the first year of operation: Silica, iron, calcium, magnesium, sodium, potassium, bicarbonate, carbonate, sulfate, chloride, fluoride, nitrate, boron, dissolved solids, and specific conductance. The following values were calculated from the analytical data: Dissolved solids in tons per acre-foot, dissolved solids in total tons, total hardness, noncarbonate hardness, and percent sodium.

It was further recommended by the Subcommittee that during the second and third years the following series of 11 determinations (schedule 2) would be made on all composite samples: Calcium, magnesium, sodium, bicarbonate, carbonate, sulfate, chloride, nitrate, boron, dissolved solids, and specific conductance. Hardness, noncarbonate hardness, percent sodium, total tons and tons per acre-foot would be calculated as in schedule 1.

For the 1955 data there were notable exceptions to the recommended schedules as outlined above. At some stations, where more complete data were needed for other uses, the number of constituents determined was increased. Conversely, some stations that had been in operation for several years prior to this project, during which time at least the minimum determinations in schedule 1 were completed, were immediately placed on a reduced analytical schedule.

In the fourth and succeeding years (unless significant changes become apparent) it was recommended that the following determinations (schedule 3) would be made on all composite samples as long as the program is in effect: Calcium and magnesium (either separately, or together by the recently developed ethylenediamine tetraacetic acid titration test for hardness), sodium, dissolved solids, and specific conductance. In addition, four complete analyses (schedule 1) would be made each year, one analysis to be made on a composite sample during each quarter. Certain additional determinations above these minimum requirements were to be made if deemed necessary to define widely varying characteristics of the stream water.

All laboratory determinations were to be made in accordance with standard procedures used by the Geological Survey. These procedures are based on methods found in authoritative publications on water analysis.

REPORTING OF DATA

In order to release the data in the form most widely used in the evaluation of irrigation waters, the results of analyses in this compilation are given in equivalents per million, rather than the conventional unit part per million. Some agencies that actively participate in irrigation water-quality investigations prefer to express results in milligrams per liter (mg/l) and milliequivalents per liter (meq/l). However, for all practical purposes where concentrations of dissolved solids are less than about 7,000 parts per million, no correction for density of the water is necessary and the units reported in each method are considered to be synonymous.

If results are desired in parts per million they can be calculated by multiplying the reported values in equivalents per million by the chemical combining weights of the individual constituents. Pertinent physical data and water discharge are also included in the tables.

EXPLANATION OF TABLES

The tables of analyses beginning on page 24 include a brief descriptive heading summarizing the more pertinent features at each station as follows:

Location of station is given generally as the distance in land or river miles from a town or other political or geographic feature. In Survey practice the term "at" generally implies that the station is within a mile radius of the named town whereas "near" implies that it is beyond a mile radius.

Drainage area above the gaging station was obtained from the most recent published records of the annual reports of the Geological Survey on Surface Water of the United States, and from the International Boundary and Water Commission.

Records available are given for all periods during which samples, other than infrequent, were collected for chemical analyses. It does not include the periods for which discharge records are available.

Extremes for the current year and for the period of record are reported for specific conductance and percent sodium because of their widespread application in the evaluation of analyses of water used for irrigation. The results for specific conductance are based on the measurement made at the laboratory upon receipt of

the sample from the field. Data for percent sodium were obtained from the composite-samples analysis.

Remarks include sources of data, additional explanation concerning the records, and offices where the records of chemical quality may be obtained.

Discharge records were obtained from the responsible Geological Survey Surface Water Branch offices except for the seven stations operated by the International Boundary and Water Commission. Discharge data are shown in acre-feet, calculated from the mean daily discharge in cubic feet per second by multiplying by the factor 1.983.

Analytical values are reported in equivalents per million for cations and anions. The equivalent is the weight with reference to some standard (such as the combining weight—either of oxygen, 8, or of hydrogen, 1.008) of that quantity of an element, radical, or compound to complete a definite chemical reaction. An equivalent of an element or ion is exactly equal in combining power to one equivalent of another element or ion. As previously discussed, for concentrations of dissolved solids that are normally encountered in water for irrigation, an equivalent per million is equal to a milliequivalent per liter. Silica, which is considered to be present in the colloidal state, and boron, are reported in parts per million. Percent sodium is calculated as follows:

$\frac{\text{Na} \times 100}{\text{Na} + \text{K} + \text{Ca} + \text{Mg}}$, where all constituents are reported in equivalents per million.

At the recommendation of the Subcommittee, sodium-adsorption-ratio (SAR) is published for all network stations beginning October 1952. The term is defined and described under "Sodium hazard" on page 21.

DISCUSSION OF RESULTS

Discharge data and dissolved-solids loads for stations operated in 1955 are summarized in the following table.

HUDSON BAY AND UPPER MISSISSIPPI RIVER BASINS

Red River of the North basin.—Two stations were operated in the basin; Sheyenne River near Warwick, N. Dak., and Souris River near Westhope, N. Dak. Runoff in the Upper Sheyenne River basin was about the same as in 1951 and 1954 and was greater than in 1952

Summary of water discharge, and tonnages of dissolved solids—Continued

Station	Runoff (acre-feet)	Dissolved Solids (tons per acre-foot)
Red River of the North basin		
Sheyenne River near Warwick, N. Dak.....	36,800	0.65
Souris River near Westhope, N. Dak.....	459,400	.62
Missouri River main stem		
Missouri River near Williston, N. Dak.....	18,350,000	.61
Missouri River at Pierre, S. Dak.....	14,580,000	.65
Missouri River at Nebraska City, Nebr.....	19,870,000	.65
Yellowstone River basin		
Yellowstone River at Billings, Mont.....	3,874,000	.28
Yellowstone River near Sidney, Mont.....	6,506,000	.67
Bighorn River at Bighorn, Mont.....	2,178,000	1.01
Tongue River at Miles City, Mont.....	248,500	.61
Powder River near Locate, Mont.....	309,200	1.56
Platte River basin		
North Platte River below Guemsey Reservoir, Wyo.....	637,600	.65
Platte River at Brady, Nebr.....	226,500	.60
Supply Canal (Tri-County Diversion) near Maxwell, Nebr.....	930,700	.65
South Platte River at Julesburg, Colo.....	73,100	1.93
Kansas River basin		
Republican River above Medicine Creek at Cambridge, Nebr.....	92,010	.44
Arkansas River basin		
Arkansas River below John Martin Reservoir, Colo.....	248,500	1.74
Arkansas River at Arkansas City, Kans.....	468,200	1.19
Arkansas River at Ralston, Okla.....	1,108,000	1.67
Cimarron River at Perkins, Okla.....	976,700	2.82
Arkansas River at Van Buren, Ark.....	9,298,580	1.03
Canadian River near Whitefield, Okla.....	1,883,000	1.93
Red River basin		
Red River at Denison Dam near Denison, Tex.....	2,000,000	1.27
Sabine River basin		
Sabine River near Ruliff, Tex.....	4,036,000	.14
Neches River basin		
Neches River at Evadale, Tex.....	2,280,000	.15
Trinity River basin		
Trinity River at Romayor, Tex.....	2,125,000	.40
Brazos River basin		
Brazos River at Richmond, Tex.....	1,569,000	.68
Colorado River basin		
Colorado River at Austin, Tex.....	956,900	.33
Colorado River at Wharton, Tex.....	865,700	.33
Guadalupe River basin		
Guadalupe River at Victoria, Tex.....	270,800	.40
Nueces River basin		
Nueces River near Mathis, Tex.....	97,400	.47
Rio Grande basin		
Rio Grande above Culebra Creek near Lobatos, Colo.....	62,130	.....
Rio Grande at Otowi Bridge near San Ildefonso, N. Mex.....	432,000	.35
Rio Grande Conveyance channel at San Marcial, N. Mex.....	185,690	1.13
Rio Grande floodway at San Marcial, N. Mex.....	72,190	1.39
Rio Grande below Elephant Butte Outlet, N. Mex.....	211,800	.....
Rio Grande near El Paso, Tex.....	69,710	.....
Rio Grande below Old Fort Quitman, Tex.....	7,479	.....
Rio Grande at Upper Presidio, Tex.....	22,730	.....
Rio Grande at Langtry, Tex.....	952,900	.....
Rio Grande at Laredo, Tex.....	.....	.....
Rio Grande at Chapeno, Tex.....	.....	.....
Pecos River below Alamogordo Dam, N. Mex.....	130,500	1.65
Pecos River near Artesia, N. Mex.....	321,100	3.51
Pecos River below Red Bluff Dam near Orla, Tex.....	157,100	4.56
Pecos River near Shumla, Tex.....	.....	.....
Colorado River main stem		
Colorado River near Glenwood Springs, Colo.....	1,026,000	.51
Colorado River near Cisco, Utah.....	2,629,000	.96
Colorado River at Lees Ferry, Ariz.....	7,290,000	.94
Colorado River near Grand Canyon, Ariz.....	7,580,000	1.02

Summary of water discharge, and tonnages of dissolved solids—Continued

Station	Runoff (acre-feet)	Dissolved Solids (tons per acre-foot)
Colorado River main stem—Continued		
Colorado River below Hoover Dam, Ariz. -Nev.....	9, 276, 000	1.06
Diversions and Return Flows at and below Imperial Dam		
Yuma Main Canal below Colorado River siphon at Yuma, Ariz.....	333, 000	1.11
Gunnison River basin		
Gunnison River near Grand Junction, Colo.....	1, 032, 000	1.13
Green River basin		
Green River at Green River, Utah.....	2, 820, 000	.63
San Juan River basin		
San Juan River near Blanco, N. Mex.....		
San Juan River near Archuleta, N. Mex.....	493, 700	
San Juan River near Bluff, Utah.....	965, 600	.71
Little Colorado River basin		
Little Colorado River at Cameron, Ariz.....		
Virgin River basin		
Virgin River at Littlefield, Ariz.....	135, 500	3.18
Gila River basin		
Gila River at Kelvin, Ariz.....	229, 400	.85
Gila River below Gillespie Dam, Ariz.....	122, 500	2.00
Salt River at Stewart Mountain Dam, Ariz.....	581, 800	.96
Verde River below Bartlett Dam, Ariz.....	155, 400	.50
Aqua Fria River below Lake Pleasant Dam, Ariz.....	15, 070	.35
Sevier Lake basin		
Sevier River near Lynndyl, Utah.....	116, 500	2.33
Humboldt River basin		
Humboldt River near Rye Patch, Nev.....	119, 470	1.90
San Joaquin River basin		
San Joaquin River near Biola, Calif.....	85, 950	.08
San Joaquin River near Vernalis, Calif.....	975, 100	.48
Mokelumne River at Woodbridge, Calif.....	175, 300	a.06
Sacramento River basin		
Sacramento River at Knights Landing, Calif.....	6, 073, 000	.18
Feather River at Nicolaus, Calif.....	2, 675, 000	.10
American River at Fair Oaks, Calif.....	1, 428, 000	.07
Columbia River main stem		
Columbia River at International Boundary.....	75, 350, 000	.12
Columbia River at Grand Coulee Dam, Wash.....	81, 790, 000	.12
Yakima River basin		
Yakima River at Kiona, Wash.....	2, 222, 000	.20
Snake River main stem		
Snake River near Heise, Idaho.....	4, 091, 000	.31
Snake River at King Hill, Idaho.....	6, 845, 000	.45
Snake River near Clarkston, Wash.....	30, 890, 000	.23
Boise River basin		
Boise River at Notus, Idaho.....	279, 400	.58
Columbia River main stem		
Columbia River at Maryhill Ferry near Rufus, Oreg.....	129, 600, 000	.14
Willamette River basin		
Willamette River at Salem, Oreg.....	15, 020, 000	.07
Rogue River basin		
Rogue River at Grants Pass, Oreg.....	1, 635, 000	.10

^a For period of sampling only. See individual station records and footnotes for additional description of discharge data used in computations of weighted averages.

and 1953. The percentage composition and the weighted average dissolved solids concentration were similar to those of previous years of chemical quality record.

The Souris River near Westhope station is being operated as part of the Missouri River basin program. It is included in this report because it is at a site recommended for inclusion in the network program by the Federal Inter-Agency River Basin committee, in 1950.

MISSOURI RIVER BASIN

Missouri River-main stem.— The Missouri River has become a highly regulated stream. Reservoirs on the main stem that regulate flow and consequently influence the chemical quality of the water are Ft. Peck on the Upper Missouri River above Williston, Garrison which lies between Williston and Pierre, Ft. Randall and Gavins Point which lie between Pierre and Nebraska City.

In the 1955 water year the flow at Williston was about 125 percent of the average flow for the 26-year period 1928-54 and about 13 percent more than the flow for the 1954 water year. The flow at Pierre was about 85 percent of the average flow for the 25-year period 1929-54 and about 15 percent less than the flow for the 1954 water year. The flow at Nebraska City was about 78 percent of the average flow for the 24-year period 1929-53 and 11 percent lower than the flow for the 1954 water year.

In 1955 the Ft. Peck Reservoir greatly influenced the water quality at Williston. Much of the spring runoff in the Missouri River Valley was stored in Ft. Peck Reservoir until after the spring runoff from Yellowstone River Valley had passed Williston. In October, July, August, and September, when flow in the Yellowstone River was low, large flows were maintained at Williston by releases from Ft. Peck. About 4 million more acre-feet of water was released from Ft. Peck than entered. The release of this water from storage increased the water discharge and the dissolved solid load at Williston over the two previous years. The weighted average dissolved solids concentration at Williston was higher than in the previous years of record because the Yellowstone River contributed water with higher dissolved solids concentrations than usual.

Garrison Reservoir also had a considerable effect on water quality of downstream stations. Water in storage increased about 4 million acre-feet during the water year. The impoundment of the water from upstream caused the water passing the downstream

stations to be composed of proportionately more local runoff than in previous years. Water entering the Missouri River from tributaries in the Dakotas tends to high higher dissolved solids concentrations than water entering from tributaries in Montana and Wyoming. The load at downstream stations was decreased by the additional storage upstream. Also, between Williston and Pierre a noticeable loss of water to the ground-water table occurs which further decreases the load at downstream stations.

Ft. Randall Reservoir released about the same amount of water as it received so the effect on water quality was probably small. Gavins Point Reservoir began to impound water in September so the amount impounded was small and had only a small effect on water quality downstream.

The water quality is similar at the three sampling stations on the Missouri River. As in 1953 and 1954 a comparison of weighted averages for dissolved solids shows a slight increase in mineralization between Williston and Pierre and a decrease between Pierre and a decrease between Pierre and Nebraska City. The increase in mineralization probably is due to the influence of tributary streams in the Dakotas; the decrease probably is due to dilution by the Niobrara, Platte, and possibly the Big Sioux Rivers. The quality of the water was essentially the same as in 1953 and 1954.

Of the dissolved-solids load passing Williston in the 1955 water year, 39 percent came from the Yellowstone River basin and 61 percent came from the Upper Missouri River basin. The dissolved solids load passing Pierre was 16 percent less than the load passing Williston principally because of the additional 4 million acre-feet of water kept in storage at Garrison Reservoir. A significant amount of the load was probably lost through inflow to the ground-water table between Williston and Pierre. Of the load passing Nebraska City, 75 percent came from the reach of the Missouri River above Pierre and 25 percent came from tributaries between Pierre and Nebraska City.

Yellowstone River basin.—Runoff in the basin was less than for any previous year for which chemical quality records are available. Runoff from the basin above Billings was less than the 1951-54 period, but runoff from the basin below Billings was more than the yearly runoff for the four years 1951 to 1954.

The dissolved-solids load at Sidney was higher than the loads in the 1953 and 1954 years; and lower than the loads in 1951 and 1952, which were years of comparatively high water discharge. The increase in load was caused by increased loads in Bighorn, Tongue, and Powder Rivers. Weighted average concentrations of

dissolved solids were greater in 1955 than in 1953 and 1954 at the mainstem stations but were smaller at the Bighorn, Tongue, and Powder River stations. Twenty-five percent of the dissolved-solids load at Sidney was contributed by the Yellowstone River basin above Billings, 51 percent by the Bighorn basin, 3 percent by the Tongue River basin, and 11 percent by the Powder River basin. Ten percent of the dissolved solids load at Sidney is assumed to have been contributed by minor tributaries and the Yellowstone Valley between Billings and Sidney.

Major reservoirs in operation in the basin are Buffalo Bill Reservoir in the Shoshone River basin and Bull Lake, Pilot Butte, and Boysen Reservoirs in the Wind River basin.

Platte River basin.— Flow in the Platte River is affected by trans-basin diversion, reservoirs (Seminoe, Pathfinder, Alcova, Guernsey, and McConaughy on the North Platte River; Elevenmile Canyon and Cheesman on the South Platte River), power developments, ground-water withdrawals, and diversions for and return flow from irrigation developments. The Platte River is utilized to such an extent that no flow is recorded in some reaches during parts of the year. For example, near Grand Island, Nebr., the river is dry for most of the summer. Water flowing past upstream stations sometimes does not reach the downstream stations; water flowing past downstream stations is frequently composed of proportionately large amounts of local inflow.

Runoff in the Platte River basin was very low during the 1955 water year. The weighted average dissolved solids concentration of the water passing the station below Guernsey Reservoir increased over previous years of record, and the weighted average dissolved solids concentration of the water passing the Julesburg station decreased. Decreases in the weighted average dissolved solids concentration at the Brady and Supply Canal stations were due principally to the release of large amounts of relatively dilute water from McConaughy Reservoir during recent years.

Kansas River basin.— Runoff at the station Republican River above Medicine Creek at Cambridge, Nebr., was small in 1955 although it was about 50 percent greater than in 1954. Major reservoirs above the station, include Bonny Reservoir on the South Fork Republican, Enders Reservoir on Frenchman Creek, and Swanson Lake on the main stem.

The quality of the water was essentially the same as in previous years. Regulation of flow by Trenton Dam (Swanson Lake), and Enders Reservoir tends to make the quality of the water uniform throughout the year. In 1955, about two-thirds of the flow past the sampling station came from Swanson Lake and Enders Reservoir.

LOWER MISSISSIPPI RIVER BASIN

Arkansas River basin.—Runoff in the Arkansas basin of Okla. for the 1955 water year was increased from the 1954 water year. The exception was the Canadian River near Whitefield which decreased slightly. However the runoff at this station for 1954 was affected by heavy local rainfall in the lower Canadian basin and this did not reflect average conditions for the State. Runoff in the Arkansas River above its junction with the Canadian River increased over 100 percent from 1954 to 1955.

The increased runoff in the Arkansas basin caused a decrease in the concentrations of dissolved solids. Runoff for the Arkansas River at Ralston was nearly twice that of 1954 and the dissolved solids concentration decreased from 2.27 to 1.67 tons per acre-foot. Runoff for the Cimarron River at Perkins was more than four times that of 1954 and the dissolved solids concentration decreased from 5.52 to 2.82 tons per acre-foot.

There were wide daily variations in mineral concentrations for most streams. The weighted average dissolved solids concentration for the Cimarron River at Perkins was about one-half that of the 1953 and 1954 water years, both the maximum and minimum concentrations dissolved solids for the 3-year period of record occurred during the 1955 water year. Sodium-adsorption ratio values for this station ranged from a low of 3.0 to a high of 98.

Runoff of the Arkansas River at Van Buren during the 1955 water year was 9.3 million acre-feet, as compared to 6.1 in 1954, 9.4 in 1953, 19.4 in 1952, and 33.3 million acre-feet in 1951. This 54 percent increase in water discharge over previous year was accompanied by an approximately 15 percent decrease in average concentration of dissolved solids. The percent sodium remained almost the same as the previous year.

WESTERN GULF OF MEXICO BASIN

In the western Gulf of Mexico basin, from the Sabine to the Nueces River, the runoff continued below average during the 1955 water year, although at several stations flow was greater than in 1954. Comparatively minor changes in weighted average dissolved solids concentrations occurred.

Rio Grande basin.—The total annual runoff over most of the Rio Grande basin was once again below average; however, heavy October rains contributed enough water within most of the Pecos River valley to bring total runoff figures up to about average or

slightly above average. This storm runoff was generally of very good quality, accounting for some of the lowest dissolved-solids concentrations ever measured in that part of the Pecos River lying above Red Bluff reservoir.

The International Boundary and Water Commission water Bulletin No. 25 reported the yearly volume of flow of the Rio Grande from El Paso to Falcon Dam was much below normal, varying from 15 percent of normal at El Paso to 3 percent of normal at Fort Quitman and 63 percent of normal at Laredo. Below Falcon Dam, the flow in the Rio Grande was largely regulated by releases from Falcon Reservoir and at Chapeño gaging station, the flow was 107 percent of the estimated normal.

The 1955 investigation of the quality of Rio Grande by the IB & WC extended from El Paso to Mercedes, Texas. The annual tonnage of salts, or dissolved solids, carried by the river was generally about one-half of normal, except for the reach from El Paso to Upper Presidio where it was much below normal.

At the Orla, Texas station on the Pecos River the runoff was 75 percent of the 18-year average and the dissolved-solids concentration of 4.56 tons per acre-foot was the lowest since the high-flow years of 1941 and 1942.

COLORADO RIVER BASIN

In the Colorado River basin runoff was also below average. There were no significant trends of quality except that the salinity of water released from Lake Mead and sampled from the Yuma Main Canal at Yuma, Ariz. continued to increase. This trend has been observed for several years and is undoubtedly due to the continued drouth conditions in the Colorado River basin.

Colorado River main stem.—A slight decrease in concentration of dissolved mineral constituents may be noted for the stations at Glenwood Springs, Colorado and near Cisco, Utah. This change in water quality reflects an increase in runoff as compared with the preceding year. Eighty-one percent of the annual runoff was represented by analyses for the station near Cisco. The concentration of dissolved constituents for the station below Hoover Dam remains relatively constant due to the leveling effect of Lake Mead.

Gunnison River basin.—An increase in flow of about 50 percent is reflected by a 33 percent decrease in dissolved solids concentration as compared with the preceding water year.

Green River basin.— A slight increase in annual runoff as compared with the preceding year is reflected by an 8 percent decrease in dissolved solids concentration.

San Juan River basin.— A considerable decrease in average concentration of dissolved mineral constituents and total loads may be noted with less than 1 percent increase in annual runoff.

Virgin River basin.— The effects of intensive irrigation in the Upper Virgin River Basin are reflected by a 25 percent increase in average dissolved solids concentration. This increase was accompanied by a 10 percent decrease in percent sodium with less than 1 percent decrease in annual runoff.

Gila River basin.—The total runoff in the Gila River basin varied inconsistently from the long term averages, in some parts being above but in other parts being below average. This situation was due in part to "spotty" thunderstorm activity over the basin. Storm runoff during the month of August accounted for much of the total runoff, and the quality of water from this source was generally much better than average. The weighted—average analysis for the station Gila River at Kelvin, Ariz. is not related to total discharge because the amount of water released from upstream San Carlos Reservoir is not consistently proportional to discharge from other sources. The quality of this storage water is quite variable which further affects the weighted—average analysis of downstream flow.

THE GREAT BASIN

Sevier Lake basin.— Relatively no change was noted in average dissolved solids concentration and percent sodium in the heavily irrigated Sevier Lake basin. However, total loads for the 1955 water year were less than the preceding year. This may be attributed to a 12 percent decrease in annual runoff.

Humboldt River basin.—The runoff from the Humboldt River near Rye Patch, Nevada was 80 percent less than that for the previous year. Flow was intermittent for the entire year, occurring mostly in the months of May through August. Ninety-two percent of the runoff was represented by analysis. The average dissolved solids concentration increased 88 percent. Total loads decreased by 64 percent.

PACIFIC SLOPE BASINS IN CALIFORNIA

Flows at all stations in the San Joaquin River and Sacramento River basins were considerably lower during the 1955 water year than during the 1954 water year. Seasonal precipitation and runoff was below normal for the report period. In some areas precipitation was nearly 20 percent less than normal.

The quality of the streams deteriorated somewhat from the previous year. During the year the highest weighted average concentration (0.48 ton per acre foot) observed was for the San Joaquin River near Vernalis, Calif., and the lowest (0.06 ton per acre foot) was for the Mokelumne River at Woodbridge, Calif.

Folsom Dam on the American River began operation during the 1955 water year. The dam is located approximately 3.5 miles upstream from the Fair Oaks station. It is too early to determine what effect the impounding will have on the quality of the water.

The flow of the Sacramento River is regulated by Shasta Dam, and the water of the San Joaquin River is impounded behind Friant Dam, a few miles upstream from the Biola station. Both of these dams have been in operation for several years. A minimum flow is maintained in the Sacramento River by releases of water from Shasta Dam to control salinity in the lower reaches of the river.

The Sacramento and San Joaquin River channels are used in part for irrigation return flow. Because of the diluting effect of the American and Feather Rivers on the Sacramento, and the large releases from Shasta Dam for salinity control, the quality of water in the middle and lower reaches of the Sacramento River was better than in similar reaches of the San Joaquin River.

The major portion of the impounded San Joaquin River water is used to irrigate parts of the east side of the upper San Joaquin River valley north of Friant Dam and also south of Friant Dam along the east side of the Central Valley. This water is replaced by a more concentrated Sacramento River water brought into the San Joaquin valley via the Delta-Mendota canal. As a result, the river below Friant Dam is largely irrigation return water of poor quality.

PACIFIC SLOPE BASINS IN WASHINGTON AND UPPER COLUMBIA RIVER BASIN

Columbia River main stem.—The average salt concentration, in tons per acre-foot, and SAR values for the Columbia River at International Boundary were identical to those for the previous 2 years. The flow from 1953 through 1955 has been 98, 125, and 109 percent, respectively, of the mean annual discharge. Downstream at Grand Coulee Dam, Wash. the quality of river water also changed very little from the preceding year.

Yakima River basin.—Slight increases in average SAR and salt concentrations occurred in the Yakima River at the Kiona, Wash. gaging station. However, the runoff decreased 28 percent with a 18 percent decrease in salt load.

SNAKE RIVER BASIN

Snake River main stem.—The Snake River at King Hill, Idaho had little variation from the prior year; SAR values were identical and water discharge and salt load were similar. Downstream at Clarkston, Wash. the Snake River water increased slightly in SAR value, 0.8 to 0.9. A small increase in salt load over the prior year, was principally attributable to a corresponding increase in discharge.

Flow past the Heise station was 19 percent less than in 1954 with a 7 percent increase in dissolved mineral concentration.

Boise River basin.—Reduced runoff of the Boise River at Notus, Idaho in 1955 caused an increase in SAR values, and the weighted average salt concentration was almost twice the previous high value, which occurred in 1954.

PACIFIC SLOPE BASINS IN OREGON AND LOWER COLUMBIA RIVER BASIN

Columbia River main stem.—Very little change in chemical properties of Columbia River water near Rufus, Oreg. was observed in 1955. The average specific conductance was 169 as compared to 167 for the previous year. A decrease in discharge in 1955 was accompanied by a slight lowering of the average salt concentration to 0.14 tons per acre-foot; 0.02 tons below that reported for 1954.

Willamette River basin.—Salinity of the Willamette River water remained very low in 1955. At Salem, Oreg. the river water had an average specific conductance of 56.

Rogue River basin.— The analysis of the water from the Rogue River at Grants Pass, Oreg., showed no significant change from data reported in 1954. The SAR and average salt concentration were identical to those reported in the previous year.

CRITERIA OF WATER QUALITY

Many different classifications of water for irrigation appear in the literature; however, most of the development in this field has been made in the last 30 years. Scofield and Headley (1921) were among the first important contributors to water-quality criteria; they pointed out the hazards from the use of high-sodium water. A brief historical resumé of these early developments is given in Water-Supply Paper 1264, the first of this series of reports.

Although the above classifications have relied principally on specific conductance as the criterion for total salt concentrations, investigators generally place emphasis on the composition of the water, as indicated by the analysis of dissolved constituents in equivalents per million. For example, Eaton (1950) discusses precipitation of calcium and magnesium carbonate and its effects on the sodium percentage in the soil solution. Eaton's suggestion of "residual sodium carbonate" in irrigation waters as related to the base exchange of the soil has assumed added importance in soil permeability studies.

Thorne and Thorne (1951) in developing a system for classifying Utah waters for irrigation used a diagram similar to that of Wilcox (1948) and designated categories by a series of numbers and letters: 1A.....5E. The numbers 1 to 5 denote increasing concentrations of dissolved solids, and the letters A to E increasing sodium percentages in the water with increasing probabilities for developing alkali soil conditions. Class 1A water, in which specific conductance ranges from 0 to 750 micromhos and the percent sodium from 0 to an approximate maximum of 70, can be used safely on most soils. Class 5E waters, those having specific conductance greater than 5,000 micromhos and percent sodium of about 90 and above, are generally unsatisfactory for irrigation.

The United States Salinity Laboratory Staff (1954) recently released a classification that incorporates many of the desirable features of the early classifications together with more recent developments. Empirical equations are used in developing a diagram for the classification of irrigation waters. Although the classification embodies both research and field observations, it is tentative and should be used for general guidance only.

A. Salinity hazard.

Waters are divided into four classes: low salinity, medium salinity, high salinity, and very high salinity, the dividing points between classes being 250, 750, and 2,250 micromhos per centimeter. They range from water that can be used for irrigation of most crops on most soils to that which is not suitable for irrigation under ordinary conditions.

B. Sodium hazard

The Salinity Laboratory introduced the term sodium-adsorption-ratio (SAR), a ratio for irrigation waters and soil extracts used to express the relative activity of sodium ions in exchange reactions with the soil. This ratio is expressed by the equation:

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

where the concentrations of the ions are expressed in milliequivalents per liter (or equivalents per million for most irrigation waters). It has more significance than percent sodium for use as an index of the sodium or alkali hazard of the water because it relates more directly to the adsorption of sodium by the soil.

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

C. Boron hazard

In assessing water quality on the basis of boron only, the classification uses the limits proposed by Scofield (1936). This grouping involves the ranges for sensitive, semitolerant, and tolerant crops, with respect to boron, for each of five classes.

D. Bicarbonate ion hazard.

The effect of bicarbonate ion concentration on water quality is expressed in terms of "residual sodium carbonate" (RSC) which is defined by the equation:

$$\text{RSC} = (\text{HCO}_3^- + \text{CO}_3^{=}) - (\text{Ca}^{++} + \text{Mg}^{++})$$

Then in appraising quality of irrigation water with the above classifications, the Salinity Laboratory Staff recommends that first consideration be given to salinity and alkali hazards, then to independent characteristics, boron or toxic elements, any one of which may change the quality rating. Factors such as drainage and management practices, largely determine the effectiveness of irrigation activity.

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PART 5. HUDSON BAY AND UPPER MISSISSIPPI RIVER BASINS

RED RIVER OF THE NORTH BASIN

SHEYENNE RIVER NEAR WARWICK, N. DAK.

LOCATION.--At gaging station at highway bridge, 3.3 miles south of Warwick, Benson County.
DRAINAGE AREA.--2,100 square miles, approximately.

RECORDS AVAILABLE.--Chemical analyses: January 1951 to September 1955.

Water temperatures: January 1951 to September 1955.

EXTREMES, 1954-55.--Specific conductance: Maximum daily, 1,940 micromhos Feb. 1; minimum daily, 240 micromhos Apr. 4.

Percent sodium: Maximum, 66 July 8-18; minimum, 11 Feb. 2, 1955.

EXTREMES, 1951-55.--Specific conductance: Maximum daily, 1,940 micromhos Feb. 1, 1955; minimum daily, 240 micromhos Apr. 4, 1955.

Percent sodium: Maximum, 66 July 8-18, 1955; minimum, 11 Feb. 2, 1955.

REMARKS.--Values reported for dissolved solids are residues on evaporation at 180°C unless otherwise noted. Daily samples for chemical analyses composited by discharge. Records of specific conductance of daily samples available in regional office at Lincoln, Nebr.
Records of discharge for water year October 1954 to September 1955 given in WSP 1388.

Chemical analyses, water year October 1954 to September 1955.

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million										Dissolved solids			Per- cent so- dium	So- ad- sorp- tion ratio	Specific conduct- mhos at 25°C)	
			Cal- cium (Ca)	Magne- sium (Mg)	So- dium (Na)	Potas- sium (K)	Bicar- bonate (HCO ₃)	Car- bonate (CO ₃)	Sul- fate (SO ₄)	Chlo- ride (Cl)	Ni- trate (NO ₃)	Boron (B) ppm	Parts per mil- lion	Tons per acre- foot	Total tons				
Oct. 1-8, 1954 ..	660	--	4.84	7.65	5.78	--	9.72	0.17	2.27	--	--	--	720	0.98	647	61	4.9	1,080	8.2
Oct. 9	63	--	4.56	4.78	4.77	--	7.47	.00	1.77	--	--	--	536	.73	46	51	3.2	827	7.9
Oct. 10-16	498	--	4.84	8.31	--	--	10.28	.00	2.58	--	--	--	769	1.05	523	63	5.4	1,160	7.9
Oct. 17-19	171	--	4.74	5.35	--	--	7.92	.00	1.92	--	--	--	587	.80	137	53	3.5	900	8.1
Oct. 20-Nov. 14 ..	1,210	--	5.24	7.48	--	--	9.54	.00	2.69	--	--	--	740	1.01	1,220	59	4.6	1,130	8.1
Nov. 15-16	75	--	5.12	5.78	--	--	7.80	.53	2.37	--	--	--	638	.87	65	53	3.6	975	8.3
Nov. 17-27	393	12	2.54	2.78	7.26	0.31	9.70	.00	2.64	0.68	0.01	0.31	d739	1.01	397	56	4.5	1,120	8.1
Nov. 28-Dec. 15 ..	443	--	5.36	5.26	--	--	8.15	.00	2.17	--	--	--	613	.83	368	50	3.2	945	8.1
Dec. 16-Jan.13,1954 ..	296	--	6.54	6.74	--	--	10.06	.00	2.79	--	--	--	769	1.05	311	51	3.7	1,170	8.1
Jan. 14-16	20	--	6.36	10.83	--	--	11.50	.80	4.33	--	--	--	c1,010	1.37	27	63	6.1	1,510	8.4
Jan. 17-19	20	--	5.86	5.70	--	--	8.26	.30	2.62	--	--	--	676	.92	18	49	3.3	1,030	8.3
Jan. 20	7	--	6.44	11.44	--	--	11.73	1.10	4.58	--	--	--	c1,070	1.46	10	64	6.4	1,590	8.5
Jan. 21-23	20	--	6.64	6.35	--	--	9.33	.40	2.91	--	--	--	762	1.04	21	49	3.5	1,140	8.3
Jan. 24-26	20	--	7.76	9.91	--	--	12.95	.33	4.06	--	--	--	c1,050	1.43	29	56	5.0	1,560	8.2
Jan. 27-30	15	--	6.48	5.48	--	--	8.49	.47	2.77	--	--	--	695	.95	14	46	3.0	1,050	8.3

c Sum of determined constituents.

d .03 equivalent per million fluoride (F).

- U. S. Geol. Survey, 1954, Quality of surface waters for irrigation, Western United States, 1951: U. S. Geol. Survey Water-Supply Paper 1264, p. 1-153; 1955, Quality of surface waters for irrigation, Western United States, 1952: U. S. Geol. Survey Water-Supply Paper 1362, p. 1-179.
- U. S. Salinity Laboratory Staff, 1954, Diagnosis and improvement of saline and alkali soils: U. S. Dept. Agriculture Handbook 60, p. 1-160.
- Wilcox, L. V., 1948, The quality of water for irrigation use: U. S. Dept. Agriculture Tech. Bull. 926, p. 1-40.

RED RIVER OF THE NORTH BASIN--Continued

SOURIS RIVER NEAR WESTHOPE, N. DAK.

LOCATION.--At gaging station, 1,200 feet upstream from second crossing of international boundary, 1 mile downstream from Fish and Wildlife Service dam 357, 7 miles northeast of Westhope, Bottineau County, and 11 miles downstream from Boundary Creek. DRAINAGE AREA.--17,600 square miles, approximately.

RECORDS AVAILABLE.--Chemical analyses: June 1954 to September 1955.

Water temperatures: September 1954 to January 1955, May to September 1955.

EXTREMES, August 1954 to September 1955.--Specific conductance: Minimum daily, 355 micromhos Apr. 12, 1955.

Percent sodium: Maximum 48 Sept. 10-26, 1954; minimum, 30 June 12, 1955.

REMARKS.--Values reported for dissolved solids are residues on evaporation unless otherwise noted. Daily samples for chemical analyses composited by discharge. Records of specific conductance of daily samples available in regional office at Lincoln, Neb. Samples collected monthly during winter because of extreme weather conditions. Records of discharge for water year October 1954 to September 1955 given in WSP 1388.

Chemical analyses, July 1951 to September 1954

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million								Dissolved solids			Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH		
			Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B) ppm	Parts per million				Tons per acre-foot	Total tons
July 4, 1951	--	7.1	1.85	1.99	2.86	4.50	1.92	0.23	0.01	0.04	0.11	400	0.54	--	43	723	8.7	
June 30, 1954	2,300	--	2.15	2.51	3.00	--	4.92	2.79	.31	--	--	479	.65	1,500	37	721	7.5	
Aug. 12-Sept. 8	14,560	12	1.75	2.85	3.61	0.28	5.74	2.39	.34	.02	.11	.16	.499	.68	9,900	43	759	8.0
Sept. 10-26	823	13	1.10	2.58	3.65	.28	4.92	2.17	.39	.02	.16	.15	.464	.63	518	48	700	7.4

a Includes 0.53 equivalent per million of carbonate (CO₃).

Jan. 31-Feb. 1, 1955	8	--	7.44	11.65	--	12.75	1.00	4.75	--	--	cl. 110	1.51	12	61	6.1	1,660	8.3
Feb. 2	4	--	4.20	.52	--	3.77	.20	.75	--	--	.274	.37	1	11	.4	437	8.3
Feb. 3-11	58	--	8.08	11.57	--	13.83	.53	4.64	--	--	cl. 150	1.56	90	59	5.7	1,690	8.3
Feb. 12-14	12	--	6.44	5.65	--	8.49	.67	2.77	--	--	.702	.95	11	47	3.2	1,060	8.3
Feb. 15-17	10	--	8.08	10.52	--	13.39	.27	4.27	--	--	cl. 170	1.46	15	57	5.2	1,600	8.2
Feb. 18-Mar. 9	82	--	6.90	6.39	--	10.01	.00	2.79	--	--	.761	1.03	84	48	3.4	1,180	8.1
Mar. 10-20	441	16	3.09	2.95	.38	8.75	.00	2.71	.68	.06	.43	.95	419	47	3.3	1,060	8.0
Mar. 21-23	282	--	8.48	11.74	--	13.55	.70	5.50	--	--	cl. 230	1.67	471	58	5.7	1,760	8.4
Mar. 24-29	512	--	3.44	3.17	--	4.33	.00	2.17	--	--	.446	.61	312	48	2.4	665	7.8
Mar. 30-Apr. 2	4,570	--	1.52	1.09	--	1.82	.00	.83	--	--	.190	.26	1,190	41	1.3	281	7.4
Apr. 3-5	7,360	--	1.56	1.00	--	1.74	.00	.92	--	--	.179	.24	1,770	38	1.1	273	7.7
Apr. 6-7	2,800	--	2.06	1.91	--	2.64	.00	1.39	--	--	.279	.38	1,060	47	1.9	409	7.8
Apr. 8-17	3,720	--	2.70	2.61	--	3.59	.00	1.79	--	--	.357	.49	1,820	49	2.2	530	7.7
Apr. 18-May 8	3,860	--	4.10	4.61	--	6.10	.00	2.46	--	--	.536	.73	2,820	53	3.2	826	8.1
May 9-28	2,040	--	5.26	6.17	--	7.95	.00	3.12	--	--	.687	.93	1,900	54	3.8	1,040	8.0
May 29-June 8	2,420	--	5.82	7.40	--	9.70	.00	3.41	--	--	.782	1.06	2,570	56	4.3	1,170	7.8
June 9-July 7	3,580	--	5.58	9.57	--	10.82	.30	3.87	--	--	.916	1.25	4,480	63	5.7	1,360	8.2
July 8-18	492	--	4.86	9.57	--	10.85	.00	3.73	--	--	.862	1.17	576	66	6.1	1,290	7.9
July 19-Aug. 2	272	--	4.20	7.04	--	8.62	.00	2.62	--	--	.680	.92	250	63	4.9	1,030	8.0
Aug. 3-16	150	--	4.08	5.26	--	7.21	.00	1.81	--	--	.557	.76	114	56	3.7	852	7.9
Aug. 17-Sept. 4	112	--	4.10	3.39	--	6.10	.00	1.46	--	--	.448	.61	68	45	2.4	705	7.9
Sept. 5-30	114	28	2.74	1.48	.10	4.57	.00	1.04	.13	.01	.321	.44	50	23	.9	510	8.1
Total or weighted average ^a	36,800	--	3.50	4.22	--	5.54	--	2.08	--	--	.477	0.65	24,920	55	3.2	718	--

e 0.02 equivalent per million fluoride (F).

f 0.01 equivalent per million fluoride (F).

a Represents 100 percent of runoff for water year.

b Includes carbonate as bicarbonate.

c Sum of determined constituents.

RED RIVER OF THE NORTH BASIN--Continued

SOURIS RIVER NEAR WESTHOPE, N. DAK.--Continued

Chemical analyses, October 1954 to September 1955

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million										Dissolved solids			Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
			Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B) ppm	Parts per million	Tons per acre-foot	Total tons				
Oct. 1-5, 1954 ..	2,450	5.7	1.40	2.62	3.70	0.28	5.18	2.19	0.39	0.02	0.16	0.15	470	0.64	1,570	46	2.6	723	8.1
Oct. 6-Nov. 2 ...	25,410	7.9	2.15	2.95	3.87	.28	6.10	2.60	.48	.02	.06	.16	535	.73	18,550	42	2.4	822	8.1
Nov. 3-30	10,680	10	2.64	3.48	4.44	.28	6.72	3.56	.54	.02	.06	.19	633	.86	9,180	41	2.5	957	7.8
Dec. 1-7	3,030	10	2.99	3.97	4.91	.31	7.54	3.91	.62	.02	.05	.16	709	.96	2,910	40	2.6	1,060	8.0
Dec. 8-24	2,290	9.8	3.24	4.60	5.31	.36	8.36	4.48	.71	.02	.04	.16	780	1.06	2,430	39	2.7	1,170	8.1
Dec. 25	125	11	2.30	3.50	4.09	.36	6.23	3.44	.54	--	.02	.11	594	.81	101	40	2.4	912	8.2
Dec. 26-Jan. 8, 1955	1,790	8.2	4.09	5.17	6.48	.38	9.80	5.52	.87	.02	.04	.21	935	1.27	2,270	40	3.0	1,360	8.1
Jan. 9-15	1,944	10	3.59	6.09	7.09	.41	10.14	6.10	.96	.02	.02	.23	1,080	1.39	1,310	41	3.2	1,460	8.2
Jan. 16-23	139	11	4.39	6.61	7.31	.43	11.34	6.25	1.02	.03	.08	.23	1,080	1.47	1,204	39	3.1	1,590	7.9
Jan. 24-30	135	21	5.19	5.47	6.52	.38	10.78	5.48	.96	.02	.12	.09	1,020	1.39	188	37	2.8	1,500	7.8
Feb. 26	135	21	4.89	5.27	6.04	.38	10.19	5.41	.96	.01	.14	.20	981	1.33	180	36	2.7	1,420	7.4
Mar. 9																			
Apr. 5-15	44,650	7.6	1.20	1.22	1.22	.24	2.21	1.35	.18	.01	.06	.09	249	.34	15,180	31	1.1	377	7.4
Apr. 16-23	44,390	4.1	1.45	1.55	1.48	.26	2.77	1.79	.20	.01	.02	.14	249	.39	17,310	31	1.2	451	7.5
Apr. 24-30	33,100	7.8	1.95	2.03	2.13	.28	3.56	2.60	.27	.00	.02	.10	393	.53	17,540	33	1.5	605	8.2
May 1-8	31,600	9.1	2.50	2.22	2.48	.28	4.28	3.04	.28	.00	.02	.11	455	.62	19,590	33	1.6	695	8.3
May 9-June 2 ...	100,500	7.7	2.59	3.03	3.40	.33	5.31	3.33	.31	.02	.04	.18	540	.73	73,370	34	1.8	811	7.9
June 3-11	29,140	3.3	2.25	2.51	2.52	.28	4.85	2.50	.25	.01	.05	.11	452	.61	17,780	33	1.6	697	7.8
June 12	3,110	9.2	3.64	2.44	2.74	.38	7.18	1.25	.37	--	.02	.14	560	.76	2,360	30	1.6	940	7.4
June 13-30	49,550	4.3	2.10	2.46	2.52	.25	4.79	2.39	.21	.01	.04	.12	442	.60	29,730	34	1.7	676	7.8
July 1-17	28,210	6.8	2.00	2.38	2.87	.25	4.61	2.56	.25	.02	.05	.15	447	.61	17,210	38	1.9	685	7.9
July 18-Aug. 1 ..	10,640	9.4	2.00	2.46	2.83	.28	4.72	2.77	.25	.02	.04	.16	454	.62	6,600	37	1.9	682	7.9
Aug. 2-31	16,640	9.0	1.85	2.77	2.96	.31	4.82	2.89	.31	.02	.07	.15	477	.65	10,820	38	2.0	707	8.0
Sept. 1-18	6,100	6.1	1.95	2.73	3.31	.31	5.02	2.87	.27	.02	.11	.13	504	.69	4,210	40	2.2	769	8.0
Sept. 19-38	1,150	2.6	1.75	2.77	3.48	.31	4.95	2.83	.31	.02	.02	.14	491	.67	771	42	2.3	752	7.9
Total or weighted average	445,900	6.9	2.10	2.47	2.61	0.28	4.52	2.62	0.28	0.01	0.04	0.14	448	0.61	271,400	35	1.7	682	--
Total or weighted average	459,400	7.1	2.15	2.55	2.70	0.28	4.64	2.69	0.31	0.01	0.04	0.14	459	0.62	282,700	35	1.8	697	--

b Sum of determined constituents.

c Represents 97 percent of runoff for water year

d Includes estimates where data are missing.

e Includes estimated data for missing periods. Represents 100 percent of runoff for water year.

PART 6. MISSOURI RIVER BASIN

MISSOURI RIVER MAIN STEM

MISSOURI RIVER NEAR WILLISTON, N. DAK.

LOCATION.--At gaging station at Lewis and Clark Highway bridge, 5 miles southwest of Williston, Williams County, and 25 miles downstream from Yellowstone River.

DRAINAGE AREA.--164,500 square miles, approximately.

RECORDS AVAILABLE.--Chemical analyses: December 1955.

Water temperatures: May 1951 to September 1955.

EXTREMES, 1954-55.--Specific conductance: Maximum daily, 919 micromhos Jan. 9, 1955; minimum daily, 459 micromhos June 18, 28.

Percent sodium: Maximum, 41 Apr. 14 to May 24; minimum, 32 June 3.

EXTREMES, 1950-55.--Specific conductance: Maximum daily, 919 micromhos Jan. 9, 1955; minimum daily, 320 micromhos June 24, 1951.

Percent sodium: Maximum, 41 May 26 to June 9, 1953, Apr. 14 to May 24, 1955; minimum, 31 Jan. 30, 1952.

REMARKS.--Values reported for dissolved solids are residues on evaporation. Daily samples for chemical analyses composited by discharge. Records of specific conductance of daily samples available in regional office at Lincoln, Nebr. Records of discharge for water year 1954 to September 1955 given in WSP 1389.

Chemical analyses, water year October 1954 to September 1955

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million								Dissolved solids			Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)				
			Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B) ppm	Parts per million			Tons per acre-foot	Total tons		
Oct. 1-28, 1954	1,900,000	--	4.76	2.61	--	--	3.23	4.04	--	--	--	--	463	0.63	1,197,000	35	1.7	701	8.0
Oct. 29-Nov. 12	792,600	--	4.88	2.70	--	--	3.28	4.25	--	--	--	--	485	.66	523,100	36	1.7	724	8.0
Nov. 13-Dec. 6	627,800	13	3.24	2.16	3.13	0.10	3.56	4.79	0.31	0.03	0.01	0.15	542	.74	464,600	36	1.9	805	8.0
Dec. 7-26	466,900	--	5.56	3.26	--	--	3.67	4.89	--	--	--	--	559	.76	354,800	37	1.9	824	8.1
Dec. 27-Jan. 23, 1955	505,700	--	6.04	3.35	--	--	3.93	5.31	--	--	--	--	592	.81	409,600	36	1.9	872	8.1
Jan. 24-Feb. 7	328,100	--	5.58	3.00	--	--	3.64	4.95	--	--	--	--	540	.73	239,500	35	1.8	808	7.8
Feb. 8-11	84,540	--	5.14	2.78	--	--	3.34	4.58	--	--	--	--	502	.68	57,490	35	1.7	754	7.9
Feb. 12-13	38,760	--	6.02	3.30	--	--	3.87	5.37	--	--	--	--	600	.82	31,780	35	1.9	880	7.6
Feb. 14-Mar. 6	384,200	11	3.24	2.20	2.91	.12	3.52	4.71	.34	.03	.03	.17	537	.73	280,500	34	1.8	793	8.0
Mar. 7-8	38,960	--	4.64	2.48	--	--	3.03	3.93	--	--	--	--	450	.61	23,770	35	1.6	681	7.7
Mar. 9	19,830	--	6.16	3.30	--	--	3.97	5.48	--	--	--	--	604	.82	16,260	35	1.9	895	7.5
Mar. 10-12	69,220	--	4.16	2.17	--	--	3.08	3.50	--	--	--	--	398	.54	37,380	33	1.5	622	7.5
Apr. 3-6	451,200	--	4.26	2.39	--	--	2.74	3.79	--	--	--	--	420	.57	257,200	36	1.6	650	7.8
Apr. 7-13	452,600	--	4.00	2.61	--	--	2.72	3.83	--	--	--	--	428	.58	262,500	39	1.8	651	7.6
Apr. 14-30	979,600	--	4.50	3.13	--	--	2.92	4.68	--	--	--	--	493	.67	656,300	41	2.1	750	7.9
May 1-24	1,321,000	--	4.34	3.04	--	--	3.13	4.12	--	--	--	--	492	.67	885,100	41	2.1	741	7.7
May 25 - June 2	640,500	--	3.78	2.26	--	--	2.70	3.33	--	--	--	--	331	.53	339,500	37	1.6	601	7.7

June 3, 1955	61,290	--	3.20	1.48	--	2.46	2.06	--	.02	--	302	.41	25,130	32	1.2	470	7.8
June 4-16	878,960	18	2.20	2.09	.09	2.57	3.02	.17	.02	.13	374	.51	448,200	36	1.5	569	7.7
June 17	83,110	--	3.92	2.48	--	2.79	3.46	--	--	--	415	.56	46,540	39	1.8	634	7.8
June 18-30	1,290,000	--	3.34	1.61	--	2.29	2.58	--	--	--	324	.44	567,600	33	1.2	498	7.6
July 1-23	1,892,000	--	3.90	2.13	--	2.74	3.21	--	--	--	389	.53	1,003,000	35	1.5	594	7.9
July 24-28	1,365,000	--	4.00	2.22	--	2.84	3.54	--	--	--	393	.53	193,500	35	1.6	603	7.5
July 29 - Aug. 31 ..	2,225,000	--	4.56	2.44	--	3.13	3.02	--	--	--	443	.60	1,335,000	34	1.6	678	7.8
Sept. 1-30	1,762,000	12	2.74	2.02	.11	3.23	4.06	.25	.03	.13	446	.63	1,110,000	35	1.7	693	7.8
Total or weighted average a	17,660,000	--	4.46	2.52	--	3.05	3.91	--	--	--	449	0.61	10,770,000	36	1.7	678	--
Total or weighted average b	18,350,000	--	4.46	2.52	--	3.03	3.89	--	--	--	448	0.61	11,160,000	36	1.7	677	--

a Represents 96 percent of runoff for water year October 1954 to September 1955.

b Includes estimated data for missing periods. Represents 100 percent of runoff for water year October 1954 to September 1955.

MISSOURI RIVER MAIN STEM--Continued

MISSOURI RIVER AT PIERRE, S. DAK.

LOCATION --At bridge on U. S. Highway 14 at Pierre, Hughes County, 0.3 mile upstream from gaging station and 1.5 miles upstream from Bad River.

DRAINAGE AREA.--243,500 square miles, approximately.

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

Water temperatures: March 1951 to September 1955.

EXTREMES 1954-55.--Specific conductance: Maximum daily, 959 micromhos Feb. 28; minimum daily, 582 micromhos Sept. 9.

Percent sodium: Maximum, 43 June 7-30; minimum, 36 Oct. 27 to Feb. 3.

EXTREMES, 1951-55.--Specific conductance: Maximum daily, 1,040 micromhos Jan. 23, 1954; minimum daily, 394 micromhos July 3, 1951.

Percent sodium: Maximum, 45 May 1-3, 1953; minimum, 27 Jan. 24-27, 1952.

REMARKS.--Values reported for dissolved solids are residues on evaporation at 180°C. Daily samples for chemical analyses composited by discharge. Records of specific conductance of daily samples available in regional office at Lincoln, Nebr. Records of discharge for water year October 1954 to September 1955 given in WSP 1389.

Chemical analyses, water year October 1954 to September 1955

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million										Dissolved solids			Per cent sodium	So-dium adsorp-tion ratio	Specific conduct-ance (micro-mhos at 25°C)	pH
			Cal-cium (Ca)	Magne-sium (Mg)	So-dium (Na)	Potas-sium (K)	Bicar-bonate (HCO ₃)	Sul-fate (SO ₄)	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO ₃)	Boron (B) ppm	Parts per mil-lion	Tons per acre-foot	Total tons				
Oct. 1-26, 1954 . . .	1,761,000	--	4.62		2.78	--	3.13	4.06	--	--	--	--	457	0.62	1,092,000	38	1.8	697	8.0
Oct. 27-29	151,900	--	4.76		2.70	--	3.18	4.12	--	--	--	--	472	.64	97,220	36	1.7	708	7.9
Oct. 30-Nov. 30 . . .	903,500	--	4.94		2.83	--	3.33	4.33	--	--	--	--	491	.67	605,300	36	1.8	735	8.0
Dec. 1-31	459,600	11	3.14	2.10	3.00	0.11	3.62	4.56	0.28	0.03	0.01	0.15	528	.72	330,900	36	1.9	790	8.0
Jan. 1-22, 1955 . . .	306,600	--	5.68		3.17	--	3.85	4.93	--	--	--	--	551	.75	230,000	36	1.9	833	8.1
Jan. 23-Feb. 3 . . .	166,600	--	5.86		3.35	--	3.95	5.27	--	--	--	--	582	.79	131,600	36	2.0	864	8.1
Feb. 4-23	299,500	--	5.96		3.44	--	4.00	5.35	--	--	--	--	595	.81	242,600	37	2.0	880	8.1
Feb. 24-Mar. 8 . . .	203,800	--	6.32		3.74	--	4.16	5.79	--	--	--	--	639	.87	177,300	37	2.1	933	8.0
Mar. 9-22	311,000	13	2.89	2.07	3.17	.13	3.06	4.85	.31	.03	.02	.20	534	.73	227,000	38	2.0	784	7.9
Mar. 23-31	132,800	--	5.08		3.44	--	3.62	4.85	--	--	--	--	551	.75	99,600	40	2.2	818	7.9
Apr. 1-3	58,160	--	5.50		3.52	--	3.43	5.45	--	--	--	--	595	.81	47,110	39	2.1	862	8.1
Apr. 4-8	145,600	--	4.92		3.13	--	3.39	4.52	--	--	--	--	524	.71	103,400	39	2.0	769	8.1
Apr. 9-24	365,800	--	5.64		3.52	--	3.75	5.41	--	--	--	--	593	.81	296,300	38	2.1	873	8.0
Apr. 25-May 6	517,900	--	5.44		3.30	--	3.67	4.85	--	--	--	--	562	.76	393,600	38	2.0	846	8.0
May 7-30	1,909,000	--	4.64		3.00	--	3.11	4.62	--	--	--	--	479	.65	1,241,000	39	2.0	730	8.0
May 31-June 6	506,400	--	4.28		3.09	--	2.92	4.33	--	--	--	--	485	.66	334,200	42	2.1	734	7.7

June 7-30, 1955...	1,102,000	20	2.64	1.72	3.35	.15	3.02	4.48	.27	.02	.02	.15	510	.69	760,400	43	2.3	754	8.0
July 1-31.....	1,927,000	--	4.18	3.13	3.05	--	3.05	4.58	--	--	--	--	477	.65	1,253,000	41	2.2	729	7.8
Aug. 1-31.....	1,513,000	--	3.80	2.57	2.77	--	2.77	3.71	--	--	--	--	422	.57	882,400	40	1.9	624	7.8
Sept. 1-30	1,838,000	15	2.35	1.31	2.44	.12	2.72	3.50	.20	.03	.02	.14	398	.54	992,500	39	1.8	603	8.1
Total or weighted average a	14,580,000	--	4.52	2.96	3.15	--	3.15	4.35	--	--	--	--	481	0.65	9,517,000	39	2.0	723	--

a Represents 100 percent of runoff for water year October 1954 to September 1955.

MISSOURI RIVER MAIN STEM--Continued

MISSOURI RIVER AT NEBRASKA CITY, NEBR.

LOCATION.--At gaging station at Wabonsie Highway bridge at Nebraska City, Otoe County.
DRAINAGE AREA.--414,400 square miles, approximately.

RECORDS AVAILABLE.--Chemical analyses: January 1951 to September 1955.

Water temperatures: May 1951 to September 1955.

EXTREMES, 1954-55.--Specific conductance: Maximum daily, 841 micromhos Jan. 23; minimum daily, 495 micromhos Mar. 12.

Percent sodium: Maximum, 43 Aug. 8-31; minimum, 26 Mar. 11-16.

EXTREMES, 1951-55.--Specific conductance: Maximum daily, 936 micromhos Jan. 6, 1953; minimum daily, 361 micromhos Mar. 29, 1951.

Percent sodium: Maximum, 43 June 20-25, 1953, Aug. 8-31, 1955; minimum, 18 Mar. 27-29, 1951.

REMARKS.--Values reported for dissolved solids are residues on evaporation. Daily samples for chemical analysis composited by discharge.

Records of specific conductance of daily samples available in regional office at Lincoln, Nebr. Records of discharge for water year October 1954 to September 1955 given in WSP 1390.

Chemical analyses, water year October 1954 to September 1955

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million										Dissolved solids			Per-cent sodium	So-dium adsorp-tion ratio	Specific conduct-ance (micro-mhos at 25° C)	pH
			Cal-cium (Ca)	Magne-sium (Mg)	So-dium (Na)	Potas-sium (K)	Bicar-bonate (HCO ₃)	Sul-fate (SO ₄)	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO ₃)	Boron (B) ppm	Parts per mil-lion	Tons per acre-foot	Total tons				
Oct. 1-31, 1954 . . .	2,218,000	--	4.30	2.39	--	2.98	3.44	--	--	--	--	426	0.58	1,286,000	36	1.6	657	7.8	
Nov. 1-30	1,123,000	--	4.72	2.57	--	3.41	3.35	--	--	--	--	463	.63	707,500	35	1.7	701	7.8	
Dec. 1-31	1,008,000	17	3.14	1.58	0.13	3.44	3.29	0.71	0.03	0.05	0.09	457	.62	625,000	33	1.6	702	7.9	
Jan. 1-4, 1955 . . .	409,000	--	4.82	2.48	--	3.47	3.33	--	--	--	--	469	.64	261,800	34	1.6	703	7.7	
Jan. 15-Feb. 9 . . .	596,700	--	5.24	2.78	--	3.80	3.62	--	--	--	--	516	.70	417,700	35	1.7	769	7.8	
Feb. 10-28	564,900	--	4.78	2.61	--	3.38	3.39	--	--	--	--	474	.64	361,500	35	1.7	715	7.8	
Mar. 1-10	497,100	--	4.28	2.00	--	3.13	2.71	--	--	--	--	396	.54	268,400	32	1.4	622	7.6	
Mar. 11-16	572,400	15	2.54	1.36	.16	2.95	2.25	.37	.02	.06	.07	341	.46	263,300	26	1.0	529	7.5	
Mar. 17-22	347,100	--	4.00	1.48	--	2.93	2.23	--	--	--	--	345	.47	163,100	27	1.0	535	7.7	
Mar. 23-Apr. 10 . .	1,083,000	--	4.76	2.22	--	3.31	3.27	--	--	--	--	447	.61	660,600	32	1.4	674	7.8	
Apr. 11-May 11 . . .	1,944,000	--	5.22	2.65	--	3.47	4.14	--	--	--	--	498	.68	1,322,000	34	1.6	762	7.8	
May 12-29	1,182,000	--	5.20	3.04	--	3.36	4.58	--	--	--	--	520	.71	839,200	37	1.9	799	7.8	
May 30-June 25 . . .	1,921,000	16	3.14	1.72	.16	3.26	4.21	.51	.03	.01	.13	506	.69	1,325,000	37	1.9	767	7.5	
June 26-July 12 . . .	1,195,000	--	4.54	2.65	--	3.13	3.85	--	--	--	--	471	.64	764,800	37	1.8	716	7.6	
July 13-19	484,200	--	4.40	2.61	--	3.05	3.77	--	--	--	--	458	.62	300,200	37	1.8	701	7.5	
July 20-31	766,600	--	4.60	3.13	--	3.11	4.37	--	--	--	--	511	.69	529,000	40	2.1	778	7.6	

Aug. 1-7, 1955 . . .	215,400	--	4.84	3.39	--	3.33	4.48	--	--	--	532	.72	155,100	41	2.2	806	7.8
Aug. 8-31	1,621,000	--	4.72	3.52	--	3.20	4.79	--	--	--	526	.72	1,167,000	43	2.3	798	7.4
Sept. 1-30	2,122,000	10	2.94	3.39	.16	3.25	4.54	.42	.03	.01	504	.69	1,464,000	42	2.3	764	7.9
Total or weighted average a	19,870,000	--	4.70	2.74	--	3.26	3.87	--	--	--	476	0.65	12,880,000	37	1.8	723	--

a Represents 100 percent of runoff for water year October 1954 to September 1955.

May 9-16, 1955 ..	94,850	--	2.20	.87	--	1.90	1.08	--	--	--	204	.28	26,560	28	.8	308	7.8
May 17-22	104,100	--	1.96	.65	--	1.72	.87	--	--	--	170	.23	23,940	25	.7	265	7.8
May 23-26	109,900	--	1.52	.52	--	1.36	.67	--	--	--	136	.18	19,780	25	.6	204	7.8
May 27-June 9 ...	324,400	--	1.76	.70	--	1.61	.83	--	--	--	165	.22	71,370	28	.7	246	7.6
June 10-13	151,300	--	1.34	.42	--	1.26	.44	--	--	--	117	.16	24,210	24	.5	178	7.7
June 14	45,820	--	2.08	.52	--	1.95	.67	--	--	--	176	.24	11,000	20	.5	257	7.7
June 15-27	676,400	16	.75	.37	.03	1.13	.31	.06	.01	.02	110	.15	101,500	24	.5	188	7.4
June 28-July 3 ...	194,400	--	1.40	.48	--	1.34	.48	--	--	--	123	.17	33,050	26	.6	193	7.7
July 4	23,210	--	1.84	.61	--	1.41	.62	.39	--	--	157	.21	4,870	25	.6	257	7.5
July 5-22	370,300	--	1.56	.65	--	1.47	.67	--	--	--	145	.20	74,060	29	.7	237	7.8
July 23-29	128,000	--	1.84	.74	--	1.70	.81	--	--	--	171	.23	29,440	29	.8	268	7.7
July 30-Aug. 9 ...	123,500	--	2.30	1.00	--	2.06	1.23	--	--	--	204	.28	34,580	30	.9	326	7.8
Aug. 10-31	153,500	--	2.76	1.30	--	2.36	1.67	--	--	--	245	.33	50,660	32	1.1	399	7.8
Sept. 1-30	160,400	17	2.00	1.40	.11	2.80	2.12	.23	.02	.24	311	.42	67,370	31	1.2	482	8.0
Total or weighted average a	3,874,000	--	2.28	0.91	--	1.95	1.19	--	--	--	206	0.28	1,085,000	29	0.9	320	--

a Represents 100 percent of runoff for water year October 1954 to September 1955.

YELLOWSTONE RIVER BASIN--Continued

YELLOWSTONE RIVER NEAR SIDNEY, MONT.

LOCATION.--At bridge on State Highway 23, 2 miles south of Sidney, Richland County, 4½ miles downstream from gaging station, 2 miles downstream from Fox Creek, and 30 miles upstream from mouth.

DRAINAGE AREA.--69,450 square miles, approximately.

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

Water temperatures: January 1951 to September 1955.

EXTREMES, 1954-55.--Specific conductance: Maximum daily, 1,400 micromhos Mar. 3; minimum daily, 361 micromhos June 25.

Percent sodium: Maximum, 47 May 5-13; minimum, 30, June 20-27.

EXTREMES, 1951-55.--Specific conductance: Maximum daily, 2,780 micromhos Jan. 14, 1951; minimum daily, 277 micromhos June 29, 1954.

Percent sodium: Maximum, 48 May 1-30, 1953; minimum, 26 June 11-13, 1952.

REMARKS.--Values reported for dissolved solids are residues on evaporation unless otherwise noted. Daily samples for chemical analyses composited by discharge. Records of specific conductance of daily samples available in regional office at Lincoln, Nebr. Records of discharge for gaging station near Sidney for water year October 1954 to September 1955 given in WSP 1389. No appreciable inflow between gaging station and sampling station.

Chemical analyses, water year October 1954 to September 1955

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million										Dissolved solids			Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
			Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B) ppm	Parts per million	Tons per acre-foot	Total tons				
Oct. 1-31, 1954...	369,900	--	5.68		4.00	--	3.46	5.89	--	--	--	--	614	0.84	310,700	41	2.4	898	7.8
Nov. 1-30	387,300	--	5.98		3.83	--	3.62	5.83	--	--	--	--	618	.84	325,300	39	2.2	903	7.8
Dec. 1-31	353,700	13	3.79	2.57	3.87	0.12	3.88	6.31	0.42	0.03	0.23		654	.89	314,800	37	2.2	946	8.1
Jan. 1-4, 1955...	26,780	--	7.12		4.22	--	4.33	6.83	--	--	--	--	733	1.00	26,780	37	2.2	1,040	8.2
Jan. 5-12	61,090	--	7.96		4.87	--	4.74	7.60	--	--	--	--	819	1.11	67,810	38	2.4	1,150	8.0
Jan. 13-31	154,000	--	6.96		3.87	--	4.29	6.52	--	--	--	--	698	.95	146,300	36	2.1	1,010	8.0
Feb. 1-28	256,500	--	6.08		3.39	--	3.70	5.60	--	--	--	--	608	.83	212,900	36	1.9	892	8.1
Mar. 1-2	12,810	--	6.94		4.09	--	4.18	6.56	--	--	--	--	708	.96	12,300	37	2.2	1,020	8.0
Mar. 3-7	35,640	--	9.70		5.74	--	5.77	9.26	--	--	--	--	al, 020	1.39	49,540	37	2.6	1,380	7.8
Mar. 8-16	115,500	12	3.09	1.75	3.04	.14	3.02	4.64	.37	.04	.06	.16	514	.70	80,850	38	2.0	771	7.6
Mar. 17-Apr. 11..	483,900	--	5.74		3.26	--	3.03	5.77	--	--	--	--	589	.80	387,100	36	1.9	868	7.7
Apr. 12-May 4....	525,700	--	5.78		4.09	--	3.23	6.45	--	--	--	--	660	.90	473,100	41	2.4	941	7.8
May 5-13	179,600	--	4.70		4.09	--	3.31	5.27	--	--	--	--	573	.78	140,100	47	2.7	851	7.9
May 14-23	274,000	--	4.26		2.61	--	2.61	4.14	--	--	--	--	449	.61	167,100	38	1.8	673	8.0
May 24-June 11..	728,300	--	3.52		1.91	--	2.38	2.94	--	--	--	--	358	.49	356,900	35	1.4	536	7.7
June 12-19	434,800	21	1.90	.90	1.26	.06	2.18	1.75	.14	.01	.04	.09	272	.37	160,900	31	1.1	408	7.7
June 20-27	543,100	--	3.12		1.35	--	1.97	2.37	--	--	--	--	299	.41	222,700	30	1.1	448	7.7

a Sum of determined constituents.

June 28-July 4, 1955	431,000	--	3.10	1.61	--	2.20	2.42	--	--	--	315	.43	185,300	34	1.3	477	7.8
July 5-28.....	585,800	--	3.04	1.91	--	2.20	2.69	--	--	--	328	.45	263,600	39	1.5	510	7.9
July 29-Aug. 9....	198,300	--	4.36	2.91	--	2.75	4.54	--	--	--	478	.65	128,900	40	2.0	711	7.7
Aug. 10-13.....	36,750	--	8.64	4.91	--	3.62	10.10	--	--	--	921	1.25	45,940	36	2.4	1,240	7.8
Aug. 14-31.....	131,500	--	5.20	3.78	--	3.00	6.00	--	--	--	597	.81	106,500	42	2.3	868	7.9
Sept. 1-30.....	180,000	11	3.19	2.61	.13	3.47	6.83	.37	.03	.01	665	.93	167,400	44	2.8	983	8.1
Total or weighted average b.....	6,506,000	--	4.66	2.87	--	2.90	4.48	--	--	--	491	0.67	4,353,000	38	1.9	722	--

b Represents 100 percent of runoff for water year October 1954 to September 1955.

YELLOWSTONE RIVER BASIN--Continued

BIGHORN RIVER AT BIGHORN, MONT.

LOCATION.--At bridge on U. S. Highways 10 and 12, 1 mile upstream from mouth, 1 mile southwest of Bighorn, Treasure County, and 3½ miles downstream from gaging station near Custer.

RECORDS AVAILABLE.--Chemical analyses: February 1950 to September 1955.

Water temperatures: April 1949 to September 1951, August 1952 to September 1955.

Sediment records: July 1947 to September 1954.

EXTREMES, 1954-55.--Specific conductance: Maximum daily, 1,560 micromhos July 28; minimum daily, 503 micromhos Mar. 9.

Percent sodium: Maximum, 45 Sept. 1-30; minimum, 27 June 20-21.

EXTREMES, 1951-55.--Specific conductance: Maximum daily, 1,560 micromhos July 28, 1955; minimum daily, 384 micromhos June 20, 1951.

Percent sodium: Maximum, 49 May 23-28, 1952; minimum, 27 June 20-21, 1955.

REMARKS.--Values reported for dissolved solids are residues on evaporation unless otherwise noted. Daily samples for chemical analyses composited by discharge. Records of specific conductance of daily samples available in regional office at Lincoln, Nebr. Records of discharge for gaging station near Custer for water year October 1954 to September 1955 given in WSP 1389. No appreciable inflow between gaging station and sampling point except small amounts of irrigation waste water.

Chemical analyses, water year October 1954 to September 1955

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million										Dissolved solids			Per cent sodium	So-dium adsorp-tion ratio	Specific conductance (micro-mhos at 25°C)	pH
			Cal-cium (Ca)	Magne-sium (Mg)	So-dium (Na)	Potas-sium (K)	Bicar-bonate (HCO ₃)	Sul-fate (SO ₄)	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO ₃)	Boron (B) ppm	Parts per mil-lion	Tons per acre-foot	Total tons				
Oct. 1-31, 1954 ..	162,900	--	7.48		5.31	--	3.85	8.70	--	--	--	--	843	1.15	187,300	42	2.7	1,180	7.9
Nov. 1-30.....	167,900	--	7.58		5.17	--	3.90	8.43	--	--	--	--	823	1.12	188,000	41	2.7	1,160	7.8
Dec. 1-31	176,400	12	4.69	2.85	4.74	0.11	4.10	8.02	0.45	0.03	0.16	--	793	1.08	190,500	38	2.4	1,110	7.9
Jan. 1-31, 1955 ..	144,500	--	7.62		4.44	--	4.20	7.81	--	--	--	--	784	1.07	154,600	37	2.3	1,110	7.9
Feb. 1	4,960	--	5.44		3.22	--	3.15	5.45	--	--	--	--	568	.77	3,820	37	2.0	826	7.7
Feb. 2-11.....	41,450	--	7.34		4.35	--	4.05	7.49	--	--	--	--	770	1.05	43,520	37	2.3	1,080	7.9
Feb. 12-23.....	49,590	--	8.46		4.87	--	4.49	8.64	--	--	--	--	879	1.20	59,510	37	2.4	1,210	8.0
Feb. 24	3,970	--	6.00		3.44	--	3.21	6.10	--	--	--	--	616	.84	3,330	36	2.0	897	7.8
Feb. 25-28	16,460	11	4.49	3.37	4.13	.12	4.62	7.14	.39	.02	.05	.17	762	1.04	17,120	34	2.1	1,080	7.8
Mar. 1-8	35,500	--	7.56		4.48	--	3.93	7.87	--	--	--	--	799	1.09	38,700	37	2.3	1,110	7.7
Mar. 9-10	10,120	--	3.32		1.96	--	1.84	3.29	--	--	--	--	345	.47	4,760	37	1.5	529	7.9
Mar. 11-31	132,700	--	6.98		4.30	--	3.56	7.66	--	--	--	--	756	1.03	136,700	38	2.3	1,060	8.0
Apr. 1-5	61,190	--	6.24		3.96	--	3.44	6.72	--	--	--	--	682	.93	56,910	39	2.2	975	8.1
Apr. 6-30	249,800	--	6.52		4.87	--	3.47	7.77	--	--	--	--	756	1.03	257,300	43	2.7	1,070	7.8

May 1-16, 1955...	107,800	--	6'48	4.09	--	3.33	7.08	--	--	--	695	.95	102,400	39	2.3	978	8.0
May 17-29	150,300	--	4.82	2.91	--	2.74	5.06	--	--	--	516	.70	105,200	37	1.9	749	8.0
May 30-June 19...	218,700	18	3.44	3.13	.08	3.00	5.48	.25	.05	.12	580	.79	172,800	36	1.9	828	7.8
June 20-21	23,050	--	7'06	2.65	--	2.77	6.93	--	--	--	666	.91	20,980	27	1.4	913	7.8
June 22-July 4 ...	138,300	--	5.12	2.91	--	2.88	5.10	--	--	--	545	.74	102,300	36	1.8	789	7.4
July 5-14	42,410	--	6'36	4.04	--	3.13	6.97	--	--	--	702	.95	40,290	39	2.3	993	7.9
July 15-27	35,450	--	7.18	5.65	--	3.15	9.47	--	--	--	872	1.19	42,190	44	3.0	1,210	7.8
July 28-31	16,110	--	10.88	6.31	--	4.26	13.22	--	--	--	1,190	1.62	26,100	36	2.7	1,540	7.6
Aug. 1-31	89,390	--	7.80	6.13	--	3.56	10.51	--	--	--	942	1.28	114,400	44	3.1	1,280	8.0
Sept. 1-30	98,700	19	4.74	6.57	.13	3.57	10.72	.54	.03	.21	981	1.33	131,300	45	3.3	1,330	8.0
Total or weighted average b	2,178,000	--	6.76	4.44	--	3.52	7.54	--	--	--	742	1.01	2,200,000	40	2.4	1,040	--

a Sum of determined constituents.

b Represents 100 percent of runoff for water year October 1954 to September 1955.

YELLOWSTONE RIVER BASIN--Continued

TONGUE RIVER AT MILES CITY, MONT.

LOCATION.--At gaging station, 4 miles south of Miles City, Custer County, and 8 miles upstream from mouth.

RECORDS AVAILABLE.--Chemical analyses: January 1951 to September 1955.

Water temperatures: April 1949 to September 1955.

Sediment records: June 1946 to September 1951.

EXTREMES, 1954-55.--Specific conductance: Maximum daily, 1,790 micromhos Sept. 25; minimum daily, 353 micromhos Mar. 10.

Percent sodium: Maximum, 69 May 4; minimum, 19 June 21-30, July 2-5.

EXTREMES, 1951-55.--Specific conductance: Maximum daily, 2,280 micromhos July 24, 1953; minimum daily, 288 micromhos June 21, 1953.

Percent sodium: Maximum, 69 May 4, 1955; minimum, 19 June 8-11, 1951, June 1-15, 1952, June 2-3, 1953, June 21-30, July 2-5, 1955.

REMARKS.--Values reported for dissolved solids are residues on evaporation unless otherwise noted. Daily samples for chemical analyses composited by discharge. Records of specific conductance of daily samples available in regional office at Lincoln, Nebr. Records of discharge for water year October 1954 to September 1955 given in WSP 1389.

Chemical analyses, water year October 1954 to September 1955

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million								Dissolved solids				Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)
			Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B) ppm	Parts per million	Tons per acre-foot				Total tons
Oct. 1-25, 1954...	2,990	--	7.08	3.87	--	5.33	5.62	--	--	--	--	660	0.90	2,690	35	2.1	983
Oct. 26-31.....	1,850	--	6.56	2.74	--	4.67	4.73	--	--	--	--	554	.75	1,390	29	1.5	844
Nov. 1-30.....	12,650	--	7.06	2.65	--	4.87	5.14	--	--	--	--	582	.79	9,990	26	1.4	872
Dec. 1-31.....	12,800	9.0	4.09	4.81	0.13	5.88	6.35	0.17	0.02	0.02	0.14	720	.98	12,540	25	1.5	1,040
Jan. 1-31, 1955...	9,380	--	9.88	3.22	--	6.49	6.66	--	--	--	--	799	1.09	10,220	24	1.4	1,120
Feb. 1-28.....	5,840	--	8.64	3.26	--	6.00	6.25	--	--	--	--	710	.97	5,660	27	1.6	1,050
Mar. 1-8.....	1,970	13	4.19	5.05	3.44	.13	6.36	6.20	.16	.02	.15	760	1.03	2,030	27	1.6	1,120
Mar. 9-11.....	4,460	--	2.14	1.91	--	2.25	1.81	--	--	--	--	258	.35	1,560	47	1.8	7.7
Mar. 12-14.....	2,270	--	3.48	1.96	--	2.80	2.69	--	--	--	--	340	.46	1,040	36	1.5	531
Mar. 15-22.....	3,910	--	5.54	2.78	--	3.82	4.64	--	--	--	--	513	.70	2,740	33	1.7	775
Mar. 23-29.....	2,470	--	7.98	3.57	--	5.50	6.14	--	--	--	--	696	.95	2,350	31	1.8	7.8
Mar. 30-Apr. 11..	8,180	--	4.92	2.61	--	3.62	3.98	--	--	--	--	467	.64	5,240	34	1.7	1,010
Apr. 12-18.....	4,430	--	6.94	2.96	--	4.54	5.52	--	--	--	--	611	.83	3,680	29	1.6	711
Apr. 19-May 3....	19,130	--	6.12	1.91	--	3.90	4.29	--	--	--	--	505	.69	13,200	23	1.1	905
May 4.....	4,760	--	1.88	4.39	--	3.16	3.21	--	--	--	--	412	.56	2,670	69	4.5	751
May 5-17.....	14,630	--	5.28	2.87	--	3.62	4.58	--	--	--	--	514	.70	10,240	35	1.8	8.0
May 18-27.....	19,550	--	4.96	2.13	--	3.39	3.73	--	--	--	--	451	.61	11,930	30	1.3	620
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a Includes 0.17 equivalent per million of carbonate (CO₃).

May 28-June 3, 1955	17,050	--	2.00	4.40	1.30	--	3.06	2.64	--	--	--	358	.49	8,350	23	.9	546	7.7
June 4-15.....	27,710	15	2.00	1.68	1.09	.08	2.69	2.00	.06	.01	.04	297	.40	11,080	22	.8	463	7.8
June 16-20.....	9,570	--	--	3.78	2.04	--	3.08	2.81	--	--	--	359	.49	4,690	35	1.5	563	7.8
June 21-30.....	30,940	--	--	3.48	.83	--	2.62	1.60	--	--	--	269	.37	11,450	19	.6	421	7.8
July 1.....	3,610	--	--	4.24	1.61	--	2.82	2.98	--	--	--	372	.51	1,840	28	1.1	573	7.9
July 2-5.....	12,990	--	--	3.20	.78	--	2.33	1.71	--	--	--	242	.33	4,290	19	.6	388	7.9
July 6-7.....	2,680	--	--	3.92	1.61	--	2.72	2.77	--	--	--	352	.48	1,290	29	1.2	545	8.0
July 8-21.....	5,610	--	--	4.96	2.26	--	3.56	3.58	--	--	--	450	.61	3,420	31	1.4	691	7.9
July 22-Aug. 17...	4,630	--	--	5.70	3.30	--	4.38	4.85	--	--	--	564	.77	3,570	36	2.0	841	8.0
Aug. 18-28.....	1,520	--	--	6.52	3.70	--	4.92	5.27	--	--	--	632	.86	1,310	36	2.1	935	7.5
Aug. 29-Sept. 4...	1,387	--	--	7.80	5.48	--	6.33	7.08	--	--	--	826	1.12	433	41	2.8	1,200	7.9
Sept. 5-30.....	518	20	4.04	5.56	8.22	.21	8.00	9.89	.25	.02	.02	b ₁ ,090	1.48	767	46	3.8	1,540	8.1
Total or weighted average c.....	248,500	--	--	5.18	2.04	--	3.67	3.62	--	--	--	448	0.61	151,700	28	1.3	674	--

b Sum of determined constituents.

c Represents 100 percent of runoff for water year October 1954 to September 1955.

May 1-2, 1955	1,790	--	11.76	7.61	--	3.75	14.99	1.07	--	--	--	--	1,290	1.75	3,130	38	3.1	1,700	8.1
May 3-4	4,940	--	4.80	7.13	--	3.43	8.91	.45	--	--	--	--	a798	1.09	5,380	56	4.6	1,160	7.9
May 5-16	13,320	--	9.96	7.48	--	3.46	13.53	1.07	--	--	--	--	1,180	1.60	21,310	41	3.3	1,580	8.0
May 17-22	18,960	--	6.52	5.09	--	2.80	9.12	.56	--	--	--	--	a794	1.08	20,480	41	2.8	1,120	7.9
May 23-June 1	17,170	--	6.60	3.57	--	2.79	7.08	.54	--	--	--	--	a689	.94	16,140	34	2.0	975	7.7
June 2-10	12,150	--	7.80	4.78	--	2.82	9.33	.71	--	--	--	--	a861	1.17	14,220	37	2.4	1,180	7.7
June 11-18	7,720	17	5.99	6.26	.16	3.08	11.62	1.04	.03	.06	--	--	1,090	1.48	11,430	39	2.9	1,450	7.8
June 19-20	12,300	--	11.04	5.44	--	3.33	12.60	.59	--	--	--	--	1,150	1.56	19,190	33	2.3	1,460	7.6
June 21-24	12,200	--	13.98	7.17	--	3.51	16.76	1.21	--	--	--	--	1,490	2.03	24,770	33	2.7	1,850	7.4
June 25-26	3,100	--	9.84	6.78	--	3.08	12.91	.82	--	--	--	--	1,160	1.58	4,900	40	3.1	1,520	7.8
June 27-28	6,380	--	8.90	5.48	--	3.15	10.83	.54	--	--	--	--	a983	1.34	8,550	38	2.6	1,320	7.8
June 29	6,050	--	8.36	3.48	--	3.47	8.33	.45	--	--	--	--	a812	1.10	6,660	28	1.7	1,100	7.4
June 30 - July 11	22,290	--	11.00	5.91	--	2.95	13.42	.82	--	--	--	--	1,190	1.62	36,110	35	2.5	1,530	7.3
July 12	1,210	--	6.68	5.87	--	3.64	8.54	.48	--	--	--	--	a848	1.15	1,390	46	3.2	1,180	7.5
July 13-16	2,570	--	9.96	7.74	--	3.49	13.95	.87	--	--	--	--	1,230	1.67	4,290	42	3.5	1,620	7.4
July 17-25	3,200	--	15.64	10.27	--	3.70	21.44	1.41	--	--	--	--	1,840	2.50	8,000	39	3.7	2,250	7.3
July 26	506	--	12.52	8.87	--	3.70	17.59	.93	--	--	--	--	1,500	2.04	1,030	40	3.5	1,870	8.1
July 27	817	--	7.72	6.65	--	4.33	10.10	.45	--	--	--	--	a951	1.29	1,050	45	3.4	1,320	8.1

a Residue on evaporation at 180°C.

YELLOWSTONE RIVER BASIN--Continued

POWDER RIVER NEAR LOCATE, MONT.--Continued

Chemical analyses, water year October 1954 to September 1955.--Continued

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million								Boron (B) ppm	Dissolved solids			Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH
			Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)		Parts per million	Tons per acre-foot	Total tons			
July 28, 1955.....	1,170	--	4.80		3.74	--	4.06	4.68	0.17	--	--	a 550	0.75	878	42	810	8.1
July 29-30	2,290	--	6.76		6.22	--	3.41	9.78	.31	--	--	a 881	1.20	2,750	45	1,210	7.6
July 31	922	--	4.44		5.31	--	3.24	6.52	.17	--	--	a 640	.87	802	53	935	7.7
Aug. 1-10	5,700	--	19.70		9.74	--	3.52	26.02	1.16	--	--	2,140	2.91	16,590	32	2,460	7.1
Aug. 11-13	4,000	--	32.60		6.83	--	3.36	36.64	.73	--	--	2,900	3.94	15,760	17	2,940	6.8
Aug. 14-31	3,310	--	19.00		7.22	--	3.34	22.69	.71	--	--	1,910	2.60	8,610	27	2,180	7.1
Sept. 1-29	484	12	9.98	6.02	13.92	0.28	4.23	25.19	1.13	0.03	0.01	2,090	2.84	1,370	46	2,550	8.2
Sept. 30	11	--	28.32		21.92	--	3.15	46.01	2.31	--	--	3,660	4.98	55	43	4,010	7.1
Total or weighted average b	309,200	--	10.44		6.13	--	3.23	12.89	0.82	--	--	1,150	1.56	462,800	37	1,480	--

a Residue on evaporation at 180° C.

b Represents 100 percent of runoff for water year October 1954 to September 1955.

PLATTE RIVER BASIN

NORTH PLATTE RIVER BELOW GUERNSEY RESERVOIR, WYO.

LOCATION.--At bridge on U. S. Highway 26, at Guernsey, Platte County, 0.9 mile downstream from gaging station and 2 miles downstream from Guernsey Dam.

DRAINAGE AREA.--16,200 square miles, approximately.

RECORDS AVAILABLE.--Chemical analyses: December 1950 to September 1955.

Water temperatures: October 1951, April to September 1952, March to September 1953, May to August 1954, November 1954 to September 1955. Sediment records: April 1947 to June 1953.

EXTREMES, 1954-55.--Specific conductance: Maximum daily, 1,340 micromhos Mar. 7-9; minimum daily, 354 micromhos June 27.

Percent sodium: Maximum, 40 Apr. 18-30; minimum, 24 June 27.

EXTREMES, 1951-53, May 1954 to September 1955.--Specific conductance: Maximum daily (1954-55), 1,340 micromhos Mar. 7-9, 1955; minimum daily, 354 micromhos June 27, 1955.

Percent sodium: Maximum, 40 Apr. 18-30, 1955; minimum, 24 June 27, 1955.

REMARKS.--Values reported for dissolved solids are residues on evaporation. During period December 1950 to Nov. 4, 1954 samples collected at gaging station. Records of specific conductance of daily samples available in regional office at Lincoln, Nebr. Records of discharge for water year October 1954 to September 1955 given in WSP 1390. No appreciable inflow between gaging station and sampling station except during periods of heavy local precipitation.

Chemical analyses, water year October 1954 to September 1955

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million										Dissolved solids			Per-cent so-dium	So-dium adsorp-tion ratio	Specific conduct-ance (micro-mhos at 25°C)	pH
			Cal-cium (Ca)	Magne-sium (Mg)	So-dium (Na)	Potas-sium (K)	Bicar-bonate (HCO ₃)	Sul-fate (SO ₄)	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO ₃)	Boron (B) ppm	Parts per mil-lion	Tons per acre-foot	Total tons				
Oct. 1-12, 1954.	353	--	6.32		3.44	--	3.44	5.83	--	--	--	--	640	0.87	307	35	1.9	922	7.7
Oct. 13-27,	417	--	6.40		3.57	--	3.51	5.89	--	--	--	--	654	.89	371	36	2.0	937	7.9
Oct. 28-Nov. 4 .	315	--	6.40		3.57	--	3.54	6.00	--	--	--	--	652	.89	280	36	2.0	947	8.1
Nov. 5-29,	1,040	12	3.94	2.60	3.78	0.16	3.46	6.45	0.76	0.02	0.03	0.13	682	.93	967	36	2.1	978	7.7
Nov. 30-Dec. 2 .	333	--	6.66		3.91	--	3.54	6.35	--	--	--	--	683	.93	310	37	2.1	986	8.2
Dec. 3-6,	6,030	--	7.14		4.52	--	3.54	7.49	--	--	--	--	764	1.04	6,270	39	2.4	1,090	8.2
Dec. 7-31,	13,810	--	7.68		4.96	--	3.72	7.97	--	--	--	--	828	1.13	15,610	39	2.5	1,160	8.1
Jan. 1-31, 1955.	799	--	8.36		4.87	--	4.41	8.02	--	--	--	--	881	1.20	959	37	2.4	1,210	8.0
Feb. 1-28,	645	--	8.76		5.09	--	4.47	8.60	--	--	--	--	928	1.26	813	37	2.4	1,260	8.0
Mar. 1-31,	1,020	12	5.24	3.56	5.26	.16	4.39	8.74	1.10	.02	.07	.17	924	1.26	1,290	37	2.5	1,280	8.0

PLATTE RIVER BASIN--Continued

NORTH PLATTE RIVER BELOW GUERNSEY RESERVOIR, WYO.--Continued

Chemical analyses, water year October 1954 to September 1955.--Continued

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million								Dissolved solids			Per-cent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH		
			Cal-cium (Ca)	Magne-sium (Mg)	So-dium (Na)	Potas-sium (K)	Bicar-bonate (HCO ₃)	Sul-fate (SO ₄)	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO ₃)	Boron (B) ppm	Parts per million				Tons per acre-foot	Total tons
Apr. 1-17, 1955..	21,090	--	7.78		4.87	--	3.75	8.08	--	--	--	838	1.14	24,040	38	2.5	1,180	7.9
Apr. 18-30	25,180	--	6.18		4.17	--	2.77	7.08	--	--	--	692	.94	23,650	40	2.4	1,000	7.8
May 1-15	13,230	--	4.78		2.96	--	2.31	5.27	--	--	--	514	.70	9,260	38	1.9	764	8.0
May 16-June 2 ...	7,200	--	4.06		2.26	--	2.20	3.96	--	--	--	425	.58	4,180	36	1.6	643	7.7
June 3-26	22,830	13	2.69	1.33	2.13	0.11	2.39	3.54	0.39	0.02	0.08	404	.55	12,560	34	1.5	618	7.6
June 27	56	--	2.64		.87	--	2.33	1.23	--	--	--	226	.31	17	24	.8	354	8.0
June 28-July 13 ..	30,210	--	4.46		2.39	--	2.74	3.91	--	--	--	468	.64	19,330	35	1.6	680	7.6
July 14-16	19,340	--	5.32		2.87	--	3.18	4.75	--	--	--	558	.76	14,700	35	1.8	803	7.8
July 17-19	24,140	--	5.04		2.17	--	2.98	3.85	--	--	--	494	.67	16,170	30	1.4	698	7.7
July 20-Aug. 21 ..	245,400	--	4.54		1.96	--	2.80	3.64	--	--	--	423	.58	142,300	30	1.3	633	7.8
Aug. 22-Sept. 12 ..	146,500	--	4.64		1.96	--	2.92	3.50	--	--	--	431	.59	86,440	30	1.3	647	7.5
Sept. 13-30	57,740	19	3.19	1.81	2.35	.12	3.10	3.91	.45	.02	.03	483	.66	38,110	31	1.5	700	8.2
Total or weighted average ^a	637,600	--	4.92		2.39	--	2.90	4.16	--	--	--	480	0.65	417,900	33	1.5	706	--

a Represents 100 percent of runoff for water year October 1954 to September 1955.

PLATTE RIVER BASIN--Continued

PLATTE RIVER AT BRADY, NEBR.

LOCATION.--At gaging stations at highway bridges, half a mile and 2½ miles south of Brady, Lincoln County, and 18 miles downstream from confluence of North Platte and South Platte Rivers.

DRAINAGE AREA.--56,900 square miles, approximately.

RECORDS AVAILABLE.--Chemical analyses: November 1950 to September 1955.

Water temperatures: March 1951 to September 1955.

EXTREMES, 1954-55.--Specific conductance: Maximum daily, 852 micromhos May 12 (channel 1); minimum daily, 415 micromhos June 28 (channel 1). Percent sodium: Maximum, 33 Feb. 14-19, Feb. 24 to Mar. 24, Mar. 28 to Apr. 25.

EXTREMES, 1951-55.--Specific conductance: Maximum daily, 1,070 micromhos Feb. 19, 1953 (channel 1); minimum daily, 345 micromhos Nov. 26, 1952 (channel 1).

Percent sodium: Maximum, 46 Aug. 1-22, 1955; minimum, 22 Nov. 26, 1952.

REMARKS.--Values reported for dissolved solids are residues on evaporation. Daily samples for chemical analyses from each of two major channels composited by discharge. Composite periods normally identical to those of Supply Canal (Iri-County Diversion) near Maxwell, Nebr. Records of specific conductance of daily samples, taken at each of the two major channels, available in regional office at Lincoln, Nebr. Records of discharge for water year October 1954 to September 1955 given in WSP 1390.

Chemical analyses, water year October 1954 to September 1955

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million								Dissolved solids				Per-cent so-dium	So-ad-sorp-tion ratio	Specific conduct-ance (micro-mhos at 25°C)		
											Boron (B) ppm								
			Cal-cium (Ca)	Magne-sium (Mg)	So-dium (Na)	Potas-sium (K)	Bicar-bonate (HCO ₃)	Sul-fate (SO ₄)	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO ₃)	Parts per mil-lion	Tons per acre-foot	Total tons					
Oct. 1-31, 1954..	8,150	--	3.98		2.35	--	3.44	2.48	--	--	--	0.12	427	0.58	4,730	37	1.7	626	7.8
Nov. 1-30	8,030	44	2.74	1.22	2.13	0.17	3.64	2.33	0.34	0.03	0.03	0.12	415	.56	4,500	34	1.5	607	7.8
Dec. 1-28	8,930	--	3.96		2.13	--	3.65	2.23	--	--	--	--	412	.56	5,000	35	1.5	597	8.0
Dec. 29-Jan.19,1955	10,130	--	4.10		2.22	--	3.70	2.37	--	--	--	--	434	.59	5,980	35	1.6	616	8.1
Jan. 20-26	6,020	--	4.12		2.52	--	3.64	2.69	--	--	--	--	436	.59	3,550	38	1.8	647	7.9
Jan. 27-Feb. 4...	4,780	--	3.78		2.04	--	3.46	2.23	--	--	--	--	390	.53	2,530	35	1.5	576	8.1
Feb. 5-10	4,770	--	3.98		2.30	--	3.52	2.52	--	--	--	--	421	.57	2,720	37	1.6	619	7.8
Feb. 11-13	2,290	--	4.30		2.57	--	3.80	2.83	--	--	--	--	456	.62	1,420	37	1.8	677	8.0
Feb. 14-19	3,730	36	2.59	1.13	1.96	.23	3.31	2.12	.39	.02	.04	.09	386	.52	1,940	33	1.4	558	8.0
Feb. 20-23	2,890	--	4.52		2.78	--	3.83	3.12	--	--	--	--	481	.65	1,880	38	1.9	709	7.9
Feb. 24-Mar. 16.	10,920	--	3.74		1.87	--	3.36	2.10	--	--	--	--	388	.53	5,790	33	1.4	556	7.9
Mar. 17-24	2,660	--	4.16		2.04	--	3.59	2.39	--	--	--	--	418	.57	1,520	33	1.4	613	7.9
Mar. 25-27	1,770	--	4.82		2.70	--	4.02	3.19	--	--	--	--	508	.69	1,220	36	1.7	734	8.0
Mar. 28-Apr. 25.	11,410	--	3.88		1.91	--	3.38	2.31	--	--	--	--	386	.52	5,930	33	1.4	574	8.0
Apr. 26-May 11..	4,650	--	4.12		2.22	--	3.59	2.58	--	--	--	--	431	.59	2,740	35	1.6	632	8.0

PLATTE RIVER BASIN--Continued

PLATTE RIVER AT BRADY, NEBR.--Continued

Chemical analyses, water year October 1954 to September 1955.--Continued

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million						Boron (B) ppm	Dissolved solids			Per-cent so-dium	So-dium adsorp-tion ratio	Specific conductance (micro-mhos at 25°C)	pH
			Cal-cium (Ca)	Magne-sium (Mg)	So-dium (Na)	Potas-sium (K)	Bicar-bonate (HCO ₃)	Sul-fate (SO ₄)	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO ₃)	Parts per million	Tons per acre-foot	Total tons		
May 12-25, 1955.	9,140	--	3.56	1.23	2.65	--	3.62	2.85	--	--	--	446	0.61	5,580	669	7.9
May 26-June 26..	10,680	42	2.69	3.36	2.13	0.26	3.59	2.33	0.39	0.03	0.11	412	.56	5,980	611	8.0
June 27-July 1....	3,060	--	3.36	4.00	1.70	--	3.23	1.79	--	--	--	347	.47	1,440	515	8.0
July 2-9.....	2,770	--	3.98	3.98	2.39	--	3.57	2.66	--	--	--	437	.59	1,630	642	8.1
July 10-31.....	53,650	--	3.86	3.86	3.17	--	3.97	2.96	--	--	--	473	.64	34,340	711	8.2
Aug. 1-22.....	46,070	--	3.86	3.86	3.26	--	4.06	2.77	--	--	--	467	.64	29,480	702	7.8
Aug. 23-Sept. 15.	4,990	--	3.86	3.86	3.00	--	3.84	2.81	--	--	--	459	.62	3,090	679	8.1
Sept. 16-30.....	5,020	44	2.59	1.23	2.57	.28	3.92	2.48	.45	.03	.02	436	.59	2,980	633	7.8
Total or weighted average.....	226,500	--	3.94	3.94	2.65	--	3.77	2.62	--	--	--	442	0.60	136,000	655	--

a Represents 100 percent of runoff for water year October 1954 to September 1955.

PLATTE RIVER BASIN--Continued

SUPPLY CANAL (TRI-COUNTY DIVERSION) NEAR MAXWELL, NEBR.

LOCATION.--At gaging station at Parshall Flume in sec. 28, T. 13 N., R. 29 W., near Maxwell, Lincoln County.

RECORDS AVAILABLE.--Chemical analyses: March 1951 to September 1955.

Water temperatures: March 1951 to September 1955.

EXTREMES, 1954-55.--Specific conductance: Maximum daily, 906 micromhos May 6, 8; minimum daily, 541 micromhos June 28.

Percent sodium: Maximum, 48 Aug. 1 to Sept. 15; minimum, 39 Feb. 14-19, Feb. 26 to Mar. 16, Mar. 25 to Apr. 25.

EXTREMES, 1951-55.--Specific conductance: Maximum daily, 1,210 micromhos Mar. 26, Apr. 6, 14, 15, 1952; minimum daily, 499 micromhos May 15, 1951.

Percent sodium: Maximum, 48 Aug. 1 to Sept. 15, 1955; minimum, 36 Mar. 27 to Apr. 14, May 26 to June 8, 1952, Jan. 29 to Feb. 18, 1953.

REMARKS.--Values reported for dissolved solids are residues on evaporation. Daily samples for chemical analyses composited by discharge.

Composite periods normally identical to those of Platte River at Brady, Nebr. Records of specific conductance of daily samples available in regional office at Lincoln, Nebr. Records of discharge for water year October 1954 to September 1955 given in reports of State Engineer.

Chemical analyses, water year October 1954 to September 1955

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million										Dissolved solids			Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)		
			Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B) ppm	Parts per million						
													per acre-foot	Total tons					
Oct. 1-31, 1954.	69,820	--	3.80		2.87	--	3.57	2.81	--	--	--	--	438	0.60	41,890	43	2.1	660	7.9
Nov. 1-30	55,330	31	2.45	1.27	2.74	0.26	3.46	2.71	0.51	0.03	0.02	0.12	421	.57	31,940	41	2.0	639	8.0
Dec. 1-28	55,330	--	3.80		2.83	--	3.54	2.79	--	--	--	--	422	.57	31,540	43	2.1	655	8.0
Dec. 29-Jan. 19, 1955.	41,950	--	4.18		3.09	--	3.70	3.29	--	--	--	--	482	.66	27,690	43	2.1	720	7.9
Jan. 20-26	12,470	--	4.48		3.48	--	3.87	3.77	--	--	--	--	519	.71	8,850	44	2.3	785	8.1
Jan. 27-Feb. 4 .	18,820	--	4.34		3.13	--	3.69	3.50	--	--	--	--	487	.66	12,420	42	2.1	742	8.0
Feb. 5-10	10,800	--	4.52		3.30	--	3.80	3.77	--	--	--	--	509	.69	7,450	42	2.2	778	8.0
Feb. 11-13	5,290	--	4.74		3.52	--	3.90	4.00	--	--	--	--	537	.73	3,860	43	2.3	815	8.1
Feb. 14-19	13,030	30	2.74	1.56	2.91	.28	3.57	3.27	.56	.03	.03	.12	472	.64	8,340	39	2.0	706	7.9
Feb. 20-23	5,760	--	4.90		3.74	--	3.98	4.31	--	--	--	--	560	.76	4,380	43	2.4	850	7.9
Feb. 24-Mar. 16	46,580	--	4.28		2.70	--	3.51	3.14	--	--	--	--	465	.63	29,350	39	1.8	689	8.0
Mar. 17-24	16,460	--	4.40		2.96	--	3.47	3.56	--	--	--	--	496	.67	11,030	40	2.0	727	8.0
Mar. 25-27	4,410	--	4.98		3.17	--	3.64	4.14	--	--	--	--	552	.75	3,310	39	2.0	803	8.0
Mar. 28-Apr. 25	57,300	--	4.56		2.91	--	3.34	3.83	--	--	--	--	500	.68	38,960	39	1.9	747	8.0

PLATTE RIVER BASIN--Continued
SOUTH PLATTE RIVER AT JULESBURG, COLO.

LOCATION.--At gaging station at bridge on State Highway 51, 0.5 mile southeast of Julesburg, Sedgwick County, 4 miles upstream from Colorado-Nebraska State line, and 8 miles downstream from Lodgepole Creek.

DRAINAGE AREA.--22,800 square miles, approximately.

RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1955.

Water temperatures: October 1945 to September 1955.

EXTREMES, 1954-55.--Specific conductance: Maximum daily, 2,350 micromhos Apr. 13; minimum daily, 1,010 micromhos May 17.

Percent sodium: Maximum, 47 Apr. 13; minimum, 30 Nov. 11-27.

EXTREMES, 1945-55.--Specific conductance: Maximum daily, 2,350 micromhos Apr. 13, 1955; minimum daily, 617 micromhos Aug. 19, 1953.

Percent sodium: Maximum, 82 Mar. 1-12, 1947; minimum, 29 Aug. 6-10, 1951, Aug. 19, 1953.

REMARKS.--Values reported for dissolved solids are sums of determined constituents. Records of specific conductance of daily samples available in regional office at Lincoln, Nebr. Records of discharge for water year October 1954 to September 1955 given in WSP 1390.

Chemical analyses, water year October 1954 to September 1955

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million										Dissolved solids				So-dium adsorp-tion ratio	Specific conduct-ance (micro-mhos at 25°C)	pH
											Boron (B) ppm	Parts per million			Total tons				
			Cal-cium (Ca)	Magne-sium (Mg)	So-dium (Na)	Potas-sium (K)	Bicar-bonate (HCO ₃)	Sul-fate (SO ₄)	Chlo-ride (Cl)	Fluo-ride (F)		Ni-trate (NO ₃)							
Oct. 1-29, 1954.	1,960	--	13.84		6.61	--	--	--	--	--	--	--	1,360	1.85	3,630	32	2.5	1,780	--
Oct. 30-Nov. 10.	1,800	--	15.24		7.57	--	--	--	--	--	--	--	1,470	2.00	3,600	33	2.7	1,960	--
Nov. 11-27	1,570	--	14.76		6.31	--	--	--	--	--	--	--	1,360	1.85	2,900	30	2.3	1,830	--
Nov. 28-Dec. 13	3,210	36	11.43	3.95	7.74	0.49	6.70	15.09	1.95	0.03	0.07	0.23	1,550	2.11	6,770	33	2.8	1,970	7.5
Dec. 14-Jan. 12, 1955.	5,850	--	14.20		7.44	--	--	--	--	--	--	--	1,510	2.05	11,990	34	2.8	1,900	--
Jan. 13-31.	4,170	--	14.08		7.52	--	--	--	--	--	--	--	1,510	2.05	8,550	35	2.8	1,900	--
Feb. 1-19	8,120	--	14.36		7.78	--	--	--	--	--	--	--	1,530	2.08	16,890	35	2.9	1,940	--
Feb. 20	361	--	16.92		8.65	--	--	--	--	--	--	--	1,770	2.41	870	34	3.0	2,220	--
Feb. 21-Mar. 9.	9,560	--	14.08		7.65	--	--	--	--	--	--	--	1,490	2.03	19,410	35	2.9	1,900	--
Mar. 10-26	6,710	31	8.78	4.66	7.52	.36	4.62	14.99	1.81	.04	.05	.28	1,440	1.96	13,150	35	2.9	1,840	8.0
Mar. 27-Apr. 10	4,030	--	13.38		7.35	--	--	--	--	--	--	--	1,450	1.97	7,940	35	2.8	1,830	--
Apr. 11-12	371	--	12.00		7.09	--	--	--	--	--	--	--	1,340	1.82	675	37	2.9	1,720	--
Apr. 13	319	--	13.88		12.13	--	--	--	--	--	--	--	1,860	2.53	807	47	4.6	2,350	--
Apr. 14-23	1,640	--	13.32		7.57	--	--	--	--	--	--	--	1,460	1.99	3,260	36	2.9	1,850	--
Apr. 24-May 16.	1,680	--	12.32		6.70	--	--	--	--	--	--	--	1,310	1.78	2,990	35	2.7	1,710	--
May 17-18	1,080	--	7.04		4.00	--	--	--	--	--	--	--	.751	1.02	1,100	36	2.1	1,070	--
May 19-31	3,670	--	12.68		7.39	--	--	--	--	--	--	--	1,360	1.85	6,790	37	2.9	1,790	--

PLATTE RIVER BASIN--Continued
SOUTH PLATTE RIVER AT JULESBURG, COLO.--Continued

Chemical analyses, water year October 1954 to September 1955--Continued

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million								Boron (B) ppm	Dissolved solids			Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	
			Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)		Nitrate (NO ₃)	Parts per million	Tons per acre-foot					Total tons
June 1-16, 1955.	4,700	33	7.73	4.09	6.48	0.38	4.47	12.18	1.55	0.04	0.06	0.23	1,230	1.67	7,850	35	2.7	1,630	7.8
June 17-18	1,440	--	8.88	5.52	--	--	--	--	--	--	--	--	1,010	1.37	1,970	38	2.6	1,360	--
June 19-July 18 .	7,770	--	12.40	7.00	--	--	--	--	--	--	--	--	1,350	1.84	14,300	36	2.8	1,750	--
July 19-Aug. 26 .	1,710	--	12.00	6.70	--	--	--	--	--	--	--	--	1,320	1.80	3,080	36	2.7	1,710	--
Aug. 27-Sept. 11	567	--	11.38	6.83	--	--	--	--	--	--	--	--	1,330	1.81	1,030	38	2.9	1,710	--
Sept. 12-30	827	44	8.88	3.72	7.13	.43	4.05	14.05	1.78	.04	.05	.24	1,390	1.89	1,560	35	2.8	1,770	7.8
Total or weighted average ^a	73,100	--	13.36	7.26	--	--	--	--	--	--	--	--	1,420	1.93	141,100	35	2.8	1,820	--

a Represents 100 percent of runoff for water year October 1954 to September 1955.

KANSAS RIVER BASIN

REPUBLICAN RIVER ABOVE MEDICINE CREEK AT CAMBRIDGE, NEBR.

LOCATION.--At bridge on State Highway 47, 1 mile upstream from gaging station at Cambridge, Furnas County, a quarter of a mile upstream from Medicine Creek, and 2.3 miles upstream from Cambridge diversion dam.
DRAINAGE AREA.--13,200 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: December 1950 to September 1955.

Water temperatures: December 1950 to September 1955.

EXTREMES, 1954-55.--Specific conductance: Maximum daily, 731 micromhos Jan. 11; minimum daily, 298 micromhos June 19.

Percent sodium: Maximum, 31 Sept. 7-8, 19-21; minimum, 14 June 17-20.

EXTREMES, 1950-55.--Specific conductance: Maximum daily (1951-55), 830 micromhos Aug. 21, 1952; minimum daily, 267 micromhos Aug. 17, 1954.

Percent sodium: Maximum, 31 Sept. 7-8, 19-21, 1955; minimum, 9 July 11-14, 1953.

REMARKS.--Values reported for dissolved solids are residues on evaporation. Daily samples for chemical analyses composited by discharge.

Records of specific conductance of daily samples available in regional office at Lincoln, Nebr. Water discharge computed by subtracting the discharge of Medicine Creek at Cambridge from that of the Republican River at Cambridge. Records of discharge for the

Republican River at Cambridge and Medicine Creek at Cambridge for water year October 1954 to September 1955 given in WSP 1390.

Chemical analyses, water year October 1954 to September 1955

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million										Dissolved solids				Percent sodium	So-dium adsorp-tion ratio	Specific conduct-ance (micro-mhos at 25°C)	pH
			Cal-cium (Ca)	Magne-sium (Mg)	So-dium (Na)	Potas-sium (K)	Bicar-bonate (HCO ₃)	Sul-fate (SO ₄)	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO ₃)	Boron (B) ppm	Parts per mil-lion	Tons per acre-foot	Total tons					
Oct. 1-31, 1954..	5,650	--	4.16		1.26	--	4.54	0.81	--	--	--	--	350	0.48	2,710	23	0.9	526	7.7	
Nov. 1-30	5,800	--	4.48		1.22	--	4.87	.79	--	--	--	--	367	.50	2,900	21	.8	543	8.2	
Dec. 1-28	5,890	44	3.04	1.50	1.22	0.36	4.95	.81	0.27	0.05	0.08	0.12	372	.51	3,000	20	.8	560	8.2	
Dec. 29-Jan.13,1955	2,920	--	5.00		1.39	--	5.49	.94	--	--	--	--	411	.56	1,640	22	.9	616	8.1	
Jan. 14-Feb. 16...	7,360	--	4.78		1.22	--	5.05	.87	--	--	--	--	377	.51	3,750	20	.8	575	8.0	
Feb. 17-19	1,180	--	3.50		.96	--	3.82	.69	--	--	--	--	291	.40	472	21	.7	445	7.9	
Feb. 20-Mar. 1...	3,490	--	4.54		1.30	--	4.93	.90	--	--	--	--	380	.52	1,810	22	.9	565	8.1	
Mar. 2-5	2,540	--	3.50		.91	--	3.72	.67	--	--	--	--	290	.39	991	21	.7	438	7.9	
Mar. 6-25	9,260	43	2.30	1.74	1.00	.33	a4.38	.69	.21	.05	.07	.09	337	.46	4,260	19	.7	503	8.0	
Mar. 26	9,323	--	4.96		1.26	--	a5.38	.87	--	--	--	--	414	.56	181	20	.8	597	8.3	
Mar. 27-Apr. 19..	8,220	--	4.10		1.13	--	4.51	.75	--	--	--	--	347	.47	3,860	21	.8	512	8.2	
Apr. 20-May 17 ..	3,150	--	4.40		1.43	--	4.88	.94	--	--	--	--	396	.54	1,700	25	1.0	582	8.0	
May 18-21	885	--	3.30		1.17	--	3.64	.92	--	--	--	--	294	.40	354	26	.9	462	8.1	
May 22-25	859	--	4.06		1.22	--	4.49	.77	--	--	--	--	349	.47	404	23	.9	540	7.6	

a Includes 0.23 equivalent per million of carbonate (CO₃).

KANSAS RIVER BASIN--Continued

REPUBLICAN RIVER ABOVE MEDICINE CREEK AT CAMBRIDGE, NEBR.--Continued

Chemical analyses, water year October 1954 to September 1955.--Continued

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million								Dissolved solids			Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH
			Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B) ppm	Parts per million	Tons per acre-foot	Total tons		
May 26-29, 1955..	2,480	--	3.00	3.00	0.87	--	3.41	0.54	--	--	0.06	--	263	0.36	893	406	7.7
May 30-June 16 ..	3,970	43	2.35 | 1.39	1.13	1.13	0.46	4.26	.71	0.20	0.04	0.11	0.11	327	.44	1,750	503	7.5
June 17-20	15,600	--	2.58	.43	--	--	2.88	.17	--	--	--	--	204	.28	4,370	319	7.6
June 21-27	4,200	--	3.86	1.04	--	--	4.31	.75	--	--	--	--	347	.47	1,970	503	7.9
June 28-July 27 ...	3,070	--	3.80	1.30	1.30	--	4.26	.96	--	--	--	--	356	.48	1,470	527	7.9
July 28-Aug. 10 ..	2,310	--	3.56	1.61	--	--	4.02	1.37	--	--	--	--	347	.47	1,090	532	7.6
Aug. 11-14	879	--	2.92	.91	--	--	3.33	.67	--	--	--	--	254	.35	308	399	7.6
Aug. 15-16	38	--	3.55	1.30	--	--	4.02	.98	--	--	--	--	328	.45	17	497	7.8
Aug. 23-25	77	--	3.76	1.57	--	--	4.38	1.10	--	--	--	--	371	.50	39	546	7.7
Sept. 7-8	22	--	3.66	1.65	--	--	4.03	1.35	--	--	--	--	348	.47	10	549	7.5
Sept. 12-14	56	--	3.60	1.57	--	--	4.00	1.19	--	--	--	--	334	.45	25	532	7.4
Sept. 19-21	220	--	3.42	1.52	--	--	3.98	.87	--	--	--	--	331	.45	99	532	7.1
Sept. 22-26	974	27	2.00 | 1.06	.87	.36	3.21	.67	.75	.17	.03	.08	.07	252	.34	331	385	8.0
Sept. 27-30	573	--	3.64	1.22	--	--	4.10	.75	--	--	--	--	320	.44	254	502	7.9
Total or weighted average b....	92,010	--	3.86	1.04	--	--	4.24	0.69	--	--	--	--	325	0.44	40,660	489	--

b Represents 100 percent of runoff for water year October 1954 to September 1955.

PART 7. LOWER MISSISSIPPI RIVER BASIN

ARKANSAS RIVER BASIN

ARKANSAS RIVER BELOW JOHN MARTIN RESERVOIR, COLO.

LOCATION.--At gaging station 1 mile upstream from Caddoa Creek, 1½ miles downstream from John Martin Dam, Bent County, and 3 miles southeast of Hasty.
DRAINAGE AREA.--18,917 square miles, of which 785 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: August 1942 to August 1943, October 1945 to July 1949 (intermittent and weekly samples); January 1951 to September 1955 (daily samples).

Water temperatures: January 1951 to September 1955.

EXTREMES, 1954-55.--Specific conductance: Maximum observed, 5,180 micromhos Apr. 21; minimum observed, 1,310 micromhos June 15.

Percent sodium: Maximum, 41 Mar. 1-10, Apr. 21 to May 10, 21-23; minimum, 23 July 1-10.

EXTREMES, 1951-55.--Specific conductance: Maximum observed, 5,180 micromhos Apr. 21, 1955; minimum observed, 830 micromhos June 19, 1952.

Percent sodium: Maximum, 42 Feb. 1-10, 1955; minimum, 23 July 1-10, 1955.

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 1954 to September 1955 given in WSP 1391.

Chemical analyses, water year October 1954 to September 1955

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million								Dissolved solids			Percent sodium	Specific conductance (micro-mhos at 25°C)
			Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B) ppm	Parts per million	Tons per acre-foot	Total tons
Oct. 1-6, 8-10, 1954.....	422	13	17.51	11.60	18.44	0.20	4.56	40.18	2.99	0.05	0.05	0.50	3,270	4.45	1,880
Oct. 7.....	182	--	12.38	6.74	9.26	--	2.98	--	--	--	--	--	1,920	2.61	475
Oct. 11-20.....	462	--	19.41	14.64	19.18	--	--	--	--	--	--	--	3,510	4.77	2,200
Oct. 21-31.....	375	--	19.21	14.06	19.83	--	--	--	--	--	--	--	3,520	4.79	1,800
Nov. 1-10.....	351	--	19.61	13.90	19.65	--	--	--	--	--	--	--	3,510	4.77	1,870
Nov. 11-20.....	393	--	19.21	14.31	19.57	--	--	--	--	--	--	--	3,470	4.72	1,850
Nov. 21-30.....	466	--	19.01	13.90	19.39	--	--	--	--	--	--	--	3,410	4.64	2,160
Dec. 1-10.....	482	--	18.41	14.64	19.79	--	5.54	--	--	--	--	--	3,580	4.87	2,350
Dec. 11-20.....	478	--	19.01	14.84	20.09	--	5.79	--	--	--	--	--	3,510	4.91	2,350
Dec. 21-31.....	363	--	19.61	14.47	20.61	--	5.70	--	--	--	--	--	3,730	5.07	1,840
Jan. 1-10, 1955..	60	21	20.41	14.88	22.48	.20	6.05	47.26	3.86	.04	.12	.88	3,890	5.29	317
Jan. 11-20.....	41	--	18.41	15.62	21.52	--	6.36	--	--	--	--	--	3,770	5.13	210
Jan. 21-31.....	41	--	19.01	15.62	21.96	--	6.19	--	--	--	--	--	3,840	5.22	214
Feb. 1-10.....	39	--	17.81	16.20	21.52	--	6.33	--	--	--	--	--	3,750	5.10	199
Feb. 11-20.....	33	--	17.02	16.45	21.65	--	6.47	--	--	--	--	--	3,720	5.06	167
Feb. 21-28.....	22	--	16.17	16.53	20.96	--	6.24	--	--	--	--	--	3,650	4.96	109

ARKANSAS RIVER BASIN--Continued

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

Chemical analyses, water year October 1954 to September 1955--Continued

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million								Dissolved solids				Per cent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	
			Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B) ppm	Parts per million	Tons per acre-foot				Total tons
Mar. 1-10, 1955..	118	--	15.47	14.31	20.65	--	5.95	--	--	--	--	3,480	4.73	558	41	3,820	7.8	
Mar. 11-20	193	--	15.27	12.34	18.05	--	4.49	--	--	--	--	3,120	4.24	818	40	3,490	7.5	
Mar. 21-31	224	--	16.07	13.08	19.26	--	4.38	--	--	--	--	3,320	4.52	1,010	40	3,640	7.7	
Apr. 1-10	175	11	17.22	13.32	18.18	0.22	4.41	40.60	3.10	0.05	0.05	0.47	3,350	4.56	798	37	3,690	7.6
Apr. 11-20	6,240	--	16.27	13.49	19.92	--	3.79	--	--	--	--	3,400	4.62	28,830	40	3,750	7.5	
Apr. 21-30	488	--	18.01	15.21	22.70	--	4.39	--	--	--	--	3,880	5.28	2,580	41	4,160	7.6	
May 1-10	454	--	17.81	13.90	22.22	--	4.13	--	--	--	--	3,690	5.02	2,280	41	3,970	7.5	
May 11-20	673	--	14.87	11.51	16.83	--	4.93	--	--	--	--	2,940	4.09	2,690	39	3,300	7.6	
May 21-23	31	--	15.87	13.32	20.44	--	5.34	--	--	--	--	3,390	4.61	143	41	3,740	7.6	
May 24-31	5,620	--	9.78	5.59	6.00	--	6.42	--	--	--	--	1,320	1.80	10,120	28	1,640	7.4	
June 1-2, 4-10 ..	3,440	--	9.13	5.18	4.70	--	5.44	--	--	--	--	1,270	1.73	5,950	25	1,570	7.4	
June 3	329	--	14.67	8.55	12.00	--	5.05	--	--	--	--	2,300	3.13	1,030	34	2,740	7.4	
June 11-20	9,220	--	7.19	3.78	4.48	--	2.10	--	--	--	--	1,030	1.40	12,910	29	1,330	7.7	
June 21-30	14,620	--	7.29	3.87	4.48	--	2.20	--	--	--	--	1,070	1.46	21,350	29	1,360	7.6	
July 1-10	24,040	12	7.78	4.36	3.70	.17	2.13	13.10	.51	.03	.09	1.14	1.080	1.47	35,340	23	1,370	7.8
July 11-20	23,800	--	7.68	4.11	4.35	--	2.21	--	--	--	--	1,110	1.51	35,940	27	1,400	7.7	
July 21-31	26,990	--	8.18	3.95	4.52	--	2.34	--	--	--	--	1,130	1.54	41,560	27	1,430	7.7	
Aug. 1-7, 9-10 ..	21,120	--	8.18	4.28	4.70	--	2.29	--	--	--	--	1,170	1.59	33,580	27	1,470	7.7	
Aug. 8	960	--	23.55	14.64	25.26	--	4.92	--	--	--	--	1,280	5.82	5,590	40	4,620	7.2	
Aug. 11-20	22,530	--	8.33	4.36	4.78	--	2.38	--	--	--	--	1,200	1.63	36,720	27	1,490	7.7	
Aug. 21-31	25,420	--	8.03	4.28	4.70	--	2.34	--	--	--	--	1,160	1.58	40,160	28	1,460	7.6	
Sept. 1-10	22,310	--	7.83	4.36	4.65	--	2.36	--	--	--	--	1,140	1.55	34,580	28	1,440	7.8	
Sept. 11-20	20,540	--	7.93	4.44	4.78	--	2.39	--	--	--	--	1,170	1.59	32,660	28	1,460	7.8	
Sept. 21-30	14,670	--	8.13	4.52	5.00	--	2.44	--	--	--	--	1,220	1.66	24,350	28	1,500	7.7	
Total or weighted average.....	248,500	--	8.53	4.77	5.48	--	2.54	--	--	--	--	1,280	1.74	432,400	29	2.1	1,570	--

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

LOCATION.--At gaging station at Chestnut Avenue Highway bridge, half a mile west of Arkansas City, Cowley County, 5.9 (revised) miles up-stream from Walnut River, and at mile 701.9.
DRAINAGE AREA.--43,713 square miles (revised), of which about 7,607 square miles does not contribute directly to surface runoff.
RECORDS AVAILABLE.--Chemical analyses: October 1951 to September 1955.

Water temperatures: October 1951 to September 1955.

EXTREMES, 1954-55.--Specific conductance: Maximum daily, 4,640 micromhos Aug. 7; minimum daily, 341 micromhos May 27.

Percent sodium: Maximum, 79 Apr. 28; minimum, 36 May 27-29.

Sodium adsorption ratio: Maximum, 16 Aug. 7; minimum, 1.3 May 27-29.

EXTREMES, 1951.--Specific conductance: Maximum daily, 4,720 micromhos Oct. 5, 1953; minimum daily, 341 micromhos May 27, 1955.

Percent sodium: Maximum, 79 Apr. 28, 1955; minimum, 36 May 27-29, 1955.

Sodium adsorption ratio: Maximum, 16 Oct. 5, 1953, Aug. 7, 1955; minimum, 1.3 May 27-29, 1955.

REMARKS.--Values reported for dissolved solids are residues on evaporation at 180°C. Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of discharge for water year October 1954 to September 1955 given in WSP 1391.

Chemical analyses, water year October 1954 to September 1955

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million										Dissolved solids			Specific conductance (micro-mhos at 25°C)
			Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B) ppm	Parts per million	Tons per acre-foot	Percent sodium	
Oct. 1-6, 1954...	532	--	6.24	2.36	21.05	--	4.26	3.37	23.27	--	0.16	--	1,910	2.60	71	3,410
Oct. 7-10	849	--	4.79	1.91	16.22	--	3.44	2.96	16.36	--	.24	--	1,450	1.97	71	2,600
Oct. 11-20	1,410	--	5.19	2.21	21.13	--	3.74	2.87	21.86	--	.23	--	1,730	2.35	74	3,140
Oct. 21-27	912	--	5.99	2.41	20.70	--	4.06	3.23	21.15	--	.15	--	1,750	2.38	71	3,080
Oct. 28-31	1,320	--	4.14	1.86	12.35	--	3.31	2.46	12.41	--	.19	--	1,120	1.52	67	1,990
Nov. 1-10	2,350	17	5.09	2.11	17.87	0.20	3.87	3.04	18.33	0.03	.29	0.28	1,550	2.11	71	2,770
Nov. 11-20	3,210	--	5.19	1.61	17.83	--	3.72	2.94	16.92	--	.24	--	1,480	2.03	72	2,620
Nov. 21-30	3,080	13	5.19	2.21	16.70	.18	3.92	3.06	17.63	.03	.24	.24	1,510	2.05	69	2,680
Dec. 1-10	3,280	--	5.19	1.81	16.35	--	3.88	2.96	16.92	--	.26	--	1,430	1.94	70	2,540
Dec. 11-20	3,540	--	5.19	1.81	17.70	--	3.88	3.12	16.92	--	.21	--	1,470	2.00	72	2,670
Dec. 21-31	5,120	14	5.59	2.21	18.70	.31	3.87	3.39	19.04	--	.13	.00	1,560	2.12	70	2,860
Jan. 1-10, 1955.	5,690	--	5.19	2.11	17.78	--	3.82	3.35	18.33	--	.21	--	1,530	2.08	71	2,710
Jan. 11-18	4,710	--	5.59	1.81	17.87	--	3.87	3.52	18.33	--	.26	--	1,570	2.14	71	2,760
Jan. 19-20	1,260	--	5.19	1.51	16.35	--	3.67	2.96	15.93	--	.27	--	1,400	1.90	71	2,470
Jan. 21-31	6,360	14	5.29	2.31	16.87	.23	3.97	3.54	16.92	--	.26	.25	1,470	2.00	68	2,710

a Includes 0.20 equivalents per million of carbonate (CO₃).

b Includes 0.53 equivalents per million of carbonate (CO₃).

c Includes 0.07 equivalents per million of carbonate (CO₃).

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

Chemical analyses, water year October 1954 to September 1955--Continued

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million										Dissolved solids			Percent sodium so-	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
			Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B) ppm	Parts per million	Tons per acre-foot	Total tons				
Feb. 1-10, 1955..	7,330	--	4.79	1.61	15.13	--	3.49	3.23	15.00	--	0.24	--	1,330	1.81	13,270	70	8.5	2,370	7.9
Feb. 11-14	2,650	--	5.39	2.01	17.74	--	3.93	3.66	17.63	--	.21	--	1,530	2.08	5,520	71	9.2	2,370	8.3
Feb. 15-20	4,740	--	4.99	1.41	14.57	--	3.70	3.27	14.10	--	.24	--	1,320	1.80	8,530	69	8.1	2,350	8.1
Feb. 21-28	5,970	18	5.39	1.91	17.22	0.15	3.82	3.98	16.22	0.02	.19	0.03	1,460	1.99	11,860	70	9.0	2,600	8.2
Mar. 1-10	8,300	--	5.99	1.71	16.92	--	4.08	4.41	16.92	--	.16	--	1,490	2.03	16,840	69	8.6	2,670	8.1
Mar. 11-13	2,330	--	5.59	2.21	18.05	--	4.08	4.35	16.22	--	.18	--	1,500	2.04	4,760	70	9.1	2,700	7.9
Mar. 14-20	4,900	--	5.59	2.41	19.83	--	3.83	4.77	19.04	--	.16	--	1,660	2.26	11,080	71	9.9	2,970	7.8
Mar. 21-31	7,620	16	5.34	2.66	17.92	.18	4.06	4.54	18.33	.02	.16	.26	1,670	2.27	17,330	69	9.0	2,900	8.0
Apr. 1-10	8,280	--	5.09	1.91	18.09	--	3.79	4.43	16.92	--	.15	--	1,490	2.03	16,790	72	9.7	2,620	8.0
Apr. 11-20	8,450	10	5.44	1.56	17.92	.19	3.65	4.37	17.77	.05	.11	.16	1,590	2.16	18,290	71	9.6	2,770	7.8
Apr. 21-22	3,170	--	3.89	1.51	11.35	--	3.23	3.00	11.00	--	.08	--	1,050	1.43	4,540	68	6.9	1,850	8.1
Apr. 23-27, 29-30	7,020	--	4.89	3.11	17.05	--	3.80	4.12	16.64	--	.10	--	1,490	2.03	14,250	68	8.5	2,630	7.8
Apr. 28	908	--	6.19	2.01	30.87	--	3.80	4.58	29.90	--	--	--	2,480	3.37	3,070	79	15	4,110	8.1
May 1-10	5,360	--	5.19	2.51	21.13	--	3.90	4.77	20.31	--	--	--	1,830	2.49	13,360	73	11	3,169	7.8
May 11-21	6,740	18	5.29	1.91	19.39	.22	3.57	1.27	21.01	.03	.08	.42	1,730	2.35	15,870	72	10	3,110	7.2
May 22-25	4,450	--	3.69	1.51	11.87	--	2.88	2.62	12.18	--	.03	--	1,010	1.37	6,120	70	7.4	1,650	7.7
May 26	12,240	--	2.99	1.11	5.13	--	2.69	1.96	4.51	--	.07	--	580	.79	9,660	56	3.6	949	7.6
May 27-29	41,830	--	1.74	.75	1.43	--	1.93	.77	1.30	--	.03	--	240	.33	13,670	36	1.3	384	7.3
May 30-31	8,610	--	3.29	1.01	4.35	--	2.43	2.71	3.84	--	.03	--	546	.74	6,400	50	3.0	858	7.6
June 1-5	18,270	--	4.79	.41	6.26	--	2.82	3.19	5.47	--	.06	--	723	.98	17,980	55	3.9	1,190	6.6
June 6	8,590	--	2.54	1.06	3.74	--	2.49	1.79	2.93	--	.06	--	462	.63	5,400	51	2.8	727	7.5
June 7-8	17,490	--	1.80	1.40	2.74	--	2.23	1.48	2.20	--	.04	--	361	.49	8,600	46	2.2	603	7.4
June 9	5,180	--	3.34	1.26	5.22	--	2.62	2.96	4.29	--	.12	--	632	.86	4,450	53	3.4	967	7.7
June 10	4,340	--	3.59	1.41	7.96	--	2.65	2.73	6.93	--	.16	--	767	1.04	5,200	61	5.0	1,300	7.7
June 11	4,980	--	3.29	1.31	7.39	--	2.69	2.35	7.19	--	.13	--	778	1.06	4,600	62	4.9	1,280	7.8

d Includes 0.17 equivalents per million of carbonate (CO₃).

	27,870	--	4.14	1.66	9.57	--	3.15	3.66	8.60	--	.11	--	957	1.30	36,300	62	5.6	1,650	7.7
June 12-18, 1955.	29,130	--	1.70	.70	1.91	--	1.77	.85	1.64	--	.06	--	260	.35	10,310	44	1.7	457	7.4
June 19-20	26,900	--	2.40	.90	3.09	--	2.23	1.27	2.71	--	.08	--	367	.50	13,440	48	2.4	647	7.3
June 21-22, 24-25	22,680	--	2.94	1.26	4.44	--	2.62	1.87	4.03	--	.10	--	496	.67	15,320	51	3.1	873	7.4
June 23, 26-28 ..	13,670	--	2.00	.90	2.70	--	1.84	1.15	2.51	--	.06	--	317	.43	5,900	48	2.2	562	7.2
June 29-30	3,550	--	3.14	1.66	5.52	--	2.56	2.56	5.08	--	.13	--	617	.84	2,960	52	3.5	1,070	7.1
July 1	19,000	--	4.39	2.41	10.52	--	3.28	4.00	9.73	--	.10	--	1,030	1.40	26,640	61	5.7	1,730	7.6
July 2-10	11,640	13	5.49	2.51	18.05	.06	2.95	4.60	19.60	.02	.02	.19	1,650	2.24	26,140	69	9.0	3,030	7.2
July 11-20	9,120	--	4.89	2.91	14.35	--	3.67	4.39	13.82	--	.10	--	1,320	1.80	16,380	65	7.3	2,220	7.3
July 21-31	5,070	--	5.19	2.71	17.26	--	3.67	4.64	17.63	--	.10	--	1,500	2.04	10,360	69	8.7	2,710	8.0
Aug. 1-6, 8-10 ...	545	--	6.99	3.61	36.09	--	34.00	6.60	34.69	--	--	--	2,680	3.64	9,170	77	16	4,640	8.3
Aug. 7	4,550	13	4.74	2.66	17.26	.18	3.67	3.91	16.92	.02	.08	.29	1,480	2.01	6,460	69	9.0	2,630	7.6
Aug. 11-20	2,760	--	5.29	2.91	21.26	--	3.24	4.54	21.72	--	.13	--	1,720	2.34	6,460	72	11	3,110	7.9
Aug. 21-23, 26-31	772	--	4.39	2.61	17.22	--	3.08	3.98	17.20	--	.13	--	1,420	1.93	1,490	71	9.2	2,530	8.0
Aug. 24-25	2,330	--	6.39	3.41	23.87	--	4.13	4.29	25.10	--	.16	--	2,050	2.79	6,500	71	11	3,580	8.2
Sept. 1-10	2,040	--	6.69	2.71	23.39	--	4.39	4.27	24.11	--	.13	--	1,970	2.68	5,470	71	11	3,460	7.3
Sept. 11, 13-20 ..	405	--	3.19	1.61	10.61	--	2.62	2.37	10.72	--	.16	--	968	1.32	533	68	6.7	1,760	8.0
Sept. 12	1,270	--	6.49	3.71	23.74	--	4.72	3.77	24.54	--	.13	--	1,980	2.69	3,410	70	11	3,620	8.1
Sept. 21-25	9,760	--	2.30	.90	4.44	--	2.53	1.39	4.09	--	.03	--	461	.63	6,120	58	3.5	873	7.8
Sept. 26-28	21,760	--	1.75	.65	1.87	--	1.90	.67	1.64	--	.05	--	241	.33	7,140	44	1.7	456	7.8
Sept. 29-30	468,200	--	3.64	1.48	9.26	--	2.87	2.58	8.97	--	.10	--	677	1.19	559,000	64	5.6	1,530	--
Total or weighted average																			

a Includes 0.20 equivalents per million of carbonate (CO₃).

ARKANSAS RIVER BASIN--Continued

ARKANSAS RIVER AT RALSTON, OKLA.

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

DRAINAGE AREA.--54,227 square miles.

RECORDS AVAILABLE.--Chemical analyses: January 1950 to September 1955.

Water temperatures: January 1950 to September 1955.

EXTREMES, 1954-55.--Specific conductance: Maximum daily, 7,510 micromhos Sept. 14; minimum daily, 316 micromhos May 10.

Percent sodium: Maximum, 83 June 23-25; minimum, 42 May 26-29.

Sodium adsorption ratio: Maximum, 21 June 23-25, Sept. 11-16; minimum, 1.4 May 10.

EXTREMES, January 1950 to September 1955.--Specific conductance: Maximum daily, 7,510 micromhos Sept. 14, 1955; minimum daily, 316 micromhos May 10, 1955.

Percent sodium: Maximum, 86 May 30, 1954; minimum, 36 July 18-20, 1950.

Sodium adsorption ratio, 1951-55: Maximum, 24 May 30, 1954; minimum, 1.4 May 10, 1955.

REMARKS.--Values reported for dissolved solids are residues on evaporation at 180°C. Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of discharge for water year October 1954 to September 1955 given in WSP 1391.

Chemical analyses, water year October 1954 to September 1955

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million										Dissolved solids			Per-cent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	
			Cal-cium (Ca)	Magne-sium (Mg)	So-dium (Na)	Potas-sium (K)	Bicar-bonate (HCO ₃)	Sul-fate (SO ₄)	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO ₃)	Boron (B) ppm	Parts per million	Tons per acre-foot	Total tons				
Oct. 1-8, 1954.....	1,330	--	4.89	2.51	19.70	--	2.82	3.33	21.86	--	0.05	--	1,720	2.34	3,110	73	10	3,070	7.8
Oct. 9-10.....	649	--	4.14	1.36	14.83	--	2.20	2.33	16.58	--	.04	--	1,340	1.82	1,180	73	8.9	2,390	8.1
Oct. 11-13, 15-20.....	4,750	--	4.79	1.81	16.74	--	2.41	2.44	19.04	--	.05	--	1,420	1.93	9,190	72	9.2	2,630	8.0
Oct. 14.....	1,720	--	3.29	1.23	9.57	--	1.64	1.35	11.00	--	.21	--	918	1.25	2,150	68	8.4	1,610	8.1
Oct. 21-24, 31.....	1,530	--	5.09	3.71	18.39	--	a 2.98	3.06	21.15	--	.02	--	1,620	2.20	3,380	68	8.8	2,900	8.4
Oct. 25-30.....	4,940	--	3.69	1.91	13.39	--	b 2.16	2.19	14.05	--	.05	--	1,120	1.52	7,530	71	8.0	2,020	8.3
Nov. 1-10.....	4,200	--	4.99	1.91	19.31	--	3.23	2.77	19.74	--	.10	--	1,550	2.11	8,860	74	10	2,740	8.2
Nov. 11-20.....	3,330	--	5.39	2.31	21.52	--	b 3.36	3.10	21.88	--	.04	--	1,740	2.37	7,880	74	11	3,060	8.3
Nov. 21-30.....	3,180	5.0	5.89	1.91	20.52	0.18	3.82	3.25	21.15	0.03	.04	0.18	1,720	2.34	7,440	72	10	3,060	8.0
Dec. 1-10.....	3,270	--	6.39	1.71	20.31	--	3.92	3.25	20.45	--	.06	--	1,650	2.24	7,340	71	10	3,010	8.0
Dec. 11-20.....	3,960	--	6.19	1.61	19.92	--	3.95	3.27	20.45	--	.08	--	1,630	2.22	8,790	72	10	2,960	8.1
Dec. 21-31.....	5,750	5.5	5.34	2.66	18.09	0.23	b 3.64	3.10	19.04	--	.08	.00	1,580	2.15	12,370	69	9.0	2,860	8.3
Jan. 1-10, 1955.....	6,100	--	6.19	2.01	19.79	--	a 3.87	3.58	20.45	--	.19	--	1,670	2.27	13,870	71	9.8	2,960	8.3
Jan. 11-20.....	6,810	--	6.19	2.61	20.00	--	3.79	3.79	21.15	--	.16	--	1,780	2.42	16,510	69	9.5	3,160	7.9
Jan. 21-31.....	7,130	4.0	6.04	3.16	20.22	.24	3.80	3.70	21.15	--	.11	.00	1,750	2.38	16,980	68	9.4	3,180	7.8

a Includes 0.20 equivalent per million of carbonate (CO₃).

b Includes 0.07 equivalent per million of carbonate (CO₃).

Feb. 1-10, 1955...	8,650	5.39	2.61	18.70	--	3.62	3.27	19.74	--	.18	--	1,620	2.20	19,070	70	9.4	2,860	8.1
Feb. 11-20.....	8,300	6.19	2.01	19.96	--	3.67	3.89	20.45	--	.18	--	1,770	2.41	19,990	71	9.9	3,110	8.3
Feb. 21-24.....	4,170	5.59	2.21	18.48	--	3.72	3.58	18.33	--	.19	--	1,570	2.14	8,920	70	9.4	2,780	8.4
Feb. 25-28.....	3,900	5.69	2.21	20.09	.13	3.61	4.02	23.27	.03	.07	.03	1,870	2.54	9,930	70	10	3,290	8.1
Mar. 1-10.....	9,150	5.69	2.21	20.09	--	3.46	3.87	20.45	--	.14	--	1,690	2.30	21,050	71	10	3,020	8.0
Mar. 11-14, 16-19	6,390	5.79	2.61	20.09	--	3.67	4.31	21.15	--	.04	--	1,690	2.30	14,700	71	9.8	2,990	8.2
Mar. 15.....	1,150	4.79	1.51	15.00	--	2.65	3.12	15.23	--	.13	--	1,280	1.74	2,000	70	8.5	2,200	8.1
Mar. 16.....	1,150	3.79	1.11	10.78	--	2.43	2.39	10.21	--	.12	--	1,280	1.74	2,000	70	8.5	2,200	8.1
Mar. 20.....	1,090	5.29	2.51	18.61	.17	3.75	3.96	18.33	.03	.07	.20	1,620	2.20	22,400	70	9.4	1,630	7.9
Mar. 21-31.....	10,160	5.29	2.51	18.61	.17	3.75	3.96	18.33	.03	.07	.20	1,620	2.20	22,400	70	9.4	2,710	8.1
Apr. 1-10.....	8,510	5.49	2.61	19.26	--	3.75	4.31	19.74	--	.07	--	1,680	2.28	19,460	70	9.6	2,950	8.0
Apr. 11-20.....	7,960	4.89	2.71	17.09	.20	3.46	3.98	18.33	.02	.05	.14	1,620	2.20	17,550	69	8.8	2,670	7.8
Apr. 21-23.....	2,250	4.59	2.61	19.13	--	3.10	4.37	19.46	--	.13	--	1,680	2.26	5,090	73	10	2,900	7.9
Apr. 24-30.....	8,640	3.98	2.01	14.65	--	2.64	3.64	14.95	--	.10	--	1,320	1.80	15,520	71	8.5	2,320	7.7
May 1-7.....	6,220	4.49	2.41	17.18	--	3.62	4.10	17.91	--	.07	--	1,520	2.07	12,880	71	9.2	2,680	7.7
May 8.....	1,340	3.74	2.06	11.96	--	2.20	2.48	13.62	--	.06	--	1,140	1.55	2,090	67	7.0	1,990	6.9
May 9.....	11,680	2.30	.82	2.83	--	2.36	.65	3.07	--	.02	--	356	.48	5,660	48	2.3	575	6.9
May 10.....	15,910	1.30	.46	1.35	--	1.44	.50	1.16	--	.07	--	189	.26	4,090	43	1.4	316	7.6
May 11-12.....	25,820	1.30	.66	1.83	--	1.47	.56	1.81	--	.05	--	236	.32	8,300	48	1.8	405	7.5
May 13-14.....	9,180	2.25	1.15	5.31	--	2.10	1.25	5.53	--	.03	--	535	.73	6,690	61	4.1	957	7.8
May 15-16, 19.....	6,430	2.99	1.51	9.74	--	2.43	2.14	9.45	--	.05	--	846	1.15	7,400	68	6.5	1,520	7.8
May 17-18.....	3,750	3.44	1.56	12.48	--	2.59	2.46	12.64	--	.07	--	1,080	1.47	5,520	71	7.9	1,910	7.7
May 20.....	8,250	1.90	.50	2.87	--	1.80	.62	2.82	--	.08	--	352	.48	3,950	54	2.6	564	7.6
May 21-23.....	44,870	1.30	.50	2.09	--	1.34	.56	2.03	--	.03	--	242	.33	14,780	54	2.2	437	7.1
May 24-25.....	13,430	2.25	1.15	6.78	--	2.49	1.31	6.35	--	.05	--	584	.79	10,670	67	5.2	1,040	7.5
May 26-29.....	172,600	1.60	.60	1.61	--	1.70	.44	1.72	--	.04	--	232	.32	54,500	42	1.5	402	7.2
May 30-31.....	49,510	2.54	.66	3.52	--	2.62	1.19	2.76	--	.05	--	377	.51	25,410	52	2.8	609	7.7
June 1.....	12,100	3.39	1.51	12.52	--	2.10	2.19	13.54	--	.06	--	1,120	1.52	18,450	72	8.0	1,950	7.7
June 2-7.....	46,550	5.59	1.71	32.61	--	2.59	4.52	32.43	--	.08	--	2,480	3.37	157,200	82	17	4,170	7.8
June 8, 10.....	20,250	4.09	1.51	19.83	--	2.56	3.14	19.74	--	.08	--	1,560	2.12	45,000	78	12	2,760	7.8

c Includes 0.13 equivalent per million of carbonate (CO₃).d Includes 0.17 equivalent per million of carbonate (CO₃).

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

Chemical analyses, water year October 1954 to September 1955--Continued

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million							Dissolved solids				Per-cent sodium	So-dium adsorp-tion ratio	Specific conduct-ance (micro-mhos at 25° C)	pH		
			Cal-cium (Ca)	Magne-sium (Mg)	Sod-ium (Na)	Potas-sium (K)	Bicar-bonate (HCO ₃)	Sul-fate (SO ₄)	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO ₃)	Boron (B) ppm	Parts per mil-lion					Tons per acre-foot	Total tons
June 9, 1955	14,600	--	3.09	1.31	11.74	--	2.29	2.10	11.42	--	0.09	--	991	1.35	19,690	73	7.9	1,720	7.4
June 11-17	45,740	--	4.99	2.21	27.92	--	2.75	4.29	28.20	--	--	--	2,150	2.92	133,900	79	15	3,820	7.7
June 18-19	25,470	--	4.39	2.01	21.52	--	2.82	3.25	21.29	--	.14	--	1,690	2.30	58,590	77	12	2,930	7.8
June 20	35,110	--	2.10	.80	6.09	--	1.94	1.04	6.06	--	.09	--	564	.77	26,950	68	5.1	958	7.0
June 21	46,410	--	1.65	.85	4.00	--	1.64	1.23	3.84	--	.08	--	400	.54	25,270	62	3.6	674	7.1
June 22	30,150	--	2.94	1.66	16.39	--	1.70	2.19	16.64	--	.10	--	1,240	1.69	50,890	78	11	2,240	7.3
June 23-25	56,530	--	5.59	3.21	44.35	--	2.03	5.77	45.13	--	--	--	3,160	4.30	243,200	83	21	5,470	7.5
June 26-30	66,980	--	5.19	2.61	28.48	--	2.23	4.81	28.20	--	.09	--	2,140	2.91	195,100	79	14	3,720	7.4
July 1	11,390	--	4.99	2.21	20.22	--	2.36	4.29	19.74	--	.16	--	1,580	2.15	24,490	74	11	2,880	7.8
July 2-3	19,680	--	4.14	1.86	15.48	--	2.29	3.35	15.37	--	.13	--	1,260	1.71	33,750	72	8.9	2,320	7.7
July 4-6	18,310	--	5.19	2.61	19.44	--	2.75	4.41	19.46	--	.07	--	1,610	2.19	40,120	71	9.8	2,770	7.8
July 7, 9	12,280	--	4.24	2.16	12.87	--	2.69	3.44	13.40	--	.07	--	1,150	1.56	19,220	67	7.2	2,060	7.7
July 8	7,560	--	3.44	1.76	9.91	--	2.62	2.52	9.45	--	.10	--	859	1.17	8,840	66	6.1	1,570	7.3
July 10	5,160	--	5.19	2.81	17.92	--	2.88	4.46	18.61	--	.15	--	1,600	2.18	11,230	69	9.0	2,690	7.9
July 11-20	39,070	8.0	5.29	2.55	19.13	0.15	3.57	3.52	20.59	0.02	0.04	--	1,620	2.20	86,170	71	9.7	2,870	7.9
July 21-22, 27-31	18,150	--	5.19	3.21	20.39	--	2.98	4.60	21.43	--	.05	--	1,720	2.34	42,490	71	10	3,090	7.6
July 23-26	12,000	--	4.79	2.61	17.44	--	2.95	3.93	17.20	--	.05	--	1,480	2.01	24,180	70	9.1	2,620	7.7
Aug. 1-3, 6-10	12,710	--	4.79	2.61	19.48	--	2.88	3.93	19.88	--	.06	--	1,580	2.15	27,350	72	10	2,830	7.9
Aug. 4	3,170	--	2.10	.80	5.52	--	1.51	1.25	5.78	--	.11	--	514	.70	2,220	66	4.6	963	7.6
Aug. 5	1,920	--	4.09	1.81	14.22	--	2.39	2.66	15.09	--	.06	--	1,190	1.62	3,120	71	8.3	2,120	8.0
Aug. 11-12, 14-20	12,040	--	4.09	2.41	15.74	--	2.72	3.21	16.92	--	.05	--	1,370	1.85	22,460	71	8.7	2,450	7.4
Aug. 13	2,120	--	3.29	1.71	9.61	--	2.43	1.98	10.44	--	.15	--	905	1.23	2,610	66	6.1	1,590	8.1
Aug. 21-29, 31	8,160	--	4.49	2.71	18.57	--	2.82	3.41	20.31	--	.07	--	1,590	2.16	17,660	72	9.8	2,840	7.2
Aug. 30	803	--	5.29	3.11	24.83	--	b 2.82	3.83	26.79	--	.08	--	2,030	2.76	2,220	75	12	3,650	8.3

a Includes 0.07 equivalent per million of carbonate (CO₃).

b Includes 0.07 equivalent per million of carbonate (CO₃).

b Includes 0.07 equivalent per million of carbonate (CO₃).

Sept. 1-10, 1955..	5,130	--	4.89	2.71	19.39	--	3.08	3.44	20.73	--	.03	--	1,640	2.23	11,440	72	9.9	2,910	8.2
Sept. 11-16.....	3,880	--	6.59	3.31	46.09	--	2.36	6.20	47.95	--	--	--	3,390	4.61	17,880	82	21	6,060	7.8
Sept. 17-20.....	1,700	--	5.09	2.91	32.31	--	2.62	4.44	33.84	--	--	--	2,420	3.29	5,590	80	16	4,320	7.4
Sept. 21-24.....	1,310	--	5.19	3.11	30.35	--	2.95	4.27	31.02	--	--	--	2,250	3.06	4,020	79	15	4,190	7.9
Sept. 25-29.....	2,210	--	4.59	2.81	22.22	--	2.98	3.35	23.27	--	.01	--	1,760	2.39	5,300	75	12	3,280	7.9
Sept. 30.....	1,300	--	3.34	1.66	11.61	--	2.36	2.31	11.99	--	.18	--	1,000	1.36	1,770	70	7.3	1,800	8.0
Total or weighted average	1,108,000	--	3.64	1.64	15.05	--	2.38	2.64	15.26	--	--	--	1,230	1.67	1,855,000	74	9.2	2,150	--

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

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

DRAINAGE AREA.--17 825 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1952 to September 1955.

Water temperatures: October 1952 to September 1955.

EXTREMES, 1954-55.--Specific conductance: Maximum daily, 31,800 micromhos Feb. 18, 20; minimum daily, 507 micromhos May 20.

Percent sodium: Maximum, 94 Feb. 18-20; minimum, 61 May 10, 20.

Sodium adsorption ratio: Maximum, 98 Feb. 18-20; minimum 3.0 May 20.

EXTREMES, 1952-55.--Specific conductance: Maximum daily, 31,800 micromhos Feb. 18, 20, 1955; minimum daily, 507 micromhos May 20, 1955.

Percent sodium: Maximum, 94 Feb. 18-20, 1955; minimum, 61 May 10, 20, 1955.

Sodium adsorption ratio: Maximum, 98 Feb. 18-20, 1955; minimum, 3.0 May 20, 1955.

REMARKS.--Values reported for dissolved solids are residues on evaporation. Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of discharge for water year October 1954 to September 1955 given in WSP 1391.

Chemical analyses, water year October 1954 to September 1955

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million										Dissolved solids		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
			Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B) ppm	Parts per million	Tons per acre-foot				
Oct. 1, 1954.....	4.6	--	9.13	5.83	101.32	--	3.75	6.37	105.48	--	--	--	6,830	9.29	87	37	11,500	8.4
Oct. 2-7	28	--	11.33	6.99	121.32	--	2.08	7.14	128.61	--	--	--	8,310	11.30	87	40	14,200	8.0
Oct. 8-10	9.3	--	9.93	5.81	99.14	--	2.10	6.66	108.02	--	--	--	7,040	9.57	89	35	12,300	8.0
Oct. 11	1.8	--	9.53	3.63	90.88	--	2.23	6.18	97.02	--	--	--	6,380	8.68	87	35	11,000	8.4
Oct. 12-13	1,160	--	1.70	.30	4.00	--	1.54	.79	3.44	--	0.12	--	364	.50	67	4.0	639	7.8
Oct. 14	151	--	2.10	.60	6.87	--	1.61	1.19	6.77	--	.07	--	574	.78	72	5.9	1,060	8.4
Oct. 15-16	81	--	3.19	1.61	15.00	--	2.03	2.08	15.51	--	.05	--	1,160	1.58	76	9.7	2,210	8.4
Oct. 17-20	63	--	4.99	2.61	32.22	--	2.88	3.31	32.43	--	.04	--	2,300	3.13	81	17	4,140	8.5
Oct. 21-23	43	--	6.79	2.41	44.35	--	3.24	4.08	45.13	--	.03	--	3,160	4.30	83	21	5,650	8.5
Oct. 24-28	50	--	8.38	3.02	55.66	--	3.41	4.27	59.23	--	.02	--	4,000	5.44	83	23	6,910	8.4
Oct. 29-31	22	--	9.48	4.32	66.53	--	3.57	4.91	70.51	--	--	--	4,740	6.45	83	25	8,300	8.5

a Includes 0.27 equivalent per million of carbonate (CO₃).

b Includes 0.13 equivalent per million of carbonate (CO₃).

c Includes 0.07 equivalent per million of carbonate (CO₃).

d Includes 0.20 equivalent per million of carbonate (CO₃).

e Includes 0.33 equivalent per million of carbonate (CO₃).

[illegible]

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

Chemical analyses, water year October 1954 to September 1955--Continued

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million								Dissolved solids				Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	
			Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B) ppm	Parts per million	Tons per acre-foot				Total tons
Feb. 18-20, 1955	300	--	14.17	8.43	330.04	--	4.00	13.12	324.34	--	--	20,500	27.88	8,360	95	98	30,100	8.2
Feb. 21	17	--	12.03	8.57	273.51	--	4.02	11.62	276.11	--	--	17,400	23.66	1,690	93	85	26,900	8.4
Feb. 22-28	514	--	9.93	6.79	183.50	--	3.54	9.87	179.65	--	--	11,500	15.64	8,040	92	64	19,100	8.2
Mar. 1-2	123	--	11.48	8.38	223.51	--	3.20	11.87	221.40	--	--	14,200	19.31	2,380	92	71	23,200	8.1
Mar. 3, 10	111	--	10.13	6.99	175.67	--	3.43	10.83	174.01	--	--	11,300	15.37	1,710	91	60	18,800	8.2
Mar. 4-9	311	--	9.13	6.41	145.67	--	3.64	9.37	143.27	--	--	9,390	12.77	3,980	90	52	16,000	8.1
Mar. 11, 14-16	145	--	11.48	7.00	191.76	--	3.79	11.53	190.37	--	--	12,400	16.86	2,440	92	73	20,500	8.1
Mar. 12-13	77	--	13.47	8.33	239.16	--	3.97	13.37	236.06	--	--	15,400	20.94	1,620	92	62	24,600	8.2
Mar. 17-19	89	--	11.13	6.59	162.63	--	3.92	9.78	162.73	--	--	10,700	14.55	1,300	90	55	18,000	8.0
Mar. 20	73	--	8.18	5.98	123.06	--	3.06	7.62	125.22	--	--	8,200	11.15	819	90	46	13,400	8.3
Mar. 21-22	234	--	7.83	5.71	117.84	--	3.38	7.39	120.71	--	--	7,920	10.77	2,520	90	45	13,500	8.2
Mar. 23-27	387	--	7.09	4.69	86.53	--	3.74	6.37	88.56	--	--	5,950	8.09	3,130	88	36	10,200	8.1
Mar. 28-29	111	--	8.93	5.43	109.58	--	4.74	8.06	109.71	--	--	7,590	10.32	1,150	88	41	12,700	8.3
Mar. 30-31	87	--	9.93	6.41	127.41	--	4.29	9.41	129.17	--	--	8,610	11.71	1,020	88	45	14,500	8.1
Apr. 1-8	319	--	8.93	7.31	116.54	--	3.79	9.06	120.71	--	--	8,040	10.93	3,490	88	41	13,600	8.0
Apr. 9-10	79	--	6.59	4.11	80.45	--	3.87	6.79	81.79	--	--	5,870	7.71	612	88	35	9,770	8.0
Apr. 11-18	319	--	8.18	7.08	101.75	--	3.49	8.74	104.07	--	--	7,100	9.66	3,090	87	37	12,300	7.8
Apr. 19	101	--	13.77	8.23	219.16	--	3.34	17.48	215.19	--	--	14,400	19.58	1,980	91	66	21,600	8.2
Apr. 20-22	2,900	--	12.72	8.88	235.68	--	4.74	13.57	242.83	--	--	15,800	21.49	62,450	92	72	25,300	8.3
Apr. 23-30	2,080	--	8.33	6.19	145.24	--	4.10	8.97	145.81	--	--	9,790	13.31	27,780	91	54	16,400	8.2
May 1-8	357	--	9.93	7.95	162.19	--	3.49	10.87	165.27	--	--	11,000	14.96	5,350	90	54	18,400	7.9
May 9	3,590	--	15.42	10.98	219.59	--	4.34	15.30	229.01	--	--	15,300	20.81	74,770	89	60	24,000	8.3
May 10	16,480	--	1.95	.65	4.09	--	2.52	.40	3.67	--	0.08	1,397	.54	8,910	61	3	685	7.4
May 11, 13	37,350	--	2.79	1.11	25.31	--	2.43	2.48	25.38	--	.06	1,770	2.41	89,980	87	18	3,310	7.8
May 12, 14-17	24,240	--	2.69	.71	13.00	--	2.05	2.12	11.85	--	.08	1,967	1.32	31,910	79	10	1,790	6.9
May 18-19	13,510	--	5.39	1.81	42.18	--	2.36	4.81	41.74	--	--	3,020	4.11	55,540	85	22	5,290	7.7

b Includes 0.13 equivalent per million of carbonate (CO₃).

h Includes 0.17 equivalent per million of carbonate (CO₃).

k Includes 0.53 equivalent per million of carbonate (CO₃).

May 20, 1955.....	47,800	--	1.25	.59	2.83	--	1.52	.48	2.82	--	.05	--	311	.42	20,240	61	3.0	507	7.4
May 21-22, 27, 31	222,800	--	4.39	1.81	25.61	--	2.06	3.98	25.38	--	.06	--	1,930	2.62	585,300	81	15	3,320	7.6
May 23-26.....	109,900	--	5.39	2.41	58.70	--	3.05	4.35	59.23	--	--	--	4,050	5.51	605,800	88	30	7,100	7.8
May 28-30.....	68,150	--	3.54	1.66	13.57	--	2.06	3.87	12.69	--	.04	--	1,130	1.54	104,800	72	8.4	2,050	7.6
June 1-9.....	28,900	--	6.79	3.61	44.79	--	3.28	5.37	45.13	--	--	--	3,280	4.46	129,000	81	20	5,610	7.8
June 10.....	3,430	--	6.79	4.01	25.92	--	3.02	6.87	25.38	--	--	--	2,160	2.94	10,090	71	11	3,700	7.9
June 11-17.....	14,160	--	5.39	3.01	21.70	--	2.95	4.37	21.86	--	.09	--	1,740	2.37	33,540	72	11	3,100	7.8
June 12.....	2,020	--	8.78	4.42	37.05	--	3.21	7.37	39.48	--	--	--	2,970	4.04	8,180	74	14	5,210	7.9
June 13-16.....	7,430	--	9.58	5.02	64.36	--	3.67	7.20	66.28	--	--	--	4,620	6.28	46,730	82	24	7,730	7.7
June 18-20.....	152,100	--	3.44	1.46	9.87	--	2.39	2.35	9.73	--	.11	--	856	1.16	177,300	67	6.3	1,580	7.5
June 21-25.....	115,800	--	3.74	.96	12.91	--	2.06	2.39	12.97	--	.08	--	1,030	1.40	162,400	73	8.4	1,830	7.5
June 26-28.....	15,710	--	4.39	2.21	20.31	--	2.49	3.64	19.74	--	.10	--	1,570	2.14	33,570	75	11	2,770	7.7
June 29-30.....	6,150	--	5.99	3.21	28.79	--	2.95	4.73	29.61	--	.07	--	2,210	3.01	18,500	76	13	3,890	7.9
July 1-3, 10.....	9,440	--	6.99	3.41	31.66	--	3.21	5.60	33.84	--	--	--	2,550	3.47	32,770	75	14	4,350	7.6
July 4-9.....	19,320	--	6.79	3.41	40.40	--	3.24	5.10	42.30	--	--	--	3,030	4.12	79,680	80	18	5,240	7.5
July 11, 20.....	3,130	--	6.19	2.61	23.74	--	2.29	5.02	25.38	--	--	--	1,980	2.69	8,430	73	11	3,390	7.6
July 12-13.....	2,080	--	9.08	3.92	33.05	--	3.38	7.58	35.25	--	--	--	2,800	3.81	7,940	72	13	4,740	7.8
July 14.....	883	--	8.98	5.22	46.96	--	2.56	7.99	50.20	--	--	--	3,720	5.06	4,470	77	18	6,050	7.9
July 15-19, 21-31	12,130	--	10.38	5.52	63.92	--	3.67	7.64	69.10	--	--	--	4,800	6.53	79,290	80	23	7,890	7.8
Aug. 1-10.....	3,480	19	10.63	6.89	100.01	20	3.20	8.60	106.61	.01	--	.25	7,120	9.68	33,680	85	34	12,000	8.1
Aug. 11-13.....	1,310	--	11.33	6.77	102.19	--	b3.16	9.06	106.61	--	--	--	7,210	9.81	12,810	85	34	12,300	8.3
Aug. 14, 17.....	1,360	--	10.08	5.52	73.92	--	3.18	9.62	74.74	--	--	--	5,310	7.22	9,850	83	26	9,280	8.2
Aug. 15-16.....	1,540	--	8.98	4.22	45.22	--	b2.69	8.85	45.13	--	--	--	3,490	4.75	7,320	77	18	6,120	8.3
Aug. 18-20.....	1,370	--	11.73	5.99	108.27	--	2.74	10.26	112.25	--	--	--	7,530	10.24	14,090	86	36	12,900	8.2
Aug. 21-30.....	2,770	--	11.53	6.39	101.75	--	3.33	9.18	106.61	--	--	--	7,180	9.76	27,060	85	34	11,800	7.9
Aug. 31.....	224	--	8.38	5.62	72.62	--	c2.95	7.18	73.33	--	--	--	5,180	7.04	1,580	84	27	8,980	8.3

b Includes 0.13 equivalent per million of carbonate (CO₃).

c Includes 0.07 equivalent per million of carbonate (CO₃).

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

Chemical analyses, water year October 1954 to September 1955--Continued

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million										Dissolved solids			Per-cent so-dium	So-dium adsorp-tion ratio	Specific conduct-ance (micro-mhos at 25° C)	pH
			Cal-cium (Ca)	Magne-sium (Mg)	So-dium (Na)	Potas-sium (K)	Bicar-bonate (HCO ₃)	Sul-fate (SO ₄)	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO ₃)	Boron (B) ppm	Parts per mil-lion	Tons per acre-foot	Total tons				
Sept. 1-4, 1955...	738	--	8.38	5.42	77.84	--	2.26	7.31	81.79	--	--	5,520	7.51	5,540	85	30	9,160	8.0	
Sept. 5-8	1,050	--	11.93	7.19	104.80	--	3.62	9.74	109.43	--	--	7,410	10.08	10,600	85	34	12,400	8.0	
Sept. 9	587	--	11.98	4.02	63.05	--	2.52	11.85	63.46	--	--	4,850	6.60	3,860	80	22	8,120	8.0	
Sept. 10	432	--	7.39	3.01	46.96	--	2.49	7.77	45.13	--	--	3,440	4.68	2,020	82	21	6,070	8.0	
Sept. 11-12, 14-17	2,080	--	6.39	2.21	29.05	--	2.79	4.91	29.61	--	--	2,280	3.10	6,500	77	14	4,000	7.8	
Sept. 13, 18	1,110	--	7.58	3.22	42.70	--	2.88	6.68	45.13	--	--	3,290	4.47	4,970	80	18	5,730	8.0	
Sept. 19-20	329	--	7.19	3.61	54.35	--	1.90	6.22	57.82	--	--	4,050	5.51	1,820	83	23	6,960	7.9	
Sept. 21-22	450	--	7.58	5.42	72.62	--	1.38	7.64	74.74	--	--	5,140	6.99	3,150	85	28	8,820	8.0	
Sept. 23-24	619	--	9.98	6.18	86.97	--	3.54	8.93	89.97	--	--	6,160	8.38	5,190	84	31	10,500	8.2	
Sept. 25-27	811	--	4.69	2.91	33.83	--	3.02	3.14	33.84	--	--	2,410	3.28	2,660	82	17	4,400	8.1	
Sept. 28	1,140	--	6.99	4.61	60.01	--	2.56	5.81	62.05	--	--	4,280	5.82	6,630	84	25	7,480	8.2	
Sept. 29-30	4,590	--	4.69	2.51	20.92	--	2.29	4.79	21.15	--	0.06	1,700	2.31	10,620	74	11	3,050	8.1	
Total or weighted average	976,700	--	4.49	1.97	28.00	--	2.41	3.64	28.20	--	--	2,070	2.82	2,752,000	81	16	3,600	--	

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

LOCATION.---At gaging station at bridge on U. S. Highways 64 and 71 at Van Buren, Crawford County, 1.3 miles downstream from Lee Creek, 8.6 miles downstream from Poteau River, and at mile 353.4.

DRAINAGE AREA.---150,483 square miles (revised) of which 22,241 square miles is probably noncontributing.

RECORDS AVAILABLE.---Chemical analyses: October 1945 to September 1955.

Water temperatures: October 1945 to September 1955.

EXTREMES, 1954-55.---Specific conductance: Maximum daily, 4,460 micromhos Feb. 15; minimum daily, 169 micromhos Mar. 20.

Percent sodium: Maximum, 78 June 30; minimum, 48 Mar. 20.

EXTREMES, 1945-55.---Specific conductance: Maximum daily, 8,980 micromhos Apr. 1, 1954; minimum daily, 132 micromhos May 11, 1948.

Percent sodium: Maximum, 80 Oct. 21-24, 1946; minimum, 32 July 18-27, 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 1954 to September 1955 given in WSP 1391.

Chemical analyses, water year October 1954 to September 1955

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million								Dissolved solids				Per- cent so- dium	So- dium ad- sorp- tion ratio	Specific conduct- ance (micro- mhos at 25°C)	pH
			Cal- cium (Ca)	Magne- sium (Mg)	So- dium (Na)	Potas- sium (K)	Bicar- bonate (HCO ₃)	Sul- fate (SO ₄)	Chlo- ride (Cl)	Fluo- ride (F)	Ni- trate (NO ₃)	Boron (B) ppm	Parts per mil- lion	Tons per acre- foot					Total tons
Oct. 1-2, 1954...	2,634	8.3	3.39	1.32	7.91	0.14	2.84	0.75	9.31	0.03	0.02	0.00	799	1.09	2,870	5.2	1,420	8.0
Oct. 3-4.....	2,245	8.8	3.54	1.81	10.52	.17	2.93	.81	12.13	.03	.03	.05	982	1.34	3,010	6.4	1,640	8.1
Oct. 5-10.....	6,307	10	4.29	1.73	12.61	.20	3.08	.98	14.67	.03	.03	.05	1,160	1.58	9,970	67	2,060	8.1
Oct. 11-12.....	2,535	10	4.04	1.81	11.74	.18	2.98	.92	13.88	.03	.04	.00	1,110	1.51	3,830	66	1,960	7.7
Oct. 13.....	2,420	--	3.24	1.40	9.13	--	2.44	.81	10.72	--	.03	.05	845	1.15	2,780	66	1,530	8.2
Oct. 14-16.....	13,580	8.8	3.89	2.06	12.70	.18	2.59	1.04	15.17	.03	.04	.00	1,190	1.62	22,000	67	2,090	7.4
Oct. 17.....	15,150	--	3.09	1.15	7.70	--	2.15	.79	9.08	--	.05	.10	725	.99	15,000	64	1,330	8.0
Oct. 18-22.....	35,150	7.6	2.30	.82	4.39	.11	1.61	.71	5.22	.03	.04	.00	497	.68	23,900	58	870	7.5
Oct. 23.....	8,529	--	3.64	1.64	11.83	--	1.59	.92	14.67	--	.04	--	1,050	1.43	12,200	69	1,880	7.0
Oct. 24.....	7,200	--	2.79	.90	6.57	--	1.77	1.31	7.19	--	.06	--	614	.84	6,050	64	1,120	7.7
Oct. 25-26.....	12,480	8.6	2.15	.90	4.70	.11	1.56	.94	5.16	.03	.05	.05	490	.67	8,360	60	865	7.2
Oct. 27.....	4,284	--	2.70	1.07	6.48	--	1.84	1.21	7.33	--	.03	.10	629	.86	3,680	63	1,130	8.2
Oct. 28.....	4,423	--	3.54	1.48	10.70	--	1.97	1.62	11.99	--	.05	--	975	1.33	5,880	68	1,700	7.9
Oct. 29.....	8,707	--	5.59	2.63	22.57	--	2.02	1.69	26.65	--	.04	.05	1,860	2.53	22,030	73	3,230	7.6
Oct. 30.....	21,220	--	3.09	1.07	6.74	--	2.06	1.17	7.61	--	.02	--	655	.89	18,890	62	1,190	8.2
Oct. 31, Nov. 1-4	57,320	5.9	2.20	.72	3.70	.12	1.52	.79	4.23	.03	.03	.10	428	.58	33,250	55	752	8.0

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

Chemical analyses, water year October 1954 to September 1955--Continued

Chemical analyses, water year October 1954 to September 1955—Continued																			
Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million										Dissolved solids			Per cent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
			Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B) ppm	Parts per million	Tons per acre-foot	Total tons				
Nov. 5-6, 1954.....	10,310	4.0	2.74	0.99	5.70	0.13	1.72	1.00	6.77	0.03	0.06	0.00	601	0.82	8,450	60	4.2	1,060	8.0
Nov. 7-8.....	10,160	4.3	2.99	1.07	6.35	.13	1.97	1.02	7.61	.03	.03	.05	668	.91	9,250	60	4.4	1,180	7.4
Nov. 9-10.....	9,164	6.5	3.49	1.32	8.91	.16	1.97	1.14	10.58	.03	.02	.10	876	1.19	10,910	64	5.8	1,540	7.2
Nov. 11-20.....	44,130	3.6	3.24	1.15	6.35	.14	2.18	1.19	7.61	.03	.03	.05	688	.94	41,460	58	4.3	1,210	7.7
Nov. 21-30.....	42,940	4.8	3.24	1.15	5.87	.14	2.28	1.29	6.91	.03	.01	.05	651	.89	38,220	56	4.0	1,150	7.2
Dec. 1-2.....	7,418	4.8	3.44	1.07	5.39	.13	2.46	1.21	6.49	.03	.00	.10	626	.85	6,310	54	3.6	1,100	7.6
Dec. 3.....	4,165	--	3.94	1.40	7.74	--	2.43	1.35	9.31	--	.02	.05	883	1.20	5,000	59	4.8	1,440	8.2
Dec. 4-6.....	12,220	3.2	3.44	1.07	5.74	.14	2.38	1.25	6.91	.03	.01	.05	673	.92	11,240	55	3.8	1,150	8.3
Dec. 7-10.....	11,780	2.4	3.39	1.15	5.39	.13	2.54	1.17	6.12	.01	.03	.15	620	.84	9,900	54	3.6	1,070	8.2
Dec. 11-13.....	12,100	3.1	3.59	1.15	6.44	.14	2.41	1.27	7.56	.03	.02	.05	706	.96	11,620	57	4.2	1,250	7.8
Dec. 14-15.....	8,886	3.8	2.30	.82	4.00	.10	1.80	.85	4.48	.03	.01	.05	422	.57	5,070	55	3.2	804	7.9
Dec. 16-17.....	10,950	3.2	2.00	.90	3.39	.10	1.48	.94	3.84	.03	.01	.05	389	.53	5,800	53	2.8	695	7.4
Dec. 18.....	6,129	--	2.44	.90	4.39	--	1.61	.83	5.42	--	.03	--	534	.73	4,470	57	3.4	858	6.9
Dec. 19-20.....	11,580	3.1	3.09	1.07	6.74	.13	1.84	1.04	8.32	.03	.02	.00	704	.96	11,120	61	4.7	1,250	7.8
Dec. 21-23.....	12,380	2.3	3.34	1.23	7.74	.13	1.88	1.02	9.45	.03	.01	.05	778	1.06	13,120	62	5.1	1,370	7.7
Dec. 24-25.....	8,588	2.4	3.89	1.40	9.18	.20	2.13	1.10	11.14	.03	.01	.10	916	1.25	10,740	63	5.6	1,600	7.8
Dec. 26-27.....	9,223	2.4	4.09	1.89	11.31	.21	2.23	1.27	13.82	.03	.03	.05	1,110	1.51	13,930	65	6.5	1,920	7.4
Dec. 28.....	24,990	--	1.80	.63	3.26	--	1.06	.54	4.09	--	.05	--	409	.56	13,990	57	3.0	658	6.6
Dec. 29-30.....	93,220	3.3	1.35	.58	2.52	.09	.95	.46	2.99	.03	.01	.05	318	.43	40,080	56	2.6	525	7.1
Dec. 31.....	39,670	--	1.60	.65	3.26	--	.90	.54	4.15	--	.05	--	407	.55	21,820	59	3.1	650	6.6
Jan. 1-2, 1955.....	66,640	2.4	1.05	.47	2.00	.07	.75	.42	2.31	.03	.04	.05	236	.32	21,320	56	2.3	402	7.3
Jan. 3-4.....	48,200	2.9	1.65	.61	4.70	.09	.67	.46	5.98	.02	.05	.10	481	.65	31,330	67	4.4	844	7.2
Jan. 5.....	18,270	--	2.84	1.07	9.39	--	.79	.52	11.79	--	.07	.05	925	1.26	23,020	71	6.7	1,520	7.1
Jan. 6-7.....	27,810	1.8	5.49	2.30	19.00	.19	1.31	.94	24.82	.02	.05	.10	1,640	2.23	62,020	70	9.6	3,070	7.2
Jan. 8-9.....	26,140	4.7	5.09	1.89	16.96	.26	1.59	1.08	21.29	.02	.06	.05	1,370	1.86	48,620	70	9.1	2,690	7.3
Jan. 10.....	17,320	1.0	4.44	1.97	14.09	.28	1.79	1.12	17.49	.02	.05	--	1,310	1.78	30,830	68	7.9	2,310	8.0

a Includes 0.07 equivalent per million of carbonate (CO₃).

Jan. 11, 1955.....	19,700	--	3.54	1.15	8.00	--	1.74	.87	9.93	--	.10	--	867	1.18	23,250	63	5.2	1,430	6.8
Jan. 12-13.....	32,450	3.2	2.84	1.23	6.00	.13	1.52	1.00	7.76	.02	.09	.05	670	.91	29,530	59	4.2	1,160	7.7
Jan. 14-15.....	32,010	3.6	2.79	1.40	6.96	.13	1.48	1.04	8.74	.03	.06	.05	734	1.00	32,010	62	4.8	1,250	7.8
Jan. 16.....	20,230	--	2.40	.82	5.35	--	1.18	.83	6.54	--	.09	--	588	.80	16,180	62	4.2	986	7.9
Jan. 17-18.....	40,860	4.0	1.95	.99	4.91	.10	.96	.77	5.92	.03	.05	--	511	.69	28,190	62	4.0	869	7.7
Jan. 19-20.....	40,860	5.2	2.54	.90	6.61	.12	1.11	.77	8.24	.03	.05	.05	657	.89	36,370	65	5.0	1,150	7.5
Jan. 21-23.....	51,150	5.3	2.44	.82	4.96	.10	1.31	.87	5.98	.03	.03	.05	541	.74	37,850	60	3.9	930	7.8
Jan. 24-27.....	54,370	4.2	3.14	1.15	7.17	.13	1.57	1.04	8.74	.03	.06	.05	746	1.01	54,910	62	4.9	1,280	7.5
Jan. 28-29.....	24,910	4.0	3.49	1.32	8.13	.14	1.70	1.12	10.01	.02	.06	.10	854	1.16	28,900	62	5.2	1,470	7.7
Jan. 30-31.....	26,140	3.9	3.14	1.07	6.57	.15	1.62	1.06	8.24	.02	.06	.10	725	.99	25,880	60	4.5	1,230	7.8
Feb. 1.....	10,650	2.4	3.14	1.23	6.78	.14	1.61	1.06	8.46	.00	.12	--	794	1.08	11,500	60	4.6	1,260	8.0
Feb. 2.....	8,707	2.6	3.29	1.56	7.96	.13	1.74	1.02	9.87	.00	.06	--	897	1.22	10,820	62	5.1	1,440	7.5
Feb. 3-5.....	25,630	5.0	3.84	1.36	9.22	.14	1.93	1.08	11.56	.01	.06	.00	924	1.26	32,290	63	5.7	1,670	7.5
Feb. 6.....	15,180	--	2.40	1.07	6.31	--	1.13	.90	7.61	--	.10	.00	718	.98	14,850	65	4.8	1,090	7.3
Feb. 7-8.....	31,140	4.8	2.00	.80	4.74	.11	.95	.81	5.70	.00	.04	.05	529	.72	22,420	62	4.0	864	6.7
Feb. 9.....	15,150	3.6	2.30	1.15	7.39	.13	.87	.58	9.53	.00	.06	--	836	1.14	17,270	67	5.6	1,270	7.8
Feb. 10.....	13,070	--	1.40	.79	3.78	--	.79	.40	4.71	--	.03	--	461	.63	8,230	63	3.6	698	7.7
Feb. 11.....	10,680	--	2.40	.90	6.09	--	1.06	.58	7.84	--	.02	.00	747	1.02	10,860	65	4.7	1,100	7.9
Feb. 12.....	9,461	1.1	3.39	1.56	10.44	.18	1.28	.81	13.26	.00	.03	--	1,080	1.47	13,910	67	6.6	1,750	8.1
Feb. 13.....	7,775	3.8	5.74	2.47	19.92	.26	1.51	1.04	25.52	.00	.03	--	2,000	2.72	21,150	70	9.8	3,180	7.1
Feb. 14-15.....	12,280	5.5	8.28	2.72	30.05	.33	1.82	1.00	37.23	.02	.07	.09	2,620	3.56	43,720	73	13	4,440	7.5
Feb. 16-17.....	16,300	7.5	5.59	1.81	19.87	.28	1.81	.92	24.68	.02	.04	.12	1,690	2.30	37,490	72	10	3,020	7.8
Feb. 18.....	9,461	4.1	5.09	2.30	17.39	.26	1.94	1.04	22.14	.00	.07	--	1,770	2.41	22,800	69	9.0	2,790	8.2
Feb. 19.....	19,830	3.2	4.14	1.73	14.00	.21	1.49	1.00	17.20	.00	.05	--	1,390	1.89	37,480	70	8.2	2,230	7.6
Feb. 20.....	72,600	--	2.00	.82	5.31	--	.98	.64	6.35	--	.04	.05	522	.71	51,550	65	4.5	917	7.1

ARKANSAS RIVER BASIN--Continued
ARKANSAS RIVER AT VAN BUREN, ARK.--Continued
Chemical analyses, water year October 1954 to September 1955--Continued

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million										Dissolved solids			Percent sodium	So-dium adsorp-tion ratio	Specific conduct-ance (micro-mhos at 25°C)	pH
			Cal-cium (Ca)	Magne-sium (Mg)	So-dium (Na)	Potas-sium (K)	Bicar-bonate (HCO ₃)	Sul-fate (SO ₄)	Chlo-ride (Cl)	Fluo-ride (F)	Ni-tra-te (NO ₃)	Boron (B) ppm	Parts per mil-lion	Tons per acre-foot	Total tons				
Feb. 21-25, 1955	270,000	5.0	1.20	0.36	2.44	0.07	0.79	0.52	2.76	0.02	0.08	0.05	275	0.37	99,900	60	2.8	474	7.5
Feb. 26	36,500	--	1.35	.58	3.17	--	.61	.40	4.00	--	.05	--	375	.51	18,620	62	3.2	607	7.2
Feb. 27	26,780	--	1.55	.68	3.52	--	.80	.60	4.23	--	.03	.00	403	.55	14,730	61	3.3	669	7.7
Feb. 28	22,810	--	2.25	.82	5.22	--	1.02	.62	6.43	--	.03	.05	577	.78	17,790	63	4.2	949	7.9
Mar. 1	22,210	3.2	2.40	.90	6.44	.12	1.08	.79	7.76	.00	.06	--	686	.93	20,660	65	5.0	1,120	8.0
Mar. 2-3	50,580	2.0	2.15	.99	5.44	.11	1.03	.75	6.77	.00	.08	.10	622	.85	42,990	63	4.3	994	7.6
Mar. 4	22,210	1.8	2.50	1.07	6.91	.13	1.03	.79	8.88	.00	.05	--	793	1.08	23,990	65	5.2	1,250	7.8
Mar. 5-6	34,710	4.0	2.40	.90	5.61	.14	1.21	.83	6.83	.01	.07	.06	559	.76	26,380	62	4.4	1,010	7.0
Mar. 7	16,010	3.4	2.54	.99	7.04	.13	1.18	.81	8.46	.01	.04	--	711	.97	15,530	66	5.3	1,200	7.9
Mar. 8	16,010	3.3	3.49	1.48	10.83	.18	1.16	.92	13.54	.01	.05	--	1,110	1.51	24,180	68	6.8	1,810	7.9
Mar. 9-10	38,020	5.5	2.30	.70	6.35	.13	.98	.65	8.04	.01	.06	.08	624	.85	32,320	67	5.2	1,130	7.1
Mar. 11-15	67,950	2.2	2.54	1.07	7.74	.12	1.13	.94	9.19	.01	.05	.10	779	1.06	72,030	68	5.8	1,300	7.8
Mar. 16-17	29,080	5.0	2.20	.80	6.00	.13	1.13	.87	7.11	.01	.04	.08	591	.80	23,250	66	4.9	1,060	7.2
Mar. 18	29,550	--	1.30	.48	3.17	--	.74	.60	3.55	--	.05	.00	359	.49	14,480	64	3.4	553	7.8
Mar. 19	41,450	--	.65	.43	1.65	--	.46	.40	1.86	--	.04	--	236	.32	13,260	60	2.2	311	7.6
Mar. 20	51,170	--	.50	.29	.74	--	.39	.38	.73	--	.05	--	144	.20	10,230	48	1.2	171	7.4
Mar. 21	106,700	--	1.00	.48	2.00	--	.69	.40	2.31	--	.06	--	269	.37	39,480	57	2.3	390	7.8
Mar. 22	141,600	--	.85	.24	1.17	--	.62	.29	1.30	--	.04	--	209	.28	39,650	52	1.6	258	7.8
Mar. 23	144,000	--	1.50	.54	3.35	--	.80	.38	4.29	--	.05	--	424	.58	83,520	62	3.3	636	7.8
Mar. 24	115,200	--	2.30	.90	5.91	--	1.05	.54	7.39	--	.06	.05	670	.91	104,800	65	4.7	1,020	7.6
Mar. 25	82,910	--	1.80	.58	3.48	--	1.10	.52	4.23	--	.06	--	436	.59	48,920	59	3.2	675	7.9
Mar. 26-27	114,200	4.6	1.40	.49	2.70	.07	.84	.50	3.22	.01	.03	.15	341	.46	52,530	58	2.8	543	7.1
Mar. 28-29	81,120	4.2	1.60	.53	3.09	.08	.92	.56	3.84	.01	.04	.10	389	.53	42,990	58	3.0	614	7.1
Mar. 30-31	74,580	4.0	1.20	.56	2.35	.07	.79	.50	2.76	.01	.03	.05	292	.40	29,830	56	2.5	468	7.0
Apr. 1-2	77,950	--	1.00	.43	1.83	--	.69	.50	2.03	--	.04	.05	239	.33	25,720	56	2.2	385	7.0
Apr. 3-7	192,400	4.2	.90	.35	1.39	.07	.59	.40	1.66	.01	.04	.05	218	.30	57,720	51	1.8	308	7.4
Apr. 8-9	69,020	--	1.05	.39	1.91	--	.69	.50	2.23	--	.02	.05	252	.34	23,470	57	2.3	394	7.6
Apr. 10	29,160	--	1.10	.51	2.48	--	.69	.52	2.82	--	.02	.05	300	.41	11,960	61	2.8	460	7.6

Apr. 11, 1955	20,230	--	2.15	.78	4.65	--	1.21	.79	5.39	--	.02	.00	528	.72	14,570	61	3.8	837	7.8
Apr. 12-15	78,700	3.3	2.70	.90	6.35	.09	1.15	.94	7.92	.01	.05	.00	660	.90	70,830	63	4.7	1,110	7.8
Apr. 16	27,370	3.4	2.99	1.15	8.96	.19	1.21	1.00	10.66	.01	.05	--	887	1.21	33,120	67	6.3	1,440	7.5
Apr. 17-18	45,220	3.8	3.79	1.64	11.74	.24	1.25	.85	15.09	.01	.05	.05	1,160	1.58	71,140	67	7.1	1,940	6.9
Apr. 19	16,440	2.4	3.44	1.64	11.74	.24	1.21	.87	18.05	.01	.13	--	1,350	1.84	30,250	69	8.2	2,310	7.7
Apr. 20	19,220	4.4	3.44	1.48	11.35	.21	1.13	.83	13.82	.00	.07	--	1,080	1.44	27,680	69	7.3	1,810	7.5
Apr. 21	23,400	--	2.50	.81	6.74	--	1.10	.77	8.12	--	.04	.05	723	.98	22,930	67	5.2	1,140	7.5
Apr. 22-23	60,890	4.0	2.00	.72	4.70	.13	1.06	.64	5.78	.02	.03	.05	506	.69	42,010	62	4.0	845	7.6
Apr. 24-26	85,490	4.2	1.20	.54	2.17	.08	.80	.48	2.57	.02	.05	.05	277	.38	32,490	54	2.3	457	7.0
Apr. 27	16,880	--	1.55	.68	2.91	--	.98	.62	3.44	--	.01	--	369	.50	8,440	57	2.8	580	7.5
Apr. 28-30	46,350	2.4	2.20	.81	4.70	.13	1.36	.87	5.36	.00	.06	.10	541	.74	34,300	60	3.8	862	7.6
May 1	12,650	4.6	2.74	1.07	7.13	.18	1.34	1.06	8.60	.02	.06	--	747	1.02	12,900	64	5.2	1,240	8.1
May 2	10,650	3.8	2.79	1.15	9.48	.18	1.25	1.02	10.94	.02	.09	--	851	1.16	12,350	70	6.8	1,510	7.9
May 3	9,084	4.6	3.19	1.15	13.70	.26	1.41	1.33	15.09	.02	.06	--	1,160	1.58	14,350	75	9.3	2,070	8.1
May 4-5	21,740	3.8	4.14	1.48	18.83	.31	1.87	1.62	20.59	.02	.07	--	1,500	2.04	44,350	76	11	2,670	7.0
May 6	13,070	4.6	3.54	1.48	14.26	.26	1.97	1.50	16.23	.02	.09	--	1,180	1.60	20,910	73	9.0	2,100	8.1
May 7	12,650	5.1	3.29	1.15	11.00	.23	1.87	1.31	11.85	.02	.07	--	955	1.30	16,440	70	7.4	1,690	7.9
May 8	12,240	3.1	3.04	1.23	8.26	.11	1.79	1.12	9.45	.02	.07	--	795	1.08	13,220	65	5.6	1,380	8.1
May 9-10	18,390	2.9	3.49	1.48	10.87	.26	1.56	1.12	12.97	.01	.08	--	988	1.34	24,640	68	6.9	1,760	7.2
May 11	10,450	3.0	4.24	1.64	14.13	.33	1.49	1.10	17.20	.02	.05	--	1,280	1.75	16,280	69	8.2	2,220	8.0
May 12	15,150	9.9	4.44	1.89	12.39	.36	b 2.34	2.77	13.40	.03	.12	--	1,200	1.63	24,690	65	7.0	2,010	8.3
May 13	16,880	4.6	3.84	1.48	11.26	.28	2.03	2.14	12.13	.03	.08	--	1,090	1.48	24,980	67	6.9	1,800	8.1
May 14	41,260	7.8	3.89	1.64	10.35	.26	- 2.23	1.90	11.28	.02	.10	--	1,030	1.40	57,760	64	6.2	1,710	8.1
May 15	81,120	3.4	5.54	1.48	16.70	.36	1.93	1.25	20.02	.02	.13	--	1,530	2.08	168,700	69	8.9	2,800	8.2
May 16	72,600	5.0	3.79	1.07	11.44	.26	1.95	1.06	12.97	.02	.10	--	1,040	1.41	102,400	69	7.4	1,780	8.1
May 17-20	150,500	3.0	2.74	.99	7.44	.20	1.95	1.21	8.04	.02	.09	--	696	.95	143,000	65	5.4	1,240	7.0
May 21	63,470	5.9	3.59	1.23	9.31	.24	2.15	1.37	10.44	.02	.10	--	897	1.22	77,430	65	6.0	1,560	8.1

b Includes 0.03 equivalent per million of carbonate (CO₃).

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

Chemical analyses, water year October 1954 to September 1955--Continued

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million										Dissolved solids			Percent sodium	Soil adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	
			Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B) ppm	Parts per million	Tons per acre-foot	Total tons					
May 22-23, 1955..	334,200	7.4	3.09	0.90	6.96	0.18	2.11	0.71	8.04	0.02	0.07	--	--	692	0.94	314,100	63	4.9	1,220	7.3
May 24.....	192,000	9.0	2.94	.90	7.39	.18	2.08	1.06	8.04	.03	.07	--	--	720	.98	188,200	65	5.3	1,230	8.2
May 25-28.....	583,100	6.8	3.19	1.32	12.52	.25	2.10	1.79	12.97	.03	.07	--	--	1,060	1.44	839,700	72	8.3	1,860	8.0
May 29-30.....	286,600	5.6	3.49	1.32	15.48	.26	2.36	1.67	16.08	.03	.09	--	--	1,250	1.70	487,200	75	10	2,220	8.0
May 31.....	197,200	--	2.60	.67	8.22	.20	2.10	1.21	8.18	--	.09	--	--	723	.98	193,300	70	6.4	1,280	8.1
June 1-6.....	585,300	6.2	2.44	.71	4.00	.14	1.87	.85	4.37	.01	.06	.00	.00	459	.62	362,900	55	3.2	783	7.5
June 7-8.....	76,760	7.6	3.04	.99	6.35	.19	2.00	1.37	6.91	.02	.07	--	--	670	.91	69,850	60	4.5	1,140	7.1
June 9-10.....	68,230	5.6	3.54	1.15	10.70	.28	2.13	1.60	11.28	.02	.08	--	--	976	1.33	90,750	68	7.0	1,650	7.3
June 11-12.....	60,500	8.1	3.74	1.32	11.91	.26	2.20	1.79	12.83	.01	.09	--	--	1,090	1.48	89,540	69	7.5	1,860	7.5
June 13-14.....	60,300	5.8	4.94	1.89	16.92	.33	2.69	2.79	17.91	.02	.13	--	--	1,480	2.01	121,200	70	9.2	2,540	7.4
June 15.....	36,690	12	4.19	1.56	13.18	.31	2.67	2.33	13.68	.02	.10	--	--	1,200	1.63	59,800	69	7.7	2,040	7.3
June 16-18.....	96,990	5.8	3.59	1.23	10.26	.17	2.21	1.94	10.77	.02	.10	--	--	934	1.27	123,200	67	6.6	1,640	6.8
June 19.....	40,260	6.9	3.94	1.32	12.78	.26	2.26	2.23	13.26	.01	.07	--	--	1,130	1.54	62,000	70	7.9	1,920	7.6
June 20-21.....	71,800	5.6	4.34	1.32	8.96	.15	3.34	1.81	9.17	.03	.02	--	--	873	1.19	85,440	61	5.3	1,500	7.4
June 22.....	68,230	10	5.54	1.97	20.26	.36	2.44	2.56	23.13	.01	.09	--	--	1,820	2.48	169,200	72	10	3,060	7.4
June 23.....	97,980	9.9	3.69	1.23	11.39	.28	2.24	2.27	11.56	.02	.10	--	--	996	1.35	132,300	69	7.3	1,740	7.5
June 24-26.....	237,200	9.8	3.24	.99	9.61	.17	2.00	1.77	10.01	.02	.03	--	--	881	1.20	284,600	69	6.6	1,530	7.2
June 27.....	57,120	10	3.59	1.07	10.44	.19	2.00	1.83	11.00	.03	.04	--	--	975	1.33	75,970	68	6.8	1,650	7.1
June 28-29.....	91,240	9.8	3.84	1.15	15.13	.23	1.70	2.16	15.79	.02	.02	--	--	1,290	1.75	159,700	74	9.6	2,210	7.5
June 30.....	53,550	9.4	4.19	1.56	21.05	.25	2.05	2.83	21.15	.02	.05	--	--	1,680	2.28	122,100	78	12	2,880	7.4
July 1.....	60,690	7.0	3.44	.99	12.26	.28	1.87	2.29	12.41	.02	.06	--	--	1,050	1.43	86,790	72	8.3	1,840	7.7
July 2.....	77,360	7.3	3.39	.99	9.78	.24	1.95	2.35	9.73	.02	.09	--	--	855	1.16	89,740	68	6.6	1,510	7.7
July 3-6.....	212,800	7.0	3.24	.99	7.96	.20	2.05	2.54	7.95	.02	.05	.10	.10	759	1.03	219,200	64	5.5	1,320	7.5
July 7-9.....	87,070	5.7	3.54	1.07	9.39	.28	2.03	2.71	9.25	.02	.09	.05	.05	864	1.18	102,700	66	6.2	1,490	7.8
July 10.....	33,320	8.8	3.84	1.07	10.04	.25	2.13	2.60	10.29	.02	.07	.10	.10	922	1.25	41,650	66	6.4	1,600	8.0

July 11-12, 1955..	65,060	4.6	3.59	1.15	8.00	.21	2.10	2.62	8.32	.02	.08	.15	802	1.09	70,920	62	5.2	1,380	7.7
July 13-14.....	60,300	7.7	3.94	1.15	11.04	.24	2.16	2.77	11.14	.02	.06	.05	1,000	1.36	82,010	67	6.9	1,730	7.8
July 15.....	27,170	3.4	3.59	.99	8.91	.20	2.13	2.42	8.74	.02	.05	--	826	1.12	30,430	65	5.9	1,430	8.0
July 16-19.....	84,260	7.9	2.99	1.15	6.44	.16	2.02	1.50	6.77	.02	.06	.00	691	.94	79,200	60	4.5	1,170	8.0
July 20.....	15,830	6.2	3.69	1.15	8.87	.20	2.29	2.37	8.88	.02	.04	--	836	1.14	18,050	64	5.7	1,450	8.2
July 21.....	18,410	5.6	4.14	1.32	11.13	.25	2.33	3.02	11.28	.02	.04	--	1,010	1.37	25,220	66	6.7	1,740	8.2
July 22.....	18,960	4.2	3.79	1.15	8.57	.23	2.16	2.21	8.97	.02	.04	--	838	1.14	21,610	62	5.5	1,440	7.6
July 23.....	16,300	4.2	3.69	1.15	8.74	.20	2.03	2.23	9.08	.02	.04	--	845	1.15	18,740	63	5.6	1,440	7.7
July 24.....	14,880	6.3	3.29	1.07	7.83	.20	1.87	2.08	8.32	.02	.04	--	753	1.02	15,180	63	5.3	1,320	7.7
July 25-26.....	29,320	3.5	3.74	1.15	9.91	.18	1.77	2.14	10.72	.02	.05	.10	900	1.22	35,770	66	6.3	1,580	7.0
July 27-29.....	44,190	2.8	4.14	1.48	14.22	.24	1.54	1.85	16.08	.02	.04	.05	1,230	1.67	73,800	71	8.5	2,170	7.0
July 30-31.....	27,930	2.1	3.19	1.23	11.13	.19	1.34	2.04	12.13	.02	.03	.05	967	1.32	36,870	71	7.5	1,720	7.0
Aug. 1-7.....	81,960	2.9	2.89	1.23	9.91	.20	1.36	1.71	10.86	.02	.06	.00	882	1.20	98,350	70	6.9	1,570	7.2
Aug. 8-9.....	20,470	2.8	3.74	1.40	12.78	.26	1.41	1.79	14.38	.02	.04	.10	1,130	1.54	31,520	70	8.0	1,980	7.0
Aug. 10.....	10,590	2.1	3.54	1.32	9.83	.23	1.70	1.81	11.28	.02	.03	.10	943	1.28	13,560	66	6.3	1,650	8.0
Aug. 11-12.....	27,490	5.9	3.74	1.40	11.91	.23	1.84	2.12	12.97	.02	.04	.10	1,060	1.44	39,590	69	7.5	1,870	7.4
Aug. 13-14.....	23,600	3.2	3.44	1.23	10.26	.19	1.84	1.87	11.28	.02	.04	.10	925	1.26	29,740	68	6.7	1,640	6.9
Aug. 15-16.....	20,330	4.5	4.89	2.22	16.39	.31	1.75	2.02	20.31	.02	.03	--	1,520	2.07	42,080	69	8.7	2,650	7.4
Aug. 17-18.....	20,110	6.4	5.84	2.38	20.79	.38	1.79	1.62	25.38	.02	.03	.15	1,840	2.50	50,280	71	10	3,160	7.5
Aug. 19.....	10,990	4.3	4.24	1.81	17.00	.31	1.41	2.16	20.02	.02	.03	--	1,480	2.01	22,090	73	9.8	2,580	7.2
Aug. 20-21.....	21,580	5.6	3.64	1.56	13.48	.25	1.48	1.58	15.51	.02	.03	.10	1,180	1.60	34,530	71	8.4	2,090	7.0
Aug. 22.....	10,200	2.8	3.29	1.48	10.83	.22	1.70	1.92	12.47	.02	.00	--	973	1.32	13,460	68	7.0	1,690	7.8
Aug. 23-24.....	16,460	2.9	2.99	1.23	9.13	.20	1.61	1.50	10.01	.02	.06	.15	825	1.12	18,440	67	6.3	1,470	7.5
Aug. 25-27.....	28,910	4.3	3.24	1.56	12.96	.24	1.38	1.67	14.67	.02	.02	.05	1,090	1.48	44,270	72	8.4	1,950	8.0
Aug. 28-29.....	20,790	2.8	2.94	1.48	10.35	.24	1.43	1.77	11.56	.02	.03	.15	917	1.25	25,990	69	7.0	1,640	7.2
Aug. 30-31.....	19,620	2.5	3.14	1.23	8.96	.22	1.66	1.96	10.15	.02	.03	.15	827	1.12	21,970	66	6.0	1,480	7.7

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

Chemical analyses, water year October 1954 to September 1955.--Continued

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million										Dissolved solids			Per cent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)
			Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B) ppm	Parts per million	Tons per acre-foot	Total tons			
Sept. 1, 1955.....	17,340	4.8	3.49	1.32	10.39	0.24	1.64	1.98	11.70	0.01	0.03	--	941	1.28	22,200	67	6.7	1,680
Sept. 2.....	20,030	7.8	3.84	1.32	12.44	.28	1.67	1.62	14.10	.01	.04	0.25	1,090	1.48	29,640	70	7.7	1,920
Sept. 3-4.....	32,810	7.8	2.94	.99	7.57	.23	1.74	1.40	8.60	.01	.03	.00	714	.97	31,830	65	5.4	1,280
Sept. 5.....	12,220	3.5	4.39	1.56	13.70	.28	1.74	1.60	16.64	.01	.04	--	1,250	1.70	20,770	69	7.9	2,160
Sept. 6.....	9,124	7.8	6.84	2.30	23.61	.33	1.77	1.44	29.33	.01	.03	--	2,070	2.62	25,730	71	11	3,520
Sept. 7.....	5,732	6.3	4.89	1.97	14.91	.33	1.87	1.25	18.90	.01	.04	--	1,400	1.90	10,890	67	8.0	2,420
Sept. 8-10.....	25,290	3.5	4.34	1.64	13.91	.33	1.74	1.48	16.64	.01	.02	.10	1,260	1.71	43,250	69	8.0	2,190
Sept. 11.....	10,200	3.5	2.89	1.07	9.65	.22	1.21	1.29	11.00	.01	.03	--	848	1.15	11,730	70	6.9	1,530
Sept. 12-14.....	23,030	4.2	3.19	1.07	8.13	.19	1.64	1.62	9.17	.02	.03	.10	753	1.02	23,490	65	5.5	1,340
Sept. 15.....	10,590	2.8	3.29	1.23	8.52	.20	1.84	1.40	9.59	.01	.04	--	786	1.07	11,330	64	5.7	1,400
Sept. 16.....	11,390	3.1	3.39	1.15	9.57	.24	1.61	1.50	10.94	.02	.03	--	880	1.20	13,670	67	6.4	1,550
Sept. 17.....	10,200	3.5	2.74	.90	6.57	.18	1.44	1.29	7.76	.02	.04	--	655	.89	9,080	63	4.9	1,170
Sept. 18.....	9,481	2.8	3.19	1.07	8.83	.22	1.54	1.65	9.87	.02	.04	--	795	1.08	10,240	66	6.0	1,410
Sept. 19-20.....	15,270	3.6	3.64	1.48	11.22	.25	1.44	1.60	13.82	.02	.04	.10	1,060	1.44	21,990	68	7.0	1,850
Sept. 21.....	5,691	3.9	4.54	1.73	14.70	.28	1.36	1.37	18.33	.02	.03	--	1,390	1.89	11,130	69	8.3	2,370
Sept. 22.....	9,481	3.1	5.34	2.14	20.09	.31	1.41	1.62	24.82	.02	.03	--	1,750	2.38	22,560	72	10	3,050
Sept. 23.....	10,590	3.4	4.24	1.64	16.61	.28	1.38	1.96	19.74	.02	.04	--	1,440	1.96	20,760	73	9.7	2,570
Sept. 24-26.....	30,980	3.6	3.64	1.15	11.43	.20	1.54	1.67	12.97	.02	.04	.15	1,010	1.37	42,440	70	7.4	1,820
Sept. 27.....	13,960	2.9	4.19	1.32	12.83	.24	1.79	1.48	14.95	.02	.05	--	1,140	1.55	21,640	69	7.7	2,020
Sept. 28.....	14,880	4.2	2.74	.82	6.61	.16	1.69	.94	7.47	.02	.05	--	615	.84	12,500	64	5.0	1,130
Sept. 29.....	25,790	4.8	4.34	1.40	13.13	.25	1.74	1.14	16.08	.02	.07	--	1,190	1.62	41,780	69	7.8	2,130
Sept. 30.....	25,790	3.9	3.44	1.07	7.35	.18	2.05	1.06	9.08	.02	.09	--	745	1.01	26,050	61	4.9	1,360
Total or weighted average.....	9,298,580	--	2.84	0.99	8.00	--	1.62	1.25	8.88	--	0.06	--	761	1.03	9,578,000	68	5.8	1,310

ARKANSAS RIVER BASIN

CANADIAN RIVER NEAR WHITEFIELD, OKLA.

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

DRAINAGE AREA.--47,576 square miles.

RECORDS AVAILABLE.--Chemical analyses: September 1944 to February 1945, September 1946 to September 1955.

EXTREMES, 1954-55.--Specific conductance: Maximum daily, 19,900 micromhos Feb. 10; minimum daily, 469 micromhos Apr. 22.

Percent sodium: Maximum, 77 Jan. 8-9, Feb. 10-13; minimum, 58 July 4-5, 9.

Sodium adsorption ratio: Maximum, 32 Feb. 10; minimum, 3, 2 Feb. 22.

EXTREMES, 1944-45, 1946-55.--Specific conductance: Maximum daily, 19,900 micromhos Feb. 10, 1955; minimum daily, 71.7 micromhos Jan. 2, 1948.

Percent sodium: Maximum, 80 Nov. 6-14, Dec. 21-23, 1947; minimum, 37 Feb. 3-5, 1948.

Sodium adsorption ratio, 1951-55: Maximum, 32 Feb. 10, 1955; minimum, 1.9 Mar. 17, 1953.

REMARKS. Values reported for dissolved solids are residues on evaporation. Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of discharge for water year October 1954 to September 1955 given in WSP 1391.

Chemical analyses, water year October 1954 to September 1955

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million										Dissolved solids			So-dium adsorp-tion ratio	Specific conduct-ance (micro-mhos at 25° C)		
			Cal-cium (Ca)	Magne-sium (Mg)	So-dium (Na)	Potas-sium (K)	Bicar-bonate (HCO ₃)	Sul-fate (SO ₄)	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO ₃)	Boron (B) ppm	Parts per mil-lion	Tons per acre-foot	Total tons				
Oct. 1-10, 1954..	397	20	5.89	3.01	15.44	0.16	2.93	0.29	21.15	0.01	0.03	0.12	1,600	2.18	864	63	7.3	2,780	8.1
Oct. 11-15	555	--	5.99	2.81	14.26	--	a2.62	.35	19.74	--	.02	--	1,410	1.92	1,070	62	6.8	2,570	8.4
Oct. 16	349	--	12.38	4.42	39.87	--	b2.65	.67	53.59	--	.01	--	3,400	4.62	1,620	70	14	6,240	8.4
Oct. 17	274	--	17.76	4.24	62.62	--	1.38	.62	83.20	--	--	--	5,260	7.15	1,960	74	19	9,290	8.1
Oct. 18	770	--	23.65	7.35	93.93	--	1.44	.87	124.94	--	--	--	7,520	10.23	7,880	75	24	13,100	8.1
Oct. 19-20	1,380	--	9.18	3.42	26.26	--	c3.74	6.75	28.77	--	.08	--	2,400	3.26	4,520	68	10	4,070	8.4
Oct. 21, 23, 28-31	3,440	--	6.99	2.81	22.74	--	a3.02	3.73	26.79	--	.08	--	2,020	2.75	9,460	70	10	3,640	8.4
Oct. 22, 26-27	2,100	--	6.19	1.81	16.26	--	d2.59	3.04	19.04	--	.06	--	1,490	2.03	4,260	67	8.1	2,670	8.4
Oct. 24-25	2,470	--	9.78	2.22	31.61	--	e2.46	2.71	39.48	--	.04	--	2,800	3.81	9,410	72	13	4,920	8.3

a Includes 0.20 equivalent per million of carbonate (CO₃).

b Includes 0.27 equivalent per million of carbonate (CO₃).

c Includes 0.40 equivalent per million of carbonate (CO₃).

d Includes 0.13 equivalent per million of carbonate (CO₃).

e Includes 0.07 equivalent per million of carbonate (CO₃).

ARKANSAS RIVER BASIN--Continued
CANADIAN RIVER NEAR WHITEFIELD, OKLA.--Continued
Chemical analyses, water year October 1954 to September 1955.--Continued

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids			Per-cent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
			Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Parts per million		Tons per acre-foot	Total tons				
Nov. 1-3, 1954 .	516	--	9.28	4.12	32.57	--	2.95	2.21	40.89	--	--	2,910	3.96	2,040	71	5,010	8.2		
Nov. 4-10	964	--	11.18	5.82	42.09	--	3.11	1.75	52.18	--	--	3,650	4.96	4,790	71	6,280	8.0		
Nov. 11-14	428	--	12.57	6.03	47.40	--	62.47	1.44	61.48	--	--	4,110	5.59	2,400	72	7,200	8.3		
Nov. 15-20	655	--	14.67	7.13	55.66	--	2.77	1.12	71.92	--	--	4,760	6.47	4,240	72	8,100	8.0		
Nov. 21-30	770	14	17.07	7.73	62.18	0.33	3.39	.96	81.23	0.01	--	5,490	7.47	5,750	71	9,100	7.9		
Dec. 1-10	653	--	17.17	7.63	66.10	--	3.02	.98	86.02	--	--	5,580	7.59	4,960	73	9,510	7.9		
Dec. 11, 15-17, 20	1,220	--	19.71	5.49	76.53	--	2.74	1.33	94.20	--	--	5,830	7.93	9,650	75	10,400	7.8		
Dec. 12-13, 18 . . .	684	--	15.17	6.43	60.01	--	2.72	1.15	74.75	--	--	4,940	6.72	4,600	74	8,360	7.9		
Dec. 14, 19	462	--	16.37	6.43	67.40	--	2.62	1.21	83.20	--	--	5,340	7.26	3,360	75	9,190	7.8		
Dec. 21-27	1,570	--	20.71	8.89	83.05	--	2.44	1.08	111.12	--	--	7,190	9.78	15,340	74	22	11,900	8.0	
Dec. 28-29	8,750	--	6.59	2.61	24.66	--	1.56	.48	32.43	--	--	2,130	2.90	25,360	73	3,810	7.9		
Dec. 30-31	13,390	--	4.39	1.61	14.18	--	1.20	.31	19.04	--	0.08	1,310	1.78	23,870	70	8.2	2,370	7.6	
Jan. 1, 10, 1955 . . .	4,690	--	13.17	4.83	55.66	--	1.31	.71	69.94	--	--	4,430	6.02	28,290	76	19	7,790	7.8	
Jan. 2-7	9,360	--	24.70	11.30	112.62	--	1.08	1.02	144.96	--	--	8,920	12.13	113,700	76	27	14,900	7.4	
Jan. 8-9	1,140	--	17.76	7.04	82.18	--	1.54	1.02	101.53	--	--	6,390	8.69	9,920	77	23	10,700	7.8	
Jan. 11-12, 14 . . .	2,000	--	15.97	6.03	68.27	--	1.77	1.00	84.61	--	--	5,440	7.40	14,780	76	21	9,130	7.9	
Jan. 13, 15-16 . . .	3,490	--	14.37	4.83	56.96	--	1.59	.87	71.92	--	--	4,630	6.30	22,030	75	18	7,890	7.8	
Jan. 17-20	10,660	--	7.58	2.62	31.26	--	1.16	.83	39.48	--	--	2,480	3.37	35,990	75	14	4,510	7.5	
Jan. 21-24	6,110	--	11.18	3.62	43.48	--	1.47	.69	56.41	--	--	3,750	5.10	31,210	75	16	6,310	7.9	
Jan. 25-27	2,520	--	16.77	5.23	69.57	--	1.62	.87	86.02	--	.00	5,600	7.62	19,250	76	21	9,210	7.7	
Jan. 28-31	2,210	--	21.16	9.24	97.40	--	1.90	1.06	119.86	--	--	7,240	9.85	21,760	76	25	12,400	7.8	
Feb. 1-2	861	--	21.11	8.89	92.19	--	1.74	1.06	119.58	--	--	7,460	10.15	8,740	75	24	12,700	7.9	
Feb. 3-4	968	--	18.31	7.69	77.84	--	1.77	.96	99.84	--	--	6,350	8.64	8,370	75	22	10,900	7.7	
Feb. 5	1,750	--	13.57	5.63	57.83	--	1.38	.87	73.33	--	--	4,780	6.50	11,400	75	19	7,270	7.9	
Feb. 6	4,520	--	9.18	3.42	36.92	--	1.21	.71	47.95	--	--	3,130	4.26	19,270	75	15	5,380	7.8	
Feb. 7-8	7,360	--	4.19	1.51	15.87	--	.79	.46	21.15	--	.06	1,440	1.96	14,420	74	9.4	2,550	7.5	
Feb. 9	2,780	--	16.77	6.83	72.62	--	1.43	1.00	91.66	--	--	5,940	8.08	22,450	75	21	10,000	7.9	

e Includes 0.07 equivalent per million of carbonate (CO₃).

Feb. 10, 1955	2,100	33.68	14.72	158.72	1.11	1.17	197.42	--	--	12,800	17.14	36,060	77	32	19,900	7.8
Feb. 11-13	3,370	22.26	9.14	104.80	1.23	1.02	129.17	--	--	8,290	11.27	36,070	77	26	13,800	7.8
Feb. 14-15	1,320	--	7.68	71.31	1.48	.98	92.79	--	--	6,150	8.36	11,010	75	21	10,500	7.8
Feb. 16-18	1,490	--	5.23	62.18	1.80	.98	78.97	--	--	5,090	6.30	20,320	76	20	8,660	7.8
Feb. 19	4,400	--	11.77	44.35	1.44	.98	55.00	--	--	3,720	5.06	22,300	74	16	6,340	8.0
Feb. 20	18,410	--	2.25	.55	1.16	.40	6.83	--	.05	578	.79	14,480	66	4.6	830	7.9
Feb. 21	14,420	--	2.15	.61	1.21	.31	5.98	--	.06	513	.70	10,070	64	4.2	895	7.8
Feb. 22	11,400	--	1.45	.43	.92	.31	3.89	--	.06	357	.49	5,540	62	3.2	594	7.7
Feb. 23	8,830	--	2.40	.70	.77	.27	9.87	--	.04	772	1.05	9,280	72	6.5	1,220	7.5
Feb. 24-25	6,900	--	6.79	2.81	.72	.56	38.07	--	--	2,550	3.47	23,960	76	14	4,410	7.5
Feb. 26-28	4,890	--	11.98	4.82	.97	.69	69.10	--	--	4,440	6.04	29,570	76	18	7,640	7.6
Mar. 1	3,110	--	6.59	2.81	.80	.44	36.66	--	--	2,440	3.32	10,340	75	13	4,260	7.6
Mar. 2-3	7,800	--	5.19	1.81	1.03	.48	25.38	--	.07	1,770	2.41	18,780	74	11	3,110	7.7
Mar. 4	3,010	--	8.98	4.02	.93	.62	49.36	--	--	3,360	4.57	13,790	75	15	5,750	7.7
Mar. 5, 9-10	3,560	--	14.37	5.23	1.31	.77	78.97	--	--	5,240	7.13	25,420	76	20	8,820	7.8
Mar. 6-8	3,350	--	17.51	7.69	1.11	.77	101.25	--	--	6,640	9.03	30,280	76	23	11,000	7.6
Mar. 11-15	2,340	--	11.38	5.52	1.77	.87	62.05	--	--	3,960	5.39	12,610	74	17	6,890	8.0
Mar. 16	2,780	--	6.99	2.71	1.49	.79	33.28	--	--	2,330	3.17	8,810	73	12	3,940	7.9
Mar. 17	4,480	--	2.20	.30	.90	.58	6.20	--	.04	480	.65	2,930	67	4.6	859	7.5
Mar. 18-19	14,160	--	2.79	.65	.85	.46	9.73	--	.03	719	.98	13,860	70	6.0	1,290	7.1
Mar. 20	22,610	--	1.45	.47	.85	.44	3.95	--	.04	350	.48	10,770	63	3.4	553	7.4
Mar. 21	47,010	--	2.10	.40	1.34	.33	5.08	--	.04	445	.61	28,480	62	3.7	703	7.7
Mar. 22	43,640	--	5.39	1.91	1.16	.62	25.38	--	.07	1,750	2.38	104,000	73	10	2,910	7.5
Mar. 23	37,290	--	3.39	1.01	1.36	.46	13.54	--	.05	1,030	1.40	52,280	71	7.2	1,770	7.7
Mar. 24-25	45,260	--	1.90	.70	.82	.37	7.67	--	.03	1,650	.88	40,050	70	5.4	1,060	7.5
Mar. 26-31	18,320	--	4.59	1.01	1.16	.79	19.74	--	.06	1,460	1.99	36,400	74	9.3	2,410	7.4

ARKANSAS RIVER BASIN--Continued

CANADIAN RIVER NEAR WHITEFIELD, OKLA.--Continued

Chemical analyses, water year October 1954 to September 1955--Continued

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million								Boron (B) ppm	Dissolved solids			Per cent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	
			Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)		Nitrate (NO ₃)	Parts per million	Tons per acre-foot					Total tons
Apr. 1, 5, 1955..	5,990	--	3.99	1.91	15.09	--	1.13	0.73	19.04	--	0.08	--	1,480	2.01	12,070	72	8.8	2,390	7.7
Apr. 2-3	13,490	--	2.00	.90	6.22	--	.95	.71	7.47	--	.07	--	.660	.90	12,120	68	5.2	1,060	7.6
Apr. 4	3,130	--	3.19	1.01	11.44	--	.90	.67	13.54	--	.09	--	1,110	1.51	4,740	73	7.9	1,640	7.6
Apr. 6-7	4,240	--	7.98	3.02	31.74	--	1.05	.98	40.05	--	--	--	2,770	3.77	15,980	74	14	4,820	7.5
Apr. 8-10	4,230	--	9.38	4.02	38.31	--	1.26	1.00	49.36	--	--	--	3,410	4.64	19,640	74	15	5,900	7.6
Apr. 11-13, 16-17	16,150	--	10.18	4.02	42.35	--	1.23	.87	53.02	--	--	--	3,660	4.98	80,460	75	16	6,190	7.7
Apr. 14	15,070	--	3.99	1.01	14.57	--	1.07	.69	17.63	--	.07	--	1,300	1.77	26,680	74	9.2	2,120	7.7
Apr. 15, 18-20..	15,660	--	7.98	2.82	31.83	--	1.26	.83	41.74	--	--	--	2,880	3.92	61,380	75	14	4,900	7.6
Apr. 21	10,040	--	1.85	.95	7.22	--	.66	.27	9.03	--	.07	--	636	.86	8,690	72	6.1	1,100	7.2
Apr. 22	14,900	--	1.10	.42	2.96	--	.72	.23	3.38	--	.02	--	281	.38	5,700	66	3.4	469	7.2
Apr. 23	9,520	--	1.55	.93	5.39	--	.85	.33	6.49	--	.01	--	521	.71	6,750	68	4.8	882	7.2
Apr. 24-25	8,170	--	2.94	1.56	11.31	--	.92	.75	13.82	--	.03	--	1,080	1.47	12,010	72	7.5	1,830	7.2
Apr. 26-28	4,120	--	4.59	1.91	16.52	--	1.38	.50	20.73	--	.02	--	1,500	2.04	8,400	72	9.2	2,560	7.5
Apr. 29-30	1,640	--	6.39	2.81	22.87	--	1.66	.67	30.18	--	--	--	2,180	2.96	4,870	71	11	3,660	7.6
May 1-4	2,400	--	8.58	4.22	32.00	--	1.90	.62	42.30	--	--	--	3,080	4.19	10,050	71	13	5,050	7.7
May 5-6	1,130	--	23.85	12.15	99.58	--	1.66	1.12	134.81	--	--	--	8,550	11.63	13,160	73	23	14,300	7.8
May 7	734	--	14.17	7.83	61.31	--	1.57	.83	81.79	--	--	--	5,610	7.63	5,600	74	18	8,830	7.7
May 8	4,170	--	8.58	4.62	34.79	--	1.66	.69	45.13	--	--	--	3,190	4.34	18,090	72	14	5,230	7.9
May 9-10	8,270	--	8.08	5.12	19.39	--	4.03	.69	27.36	--	--	--	2,440	3.32	27,470	59	7.5	4,010	6.0
May 11	2,580	--	6.79	3.41	22.87	--	2.52	4.10	26.51	--	.15	--	2,190	2.98	7,690	69	10	3,940	7.8
May 12, 19	8,510	--	8.78	3.82	30.66	--	2.41	3.91	38.07	--	--	--	2,860	3.89	33,130	71	12	4,760	7.8
May 13, 15	33,440	--	5.19	2.41	18.13	--	1.95	2.08	22.56	--	.11	--	1,700	2.31	77,390	70	9.3	2,940	7.7
May 14	18,960	--	9.78	3.62	37.57	--	1.87	1.71	47.95	--	--	--	3,410	4.64	88,020	74	15	5,590	7.8
May 16-17	14,400	--	4.59	1.81	12.74	--	2.23	3.12	13.54	--	.10	--	1,290	1.75	25,290	67	7.1	2,060	7.7
May 18	3,610	--	5.69	2.61	16.96	--	2.51	2.94	19.04	--	.10	--	1,630	2.22	8,010	67	8.3	2,680	7.8
May 20-31	764,000	14	3.09	.99	6.39	0.13	2.02	.31	7.84	0.03	0.04	0.03	719	.93	747,800	60	4.5	1,280	7.0

June 1-6, 1955..	69,360	--	3.79	2.01	10.61	--	1.92	.85	13.82	--	.04	--	1.080	1.47	102,000	65	6.2	1,900	7.2
June 7-8	14,600	--	3.79	2.31	10.35	--	1.61	.61	14.38	--	.04	--	1.090	1.48	21,660	63	5.9	1,960	7.3
June 9	4,200	--	5.39	2.61	16.57	--	1.85	1.04	21.86	--	.03	--	1.600	2.13	9,160	67	8.3	2,800	7.6
June 10	3,510	--	8.98	4.62	27.92	--	2.88	3.58	35.25	--	--	--	2.700	3.67	20,270	67	11	4,480	7.8
June 11-14	17,750	--	7.09	4.11	19.48	--	2.65	3.87	23.69	--	.10	--	2.020	2.75	48,810	63	8.2	3,220	7.8
June 15-17	9,980	--	8.38	4.72	25.66	--	2.36	2.94	32.72	--	--	--	2.420	3.29	32,870	66	10	4,100	7.7
June 18	12,600	--	5.79	4.21	15.65	--	2.95	4.41	19.18	--	.12	--	1.640	2.23	28,120	61	7.0	2,710	7.8
June 19-20	17,510	--	9.58	3.72	31.13	--	2.39	2.56	40.89	--	--	--	3.040	4.13	72,480	70	12	4,920	7.7
June 21-22	11,640	--	6.79	4.21	22.26	--	2.16	1.77	28.20	--	.12	--	2.060	2.80	32,850	67	9.5	3,390	7.5
June 23-24	12,100	--	10.78	5.62	37.53	--	1.90	1.54	49.36	--	--	--	3.440	4.68	56,660	70	13	5,590	7.6
June 25-27, 29-30	27,230	--	6.79	4.41	21.48	--	2.39	2.50	26.79	--	.12	--	2.090	2.84	77,480	66	9.1	3,510	7.5
June 28	5,970	--	5.49	3.51	14.61	--	2.36	4.35	16.92	--	.21	--	1.420	1.93	11,540	62	6.9	2,340	7.8
July 1-3	15,990	--	5.59	3.01	15.31	--	2.79	2.81	17.77	--	.11	--	1.390	1.89	30,250	64	7.4	2,540	7.9
July 4-5, 9	14,380	--	4.54	2.86	10.35	--	2.95	3.19	11.42	--	.11	--	1.030	1.40	20,160	58	5.4	1,880	8.0
July 6-7	4,920	--	5.09	3.01	13.52	--	2.79	2.83	16.36	--	.07	--	1.300	1.77	8,700	63	6.7	2,380	8.1
July 8, 10	8,810	--	6.24	3.56	18.31	--	2.56	2.83	22.84	--	.12	--	1.700	2.31	20,380	65	8.3	3,080	8.2
July 11-17	17,110	--	4.89	2.31	11.61	--	2.52	2.54	13.54	--	.07	--	1.160	1.58	27,010	62	6.1	2,050	7.7
July 18-20	8,040	--	5.59	3.41	14.39	--	2.59	2.17	18.05	--	.07	--	1.410	1.92	15,440	62	6.8	2,570	7.8
July 21	2,780	--	3.64	1.96	10.39	--	1.57	1.02	12.97	--	.05	--	.927	1.26	3,500	65	6.2	1,730	7.9
July 22	1,590	--	8.68	3.32	27.66	--	1.84	1.08	36.66	--	--	--	2.460	3.35	5,320	70	11	4,350	8.1
July 23	1,370	--	11.58	6.12	45.22	--	1.67	1.33	57.82	--	--	--	3.790	5.15	7,060	72	15	6,660	8.2
July 24-31	6,020	--	16.37	8.83	68.70	--	1.77	2.04	87.99	--	--	--	5.610	7.63	45,960	73	19	9,970	7.7
Aug. 1-4	1,950	--	10.38	5.02	42.09	--	e2.13	1.39	55.00	--	--	--	3.500	4.76	9,300	73	15	6,290	8.3
Aug. 5-6	2,780	--	13.57	8.43	56.53	--	e2.10	2.96	73.33	--	--	--	4.780	6.50	18,070	72	17	8,070	8.3
Aug. 7-10	6,520	--	7.14	3.86	23.09	--	2.43	3.29	28.20	--	--	--	2.150	2.92	19,070	68	9.8	3,780	8.2
Aug. 11	1,290	--	12.48	7.12	51.75	--	2.29	2.56	64.87	--	--	--	4.190	5.70	7,380	73	17	7,220	8.1
Aug. 12	2,880	--	16.77	9.23	73.05	--	2.00	1.64	93.07	--	--	--	5.980	8.13	23,410	74	20	9,970	8.1

e Includes 0.07 equivalent per million of carbonate (CO₃).

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

Chemical analyses, water year October 1954 to September 1955--Continued

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million								Dissolved solids			Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)				
			Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B) ppm	Parts per million			Tons per acre-foot	Total tons		
Aug. 13, 1955 ...	5,340	--	7.98	4.62	29.74	--	2.26	2.37	36.66	--	--	--	2,480	3.37	19,010	70	12	4,140	7.9
Aug. 14-15	6,150	--	12.18	6.62	47.83	--	2.00	1.94	62.05	--	--	--	3,980	5.41	33,310	72	16	7,040	8.0
Aug. 16-17	3,560	--	8.98	5.02	34.05	--	2.10	2.33	43.71	--	--	--	2,970	4.04	14,400	71	13	5,290	8.0
Aug. 18-20	3,730	--	6.39	3.81	21.79	--	2.26	3.10	26.79	--	0.07	--	1,970	2.88	10,020	68	9.6	3,530	7.8
Aug. 21-22, 24-26	5,820	--	8.58	4.42	30.48	--	2.29	2.75	39.48	--	--	--	2,580	3.51	20,440	70	12	4,610	8.0
Aug. 23, 27-28, 30	6,800	--	6.09	3.21	20.44	--	2.06	2.06	25.38	--	.05	--	1,810	2.46	16,760	69	9.5	3,270	7.9
Aug. 29	1,890	--	3.04	1.46	8.83	--	1.57	1.35	10.72	--	.05	--	1,802	1.09	2,060	66	5.9	1,480	7.7
Aug. 31	6,680	--	4.49	1.71	13.31	--	1.80	1.00	16.36	--	--	--	1,180	1.60	10,740	68	7.6	2,150	7.8
Sept. 1-2	11,920	--	3.34	1.46	9.26	--	1.51	.93	12.13	--	.06	--	925	1.26	15,010	66	6.0	1,640	7.6
Sept. 3	2,780	--	22.65	10.15	94.36	--	1.11	.87	123.53	--	--	--	8,420	11.45	31,830	74	23	13,200	7.7
Sept. 4-5	2,720	--	12.97	6.23	53.92	--	1.25	.83	70.51	--	--	--	4,810	6.54	17,790	74	17	7,680	7.6
Sept. 6-10	2,560	--	10.39	4.02	39.96	--	1.84	.75	50.77	--	--	--	3,550	4.83	12,360	74	15	5,980	7.7
Sept. 11, 13	1,270	--	8.78	4.02	32.48	--	1.74	.87	42.30	--	--	--	2,780	3.78	4,820	72	13	4,910	7.7
Sept. 12, 15	1,460	--	12.38	5.42	43.92	--	1.84	.83	59.79	--	--	--	3,900	5.30	7,760	71	15	6,790	7.8
Sept. 14	793	--	5.59	2.61	20.05	--	1.25	.48	26.79	--	.05	--	1,800	2.45	1,940	71	9.9	3,260	7.5
Sept. 16	793	--	18.71	8.89	76.97	--	1.31	.85	101.25	--	--	--	6,520	8.87	7,040	74	21	11,100	7.7
Sept. 17-18	1,000	--	30.14	15.26	136.97	--	1.11	.96	176.55	--	--	--	14,100	15.10	15,100	75	29	17,900	7.7
Sept. 19-20	801	--	13.97	6.23	58.27	--	1.38	.75	77.56	--	--	--	4,890	6.65	5,330	74	18	8,410	7.7
Sept. 21-23	1,010	--	15.57	8.43	68.79	--	1.84	1.29	87.43	--	--	--	5,670	7.71	7,760	74	20	9,720	8.1
Sept. 24	3,250	--	10.38	6.02	45.22	--	1.74	1.02	56.97	--	--	--	3,740	5.09	16,560	73	16	6,590	7.9
Sept. 25-26, 28 ..	41,200	--	2.30	1.30	7.04	--	1.54	.48	8.60	--	.02	--	646	.88	36,230	66	5.2	1,210	7.7
Sept. 27, 29-30	39,850	--	3.59	2.61	16.26	--	1.41	.50	20.31	--	.03	--	1,380	1.88	74,960	72	9.2	2,520	7.6
Total or weighted average.....	1,883,000	--	4.79	1.97	15.18	--	1.79	0.85	19.12	--	--	--	1,420	1.93	3,640,000	69	8.2	2,440	--

PART 8. WESTERN GULF OF MEXICO BASINS

SABINE RIVER BASIN

SABINE RIVER NEAR RULIFF, TEX.

LOCATION.--At gaging station at bridge on State Highway 235, 2.4 miles north of Ruliff, Newton County, 4.2 miles upstream from Kansas City Southern Railway bridge, 4.5 miles downstream from Cypress Creek and at mile 40.
DRAINAGE AREA.--9,440 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1955.

Water temperatures: October 1947 to September 1955.

EXTREMES, 1954-55.--Specific conductance: Maximum daily, 612 micromhos Dec. 22; minimum daily, 50.4 micromhos Aug. 9.

Percent sodium: Maximum, 80 Nov. 7-12; minimum, 48 Aug. 5-13.

EXTREMES, 1945-46, 1947-55.--Specific conductance: Maximum daily, 774 micromhos Dec. 26, 1948; minimum daily, 32.9 micromhos May 22, 1953.

Percent sodium: Maximum, 86 Dec. 26-27, 1948; minimum, 27 June 3-7, 10, 1946.

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 1954 to September 1955 given in WSP 1392.

Chemical analyses, water year October 1954 to September 1955

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million								Dissolved solids			Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)
			Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B) ppm	Parts per million				Tons per acre-foot	Total tons
Oct. 1-10, 1954 ..	6,600	21	0.38	0.23	1.44	0.77	0.13	1.13	0.02	0.19	1,250	70	2.6	223	6.9	
Oct. 11-20	7,760	21	.36	.21	1.39	.70	.11	1.13	.02	.19	1,470	71	2.6	222	7.2	
Oct. 21-31	9,720	19	.36	.20	1.53	.66	.14	1.27	.02	.20	1,940	73	2.9	231	7.1	
Nov. 1-6	8,220	18	.36	.30	1.76	.66	.20	1.55	.01	.21	1,730	73	3.1	270	7.3	
Nov. 7-12	34,590	13	.55	.35	3.65	.46	.42	3.64	.03	.40	13,840	80	5.4	520	7.1	
Nov. 13-20	66,980	11	.50	.29	.97	.52	.35	.87	.02	.15	10,050	55	1.5	197	7.0	
Nov. 21-30	58,140	12	.55	.30	1.36	.52	.40	1.27	.02	.19	11,050	62	2.1	249	6.9	
Dec. 1-10	28,800	16	.71	.21	1.88	.46	.46	1.86	.02	.28	8,060	67	2.8	318	7.3	
Dec. 11-20	25,350	17	.65	.21	1.86	.44	.40	1.86	.02	.26	6,590	68	2.8	311	7.4	
Dec. 21-22	11,680	19	.97	.33	3.47	.52	.62	3.61	.02	.43	5,020	73	4.3	534	7.4	
Dec. 23-31	36,990	14	.51	.21	1.88	.29	.37	1.92	.02	.26	9,620	72	3.1	305	6.5	
Jan. 1-7, 1955	21,780	17	.37	.31	1.54	.33	.40	1.47	.02	.22	4,790	69	2.6	261	7.0	
Jan. 8-11	16,190	16	.42	.34	2.27	.28	.46	2.26	.03	.28	4,530	75	3.7	351	7.0	
Jan. 12-20, 22, 29-31	98,660	14	.32	.24	1.43	.23	.33	1.41	.02	.20	19,730	72	2.7	232	6.6	
Jan. 21, 23-28	74,500	14	.44	.34	2.02	.20	.48	2.09	.03	.28	20,860	72	3.2	334	6.5	

a Sum of determined constituents.

Feb. 1-6, 16-23, 27-28, 1955.....	263,400	11	.33	.25	1.29	.23	.44	1.18	.02	148	.20	52,680	69	2.4	218	6.9
Feb. 7-11, 24-26	276,500	7.4	.20	.12	.63	.18	.21	.54	.02	a62	.08	22,120	66	1.6	109	6.5
Feb. 12-15.....	130,300	9.0	.25	.15	.80	.16	.29	.73	.02	a80	.11	14,330	67	1.8	144	6.8
Mar. 1-8.....	131,100	14	.46	.24	1.04	.25	.44	1.02	.03	a116	.16	20,980	60	1.8	201	6.7
Mar. 9-17.....	66,270	17	.55	.33	1.53	.39	.56	1.44	.02	a158	.21	13,920	63	2.3	271	7.0
Mar. 18-26.....	59,370	19	.66	.32	1.61	.49	.50	1.58	.02	a169	.23	13,680	62	2.3	292	7.1
Mar. 27-31, Apr. 1-12.....	354,800	10	.44	.18	.96	.29	.33	.93	.03	a103	.14	49,670	61	1.7	188	6.7
Apr. 13-22.....	473,700	8.8	.23	.13	.52	.21	.19	.45	.02	a80	.08	37,900	59	1.2	107	6.8
Apr. 23-30.....	216,000	13	.39	.21	1.00	.39	.35	.82	.04	a107	.15	32,400	62	1.8	178	6.5
May 1-10.....	118,600	15	.58	.30	1.12	.59	.37	1.02	.02	156	.21	24,910	56	1.7	231	7.0
May 11-20, 23-25.....	117,700	16	.55	.29	1.33	.56	.35	1.24	.02	154	.21	24,720	61	2.1	247	6.7
May 22.....	19,040	--	.20	.20	--	.11	--	.28	--	--	--	--	--	--	59.1	6.7
May 21, 26-31.....	133,700	9.0	.28	.16	.88	.28	.20	.82	.02	a84	.11	14,710	67	1.9	151	6.6
June 1-6.....	108,100	12	.33	.19	.71	.34	.25	.62	.02	a82	.11	11,890	58	1.4	145	6.8
June 7-14.....	54,470	17	.46	.26	1.05	.46	.27	1.02	.02	139	.19	10,350	59	1.8	206	6.9
June 15-30.....	55,180	22	.56	.32	1.47	.69	.29	1.35	.02	167	.23	12,690	63	2.2	268	7.3
July 1-10.....	28,800	18	.50	.30	1.53	.66	.27	1.38	.02	162	.22	6,340	66	2.4	267	7.0
July 11-17.....	20,830	17	.51	.29	1.98	.61	.20	1.95	.02	184	.25	5,210	71	3.1	316	7.4
July 18-23, 30-31.....	48,030	9.0	.21	.15	.72	.33	.12	.62	.01	a71	.10	4,900	67	1.7	127	6.7
July 24-28.....	40,300	11	.35	.21	1.51	.43	.19	1.44	.01	a129	.18	7,250	73	2.9	238	6.7
Aug. 1-3.....	17,910	12	.39	.21	1.22	.51	.12	1.18	.01	a114	.16	2,870	67	2.2	206	7.5
Aug. 4, 14-20, 30-31.....	164,800	11	.24	.12	.53	.31	.11	.45	.02	a80	.08	13,170	60	1.2	101	6.8
Aug. 5-13.....	397,700	6.2	.16	.06	.25	.16	.07	.28	.02	a37	.05	19,880	48	.8	57.2	6.5
Aug. 21-29.....	46,510	16	.35	.21	.95	.49	.15	.85	.02	112	.15	6,980	63	1.8	168	6.9

a Sum of determined constituents.

SABINE RIVER BASIN--Continued

SABINE RIVER NEAR RULIFF, TEX.--Continued

Chemical analyses, water year October 1954 to September 1955--Continued

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million										Dissolved solids			Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
			Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B) ppm	Parts per million	Tons per acre-foot	Total tons			
Sept. 1-9, 1955.....	93,120	12	0.21	0.11		0.62	0.33	0.08	0.51		0.02	a 65	0.09	8,380	66	1.6	106	6.4
Sept. 10-11, 13-14, 21-22.....	25,940	18	.41	.21		1.47	.57	.16	1.35		.01	a 136	.18	4,670	70	2.6	240	7.3
Sept. 12, 15-20..	25,490	15	.55	.27		2.25	.49	.25	2.31		.02	208	.28	8,260	73	3.5	356	6.6
Sept. 23-30.....	37,350	14	.28	.12		.88	.36	.11	.79		.02	a 87	.12	4,480	69	2.0	141	6.7
Total or weighted average	4,036,000	11	0.34	0.19		0.96	0.31	0.27	0.90		0.02	104	0.14	565,000	64	1.9	174	--

a Sum of determined constituents.

NECHES RIVER BASIN
NECHES RIVER AT EVADALE, TEX.

LOCATION.--At gaging station at bridge on U. S. Highway 96, 200 feet upstream from Gulf, Colorado and Santa Fe Railway bridge at Evadale, Jasper County, 600 feet downstream from Mill Creek, 15 miles upstream from Village Creek and at mile 55.

DRAINAGE AREA.--7,908 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1955.

Water temperatures: October 1947 to September 1955.

EXTREMES, 1954-55.--Specific conductance: Maximum daily, 408 micromhos Oct. 26; minimum daily, 83.3 micromhos Apr. 19.

Percent sodium: Maximum, 70 Nov. 21-30, Jan. 1-10, 11-20; minimum, 51 June 21-30.

EXTREMES, 1947-55.--Specific conductance: Maximum daily, 415 micromhos Nov. 29, 1952; minimum daily, 49.3 micromhos May 9, 1953.

Percent sodium: Maximum, 74 Dec. 21-31, 1948; minimum, 41 June 4-18, 1950.

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 1954 to September 1955 given in WSP 1392.

Chemical analyses water year October 1954 to September 1955

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million								Dissolved solids				Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
			Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B) ppm	Parts per million	Tons per acre-foot					Total tons
Oct. 1-10, 1954	3,790	26	0.70	0.43	2.02	1.41	0.20	1.47	0.02	0.05		203	0.28	1,060	64	2.7	330	7.6
Oct. 11-20	3,120	26	0.65	0.37	1.74	1.33	0.15	1.21	0.02	0.05		196	0.27	1,842	63	2.4	300	7.5
Oct. 21-31	3,500	24	0.65	0.37	1.69	1.23	0.16	1.27	0.02	0.03		196	0.27	945	62	2.4	290	7.6
Nov. 1-10	2,010	25	0.60	0.30	1.37	1.16	0.15	0.90	0.02	0.04		152	0.21	422	60	2.0	236	7.6
Nov. 11-20	3,900	22	0.55	0.23	1.14	0.88	0.20	0.79	0.01	0.04		138	0.19	741	59	1.8	205	7.5
Nov. 21-30	10,750	16	0.55	0.23	1.83	0.77	0.40	1.38	0.02	0.04		194	0.26	2,800	70	2.9	287	7.5
Dec. 1-10	8,830	17	0.60	0.18	1.52	0.52	0.52	1.21	0.03	0.02		152	0.21	1,850	66	2.4	264	7.2
Dec. 11-20	12,100	16	0.60	0.18	1.26	0.43	0.52	1.04	0.03	0.02		136	0.18	2,180	62	2.0	229	7.2
Dec. 21-31	35,000	18	0.52	0.18	1.34	0.34	0.58	1.07	0.04	0.01		139	0.19	6,650	66	2.3	229	7.0
Jan. 1-10, 1955	35,070	16	0.35	0.33	1.59	0.33	0.60	1.30	0.03	0.01		165	0.22	7,720	70	2.7	258	6.8
Jan. 11-20	42,490	17	0.32	0.32	1.51	0.26	0.50	1.35	0.03	0.01		160	0.22	9,350	70	2.7	247	6.9
Jan. 21-31	74,320	16	0.35	0.29	1.41	0.28	0.48	1.24	0.03	0.02		154	0.21	15,610	69	2.5	236	6.8
Feb. 1-5	34,910	16	0.57	0.23	1.17	0.29	0.50	1.13	0.03	0.02		162	0.22	7,680	59	1.8	230	6.7
Feb. 6-18, 21-22, 24	363,700	11	0.29	0.13	0.60	0.16	0.29	0.54	0.02	0.01		172	0.10	36,370	59	1.3	116	6.3
Feb. 19-20, 23, 25-28	99,330	13	0.34	0.22	0.79	0.21	0.42	0.68	0.03	0.01		192	0.13	12,910	59	1.5	155	6.6

a Sum of determined constituents.

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

Chemical analyses water year October 1954 to September 1955--Continued

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million										Dissolved solids				Specific conductance (micro-mhos at 25° C)	pH
			Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B) ppm	Solids					
													Parts per million	Tons per acre-foot	Total tons			
Mar. 1-10, 1955 ..	99,750	15	0.39	0.27	1.08	0.23	0.54	0.93	0.02	0.02	0.02	123	0.17	16,960	62	1.9	202	7.0
Mar. 11-20	69,980	15	.45	.30	1.15	.26	.58	1.02	.02	.02	.02	131	.18	12,600	61	1.9	220	7.0
Mar. 21-31	84,500	13	.55	.33	1.22	.34	.60	1.13	.01	.02	.02	161	.22	18,590	58	1.8	235	7.3
Apr. 1-12	129,100	11	.49	.30	1.04	.43	.50	.87	.02	.01	.01	118	.16	20,660	57	1.7	208	7.1
Apr. 13-19, 21-26 ..	490,600	8.6	.25	.16	.51	.26	.23	.40	.03	.01	.01	62	.08	39,250	55	1.1	101	6.8
Apr. 20, 27-30	104,200	12	.50	.23	.84	.66	.33	.51	.05	.02	.02	100	.14	14,590	54	1.4	158	6.9
May 1-10	92,350	15	.48	.30	.98	.52	.35	.85	.01	.03	.03	144	.20	18,470	56	1.6	194	6.8
May 11-20	34,730	14	.58	.30	.95	.62	.31	.85	.02	.03	.03	144	.20	6,950	52	1.4	203	7.5
May 21-31	75,830	10	.57	.33	1.03	.67	.33	.90	.01	.02	.02	140	.19	14,410	53	1.5	210	7.0
June 1-10	114,000	15	.42	.28	.81	.44	.35	.68	.02	.02	.02	101	.14	15,960	54	1.4	171	7.0
June 11-20	46,100	16	.41	.27	.78	.43	.31	.68	.02	.02	.02	99	.13	5,990	53	1.3	169	7.0
June 21-30	19,780	16	.53	.31	.88	.59	.31	.79	.02	.01	.01	113	.15	2,970	51	1.4	193	7.2
July 1-10	26,260	17	.51	.33	1.12	.62	.31	.99	.02	.02	.02	136	.18	4,730	57	1.7	207	7.0
July 11-20	17,150	18	.58	.34	1.15	.72	.29	1.02	.02	.02	.02	140	.19	3,260	56	1.7	219	7.0
July 21-31	9,620	19	.61	.35	1.19	.82	.25	1.04	.02	.02	.02	139	.19	1,830	55	1.7	227	7.1
Aug. 1-10	15,010	17	.53	.27	1.15	.67	.27	.96	.02	.03	.03	143	.19	2,850	59	1.8	203	7.7
Aug. 11-20	33,710	16	.56	.30	1.31	.74	.23	1.16	.02	.02	.02	159	.22	7,420	60	2.0	238	7.6
Aug. 21-31	40,400	14	.51	.27	1.34	.64	.27	1.16	.02	.03	.03	159	.22	8,890	63	2.1	239	7.6
Sept. 1-9	17,540	14	.48	.20	1.06	.59	.21	.90	.02	.02	.02	131	.18	3,160	61	1.8	194	7.0
Sept. 10-20	14,290	15	.54	.28	1.39	.72	.27	1.18	.02	.02	.02	152	.21	3,000	63	2.2	242	7.6
Sept. 21-30	12,180	16	.51	.25	1.38	.70	.23	1.18	.02	.01	.01	151	.21	2,560	64	2.2	235	7.1
Total or weighted average	2,280,000	13	0.39	0.23	0.91	0.36	0.35	0.76	0.02	0.02	0.02	107	0.15	342,000	59	1.6	169	--

a Sum of determined constituents.

TRINITY RIVER BASIN

TRINITY RIVER AT ROMAYOR, TEX.

LOCATION.--At gaging station at bridge on State Highway 105, 1.9 miles south of Romayor, Liberty County, 2.0 miles downstream from Gulf, Colorado and Santa Fe Railway bridge and at mile 94.
DRAINAGE AREA.--17,192 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1945 to November 1949, February 1950 to September 1951, April 1953 to September 1955.

Water temperatures: February 1950 to September 1955.
EXTREMES, 1954-55.--Specific conductance: Maximum daily, 3,020 micromhos Oct. 17-19; minimum daily, 114 micromhos Apr. 14.

Percent sodium: Maximum, 82 Oct. 17-19; minimum, 44 Apr. 11-14.
EXTREMES, 1945-50, 1953-55.--Specific conductance: Maximum daily, 3,170 micromhos Nov. 7, 1953; minimum daily, 103 micromhos Nov. 9, 1946.

Percent sodium: Maximum, 86 Nov. 7, 1953; minimum, 23 June 11-20, 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 noted. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1954 to September 1955 given in WSP 1392.

Chemical analyses, water year October 1954 to September 1955

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million										Dissolved solids			Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)
			Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B) ppm	Total tons					
													Parts per million	Tons per acre-foot				
Oct. 1-6, 25-26, 28, 1954.....	31,540	20	2.99	0.51	8.13	3.20	1.31	7.05		0.07		a 886	0.93	29,330	70	6.1	1,190	
Oct. 7-16, 20-24.....	17,840	19	3.64	.76	16.35	3.80	2.66	14.24	.05	.05		1,230	1.67	29,790	79	11	2,140	
Oct. 17-19.....	1,840	15	4.19	.90	23.21	3.92	3.81	20.53	.04	.04		1,680	2.28	4,200	82	15	2,790	
Oct. 27, 29-30.....	50,100	12	1.40	.26	3.18	1.28	.75	2.74	.07	.07		322	.44	22,040	66	3.5	507	
Oct. 31, Nov. 1-8, 14-15, 28-30.....	112,300	13	1.46	.32	2.70	1.28	.81	2.31	.08	.08		301	.41	46,040	60	2.9	503	
Nov. 9-13, 22-27.....	66,030	13	1.76	.36	4.45	1.39	.92	4.15	.11	.11		426	.58	38,170	68	4.3	727	
Nov. 16-21.....	70,670	8.4	.85	.13	.95	.72	.40	.76	.05	.05		a 120	.16	11,310	49	1.4	212	
Dec. 1-10.....	17,030	17	1.80	.28	2.45	1.75	.71	2.00	.07	.07		288	.39	6,640	54	2.4	492	
Dec. 11-20.....	30,150	17	1.87	.33	3.61	1.59	.92	3.24	.06	.06		368	.50	15,080	62	3.6	639	
Dec. 21, 24-31.....	19,020	16	1.30	.70	3.86	1.51	1.00	3.24	.11	.11		366	.50	9,510	66	3.9	639	
Dec. 22-23.....	4,680	23	2.20	.58	9.73	1.64	1.29	9.45	.13	.13		767	1.04	4,870	78	8.3	1,370	
Jan. 1-12, 1955.....	21,510	22	1.91	.49	5.30	1.67	1.17	4.74	.12	.12		492	.67	14,410	69	4.8	831	
Jan. 13-18, 26-28.....	32,340	20	2.05	.49	7.40	1.61	1.33	6.77	.23	.23		631	.86	27,810	74	6.6	1,080	
Jan. 19-25, 29-31.....	87,850	14	1.25	.27	3.59	1.05	.85	3.10	.11	.11		348	.47	41,290	70	4.1	567	

a Sum of determined constituents.

TRINITY RIVER BASIN

TRINITY RIVER AT ROMAYOR, TEX.

LOCATION.--At gaging station at bridge on State Highway 105, 1.9 miles south of Romayor, Liberty County, 2.0 miles downstream from Gulf, Colorado and Santa Fe Railway bridge and at mile 94.

DRAINAGE AREA.--17,192 square miles.

RECORDS AVAILABLE.--Chemical analyses: February 1950 to September 1951, April 1953 to September 1955.

Water temperatures: February 1950 to September 1951, April 1953 to September 1955.

EXTREMES, 1954-55.--Specific conductance: Maximum daily, 3,020 micromhos Oct. 17-19; minimum daily, 114 micromhos Apr. 14.

Percent sodium: Maximum, 82 Oct. 17-19; minimum, 44 Apr. 11-14.

EXTREMES, 1945-50, 1953-55.--Specific conductance: Maximum daily, 3,170 micromhos Nov. 7, 1953; minimum daily, 103 micromhos Nov. 9, 1946.

Percent sodium: Maximum, 86 Nov. 7, 1953; minimum, 23 June 11-20, 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 noted. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1954 to September 1955 given in WSP 1392.

Chemical analyses, water year October 1954 to September 1955

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million										Dissolved solids			Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
			Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B) ppm	Parts per million	Tons per acre-foot	Total tons				
Oct. 1-6, 25-26, 28, 1954.....	31,540	20	2.99	0.51	8.13	3.20	1.31	7.05	0.07				a686	0.93	29,330	70	6.1	1,190	8.1
Oct. 7-16, 20-24..	17,840	19	3.64	.76	16.35	3.80	2.66	14.24	.05				1,230	1.67	29,790	79	11	2,140	8.2
Oct. 17-19.....	1,840	15	4.19	.90	23.21	3.92	3.81	20.53	.04				1,680	2.28	4,200	82	15	2,790	8.1
Oct. 27, 29-30....	50,100	12	1.40	.26	3.18	1.28	.75	2.74	.07				322	.44	22,040	66	3.5	507	7.5
Oct. 31, Nov. 1-8, 14-15, 28-30....	112,300	13	1.46	.32	2.70	1.28	.81	2.31	.08				301	.41	46,040	60	2.9	503	7.7
Nov. 9-13, 22-27..	66,030	13	1.76	.36	4.45	1.39	.92	4.15	.11				426	.58	38,170	68	4.3	727	7.2
Nov. 16-21.....	70,670	8.4	.85	.13	.95	.72	.40	.76	.05				a120	.16	11,310	49	1.4	212	7.2
Dec. 1-10.....	17,030	17	1.80	.28	2.45	1.75	.71	2.00	.07				288	.39	6,640	54	2.4	492	7.8
Dec. 11-20.....	30,150	17	1.87	.33	3.61	1.59	.92	3.24	.06				368	.50	15,080	62	3.6	639	7.7
Dec. 21, 24-31....	19,020	16	1.30	.70	3.86	1.51	1.00	3.24	.11				366	.50	9,510	66	3.9	639	7.6
Dec. 22-23.....	4,680	23	2.20	.58	9.73	1.64	1.29	9.45	.13				767	1.04	4,870	78	8.3	1,370	7.8
Jan. 1-12, 1955..	21,510	22	1.91	.49	5.30	1.67	1.17	4.74	.12				492	.67	14,410	69	4.8	831	7.7
Jan. 13-18, 26-28..	32,340	20	2.05	.49	7.40	1.61	1.33	6.77	.23				631	.86	27,810	74	6.6	1,080	7.6
Jan. 19-25, 29-31..	87,850	14	1.25	.27	3.59	1.05	.85	3.10	.11				348	.47	41,290	70	4.1	567	7.3

a Sum of determined constituents.

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

Chemical analyses, water year October 1954 to September 1955--Continued

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million								Dissolved solids				Per- cent adsorp- tion ratio	Specific conduct- ance (micro- mhos at 25°C)	pH	
			Cal- cium (Ca)	Magne- sium (Mg)	So- dium (Na)	Potas- sium (K)	Bicar- bonate (HCO ₃)	Sul- fate (SO ₄)	Chlo- ride (Cl)	Fluo- ride (F)	Ni- trate (NO ₃)	Boron (B) ppm	Parts per mil- lion	Tons per acre- foot				Total tons
Feb. 1-4, 1955 ...	11,030	17	1.46	0.36	2.63	1.26	0.73	2.40	2.40	0.06		300	0.41	4,520	59	2.8	492	7.5
Feb. 5-10 ...	258,600	10	.82	.14	.91	.67	.35	.79	.79	.06		166	.23	59,480	49	1.3	207	7.5
Feb. 11-13 ...	53,200	15	1.41	.19	3.14	1.13	.65	2.85	2.85	.11		318	.43	22,880	66	3.5	529	7.4
Feb. 14-21, 25 ...	59,900	16	1.47	.23	1.97	1.20	.90	1.44	1.44	.13		262	.36	21,560	54	2.1	396	7.7
Feb. 22-24, 26-28	59,310	17	1.70	.26	2.85	1.25	.96	2.48	2.48	.12		334	.45	26,680	59	2.9	535	7.6
Mar. 1-23 ...	74,040	15	1.94	.44	4.06	1.66	1.19	3.47	3.47	.12		406	.55	40,720	63	3.7	704	7.7
Mar. 24-31 ...	102,800	11	1.51	.29	1.80	1.41	.79	1.30	1.30	.10		247	.34	34,950	50	1.9	388	7.2
Apr. 1-9 ...	36,220	15	1.65	.35	2.07	1.51	.87	1.61	1.61	.08		283	.38	13,760	51	2.1	443	7.7
Apr. 10, 15-17 ...	141,200	13	.91	.15	1.01	.84	.35	.85	.85	.03		130	.18	25,420	49	1.4	229	7.2
Apr. 11-14 ...	250,710	9.0	.62	.10	.56	.59	.31	.34	.34	.04		83	.11	27,580	44	.9	130	7.5
Apr. 18-30 ...	151,100	18	1.78	.34	1.85	1.77	.75	1.38	1.38	.07		268	.36	54,400	47	1.8	415	7.4
May 1-4, 20 ...	19,850	17	1.38	.26	1.77	1.41	.65	1.30	1.30	.05		230	.31	6,150	52	2.1	345	7.3
May 5-14 ...	15,080	15	2.20	.52	3.21	1.92	1.17	2.76	2.76	.08		376	.51	7,680	54	2.8	633	7.7
May 15-19, 21-22, 24, 26 ...	49,070	13	2.20	.48	3.77	1.93	1.08	3.36	3.36	.08		400	.54	26,500	58	3.3	702	7.6
May 23, 27-31 ...	75,010	13	1.94	.26	2.10	1.79	.83	1.55	1.55	.13		274	.37	27,750	49	2.0	452	7.5
May 25 ...	11,110	20	2.98	.66	14.97	2.54	1.64	14.24	14.24	.19		1,100	1.50	16,670	80	11	1,980	7.9
June 1-12 ...	46,170	19	1.90	.32	2.32	1.75	.69	2.03	2.03	.07		293	.40	18,470	51	2.2	488	7.9
June 13-20, 27-30	35,510	16	2.27	.39	3.30	2.05	1.02	2.79	2.79	.10		374	.51	18,110	55	2.9	636	7.8
June 21-26 ...	21,830	8.4	2.97	.53	7.13	2.44	1.79	6.26	6.26	.14		4628	.85	18,560	67	5.4	1,130	7.9
July 1-10 ...	14,320	17	2.56	.40	3.27	2.39	1.21	2.48	2.48	.15		397	.54	7,730	52	2.7	670	8.0
July 11-24 ...	10,710	15	2.40	.42	3.08	2.33	.79	2.76	2.76	.02		363	.49	5,250	52	5.8	639	7.8
July 25-31 ...	7,240	14	2.78	.52	7.48	2.52	.85	7.39	7.39	.02		648	.88	6,370	69	5.6	1,180	7.7
Aug. 1-10 ...	7,840	16	2.84	.48	6.31	2.82	1.10	5.64	5.64	.07		576	.78	6,120	66	4.9	1,020	8.0
Aug. 11-20 ...	8,780	17	2.99	.54	10.71	3.05	1.81	9.36	9.36	.02		2841	1.14	10,010	75	8.1	1,500	8.0
Aug. 21-31 ...	11,790	15	2.79	.53	9.75	2.88	1.71	8.46	8.46	.02		2772	1.04	12,260	75	7.6	1,380	7.9
Sept. 1-10 ...	11,930	18	3.13	.59	13.73	3.18	1.83	12.41	12.41	.03		1,030	1.40	16,700	79	10.1	1,840	7.9
Sept. 11-18 ...	7,740	18	2.64	.52	9.53	2.69	1.50	8.46	8.46	.04		2752	1.02	7,890	75	7.6	1,360	8.1
Sept. 19-21, 25-30	7,580	16	2.23	.41	5.64	2.49	1.33	4.43	4.43	.03		504	.69	5,230	68	4.9	880	7.9
Sept. 22-24 ...	2,420	16	3.28	.60	12.79	3.13	2.06	11.42	11.42	.06		2885	1.34	3,240	77	9.2	1,750	7.6
Total or weighted average	2,125,000	14	1.45	0.28	2.78	1.33	0.75	2.34	2.34	0.08		296	0.40	850,000	62	3.0	487	--

LOCATION.--At gaging station at bridge on U. S. Highway 59 in Richmond, Fort Bend County, 925 feet downstream from Texas and New Orleans Railroad bridge and at mile 93.

DRAINAGE AREA.--44,050 square miles, approximately, of which 9,240 square miles is probably non-contributing.

RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1955.

Water temperatures: November 1950 to September 1955.

EXTREMES, 1954-55.--Specific conductance: Maximum daily, 1,870 micromhos May 31; minimum daily, 217 micromhos Apr. 23.

Percent sodium: Maximum, 60 May 29-31, June 1, 9-11; minimum, 26 Apr. 14-21, May 20-21, 23-28.

EXTREMES, 1945-55.--Specific conductance: Maximum daily, 2,540 micromhos Sept. 4, 1951; minimum daily, 187 micromhos Aug. 31, 1947.

Percent sodium: Maximum, 76 Dec. 3-4, 1945; minimum, 18 Aug. 27-31, 1947.

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 1954 to September 1955 given in WSP 1392.

Chemical analyses, water year October 1954 to September 1955

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million								Dissolved solids			Per- cent sodium adsorp- tion ratio	Specific conduct- ance (micro- mhos at 25°C)	pH			
			Cal- cium (Ca)	Magne- sium (Mg)	So- dium (Na)	Potas- sium (K)	Bicar- bonate (HCO ₃)	Sul- fate (SO ₄)	Chlo- ride (Cl)	Fluo- ride (F)	Ni- trate (NO ₃)	Boron (B) ppm	Parts per mil- lion				Tons per acre- foot	Total tons	
Oct. 1-10, 1954...	13,590	18	4.29	1.89	9.09	0.17	2.62	3.58	9.45	0.01	0.03	0.28	959	1.30	17,670	59	5.2	1,620	8.0
Oct. 11-19	10,400	17	4.59	1.64	9.22	.16	2.65	3.64	9.36	.01	.02	.19	973	1.32	13,730	59	5.2	1,630	8.0
Oct. 20-31	12,720	17	3.19	1.07	3.74	.10	3.21	1.50	3.47	.01	.02	.26	486	.66	8,400	46	2.6	825	8.0
Nov. 1-7, 22-23 ..	19,340	17	3.64	1.32	5.39	.12	3.26	2.46	4.85	.01	.02	.21	654	.89	17,210	51	3.4	1,100	8.0
Nov. 8-21	19,790	15	4.59	1.40	8.09	.15	3.10	3.25	8.04	.01	.02	.16	872	1.19	23,550	57	4.7	1,480	8.1
Nov. 24-30	12,420	15	2.10	.69	2.35	.10	2.31	.83	2.12	.02	.05	.15	322	.44	5,460	45	2.0	554	8.0
Dec. 1-6	5,570	15	2.89	.90	3.22	.10	2.92	.98	3.16	.02	.03	.12	422	.57	3,170	45	2.3	726	8.1
Dec. 7-16	7,730	15	3.64	1.32	5.52	.11	3.69	1.08	5.70	.02	.02	.17	606	.82	6,340	52	3.5	1,070	8.2
Dec. 17-27	10,680	16	3.59	1.32	4.17	.10	3.93	1.29	3.81	.02	.02	.13	522	.71	7,580	44	2.7	912	8.2
Dec. 28-31	5,520	12	2.26	.60	2.35	.09	2.56	.69	2.09	.02	.05	--	312	.42	2,320	44	2.0	549	8.1
Jan. 1-10, 1955...	7,550	17	3.14	1.07	4.96	.11	3.46	.98	4.74	.01	.02	.22	548	.75	5,660	53	3.4	941	8.2
Jan. 11-19	7,550	16	2.74	1.32	4.91	.10	3.11	1.42	4.46	.01	.02	.22	530	.72	5,440	54	3.4	911	8.0
Jan. 20-21, 29-31...	7,850	16	2.40	.72	2.74	.09	2.62	.98	2.37	.01	.04	.16	359	.49	3,850	46	2.2	610	8.2
Jan. 22-28	12,840	15	3.09	1.07	4.09	.11	3.16	1.48	3.58	.02	.03	.20	505	.69	8,860	49	2.8	845	8.2
Feb. 1-7	49,460	13	2.50	.67	3.04	.09	2.61	1.08	2.59	.03	.06	.16	385	.52	25,720	48	2.4	661	7.8
Feb. 8-18	158,900	11	1.54	.28	1.00	.08	1.70	.44	.71	.03	.06	.09	132	.26	41,310	34	1.0	303	7.6
Feb. 19-28	31,480	13	1.90	.44	2.91	.11	1.82	.60	2.93	.02	.02	.15	335	.46	14,480	54	2.7	587	7.5

COLORADO RIVER BASIN
COLORADO RIVER AT AUSTIN, TEX.

LOCATION.--At raw-water intake at Austin City Water Plant, 4½ miles upstream from gaging station which is at Montopolis bridge on U. S. Highway 183, at southeast edge of Austin, Travis County, 2.8 miles upstream from Walnut Creek, 3.8 miles downstream from Waller Creek, 5 miles downstream from Barton Creek, and at mile 290.

DRAINAGE AREA.--38,400 square miles, approximately, of which 11,900 square miles is probably noncontributing.

RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1955.

Water temperatures: October 1947 to September 1955.

EXTREMES, 1954-55.--Specific conductance: Maximum daily, 503 micromhos Mar. 28; minimum daily, 410 micromhos Oct. 5.

Percent sodium: Maximum, 32 Aug. 1-31, Sept. 1-30; minimum, 25 Dec. 1-31.

EXTREMES, 1947-55.--Specific conductance: Maximum daily, 591 micromhos July 1, 1948; minimum daily, 243 micromhos Dec. 2, 1953.

Percent sodium: Maximum, 46 Nov. 1-30; minimum, 15 Nov. 1-30, 1953, Jan. 1-31, 1954.

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 1954 to September 1955 given in WSP 1392. No appreciable inflow between sampling point and gaging station except during periods of heavy local rains.

Chemical analyses, water year October 1954 to September 1955

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million										Dissolved solids			So-dium adsorp-tion ratio	Specific conduct-ance (micro-mhos at 25°C)	
			Cal-cium (Ca)	Magne-sium (Mg)	So-dium (Na)	Potas-sium (K)	Bicar-bonate (HCO ₃)	Sul-fate (SO ₄)	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO ₃)	Boron (B) ppm	Parts per mil-lion	Tons per acre-foot	Total tons			
Oct. 1-30, 1954.	17,710	10	2.15	0.99	1.14	2.92	0.37	0.96	0.02	0.01		238	0.32	5,670	27	0.9	426	7.7
Nov. 1-30	18,390	11	2.25	1.07	1.16	3.02	.42	1.02	.01	.01		252	.34	6,250	26	.9	432	7.8
Dec. 1-31	16,670	9.6	2.20	1.15	1.13	3.00	.44	1.02	.01	.01		248	.34	5,670	25	.9	440	8.1
Jan. 1-31, 1955.	17,630	9.4	2.27	1.07	1.29	2.95	.46	1.18	.02	.02		262	.36	6,350	28	1.0	444	7.9
Feb. 1-28	29,410	9.4	2.11	1.23	1.36	3.03	.50	1.13	.02	.02		254	.35	10,290	29	1.1	457	7.9
Mar. 1-31	28,090	7.8	2.71	.55	1.33	2.95	.48	1.13	.02	.01		260	.35	9,830	29	1.0	451	8.2
Apr. 1-30	57,100	8.4	2.10	1.07	1.33	2.85	.46	1.16	.02	.01		a244	.33	18,840	30	1.1	441	8.2
May 1-31	111,400	7.6	2.10	.99	1.35	2.85	.46	1.10	.02	.01		244	.33	36,760	30	1.1	427	8.2
June 1-30	250,100	9.0	2.05	.99	1.33	2.69	.46	1.18	.02	.02		241	.33	82,530	30	1.1	439	8.2
July 1-31	172,500	7.2	2.08	.90	1.28	2.65	.44	1.13	.02	.02		a232	.32	55,200	30	1.0	428	8.2
Aug. 1-31	137,400	8.8	2.04	.90	1.37	2.62	.44	1.21	.02	.02		252	.34	46,720	32	1.1	428	8.1
Sept. 1-30	100,500	9.6	2.16	.80	1.40	2.65	.48	1.21	.01	.01		240	.33	33,160	32	1.2	430	8.2
Total or weighted average	956,900	8.6	2.10	0.99	1.35	2.74	0.46	1.16	0.02	0.02		243	0.33	315,800	30	1.1	431	--

a Sum of determined constituents.

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 downstream from Jones Creek and at mile 67.

DRAINAGE AREA.--41,380 square miles, approximately, of which 11,900 square miles is probably noncontributing.

RECORDS AVAILABLE.--Chemical analyses: April 1944 to September 1955.

Water temperatures: October 1945 to September 1948, March 1950 to September 1955.

EXTREMES, 1954-55.--Specific conductance: Maximum daily, 621 micromhos Mar. 21; minimum daily, 207 micromhos Feb. 6.

Percent sodium: Maximum, 29 Aug. 1-31, Sept. 1-30; minimum, 21 May 20-26.

EXTREMES, 1944-55.--Specific conductance: Maximum daily, 721 micromhos Oct. 3, 1952; minimum daily, 179 micromhos Oct. 30, 1953.

Percent sodium: Maximum, 43 Nov. 1-30, 1951; minimum, 7 Jan. 19-24, 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 water year October 1954 to September 1955 given in WSP 1392.

Chemical analyses, water year October 1954 to September 1955

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million										Dissolved solids			Per-cent so-dium	So-ad-sorp-tion ratio	Specific conduct-ance (micro-mhos at 25°C)	
			Cal-cium (Ca)	Magne-sium (Mg)	So-dium (Na)	Potas-sium (K)	Bicar-bonate (HCO ₃)	Sul-fate (SO ₄)	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO ₃)	Boron (B) ppm	Parts per mil-lion	Tons per acre-foot	Total tons				
Oct. 1-31, 1954..	22,750	16	2.40	1.15	1.26	0.12	3.34	0.44	1.13	0.02	0.02	0.08	276	0.38	8,640	26	0.9	485	8.1
Nov. 1-31.....	20,560	10	2.54	1.23	1.26	.11	3.52	.48	1.13	.00	.01	.22	288	.39	8,020	25	.9	499	7.8
Dec. 1-31.....	21,390	7.8	2.69	1.23	1.30	.10	3.62	.52	1.18	.02	.02	.14	289	.39	8,340	24	.9	509	8.2
Jan. 1-31, 1955..	24,790	9.5	2.59	1.15	1.52	.10	3.41	.58	1.35	.02	.02	.14	298	.41	10,160	28	1.1	529	8.1
Feb. 1-5, 16-28..	18,160	12	2.50	.90	1.26	.12	3.08	.60	1.04	.02	.05	.11	270	.37	6,720	26	1.0	472	8.2
Feb. 6-15.....	56,330	16	1.60	.49	.70	.09	1.65	.37	.56	.03	.07	.10	182	.25	14,080	24	.7	298	7.9
Mar. 1-31.....	22,160	8.6	2.69	1.15	1.57	.12	3.65	.60	1.33	.02	.02	.14	310	.42	9,310	28	1.1	539	8.0
Apr. 1-30.....	41,720	7.6	2.25	.99	1.26	.12	2.98	.48	1.10	.02	.02	.12	252	.34	14,180	27	1.0	454	8.1
May 1-19, 27-31.	53,500	11	2.28	.90	1.13	--	2.75	.48	1.07	.02	.02	.17	248	.34	18,190	26	.9	432	8.0
May 20-26.....	58,990	13	1.90	.44	.61	--	2.06	.35	.51	.02	.06	.17	185	.25	14,750	21	.6	307	7.6
June 1-30.....	204,900	12	2.00	.90	1.13	.13	2.54	.50	1.13	.01	.03	.09	a236	.32	65,570	27	.9	422	8.1
July 1-31.....	141,600	10	2.18	.90	1.22	.13	2.69	.50	1.30	.01	.02	.11	a251	.34	48,140	28	1.0	448	8.2
Aug. 1-31.....	109,400	12	2.08	.90	1.26	.13	2.69	.48	1.18	.00	.04	.07	247	.34	37,200	29	1.0	447	7.6
Sept. 1-30.....	69,480	13	2.13	.99	1.35	.13	2.79	.50	1.30	.00	.02	.09	259	.35	24,320	29	1.1	459	7.9
Total or weighted average	865,700	12	2.15	0.90	1.17	0.12	2.70	0.48	1.10	0.01	0.03	0.11	244	0.33	285,600	27	0.9	431	--

a Sum of determined constituents.

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.--5,161 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1946, October 1948 to September 1955.

Water temperatures: November 1950 to September 1955.

EXTREMES, 1954-55.--Specific conductance: Maximum daily, 876 micromhos Oct. 22; minimum daily, 308 micromhos June 14.

Percent sodium: Maximum, 43 Nov. 11-20; minimum, 24 June 1-10.

EXTREMES, 1945-46, 1948-55.--Specific conductance: Maximum daily, 1,950 micromhos Jan. 11-17, 1946; minimum daily, 201 micromhos Sept. 1, 1953.

Percent sodium: Maximum, 67 July 23-24, 1950; minimum, 18 May 22-29, 1950.

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 1954 to September 1955 given in WSP 1392.

Chemical analyses, water year October 1954 to September 1955

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million										Dissolved solids			Per-cent so-dium	So-ad-sorp-tion ratio	Specific conduct-ance (micro-mhos at 25°C)	pH
			Cal-cium (Ca)	Magne-sium (Mg)	So-dium (Na)	Potas-sium (K)	Bicar-bonate (HCO ₃)	Sul-fate (SO ₄)	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO ₃)	Boron (B) ppm	Parts per mil-lion	Tons per acre-foot	Total tons				
Oct. 1-10, 1954	2,220	21	2.40	1.40	2.52	0.09	3.62	0.60	2.23	0.02	0.02	0.22	367	0.50	1,110	39	1.8	648	8.2
Oct. 11-20	2,010	20	2.50	1.48	2.78	--	3.61	.65	2.48	.02	.02	.19	398	.54	1,090	41	2.0	692	8.2
Oct. 21-31	3,220	17	2.50	1.56	2.96	.09	3.70	.71	2.74	.02	.02	.18	410	.56	1,800	42	2.1	727	8.2
Nov. 1-10	3,380	23	2.40	1.64	3.00	.09	3.67	.75	2.71	.01	.02	.23	408	.55	1,860	42	2.1	704	8.1
Nov. 11-20	4,710	22	2.40	1.73	3.04	.09	3.44	.75	2.88	.01	.02	.16	410	.56	2,640	43	2.2	710	8.1
Nov. 21-30	3,830	18	2.40	1.56	2.35	.09	3.59	.69	2.17	.01	.03	.21	367	.50	1,920	37	1.7	636	8.0
Dec. 1-10	4,190	16	2.69	1.73	2.30	.09	3.85	.73	2.20	.02	.02	.16	380	.52	2,180	34	1.6	669	8.2
Dec. 11-20	6,010	16	2.54	1.64	2.35	.08	3.70	.73	2.17	.02	.02	.28	369	.50	3,010	36	1.6	651	8.1
Dec. 21-31	4,660	15	2.45	1.73	2.35	.08	3.65	.73	2.14	.02	.02	.21	365	.50	2,330	36	1.6	645	8.2
Jan. 1-10, 1955	4,730	15	2.25	1.56	2.44	.08	3.41	.67	2.14	.02	.02	.18	350	.48	2,270	39	1.8	631	8.2
Jan. 11-20	4,810	17	2.84	1.56	2.35	.07	4.13	.65	1.97	.02	.03	.18	380	.52	2,500	34	1.6	662	8.2
Jan. 21-31	6,350	16	2.05	1.56	2.30	.07	3.39	.69	1.97	.02	.03	.18	340	.46	2,920	38	1.7	601	8.2
Feb. 1-6	14,720	18	2.05	1.40	2.17	.07	3.18	.65	1.81	.03	.04	.16	324	.44	6,480	38	1.7	573	8.0
Feb. 7-21	33,940	16	2.05	.63	1.13	.09	2.47	.50	.90	.02	.06	.08	233	.32	10,860	29	1.0	396	7.9
Feb. 22-28	4,110	15	2.69	1.07	1.61	.08	3.26	.71	1.38	.02	.08	.12	312	.42	1,730	30	1.2	538	7.8
Mar. 1-10	5,550	16	2.77	1.15	1.83	.08	3.38	.69	1.78	.02	.05	.24	346	.47	2,610	31	1.3	575	8.0
Mar. 11-20	5,140	7.8	2.36	1.32	2.17	.08	3.11	.75	2.00	.02	.03	.26	346	.47	2,420	37	1.6	586	7.9
Mar. 21-31	9,550	16	2.59	1.15	1.91	.09	3.33	.73	1.69	.02	.05	.17	340	.46	4,390	33	1.4	563	8.0

GUADALUPE RIVER BASIN--Continued
GUADALUPE RIVER AT VICTORIA, TEX.--Continued

Chemical analyses, water year October 1954 to September 1955--Continued

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million										Dissolved solids			Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH
			Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B) ppm	Parts per million	Tons per acre-foot	Total tons				
Apr. 1-10, 1955	9,270	14	2.69	1.23	1.74	0.09	3.52	0.58	1.52	0.03	0.04	0.17	a318	0.43	3,990	30	561	8.2	
Apr. 11-20	4,400	15	2.64	1.32	1.96	.09	3.54	.62	1.69	.02	.04	.16	a331	.45	1,980	33	579	8.2	
Apr. 21-30	3,610	15	2.50	1.15	1.96	.09	3.31	.69	1.58	.03	.04	.19	a318	.43	1,550	34	557	8.2	
May 1-10	2,340	19	2.34	1.32	2.13	--	3.24	.67	1.95	.02	.02	.22	341	.46	1,080	37	586	7.9	
May 11-20	12,510	20	2.42	1.32	2.09	--	3.41	.60	1.89	.02	.02	.28	340	.46	5,750	36	600	8.2	
May 21-31	32,550	17	2.25	.55	.96	--	2.46	.52	.73	.03	.06	.17	231	.31	10,090	26	393	7.9	
June 1-10	27,330	21	2.35	.75	1.00	.10	2.88	.44	.85	.02	.06	.21	a246	.33	9,020	24	417	8.2	
June 11-20	14,320	18	2.07	.53	1.04	.12	2.23	.48	.99	.02	.05	.13	a223	.30	4,300	28	378	8.2	
June 21-30	5,790	20	2.35	.76	1.52	.12	2.70	.50	1.55	.01	.04	.12	282	.38	2,200	32	489	8.1	
July 1-10	3,240	21	2.28	.72	1.52	.13	2.67	.48	1.47	.02	.04	.23	a274	.37	1,200	33	471	8.2	
July 11-20	3,020	22	2.61	.99	1.91	.11	3.38	.56	1.72	.01	.02	.22	a325	.44	1,330	34	559	8.2	
July 21-31	6,910	17	2.45	1.32	2.26	.10	3.43	.60	2.90	.01	.01	.23	a342	.47	3,250	37	606	8.2	
Aug. 1-10	3,690	21	2.01	1.15	1.70	.09	3.05	.44	1.44	.01	.02	.03	a282	.38	1,400	34	492	8.2	
Aug. 11-20	4,100	21	2.15	1.07	1.61	.10	3.08	.44	1.41	.01	.02	.13	a282	.38	1,560	33	483	8.1	
Aug. 21-31	5,170	18	1.98	.72	1.43	.10	2.67	.35	1.24	.01	.03	.05	a247	.34	1,760	34	422	8.0	
Sept. 1-10	4,330	18	2.15	.99	1.57	.10	3.10	.42	1.27	.02	.02	.23	a273	.37	1,600	33	473	8.2	
Sept. 11-20	2,810	18	2.02	.70	1.48	.10	2.77	.35	1.16	.03	.02	.23	250	.34	955	34	431	7.6	
Sept. 21-30	2,270	18	2.36	.90	1.65	.10	3.26	.44	1.30	.02	.01	.23	284	.39	885	33	493	7.6	
Total or weighted average	270,800	18	2.30	0.99	1.65	0.09	3.02	0.56	1.44	0.02	0.04	0.17	293	0.40	108,300	33	507	--	

a Sum of determined constituents.

NUECES RIVER BASIN

NUECES RIVER NEAR MATHIS, TEX.

LOCATION.--At intake tower at Lake Corpus Christi, 0.8 mile upstream from gaging station at bridge on U. S. Highway 59, 200 feet downstream from Texas and New Orleans Railroad bridge and 4 miles southwest of Mathis, San Patricio County.

DRAINAGE AREA.--16,660 square miles.

RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1955.

Water temperatures: October 1947 to September 1955.

EXTREMES, 1954-55.--Specific conductance: Maximum daily, 817 micromhos May 18; minimum daily, 424 micromhos Sept. 27.

Percent sodium: Maximum, 53 May 1-31; minimum, 34 Oct. 1-31.

EXTREMES, 1947-55.--Specific conductance: Maximum daily, 1,040 micromhos July 1, 1948; minimum daily, 233 micromhos July 30, 1949.

Percent sodium: Maximum, 63 May 1-20, 1953; minimum, 24 Sept. 1-30, 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 1954 to September 1955 given in WSP 1392.

Chemical analyses, water year October 1954 to September 1955

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million								Dissolved solids				Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH		
			Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B) ppm	Parts per million	Tons per acre-foot				Total tons	
Oct. 1-31, 1954...	4,450	27	2.69	0.44	1.74	0.22	3.52	0.54	1.07	0.01	0.05	0.34	318	0.43	1,910	34	1.4	501	7.8
Nov. 1-30.....	7,650	26	2.50	.40	2.26	.21	3.29	.69	1.27	.01	.03	.30	330	.45	3,440	42	1.9	520	7.9
Dec. 1-31.....	3,590	24	2.40	.39	2.30	.20	3.28	.71	1.18	.03	.03	.20	318	.43	1,540	43	1.9	513	8.0
Jan. 1-31, 1955..	2,980	25	2.54	.44	2.65	.20	3.39	.81	1.64	.03	.03	.22	360	.49	1,460	45	2.2	585	8.2
Feb. 1-28.....	3,020	22	2.59	.37	2.78	.20	3.56	.81	1.47	.03	.02	.25	354	.48	1,450	47	2.3	573	7.7
Mar. 1-31.....	4,260	18	2.54	.37	3.17	.21	3.74	.83	1.66	.03	.03	.20	378	.51	2,170	50	2.6	623	8.0
Apr. 1-30.....	4,410	23	2.69	.45	3.52	.21	a4.00	.83	1.86	.03	.04	.27	b401	.55	2,430	51	2.8	669	8.5
May 1-31.....	17,260	20	2.59	.37	3.61	.23	3.75	.96	2.06	.03	.06	.31	419	.57	9,840	53	3.0	682	7.8
June 1-30.....	15,180	22	2.10	.30	2.65	.19	2.95	.81	1.44	.02	.07	.19	b320	.44	6,680	51	2.4	530	8.2
July 1-31.....	5,550	24	2.20	.32	2.61	.18	3.15	.81	1.35	.02	.05	.22	b324	.44	2,440	49	2.3	536	8.2
Aug. 1-31.....	6,120	24	2.48	.26	2.74	.18	3.38	.83	1.35	.01	.06	.20	347	.47	2,860	48	2.3	560	8.1
Sept. 1-30.....	22,930	23	2.19	.25	2.30	.17	2.88	.73	1.18	.01	.05	.35	b297	.40	9,170	47	2.1	484	7.9
Total or weighted average.....	97,400	23	2.40	0.34	2.74	0.19	3.29	0.79	1.47	0.02	0.05	0.27	343	0.47	45,780	48	2.3	559	--

a Includes 0.33 equivalent per million of carbonate (CO₃).

b Sum of determined constituents.

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, 2½ miles downstream from Pojoaque River (formerly shown as 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 1955.

Water temperatures: October 1948 to September 1955.

Sediment records: October 1947 to September 1955.

EXTREMES, 1954-55.--Specific conductance: Maximum observed, 1,080 micromhos Aug. 21; minimum observed, 236 micromhos June 6.

Percent sodium: Maximum, 32 Nov. 1-20; minimum 15, May 21-31.

EXTREMES, 1946-55.--Specific conductance: Maximum observed, 1,230 micromhos Aug. 26, 1951; minimum observed, 165 micromhos June 13, 1952.

Percent sodium: Maximum, 34 Jan. 21 to Feb. 10, 1954; minimum, 14 June 11-20, 1949, May 11-20, 1952.

REMARKS.--Values reported for dissolved solids are sums of determined constituents. Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of discharge for water year October 1954 to September 1955 given in WSP 1392. Stage-discharge relation affected by ice Jan. 23, 24, Feb. 4-8, Feb. 20-24.

Chemical analyses, water year October 1954 to September 1955

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million										Dissolved solids			Percent sodium	So-dium adsorp-tion ratio	Specific conduct-ance (micro-mhos at 25° C)	pH
			Cal-cium (Ca)	Magne-sium (Mg)	So-dium (Na)	Potas-sium (K)	Bicar-bonate (HCO ₃)	Sul-fate (SO ₄)	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO ₃)	Boron (B) ppm	Parts per mil-lion	Tons per acre-foot	Total tons				
Oct. 1-10, 1954 ..	6,890	31	2.40	0.82	1.43		3.05	1.48	0.28		0.02		295	0.40	2,880	31	1.1	457	7.8
Oct. 11-20	6,070	31	2.10	.99	1.35		2.92	1.29	.31		.00		277	.38	2,310	30	1.1	426	7.9
Oct. 21-31	6,350	31	2.20	.82	1.35		2.88	1.31	.28		.00		276	.38	2,410	31	1.1	426	8.0
Nov. 1-10	6,240	29	2.20	.82	1.39		2.92	1.33	.28		.00		277	.38	2,370	32	1.1	432	8.0
Nov. 11-20	6,340	30	2.25	.81	1.43		3.00	1.35	.31		.01		284	.39	2,470	32	1.2	442	7.8
Nov. 21-30	6,610	30	2.30	.90	1.43		2.97	1.39	.28		.01		287	.39	2,580	31	1.1	444	7.8
Dec. 1-10	7,130	32	2.30	.99	1.43		2.97	1.46	.31		.01		294	.40	2,850	30	1.1	448	7.9
Dec. 11-20	7,670	34	2.40	.82	1.43		3.02	1.35	.34		.01		293	.40	3,070	31	1.1	442	7.9
Dec. 21-31	8,530	34	2.30	.76	1.22		2.85	1.21	.28		.01		272	.37	3,160	29	1.0	408	7.8
Jan. 1-10, 1955 ..	9,260	31	2.20	.74	1.13		2.70	1.08	.28		.01		254	.35	3,240	28	.9	386	7.7
Jan. 11-20	9,290	31	2.05	.72	1.09		2.57	1.04	.27		.01		243	.33	3,070	28	.9	368	7.8
Jan. 21-31	9,920	34	2.10	.68	1.09		2.64	1.02	.27		.01		248	.34	3,370	28	.9	370	8.0
Feb. 1-10	9,380	36	1.80	.82	1.17		2.49	1.00	.25		.01		242	.33	3,100	31	1.0	361	7.5
Feb. 11-20	9,780	36	2.00	.74	1.13		2.59	.96	.27		.01		245	.33	3,230	29	1.0	370	7.9
Feb. 21-28	8,210	33	2.00	.81	1.17		2.62	1.04	.27		.01		249	.34	2,790	29	1.0	383	7.6

Mar. 1-10, 1955..	12,230	30	2.20	.67	1.13	2.56	1.21	.25	.01	253	.34	4,160	28	.9	389	7.2
Mar. 11-17, 19-20	10,710	28	2.20	.79	1.22	2.49	1.33	.23	.01	256	.35	3,750	30	1.0	396	7.6
Mar. 18	1,660	22	2.15	1.32	2.17	3.18	3.77	.39	.01	456	.62	1,030	30	1.3	676	7.4
Mar. 21-28, 30-31	8,200	29	2.15	.74	1.30	2.67	1.25	.28	.01	261	.35	2,870	31	1.1	407	7.6
Mar. 29	978	23	3.54	1.48	2.00	3.11	3.48	.37	.03	433	.59	577	28	1.3	644	7.5
Apr. 1-10	7,260	30	2.20	.82	1.35	2.70	1.25	.34	.00	268	.36	2,610	31	1.1	409	7.8
Apr. 11-20	7,670	32	2.30	.90	1.26	2.72	1.44	.31	.01	280	.38	2,910	28	1.0	426	7.5
Apr. 21-30	6,850	27	2.20	.70	1.17	2.70	1.06	.34	.01	251	.34	2,330	29	1.0	390	7.4
May 1-4, 6-10 ..	13,410	22	2.00	.72	.84	2.46	.81	.25	.02	213	.29	3,890	23	.7	337	7.5
May 5	1,310	24	3.69	1.64	2.35	3.44	3.60	.51	.02	468	.64	838	31	1.4	724	7.2
May 11-20	26,180	19	2.25	.64	.78	2.64	.85	.22	.02	219	.30	7,850	21	.6	355	7.4
May 21-31	47,830	18	2.05	.57	.48	2.34	.62	.17	.02	185	.25	11,960	15	.4	302	7.5
June 1-10	24,590	20	1.65	.54	.16	2.03	.54	.16	.01	165	.22	5,410	19	.5	267	7.5
June 11-20	12,990	20	1.90	.54	.74	2.21	.81	.21	.01	195	.27	3,510	23	.7	312	7.5
June 21-30	10,220	25	1.85	.62	.78	2.16	.90	.21	.01	204	.28	2,860	24	.7	311	7.6
July 1-11	13,360	25	1.80	.61	.65	2.13	.75	.20	.01	191	.26	3,470	21	.6	293	7.6
July 12-15, 17-20	8,940	25	3.19	.90	1.13	3.03	1.89	.24	.01	317	.43	3,840	22	.8	483	7.7
July 21-28, 30-31	6,950	28	2.64	.82	1.04	2.77	1.52	.23	.03	281	.38	2,640	23	.8	432	8.0
July 16, 29, Aug. 6, 8-10	7,620	23	4.74	1.32	1.87	3.52	4.02	.27	.03	487	.66	5,030	24	1.1	709	7.8
Aug. 1-5, 7	5,910	31	3.04	.74	1.13	3.33	1.35	.28	.03	304	.41	2,420	23	.8	462	7.8
Aug. 11-20	13,980	26	3.54	.99	1.17	3.59	1.81	.23	.02	340	.46	6,430	21	.8	521	7.6
Aug. 21	4,010	17	8.08	2.38	2.73	4.54	8.33	.31	.01	819	1.11	4,450	21	1.2	1,090	6.9
Aug. 22-28	16,160	24	3.99	1.15	1.26	3.44	2.73	.24	.03	392	.53	8,560	20	.8	585	7.5
Aug. 29, Sept. 10	31,250	22	2.15	.56	.52	2.13	1.04	.13	.02	203	.28	8,750	16	.4	316	7.5
Sept. 11-20	9,340	26	2.30	.74	.96	2.52	1.23	.20	.01	246	.33	3,080	24	.8	378	7.4
Sept. 21-30	4,770	29	2.20	.81	1.13	2.75	1.12	.28	.01	256	.35	1,670	27	.9	390	7.5
Total or weighted average	432,000	26	2.35	0.76	1.00	2.64	1.27	0.24	0.02	255	0.35	151,200	24	0.8	392	--

RIO GRANDE BASIN--Continued

RIO GRANDE CONVEYANCE CHANNEL AT SAN MARCIAL, N. MEX.

LOCATION.--At gaging station 440 feet downstream from grade control at outlet of San Marcial Lake, 150 feet downstream from mouth of drain entering from left side, 1,800 feet west of San Marcial gage on railway bridge, about 18½ miles southwest of San Antonio, and about 1 mile south of the site of the former village of San Marcial, Socorro County.

RECORDS AVAILABLE.--Chemical analyses: March 1954 to September 1955.

Sediment records: March 1954 to September 1955.

EXTREMES, 1954-55.--Specific conductance: Maximum observed, 2,560 micromhos July 25; minimum observed, 640 micromhos May 27.

Percent sodium: Maximum, 57 April 21-30; minimum, 36 July 25, 28-29.

EXTREMES, 1954-55.--Specific conductance: Maximum observed, 2,560 micromhos July 25, 1955; minimum observed, 622 micromhos May 28, 1954.

Percent sodium: Maximum, 59 Mar. 11-18, 1954; minimum, 36 July 25, 28-29, 1955.

REMARKS.--Values reported for dissolved solids are residue on evaporation. Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of discharge for water year October 1954 to September 1955 furnished by Santa Fe district office at San Marcial given under Rio Grande at San Marcial in WSP 1392. Chemical analyses for Rio Grande floodway given on page 104.

Chemical analyses, water year October 1954 to September 1955

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million						Dissolved solids				So-dium adsorp-tion ratio	Specific conductance (micro-mhos at 25° C)	pH				
			Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B) ppm				Parts per million	Tons per acre-foot	Total tons	
Oct. 1-10, 1954	4,460	22	7.93	2.71	7.31	0.21	3.75	11.76	2.62	0.04	0.01	0.27	1,180	1.60	7,140	40	3.2	1,620	7.4
Oct. 11-20	2,500	--	6.89	2.38	7.91	--	--	--	--	--	--	--	1,080	1.47	3,680	46	3.7	1,580	--
Oct. 21-31	646	--	6.79	3.12	10.65	--	--	--	--	--	--	--	1,240	1.69	1,090	52	4.8	1,850	--
Nov. 1-10	720	--	5.74	2.55	9.26	--	--	--	--	--	--	--	1,080	1.47	1,060	53	4.5	1,640	--
Nov. 11-20	976	--	5.59	2.30	8.26	--	--	--	--	--	--	--	993	1.35	1,320	51	4.2	1,520	--
Nov. 21-30	2,500	--	4.99	1.81	5.96	--	--	--	--	--	--	--	760	1.03	2,580	47	3.2	1,170	--
Dec. 1-10	3,560	--	4.49	1.73	5.17	--	3.90	--	--	--	--	--	719	.98	3,490	45	2.9	1,070	7.7
Dec. 11-20	5,600	--	4.14	1.64	4.39	--	3.70	--	--	--	--	--	663	.90	5,040	43	2.6	986	7.8
Dec. 21-31	6,300	--	4.29	1.73	4.70	--	4.00	--	--	--	--	--	696	.95	5,980	44	2.7	1,030	7.7
Jan. 1-10, 1955	8,380	32	4.19	1.32	4.35	.14	3.80	4.16	1.95	.04	.01	.19	624	.85	7,120	44	2.6	937	7.8
Jan. 11-20	9,110	--	3.74	1.40	4.09	--	3.47	--	--	--	--	--	602	.82	7,470	44	2.6	895	7.5
Jan. 21-31	9,720	--	3.99	1.48	4.26	--	3.64	--	--	--	--	--	622	.85	8,260	44	2.6	931	7.5

Feb. 1-10, 1955	9,460	--	3.89	1.48	4.09	--	--	--	--	608	.83	7,850	43	2.5	895	7.6
Feb. 11-20	9,090	--	3.74	1.48	3.83	--	--	--	--	572	.78	7,090	42	2.4	854	7.6
Feb. 21-28	7,950	--	3.59	1.48	3.78	--	--	--	--	557	.76	6,040	43	2.4	849	7.4
Mar. 1-10	8,020	--	3.99	1.48	4.44	--	--	--	--	634	.86	6,500	45	2.7	951	7.6
Mar. 11-20	3,630	--	4.64	1.64	5.65	--	--	--	--	748	1.02	3,700	47	3.2	1,140	7.6
Mar. 21-31	3,560	--	4.69	1.81	6.39	--	--	--	--	808	1.10	3,920	50	3.5	1,220	7.6
Apr. 1-10	1,300	36	5.24	1.48	8.09	21	4.28	6.35	4.48	.05	.36	1,690	54	4.4	1,460	8.0
Apr. 11-20	1,530	--	4.69	1.81	7.78	--	--	--	--	924	1.26	1,930	54	4.3	1,390	8.0
Apr. 21-30	1,080	--	4.44	1.81	8.35	--	--	--	--	956	1.30	1,400	57	4.7	1,430	8.0
May 1-10	892	--	4.59	1.89	8.39	--	--	--	--	967	1.32	1,180	56	4.7	1,460	8.0
May 11-20	1,330	--	4.74	1.97	8.26	--	--	--	--	966	1.31	1,740	55	4.5	1,440	8.1
May 21-31	12,600	--	3.59	1.07	3.78	--	--	--	--	552	.75	9,450	45	2.5	828	8.0
June 1-10	5,840	--	3.74	1.15	3.96	--	--	--	--	574	.78	4,560	45	2.5	861	7.9
June 11-20	980	--	4.39	1.64	7.09	--	--	--	--	862	1.17	1,150	54	4.1	1,280	7.9
June 21-30	498	--	4.94	1.89	8.09	--	--	--	--	974	1.32	657	54	4.4	1,450	7.8
July 1-10	476	30	5.29	2.30	8.74	25	4.39	7.12	4.79	.06	.35	666	53	4.5	1,560	7.9
July 11-20	230	--	5.74	2.30	9.57	--	--	--	--	1,030	1.40	356	54	4.8	1,670	8.0
July 21-23, 26-27, 30-31	6,180	--	8.83	2.80	8.57	--	--	--	--	1,140	1.55	11,250	42	3.6	1,780	7.7
July 24	323	--	4.49	1.32	4.35	--	--	--	--	1,340	1.82	297	43	2.6	986	7.6
July 25	5,190	--	13.27	4.28	9.91	--	--	--	--	677	.92	13,290	36	3.3	2,250	7.7
July 26, 28-29	8,190	--	8.73	2.55	7.48	--	--	--	--	1,880	2.56	13,350	40	3.1	1,630	7.6
Aug. 1-10	13,890	--	7.73	2.22	6.78	--	--	--	--	1,200	1.63	21,670	38	2.9	1,540	7.7
Aug. 11-20	17,470	--	7.73	2.06	6.13	--	--	--	--	1,150	1.56	24,280	39	2.8	1,400	7.7
Sept. 1-10	4,340	--	4.69	1.23	4.03	--	--	--	--	1,020	1.39	3,690	41	2.4	926	7.9
Sept. 11-17	1,450	--	4.19	1.32	4.26	--	--	--	--	623	.85	1,200	44	2.6	919	8.1
Sept. 18-30	5,660	--	6.94	2.06	5.57	--	--	--	--	610	.83	7,020	38	2.6	1,300	7.8
Total or weighted average	185,690	--	5.64	1.81	5.48	--	--	--	--	834	1.13	209,800	42	2.8	1,190	--

RIO GRANDE BASIN--Continued

RIO GRANDE FLOODWAY AT SAN MARCIAL, N. MEX.

LOCATION.--At gaging station at Atchison, Topeka & Santa Fe Railway bridge, 1.1 miles downstream from former site of San Marcial, Socorro County, and 18½ miles southwest of San Antonio.
DRAINAGE AREA.--27,700 square miles, approximately. (Includes 2,940 square miles in closed basin in northern part of San Luis Valley, Colo.).

RECORDS AVAILABLE.--Chemical analyses: July 1946 to September 1955.

Water temperatures: January 1949 to September 1955.

Sediment records: July 1946 to September 1955.

EXTREMES, 1954-55.--Specific conductance: Maximum observed, 2,210 micromhos, Aug. 12; minimum observed, 562 micromhos June 1.

Percent sodium: Maximum, 52 June 11-14; minimum, 30 May 28-31.

EXTREMES, 1946-55.--Specific conductance: Maximum observed, 2,730 micromhos Apr. 8, 1953; minimum observed, 311 micromhos June 14, 1952.
Percent sodium: Maximum, 65 May 1-10, 1951; minimum, 22 Nov. 21-22, 28-30, 1947, June 21-30, 1949.

REMARKS.--Values reported for dissolved solids are residue 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 years prior to 1946 have been published in Water Bulletins of International Boundary and Water Commission. Records of discharge for water year October 1954 to September 1955 furnished by Santa Fe district office of Surface Water Branch; records of composite discharge for Rio Grande conveyance channel at San Marcial Rio Grande floodway at San Marcial given under Rio Grande at San Marcial in WSP 1392. Chemical analyses for Rio Grande conveyance channel given on page 102.

Chemical analyses, water year October 1954 to September 1955

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million								Dissolved solids				Per cent sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH		
			Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B) ppm	Parts per million	Tons per acre-foot				Total tons	
Oct. 1-6, 8-10, 1954	4,150	22	7.29	2.38	6.31	0.18	4.00	10.45	1.75	0.04	0.02	0.25	1,050	1.43	5,930	39	2.9	1,440	7.5
Oct. 7	845		12.67	3.78	8.44		3.61		1.41				1,750	2.38	2,010	34	2.9	2,030	--
Oct. 11-15	2,280		7.39	2.47	6.35		--		--				987	1.34	3,060	39	2.9	1,400	--
Oct. 16-30	a 702		4.79	1.73	5.35		--		--				715	.97	681	45	3.0	1,080	--
May 28-31, 1955	6,410		3.54	.99	1.96		3.77		--				401	.55	3,530	30	1.3	605	7.7
June 1-10	3,990		3.44	.99	2.65		3.44		--				457	.62	2,470	37	1.8	677	8.0
June 11-14	a 90		4.24	1.32	6.09		3.64		--				677	.92	83	52	3.6	1,030	7.8
July 29-31	4,770		10.08	3.45	8.09		3.70		--				1,430	1.94	9,250	37	3.1	1,820	7.9
Aug. 1-10	6,190		9.23	2.55	6.44		5.05		--				1,170	1.59	9,840	35	2.7	1,560	7.7
Aug. 11-20	16,610		9.23	2.63	6.87		4.33		--				1,220	1.66	27,570	37	2.8	1,600	7.7
Aug. 21-31	22,850		8.13	2.55	6.04		4.47		--				1,070	1.46	33,360	36	2.6	1,430	7.7
Sept. 1-9	a 3,290		4.84	1.48	3.70		3.61		--				630	.86	2,830	37	2.1	919	7.9
Total or weighted average	b 72,190	--	7.73	2.38	5.79	--	4.23	--	--	--	--	--	1,020	1.39	100,300	36	2.6	1,370	--

RIO GRANDE BASIN

RIO GRANDE BELOW ELEPHANT BUTTE OUTLET, N. MEX.

LOCATION.--At gaging station 1.0 mile downstream from dam, 1½ miles upstream from Cuchillo Negro River, and in Pedro Armendaris Grant. DRAINAGE AREA.--28,900 square miles, approximately (includes 2,940 square miles in closed basin in San Luis Valley, Colorado). RECORDS AVAILABLE.--Chemical analyses, 1933 to 1955. REMARKS.--Chemical analyses by the U. S. Dept. of Agriculture, Agricultural Research Service, U. S. Salinity Laboratory, Riverside, Calif. Records of discharge for water year October 1954 to September 1955 given in WSP 1952.

Chemical analyses water year October 1954 to September 1955

Month	Num- ber of sam- ples	Runoff (acre- feet)	Silica (SiO ₂) ppm	Equivalents per million								Dissolved solids				Per- cent so- lids	So- lids adsorp- tion ratio	Specific conduct- ance (micro- mhos at 25°C)	pH	
				Cal- cium (Ca)	Magne- sium (Mg)	Sod- ium (Na)	Potas- sium (K)	Bicar- bonate (HCO ₃)	Sul- fate (SO ₄)	Chlo- ride (Cl)	Fluo- ride (F)	Ni- trate (NO ₃)	Boron (B) ppm	Parts per mil- lion	Tons per acre- foot					Total tons
October 1954	20	266	--	7.18	2.43	8.30	--	a 2.60	12.18	3.32	--	0.01	0.20	1.236	1.68	447	46	3.8	1,680	8.2
November...	25	196	--	7.01	2.57	8.58	--	1.95	13.02	3.40	--	.01	.21	1.245	1.69	331	47	3.9	1,700	8.0
December...	20	179	--	7.71	2.63	8.54	--	b 2.15	13.59	3.30	--	.02	.22	1.286	1.75	313	45	3.8	1,750	8.1
January 1955	25	433	18	6.70	2.64	8.51	0.24	c 1.67	12.89	3.55	0.05	.01	.37	1.237	1.68	727	47	3.9	1,690	8.2
February...	20	188	--	5.31	2.20	8.24	--	1.70	10.94	3.30	--	(d)	.05	1.094	1.49	280	52	4.3	1,550	8.1
March.....	20	27,080	--	6.22	2.34	7.59	--	2.50	10.50	3.30	--	.01	.18	1.093	1.49	40,350	47	3.7	1,530	8.0
April.....	20	24,000	--	5.24	2.13	8.09	--	2.90	9.61	3.28	--	.03	.26	1.049	1.43	34,320	52	4.2	1,510	8.0
May.....	25	4,810	--	6.28	2.35	8.01	--	3.85	9.66	3.50	--	(d)	.24	1.134	1.54	7,410	48	3.9	1,600	7.8
June.....	20	47,810	--	5.25	2.03	6.68	--	2.80	8.09	3.30	--	.01	.19	1.018	1.25	59,760	48	3.5	1,340	8.0
July.....	25	42,220	20	5.46	1.01	6.60	.22	3.05	6.91	3.30	.04	.01	.17	840	1.14	48,130	50	3.7	1,270	8.1
August.....	20	39,390	--	5.05	1.99	6.61	--	2.90	7.75	3.10	--	.01	.25	894	1.22	48,060	48	3.5	1,300	7.9
September ..	20	25,210	--	5.42	1.97	7.08	--	2.05	9.94	2.55	--	.01	.26	982	1.34	33,780	49	3.7	1,380	8.1
Total		211,800	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

c Includes 0.10 equivalent per million of carbonate (CO₃).

d Less than 0.01 equivalent per million.

a Includes 0.24 equivalent per million of carbonate (CO₃).b Includes 0.20 equivalent per million of carbonate (CO₃).

RIO GRANDE BASIN--Continued

RIO GRANDE NEAR EL PASO, TEX.

LOCATION.--At gaging station 5 miles northwest of El Paso, Tex., 6 miles northwest of Juarez, Chihuahua, and 1.9 river miles above the American Dam.

DRAINAGE AREA.--29,267 square miles (from International Boundary and Water Commission Water Bulletin Number 20).

RECORDS AVAILABLE.--Chemical analyses, 1933 to 1955.

REMARKS.--Chemical analyses by the U. S. Department of Agriculture, Agricultural Research Service, U. S. Salinity Laboratory, Riverside, Calif. Records of discharge, electrical conductivity of individual water samples, and these same chemical analyses for water year October 1954 to September 1955 given in International Boundary and Water Commission Water Bulletin Numbers 24 and 25. Data for previous years given in earlier bulletins.

Chemical analyses water year October 1954 to September 1955

Chemical analyses water year October 1954 to September 1955																				
Month	Num- ber of sam- ples	Runoff (acre- feet)	Silica (SiO ₂) ppm	Equivalents per million								Boron (B) ppm	Dissolved solids			Per- cent so- lids	So- dium adsorp- tion ratio	Specific conduct- ance (micro- mhos at 25°C)	pH	
				Cal- cium (Ca)	Magne- sium (Mg)	So- dium (Na)	Potas- sium (K)	Bicar- bonate (HCO ₃)	Sul- fate (SO ₄)	Chlo- ride (Cl)	Fluo- ride (F)		Ni- trate (NO ₃)	Parts per mil- lion	Tons per acre- foot					Total tons
October 1954	31	3,790	--	1.40	1.24	9.37	--	a 1.38	5.54	5.35	--	(b)	0.33	824	1.12	4,240	78	8.2	1,300	8.3
November ..	30	540	--	7.08	1.85	26.50	--	c 6.05	14.93	14.70	--	(b)	.47	2,226	3.03	1,640	75	13	3,390	8.4
December ..	31	435	--	4.70	2.07	26.00	--	d 5.00	14.09	14.20	--	(b)	.57	2,101	2.86	1,240	79	14	3,250	8.5
January 1955	31	533	34	5.85	1.74	25.26	0.24	e 5.65	13.63	13.82	0.06	(b)	.66	2,093	2.85	1,520	76	13	3,210	8.4
February ..	28	283	--	6.00	2.57	28.96	--	f 5.25	16.54	16.05	--	(b)	.63	2,409	3.28	928	77	14	3,610	8.3
March	31	4,580	--	6.41	2.39	10.22	--	3.20	8.50	7.50	--	0.04	.20	1,205	1.64	7,510	54	4.9	1,860	7.7
April	30	10,500	--	6.76	2.48	9.00	--	3.05	10.45	4.85	--	.02	.21	1,164	1.58	16,600	49	4.2	1,720	7.8
May	31	2,130	--	6.92	2.45	11.88	--	3.35	11.35	6.60	--	(b)	.30	1,366	1.86	3,960	56	5.5	2,000	8.0
June	30	6,020	--	5.96	2.15	9.30	--	3.05	9.27	5.20	--	.01	.24	1,140	1.55	9,330	53	4.6	1,670	8.1
July	30	15,000	22	4.50	1.65	6.37	.22	3.10	6.03	3.50	.04	(b)	.08	802	1.09	16,400	50	3.6	1,200	7.8
August	31	12,100	--	4.72	1.69	6.73	--	2.90	5.98	4.30	--	.01	.17	827	1.12	13,600	51	3.7	1,270	8.0
September ..	30	13,800	--	5.80	2.05	7.28	--	2.65	8.96	3.70	--	.03	.22	982	1.34	18,500	48	3.8	1,450	8.0
Total	69,710	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

a Includes 0.12 equivalent per million of carbonate (CO₃).b Less than 0.01 equivalent per million, nitrate (NO₃).c Includes 0.48 equivalent per million of carbonate (CO₃).d Includes 0.52 equivalent per million of carbonate (CO₃).e Includes 0.64 equivalent per million of carbonate (CO₃).f Includes 0.40 equivalent per million of carbonate (CO₃).

RIO GRANDE BASIN--Continued
RIO GRANDE BELOW OLD FORT QUITMAN, TEX.

LOCATION.--At gaging station at the rectified channel of the Rio Grande, 1.5 miles below Old Fort Quitman, and 81.1 river miles below the American Dam at El Paso, Tex.
DRAINAGE AREA.--31,990 square miles (United States and Mexico; from International Boundary and Water Commission Water Bulletin Number 20).
RECORDS AVAILABLE.--Chemical analyses, 1933 to 1955.
REMARKS.--Chemical analyses by the U. S. Department of Agriculture, Agricultural Research Service, U. S. Salinity Laboratory, Riverside, Calif. Records of discharge, electrical conductivity of individual water samples, and these same chemical analyses for water year October 1954 to September 1955 given in International Boundary and Water Commission Water Bulletin Numbers 24 and 25. Data for previous years given in earlier bulletins.

Chemical analyses water year October 1954 to September 1955

Month	Num- ber of sam- ples	Runoff (acre- feet)	Silica (SiO ₂) ppm	Equivalents per million								Dissolved solids				Specific conduct- ance (micro- mhos at 25°C)	pH		
				Cal- cium (Ca)	Magne- sium (Mg)	So- dium (Na)	Potas- sium (K)	Bicar- bonate (HCO ₃)	Sul- fate (SO ₄)	Chlo- ride (Cl)	Fluo- ride (F)	Ni- trate (NO ₃)	Boron (B) ppm	Parts per mil- lion	Tons per acre- foot			Total tons	Per- cent so- lids	So- dium adsorp- tion ratio
October 1954	8	2,030	--	6.08	2.13	7.22	--	2.18	3.54	9.80	--	(a)	0.07	986	1.34	2,720	47	1,620	7.9
November	4	67.6	--	41.25	19.23	77.70	--	b3.00	28.65	107.1	--	(a)	.58	8,598	11.69	790	56	12,320	8.1
December	5	43.2	--	40.82	20.06	76.30	--	3.40	30.04	104.2	--	(a)	.54	8,878	12.07	521	56	12,200	8.0
January 1955	4	32.7	16	38.25	19.51	76.25	0.61	b2.52	27.74	103.5	0.03	(a)	.59	8,654	11.80	386	57	12,000	8.0
February	4	20.0	--	38.20	19.28	78.80	--	c2.60	28.44	105.8	--	(a)	.66	8,602	11.70	234	58	12,100	8.0
March	3	9.9	--	41.45	23.11	85.50	--	2.15	29.75	118.2	--	0.01	.72	9,158	12.45	123	57	13,300	7.8
April	--	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
May	(d)	6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
June	(d)	3.8	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
July	1	1,480	16	2.95	.70	1.61	.10	3.30	1.46	.56	.04	.02	.13	338	.46	681	30	505	8.0
August	(d)	714	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
September	4	680	--	.85	.36	5.91	--	e2.95	2.95	1.20	--	.04	.33	433	.59	401	83	695	8.0
Total	.....	7,479	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

a Less than 0.01 equivalent per million.

b Includes 0.12 equivalent per million of carbonate (CO₃).

c Includes 0.24 equivalent per million of carbonate (CO₃).

d No samples collected.

e Includes 0.10 equivalent per million of carbonate (CO₃).

RIO GRANDE BASIN--Continued

RIO GRANDE AT UPPER PRESIDIO, TEX.

LOCATION.--At gaging station 7.8 river miles above the junction of the Rio Conchos, and about 10 miles northwest of Presidio, Tex., and Ojinaga, Chihuahua, and 285.7 river miles below the American Dam at El Paso, Tex.

DRAINAGE AREA.--35,000 square miles (United States and Mexico; from International Boundary and Water Commission Water Bulletin Number 20).

RECORDS AVAILABLE.--Chemical analyses 1935 to 1955.

REMARKS.--Chemical analyses by the U. S. Department of Agriculture, Agricultural Research Service, U. S. Salinity Laboratory, Riverside, Calif. Records of discharge, electrical conductivity of individual water samples, and these same chemical analyses for water year October 1954 to September 1955 given in International Boundary and Water Commission Water Bulletin Numbers 24 and 25. Data for previous years given in earlier bulletins.

Chemical analyses water year October 1954 to September 1955

Month	Num- ber of sam- ples	Runoff (acre- feet)	Silica (SiO ₂) ppm	Equivalents per million						Boron (B) ppm	Dissolved solids		Per- cent so- dium	So- dium adsorp- tion ratio	Specific conduct- ance (micro- mhos at 25°C)
				Cal- cium (Ca)	Magne- sium (Mg)	So- dium (Na)	Potas- sium (K)	Bicar- bonate (HCO ₃)	Sul- fate (SO ₄)	Chlo- ride (Cl)	Fluo- ride (F)	Ni- trate (NO ₃)	Parts per mil- lion	Tons per acre- foot	Total tons
October 1954	5	9,340	--	4.18	19.50	2.98	--	2.85	--	1.80	--	--	454	0.62	5,790
November...	1	..6	--	--	--	25.60	--	a 2.70	--	27.15	--	--	2,854	3.88	2.3
December...	(c)	0	--	--	--	--	--	--	--	--	--	--	--	--	--
January 1955	1	42.2	7	5.60	0.47	2.02	0.10	b 1.63	5.43	1.15	0.03	0.02	547	.74	31.2
February...	1	0	--	--	--	--	--	--	--	--	--	--	--	--	--
March.....	--	0	--	--	--	--	--	--	--	--	--	--	--	--	--
April.....	(c)	18.6	--	--	--	--	--	--	--	--	--	--	--	--	--
May.....	--	0	--	--	--	--	--	--	--	--	--	--	--	--	--
June.....	(c)	226	--	--	--	--	--	--	--	--	--	--	--	--	--
July.....	8	2,240	22	4.39	.79	2.43	.16	3.23	3.61	.90	.03	.02	495	.67	1,500
August.....	12	4,030	--	--	2.98	2.30	--	2.40	--	1.10	--	--	348	.47	1,890
September..	6	6,830	--	3.68	2.98	2.51	--	2.01	--	.80	--	--	400	.54	3,690
Total		22,730	--	--	--	--	--	--	--	--	--	--	--	--	--

a Includes 0.20 equivalent per million of carbonate (CO₃).

b Includes 0.16 equivalent per million of carbonate (CO₃).

c No samples collected.

RIO GRANDE BASIN--Continued

RIO GRANDE AT LANGTRY, TEX.

LOCATION.--At gaging station at Langtry, Tex., 24.1 river miles above the confluence with the Pecos River, and 614.1 river miles below the American Dam at El Paso, Tex.
 DRAINAGE AREA.--79,375 square miles (United States and Mexico; from International Boundary and Water Commission Water Bulletin Number 20).
 RECORDS AVAILABLE.--79,375 square miles (United States and Mexico; from International Boundary and Water Commission Water Bulletin Number 20).
 REMARKS. Chemical analyses by the U. S. Department of Agriculture, Agricultural Research Service, U. S. Salinity Laboratory, Riverside, Calif. Records of discharge, electrical conductivity of individual water samples, and these same chemical analyses for water year October 1954 to September 1955 given in International Boundary and Water Commission Water Bulletin Numbers 24 and 25. Data for previous years given in earlier bulletins.

Chemical analyses, water year October 1954 to September 1955

Month	Num- ber of sam- ples	Runoff (acre- feet)	Silica (SiO ₂) ppm	Equivalents per million								Dissolved solids			Per- cent so- dium	So- dium adsorp- tion ratio	Specific conduct- ance (micro- mhos at 25°C)	pH		
				Cal- cium (Ca)	Magne- sium (Mg)	Sod- ium (Na)	Potas- sium (K)	Bicar- bonate (HCO ₃)	Sul- fate (SO ₄)	Chlo- ride (Cl)	Fluo- ride (F)	Ni- trate (NO ₃)	Boron (B) ppm	Parts per mil- lion					Tons per acre- foot	Total tons
October 1954	6	60,000	--	4.32	1.19	4.28	--	a2.47	5.33	2.20	--	(b)	0.21	644	0.88	52,800	44	2.6	971	8.4
November..	5	31,700	--	4.39	1.98	4.62	--	c2.93	5.80	2.35	--	0.01	.20	701	.95	30,100	42	2.6	1,050	8.2
December..	7	29,700	--	4.38	1.53	4.54	--	d2.95	5.47	2.10	--	.02	.20	698	.95	28,200	43	2.6	1,030	8.1
January 1955	7	30,700	28	3.71	1.88	4.71	0.13	2.27	5.71	2.30	0.07	.03	.24	689	.94	28,900	43	2.8	1,010	7.9
February..	8	28,700	--	4.24	1.83	5.00	--	e2.90	6.03	2.22	--	.01	.17	721	.98	28,100	45	2.9	1,050	8.2
March.....	9	26,000	--	3.64	2.08	4.65	--	2.55	5.57	2.30	--	.01	.24	647	.88	22,900	45	2.8	995	8.0
April.....	6	16,700	--	2.62	1.99	3.00	--	f2.50	3.59	1.55	--	.01	.20	476	.65	10,900	39	2.0	740	7.9
May.....	11	71,500	--	4.09	.83	2.22	--	3.10	3.50	.65	--	.02	.13	457	.62	44,300	31	1.4	688	8.1
June.....	12	75,200	--	3.34	.77	1.17	--	3.07	1.80	.50	--	.04	.09	335	.46	34,600	22	.8	509	7.9
July.....	10	112,000	20	4.95	.83	2.00	.16	2.95	4.55	.45	.03	.04	.07	530	.72	80,600	25	1.2	736	7.8
August.....	12	219,000	--	4.32	.72	2.42	--	g2.70	3.98	.85	--	.06	.14	489	.67	147,000	32	1.5	712	8.2
September..	10	229,000	--	4.20	.74	1.90	--	h2.47	3.46	.90	--	.03	.04	415	.56	128,000	28	1.2	642	8.1
Total		952,900	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

a Includes 0.32 equivalent per million of carbonate (CO₃).

b Less than 0.01 equivalent per million.

c Includes 0.22 equivalent per million of carbonate (CO₃).d Includes 0.20 equivalent per million of carbonate (CO₃).e Includes 0.28 equivalent per million of carbonate (CO₃).f Includes 0.10 equivalent per million of carbonate (CO₃).g Includes 0.20 equivalent per million of carbonate (CO₃).h Includes 0.28 equivalent per million of carbonate (CO₃).

RIO GRANDE BASIN--Continued

RIO GRANDE AT LAREDO, TEX.

LOCATION.--At gaging station 0.9 miles downstream from the highway bridge between Larado, Texas and Nueve Laredo, Tamaulipas, which is 885.8 miles below the American Dam at El Paso, Tex. Prior to July 1955, samples obtained at gaging station at Eagle Pass which is 0.5 miles above international highway bridge between Eagle Pass, Tex., and Piedras Negras, Coahuila, and 754.6 river miles below the American Dam at El Paso, Tex.

DRAINAGE AREA.--135,976 square miles (United States and Mexico: from International Boundary and Water Commission Water Bulletin Number 24).

RECORDS AVAILABLE.--Chemical analyses: 1938 to June 1955 at Eagle Pass, July to September 1955 at Laredo.
REMARKS.--Records of discharge, electrical conductivity of individual water samples, and these same chemical analyses for water year October 1954 to September 1955 given in International Boundary and Water Commission Water Bulletin Numbers 24 and 25. Records for previous years are given in earlier bulletins

Chemical analyses, water year October 1954 to September 1955

Month	Num- ber of sam- ples	Runoff (acre- feet)	Silica (SiO ₂) ppm	Equivalents per million								Dissolved solids				Per- cent sol- idum	So- lids adsorp- tion ratio	Specific conduct- ance (micro- mhos at 25°C)	pH	
				Cal- cium (Ca)	Magne- sium (Mg)	Sod- ium (Na)	Potas- sium (K)	Bicar- bonate (HCO ₃)	Sul- fate (SO ₄)	Chlo- ride (Cl)	Fluo- ride (F)	Ni- trate (NO ₃)	Boron (B) ppm	Parts per mil- lion	Tons per acre- foot					Total tons
October 1954	26	197,400	--	5.27	3.58	--	--	2.80	--	2.75	--	--	--	560	0.76	150,000	46	2.2	905	--
November ..	25	90,980	--	6.12	3.92	--	--	a 3.07	--	3.40	--	--	--	652	.89	81,000	39	2.2	1,030	--
December ..	26	79,480	--	6.17	4.25	--	--	b 3.17	--	3.60	--	--	--	663	.90	71,500	41	2.4	1,040	--
January 1955	22	73,550	14	3.64	2.10	4.68	0.08	c 2.23	3.99	4.15	0.04	0.08	0.19	664	.90	66,200	45	2.8	1,060	8.1
February ..	24	59,620	--	6.86	5.86	--	--	2.50	--	5.10	--	--	--	820	1.12	66,800	46	3.2	1,270	--
March	27	50,350	--	6.07	5.08	--	--	2.67	--	4.45	--	--	--	713	.92	46,300	46	2.9	1,140	--
April	26	30,480	--	6.02	5.28	--	--	2.45	--	4.90	--	--	--	692	.94	28,700	47	3.0	1,150	--
May	26	130,800	--	5.07	3.24	--	--	2.80	--	2.50	--	--	--	528	.72	93,600	39	2.0	843	--
June	25	103,800	--	5.02	3.20	--	--	c 2.81	--	3.10	--	--	--	521	.71	73,700	39	2.0	827	--
July	31	187,600	18	3.75	1.17	2.82	.13	d 2.90	2.45	2.45	.03	.07	.16	494	.67	126,000	36	1.8	760	8.1
August	31	327,900	--	4.48	2.28	--	--	2.60	--	1.85	--	--	--	441	.60	197,000	34	1.5	679	--
September ..	25	388,900	--	4.73	2.52	--	--	e 2.80	--	1.80	--	--	--	438	.60	233,000	35	1.6	707	--

a Includes 0.24 equivalent per million of carbonate (CO₃).b Includes 0.30 equivalent per million of carbonate (CO₃).c Includes 0.16 equivalent per million of carbonate (CO₃).d Includes 0.14 equivalent per million of carbonate (CO₃).e Includes 0.32 equivalent per million of carbonate (CO₃).

RIO GRANDE RIVER BASIN--Continued

RIO GRANDE AT CHAPENO, TEX.

LOCATION.--At Chapeno gaging station 2.5 river miles below Falcon Dam, 973.4 river miles below the American Dam at El Paso, and 11.2 river miles above the confluence of the Rio Alamo from Mexico. Prior to July 1955, samples obtained at gaging station at Roma which is at international bridge between Roma, Tex. and Cd. Miguel Aleman, (formerly San Pedro), Tamaulipas, 14.9 river miles above the confluence of the Rio San Juan from Mexico, and 992.0 river miles below the American Dam at El Paso, Tex.

DRAINAGE AREA.--164,538 square miles in United States and Mexico (International Boundary and Water Commission Bulletin Number 24).

RECORDS AVAILABLE.--Chemical analyses: At Roma, 1933 to January 1955 (discontinued), at Chapeno, July to September 1955.

REMARKS.--Chemical analyses are by the U. S. Department of Agriculture, Agricultural Research Service, U. S. Salinity Laboratory, Riverside, Calif. Records of discharge, electrical conductivity of individual water samples, and these same chemical analyses for water year October 1954 to September 1955 are available in International Boundary and Water Commission Bulletin Numbers 24 and 25.

Chemical analyses, October 1954 to January 1955, July to September 1955

Month	Num- ber of sam- ples	Runoff (acre- feet)	Silica (SiO ₂) ppm	Equivalents per million								Dissolved solids				Per- cent so- lids	So- dium adsorp- tion ratio	Specific conduct- ance (micro- mhos at 25°C)	pH	
				Cal- cium (Ca)	Magne- sium (Mg)	So- dium (Na)	Potas- sium (K)	Bicar- bonate (HCO ₃)	Sul- fate (SO ₄)	Chlo- ride (Cl)	Fluo- ride (F)	Ni- trate (NO ₃)	Boron (B) ppm	Parts per mil- lion	Tons per acre- foot					Total tons
October 1954	4	46,570	--	3.21	0.79	2.07	--	a 2.75	1.77	1.65	--	0.03	0.07	370	0.50	23,300	34	1.5	611	8.1
November ..	3	68,590	--	3.39	.69	2.14	--	b 2.70	1.98	1.65	--	.03	.10	400	.54	37,000	34	1.5	628	8.0
December ..	4	106,200	--	2.24	.93	2.00	--	c 1.60	1.85	1.90	--	(d)	.05	321	.44	46,700	39	1.6	525	8.3
January 1955	4	d 355,400	12	3.52	.89	2.10	--	2.80	2.13	1.65	0.03	.03	.12	411	.56	199,000	32	1.4	646	8.1
February....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
March	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
April	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
May	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
June	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
July	12	78,700	20	3.44	1.60	3.68	0.17	2.50	3.19	3.10	.02	.02	.10	562	.76	59,800	41	2.3	850	7.8
August	13	195,000	--	3.38	1.38	3.58	--	2.25	3.02	3.10	--	.02	.20	513	.70	136,000	43	2.3	838	8.1
September...	5	15,600	--	3.22	1.28	3.50	--	2.27	3.14	2.70	--	.04	.13	473	.64	9,980	44	2.3	788	8.0

a Includes 0.16 equivalent per million of carbonate (CO₃).

b Includes 0.20 equivalent per million of carbonate (CO₃).

c Includes 0.30 equivalent per million of carbonate (CO₃).

d Calculated.

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 1955.

EXTREMES, 1954-55.--Specific conductance: Maximum observed, 2,120 micromhos Apr. 28; minimum observed, 815 micromhos Oct. 23. Percent sodium: Maximum, 14 Dec. 18-20; minimum, 7 Mar. 1-10.

EXTREMES, 1937-55.--Specific conductance: Maximum observed, 3,200 micromhos Jan. 14, 1948; minimum observed, 513 micromhos July 22, 1937. Percent sodium: Maximum, 19 July 1, 3-10, 1947; minimum, 1 Feb. 21-28, 1950.

REMARKS.--Values reported for dissolved solids are sums of determined constituents. Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of discharge for water year October 1954 to September 1955 given in WSP 1392.

Chemical analyses, water year October 1954 to September 1955

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million										Dissolved solids			Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	
			Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B) ppm	Parts per million	Tons per acre-foot	Total tons				
Oct. 1-10, 1954	1,030	9.0	9.03	2.22	1.22		1.90	9.83	0.90		0.03		808	1.10	1,130	10	0.5	1,100	7.2
Oct. 11-19	262	10	7.24	1.48	.96		1.87	7.27	.59		.03		623	.85	223	10	.5	861	7.2
Oct. 20	180	23	12.08	2.71	1.91		2.16	12.72	1.61		.05		1,080	1.47	265	11	.7	1,420	7.2
Oct. 21-31	1,480	9.0	7.53	1.56	1.00		1.62	7.83	.71		.02		653	.89	1,320	10	.5	915	7.0
Nov. 1-10	140	12	8.83	2.55	1.30		1.75	9.76	.96		.02		808	1.10	1,154	10	.5	1,100	7.5
Nov. 11-20	66	12	9.23	2.30	1.30		1.79	9.93	1.02		.03		824	1.12	74	10	.5	1,110	7.6
Nov. 21-30	77	11	10.08	2.80	1.57		1.90	11.05	1.24		.02		916	1.25	96	11	.6	1,210	7.6
Dec. 1-10	63	12	10.78	2.71	1.70		1.95	11.87	1.27		.02		975	1.33	84	11	.7	1,290	7.8
Dec. 11-17	28	12	11.18	3.04	1.91		1.98	12.51	1.35		.02		1,030	1.40	39	12	.7	1,350	7.8
Dec. 18-20	13	14	14.87	5.43	3.39		2.35	18.55	2.48		.04		1,510	2.05	27	14	1.1	1,870	7.8
Dec. 21-31	50	12	12.48	3.54	2.17		2.10	14.28	1.64		.02		1,160	1.58	79	12	.8	1,500	7.8
Jan. 1-10, 1955	69	20	11.98	3.45	2.22		2.16	13.68	1.61		.02		1,180	1.54	106	13	.8	1,470	7.6
Jan. 11-19	61	13	11.78	3.29	2.04		1.93	13.45	1.47		.01		1,090	1.48	90	12	.7	1,410	7.3
Jan. 20-31	2,370	11	11.68	3.29	1.96		1.88	13.51	1.44		.02		1,090	1.48	3,510	12	.7	1,400	7.5
Feb. 1-10	805	8.6	12.67	4.03	2.26		1.97	15.16	1.75		.00		1,210	1.65	1,330	12	.8	1,550	7.6
Feb. 11-20	33	12	14.07	5.10	2.83		2.23	17.57	2.17		.00		1,410	1.92	63	13	.9	1,750	7.5
Feb. 21-28	22	14	14.27	4.93	2.83		2.31	17.28	2.14		.01		1,400	1.90	42	13	.9	1,770	7.4
Mar. 1-10	478	11	14.17	4.52	1.35		2.11	16.13	1.89		.01		1,290	1.75	836	7	.4	1,660	7.7

Mar. 11-20, 1955.	1,690	9.3	13.77	3.54	1.57	1.97	15.26	1.64	.01	1,210	1.65	2,790	8	.5	1,570	7.4
Mar. 21-31	1,320	7.9	13.97	3.54	1.57	1.95	15.36	1.72	.01	1,230	1.67	2,200	8	.5	1,590	7.5
Apr. 1-10	1,520	13	13.97	4.11	2.44	1.98	16.24	1.92	.01	1,300	1.77	2,690	12	.8	1,650	7.9
Apr. 11-20	1,460	12	14.37	4.03	2.44	2.00	16.59	1.92	.01	1,320	1.80	2,630	12	.8	1,670	7.6
Apr. 21-30	1,570	12	14.87	4.11	2.87	2.13	17.55	2.14	.01	1,400	1.90	2,980	13	.9	1,760	7.7
May 1-10	1,570	9.4	14.97	4.19	2.52	2.05	17.65	1.97	.01	1,390	1.89	2,970	12	.8	1,750	7.7
May 11-20	1,610	10	15.47	4.52	2.65	2.13	18.24	2.09	.01	1,440	1.96	3,160	12	.8	1,780	7.7
May 21-31	1,900	9.6	15.47	4.69	2.74	2.05	18.45	2.14	.01	1,460	1.99	3,760	12	.4	1,800	7.8
June 1-10	1,930	11	16.37	4.36	2.61	2.11	18.74	2.31	.01	1,500	2.04	3,940	11	.8	1,840	7.4
June 11-20	13,250	11	16.27	4.69	2.65	2.11	18.82	2.31	.01	1,510	2.05	27,160	11	.8	1,840	7.6
June 21-30	17,310	11	16.27	4.28	2.61	2.13	18.65	2.31	.01	1,490	2.03	35,140	11	.8	1,840	7.4
July 1-10	5,750	12	16.62	3.70	2.65	2.23	18.95	2.23	.01	1,510	2.05	11,790	12	.8	1,860	7.6
July 11-20	11,630	14	17.02	3.62	2.70	2.23	19.28	2.28	.01	1,540	2.09	24,310	12	.8	1,900	7.5
July 21-31	4,540	15	14.97	3.21	2.65	2.28	17.01	2.03	.01	1,370	1.86	8,440	13	.9	1,730	7.5
Aug. 1-10	1,940	12	12.77	2.63	2.13	1.93	14.39	1.58	.02	1,160	1.58	3,070	12	.8	1,490	7.5
Aug. 11-20	2,000	12	11.68	2.47	1.87	1.82	13.12	1.35	.01	1,050	1.43	2,860	12	.7	1,380	7.5
Aug. 21-31	2,090	13	9.88	2.30	1.61	1.84	11.03	1.16	.01	903	1.23	2,570	12	.7	1,220	7.3
Sept. 1-10	10,650	12	9.53	2.30	1.61	1.84	10.56	1.16	.02	872	1.19	12,670	12	.7	1,190	7.2
Sept. 11-20	19,100	15	10.88	2.30	1.91	1.98	12.20	1.24	.01	996	1.35	25,785	13	.7	1,320	7.3
Sept. 21-30	20,380	12	9.73	2.14	1.70	1.97	10.72	1.16	.01	888	1.21	24,660	13	.7	1,190	7.3
Total or weighted average	130,500	12	13.22	3.21	2.17	2.03	15.03	1.72	0.01	1,210	1.65	215,300	12	0.8	1,540	--

RIO GRANDE BASIN--Continued

PECOS RIVER NEAR ARTESIA, N. MEX.

LOCATION.--At gaging station at bridge on State Highway 83, 4.3 miles east of Artesia, Eddy County, 7.0 miles north of mouth of Rio Penasco, and 17 miles north of McMillan Dam.

DRAINAGE AREA.--15,300 square miles, approximately (contributing area).

RECORDS AVAILABLE.--Chemical analyses: July 1937 to September 1955.

Water temperatures: April 1949 to September 1955.

Sediment records: January 1949 to September 1955.

EXTREMES, 1954-55 Specific conductance: Maximum observed, 20,700 micromhos Sept. 10; minimum observed, 745 micromhos Oct. 8.

Percent sodium: Maximum, 69 Sept. 9; minimum, 20 June 22-30.

EXTREMES, 1937-55 Specific conductance: Maximum observed, 20,700 micromhos Sept. 10, 1955; minimum observed, 745 micromhos Oct. 8, 1954.

Percent sodium: Maximum, 71 May 16, 1950; minimum, 12 Mar. 25-31, 1951.

REMARKS.--Values reported for dissolved solids are sums of determined constituents. Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of discharge for water year October 1954 to September 1955 given in WSP 1392.

Chemical analyses, water year October 1954 to September 1955

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million										Dissolved solids				Per- cent sodium	So- adorp- tion ratio	Specific conduct- (micro- mhos at 25°C)	pH
			Cal- cium (Ca)	Magne- sium (Mg)	So- dium (Na)	Potas- sium (K)	Bicar- bonate (HCO ₃)	Sul- fate (SO ₄)	Chlo- ride (Cl)	Fluo- ride (F)	Ni- trate (NO ₃)	Boron (B) ppm	Parts per mil- lion	Tons per acre- foot	Total tons					
Oct. 1-5, 1954	349	26	31.79	25.58	72.62		2.46	50.17	77.56		--		7,880	10.7	3,730	56	14	10,900	6.8	
Oct. 6	184	14	19.41	14.31	41.05		2.44	27.27	43.43		0.34		4,460	6.07	1,120	55	10	6,620	7.0	
Oct. 7-8	58,080	13	4.24	1.15	2.39		2.23	3.46	2.09		.08		1,479	.65	37,750	31	1.5	755	7.5	
Oct. 9-11	73,850	42	18.41	4.11	6.35		1.98	20.59	5.98		.06		1,870	2.54	187,600	22	1.9	2,380	7.7	
Oct. 12-17	10,620	20	26.55	11.51	25.31		2.95	32.89	26.51		.08		3,890	5.29	56,180	40	5.8	5,270	7.3	
Oct. 18-31	9,620	43	30.89	18.59	47.83		2.98	44.55	49.36		.05		5,970	8.12	78,110	49	5.6	7,970	7.4	
Nov. 1-10	4,910	43	29.89	19.16	50.01		3.38	44.76	50.77		.03		6,080	8.27	40,610	50	10	8,140	7.4	
Nov. 11-20	4,010	35	30.29	20.31	54.79		3.44	45.18	56.97		.06		6,450	8.77	35,170	52	11	8,620	7.2	
Nov. 21-30	3,540	36	31.09	20.89	56.09		3.57	45.39	58.66		--		6,570	8.94	31,650	52	11	8,910	7.4	
Dec. 1-10	3,160	22	30.89	22.12	56.53		3.69	46.01	60.07		--		6,660	9.06	28,630	52	11	9,020	7.9	
Dec. 11-20	2,800	20	29.54	22.12	57.40		3.47	43.93	60.35		--		6,560	8.92	24,980	53	11	9,100	7.8	
Dec. 21-31	2,700	25	30.49	22.45	60.88		3.56	45.18	63.74		--		6,850	9.32	25,160	53	12	9,490	7.4	
Jan. 1-10, 1955	2,390	20	29.94	22.45	60.88		3.36	44.76	63.46		--		6,790	9.23	22,060	54	12	9,490	7.5	
Jan. 11-20	2,400	21	29.14	23.03	60.01		3.13	44.97	61.48		--		6,700	9.11	21,860	53	12	9,240	7.7	
Jan. 21-31	2,410	20	30.29	23.44	61.75		3.34	46.01	63.74		--		6,900	9.38	22,610	53	12	9,520	7.8	
Feb. 1-10	2,280	16	30.69	20.56	52.18		3.36	44.14	56.41		--		6,300	8.57	19,540	50	10	8,850	7.3	
Feb. 11-20	2,220	15	30.29	19.57	50.01		3.26	43.10	53.59		.04		6,080	8.27	18,360	50	10	8,530	7.5	
Feb. 21-28	1,490	16	31.49	21.55	57.40		3.21	45.59	61.48		--		6,700	9.11	13,570	52	11	9,340	7.4	

Mar. 1-10, 1955...	1,660	18	30.09	25.25	60.88	2.98	47.47	67.12	--	7,660	9.63	15,990	52	11	9,740	7.7
Mar. 11-20.....	1,380	16	31.19	26.89	65.23	2.77	49.76	70.51	--	7,440	10.1	13,940	53	12	10,400	7.4
Mar. 21-31.....	1,450	20	32.39	26.48	66.10	2.90	50.59	69.66	--	7,500	10.2	14,790	53	12	10,400	7.3
Apr. 1-10.....	1,110	19	32.39	26.32	67.83	2.87	51.21	70.23	--	7,580	10.3	11,430	54	13	10,600	7.3
Apr. 11-20.....	1,080	21	33.93	29.77	77.40	3.23	54.75	81.51	--	8,460	11.5	12,420	55	14	11,800	7.4
Apr. 21-30.....	1,020	26	34.73	28.78	72.62	3.02	55.17	79.25	--	8,300	11.3	11,530	53	13	11,500	7.4
May 1-10.....	1,320	27	33.73	27.88	65.66	3.11	52.26	72.48	--	7,720	10.5	13,860	52	12	10,800	7.3
May 11, 19-20...	412	25	28.14	18.01	43.92	2.82	41.43	45.69	.42	5,520	7.51	3,090	49	9	7,580	7.5
May 21-31.....	4,000	18	18.81	9.54	18.00	2.13	26.02	17.63	.47	2,870	3.90	15,600	39	5	3,960	7.4
May 12-18.....	1,080	20	30.09	21.87	53.49	2.69	46.22	58.66	--	6,500	8.84	9,550	51	10	9,080	7.3
June 1-10.....	781	23	35.53	25.74	72.18	2.82	54.75	76.43	--	8,130	11.1	8,670	54	13	11,000	7.4
June 11-19.....	589	23	36.68	27.63	82.18	2.88	56.84	85.46	--	8,830	12.0	7,070	56	14	12,000	7.4
June 20-21.....	2,250	21	25.55	8.96	14.44	2.65	33.10	12.83	.08	3,100	4.22	9,500	29	3.5	3,940	7.2
June 22-30.....	11,330	18	22.80	6.83	6.78	2.21	27.06	6.60	.05	2,320	3.16	35,800	20	1.9	2,860	7.4
July 1-10.....	11,050	18	21.81	5.43	7.65	2.10	26.02	7.28	.06	2,270	3.09	34,140	22	2.1	2,830	7.7
July 11-19.....	2,920	21	23.55	8.55	21.52	1.98	30.19	22.14	.05	3,390	4.61	13,460	40	5.4	4,570	7.7
July 20-29, 31...	22,430	18	19.81	3.87	6.13	2.16	22.48	5.42	.09	1,950	2.65	59,440	21	1.8	2,430	7.7
July 30.....	2,480	16	7.14	1.40	2.83	2.36	6.35	2.68	.07	716	.97	2,410	25	1.4	1,070	8.0
Aug. 1-4.....	2,060	20	16.82	4.69	12.96	2.20	19.36	13.11	.09	2,180	2.96	6,100	38	4.0	3,050	8.0
Aug. 5-10.....	1,260	24	24.55	10.53	28.66	2.20	32.89	29.33	.06	3,990	5.43	6,840	45	6.8	5,410	7.8
Aug. 11-20.....	1,340	21	27.15	13.65	38.79	2.00	38.52	40.05	.07	4,960	6.75	9,050	49	8.6	6,740	7.4
Aug. 21-31.....	285	24	30.89	18.91	63.92	2.23	47.26	65.15	--	6,990	9.51	2,810	56	13	9,830	7.4
Sept. 1-8.....	102	26	31.39	20.64	68.70	2.38	49.76	69.94	--	7,430	10.1	1,030	57	13	10,400	7.2
Sept. 9.....	17	24	41.87	29.44	161.76	1.70	63.29	170.63	--	14,100	19.2	326	69	27	19,900	7.0
Sept. 10-11.....	1,050	20	23.15	8.22	19.79	2.54	32.48	17.06	.09	3,290	4.47	4,890	39	5.0	4,310	7.7
Sept. 12-20.....	11,290	19	15.47	4.28	5.78	2.03	19.13	4.74	.05	1,670	2.27	25,630	23	1.8	2,380	8.0
Sept. 21-30.....	48,360	17	16.27	4.28	5.39	2.03	19.57	4.46	.07	1,680	2.28	110,300	21	1.7	2,150	7.7
Total or weighted average.....	321,100	24	18.31	7.32	15.70	2.33	23.11	15.85	--	2,580	3.51	1,127,000	38	4.4	3,450	--

RIO GRANDE BASIN--Continued

PECOS RIVER BELOW RED BLUFF DAM NEAR ORLA, TEX.

LOCATION.--Just below dam, 3 miles upstream from Salt (Screwbean) Draw, 5 miles northwest of Orla, Reeves County and 14 miles upstream from gaging station near Orla.

DRAINAGE AREA.--20,720 square miles, approximately (contributing area).

RECORDS AVAILABLE.--Chemical analyses: July 1937 to September 1955.

Water temperatures: March 1953 to September 1955.

EXTREMES, 1954-55.--Specific conductance: Maximum daily, 17,400 micromhos Oct. 5; minimum daily, 3,850 micromhos Apr. 23.

Percent sodium: Maximum, 78 Oct. 4-8; minimum, 57 July 1-31, Aug. 1-31.

EXTREMES, 1937-55.--Specific conductance: Maximum daily, 24,200 micromhos Sept; 28, 30, 1953; minimum daily, 1,610 micromhos June 2, 1948.

Percent sodium: Maximum, 78 Oct. 4-8, 1954; minimum, 9 Aug. 17-19, 1944.

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 1954 to September 1955 given in WSP 1392. No appreciable inflow between sampling point and gaging station except during periods of heavy local rains.

Chemical analyses, water year October 1954 to September 1955

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million								Boron (B) ppm	Dissolved solids			Percent sodium adsorption	Sodium ratio	Specific conductance (micro-mhos at 25°C)	pH
			Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)		Nitrate (NO ₃)	Parts per million	Tons per acre-foot					Total tons
Oct. 1-3, 1954	717	14	17.86	10.77	78.06	1.97	25.19	79.53		--		6,390	8.69	6,230	73	21	9,970	7.5
Oct. 4-8	149	13	23.30	16.94	140.18	1.57	37.27	141.58		--		10,800	14.7	2,190	78	31	16,200	7.4
Nov. 1-30	144	14	17.66	8.88	49.04	2.43	23.73	49.36		0.06		4,570	6.22	896	65	13	6,940	7.5
Dec. 1-31	1,720	13	17.56	9.37	44.66	2.47	23.94	45.13		0.05		4,340	5.90	10,150	62	12	6,480	8.0
Jan. 1-31, 1955	1,880	12	18.46	10.28	45.95	2.49	25.61	46.54		0.05		4,520	6.15	11,560	62	12	6,790	7.9
Feb. 1-28	1,630	12	18.66	10.20	41.40	2.52	25.40	42.30		0.04		4,260	5.79	9,440	59	11	6,360	7.7
Mar. 1-31	17,730	10	15.77	7.32	33.95	2.36	20.78	33.84		0.06		3,470	4.72	83,690	60	10	5,110	7.7
Apr. 1-30	23,730	10	13.37	5.67	25.77	2.20	17.20	25.38		0.03		2,730	3.71	88,040	58	8.4	4,280	7.5
May 1-31	12,910	10	14.87	6.17	31.39	2.26	19.13	31.02		0.02		3,190	4.34	56,030	60	9.7	4,840	7.7
June 1-30	22,440	13	15.12	6.58	31.41	2.18	19.30	31.59		0.04		3,230	4.39	98,510	59	9.5	5,090	7.6
July 1-31	32,450	16	15.27	6.50	28.54	2.15	19.36	28.77		0.03		3,070	4.18	135,600	57	8.6	4,890	7.6
Aug. 1-31	31,160	14	16.97	7.48	32.69	1.98	21.86	33.28		0.02		3,490	4.75	148,000	57	9.4	5,320	7.7
Sept. 1-12	7,620	18	20.26	7.73	38.65	1.93	25.19	39.48		0.04		4,080	5.55	42,290	58	10	6,010	7.7
Sept. 13-30	1,540	17	24.95	14.31	86.33	2.26	34.77	88.56		--		7,560	10.3	15,860	69	19	11,200	7.6
Total or weighted average	157,100	13	15.82	6.91	32.32	2.16	20.36	32.43		--		3,350	4.56	716,400	59	9.6	5,160	--

RIO GRANDE RIVER BASIN--Continued

PECOS RIVER NEAR SHUMLA, TEX.

LOCATION.--At gaging station located 13.0 river miles upstream from the Pecos High Bridge, and 18.5 river miles above the confluence with the Rio Grande. The river enters the Rio Grande, 638.2 river miles below the American Dam at El Paso, Tex. Prior to January 1955, samples obtained at gaging station near mouth, 4.7 river miles downstream from Pecos High Bridge and 0.8 river mile above the confluence with the Rio Grande.

DRAINAGE AREA.--35,162 square miles (International Boundary and Water Commission Water Bulletin No. 24).

RECORDS AVAILABLE.--Chemical analyses, October 1954 to September 1955. Chemical analyses for the period July 1954 through December 1954 are available for a station near the mouth and for the period Feb. 1935 through June 1954 for a station 4.7 river miles upstream at the Pecos High Bridge.

REMARKS.--Chemical analyses are by the U. S. Department of Agriculture, Agricultural Research Service, U. S. Salinity Laboratory, Riverside, Calif. Records of discharge, electrical conductivity of individual water samples, and these same chemical analyses for water year October 1954 to September 1955 are available in International Boundary and Water Commission Water Bulletin Numbers 24 and 25. Data of previous years are given in earlier bulletins for a station near the mouth and for a station 4.7 river miles upstream at the Pecos High Bridge.

Chemical analyses, water year October 1954 to September 1955

Month	Num- ber of sam- ples	Runoff (acre- feet)	Silica (SiO ₂) ppm	Equivalents per million						Dissolved solids				So- dium adsorp- tion ratio	Specific conduct- ance (micro- mhos at 25°C)	pH				
				Cal- cium (Ca)	Magne- sium (Mg)	So- dium (Na)	Potas- sium (K)	Bicar- bonate (HCO ₃)	Sul- fate (SO ₄)	Chlo- ride (Cl)	Fluo- ride (F)	Ni- trate (NO ₃)	Boron (B) ppm				Parts per mil- lion	Tons per acre- foot	Total tons	
October 1954	4	--	--	7.85	5.59	16.90	--	2.65	9.60	18.40	--	0.04	0.23	1,934	2.63	--	56	6.5	3,010	8.0
November...	4	--	--	6.85	5.30	13.90	--	a2.45	8.42	15.25	--	.02	.18	1,579	2.15	--	--	5.6	2,560	8.3
December...	5	--	--	6.32	4.11	12.60	--	b2.31	7.33	13.60	--	.02	.16	1,445	1.97	--	53	5.5	2,340	8.4
January 1955	4	12,400	11	8.35	6.04	16.86	0.22	a3.00	9.25	19.18	0.05	.04	.19	1,970	2.68	33,200	54	6.3	3,090	8.3
February...	4	10,300	--	8.82	6.52	19.66	--	b2.90	10.52	21.84	--	.05	.21	2,165	2.94	30,300	56	7.1	3,410	8.1
March.....	5	11,500	--	8.90	7.01	21.60	--	c2.60	11.32	23.85	--	.03	.26	2,293	3.12	35,900	58	7.7	3,700	7.9
April.....	4	9,570	--	7.85	6.43	21.60	--	1.95	10.76	23.30	--	.02	.25	2,194	2.98	28,500	60	8.1	3,530	7.7
May.....	4	15,000	--	7.82	4.92	18.00	--	2.10	9.25	19.65	--	.02	.21	1,895	2.58	38,700	59	7.1	3,100	7.9
June.....	6	19,700	--	6.44	5.19	14.97	--	2.33	7.82	16.65	--	.02	.18	1,666	2.27	44,700	56	6.2	2,690	7.8
July.....	6	29,800	12	3.99	1.78	5.29	.11	2.30	2.71	5.90	.03	.07	.17	708	.96	26,600	47	3.1	1,140	7.9
August.....	8	26,500	--	5.25	3.31	9.51	--	2.47	5.09	10.75	--	.07	.21	1,132	1.54	40,800	53	4.6	1,430	8.0
September..	5	29,500	--	5.30	3.31	9.15	--	d2.83	4.51	10.40	--	.07	.19	1,048	1.43	42,200	52	4.4	1,790	8.1

a Includes 0.28 equivalent per million of carbonate (CO₃).

b Includes 0.24 equivalent per million of carbonate (CO₃).

c Includes 0.10 equivalent per million of carbonate (CO₃).

d Includes 0.20 equivalent per million of carbonate (CO₃).

PART 9. COLORADO RIVER BASIN

COLORADO RIVER MAIN STEM

COLORADO RIVER NEAR GLENWOOD SPRINGS, COLO.

LOCATION.--At Shoshone power plant, 6 miles upstream from gaging station at Glenwood Springs, Garfield County, which is half a mile upstream from Roaring Fork.

DRAINAGE AREA.--4,560 square miles approximately (above gaging station).

RECORDS AVAILABLE.--Chemical analyses: October 1941 to September 1955.

Water temperatures: May 1949 to September 1955.

EXTREMES, 1954-55.--Specific conductance: Maximum daily, 1,220 micromhos Dec. 18; minimum daily, 290 micromhos May 16.

Percent sodium: Maximum, 53 Dec. 11-20; minimum, 13 Aug. 6.

EXTREMES, 1941-55.--Specific conductance: Maximum daily, 2,260 micromhos Aug. 10, 1947; minimum daily, 153 micromhos May 24, 1948.

Percent sodium: Maximum, 53 Dec. 11-20, 1954; minimum, 13 June 1-10, 1949.

REMARKS.--Values reported for dissolved solids are residues on evaporation. Records of specific conductance of daily samples available in district office at Salt Lake City, Utah. Records of discharge for water year October 1954 to September 1955 given in WSP 1393. No appreciable inflow between Shoshone power plant and gaging station except during periods of heavy local rains.

Chemical analyses, water year October 1954 to September 1955

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million							Dissolved solids			Per-cent so-dium	So-ad-sorp-tion ratio	Specific conduct-ance (micro-mhos at 25°C)	pH			
			Cal-cium (Ca)	Magne-sium (Mg)	So-dium (Na)	Potas-sium (K)	Bicar-bonate (HCO ₃)	Sul-fate (SO ₄)	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO ₃)	Boron (B) ppm					Parts per mil-lion	Tons per acre-foot	Total tons
Oct. 1-10, 1954...	16,630	--	4.14	1.32	3.17	--	2.52	2.69	2.76	--	--	--	520	0.71	11,810	37	1.9	863	--
Oct. 11-20	19,190	13	3.59	1.32	3.13	0.08	--	--	--	0.02	0.01	0.05	484	.66	12,670	39	2.0	805	7.5
Oct. 21-31	21,770	--	3.49	1.07	2.87	--	--	--	--	--	--	--	444	.60	13,060	39	1.9	753	--
Nov. 1-10	18,870	--	3.59	.99	2.48	--	--	--	--	--	--	--	473	.64	12,080	35	1.6	776	--
Nov. 11-20	15,170	--	4.04	1.07	2.87	--	--	--	--	--	--	--	539	.73	11,070	36	1.8	883	--
Nov. 21-29	13,370	--	3.94	1.07	2.87	--	--	--	--	--	--	--	540	.73	9,760	36	1.8	874	--
Nov. 30, Dec. 1-10.	14,760	--	4.39	1.15	5.65	--	--	--	--	--	--	--	644	.88	12,990	50	3.4	1,060	--
Dec. 11-20	12,810	--	4.49	1.23	6.44	--	--	--	--	--	--	--	686	.93	11,910	53	3.8	1,130	--
Dec. 21-31	13,090	--	4.29	1.23	4.74	--	--	--	--	--	--	--	647	.88	11,520	46	2.9	1,070	--
Jan. 1-10, 1955...	12,200	--	4.04	1.15	4.61	--	--	--	--	--	--	--	613	.83	10,130	47	2.9	1,020	--
Jan. 11-20	12,150	16	3.59	1.32	4.26	.07	2.51	2.58	4.12	.01	.01	.04	560	.76	9,230	46	2.7	952	7.5
Jan. 21-31	13,390	--	3.69	1.07	4.39	--	--	--	--	--	--	--	567	.77	10,310	48	2.8	950	--
Feb. 1-10	12,850	--	3.79	1.07	4.65	--	--	--	--	--	--	--	593	.81	10,250	49	3.0	1,000	--
Feb. 11-20	12,310	--	3.79	1.07	4.65	--	--	--	--	--	--	--	605	.82	10,060	49	3.0	1,020	--
Feb. 21-28	9,300	--	3.79	1.15	4.74	--	--	--	--	--	--	--	612	.83	7,720	49	3.0	1,020	--
Mar. 1-10	12,570	--	3.74	.99	4.65	--	2.41	--	--	--	--	--	596	.81	10,180	50	3.0	1,000	8.0
Mar. 11-20	14,440	--	3.74	.99	4.09	--	2.34	--	--	--	--	--	548	.75	10,830	46	2.7	909	7.6
Mar. 21-31	16,460	--	3.84	.99	4.17	--	2.34	--	--	--	--	--	556	.76	12,510	46	2.7	922	7.8

Apr. 1-10, 1955.	20,380	--	3.54	.90	2.87	--	2.11	--	1.92	--	1.69	--	.01	--	--	466	.63	12,840	39	1.9	754	7.7
Apr. 11-20.....	32,210	12	2.50	.99	1.96	.08	1.97	--	1.97	--	1.69	--	.03	--	.05	347	.47	15,140	35	1.5	564	7.6
Apr. 21-30.....	37,250	--	2.45	.57	1.52	--	1.59	--	--	--	--	--	--	--	--	294	.40	14,900	33	1.2	482	7.7
May 1-10.....	53,710	--	2.00	.48	1.09	--	1.86	--	--	--	--	--	--	--	--	226	.31	16,650	31	1.0	371	7.6
May 11-20.....	65,320	--	1.85	.48	1.00	--	1.61	--	--	--	--	--	--	--	--	208	.28	16,290	30	.9	344	7.5
May 21-31.....	86,860	--	1.85	.50	.87	--	1.57	--	--	--	--	--	--	--	--	200	.27	23,450	27	.8	330	7.5
June 1-10.....	74,500	--	2.05	.62	1.00	--	1.69	--	--	--	--	--	--	--	--	225	.31	23,100	27	.9	378	7.7
June 11-20.....	79,990	--	2.10	.56	.96	--	1.67	--	--	--	--	--	--	--	--	221	.30	24,000	27	.8	370	7.7
June 21-30.....	62,220	--	2.20	.66	1.26	--	1.69	--	--	--	--	--	--	--	--	250	.34	21,150	31	1.1	421	7.5
July 1-10.....	35,640	--	2.69	1.40	2.04	--	1.97	--	--	--	--	--	--	--	--	350	.48	17,110	33	1.4	574	7.7
July 11-20.....	27,230	10	3.09	1.23	2.48	.05	2.23	--	2.27	2.45	--	--	.01	--	.03	430	.58	15,790	36	1.7	698	7.8
July 21-31.....	36,730	--	3.84	.81	2.35	--	2.23	--	--	--	--	--	--	--	--	452	.61	22,410	34	1.5	715	7.7
Aug. 1-5, 7-10..	26,220	--	3.74	1.56	2.30	--	2.26	--	--	--	--	--	--	--	--	485	.66	17,310	30	1.4	774	7.9
Aug. 6.....	3,970	--	5.84	4.28	1.52	--	2.13	--	--	--	--	--	--	--	--	815	1.11	4,410	13	.7	1,070	7.6
Aug. 11-20.....	27,310	--	3.94	.82	2.35	--	2.39	--	--	--	--	--	--	--	--	470	.64	17,480	33	1.5	764	7.4
Aug. 21-31.....	28,320	--	3.74	.82	2.35	--	2.20	--	--	--	--	--	--	--	--	458	.62	17,560	34	1.5	743	7.7
Sept. 1-10.....	21,340	--	3.44	.90	2.65	--	2.20	--	--	--	--	--	--	--	--	457	.62	13,230	38	1.8	762	7.9
Sept. 11-20.....	22,080	--	3.14	.58	2.57	--	2.03	--	--	--	--	--	--	--	--	420	.57	12,590	41	1.9	711	7.8
Sept. 21-30.....	24,020	--	3.04	.76	2.22	--	2.00	--	--	--	--	--	--	--	--	392	.53	12,730	37	1.6	659	7.5
Total or weighted average	1,026,000	--	2.89	0.82	2.18	--	--	--	--	--	--	--	--	--	--	372	0.51	523,300	37	1.6	613	--

COLORADO RIVER MAIN STEM--Continued

COLORADO RIVER NEAR CISCO, UTAH

LOCATION.--At gaging station, 1 mile downstream from Dolores River, 11 miles south of Cisco, Grand County, 97 miles upstream from Green River, and 235 miles upstream from San Juan River.

DRAINAGE AREA.--24,100 square miles, approximately.

RECORDS AVAILABLE.--Chemical analyses: August 1928 to September 1955.

Water temperatures: May 1949 to September 1955.

Sediment records: May 1930 to September 1955.

EXTREMES, 1954-55.--Specific conductance: Maximum daily, 2,500 micromhos Dec. 27; minimum daily, 480 micromhos May 18.

Percent sodium: Maximum, 57 Mar. 2, 4; minimum, 25 May 11-20.

EXTREMES, 1941-52, 1953-55.--Specific conductance: Maximum daily, 4,100 micromhos Sept. 30, 1946; minimum daily, 310 micromhos June 15, 1952.

Percent sodium: Maximum, 57 Mar. 2, 4, 1955; minimum, 19 May 1-10, 1952.

REMARKS.--Values reported for dissolved solids are sums of determined constituents. Records of specific conductance of daily samples available in district office at Salt Lake City, Utah. Records of discharge for water year October 1954 to September 1955 given in WSP 1393.

Chemical analyses, water year October 1954 to September 1955

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million								Dissolved solids				Per-cent so-dium	So-dium adsorp-tion ratio	Specific conduct-ance (micro-mhos at 25°C)	
			Cal-cium (Ca)	Magne-sium (Mg)	So-dium (Na)	Potas-sium (K)	Bicar-bonate (HCO ₃)	Sul-fate (SO ₄)	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO ₃)	Boron (B) ppm	Parts per mil-lion	Tons per acre-foot				Total tons
Oct. 1-10, 1954...	71,460	15	7.88	4.69	7.09	0.16	3.62	12.45	3.67	0.13	--	1,240	1.69	120,800	36	2.8	1,760	7.4
Oct. 11-20	77,890	15	7.39	4.03	6.31	.15	3.52	11.30	2.96	.10	0.12	1,120	1.52	118,400	35	2.6	1,590	7.6
Oct. 21-31	65,950	12	6.69	4.44	7.09	.15	3.41	10.87	3.92	.16	--	1,140	1.55	102,200	39	3.0	1,660	7.9
Nov. 1, 3, 5, 8, 10, 12, 15	38,540	11	6.69	4.44	8.91	.20	3.39	11.08	5.75	.19	--	1,260	1.71	65,900	44	3.8	1,890	7.8
Nov. 17, 19, 22, 24, 29	25,550	15	6.49	4.61	8.96	.18	2.82	11.55	5.75	.18	--	1,270	1.73	44,200	44	3.8	1,900	7.9
Dec. 1, 3, 6, 8, 10, 13, 15	34,490	15	6.49	4.77	10.09	.22	3.15	11.66	6.71	.16	.12	1,350	1.84	63,460	47	4.2	2,040	7.6
Dec. 17, 20, 22, 27, 29, 31	24,260	14	7.09	4.93	11.22	.24	3.67	12.01	7.81	.16	--	1,460	1.99	48,280	48	4.6	2,220	7.6
Jan. 5, 7, 14, 17, 19, 1955	23,640	19	6.14	4.44	11.13	.21	3.02	10.43	7.98	.16	.22	1,350	1.84	43,500	51	4.8	2,090	8.2
Jan. 21, 24, 26, 28, 31	20,770	15	5.99	4.52	11.91	.24	2.97	10.51	8.94	.11	.22	1,390	1.89	39,260	53	5.2	2,190	7.7

Feb. 2, 4, 7, 9, 11, 14, 1955...	25, 370 15	5.69	4.28	11.18	.24	2.80	10.10	8.43	.16	.13	1, 330	1.81	45, 920	52	5.0	2, 080	7.7
Feb. 16, 18, 21, 23, 25	21, 640 10	5.79	4.03	10.70	.24	3.05	9.85	7.59	.14	--	1, 270	1.73	37, 440	52	4.8	1, 970	7.5
Mar. 2, 4	13, 390 7.4	5.09	3.12	11.18	.33	2.61	7.39	9.56	.19	--	1, 200	1.63	21, 830	57	5.5	1, 990	7.6
Mar. 9, 11, 14, Mar. 16, 18, 21, 23, 28, 31	27, 570 8.8	6.24	2.80	5.65	.18	2.65	8.66	3.16	.13	.10	921	1.25	34, 460	38	2.7	1, 380	7.5
Mar. 31	31, 700 16	5.69	3.78	7.96	.19	3.28	8.95	5.36	.16	.12	1, 100	1.50	47, 550	45	3.7	1, 650	7.8
Apr. 2, 6-11, 13, 15	4, 600 12	3.09	1.48	--	--	2.28	3.00	1.97	.08	--	442	.60	2, 760	38	1.8	746	7.7
Apr. 16, 20, 26-30	62, 040 16	4.79	2.96	5.96	.15	2.90	7.02	3.86	.12	.09	859	1.17	72, 590	43	3.0	1, 310	7.6
May 1-10	111, 900 12	3.29	1.64	2.52	.10	2.56	3.27	1.58	.07	.06	454	.62	69, 380	33	1.6	724	7.5
May 11-20	221, 600 13	2.89	1.40	1.87	.08	2.47	2.44	1.24	.06	--	373	.51	113, 000	30	1.3	598	7.8
May 21-31	270, 600 12	2.89	1.32	1.43	.07	2.33	2.35	.90	.05	.19	340	.46	134, 500	25	1.0	538	7.7
June 1-10	259, 600 11	2.99	1.48	1.87	.07	2.20	3.02	1.21	.05	--	392	.53	137, 600	29	1.2	620	7.6
June 11-20	205, 200 10	3.39	1.73	2.39	.08	2.15	3.71	1.58	.05	--	460	.63	129, 300	31	1.5	895	7.8
June 21-30	275, 700 11	2.89	1.32	1.61	.06	2.10	2.77	.90	.08	.00	357	.49	135, 100	27	1.1	566	7.6
July 1-10	208, 200 9.9	3.04	1.56	2.26	.06	2.06	3.56	1.27	.07	.00	427	.58	120, 800	33	1.5	873	7.6
July 11-20	100, 400 11	4.34	2.38	3.57	.09	2.38	5.58	2.28	.07	.10	637	.87	87, 350	34	2.0	990	7.6
July 21-26, 28-31	50, 160 10	5.89	3.62	5.44	.12	2.65	8.66	3.47	.10	.13	927	1.26	63, 200	36	2.5	1, 400	7.6
July 27	58, 080 16	7.19	4.61	7.09	.18	3.00	11.83	4.17	.21	--	1, 210	1.65	95, 830	37	2.9	1, 720	8.0
Aug. 1-10	5, 730 19	13.22	6.66	8.91	.28	3.21	21.86	3.41	.09	--	1, 850	2.52	14, 440	31	2.8	2, 360	7.9
Aug. 11-20	74, 700 20	8.13	4.03	5.39	.18	3.20	11.62	2.90	.10	--	1, 130	1.54	115, 000	30	2.2	1, 570	7.8
Aug. 21-31	58, 330 17	8.08	4.44	6.44	.18	3.36	12.22	3.33	.15	.11	1, 200	1.63	95, 080	34	2.6	1, 680	7.5
Sept. 1-10	51, 950 17	8.83	5.10	7.35	.19	3.31	14.47	3.64	.21	--	1, 370	1.86	96, 630	34	2.8	1, 880	7.9
Sept. 11-20	33, 400 13	8.88	6.00	8.44	.18	3.24	15.78	4.40	.24	.20	1, 490	2.03	67, 800	36	3.1	2, 040	7.8
Sept. 21-30	30, 570 11	10.18	7.24	9.66	.19	3.02	19.09	5.22	.26	--	1, 750	2.38	72, 760	36	3.4	2, 410	7.6
Sept. 21-30	43, 780 16	9.53	6.00	9.00	.17	3.49	16.16	4.65	.19	--	1, 550	2.11	92, 380	36	3.2	2, 150	7.6
Total or weighted average.....	12, 629, 000 13	4.64	2.63	4.13	0.11	2.61	6.27	2.48	0.10	--	709	0.96	2, 524, 000	36	2.2	1, 080	--

a Represents 81 percent of runoff for water year October 1954 to September 1955.

COLORADO RIVER MAIN STEM--Continued

COLORADO RIVER AT LEES FERRY, ARIZ.

LOCATION.--At gaging station at head of Marble Gorge at Lees Ferry, Coconino County, just upstream from Paria River, 28 miles downstream from Utah-Arizona State line, 61.5 miles upstream from Little Colorado River, and 79 miles downstream from San Juan River.

DRAINAGE AREA.--107,900 square miles, approximately.

RECORDS AVAILABLE.--Chemical analyses, January to July 1926, October 1926 to June 1927, October 1928 to September 1930, November 1942 to October 1945, October 1947 to September 1955.

Water temperatures: July 1949 to September 1955.

Sediment records: October 1928 to December 1933, November 1942 to September 1944, October 1947 to September 1955.

EXTREMES, 1954-55.--Specific conductance: Maximum observed, 2,020 micromhos Sept. 23; minimum observed, 480 micromhos May 24.

Percent sodium: Maximum, 42 Dec. 11-31, Feb. 1-10, 21-28, Apr. 1-10; minimum, 26 May 21-31, June 21-30.

EXTREMES, 1928-30, 1942-45, 1947-55.--Specific conductance (1942-45, 1947-55): Maximum observed, 2,280 micromhos Oct. 15, 1945; minimum observed, 318 micromhos June 9, 1948.

Percent sodium (1942-44, 1947-55): Maximum, 46, Mar. 2, 4, 7, 10, 1944; minimum, 21 June 21-30, 1949, June 1-10, 1951.

REMARKS.--Values reported for dissolved solids are sums of determined constituents. Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of discharge for water year October 1954 to September 1955 given in WSP 1393.

Chemical analyses, water year October 1954 to September 1955

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million										Dissolved solids			Percent sodium	So- dium adsorp- tion ratio	Specific conductance (micro-mhos at 25°C)	
			Cal- cium (Ca)	Magne- sium (Mg)	So- dium (Na)	Potas- sium (K)	Bicar- bonate (HCO ₃)	Sul- fate (SO ₄)	Chlo- ride (Cl)	Fluo- ride (F)	Ni- trate (NO ₃)	Boron (B) ppm	Parts per mil- lion	Tons per acre- foot	Total tons				
Oct. 1-10, 1954	187,900	15	8.33	3.29	6.13	0.22	4.36	11.08	2.26	0.02	0.08	0.18	1,120	1.52	285,600	34	2.5	1,560	7.4
Oct. 11-20	183,000	15	7.93	2.96	5.70	.20	4.29	10.28	2.14	.02	.10	.16	1,060	1.44	263,500	34	2.4	1,470	7.4
Oct. 21-31	141,400	13	6.54	3.21	5.61	.16	3.77	8.95	2.43	.02	.11	.16	954	1.30	183,800	36	2.5	1,370	7.5
Nov. 1-10	120,100	13	6.14	3.45	6.17	.16	3.57	9.22	2.79	.02	.09	.17	981	1.33	159,700	39	2.8	1,430	7.7
Nov. 11-20	118,000	12	6.14	3.45	6.44	.16	3.70	9.18	3.13	.02	.08	.16	1,000	1.36	160,500	40	2.9	1,460	7.6
Nov. 21-30	110,700	12	6.54	3.78	6.91	.16	3.83	10.18	3.33	.02	.09	.21	1,080	1.47	162,700	40	3.0	1,570	7.7
Dec. 1-10	105,500	12	5.94	3.62	6.87	.15	3.82	9.24	3.55	.02	.08	.22	1,030	1.40	147,700	41	3.1	1,510	7.9
Dec. 11-20	94,330	12	6.44	3.78	7.48	.18	3.88	10.03	3.98	.02	.10	.22	1,110	1.51	142,400	42	3.3	1,630	7.8
Dec. 21-31	78,660	14	6.84	4.28	8.31	.18	4.29	10.74	4.48	.02	.14	.22	1,210	1.65	129,800	42	3.5	1,760	8.0
Jan. 1-10, 1955	80,270	18	6.69	5.02	8.35	.18	4.56	10.74	4.57	.02	.12	.08	1,230	1.67	134,100	41	3.5	1,840	7.8
Jan. 11-20	85,490	16	6.19	4.77	7.31	.18	4.26	9.60	4.06	.02	.12	.07	1,110	1.51	129,100	40	3.1	1,680	7.5
Jan. 21-31	78,290	18	6.14	4.77	7.65	.17	4.20	9.64	4.40	.02	.11	.09	1,130	1.54	120,600	41	3.3	1,680	7.8
Feb. 1-10	87,390	19	5.94	3.95	7.22	.16	3.82	9.06	4.20	.02	.10	.20	1,060	1.44	125,800	42	3.2	1,580	7.9
Feb. 11-20	82,020	17	5.94	3.62	6.70	.16	3.98	8.37	3.92	.02	.10	.22	1,010	1.37	112,400	41	3.1	1,510	7.6
Feb. 21-28	73,860	18	5.84	3.21	6.74	.15	3.62	8.18	4.03	.02	.11	.19	987	1.34	98,970	42	3.2	1,480	7.7

Mar. 1-10, 1955..	132,800	17	6.44	3.29	6.44	.17	4.03	8.62	3.67	.02	.11	.19	1,010	1.37	181,900	39	2.9	1,500	7.7
Mar. 11-20	272,000	15	7.24	3.04	5.57	.17	4.34	8.95	2.43	.02	.12	.18	986	1.34	364,500	35	2.5	1,420	7.3
Mar. 21-31	175,000	15	5.44	2.71	5.35	.15	3.75	7.52	2.17	.02	.08	.24	842	1.15	201,200	39	2.6	1,240	7.7
Apr. 1-10	137,800	15	5.54	3.21	6.35	.16	3.75	8.27	3.05	.02	.08	.26	941	1.28	176,500	42	3.0	1,390	7.6
Apr. 11-20	172,800	15	5.44	2.96	5.65	.15	3.98	7.27	2.71	.02	.08	.23	865	1.18	203,900	40	2.8	1,290	7.7
Apr. 21-30	306,800	17	4.44	2.22	3.74	.13	3.72	4.95	1.61	.02	.10	.18	638	.87	266,900	36	2.0	964	7.6
May 1-10	364,800	15	3.89	1.64	2.48	.14	3.49	3.39	1.18	.02	.07	.16	490	.67	244,400	30	1.5	763	7.6
May 11-20	592,900	16	3.29	1.56	1.87	.11	3.29	2.73	.73	.02	.07	.11	409	.56	332,000	27	1.2	635	7.8
May 21-31	612,100	17	3.09	1.32	1.61	.08	3.03	2.25	.62	.02	.07	.08	361	.49	298,900	26	1.1	572	7.6
June 1-10	468,900	16	2.99	1.23	1.65	.09	2.75	2.35	.71	.02	.05	.08	357	.49	229,800	28	1.1	570	7.7
June 11-20	608,500	14	2.99	1.32	1.61	.08	2.85	2.35	.62	.02	.05	.07	355	.48	292,100	27	1.1	575	7.7
June 21-30	509,000	15	3.09	1.32	1.61	.09	2.72	2.60	.71	.02	.05	.07	369	.50	254,500	26	1.1	569	7.7
July 1-10	290,200	14	2.99	1.48	2.04	.10	2.56	2.94	.96	.02	.04	.07	398	.54	156,700	31	1.4	631	7.6
July 11-20	151,600	15	3.64	1.73	2.91	.11	2.74	4.00	1.44	.02	.05	.12	509	.69	104,600	35	1.8	784	7.6
July 21-30	112,900	13	4.89	2.30	4.17	.16	3.21	6.14	1.97	.02	.06	.13	706	.96	108,400	36	2.2	1,080	7.6
July 31	15,990	18	8.58	4.28	6.54	.54	3.93	12.93	2.48	.03	.03	--	1,220	1.66	26,540	34	2.6	1,630	7.3
Aug. 1-10	163,900	17	8.03	2.22	5.83	.20	3.97	9.74	2.45	.03	.06	.28	1,030	1.40	229,560	36	2.6	1,430	7.7
Aug. 11-20	191,700	19	7.73	2.80	5.83	.21	3.97	10.22	2.00	.03	.04	.32	1,030	1.40	268,400	35	2.5	1,440	7.6
Aug. 21-31	154,000	18	7.14	3.37	5.74	.20	4.10	10.20	2.03	.03	.06	.17	1,030	1.40	215,600	35	2.5	1,420	7.5
Sept. 1-10	108,700	17	6.84	3.70	6.26	.20	3.93	10.70	2.37	.03	.12	.19	1,070	1.46	158,700	37	2.7	1,480	7.5
Sept. 11-20	57,380	16	7.04	4.36	6.96	.20	3.44	12.37	2.93	.03	.10	.19	1,190	1.62	92,960	38	2.9	1,600	7.6
Sept. 21-30	63,610	11	7.39	5.51	8.35	.21	3.28	14.59	3.89	.03	.10	.19	1,370	1.86	118,300	39	3.3	1,850	7.5
Total or weighted average	7,290,000	15	4.84	2.38	3.96	0.14	3.46	5.89	1.80	0.02	0.07	0.14	694	0.94	6,853,000	35	2.1	1,030	--

COLORADO RIVER MAIN STEM--Continued
COLORADO RIVER NEAR GRAND CANYON, ARIZ.

LOCATION.--At gaging station at Kaibab Bridge, a quarter of a mile upstream from Bright Angel Creek, 11 miles by trail northeast of Grand Canyon, Coconino County, 26 miles downstream from Little Colorado River, and 267 miles upstream from Hoover Dam.

DRAINAGE AREA.--137,800 square miles, approximately.

RECORDS AVAILABLE.--Chemical analyses: August 1925 to November 1942, September 1943 to September 1955.

Water temperatures: October 1936 to October 1942, September 1943 to September 1955.

Sediment records: October 1925 to November 1942, September 1943 to September 1955.

EXTREMES, 1954-55.--Specific conductance: Maximum observed, 2,090 micromhos Jan. 1; minimum observed, 550 micromhos May 25.

Percent sodium: Maximum, 48 Feb. 1-10; minimum, 28 June 1-10, July 23.

EXTREMES, 1937-42, 1943-55.--Specific conductance: Maximum observed, 2,900 micromhos Sept. 6, 1940; minimum observed, 341 micromhos June 15, 1942.

Percent Sodium (1941-42, 1943-55): Maximum, 48 Sept. 11-20, 1942; Apr. 1-10, 1954; Feb. 1-10, 1955; minimum, 16 June 11-20, 1952. REMARKS.--Values reported for dissolved solids are sums of determined constituents. Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of discharge for water year October 1954 to September 1955 given in WSP 1393.

Chemical analyses, water year October 1954 to September 1955

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million										Dissolved solids			Per- cent so- dium	So- adsorp- tion ratio	Specific conduct- ance (micro- mhos at 25°C)	
			Cal- cium (Ca)	Magne- sium (Mg)	So- dium (Na)	Potas- sium (K)	Bicar- bonate (HCO ₃)	Sul- fate (SO ₄)	Chlo- ride (Cl)	Fluo- ride (F)	Ni- trate (NO ₃)	Boron (B) ppm	Parts per mil- lion	Tons per acre- foot	Total tons				
Oct. 1-10, 1954 ...	180,800	17	9.03	3.12	7.17	0.25	4.47	11.62	3.24	0.02	0.04	0.17	1.220	1.66	300,100	37	2.9	1,710	7.3
Oct. 11-20.....	198,300	16	8.03	3.12	6.17	.21	4.42	9.83	2.93	.02	.06	.17	1.080	1.47	291,500	35	2.6	1,530	7.4
Oct. 21-31.....	147,100	13	7.14	3.04	6.48	.20	3.95	9.16	3.50	.02	.13	.16	1.040	1.41	207,400	38	2.9	1,520	7.4
Nov. 1-10.....	123,000	12	6.14	3.45	7.04	.18	3.82	8.76	3.98	.02	.08	.16	1.030	1.40	172,200	42	3.2	1,530	7.6
Nov. 11-20.....	121,500	11	6.44	3.29	7.39	.20	3.93	8.91	4.29	.02	.08	.19	1.060	1.44	175,000	43	3.4	1,580	7.6
Nov. 21-30.....	115,000	13	6.64	3.95	8.22	.19	4.15	10.01	4.63	.02	.13	.22	1.170	1.59	182,800	43	3.6	1,710	7.6
Dec. 1-10.....	109,600	14	6.04	3.95	8.26	.18	4.21	9.16	4.79	.02	.11	.22	1.120	1.52	166,600	45	3.7	1,670	7.7
Dec. 11-20.....	101,800	14	6.34	4.11	8.65	.19	4.31	9.49	5.42	.02	.12	.22	1.180	1.60	162,900	45	3.8	1,760	7.6
Dec. 21-31.....	84,420	15	6.64	4.44	9.48	.19	4.54	10.03	5.89	.02	.12	.22	1.260	1.71	144,400	46	4.0	1,870	7.7
Jan. 1-10, 1955 ...	80,510	18	6.69	5.18	10.09	.22	4.77	10.43	6.54	.02	.12	.08	1.340	1.82	146,500	45	4.1	2,040	8.0
Jan. 11-20.....	95,030	17	6.24	4.77	9.04	.20	4.59	9.54	5.70	.02	.11	.09	1.220	1.66	157,700	45	3.9	1,850	7.6
Jan. 21-31.....	85,470	18	6.04	4.52	9.04	.19	4.56	8.93	5.92	.02	.11	.09	1.190	1.62	138,500	46	3.9	1,830	7.6
Feb. 1-10.....	93,460	17	5.69	3.95	8.96	.18	4.03	8.83	5.98	.02	.14	.21	1.160	1.58	147,700	48	4.1	1,760	8.0
Feb. 11-20.....	91,280	16	5.69	3.95	8.31	.21	4.34	7.89	5.58	.02	.12	.19	1.090	1.48	135,100	46	3.8	1,710	7.6
Feb. 21-28.....	83,940	16	5.64	3.70	8.04	.21	4.20	7.70	5.27	.02	.12	.18	1.060	1.44	120,900	46	3.7	1,650	7.6
Mar. 1-10.....	131,300	18	6.04	3.78	7.44	.20	4.15	8.18	4.94	.02	.13	.31	1.060	1.44	189,100	43	3.4	1,620	7.7

Mar. 11-20, 1955..	266,600	16	6.84	3.62	6.13	.20	4.26	8.85	3.44	.02	.11	.27	1,030	1.40	373,200	37	2.7	1,520	7.4
Mar. 21-31	188,000	15	5.74	2.96	5.96	.16	4.21	7.31	3.02	.02	.11	.33	901	1.23	231,200	40	2.9	1,350	7.4
Apr. 1-10	147,900	15	5.34	3.62	6.78	.17	3.98	7.79	4.00	.02	.08	.33	969	1.32	195,200	43	3.2	1,460	7.4
Apr. 11-20	172,400	16	5.14	3.12	6.91	.17	4.10	7.52	3.84	.02	.10	.17	949	1.29	222,400	45	3.4	1,450	7.7
Apr. 21-30	300,900	16	4.44	2.47	4.78	.16	4.00	5.33	2.37	.03	.11	.13	718	.98	294,900	40	2.6	1,110	7.7
May 1-10	359,000	17	3.69	1.97	3.13	.16	3.77	3.54	1.64	.03	.09	.12	540	.73	262,100	35	1.9	864	7.6
May 11-20	559,100	15	3.34	1.48	2.09	.12	3.57	2.50	1.04	.00	.05	.11	420	.57	318,700	30	1.3	682	7.7
May 21-31	597,200	15	3.19	1.32	1.91	.10	3.18	2.25	.96	.03	.06	.09	383	.52	310,500	29	1.3	628	7.7
June 1-10	470,700	15	3.39	1.48	1.91	.09	3.20	2.35	1.13	.02	.04	.17	401	.55	236,900	28	1.2	645	7.8
June 11-20	617,900	19	3.24	1.23	2.30	.11	3.16	2.46	1.07	.02	.05	.19	410	.56	346,000	33	1.5	647	7.8
June 21-30	507,000	17	3.14	1.32	2.04	.11	2.92	2.46	1.13	.02	.04	.18	396	.54	273,800	31	1.4	625	7.9
July 1-10	305,300	15	3.29	1.48	2.48	.12	2.85	2.85	1.52	.02	.04	.17	440	.60	183,200	34	1.6	707	7.8
July 11-20	167,800	14	3.64	1.97	3.57	.13	2.95	3.85	2.37	.02	.05	.24	559	.76	127,500	38	2.1	894	7.6
July 21-22, 24-31..	132,900	17	5.89	2.71	5.83	.21	3.83	7.06	3.33	.02	.07	.29	881	1.20	159,500	41	2.9	1,310	7.6
July 23	12,180	14	3.39	1.97	2.08		2.88	3.25	1.27	--	.04	--	444	.60	7,310	28	1.3	697	7.9
Aug. 1-10	208,500	19	7.14	2.63	6.87	.21	4.24	9.10	3.22	.03	.01	.32	1,040	1.41	294,000	41	3.1	1,520	7.6
Aug. 11-20	251,700	19	7.24	2.22	6.87	.20	4.23	9.41	2.59	.03	.00	.32	1,030	1.40	352,400	42	3.2	1,430	7.6
Aug. 21-31	207,400	19	6.34	2.22	7.17	.21	4.29	8.83	2.99	.03	.09	.24	1,010	1.37	284,100	45	3.5	1,450	7.6
Sept. 1-10	127,600	19	6.99	3.37	7.39	.25	4.42	9.72	3.67	.03	.15	.26	1,120	1.52	194,000	41	3.2	1,610	7.5
Sept. 11-20	68,170	18	6.49	4.03	8.74	.25	3.92	10.35	5.10	.03	.16	.27	1,210	1.65	112,500	45	3.8	1,780	7.5
Sept. 21-30	68,790	13	7.04	4.61	9.57	.25	3.70	11.91	6.01	.03	.11	.25	1,340	1.82	125,200	45	4.0	1,960	7.4
Total or weighted average	7,580,000	16	4.94	2.47	4.83	0.16	3.74	5.85	2.62	0.02	0.07	0.19	753	1.02	7,732,000	39	2.5	1,140	--

COLORADO RIVER MAIN STEM--Continued

COLORADO RIVER BELOW HOOVER DAM, ARIZ.-NEV.

LOCATION.--At Hoover Dam, state line between Mohave County, Ariz., and Clark County, Nev., about 1 mile upstream from gaging station. DRAINAGE AREA.--167,800 square miles, approximately.

RECORDS AVAILABLE.--Chemical analyses: October 1939 to September 1955.

Water temperatures: October 1941 to September 1955.

EXTREMES, 1954-55.--Specific conductance: Maximum daily, 1,580 micromhos June 20; minimum daily, 1,020 micromhos Oct. 8, 10.

Percent sodium: Maximum, 40 during several periods February to July; minimum, 36 Oct. 11-20.

EXTREMES, 1939-55.--Specific conductance: Maximum daily, 1,580 micromhos June 20, 1955; minimum daily, 712 micromhos Nov. 25-26, 1952. Percent sodium (1941-44, 1950-55): Maximum, 41 during several periods in 1951 and 1952; minimum, 32 Jan. 21-22, 25-29, 31, June 12-17, 19-20, 1944.

REMARKS.--Values reported for dissolved solids are residues on evaporation. Records of specific conductance of daily samples available in district office at Salt Lake City, Utah. Records of discharge for water year October 1954 to September 1955 given in WSP 1393.

Chemical analyses, water year October 1954 to September 1955

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million										Dissolved solids			Per-cent sodium	So-dium adsorp-tion ratio	Specific conduct-ance (micro-mhos at 25°C)	pH
			Cal-cium (Ca)	Magne-sium (Mg)	So-dium (Na)	Potas-sium (K)	Bicar-bonate (HCO ₃)	Sul-fate (SO ₄)	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO ₃)	Boron (B) ppm	Parts per mil-lion	Tons per acre-foot	Total tons				
Oct. 1-10, 1954	242,800	--	4.69	1.97	4.22	--	--	--	--	--	--	--	702	0.95	230,700	39	2.3	1,040	--
Oct. 11-20	262,900	12	4.39	2.38	3.91	0.12	2.72	6.06	2.14	0.01	0.04	0.10	690	.94	247,100	36	2.1	1,040	7.6
Oct. 21-31	270,500	--	4.89	1.97	4.17	--	--	--	--	--	--	--	692	.94	254,300	39	2.3	1,040	--
Nov. 1-10	235,700	--	4.74	1.97	4.17	--	--	--	--	--	--	--	697	.95	223,900	36	2.3	1,040	--
Nov. 11-20	233,000	--	4.69	1.97	4.17	--	--	--	--	--	--	--	695	.95	221,400	39	2.3	1,040	--
Nov. 21-30	207,200	--	4.74	2.06	4.13	--	--	--	--	--	--	--	697	.95	196,800	38	2.2	1,040	--
Dec. 1-10	245,300	--	4.79	1.97	4.13	--	--	--	--	--	--	--	704	.96	235,500	38	2.2	1,050	--
Dec. 11-20	224,600	--	4.74	1.97	4.17	--	--	--	--	--	--	--	708	.96	215,600	38	2.3	1,050	--
Dec. 21-31	271,100	--	4.69	2.06	4.13	--	--	--	--	--	--	--	726	.99	268,400	38	2.2	1,060	--
Jan. 1-10, 1955	245,500	--	4.74	2.06	4.22	--	--	--	--	--	--	--	729	.99	243,000	38	2.3	1,050	--
Jan. 11-20	250,500	13	4.44	2.47	4.17	.12	2.62	6.22	2.37	.02	.03	.13	714	.97	243,000	37	2.2	1,070	7.6
Jan. 21-31	288,700	--	4.74	2.22	4.22	--	--	--	--	--	--	--	748	1.02	233,300	38	2.3	1,090	--
Feb. 1-10	280,200	--	4.84	2.06	4.61	--	--	--	--	--	--	--	763	1.04	270,600	40	2.5	1,080	--
Feb. 11-20	239,400	--	4.94	2.14	4.48	--	--	--	--	--	--	--	758	1.03	246,600	39	2.4	1,120	--
Feb. 21-28	205,400	--	4.94	2.14	4.48	--	--	--	--	--	--	--	770	1.05	215,700	39	2.4	1,130	--
Mar. 1-10	259,000	--	5.14	2.22	4.52	--	--	--	--	--	--	--	791	1.08	279,700	38	2.3	1,160	--
Mar. 11-20	292,400	--	5.24	2.14	4.96	--	2.74	--	--	--	--	--	788	1.07	312,900	40	2.6	1,180	7.5
Mar. 21-31	354,400	--	5.29	2.30	4.96	--	2.87	--	--	--	--	--	807	1.10	369,800	40	2.5	1,190	7.5

Apr. 1-10, 1955..	289,700	--	5.29	2.38	4.96	--	2.85	--	--	--	--	811	1.10	318,700	39	2.5	1,210	7.7
Apr. 11-20.....	306,800	14	4.89	2.88	4.96	.13	2.85	7.12	--	--	.04	821	1.12	343,600	39	2.5	1,200	7.2
Apr. 21-30.....	286,000	--	5.34	2.30	5.09	--	2.92	--	--	--	--	820	1.12	320,300	40	2.6	1,210	7.8
May 1-10.....	286,800	--	5.34	2.30	4.78	--	2.84	--	--	--	--	836	1.14	327,000	38	2.5	1,200	7.7
May 11-20.....	311,800	--	5.39	2.22	4.78	--	2.84	--	--	--	--	835	1.14	355,500	39	2.5	1,200	7.9
May 21-31.....	328,900	--	5.29	2.38	5.17	--	2.82	--	--	--	--	800	1.09	358,500	40	2.6	1,200	7.4
June 1-10.....	242,800	--	5.39	2.30	5.17	--	2.80	--	--	--	--	812	1.10	287,100	40	2.6	1,210	7.5
June 11-20.....	178,800	--	5.49	2.22	4.87	--	2.85	--	--	--	--	835	1.14	203,800	39	2.5	1,270	7.4
June 21-30.....	258,000	--	5.49	2.22	4.87	--	2.82	--	--	--	--	826	1.12	289,000	39	2.5	1,220	7.7
July 1-10.....	232,000	--	5.49	2.06	5.13	--	2.82	--	--	--	--	811	1.10	255,200	40	2.6	1,210	7.6
July 11-20.....	309,300	15	5.19	2.63	4.91	.13	2.85	7.14	--	--	.06	823	1.12	346,400	38	2.5	1,210	7.1
July 21-31.....	305,600	--	5.29	2.30	4.61	--	2.82	--	--	--	--	814	1.11	339,200	38	2.4	1,200	8.2
Aug. 1-10.....	263,900	--	5.39	2.22	4.61	--	2.85	--	--	--	--	821	1.12	295,600	38	2.4	1,210	8.0
Aug. 11-20.....	244,300	--	5.44	2.22	4.74	--	2.82	--	--	--	--	833	1.13	276,100	38	2.4	1,240	7.8
Aug. 21-31.....	280,800	--	5.49	2.14	4.96	--	2.85	--	--	--	--	818	1.11	311,700	39	2.5	1,220	7.6
Sept. 1-10.....	250,800	--	5.39	2.22	4.78	--	2.72	--	--	--	--	811	1.10	275,900	39	2.5	1,220	7.8
Sept. 11-20.....	190,900	--	5.49	2.14	4.78	--	2.82	--	--	--	--	821	1.12	213,800	39	2.5	1,220	7.8
Sept. 21-30.....	179,800	--	5.44	2.30	4.78	--	2.82	--	--	--	--	825	1.12	201,400	38	2.4	1,220	7.9
Total or weighted average.....	9,276,000	--	5.09	2.22	4.61	--	--	--	--	--	--	778	1.06	9,833,000	39	2.4	1,150	--

DIVERSIONS AND RETURN FLOW AT AND BELOW IMPERIAL DAM

YUMA MAIN CANAL BELOW COLORADO RIVER SIPHON, AT YUMA, ARIZ.

LOCATION.--At gaging station on Yuma Main Canal below Colorado River siphon on Arizona side of river, 3½ miles downstream from siphon-drop power plant, and a quarter of a mile downstream from highway bridge over Colorado River at Yuma, Yuma County.

RECORDS AVAILABLE.--Chemical analyses: September 1926 to September 1928. October 1942 to September 1955.

EXTREMES, 1954-55.--Specific conductance: Maximum observed, 1,300 micromhos Sept. 20; minimum observed, 1,090 micromhos Jan. 20.

Percent sodium: Maximum 43 Aug. 21-31; minimum, 39 Jan. 1 to Apr. 20.

EXTREMES, 1943-55.--Specific conductance: Maximum observed, 1,300 micromhos Sept. 20, 1955; minimum observed, 795 micromhos Jan. 5, 1953.

Percent sodium: Maximum, 46 Nov. 21-30, 1953; minimum, 32 several periods in 1945, 1946, 1948 and 1949.

REMARKS.--Values reported for dissolved solids are residues on evaporation. Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Samples collected prior to February 1943 were from gaging station on the Colorado River at Yuma. Records of discharge for water year October 1954 to September 1955 given in WSP 1393.

Chemical analyses, water year October 1954 to September 1955

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million										Dissolved solids		Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
			Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B) ppm	Parts per million	Tons per acre-foot	Total tons			
Oct. 1-10, 1954...	11,380	14	4.34	2.47	4.91	0.12	2.84	6.35	2.76	0.02	0.02	0.16	754	1.03	11,720	41	2.7	1,120 7.7
Oct. 11-20.....	9,230	14	4.39	2.47	4.87	.12	2.80	6.25	2.74	.02	.02	.17	755	1.03	9,510	41	2.6	1,120 7.8
Oct. 21-31.....	8,730	14	4.34	2.47	4.87	.12	2.79	6.35	2.76	.02	.02	.17	754	1.03	8,980	41	2.6	1,120 7.7
Nov. 1-10.....	8,110	12	4.44	2.47	4.87	.12	2.80	6.33	2.76	.02	.02	.17	752	1.02	8,270	41	2.6	1,120 7.9
Nov. 11-20.....	8,400	12	4.44	2.47	4.87	.12	2.77	6.35	2.74	.02	.02	.17	753	1.02	8,570	41	2.6	1,120 7.9
Nov. 21-30.....	7,130	13	4.44	2.47	4.87	.12	2.77	6.37	2.71	.02	.02	.17	753	1.02	7,270	41	2.6	1,110 8.0
Dec. 1-10.....	4,470	13	4.44	2.47	4.91	.12	2.80	6.37	2.71	.02	.02	.17	760	1.03	4,600	41	2.6	1,120 8.0
Dec. 11-20.....	4,950	12	4.34	2.47	4.83	.12	2.77	6.39	2.71	.02	.02	.16	757	1.03	5,100	41	2.6	1,110 8.0
Dec. 21-31.....	5,100	14	4.49	2.63	4.74	.12	2.70	6.43	2.68	.02	.02	.18	745	1.01	5,160	40	2.5	1,130 8.0
Jan. 1-10, 1955...	1,880	14	4.49	2.55	4.65	.12	2.70	6.35	2.62	.02	.02	.20	741	1.01	1,900	39	2.5	1,110 8.0
Jan. 11-20.....	2,230	13	4.44	2.55	4.61	.12	2.72	6.33	2.59	.02	.02	.17	734	1.00	2,230	39	2.5	1,110 8.0
Jan. 21-31.....	6,400	15	4.54	2.47	4.57	.12	2.72	6.29	2.57	.02	.03	.20	739	1.01	6,460	39	2.4	1,100 8.0
Feb. 1-10.....	7,490	13	4.54	2.47	4.65	.12	2.79	6.31	2.62	.02	.02	.20	740	1.01	7,560	39	2.5	1,110 8.1
Feb. 11-20.....	9,240	13	4.54	2.55	4.70	.12	2.80	6.31	2.62	.02	.03	.20	751	1.02	9,420	39	2.5	1,120 8.1
Feb. 21-28.....	6,320	16	4.69	2.55	4.70	.12	2.85	6.50	2.68	.02	.03	.29	777	1.06	6,700	39	2.5	1,140 7.8
Mar. 1-10.....	9,860	18	4.89	2.47	4.70	.12	2.88	6.47	2.74	.02	.03	.24	785	1.07	10,550	39	2.4	1,150 7.8
Mar. 11-20.....	12,170	16	4.79	2.55	4.78	.12	2.82	6.58	2.74	.02	.02	.30	782	1.06	12,900	39	2.5	1,150 7.9
Mar. 21-31.....	10,090	14	4.79	2.47	4.78	.13	2.80	6.56	2.74	.02	.02	.29	783	1.06	10,700	39	2.5	1,150 7.7

Apr. 1-10, 1955...	8,860	16	4.79	2.55	4.83	.13	2.82	6.66	2.82	.02	.31	797	1.08	9,570	39	2.5	1,160	7.9
Apr. 11-20.....	10,100	20	4.84	2.71	4.87	.13	2.84	6.77	2.88	.02	.29	808	1.10	11,110	39	2.5	1,180	7.8
Apr. 21-30.....	11,220	14	4.59	2.80	5.26	.13	2.84	6.83	2.90	.02	.18	806	1.10	12,340	41	2.7	1,200	8.0
May 1-10.....	9,710	16	4.79	2.55	5.39	.13	2.82	7.12	3.02	.00	.18	817	1.11	10,780	42	2.8	1,220	7.9
May 11-20.....	10,040	17	4.74	2.63	5.48	.13	2.84	7.18	3.05	.00	.17	832	1.13	11,350	42	2.8	1,230	8.0
May 21-31.....	12,950	16	4.79	2.71	5.57	.14	2.84	7.33	3.13	.00	.19	850	1.16	15,020	42	2.9	1,250	8.0
June 1-10.....	10,930	18	4.99	2.88	5.61	.14	2.85	7.37	3.22	.02	.26	875	1.19	13,010	41	2.8	1,270	7.9
June 11-20.....	13,270	21	5.04	2.96	5.61	.14	2.87	7.37	3.19	.02	.24	889	1.21	16,060	41	2.8	1,270	8.0
June 21-30.....	11,500	17	5.09	2.88	5.61	.14	2.82	7.45	3.22	.03	.26	884	1.20	13,800	41	2.8	1,270	7.9
July 1-10.....	9,690	15	5.09	2.88	5.61	.14	2.84	7.43	3.22	.02	.26	894	1.22	11,820	41	2.8	1,270	8.0
July 11-20.....	10,190	14	5.04	2.80	5.65	.14	2.79	7.41	3.22	.02	.24	891	1.21	12,330	41	2.9	1,270	7.9
July 21-31.....	11,860	14	5.04	2.88	5.65	.14	2.82	7.37	3.24	.02	.25	880	1.20	14,230	41	2.8	1,280	7.9
Aug. 1-10.....	10,650	14	4.99	2.88	5.70	.15	2.79	7.43	3.27	.02	.25	887	1.21	12,890	42	2.9	1,280	8.0
Aug. 11-20.....	9,530	17	4.59	3.12	5.74	.15	2.70	7.79	3.19	.02	.18	857	1.16	11,050	42	2.9	1,260	8.0
Aug. 21-31.....	7,930	14	4.54	3.12	5.78	.15	2.62	7.91	3.19	.02	.17	849	1.16	9,200	43	2.9	1,240	7.9
Sept. 1-10.....	12,580	18	4.64	2.80	5.57	.14	2.59	7.22	3.22	.02	.21	839	1.14	14,340	42	2.9	1,240	8.0
Sept. 11-20.....	13,550	20	4.69	3.21	5.87	.15	2.75	7.89	3.33	.02	.20	872	1.19	16,120	42	3.0	1,280	8.0
Sept. 21-30.....	15,120	17	4.89	2.88	5.78	.14	2.69	7.52	3.33	.02	.20	876	1.19	17,990	42	2.9	1,280	7.9
Total or weighted average.....	333,000	16	4.74	2.71	5.26	0.13	2.79	6.83	2.99	0.02	0.22	818	1.11	369,600	41	2.7	1,200	--

GUNNSON RIVER BASIN

GUNNSON RIVER NEAR GRAND JUNCTION, COLO.

LOCATION.--At road bridge about a half mile downstream from gaging station, 1 mile downstream from point of diversion of Redlands power canal, and 1½ miles downstream from mouth and Grand Junction, Mesa County.

DRAINAGE AREA.--8 020 square miles, approximately (at gaging station).

RECORDS AVAILABLE.--Chemical analyses: October 1931 to September 1955.

Water temperatures: April 1949 to September 1955.

EXTREMES, 1954-55.--Specific conductance: Maximum daily, 2,520 micromhos Sept. 29; minimum daily, 416 micromhos May 14.

Percent sodium: Maximum, 34 Mar. 1-10; minimum, 21 May 1-10, 11-18.

EXTREMES, 1941-55.--Specific conductance: Maximum daily, 2,680 micromhos Nov. 5, 1950; minimum daily, 280 micromhos May 23, 1948.

Percent sodium (1950-55): Maximum, 34 Feb. 1-10, 1951, Jan. 21-31, Feb. 21-29, 1952, Mar. 1-10, 1955; minimum, 10 June 2-5, 10, 1952.

REMARKS.--Values reported for dissolved solids are residues on evaporation. Records of specific conductance of daily samples available in district office at Salt Lake City, Utah. Records of discharge for water year October 1954 to September 1955 given in WSP 1953.

Chemical analyses, water year October 1954 to September 1955

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million										Dissolved solids			Per-centage ad-sorp-tion ratio	Specific conduct-mhos at 25°C)	pH	
			Cal-cium (Ca)	Magne-sium (Mg)	So-dium (Na)	Potas-sium (K)	Bicar-bonate (HCO ₃)	Sul-fate (SO ₄)	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO ₃)	Boron (B) ppm	Total tons						
													Parts per mil-lion	Tons per acre-foot					
Oct. 1-10, 1954 ...	20,180	--	9.83	5.35	6.87	--	--	--	--	--	--	1,550	2.11	42,580	31	2.5	1,850	--	
Oct. 11-20	24,060	18	8.48	5.18	5.48	0.17	3.75	14.80	0.56	0.03	0.09	0.22	1,310	1.78	42,830	28	2.1	1,630	7.2
Oct. 21-31	20,180	--	9.43	4.93	6.00	--	--	--	--	--	--	--	1,390	1.89	38,140	29	2.2	1,730	--
Nov. 1-10	16,360	--	9.73	5.51	6.70	--	--	--	--	--	--	--	1,510	2.05	33,540	31	2.4	1,840	--
Nov. 11-20	16,880	--	9.88	5.43	6.87	--	--	--	--	--	--	--	1,520	2.07	34,940	31	2.5	1,850	--
Nov. 21-30	17,540	--	7.78	4.36	5.61	--	--	--	--	--	--	--	1,240	1.69	29,640	32	2.3	1,540	--
Dec. 1-10	18,020	--	8.68	5.10	6.57	--	--	--	--	--	--	--	1,420	1.93	34,780	32	2.5	1,740	--
Dec. 11-20	16,020	--	8.58	4.93	6.17	--	--	--	--	--	--	--	1,360	1.85	29,640	31	2.4	1,670	--
Dec. 21-31	15,150	--	8.18	5.10	6.13	--	--	--	--	--	--	--	1,400	1.90	28,780	32	2.4	1,680	--
Jan. 1-10, 1955 ...	16,170	--	7.49	4.69	5.57	--	--	--	--	--	--	--	1,260	1.71	27,650	31	2.3	1,540	--
Jan. 11-20	13,750	20	7.04	5.02	5.57	.12	3.69	13.66	.51	.02	.19	.20	1,200	1.63	22,410	31	2.3	1,530	7.7
Jan. 21-31	16,320	--	7.44	4.52	5.48	--	--	--	--	--	--	--	1,240	1.69	27,580	31	2.2	1,510	--
Feb. 1-10	14,620	--	7.29	4.69	5.61	--	--	--	--	--	--	--	1,220	1.66	24,270	32	2.3	1,510	--
Feb. 11-20	15,130	--	7.53	4.44	5.61	--	--	--	--	--	--	--	1,230	1.67	25,270	32	2.3	1,520	--
Feb. 21-28	10,510	--	7.53	4.85	5.87	--	--	--	--	--	--	--	1,250	1.70	17,870	32	2.4	1,550	--
Mar. 1-10	21,850	--	7.24	3.78	5.65	--	--	--	--	--	--	--	1,160	1.58	34,520	34	2.4	1,490	--
Mar. 11-20	19,860	--	6.79	3.70	4.96	--	--	--	--	--	--	--	1,080	1.47	29,190	32	2.2	1,390	--
Mar. 21-31	16,870	--	6.29	3.87	3.44	--	3.26	--	--	--	--	--	1,020	1.39	23,450	25	1.5	1,340	7.9

Apr. 1-10, 1955	21,110	--	4.99	2.88	3.22	--	2.98	--	5.31	--	--	--	785	1.07	22,590	29	1.6	1,070	7.8
Apr. 11-20	38,020	16	3.79	2.14	2.26	.09	2.69	--	2.69	--	--	--	560	.76	28,900	27	1.3	787	7.5
Apr. 21-26	23,330	--	3.89	1.81	1.78	--	2.94	--	2.94	--	--	.05	508	.69	16,100	24	1.1	727	7.7
Apr. 27-30	25,290	--	3.24	.99	1.17	--	2.54	--	2.54	--	--	--	349	.47	11,890	22	.8	515	7.5
May 1-10	87,150	--	3.24	.90	1.09	--	2.87	--	2.87	--	--	--	341	.46	40,090	21	.8	502	7.7
May 11-18	83,420	--	2.84	.99	1.04	--	2.06	--	2.06	--	--	--	324	.44	36,700	21	.8	458	7.8
May 19-30	86,380	--	3.69	1.48	1.78	--	2.15	--	2.15	--	--	--	476	.65	56,150	26	1.1	629	7.9
May 31, June 1-10	70,250	--	4.49	.90	1.96	--	2.28	--	2.28	--	--	--	481	.65	45,680	27	1.2	682	7.6
June 11-20	90,510	--	3.49	1.15	1.48	--	2.13	--	2.13	--	--	--	410	.56	50,690	24	1.0	583	7.5
June 21-30, July 1	66,330	--	4.24	1.56	2.09	--	2.33	--	2.33	--	--	--	525	.71	47,090	26	1.2	733	7.3
July 2-10	15,960	--	7.14	3.29	4.74	--	2.74	--	2.74	--	--	--	1,050	1.43	22,820	31	2.1	1,330	7.5
July 11-20	8,868	15	8.73	5.35	6.35	.17	2.98	.02	17.01	.85	.09	.24	1,450	1.97	17,470	31	2.4	1,750	7.5
July 21-28	11,310	--	11.28	5.67	7.95	--	3.31	--	3.31	--	--	--	1,730	2.35	26,580	32	2.7	2,010	7.8
July 29-31, Aug. 1-10	28,370	--	8.68	3.54	4.61	--	3.31	--	3.31	--	--	--	1,160	1.58	44,820	27	1.9	1,440	7.8
Aug. 11-20	15,000	--	10.13	4.69	6.39	--	3.61	--	3.61	--	--	--	1,480	2.01	30,150	30	2.3	1,770	7.6
Aug. 21-31	15,800	--	10.78	4.85	5.96	--	3.44	--	3.44	--	--	--	1,520	2.07	32,710	28	2.1	1,870	8.0
Sept. 1-10	10,240	--	10.23	6.33	6.74	--	2.98	--	2.98	--	--	--	1,640	2.23	22,840	29	2.3	1,980	8.1
Sept. 11-20	10,210	--	12.43	6.91	7.83	--	3.31	--	3.31	--	--	--	1,960	2.67	27,260	29	2.5	2,280	7.6
Sept. 21-30	15,000	--	12.28	6.33	5.61	--	3.67	--	3.67	--	--	--	1,790	2.43	36,450	23	1.8	2,120	7.6
Total or weighted average	1,032,000	--	5.79	2.80	3.44	--	--	--	--	--	--	--	830	1.13	1,166,000	29	1.7	1,060	--

GREEN RIVER BASIN

GREEN RIVER AT GREEN RIVER, UTAH

LOCATION.--At gaging station, 1 mile southeast of the town of Green River, Emery County, 22 miles upstream from San Rafael River, and 117 miles upstream from mouth.

DRAINAGE AREA.--40,600 square miles, approximately.

RECORDS AVAILABLE.--Chemical analyses: August 1928 to September 1955.

Water temperatures: May 1949 to September 1955.

Sediment records: May 1930 to September 1955.

EXTREMES, 1954-55.--Specific conductance: Maximum daily, 1,120 micromhos Dec. 27; minimum daily, 349 micromhos May 31.

Percent sodium: Maximum, 47 Nov. 21-24, 26, Dec. 1-10; minimum, 25 May 11-20.

EXTREMES, 1941-55.--Specific conductance: Maximum daily, 2,420 micromhos Sept. 29, 1943; minimum daily, 321 micromhos May 30, 1948.

Percent sodium (1950-55): Maximum, 47 Nov. 21-24, 26, Dec. 1-10, 1954; minimum, 21 June 1-10, 1951, June 11-20, 1952, June 21-30, 1953.

REMARKS.--Values reported for dissolved solids are residues on evaporation. Records of specific conductance of daily samples available in district office at Salt Lake City, Utah. Records of discharge for water year October 1954 to September 1955 given in WSP 1393.

Chemical analyses, water year October 1954 to September 1955

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million										Dissolved solids			Per-cent so-dium	So-dium adsorp-tion ratio	Specific conduct-ance (micro-mhos at 25°C)	pH
			Equivalents per million								Boron (B) ppm	Parts per mil-lion		Tons per acre-foot	Total tons				
			Cal-cium (Ca)	Magne-sium (Mg)	So-dium (Na)	Potas-sium (K)	Bicar-bonate (HCO ₃)	Sul-fate (SO ₄)	Chlo-ride (Cl)	Fluo-ride (F)		Ni-trate (NO ₃)							
Oct. 1-10, 1954...	42,840	--	6.59	2.63	5.26	--	--	--	--	--	--	--	960	1.31	56,120	36	2.5	1,320	--
Oct. 11-20	47,330	14	4.99	3.12	4.74	0.15	3.97	7.93	1.24	0.02	0.09	0.25	832	1.13	53,480	36	2.4	1,180	7.7
Oct. 21-23, 25-31.	44,190	--	4.19	2.38	4.61	--	--	--	--	--	--	--	725	.99	43,750	41	2.5	1,060	--
Oct. 24 ^a	4,220	--	5.74	3.54	7.44	--	--	--	--	--	--	--	--	--	--	44	3.4	1,510	--
Nov. 1-10.....	39,950	--	4.19	2.63	5.48	--	--	--	--	--	--	--	761	1.03	41,150	45	3.0	1,060	--
Nov. 11-20.....	40,030	--	4.54	2.80	6.22	--	--	--	--	--	--	--	800	1.09	43,630	46	3.3	1,130	--
Nov. 21-24, 26...	20,710	--	4.14	2.88	6.22	--	--	--	--	--	--	--	773	1.05	21,750	47	3.3	1,090	--
Dec. 1-10.....	29,430	--	4.04	3.62	6.78	--	--	--	--	--	--	--	839	1.14	33,550	47	3.5	1,190	--
Dec. 11-20.....	23,980	--	5.04	3.45	7.09	--	--	--	--	--	--	--	918	1.25	29,980	46	3.4	1,280	--
Dec. 21-31.....	26,240	--	5.69	4.11	5.91	--	--	--	--	--	--	--	1,030	1.40	36,740	38	2.7	1,420	--
Jan. 1-10, 1955....	29,160	--	4.74	3.37	5.35	--	--	--	--	--	--	--	847	1.15	33,530	40	2.7	1,220	--
Jan. 11-20.....	24,180	12	4.39	3.29	4.61	.08	4.41	6.60	1.41	.01	.05	.20	773	1.05	25,390	37	2.3	1,130	7.8
Jan. 21-31.....	26,380	--	4.54	2.80	4.48	--	--	--	--	--	--	--	737	1.00	26,380	38	2.3	1,080	--
Feb. 1-10.....	30,450	--	4.34	2.55	3.87	--	--	--	--	--	--	--	684	.93	28,320	36	2.1	1,010	--
Feb. 11-20.....	32,550	--	4.24	2.55	3.91	--	--	--	--	--	--	--	677	.92	29,950	37	2.1	.991	--
Feb. 21-28.....	23,400	--	3.84	2.71	3.87	--	--	--	--	--	--	--	636	.86	20,120	37	2.1	.943	--

^a Not included for computation of weighted averages.

Mar. 1-10, 1955..	36,100	--	4.04	2.55	4.04	--	--	--	--	--	--	668	.91	32,850	38	2.2	979	--
Mar. 11-20.....	120,900	--	3.84	2.14	4.39	--	--	--	--	--	--	665	.90	108,600	42	2.5	991	--
Mar. 21-31.....	80,470	--	3.79	2.38	4.57	--	--	--	--	--	--	704	.96	77,250	43	2.6	1,010	--
Apr. 1-10.....	69,240	--	4.14	2.47	4.30	--	3.77	--	--	--	--	703	.96	66,470	39	2.4	1,060	7.8
Apr. 11-20.....	102,300	12	3.59	2.47	3.91	.10	3.61	.20	.06	1.02	--	639	.87	89,000	39	2.2	945	7.7
Apr. 21-30.....	139,400	--	3.09	1.48	2.44	--	3.11	--	--	--	--	443	.60	83,640	35	1.6	678	7.8
May 1-10.....	159,700	--	2.74	1.15	1.83	--	2.90	--	--	--	--	360	.49	78,250	32	1.3	567	8.0
May 11-20.....	244,800	--	2.69	.76	1.17	--	2.85	--	--	--	--	288	.39	95,470	25	.9	455	7.7
May 21-31.....	273,100	--	2.25	.72	1.04	--	2.39	--	--	--	--	244	.33	90,120	26	.9	397	7.7
June 1-10.....	202,700	--	2.35	.76	1.22	--	2.39	--	--	--	--	275	.37	75,000	28	1.0	436	7.8
June 11-20.....	242,600	--	2.25	.82	1.26	--	2.29	--	--	--	--	260	.35	84,910	29	1.0	426	7.7
June 21-30.....	209,300	--	2.20	.79	1.26	--	2.33	--	--	--	--	259	.35	73,260	30	1.0	428	7.7
July 1-10.....	119,700	--	2.25	.72	1.26	--	2.21	--	--	--	--	263	.36	43,090	30	1.0	422	7.5
July 11-20.....	56,330	12	2.45	1.48	1.91	.06	2.65	.08	.02	.68	--	362	.49	27,600	32	1.4	559	7.6
July 21-26, 28-31.	42,430	--	3.19	1.23	3.13	--	3.18	--	--	--	--	471	.64	27,170	41	2.1	736	7.6
July 27.....	4,090	--	4.69	2.30	4.52	--	2.98	--	--	--	--	758	1.03	4,210	39	2.4	1,060	8.1
Aug. 1-10.....	55,300	--	3.59	1.48	3.74	--	3.22	--	--	--	--	558	.76	42,030	42	2.3	842	8.0
Aug. 11-20.....	50,060	--	3.74	2.22	4.09	--	3.54	--	--	--	--	559	.76	38,050	41	2.4	967	7.8
Aug. 21-26, 28-30	44,870	--	3.99	1.73	4.17	--	3.41	--	--	--	--	633	.86	38,590	42	2.5	939	7.9
Aug. 27, 31.....	10,650	--	6.64	3.21	5.78	--	4.13	--	--	--	--	1,070	1.46	15,550	37	2.6	1,450	7.6
Sept. 1-2, 4-10...	27,510	--	4.44	1.81	4.26	--	3.34	--	--	--	--	674	.92	25,310	41	2.4	994	7.8
Sept. 3.....	3,410	--	7.68	2.30	4.83	--	3.31	--	--	--	--	1,030	1.40	4,770	33	2.2	1,360	7.7
Sept. 11-20.....	20,310	--	3.84	1.97	4.30	--	3.38	--	--	--	--	644	.88	17,870	43	2.5	970	7.7
Sept. 21-30.....	19,450	--	3.84	2.47	4.70	--	3.34	--	--	--	--	699	.95	18,480	43	2.6	1,050	7.9
Total or weighted average.....	b2,820,000	--	3.19	1.56	2.74	--	--	--	--	--	--	466	0.63	1,777,000	37	1.8	706	--

b Represents 99 percent of runoff for water year October 1954 to September 1955.

SAN JUAN RIVER BASIN--Continued

SAN JUAN RIVER NEAR BLANCO, N. MEX.

LOCATION.--At highway bridge, half a mile downstream from gaging station which is 1 mile upstream from Canyon Largo and 1½ miles east of Blanco, San Juan County.

DRAINAGE AREA.--3,560 square miles, approximately, (at gaging station).

RECORDS AVAILABLE.--Chemical analyses: October 1945 to December 1954 (discontinued).

Water temperatures: March 1949 to December 1954 (discontinued).

Sediment records: March 1949 to December 1954 (discontinued).

EXTREMES, 1945-54.--Specific conductance: Maximum observed 1,420 micromhos Aug. 16, 1947; minimum observed, 107 micromhos June 20, 1952. Percent sodium: (1945-49, 1950-54) Maximum, 52 July 11-16, 18, 20, 1947; minimum, 13 Apr. 11-20, June 4, 1952.

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. Site of data collection moved about 12 miles upstream in December 1954 to gaging station located on San Juan River near Archuleta, N. Mex. Records of discharge for October to December 1954 given in #SP 1393. No appreciable inflow between gaging station and sampling point.

Chemical analyses, October to December 1954

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million								Dissolved solids			Percent sodium adsorption ratio	So-dium adsorp-tion ratio	Specific conductance (micro-mhos at 25°C)	pH		
			Cal-cium (Ca)	Magne-sium (Mg)	So-dium (Na)	Potas-sium (K)	Bicar-bonate (HCO ₃)	Sul-fate (SO ₄)	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO ₃)	Boron (B) ppm	Parts per million					Tons per acre-foot	Total tons
Oct. 1-10, 1954 ..	14,600	14	1.60	0.47	0.83	0.09	1.87	0.94	0.14	0.01	0.01	0.08	174	0.24		28	0.8	286	7.5
Oct. 11-20	12,280																	274	
Oct. 21-31	8,150																	333	
Nov. 1-10	6,980																	356	
Nov. 11-20	4,600																	425	
Nov. 21-30	3,440																	474	
Dec. 1-10	3,230																	494	
Dec. 11-20	3,140																	523	
Dec. 21-23	1,150																	554	

SAN JUAN RIVER BASIN--Continued

SAN JUAN RIVER NEAR BLUFF, UTAH

LOCATION.--At bridge on State Highway 47, 1,800 feet downstream from gaging station and 20 miles southwest of Bluff, San Juan County. DRAINAGE AREA.--23,000 square miles, approximately (at gaging station). RECORDS AVAILABLE.--Chemical analyses: February to June 1927, October 1929 to September 1955.

Water temperatures: May 1944 to September 1955.

Sediment records: August to September 1928, July 1929 to September 1955.

EXTREMES, 1954-55.--Specific conductance: Maximum daily, 1,670 micromhos July 28; minimum daily, 282 micromhos June 12.

Percent sodium: Maximum, 45 July 27-31; minimum, 22 June 11-20.

EXTREMES, 1929-55.--Specific conductance (1941-55): Maximum daily, 2,110 micromhos Aug. 13, 1954; minimum daily, 208 micromhos June 17, 1952.

Percent sodium: Maximum, 58 Sept. 10, 1954; minimum, 11 May 21, 23-27, 29-31, July 1-10, 1944.

REMARKS.--Values reported for dissolved solids are residues on evaporation. Records of specific conductance of daily samples available in district office at Salt Lake City, Utah. Records of discharge for water year October 1954 to September 1955 given in WSP 1953.

Chemical analyses, water year October 1954 to September 1955

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million										Dissolved solids			Per-cent so-dium	So-ad-sorp-tion ratio	Specific conductance (micro-mhos at 25°C)	pH
			Cal-cium (Ca)	Magne-sium (Mg)	So-dium (Na)	Potas-sium (K)	Bicar-bonate (HCO ₃)	Sul-fate (SO ₄)	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO ₃)	Boron (B) ppm	Total						
													Parts per million	Tons per acre-foot					
Oct. 1-11, 1954.	48,020	16	4.84	1.40	2.78	0.13	3.61	5.06	0.48	0.04	--	584	0.79	37,940	30	1.6	839	7.6	
Oct. 12-20.....	27,370	14	3.74	1.23	1.96	.09	2.57	4.08	.37	.03	0.07	453	.62	16,970	28	1.2	661	7.6	
Oct. 21-31.....	20,030	13	4.34	1.81	2.74	.07	2.69	5.68	.56	.05	--	586	.80	16,020	31	1.6	835	7.8	
Nov. 1-10.....	14,830	12	4.74	2.06	3.30	.08	2.88	6.77	.62	.05	--	670	.91	13,500	32	1.8	935	8.1	
Nov. 11-20.....	12,860	11	5.29	2.63	4.00	.08	3.00	8.18	.73	.05	.09	794	1.08	13,890	33	2.0	1,080	7.8	
Nov. 21-30.....	11,540	12	5.59	3.04	4.39	.09	2.95	9.22	.85	.06	--	843	1.15	13,270	33	2.1	1,180	7.8	
Dec. 1-10.....	11,630	14	6.09	3.45	4.74	.10	3.21	10.33	.93	.08	--	943	1.28	14,890	33	2.2	1,280	7.8	
Dec. 11-20.....	13,060	15	6.19	3.12	4.87	.10	3.21	10.22	.93	.09	.10	942	1.28	16,720	34	2.3	1,280	7.9	
Dec. 21, 31.	2,530	14	5.99	3.21	5.17	.11	2.97	10.45	1.02	.09	--	937	1.27	3,210	36	2.4	1,300	7.9	
Jan. 1-10, 1955.	10,840	14	6.34	3.29	4.87	.11	3.39	10.16	1.02	.11	--	944	1.28	13,880	33	2.2	1,300	7.8	
Jan. 11-20.....	11,150	16	5.89	2.88	4.39	.10	3.24	9.22	.90	.09	.12	866	1.18	13,160	33	2.1	1,200	8.0	
Jan. 21-31.....	8,730	14	6.69	3.29	5.09	.10	3.47	10.76	1.04	.10	--	998	1.36	11,870	34	2.3	1,340	7.9	
Feb. 1-10.....	10,480	13	5.79	2.71	4.39	.10	3.28	8.93	.90	.08	.17	844	1.15	12,050	34	2.1	1,170	7.9	
Feb. 14-18.....	6,600	12	5.79	2.63	4.26	.10	3.18	8.85	.90	.08	--	829	1.13	7,460	33	2.1	1,150	7.8	
Feb. 21-28.....	9,520	12	5.64	2.88	4.65	.10	3.18	9.18	.90	.09	--	854	1.16	11,040	35	2.3	1,180	7.8	
Mar. 1-10.....	22,360	12	5.49	2.63	4.26	.13	2.92	8.85	.76	.11	--	830	1.13	25,270	34	2.1	1,140	7.5	
Mar. 11-20.....	25,720	12	4.59	2.14	3.26	.13	2.75	6.68	.68	.10	.10	664	.90	23,150	32	1.8	947	7.6	
Mar. 21-31.....	14,870	14	5.49	2.55	3.26	.12	3.03	7.60	.79	.08	--	746	1.01	15,020	29	1.6	1,050	7.7	

Apr. 1-10, 1955.	15,520	15	4.69	2.06	3.17	.10	2.84	6.35	.71	.06	--	645	.88	13,660	32	1.7	927	7.6
Apr. 11-20	18,700	14	4.59	1.97	3.00	.10	2.82	6.06	.68	.05	.06	617	.84	15,710	31	1.7	903	7.6
Apr. 21-30	28,260	13	3.34	1.32	1.87	.07	2.29	3.87	.65	.04	--	426	.58	16,390	28	1.2	639	7.6
May 1-10	41,570	15	2.99	1.07	1.48	.07	2.10	3.21	.27	.04	--	360	.49	20,370	26	1.0	548	7.9
May 11-20	67,560	14	2.54	.65	.96	.04	2.08	1.98	.16	.03	.06	266	.36	24,320	23	.8	490	7.7
May 21-31	77,180	13	2.25	.62	.96	.05	1.72	2.00	.18	.03	--	251	.34	26,240	25	.8	393	7.7
June 1-10	71,760	12	2.30	.82	.96	.07	1.87	1.98	.20	.02	--	256	.35	25,120	23	.8	395	7.8
June 11-20	83,860	10	2.00	.62	.74	.05	1.57	1.60	.16	.02	.00	212	.29	24,320	22	.6	328	7.8
June 21-30	52,520	15	2.15	.62	.91	.05	1.61	1.83	.19	.02	--	240	.33	17,330	24	.8	365	7.6
July 1-10	22,850	16	2.69	.81	1.57	.07	1.97	2.89	.34	.02	--	340	.46	10,510	31	1.2	511	7.7
July 11-14, 16-20	12,710	18	4.09	1.15	3.13	.12	2.62	5.31	.51	.04	.11	562	.76	9,660	37	1.9	801	7.8
July 15 a	1,870	23	6.39	1.40	--	--	3.15	7.20	.68	.02	--	--	--	--	--	--	1,200	7.4
July 21-26	6,270	16	4.54	1.56	3.22	.12	2.85	5.91	.68	.04	--	627	.85	5,330	34	1.8	876	7.7
July 27-31	21,060	25	6.69	1.73	6.96	.17	3.90	11.05	.65	.02	--	1,050	1.43	30,120	45	3.4	1,390	7.3
Aug. 1-10	44,380	21	5.54	1.73	5.04	.15	4.23	7.52	.51	.01	--	796	1.08	47,930	40	2.6	1,120	7.5
Aug. 11-20	54,600	22	5.89	1.48	5.57	.15	4.13	8.29	.51	.00	.09	854	1.16	63,340	43	2.9	1,170	7.6
Aug. 21-28, 30-31	38,000	21	4.69	1.40	3.78	.12	3.70	5.91	.45	.00	--	659	.90	34,200	38	2.2	931	7.4
Aug. 29 a	5,490	20	--	--	--	--	3.64	10.76	.48	.00	--	--	--	--	--	--	1,270	7.2
Sept. 1-10	12,090	17	3.99	1.32	2.83	.12	2.69	5.08	.51	.05	--	549	.75	9,070	34	1.7	780	7.7
Sept. 11-20	3,740	15	4.49	1.97	4.83	.12	2.36	8.18	.85	.03	.07	758	1.03	3,850	42	2.7	1,060	7.4
Sept. 21 a	936	14	--	--	--	--	3.02	10.47	.96	.07	--	--	--	--	--	--	1,310	7.4
Sept. 22-30	10,800	15	4.24	1.40	3.30	.12	2.98	5.43	.62	.06	--	600	.82	8,860	36	2.0	860	7.6
Total or weighted average	b 965,600	15	3.89	1.40	2.65	0.09	2.64	4.93	0.45	0.04	--	522	0.71	695,600	33	1.6	747	--

a Not included for computation of weighted averages.

b Represents 98 percent of runoff for water year October 1954 to September 1955.

LITTLE COLORADO RIVER BASIN

LITTLE COLORADO RIVER AT CAMERON, ARIZ.

LOCATION.--At bridge on U. S. Highway 89 at Cameron, Coconino County, 12 miles upstream from gaging station which is 9½ miles downstream from Moenkopi Wash, 9½ miles northwest of Cameron, and 45.5 miles upstream from mouth.

DRAINAGE AREA.--26,500 square miles, approximately (above gaging station).

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

Water temperatures: October 1952 to September 1955.

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 station near Cameron (below Moenkopi Wash) for water year October 1954 to September 1955 given in WSP 1393. Appreciable inflow between sampling site and gaging station during periods of storm runoff. Most of this inflow is from Moenkopi Wash but other arroyos may at times become sizeable contributors.

Chemical analyses, water year October 1954 to September 1955

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million								Dissolved solids			Per- cent so- dium ratio	Specific conduct- (micro- mhos at 25°C)	pH			
			Cal- cium (Ca)	Magne- sium (Mg)	So- dium (Na)	Potas- sium (K)	Bicar- bonate (HCO ₃)	Sul- fate (SO ₄)	Chlo- ride (Cl)	Fluo- ride (F)	Ni- trate (NO ₃)	Boron (B) ppm	Parts per mil- lion				Tons per acre- foot	Total tons	
Oct. 1-4, 8-9, 1954		29	0.65	0.35	6.96	0.07	4.92	1.67	1.24	0.05	0.02	0.69	488	0.66		87	9.8	768	8.5
Oct. 6-7, 10		22	3.29	1.23	9.58		5.11	5.95	2.99	.05	.00	--	909	1.24		68	6.4	1,410	8.0
Oct. 11-14		--	2.05	.90	7.91	--	4.46	--	--	--	--	--	666	.91		73	6.5	1,080	7.5
Oct. 22		--	1.35	.35	8.61	--	3.29	--	--	--	--	--	644	.88		84	9.3	1,070	7.7
Mar. 13-14, 1955.		--	11.78	5.18	7.22	--	4.06	--	--	--	--	--	1,590	2.16		30	2.5	1,940	7.6
Mar. 23, 26-31		--	2.25	.82	9.39	--	2.69	--	--	--	--	--	758	1.03		75	7.6	1,350	8.0
Mar. 24-25		--	3.14	1.56	14.35	--	3.11	--	--	--	--	--	1,130	1.54		75	9.4	2,010	8.0
Apr. 1, 5-10		13	3.19	.90	12.18	.13	2.92	2.21	11.22	.02	.06	.19	975	1.33		74	8.5	1,720	7.8
Apr. 11-12		--	3.54	1.97	15.83	--	3.31	--	--	--	--	--	1,210	1.65		74	9.5	2,170	7.6
June 13		--	0.52		4.78	--	3.12	--	--	--	--	--	355	.48		90	9.4	508	8.5
June 14-20		--	1.65	.71	10.09	--	4.36	--	--	--	--	--	736	1.00		81	9.3	1,230	7.8
June 21-26		--	1.45	.50	8.44	--	3.59	--	--	--	--	--	617	.84		81	8.5	1,070	7.9
July 18-31		--	4.34	1.89	9.74	--	6.42	--	--	--	--	--	906	1.23		61	5.5	1,430	7.6
Aug. 1-10		--	4.54	2.47	8.22	--	5.03	--	--	--	--	--	878	1.19		54	4.4	1,310	7.5
Aug. 11-20		--	2.54	1.23	8.65	--	4.49	--	--	--	--	--	736	1.00		70	6.3	1,170	8.0
Aug. 21-31		--	1.95	.82	7.83	--	3.49	--	--	--	--	--	647	.88		74	6.7	1,040	8.0
Sept. 1-10		--	2.00	.90	7.48	--	2.90	--	--	--	--	--	613	.83		72	6.2	1,010	7.9

a Includes 0.27 equivalent per million of carbonate (CO₃).

b Includes 0.20 equivalent per million of carbonate (CO₃).

VIRGIN RIVER BASIN

VIRGIN RIVER AT LITTLEFIELD, ARIZ.

LOCATION.--At gaging station, three-eighths of a mile downstream from Beavertown Wash, three-eighths of a mile upstream from Littlefield, Mohave County, and 36 miles upstream from water line of Lake Mead at elevation 1,221 feet above mean sea level.

DRAINAGE AREA.--5,090 square miles, approximately.

RECORDS AVAILABLE.--Chemical analyses: July 1949 to September 1955.

Water temperatures: October 1947 to September 1955.

Sediment records: October 1947 to September 1955.

EXTREMES, 1954-55.--Specific conductance: Maximum daily, 3,660 micromhos Oct. 19; minimum daily, 1,660 micromhos Feb. 19.

Percent sodium: Maximum, 35 Jan. 1-10; minimum, 16 Aug. 11-20.

EXTREMES, 1949-55.--Specific conductance: Maximum daily, 3,960 micromhos July 14, 1954; minimum daily, 734 micromhos Apr. 28, 1952.

Percent sodium (1953-55): Maximum, 35 Jan. 1-10, 1955; minimum, 16 Aug. 11-20, 1955.

REMARKS.--Values reported for dissolved solids are sums of determined constituents. Records of specific conductance of daily samples available in district office at Salt Lake City, Utah. Records of discharge for water year October 1954 to September 1955 given in WSP 1393.

Chemical analyses, water year October 1954 to September 1955

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million								Dissolved solids				Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	
			Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B) ppm	Parts per million	Tons per acre-foot				Total tons
Oct. 1-10, 1954 ..	3,830	22	20.01	9.21	10.18	0.56	5.15	25.82	9.08	0.02	0.94	2,510	3.41	12,380	25	2.7	3,250	7.4
Oct. 11-20	2,300	19	21.26	8.88	12.61	.59	5.75	26.23	11.00	.04	.92	2,690	3.66	8,420	29	3.3	3,510	7.5
Oct. 21-31	2,690	20	18.16	8.72	13.05	.59	5.39	23.53	11.56	.05	.99	2,520	3.43	9,230	32	3.6	3,390	7.5
Nov. 1-10	2,650	21	17.22	8.55	12.83	.67	5.15	22.28	11.85	.05	.83	2,440	3.32	8,800	33	3.6	3,280	7.9
Nov. 11-20	3,330	21	16.37	8.06	11.83	.59	5.15	20.47	10.86	.05	.74	2,270	3.09	10,290	32	3.4	3,060	7.8
Nov. 21-30	3,290	20	15.87	8.14	11.83	.59	5.01	19.88	11.00	.05	.77	2,230	3.03	9,970	32	3.4	3,030	7.9
Dec. 1-10	5,090	17	15.27	6.74	9.96	.51	4.95	17.97	9.03	.05	.63	1,990	2.71	13,790	31	3.0	2,710	7.9
Dec. 11-20	4,160	19	14.17	6.74	10.70	.51	5.28	16.95	9.53	.05	.61	1,970	2.68	11,150	33	3.3	2,700	7.9
Dec. 21-31	3,940	21	14.67	6.91	10.96	.46	5.36	17.28	9.93	.04	.70	2,010	2.73	10,760	33	3.3	2,850	7.7
Jan. 1-10, 1955 ..	3,840	21	13.12	6.66	10.83	.46	4.93	16.22	9.59	.04	.70	1,900	2.58	9,910	35	3.4	2,690	7.7
Jan. 11-20	3,940	19	13.22	6.66	10.57	.46	5.10	16.53	9.53	.03	.70	1,910	2.60	10,240	34	3.4	2,720	7.8
Jan. 21-31	3,980	19	13.27	6.74	10.57	.46	5.00	16.61	9.73	.04	.70	1,920	2.61	10,390	34	3.3	2,710	7.7
Feb. 1-10	3,590	19	13.77	6.74	10.57	.46	5.20	16.51	9.53	.03	.71	1,930	2.62	9,410	34	3.3	2,740	7.8
Feb. 11-18	4,050	20	13.47	6.74	10.57	.46	5.21	16.53	9.53	.03	.71	1,920	2.61	10,570	34	3.3	2,710	8.0
Feb. 19	768	13	9.98	3.70	4.87	.25	3.44	11.24	3.95	.04	--	1,160	1.58	1,210	26	1.9	1,660	8.2
Feb. 20-28	3,670	18	13.17	6.58	10.00	.43	5.21	15.78	8.74	.03	.66	1,840	2.50	9,180	33	3.2	2,590	8.0

VIRGIN RIVER BASIN--Continued
VIRGIN RIVER AT LITTLEFIELD, ARIZ.--Continued

Chemical analyses, water year October 1954 to September 1955--Continued

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million								Dissolved solids				Per-cent sodium adsorp-tion ratio	Specific conduct-ance (micro-mhos at 25°C)	pH
			Cal-cium (Ca)	Magne-sium (Mg)	So-dium (Na)	Potas-sium (K)	Bicar-bonate (HCO ₃)	Sul-fate (SO ₄)	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO ₃)	Boron (B) ppm	Parts per mil-lion	Tons per acre-foot				Total at-tons
Mar. 1-10, 1955...	3,750	21	12.48	6.41	9.52	0.56	4.92	15.49	8.80	0.05	0.60	1,800	2.45	9,190	33	2,580	7.8
Mar. 11-20.....	3,390	20	12.77	6.50	9.52	.56	4.88	15.91	8.60	.05	.60	1,820	2.48	8,410	32	2,600	7.5
Mar. 21-31.....	3,430	20	13.67	6.99	10.13	.59	5.00	17.40	9.36	.04	.70	1,960	2.67	9,160	32	2,780	7.6
Apr. 1-10.....	1,630	22	17.51	9.13	11.39	.74	5.13	22.90	10.49	.02	.90	2,400	3.26	5,310	29	3,240	7.4
Apr. 11-20.....	2,010	21	16.97	8.63	11.39	.72	5.24	21.65	10.58	.03	.80	2,330	3.17	6,370	30	3,160	7.4
Apr. 21-30.....	2,290	19	16.07	8.14	11.18	.67	5.38	20.30	10.01	.03	.80	2,220	3.02	6,920	31	3,070	7.5
May 1-10.....	2,130	24	14.97	8.14	11.35	.61	4.49	20.59	10.29	.05	.89	2,200	2.99	6,370	32	3,010	7.4
May 11-20.....	1,570	25	17.07	9.13	11.26	.67	5.00	23.32	10.49	.03	1.0	2,410	3.28	5,150	30	3,200	7.3
May 21-31.....	1,460	25	17.91	9.46	11.22	.72	5.18	23.94	10.49	.03	1.0	2,470	3.36	4,910	29	3,260	7.4
June 1-10.....	1,310	26	17.17	10.36	10.65	.79	4.52	24.36	10.58	.02	1.0	2,460	3.35	4,390	27	3,250	7.6
June 11-20.....	1,320	24	17.76	10.44	10.87	.82	5.10	24.36	10.44	.03	.96	2,480	3.37	4,450	27	3,280	7.6
June 21-30.....	1,330	23	18.36	10.36	10.91	.84	5.34	24.77	10.58	.03	.96	2,530	3.44	4,580	27	3,330	7.4
July 1-10.....	1,340	30	16.97	9.87	11.96	.84	4.16	24.36	10.66	.03	.93	2,470	3.36	4,500	30	3,240	7.5
July 11-20.....	1,560	28	17.86	9.70	11.74	.82	4.77	24.57	10.38	.03	.93	2,500	3.40	5,300	29	3,260	7.4
July 21-31.....	7,320	26	24.55	7.98	10.26	.59	5.62	28.94	8.12	.04	.68	2,720	3.70	27,080	24	3,310	7.4
Aug. 1-10.....	6,960	24	26.85	7.65	8.70	.56	5.67	30.40	7.61	.05	.55	2,780	3.78	26,310	20	3,340	7.4
Aug. 11-20.....	7,880	23	28.14	6.00	6.57	.49	4.46	31.02	5.92	.04	.49	2,670	3.63	28,600	16	3,110	7.3
Aug. 21-31.....	25,450	25	26.95	6.74	7.91	.54	4.65	30.60	6.91	.04	.55	2,710	3.69	93,910	19	3,210	7.5
Sept. 1-10.....	1,620	30	17.17	9.13	10.91	.77	4.10	23.73	10.10	.04	--	2,390	3.25	5,260	29	3,150	7.2
Sept. 11-20.....	1,450	29	17.32	9.70	11.13	.77	4.59	23.53	10.01	.05	1.0	2,410	3.28	4,760	29	3,250	7.2
Sept. 21-30.....	1,400	27	17.32	9.29	10.78	.72	4.46	23.53	9.93	.04	--	2,380	3.24	4,540	28	3,170	7.2
Total or weighted average.....	135,500	22	19.36	7.48	9.92	0.56	5.00	23.32	8.85	0.04	0.69	2,340	3.18	430,900	27	3,030	--

GILA RIVER BASIN

GILA RIVER AT KELVIN, ARIZ.

LOCATION.--Just above mouth of Mineral Creek, and 1,200 feet upstream from gaging station at Kelvin, Pinal County, which is 17 miles downstream from San Pedro River and 19½ miles upstream from Ashurst-Hayden Dam.
DRAINAGE AREA.--18,011 square miles (at gaging station) of which 5,125 square miles is below Coolidge Dam.
RECORDS AVAILABLE.--Chemical analyses: December 1950 to September 1955.

Water temperatures: December 1950 to September 1955.

EXTREMES, 1954-55.--Specific conductance: Maximum observed, 3,860 micromhos July 15; minimum observed, 601 micromhos July 30.

Percent sodium: Maximum, 67 July 15; minimum, 12 July 1-10.

EXTREMES, 1950-55.--Specific conductance: Maximum observed, 3,860 micromhos July 15, 1955; minimum observed, 407 micromhos Jan. 20, 1952.

Percent sodium: Maximum, 67 July 15, 1955; minimum, 12 July 1-10, 1955.

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 1954 to September 1955 given in WSP 1933. No appreciable inflow from Mineral Creek between sampling point and gaging station, except during periods of heavy local rains.

Chemical analyses, water year October 1954 to September 1955

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million							Dissolved solids			Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH			
			Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B) ppm					Parts per million	Tons per acre-foot	Total tons
Oct. 1-10, 1954	4,580	--	3.19	0.99	4.35	0.17	3.83	2.29	2.65	0.05	0.02	0.18	530	0.72	3,300	50	3.0	864	7.7
Oct. 11-20	3,920	--	3.19	1.15	4.57	--	--	--	--	--	--	--	538	.73	2,860	51	3.1	890	--
Oct. 21-31	3,490	--	3.54	1.23	4.91	--	--	--	--	--	--	--	581	.79	2,760	51	3.2	950	--
Nov. 1-10	2,850	--	3.74	1.23	5.04	--	--	--	--	--	--	--	595	.81	2,310	50	3.2	981	--
Nov. 11-20	3,760	--	3.49	1.15	5.09	--	--	--	--	--	--	--	573	.78	2,930	52	3.4	947	--
Nov. 21-30	3,760	--	3.54	1.32	5.22	--	--	--	--	--	--	--	585	.80	3,010	52	3.3	973	--
Dec. 1-10	3,520	--	3.44	1.56	5.74	--	3.97	--	--	--	--	--	644	.88	3,100	53	3.6	1,030	7.7
Dec. 11-20	4,760	--	2.54	1.40	5.91	--	3.73	--	--	--	--	--	645	.88	4,190	60	4.2	991	8.3
Dec. 21-31	6,100	--	3.14	1.48	5.83	--	3.93	--	--	--	--	--	643	.87	5,310	56	3.8	1,050	8.0
Jan. 1-10, 1955	1,440	31	5.99	2.30	7.26	.22	4.82	5.98	4.94	.06	.04	.23	957	1.30	1,870	46	3.6	1,470	8.0
Jan. 11-16	500	--	7.53	3.29	9.74	--	4.80	--	--	--	--	--	1,160	1.58	790	47	4.2	1,710	8.1
Jan. 17-20	722	--	6.04	2.14	6.09	--	4.26	--	--	--	--	--	834	1.13	816	43	3.0	1,290	7.9
Jan. 21-31	843	--	7.93	3.04	9.04	--	4.92	--	--	--	--	--	894	1.22	1,030	45	3.9	1,740	8.2
Feb. 1-10	1,190	--	6.54	3.62	8.78	--	4.82	--	--	--	--	--	1,040	1.41	1,680	46	3.9	1,610	8.1
Feb. 11-20	2,780	--	4.64	2.06	7.35	--	4.46	--	--	--	--	--	799	1.09	3,030	52	4.0	1,330	8.1
Feb. 21-28	2,440	--	4.94	1.64	7.70	--	4.36	--	--	--	--	--	802	1.09	2,660	54	4.2	1,380	8.0

a Includes 0.30 equivalent per million of carbonate (CO₃).

GILA RIVER BASIN--Continued

GILA RIVER AT KELVIN, ARIZ.--Continued

Chemical analyses, water year October 1954 to September 1955.--Continued

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million										Dissolved solids				Per-cent sodium	So-dium adsorp-tion ratio	Specific conduct-ance (micro-mhos at 25° C)	pH
			Cal-cium (Ca)	Magne-sium (Mg)	So-dium (Na)	Potas-sium (K)	Bicar-bonate (HCO ₃)	Sul-fate (SO ₄)	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO ₃)	Boron (B) ppm	Parts per mil-lion	Tons per acre-foot	Total tons					
Mar. 1-10, 1955...	3,190	--	4.29	2.14	8.04	--	4.38	--	--	--	--	912	1.24	3,960	56	4.5	1,420	7.8		
Mar. 11-20	5,220	--	4.19	2.06	8.04	--	4.57	--	--	--	--	922	1.35	7,050	56	4.6	1,440	7.8		
Mar. 21-31	8,080	--	4.44	2.14	9.13	--	4.64	--	--	--	--	1,020	1.39	11,230	58	5.0	1,530	7.7		
Apr. 1-10	8,340	23	5.14	2.22	9.57	0.20	4.85	3.29	8.66	0.06	0.27	1,000	1.36	11,340	56	5.0	1,680	7.7		
Apr. 11-20	7,280	--	6.19	2.63	11.39	--	4.97	--	--	--	--	1,250	1.70	12,380	59	5.8	1,880	7.8		
Apr. 21-30	2,770	--	6.09	3.27	12.96	--	4.69	--	--	--	--	1,460	1.99	5,510	58	5.9	2,150	7.7		
May 1-10	434	--	7.44	3.95	12.52	--	4.15	--	--	--	--	1,650	2.24	972	52	5.2	2,210	7.8		
May 11-20	170	--	8.93	4.69	13.13	--	4.18	--	--	--	--	1,850	2.52	428	49	5.0	2,420	7.8		
May 21-31	58	--	8.83	4.61	12.61	--	3.95	--	--	--	--	1,860	2.53	147	48	4.9	2,410	7.9		
June 1-10	18	--	15.07	6.74	7.87	--	4.54	--	--	--	--	2,230	3.03	55	27	2.4	2,480	7.7		
June 11-13, 17-20	29	--	12.87	5.67	8.87	--	4.31	--	--	--	--	2,050	2.79	81	32	2.9	2,330	7.7		
June 14	161	--	3.24	1.56	3.46	--	5.77	--	--	--	--	568	.77	124	42	2.2	784	7.1		
June 15-16	65	--	8.23	3.21	5.65	--	3.43	--	--	--	--	1,270	1.73	112	33	2.4	1,520	7.6		
June 21-30	26	--	17.81	7.81	6.22	--	4.52	--	--	--	--	2,270	3.09	80	20	1.7	2,470	7.7		
July 1-10	48	41	21.01	8.96	4.09	.15	4.21	27.69	2.26	.02	.01	.08	2,340	3.18	153	12	1.1	2,540	7.5	
July 11-14, 16, 18	599	--	16.72	7.40	7.61	--	4.56	--	--	--	--	2,100	2.86	1,710	24	2.2	2,510	7.8		
July 15	246	--	7.93	4.69	25.44	--	3.90	--	--	--	--	2,360	3.21	790	67	10	3,860	7.4		
July 17, 19-23	8,600	--	5.74	2.55	5.13	--	9.64	--	--	--	--	722	.98	8,430	38	2.5	1,220	7.7		
July 24-31	21,200	--	3.54	1.32	2.52	--	5.08	--	--	--	--	423	.58	12,300	34	1.6	669	7.9		
Aug. 1-10	35,810	--	3.49	1.40	3.00	--	4.79	--	--	--	--	468	.64	22,920	38	1.9	715	7.9		
Aug. 11-20	23,090	--	4.49	1.48	2.83	--	4.20	--	--	--	--	550	.75	17,320	32	1.6	806	7.9		
Aug. 21-31	37,300	--	3.64	1.32	3.04	--	4.42	--	--	--	--	484	.66	24,620	38	1.9	732	8.0		
Sept. 1-7	3,850	--	3.69	1.23	4.22	--	3.90	--	--	--	--	558	.76	2,930	46	2.7	873	8.0		
Sept. 8-20	10,220	--	2.50	.82	3.35	--	3.13	--	--	--	--	409	.56	5,720	50	2.6	648	8.1		
Sept. 21-30	5,920	--	2.79	.90	3.74	--	3.11	--	--	--	--	450	.61	3,610	50	2.8	720	8.0		
Total or weighted average	229,400	--	3.99	1.56	4.74	--	4.65	--	--	--	--	624	0.83	195,000	46	2.8	972	--		

GILA RIVER BELOW GILLESPIE DAM, ARIZ.

LOCATION.--About 1 mile below gaging station on Gila Bend Canal which is 200 feet below Gillespie Dam, Maricopa County, and 8 miles downstream from Hassayampa River. Gila Bend Canal diverts from left bank and Enterprise Canal from right bank at Gillespie Dam. DRAINAGE AREA.--49,620 square miles.

RECORDS AVAILABLE.--Chemical analyses: December 1950 to September 1955.

Water temperatures: December 1950 to September 1955.

EXTREMES, 1954-55.--Specific conductance: Maximum observed, 9,670 micromhos Dec. 1; minimum observed, 370 micromhos Aug. 2.

Percent sodium: Maximum, 67 Oct. 21 to Dec. 20, Feb. 1-20, Apr. 21-30, May 21 to June 10, Sept. 21-30, minimum, 40 Aug. 3-9.

EXTREMES, 1950-55.--Specific conductance: Maximum observed, 10,200 micromhos Oct. 3, 1951; minimum observed, 370 micromhos Aug. 2, 1955.

Percent sodium: Maximum, 69 Aug. 6-10, 1951, June 11 to July 10, 1954; minimum, 36 Jan. 23-24, 1952.

REMARKS.--Values reported for dissolved solids are sums of determined constituents. Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Samples from canal are believed to be representative of total flow passing Gillespie Dam including spill and amounts diverted into Gila Bend and Enterprise Canals. Records of separate and combined discharge for the river and canals for water year October 1954 to September 1955 given in WSP 1393.

Chemical analyses, water year October 1954 to September 1955

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million								Dissolved solids			Per-cent so-dium	So-dium adsorp-tion ratio	Specific conduct-ance (micro-mhos at 25°C)	pH		
			Cal-cium (Ca)	Magne-sium (Mg)	So-dium (Na)	Potas-sium (K)	Bicar-bonate (HCO ₃)	Sul-fate (SO ₄)	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO ₃)	Boron (B) ppm	Parts per mil-lion					Tons per acre-foot	Total tons
Oct. 1-10, 1954.	555	35	19.41	13.49	63.92	0.33	6.11	26.44	63.74	0.14	0.66	3.2	5,830	7.93	4,400	66	16	8,780	7.5
Oct. 11-20.	480	32	19.21	13.08	64.36	.31	5.72	26.65	64.59	.15	.68	3.3	5,850	7.96	3,820	66	16	8,780	7.6
Oct. 21-31.	543	34	19.01	12.66	65.23	.31	5.65	27.06	64.59	.15	.71	3.3	5,890	8.01	4,350	67	16	8,800	7.6
Nov. 1-10.	476	31	19.01	13.49	67.40	.31	5.62	27.90	65.43	.15	.71	3.5	6,010	8.17	3,890	67	17	9,000	7.5
Nov. 11-20.	472	34	19.21	13.49	67.40	.31	6.05	28.11	66.28	.14	.69	3.5	6,070	8.26	3,900	67	17	9,050	7.7
Nov. 21-30.	508	33	18.61	13.90	66.97	.31	6.05	27.90	65.43	.14	.66	3.5	6,010	8.17	4,150	67	17	8,980	7.7
Dec. 1-10.	502	31	19.61	13.08	66.53	.31	6.29	27.90	65.71	.14	.73	3.5	6,030	8.20	4,120	67	16	8,980	7.8
Dec. 11-20.	527	36	19.41	13.49	66.10	.31	6.36	27.69	65.15	.14	.81	3.6	6,000	8.16	4,300	67	16	8,910	7.8
Dec. 21-31.	611	32	19.41	13.49	64.79	.31	6.64	27.27	64.59	.15	.79	3.5	5,940	8.08	4,940	66	16	8,860	7.9
Jan. 1-10, 1955.	648	30	18.61	12.91	62.62	.28	6.51	26.02	62.33	.15	.71	3.5	5,710	7.77	5,030	66	16	8,540	7.9
Jan. 11-20.	916	34	16.72	12.99	58.27	.31	5.74	24.57	57.82	.13	.65	4.0	5,320	7.24	6,630	66	15	8,210	7.8
Jan. 21-31.	938	36	18.41	14.47	62.18	.31	6.28	27.06	62.05	.12	.74	4.4	5,760	7.89	7,400	65	15	8,730	7.8
Feb. 1-10.	718	32	17.61	14.47	64.36	.31	6.26	27.06	62.89	.15	.73	4.4	5,820	7.92	5,690	67	16	8,790	7.7
Feb. 11-20.	708	32	17.61	13.49	63.49	.31	6.23	27.27	61.48	.15	.68	4.3	5,750	7.82	5,540	67	16	8,700	7.8
Feb. 21-28.	553	33	18.21	13.57	63.49	.31	6.26	27.27	61.20	.14	.65	4.6	5,750	7.82	4,320	66	16	8,770	7.8
Mar. 1-10.	710	30	18.61	13.49	63.05	.28	5.95	26.86	63.46	.14	.63	3.2	5,590	7.87	5,590	66	16	8,780	7.8
Mar. 11-20.	763	31	17.61	11.76	58.70	.28	5.70	24.77	57.82	.15	.66	3.0	5,340	7.26	5,540	66	15	8,100	7.8
Mar. 21-31.	752	30	18.21	12.91	61.75	.31	5.57	26.02	61.77	.14	.68	2.9	5,640	7.67	5,770	66	16	8,540	7.9

GILA RIVER BASIN--Continued
GILA RIVER BELOW GILLESPIE DAM, ARIZ.--Continued

Chemical analyses, water year October 1954 to September 1955--Continued

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million							Dissolved solids				Per-cent sodium	So-dium adsorp-tion ratio	Specific conduct-ance (micro-mhos at 25°C)	pH		
			Cal-cium (Ca)	Magne-sium (Mg)	So-dium (Na)	Potas-sium (K)	Bicar-bonate (HCO ₃)	Sul-fate (SO ₄)	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO ₃)	Boron (B) ppm	Parts per mil-lion					Tons per acre-foot	Total tons
Apr. 1-10, 1955.	547	28	17.61	13.08	60.88	0.28	5.47	25.40	61.77	0.14	0.56	2.8	5.560	7.56	4,140	66	16	8,470	7.9
Apr. 11-20	563	33	17.81	12.91	59.14	.31	5.57	24.98	60.35	.14	.66	3.1	5.470	7.44	4,340	66	15	8,300	7.8
Apr. 21-30	531	37	17.42	12.91	60.88	.31	5.15	25.61	61.77	.14	.58	3.0	5.570	7.58	4,020	67	16	8,480	7.9
May 1-10	535	34	17.42	12.34	57.83	.31	5.88	24.36	57.53	.15	.61	2.8	5.300	7.21	3,860	66	15	8,070	7.8
May 11-20	424	30	18.01	12.66	60.88	.31	5.85	25.40	60.35	.14	.50	3.0	5.530	7.52	3,190	66	16	8,400	7.8
May 21-31	403	26	18.01	12.34	60.88	.31	5.51	25.61	60.35	.15	.50	3.3	5.520	7.51	3,030	67	16	8,360	7.8
June 1-10	295	23	17.61	13.08	61.75	.31	5.23	26.23	61.48	.14	.52	3.1	5.600	7.62	2,250	67	16	8,500	7.9
June 11-15, 17-20	292	30	17.22	12.09	56.53	.28	5.51	24.15	55.56	.15	.44	2.6	5.160	7.02	2,050	66	15	7,840	7.7
June 16	44	30	10.08	5.67	24.44	.28	4.42	10.35	24.82	.08	.29	1.3	2.400	3.26	143	60	8.7	3,880	7.2
June 21-30	295	26	16.62	13.49	59.57	.31	4.51	25.61	58.38	.13	.50	3.2	5.370	7.30	2,150	66	15	8,200	7.9
July 1-10	280	27	16.82	13.49	60.01	.31	4.47	26.02	58.94	.14	.48	3.3	5.430	7.38	2,070	66	15	8,260	7.8
July 11-18	266	23	17.22	13.49	60.88	.31	5.10	26.23	59.23	.14	.47	3.3	5.490	7.47	1,990	66	16	8,280	7.6
July 19-21, 24-31	14,950	27	2.59	.82	3.35	.17	3.52	1.48	1.81	.04	.06	.47	4.19	.57	8,520	48	2.6	679	7.8
July 22	48	20	8.13	4.11	20.87	.28	3.65	8.87	20.17	.08	.19	1.4	1.990	2.71	130	63	8.5	3,230	7.4
July 23	234	15	3.84	1.32	6.26	.21	2.57	2.31	6.49	.04	.11	.55	.686	.93	218	54	3.9	1,190	7.7
Aug. 1, 18-23	6,820	28	4.89	1.56	5.04	.17	4.11	3.77	3.58	.04	.07	.84	.704	.96	6,550	43	2.8	1,110	7.8
Aug. 2	2,720	13	1.60	.30	1.78	.21	2.49	.54	.73	--	.03	.70	.227	.31	843	46	1.8	370	7.4
Aug. 3-9	20,120	25	3.09	.78	2.70	.17	3.77	1.58	1.16	.04	.09	.66	.401	.55	11,070	40	1.9	638	7.9
Aug. 10-17	29,020	27	5.24	1.97	11.31	.20	3.54	5.93	8.80	.05	.27	1.4	1.140	1.55	44,980	60	6.0	1,840	7.9
Aug. 24-29	27,230	25	3.34	.78	2.96	.17	3.52	2.31	1.18	.04	.12	.70	.443	.36	16,340	41	2.1	683	7.9
Aug. 30-31	1,530	28	10.68	5.26	24.92	.26	4.77	11.66	24.11	.07	.27	1.9	2.470	3.36	5,140	61	8.8	3,900	7.8
Sept. 1-5	1,110	36	9.93	5.59	27.18	.31	4.36	13.41	25.66	.07	.27	1.4	2.640	3.59	3,980	63	9.8	4,080	7.6
Sept. 6-10	595	41	18.01	14.64	63.92	.36	5.97	27.27	62.61	.13	.55	2.9	5.810	7.88	4,700	66	16	8,540	7.6
Sept. 11-20	1,180	40	19.81	15.21	69.57	.33	6.26	29.56	68.53	.13	.58	3.4	6.310	8.50	10,120	66	17	9,380	7.7
Sept. 21-30	1,020	34	22.80	12.66	71.75	.33	6.19	31.02	70.23	.12	.58	3.3	6.510	8.85	9,030	67	17	9,540	7.6
Total or weighted average	122,500	27	6.19	3.13	14.75	0.20	3.97	6.93	13.08	0.06	0.23	1.3	1,470	2.00	245,000	61	6.8	2,260	--

GILA RIVER BASIN--Continued

SALT RIVER AT STEWART MOUNTAIN DAM, ARIZ.

LOCATION.--Just below dam, 3½ miles above gaging station below Stewart Mountain Dam, which is 6 miles upstream from Verde River, Maricopa County.

DRAINAGE AREA.--6,211 square miles.

RECORDS AVAILABLE.--Chemical analyses: December 1950 to September 1955.

Water temperatures: December 1950 to September 1955.

EXTREMES, 1954-55.--Specific conductance: Maximum observed, 1,410 micromhos Sept. 27-28, 30; minimum observed 992 micromhos Feb. 20, 23. Percent sodium: Maximum, 68 Feb. 17-28, Apr. 11-30, Aug. 1-10, Sept. 11-30; minimum, 62 Jan. 1-10.

EXTREMES, 1950-55.--Specific conductance: Maximum observed, 2,490 micromhos Aug. 20, 1951; minimum observed, 620 micromhos Mar. 28, 1953. Percent sodium: Maximum, 76 July 21-31, Aug. 11-26, 1951; minimum, 53 Mar. 21-31, Apr. 11-30, 1953.

REMARKS.--Values reported for dissolved solids are residues on evaporation. Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of discharge for gaging station below Stewart Mountain Dam for water year October 1954 to September 1955 given in WSP 1393. No inflow between sampling point and gaging station except during periods of heavy local rains.

Chemical analyses, water year October 1954 to September 1955

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million								Dissolved solids			Per-cent sodium	So-dium adsorp-tion ratio	Specific conduct-ance (micro-mhos at 25°C)			
			Cal-cium (Ca)	Magne-sium (Mg)	So-dium (Na)	Potas-sium (K)	Bicar-bonate (HCO ₃)	Sul-fate (SO ₄)	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO ₃)	Boron (B) ppm	Parts per mil-lion				Tons per acre-foot	Total tons	
Oct. 1-10, 1954 ..	10,590	18	2,30	0.99	6.00	0.13	2.59	0.87	6.09	0.02	0.04	0.14	552	0.75	7,940	64	4.7	1,010 ^a	7.5
Oct. 11-20	7,200	--	2,45	1.07	6.04	--	--	--	--	--	--	--	540	.73	5,260	63	4.6	1,010	--
Oct. 21-31	6,720	--	2,40	1.15	6.09	--	--	--	--	--	--	--	543	.74	4,970	63	4.6	1,020	--
Nov. 1-10	7,470	--	2,40	1.15	6.17	--	--	--	--	--	--	--	547	.74	5,530	63	4.6	1,020	--
Nov. 11-20	5,340	--	2,40	1.15	6.04	--	--	--	--	--	--	--	546	.74	3,950	63	4.5	1,010	--
Nov. 21-30	4,680	--	2,25	1.15	6.35	--	--	--	--	--	--	--	573	.78	3,650	65	4.9	1,020	--
Dec. 1-10	3,920	--	2,35	1.23	6.00	--	2.56	--	--	--	--	--	556	.76	2,980	63	4.5	1,010	7.4
Dec. 11-20	11,640	--	2,25	1.15	6.09	--	2.57	--	--	--	--	--	549	.75	8,730	64	4.7	1,010	7.4
Dec. 21-31	21,620	--	2,35	1.07	5.96	--	2.57	--	--	--	--	--	545	.74	16,000	64	4.6	1,010	7.4
Jan. 1-10, 1955 ..	264	13	2,54	1.07	6.00	.13	2.77	.90	6.09	.02	.03	.13	553	.75	198	62	4.5	1,020	7.7
Jan. 11-20	28	--	2,50	1.15	6.13	--	2.67	--	--	--	--	--	552	.75	21	63	4.5	1,020	7.8
Jan. 21-26 a	4.4	--	2,50	1.07	6.04	--	2.72	--	--	--	--	--	539	.73	3	63	4.5	1,020	7.8
Feb. 17-20	5,190	--	2,10	1.07	6.74	--	2.59	--	--	--	--	--	577	.78	4,050	68	5.4	1,010	8.5
Feb. 21-28	7,100	--	2,05	1.07	6.78	--	2.57	--	--	--	--	--	577	.78	5,540	68	5.4	1,030	8.2
Mar. 1-10	17,580	--	2,40	1.23	6.61	--	2.75	--	--	--	--	--	652	.89	15,650	65	4.9	1,110	7.4
Mar. 11-20	19,140	--	2,35	1.23	7.13	--	2.79	--	--	--	--	--	663	.90	17,230	67	5.3	1,160	7.6
Mar. 21-31	19,150	--	2,50	1.23	7.61	--	2.80	--	--	--	--	--	705	.96	18,380	67	5.6	1,220	7.6

^a No flow Jan. 27 to Feb. 16.

^b Includes 0.23 equivalent per million of carbonate (CO₃).

GILA RIVER BASIN--Continued

SALT RIVER AT STEWART MOUNTAIN DAM, ARIZ.--Continued

Chemical analyses, water year October 1954 to September 1955--Continued

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million								Dissolved solids				Per-cent sodium	So-dium adsorp-tion ratio	Specific conduct-ance (micro-mhos at 25°C)	pH	
			Cal-cium (Ca)	Magne-sium (Mg)	So-dium (Na)	Potas-sium (K)	Bicar-bonate (HCO ₃)	Sul-fate (SO ₄)	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO ₃)	Boron (B) ppm	Parts per mil-lion	Tons per acre-foot					Total tons
Apr. 1-10, 1955...	27,430	14	2.69	1.23	7.83	0.14	2.79	1.08	7.90	0.02	0.0	0.18	687	0.93	25,510	66	5.6	1,250	7.7
Apr. 11-20.....	24,530	--	2.45	1.32	7.83	--	2.77	--	--	--	--	--	721	.98	24,040	68	5.7	1,260	7.6
Apr. 21-30.....	17,600	--	2.45	1.32	7.87	--	2.80	--	--	--	--	--	716	.97	17,070	68	5.7	1,260	7.5
May 1-10.....	15,610	--	2.59	1.40	7.22	--	2.80	--	--	--	--	--	705	.96	14,990	64	5.1	1,270	7.7
May 11-20.....	19,330	--	2.59	1.40	7.39	--	2.84	--	--	--	--	--	711	.97	18,750	65	5.2	1,290	7.5
May 21-31.....	22,490	--	2.69	1.32	7.52	--	2.84	--	--	--	--	--	734	1.00	22,490	65	5.3	1,300	7.5
June 1-10.....	23,480	--	2.59	1.48	7.61	--	2.87	--	--	--	--	--	744	1.01	23,710	65	5.3	1,330	7.5
June 11-20.....	22,590	--	2.64	1.40	7.70	--	2.85	--	--	--	--	--	758	1.03	23,270	66	5.4	1,330	7.5
June 21-30.....	32,360	--	2.64	1.48	7.83	--	2.85	--	--	--	--	--	756	1.03	33,330	66	5.0	1,350	7.4
July 1-10.....	32,160	14	2.69	1.40	8.52	.15	2.88	1.12	8.69	.02	.01	.08	746	1.01	32,480	67	6.0	1,350	7.6
July 11-20.....	32,720	--	2.54	1.81	9.00	--	2.93	--	--	--	--	--	774	1.05	34,360	67	6.1	1,370	7.5
July 21-31.....	10,850	--	2.64	1.81	9.13	--	2.90	--	--	--	--	--	785	1.07	11,610	67	6.2	1,380	7.5
Aug. 1-10.....	10,590	--	2.79	1.48	9.04	--	2.95	--	--	--	--	--	778	1.06	11,230	68	6.2	1,380	7.5
Aug. 11-20.....	14,940	--	2.64	1.73	8.78	--	2.88	--	--	--	--	--	762	1.04	15,540	67	5.9	1,360	7.5
Aug. 21-31.....	37,840	--	2.59	2.06	8.78	--	2.84	--	--	--	--	--	751	1.02	38,600	65	5.8	1,340	7.3
Sept. 1-10.....	36,230	--	2.59	1.64	8.74	--	2.85	--	--	--	--	--	761	1.03	37,320	67	6.0	1,360	7.5
Sept. 11-20.....	30,050	--	2.59	1.56	8.78	--	2.75	--	--	--	--	--	763	1.04	31,250	68	6.1	1,360	7.6
Sept. 21-30.....	23,210	--	2.59	1.89	9.31	--	2.92	--	--	--	--	--	781	1.06	24,600	68	6.2	1,400	7.5
Total or weighted average.....	581,800	--	2.54	1.48	7.82	--	2.80	--	--	--	--	--	709	0.96	558,500	66	5.5	1,270	--

VERDE RIVER BELOW BARTLETT DAM, ARIZ.

LOCATION.--At gaging station 2 1/4 miles downstream from Bartlett Dam, Maricopa County and at 3 1/2 miles upstream from Camp Creek. DRAINAGE AREA.--6,188 square miles.

RECORDS AVAILABLE.--Chemical analyses: December 1950 to September 1955.

Water temperatures: December 1950 to September 1955.

EXTREMES, 1954-55.--Specific conductance: Maximum observed, 676 micromhos Nov. 16; minimum observed, 401 micromhos Sept. 18. Percent sodium: Maximum 28 Aug. 1-20, Sept. 1-10; minimum, 22 July 1-10.

EXTREMES, 1950-55.--Specific conductance: Maximum observed, 725 micromhos Jan. 28, 1951; minimum observed, 234 micromhos Jan. 13, 15, 1952. Percent sodium: Maximum, 31 July 21-31, 1951, Nov. 1-20, 1953; minimum, 12 Jan. 4-20, 1952.

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 1954 to September 1955 given in WSP 1393.

Chemical analyses, water year October 1954 to September 1955

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million							Dissolved solids			Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH			
			Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B) ppm					Parts per million	Tons per acre-foot	Total tons
Oct. 1-10, 1954...	1,250	24	2.35	2.47	1.61	0.10	4.39	1.46	0.68	0.02	0.02	0.22	355	0.48	600	25	1.0	597	7.8
Oct. 11-20.....	1,200	--	2.45	2.88	1.65	--	--	--	--	--	--	--	374	.51	612	24	1.0	623	--
Oct. 21-31.....	1,310	--	2.30	2.96	1.74	--	--	--	--	--	--	--	372	.51	668	25	1.1	621	--
Nov. 1-10.....	1,180	--	2.40	3.04	1.83	--	--	--	--	--	--	--	394	.54	637	25	1.1	642	--
Nov. 11-20.....	1,190	--	2.40	3.21	1.83	--	--	--	--	--	--	--	402	.55	654	25	1.1	655	--
Nov. 21-30.....	1,180	--	2.45	3.21	1.87	--	--	--	--	--	--	--	404	.55	649	25	1.1	657	--
Dec. 1-10.....	1,190	--	2.25	3.12	1.96	--	4.77	--	--	--	--	--	396	.54	643	27	1.2	652	8.1
Dec. 11-20.....	1,210	--	2.30	3.12	1.87	--	4.83	--	--	--	--	--	402	.55	666	26	1.1	657	8.0
Dec. 21-31.....	1,300	--	2.25	3.21	1.83	--	4.83	--	--	--	--	--	396	.54	702	25	1.1	654	8.0
Jan. 1-10, 1955..	1,260	22	2.40	2.96	1.74	.09	5.01	1.50	.56	.01	.00	.23	386	.52	655	24	1.1	648	7.4
Jan. 11-21.....	964	--	2.40	3.12	1.83	--	4.77	--	--	--	--	--	396	.54	520	25	1.1	649	8.1
Jan. 22-31.....	2,110	--	2.20	3.12	1.78	--	4.64	--	--	--	--	--	385	.52	1,100	25	1.1	638	8.1
Feb. 1-10.....	855	--	2.30	3.12	1.78	--	4.62	--	--	--	--	--	383	.52	445	25	1.1	630	8.2
Feb. 11-20.....	2,390	--	2.20	2.96	1.78	--	4.61	--	--	--	--	--	380	.52	1,240	26	1.1	629	8.1
Feb. 21-28.....	436	--	2.30	2.96	1.78	--	4.67	--	--	--	--	--	375	.51	232	25	1.1	632	8.0
Mar. 1-10.....	551	--	2.10	2.96	1.74	--	4.79	--	--	--	--	--	381	.52	287	26	1.1	636	7.8
Mar. 11-20.....	9,290	--	2.05	3.04	1.78	--	4.75	--	--	--	--	--	377	.51	4,740	26	1.1	632	7.8
Mar. 21-31.....	20,250	--	2.05	2.96	1.78	--	4.75	--	--	--	--	--	379	.52	10,530	26	1.1	630	8.0

GILA RIVER BASIN--Continued
VERDE RIVER BELOW BARTLETT DAM, ARIZ.--Continued
Chemical analyses, water year October 1954 to September 1955--Continued

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million										Dissolved solids			Per-cent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH
			Cal-cium (Ca)	Magne-sium (Mg)	So-dium (Na)	Potas-sium (K)	Bicar-bonate (HCO ₃)	Sul-fate (SO ₄)	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO ₃)	Boron (B) ppm	Parts per million	Tons per acre-foot	Total tons				
Apr. 1-10, 1955..	5,650	21	2.40	2.80	1.74	0.08	4.82	1.39	0.73	0.02	0.01	0.27	387	0.53	2,990	25	1.1	630	8.1
Apr. 11-20	4,200	--	2.20	2.80	1.70	--	4.79	--	--	--	--	--	373	.51	2,140	25	1.1	620	8.0
Apr. 21-30	2,880	--	2.20	2.88	1.65	--	4.72	--	--	--	--	--	364	.50	1,440	24	1.0	611	8.0
May 1-10	2,930	--	2.25	2.96	1.57	--	4.74	--	--	--	--	--	368	.50	1,460	23	1.0	610	8.2
May 11-20	2,900	--	2.30	2.88	1.57	--	4.65	--	--	--	--	--	363	.49	1,420	23	1.0	601	8.2
May 21-31	3,200	--	2.30	2.80	1.57	--	4.69	--	--	--	--	--	364	.50	1,600	24	1.0	602	8.2
June 1-10	5,290	--	2.30	2.88	1.52	--	4.64	--	--	--	--	--	362	.49	2,590	23	.9	600	8.2
June 11-20	5,830	--	2.20	2.96	1.61	--	4.70	--	--	--	--	--	372	.51	2,970	24	1.0	608	8.1
June 21-30	20,050	--	2.20	2.96	1.70	--	4.65	--	--	--	--	--	378	.51	10,230	25	1.1	621	8.1
July 1-10	13,430	29	2.30	2.80	1.48	1.0	4.39	1.42	.71	.02	.01	.26	367	.50	6,720	22	.9	598	8.1
July 11-20	12,770	--	2.10	2.80	1.74	--	4.26	--	--	--	--	--	366	.50	6,380	26	1.1	593	7.9
July 21-31	3,240	--	2.10	2.88	1.78	--	4.29	--	--	--	--	--	380	.52	1,680	26	1.1	607	7.9
Aug. 1-10	3,410	--	2.10	2.80	1.87	--	4.25	--	--	--	--	--	377	.51	1,740	28	1.2	607	7.8
Aug. 11-20	4,320	--	1.95	2.80	1.87	--	4.06	--	--	--	--	--	368	.50	2,160	28	1.2	589	7.8
Aug. 21-31	3,120	--	2.25	2.63	1.78	--	4.39	--	--	--	--	--	367	.50	1,560	24	1.1	592	7.7
Sept. 1-10	7,660	--	2.69	1.73	1.70	--	3.97	--	--	--	--	--	346	.47	3,600	28	1.1	554	7.7
Sept. 11-20	3,520	--	1.85	1.73	1.13	--	3.18	--	--	--	--	--	281	.38	1,340	24	.8	430	7.7
Sept. 21-30	1,890	--	1.75	2.55	1.52	--	3.44	--	--	--	--	--	310	.42	.794	26	1.0	490	7.7
Total or weighted average.....	155,400	--	2.20	2.80	1.70	--	4.51	--	--	--	--	--	370	0.50	77,700	25	1.1	607	--

AGUA FRIA RIVER BELOW LAKE PLEASANT DAM, ARIZ.

LOCATION.--At water stage recorder on canal 1½ miles downstream from Lake Pleasant Dam on Agua Fria River, 19 miles north of Marinette, Maricopa County, and 23 miles upstream from New River.

DRAINAGE AREA.--1,460 square miles, approximately (above Lake Pleasant).

RECORDS AVAILABLE.--Chemical analyses: December 1950 to September 1955.

Water temperatures: December 1950 to September 1955.

EXTREMES, 1954-55.--Specific conductance: Maximum observed, 579 micromhos June 15; minimum observed, 350 micromhos Sept. 21.

Percent sodium: Maximum, 29 June 11-20; July 11-25, 28-31; minimum, 24 Sept. 1-10.

EXTREMES, 1950-55.--Specific conductance: Maximum observed, 600 micromhos Sept. 26, 1954; minimum observed, 241 micromhos Jan. 29, 1952.

Percent sodium: Maximum, 29 Sept. 21-30, 1954, June 11-20, July 11-25, 28-31, 1955; minimum, 14 Jan. 29-31, Feb. 1-10, 1952.

REMARKS.--Values reported for dissolved solids are residues on evaporation. Samples collected from diversion canal when there is flow.

Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of discharge furnished by Maricopa County Water District through Surface Water Branch, Tucson District for water year October 1954 to September 1955. Monthly diversions to canal below Lake Pleasant Dam are published as Agua Fria River at Lake Pleasant Dam in WSP 1393.

Chemical analyses, water year October 1954 to September 1955

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million										Dissolved solids			Per-cent sodium	So-dium adsorp-tion ratio	Specific conductance (micro-mhos at 25°C)	pH
			Cal-cium (Ca)	Magne-sium (Mg)	So-dium (Na)	Potas-sium (K)	Bicar-bonate (HCO ₃)	Sul-fate (SO ₄)	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO ₃)	Boron (B) ppm	Parts per million	Tons per acre-foot	Total tons				
Oct. 1-2, 1954 ...	a33	38	2.10	1.48	1.43	0.14	3.47	0.83	0.71	0.01	0.02	0.47	297	0.42	14	28	1.1	469	8.1
June 11-20, 1955 ...	1,430	--	2.40	1.73	1.65	--	4.03	--	--	--	--	--	321	.44	629	29	1.2	549	7.8
June 21-30 ...	1,990	--	2.00	1.64	1.43	--	3.49	--	--	--	--	--	285	.39	776	28	1.1	492	7.6
July 1-10 ...	2,190	14	2.00	1.64	1.35	.15	3.44	.87	.79	.02	.05	.12	287	.39	854	26	1.0	472	7.5
July 11-20 ...	2,140	--	1.75	1.64	1.39	--	3.29	--	--	--	--	--	268	.36	770	29	1.1	488	7.3
July 21-25, 28-31	a1,050	--	1.70	1.48	1.30	--	3.44	--	--	--	--	--	250	.34	357	29	1.0	455	7.3
Aug. 1-3, 6, 9-10	a291	--	1.65	1.25	1.09	--	3.13	--	--	--	--	--	225	.31	90	27	.9	401	7.3
Aug. 11-20 ...	394	--	1.60	1.23	1.09	--	2.92	--	--	--	--	--	232	.32	126	28	.9	387	7.4
Aug. 21-31 ...	1,140	--	1.65	1.23	1.04	--	2.95	--	--	--	--	--	222	.30	342	27	.9	384	7.2
Sept. 1-10 ...	1,360	--	1.85	1.15	.96	--	2.95	--	--	--	--	--	230	.31	422	24	.8	386	7.3
Sept. 11-20 ...	1,410	--	1.75	1.15	.96	--	2.85	--	--	--	--	--	226	.31	437	25	.8	379	7.4
Sept. 21-30 ...	1,650	--	1.60	1.15	.96	--	2.59	--	--	--	--	--	214	.29	478	26	.8	355	7.4
Total or weighted average.....	15,070	--	1.85	1.48	1.26	--	3.23	--	--	--	--	--	258	0.35	5,270	27	1.0	441	--

a No flow Oct. 3 to June 10, July 26-27, Aug. 4-5, 7-8.

PART 10. THE GREAT BASIN

SEVIER LAKE BASIN

SEVIER RIVER NEAR LYNNDYL, UTAH

LOCATION.--At bridge on State Highway 125, 1½ miles upstream from gaging station, which is 3½ miles southwest of Lynndyl, Millard County. DRAINAGE AREA.--6,270 square miles, approximately. RECORDS AVAILABLE.--Chemical analyses: March 1951 to September 1955.

Water temperatures: March 1951 to September 1955.

EXTREMES, 1954-55.--Specific conductance: Maximum daily, 7,040 micromhos Jan. 21; minimum daily, 855 micromhos Mar. 11.

Percent sodium.--Maximum, 61 Sept. 11-20; minimum, 40 Mar. 9-12.

EXTREMES, 1951-55.--Specific conductance: Maximum daily, 7,040 micromhos Jan. 21, 1955; minimum daily, 855 micromhos Mar. 11, 1955.

Percent sodium: Maximum, 61 Sept. 11-20, 1955; minimum, 39 Oct. 5-6, 8-9, 1952.

REMARKS: Values reported for dissolved solids are sums of determined constituents. Records of specific conductance of daily samples available in district office at Salt Lake City, Utah. Records of discharge for water year October 1954 to September 1955 given in WSP 1393.

Chemical analyses, water year October 1954 to September 1955

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million								Dissolved solids				Percent sodium	Soil adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
			Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B) ppm	Parts per million	Tons per acre-foot					Total tons
Oct. 1-6, 1954 . . .	585	16	4.14	7.81	12.74	0.15	4.97	7.77	12.13	0.04	0.38	1,450	1.97	1,150	51	5.2	2,350	7.9
Oct. 7-10	200	17	5.59	11.84	24.66	.23	5.13	14.89	22.14	.03	.61	2,510	3.41	682	58	8.4	3,870	8.0
Oct. 11-15	163	19	6.99	13.65	28.79	.24	5.74	17.38	25.95	.02	.68	2,920	3.97	647	58	9.0	4,420	7.9
Oct. 16-20	250	16	4.64	8.31	14.83	.16	4.87	9.08	13.96	.03	.40	1,640	2.23	558	53	5.8	2,620	8.0
Oct. 21-31	1,280	15	4.44	7.57	11.35	.14	4.80	7.39	11.22	.04	.30	1,360	1.85	2,370	48	4.6	2,230	7.9
Nov. 1-10	1,440	17	4.19	7.73	11.44	.15	4.65	7.64	11.34	.05	.26	1,380	1.88	2,710	49	4.7	2,230	8.0
Nov. 11-17	2,090	21	4.34	9.13	17.61	.20	5.18	10.58	15.93	.12	.45	1,870	2.54	5,310	56	6.8	2,930	8.2
Nov. 18-24, 27-30	611	22	7.14	12.50	25.13	.20	5.80	15.16	23.69	.04	.52	2,650	3.60	2,200	56	8.0	4,040	8.1
Nov. 25-26	143	19	5.09	8.63	13.57	.15	4.79	8.56	13.40	.07	--	1,580	2.15	307	49	5.2	2,530	8.0
Dec. 1-10	377	22	7.29	12.50	25.70	.21	5.65	15.64	23.69	.05	.51	2,680	3.64	1,370	56	8.2	4,140	8.1
Dec. 11-20	331	22	8.23	12.83	27.31	.23	6.32	16.68	25.38	.04	.52	2,880	3.92	1,300	56	8.4	4,410	8.0
Dec. 21-31	379	26	7.68	12.75	27.26	.20	6.23	16.55	24.25	.05	--	2,820	3.84	1,460	57	8.5	4,390	8.0
Jan. 1-10, 1955 . . .	341	27	8.28	12.17	25.87	.19	6.36	16.07	23.97	.06	--	2,760	3.75	1,280	56	8.1	4,230	8.0
Jan. 11-15	169	27	7.49	12.00	25.79	.19	5.67	15.84	23.55	.05	.63	2,690	3.66	619	57	8.3	4,230	8.0
Jan. 16-22	236	33	11.43	22.86	44.35	.31	7.93	27.48	42.87	.04	.86	4,650	6.32	1,490	56	11	6,870	7.8
Jan. 23-31	303	30	9.43	15.05	32.13	.22	7.37	19.69	29.33	.07	--	3,360	4.57	1,380	57	9.2	5,140	7.8
Feb. 1-10	357	26	8.78	12.91	26.87	.18	7.11	16.38	24.82	.04	--	2,870	3.90	1,390	55	8.2	4,400	7.9
Feb. 11-19	337	26	7.88	12.34	25.22	.21	6.08	15.76	24.54	.10	.56	2,740	3.73	1,260	55	7.9	4,230	7.9
Feb. 20-28, Mar 1-7	404	22	7.43	11.76	24.48	.21	5.75	14.97	23.55	.10	.52	2,670	3.56	1,760	56	7.9	4,040	8.0

Mar. 3-8, 1955.	615	16	3.89	5.67	8.70	.16	4.03	6.08	8.40	.05	.25	1,080	1.47	904	47	4.0	1,790	7.8
Mar. 9-12	1,550	12	2.59	2.38	3.48	--	2.61	2.79	3.24	.05	.13	512	.70	1,080	40	2.2	874	7.7
Mar. 13 a	311	--	--	--	--	--	2.85	5.35	6.77	.06	--	--	--	--	--	--	1,480	7.7
Mar. 16-20	196	24	8.63	13.32	28.13	.36	6.16	17.63	29.05	.05	.61	3,020	4.11	806	56	8.5	4,650	8.0
Mar. 21-22	67	27	8.73	14.06	30.44	.33	5.88	19.13	27.22	.03	.66	3,210	4.37	293	57	9.0	4,780	7.8
Mar. 25-26	97	27	7.63	10.12	19.13	.26	5.47	11.97	19.80	.04	.48	2,200	2.99	290	52	6.4	3,420	7.7
Mar. 27-31	545	17	4.59	7.24	10.18	.16	4.62	6.72	10.66	.05	.28	1,280	1.74	948	46	4.2	2,120	7.7
Apr. 1-10	1,110	14	4.19	8.14	11.61	.17	4.62	7.81	12.07	.04	.25	1,410	1.92	2,130	48	4.7	2,330	7.8
Apr. 11-20	821	16	4.69	8.31	12.44	.18	4.77	8.08	12.69	.04	.32	1,490	2.03	1,670	49	4.9	2,410	7.8
Apr. 21-26, 28-30	1,790	20	4.49	7.40	12.13	.16	4.88	7.33	11.79	.07	.36	1,410	1.92	3,440	50	5.0	2,320	7.7
Apr. 27 a	315	--	--	--	--	--	4.79	3.79	6.49	.07	--	--	--	--	--	--	1,480	7.5
May 1-10	13,000	28	4.49	7.24	15.74	.19	5.24	8.91	13.26	.21	.48	1,640	2.23	28,990	57	6.5	2,630	7.8
May 11-20	11,880	27	4.39	7.40	16.13	.18	5.20	9.01	13.40	.19	.44	1,660	2.26	26,850	57	6.6	2,660	7.8
May 21-31	8,200	26	4.49	7.40	16.13	.18	5.08	9.04	13.54	.16	.47	1,660	2.26	18,530	57	6.6	2,660	7.8
June 1-10	5,450	26	4.34	7.73	15.39	.20	4.88	9.20	13.59	.16	.48	1,650	2.24	12,210	56	6.3	2,650	7.8
June 11-20	5,060	24	4.29	8.06	15.92	.20	4.74	9.64	14.33	.12	.44	1,700	2.31	11,690	56	6.4	2,750	7.9
June 21-30	3,860	28	4.24	7.98	14.96	.17	4.62	8.81	13.54	.11	.48	1,610	2.19	8,450	55	6.1	2,620	8.0
July 1-10	11,330	30	4.39	7.98	16.26	.20	4.97	9.45	14.38	.16	.52	1,720	2.34	26,510	56	6.5	2,780	7.9
July 11-20	12,200	28	4.44	8.14	17.00	.20	4.97	9.68	14.61	.15	.51	1,760	2.39	29,160	57	6.8	2,840	7.8
July 21-31	4,640	27	4.29	8.31	16.87	.22	4.92	9.62	14.81	.11	.49	1,750	2.38	11,040	57	6.7	2,830	7.6
Aug. 1-10	3,620	23	3.84	6.06	15.96	.19	4.67	9.08	14.10	.13	.48	1,660	2.26	8,180	57	6.5	2,700	8.0
Aug. 11-20	4,290	26	3.39	7.65	15.61	.31	4.36	8.56	13.48	.12	.47	1,590	2.16	9,270	58	6.7	2,560	8.1
Aug. 21-31	6,970	30	3.74	8.22	17.92	.22	4.65	9.58	15.17	.15	.50	1,770	2.41	16,800	60	7.3	2,860	8.1
Sept. 1-10	4,330	28	3.69	8.55	18.61	.22	4.70	9.93	16.02	.12	.52	1,840	2.50	10,820	60	7.5	2,960	8.0
Sept. 11-20	3,300	23	3.29	8.88	18.96	.20	4.39	9.87	16.41	.10	.51	1,840	2.50	8,250	61	7.7	2,960	8.1
Sept. 21-30	1,530	18	3.79	7.81	13.91	.16	4.54	7.95	12.92	.09	.38	1,500	2.04	3,120	54	5.8	2,450	7.9
Total or weighted average	b116,500	26	4.34	7.98	16.36	0.20	4.92	9.37	14.30	0.14	0.47	1,710	2.33	271,400	57	6.6	2,740	--

b Represents 99 percent of runoff for water year October 1954 to September 1955

a Not included for computation of weighted averages.

HUMBOLDT RIVER BASIN

HUMBOLDT RIVER NEAR RYE PATCH, NEV.

LOCATION.--Below Rye Patch Dam 1,000 feet upstream from gaging station, and 2 miles northwest of Rye Patch, Pershing County. DRAINAGE AREA.--13,700 square miles, approximately.

RECORDS AVAILABLE.--Chemical analyses: December 1951 to September 1955.

Water temperatures: December 1951 to September 1955.

EXTREMES, 1954-55.--Specific conductance: Maximum daily, 2,940 micromhos May 26; minimum daily, 1,650 micromhos July 28.

Percent sodium: Maximum, 70 May 25-31; minimum, 64 July 21-28.

EXTREMES, 1951-55.--Specific conductance: Maximum daily, 4,010 micromhos Sept. 2, 1954; minimum daily, 784 micromhos Dec. 31, 1951, Sept. 10, 1952.

Percent sodium: Maximum, 71 Sept. 1-5, 1954; minimum, 48 Aug. 11-20, Sept. 1-10, 11-20, 1952.

REMARKS.--Values reported for dissolved solids are sums of determined constituents. Records of specific conductance of daily samples available in district office at Salt Lake City, Utah. Records of discharge for water year October 1954 to September 1955 given in WSP 1393.

Chemical analyses, water year October 1954 to September 1955

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million										Dissolved solids				So- dium adsorp- tion ratio	Specific conduct- ance (micro- mhos at 25°C)	pH
			Cal- cium (Ca)	Magne- sium (Mg)	So- dium (Na)	Potas- sium (K)	Bicar- bonate (HCO ₃)	Sul- fate (SO ₄)	Chlo- ride (Cl)	Fluo- ride (F)	Ni- trate (NO ₃)	Boron (B) ppm	Parts per mil- lion	Tons per acre- foot	Total tons	Per- cent so- dium			
May 25-31, 1955	6,310	41	3.84	3.29	19.35	1.07	5.47	3.81	18.76		0.05	1.8	1,660	2.26	14,320	70	10	2,870	7.7
June 1-10	5,730	42	3.59	2.96	17.44	1.02	5.62	3.52	15.46		.05	1.4	1,480	2.01	11,460	70	9.6	2,530	7.7
June 11	202	--	3.79	2.71	--	--	5.97	3.33	14.24		--	--	--	--	--	--	--	2,440	8.1
July 11-20	2,030	51	3.49	2.63	14.13	.92	5.83	3.06	12.18		.04	1.5	1,270	1.73	3,510	67	8.1	2,150	7.6
July 21-31, Aug. 1-3	5,190	56	3.04	2.47	11.13	.79	5.57	2.54	9.08		.06	1.3	1,050	1.43	7,320	64	6.7	1,760	7.7
Total or weighted average	a 19,470	46	3.54	2.88	16.01	0.97	5.59	3.31	14.47		0.05	1.5	1,400	1.90	36,990	68	8.9	2,390	--

a Represents 92 percent of runoff for water year October 1954 to September 1955.

PART 11. PACIFIC SLOPE BASINS IN CALIFORNIA

SAN JOAQUIN RIVER BASIN

SAN JOAQUIN RIVER NEAR BIOLA, CALIF.

LOCATION. --At Skaggs bridge, 1.9 miles upstream from gaging station, and about 2.5 miles northwest of Biola, Fresno County. DRAINAGE AREA. --1,805 square miles (above gaging station). RECORDS AVAILABLE. --Chemical analyses: November 1952 to September 1955.

Water temperatures: November 1952 to September 1955. EXTREMES, 1954-55. --Specific conductance: Maximum daily, 147 micromhos Feb. 23; minimum daily, 44.7 micromhos Nov. 28.

Percent sodium: Maximum, 45 Aug. 21-31; minimum, 37 Feb. 21-28. EXTREMES, 1952-55. --Specific conductance: Maximum daily, 170 micromhos Jan. 3, 1953; minimum daily, 36.1 micromhos Oct. 12, 1953.

Percent sodium: Maximum, 49 Nov. 1-5, 7-10, 1952; minimum, 30 Jan. 3-13, 1953. PERCENTS. --Values reported for dissolved solids are residues on evaporation. Records of specific conductance of daily samples available in district office at Sacramento, Calif. Records of discharge for water year October 1954 to September 1955 given in WSP 1395. No appreciable inflow between sampling point and gaging station except during periods of heavy local runoff.

Chemical analyses, water year October 1954 to September 1955

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million								Dissolved solids			Per-centage of sodium	So-adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH		
			Cal-cium (Ca)	Magne-sium (Mg)	So-dium (Na)	Potas-sium (K)	Bicar-bonate (HCO ₃)	Sul-fate (SO ₄)	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO ₃)	Boron (B) ppm	Parts per mil-lion					Tons per acre-foot	Total tons
Oct. 1-10, 1954..	1,710	11	0.29	0.10	0.32	0.04	0.59	0.04	0.11	0.02	0.01	0.03	54	0.07	120	43	0.7	75.7	6.9
Oct. 11-20	2,240	11	.28	.10	.28	.04	.48	.12	.10	.02	.01	.03	53	.07	157	40	.6	72.9	6.7
Oct. 21-31	2,200	11	.28	.11	.29	.03	.56	.04	.11	.02	.02	.04	52	.07	154	41	.7	71.9	6.8
Nov. 1-10	2,160	11	.28	.10	.29	.03	.54	.04	.11	.02	.02	.03	52	.07	151	41	.7	72.0	6.8
Nov. 11-20	2,250	12	.30	.09	.29	.03	.56	.04	.09	.02	.02	.05	53	.07	158	40	.7	72.6	6.9
Nov. 21-25	1,710	--	.31	.11	.30	.03	.59	.05	.10	--	.02	--	57	.08	137	40	.6	76.3	6.9
Nov. 26-30	6,660	--	.21	.04	.18	.03	.34	.03	.07	--	.02	--	41	.06	400	40	.5	47.0	6.8
Dec. 1-10	11,090	12	.24	.04	.19	.02	.39	.03	.07	.02	.01	.06	42	.06	665	38	.5	49.9	7.1
Dec. 11-20	3,060	12	.31	.09	.29	.03	.56	.04	.10	.02	.02	.03	54	.07	214	40	.6	72.2	7.3
Dec. 21-31	2,490	13	.33	.11	.31	.04	.59	.05	.11	.02	.02	.00	58	.08	199	39	.7	80.6	7.0
Jan. 1-10, 1955..	2,240	11	.32	.14	.31	.04	.61	.06	.14	.02	.02	.03	58	.08	179	38	.6	80.4	7.0
Jan. 11-20	2,070	11	.35	.17	.36	.04	.69	.08	.15	.02	.01	.02	64	.09	186	39	.7	91.8	7.1
Jan. 21-31	1,830	15	.50	.30	.57	.06	.97	.14	.22	.03	.04	.04	96	.13	238	40	.9	137	7.3

SAN JOAQUIN RIVER BASIN--Continued
SAN JOAQUIN RIVER NEAR BIOLA, CALIF.--Continued
Chemical analyses, water year October 1954 to September 1955--Continued

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million										Dissolved solids			Per cent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
			Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B) ppm	Parts per million	Tons per acre-foot	Total tons				
Feb. 1-10, 1955..	1,350	14	0.50	0.22	0.56	0.05	0.93	0.12	0.21	0.03	0.02	0.06	84	0.11	148	42	0.9	130	7.4
Feb. 11-20	1,440	12	.46	.22	.48	.05	.90	.10	.21	.01	.02	.05	78	.11	158	40	.8	124	7.2
Feb. 21-28	1,090	13	.55	.29	.52	.05	.92	.12	.23	.02	.02	.05	89	.12	131	37	.8	137	7.5
Mar. 1-10	1,400	13	.55	.23	.52	.05	1.02	.12	.25	.01	.01	.04	86	.12	168	39	.8	136	7.4
Mar. 11-20	1,270	12	.49	.27	.52	.05	1.00	.10	.22	.01	.01	.04	82	.11	140	39	.8	133	7.7
Mar. 21-31	1,020	12	.49	.23	.57	.05	.98	.10	.23	.01	.02	.11	82	.11	112	42	.9	133	7.5
Apr. 1-10	1,890	13	.35	.17	.39	.04	.70	.07	.19	.01	.01	.09	61	.08	151	41	.8	108	7.1
Apr. 11-20	1,750	10	.38	.06	.34	.04	.62	.06	.16	.01	.01	.07	57	.08	140	42	.7	86.8	7.1
Apr. 21-30	1,700	9.5	.39	.09	.38	.05	.67	.07	.17	.01	.02	.03	59	.08	136	42	.8	98.1	7.0
May 1-10	1,850	8.9	.34	.14	.38	.05	.67	.05	.19	.01	.01	.06	59	.08	148	42	.8	85.7	7.0
May 11-20	1,760	12	.36	.18	.40	.04	.70	.08	.19	.00	.01	.06	66	.09	158	41	.8	97.0	7.3
May 21-31	2,230	10	.39	.07	.36	.03	.61	.06	.16	.00	.01	.04	60	.08	178	42	.7	84.9	7.1
June 1-10	1,840	12	.31	.13	.36	.04	.61	.05	.16	.00	.01	.05	60	.08	147	42	.7	82.3	7.1
June 11-20	2,000	13	.28	.14	.34	.03	.59	.05	.14	.00	.01	.02	62	.08	160	43	.7	78.5	7.0
June 21-30	2,270	9.5	.26	.16	.31	.04	.57	.07	.12	.01	.01	.05	54	.07	159	41	.7	81.3	6.9
July 1-10	2,380	7.9	.29	.11	.30	.04	.57	.06	.11	.01	.01	.05	50	.07	167	40	.7	80.2	6.8
July 11-20	2,230	10	.28	.12	.31	.05	.56	.04	.16	.01	.01	.03	60	.08	178	41	.7	81.2	7.1
July 21-31	2,100	9.3	.28	.12	.31	.05	.56	.05	.16	.01	.02	.09	56	.08	168	41	.7	78.4	7.0
Aug. 1-10	2,330	12	.30	.08	.33	.04	.56	.04	.16	.01	.02	.04	57	.08	186	44	.8	78.3	6.9
Aug. 11-20	2,330	12	.28	.09	.32	.04	.56	.04	.16	.01	.01	.03	54	.07	163	44	.7	79.1	6.9
Aug. 21-31	2,360	12	.30	.08	.34	.04	.56	.04	.18	.01	.02	.09	56	.08	189	45	.8	81.7	6.9
Sept. 1-10	1,880	12	.31	.09	.32	.04	.56	.04	.17	.01	.01	.02	56	.08	150	43	.7	81.5	7.1
Sept. 11-20	2,030	11	.32	.09	.34	.04	.61	.06	.15	.01	.01	.09	56	.08	162	43	.7	83.6	6.9
Sept. 21-30	1,720	12	.31	.12	.35	.03	.64	.06	.14	.01	.00	.01	53	.08	138	43	.8	85.0	7.1
Total or weighted average ^a	85,950	b11	0.31	0.12	0.32	0.04	0.59	0.06	0.14	b0.01	0.01	b0.05	57	0.08	6,880	41	0.7	80.4	--

^a Represents 100 percent of runoff for water year October 1954 to September 1955.

^b Represents 90 percent of runoff for water year October 1954 to September 1955.

SAN JOAQUIN RIVER BASIN--Continued
SAN JOAQUIN RIVER NEAR VERNALIS, CALIF.

LOCATION.--At gaging station in El Pescadero Grant, at Durham Ferry highway bridge, 3 miles downstream from Stanislaus River, and 3.4 miles northeast of Vernalis, San Joaquin County.
DRAINAGE AREA.--14,010 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: March 1951 to September 1955.
Water temperatures: March 1951 to September 1955.
EXTREMES, 1954-55.--Specific conductance: Maximum daily, 1,120 micromhos Aug. 5; minimum daily, 157 micromhos June 12.
Percent sodium: Maximum, 53 Jan. 25-31; minimum, 46 Jan. 4-10, June 14-19.
EXTREMES, 1951-55.--Specific conductance: Maximum daily, 1,120 micromhos Aug. 5, 1955; minimum daily, 60.0 micromhos June 21, 1953.
Percent sodium: Maximum, 56 Jan. 21-31, 1954; minimum, 34 Apr. 1-10, May 1-10, 1952; May 11-20, 1954.
REMARKS.--Values reported for dissolved solids are residues on evaporation. Records of specific conductance of daily samples available in district office at Sacramento, Calif. Records of discharge for water year October 1954 to September 1955 given in WSP 1395.

Chemical analyses, water year October 1954 to September 1955

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million								Boron (B) ppm	Dissolved solids			Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)		
			Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)		Nitrate (NO ₃)	parts per million	Tons per acre-foot				Total tons	
Oct. 1-10, 1954.	16,740	35	2.45	1.65	4.48	0.11	2.84	1.27	4.23	0.01	0.06	0.26	532	0.72	12,050	52	3.1	895	7.3
Oct. 11-16	10,750	35	2.35	1.85	4.35	.13	2.80	1.33	4.46	.01	.02	.23	535	.73	7,850	50	3.0	910	7.4
Oct. 17-20	9,420	27	1.75	1.13	3.09	.11	2.13	.96	2.90	.01	.02	.24	380	.52	4,900	51	2.6	645	7.4
Oct. 21-31	27,190	29	1.80	1.24	3.30	.10	2.05	1.00	3.22	.01	.03	.29	391	.53	14,410	51	2.7	675	7.3
Nov. 1-10	24,680	29	1.90	1.26	3.52	.10	2.06	1.06	3.41	.01	.03	.33	412	.56	13,830	52	2.8	706	7.9
Nov. 11-20	28,360	28	1.80	1.20	3.22	.10	2.05	.98	3.10	.01	.03	.31	386	.52	14,750	51	2.6	664	7.2
Nov. 21-30	29,400	27	1.80	1.24	3.17	.09	1.98	1.00	3.16	.01	.04	.24	390	.53	15,580	50	2.6	672	7.3
Dec. 1-10	32,670	25	1.60	1.12	2.78	.10	1.79	.90	2.74	.01	.04	.20	348	.47	15,350	50	2.4	597	7.3
Dec. 11-20	42,840	22	1.30	.94	2.17	.09	1.57	.71	2.09	.02	.05	.17	279	.38	16,280	48	2.1	481	7.2
Dec. 21-31	36,020	26	1.70	1.06	2.87	.09	1.87	.87	2.85	.01	.05	.20	355	.48	17,290	50	2.4	611	7.3
Jan. 1-2, 1955 ..	8,230	--	1.70	1.06	2.96	--	--	--	--	--	--	--	364	.50	4,120	--	2.5	622	--
Jan. 3	7,970	--	.75	.49	1.00	--	--	--	--	--	--	--	172	.23	1,830	--	1.3	251	--
Jan. 4-10	37,290	20	1.10	.78	1.65	.08	1.46	.56	1.58	.01	.04	.15	234	.32	11,930	46	1.7	395	7.3
Jan. 11, 13-18 ..	38,780	22	1.25	.87	2.17	.09	1.74	.71	1.86	.02	.06	.10	294	.40	15,510	50	2.1	467	7.6
Jan. 12, 19-20 ..	24,080	--	.90	.66	1.44	--	--	--	--	--	--	--	218	.30	7,220	--	1.6	329	--
Jan. 21-24	30,900	--	1.00	.76	1.65	.08	1.41	.62	1.30	--	.05	.14	233	.32	9,890	47	1.8	360	7.1
Jan. 25-31	35,070	23	1.45	1.03	2.87	.10	1.98	1.02	2.23	.02	.05	.21	337	.46	16,130	53	2.6	562	7.4

SAN JOAQUIN RIVER BASIN--Continued
SAN JOAQUIN RIVER NEAR VERNALIS, CALIF.--Continued

Chemical analyses, water year October 1954 to September 1955.--Continued

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million								Boron (B) ppm	Dissolved solids			Per- cent adsorp- tion	So- dium adsorp- tion ratio	Specific conduct- ance (micro- mhos at 25°C)	pH
			Cal- cium (Ca)	Magne- sium (Mg)	So- dium (Na)	Potas- sium (K)	Bicar- bonate (HCO ₃)	Sul- fate (SO ₄)	Chlo- ride (Cl)	Fluo- ride (F)		Ni- trate (NO ₃)	Parts per mil- lion	Tons per acre- foot					Total tons
Feb. 1-10, 1955.	43,800	24	1.60	1.16	2.96	0.08	1.98	1.17	2.57	0.02	0.05	0.21	359	0.49	51	2.5	608	7.4
Feb. 11-20.....	50,560	20	1.35	1.01	2.57	.06	1.57	1.19	2.20	.01	.03	.23	314	.43	52	2.4	531	7.5
Feb. 21-28.....	41,770	20	1.20	1.04	2.26	.06	1.43	1.02	1.97	.01	.02	.20	285	.39	50	2.1	485	7.7
Mar. 1-10.....	42,740	20	1.40	1.04	2.48	.07	1.70	1.02	2.26	.01	.02	.18	312	.42	50	2.2	536	7.6
Mar. 11-20.....	37,770	21	1.50	1.02	2.57	.08	1.62	.96	2.54	.01	.02	.17	320	.44	50	2.3	554	7.2
Mar. 21-31.....	15,470	30	2.50	1.66	4.17	.15	2.47	1.15	4.79	.01	.06	.22	543	.74	49	2.9	902	7.5
Apr. 1-10.....	10,880	31	2.45	1.75	4.30	.15	2.54	1.00	5.08	.01	.06	.21	568	.77	50	3.0	922	7.5
Apr. 11-20.....	15,460	28	2.30	1.66	3.96	.15	2.62	1.06	4.40	.01	.06	.22	513	.70	49	2.8	861	7.5
Apr. 21-30.....	28,200	27	1.85	1.11	2.96	.12	2.20	.87	2.90	.02	.04	.21	370	.50	49	2.4	631	7.3
May 1-10.....	24,460	29	1.95	1.31	3.48	.10	2.28	1.04	3.38	.01	.04	.20	420	.57	51	2.7	711	7.3
May 11-20.....	14,780	28	2.54	1.60	4.61	.15	2.67	1.23	4.68	.01	.02	.27	548	.75	52	3.2	911	7.3
May 21-25.....	6,590	31	2.64	1.80	4.96	.21	2.82	1.17	5.58	.02	.05	.34	590	.80	52	3.3	985	7.3
May 26-31.....	24,910	19	.85	.55	1.35	.06	1.03	.33	1.41	.01	.02	.17	179	.24	48	1.6	307	7.0
June 1-2, 8-13 ..	44,550	17	.60	.42	1.04	.04	.84	.21	1.04	.01	.01	.12	141	.19	50	1.5	208	7.0
June 3-7.....	16,420	22	1.20	.76	1.96	.08	1.46	.54	1.97	.01	.02	.17	252	.34	49	2.0	423	7.1
June 14-19.....	14,250	29	1.25	.93	1.96	.08	1.57	.48	2.09	.01	.02	.20	260	.35	46	1.9	437	7.3
June 20-30.....	13,780	29	2.25	1.41	3.74	.13	2.56	.92	3.95	.01	.03	.28	466	.63	50	2.8	733	7.6
July 1-10.....	9,870	33	2.54	1.62	4.17	.13	2.79	1.06	4.63	.02	.05	.28	546	.74	49	2.9	896	7.5
July 11-20.....	8,180	35	2.50	1.70	4.17	.13	2.84	1.02	4.65	.02	.04	.26	553	.75	49	2.9	901	7.6
July 21-31.....	7,580	40	2.64	1.76	4.39	.13	2.85	.92	5.16	.02	.09	.25	582	.79	49	3.0	954	8.2
Aug. 1-10.....	7,380	37	2.59	1.77	4.39	.13	2.82	.94	5.13	.02	.08	.28	572	.78	49	3.0	946	8.0
Aug. 11-20.....	8,030	33	2.50	1.72	4.39	.13	2.85	1.06	4.79	.02	.05	.22	562	.77	50	3.0	928	7.5
Aug. 21-31.....	11,080	33	2.40	1.66	4.13	.13	2.90	1.06	4.43	.02	.07	.26	529	.72	50	2.9	889	7.5
Sept. 1-10.....	10,200	35	2.50	1.62	4.44	.14	2.95	1.15	4.51	.01	.04	.19	540	.73	51	3.1	932	7.6
Sept. 11-20.....	12,480	38	2.40	1.64	4.39	.13	3.00	1.17	4.31	.01	.08	.24	533	.72	51	3.1	906	8.2
Sept. 21-30.....	13,590	37	2.54	1.72	4.61	.13	3.05	1.31	4.60	.01	.08	.26	564	.77	51	3.1	945	8.2
Total or weighted average ^a	975,100	b25	1.60 ^c	1.15	2.83	c 0.09	c1.92	c0.92	c2.79	b0.01	c0.04	c0.20	353	0.48	50	2.4	593	--

a Represents 100 percent of runoff for water year October 1954 to September 1955.

b Represents 93 percent of runoff for water year October 1954 to September 1955.

c Represents 96 percent of runoff for water year October 1954 to September 1955.

SAN JOAQUIN RIVER BASIN--Continued
MOKELUMNE RIVER AT WOODBRIDGE, CALIF.

LOCATION.--At dam of Woodbridge Irrigation District, San Joaquin County, 0.4 mile upstream from gaging station at Woodbridge.
DRAINAGE AREA.--644 square miles (above gaging station).

RECORDS AVAILABLE.--Chemical analyses: March 1951 to September 1955.

Water temperatures: March 1951 to September 1955.

EXTREMES, 1954-55.--Specific conductance: Maximum daily, 91.8 micromhos Apr. 30; minimum daily, 35.0 micromhos Nov. 7.

EXTREMES, 1951-55.--Specific conductance: Maximum daily, 202 micromhos Dec. 15, 1952; minimum daily, 29.4 micromhos July 9, 1952.

Percent sodium (1951-54): Maximum, 33 Nov. 21-30, 1952; minimum, 10 Dec. 22-23, 1952.

REMARKS.--Values reported for dissolved solids are residues on evaporation. Records of specific conductance of daily samples available in district office at Sacramento, Calif. Records of discharge for water year October 1954 to September 1955 given in WSP 1395.

Chemical analyses, water year October 1954 to September 1955

Date of collection	Runoff (acre- feet)	Silica (SiO ₂) ppm	Equivalents per million										Dissolved solids		Per- cent so- dium	So- dium adsorp- tion ratio	Specific conduct- ance (micro- mhos at 25°C)	pH
			Cal- cium (Ca)	Magne- sium (Mg)	So- dium (Na)	Potas- sium (K)	Bicar- bonate (HCO ₃)	Sul- fate (SO ₄)	Chlo- ride (Cl)	Fluo- ride (F)	Ni- trate (NO ₃)	Boron (B) ppm	Parts per mil- lion	Tons per acre- foot	Total tons			
Oct. 1-10, 1954.	5,030		0.20	0.08	0.10		--						35	0.05	252	0.3	41.6	--
Oct. 11-20.....	5,720		.20	.08	.08		--						38	.05	286	.2	38.9	--
Oct. 21-31.....	6,840		.20	.06	.08		--						37	.05	342	.2	39.8	--
Nov. 1-10.....	7,530		.20	.06	.08		--						39	.05	376	.2	38.9	--
Nov. 11-20.....	11,440		.20	.06	.08		--						36	.05	572	.2	38.2	--
Nov. 21-30.....	10,720		.20	.06	.08		--						36	.05	536	.2	37.6	--
Dec. 1-10.....	11,630		.24	.08	.09		--						44	.06	698	.2	51.6	--
Dec. 11.....	--		.33	.19	.14		--						--	--	--	.3	80.3	--
Dec. 12-20.....	9,820		.24	.10	.10		--						45	.06	589	.2	50.1	--
Dec. 21-31.....	11,990		.21	.09	.10		--						35	.05	600	.3	42.8	--
Jan. 1-10, 1955.	12,040		.24	.11	.12		--						45	.06	722	.3	53.4	--
Jan. 11-20.....	13,890		.26	.18	.13		--						57	.08	1,110	.3	60.4	--
Jan. 21-31.....	12,980		.26	.14	.14		--						50	.07	909	.3	60.9	--
Feb. 1-10.....	12,570		.26	.13	.14		0.41						46	.06	754	.3	60.8	7.2
Feb. 11-20.....	11,900		.26	.14	.14		.41						46	.06	673	.3	57.0	7.4
Feb. 21-28.....	7,200		.27	.17	.14		.44						47	.06	474	.3	64.6	7.3
Mar. 1-10.....	5,190		.30	.16	.16		.46						53	.07	363	.3	69.4	7.3
Mar. 11-20.....	3,870		.32	.18	.17		.49						54	.07	271	.3	74.9	7.0
Mar. 21-31.....	522		.32	.18	.16		.48						52	.07	37	.3	70.7	7.1

SAN JOAQUIN RIVER BASIN--Continued
MOKELUMNE RIVER AT WOODBRIDGE, CALIF.--Continued

Chemical analyses, water year October 1954 to September 1955--Continued

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million								Boron (B) ppm	Dissolved solids			Per-cent so-dium	So-dium adsorp-tion ratio	Specific conduct-ance (micro-mhos at 25°C)	pH
			Cal-cium (Ca)	Magne-sium (Mg)	So-dium (Na)	Potas-sium (K)	Bicar-bonate (HCO ₃)	Sul-fate (SO ₄)	Chlo-ride (Cl)	Fluo-ride (F)		Ni-trate (NO ₃)	Parts per mil-lion	Tons per acre-foot					Total tons
Apr. 1-10, 1955..	280		0.28	0.16	0.15		0.46					48	0.07	20	0.3	63.4	7.0	
Apr. 11-20	234		.31	.23	.17		.49					54	.07	16	.3	77.8	6.9	
Apr. 21-30	2,460		.36	.26	.18		.56					68	.09	221	.3	84.9	7.3	
May 1-10	1,950		.32	.22	.16		.51					52	.07	136	.3	70.1	7.4	
May 11-20	893		.29	.23	.17		.49					48	.07	63	.3	69.9	7.0	
May 21-31	377		.33	.09	.17		.49					48	.07	26	.4	66.7	7.1	
June 1-10	331		.47	.01	.17		.49					48	.07	23	.3	64.8	6.9	
June 11-20	234		.30	.16	.17		.48					48	.07	16	.3	64.9	6.8	
June 21-30	242		.35	.09	.17		.46					52	.07	17	.4	63.0	6.8	
July 1-10	383		.30	.13	.17		.46					52	.07	27	.4	66.9	7.1	
July 21-31	353		.31	.11	.16		.46					50	.07	25	.3	68.4	6.7	
Aug. 1-10	345		.32	.12	.15		.49					50	.07	24	.3	68.2	6.7	
Aug. 11-31	470		.29	.11	.15		.46					48	.07	33	.3	60.7	7.0	
Sept. 1-10	547		.34	.08	.17		.49					46	.06	33	.4	65.2	7.1	
Sept. 11-20	2,090		.31	.08	.14		.44					44	.06	125	.3	57.6	7.0	
Sept. 21-30	3,180		.29	.07	.14		.43					41	.06	191	.3	53.9	7.0	
Total or weighted average ^a	175,300		0.25	0.12	0.11		--					b44	b0.06	b10,520	0.3	53.1	--	

^a Represents 100 percent of runoff for water year October 1954 to September 1955.

^b Represents 99 percent of runoff for water year October 1954 to September 1955.

SACRAMENTO RIVER BASIN

SACRAMENTO RIVER AT KNIGHTS LANDING, CALIF.

LOCATION.--At Southern Pacific Railroad bridge, at Knights Landing, Yolo County, just downstream from gaging station and about 34 miles upstream from Sacramento.

RECORDS AVAILABLE.--Chemical analyses: March 1951 to September 1955.

Water temperatures: March 1951 to September 1955.

EXTREMES, 1954-55.--Specific conductance: Maximum daily, 406 micromhos May 29; minimum daily, 106 micromhos Nov. 16.

Percent sodium: Maximum, 44 May 28-30; minimum, 20 Nov. 14, 16-19.

EXTREMES, 1951-55.--Specific conductance: Maximum daily, 447 micromhos Sept. 9, 1952; minimum daily, 99.1 micromhos March 17, 1952.

PERCENT SODIUM: Maximum, 46 May 12, 19, 21, 23-29, 1953; minimum, 15 Dec. 21-23, 29, 1952.

REMARKS.--Values reported for dissolved solids are residues on evaporation. Records of specific conductance of daily samples available

in district office at Sacramento, Calif. Records of discharge for water year October 1954 to September 1955 given in WSP 1955.

Considerable inflow during irrigation season of irrigation waste water from drainage canal about 0.3 mile above sampling site.

Mixing not complete at sampling site.

Chemical analyses, water year October 1954 to September 1955

Chemical analyses, water year October 1954 to September 1955																			
Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million								Dissolved solids			Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH		
			Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B) ppm	Parts per million					Tons per acre-foot	Total tons
Oct. 1-10, 1954..	147,500	26	0.75	0.75	0.70	0.02	1.69	0.29	0.27	0.01	0.01	0.10	148	0.20	29,500	31	0.8	220	7.9
Oct. 11-20	141,800	26	.70	.62	.48	.04	1.44	.20	.20	.01	.01	.09	124	.17	24,110	26	.6	182	7.4
Oct. 21-31	139,800	25	.65	.60	.48	.04	1.36	.23	.21	.01	.02	.12	121	.16	22,370	27	.6	182	7.3
Nov. 1-10	128,000	27	.70	.58	.44	.04	1.43	.19	.20	.01	.00	.11	119	.16	20,480	25	.5	178	7.5
Nov. 11-13, 15, 20	107,900	24	.70	.55	.48	.04	1.33	.23	.20	.01	.02	.10	120	.16	17,260	27	.6	180	7.9
Nov. 14, 16-19 ..	175,500	20	.47	.37	.21	.03	.77	.13	.13	.01	.07	.09	90	.12	21,060	20	.3	114	7.5
Nov. 21-30	178,600	27	.80	.65	.61	.04	1.52	.31	.28	.01	.01	.16	140	.19	33,930	29	.7	215	7.6
Dec. 1	13,980	--	.80	.64	.61	--	--	--	--	--	--	--	146	.20	2,800	--	.7	210	--
Dec. 2-10	325,100	21	.55	.38	.26	.03	.92	.16	.14	.01	.02	.08	99	.13	42,260	21	.4	129	7.3
Dec. 11, 13, 15-16	136,300	21	.55	.44	.27	.04	1.00	.16	.16	.01	.02	.12	99	.13	17,720	21	.4	135	7.6
Dec. 12, 14, 17-20	168,000	27	.75	.76	.65	.05	1.51	.40	.31	.01	.01	.13	147	.20	33,600	30	.8	225	7.4
Dec. 21-24, 27-28	125,800	27	.80	.74	.70	.04	1.59	.35	.31	.01	.01	.12	152	.21	26,420	31	.8	228	7.8
Dec. 25-26, 29-31	98,420	24	.65	.57	.48	.03	1.25	.23	.20	.01	.01	.09	120	.16	15,750	28	.6	169	7.9
Jan. 1-10, 1955..	234,200	26	.70	.62	.48	.03	1.38	.25	.23	.01	.01	.13	126	.17	39,810	26	.6	186	7.7
Jan. 11-20	251,100	24	.70	.62	.57	.03	1.34	.31	.28	.01	.01	.12	129	.18	45,200	29	.7	189	7.7
Jan. 21-22, 25, 29-30	150,300	--	.70	.52	.48	.04	1.26	.25	.20	--	.01	.07	116	.16	24,050	28	.6	165	7.9
Jan. 23-24, 26-28, 31	157,700	--	.80	.68	.70	.04	1.51	.35	.34	--	.02	.07	142	.19	29,960	31	.8	214	7.8

SACRAMENTO RIVER BASIN--Continued

SACRAMENTO RIVER AT KNIGHTS LANDING, CALIF.--Continued

Chemical analyses, water year October 1954 to September 1955.--Continued

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million								Boron (B) ppm	Dissolved solids		Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
			Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Parts per million	Tons per acre-foot	Total tons		
Feb. 1-10, 1955..	193,800	28	0.85	0.71	0.74	0.03	1.57	0.38	0.34	0.01	0.01	145	0.20	38,760	32	0.8
Feb. 11-20.....	167,700	28	.80	.74	.65	.04	1.61	.33	.31	.00	.01	139	.19	31,860	29	.7
Feb. 21-28.....	135,600	28	.75	.65	.57	.03	1.52	.23	.24	.00	.00	129	.18	24,410	28	.7
Mar. 1-10.....	149,700	28	.80	.74	.61	.04	1.62	.29	.28	.00	.01	137	.19	28,440	28	.7
Mar. 11-20.....	136,400	29	.80	.66	.52	.04	1.57	.25	.25	.00	.00	131	.18	24,550	26	.6
Mar. 21-31.....	121,300	27	.75	.69	.61	.04	1.57	.25	.25	.00	.00	131	.18	21,830	29	.7
Apr. 1-10.....	104,800	29	.70	.64	.48	.04	1.49	.19	.21	.01	.01	122	.17	17,820	26	.6
Apr. 11-20.....	88,460	27	.70	.68	.57	.04	1.52	.23	.24	.01	.01	126	.17	15,040	28	.7
Apr. 21.....	12,600	--	.55	.47	.31	--	1.11	--	--	--	--	83	.11	1,390	--	4
Apr. 22-30.....	191,600	24	.70	.60	.65	.05	1.34	.42	.27	.02	.02	132	.18	34,490	33	.8
May 1.....	17,490	--	.65	.57	.52	--	1.28	--	--	--	--	126	.17	2,970	--	.7
May 2-10.....	148,100	25	.80	.72	.83	.05	1.59	.40	.34	.01	.01	153	.21	31,100	35	.9
May 11-20.....	146,800	25	.85	.69	.87	.04	1.69	.44	.34	.01	.01	155	.21	30,830	35	1.0
May 21-27, 31.....	112,200	25	.85	.79	.96	.05	1.77	.46	.37	.01	.01	168	.21	23,560	36	1.1
May 28-30.....	33,060	25	1.05	1.15	1.74	.05	2.45	.90	.70	.01	.04	243	.33	10,910	44	1.7
June 1-6.....	62,880	26	.80	.82	.91	.06	1.80	.46	.34	.01	.01	157	.21	13,200	35	1.0
June 7-12.....	60,600	28	.75	.61	.65	.04	1.56	.31	.31	.01	.01	137	.18	10,910	32	.8
June 13-20.....	89,610	29	.80	.76	1.00	.04	1.82	.48	.27	.01	.01	164	.22	19,710	38	1.1
June 21-30.....	121,500	28	.75	.65	.78	.04	1.64	.35	.28	.01	.01	142	.19	23,080	35	.9
July 1-10.....	144,300	28	.80	.76	1.04	.04	1.88	.48	.37	.01	.01	164	.22	31,750	39	1.2
July 11-20.....	141,000	28	.70	.62	.74	.04	1.82	.31	.23	.01	.01	132	.18	25,510	35	.9
July 21-31.....	155,400	27	.70	.68	.78	.05	1.67	.31	.25	.01	.01	138	.19	29,530	35	.9
Aug. 1-10.....	142,700	29	.70	.70	.78	.05	1.64	.31	.25	.01	.01	144	.20	28,540	35	.9
Aug. 11-20.....	142,000	29	.75	.69	.78	.05	1.72	.31	.25	.01	.01	145	.20	28,400	35	.9
Aug. 21-25.....	62,860	28	.80	.83	.83	.04	1.77	.33	.27	.01	.01	151	.21	13,200	35	1.0
Aug. 26-28.....	36,360	26	1.20	1.10	1.74	.05	2.72	.69	.56	.02	.01	242	.33	12,000	43	1.6
Aug. 29-31.....	37,450	28	.90	.90	1.22	.04	2.13	.46	.37	.01	.01	188	.26	9,740	40	1.3

Sept. 1-10, 1955...	146,200	29	.85	.79	.96	.04	1.97	.35	.31	.01	.06	166	.23	33,630	36	1.1	260	8.2
Sept. 11-20	161,800	32	.85	.75	.83	.04	1.92	.31	.28	.01	.16	160	.22	35,600	33	.9	244	8.2
Sept. 21-30	127,500	31	.75	.65	.61	.04	1.62	.21	.20	.01	.17	134	.18	22,950	30	.7	200	7.8
Total or weighted average ^a	6,073,000	b26	0.75	0.65	0.65	c0.04	1.51	c0.31	c0.26	b0.01	c0.12	136	0.18	1,093,000	31	0.8	205	--

a Represents 100 percent of runoff for water year October 1954 to September 1955.

b Represents 94 percent of runoff for water year October 1954 to September 1955.

c Represents 99 percent of runoff for water year October 1954 to September 1955.

Apr. 1-10, 1955...	99,010	--	.48	.34	.15	--	.84	--	--	--	71	.10	9,900	--	.2	98.6	7.2
Apr. 11-20	79,240	--	.45	.35	.15	--	.84	--	--	--	67	.09	7,130	--	.2	93.4	7.4
Apr. 21-30	153,800	--	.47	.37	.15	--	.82	--	--	--	70	.10	15,380	--	.2	99.8	7.4
May 1-10	182,900	--	.47	.31	.14	--	.82	--	--	--	64	.09	16,460	--	.2	89.8	7.4
May 11-20	202,400	--	.36	.28	.12	--	.61	--	--	--	51	.07	14,170	--	.2	71.5	7.1
May 21-31	171,900	--	.38	.20	.11	--	.62	--	--	--	47	.06	10,310	--	.2	70.5	7.1
June 1-10	89,810	--	.43	.19	.14	--	.69	--	--	--	54	.07	6,290	--	.2	85.0	7.3
June 11-20	44,770	--	.47	.29	.16	--	.85	--	--	--	62	.08	3,580	--	.3	97.4	7.1
June 21-30	12,710	--	.60	.56	.24	--	1.10	--	--	--	80	.11	1,400	--	.3	128	7.0
July 1-10	9,680	--	.60	.42	.23	--	1.10	--	--	--	82	.11	1,060	--	.3	130	7.0
July 11-20	8,070	--	.60	.40	.20	--	1.08	--	--	--	82	.11	888	--	.3	127	7.2
July 21-31	8,450	--	.65	.43	.20	--	1.11	--	--	--	84	.11	930	--	.3	134	7.2
Aug. 1-10	7,810	--	.70	.46	.23	--	1.18	--	--	--	93	.13	1,020	--	.3	148	7.1
Aug. 11-20	6,900	--	.70	.48	.24	--	1.23	--	--	--	94	.13	897	--	.3	144	7.3
Aug. 21-31	8,120	--	.70	.50	.26	--	1.26	--	--	--	95	.13	1,060	--	.3	147	7.4
Sept. 1-10	8,800	--	.80	.52	.28	--	1.39	--	--	--	102	.14	1,230	--	.3	164	7.5
Sept. 11-20	15,900	20	.75	.57	.31	.05	1.44	0.01	0.01	0.07	102	.14	2,230	18	.4	159	7.7
Sept. 21-30	18,670	--	.70	.50	.29	--	1.36	--	--	--	96	.13	2,430	--	.4	150	7.5
Total or weighted average ^a	2,675,000	--	0.55	0.35	0.17	--	--	--	--	--	73	0.10	267,500	--	0.3	105	--

^a Represents 100 runoff for water year October 1954 to September 1955.

SACRAMENTO RIVER BASIN--Continued
AMERICAN RIVER AT FAIR OAKS, CALIF.

LOCATION (revised).--At old highway bridge downstream from gaging station at Fair Oaks, Sacramento County, 2.6 miles downstream from Nimbus Dam and 10 miles downstream from South Fork.

DRAINAGE AREA.--1,921 square miles.

RECORDS AVAILABLE.--Chemical analyses: January to December 1906, March 1951 to September 1955.

Water temperatures: March 1951 to September 1955.

EXTREMES, 1954-55.--Specific conductance: Maximum daily, 103 micromhos Jan. 22, 23; minimum daily, 38.1 micromhos June 13, 16.

EXTREMES, 1951-55.--Specific conductance: Maximum daily, 112 micromhos Aug. 28, 1951; minimum daily, 29.1 micromhos June 3, 1952.

Percent sodium (1951-54): Maximum, 28 June 1-10, 1953; minimum, 8 Jan. 21-31, 1953.

REMARKS.--Values reported for dissolved solids are residues on evaporation. Records of specific conductance of daily samples available in district office at Sacramento, Calif. Records of discharge for water year October 1954 to September 1955 given in WSP 1395.

Chemical analyses, water year October 1954 to September 1955

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million								Dissolved solids			Per-cent so-dium	So-dium adsorp-tion ratio	Specific conduct-ance (micro-mhos at 25°C)	pH
			Cal-cium (Ca)	Magne-sium (Mg)	So-dium (Na)	Potas-sium (K)	Bicar-bonate (HCO ₃)	Sul-fate (SO ₄)	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO ₃)	Boron (B) ppm	Parts per mil-lion					Tons per acre-foot	Total tons
Oct. 1-10, 1954 ..	7,790		0.39	0.17	0.14		--	--				55	0.07	545	0.3	72.4	--
Oct. 11-20	8,440		.39	.16	.13		--	--				53	.07	591	.2	70.2	--
Oct. 21-31	10,330		.44	.16	.13		--	--				56	.08	826	.2	80.8	--
Nov. 1-10	10,380		.37	.17	.12		--	--				49	.07	727	.2	68.4	--
Nov. 11-20	21,550		.44	.19	.14		--	--				58	.08	1,720	.2	82.3	--
Nov. 21-30	14,430		.40	.17	.12		--	--				54	.07	1,010	.2	72.4	--
Dec. 1-2, 4-5, 8-9.	37,040		.39	.20	.12		--	--				57	.08	2,960	.2	75.2	--
Dec. 3, 6-7, 10..	36,890		.44	.26	.14		--	--				70	.10	3,690	.2	89.2	--
Dec. 11-20	33,720		.44	.27	.13		--	--				65	.09	3,030	.2	86.8	--
Dec. 21-31	24,510		.43	.25	.14		--	--				62	.08	1,960	.2	85.9	--
Jan. 1-10, 1955..	70,650		.39	.26	.14		--	--				63	.09	6,360	.2	80.1	--
Jan. 11-20	48,340		.42	.30	.15		--	--				67	.09	4,350	.2	91.6	--
Jan. 21-31	45,100		.48	.32	.17		--	--				64	.09	4,060	.3	96.6	--
Feb. 1-10	36,670		.45	.29	.17		--	--				60	.08	2,930	.3	91.8	--
Feb. 11-20	39,030		.42	.28	.15		0.70					62	.08	3,120	.3	91.9	7.3
Feb. 21-28	25,980		.39	.27	.15		.67					60	.08	2,080	.3	82.6	7.5
Mar. 1-10	40,620		.44	.32	.16		.74					67	.09	3,660	.3	93.8	7.4
Mar. 11-20	50,200		.37	.23	.13		.61					59	.08	4,020	.2	74.7	7.5
Mar. 21-31	10,850		.40	.26	.14		.66					66	.09	976	.2	80.8	7.1

PART 12. PACIFIC SLOPE BASINS IN WASHINGTON AND UPPER COLUMBIA RIVER BASIN

COLUMBIA RIVER MAIN STEM

COLUMBIA RIVER AT INTERNATIONAL BOUNDARY

LOCATION.--At cableway 2.2 miles downstream from gaging station, which is 0.5 miles downstream from Pend Oreille River, and about 10 miles upstream from Northport, Stevens County, Washington.

DRAINAGE AREA.--59,700 square miles, approximately.

RECORDS AVAILABLE.--Chemical analyses: February 1910 to January 1911, November 1951 to September 1955.

Water temperatures: November 1951 to September 1955.

EXTREMES: 1954-55.--Specific conductance: Maximum daily, 183 micromhos Mar. 3, 5, 28, 30; minimum daily, 129 micromhos July 28, Aug. 5, 8, 9.

Percent sodium: Maximum, 8 Apr. 1-11; minimum, 4 Oct. 1-10, 11-20, 21-31.

EXTREMES, 1951-55.--Specific conductance: Maximum daily, 190 micromhos Mar. 10, 1953; minimum daily, 129 micromhos July 28, Aug. 5, 8, 9, 1955.

Percent sodium: Maximum, 8 Apr. 1-11, 1955; minimum, 3 July 21-31, Aug. 1-10, 11-20, 1954.

REMARKS.--Values reported for dissolved solids are residues on evaporation. Records of specific conductance of daily samples available in district office at Portland, Ore. Records of discharge for water year October 1954 to September 1955 given in WSP 1396.

Chemical analyses, water year October 1954 to September 1955

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million										Dissolved solids			Per cent sodium	So-dium adsorp-tion ratio	Specific conduct-ance (micro-mhos at 25°C)
			Cal-cium (Ca)	Magne-sium (Mg)	So-dium (Na)	Potas-sium (K)	Bicar-bonate (HCO ₃)	Sul-fate (SO ₄)	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO ₃)	Boron (B) ppm	Parts per mil-lion	Tons per acre-foot	Total tons			
Oct. 1-10, 1954, ...	1,236,000	4.4	1.05	0.42	0.06	0.02	1.20	0.29	0.03	0.02	--	80	0.11	136,000	4	0.1	146	7.0
Oct. 11-20,	1,182,000	5.2	1.05	.41	.06	.02	1.21	.27	.02	.01	0.03	80	.11	130,000	4	.1	146	7.2
Oct. 21-31,	1,279,000	4.8	1.10	.40	.06	.03	1.23	.29	.03	.01	--	84	.11	140,700	4	.1	152	7.2
Nov. 1-10,	1,094,000	4.9	1.05	.40	.06	.02	1.28	.29	.04	.02	--	89	.12	131,300	5	.1	158	7.3
Nov. 11-20,	1,287,000	5.6	1.05	.40	.08	.02	1.30	.27	.02	.01	.00	89	.12	154,400	5	.1	156	7.2
Nov. 21-30,	1,304,000	6.4	1.05	.39	.08	.02	1.28	.27	.03	.02	--	88	.12	156,500	5	.1	154	7.3
Dec. 1-10,	1,191,000	5.0	1.05	.40	.08	.02	1.26	.29	.04	.02	--	89	.12	142,900	5	.1	157	7.4
Dec. 11-20,	1,077,000	5.2	1.10	.40	.08	.02	1.30	.29	.03	.02	.00	90	.12	129,200	5	.1	158	7.5
Dec. 21-31,	1,030,000	6.3	1.15	.44	.10	.03	1.48	.33	.03	.01	--	98	.13	133,900	6	.1	169	7.6
Jan. 1-10, 1955, ...	841,400	6.8	1.20	.44	.10	.03	1.44	.35	.03	.01	--	100	.14	117,800	6	.1	169	7.9
Jan. 11-20,	852,300	7.4	1.20	.45	.10	.03	1.48	.35	.03	.01	.00	103	.14	119,300	6	.1	173	7.9
Jan. 21-31,	917,400	7.0	1.20	.47	.10	.03	1.48	.35	.03	.01	--	104	.14	128,400	6	.1	178	7.7
Feb. 1-10,	830,100	6.9	1.20	.47	.10	.03	1.48	.33	.03	.01	--	102	.14	116,200	6	.1	173	8.0
Feb. 11-19,	741,400	6.2	1.20	.46	.09	.03	1.39	.33	.03	.01	--	98	.13	96,380	5	.1	175	7.5
Feb. 20-28,	711,900	6.2	1.20	.46	.09	.03	1.39	.33	.02	.01	.00	100	.14	99,670	5	.1	175	7.5

Mar. 1-10, 1955..	675,400	7.2	1.25	.48	.10	.03	1.44	.35	.05	.01	--	108	.15	101,300	5	.1	181	7.5
Mar. 11-20	736,300	6.8	1.20	.48	.09	.03	1.43	.33	.03	.01	.01	103	.14	108,700	5	.1	177	7.3
Mar. 21-31	930,000	7.0	1.25	.49	.10	.03	1.48	.33	.05	.02	--	108	.15	139,500	5	.1	183	7.3
Apr. 1-11.....	1,271,000	7.4	1.25	.37	.14	.03	1.46	.31	.01	.02	--	104	.14	177,900	8	.2	175	7.7
Apr. 12-20	920,300	8.3	1.20	.38	.10	.03	1.38	.33	.02	.02	.04	101	.14	128,800	6	.1	171	7.3
Apr. 21-30	1,059,000	8.2	1.15	.35	.10	.03	1.34	.29	.01	.01	--	97	.13	137,700	6	.1	163	7.3
May 1-16	2,095,000	7.1	1.05	.37	.09	.03	1.28	.27	.01	.01	--	91	.12	251,400	6	.1	154	7.2
May 17-31	4,072,000	7.1	1.05	.34	.09	.02	1.28	.25	.01	.01	.06	88	.12	488,600	6	.1	152	7.3
June 1-10.....	3,834,000	6.9	1.00	.32	.10	.04	1.20	.23	.02	.02	--	84	.11	421,700	7	.1	147	7.3
June 11-20	5,934,000	6.3	.95	.37	.10	.03	1.20	.23	.01	.01	--	84	.11	652,700	7	.1	145	7.4
June 21-30	7,393,000	5.9	.95	.40	.07	.03	1.18	.21	.01	.01	.02	82	.11	813,200	5	.1	140	7.2
July 1-15.....	9,676,000	6.4	.95	.30	.07	.03	1.11	.19	.01	.02	--	77	.10	967,600	5	.1	134	7.3
July 16-31	8,793,000	4.9	.90	.34	.07	.02	1.11	.19	.01	.02	.04	76	.10	879,300	6	.1	134	7.2
Aug. 1-13.....	4,432,000	8.1	.90	.33	.07	.03	1.08	.21	.01	.02	.01	79	.11	487,500	5	.1	132	7.1
Aug. 14-31.....	3,672,000	6.7	.95	.31	.07	.04	1.08	.23	.01	.02	--	78	.11	403,900	5	.1	136	7.0
Sept. 1-30	4,245,000	5.8	1.00	.34	.07	.04	1.15	.25	.01	.01	.04	79	.11	467,000	5	.1	140	7.2
Total or weighted average	75,350,000	6.3	1.00	0.36	0.08	0.03	1.21	0.25	0.01	0.01	--	85	0.12	9,042,000	5	0.1	147	--

COLUMBIA RIVER MAIN STEM--Continued

COLUMBIA RIVER AT GRAND COULEE DAM, WASH.

LOCATION.--At grand Coulee Dam, Grant-Okanogan County line, 2,500 feet upstream from gaging station, which is 14 miles upstream from Nespelem River.

DRAINAGE AREA.--74,100 square miles (above gaging station).

RECORDS AVAILABLE.--Chemical analyses: November 1950 to September 1955.

Water temperatures: November 1950 to September 1955.

EXTREMES, 1954-55.--Specific conductance: Maximum daily, 193 micromhos Apr. 24, 25; minimum daily, 123 micromhos Sept. 16, 17.

EXTREMES, 1950-55.--Specific conductance: Maximum daily, 193 micromhos Apr. 24, 25, 1955; minimum daily, 123 micromhos Sept. 16, 17, 1955.

REMARKS.--Values reported for dissolved solids are residues on evaporation. Records of specific conductance of daily samples available in district office at Portland, Ore. Records of discharge for water year October 1954 to September 1955 given in WSP 1396.

Chemical analyses, water year October 1954 to September 1955

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million								Dissolved solids			Per-cent sodium adsorp-tion ratio	Specific conduct-ance (micro-mhos at 25°C)	pH
			Cal-cium (Ca)	Magne-sium (Mg)	Sod-ium (Na)	Potas-ium (K)	Bicar-bonate (HCO ₃)	Sul-fate (SO ₄)	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO ₃)	Boron (B) ppm	Parts per mil-lion				Tons per acre-foot	Total tons
Oct. 1-10, 1954..	1,343,000	--	--	--	--	--	--	--	--	--	--	84	0.11	147,700	--	138
Oct. 11-20.....	1,306,000	4.7	1.05	0.33	0.06	--	1.21	0.23	0.03	0.02	0.06	82	.11	143,700	5	136
Oct. 21-31.....	1,388,000	--	--	--	--	--	--	--	--	--	--	85	.12	166,600	--	137
Nov. 1-10.....	1,298,000	--	--	--	--	--	--	--	--	--	--	86	.12	155,800	--	138
Nov. 11-20.....	1,188,000	4.9	1.05	.32	.07	--	1.18	.25	.03	.02	.06	85	.12	142,600	5	143
Nov. 21-30.....	1,388,000	--	--	--	--	--	--	--	--	--	--	90	.12	166,600	--	146
Dec. 1-10.....	1,340,000	--	--	--	--	--	--	--	--	--	--	87	.12	160,800	--	147
Dec. 11-20.....	1,253,000	4.5	1.15	.23	.07	--	1.21	.29	.03	.02	.03	88	.12	150,400	5	149
Dec. 21-31.....	1,360,000	--	--	--	--	--	--	--	--	--	--	94	.13	176,800	--	150
Jan. 1-10, 1955..	1,165,000	--	--	--	--	--	--	--	--	--	--	98	.13	151,400	--	152
Jan. 11-20.....	1,309,000	6.7	1.10	.34	.10	--	1.26	.27	.04	.02	--	98	.13	170,200	6	155
Jan. 21-31.....	1,419,000	--	--	--	--	--	--	--	--	--	--	97	.13	184,500	--	155
Feb. 1-10.....	1,374,000	--	--	--	--	--	--	--	--	--	--	94	.13	178,600	--	154
Feb. 11-20.....	1,367,000	7.5	1.10	.34	.09	--	1.25	.27	.05	.02	--	99	.13	177,700	6	154
Feb. 21-28.....	1,241,000	--	--	--	--	--	--	--	--	--	--	100	.14	173,700	--	159

Mar. 1-10, 1955	1,601,000	8.8	1.20	.38	.09	--	1.33	.33	.06	.02	--	99	.13	208,100	5	.1	167	7.5
Mar. 11-20,	1,579,000	8.8	1.20	.34	.10	--	1.36	.33	.04	.02	.00	102	.14	221,100	6	.1	170	7.5
Mar. 21-31	1,690,000	--	1.30	.36	.16	--	1.41	--	--	--	--	101	.14	236,600	9	.2	180	7.2
Apr. 1-10	1,416,000	--	--	--	--	--	--	--	--	--	--	107	.15	212,400	--	--	180	--
Apr. 11-20	1,414,000	8.9	1.25	.43	.15	--	1.51	.35	.03	.02	.08	111	.15	212,100	8	.2	186	7.7
Apr. 21-30	1,426,000	--	--	--	--	--	--	--	--	--	--	111	.15	213,900	--	--	187	--
May 1-10	1,405,000	--	--	--	--	--	--	--	--	--	--	109	.15	210,800	--	--	187	--
May 11-20	1,365,000	10	1.10	.42	.14	--	1.39	.31	.03	.01	.04	104	.14	191,100	8	.2	173	7.5
May 21-31	1,861,000	--	--	--	--	--	--	--	--	--	--	95	.13	241,900	--	--	158	--
June 1-10	4,141,000	--	--	--	--	--	--	--	--	--	--	93	.13	538,300	--	--	151	--
June 11-20	5,739,000	11	.95	.31	.11	--	1.18	.23	.02	.01	.06	91	.12	688,700	8	.1	143	7.9
June 21-30	7,418,000	--	--	--	--	--	--	--	--	--	--	78	.11	816,000	--	--	133	--
July 1-10	6,603,000	--	--	--	--	--	--	--	--	--	--	77	.10	660,300	--	--	133	--
July 11-20	6,124,000	7.4	.90	.30	.08	--	1.13	.20	.01	.01	.02	81	.11	673,600	6	.1	136	7.5
July 21-31	5,733,000	--	--	--	--	--	--	--	--	--	--	79	.11	630,600	--	--	134	--
Aug. 1-10	3,668,000	--	--	--	--	--	--	--	--	--	--	81	.11	403,500	--	--	137	--
Aug. 11-20	2,467,000	8.7	.90	.31	.08	0.03	1.15	.19	.01	.01	--	80	.11	271,400	6	.1	135	7.3
Aug. 21-31	2,086,000	--	--	--	--	--	--	--	--	--	--	79	.11	229,500	--	--	133	--
Sept. 1-10	1,485,000	--	--	--	--	--	--	--	--	--	--	76	.10	148,500	--	--	132	--
Sept. 11-20	1,426,000	5.3	.90	.36	.06	.03	1.08	.20	.01	.01	--	79	.11	186,900	5	.1	132	7.0
Sept. 21-30	1,402,000	--	--	--	--	--	--	--	--	--	--	75	.10	140,200	--	--	132	--
Total or weighted average	81,790,000	--	--	--	--	--	--	--	--	--	--	88	0.12	9,815,000	--	--	146	--

YAKIMA RIVER BASIN

YAKIMA RIVER AT KIONA WASH.

LOCATION.--At highway bridge downstream from gaging station at Kiona, Benton County, 3½ miles downstream from intake of Kiona Canal and 25 miles upstream from mouth.

DRAINAGE AREA.--5,600 square miles, approximately.

RECORDS AVAILABLE.--Chemical analyses: December 1952 to September 1955.

Water temperatures: December 1952 to September 1955.

EXTREMES, 1954-55.--Specific conductance: Maximum daily, 387 micromhos Sept. 29; minimum daily, 112 micromhos June 15.

Percent sodium: Maximum, 29 Oct. 1-10, Nov. 1-10; minimum, 23 May 5-6, 9-10, 14-15, 21-25.

EXTREMES, 1952-55.--Specific conductance: Maximum daily, 387 micromhos Sept. 29, 1955; minimum daily, 112 micromhos June 15, 1955.

Percent sodium: Maximum, 29 for several periods; minimum, 23 for several periods.

REMARKS.--Values reported for dissolved solids are residues on evaporation. Records of specific conductance of daily samples available in district office at Portland, Oreg. Records of discharge for water year October 1954 to September 1955 given in WSP 1396.

Chemical analyses, water year October 1954 to September 1955

Date of collection	Runoff (acre- feet)	Silica (SiO ₂) ppm	Equivalents per million								Boron (B) ppm	Dissolved solids			Per- cent sodium	So- dium adsorp- tion ratio	Specific conduct- ance (micro- mhos at 25°C)	pH
			Cal- cium (Ca)	Magne- sium (Mg)	So- dium (Na)	Potas- sium (K)	Bicar- bonate (HCO ₃)	Sul- fate (SO ₄)	Chlo- ride (Cl)	Fluo- ride (F)		Ni- trate (NO ₃)	Parts per mil- lion	Tons per acre- foot					Total tons
Oct. 1-10, 1954 ..	58,180		1.35	0.72	0.83		2.44	0.35	0.17	0.03	--	187	0.25	14,540	29	0.8	280	7.9
Oct. 11-20	55,000		1.35	.76	.83		2.52	.35	.16	.03	0.05	190	.26	14,300	28	.8	289	8.1
Oct. 21-31	85,050		1.10	.67	.70		2.08	.29	.16	.03	--	161	.22	18,710	28	.7	243	8.0
Nov. 1-10	66,210		1.10	.63	.70		2.06	.31	.16	.02	--	159	.22	14,570	29	.7	241	8.1
Nov. 11-20	58,160		1.20	.69	.74		2.23	.33	.16	.03	.08	172	.23	13,380	28	.8	262	8.0
Nov. 21-30	72,990		1.00	.58	.61		1.82	.25	.13	.03	--	144	.20	14,600	28	.7	215	8.1
Dec. 1-13	80,330		1.15	.71	.65		2.06	.31	.15	.04	--	153	.21	16,870	26	.7	251	7.8
Dec. 14-31	81,540		1.15	.72	.70		1.77	.33	.16	.04	.04	157	.21	17,120	27	.7	262	7.8
Jan. 1-10, 1955 ..	47,700		1.15	.61	.65		2.02	.31	.17	.03	--	142	.19	9,060	26	.7	243	7.8
Jan. 11-20	43,060		1.25	.62	.70		2.13	.33	.17	.04	.05	160	.22	9,470	26	.7	258	7.7
Jan. 21-31	46,020		1.20	.69	.70		2.15	.33	.18	.04	--	157	.21	9,660	26	.7	259	7.7
Feb. 1-9, 19-28 ..	78,860		1.15	.68	.70		2.10	.31	.18	.03	.02	161	.22	17,350	27	.7	251	7.8
Feb. 10-18	56,290		.90	.50	.48		1.56	.21	.13	.03	--	124	.17	9,570	25	.6	191	7.6
Mar. 1-10	35,460		1.20	.77	.74		2.21	.33	.18	.04	--	172	.23	8,570	27	.7	268	7.7
Mar. 11-20	34,650		1.25	.72	.65		2.15	.31	.17	.03	.08	162	.22	7,620	25	.7	258	7.9
Mar. 21-31	45,520		1.10	.60	.61		1.93	.27	.14	.04	--	147	.20	9,100	26	.7	234	7.6

Apr. 1-10, 1955 .	45,900	.95	.57	.52	1.77	.25	.14	.03	--	135	.18	8,260	26	.6	211	7.8
Apr. 11-20	39,630	1.00	.64	.52	1.80	.27	.12	.03	.02	138	.19	7,530	24	.6	218	7.9
Apr. 21-30	33,360	1.15	.71	.70	2.06	.38	.16	.03	--	160	.22	7,340	27	.7	256	8.1
May 1-3, 17-19, 27-30	51,190	1.20	.66	.70	2.15	.33	.14	.04	--	167	.23	11,770	26	.7	255	7.8
May 4, 7-8, 11-13, 16, 20, 26, 31	60,970	1.05	.57	.56	1.90	.27	.12	.04	--	148	.20	12,190	24	.6	226	7.8
May 5-6, 9-10, 14-15, 21-25	87,630	.85	.51	.44	1.57	.21	.09	.04	.09	125	.17	14,900	23	.5	189	7.5
June 1-6, 22, 29-30	84,730	.85	.51	.48	1.64	.20	.10	.03	--	131	.18	15,250	24	.6	192	7.8
June 7-9, 18-21, 23, 27-28	149,800	.65	.40	.37	1.25	.14	.06	.03	--	100	.14	20,970	25	.5	145	7.5
June 10-17, 24-26	272,500	.55	.34	.30	1.02	.12	.05	.04	.05	85	.12	32,700	25	.5	122	7.5
July 1-10	97,750	.85	.51	.48	1.57	.21	.10	.03	--	125	.17	16,620	25	.6	188	7.6
July 11-20	71,090	.95	.55	.56	1.75	.23	.11	.03	.01	142	.19	13,510	27	.7	209	7.5
July 21-31	47,940	1.35	.74	.83	2.46	.38	.16	.04	--	196	.27	12,940	27	.8	290	7.8
Aug. 1-10	40,560	1.40	.90	.87	2.61	.40	.17	.03	--	200	.27	10,950	27	.8	306	7.8
Aug. 11-20	32,530	1.55	.90	.96	2.85	.46	.18	.03	.02	217	.30	9,760	28	.9	332	7.9
Aug. 21-31	38,120	1.50	.90	.96	2.79	.44	.18	.03	--	208	.28	10,670	28	.9	323	7.9
Sept. 1-10	38,960	1.50	.90	.91	2.79	.42	.17	.03	--	199	.27	10,520	27	.8	323	7.9
Sept. 11-20	42,880	1.50	.99	.91	2.82	.44	.20	.03	.02	212	.29	12,440	26	.8	328	7.9
Sept. 21-30	40,860	1.60	.90	1.00	2.88	.48	.21	.03	--	219	.30	12,260	28	.9	339	8.0
Total or weighted average	2,222,000	1.05	0 .61	0.61	1.88	0.27	0.13	0.03	--	147	0.20	444,700	27	0.7	225	--

PART 13. SNAKE RIVER BASIN

SNAKE RIVER MAIN STEM

SNAKE RIVER NEAR HEISE, IDAHO

LOCATION. --At Eagle Rock Canal headgate, 1 1/4 miles upstream from Heise, Bonneville County, 1 5/8 miles downstream from Anderson Canal headgate, 1 1/4 miles downstream from gaging station, about 4 1/4 miles east of Ririe, and about 21 miles upstream from Henrys Fork. DRAINAGE AREA. --5,752 square miles (above gaging station).

RECORDS AVAILABLE. --Chemical analyses: January 1953 to September 1955.

Water temperatures: January 1953 to September 1955.

EXTREMES, 1954-55. --Specific conductance: Maximum daily, 635 micromhos Jan. 9; minimum daily, 241 micromhos June 25.

Percent sodium: Maximum, 19 Sept. 1-10; minimum, 7 May 1-10, June 1-10.

EXTREMES, 1953-55. --Specific conductance Maximum daily, 635 micromhos Jan. 9, 1955; minimum daily, 240 micromhos June 27, 1954.

Percent sodium: Maximum, 19 Sept. 1-10, 1955; minimum, 7 June 11-20, 1953, May 1-10, June 1-10, 1955.

REMARKS. --Values reported for dissolved solids are residues on evaporation. Records of specific conductance of daily samples available in district office at Salt Lake City, Utah. Records of discharge for water year October 1954 to September 1955 given in WSP 1397.

Chemical analyses, water year October 1954 to September 1955

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million								Dissolved solids			Per-cent sodium	So-adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH		
			Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B) ppm	Parts per million					Tons per acre-foot	Total tons
Oct. 1-10, 1954...	63,830	11	3.19	1.48	0.61	0.05	3.31	1.54	0.51	0.02	0.01	--	305	0.41	26,170	11	0.4	497	7.6
Oct. 11-20.....	61,820	10	3.44	1.56	.61	.05	3.43	1.67	.51	--	.01	0.06	312	.42	25,960	11	.4	504	7.7
Oct. 21-31.....	66,820	9.6	3.49	1.48	.61	.05	3.39	1.69	.54	--	.01	--	312	.42	28,060	11	.4	504	7.7
Nov. 1-10.....	56,530	10	3.54	1.56	.61	.05	3.51	1.69	.56	--	.01	--	320	.44	24,870	11	.4	515	7.7
Nov. 11-20.....	56,990	12	3.59	1.56	.61	.05	3.52	1.67	.56	--	.02	.10	320	.44	25,080	10	.4	518	7.7
Nov. 21-30.....	52,840	9.5	3.64	1.64	.61	.05	3.52	1.73	.56	--	.01	--	336	.46	24,310	10	.4	533	7.7
Dec. 1-10.....	49,730	12	3.54	1.56	.74	.07	3.57	1.73	.56	--	.01	--	342	.47	23,370	13	.5	554	7.9
Dec. 11-20.....	45,140	12	3.74	1.64	.74	.07	3.70	1.77	.62	--	.02	.11	356	.48	21,670	12	.5	576	7.8
Dec. 21-31.....	47,820	12	3.84	1.64	.78	.07	3.74	1.92	.62	--	.02	--	369	.50	23,910	12	.5	583	8.0
Jan. 1-10, 1955...	42,640	11	3.69	1.64	.78	.07	3.67	1.81	.62	--	.02	--	356	.48	20,470	13	.5	570	7.9
Jan. 11-20.....	43,320	11	3.79	1.56	.78	.08	3.72	1.79	.62	--	.02	.05	359	.49	21,230	13	.5	587	7.6
Jan. 21-31.....	46,710	11	3.69	1.56	.74	.06	3.59	1.79	.56	--	.01	--	349	.47	21,950	12	.5	565	7.8
Feb. 1-10.....	41,870	13	3.79	1.73	.74	.06	3.64	1.94	.62	--	.02	--	362	.49	20,520	12	.4	587	7.9
Feb. 11-19.....	38,540	13	3.79	1.73	.74	.06	3.57	2.04	.65	--	.02	.03	363	.49	18,860	12	.4	561	8.1
Feb. 20-28.....	38,840	13	3.79	1.73	.74	.06	3.67	2.04	.62	--	.01	--	364	.50	19,420	12	.4	568	7.9

Mar. 1-10, 1955...	42,680	12	3.74	1.73	.74	.06	3.64	1.92	.65	.01	--	364	.50	21,340	12	.4	569	7.8
Mar. 11-20.....	43,500	12	3.69	1.64	.74	.06	3.57	1.89	.65	.01	.08	353	.48	20,880	12	.5	554	8.0
Mar. 21-31.....	45,460	13	3.59	1.73	.78	.05	3.57	1.83	.68	.02	--	348	.47	21,370	13	.5	561	7.7
Apr. 1-10.....	43,720	12	3.39	1.64	.78	.05	3.41	1.73	.68	.01	--	332	.45	19,670	13	.5	540	7.9
Apr. 11-20.....	63,930	9.0	3.29	1.48	.74	.05	3.36	1.48	.62	.02	.05	311	.42	26,850	13	.5	513	7.7
Apr. 21-30.....	65,530	8.8	3.39	1.40	.74	.05	3.43	1.52	.68	.01	--	310	.42	27,520	13	.5	510	7.7
May 1-10.....	119,500	14	2.89	1.23	.29	.02	3.08	1.14	.19	.03	--	268	.36	43,020	7	.2	430	7.8
May 11-20.....	173,300	13	2.50	.99	.35	.02	2.72	.85	.21	.02	.07	224	.30	51,990	9	.3	359	7.8
May 21-31.....	236,300	12	2.20	.99	.30	.02	2.49	.75	.19	.02	--	203	.28	66,160	9	.2	328	7.6
June 1-10.....	226,000	12	2.30	.99	.24	.02	2.59	.73	.20	.02	--	204	.28	63,280	7	.2	333	7.6
June 11-20.....	332,200	13	1.85	.77	.30	.04	2.20	.56	.15	.02	.04	169	.23	76,410	10	.3	278	7.6
June 21-30.....	297,300	12	1.80	.76	.26	.04	2.03	.60	.17	.02	--	163	.22	65,410	9	.2	269	7.6
July 1-10.....	228,200	15	1.85	.81	.29	.04	2.03	.67	.23	.01	--	176	.24	54,770	10	.3	290	7.6
July 11-20.....	245,000	16	1.65	.72	.42	.05	1.93	.56	.21	.02	.11	162	.22	53,900	15	.4	272	7.3
July 21-31.....	262,000	17	1.65	.69	.42	.05	1.97	.58	.21	.02	--	166	.23	60,260	15	.4	275	7.5
Aug. 1-10.....	209,300	16	1.65	.70	.44	.05	1.90	.60	.23	.02	--	167	.23	48,140	15	.4	277	7.3
Aug. 11-20.....	165,300	16	1.85	.73	.52	.06	2.13	.71	.27	.02	.10	183	.25	41,320	17	.5	314	7.7
Aug. 21-31.....	164,900	16	1.90	.77	.56	.06	2.16	.75	.28	.02	--	191	.26	42,870	17	.5	322	7.6
Sept. 1-10.....	149,600	16	1.85	.72	.61	.06	2.08	.81	.28	.02	--	190	.26	38,900	19	.5	315	7.5
Sept. 11-20.....	135,900	20	1.90	.76	.61	.06	2.13	.77	.31	.02	.10	193	.26	35,330	18	.5	323	7.5
Sept. 21-30.....	87,770	14	2.44	1.07	.65	.06	2.70	1.06	.37	.02	--	243	.33	28,960	15	.5	409	7.7
Total or weighted average.....	4,091,000	14	2.40	0.99	0.48	0.05	2.56	0.98	0.31	0.02	--	225	0.31	1,268,000	12	0.4	368	--

SNAKE RIVER MAIN STEM--Continued

SNAKE RIVER AT KING HILL, IDAHO

LOCATION.--At county highway bridge about 400 yards downstream from gaging station, which is 300 feet east of railroad station at King Hill, Elmore County, and 20 miles downstream from Malad River.

DRAINAGE AREA.--35,800 square miles, approximately.

RECORDS AVAILABLE.--Chemical analyses: March 1951 to September 1955.

Water temperatures: March 1951 to September 1955.

EXTREMES, 1954-55.--Specific conductance: Maximum daily, 577 micromhos Oct. 12; minimum daily, 461 micromhos Apr. 13.

Percent sodium: Maximum, 28 Aug. 1-10, 11-20, 21-31, Sept. 1-10, 21-30; minimum, 24 Jan. 21-31, Feb. 1-10, 11-19, 20-28.

EXTREMES, 1951-55.--Specific conductance: Maximum daily, 594 micromhos Oct. 3, 1952; minimum daily, 394 micromhos May 7, 1952.

Percent sodium: Maximum, 29 July 21-31, 1951; minimum, 17 Apr. 1-10, 1951.

REMARKS.--Values reported for dissolved solids are residues on evaporation. Records of specific conductance of daily samples available in district office at Portland, Oreg. Records of discharge for water year October 1954 to September 1955 given in WSP 1397.

Chemical analyses, water year October 1954 to September 1955

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million								Boron (B) ppm	Dissolved solids			Percent sodium ratio	So-dium adsorp-tion ratio	Specific conduct-ance (micro-mhos at 25°C)	pH	
			Cal-cium (Ca)	Magne-sium (Mg)	So-dium (Na)	Potas-sium (K)	Bicar-bonate (HCO ₃)	Sul-fate (SO ₄)	Chlo-ride (Cl)	Fluo-ride (F)		Ni-trate (NO ₃)	parts per mil-lion	Tons per acre-foot					Total tons
Oct. 1-10, 1954.	186,100	35	2.40	1.81	1.57	0.13	3.74	1.27	0.79	0.08	--	344	0.47	87,470	27	1.1	546	8.1	
Oct. 11-20	227,900	37	2.50	1.81	1.65	.10	3.80	1.29	.85	.06	0.11	348	.47	107,100	27	1.1	553	8.0	
Oct. 21-31	239,100	38	2.50	1.81	1.61	.10	3.74	1.29	.82	.05	--	342	.47	112,400	27	1.1	537	8.1	
Nov. 1-10	219,900	37	2.54	1.73	1.52	.10	3.70	1.29	.82	.05	--	340	.46	101,200	26	1.0	534	8.0	
Nov. 11-20	211,600	36	2.59	1.73	1.52	.10	3.70	1.31	.82	.06	.13	342	.47	99,450	26	1.0	539	7.8	
Nov. 21-30	215,400	35	2.59	1.73	1.52	.10	3.70	1.29	.85	.06	--	340	.46	99,080	26	1.0	536	7.9	
Dec. 1-20	405,200	36	2.45	1.64	1.48	.12	3.64	1.12	.79	.04	--	340	.46	186,400	26	1.0	547	7.8	
Dec. 21-31	212,800	35	2.45	1.64	1.48	.12	3.65	1.15	.79	.04	--	341	.46	97,880	26	1.0	546	7.9	
Jan. 1-10, 1955.	198,400	35	2.54	1.64	1.48	.12	3.64	1.19	.79	.05	--	338	.46	91,260	26	1.0	540	8.0	
Jan. 11-20	203,100	35	2.50	1.64	1.48	.12	3.57	1.19	.85	.05	.07	337	.46	93,430	26	1.0	538	7.8	
Jan. 21-31	217,400	38	2.54	1.81	1.39	.09	3.57	1.21	.79	.05	--	342	.47	102,200	24	.9	530	7.9	
Feb. 1-10	190,700	38	2.54	1.81	1.39	.09	3.54	1.19	.79	.06	--	340	.46	87,720	24	.9	523	8.1	
Feb. 11-19	147,900	38	2.50	1.81	1.39	.09	3.47	1.21	.79	.06	.12	338	.46	66,030	24	.9	517	7.9	
Feb. 20-28	146,300	38	2.45	1.81	1.39	.09	3.47	1.23	.79	.06	--	334	.45	65,840	24	.9	514	8.0	

Mar. 1-10, 1955.	170,300	38	2.40	1.73	1.39	.09	3.47	1.21	.82	.06	--	336	.46	78,340	25	1.0	516	8.2
Mar. 11-20	196,100	40	2.35	1.64	1.43	.12	3.43	1.12	.76	.05	.10	329	.45	88,240	26	1.0	516	7.9
Mar. 21-31	243,000	37	2.40	1.64	1.39	.12	3.49	1.12	.79	.05	--	329	.45	109,400	25	1.0	522	7.9
Apr. 1-10	238,400	32	2.25	1.40	1.26	.12	3.38	1.04	.73	.05	--	322	.44	104,900	25	.9	505	8.1
Apr. 11-20	250,900	36	2.20	1.48	1.30	.11	3.33	1.06	.71	.05	.08	317	.43	107,900	26	1.0	496	8.4
Apr. 21-30	240,400	34	2.30	1.40	1.30	.11	3.41	1.06	.73	.04	--	317	.43	103,400	25	1.0	504	8.1
May 1-10	176,700	36	2.20	1.40	1.26	.12	3.34	1.02	.68	.05	--	306	.42	74,210	25	.9	498	8.2
May 11-20	164,800	34	2.20	1.40	1.30	.13	3.34	1.06	.71	.05	.05	315	.43	70,860	26	1.0	502	8.1
May 21-31	175,100	35	2.20	1.40	1.35	.12	3.38	1.04	.68	.05	--	316	.43	75,290	27	1.0	504	8.0
June 1-10	152,100	34	2.15	1.48	1.35	.12	3.34	1.10	.68	.05	--	313	.43	65,400	26	1.0	513	8.0
June 11-20	160,600	35	2.15	1.48	1.39	.12	3.36	1.12	.68	.05	.05	318	.43	69,060	27	1.0	512	8.0
June 21-30	168,700	35	2.15	1.56	1.43	.12	3.43	1.12	.68	.05	--	321	.44	74,230	27	1.0	518	7.9
July 1-10	166,700	33	2.20	1.64	1.43	.12	3.44	1.15	.68	.05	--	324	.44	73,350	27	1.0	517	8.2
July 11-20	155,600	35	2.15	1.64	1.35	.12	3.44	1.12	.68	.05	.06	324	.44	68,460	26	1.0	513	8.1
July 21-31	172,000	40	2.25	1.56	1.48	.13	3.54	1.17	.71	.05	--	342	.47	80,840	27	1.1	522	7.9
Aug. 1-10	156,500	38	2.20	1.64	1.52	.13	3.57	1.15	.71	.05	--	349	.47	73,560	28	1.1	533	7.9
Aug. 11-20	158,500	42	2.20	1.73	1.57	.13	3.62	1.19	.73	.05	.08	351	.48	76,080	28	1.1	540	7.8
Aug. 21-31	171,300	36	2.40	1.56	1.57	.13	3.61	1.23	.73	.06	--	340	.46	78,800	28	1.1	543	8.0
Sept. 1-10	159,100	36	2.35	1.56	1.57	.11	3.61	1.25	.73	.06	--	338	.46	73,190	28	1.1	542	8.1
Sept. 11-20	167,700	38	2.40	1.73	1.57	.12	3.67	1.27	.73	.01	.01	348	.47	78,820	27	1.1	548	8.1
Sept. 21-30	178,600	35	2.40	1.64	1.61	.13	3.67	1.29	.73	.06	--	348	.47	83,940	28	1.1	559	8.0
Weighted average	6,845,000	36	2.35	1.64	1.44	0.11	3.54	1.17	0.76	0.05	--	334	0.45	3,080,000	26	1.0	527	--

Apr. 1-10, 1955.	869,000	24	1.35	.71	.91	.05	1.98	.64	.34	.05	--	200	.27	234,600	30	.9	304	7.8
Apr. 11-20	1,043,000	26	1.10	.63	.70	.07	1.72	.52	.28	.04	.04	174	.24	250,300	28	.7	259	7.7
Apr. 21-30	1,181,000	34	1.10	.56	.70	.07	1.66	.50	.26	.04	--	164	.22	259,800	29	.8	246	7.6
May 1-8, 16	1,467,000	24	.95	.44	.56	.06	1.46	.40	.20	.03	--	141	.19	278,700	28	.7	206	7.6
May 9-11, 17-21, 29-31	2,087,000	19	.70	.33	.44	.05	1.05	.29	.15	.02	.01	104	.14	292,200	29	.6	151	7.2
May 12-15, 22-28	2,579,000	16	.60	.27	.37	.05	.95	.23	.11	.01	--	94	.13	335,300	29	.6	133	7.0
June 1-6, 26-30.	2,015,000	16	.70	.30	.48	.06	1.10	.31	.14	1.56	--	104	.14	282,100	31	.7	157	7.1
June 7-8, 17, 19-22, 24-25 ..	2,259,000	14	.55	.24	.41	.05	.88	.25	.11	.01	.02	87	.12	271,100	33	.7	127	7.0
June 9-16, 18, 23	3,380,000	14	.47	.20	.33	.05	.74	.19	.08	.01	--	76	.10	338,000	31	.6	105	6.9
July 1-10	1,360,000	15	.75	.38	.61	.06	1.18	.40	.17	.02	--	115	.16	217,600	34	.8	182	7.4
July 11-20	1,059,000	16	.80	.44	.61	.06	1.30	.42	.19	.01	.01	122	.17	180,000	32	.8	192	7.6
July 21-31	747,800	21	1.00	.54	.83	.08	1.67	.54	.24	.02	--	160	.22	164,500	34	.9	244	7.4
Aug. 1-10	494,700	26	1.35	.71	1.09	.09	2.24	.69	.34	.02	--	203	.28	138,500	34	1.1	321	7.4
Aug. 11-20	416,100	27	1.50	.99	1.26	.10	2.66	.73	.34	.02	.10	229	.31	129,000	33	1.1	369	7.5
Aug. 21-31	414,300	25	1.50	1.07	1.35	.11	2.79	.79	.37	.02	--	242	.33	136,700	34	1.2	394	7.7
Sept. 1-10	357,800	26	1.65	.99	1.39	.11	2.95	.83	.40	.02	--	253	.34	121,700	34	1.2	413	8.0
Sept. 11-20	405,400	28	1.70	1.07	1.44	.12	3.00	.90	.40	.03	.02	263	.36	145,900	33	1.2	425	7.7
Sept. 21-30	431,200	30	1.75	1.07	1.52	.11	3.11	.92	.42	.03	--	298	.41	176,800	34	1.3	436	7.9
Total or weighted average	30,890,000	22	1.10	0.62	0.83	0.07	1.75	0.56	0.27	0.02	--	168	0.23	7,105,000	32	0.9	257	--

BOISE RIVER BASIN

BOISE RIVER AT NOTUS, IDAHO

LOCATION.--At steel highway bridge 1,100 feet downstream from gaging station, a quarter of a mile southeast of Notus, Canyon County, and 7 miles northwest of Caldwell.

DRAINAGE AREA.--3,820 square miles, approximately.

RECORDS AVAILABLE.--Chemical analyses: January 1939 to January 1940, November 1950 to September 1955.

Water temperatures: November 1950 to September 1955.

Sediment records: January 1939 to June 1940.

EXTREMES, 1954-55.--Specific conductance: Maximum daily, 924 micromhos May 10; minimum daily, 307 micromhos May 16.

Percent sodium: Maximum, 55 Aug. 3, 15-18, 20-23, 28, 30-31; minimum, 43 Jan. 21-31.

EXTREMES, 1939-40, 1950-55.--Specific conductance: Maximum daily, 1,470 micromhos July 30, Aug. 26, 1939; minimum daily, 81.7 micromhos Apr. 27, 1952.

Percent sodium: Maximum, 64 Sept. 1-10, 1939; minimum, 25 Apr. 11-20, 1951.

REMARKS.--Values reported for dissolved solids are residues on evaporation. Records of specific conductance of daily samples available in district office at Portland, Ore. Records of discharge for water year October 1954 to September 1955 given in WSP 1397.

Chemical analyses, water year October 1954 to September 1955

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million								Dissolved solids				Specific conductance (micro-mhos at 25°C)	pH		
			Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B) ppm	Parts per million	Tons per acre-foot			Total tons	Percent sodium	Sodium to total ratio
Oct. 1-10, 1954	8,160	30	2.05	0.99	2.96	0.11	3.93	1.60	0.54	0.07	--	370	0.50	4,080	48	2.4	571	7.9
Oct. 11-20	18,000	30	2.05	.99	2.74	.10	3.72	1.52	.48	.05	0.15	351	.48	8,640	47	2.2	543	7.9
Oct. 21-31	18,120	36	2.54	1.32	3.48	.12	4.65	2.06	.62	.05	--	446	.61	11,050	47	2.5	680	7.7
Nov. 1-10	13,880	36	2.69	1.40	3.57	.12	4.82	2.19	.68	.07	--	464	.63	8,740	46	2.5	707	7.7
Nov. 11-20	13,640	36	2.64	1.32	3.57	.13	4.72	2.29	.68	.07	.20	464	.63	8,590	47	2.5	707	7.6
Nov. 21-30	12,330	42	2.69	1.32	3.61	.12	4.77	2.12	.65	.04	--	469	.64	7,890	47	2.6	715	8.0
Dec. 1-10	11,790	44	2.64	1.32	3.52	.12	4.80	2.14	.68	.05	--	471	.64	7,550	46	2.5	716	8.2
Dec. 11-20	10,920	44	2.69	1.32	3.65	.13	4.83	2.12	.68	.03	.16	479	.65	7,100	47	2.6	727	7.9
Dec. 21-31	11,910	42	2.74	1.32	3.65	.14	4.82	2.19	.68	.04	--	473	.64	7,620	46	2.5	732	7.8
Jan. 1-10, 1955	11,230	42	2.69	1.40	3.52	.14	4.70	2.17	.68	.04	--	461	.63	7,070	45	2.5	709	7.7
Jan. 11-20	9,910	46	2.84	1.40	3.57	.12	4.90	2.17	.71	.06	.14	478	.65	6,440	45	2.5	725	7.9
Jan. 21-31	10,310	44	3.29	1.40	3.57	.12	5.39	2.14	.73	.05	--	504	.69	7,110	43	2.3	764	7.9
Feb. 1-10	9,030	42	3.04	1.32	3.57	.12	5.18	2.17	.76	.06	--	498	.68	6,140	44	2.4	757	7.6
Feb. 11-19	8,280	39	2.74	1.32	3.35	.12	4.62	2.12	.71	.11	.13	464	.63	5,220	44	2.4	710	7.8
Feb. 20-28	8,480	37	2.59	1.23	3.35	.12	4.44	2.08	.68	.11	--	450	.61	5,170	46	2.4	689	7.7

Mar. 1-10, 1955...	9,460	36	2.69	1.15	3.22	.10	4.33	2.06	.68	.60	5,680	45	2.3	679	7.9
Mar. 11-20	9,140	35	2.59	1.15	3.35	.10	4.36	2.10	.68	.60	5,480	47	2.4	685	7.9
Mar. 21-31	9,590	33	2.59	1.15	3.44	.10	4.38	2.12	.68	.60	5,750	47	2.5	684	8.0
Apr. 1-10.....	7,560	31	2.40	.99	3.26	.11	4.21	1.94	.62	.58	4,380	48	2.5	658	8.2
Apr. 11-13, 15-18,	2,530	26	2.10	.82	2.70	.09	3.77	1.62	.59	.09	1,260	47	2.2	585	8.0
28-30	5,090	29	1.65	.72	2.09	.09	3.03	1.12	.40	.40	2,040	46	1.9	454	8.0
Apr. 14, 19-27...															
May 1-7, 12-13,															
21-25.....	2,850	28	2.05	.80	2.87	.10	3.61	1.62	.62	.50	1,420	49	2.4	577	8.2
May 8-11, 14	294	34	2.59	1.32	4.61	.15	4.72	2.79	1.10	.74	218	53	3.3	836	8.2
May 15-20, 26-31.	7,080	26	1.55	.62	1.87	.09	2.66	1.00	.37	.37	2,620	45	1.8	413	7.9
June 1, 11-17, 29-30	7,230	28	1.65	.57	1.96	.10	2.79	1.02	.34	.36	2,600	46	1.9	421	7.6
June 2, 4, 6, 18-20,															
25-27.....	3,380	30	1.85	.80	2.74	.11	3.34	1.39	.51	.45	1,520	50	2.4	519	7.8
June 5, 7-10, 21-24,															
28	1,820	28	2.15	.90	3.44	.13	3.88	1.87	.68	.55	1,000	52	2.8	625	7.8
July 1-7, 29-31...	5,450	31	1.85	.76	2.74	.11	3.39	1.35	.42	.45	2,450	50	2.4	516	7.7
July 12-17, 19-21, 28	1,570	35	2.35	1.07	4.04	.13	4.39	2.25	.79	.64	1,000	53	3.1	725	7.8
July 8-11, 18, 22-27	2,890	34	2.20	.99	3.52	.12	4.05	1.85	.62	.56	1,620	52	2.8	638	7.9
Aug. 1-2, 6, 7, 11-13,															
24-26	3,030	30	2.15	.99	3.30	.12	4.00	1.79	.62	.54	1,640	50	2.6	623	7.7
Aug. 3, 15-18, 20-23															
28, 30-31	2,030	37	2.40	1.15	4.44	.13	4.62	2.39	.85	.67	1,360	55	3.3	747	8.1

BOISE RIVER BASIN--Continued
BOISE RIVER AT NOTUS, IDAHO--Continued

Chemical analyses, water year October 1954 to September 1955--Continued

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million								Dissolved solids				Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH	
			Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B) ppm	Parts per million	Tons per acre-foot				Total tons
Aug. 4-5, 8-10, 14, 19, 27, 29 Sept. 1-10 Sept. 11-20 Sept. 21-30	1,770	33	2.35	0.99	3.78	0.12	4.34	2.12	0.73	0.05	--	450	0.61	1,080	52	2.9	691	--
	3,160	36	2.20	1.07	3.70	.12	4.29	1.98	.68	.06	--	434	.59	1,860	52	2.9	664	8.3
	9,420	32	2.00	.90	2.96	.11	3.72	1.54	.51	.06	0.04	362	.49	4,620	50	2.5	563	8.1
	8,110	32	2.10	.90	3.13	.11	3.95	1.64	.51	.06	--	378	.51	4,140	50	2.6	594	8.1
Total or weighted average	279,400	36	2.45	1.15	3.26	0.12	4.34	1.94	0.62	0.06	--	427	0.58	162,100	47	2.4	655	--

PART 14. PACIFIC SLOPE BASINS IN OREGON AND LOWER COLUMBIA RIVER BASIN

COLUMBIA RIVER MAIN STEM

COLUMBIA RIVER AT MARYHILL FERRY NEAR RUFUS, OREG.

LOCATION.--At Maryhill Ferry about 2½ miles downstream from Rufus, Sherman County, and about 9 miles upstream from The Dalles gaging station, which is just upstream from Celilo Falls, 3 miles downstream from Deschutes River, and 11 miles east of The Dalles, Wasco County.

DRAINAGE AREA.--237,000 square miles (above gaging station near The Dalles).

RECORDS AVAILABLE.--Chemical analyses: December 1950 to September 1955.

Water temperatures: December 1950 to September 1955.

EXTREMES, 1954-55.--Specific conductance: Maximum daily, 232 micromhos Dec. 8; minimum daily, 110 micromhos June 7, 1955.

EXTREMES, 1950-55.--Specific conductance: Maximum daily, 268 micromhos Dec. 29, 1952; minimum daily, 110 micromhos June 7, 1955. RECORDS of specific conductance of daily samples available in district office at Portland, Oreg. Records of discharge for dissolved solids are residues on evaporation. Records of specific conductance of daily samples available in district office at Portland, Oreg. Records of discharge for gaging station near The Dalles for water year October 1954 to September 1955 given in WSP 1398. These records include the inflow of the Deschutes River, which on the average amounts to less than 5 percent of the annual runoff at the gaging station. No other appreciable inflow between Maryhill Ferry and gaging station except during periods of heavy local rains.

Chemical analyses, water year October 1954 to September 1955

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million								Boron (B) ppm	Dissolved solids			Percent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH	
			Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)		Nitrate (NO ₃)	Parts per million	Tons per acre-foot					Total tons
Oct. 1-10, 1954	2,261,000	10	1.15	0.53	0.48	0.06	1.61	0.48	0.14	0.01	0.02	0.09	136	0.18	407,000	22	0.5	222	7.7
Oct. 11-20	2,103,000	--	--	--	.48	--	1.66	--	--	--	--	--	135	.18	378,500	--	--	223	7.6
Oct. 21-31	2,376,000	--	--	--	.48	--	1.67	--	--	--	--	--	135	.18	427,700	--	--	224	7.7
Nov. 1-10	2,146,000	--	--	--	.48	--	1.69	--	--	--	--	--	134	.18	386,300	--	--	221	7.7
Nov. 11-20	2,200,000	--	--	--	.40	--	1.52	--	--	--	--	--	123	.17	374,000	--	--	204	7.7
Nov. 21-30	2,364,000	--	--	--	.43	--	1.54	--	--	--	--	--	125	.17	401,900	--	--	204	7.9
Dec. 1-10	2,241,000	--	--	--	.48	--	1.64	--	--	--	--	--	137	.19	425,800	--	--	225	8.2
Dec. 11-20	1,984,000	--	--	--	.44	--	1.59	--	--	--	--	--	131	.18	357,100	--	--	222	7.5
Dec. 21-31	2,122,000	--	--	--	.43	--	1.62	--	--	--	--	--	130	.18	382,000	--	--	219	7.2
Jan. 1-10, 1955	1,997,000	11	1.25	.51	.41	.04	1.59	.44	.13	.01	.03	.04	135	.18	359,500	19	.4	221	7.7
Jan. 11-20	2,019,000	--	--	--	.44	--	1.62	--	--	--	--	--	132	.18	363,400	--	--	220	7.6
Jan. 21-31	2,266,000	--	--	--	.44	--	1.62	--	--	--	--	--	133	.18	407,900	--	--	221	7.6
Feb. 1-13	2,801,000	--	--	--	.44	--	1.66	--	--	--	--	--	132	.18	504,200	--	--	223	--
Feb. 14-28	3,221,000	--	--	--	.41	--	1.54	--	--	--	--	--	121	.16	515,400	--	--	210	7.5

COLUMBIA RIVER MAIN STEM--Continued
COLUMBIA RIVER AT MARYHILL FERRY NEAR RUFUS, OREG.--Continued

Chemical analyses, water year October 1954 to September 1955--Continued

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million						Boron (B) ppm	Dissolved solids			Percent sodium adsorption ratio	Specific conductance (micro-mhos at 25° C)	pH
			Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Parts per million	Tons per acre-foot	Total tons	
Mar. 1-10, 1955..	2,307,000	--	--	--	0.40	--	1.56	--	--	--	--	122	0.17	392,200	7.2
Mar. 11-20.....	2,364,000	--	--	--	.39	--	1.57	--	--	--	--	125	.17	401,900	7.1
Mar. 21-31.....	2,624,000	--	--	--	.40	--	1.57	--	--	--	--	132	.18	472,300	7.1
Apr. 1-10.....	2,592,000	14	1.15	0.55	.40	0.05	1.57	0.40	0.13	0.01	0.06	132	.18	466,600	7.7
Apr. 11-20.....	2,848,000	--	--	--	.32	--	1.39	--	--	--	--	110	.15	427,200	7.6
Apr. 21-30.....	3,039,000	--	--	--	.37	--	1.49	--	--	--	--	127	.17	516,600	7.5
May 1-10.....	3,420,000	--	--	--	.32	--	1.31	--	--	--	--	114	.16	547,200	7.7
May 11-20.....	3,866,000	--	--	--	.27	--	1.15	--	--	--	--	103	.14	541,200	7.5
May 21-31.....	5,048,000	--	--	--	.23	--	1.03	--	--	--	--	90	.12	605,800	7.6
June 1-10.....	6,407,000	--	--	--	.18	--	.98	--	--	--	--	80	.11	704,800	7.7
June 11-20.....	9,836,000	--	--	--	.15	--	.98	--	--	--	--	78	.11	1,082,000	7.8
June 21-30.....	10,420,000	--	--	--	.14	--	1.05	--	--	--	--	78	.11	1,146,000	7.7
July 1-10.....	9,271,000	9.3	.85	.29	.04	.16	1.06	.23	.03	.02	.01	79	.11	1,020,000	7.4
July 11-20.....	8,108,000	--	--	--	.16	--	1.10	--	--	--	--	85	.12	973,000	7.5
July 21-31.....	7,424,000	--	--	--	.17	--	1.16	--	--	--	--	87	.12	890,900	7.5
Aug. 1-10.....	4,828,000	--	--	--	.19	--	1.21	--	--	--	--	91	.12	579,400	7.5
Aug. 11-20.....	3,416,000	--	--	--	.26	--	1.30	--	--	--	--	100	.14	478,200	7.6
Aug. 21-31.....	2,902,000	--	--	--	.28	--	1.34	--	--	--	--	102	.14	406,300	7.8
Sept. 1-10.....	2,299,000	--	--	--	.32	--	1.34	--	--	--	--	106	.14	321,900	7.6
Sept. 11-20.....	2,237,000	--	--	--	.35	--	1.41	--	--	--	--	110	.15	335,600	7.9
Sept. 21-30.....	2,216,000	--	--	--	.41	--	1.48	--	--	--	--	118	.16	354,600	7.8
Total or weighted average	129,600,000	--	--	--	0.28	--	1.29	--	--	--	--	103	0.14	18,140,000	--

WILLAMETTE RIVER BASIN

WILLAMETTE RIVER AT SALEM, OREG.

LOCATION --At bridge on Oregon Highway 22, 300 feet downstream from gaging station at Salem, Marion County.
DRAINAGE AREA --7,280 square miles, approximately.

RECORDS AVAILABLE --Chemical analyses: August to December 1910, August 1911 to August 1912, February 1951 to September 1955.

Water temperatures: February 1951 to September 1955.

EXTREMES, 1954-55 --Specific conductance: Maximum daily, 133 micromhos Nov. 7; minimum daily, 39.4 micromhos June 11.

EXTREMES, 1951-55 --Specific conductance: Maximum daily, 133 micromhos Nov. 7, 1954; minimum daily, 34.6 micromhos Jan. 20, 1953.

REMARKS --Values reported for dissolved solids are residues on evaporation. Records of specific conductance of daily samples available in district office at Portland, Oreg. Records of discharge for water year October 1954 to September 1955 given in WSP 1398.

Chemical analyses, water year October 1954 to September 1955

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million								Boron (B) ppm	Dissolved solids			Per-cent sodium	So-ad-sorp-tion ratio	Specific conduct-ance (micro-mhos at 25°C)	pH
			Cal-cium (Ca)	Magne-sium (Mg)	So-dium (Na)	Potas-sium (K)	Bicar-bonate (HCO ₃)	Sul-fate (SO ₄)	Chlo-ride (Cl)	Fluo-ride (F)		Ni-trate (NO ₃)	Parts per mil-lion	Tons per acre-foot					Total tons
Oct. 1-16, 1954...	281,100	18	0.30	0.15	0.19	0.03	0.51	0.05	0.07	0.01	0.01	53	0.07	19,680	28	0.4	66.4	6.9
Oct. 17-31.....	387,600	--	--	--	.17	--	.49	--	--	--	--	51	.07	27,130	--	--	61.4	6.8
Nov. 1-10.....	179,700	--	--	--	.21	--	.57	--	--	--	--	59	.08	14,380	--	--	69.6	7.0
Nov. 11-20.....	371,900	--	--	--	.17	--	.51	--	--	--	--	58	.08	29,750	--	--	66.9	6.9
Nov. 21-30.....	379,400	--	--	--	.16	--	.46	--	--	--	--	50	.07	26,560	--	--	57.4	7.1
Dec. 1-10.....	320,700	--	--	--	.16	--	.46	--	--	--	--	58	.08	25,660	--	--	61.7	7.1
Dec. 11-17.....	320,500	--	--	--	.15	--	.43	--	--	--	--	57	.08	25,640	--	--	57.7	6.9
Dec. 18-31.....	674,400	--	--	--	.16	--	.43	--	--	--	--	54	.07	47,210	--	--	59.3	7.2
Jan. 1-10, 1955...	1,102,000	13	.25	.11	.14	.02	.39	.06	.06	.01	.02	.09	.07	77,140	28	.3	56.8	6.6
Jan. 11-31.....	1,023,000	--	--	--	.15	--	.44	--	--	--	--	58	.08	81,840	--	--	62.0	6.4
Feb. 1-10.....	544,500	--	--	--	.14	--	.41	--	--	--	--	48	.07	38,120	--	--	54.1	6.3
Feb. 11-20.....	439,100	--	--	--	.15	--	.41	--	--	--	--	50	.07	30,740	--	--	57.1	6.2
Feb. 21-28.....	209,300	--	--	--	.17	--	.44	--	--	--	--	54	.07	14,650	--	--	62.8	6.3
Mar. 1-10.....	477,000	--	--	--	.15	--	.43	--	--	--	--	54	.07	33,390	--	--	57.2	6.7
Mar. 11-20.....	427,400	--	--	--	.16	--	.44	--	--	--	--	50	.07	29,920	--	--	56.9	6.7
Mar. 21-31.....	838,800	--	--	--	.13	--	.34	--	--	--	--	46	.06	50,330	--	--	49.6	6.6
Apr. 1-10.....	768,600	16	.26	.07	.14	.02	.43	.03	.04	.00	.01	.01	.07	53,800	29	.4	52.1	6.9
Apr. 11-20.....	1,023,000	--	--	--	.13	--	.43	--	--	--	--	51	.07	71,610	--	--	50.8	6.6
Apr. 21-30.....	855,300	--	--	--	.14	--	.43	--	--	--	--	53	.07	59,870	--	--	56.4	6.9

WILLAMETTE RIVER BASIN--Continued

WILLAMETTE RIVER AT SALEM, OREG.--Continued

Chemical analyses, water year October 1954 to September 1955--Continued

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million										Dissolved solids			Per-cent sodium	Sodium adsorption ratio	Specific conductance (micro-mhos at 25°C)	pH
			Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Fluoride (F)	Nitrate (NO ₃)	Boron (B) ppm	Parts per million	Tons per acre-foot	Total tons				
May 1-10, 1955...	498,200	--	--	--	0.14	--	0.44	--	--	--	--	--	47	0.06	29,890	--	--	54.8	7.3
May 11-20	497,300	--	--	--	.13	--	.39	--	--	--	--	--	42	.06	29,840	--	--	49.6	7.3
May 21-31	552,800	--	--	--	.13	--	.43	--	--	--	--	--	50	.07	38,700	--	--	48.8	7.4
June 1-10	541,100	--	--	--	.13	--	.39	--	--	--	--	--	41	.06	32,470	--	--	46.7	7.3
June 11-20	505,600	--	--	--	.12	--	.36	--	--	--	--	--	42	.06	30,340	--	--	46.0	7.0
June 21-30	313,800	--	--	--	.13	--	.39	--	--	--	--	--	43	.06	18,830	--	--	49.7	7.1
July 1-10	267,600	15	0.26	0.07	.15	0.02	.43	0.05	0.04	0.02	0.01	0.05	43	.06	16,060	29	0.4	53.3	6.9
July 11-20	197,500	--	--	--	.17	--	.49	--	--	--	--	--	52	.07	13,820	--	--	59.7	6.9
July 21-31	175,000	--	--	--	.17	--	.49	--	--	--	--	--	55	.07	12,250	--	--	62.1	6.8
Aug. 1-10	132,900	--	--	--	.19	--	.54	--	--	--	--	--	56	.08	10,630	--	--	65.0	7.0
Aug. 11-20	126,400	--	--	--	.18	--	.51	--	--	--	--	--	53	.07	8,850	--	--	63.1	6.9
Aug. 21-31	134,800	--	--	--	.18	--	.51	--	--	--	--	--	52	.07	9,440	--	--	63.1	6.9
Sept. 1-10	129,700	--	--	--	.19	--	.52	--	--	--	--	--	52	.07	9,080	--	--	63.9	7.0
Sept. 11-20	165,300	--	--	--	.17	--	.46	--	--	--	--	--	53	.07	11,570	--	--	61.5	7.0
Sept. 21-30	155,000	--	--	--	.18	--	.48	--	--	--	--	--	52	.07	10,850	--	--	60.8	6.9
Total or weighted average	15,020,000	--	--	--	0.15	--	0.43	--	--	--	--	--	50	0.07	1,051,000	--	--	55.9	--

ROGUE RIVER BASIN

ROGUE RIVER AT GRANTS PASS, OREG.

LOCATION.--At bridge on U. S. Highway 99 at Grants Pass, Josephine County, and 0.6 mile downstream from gaging station. DRAINAGE AREA.--2,420 square miles, approximately.

RECORDS AVAILABLE.--Chemical analyses: January 1953 to September 1955.

Water temperatures: January 1953 to September 1955.

EXTREMES, 1954-55.--Specific conductance: Maximum daily, 125 micromhos Feb. 5; minimum daily, 60.1 micromhos May 25.

Percent sodium: Maximum, 28 Nov. 11-20, Aug. 1-10; minimum, 22 May 22-31.

EXTREMES, 1953-55.--Specific conductance: Maximum daily, 231 micromhos Feb. 21, 1954; minimum daily, 58.5 micromhos Jan. 19, 1953.

Percent sodium: Maximum, 35 Oct. 11-20, 1953; minimum, 11 Feb. 16-22, 1954.

REMARKS.--Values reported for dissolved solids are residues on evaporation. Records of specific conductance of daily samples available in district office at Portland, Oreg. Records of discharge for water year October 1954 to September 1955 given in WSP 1398.

Chemical analyses, water year October 1954 to September 1955

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million								Dissolved solids				Per-cent so-dium ratio	So-dium adsorp-tion ratio	Specific conduct-ance (micro-mhos at 25°C)	pH	
			Cal-cium (Ca)	Magne-sium (Mg)	So-dium (Na)	Potas-sium (K)	Bicar-bonate (HCO ₃)	Sul-fate (SO ₄)	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO ₃)	Boron (B) ppm	Parts per mil-lion	Tons per acre-foot					Total tons
Oct. 1-10, 1954...	30,310		0.41	0.24	0.26		0.85	0.03	0.06	0.01	--	80	0.11	3,330	27	0.5	93.3	7.4	
Oct. 11-20.....	31,220		.41	.24	.26		.87	.03	.07	.01	0.06	81	.11	3,430	27	.5	93.6	7.4	
Oct. 21-31.....	34,650		.43	.25	.27		.88	.03	.08	.01	--	83	.11	3,810	27	.5	97.9	7.2	
Nov. 1-10.....	30,350		Nov. 1-10	.41	.25	.26		.85	.03	.07	.01	--	80	.11	3,340	27	.5	94.6	7.3
Nov. 11-20.....	35,170		.42	.25	.26		.85	.03	.07	.01	.02	82	.11	3,870	28	.5	95.4	7.1	
Nov. 21-30.....	31,440		.42	.23	.26		.85	.04	.08	.01	--	81	.11	3,460	26	.4	97.6	7.0	
Dec. 1-10.....	34,610		.45	.23	.26		.88	.04	.08	.01	--	84	.11	3,810	26	.4	97.9	7.1	
Dec. 11-20.....	34,450		.49	.26	.26		.92	.06	.09	.01	.01	86	.12	4,130	24	.4	109	7.1	
Dec. 21-31.....	48,440		.44	.25	.24		.85	.05	.08	.01	--	81	.11	5,330	24	.4	98.8	6.9	
Jan. 1-10, 1955..	54,450		.42	.21	.21		.66	.05	.08	.04	--	90	.12	6,530	25	.4	91.3	6.7	
Jan. 11-20.....	38,040		.45	.22	.26		.90	.04	.08	.01	.05	84	.11	4,180	25	.4	102	7.2	
Jan. 21-31.....	52,380		.47	.29	.26		.92	.05	.08	.01	--	89	.12	6,290	25	.4	105	7.2	
Feb. 1-10.....	56,450		.49	.26	.27		.90	.05	.09	.02	.02	95	.13	7,340	26	.4	109	7.0	
Feb. 11-20.....	48,610		.45	.26	.26		.90	.04	.08	.01	.04	86	.12	5,830	25	.4	102	6.8	
Feb. 21-28.....	32,050		.43	.26	.26		.88	.04	.09	.01	--	88	.12	3,850	25	.4	103	7.4	

ROGUE RIVER BASIN--Continued
ROGUE RIVER AT GRANTS PASS, OREG.--Continued

Chemical analyses, water year October 1954 to September 1955--Continued

Date of collection	Runoff (acre-feet)	Silica (SiO ₂) ppm	Equivalents per million								Dissolved solids			Per-cent so-dium	So-dium adsorp-tion ratio	Specific conductance (micro-mhos at 25° C)	pH
			Cal-cium (Ca)	Magne-sium (Mg)	So-dium (Na)	Potas-sium (K)	Bicar-bonate (HCO ₃)	Sul-fate (SO ₄)	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO ₃)	Boron (B) ppm	Parts per million	Tons per acre-foot	Total tons		
Mar. 1-10, 1955.	44,790		0.46	0.26	0.28		0.92	0.04	0.11		0.01	--	90	0.12	5,370	107	6.9
Mar. 11-20	45,960		.43	.30	.27		.87	.04	.08		.01	0.06	87	.12	5,520	105	7.0
Mar. 21-31	92,730		.42	.26	.24		.90	.04	.08		.01	--	83	.11	10,200	97.2	7.0
Apr. 1-10	70,630		.41	.26	.21		.80	.04	.05		.01	--	77	.10	7,060	89.0	7.1
Apr. 11-20	69,180		.37	.25	.20		.75	.04	.04		.01	0.05	75	.10	6,920	82.7	7.3
Apr. 21-30	83,780		.43	.24	.22		.82	.04	.06		.01	--	81	.11	9,220	92.4	7.2
May 1-12	96,300		.43	.25	.22		.82	.04	.06		.01	0.02	78	.11	10,590	93.9	7.1
May 13-21	72,340		.30	.16	.16		.57	.03	.03		.01	--	56	.08	5,790	65.2	7.0
May 22-31	77,040		.28	.16	.14		.56	.03	.04		.01	--	53	.07	5,390	62.4	7.0
June 1-10	77,160		.32	.13	.16		.61	.02	.05		.02	--	58	.08	6,170	67.4	6.8
June 11-20	65,570		.31	.12	.17		.62	.03	.06		.03	0.05	58	.08	5,250	67.4	6.6
June 21-30	42,600		.29	.12	.16		.57	.02	.03		.01	--	57	.08	3,410	63.8	6.8
July 1-10	33,460		.33	.19	.19		.69	.02	.05		.01	--	65	.09	3,010	77.5	6.9
July 11-20	26,660		.33	.23	.22		.74	.02	.06		.01	0.02	71	.10	2,670	81.4	6.9
July 21-31	24,140		.33	.20	.23		.74	.02	.05		.01	--	71	.10	2,410	80.3	7.0
Aug. 1-10	20,490		.33	.21	.22		.72	.02	.03		.00	--	70	.10	2,050	82.2	6.9
Aug. 11-20	19,750		.33	.22	.22		.74	.02	.04		.01	0.01	70	.10	1,980	81.2	7.1
Aug. 21-31	19,440		.33	.21	.22		.74	.02	.05		.01	--	70	.10	1,940	81.6	7.0
Sept. 1-10	17,560		.34	.21	.22		.75	.02	.05		.00	--	71	.10	1,760	83.1	7.0
Sept. 11-20	22,230		.36	.21	.23		.79	.03	.06		.01	0.00	73	.10	2,220	86.3	6.9
Sept. 21-30	20,790		.40	.25	.26		.84	.05	.06		.01	--	79	.11	2,290	94.9	7.1
Total or weighted average	1,835,000		0.40	0.22	0.22		0.79	0.04	0.06		0.01	--	76	0.10	163,500	88.9	--

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