Quality of Surface Waters for Irrigation Western United States 1956

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

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PREFACE

This report was prepared by the Geological Survey in cooperation with other State and Federal Agencies by personnel of the Water Resources Division under the direction of C. G. Paulsen, chief hydraulic engineer, succeeded by L. B. Leopold, and S. K. Love, chief, Quality of Water Branch.

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QUALITY OF SURFACE WATERS FOR IRRIGATION, WESTERN UNITED STATES, 1956

INTRODUCTION

The records of chemical analyses, other physical measurements, and discharge given in this report comprise the sixth annual compilation of data for 79 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 Interagency Committee on Water Resources (formerly the Federal Interagency River Basin Committee) 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 streamflow 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.	Geological 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, 1950
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
		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 Wakpala, S. Dak.	Jan. 17, 1951
12		Moreau River	at Promise, S. Dak	
13		Cheyenne River[c]	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, Kan	
23		Saline River[d]	near Wilson (or Russell), Kans	
		Saline River[e]	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[f]	at Mannford, Okla	Oct. 1, 1949
		Cimarron River	at Perkins, Okla	Oct. 1, 1952
29		Canadian River[e]	near Tascosa, Tex	June 2, 1948
30		Canadian River	near Whitfield, Okla	Sept. 1, 1946
31		Red River	at Denison Dam, near Dennison, Tex.	May 1, 1944
32		Washita River[g]	near Tabler, Okla	Sept. 10, 1946
33	8	Sabine River	near Ruliff, Tex	Oct. 1, 1947
34		Neches River	at Evadale, Tex	Oct. 1, 1947
35		Trinity River	at Romayor, Tex	Sept. 1, 1945
36		San Jacinto River[h]	near Huffman, Tex	Sept. 1, 1945
37		Brazos River	at Richmond, Tex	Sept. 1, 1945
38		Colorado River[i]	at Robert Lee, Tex	Oct. 1, 1947
39		Colorado River	at Austin, Tex	Oct. 1, 1947
40		Colorado River	at Wharton, Tex	Apr. 11, 1944
41		Guadalupe River	at Victoria, Tex	Sept. 1, 1945
42		Nueces River	near Mathis, Tex	Oct. 1, 1947
43		Rio Grande	above Culebra Creek near Lobatos, Colo.	Oct. 11, 1946
44		Rio Grande	at Otowi Bridge near San Ildefonso, N. Mex.	Oct. 23, 1947
45		Rio Grande	at San Marcial, N. Mex	July 1, 1948
46		Rio Grande	below Elephant Butte Outlet, N. Mex.	1933
47		Rio Grande[j]	near El Paso, Tex	1930
48		Rio Grande[j]	below Old Fort Quitman, Tex	1930
49		Rio Grande[j]	at Upper Presidio, Tex	1935
50		Rio Grande[j]	at Langtry, Tex	1945
51		Rio Grande[j,k]	at Eagle Pass, Tex	1938
		Rio Grande[j]	at Laredo, Tex	July 1, 1955
52		Rio Grande[j,m]	at Roma, Tex	1944

Irrigation-Quality Network Stations in Western United States—Continued

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

No.	Geological Survey Part No.	Stream	Location	Date established
		Rio Grande [j]	at Chapeno, Tex	July 1955
53		Pecos River [j]	below Alamorgordo 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 [j, n]	near Comstock, Tex	1935
		Pecos River [j]	near Shumla, Tex	Jan. 1, 1955
57	9	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 [o]	near Blanco, N. Mex	Oct. 1, 1945
		San Juan River	near Archuleta, N. Mex	Dec. 31, 1954
68		San Juan River	near Bluff, Utah	Oct. 1929
69		Little Colorado River	at Camerson, 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		Humboldt River	at Palisade, Nev	
79		Humboldt River	near Rye Patch, Nev	Dec. 10, 1951
80	11	San Joaquin River	below Friant Dam, Calif	
81		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). [p]	at Stockton, Calif	Mar. 1, 1951
		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	12	Columbia River	at International Boundary	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	13	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 [q]	near Clarkston, Wash	Nov. 14, 1951
		Snake River	at Central Ferry, near Pomeroy, Wash.	Sept. 28, 1955
100		Boise River	near Arrowrock, Idaho	
101		Boise River	at Notus, Idaho	Nov. 21, 1950
102	14	Columbia River	at Maryhill Ferry near Rufus, Oreg.	Dec. 1, 1950
103		Dischutes River [r]	at Moody near Biggs, Oreg	Dec. 1952
104		Willamette River	at Salem, Oreg	Feb. 1, 1951

Irrigation-Quality Network Stations in Western United States—Continued

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

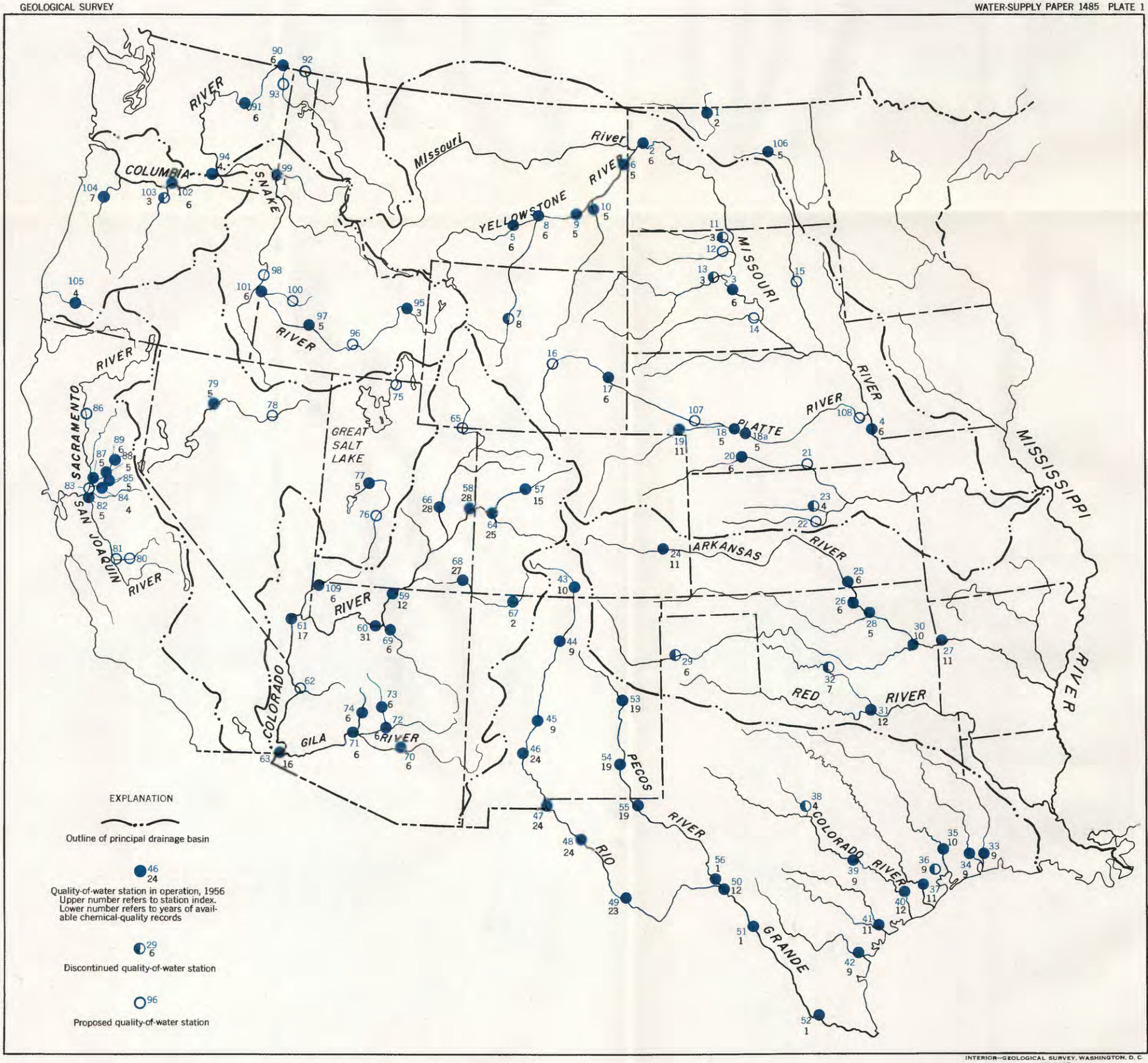
No.	Geological Survey Part No.	Stream	Location	Date established
105		Rogue River	at Grants Pass, Oreg	Jan. 5, 1953
106	5	Sheyenne River	near Warwick, N. Dak	Jan. 8, 1951
		Stations added by Subcommittee, October 2, 1952		
107	6	North Platte River	at Lewellen, Nebr	
108		Platte River	near Louisville, Nebr	
109	9	Virgin River	at Littlefield, Ariz	July 1949

[a] Dropped from list Jan. 21, 1954; replaced by Wind River below Boysen Dam, Wyo.
[b] Discontinued Sept. 30, 1954.
[c] Discontinued Nov. 20, 1953.
[d] Dropped from list Oct. 3, 1952; replaced by station at Tescott, Kans.
[e] Discontinued Sept. 30, 1953.
[f] Discontinued Sept. 30, 1952; replaced by station at Perkins, Okla.
[g] Dropped from list Oct. 3, 1952.
[h] Dropped from list Apr. 5, 1954.
[i] Discontinued Sept. 30, 1951.
[j] Operated by International Boundary and Water Commission.
[k] Discontinued Jan. 30, 1955; replaced by station at Laredo, Tex.
[m] Discontinued Jan. 31, 1955; replaced by station at Chapeno, Tex.
[n] Discontinued December 1954; replaced by station near Shumla, Tex.
[o] Discontinued Dec. 31, 1954; replaced by station near Archuleta, N. Mex.
[p] Dropped from list Oct. 3, 1952; replaced by San Joaquin River near Biola, Calif.
[q] Discontinued February 1956; replaced by station near Pomeroy, Wash.
[r] 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.



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QUALITY-OF-WATER STATIONS IN WESTERN UNITED STATES RECOMMENDED FOR IRRIGATION STUDY

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), 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 79 stations in operation in 1956 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 1956 water year only one station was started, Snake River at Central Ferry, near Pomery, Wash. This station replaced Snake River near Clarkston, Wash. which was discontinued in February 1956.

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 1955–56, 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, Chapeno and it operated the station Pecos River near Shumla, also. The Mexican Section operated the stream gaging station on the main stem at Laredo. 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 25 and 26 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 1955 and 1956. 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 separetely 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 25 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:

$$\frac{Na \times 100}{Na + K + Ca + Mg}$$, 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 22.

DISCUSSION OF RESULTS

Discharge data and dissolved-solids loads for stations operated in 1956 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 higher than in the previous years of chemical-quality record (1951–55). Extremely high flow for a six-day period in April comprised nearly half the flow for the year. The relatively low mineralization of the water during this period of high flow caused the weighted average concentrations to be considerably lower than in previous years.

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Summary of water discharge, and tonnages of dissolved solids

Station	Runoff (acre-feet)	Dissolved Solids (tons per acre-foot)
Red River of the North basin		
Sheyenne River near Warwick, N. Dak	57,750	0.41
Souris River near Westhope, N. Dak	321,500	.58
Missouri River main stem		
Missouri River near Williston, N. Dak	15,600,000	.58
Missouri River at Pierre, S. Dak	16,110,000	.63
Missouri River at Nebraska City, Nebr	19,640,000	.63
Yellowstone River basin		
Yellowstone River at Billings, Mont	5,861,000	.23
Yellowstone River near Sidney, Mont	8,604,000	.55
Bighorn River at Bighorn, Mont	2,302,000	.98
Tongue River at Miles City, Mont	239,700	.60
Powder River near Locate, Mont	243,100	1.52
Platte River basin		
North Platte River below Guernsey Reservoir, Wyo	909,300	.59
Platte River at Brady, Nebr	191,600	.57
Supply Canal (Tri-County Diversion) near Maxwell, Nebr	924,200	.65
South Platte River at Julesburg, Colo	55,390	2.03
Kansas River basin		
Republican River above Medicine Creek at Cambridge, Nebr	94,470	.42
Arkansas River basin		
Arkansas River below John Martin Reservoir, Colo	160,900	2.00
Arkansas River at Arkansas City, Kans	454,600	1.27
Arkansas River at Ralston, Okla	896,400	1.16
Cimarron River at Perkins, Okla	394,200	2.52
Arkansas River at Van Buren, Ark	4,330,000	1.18
Canadian River near Whitefield, Okla	711,200	2.67
Red River basin		
Red River at Denison Dam near Denison, Tex	2,577,000	1.40
Sabine River basin		
Sabine River near Ruliff, Tex	2,484,000	.14
Neches River basin		
Neches River at Evadale, Tex	1,168,000	.16
Trinity River basin		
Trinity River at Romayor, Tex	818,900	.55
Brazos River basin		
Brazos River at Richmond, Tex	1,567,000	1.13
Colorado River basin		
Colorado River at Austin, Tex	966,100	.32
Colorado River at Wharton, Tex	755,500	.33
Guadalupe River basin		
Guadalupe River at Victoria, Tex	95,500	.50
Nueces River basin		
Nueces River near Mathis, Tex	133,300	.40
Rio Grande basin		
Rio Grande above Culebra Creek near Lobatos, Colo	76,670	.33
Rio Grande at Otowi Bridge near San Ildefonso, N. Mex	377,100	.32
Rio Grande conveyance channel at San Marcial, N. Mex	174,830	.90
Rio Grande floodway at San Marcial, N. Mex	.....	.....
Rio Grande below Elephant Butte Outlet, N. Mex	253,562	.....
Rio Grande near El Paso, Tex	59,038	.....
Rio Grande below Old Fort Quitman, Tex	.....	.....
Rio Grande at Upper Presidio, Tex	.....	.....
Rio Grande at Langtry, Tex	565,300	.....
Rio Grande at Laredo, Tex	968,990	.....
Rio Grande at Chapeno, Tex	2,033,500	.....
Pecos River below Alamogordo Dam, N. Mex	130,800	2.22
Pecos River near Artesia, N. Mex	132,100	4.47
Pecos River below Red Bluff Dam near Orla, Tex	.....	.....
Pecos River near Shumla, Tex	117,690	.....
Colorado River main stem		
Colorado River near Glenwood Springs, Colo	1,469,000	.41
Colorado River near Cisco, Utah	3,604,000	.95
Colorado River at Lees Ferry, Ariz	8,740,000	.76
Colorado River near Grand Canyon, Ariz	8,860,000	.82
Colorado River below Hoover Dam, Ariz.-Nev	7,818,000	1.14

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

Station	Runoff (acre-feet)	Dissolved Solids (tons per acre-foot)
Diversions and return flows at and below Imperial Dam		
Yuma Main Canal below Colorado River siphon at Yuma, Ariz	322,500	1.20
Gunnison River basin		
Gunnison River near Grand Junction, Colo	1,113,000	.98
Green River basin		
Green River at Green River, Utah	4,056,000	.52
San Juan River basin		
San Juan River near Archuleta, N. Mex	558,000	.....
San Juan River near Bluff, Utah	861,600	.65
Little Colorado River basin		
Little Colorado River at Cameron, Ariz	.....	.....
Virgin River basin		
Virgin River at Littlefield, Ariz	92,820	2.95
Gila River basin		
Gila River at Kelvin, Ariz	121,500	.88
Gila River below Gillespie Dam, Ariz	20,910	8.19
Salt River at Stewart Mountain Dam, Ariz	570,600	1.17
Verde River below Bartlett Dam, Ariz	198,900	.51
Aqua Fria River below Lake Pleasant Dam, Ariz	18,910	.34
Sevier Lake basin		
Sevier River near Lynndyl, Utah	87,690	2.04
Humboldt River basin		
Humboldt River near Rye Patch, Nev	137,700	.72
San Joaquin River basin		
San Joaquin River near Biola, Calif	1,168,000	.07
San Joaquin River near Vernalis, Calif	6,305,000	.18
Mokelumne River at Woodbridge, Calif	855,500	.06
Sacramento River basin		
Sacramento River at Knights Landing, Calif	8,745,000	.16
Feather River at Nicolaus, Calif	1,800,000	.....
American River at Fair Oaks, Calif	4,321,000	.06
Columbia River main stem		
Columbia River at international boundary	87,400,000	.12
Columbia River at Grand Coulee Dam, Wash	99,600,000	.11
Yakima River basin		
Yakima River at Kiona, Wash	5,121,000	.16
Snake River main stem		
Snake River near Heise, Idaho	6,523,000	.28
Snake River at King Hill, Idaho	8,565,000	.43
Snake River at Central Ferry near Pomeroy, Wash	48,460,000	.18
Boise River basin		
Boise River at Notus, Idaho	1,577,000	.20
Columbia River main stem		
Columbia River at Maryhill Ferry near Rufus, Oreg	176,700,000	.14
Willamette River basin		
Willamette River at Salem, Oreg	.....	.....
Rogue River basin		
Rogue River at Grants Pass, Oreg	4,311,000	.11

Runoff in the Souris River near Westhope in 1956 was less than in the only previous year of chemical-quality record, 1955. The water was less mineralized than in 1955 but of about the same percentage composition. The sampling station is located just below several reservoirs on the Souris River in the Lower Souris National Wildlife Refuge.

MISSOURI RIVER BASIN

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

The period of subnormal precipitation generally prevalent throughout the drainage basin since 1952 and particularly severe in the lower part of the basin continued throughout the 1956 water year. The runoff at Williston and at Pierre was about 90 percent of the average for the six years of water-quality record. Runoff at Nebraska City was 71 percent of the average for the six years of water-quality record, and was the lowest for the six year period. Although much of the decrease in runoff at Nebraska City is the result of reservoir regulations, the decrease also reflects the general drought conditions especially prevalent in the middle and southern parts of the Missouri River basin.

Of the dissolved solids load passing Williston in the 1956 water year, 52 percent came from the Yellowstone River basin and 48 percent came from the Upper Missouri River basin. Of the load passing Nebraska City the contributions from the tributaries between Pierre and Nebraska City dropped to 17 percent of the total load; in 1952 and 1953 these tributaries contributed about 35 percent, and in 1954 and 1955 about 25 percent of the total load passing Nebraska City. This decrease in percentage is probably the result of the increasing severity of drought conditions in the basin.

Yellowstone River basin.—Runoff in the basin, as shown by the records for the Sidney station, was about the same as the average of 8,485,000 acre-feet for the period 1934–55 and was about 15 percent higher than for the period 1953–55. The increase was the result principally of higher rates of runoff in the part of the basin upstream from Billings, where much of the water is direct mountain runoff of low mineralization.

Although the weighted average concentration of dissolved solids in the Yellowstone River was the lowest since 1952 the dissolved-solids load was the highest since 1952. Compared to 1955 the dissolved-solids concentrations in water from the Bighorn, Tongue and Powder Rivers decreased slightly; the annual dissolved-solids load for the Bighorn River increased slightly but decreased for the Powder and Tongue rivers. Twenty-nine percent of the

dissolved-solids load at Sidney was contributed by the Yellowstone River basin above Billings, 48 percent by the Bighorn River basin, 3 percent by the Tongue River basin, and 8 percent by the Powder River basin. The remaining 12 percent probably was contributed by direct inflow from minor tributaries and ground-water inflow in the Yellowstone Valley below Billings.

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.—Runoff in the basin decreased significantly each year during the 1953–56 water years as the result of the general drought. The South Platte River at Julesburg, Colo. is not affected significantly by reservoir regulation and therefore illustrates the effect of the drought on water discharge during the period. Annual runoff at Julesburg, in acre-feet, was as follows: 1951, 193,600; 1952, 337,700; 1953, 148,100; 1954, 101,000; 1955, 73,100; 1956, 55,390. Flow in the North Platte and Platte Rivers also decreased but was augmented by continually increasing releases of water from reservoir storage in the North Platte basin. For example, storage in Lake McConaughy decreased from about 2,000,000 acre-feet in the spring of 1952 to 384,000 acre-feet in the fall of 1956.

The quality of the water in the South Platte River at Julesburg, Colo., during 1956 was similar to that in the previous three years despite the large decrease in flow from that of former years. The quality of the water in the North Platte River below Guernsey Reservoir, Wyo. also was similar to that of previous years though slightly improved over that of 1955. The quality in the Platte River at Brady and in the Supply Canal near Maxwell, Nebr. was better than in any of the previous five years of record, probably because proportionantly more of the water in the Platte River was from the North Platte River than in previous years.

Kansas River basin.—General drought conditions in the region for several years have reduced the amount of runoff at the station Republican River above Medicine Creek at Cambridge, Nebr., in 1956 to about 95,000 acre-feet. Regulation of flow by Trenton Dam (Swanson Lake) on the Republican River, Enders Reservoir on Frenchman Creek, and Bonny Reservoir on the South Fork Republican River tend to make the quality of the water uniform throughout the year and also from year to year. The quality of the water for irrigation has shown a slight improvement each year since 1952.

LOWER MISSISSIPPI RIVER BASIN

Arkansas River basin.—The runoff of the Arkansas River below John Martin Reservoir, Colorado, during the 1956 water year was approximately 65 percent of that in 1955 with only a small increase in the weighted average dissolved solids chemical concentration. Flow at this station is highly regulated. Part of the flows represent stored water, but during periods of great demand the water is allowed to flow through the reservoir to be used downstream. The weighted average dissolved solids to total discharge relationship is variable at this station due to variations in releasing the water from the reservoir.

The total runoff was 8,073,000 acre-feet in that part of the Arkansas River basin from Arkansas City, Kans., to Sallisaw, Okla. This was 4,080,300 acre-feet less in runoff than in the 1955 water year. Each of the network stations reflected this decrease in runoff.

The total runoff was 13,000 acre-feet less for the Arkansas River at Arkansas City, Kans. The weighted average dissolved solids was 936 ppm as compared to 877 ppm for the previous year. The percent sodium remained at 64 and the sodium adsorption ratio increased from 5.8 to 5.9.

The total runoff of the Arkansas River at Ralston, Okla., was 211,620 acre-feet below the runoff of 1955. The weighted average dissolved solids was 853 ppm compared to 1,230 ppm for the previous year. The percent sodium was 68 compared to 74 and the sodium adsorption ratio was 6.3 compared to 9.2. A plausible explanation for the decrease rather than an increase in constituents can be found by a comparison of the decrease in flow for the Arkansas River at Ralston, Okla., and the Salt Fork Arkansas River. The Salt Fork Arkansas River is the largest tributary entering the Arkansas River between Arkansas City, Kans., and Ralston, Okla. This stream is highly concentrated in sodium chloride, picked up as it flows through the salt beds at Jet, Okla. The Salt Fork Arkansas River decreased in flow 46 percent as compared to the previous year of 1955. The Arkansas River at Ralston, Okla., decreased only 19 percent in flow during this same period. The greater decrease in flow for the Salt Fork Arkansas River could account for the decrease in dissolved solids, percent sodium, and sodium adsorption ratio at Ralston, Okla.

The total runoff was 582,500 acre-feet less than the total runoff in 1955 for the Cimarron River at Perkins, Okla., which resulted in the following changes: the weighted average dissolved solids decreased from 2,070 ppm to 1,850 ppm; the percent sodium remained at 81 and the sodium adsorption ratio decreased from

16 to 14. The natural salt beds and gypsum deposits west of Waynoka, Okla. are major contributors to the high mineral content of the Cimarron River. In 1955, 37 percent of the total flow in the Cimarron River originated above Waynoka, and flowed through these beds. In 1956 only 10 percent of the total flow in the Cimarron River came in contact with this source. Although the Cimarron River at Perkins decreased 60 percent in total flow, this greater decrease in flow above Waynoka probably caused the decrease in dissolved solids and sodium adsorption ratio, rather than an increase as might normally be expected.

Runoff of the Arkansas River at Van Buren, Ark., during the 1956 water year was 4.3 million acre-feet, compared to 9.3 in 1955, 6.1 in 1954, and 9.4 in 1953. This decrease in flow of approximately 54 percent of the previous year resulted in an increase in dissolved solids concentration of about 12 percent. The percent sodium and the sodium adsorption ratio remained about the same.

The total runoff was 1,171,761 acre-feet less than the previous year for the Canadian River at Whitefield, Okla. The dissolved solids were 1,960 as compared to 1,420 the preceding year and the percent sodium increased from 69 to 70. The sodium adsorption ratio also increased from 8.2 to 9.9.

The day to day change in constituents seemed to be less erratic than day to day variation of the preceding year. The maximums and minimums fell well within the ranges of those for the period of record at all stations.

WESTERN GULF OF MEXICO BASIN

Runoff continued below average in the Western Gulf of Mexico basins in Texas during the 1956 Water Year. Comparatively minor changes in dissolved solids concentrations occurred except at Richmond, Tex., on the Brazos River and at the Orla, Tex., station on the Pecos River. A greater-than-usual percentage of the water passing Richmond originated above Whitney Dam, in an area which contributes water of relatively high dissolved solids concentrations. Although the runoff was about the same as in 1955, the weighted average of dissolved solids increased from 0.68 to 1.13 tons per acre-foot. Increase in dissolved solids concentration at Orla resulted from a decrease in runoff.

Rio Grande basin.—The discharge and the dissolved solids increased slightly at the Rio Grande above Culebra Creek, near Lobatos, Colo., station from that of the two preceding years as a result of subirrigation practices in the San Luis Valley of Southern Colo-

rado. In New Mexico, the weighted average dissolved solids concentration and the discharge decreased in 1956 from that of 1955 at the Otowi Bridge near San Ildefonso and Conveyance Channel at the San Marcial stations on the Rio Grande. At the Otowi station, only 38 percent of the annual discharge occurred during the last 5 months of the water year as compared with 60 percent of the annual discharge occurring during the same period in 1955. Further downstream the proportion of winter runoff to summer runoff was greater. The combined discharges of the Rio Grande floodway and Rio Grande conveyance channel during the last 5 months of the 1956 water year was 14 percent of the annual flow as compared to 58 percent of the annual flow during the same 5 months in 1955. The runoff in the middle Rio Grande was not of sufficient magnitude to cause flow in the floodway at San Marcial at any time during the 1956 water year. The lower proportion of discharge due to summer storms, to discharge due to snowmelt, resulted in a lower weighted average dissolved solids concentration.

Inflow during the 1956 water year into Alamogordo Reservoir, on the Pecos River, was approximately one half of that during 1955, resulting in an increase in the weighted average dissolved solids concentration of the released water.

COLORADO RIVER BASIN

Colorado River main stem.—Discharge increased at the stations at Glenwood Springs, Colo., and Cisco, Utah, by 43 percent and 11 percent respectively. A 16 percent decrease was noted at the station below Hoover Dam. The weighted average analysis for the station at Glenwood Springs shows a decrease in mineralization of 20 percent when compared with the previous year. The analyses further indicated that the chemical composition of the water was similar to that of the 1953 water year.

Although the discharge increased by 11 percent at the Cisco station, the chemical composition of the water remained essentially the same as 1955. This may be attributed to the influence of tributary streams in the reach above the station. Dissolved solids loads increased by 10 percent for the 1956 water year.

Runoff of the Colorado River at Lees Ferry, Ariz., and near Grand Canyon, Ariz., was greater than for the preceding year with an accompanying decrease in dissolved solids concentration.

Due to the mixing effect of Lake Mead, a slightly higher concentration of dissolved mineral constituents was noted for the station below Hoover Dam. Total loads at this station decreased 10 percent for the 1956 water year, owing to a decrease in discharge.

The salinity of the water released from Lake Mead and sampled from the Yuma Main Canal at Yuma, Ariz., continued to increase. The weighted average dissolved solids concentration has increased at this station each year since 1953.

Gunnison River basin.— An increase of 8 percent in annual runoff in the Gunnison River near Grand Junction was reflected by a decrease of 14 percent in dissolved solids concentration. Total loads for the 1956 water year decreased by 6 percent as compared with the previous year.

Green River basin.—The weighted average analysis for the station at Green River, Utah, shows that the chemical composition of the water decreased in concentration for the second consecutive year since 1954. This may be attributed to an increase in total discharge as compared with the previous two years. The weighted average analysis shows the quality of the water to be of the mixed type. However, during periods of low flow there is a considerable increase in the concentration of the sulfate ion.

San Juan River basin.— The discharge of the San Juan River at Bluff during the 1956 water year was 11 percent less than that of the previous year. The weighted average chemical analysis at this station shows that the concentration of dissolved mineral constituents was 10 percent lower than in 1955. The chemical character of the water remained unchanged. The direct variation between discharge and weighted chemical analysis may be due to variations in irrigation activities in the upper reaches of the basin.

Virgin River basin.—Discharge for the Virgin River at Littlefield, Ariz., decreased by 32 percent as compared with last year's flow. The quality of the water remained relatively unchanged for the 1956 water year. Total loads for this station decreased by 36 percent.

Gila River basin.—The runoff at the two stations on the mainstem of the Gila River was much lower than that for the two preceding years. The decrease in flow at Kelvin, Ariz., caused little effect in the weighted average dissolved solids as compared to the previous year because the amount of water released from San Carlos Reservoir is not consistently proportional to the discharge from other sources. Also, the quality of the water released from San Carlos Reservoir is quite variable. The decrease in flow at Gillespie Dam had a significant effect on the quality of the water. The large increase in the weighted average dissolved solids concentration was the highest for the period of record. There were no significant trends in discharge or water quality at the three stations, all of which are below reservoirs, on the tributary streams to the Gila River.

THE GREAT BASIN

Sevier Lake basin.—Runoff in the Sevier River basin was 25 percent less than in the 1955 water year. A slight decrease was noted in dissolved solids concentrations. This may have resulted from increased storage at Sevier Bridge Reservoir and from varied irrigation practices.

Humboldt River basin.—Flow past the Humboldt station near Rye Patch, Nev., was not represented by analysis for the first six months of the 1956 water year. During this period the flow was seepage from Rye Patch Reservoir and represented less than half of one percent of the total runoff for the water year.

For the period Apr. 1 to Sept. 30, runoff from the Humboldt station was seven (7) times greater than the total for the preceding year.

The weighted average composition of the water, for the period represented by analysis, changed in chemical character from a predominately sodium chloride water in 1955 to a sodium bicarbonate type in 1956. Although there was a significant decrease of over 50 percent in the average SAR the percent sodium remained high allowing for a "residual sodium carbonate."

PACIFIC SLOPE BASINS IN CALIFORNIA

Flows on all stations in the San Joaquin River and Sacramento River basins were extremely high during the 1956 water year as compared to flows in the 1955 water year, with one station showing an increase of about 150 percent. Extensive flooding occurred in some areas of the Central Valley during the winter months. Especially severe flooding occurred along the Feather River. Seasonal precipitation was well above average, and in some areas as high as 100 percent above the average.

The chemical quality of the outflow from the Sacramento and the San Joaquin Valleys improved considerably over the previous year. Average specific conductances for the Sacramento River at Knights Landing and the San Joaquin River at Vernalis were respectively, 20 percent and 64 percent less than those for the previous year. This improvement in quality is due to the higher rainfall and resulting larger runoff than occurred the previous year.

During the year the highest weighted average concentration (0.18 tons per acre-foot) observed was for the San Joaquin River

near Vernalis, Calif., and the lowest (0.06 tons per acre-foot) was for the Mokelumne River at Woodbridge, Calif., and the American River at Fair Oaks, Calif.

The flow of the Sacramento River is controlled 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 river's lower reaches.

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 River, 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 that in similar reaches of the San Joaquin River.

The major portion of the impounded San Joaquin River water is used to irrigate portions 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. Water thus exported is replaced by poorer quality Sacramento River water brought into the San Joaquin valley via the Delta-Mendota canal. As a result of extensive irrigational use of San Joaquin River water and imported water, portions of the channel below Friant Dam at times carry mainly irrigation return water of poor quality.

PACIFIC SLOPE BASINS IN WASHINGTON AND UPPER COLUMBIA RIVER BASIN

Columbia River main stem.—The average dissolved solids concentration, in tons per acre-foot, and SAR values for Columbia River at international boundary were identical to those for the previous three years. Downstream at Grand Coulee Dam, Wash., the quality of river water also changed very little from the preceding years.

Yakima River basin.—Slight decreases in average SAR and percent sodium values were recorded for the 1956 water year. The average salt concentration in tons per acre foot decreased slightly as the total tons almost doubled with a 130 percent increase in discharge.

SNAKE RIVER BASIN

Runoff in the reach above the Heise, Idaho, station was 60 percent greater than in the 1955 water year. Chemical characteristics of the water remained the same at the Heise station. An 8.4 percent decrease was noted in concentrations of total dissolved mineral constituents. However, the increase in flow past the Heise was accompanied by a corresponding increase of 44 percent in total loads for the 1956 water year.

Snake River main stem.—The snake River at King Hill, Idaho had little variation from the prior year. The average percent sodium and SAR values were exactly the same and the tons per acre-foot decreased from 0.45 to 0.43. At the beginning of the water year the sampling station on the lower Snake River was moved from near Clarkston 35 miles downstream to a better sampling point at Central Ferry near Pomeroy, Wash. At this station an increase of 1.4 million tons of dissolved solids was observed over the prior year, however, this was largely attributable to an increase in discharge of almost 14 million acre-feet. The average tons per acre-foot actually decreased from 0.23 to 0.18.

Boise River basin.—The discharge at this station was over $5\frac{1}{2}$ times as great in 1956 as in 1955. With this there was almost a doubling of the tons of dissolved solids, but a reduction in the tons per acre-foot. There was an appreciable decrease in the SAR value 2.4 to 1.1.

PACIFIC SLOPE BASINS IN OREGON AND LOWER COLUMBIA RIVER BASIN

Columbia River main stem.— An above average discharge increased the salt load of the Columbia at Rufus, Oreg., but the change in chemical properties was very small. The average sodium concentration was the same as the year before as was the tons per acre-foot of dissolved solids.

Willamette River basin.—The discharge was about 64 percent above average for the 1956 water year for this river with a corresponding decrease in dissolved solids. The salinity and alkali hazards for the Willamette River water are normally very low; and the 1956 average for tons per acre-foot, 0.06, was the lowest for the period of record.

Rogue River basin.—The total tons of dissolved solids for 1956 was appreciable greater than measured in previous years. However,

the weighted average tons per acre-foot was only 0.11 which compares to 0.10 measured in each of the previous years of record. The SAR value was still very low at 0.3.

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:

$$RSC = (HCO_3^- + CO_3^=) - (Ca^{++} + Mg^{++})$$

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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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 1956.
Water temperatures: January 1951 to September 1956.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 1,200 micromhos July 2; minimum daily, 249 micromhos Apr. 19.
Percent sodium: Maximum, 53 Nov. 22-27; minimum, 22 Mar. 26-28.
EXTREMES, 1951-56.--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. Daily samples for chemical analysis composited by discharge. Records of specific conductance of daily samples available in district office at Lincoln, Nebr. Records of discharge for water year October 1955 to September 1956 given in WSP 1438.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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. 1-28, 1955 ..	143	--	4.24		1.65	--	4.80	--	--	--	--	--	335	0.46	66	28	1.1	551	7.9
Oct. 29-Nov. 3...	37	--	3.84		2.78	--	5.15	--	--	--	--	--	376	.51	19	42	2.0	608	7.9
Nov. 4-12.....	51	--	4.62		5.00	--	7.46	--	--	--	--	--	570	.78	40	52	3.3	876	8.1
Nov. 13-21.....	34	--	4.70		4.35	--	6.92	--	--	--	--	--	515	.70	24	48	2.8	807	8.0
Nov. 22-27.....	25	--	4.98		5.66	--	a 8.10	--	--	--	--	--	609	.83	21	53	3.6	939	8.3
Nov. 28-Dec. 27..	122	29	3.19	2.01	3.31	0.15	a 6.74	1.44	0.31	0.01	0.02	0.18	492	.67	82	38	2.1	766	8.2
Dec. 28-Jan. 3, 1956.....	28	--	5.06		2.48	--	5.97	--	--	--	--	--	428	.58	16	33	1.6	678	8.1
Jan. 4.....	3.2	--	3.72		1.48	--	b 4.17	--	--	--	--	--	300	.41	1	28	1.1	474	8.3
Jan. 5-15.....	32	--	5.24		2.61	--	6.20	--	--	--	--	--	448	.61	20	33	1.6	703	8.2
Jan. 16-30.....	44	--	5.84		3.22	--	7.21	--	--	--	--	--	522	.71	31	36	1.9	812	8.0
Jan. 31-Feb. 12..	41	--	6.00		2.91	--	7.15	--	--	--	--	--	505	.69	28	33	1.7	800	8.1
Feb. 13-25	52	29	3.79	2.79	2.65	.14	7.42	1.64	.31	.01	.02	.12	535	.73	38	28	1.5	830	8.1
Feb. 26-29	18	--	6.70		2.48	--	c 7.41	--	--	--	--	--	527	.72	13	27	1.4	817	8.2

a Includes 0.23 equivalent per million of carbonate (CO_3).
b Includes 0.20 equivalent per million of carbonate (CO_3).
c Includes 1.30 equivalents per million of carbonate (CO_3).

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RED RIVER OF THE NORTH BASIN--Continued

SHEYENNE RIVER NEAR WARWICK, N. DAK.--Continued

Chemical analyses, water year October 1955 to September 1956--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 (micromhos 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. 1-4, 1956 ..	21	--	5.64		1.65	--	5.97	--	--	--	--	--	425	0.58	12	23	1.0	658	8.1
Mar. 5.....	5.2	--	7.88		3.13	--	d8.84	--	--	--	--	--	636	.86	5	28	1.6	978	8.2
Mar. 6-25.....	82	--	6.14		2.00	--	6.54	--	--	--	--	--	470	.64	52	25	1.1	737	8.0
Mar. 26-28.....	15	--	5.56		1.61	--	e5.84	--	--	--	--	--	421	.57	9	22	1.0	647	8.3
Mar. 29-Apr. 13.	214	--	5.72		2.09	--	6.26	--	--	--	--	--	460	.63	135	27	1.2	711	8.1
Apr. 14-16	3,560	--	1.98		1.44	--	2.56	--	--	--	--	--	236	.32	1,140	42	1.4	364	8.2
Apr. 17-22	27,790	--	1.58		1.00	--	1.77	--	--	--	--	--	174	.24	6,670	39	1.1	272	7.6
Apr. 23-26	4,050	--	2.56		1.61	--	2.80	--	--	--	--	--	274	.37	1,500	39	1.4	423	7.9
Apr. 27-30	1,970	--	3.24		2.31	--	3.54	--	--	--	--	--	348	.47	926	42	1.8	545	8.0
May 1-8.....	2,440	--	4.00		3.09	--	4.52	--	--	--	--	--	446	.61	1,490	44	2.2	683	8.1
May 9-22.....	2,710	--	4.76		4.00	--	5.64	--	--	--	--	--	539	.73	1,980	46	2.6	823	8.2
May 23-June 6 ...	1,880	--	5.50		4.65	--	6.26	--	--	--	--	--	625	.85	1,600	46	2.8	946	8.2
June 7-8	3,130	20	1.70	1.26	2.18	0.16	3.51	1.58	0.23	0.01	0.02	0.14	312	.42	1,310	41	1.8	499	8.1
June 9-12.....	4,070	--	2.68		2.78	--	4.72	--	--	--	--	--	395	.54	2,200	51	2.4	611	7.9
June 13-17.....	1,620	--	4.48		3.22	--	4.85	--	--	--	--	--	482	.66	1,070	42	2.1	723	8.1
June 18-23.....	990	--	5.12		4.74	--	6.29	--	--	--	--	--	621	.84	832	48	3.0	928	8.0
June 24-July 23 ..	1,660	--	5.74		6.26	--	8.13	--	--	--	--	--	747	1.02	1,690	52	3.7	1,110	8.1
July 24-Aug. 1...	115	--	5.40		5.22	--	a7.38	--	--	--	--	--	643	.87	100	49	3.2	973	8.2
Aug. 2-Sept. 1...	269	--	5.12		3.96	--	6.46	--	--	--	--	--	538	.73	196	44	2.5	828	8.1
Sept. 2-30.....	531	18	2.45	2.71	4.48	18	6.87	2.60	.45	.01	.01	.27	563	.77	409	46	2.8	883	8.1
Total or weighted average f.....	57,750	--	2.64		2.00	--	3.20	--	--	--	--	--	301	0.41	23,730	43	1.7	464	--

a Includes 0.23 equivalent per million of carbonate (CO_3).
d Includes 1.30 equivalents per million of carbonate (CO_3).
e Includes 0.33 equivalent per million of carbonate (CO_3).
f Represents 100 percent of runoff for water year October 1955 to September 1956.

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 1956.
Water temperatures: September 1954 to September 1956.
EXTREMES, 1955-56.--Percent sodium: Maximum, 41 Oct. 1-27, July 17 to Sept. 30; minimum, 30 May 7 to June 7.
EXTREMES, 1954-56.--Specific conductance (1954-55): Minimum daily, 355 micromhos Apr. 12, 1955.
Percent sodium: Maximum, 48 Sept. 10-26, 1954; minimum, 30 June 12, 1955, May 7 to June 7, 1956.
REMARKS.--Values reported for dissolved solids are residues on evaporation at 180°C. Daily samples for chemical analysis composited by discharge. Records of specific conductance of daily samples available in district office at Lincoln, Nebr. Only monthly samples collected during winter months because of inaccessibility of sampling site during periods of extreme weather conditions. Records of discharge for year October 1955 to September 1956 given in WSP 1438.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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. 1-27, 1955..	7,980	--	2.10	2.98	3.65	--	5.51	3.12	0.34	--	0.03	0.15	533	0.72	5,750	41	2.3	818	7.9
Oct. 28-Nov. 11 .	421	--	2.25	3.11	3.74	--	5.62	3.35	.37	--	.03	.15	550	.75	316	40	2.3	846	7.9
Nov. 12-30.....	177	--	2.59	3.53	4.09	--	6.42	3.54	.45	--	.04	.14	614	.84	149	40	2.3	941	7.8
Dec. 15.....	2.0	8.1	3.49	4.55	5.09	0.43	8.34	4.54	.59	0.02	.05	.19	793	1.08	2	38	2.5	1,170	7.7
Jan. 17, 1956 ...	30	22	6.44	7.92	8.31	.64	14.62	7.87	1.04	.02	.01	.30	1,370	1.86	56	36	3.1	1,910	7.5
Feb. 16	30	17	9.03	7.69	10.22	.72	17.05	8.33	1.35	.02	.23	.32	1,620	2.20	66	37	3.5	2,230	7.4
Mar. 25	258	--	6.04	5.90	6.87	--	12.87	5.73	1.24	--	.11	.21	1,130	1.54	397	34	2.8	1,680	7.4
Mar. 30	258	--	4.99	4.95	5.83	--	10.10	4.75	1.04	--	.21	.18	941	1.28	330	36	2.6	1,410	7.3
Apr. 4.....	258	--	4.24	4.34	5.13	--	8.62	4.27	.87	--	.21	.12	818	1.11	286	37	2.5	1,230	7.3
Apr. 18.....	2,320	--	1.30	1.20	1.26	--	2.25	1.39	.20	--	.08	.07	241	.33	766	32	1.1	386	7.3
Apr. 26-May 6 ..	48,540	--	1.75	1.53	1.65	--	2.87	2.12	.18	.00	.03	.12	306	.42	20,390	32	1.3	497	7.8
May 7-June 7....	141,400	11	2.64	2.32	2.22	.28	4.39	2.83	.25	.01	.03	.11	450	.61	86,250	30	1.4	694	8.0
May 18 a.....	4,600	10	2.40	2.30	2.13	.28	4.16	2.87	.24	.00	.03	.12	451	.61	--	30	1.4	680	7.7
June 8-22.....	29,050	--	2.64	3.08	2.65	--	5.24	3.12	.25	--	.06	.17	515	.70	20,340	32	1.6	779	7.9
June 23-July 16..	18,750	--	1.90	2.30	2.35	--	4.13	2.35	.27	--	.05	.14	409	.56	10,500	36	1.6	629	8.0

a Not included in total or weighted average.

RED RIVER OF THE NORTH BASIN--Continued

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

Chemical analyses, water year October 1955 to September 1956--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 (micromhos 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				
July 17-Aug. 13, 1956	17,930	--	1.50	2.18	2.57	--	3.90	2.29	0.25	--	0.02	0.15	399	0.54	9,680	41	1.0	607	7.7
Aug. 14-31	3,380	8.4	1.35	2.37	2.78	0.25	4.20	2.35	.31	0.01	.03	.12	404	.55	1,860	41	2.0	625	7.9
Sept. 1-30	8,390	--	1.55	2.47	2.96	--	4.57	2.31	.34	--	.04	.12	440	.60	5,030	41	2.1	676	8.0
Total or weighted average b	279,200	--	2.30	2.30	2.26	--	4.21	2.66	0.25	--	0.03	0.12	427	0.58	162,200	33	1.5	661	--
Total or weighted average c	321,500	--	2.30	2.22	2.26	--	4.18	2.60	0.27	--	0.04	0.12	424	0.58	185,300	33	1.5	654	--

b Represents 87 percent of runoff for water year October 1955 to September 1956.
c Includes estimated data for missing periods. Represents 100 percent of runoff for water year October 1955 to September 1956.

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 1950 to September 1956.
Water temperatures: May 1951 to September 1956.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 890 micromhos Dec. 29; minimum daily, 323 micromhos June 3.
Percent sodium: Maximum, 37 May 26, Sept. 1-30; minimum, 24 May 27 to June 2.
EXTREMES, 1950-56.--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, 24 May 27 to June 2, 1956.
REMARKS.--Values reported for dissolved solids are residues on evaporation at 180°C. Daily samples for chemical analysis composited by discharge. Records of specific conductance of daily samples available in district office at Lincoln, Nebr. Records of discharge for water year October 1955 to September 1956 given in WSP 1439.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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. 1-31, 1955 ..	2,147,000	--	4.86		2.61	--	3.25	--	--	--	--	--	475	0.65	1,396,000	35	1.7	720	7.9
Nov. 1-14	642,400	--	5.16		2.87	--	3.41	--	--	--	--	--	516	.70	449,700	36	1.8	765	7.9
Dec. 20-31.....	296,900	15	3.69	2.13	3.26	0.12	3.79	4.96	0.34	0.04	0.07	0.17	574	.78	231,600	35	1.9	858	7.8
Jan. 1-8, 1956 ...	233,100	--	5.40		3.00	--	3.51	--	--	--	--	--	535	.73	170,200	36	1.8	800	7.6
Jan. 9-Feb. 8	793,600	--	5.82		3.26	--	3.67	--	--	--	--	--	579	.79	626,900	36	1.9	854	7.7
Feb. 9-29	498,400	--	5.74		3.18	--	3.64	--	--	--	--	--	560	.76	378,800	36	1.9	841	7.9
Mar. 1-22	690,800	--	5.08		2.74	--	3.20	--	--	--	--	--	514	.70	483,600	35	1.7	756	7.9
Apr. 1-27	937,600	--	5.20		2.91	--	3.34	--	--	--	--	--	551	.75	703,200	36	1.8	788	8.1
Apr. 28-May 12 ..	493,700	--	4.56		2.44	--	3.08	--	--	--	--	--	453	.62	306,100	35	1.6	680	7.9
May 13-23	458,400	--	4.32		2.48	--	2.95	--	--	--	--	--	434	.59	270,500	36	1.7	665	7.9
May 24-25	134,100	--	3.26		1.52	--	2.47	--	--	--	--	--	307	.42	56,320	32	1.2	479	7.9
May 26	84,690	--	4.52		2.70	--	2.85	--	--	--	--	--	482	.66	55,900	37	1.8	710	7.8
May 27-June 2 ...	790,800	20	2.25	.91	1.04	.05	2.49	1.58	.10	.02	.06	.10	265	.36	284,700	24	.8	411	7.9

MISSOURI RIVER MAIN STEM--Continued

MISSOURI RIVER NEAR WILLISTON, N. DAK.--Continued

Chemical analyses, water year October 1955 to September 1956--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 (micromhos 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 3, 1956	132,500	--	2.44		0.83	--	2.10	--	--	--	--	--	206	0.28	37,100	25	0.8	323	7.8
June 4-18	1,580,000	--	2.56		1.00	--	2.13	--	--	--	--	--	236	.32	505,600	28	.9	359	7.6
June 19-July 2...	1,062,000	--	2.84		1.31	--	2.16	--	--	--	--	--	276	.38	403,600	32	1.1	420	7.6
July 3-14	683,300	--	3.26		1.65	--	2.39	--	--	--	--	--	325	.44	300,700	34	1.3	494	7.7
July 15-Aug. 8 ..	1,037,000	--	3.66		1.96	--	2.67	--	--	--	--	--	353	.48	497,800	35	1.4	552	7.6
Aug. 9-31.....	773,400	--	4.32				3.03	--	--	--	--	--	424	.58	448,600	36	1.7	659	7.9
Sept. 1-30	822,100	15	2.84	1.80	2.78	0.12	3.21	4.12	0.31	0.03	0.02	0.16	475	.65	534,400	37	1.8	721	7.9
Total or weighted average [a]	14,290,000	--	4.24		2.22	--	2.93	--	--	--	--	--	418	0.57	8,141,000	34	1.5	629	--
Total or weighted average [b]	15,600,000	--	4.30		2.26	--	2.97	--	--	--	--	--	424	0.58	9,007,000	34	1.5	638	--

a Represents 92 percent of runoff for water year October 1955 to September 1956.
b Includes estimated data for missing periods. Represents 100 percent of runoff for water year October 1955 to September 1956.

MISSOURI RIVER AT PIERRE, S. DAK.

LOCATION (revised).--At gaging station at Chicago and North Western Railway bridge at Pierre, Hughes County, 250 feet upstream from bridge on U. S. Highway 14-83, and 1.2 miles upstream from Bad River.
DRAINAGE AREA.--243,500 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: October 1950 to September 1956.
Water temperatures: March 1951 to September 1956.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 851 micromhos May 12; minimum daily, 488 micromhos Mar. 29.
Percent sodium: Maximum, 39 Mar. 17-23; minimum, 34 Nov. 28 to Dec. 31.
EXTREMES, 1951-56.--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 analysis composited by discharge. Records of specific conductance of daily samples available in district office at Lincoln, Nebr. Records of discharge for water year October 1955 to September 1956 given in WSP 1439.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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. 1-26, 1955.	1,649,000	--	4.10		2.35	--	2.93	--	--	--	--	--	409	0.56	923,400	36	1.6	633	7.8
Oct. 27-Nov. 10.	948,700	--	4.50		2.48	--	3.18	--	--	--	--	--	438	.60	569,200	36	1.7	679	7.9
Nov. 11-17.....	263,200	--	5.20		2.87	--	3.65	--	--	--	--	--	496	.67	176,300	36	1.8	758	7.8
Nov. 18-27.....	221,000	--	5.36		2.91	--	3.69	--	--	--	--	--	521	.71	156,900	35	1.8	788	8.0
Nov. 28-Dec. 31.	586,700	6.0	3.44	1.92	2.78	0.11	3.65	4.54	0.27	0.03	0.01	0.13	524	.71	416,600	34	1.7	786	8.0
Jan. 1-Feb.2,1956	574,000	--	5.38		2.91	--	3.57	--	--	--	--	--	517	.70	401,800	35	1.8	789	7.9
Feb. 3-14	172,200	--	5.52		3.00	--	3.64	--	--	--	--	--	538	.73	125,700	35	1.8	804	7.8
Mar. 17-23	298,100	--	4.72		3.05	--	2.74	--	--	--	--	--	519	.71	211,700	39	2.0	776	8.2
Mar. 24-31	583,100	--	3.46		2.04	--	2.57	--	--	--	--	--	360	.49	285,700	37	1.6	552	7.9

MISSOURI RIVER MAIN STEM--Continued

MISSOURI RIVER AT PIERRE, S. DAK.--Continued

Chemical analyses, water year October 1955 to September 1956--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 (micromhos 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, 1956	50,180	--	3.00		1.87	--	2.29	--	--	--	--	--	322	0.44	22,080	38	1.5	499	8.0
Apr. 2-5	227,500	--	3.84		2.22	--	2.64	--	--	--	--	--	393	.53	120,600	37	1.6	608	8.0
Apr. 6-30	1,419,000	--	5.04		2.87	--	3.41	--	--	--	--	--	502	.68	964,900	36	1.8	768	8.0
May 1-13	713,300	--	5.36		3.09	--	3.59	--	--	--	--	--	547	.74	527,800	37	1.9	813	8.0
May 14-27	787,800	--	5.44		3.13	--	3.64	--	--	--	--	--	558	.76	598,700	37	1.9	835	7.9
May 28-June 30	2,264,000	10	3.09	1.95	2.87	0.13	3.31	4.64	0.27	0.03	0.01	0.16	507	.69	1,562,000	36	1.8	781	7.8
July 1-22	1,415,000	--	4.68		2.70	--	3.06	--	--	--	--	--	479	.65	919,800	37	1.8	729	7.7
July 23-Aug. 14	1,385,000	--	4.24		2.48	--	2.87	--	--	--	--	--	431	.59	817,200	37	1.7	660	7.7
Aug. 15-Sept. 6	1,177,000	--	3.80		2.26	--	2.70	--	--	--	--	--	379	.52	612,000	37	1.6	596	7.6
Sept. 7-30	986,800	8.9	2.25	1.19	1.87	.09	2.52	2.71	.18	.02	.00	.10	343	.47	463,800	35	1.4	529	7.6
Total or weighted average[a]	15,720,000	--	4.60		2.61	--	3.13	--	--	--	--	--	461	0.63	9,876,000	36	1.7	706	--
Total or weighted average[b]	16,110,000	--	4.62		2.65	--	3.15	--	--	--	--	--	465	0.63	10,190,000	36	1.7	710	--

a Represents 98 percent of runoff for water year October 1955 to September 1956.

b Includes estimated data for missing period. Represents 100 percent of runoff for water year October 1955 to September 1956.

MISSOURI RIVER AT NEBRASKA CITY, NEBR.

LOCATION.--At gaging station at Waubonsie Highway bridge at Nebraska City, Otoe County.
DRAINAGE AREA.--414,400 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: January 1951 to September 1956.
Water temperatures: May 1951 to September 1956.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 894 micromhos Dec. 4; minimum daily, 512 micromhos Mar. 8.
Percent sodium: Maximum, 48 May 29; minimum, 34 Mar. 5 to Apr. 13, Sept. 6.
EXTREMES, 1951-56.--Specific conductance: Maximum daily, 936 micromhos Jan. 6, 1953; minimum daily, 361 micromhos Mar. 29, 1951.
Percent sodium: Maximum, 48 May 29, 1956; minimum, 18 Mar. 27-29, 1951.
REMARKS.--Values reported for dissolved solids are residues on evaporation at 180°C. Daily samples for chemical analysis composited by discharge. Records of specific conductance of daily samples available in district office at Lincoln, Nebr. Records of discharge for water year October 1955 to September 1956 given in WSP 1440.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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. 1-31, 1955 ..	2,174,000	--	4.02		2.57	--	2.98	--	--	--	--	--	424	0.58	1,261,000	39	1.8	655	7.6
Nov. 1-17.....	731,500	--	3.80		2.70	--	2.92	--	--	--	--	--	406	.55	402,300	42	2.0	644	7.5
Nov. 18-20.....	55,040	--	4.32		3.00	--	3.28	--	--	--	--	--	461	.63	34,680	41	2.0	707	7.8
Nov. 21.....	18,970	--	3.88		2.78	--	2.98	--	--	--	--	--	426	.58	10,990	42	2.0	647	7.8
Nov. 22-29	216,800	--	4.06		2.78	--	3.23	--	--	--	--	--	425	.58	125,700	41	1.9	660	7.8
Nov. 30-Dec. 6...	82,120	--	4.94		3.48	--	3.84	--	--	--	--	--	529	.72	59,130	41	2.2	816	7.9
Dec. 7-23.....	351,500	19	3.04	1.52	2.83	0.14	3.47	3.39	0.73	0.03	0.07	0.12	471	.64	225,000	38	1.9	719	8.0
Dec. 29-Jan. 25, 1956.....	670,900	--	4.20		2.52	--	3.21	--	--	--	--	--	433	.59	395,800	38	1.7	674	7.7
Feb. 19-Mar. 4...	480,600	--	4.32		2.44	--	3.18	--	--	--	--	--	441	.60	288,400	36	1.7	669	8.0
Mar. 5-16	507,400	19	2.74	1.22	2.09	.13	2.95	2.54	.59	.02	.04	.08	393	.53	268,900	34	1.5	605	7.9
Mar. 17-31	1,174,000	--	4.24		2.22	--	3.03	--	--	--	--	--	411	.56	657,400	34	1.5	631	7.9
Apr. 1-13.....	886,000	--	4.56		2.35	--	3.11	--	--	--	--	--	450	.61	540,500	34	1.5	675	7.9
Apr. 14-30	1,138,000	--	4.88		2.65	--	3.31	--	--	--	--	--	493	.67	762,500	35	1.7	735	7.9
May 1-28.....	1,887,000	--	4.36		2.61	--	2.88	--	--	--	--	--	451	.61	1,151,000	37	1.8	698	7.9
May 29	64,860	--	4.28		4.00	--	2.88	--	--	--	--	--	543	.74	48,000	48	2.7	858	8.1
May 30-June 4....	431,200	--	3.98		2.31	--	2.67	--	--	--	--	--	421	.57	245,800	37	1.6	630	8.0

MISSOURI RIVER MAIN STEM--Continued

MISSOURI RIVER AT NEBRASKA CITY, NEBR.--Continued

Chemical analyses, water year October 1955 to September 1956--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 (micromhos 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 5-13, 1956..	570,800	11	2.89	1.43	2.48	0.15	2.85	3.83	0.45	0.02	0.02	0.13	443	0.60	342,500	36	1.7	684	7.9
June 14-28	1,017,000	--	4.72		2.83	--	3.15	--	--	--	--	--	507	.69	701,700	37	1.8	757	7.9
June 29-July 10..	790,400	--	4.70		2.74	--	3.08	--	--	--	--	--	484	.66	521,700	37	1.8	747	8.0
July 11-19.....	623,800	--	4.80		2.70	--	3.10	--	--	--	--	--	489	.67	417,900	36	1.7	745	7.7
July 20-Aug. 16..	1,859,000	--	5.06		3.13	--	3.25	--	--	--	--	--	531	.72	1,338,000	38	2.0	799	7.8
Aug. 17-22.....	478,800	--	4.34		2.70	--	2.88	--	--	--	--	--	465	.63	301,600	38	1.8	707	7.8
Aug. 23-Sept. 5..	954,600	--	4.78		2.83	--	3.11	--	--	--	--	--	499	.68	649,100	37	1.8	757	7.8
Sept. 6	83,900	--	4.40		2.31	--	3.02	--	--	--	--	--	430	.58	48,660	34	1.6	660	7.9
Sept. 7-30	1,637,000	9.9	2.94	1.62	2.83	113	3.02	4.06	.45	.03	.01	.15	475	.65	1,064,000	38	1.5	747	7.8
Total or weighted average [a]	18,890,000	--	4.46		2.65	--	3.06	--	--	--	--	--	462	0.63	11,860,000	37	1.8	707	--
Total or weighted average [b].....	19,640,000	--	4.46		2.65	--	3.06	--	--	--	--	--	461	0.63	12,310,000	37	1.8	706	--

a Represents 96 percent of runoff for water year October 1955 to September 1956.
b Includes estimated data for missing periods. Represents 100 percent of runoff for water year October 1955 to September 1956.

YELLOWSTONE RIVER AT BILLINGS, MONT.

LOCATION.--At gaging station at bridge on U. S. Highway 87, 1 mile northeast of Billings, Yellowstone County, and 12 miles upstream from Pryor Creek.
DRAINAGE AREA.--11,870 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: October 1950 to September 1956.
Water temperatures: December 1950 to September 1956.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 758 micromhos Nov. 18; minimum daily, 140 micromhos June 14.
Percent sodium: Maximum, 30 Oct. 1-31; minimum, 13 May 20-23, June 15.
EXTREMES, 1950-56.--Specific conductance: Maximum daily, 1,210 micromhos Feb. 2, 1951; minimum daily, 129 micromhos May 22, 1954.
Percent sodium: Maximum, 37 Dec. 1, 1950; minimum, 13 May 20-23, June 15, 1956.
REMARKS.--Values reported for dissolved solids are residues on evaporation at 180°C. Daily samples for chemical analysis composited by discharge. Records of specific conductance of daily samples available in district office at Lincoln, Nebr. Records of discharge for water year October 1955 to September 1956 given in WSP 1439.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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. 1-31, 1955..	184,200	--	3.50		1.52	--	2.79	--	--	--	--	--	308	0.42	77,360	30	1.1	492	7.7
Nov. 1-14.....	86,400	--	3.60		1.48	--	2.88	--	--	--	--	--	314	.43	37,150	29	1.1	498	7.6
Nov. 15-19.....	12,690	--	5.16		2.09	--	3.87	--	--	--	--	--	450	.61	7,740	29	1.3	684	8.0
Nov. 20-Dec. 17.	155,100	--	3.52		1.35	--	2.79	--	--	--	--	--	304	.41	63,590	28	1.0	484	7.5
Dec. 18-22.....	18,450	--	4.18		1.57	--	3.11	--	--	--	--	--	362	.49	9,040	27	1.1	556	7.7
Dec. 23-30.....	58,120	15	1.90	0.98	1.17	0.09	2.31	1.73	0.07	0.01	0.03	0.19	250	.34	19,760	28	1.0	403	7.8
Dec. 31-Jan. 17, 1956	100,600	--	3.32		1.31	--	2.59	--	--	--	--	--	291	.40	40,240	28	1.0	459	7.6
Jan. 18-19.....	6,940	--	4.00		1.48	--	2.92	--	--	--	--	--	352	.48	3,330	27	1.0	537	8.0
Jan. 20-Feb. 1 ..	60,100	--	3.28		1.26	--	2.57	--	--	--	--	--	288	.39	23,440	28	1.0	467	7.8
Feb. 2-24.....	111,100	--	3.44		1.35	--	2.61	--	--	--	--	--	302	.41	45,550	28	1.0	475	7.8
Feb. 25-Mar. 12	93,620	--	3.28		1.31	--	2.49	--	--	--	--	--	283	.38	35,580	29	1.0	456	7.8

YELLOWSTONE RIVER BASIN--Continued

YELLOWSTONE RIVER AT BILLINGS, MONT.--Continued

Chemical analyses, water year October 1955 to September 1956--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 (micromhos 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. 13-17, 1956.	26,480	--	3.48		1.39	--	2.64	--	--	--	--	--	306	0.42	11,120	29	1.1	487	8.0
Mar. 18-25.....	93,620	14	2.35	0.95	1.17	.09	2.77	1.58	0.16	0.02	0.04	0.15	280	.38	35,580	26	.9	436	7.7
Mar. 26-Apr. 3 ..	91,060	--	2.92		1.00	--	2.46	--	--	--	--	--	249	.34	30,960	26	.8	397	7.6
Apr. 4-16.....	105,200	--	3.20		1.31	--	2.62	--	--	--	--	--	272	.37	38,920	29	1.0	450	7.9
Apr. 17-22	68,970	--	2.66		.91	--	2.36	--	--	--	--	--	218	.30	20,690	25	.8	359	7.7
Apr. 23-May 11 ..	271,100		2.46		.83	--	2.13	--	--	--	--	--	206	.28	75,910	25	.7	335	7.8
May 12-19.....	162,800	--	2.42		.61	--	2.16	--	--	--	--	--	191	.26	42,330	20	.6	307	7.7
May 20-23	209,700	--	1.92		.29	--	1.72	--	--	--	--	--	142	.19	39,840	13	.3	220	7.6
May 24-June 14...	1,801,000	12	1.00	.30	.29	.03	1.25	.33	.33	.00	.01	.01	104	.14	252,100	18	.4	162	7.2
June 15	69,020	--	2.40		.36	--	2.16	--	--	--	--	--	168	.23	15,870	13	.3	273	8.2
June 16-July 2....	827,700	--	1.28		.35	--	1.28	--	--	--	--	--	104	.14	115,900	22	.4	167	7.5
July 3-25	583,100	--	1.54		.52	--	1.44	--	--	--	--	--	133	.18	105,000	25	.6	216	7.6
July 26-Aug. 17 ..	312,500	--	2.08		.83	--	1.85	--	--	--	--	--	179	.24	75,000	29	.8	297	7.7
Aug. 18-Sept. 6 ..	180,800	--	2.84		1.13	--	2.39	--	--	--	--	--	246	.33	59,660	28	.9	402	7.8
Sept. 7-30	170,800	13	1.95	1.21	1.31	.07	2.57	1.83	.17	.02	.00	.19	271	.37	63,200	29	1.0	440	7.8
Total or weighted average[a].....	5,861,000	--	2.02		0.65	--	1.77	--	--	--	--	--	170	0.23	1,345,000	24	0.6	271	--

a Represents 100 percent of runoff for water year October 1955 to September 1956.

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 1956.
Water temperatures: January 1951 to September 1956.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 1,310 micromhos Dec. 1; minimum daily, 257 micromhos June 15.
Percent sodium: Maximum, 42 Oct. 1-31; minimum, 22 May 21 to June 4.
EXTREMES, 1951-56.--Specific conductance: Maximum daily, 2,780 micromhos Jan. 14, 1951; minimum daily, 257 micromhos June 15, 1956.
Percent sodium: Maximum, 48 May 1-30, 1953; minimum, 22 May 21 to June 4, 1956.
REMARKS.--Values reported for dissolved solids are residues on evaporation at 180°C. Daily samples for chemical analysis composited by discharge. Records of specific conductance of daily samples available in district office at Lincoln, Nebr. Records of discharge for gaging station near Sidney for water year October 1955 to September 1956 given in WSP 1439. No appreciable inflow between gaging station and sampling station.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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. 1-31, 1955 ..	335,300	--	5.86		4.18	--	3.51	--	--	--	--	--	648	0.88	295,100	42	2.4	935	7.9
Nov. 1-21	189,800	--	6.56		4.35	--	3.97	--	--	--	--	--	704	.96	182,200	40	2.4	1,010	8.0
Nov. 22-Dec. 26 .	358,200	15	4.44	2.84	4.52	0.13	4.39	7.04	0.42	0.03	0.04	0.25	770	1.05	376,100	38	2.4	1,090	7.9
Dec. 27-Jan. 18, 1956	326,700	--	6.06		3.61	--	3.64	--	--	--	--	--	628	.85	277,700	37	2.1	910	7.8
Jan. 19-Feb. 11 .	264,400	--	6.52		3.87	--	3.84	--	--	--	--	--	676	.92	243,200	37	2.1	974	8.0
Feb. 12-21	132,100	--	5.90		3.35	--	3.38	--	--	--	--	--	603	.82	108,300	36	2.0	888	7.8
Feb. 22-29	101,400	--	6.44		3.74	--	3.61	--	--	--	--	--	664	.90	91,260	37	2.1	961	8.1
Mar. 1-8	169,600	--	4.50		2.57	--	2.69	--	--	--	--	--	474	.64	108,500	36	1.7	698	7.7
Mar. 9-31	612,900	11	3.44	1.80	2.83	.11	3.02	4.58	.31	.02	.03	.12	535	.73	447,400	35	1.8	786	7.8
Apr. 1-16	317,600	--	5.80		3.31	--	3.31	--	--	--	--	--	602	.82	260,400	36	1.9	876	7.8
Apr. 17	18,330	--	7.20		4.00	--	4.72	--	--	--	--	--	708	.96	17,600	36	2.1	1,040	7.9
Apr. 18-25	153,100	--	5.40		3.05	--	3.25	--	--	--	--	--	549	.75	114,800	36	1.9	816	7.9
Apr. 26-May 20 ..	532,300	--	4.22		2.26	--	2.80	--	--	--	--	--	425	.58	308,700	35	1.6	646	8.0
May 21-27	413,000	--	3.40		.96	--	2.80	--	--	--	--	--	278	.38	156,900	22	.7	430	7.6
May 28-June 4 ...	885,200	--	2.96		.83	--	2.44	--	--	--	--	--	239	.33	292,100	22	.7	377	7.2

YELLOWSTONE RIVER BASIN--Continued

YELLOWSTONE RIVER NEAR SIDNEY, MONT.--Continued

Chemical analyses, water year October 1955 to September 1956--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 (micromhos 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 5-16, 1956 ..	1,131,000	12	1.60	0.44	0.70	0.04	1.77	0.85	0.04	0.01	0.00	0.05	173	0.24	271,400	25	0.7	289	7.9
June 17-July 1 ...	989,000	--	2.56		.91	--	1.93	--	--	--	--	--	229	.31	306,600	26	.8	360	7.7
July 2-5	189,200	--	2.12		1.00	--	1.75	--	--	--	--	--	206	.28	52,980	32	1.0	330	7.6
July 6-21	509,200	--	2.78		1.44	--	2.02	--	--	--	--	--	277	.38	193,500	34	1.2	433	7.6
July 22-31	176,700	--	2.90		1.96	--	2.23	--	--	--	--	--	310	.42	74,210	40	1.6	486	7.8
Aug. 1-21.....	292,000	--	4.06		2.65	--	2.70	--	--	--	--	--	432	.59	172,300	39	1.9	663	7.8
Aug. 22-Sept. 30 .	507,300	13	2.79	1.97	3.44	.10	3.10	4.75	.27	.02	.02	.23	530	.72	365,300	41	2.2	796	7.7
Total or weighted average[a]	8,604,000	--	4.04		2.13	--	2.70	--	--	--	--	--	402	0.55	4,717,000	35	1.5	603	--

a Represents 100 percent of runoff for water year October 1955 to September 1956.

BIGHORN RIVER AT BIGHORN, MONT.

LOCATION (revised).--At gaging station at bridge on U. S. Highways 10 and 12, three-quarters of a mile upstream from mouth, 1 mile southwest of Bighorn, Treasure County, and 4 miles east of Custer. Prior to Oct. 7, 1955, gaging station at site 4 miles upstream.
RECORDS AVAILABLE.--Chemical analyses: February 1950 to September 1956.
Water temperatures: April 1949 to September 1951, August 1952 to September 1956.
Sediment records: July 1947 to September 1954, October 1955 to September 1956.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 1,640 micromhos Nov. 18; minimum daily, 544 micromhos June 5.
Percent sodium: Maximum, 45 July 21-31; minimum, 32 May 24 to June 8.
EXTREMES, 1951-56.--Specific conductance: Maximum daily, 1,640 micromhos Nov. 18, 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 at 180°C. Daily samples for chemical analysis composited by discharge. Records of specific conductance of daily samples available in district office at Lincoln, Nebr. Records of discharge for water year October 1955 to September 1956 given in WSP 1439.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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. 1-31, 1955 ..	131,500	--	8.48		5.92	--	4.05	--	--	--	--	--	953	1.30	171,000	41	2.9	1,320	7.8
Nov. 1-17.....	73,880	--	9.28		6.39	--	4.57	--	--	--	--	--	1,050	1.43	105,600	41	3.0	1,410	7.9
Nov. 18-21.....	17,260	--	10.64		6.96	--	5.44	--	--	--	--	--	1,180	1.60	27,620	40	3.0	1,590	8.0
Nov. 22-Dec. 24..	178,100	9.8	5.89	2.91	5.70	0.14	4.56	9.99	0.54	0.03	0.01	0.17	967	1.32	235,100	39	2.7	1,320	8.0
Dec. 25-Jan. 18, 1956	157,400	--	7.90		5.13	--	4.05	--	--	--	--	--	847	1.15	181,000	39	2.6	1,180	7.8
Jan. 19-31.....	75,730	--	7.44		5.09	--	3.97	--	--	--	--	--	812	1.10	83,300	41	2.6	1,130	7.9
Feb. 1-24.....	142,500	--	7.24		4.52	--	4.00	--	--	--	--	--	782	1.06	151,100	38	2.4	1,110	7.9
Feb. 25-Mar. 9 ..	115,600	--	6.08		3.92	--	3.28	--	--	--	--	--	683	.93	107,500	39	2.2	948	7.8
Mar. 10-17	50,380	12	4.74	2.64	4.44	.14	3.84	7.81	.45	.03	.01	.17	785	1.07	53,900	37	2.3	1,100	7.9
Mar. 18-20	25,790	--	5.92		3.57	--	3.33	--	--	--	--	--	647	.88	22,700	38	2.1	924	7.9
Mar. 21	11,900	--	5.96		3.65	--	3.31	--	--	--	--	--	632	.86	10,230	38	2.1	910	7.8
Mar. 22-25	32,330	--	5.88		3.39	--	3.26	--	--	--	--	--	618	.84	27,160	37	2.0	883	7.8
Mar. 26-Apr. 25 .	176,700	--	7.68		4.96	--	3.92	--	--	--	--	--	888	1.21	213,800	39	2.5	1,170	7.7

YELLOWSTONE RIVER BASIN--Continued

BIGHORN RIVER AT BIGHORN, MONT.--Continued

Chemical analyses, water year October 1955 to September 1956--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 (micromhos 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. 26-May 18, 1956	104,000	--	7.22		4.61	--	3.62	--	--	--	--	--	805	1.09	113,400	39	2.4	1,120	7.9
May 19-23	43,600	--	5.62		3.31	--	3.23	--	--	--	--	--	603	.82	35,750	37	2.0	861	8.0
May 24-31	129,400	--	4.24		2.00	--	2.84	--	--	--	--	--	415	.56	72,460	32	1.4	612	7.9
June 1-8	127,700	--	4.12		1.91	--	2.72	--	--	--	--	--	389	.53	67,680	32	1.3	590	7.9
June 7 a	15,770	12	2.45	1.11	1.91	0.05	2.23	3.14	0.16	0.02	0.05	0.07	359	.49	--	35	1.4	548	7.7
June 9-22	177,400	14	2.79	1.37	2.39	.05	2.61	3.71	.18	.02	.00	.09	416	.57	101,100	36	1.6	637	8.0
June 23	15,610	--	5.24		3.13	--	3.11	--	--	--	--	--	563	.77	12,020	37	1.9	818	8.2
June 24-July 7	148,800	--	4.16		2.35	--	2.61	--	--	--	--	--	431	.59	87,790	36	1.6	644	7.7
July 8-20	70,140	--	5.28		3.48	--	2.88	--	--	--	--	--	592	.81	56,810	40	2.1	859	7.7
July 21-31	29,040	--	6.30		5.09	--	2.87	--	--	--	--	--	773	1.05	30,490	45	2.9	1,090	8.0
July 27 a	2,240	9.9	3.69	2.63	5.31	.11	2.80	8.64	.42	.03	.03	.17	790	1.07	--	45	3.0	1,120	7.5
Aug. 1-31	108,000	--	6.94		5.39	--	3.29	--	--	--	--	--	840	1.14	123,100	44	2.9	1,170	7.7
Sept. 1-30	159,600	12	4.14	2.46	4.65	.09	3.39	7.81	.39	.02	.02	.17	755	1.03	164,400	41	2.6	1,060	7.8
Total or weighted average b	2,302,000	--	6.56		4.22	--	3.51	--	--	--	--	--	720	0.98	2,255,000	39	2.3	1,010	--

a Not included in total or weighted average.
b Represents 100 percent of runoff for water year October 1955 to September 1956.

TONGUE RIVER AT MILES CITY, MONT.

527913 O - 60 - 4

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 1956.
Water temperatures: April 1949 to September 1956.
Sediment records: June 1946 to September 1951.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 1,840 micromhos Aug. 10; minimum daily, 351 micromhos June 8.
Percent sodium: Maximum, 57 Aug. 3-4; minimum, 17 June 2-15.
EXTREMES, 1951-56.--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, 17 June 2-15, 1956.
REMARKS.--Values reported for dissolved solids are residues on evaporation at 180°C. Daily samples for chemical analysis composited by discharge. Records of specific conductance of daily samples available in district office at Lincoln, Nebr. Records of discharge for water year October 1955 to September 1956 given in WSP 1439.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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. 1-2, 1955...	22	--	8.80		9.92	--	7.83	--	--	--	--	--	1,190	1.62	36	53	4.7	1,680	8.0
Oct. 3-6.....	194	--	7.36		6.00	--	6.13	--	--	--	--	--	818	1.11	215	45	3.1	1,200	8.0
Oct. 7-15	863	--	7.24		3.83	--	5.05	--	--	--	--	--	680	.92	794	35	2.0	1,010	7.9
Oct. 16-24.....	1,080	--	7.36		3.52	--	5.06	--	--	--	--	--	670	.91	983	32	1.8	991	8.1
Oct. 25-Nov. 2 ..	559	--	7.96		4.87	--	5.87	--	--	--	--	--	784	1.07	598	38	2.4	1,140	8.1
Nov. 3-13	3,120	--	7.40		3.05	--	11.65	--	--	--	--	--	640	.87	2,710	29	1.6	942	8.0
Nov. 14-30	4,490	--	8.92		3.52	--	5.59	--	--	--	--	--	766	1.04	4,670	28	1.7	1,100	7.9
Dec. 1-17	5,120	6.9	4.49	4.27	2.78	0.12	5.67	6.14	0.13	0.02	0.01	0.15	708	.96	4,920	24	1.3	1,020	8.1
Dec. 18	278	--	6.24		2.18	--	3.93	--	--	--	--	--	508	.69	192	26	1.2	770	8.0
Dec. 19-Jan. 22, 1956	10,930	--	8.72		2.74	--	5.74	--	--	--	--	--	690	.94	10,270	24	1.3	1,000	8.0
Jan. 23-24	635	--	6.68		2.35	--	3.97	--	--	--	--	--	566	.77	489	26	1.3	830	8.1
Jan. 25-27.....	952	--	6.64		2.13	--	4.06	--	--	--	--	--	540	.73	695	24	1.2	798	8.2
Jan. 28-Feb. 29..	10,400	--	8.60		2.52	--	5.67	--	--	--	--	--	673	.92	9,570	23	1.2	974	8.0

YELLOWSTONE RIVER BASIN--Continued

TONGUE RIVER AT MILES CITY, MONT.--Continued

Chemical analyses, water year October 1955 to September 1956--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 (micromhos 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, 1956	357	--	7.08		2.70	--	a 4.86	--	--	--	--	--	604	0.82	293	28	1.4	887	8.3
Mar. 2-9	3,130	--	4.78		1.65	--	3.43	--	--	--	--	--	404	.55	1,720	26	1.1	619	7.5
Mar. 10-18	3,270	9.2	3.59	4.03	2.61	0.15	5.15	5.21	0.11	0.02	0.02	0.14	624	.85	2,780	25	1.3	923	7.8
Mar. 19-20	1,030	--	5.20		1.78	--	3.61	--	--	--	--	--	422	.57	587	26	1.1	659	7.9
Mar. 21-23	5,450	--	3.70		1.17	--	2.69	--	--	--	--	--	310	.42	2,290	24	.9	482	7.8
Mar. 24	2,760	--	5.52		1.70	--	4.10	--	--	--	--	--	458	.62	1,710	24	1.0	684	8.2
Mar. 25-29	10,420	--	4.34		1.39	--	3.20	--	--	--	--	--	354	.48	5,000	24	.9	559	7.7
Mar. 30-Apr. 21	48,610	--	5.42		1.52	--	3.29	--	--	--	--	--	445	.61	29,650	22	.9	673	7.7
Apr. 22-25	4,920	--	6.42		1.91	--	3.75	--	--	--	--	--	533	.72	3,540	23	1.1	786	7.8
Apr. 26-May 20	17,470	--	7.04		2.61	--	4.31	--	--	--	--	--	602	.82	14,330	27	1.4	887	7.9
May 21-25	7,770	--	6.26		1.91	--	3.93	--	--	--	--	--	506	.69	5,360	23	1.1	772	7.9
May 26-29	9,640	--	4.64		1.17	--	3.21	--	--	--	--	--	355	.48	4,630	20	.8	561	7.9
May 30-June 1	12,220	--	3.76		.83	--	2.97	--	--	--	--	--	281	.38	4,640	18	.6	441	8.1
June 2-15	48,940	9.6	2.00	1.16	.65	.07	2.47	1.31	.00	.02	.00	.05	225	.31	15,170	17	.5	371	7.9
June 16	833	--	4.00		1.44	--	b 3.18	--	--	--	--	--	344	.47	392	26	1.0	536	8.5
June 17-July 12	12,420	--	4.28		1.91	--	3.38	--	--	--	--	--	389	.53	6,580	31	1.3	600	7.8
July 13-15	268	--	6.92		4.57	--	5.38	--	--	--	--	--	725	.99	265	40	2.5	1,060	8.1
July 16-20	171	--	7.48		5.83	--	6.06	--	--	--	--	--	854	1.16	198	44	3.0	1,240	8.0
July 21-Aug. 2	289	--	7.96		7.40	--	6.42	--	--	--	--	--	973	1.32	381	48	3.7	1,390	7.7

a Includes 0.27 equivalent per million of carbonate (CO_3).
b Includes 0.33 equivalent per million of carbonate (CO_3).

Aug. 3-4, 1956...	87	--	4.48	6.05	--	4.62	--	--	--	--	--	706	0.96	84	57	4.0	1,030	8.0
Aug. 5-9	62	--	7.72	9.05	--	7.16	--	--	--	--	--	1,070	1.46	91	54	4.6	1,530	8.1
Aug. 10	26	--	9.76	10.61	--	c 8.33	--	--	--	--	--	1,320	1.80	47	52	4.8	1,840	8.3
Aug. 11-28	3,130	--	6.94	5.09	--	5.72	--	--	--	--	--	754	1.03	3,220	42	2.7	1,110	7.9
Aug. 29-Sept. 3..	4,680	--	3.84	3.09	--	3.69	--	--	--	--	--	436	.59	2,760	45	2.2	673	7.8
Sept. 4-30.....	3,080	11	3.19 | 3.61	3.96	0.14	5.24	5.27	0.11	0.02	0.00	0.17	651	.89	2,740	36	2.1	967	8.1
Total or weighted average d	239,700	--	5.38	1.78	--	3.67	--	--	--	--	--	442	0.60	144,600	25	1.1	670	--

c Includes 0.23 equivalent per million of carbonate (CO_3).
d Represents 100 percent of runoff for water year October 1955 to September 1956.

YELLOWSTONE RIVER BASIN--Continued

POWDER RIVER NEAR LOCATE, MONT.

LOCATION.--At gaging station at bridge on U. S. Highway 12, at present site of Locate (5 miles west of former site of Locate), Custer County, 3 miles upstream from Locate Creek, and 25 miles east of Miles City.
RECORDS AVAILABLE.--Chemical analyses: December 1949 to September 1956.
Water temperatures: February 1951 to May 1954, October 1954 to September 1956.
Sediment records: March 1950 to September 1953.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 9,270 micromhos Dec. 16; minimum daily, 715 micromhos July 15.
Percent sodium: Maximum, 57 Aug. 28 to Sept. 2; minimum, 20 June 18-21.
EXTREMES, 1951-56.--Specific conductance: Maximum daily, 9,270 micromhos Dec. 16, 1955; minimum daily, 407 micromhos Feb. 14, 1952.
Percent sodium: Maximum, 83 Oct. 22-24, 1953; minimum, 17 Aug. 11-13, 1955.
REMARKS.--Values reported for dissolved solids are residues on evaporation at 180°C. Daily samples for chemical analysis composited by discharge. Records of specific conductance of daily samples available in district office at Lincoln, Nebr. Records of discharge for water year October 1955 to September 1956 given in WSP 1439.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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. 1-31, 1955 ..	841	--	15.24		15.53	--	4.46	24.98	--	--	--	--	2,150	2.92	2,460	50	5.6	2,670	7.8
Nov. 1-12	992	--	18.80		13.49	--	4.52	27.27	--	--	--	--	2,290	3.11	3,090	42	4.4	2,720	7.8
Nov. 13-16	357	--	25.28		17.36	--	5.74	33.52	--	--	--	--	2,990	4.07	1,450	41	4.9	3,400	7.9
Nov. 17-19	149	--	28.56		20.53	--	6.74	38.52	--	--	--	--	3,450	4.69	699	42	5.4	3,880	7.8
Nov. 20-Dec. 4 ..	1,350	--	24.68		16.36	--	7.29	32.27	--	--	--	--	2,920	3.97	5,360	40	4.7	3,290	7.8
Dec. 5-12	992	--	22.08		12.18	--	7.13	25.19	--	--	--	--	2,410	3.28	3,250	36	3.7	2,800	8.0
Dec. 13-14.....	278	--	22.20		14.36	--	6.87	29.15	--	--	--	--	2,700	3.67	1,020	39	4.6	3,100	7.6
Dec. 15-17.....	417	--	42.30		34.63	--	11.83	58.92	--	--	--	--	5,430	7.38	3,080	45	7.5	5,760	7.7
Dec. 18-28.....	1,950	12	10.93	6.59	9.27	0.19	5.97	20.05	1.83	0.02	0.07	0.20	1,860	2.53	4,930	34	3.1	2,240	8.0
Dec. 29	218	--	20.84		14.27	--	4.62	27.07	--	--	--	--	2,520	3.43	748	41	4.4	2,920	8.1
Dec. 30-Jan. 20, 1956	5,200	--	17.20		9.05	--	5.11	19.53	--	--	--	--	1,800	2.45	12,740	34	3.1	2,210	7.8
Jan. 21-23	714	--	23.08		13.01	--	6.29	27.27	--	--	--	--	2,560	3.48	2,480	36	3.8	2,960	7.8
Jan. 24-Feb. 6 ...	2,600	--	16.00		8.57	--	5.10	15.62	--	--	--	--	1,710	2.33	6,060	35	3.0	2,100	8.0
Feb. 7-28.....	4,220	--	15.00		7.61	--	5.24	16.14	--	--	--	--	1,590	2.16	9,120	34	2.8	1,960	7.9
Feb. 29-Mar. 4 ..	2,380	--	8.96		5.22	--	3.38	9.79	--	--	--	--	976	1.33	3,170	37	2.5	1,300	7.7
Mar. 5-7	4,360	--	6.60		2.83	--	2.41	6.77	--	--	--	--	639	.87	3,790	30	1.6	901	7.8

Mar. 8-9, 1956...	3,170	--	5.22	2.31	--	2.21	5.06	--	--	--	--	511	.69	2,190	31	1.4	744	7.7
Mar. 10-16	6,350	8.0	5.14 | 2.82	3.92	.19	2.56	8.54	.93	.01	0.02	.12	807	1.10	6,990	32	2.0	1,110	7.6
Mar. 17-20	3,370	--	8.38	4.57	--	2.51	9.58	--	--	--	--	915	1.24	4,180	35	2.2	1,210	7.8
Mar. 21-22	2,780	--	5.40	3.00	--	2.77	5.58	--	--	--	--	581	.79	2,200	36	1.8	817	7.8
Mar. 23-27	43,280	--	8.72	3.70	--	2.92	9.16	--	--	--	--	852	1.16	50,200	30	1.8	1,150	7.7
Mar. 28-Apr. 1...	12,620	--	10.02	5.26	--	3.16	12.39	--	--	--	--	1,080	1.47	18,550	34	2.4	1,390	7.8
Apr. 2-17.....	18,750	--	12.66	7.26	--	3.95	14.99	--	--	--	--	1,400	1.90	35,630	36	2.9	1,760	7.8
Apr. 18-26.....	7,100	--	14.10	9.57	--	4.05	19.01	--	--	--	--	1,670	2.27	16,120	40	3.6	2,060	7.8
Apr. 27-May 9 ...	9,400	--	11.62	6.92	--	3.92	13.95	--	--	--	--	1,330	1.81	17,010	37	2.9	1,720	7.8
May 10-15	6,650	--	9.78	6.48	--	3.90	11.03	--	--	--	--	1,130	1.54	10,240	40	2.9	1,530	7.8
May 16-24	9,430	--	8.22	5.05	--	3.33	8.22	--	--	--	--	936	1.27	11,980	38	2.5	1,280	7.9
May 25-30	20,250	--	6.92	3.78	--	3.39	6.97	--	--	--	--	762	1.04	21,060	35	2.0	1,070	7.7
May 31-June 6 ...	25,650	--	8.24	4.31	--	3.21	8.74	--	--	--	--	861	1.17	30,010	34	2.1	1,160	7.6
June 7-13.....	11,530	11	4.09 | 1.71	3.22	.10	2.52	6.04	.37	.02	.02	.11	606	.82	9,450	35	1.9	860	8.0
June 14-17.....	2,800	--	7.66	4.57	--	2.69	9.06	--	--	--	--	850	1.16	3,250	37	2.3	1,150	7.7
June 18-21.....	9,130	--	20.60	5.05	--	3.84	21.03	--	--	--	--	1,830	2.49	22,730	20	1.6	2,050	7.8
June 22-28.....	3,810	--	15.30	4.96	--	2.84	17.45	--	--	--	--	1,480	2.01	7,660	24	1.8	1,740	7.5
June 29-July 5 ...	1,190	--	13.06	8.35	--	3.87	17.45	--	--	--	--	1,520	2.07	2,460	39	3.3	1,910	7.8
July 6-13	4,530	--	19.18	5.92	--	3.47	21.86	--	--	--	--	1,830	2.49	11,280	23	1.9	2,090	7.7
July 14	540	--	8.56	3.74	--	4.26	7.91	--	--	--	--	812	1.10	594	30	1.8	1,110	8.0
July 15-16	922	--	4.48	3.52	--	2.98	5.00	--	--	--	--	536	.73	673	44	2.3	787	8.2
July 17-19	579	--	9.04	6.05	--	2.79	12.28	--	--	--	--	1,080	1.47	851	40	2.9	1,420	8.1
July 20-28	500	--	12.84	9.61	--	3.90	18.74	--	--	--	--	1,600	2.18	1,090	42	3.8	2,010	8.0
July 29	151	--	4.16	5.26	--	3.74	5.52	--	--	--	--	644	.88	133	56	3.6	935	7.6
July 30	121	--	7.04	6.53	--	3.21	10.41	--	--	--	--	954	1.30	157	48	3.5	1,320	7.7
July 31	129	--	10.24	9.44	--	4.10	16.24	--	--	--	--	1,370	1.86	240	46	4.2	1,810	7.8
Aug. 1-3	230	--	7.56	7.40	--	3.54	11.56	--	--	--	--	1,050	1.43	329	49	3.8	1,430	7.8
Aug. 4	226	--	14.76	9.92	--	5.08	20.40	--	--	--	--	1,750	2.38	538	39	3.6	2,160	7.7
Aug. 5-6	722	--	29.40	12.48	--	4.75	36.02	--	--	--	--	3,010	4.09	2,950	30	3.3	3,300	7.7

YELLOWSTONE RIVER BASIN--Continued

POWDER RIVER NEAR LOCATE, MONT.--Continued

Chemical analyses, water year October 1955 to September 1956--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 (micromhos 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				
Aug. 7-18, 1956	2,250	--	18.76		11.61	--	4.51	25.61	--	--	--	--	2,180	2.96	6,660	38	3.8	2,600	7.4
Aug. 19-21	522	--	10.48		9.27	--	3.97	16.03	--	--	--	--	1,380	1.88	981	46	4.0	1,820	7.7
Aug. 22-27	750	--	16.28		11.70	--	3.54	24.98	--	--	--	--	2,020	2.75	2,060	41	4.1	2,460	7.6
Aug. 28-Sept. 2	5,360	--	3.96		5.48	--	3.97	5.58	--	--	--	--	635	.86	4,610	57	3.9	935	7.8
Sept. 3-7	611	--	10.56		10.05	--	4.08	16.24	--	--	--	--	1,450	1.97	1,200	49	4.4	1,890	7.8
Sept. 8-30	672	13	8.13	5.07	13.05	0.24	4.51	21.65	1.16	0.03	0.00	0.20	1,870	2.54	1,710	49	5.1	2,360	8.0
Total or weighted average[a]	243,100	--	10.54		5.52	--	3.47	11.95	--	--	--	--	1,120	1.52	371,400	34	2.4	1,440	--

a Represents 100 percent of runoff for water year October 1955 to September 1956.

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 1956.
Water temperatures: October 1951 to September 1956.
Sediment records: April 1947 to June 1953.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 1,350 micromhos Feb. 17; minimum daily, 500 micromhos Sept. 4.
Percent sodium: Maximum, 40 Apr. 1 to May 17; minimum, 24 June 19 to July 11.
EXTREMES, 1951-53, 1954-56.--Specific conductance (1954-56): Maximum daily, 1,350 micromhos Feb. 17, 1956; minimum daily, 354 micromhos June 27, 1955.
Percent sodium: Maximum, 40 Apr. 18-30, 1955, Apr. 1 to May 17, 1956; minimum, 24 June 27, 1955, June 19 to July 11, 1956.
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 Lincoln, Nebr. Records of discharge for water year October 1955 to September 1956 given in WSP 1440. No appreciable inflow between gaging station and sampling station except during periods of heavy local precipitation.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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-Nov. 3, 1955	692	--	5.70		3.18	--	3.20	5.31	--	--	--	--	587	0.80	554	36	1.9	858	7.8
Nov. 4-30	770	--	6.48		3.83	--	3.51	6.10	--	--	--	--	665	.90	693	37	2.1	958	8.0
Dec. 1-31	16,280	12	5.09	2.91	4.70	0.15	4.06	7.91	0.87	0.02	0.03	0.16	868	1.18	19,210	37	2.4	1,200	7.9
Jan. 1-30, 1956.	1,110	--	8.24		5.13	--	4.28	8.08	--	--	--	--	872	1.19	1,320	38	2.5	1,210	7.7
Jan. 31-Feb. 14	298	--	8.10		4.83	--	4.13	8.33	--	--	--	--	846	1.15	343	37	2.4	1,190	7.8
Feb. 15-29	357	--	8.64		5.22	--	4.36	8.85	--	--	--	--	907	1.23	439	38	2.5	1,270	8.0
Mar. 1-31	10,520	12	4.94	3.32	4.74	.14	3.97	8.12	.96	.02	.04	.12	873	1.19	12,520	36	2.3	1,200	8.0
Apr. 1-17	31,880	--	7.52		4.92	--	3.31	8.43	--	--	--	--	886	1.20	38,260	40	2.5	1,170	8.0
Apr. 18-30	528	--	6.66		4.44	--	2.92	7.50	--	--	--	--	806	1.10	581	40	2.4	1,070	7.7
May 1-17	15,610	--	6.72		4.52	--	2.97	7.66	--	--	--	--	753	1.02	15,920	40	2.5	1,080	7.7
May 18-20	19,540	--	5.44		2.96	--	2.98	5.41	--	--	--	--	557	.76	14,850	35	1.8	813	7.8
May 21-30	60,260	--	4.80		2.13	--	2.92	3.71	--	--	--	--	455	.62	37,360	31	1.4	679	8.0
May 31-June 18	95,520	13	3.09	1.71	2.13	.10	2.84	3.71	.39	.02	.01	.08	442	.60	57,310	30	1.4	674	7.7
June 19-July 11	139,900	--	5.14		1.65	--	2.72	3.23	--	--	--	--	402	.55	76,950	24	1.0	600	8.0
July 12-30	178,000	--	4.32		1.70	--	2.74	3.08	--	--	--	--	399	.54	96,120	28	1.2	598	7.6

PLATTE RIVER BASIN--Continued

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

Chemical analyses, water year October 1955 to September 1956--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 (micromhos 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				
July 31-Aug. 28, 1955	237,200	--	4.12		1.61	--	2.66	3.08	--	--	--	--	362	0.49	116,200	28	1.1	567	7.7
Aug. 29-Sept. 11	86,020	13	2.50	1.26	1.48	0.08	2.56	2.56	0.28	0.02	0.00	0.07	341	.46	39,570	28	1.1	516	7.7
Sept. 12-15	7,170	--	5.00		2.26	--	3.13	3.81	--	--	--	--	463	.63	4,520	31	1.4	704	7.6
Sept. 16-30	7,720	--	5.68		3.09	--	2.98	5.31	--	--	--	--	567	.77	5,940	35	1.8	844	7.6
Total or weighted average [a]	909,300	--	4.74		2.04	--	2.80	3.66	--	--	--	--	436	0.59	538,700	30	1.3	651	--

a Represents 100 percent of runoff for water year October 1955 to September 1956.

PLATTE RIVER AT BRADY, NEBR.

LOCATION.--At gaging stations at highway bridges, half a mile and 2½ miles, respectively, 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 1956.
Water temperatures: March 1951 to September 1956.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 790 micromhos Nov. 30 (chan. 1); minimum daily, 305 micromhos Jan. 13 (chan. 1).
Percent sodium: Maximum, 44 July 4 to Aug. 31; minimum, 28 Mar. 14-21.
EXTREMES, 1951-56.--Specific conductance: Maximum daily, 1,070 micromhos Feb. 19, 1953 (chan. 1); minimum daily, 305 micromhos Jan. 13, 1956 (chan. 1).
Percent sodium: Maximum, 46 Aug. 1-22, 1955; minimum, 22 Nov. 26, 1952.
REMARKS.--Values reported for dissolved solids are residues on evaporation at 180°C. Daily samples for chemical analysis from each of two major channels composited by discharge. Composite periods normally identical to those of Supply Canal (Tri-County Diversion) near Maxwell, Nebr. Records of specific conductance of daily samples, taken at each of the two major channels, available in district office at Lincoln, Nebr. Records of discharge for water year October 1955 to September 1956 given in WSP 1440.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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. 1-31, 1955 ..	8,520	--	3.80		2.31	--	3.64	2.27	--	--	--	--	416	0.57	4,860	38	1.7	616	8.1
Nov. 1-15	4,310	--	3.88		2.26	--	3.62	2.23	--	--	--	--	413	.56	2,410	37	1.6	602	7.8
Nov. 16-19	1,200	--	4.48		2.70	--	4.16	2.73	--	--	--	--	483	.66	792	38	1.8	698	7.9
Nov. 20-27	3,340	--	3.76		2.22	--	3.47	2.17	--	--	--	--	396	.54	1,800	37	1.6	582	7.6
Nov. 28-Dec. 1 ..	1,050	--	4.70		2.52	--	4.39	2.50	--	--	--	--	488	.66	693	35	1.6	707	8.0
Dec. 2-16	5,510	47	2.84	1.24	2.26	0.24	3.79	2.31	0.39	0.02	0.03	0.11	421	.57	3,140	34	1.6	621	7.9
Dec. 17-Jan. 12, 1956	11,380	--	3.84		2.04	--	3.54	2.02	--	--	--	--	392	.53	6,030	35	1.5	583	7.9
Jan. 13	323	--	3.12		1.31	--	3.11	1.23	--	--	--	--	301	.41	132	30	1.0	446	7.8
Jan. 14-16	781	--	3.78		1.96	--	3.62	2.04	--	--	--	--	389	.53	414	34	1.4	579	7.9
Jan. 17-20	1,030	--	4.38		2.52	--	4.06	2.44	--	--	--	--	477	.65	670	37	1.7	685	7.8
Jan. 21-Feb. 13..	7,400	--	3.92		2.00	--	3.57	2.12	--	--	--	--	399	.54	4,000	34	1.4	587	8.1
Feb. 14-29	5,820	--	3.70		1.78	--	3.43	1.92	--	--	--	--	371	.50	2,910	32	1.3	548	8.1
Mar. 1-5	2,090	--	3.26		1.31	--	3.15	1.29	--	--	--	--	323	.44	920	29	1.0	463	8.0
Mar. 6-11	2,160	--	3.60		1.57	--	3.33	1.75	--	--	--	--	349	.47	1,020	30	1.2	518	8.0

PLATTE RIVER BASIN--Continued

PLATTE RIVER AT BRADY, NEBR.--Continued

Chemical analyses, water year October 1955 to September 1956--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 (micromhos 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. 12-13, 1956	728	--	4.08		2.00	--	3.65	2.21	--	--	--	--	400	0.54	393	33	1.4	599	8.0
Mar. 14-21	2,750	42	2.50	0.86	1.39	0.20	3.18	1.50	0.27	0.02	0.02	0.09	323	.44	1,210	28	1.1	479	7.9
Mar. 22	355	--	3.98		2.04	--	3.31	2.50	--	--	--	--	408	.55	195	34	1.4	602	8.2
Mar. 23-28	1,660	--	3.60		1.74	--	3.34	1.85	--	--	--	--	365	.50	830	33	1.3	540	8.1
Mar. 29	319	--	4.38		2.26	--	a3.77	2.60	--	--	--	--	452	.61	195	34	1.5	650	8.2
Mar. 30-Apr. 29	10,290	--	4.06		1.87	--	3.62	2.21	--	--	--	--	408	.55	5,660	32	1.3	600	8.0
Apr. 30-May 24	7,980	--	4.04		2.09	--	3.59	2.48	--	--	--	--	422	.57	4,550	34	1.5	618	7.9
May 25-June 16	5,890	--	3.98		2.26	--	3.64	2.29	--	--	--	--	428	.58	3,420	36	1.6	630	8.0
June 17-20	10,080	--	3.60		2.22	--	3.13	2.46	--	--	--	--	404	.55	5,540	38	1.7	601	7.9
June 21-July 3	5,400	46	2.79	1.17	2.35	.28	3.77	2.14	.42	.03	.01	.12	423	.58	3,130	36	1.7	632	8.2
July 4-31	49,750	--	3.74		2.91	--	3.72	2.81	--	--	--	--	444	.60	29,850	44	2.1	671	8.1
Aug. 1-31	34,990	--	3.60		2.83	--	3.65	2.66	--	--	--	--	428	.58	20,290	44	2.1	648	8.1
Sept. 1-30	6,460	43	2.15	1.65	2.65	.23	3.57	2.73	.48	.03	.02	.16	434	.59	3,810	40	1.9	643	8.0
Total or weighted average[b]	191,600	--	3.78		2.44	--	3.61	2.46	--	--	--	--	419	0.57	108,900	39	1.8	626	--

a Includes 0.20 equivalent per million of carbonate (CO_3).

b Represents 100 percent of runoff for water year October 1955 to September 1956.

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 1956.
Water temperatures: March 1951 to September 1956.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 875 micromhos Mar. 12; minimum daily, 525 micromhos June 17.
Percent sodium: Maximum, 47 Oct. 1-31, Aug. 1-31; minimum, 35 Mar. 14-21, 29.
EXTREMES, 1951-56.--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, 35 Mar. 14-21, 29, 1956.
REMARKS.--Values reported for dissolved solids are residues on evaporation at 180°C. Daily samples for chemical analysis composited by discharge. Composite periods normally identical to those of Platte River at Brady, Nebr. Records of specific conductance of daily samples available in district office at Lincoln, Nebr. Records of discharge for water year October 1955 to September 1956 given in reports of State Engineer.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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. 1-31, 1955 .	70,860	--	3.54		3.09	--	3.59	2.81	--	--	--	--	450	0.61	43,220	47	2.3	673	8.2
Nov. 1-15.....	30,090	--	3.60		2.74	--	3.54	2.69	--	--	--	--	429	.58	17,450	43	2.0	640	7.9
Nov. 16-19.....	6,770	--	3.96		3.18	--	3.79	3.04	--	--	--	--	465	.63	4,270	45	2.3	708	7.7
Nov. 20-27	16,080	--	3.66		2.70	--	3.47	2.54	--	--	--	--	416	.57	9,170	42	2.0	626	7.9
Nov. 28-Dec. 1	7,160	--	4.12		3.00	--	3.90	3.02	--	--	--	--	467	.64	4,580	42	2.1	712	7.9
Dec. 2-16.....	27,270	32	2.74	1.26	3.09	0.25	3.80	3.00	0.54	0.03	0.03	0.14	473	.64	17,450	42	2.2	705	8.0
Dec. 17-Jan. 12, 1956	50,350	--	4.08		2.78	--	3.72	2.94	--	--	--	--	459	.62	31,220	41	1.9	680	8.0
Jan. 13.....	1,790	--	4.04		2.78	--	3.64	2.94	--	--	--	--	455	.62	1,110	41	2.0	676	8.0
Jan. 14-16	4,340	--	4.24		2.78	--	3.79	2.94	--	--	--	--	465	.63	2,730	40	1.9	693	8.0
Jan. 17-20	6,930	--	4.44		3.31	--	3.92	3.39	--	--	--	--	506	.69	4,780	43	2.2	762	8.0
Jan. 21-Feb. 18 .	44,740	--	4.36		3.05	--	3.75	3.31	--	--	--	--	490	.67	29,980	41	2.1	729	8.1
Feb. 14-29.....	28,230	--	4.36		2.78	--	3.59	3.25	--	--	--	--	478	.65	18,350	39	1.9	708	8.1
Mar. 1-5	8,800	--	4.16		2.57	--	3.51	2.94	--	--	--	--	450	.61	5,370	38	1.8	670	8.1
Mar. 6-11	9,800	--	4.22		2.48	--	3.49	2.89	--	--	--	--	456	.62	6,080	37	1.7	666	8.1
Mar. 12-13.....	3,100	--	4.94		3.22	--	3.77	4.02	--	--	--	--	545	.74	2,290	39	2.1	809	8.1

PLATTE RIVER BASIN--Continued

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

Chemical analyses, water year October 1955 to September 1956--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 (micromhos 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. 14-21, 1956	12,500	43	2.94	1.22	2.39	0.24	3.36	3.06	0.48	0.02	0.04	0.14	454	0.62	7,750	35	1.6	655	8.0
Mar. 22	1,500	--	4.08		2.26	--	3.38	2.69	--	--	--	--	412	.56	840	36	1.6	632	8.1
Mar. 23-28.....	8,490	--	4.14		2.31	--	3.36	2.83	--	--	--	--	445	.61	5,180	36	1.6	648	8.1
Mar. 29	1,410	--	4.30		2.35	--	3.51	2.85	--	--	--	--	456	.62	874	35	1.6	654	8.1
Mar. 30-Apr. 29	63,470	--	4.74		3.05	--	3.41	4.02	--	--	--	--	531	.72	45,700	39	2.0	780	7.9
Apr. 30-May 24..	67,500	--	4.46		3.22	--	3.41	4.02	--	--	--	--	523	.71	47,930	42	2.1	777	7.8
May 25-June 16..	64,560	--	3.88		3.18	--	3.43	3.46	--	--	--	--	473	.64	41,320	45	2.3	731	7.9
June 17-20	14,160	--	3.72		2.48	--	3.20	2.77	--	--	--	--	419	.57	8,070	40	1.8	636	7.9
June 21-July 3...	44,670	20	2.54	1.26	3.13	.25	3.54	3.08	.54	.03	.03	.15	451	.61	27,250	44	2.3	701	8.1
July 4-31	113,400	--	3.72		3.13	--	3.59	3.19	--	--	--	--	455	.62	70,310	46	2.3	707	8.0
Aug. 1-31.....	121,800	--	3.60		3.18	--	3.56	3.08	--	--	--	--	450	.61	74,300	47	2.4	690	7.8
Sept. 1-30	94,470	24	2.25	1.39	3.26	.24	3.51	3.19	.59	.03	.03	.17	449	.61	57,630	46	2.4	693	7.8
Total or weighted average [a]	924,200	--	3.94		3.05	--	3.56	3.23	--	--	--	--	466	0.63	585,200	44	2.2	706	--

a Represents 100 percent of runoff for water year October 1955 to September 1956.

SOUTH PLATTE RIVER AT JULESBURG, COLO.

LOCATION.--At gaging station at bridge on State Highway 51, 0.5 mile southeast of Julesburg, Sedgwick County, 3 miles (revised) 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 1956.
Water temperatures: October 1945 to September 1956.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 2,160 micromhos Feb. 2; minimum daily, 628 micromhos June 18.
Percent sodium: Maximum, 36 Jan. 31 to Feb. 15, Mar. 1-16; minimum, 29 Sept. 14-17.
EXTREMES, 1945-56.--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, Sept. 14-17, 1956.
REMARKS.--Values reported for dissolved solids are residues on evaporation at 180°C. Records of specifc conductance of daily samples available in district office at Lincoln, Nebr. Records of discharge for water year October 1955 to September 1956 given in WSP 1440.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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. 1-31, 1955 ..	2,950	--	14.22		7.40	--	6.15	--	--	--	--	--	1,490	2.03	5,990	34	2.8	1,910	7.5
Nov. 1-30	5,940	--	14.98		7.57	--	6.57	--	--	--	--	--	1,540	2.09	12,410	34	2.8	1,990	7.3
Dec. 1-31	6,980	41	11.03	4.11	7.53	0.47	6.36	14.68	2.03	0.02	0.06	0.26	1,560	2.12	14,800	33	2.7	1,990	7.5
Jan. 1-30, 1956 ..	7,690	--	14.48		7.74	--	4.95	--	--	--	--	--	1,530	2.08	16,000	35	2.9	1,940	7.6
Jan. 31-Feb. 15..	5,660	--	14.78		8.27	--	5.08	--	--	--	--	--	1,600	2.18	12,340	36	3.0	2,020	7.8
Feb. 16-29.....	5,870	--	14.52		7.96	--	4.97	--	--	--	--	--	1,540	2.09	12,270	35	3.0	1,970	7.8
Mar. 1-16.....	5,150	--	14.04		7.79	--	4.79	--	--	--	--	--	1,500	2.04	10,510	36	2.9	1,910	7.9
Mar. 17-31.....	3,360	36	9.03	3.97	7.00	.36	4.52	13.95	1.78	.03	.05	.22	1,390	1.89	6,350	34	2.7	1,800	8.0
Apr. 1-15	2,120	--	13.00		6.70	--	4.54	--	--	--	--	--	1,470	2.00	4,240	34	2.6	1,770	8.0
Apr. 16-30.....	799	--	12.76		6.74	--	4.23	--	--	--	--	--	1,440	1.96	1,570	35	2.7	1,760	7.9
May 1-26	1,360	--	12.42		6.44	--	3.98	--	--	--	--	--	1,380	1.88	2,560	34	2.6	1,790	7.9
May 27	93	--	5.14		2.78	--	2.33	--	--	--	--	--	564	.77	72	35	1.7	800	7.8
May 28-June 17 ..	1,710	--	13.20		6.35	--	4.31	--	--	--	--	--	1,400	1.90	3,250	32	2.5	1,810	8.0
June 18.....	526	--	4.04		1.83	--	2.49	--	--	--	--	--	429	.58	305	31	1.3	628	7.4
June 19-July 18 ..	1,780	35	8.63	3.61	6.79	.43	3.82	13.28	1.75	.04	.05	.24	1,320	1.80	3,200	35	2.7	1,730	8.1
July 19-31.....	543	--	12.46		6.44	--	3.80	--	--	--	--	--	1,360	1.85	1,000	34	2.6	1,750	7.7

PLATTE RIVER BASIN--Continued

SOUTH PLATTE RIVER AT JULESBURG, COLO.--Continued

Chemical analyses, water year October 1955 to September 1956--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 (micromhos 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				
Aug. 1, 1956	48	--	5.08		2.22	--	2.95	--	--	--	--	--	495	0.67	32	30	1.4	738	7.6
Aug. 2	177	--	7.24		3.83	--	2.80	--	--	--	--	--	776	1.06	188	34	2.0	1,080	7.7
Aug. 3-31	1,680	--	13.00		6.53	--	4.20	--	--	--	--	--	1,410	1.92	3,230	33	2.6	1,800	8.0
Sept. 1-13	452	45	9.13	3.55	6.70	0.59	3.74	14.84	1.83	0.03	0.16	0.24	1,370	1.86	841	34	2.7	1,760	8.2
Sept. 14-17	115	--	11.04		4.61	--	3.47	--	--	--	--	--	1,160	1.58	182	29	2.0	1,470	7.8
Sept. 18-27	300	--	13.22		6.66	--	4.06	--	--	--	--	--	1,440	1.96	588	34	2.6	1,840	7.9
Sept. 28-30	89	--	12.94		6.53	--	4.33	--	--	--	--	--	1,390	1.89	168	34	2.6	1,770	7.8
Total or weighted average[a]	55,390	--	14.02		7.40	--	5.15	--	--	--	--	--	1,490	2.03	112,100	35	2.8	1,900	--

a Represents 100 percent of runoff for water year October 1955 to September 1956.

REPUBLICAN RIVER ABOVE MEDICINE CREEK, AT CAMBRIDGE, NEBR.

LOCATION.--At bridge south of Cambridge, Furnas County, on State Highway 47, 1 mile upstream from gaging station at Cambridge, a quarter of a mile upstream from confluence with 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 1956.
Water temperatures: December 1950 to September 1956.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 659 micromhos Nov. 17; minimum daily, 304 micromhos Aug. 17.
Percent sodium: Maximum, 30 Sept. 21-30; minimum, 12 July 6.
EXTREMES, 1950-56.--Specific conductance (1951-56): Maximum daily, 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 at 180°C. Daily samples for chemical analysis composited by discharge. Records of specific conductance of daily samples available in district 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 1955 to September 1956 given in WSP 1440.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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. 1-31, 1955 ..	2,910	--	4.18		1.22	--	4.62	0.87	--	--	--	--	356	0.48	1,400	22	0.8	540	8.0
Nov. 1-16.....	3,380	--	4.36		1.22	--	a4.87	.69	--	--	--	--	358	.49	1,660	22	.8	541	8.2
Nov. 17-19.....	495	--	5.02		1.44	--	5.64	.87	--	--	--	--	416	.57	282	22	.9	626	8.0
Nov. 20-27.....	2,440	--	4.42		1.09	--	4.62	.71	--	--	--	--	365	.50	1,220	20	.7	545	7.9
Nov. 28-Dec. 21..	4,000	61	3.39	1.47	1.26	0.38	5.38	.85	0.27	0.05	0.09	0.14	399	.54	2,160	19	.8	598	8.0
Dec. 22-Jan. 17, 1956	7,400	--	4.28		1.09	--	4.65	.65	--	--	--	--	352	.48	3,550	20	.7	527	7.8
Jan. 18-31.....	2,830	--	4.60		1.09	--	4.88	.73	--	--	--	--	373	.51	1,440	19	.7	556	7.8
Feb. 1-13.....	3,210	--	4.42		1.13	--	4.67	.69	--	--	--	--	352	.48	1,540	20	.8	541	7.9
Feb. 14-29	6,480	--	3.98		1.00	--	4.31	--	--	--	--	--	321	.44	2,850	20	.7	495	8.0
Mar. 1-31	10,160	58	2.89	1.39	1.04	.33	4.69	.65	.20	.05	.07	.15	359	.49	4,980	18	.7	530	8.2
Apr. 1-19.....	7,110	--	4.28		1.13	--	4.74	.90	--	--	--	--	362	.49	3,480	20	.8	539	8.2
Apr. 20-30.....	2,120	--	4.50		1.35	--	a4.81	.94	--	--	--	--	381	.52	1,100	23	.9	572	8.3
May 1-21	2,550	--	4.24		1.31	--	4.74	.90	--	--	--	--	360	.49	1,250	23	.9	554	8.1
May 22-27	133	--	3.74		1.13	--	4.18	.79	--	--	--	--	328	.45	59.9	23	.8	496	7.8

a Includes 0.17 equivalent per million of carbonate (CO_3).

KANSAS RIVER BASIN--Continued

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

Chemical analyses, water year October 1955 to September 1956--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 (micromhos 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				
May 28-30, 1956..	1,550	--	2.68		0.57	--	2.95	0.40	--	--	--	--	238	0.32	496	17	0.5	347	7.7
May 31-June 8....	234	58	2.74	1.28	1.17	0.43	4.52	.75	0.25	0.06	0.04	0.14	364	.50	117	21	.8	537	8.2
June 11-14.....	288	--	2.92		.91	--	3.44	.46	--	--	--	--	272	.37	107	23	.8	407	7.7
June 17-18.....	2,900	--	2.72		.65	--	3.28	.18	--	--	--	--	229	.31	899	19	.6	349	7.6
June 19-21.....	12,000	--	2.44		.40	--	2.75	.27	--	--	--	--	203	.28	3,360	13	.4	309	7.4
June 22-July 1....	4,430	--	3.44		.91	--	3.84	.67	--	--	--	--	305	.41	1,820	20	.7	456	7.7
July 2-5	2,840	--	2.90		.74	--	3.52	.21	--	--	--	--	249	.34	966	20	.6	372	7.6
July 6	3,550	--	2.64		.39	--	2.98	.17	--	--	--	--	205	.28	994	12	.3	314	7.7
July 7-9	2,710	--	2.84		.52	--	3.11	.44	--	--	--	--	234	.32	867	15	.4	363	7.8
July 10-27.....	2,620	--	3.54		1.26	--	3.90	1.04	--	--	--	--	325	.44	1,150	26	.9	496	7.8
July 31-Aug. 16 ..	3,570	--	3.02		.87	--	3.34	.69	--	--	--	--	258	.35	1,250	22	.7	408	7.7
Aug. 17-20.....	1,260	--	2.52		.57	--	2.85	.33	--	--	--	--	208	.28	353	18	.5	320	7.5
Aug. 21-30.....	674	51	2.50	1.08	1.09	.38	4.00	.73	.21	.04	.05	.13	321	.44	297	22	.8	478	7.9
Aug. 31-Sept. 20 .	534	--	3.76		1.31	--	4.13	--	--	--	--	--	337	.46	246	26	1.0	518	7.7
Sept. 21-30	87.3	--	3.38		1.44	--	3.82	--	--	--	--	--	322	.44	38.4	30	1.1	504	7.9
Total or weighted average b	94,470	--	3.72		0.91	--	4.10	0.60	--	--	--	--	310	0.42	39,930	20	0.7	468	--

b Includes estimates where data are missing. Represents 100 percent of runoff for water year October 1955 to September 1956.

ARKANSAS RIVER BASIN

ARKANSAS RIVER BELOW JOHN MARTIN RESERVOIR, COLO.

LOCATION.--At gaging station, 1 mile upstream from Caddoa Creek, 1¾ 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 1956 (daily samples).
Water temperatures: January 1951 to September 1956.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 4,540 micromhos Feb. 6; minimum daily, 871 micromhos June 11.
Percent sodium: Maximum, 42 July 13; minimum, 24 Jan. 11-31.
EXTREMES, 1951-56.--Specific conductance: Maximum daily, 5,180 micromhos Apr. 21, 1955; minimum daily, 830 micromhos June 19, 1952.
Percent sodium: Maximum, 42 Feb. 1-10, 1954, July 13, 1956; minimum, 23 July 1-10, 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 Albuquerque, N. Mex. Records of discharge for water year October 1955 to September 1956 given in WSP 1441.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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, 1955 ..	7,440	3.9	8.33	4.52	5.26	0.19	2.38	15.12	0.71	0.03	0.03	0.16	1,270	1.73	12,870	29	2.1	1,560	7.5
Oct. 11-20.....	5,470	--	8.38	4.77	5.48	--	2.38	--	--	--	--	--	1,280	1.74	9,520	29	2.1	1,580	7.9
Oct. 21-31.....	8,640	--	8.53	4.85	5.74	--	2.38	--	--	--	--	--	1,310	1.78	15,380	30	2.2	1,620	7.9
Nov. 1-30	380	--	13.67	12.34	17.10	--	5.26	--	--	--	--	--	2,830	3.85	1,460	40	4.7	3,340	8.0
Dec. 1-10	49	--	15.07	13.32	17.57	--	6.44	--	--	--	--	--	3,100	4.22	207	38	4.7	3,550	7.6
Dec. 11-20.....	57	--	14.97	13.98	17.92	--	6.90	--	--	--	--	--	3,160	4.30	245	38	4.7	3,560	7.7
Dec. 21-31.....	48	--	14.97	14.15	18.53	--	7.03	--	--	--	--	--	3,240	4.41	212	39	4.9	3,650	7.7
Jan. 1-10, 1956 ..	57	16	14.67	15.21	18.92	.21	7.33	37.68	3.10	.03	.01	.44	3,300	4.49	256	39	4.9	3,640	8.0
Jan. 11-20.....	57	--	14.47	16.61	10.00	--	7.34	--	--	--	--	--	3,390	4.61	263	24	2.6	3,680	7.8
Jan. 21-31.....	74	--	13.67	14.64	9.14	--	6.16	--	--	--	--	--	3,220	4.38	324	24	2.4	3,420	7.8
Feb. 1-10.....	66	--	17.81	15.63	11.14	--	5.28	--	--	--	--	--	3,780	5.14	339	25	2.7	4,040	7.6
Feb. 11-20.....	59	--	14.27	13.30	9.74	--	6.92	--	--	--	--	--	3,320	4.52	267	26	2.6	3,620	7.8
Feb. 21-29.....	49	--	13.27	16.86	10.22	--	6.00	--	--	--	--	--	3,320	4.52	221	25	2.6	3,650	7.9
Mar. 1-31	149	--	14.77	15.38	19.44	--	6.85	--	--	--	--	--	3,390	4.61	687	39	5.0	3,780	7.9

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ARKANSAS RIVER BASIN--Continued

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

Chemical analyses, water year October 1955 to September 1956--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 (micromhos 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, 1956	3.6	21	14.57	15.38	20.53	0.23	5.90	40.39	3.41	0.04	0.01	0.85	3,440	4.68	17	40	5.3	3,850	7.7
Apr. 2-10	13,300	5.4	11.48	7.07	9.48	.20	3.00	23.53	1.49	.04	.04	.32	1,930	2.62	34,850	34	3.1	2,280	7.8
Apr. 11-29	36,260	--	11.18	7.90	9.87	--	2.85	--	--	--	--	--	1,980	2.69	97,540	34	3.2	2,370	7.8
Apr. 30-May 3	1,000	--	14.67	11.18	15.14	--	3.52	--	--	--	--	--	2,890	3.93	3,930	37	4.2	3,240	7.7
May 3	167	--	17.42	13.65	20.10	--	3.47	--	--	--	--	--	3,590	4.88	815	39	5.1	3,950	7.3
May 4-15	847	--	17.91	16.12	21.66	--	3.61	--	--	--	--	--	3,880	5.28	4,470	39	5.3	4,210	7.7
May 16-19	222	--	17.02	14.47	19.49	--	3.36	--	--	--	--	--	3,540	4.81	1,070	38	4.9	3,890	7.7
May 20-23	163	--	15.87	13.90	18.31	--	3.57	--	--	--	--	--	3,330	4.53	738	38	4.7	3,710	7.7
May 24-28	5,550	--	14.67	9.95	10.14	--	3.64	--	--	--	--	--	2,420	3.29	18,260	29	2.9	2,700	7.6
May 29-31	2,490	--	5.79	3.13	3.35	--	2.88	--	--	--	--	--	816	1.11	2,460	38	1.6	1,100	7.8
June 1-9	8,430	--	5.74	2.47	2.78	--	3.44	--	--	--	--	--	684	.93	7,840	25	1.4	955	7.7
June 10	928	--	6.24	3.13	3.87	--	3.18	--	--	--	--	--	844	1.15	1,070	29	1.8	1,150	7.4
June 11	1,200	--	5.19	2.30	2.44	--	3.26	--	--	--	--	--	609	.83	996	25	1.3	871	7.5
June 12-27	15,220	--	5.49	2.63	2.91	--	3.21	--	--	--	--	--	688	.94	14,310	26	1.4	963	7.7
June 28-30	3,210	--	7.04	4.11	4.65	--	3.79	--	--	--	--	--	1,000	1.36	4,370	29	2.0	1,320	7.7
July 1-2, 5-7	3,230	13	7.73	3.78	4.96	.17	3.11	12.35	.93	.04	.11	.18	1,110	1.51	4,880	30	2.1	1,430	7.7
July 3	1,150	--	12.33	6.58	7.79	--	3.54	--	--	--	--	--	1,860	2.53	2,910	29	2.5	2,150	7.4
July 4	1,330	--	8.83	5.10	5.74	--	3.87	--	--	--	--	--	1,360	1.85	2,460	29	2.2	1,670	7.3
July 8-10	754	15	11.88	6.41	9.35	.19	3.75	21.86	1.72	.04	.13	.28	1,890	2.57	1,940	34	3.1	2,260	7.9
July 11-12	341	--	14.97	10.28	14.40	--	4.47	--	--	--	--	--	2,670	3.63	1,240	36	4.1	3,050	7.8
July 13	262	--	9.53	5.18	10.61	--	3.25	--	--	--	--	--	1,670	2.27	595	42	3.9	2,130	7.4
July 14-18	535	--	15.77	11.51	16.01	--	3.88	--	--	--	--	--	2,930	3.98	2,130	37	4.3	3,290	7.7
July 19-20	952	--	13.07	9.87	10.79	--	5.26	--	--	--	--	--	2,270	3.09	2,940	32	3.2	2,590	7.7
July 21-30	11,490	--	8.73	4.85	4.78	--	4.21	--	--	--	--	--	1,190	1.62	18,610	26	1.8	1,510	7.7
July 31	268	--	15.57	10.94	14.05	--	6.23	--	--	--	--	--	2,700	3.67	984	35	3.9	3,110	7.2
Aug. 1-2	710	--	13.87	8.96	11.31	--	4.64	--	--	--	--	--	2,260	3.07	2,180	33	3.4	2,630	7.6
Aug. 3-8	3,710	--	10.68	6.58	6.35	--	4.52	--	--	--	--	--	1,550	2.11	7,830	27	2.2	1,880	7.5
Aug. 9	97	--	13.87	9.38	12.53	--	3.88	--	--	--	--	--	2,350	3.20	310	35	3.7	2,760	7.4
Aug. 10-14	448	--	17.02	12.01	17.01	--	4.29	--	--	--	--	--	3,120	4.24	1,900	37	4.5	3,480	7.9
Aug. 15	127	--	9.73	7.15	10.40	--	3.26	--	--	--	--	--	1,790	2.43	309	38	3.6	2,210	7.3
Aug. 16-17	135	--	15.67	12.58	18.27	--	3.61	--	--	--	--	--	3,150	4.28	578	39	4.9	3,520	7.7

Aug. 18-19, 1956	1,940	--	6.74	3.21	3.92	--	3.36	--	--	--	--	--	877	1.19	2,310	28	1.8	1,190	7.4
Aug. 20-21	486	--	14.17	10.86	15.49	--	4.31	--	--	--	--	--	2,710	3.69	1,790	38	4.4	3,110	7.8
Aug. 22-31	17,220	--	6.49	3.13	3.18	--	2.28	--	--	--	--	--	842	1.15	19,800	25	1.5	1,110	7.7
Sept. 1	1,870	--	7.48	3.87	4.44	--	2.26	--	--	--	--	--	1,030	1.40	2,620	28	1.9	1,360	8.2
Sept. 2	785	--	10.38	5.92	6.96	--	3.87	--	--	--	--	--	1,540	2.09	1,640	30	2.4	1,920	7.3
Sept. 3	131	--	16.92	11.27	15.31	--	5.62	--	--	--	--	--	2,950	4.01	525	35	4.1	3,320	7.2
Sept. 4-10	470	--	18.31	13.57	19.27	--	4.74	--	--	--	--	--	3,470	4.72	2,220	38	4.8	3,810	7.7
Sept. 11-30	819	--	19.21	14.47	20.71	--	5.15	--	--	--	--	--	3,710	5.05	4,140	38	5.0	4,040	7.8
Total or weighted average	160,900	--	9.28	5.67	6.83	--	3.11	--	--	--	--	--	1,470	2.00	321,800	31	2.5	1,800	--

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, and 5.9 miles upstream from Walnut River.
DRAINAGE AREA.--43,713 square miles of which 7,607 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: October 1951 to September 1956.
Water temperatures: October 1951 to September 1956.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 4,600 micromhos Sept. 22; minimum daily, 259 micromhos Oct. 4.
Percent sodium: Maximum, 75 July 1-4, 27-31, Sept. 11-20; minimum, 43 Oct. 1-6.
EXTREMES, 1951-56.--Specific conductance: Maximum daily, 4,720 micromhos Oct. 5, 1953; minimum daily 259 micromhos Oct. 4, 1955.
Percent sodium: Maximum, 79 April 28, 1955; minimum, 36 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 1955 to September 1956 given in WSP 1441.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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. 1-6, 1955	159,000	--	1.30	0.38	1.26		1.34	0.46	1.07	--	0.07	--	172	0.23	37,240	43	1.4	298	7.5
Oct. 7-8	16,340	--	2.15	1.05	2.63		1.97	1.02	2.76	--	.08	--	348	.47	7,740	45	2.1	612	8.0
Oct. 9-10	8,830	--	2.79	1.01	4.88		2.43	1.52	4.65	--	.08	--	522	.71	6,270	56	3.5	912	8.1
Oct. 11-13	8,150	--	3.59	1.21	7.72		2.95	2.27	7.19	--	.11	--	749	1.02	8,310	62	5.0	1,310	8.1
Oct. 14-20	12,480	--	4.64	1.86	11.33		3.74	3.27	10.72	--	.10	--	1,070	1.46	18,170	64	6.3	1,880	7.9
Oct. 21-31	14,760	18	5.09	2.41	12.96	0.17	3.87	3.91	12.97	0.01	.11	0.40	1,280	1.74	25,710	63	6.7	2,240	7.5
Nov. 1-10	10,880	--	5.39	2.51	15.83	--	4.13	4.06	14.66	--	.12	--	1,420	1.93	21,030	67	8.0	2,360	7.6
Nov. 11-20	9,540	--	5.59	2.61	15.09	--	4.29	4.08	14.95	--	.16	--	1,430	1.94	18,570	65	7.5	2,480	7.7
Nov. 21-30	8,950	--	5.69	2.61	15.44	--	4.46	4.12	15.79	--	.15	--	1,480	2.01	18,020	65	7.6	2,490	7.8
Dec. 1-10	8,420	--	5.49	2.91	15.49		4.33	4.10	15.23	--	.23	--	1,450	1.97	16,620	65	7.6	2,460	7.9
Dec. 11-20	7,160	--	6.29	2.51	17.90		4.56	4.43	17.48	--	.23	--	1,610	2.19	15,690	67	8.5	2,750	7.8
Dec. 21-22	1,790	--	6.39	2.81	18.04		4.59	4.33	18.05	--	.27	--	1,640	2.23	3,990	66	8.4	2,820	7.9
Dec. 23-31	10,230	--	5.49	3.11	14.27		4.20	4.10	14.38	--	.19	--	1,360	1.85	18,940	62	6.9	2,370	7.8
Jan. 1-10, 1956	10,260	--	6.19	2.61	15.46		4.36	5.62	14.10	--	.18	--	1,480	2.01	20,660	64	7.4	2,550	8.1
Jan. 11-18	7,320	--	7.19	2.21	17.83		4.59	5.54	16.92	--	.18	--	1,640	2.23	16,340	65	8.2	2,800	7.9
Jan. 19-20	1,190	--	7.98	3.22	21.62		5.05	5.89	21.57	--	.31	--	1,970	2.68	3,190	66	9.1	3,370	7.9
Jan. 21-31	9,690	--	5.79	2.81	15.67		4.43	4.37	15.23	--	.24	--	1,440	1.96	19,000	65	7.6	2,540	7.9

Feb. 1-4, 1956 ..	2,620	--	6.59	2.41	17.51	4.39	4.37	17.48	--	0.27	--	1,570	2.14	5,600	66	8.3	2,750	8.2
Feb. 5-10	6,870	--	5.69	2.01	14.10	4.23	3.77	13.54	--	.26	--	1,290	1.75	12,070	65	7.2	2,260	7.9
Feb. 11-16	7,650	--	5.19	2.41	12.67	a3.94	3.77	12.41	--	.15	--	1,190	1.62	12,390	63	6.5	2,110	8.3
Feb. 17-20	4,850	--	6.39	2.21	17.97	b4.16	5.20	17.06	--	.15	--	1,580	2.15	10,430	68	8.7	2,820	8.3
Feb. 21-29	10,170	24	6.39	2.81	17.66 | 0.14	a4.33	5.91	16.64	0.02	.16	0.24	1,660	2.26	22,990	65	8.2	2,720	8.3
Mar. 1-10	10,090	--	6.39	3.41	18.24	4.46	7.06	16.36	--	.16	--	1,650	2.24	22,670	65	8.2	2,780	8.1
Mar. 11-15	4,420	--	5.99	3.41	18.89	4.33	6.60	17.20	--	.16	--	1,660	2.26	9,980	67	8.7	2,840	8.1
Mar. 16-20	4,760	--	5.79	2.91	16.80	4.23	5.89	15.23	--	.15	--	1,500	2.04	9,720	66	8.1	2,520	7.9
Mar. 21-22,24-31.	9,700	--	5.09	3.21	16.34	3.87	5.41	15.23	--	.13	--	1,440	1.96	19,010	66	8.0	2,440	7.7
Mar. 23	1,140	--	4.39	2.21	11.10	3.21	4.41	10.01	--	.14	--	1,060	1.44	1,640	62	6.1	1,880	7.9
Apr. 1-4.....	3,540	--	5.79	3.01	17.61	3.93	5.60	16.78	--	.10	--	1,620	2.20	7,810	67	8.4	2,700	7.8
Apr. 5-6	2,830	--	3.99	1.91	7.79	3.18	3.39	7.05	--	.07	--	856	1.16	3,300	57	4.5	1,420	7.7
Apr. 7-10	3,760	--	5.39	2.81	15.95	3.74	5.00	15.23	--	.18	--	1,500	2.04	7,680	66	7.9	2,500	7.6
Apr. 11-14	3,980	--	4.99	2.41	12.98	3.67	4.46	12.13	--	.12	--	1,290	1.75	6,990	64	6.7	2,120	7.6
Apr. 15-20	5,190	--	5.39	2.71	15.75	4.00	4.79	14.95	--	.11	--	1,490	2.03	10,520	66	7.8	2,450	7.6
Apr. 21-30	7,660	--	5.89	2.71	17.34	4.13	4.91	16.78	--	.12	--	1,620	2.20	16,880	67	8.4	2,690	7.4
May 1-4	3,260	--	5.49	3.51	15.65	4.06	4.64	15.79	--	.16	--	1,470	2.00	6,520	63	7.4	2,570	8.2
May 5	1,060	--	4.89	3.11	20.64	b3.64	4.58	20.30	--	.12	--	1,700	2.31	2,450	72	10	2,930	8.3
May 6-10	4,790	--	4.79	2.81	14.45	3.77	4.08	14.10	--	.10	--	1,330	1.81	8,680	66	7.4	2,320	8.0
May 11-20	6,980	--	5.44	2.96	18.28	4.20	4.56	17.77	--	.15	--	1,600	2.18	15,210	69	8.9	2,790	7.9
May 21-28	4,740	--	5.74	3.26	18.98	4.33	4.60	18.89	--	.16	--	1,690	2.30	10,910	68	8.9	2,950	8.0
May 29-31	2,040	--	4.89	3.11	15.64	3.84	3.91	15.79	--	.10	--	1,420	1.93	3,940	66	7.8	2,490	7.9
June 1-4	2,650	--	5.39	2.11	18.36	3.84	4.27	17.62	--	.13	--	1,510	2.05	5,440	71	9.5	2,680	8.0
June 5 10	4,500	--	4.99	1.91	16.31	3.77	3.98	15.37	--	.09	--	1,350	1.84	8,260	70	8.9	2,420	7.9
June 11-20	4,580	--	5.19	2.41	20.37	3.61	4.43	19.74	--	.19	--	1,660	2.26	10,350	73	10	2,940	8.0
June 21-30	3,010	13	5.19	2.81	20.79 | .21	3.51	4.31	21.15	.06	.19	.22	1,770	2.41	7,250	72	10	3,060	7.8

a Includes 0.07 equivalent per million of carbonate (CO_3).
b Includes 0.13 equivalent per million of carbonate (CO_3).

ARKANSAS RIVER BASIN--Continued

ARKANSAS RIVER AT ARKANSAS CITY, KANS.--Continued

Chemical analyses, water year October 1955 to September 1956--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 (micromhos 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				
July 1-4, 1956	1,230	--	4.79	2.21	20.97		3.11	3.81	20.87	--	0.18	--	1,650	2.24	2,760	75	11	2,920	8.0
July 5, 10	2,650	--	2.45	1.05	7.10		2.43	1.35	6.77	--	.05	--	632	.86	2,280	67	5.4	1,150	7.9
July 6 9	2,830	--	3.79	1.31	12.68		2.72	2.75	12.13	--	.18	--	1,040	1.41	4,010	71	7.9	1,860	7.8
July 11-12	1,450	--	3.39	1.01	8.49		2.88	2.08	7.84	--	.09	--	772	1.05	1,520	66	5.7	1,370	7.9
July 13-20	4,600	--	4.19	1.81	13.49		3.41	3.00	12.97	--	.11	--	1,160	1.58	7,260	69	7.8	2,050	7.7
July 21-26	2,530	--	4.89	1.81	16.76		3.44	3.50	16.36	--	.16	--	1,420	1.93	4,890	71	9.2	2,450	8.0
July 27-31	1,450	--	4.59	2.51	21.49		3.25	3.91	21.29	--	.14	--	1,700	2.31	3,360	75	11	2,990	8.0
Aug. 1-10	1,480	--	5.99	3.31	24.64		4.13	4.31	25.38	--	.12	--	2,090	2.84	4,220	73	11	3,570	8.1
Aug. 11-20	1,200	--	6.89	3.31	26.50		4.72	4.23	27.64	--	.11	--	2,250	3.06	3,680	72	12	3,820	8.1
Aug. 21-22	341	--	6.39	2.81	22.48		4.52	3.85	23.12	--	.19	--	1,940	2.64	901	71	10	3,280	8.1
Aug. 23-31	1,070	--	7.19	3.51	27.58		4.92	4.31	29.05	--	--	--	2,360	3.21	3,420	72	12	3,960	8.1
Sept. 1-10	756	18	7.98	4.02	28.49	0.25	5.11	4.66	31.58	0.04	--	0.28	2,530	3.44	2,600	70	12	4,300	8.2
Sept. 11-20	619	--	6.99	3.51	31.06		3.93	4.64	32.99	--	--	--	2,440	3.32	2,060	75	14	4,380	7.7
Sept. 21-30	555	--	7.48	3.82	31.89		4.69	4.66	33.84	--	--	--	2,520	3.43	1,910	74	13	4,470	7.6
Total or weighted average	454,600	--	3.84	1.73	9.87		2.98	2.87	9.59	--	--	--	936	1.27	579,200	64	5.9	1,610	--

ARKANSAS RIVER AT RALSTON, OKLA.

LOCATION.--At gaging station at bridge on State Highway 18 at Ralston, Pawnee County, 2 miles downstream from Salt Creek, and 2 miles upstream from Grayhorse Creek.
DRAINAGE AREA.--54,465 square miles, of which 7,615 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: January 1950 to September 1956.
Water temperatures: January 1950 to September 1956.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 5,210 micromhos July 28; minimum daily, 251 micromhos Oct. 5.
Percent sodium: Maximum, 83 July 28-31; minimum, 47 Oct. 3-6.
EXTREMES, January 1950 to September 1956.--Specific conductance: Maximum daily, 7,510 micromhos Sept. 14, 1955; minimum daily, 251 micromhos Oct. 5, 1955.
Percent sodium: Maximum, 86 May 30, 1954; minimum, 36 July 18-20, 1950.
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 1955 to September 1956 given in WSP 1441.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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. 1-2, 8, 1955.	52,880	--	2.54	0.76	7.32		2.03	1.31	7.19	--	0.09	--	633	0.86	45,560	69	5.7	1,180	7.9
Oct. 3-6.....	332,400	--	1.10	.42	1.34		1.34	.31	1.13	--	.08	--	166	.23	75,120	47	1.5	297	7.7
Oct. 7.....	58,710	--	1.35	.41	3.20		1.21	.56	3.10	--	.09	--	308	.42	24,620	65	3.4	562	7.6
Oct. 9-10.....	35,940	--	2.79	.91	11.31		1.84	1.81	11.28	--	.08	--	919	1.25	44,960	75	8.3	1,680	8.0
Oct. 11-20.....	65,180	13	3.99	1.81	15.01	0.16	2.66	2.98	16.36	0.01	.04	0.16	1,350	1.84	119,800	72	8.8	2,450	7.4
Oct. 21-31.....	30,640	--	3.99	2.21	14.44	--	2.72	3.21	14.24	--	.05	--	1,270	1.73	52,980	70	8.2	2,150	7.9
Nov. 1-10.....	17,980	--	4.59	2.81	15.92	--	3.34	3.58	16.36	--	.05	--	1,420	1.93	34,760	68	8.3	2,420	7.7
Nov. 11-20.....	14,800	--	5.29	3.01	17.31	--	4.06	3.60	16.92	--	.06	--	1,510	2.05	30,430	68	8.5	2,310	7.8
Nov. 21-30.....	12,580	--	5.79	2.61	16.62	--	4.20	3.73	17.06	--	.07	--	1,530	2.08	26,210	66	8.1	2,700	7.8
Dec. 1-10.....	11,930	--	5.69	3.11	16.73		4.26	3.83	17.34	--	.10	--	1,510	2.05	24,520	66	8.0	2,640	8.2
Dec. 11-20.....	10,580	--	5.79	2.71	16.60		4.29	3.89	16.78	--	.14	--	1,490	2.03	21,460	66	8.1	2,530	8.2
Dec. 21-31.....	12,560	--	5.89	2.81	16.66		4.36	3.81	17.06	--	.13	--	1,500	2.04	25,650	66	8.0	2,680	8.0
Jan. 1-10, 1956..	12,310	--	5.89	2.61	15.54		4.26	4.31	15.37	--	.10	--	1,440	1.96	24,120	65	7.5	2,510	8.0
Jan. 11-20.....	10,230	--	5.99	3.21	16.06		4.43	4.68	16.07	--	.08	--	1,520	2.07	21,160	64	7.5	2,680	8.0
Jan. 21-31.....	11,640	--	6.09	3.11	16.34		4.39	4.10	16.92	--	.13	--	1,520	2.07	24,090	64	7.6	2,700	7.9
Feb. 1-10.....	12,890	21	5.74	3.06	15.05	.12	4.29	3.71	15.79	.01	.16	.29	1,460	1.99	25,620	63	7.2	2,510	8.1
Feb. 11-20.....	16,120	--	5.49	2.51	14.65		4.16	3.69	14.66	--	.14	--	1,340	1.82	29,400	65	7.3	2,360	7.8
Feb. 21-29.....	13,140	--	5.99	2.91	20.11		4.13	5.08	19.74	--	.06	--	1,700	2.31	30,410	69	9.5	2,920	8.2

ARKANSAS RIVER BASIN--Continued

ARKANSAS RIVER AT RALSTON, OKLA.--Continued

Chemical analyses, water year October 1955 to September 1956--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 (micromhos 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, 1956..	12,630	--	5.39	3.31	21.42		3.57	5.93	20.59	--	0.03	--	1,780	2.42	30,600	71	10	3,010	8.1
Mar. 11-20	11,100	--	5.59	3.41	20.01		4.06	5.73	19.18	--	.04	--	1,700	2.31	25,690	69	9.4	2,880	8.2
Mar. 21-31	13,470	--	5.89	2.51	17.53		3.67	4.91	17.34	--	.01	--	1,570	2.14	28,800	68	8.6	2,980	7.9
Apr. 1-8	9,550	--	5.39	3.11	18.17		3.54	4.89	18.19	--	.05	--	1,680	2.28	21,850	68	8.8	2,840	7.6
Apr. 9-10	3,270	--	4.29	2.21	11.70		3.28	3.54	11.28	--	.10	--	1,150	1.56	5,120	64	6.5	1,920	7.6
Apr. 11-20	13,150	--	4.39	2.81	16.99		2.82	4.39	16.92	--	.06	--	1,550	2.11	27,750	70	9.0	2,570	7.5
Apr. 21-30	10,360	--	4.89	3.11	17.89		3.21	4.60	18.05	--	.03	--	1,660	2.26	23,410	69	8.9	2,760	7.1
May 1-10	10,250	--	4.69	3.31	18.00		3.34	4.25	18.33	--	.08	--	1,580	2.15	22,050	69	9.0	2,730	7.9
May 11-20	9,040	--	4.89	3.11	17.65		3.34	4.18	18.05	--	.08	--	1,580	2.15	19,440	69	8.8	2,760	7.8
May 21-31	7 190	12	4.79	2.81	20.18	0.15	3.15	4.37	19.46	0.02	.11	0.10	1,670	2.27	16,350	72	10	2,890	7.8
June 1-5	3,440	--	5.09	2.31	19.89		3.21	4.21	19.74	--	.13	--	1,620	2.20	7,590	73	10	2,860	7.9
June 6-12	6,550	--	6.39	3.01	24.31		2.43	5.18	25.94	--	.16	--	2,060	2.80	18,360	72	11	3,530	7.6
June 13-15	3,460	--	3.99	2.01	14.53		2.52	3.25	14.66	--	.10	--	1,230	1.67	5,800	71	8.4	2,170	7.7
June 16-20	3,410	--	4.39	1.91	18.82		2.26	3.87	18.89	--	.10	--	1,500	2.04	6,960	75	11	2,650	7.5
June 21-25	2,450	--	4.39	2.61	19.72		2.39	4.06	20.16	--	.11	--	1,630	2.22	5,430	74	11	2,910	7.9
June 26	1,170	--	7.78	3.62	23.88		2.33	4.93	27.78	--	.24	--	2,220	3.02	3,540	68	10	3,710	8.2
June 27-30	4,890	--	3.69	1.51	10.54		2.49	2.14	11.00	--	.11	--	951	1.29	6,320	67	6.5	1,710	8.0
July 1-7	4,660	--	4.39	2.41	17.73		2.62	3.21	18.61	--	.09	--	1,460	1.99	9,260	72	9.6	2,600	7.4
July 8-9	4,560	--	2.69	1.71	6.92		2.39	1.42	7.39	--	.12	--	680	.92	4,220	61	4.7	1,230	8.0
July 10	1,830	--	6.19	2.81	19.49		2.03	3.66	22.70	--	.10	--	1,810	2.46	4,520	68	9.2	3,070	8.1
July 11-20	10,350	--	3.69	2.11	13.61		2.52	2.73	14.10	--	.06	--	1,170	1.59	16,480	70	8.0	2,100	8.1
July 21-25	3,980	--	3.64	1.76	13.73		2.59	2.64	13.82	--	.08	--	1,180	1.60	6,390	72	8.4	2,050	7.9
July 26-27	1,470	--	4.09	2.51	26.63		2.23	3.83	27.07	--	.10	--	2,080	2.83	4,160	80	15	3,580	7.9
July 28-31	2,300	--	4.99	2.81	38.90		2.29	4.93	39.48	--	--	--	2,920	3.97	9,130	83	20	5,030	7.9
Aug. 1-10	3,530	12	4.89	3.71	36.84	.26	2.52	4.91	38.07	.03	--	.12	2,780	3.78	13,350	81	18	4,870	7.5
Aug. 1-20	2,000	--	5.39	3.11	30.77		3.05	4.35	31.87	--	--	--	2,400	3.26	6,530	78	15	4,190	8.0
Aug. 21-31.....	1,570	--	5.59	3.51	26.63		3.21	4.04	28.48	--	--	--	2,080	2.83	4,440	75	12	3,810	7.8
Sept. 1-10	1,050	--	5.69	3.01	26.07		3.08	4.02	27.64	--	.03	--	2,150	2.92	3,080	75	13	3,690	8.0
Sept. 11-20	680	--	5.59	3.21	24.90		3.28	3.89	26.51	--	.02	--	2,090	2.84	1,940	74	12	3,570	8.0
Sept. 21-30	448	16	5.49	3.31	23.36	.15	3.25	3.85	25.66	.02	.03	.18	1,950	2.65	1,190	72	11	3,470	7.8
Total or weighted average	896,400	--	3.04	1.48	9.45		2.34	2.10	9.53	--	--	--	853	1.16	1,041,000	68	6.3	1,500	--

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.--17,852 square miles, of which 4,926 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: October 1952 to September 1956.
Water temperatures: October 1952 to September 1956.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 22,200 micromhos Feb. 22; minimum daily, 438 micromhos Oct. 5.
Percent sodium: Maximum, 91 Feb. 23; minimum, 56 Oct. 5-7.
EXTREMES, 1952-56.--Specific conductance: Maximum daily, 27,400 micromhos Jan. 11, 12, 1953; minimum daily, 438 micromhos Oct. 5, 1955.
Percent sodium: Maximum, 94 Feb. 18-20, 1955; minimum, 56 Oct. 5-7, 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 1955 to September 1956 given in WSP 1441.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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. 1-2, 9-10, 1955	10,790	--	4.09	1.51	14.30		1.97	3.50	14.38	--	0.05	--	1,220	1.66	17,920	72	8.5	2,130	7.6
Oct. 3, 8	28,740	--	2.40	1.00	6.89		2.03	1.35	6.91	--	--	--	629	.86	24,610	67	5.5	1,130	7.6
Oct. 4	83,110	--	1.70	.70	3.14		1.21	.60	3.61	--	.12	--	400	.54	45,250	57	2.9	682	7.5
Oct. 5-7	159,300	--	1.45	.51	2.51		1.51	.62	2.31	--	.03	--	286	.39	62,010	56	1.5	501	7.4
Oct. 11-12	3,250	--	5.39	2.61	23.99		3.08	4.33	24.53	--	.05	--	1,980	2.69	8,750	75	12	3,450	8.1
Oct. 13-15	3,530	--	6.59	3.41	34.13		3.61	5.27	35.25	--	--	--	2,640	3.59	12,690	77	15	4,680	8.0
Oct. 16-20	4,350	--	7.39	4.41	48.09		3.61	6.08	50.20	--	--	--	3,600	4.90	21,330	80	20	6,310	7.9
Oct. 21-31	6,410	24	7.58	5.62	57.42	0.26	3.57	6.87	60.63	0.01	--	0.43	4,340	5.90	37,900	81	22	7,630	8.2
Nov. 1-10	3,870	--	8.88	5.92	58.30		4.00	7.62	61.48	--	--	--	4,890	6.65	25,750	80	21	7,940	8.0
Nov. 11-20	3,180	--	9.28	6.42	57.53		4.85	7.75	60.63	--	--	--	4,880	6.64	21,120	79	21	8,220	7.9
Nov. 21-30	2,840	--	8.98	6.42	62.42		5.11	7.85	64.86	--	--	--	4,750	6.46	18,370	80	22	8,150	7.8
Dec. 1-10	2,650	--	9.38	5.62	60.29		5.44	7.81	62.04	--	--	--	4,530	6.16	16,350	80	22	7,560	8.0
Dec. 11-20	2,630	--	9.38	5.62	60.52		5.38	8.10	62.04	--	--	--	4,560	6.20	16,310	80	22	7,880	8.1
Dec. 21-31	2,970	--	9.58	6.42	68.19		5.24	8.45	70.50	--	--	--	5,030	6.84	20,330	81	24	8,420	8.0

ARKANSAS RIVER BASIN--Continued

CIMARRON RIVER AT PERKINS, OKLA.--Continued

Chemical analyses, water year October 1955 to September 1956--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 (micromhos 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				
Jan. 1, 1956	268	--	5.99	5.61	67.18		3.02	8.08	67.68	--	--	--	4,650	6.32	1,690	85	28	7,990	8.2
Jan. 2-7	1,750	--	9.18	7.22	79.35		4.98	8.99	81.78	--	--	--	5,660	7.70	13,480	83	28	9,690	8.2
Jan. 8-11	1,120	--	10.53	7.61	106.74		5.10	10.08	109.70	--	--	--	7,460	10.15	11,360	85	35	12,400	8.2
Jan. 12-20	2,390	--	10.93	6.41	104.53		a5.70	9.29	106.88	--	--	--	7,190	9.78	23,350	86	36	12,000	8.3
Jan. 21-31	3,060	--	9.13	7.81	103.77		5.03	9.08	106.60	--	--	--	7,100	9.66	29,600	86	36	12,000	7.9
Feb. 1-10	3,370	12	10.73	7.19	99.62	0.14	b5.76	8.95	104.06	0.01	--	0.42	7,110	9.67	32,580	85	33	11,900	8.4
Feb. 11-12	1,720	--	9.53	6.83	95.63		c5.46	8.31	98.42	--	--	--	6,540	8.89	15,330	85	33	11,300	8.3
Feb. 13-14	1,110	--	7.98	5.02	57.87		d5.05	6.60	59.22	--	--	--	4,170	5.67	6,310	82	23	7,360	8.3
Feb. 15-18	1,670	--	9.13	5.23	84.73		c4.81	7.14	87.14	--	--	--	5,940	8.08	13,520	86	32	10,300	8.3
Feb. 19-20	1,070	--	10.73	6.79	131.21		e4.48	9.45	134.80	--	--	--	8,740	11.89	12,740	88	44	14,800	8.4
Feb. 21-22	930	--	13.47	7.53	199.07		b4.10	11.80	204.17	--	--	--	13,300	18.09	16,840	90	61	21,200	8.4
Feb. 23	417	--	10.33	5.99	160.93		f4.71	9.82	162.71	--	--	--	10,500	14.28	5,950	91	56	17,100	8.6
Feb. 24-29	2,060	--	8.73	6.21	107.47		b4.81	8.18	109.42	--	--	--	7,290	9.91	20,490	88	39	12,400	8.5
Mar. 1-10	2,510	--	9.73	7.01	130.50		4.11	9.74	133.39	--	--	--	8,850	12.04	30,180	89	45	15,000	8.2
Mar. 11-18	1,660	--	10.53	7.77	125.36		4.82	9.97	128.87	--	--	--	8,650	11.76	19,590	87	41	14,600	8.2
Mar. 19	179	--	6.39	6.21	56.83		4.65	5.56	59.22	--	--	--	4,080	5.55	991	82	23	7,220	7.8
Mar. 21-29	2,010	--	9.13	8.39	116.61		3.79	9.64	120.70	--	--	--	8,100	11.02	22,110	87	39	13,400	7.7
Mar. 30-31	409	--	10.33	7.97	142.32		4.21	10.62	145.79	--	--	--	9,500	12.92	5,280	89	47	15,500	8.0
Apr. 1-10	1,880	--	9.93	8.57	134.01		d4.44	10.45	137.62	--	--	--	9,380	12.76	23,980	88	44	15,600	8.3
Apr. 11-20	1,690	10	11.43	7.97	129.63	--	4.61	10.08	133.39	0.02	--	--	9,040	12.29	20,750	87	42	14,700	8.1
Apr. 21-24	534	--	10.73	7.99	116.97		4.70	10.29	120.70	--	--	--	8,160	11.10	5,930	86	38	13,500	8.0
Apr. 25-30	778	--	10.33	7.81	101.66		4.57	9.76	105.47	--	--	--	7,300	9.93	7,730	85	34	12,100	7.6

a Includes 0.27 equivalent per million of carbonate (CO_3).
b Includes 0.40 equivalent per million of carbonate (CO_3).
c Includes 0.20 equivalent per million of carbonate (CO_3).
d Includes 0.13 equivalent per million of carbonate (CO_3).
e Includes 0.33 equivalent per million of carbonate (CO_3).
f Includes 0.53 equivalent per million of carbonate (CO_3).

May 1-10, 1956 ..	1,260	--	9.68	7.08	95.67	4.54	9.47	98.42	--	--	--	6,790	9.23	11,620	85	33	11,700	8.2
May 11-15, 20 ...	865	--	9.58	7.58	99.51	4.44	9.58	102.65	--	--	--	6,920	9.41	8,150	85	34	11,800	8.2
May 16, 19	413	--	6.59	5.01	62.35	4.00	6.50	63.45	--	--	--	4,460	6.07	2,500	84	26	7,890	8.1
May 17-18	393	--	4.99	3.51	43.74	3.18	4.50	44.56	--	--	--	3,110	4.23	1,660	84	21	5,550	8.0
May 21-27	1,160	--	8.38	5.52	66.14	c4.53	8.39	67.12	--	--	--	4,920	6.69	7,770	83	25	8,000	8.3
May 28-30	1,230	--	6.49	3.91	48.85	3.57	5.48	50.20	--	--	--	3,640	4.95	6,110	82	21	6,140	8.1
May 29	607	--	4.99	3.61	36.53	14.30	4.73	36.10	--	--	--	2,740	3.73	2,260	81	18	4,670	8.4
May 31	583	--	8.93	5.43	87.10	d3.19	8.31	89.96	--	--	--	6,160	8.38	4,890	86	32	10,300	8.3
June 1	349	--	6.79	3.41	65.49	3.44	7.39	64.86	--	--	--	4,520	6.15	2,150	87	29	7,680	8.2
June 2-3, 5	2,060	--	4.49	2.61	36.22	2.72	4.50	36.10	--	--	--	2,590	3.52	7,270	84	19	4,660	8.0
June 4	2,280	--	2.89	1.23	13.35	2.49	1.67	13.25	--	--	--	1,060	1.44	3,290	76	9.3	1,820	7.9
June 6-7	1,380	--	12.43	5.07	133.56	2.54	14.01	134.51	--	--	--	9,120	12.40	17,090	88	45	15,400	8.1
June 8	365	--	10.03	3.83	96.20	2.84	11.62	95.60	--	--	--	6,680	9.08	3,320	87	36	11,200	8.2
June 9-11	2,710	--	8.58	3.22	70.00	2.88	9.83	69.09	--	--	--	4,910	6.68	18,140	86	29	8,530	8.0
June 12-15	1,550	--	7.58	2.52	36.80	2.56	8.24	36.10	--	--	--	2,840	3.86	5,990	78	16	4,960	7.9
June 16-17	458	--	12.38	4.12	75.69	3.08	11.56	77.55	--	--	--	5,580	7.59	3,480	82	26	9,430	8.0
June 18-20	478	--	13.82	4.78	93.20	3.20	13.28	95.32	--	--	--	6,850	9.32	4,460	83	31	11,600	8.0
June 21-29	1,820	--	12.52	5.02	84.86	3.00	12.26	87.14	--	--	--	6,200	8.43	15,400	83	29	10,500	8.0
June 30	1,140	--	5.34	2.86	33.33	a3.55	4.14	33.84	--	--	--	2,520	3.43	3,910	80	16	4,480	8.4
July 1-3	2,340	--	3.59	1.81	24.89	2.46	3.23	24.53	--	--	--	1,790	2.43	5,700	82	15	3,240	7.9
July 4, 7	662	--	7.78	3.02	44.94	2.10	8.52	45.12	--	--	--	3,390	4.61	3,060	81	19	5,810	7.9
July 5-6	627	--	7.58	2.82	34.18	2.20	8.54	33.84	--	--	--	2,760	3.75	2,350	77	15	4,650	7.5
July 8-10	605	--	10.38	3.72	58.23	2.10	11.01	59.22	--	--	--	4,370	5.94	3,600	81	22	7,410	7.8
July 11-12, 20 ...	1,130	--	8.88	3.12	60.00	2.56	8.81	60.63	--	--	--	4,390	5.97	6,780	83	24	7,490	7.7
July 13-19	3,920	--	15.07	4.39	155.16	2.41	14.01	158.20	--	--	--	10,500	14.28	56,050	89	50	17,300	8.0

a Includes 0.27 equivalent per million of carbonate (CO_3).
c Includes 0.40 equivalent per million of carbonate (CO_3).
d Includes 0.13 equivalent per million of carbonate (CO_3).

ARKANSAS RIVER BASIN--Continued

CIMARRON RIVER AT PERKINS, OKLA.--Continued

Chemical analyses, water year October 1955 to September 1956--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 (micromhos 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				
July 21-24, 1956	4,260	--	7.29	2.71	58.84		2.46	7.16	59.22	--	--	--	4,190	5.70	24,310	85	26	7,230	8.0
July 25, 31	1,460	--	11.18	3.52	82.86		2.10	9.45	86.01	--	--	--	5,870	7.98	11,650	85	31	9,750	7.8
July 26, 29	1,100	--	9.28	2.52	45.24		2.07	9.85	45.12	--	--	--	3,500	4.76	5,250	79	19	5,920	7.9
July 27-28	904	--	9.38	2.42	28.84		1.84	10.60	28.20	--	--	--	2,560	3.48	3,150	71	12	4,250	7.9
July 30	240	--	12.38	3.02	69.17		2.33	10.33	71.91	--	--	--	5,190	7.06	1,700	82	25	8,770	8.1
Aug. 1-6	801	--	13.52	4.42	91.90		2.39	13.26	94.19	--	--	--	6,670	9.07	7,280	84	31	11,000	7.8
Aug. 7-10	268	--	15.87	6.33	132.16		3.46	13.28	137.62	--	--	--	9,560	13.00	3,480	86	40	15,300	8.2
Aug. 11-20	415	--	14.27	6.73	141.46		3.52	11.74	147.20	--	--	--	9,930	13.50	5,600	87	44	16,300	8.0
Aug. 21-23	184	--	14.67	7.13	137.65		3.36	13.12	142.97	--	--	--	9,810	13.34	2,460	86	42	15,900	8.2
Aug. 24-31	2,200	--	16.17	4.23	79.76		2.07	17.72	80.37	--	--	--	6,180	8.40	18,490	80	25	9,970	8.0
Sept. 1-3	922	--	14.72	3.62	90.13		2.66	13.03	92.78	--	--	--	6,470	8.80	8,120	83	30	11,000	7.9
Sept. 4-10	518	--	6.99	2.61	43.24		2.72	6.41	43.71	--	--	--	3,170	4.31	2,230	82	20	5,880	7.9
Sept. 11-14	117	--	8.98	3.82	59.89		2.88	7.77	62.04	--	--	--	4,330	5.89	690	82	24	7,720	7.8
Sept. 15-20	106	--	11.08	5.32	75.60		3.51	8.97	79.52	--	--	--	5,580	7.59	808	82	26	9,470	7.6
Sept. 21-30	82	18	11.73	6.59	87.87	0.20	3.74	9.68	94.19	0.01	--	0.30	6,410	8.72	718	83	29	11,000	7.8
Total or weighted average	394,200	--	3.84	1.97	24.32		2.16	2.98	24.99	--	--	--	1,850	2.52	992,600	81	14	3,140	--

ARKANSAS RIVER AT VAN BUREN, ARK.

LOCATION.--At gaging station at bridge on U. S.Highways 64 and 71 at Van Buren, Crawford County, 1.3 miles downstream from Lee Creek, 8.6 miles downstream from Poteau River, and at mile 353.4.
DRAINAGE AREA.--150,483 square miles of which 22,241 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1956.
Water temperatures: October 1945 to September 1956.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 4,400 micromhos Sept. 27; minimum daily, 382 micromhos Feb. 24.
Percent sodium: Maximum, 80 Aug. 3-4; minimum, 50 Aug. 18-22, 25.
EXTREMES, 1945-56.--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, Aug. 3-4, 1956; minimum, 32 July 18-27, 1951.
REMARKS.--Values reported for dissolved solids are residues on evaporation at 180°C. Records of specific conductance of daily samples are available in district office at Fayetteville, Ark. Records of discharge for water year October 1955 to September 1956 given in WSP 1441.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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, 1955...	45,820	--	3.04	1.23	7.66	--	1.75	0.87	9.16	--	0.05	--	771	1.05	48,110	64	5.2	1,360	7.7
Oct. 2, 6	122,300	--	3.84	1.56	11.96	--	1.82	1.15	13.82	--	.07	--	1,110	1.51	184,700	69	7.3	1,950	7.9
Oct. 4-5, 7	263,000	--	2.50	.90	6.13	--	1.59	.79	6.91	--	.05	0.05	596	.81	213,000	64	4.7	1,070	7.9
Oct. 8-14	750,000	--	2.15	.62	3.26	--	1.79	.75	3.50	--	.06	--	373	.51	382,500	54	2.8	673	7.0
Oct. 15-16	66,050	--	2.35	.76	4.52	--	1.82	1.15	4.57	--	.05	--	480	.65	42,930	59	3.6	848	7.8
Oct. 17-19.....	65,850	--	2.74	.90	6.35	--	1.90	1.33	6.63	--	.06	--	624	.85	55,970	64	4.7	1,110	7.9
Oct. 20, 27.....	37,170	--	3.99	1.32	11.57	--	2.29	2.00	12.18	--	.03	--	1,040	1.41	52,410	69	7.1	1,850	8.1
Oct. 21-26, 28-31	157,000	4.3	3.39	1.07	8.00	0.19	2.10	1.73	8.52	0.01	.04	.15	760	1.03	161,700	63	5.3	1,320	7.7
Nov. 1-2, 5, 7-9..	57,560	--	3.64	1.07	8.00	--	2.13	1.46	8.74	--	.04	.10	788	1.07	61,590	63	5.2	1,370	8.0
Nov. 3-4, 10	33,000	--	4.74	1.56	13.31	--	2.36	2.04	14.95	--	.03	.10	1,240	1.69	55,770	68	7.5	2,170	7.5
Nov. 6a.....	14,400	--	--	--	--	--	2.26	1.71	11.56	--	.03	--	1,020	1.39	20,020	--	--	1,750	8.1
Nov. 11-14, 16 ...	44,730	2.4	4.34	1.40	11.26	.25	2.24	1.79	13.11	.02	.01	.10	1,070	1.46	65,310	65	6.7	1,880	8.0
Nov. 15, 20	13,550	--	3.79	.99	8.44	--	2.18	1.33	9.59	--	.04	--	824	1.12	15,180	64	5.4	1,480	8.0
Nov. 17-19, 23-26	48,950	--	4.89	1.81	14.44	--	2.36	1.92	16.92	--	.03	.10	1,340	1.82	89,090	68	7.9	2,320	7.7
Nov. 21-22.....	12,260	--	4.59	1.48	11.92	--	2.41	1.60	13.54	--	.04	--	1,100	1.50	18,390	66	6.8	1,940	8.1
Nov. 27-30.....	19,600	--	5.59	2.14	17.18	--	2.64	2.04	19.88	--	.05	.00	1,590	2.16	42,340	69	8.8	2,740	8.1

a Not included in weighted average. Dissolved solids and loads from specific conductance.

ARKANSAS RIVER BASIN--Continued

ARKANSAS RIVER AT VAN BUREN, ARK.--Continued

Chemical analyses, water year October 1955 to September 1956--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 (micromhos 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				
Dec. 1-3, 9, 1955	34,710	--	4.94	2.22	16.10	--	2.66	2.04	18.33	--	0.04	0.15	1,500	2.04	70,810	69	8.5	2,600	8.2
Dec. 4-8, 10	44,490	--	4.04	1.73	11.31	--	2.41	1.62	12.55	--	.04	.05	1,040	1.41	62,730	66	6.6	1,870	7.5
Dec. 11-15, 17-20	70,650	6.4	4.09	1.71	10.96	0.13	2.41	1.42	11.99	0.01	.05	.20	999	1.36	96,080	65	6.4	1,790	7.2
Dec. 16a	9,840	--	--	--	--	--	b2.72	2.19	20.02	--	.04	--	1,630	2.22	21,840	--	--	2,790	8.4
Dec. 21, 24-28	42,660	--	3.74	1.64	9.57	--	2.28	1.48	10.86	--	.05	.10	924	1.26	53,750	64	5.8	1,640	7.7
Dec. 22-23, 29-30	32,690	--	4.89	1.89	13.44	--	2.51	1.64	15.51	--	.05	.05	1,280	1.74	56,880	66	7.3	2,230	7.6
Dec. 31a	10,200	--	--	--	--	--	2.13	2.17	21.71	--	.03	--	1,730	2.35	23,970	--	--	2,960	8.2
Jan. 1 4, 8, 10, 1956	41,730	--	3.69	1.15	9.53	--	1.90	1.54	10.58	--	.04	.15	886	1.20	50,080	66	6.2	1,570	8.0
Jan. 5, 9	12,420	--	3.79	1.73	11.48	--	1.97	1.62	13.25	--	.04	--	1,070	1.46	18,130	68	6.9	1,880	7.4
Jan. 6-7	17,530	--	4.79	2.22	16.53	--	2.03	1.94	19.32	--	.03	--	1,600	2.18	38,220	70	8.8	2,640	7.5
Jan. 11-14, 16-18	36,750	5.6	4.39	2.11	13.66	.14	2.26	1.42	16.07	.01	.04	.18	1,240	1.69	62,110	67	7.6	2,190	7.5
Jan. 15a	5,570	--	--	--	--	--	1.74	1.15	10.72	--	.04	--	924	1.26	7,020	--	--	1,580	8.2
Jan. 19-22	23,720	--	4.94	1.89	15.49	--	2.46	1.71	18.05	--	.05	.15	1,450	1.97	46,730	69	8.4	2,520	7.7
Jan. 23-25, 27	20,890	--	4.49	1.73	12.92	--	2.44	1.75	14.80	--	.04	--	1,220	1.66	34,680	66	6.9	2,120	8.0
Jan. 26, 28-31	28,540	--	5.49	2.61	16.31	--	2.69	1.67	20.30	--	.06	.28	1,520	2.07	59,080	67	8.1	2,760	7.3
Feb. 1-2	13,820	--	6.94	3.26	21.23	--	2.62	1.69	28.20	--	.08	--	2,080	2.83	39,110	68	9.4	3,660	8.1
Feb. 3-5, 8-9	45,880	3.8	5.69	2.30	18.14	.49	2.03	1.46	22.56	.01	.06	.15	1,830	2.49	114,200	68	9.1	2,980	7.6
Feb. 6-7	13,530	--	4.49	2.21	14.27	--	2.03	1.21	17.91	--	.04	--	1,320	1.80	24,350	68	7.8	2,400	7.9
Feb. 10, 12, 14-15	41,260	--	3.69	2.11	12.40	--	1.64	1.06	15.79	--	.06	.17	1,170	1.59	65,600	68	7.3	2,120	7.7
Feb. 11a	12,220	--	--	--	--	--	1.38	1.02	10.29	--	.03	--	848	1.15	14,050	--	--	1,450	8.2
Feb. 13, 16-17	28,170	--	4.69	2.91	16.88	--	1.97	1.29	21.86	--	.04	.21	1,580	2.15	60,570	69	8.7	2,860	7.9
Feb. 18-19	44,830	--	1.90	.98	4.57	--	.98	.62	6.06	--	.06	--	502	.68	30,480	61	3.8	912	7.4
Feb. 20-21, 27	62,820	--	2.64	1.76	9.00	--	1.18	.94	11.00	--	.03	.18	842	1.15	72,240	67	6.1	1,540	7.5
Feb. 22-23, 25	65,040	--	.80	1.04	3.61	--	.66	.44	4.51	--	.03	.16	391	.53	34,470	66	3.8	679	7.1

a Not included in weighted average. Dissolved solids and loads estimated from specific conductance.
b Includes 0.13 equivalent per million of carbonate (CO_3).

Feb. 24, 1956[a]	20,230	--	--	--	--	--	.52	0.44	2.28	--	.03	--	223	.30	6,070	--	--	382	7.4
Feb. 26[a]	15,150	--	--	--	--	--	.98	.71	7.28	--	.04	--	614	.84	12,730	--	--	1,050	8.1
Feb. 28-29	18,590	--	3.49	2.11	14.22	--	1.57	1.48	16.36	--	.02	--	1,120	1.52	28,260	73	8.5	2,210	7.7
Mar. 1-2	16,860	--	4.84	1.97	18.75	--	1.85	1.56	21.43	--	.04	--	1,690	2.30	38,780	73	10	2,680	7.8
Mar. 3-7	32,030	--	4.04	1.81	13.79	--	1.97	1.56	16.07	--	.04	0.10	1,350	1.84	58,940	70	8.0	2,150	7.7
Mar. 8-10	19,910	--	5.09	2.30	22.40	--	2.02	1.83	25.24	--	.02	.10	2,030	2.76	54,950	75	12	3,040	7.9
Mar. 11-13, 17-18	28,480	--	4.64	2.14	19.88	--	2.03	1.92	22.14	--	.04	.15	1,830	2.49	70,920	75	11	2,860	7.4
Mar. 14-16, 19	21,580	--	4.44	1.89	17.14	--	2.10	1.67	19.18	--	.05	.05	1,620	2.20	47,480	73	9.7	2,520	7.9
Mar. 20-22	13,880	--	3.79	1.73	12.44	--	1.88	1.42	14.95	--	.04	.05	1,280	1.74	24,150	69	7.5	1,950	7.9
Mar. 23-27, 29-31	57,860	.9	4.24	1.81	16.23	.38	1.80	1.73	18.47	.01	.03	.00	1,440	1.96	113,400	72	9.4	2,440	7.6
Mar. 28[a]	7,580	--	--	--	--	--	c 1.43	.83	12.13	--	.02	--	1,020	1.39	10,540	--	--	1,750	8.3
Apr. 1-4	25,860	--	4.74	1.15	15.22	--	1.77	1.46	17.62	--	.04	.05	1,370	1.86	48,100	72	8.9	2,320	7.7
Apr. 5-7, 9-11	35,540	.9	4.89	1.97	18.79	.43	1.93	1.87	21.71	.01	.05	.05	1,670	2.27	80,680	72	10	2,820	7.7
Apr. 8[a]	6,270	--	--	--	--	--	c 2.00	2.75	25.38	--	.03	--	1,970	2.68	16,800	--	--	3,360	8.4
Apr. 12-15	21,420	--	4.79	1.64	17.14	--	1.92	1.67	20.02	--	.05	--	1,550	2.11	45,200	73	9.6	2,620	7.8
Apr. 16-20	28,800	--	4.94	2.14	18.36	--	1.90	1.58	21.86	--	.04	.00	1,680	2.28	65,660	72	9.7	2,820	7.7
Apr. 21-23	17,690	--	5.19	2.38	20.31	--	2.13	2.00	23.83	--	.05	.05	1,850	2.52	44,580	73	10	3,110	8.0
Apr. 24-28	20,430	--	4.04	1.97	14.66	--	1.90	1.56	17.06	--	.05	.05	1,340	1.82	37,180	71	8.5	2,280	7.6
Apr. 29[a]	15,690	--	--	--	--	--	c 1.51	.37	3.58	--	.06	--	369	.50	7,840	--	--	631	8.3
Apr. 30[a]	17,790	--	--	--	--	--	b 2.03	1.04	19.60	--	.06	--	1,530	2.08	37,000	--	--	2,620	8.4
May 1 2	29,470	--	2.30	.99	7.22	--	1.38	.85	8.04	--	.04	--	702	.95	28,000	69	5.6	1,160	7.9
May 3, 5	29,060	--	3.34	1.48	11.83	--	1.29	.98	14.04	--	.04	--	1,120	1.52	44,170	71	7.6	1,850	7.8
May 4, 6, 8-10	49,450	--	4.24	2.14	16.18	--	1.43	.92	20.16	--	.02	.10	1,580	2.15	106,300	72	9.0	2,570	7.6
May 7[a]	11,440	--	--	--	--	--	1.38	.96	16.64	--	.04	--	1 360	1.85	21,160	--	--	2,320	8.2

a Not included in weighted average. Dissolved solids and loads estimated from specific conductance.
b Includes 0.13 equivalent per million of carbonate (CO_3).
c Includes 0.07 equivalent per million of carbonate (CO_3).

ARKANSAS RIVER BASIN--Continued

ARKANSAS RIVER AT VAN BUREN, ARK.--Continued

Chemical analyses, water year October 1955 to September 1956--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 (micromhos 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				
May 11-14,17,1956	35,270	6.1	4.89	1.97	17.44	0.38	2.13	1.81	21.01	0.03	0.04	0.25	1,580	2.15	75,830	71	9.4	2,700	7.7
May 15-16	16,260	--	4.19	1.48	14.70	--	2.00	1.27	16.64	--	.03	--	1,350	1.84	29,920	72	8.7	2,230	8.2
May 18, 23, 30-31	83,620	--	3.14	1.15	8.31	--	1.70	.98	9.59	--	.04	.10	872	1.19	99,510	66	5.7	1,410	8.2
May 19, 22, 24, 27-28	162,000	--	2.84	.90	6.66	--	1.67	.90	7.61	--	.03	.00	724	.98	158,800	64	4.9	1,150	7.8
May 20-21, 25-26	99,030	--	2.54	.81	4.52	--	1.80	1.04	4.79	--	.05	.05	509	.69	68,330	57	3.5	849	8.1
May 29[a]	32,530	--	--	--	--	--	1.48	.62	14.66	--	.06	--	1,110	1.51	49,120	--	--	1,900	8.2
June 1-2, 5, 8-10	124,500	6.7	2.99	.99	6.61	.19	1.85	1.06	7.67	.03	.05	.05	624	.85	105,800	61	4.7	1,170	7.5
June 3-4, 6-7	104,100	--	3.64	1.48	9.74	--	2.07	1.35	11.28	--	.06	.05	1,010	1.37	142,600	66	6.1	1,660	8.1
June 11-13	36,420	--	2.64	1.07	4.87	--	1.82	1.15	5.50	--	.05	.10	560	.76	27,680	57	3.6	939	8.1
June 14-15	26,980	--	3.69	1.32	10.27	--	1.77	1.62	11.84	--	.06	--	1,000	1.36	36,690	67	6.5	1,670	7.7
June 16-20	46,390	5.6	2.69	1.07	6.52	.18	1.74	1.33	7.19	.03	.04	--	625	.85	39,430	62	4.8	1,110	7.9
June 21, 23-25	33,480	--	2.69	1.48	10.35	--	1.23	1.77	11.70	--	.05	--	960	1.31	43,860	71	7.1	1,650	7.2
June 22[a]	8,330	--	--	--	--	--	1.39	3.37	27.35	--	.03	--	2,050	2.79	23,240	--	--	3,500	8.0
June 26-27, 29	22,160	--	2.54	1.32	8.44	--	1.38	1.58	9.45	--	.04	.10	804	1.09	24,150	69	6.1	1,410	7.5
June 28, 30	21,500	--	2.30	.99	5.48	--	1.51	1.33	6.06	--	.04	--	565	.77	16,560	62	4.3	974	7.9
July 1, 7-8	24,540	--	3.04	1.64	9.18	--	1.46	1.25	11.00	--	.04	.10	911	1.24	30,430	66	6.0	1,520	7.7
July 2-3	16,680	--	4.99	2.22	15.70	--	1.15	1.17	20.87	--	.03	--	1,590	2.16	36,030	69	8.3	2,610	7.7
July 4-6	24,600	--	4.44	1.89	14.09	--	1.28	1.31	17.48	--	.06	.15	1,350	1.84	45,260	69	7.9	2,260	7.8
July 9, 11, 14	19,020	--	3.04	1.56	11.14	--	1.31	1.06	13.11	--	.04	.05	1,060	1.44	27,390	71	7.3	1,790	7.5
July 10, 12	11,740	--	2.59	1.48	7.35	--	1.52	1.21	8.46	--	.02	--	729	.99	11,620	64	5.1	1,260	7.3
July 13[a]	7,400	--	--	--	--	--	1.41	2.42	18.61	--	.03	--	1,440	1.96	14,500	--	--	2,470	8.2
July 15-17	26,020	--	2.54	1.23	8.66	--	1.28	1.48	9.31	--	.04	.05	784	1.07	27,840	70	6.3	1,350	7.5
July 18-20	22,470	--	2.40	1.40	7.13	--	1.72	1.48	7.76	--	.03	.05	680	.92	20,670	65	5.2	1,180	7.3
July 21[a]	6,430	--	--	--	--	--	c 1.68	1.00	5.08	--	.02	--	515	.70	4,500	--	--	881	8.4

a Not included in weighted average. Dissolved solids and loads estimated from specific conductance.
c Includes 0.07 equivalent per million of carbonate (CO_3).

July 22-27, 1956	30,660	5.1	2.84	1.15	7.35	.19	1.70	1.37	8.18	.02	0.04	.10	697	.95	29,130	64	5.2	1,250	7.9
July 28[a]	7,220	--	--	--	--	--	1.52	2.31	17.48	--	.03	--	1,360	1.85	13,360	--	--	2,330	8.2
July 29[a]	6,740	--	--	--	--	--	c 1.48	1.04	9.87	--	.05	--	842	1.15	7,750	--	--	1,440	8.3
July 30-31	12,220	--	2.94	1.73	12.44	--	1.38	1.85	13.54	--	.03	--	1,090	1.48	18,090	73	8.1	1,860	7.5
Aug. 1-2, 5-7	27,370	4.8	3.34	1.15	15.31	.28	1.51	1.94	16.36	.02	.04	.10	1,240	1.69	46,260	76	10	2,170	7.9
Aug. 3-4	12,850	--	3.39	2.30	22.58	--	1.33	2.56	24.82	--	.04	--	1,840	2.50	32,120	80	13	3,090	7.2
Aug. 8-9	9,700	--	2.45	1.48	12.44	--	1.34	1.96	12.69	--	.04	--	1,020	1.39	13,480	76	8.9	1,790	7.4
Aug. 10[a]	6,430	--	--	--	--	--	c 1.63	1.60	9.31	--	.04	--	813	1.11	7,140	--	--	1,390	8.3
Aug. 11[a]	5,950	--	--	--	--	--	1.64	1.17	13.54	--	.05	--	1,080	1.47	8,750	--	--	1,850	7.8
Aug. 12-17	29,320	--	2.69	1.15	7.26	--	1.77	1.50	7.90	--	.02	.10	721	.98	28,730	65	5.2	1,220	7.5
Aug. 18-22, 25	33,840	--	2.20	.78	3.04	--	1.77	1.12	3.27	--	.02	.05	398	.54	18,270	50	2.5	678	7.9
Aug. 23-24, 26-28	13,170	--	2.89	.99	4.44	--	2.26	1.29	4.79	--	.02	.15	548	.75	9,880	53	3.2	911	7.6
Aug. 29-21	6,780	--	3.44	1.73	9.61	--	2.26	1.81	10.58	--	.02	.15	977	1.33	9,020	65	6.0	1,660	7.5
Sept. 1, 3-6	11,700	--	2.99	1.07	6.61	--	2.20	1.25	7.33	--	.02	.10	691	.94	11,000	62	4.6	1,010	7.5
Sept. 2[a]	4,050	--	--	--	--	--	1.93	1.04	5.22	--	.03	--	518	.70	2,840	--	--	886	8.2
Sept. 7-18	13,170	5.6	3.34	.99	4.61	.14	3.08	.96	4.79	.02	.05	.05	541	.74	9,750	51	3.1	934	8.0
Sept. 19-22	5,180	--	3.34	1.23	6.00	--	2.85	1.02	6.77	--	.03	.10	664	.90	4,660	57	4.0	1,170	8.0
Sept. 23-24, 29-30	4,470	--	4.19	1.81	13.83	--	2.59	1.87	15.51	--	.03	--	1,280	1.74	7,780	70	8.0	2,150	7.7
Sept. 25, 28	2,720	--	5.19	2.14	20.84	--	2.33	2.48	23.41	--	.03	--	1,820	2.48	6,750	74	11	3,020	7.8
Sept. 26-27	2,890	--	6.54	2.88	29.97	--	2.13	3.06	34.69	--	.04	--	2,570	3.50	10,120	76	14	4,210	7.8
Total or weighted average	4,330,000	--	3.24	1.23	8.96	--	1.84	1.23	10.29	--	0.05	--	868	1.18	5,109,000	67	6.0	1,490	--

a Not included in weighted average. Dissolved solids and loads estimated from specific conductance.
c Includes 0.07 equivalent per million of carbonate (CO_3).

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ARKANSAS RIVER BASIN--Continued

CANADIAN RIVER NEAR WHITEFIELD, OKLA.

LOCATION.--At gaging station at bridge on State Highway 2, three-quarters of a mile north of Whitefield, Haskell County, and 5½ miles upstream from Snake Creek.
DRAINAGE AREA.--47,576 square miles, of which 9,700 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: September 1944 to February 1945, September 1946 to September 1956.
Water temperatures: September 1944 to February 1945, September 1946 to September 1956.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 18,000 micromhos Feb. 1; minimum daily, 786 micromhos Oct. 3.
Percent sodium: Maximum, 75 July 1-5; minimum 54 Oct. 5.
EXTREMES, 1946-56.--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, 1947.
REMARKS.--Records of specific conductance of daily samples available in district office at Oklahoma City, Okla. Records of discharge for water year October 1955 to September 1956 given in WSP 1441.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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. 1-2, 4, 7, 1955	71,210	--	2.89	1.11	7.91		1.70	0.54	9.59	--	0.08	--	707	0.96	68,530	66	5.6	1,350	7.7
Oct. 3, 6	73,750	--	2.25	.95	4.34		1.93	.75	4.79	--	.07	--	459	.62	46,080	58	3.4	846	7.8
Oct. 5	36,300	--	3.09	1.71	5.64		2.56	.94	6.82	--	.12	--	621	.84	30,680	54	3.6	1,120	7.3
Oct. 8-9	38,160	--	2.74	1.16	6.39		2.03	.71	7.47	--	.08	--	622	.85	32,310	62	4.6	1,140	7.9
Oct. 10-15	53,850	--	2.30	1.14	4.56		1.93	.73	5.30	--	.04	--	500	.68	36,650	57	3.5	919	7.6
Oct. 16-17	7,320	--	2.79	1.61	6.45		2.07	.85	7.90	--	.03	--	666	.91	6,640	59	4.3	1,240	7.7
Oct. 18-20	6,860	--	4.49	2.41	11.92		2.39	1.15	15.23	--	.05	--	1,170	1.59	10,930	63	6.4	2,170	7.6
Oct. 21-23	4,710	--	5.94	3.06	17.07		2.75	1.39	21.86	--	.07	--	1,610	2.19	10,330	65	8.0	2,930	7.8
Oct. 24-26	3,350	--	6.69	3.51	20.37		2.39	1.39	26.79	--	--	--	1,940	2.64	8,850	67	9.0	3,430	7.8
Oct. 27-31	4,200	--	8.58	4.82	30.92		1.97	1.46	40.89	--	--	--	2,730	3.71	15,590	70	12	4,950	7.4
Nov. 1-5	3,300	--	10.58	5.42	38.47		2.07	1.64	50.76	--	--	--	3,460	4.71	15,550	71	14	6,010	7.6
Nov. 6-10	2,660	--	12.77	5.63	48.65		2.00	1.60	63.45	--	--	--	4,280	5.82	15,520	73	16	7,420	7.5
Nov. 11-20	4,580	16	13.57	6.83	50.90	0.46	1.97	1.50	70.50	0.02	--	0.31	4,780	6.50	29,800	71	16	7,520	7.6
Nov. 21-30	4,090	--	14.47	8.33	55.52		2.13	1.46	74.73	--	--	--	4,990	6.79	27,810	71	16	8,320	7.7
Dec. 1-3	1,240	--	17.17	7.83	62.42		2.88	1.35	83.19	--	--	--	5,550	7.55	9,350	71	18	9,130	7.8
Dec. 4-10	2,800	--	24.90	3.10	74.56		2.62	1.52	98.42	--	--	--	6,380	8.68	24,320	73	20	10,700	8.0
Dec. 11-20	3,480	--	24.85	10.55	92.03		3.65	1.67	122.11	--	--	--	7,830	10.65	37,040	72	22	12,700	8.1
Dec. 21-31	3,690	--	24.85	10.95	95.26		3.16	1.56	126.34	--	--	--	8,160	11.10	41,020	73	23	13,300	7.9

Jan, 1-10, 1956..	3,200	8.0	24.65	13.15	97.88	0.79	2.21	1.64	129.16	0.01	--	0.50	8,680	11.80	37,760	72	23	13,400	8.1
Jan. 11-20	2,750	--	23.90	11.90	94.30		3.29	1.60	125.21	--	--	--	7,720	10.50	28,910	72	22	13,100	8.0
Jan. 21-25	2,260	--	23.05	11.75	88.05		3.39	1.58	117.88	--	--	--	7,620	10.36	23,390	72	21	12,600	7.9
Jan. 26-30	3,440	--	26.00	14.20	103.91		3.39	1.69	139.03	--	--	--	8,980	12.21	42,090	72	23	14,600	7.9
Jan. 31	585	--	31.74	16.06	127.42		3.33	1.00	170.89	--	--	--	11,000	14.96	8,760	73	26	17,700	8.1
Feb. 1	770	--	32.53	18.27	129.82		a 3.11	.98	176.53	--	--	--	11,500	15.64	12,050	72	26	18,000	8.4
Feb. 2-4	2,850	--	24.50	12.90	99.21		b 2.85	1.50	132.26	--	--	--	8,460	11.51	32,850	73	23	13,800	8.3
Feb. 5-9	6,070	--	18.31	9.69	71.51		2.66	1.25	95.60	--	--	--	6,170	8.39	50,980	72	19	10,500	8.2
Feb. 10	3,230	--	11.38	6.02	43.68		2.46	.81	57.81	--	--	--	3,770	5.13	16,590	72	15	6,410	8.2
Feb. 11-12	5,610	--	6.79	3.21	23.82		1.61	1.19	31.02	--	--	--	2,120	2.88	16,200	70	11	3,770	8.0
Feb. 13-14	3,320	--	10.78	5.42	40.39		1.70	1.31	53.58	--	--	--	3,530	4.80	15,960	71	14	6,180	8.0
Feb. 15-17	4,340	--	16.77	9.23	68.03		2.29	1.50	90.24	--	--	--	5,810	7.90	34,350	72	19	9,750	8.2
Feb. 18-20	27,170	--	4.24	1.96	13.55		1.44	.77	17.48	--	0.06	--	1,230	1.67	45,500	69	7.7	2,100	7.7
Feb. 21	4,780	--	3.44	1.32	10.77		1.15	.52	13.82	--	.04	--	1,000	1.36	6,510	69	7.0	1,740	7.7
Feb. 22	2,980	--	4.79	2.61	16.66		1.28	.73	22.00	--	.05	--	1,520	2.07	6,160	69	8.7	2,700	7.9
Feb. 23-24	3,670	--	7.39	3.91	27.88		1.48	1.04	36.66	--	--	--	2,410	3.28	12,040	71	12	4,300	7.8
Feb. 25-26	2,800	--	12.28	6.62	46.62		1.90	1.58	62.04	--	--	--	4,170	5.67	15,880	71	15	7,150	7.9
Feb. 27-29	3,000	--	9.28	5.32	35.28		2.10	2.66	45.12	--	--	--	3,040	4.13	12,410	71	13	5,170	7.9
Mar. 1-4	2,730	--	10.78	5.62	39.59		2.23	2.44	51.32	--	--	--	3,520	4.79	13,100	71	14	6,020	7.9
Mar. 5-10.....	2,820	--	13.57	7.63	55.62		1.87	2.19	72.76	--	--	--	4,920	6.69	18,880	72	17	8,210	8.0
Mar. 11-20	3,620	--	15.97	8.63	65.63		2.16	2.06	86.01	--	--	--	5,780	7.86	28,470	73	19	9,480	7.9
Mar. 21, 24-29 ..	4,020	--	18.11	8.69	73.87		1.44	.81	98.42	--	--	--	6,930	9.42	37,960	73	20	10,500	7.3
Mar. 22-23.....	1,080	--	15.97	8.03	61.24		2.00	1.46	81.78	--	--	--	5,660	7.70	8,330	72	18	8,880	7.5
Mar. 30-31.....	833	--	21.46	12.74	95.69		1.18	.96	127.75	--	--	--	8,810	11.98	9,990	74	23	13,200	7.3
Apr. 1-8	2,750	--	21.66	11.74	90.02		1.97	.75	120.70	--	--	--	8,530	11.60	31,870	73	22	12,800	7.4
Apr. 9-11	1,070	--	18.51	10.29	75.55		2.26	.85	101.24	--	--	--	7,420	10.09	10,820	72	20	11,000	7.6
Apr. 12-15	1,690	--	25.85	13.15	107.27		2.44	1.98	141.85	--	--	--	9,490	12.91	21,780	73	24	14,800	7.9
Apr. 16-18	1,150	--	21.11	12.29	91.32		2.07	1.67	120.98	--	--	--	7,920	10.77	12,420	73	22	12,500	7.6

a Includes 0.27 equivalent per million of carbonate (CO_3).
b Includes 0.13 equivalent per million of carbonate (CO_3).

ARKANSAS RIVER BASIN--Continued

CANADIAN RIVER NEAR WHITEFIELD, OKLA.--Continued

Chemical analyses, water year October 1955 to September 1956--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 (micromhos 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. 19, 1956	472	--	17.51	10.09	68.67		1.97	1.52	92.78	--	--	--	6,420	8.73	4,130	71	18	10,100	7.8
Apr. 20-28	2,610	--	14.97	8.03	59.77		2.46	1.35	78.96	--	--	--	5,440	7.40	19,300	72	18	8,850	7.8
Apr. 29	1,780	--	4.54	2.36	17.07		1.38	.50	22.00	--	0.09	--	1,560	2.12	3,780	71	9.2	2,670	7.5
Apr. 30	1,980	--	9.43	4.87	38.55		1.38	.71	50.76	--	--	--	3,590	4.88	9,680	73	14	5,750	7.5
May 1	2,940	--	30.79	13.01	120.13		1.38	1.25	161.30	--	--	--	10,300	14.01	41,160	73	26	16,000	7.9
May 2-3, 5-10	17,410	--	9.98	6.02	38.58		1.51	.90	52.17	--	--	--	3,500	4.76	82,950	71	14	5,930	7.8
May 4	4,700	--	14.77	7.23	62.48		1.87	.83	81.78	--	--	--	5,380	7.32	34,430	74	19	8,730	7.8
May 11-14	2,070	--	9.58	6.42	37.52		1.97	.79	50.76	--	--	--	3,370	4.58	9,500	70	13	5,760	7.9
May 15-18	7,440	--	4.09	1.91	14.92		1.31	.40	19.18	--	.03	--	1,390	1.89	14,080	71	8.6	2,380	7.6
May 19-20	2,280	--	6.49	2.71	23.23		1.51	.46	30.46	--	--	--	2,090	2.84	6,470	72	11	3,600	7.6
May 21, 25	29,640	--	6.49	2.31	20.95		2.23	.67	26.79	--	.06	--	2,020	2.75	81,500	70	10	3,300	7.9
May 22-24, 27	32,160	--	9.18	4.42	34.81		2.46	.83	45.12	--	--	--	3,320	4.52	145,400	72	13	5,320	8.1
May 26, 28-31	64,700	--	3.99	1.51	12.58		1.67	.56	15.79	--	.06	--	1,230	1.67	108,300	70	7.6	2,060	7.8
June 1, 4-5, 7-10	45,260	--	3.89	1.51	9.64		2.29	1.64	11.00	--	.11	--	937	1.27	57,730	64	5.9	1,630	7.8
June 2-3, 6	32,170	--	4.59	2.01	13.72		2.43	1.56	16.22	--	.11	--	1,300	1.77	56,930	68	7.6	2,210	7.9
June 11-15	10,530	--	5.09	2.51	15.31		2.03	1.67	19.18	--	.03	--	1,480	2.01	21,210	67	7.9	2,480	8.0
June 16-20	3,970	--	7.39	3.91	27.59		2.00	1.64	35.25	--	--	--	2,620	3.56	14,150	71	12	4,240	7.9
June 21-27	3,040	--	6.89	3.51	26.07		2.00	1.19	33.28	--	--	--	2,290	3.11	9,480	71	11	3,950	7.8
June 28	1,490	--	12.97	5.83	49.05		1.70	1.29	64.86	--	--	--	4,430	6.02	8,960	72	16	7,110	7.9
June 29-30	2,220	--	23.85	10.95	96.80		1.38	1.06	129.16	--	--	--	8,610	11.71	25,970	74	23	13,700	7.6
July 1-5	3,400	--	13.37	6.63	59.67		1.31	.81	77.55	--	--	--	5,130	6.98	23,770	75	19	8,530	7.5
July 6-10	1,460	--	11.18	5.22	45.85		2.20	.83	59.22	--	--	--	3,970	5.40	7,900	74	16	6,670	7.8
July 11-12	383	--	11.98	5.62	49.66		1.90	.50	64.86	--	--	--	4,460	6.07	2,320	74	17	7,170	7.8
July 13-20	1,240	--	9.18	5.12	36.81		2.23	.94	47.94	--	--	--	3,310	4.50	5,580	72	14	5,530	8.1
July 21-24	827	--	9.08	4.12	31.91		2.43	.94	41.74	--	--	--	2,840	3.86	3,200	71	12	4,840	7.9
July 25-29	1,290	--	12.18	5.62	48.06		1.51	.90	63.45	--	--	--	4,250	5.78	7,460	73	16	7,250	7.4
July 30	464	--	7.19	3.41	27.00		1.64	.71	35.25	--	--	--	2,380	3.24	1,500	72	12	4,150	7.9
July 31	274	--	5.09	2.41	18.84		1.64	.69	23.97	--	.04	--	1,630	2.22	607	72	9.7	2,930	7.9

Aug. 1, 1956	266	--	5.79	3.21	18.89		2.03	0.46	25.38	--	.02	--	1,770	2.41	640	68	8.9	3,140	7.6
Aug. 2, 8-9.....	569	--	8.78	5.62	34.57		2.10	3.16	43.71	--	--	--	3,020	4.11	2,340	71	13	5,210	7.6
Aug. 3-6, 10	956	--	6.79	4.01	25.35		2.26	1.46	32.43	--	--	--	2,250	3.06	2,930	70	11	3,990	7.7
Aug. 7	200	--	13.17	8.03	52.28		1.90	1.08	70.50	--	--	--	4,610	6.27	1,260	71	16	7,650	7.6
Aug. 11-20.....	573	14	7.29	4.91	24.24	0.28	2.62	2.39	31.58	.04	--	.28	2,400	3.26	1,870	66	9.8	3,960	8.0
Aug. 21-31.....	229	--	7.88	4.72	24.62		2.59	.79	33.84	--	--	--	2,270	3.09	708	66	9.8	3,920	7.7
Sept. 1-10.....	94	--	8.78	5.42	24.67		3.02	.60	35.25	--	--	--	2,430	3.30	312	63	9.3	4,170	8.0
Sept. 11-20.....	35	--	9.18	5.62	26.52		2.69	.56	38.07	--	--	--	2,580	3.51	123	64	9.7	4,440	7.9
Sept. 21-30.....	29	18	10.38	5.22	24.71	.20	2.77	.44	37.22	.01	--	.12	2,590	3.52	103	61	8.8	4,590	7.6
Total or weighted average	711,200	--	6.29	2.96	21.31		2.02	0.96	27.58	--	--	--	1,960	2.67	1,898,000	70	9.9	3,280	--

RED RIVER BASIN

RED RIVER AT DENISON DAM NEAR DENISON, TEX.

LOCATION.--Immediately below dam on Red River, 1.7 miles upstream from Sand Creek, 3 miles upstream from gaging station near Colbert, Bryan County, Okla., and 4 miles northwest of Denison, Grayson County.
DRAINAGE AREA.--39,719 square miles above dam, 39,777 square miles above gaging station, of which 5,936 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: May 1944 to September 1956.
Water temperatures: October 1945 to September 1956.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 2,210 micromhos Aug. 29, Sept. 11, 26-27; minimum daily, 1,560 micromhos Dec. 29.
Percent sodium: Maximum, 60 Aug. 1-31; minimum, 54 Mar. 1-31, Apr. 1-30.
EXTREMES, 1944-56.--Specific conductance: Maximum daily, 3,520 micromhos Aug. 14, 1944; minimum daily,656 micromhos Oct. 16, 1945.
Percent sodium: Maximum, 60 Aug. 1-31, 1956; minimum, 31 Nov. 1-10, 1945.
REMARKS.--Values reported for dissolved solids concentrations less than 1,000 ppm are residues on evaporation at 180°C and for concentrations more than 1,000 ppm are calculated from determined constituents unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for gaging station near Colbert, Okla. for water year October 1955 to September 1956 given in WSP 1441. No appreciable inflow between dam and gaging station except during periods of heavy local rains.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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 31, 1955 ...	907,500	11	5.31	1.97	10.00	0.17	1.92	5.25	10.10	0.03	0.02	0.19	1,050	1.43	1,298,000	57	5.2	1,750	7.8
Nov. 1 30	284,000	10	5.15	1.81	9.14	.16	1.92	4.91	9.25	.02	.03	.15	a976	1.33	377,700	56	4.9	1,640	7.6
Dec. 1 31	249,200	9.8	4.89	1.73	8.61	.15	1.93	4.75	8.52	.02	.02	.08	970	1.32	328,900	56	4.7	1,590	7.9
Jan. 1-31, 1956 ...	223,000	11	5.09	1.73	8.44	.15	1.98	4.75	8.60	.02	.01	.17	954	1.30	289,900	55	4.6	1,600	7.9
Feb. 1-29	231,000	10	5.09	1.64	8.44	.15	2.02	4.66	8.60	.02	.01	.16	984	1.34	309,500	55	4.6	1,590	7.9
Mar. 1 31	138,300	11	5.14	1.89	8.53	.15	2.07	4.89	8.97	.02	.01	.11	977	1.33	183,900	54	4.6	1,620	7.6
Apr. 1-30	64,810	11	5.19	1.97	8.70	.15	2.13	4.89	8.97	.02	.02	.13	a963	1.36	88,140	54	4.6	1,650	7.7
May 1-31	126,500	12	5.34	1.97	9.09	.15	2.20	5.08	9.08	.02	.01	.19	a991	1.35	170,800	55	4.8	1,690	7.8
June 1-30	86,200	12	5.59	2.22	9.92	.16	2.13	5.48	10.29	.03	.02	.17	1,080	1.47	126,700	55	5.0	1,850	8.0
July 1-31	97,170	12	6.19	2.30	11.40	.16	2.21	6.23	11.90	.02	.02	.12	1,220	1.66	161,300	57	5.5	2,070	7.8
Aug. 1-31	84,890	12	5.84	2.38	12.40	.17	2.16	6.35	12.27	.02	.02	.29	1,260	1.71	145,200	60	6.1	2,120	7.9
Sept. 1-30	84,690	12	6.37	2.63	12.01	.17	2.07	6.56	12.63	.03	.01	.20	1,280	1.74	147,400	57	5.7	2,190	7.8
Total or weighted average	2,577,000	11	5.29	1.89	9.53	0.16	2.00	5.16	9.76	0.02	0.02	0.17	1,030	1.40	3,608,000	56	5.0	1,720	--

a Calculated from determined constituents.

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 1945 to September 1946, October 1947 to September 1956.
Water temperatures: October 1947 to September 1956.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 393 micromhos July 1; minimum daily, 61.1 micromhos Apr. 8.
Percent sodium: Maximum, 75 Dec. 11-20, Jan. 14-22; minimum, 59 Mar. 13-20, May 15-31.
EXTREMES, 1945-46, 1947-56.--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 at 180°C unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1955 to September 1956 given in WSP 1442.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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. 1-9, 1955	32,810	17	0.32	0.17	1.31		0.46	0.14	0.16		0.05		134	0.18	5,910	72	2.6	201	7.0
Oct. 10 20	27,810	18	.43	.25	1.63		.57	.18	1.52		.04		157	.21	5,840	71	2.8	258	7.0
Oct. 21-31	19,810	21	.38	.23	1.42		.59	.15	1.27		.02		140	.19	3,760	70	2.6	226	7.2
Nov. 1-10	17,850	23	.35	.21	1.27		.59	.12	1.10		.02		132	.18	3,210	69	2.4	204	7.0
Nov. 11-20	19,000	22	.32	.20	1.19		.54	.12	1.04		.01		126	.17	3,230	70	2.3	191	7.0
Nov. 21-30	20,150	23	.33	.19	1.22		.52	.11	1.10		.01		129	.18	3,630	70	2.4	196	6.7
Dec. 1-10	51,410	14	.27	.13	1.12		.33	.11	1.07		.01		111	.15	7,710	74	2.5	172	6.6
Dec. 11-20	35,720	15	.32	.20	1.53		.44	.16	1.44		.01		144	.20	7,140	75	3.0	235	6.8
Dec. 21-31	33,740	16	.41	.21	1.67		.44	.18	1.66		.01		155	.21	7,090	73	3.0	261	7.0
Jan. 1-13, 1956	29,830	19	.43	.25	1.89		.51	.18	1.86		.02		176	.24	7,160	74	3.2	291	7.1
Jan. 14-22	23,350	18	.37	.21	1.71		.51	.17	1.61		.00		158	.21	4,900	75	3.2	260	6.9
Jan. 23-31	133,700	8.8	.21	.11	.72		.20	.15	.68		.01		a69	.09	12,030	69	1.8	122	6.3

a Calculated from determined constituents.

SABINE RIVER BASIN--Continued

SABINE RIVER NEAR RULIFF, TEX.--Continued

Chemical analyses, water year October 1955 to September 1956--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 (micromhos 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. 1-5, 1956 ..	52,400	12	0.28	0.16	1.19		0.25	0.21	1.16		0.01		a 105	0.14	7,340	73	2.5	185	6.8
Feb. 6-16	423,300	8.8	.20	.12	.59		.13	.21	.56		.01		a 63	.09	38,100	65	1.5	110	6.3
Feb. 17-29	250,800	12	.35	.21	1.03		.23	.33	1.02		.01		a 105	.14	35,110	65	1.9	184	6.6
Mar. 1-12.....	133,800	15	.42	.28	1.07		.30	.40	1.07		.01		a 118	.16	21,400	61	1.8	210	6.5
Mar. 13-20.....	94,690	13	.38	.23	.88		.31	.31	.85		.02		a 99	.13	12,310	59	1.6	174	6.5
Mar. 21-31	119,100	14	.36	.28	.98		.33	.35	.93		.01		a 107	.15	17,870	60	1.7	185	6.4
Apr. 1-5.....	31,440	17	.49	.31	1.65		.43	.67	1.33		.02		164	.22	6,920	67	2.6	252	6.6
Apr. 6-14, 16-17..	196,800	9.2	.23	.13	.61		.21	.20	.54		.02		a 66	.09	17,710	63	1.4	112	6.1
Apr. 15, 18-30 ..	113,700	16	.40	.28	1.21		.44	.33	1.10		.02		a 124	.17	19,330	64	2.1	213	6.5
May 1-7	48,440	17	.43	.29	1.48		.51	.33	1.35		.01		a 143	.19	9,200	67	2.5	248	7.2
May 8-14	161,000	7.6	.23	.13	.70		.25	.20	.59		.02		a 69	.09	14,490	66	1.6	119	6.8
May 15-31	239,300	14	.56	.26	1.16		.62	.31	1.02		.03		a 127	.17	40,680	59	1.8	219	6.9
June 1-10	32,910	19	.56	.32	1.31		.79	.25	1.13		.02		152	.21	6,910	60	2.0	240	7.7
June 11-20	31,700	17	.43	.25	1.14		.64	.17	.99		.02		127	.17	5,390	63	2.0	193	7.3
June 21-30	25,190	17	.59	.25	1.39		.84	.16	1.21		.02		153	.21	5,290	62	2.1	232	7.7
July 1-10	18,840	20	.55	.29	1.88		.82	.20	1.69		.01		177	.24	4,520	69	2.9	298	7.0
July 11-20	12,050	22	.54	.30	2.16		.84	.17	1.97		.02		193	.26	3,130	72	3.3	332	7.3
July 21-31	11,370	21	.45	.25	1.47		.80	.14	1.21		.02		151	.21	2,390	68	2.5	236	7.1
Aug. 1-10.....	8,160	22	.47	.25	1.34		.79	.12	1.13		.02		146	.20	1,630	65	2.2	228	7.6
Aug. 11-20	7,100	22	.42	.26	1.49		.79	.12	1.24		.02		150	.20	1,420	69	2.6	238	7.5
Aug. 21-31	7,100	22	.45	.27	1.72		.82	.13	1.47		.02		163	.22	1,560	70	2.9	265	7.4
Sept. 1-10	7,680	21	.45	.27	1.67		.70	.21	1.47		.02		170	.23	1,770	70	2.8	273	7.4
Sept. 11-20	6,210	21	.35	.23	1.57		.72	.12	1.30		.01		152	.21	1,300	73	2.9	246	7.4
Sept. 21-30	5,510	21	.38	.24	1.62		.77	.11	1.35		.01		157	.21	1,160	72	2.9	254	7.6
Total or weighted average	2,484,000	13	0.34	0.20	1.00		0.34	0.25	0.93		0.01		103	0.14	347,800	65	1.9	176	--

a Calculated from determined constituents.

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 1956.
Water temperatures: October 1947 to September 1956.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 350 micromhos Nov. 18; minimum daily, 114 micromhos Jan. 26.
Percent sodium: Maximum, 72 Nov. 21-30, Dec. 21-31; minimum, 52 June 21-30.
EXTREMES, 1947-56.--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, 14 June 4-18, 1950.
REMARKS.--Values reported for dissolved solids are calculated from determined constituents unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1955 to September 1956 given in WSP 1442.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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, 1955.	12,440	17	0.46	0.30	1.44		0.62	0.27	1.24	0.02	0.05		142	0.19	2,360	65	2.3	243	6.8
Oct. 11-20.....	10,030	19	.52	.26	1.33		.69	.23	1.16	.02	.01		137	.19	1,910	63	2.1	233	7.1
Oct. 21-31.....	11,250	17	.51	.27	1.50		.67	.25	1.33	.02	.01		144	.20	2,250	66	2.4	257	7.0
Nov. 1-10.....	12,040	20	.54	.26	1.83		.72	.29	1.55	.03	.04		a189	.26	3,130	70	2.9	283	7.1
Nov. 11-20.....	10,730	19	.54	.26	1.94		.77	.31	1.61	.03	.02		a196	.27	2,900	71	3.1	293	7.1
Nov. 21-30.....	9,890	19	.55	.25	2.02		.79	.29	1.69	.03	.02		a199	.27	2,670	72	3.2	299	7.0
Dec. 1-10	12,360	15	.43	.23	1.54		.57	.25	1.33	.04	.01		139	.19	2,350	70	2.7	242	7.2
Dec. 11-20.....	8,080	17	.49	.27	1.61		.77	.25	1.30	.04	.01		150	.20	1,620	68	2.6	253	7.0
Dec. 21-31.....	10,870	17	.47	.25	1.86		.79	.27	1.47	.04	.01		163	.22	2,390	72	3.1	278	7.0
Jan. 1-10, 1956.	9,460	17	.51	.25	1.88		.79	.33	1.47	.03	.02		167	.23	2,180	71	3.0	280	7.3
Jan. 11-23.....	14,870	16	.48	.26	1.68		.70	.33	1.35	.03	.01		154	.21	3,120	69	2.8	270	7.1
Jan. 24-31.....	14,760	12	.32	.14	.85		.34	.19	.73	.03	.02		87	.12	1,770	65	1.8	148	6.7
Feb. 1-10.....	56,470	14	.39	.19	1.22		.39	.29	1.07	.03	.02		118	.16	9,040	68	2.3	204	6.6
Feb. 11-20	153,100	12	.32	.14	.73		.23	.29	.62	.04	.01		82	.11	16,840	61	1.5	138	6.2
Feb. 22-29	48,970	13	.35	.21	.94		.26	.40	.79	.04	.01		101	.14	6,860	63	1.8	170	6.4
Mar. 1-10	60,600	14	.44	.24	1.22		.30	.48	1.07	.03	.02		125	.17	10,300	64	2.1	206	6.5
Mar. 11-20	32,710	15	.49	.25	1.15		.36	.42	1.07	.03	.01		124	.17	5,560	61	1.9	212	6.4
Mar. 21-31	48,540	14	.50	.26	1.26		.38	.48	1.13	.02	.01		132	.18	8,740	62	2.0	223	7.1

NECHES RIVER BASIN--Continued

NECHES RIVER AT EVADALE, TEX.--Continued

Chemical analyses, water year October 1955 to September 1956--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 (micromhos 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. 1-14, 1956	103,800	15	0.55	0.29	0.31		0.44	0.52	1.16	0.02	0.01		140	0.19	19,720	61	2.0	246	6.9
Apr. 15-22	75,870	12	.41	.23	.93		.36	.42	.73	.03	.03		104	.14	10,620	59	1.6	176	6.8
Apr. 23-30	20,910	14	.42	.22	.90		.41	.40	.68	.03	.02		103	.14	2,930	58	1.6	169	7.1
May 1-10	35,310	13	.42	.26	.94		.43	.42	.73	.02	.02		107	.15	5,300	58	1.6	176	6.8
May 11-20	111,400	13	.43	.25	1.14		.46	.42	.90	.02	.02		118	.16	17,820	62	2.0	195	6.7
May 21-31	116,700	11	.31	.21	.86		.36	.25	.73	.02	.02		90	.12	14,000	62	1.7	153	6.9
June 1-10.....	26,810	15	.41	.29	.84		.56	.25	.70	.02	.01		101	.14	3,750	55	1.4	174	7.1
June 11-20.....	26,940	13	.46	.30	.90		.59	.25	.79	.02	.01		106	.14	3,770	54	1.5	179	7.0
June 21-30.....	12,890	15	.53	.31	.92		.67	.23	.82	.02	.02		112	.15	1,930	52	1.4	195	7.6
July 1-10	19,690	17	.55	.33	1.24		.74	.29	1.04	.03	.02		136	.18	3,540	58	1.9	233	6.8
July 11-20	16,060	16	.55	.33	1.29		.79	.27	1.07	.03	.01		137	.19	3,050	59	1.9	241	7.0
July 21-31	18,690	15	.53	.31	1.30		.77	.25	1.07	.03	.02		134	.18	3,360	61	2.0	235	7.0
Aug. 1-10.....	10,580	18	.54	.38	1.49		.89	.29	1.18	.03	.02		152	.21	2,220	62	2.2	260	7.3
Aug. 11-20	12,620	17	.55	.37	1.67		.97	.27	1.30	.03	.02		160	.22	2,780	64	2.5	279	7.4
Aug. 21-31.....	10,680	18	.62	.40	1.86		1.08	.29	1.47	.03	.01		177	.24	2,560	65	2.6	313	7.6
Sept. 1-10	4,200	24	.67	.41	1.80		1.25	.21	1.38	.03	.01		a188	.26	1,090	62	2.4	296	7.4
Sept. 11-20	4,050	23	.63	.37	1.36		1.16	.20	.96	.03	.01		a160	.22	891	58	1.9	247	7.4
Sept. 21-30	3,290	22	.64	.36	1.70		1.21	.21	1.24	.03	.01		170	.23	757	63	2.4	286	7.4
Total or weighted average	1,168,000	14	0.43	0.24	1.13		0.46	0.35	0.93	0.03	0.02		117	0.16	186,900	63	2.0	198	--

a Residue on evaporation at 180 °C.

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, 4.1 miles downstream from Big Creek, and at mile 94.
DRAINAGE AREA.--17,192 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1945 to November 1949, February 1950 to September 1951, April 1953 to September 1956. Water temperatures: February 1950 to September 1951, April 1953 to September 1956.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 2,360 micromhos May 2; minimum daily, 213 micromhos Apr. 13. Percent sodium: Maximum, 82 Sept. 11-21; minimum, 42 May 5, 8-18.
EXTREMES, 1945-50, 1953-56.--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 are calculated from determined constituents unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1955 to September 1956 given in WSP 1442.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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. 1-7, 1955 ..	15,540	20	2.98	0.64	12.73		2.85	2.12	11.22		0.16		977	1.33	20,670	78	9.5	1,720	7.9
Oct. 8-10	4,410	18	1.71	.35	6.30		2.08	.92	5.25		.11		500	.68	3,000	75	6.2	900	7.9
Oct. 11-15	6,900	17	1.82	.30	3.61		2.03	.75	2.90		.05		343	.47	3,240	63	3.5	608	7.9
Oct. 16-20	4,840	22	2.47	.31	6.93		2.31	1.46	5.78		.16		588	.80	3,870	71	5.9	1,040	7.8
Oct. 21-31	6,450	13	2.58	.50	7.50		2.38	1.87	6.15		.18		633	.86	5,550	71	6.0	1,110	7.7
Nov. 1-11	5,720	13	2.59	.53	6.15		2.47	1.31	5.41		.08		a583	.79	4,520	66	4.9	1,010	6.7
Nov. 12-20	4,890	4.4	2.86	.54	8.47		2.62	1.71	7.47		.07		a728	.99	4,840	71	6.5	1,270	7.4
Nov. 21-30	5,690	3.8	2.88	.56	7.84		2.80	1.52	6.91		.05		a689	.94	5,350	70	6.0	1,210	7.6
Dec. 1-10.....	8,870	4.2	3.10	.58	10.85		2.57	1.85	10.01		.10		851	1.16	10,290	75	8.0	1,550	8.0
Dec. 11-20	8,370	12	3.14	.66	13.43		2.90	2.17	11.98		.18		1,020	1.39	11,630	78	9.7	1,830	7.7
Dec. 21-31	7,810	15	3.13	.65	14.43		2.74	2.29	12.92		.26		1,080	1.47	11,480	79	10	1,910	7.4
Jan. 1-10, 1956 .	6,830	11	2.84	.58	13.40		2.93	2.08	11.70		.11		993	1.35	9,220	80	10	1,810	7.9
Jan. 11-21	10,130	12	2.67	.49	10.88		2.62	2.08	9.16		.18		837	1.14	11,550	77	8.7	1,500	7.7
Jan. 22-31	24,740	10	2.20	.42	8.85		1.87	1.62	7.84		.14		684	.93	23,010	77	7.7	1,280	7.4

a Residue on evaporation at 180°C.

TRINITY RIVER BASIN--Continued

TRINITY RIVER AT ROMAYOR, TEX.--Continued

Chemical analyses, water year October 1955 to September 1956--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 (micromhos 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. 1-6, 1956 ..	17,400	16	2.19	0.55	11.46		1.80	1.62	10.49		0.29		a902	1.23	21,400	81	9.8	1,530	7.8
Feb. 7-10.....	50,140	11	1.64	.28	3.73		1.79	.87	2.99		.00		336	.46	23,060	66	3.8	597	6.5
Feb. 11-20.....	89,530	11	1.67	.25	2.24		1.48	.83	.75		.10		251	.34	30,440	54	2.3	443	7.5
Feb. 21-29.....	28,680	14	2.01	.39	3.44		1.62	1.25	2.82		.15		356	.48	13,770	59	3.1	624	7.5
Mar. 1-3	6,770	17	2.48	.52	7.39		1.70	1.67	6.71		.31		a646	.88	5,960	71	6.0	1,140	7.8
Mar. 4-9	15,740	15	1.83	.27	2.48		1.67	.69	2.12		.10		a306	.42	6,610	54	2.4	493	7.8
Mar. 10-20	16,070	17	2.40	.52	3.77		2.13	1.02	3.47		.07		a420	.57	9,160	56	3.1	717	8.1
Mar. 21-31	20,120	13	2.15	.51	4.63		1.70	1.12	4.40		.07		a464	.63	12,680	64	4.0	802	7.9
Apr. 1-5, 25-30 .	14,800	15	2.30	.69	7.08		1.97	1.50	6.54		.06		599	.81	11,990	70	5.8	1,100	7.5
Apr. 6-12, 17-24.	84,290	15	1.45	.45	2.85		1.25	.81	2.62		.07		289	.39	32,870	60	2.9	532	7.3
Apr. 13-16	21,820	11	.92	.24	1.33		.79	.48	1.16		.06		155	.21	4,580	53	1.7	280	7.2
May 1-3	3,840	17	2.82	.74	12.93		2.90	1.75	11.84		.00		971	1.32	5,070	78	9.7	1,780	7.9
May 4, 6-7.....	48,060	17	1.89	.43	4.50		1.67	1.12	3.92		.11		414	.56	26,910	66	4.2	761	7.9
May 5, 8-18.....	235,900	21	1.96	.30	1.62		2.00	.64	1.18		.06		237	.32	75,490	42	1.5	410	7.8
May 19-31.....	38,480	16	2.58	.44	3.04		2.47	.98	2.57		.04		358	.49	13,960	50	2.5	641	7.8
June 1-12	18,300	14	2.99	.49	3.79		2.98	1.08	3.19		.02		422	.57	10,430	52	2.9	762	8.0
June 13-16	9,450	10	3.39	.72	13.05		3.56	2.21	11.28		.11		1,010	1.37	12,950	76	9.1	1,810	8.3
June 17-30	18,330	17	1.87	.27	2.58		1.92	.83	1.92		.05		286	.39	7,150	55	2.5	505	8.1
July 1-10	4,630	17	2.69	.41	4.08		2.92	1.17	3.07		.02		a425	.58	2,690	57	3.3	757	8.0
July 11-20	4,110	18	3.09	.45	5.41		3.34	1.08	4.51		.02		a527	.72	2,960	60	4.1	933	8.2
July 21-31	3,610	18	2.89	.51	6.76		3.02	1.25	5.87		.02		597	.81	2,920	67	5.2	1,060	7.9
Aug. 1-15	4,040	21	3.31	.69	7.49		3.56	1.19	6.71		.03		671	.91	3,680	65	5.3	1,200	8.2
Aug. 16-31.....	3,820	22	3.63	.67	9.17		3.90	1.37	8.18		.02		788	1.07	4,090	68	6.3	1,470	8.2
Sept. 1-10	4,100	19	3.29	.82	14.21		3.74	2.19	12.35		.04		1,080	1.47	6,030	78	9.9	1,940	8.2
Sept. 11-21	3,430	16	2.70	.80	16.43		3.39	2.48	14.04		.02		1,180	1.60	5,490	82	12	2,120	8.2
Sept. 22-30	2,290	16	2.82	.64	10.03		3.02	1.71	8.74		.02		795	1.08	2,470	74	7.6	1,430	8.2
Total or weighted average.....	878,900	16	2.05	0.39	4.26		1.95	1.02	3.64		0.08		405	0.55	483,400	64	3.9	720	--

a Residue on evaporation at 180°C.

BRAZOS RIVER BASIN

BRAZOS RIVER AT RICHMOND, TEX.

LOCATION.--At gaging station at bridge on U. S. Highway 59 in Richmond, Fort Bend County, 925 feet downstream from Texas and New Orleans Railroad Bridge and at mile 93.
DRAINAGE AREA.--44,020 square miles (revised), approximately, of which 9,240 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1956.
Water temperatures: November 1950 to September 1956.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 2,090 micromhos Sept. 30; minimum daily, 433 micromhos Feb. 16.
Percent sodium: Maximum, 58 Oct. 1-10, 11-20, Feb. 20-29, July 21-31, Aug. 21-31; minimum, 40 May 6-9.
EXTREMES, 1945-56.--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 concentrations less than 1,000 ppm are residues on evaporation at 180°C and for concentrations more than 1,000 ppm are calculated from determined constituents unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1955 to September 1956 given in WSP 1442.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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, 1955..	294,700	13	5.34	1.15	9.31	0.16	2.07	4.39	9.45	0.03	0.04	0.22	982	1.34	394,900	58	5.2	1,650	7.6
Oct. 11-20	297,600	13	5.29	1.23	9.09	.16	1.87	4.96	9.16	.03	.03	.24	a1,000	1.36	404,700	58	5.0	1,660	7.7
Oct. 21-31	77,870	13	5.44	1.07	8.57	.16	2.20	4.66	8.52	.03	.02	.26	952	1.29	100,500	56	4.8	1,590	7.7
Nov. 1-30.....	66,630	13	5.59	1.23	7.57	.15	2.85	3.98	7.67	.03	.02	.27	886	1.20	79,960	52	4.1	1,460	7.8
Dec. 1-10	17,230	14	5.19	1.40	6.61	.13	3.43	3.27	6.34	.02	.01	.13	811	1.10	18,950	50	3.6	1,320	8.2
Dec. 11-20	14,780	9.8	5.09	1.32	6.13	.13	3.54	3.21	5.78	.02	.00	.15	770	1.05	15,520	48	3.4	1,260	8.0
Dec. 21-31.....	16,170	8.4	4.99	1.40	6.13	.13	3.51	3.16	5.78	.02	.01	.13	757	1.03	16,660	48	3.4	1,250	7.8
Jan. 1-10, 1956 .	14,260	7.8	5.04	1.32	6.13	.13	3.44	3.29	6.06	.02	.01	.19	764	1.04	14,830	49	3.4	1,260	7.9
Jan. 11-20	15,140	9.2	5.09	1.32	6.22	.13	3.56	3.27	6.06	.02	.01	.22	772	1.05	15,900	49	3.5	1,270	7.9
Jan. 21-31	29,730	6.0	4.29	1.07	5.66	.13	2.49	3.21	5.58	.02	.01	.14	680	.92	27,350	51	3.4	1,140	7.7
Feb. 1-8, 12....	25,210	7.8	4.04	1.15	5.52	.12	2.56	2.77	5.41	.02	.01	.20	642	.87	21,930	51	3.4	1,110	7.7
Feb. 9-11, 13 ...	25,650	7.6	2.86	.66	3.26	.11	2.21	1.62	3.10	.02	.02	.16	421	.57	14,620	47	2.5	732	7.6
Feb. 14-19.....	38,220	9.6	2.05	.39	2.31	.11	1.70	.94	2.17	.03	.04	.14	318	.43	16,430	48	2.1	519	7.6
Feb. 20-29	30,470	9.4	2.89	.82	5.22	.14	2.02	1.62	5.41	.03	.02	.22	552	.75	22,850	58	3.8	970	7.6
Mar. 1-6, 14-16	24,910	9.6	5.14	1.23	7.74	.15	2.61	4.02	7.90	.02	.01	.14	884	1.20	29,890	54	4.3	1,460	7.6
Mar. 7-13.....	20,510	11	3.39	.77	4.35	.13	2.11	2.17	4.43	.02	.04	.12	530	.72	14,770	50	3.0	903	7.6
Mar. 17-31.....	19,360	10	5.49	1.48	7.13	.14	3.10	4.02	7.39	.02	.01	.12	879	1.20	23,230	50	3.8	1,430	7.7

a Residue on evaporation at 180°C.

BRAZOS RIVER BASIN--Continued

BRAZOS RIVER AT RICHMOND, TEX.--Continued

Chemical analyses, water year October 1955 to September 1956--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 (micromhos 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. 1-10, 1956	11,840	14	4.92	1.48	6.18	0.13	3.52	3.08	5.87	0.02	0.01	0.14	766	1.04	12,310	49	3.5	1,280	7.5
Apr. 11-23	32,360	15	3.06	.78	3.70	.13	2.11	1.98	3.55	.03	.02	.12	478	.65	21,030	48	2.7	807	7.4
Apr. 24-30	8,970	10	5.52	1.64	8.09	.16	2.95	4.58	7.76	.03	.02	.14	958	1.30	11,660	52	4.3	1,560	8.2
May 1-3, 13-22	94,580	13	3.39	.82	4.31	.14	2.10	2.17	4.43	.03	.02	.18	554	.75	70,940	50	3.0	921	8.1
May 4-5, 10-12	90,980	12	5.69	1.40	8.09	.17	2.41	4.77	8.12	.03	.02	.11	a1,000	1.36	123,700	53	4.3	1,580	7.8
May 6-9	116,600	13	2.57	.57	2.13	.12	2.02	1.46	1.89	.04	.03	--	343	.47	54,800	40	1.7	562	7.8
May 23-31	16,860	10	3.99	1.15	5.61	.15	2.26	2.91	5.70	.03	.01	.12	700	.95	16,020	51	3.5	1,140	8.0
June 1-10	18,170	15	5.39	1.56	7.57	.15	2.70	4.35	7.47	.03	.01	.17	943	1.28	23,260	52	4.0	1,490	8.0
June 11-20	17,210	12	4.79	1.40	6.70	.14	2.46	3.85	6.77	.03	.01	.14	846	1.15	19,790	51	3.8	1,330	8.1
June 21-30	11,410	13	5.09	1.48	7.57	.15	2.67	4.06	7.47	.03	.01	.18	922	1.25	14,260	53	4.2	1,460	8.1
July 1-10	2,670	17	4.99	1.56	7.92	.16	3.05	4.27	7.33	.03	.01	.11	926	1.26	3,360	54	4.4	1,530	7.9
July 11-20	19,680	13	5.74	1.64	9.79	.17	2.18	5.52	9.53	.03	.01	.03	1,050	1.43	28,140	56	5.1	1,750	7.7
July 21-31	21,740	11	5.94	1.56	10.40	.16	1.92	5.95	10.15	.03	.01	.06	1,100	1.50	32,610	58	5.4	1,870	7.8
Aug. 1-10	17,090	12	5.69	1.56	9.83	.16	1.95	5.60	9.64	.02	.02	.16	1,050	1.43	24,440	57	5.2	1,790	7.9
Aug. 11-20	6,990	13	5.39	1.64	9.31	.15	2.31	5.16	9.16	.02	.02	.16	b1,000	1.36	9,510	56	5.0	1,720	7.8
Aug. 21-31	15,050	11	5.74	1.81	10.70	.16	1.97	6.02	10.38	.02	.02	.19	1,120	1.52	22,880	58	5.5	1,890	7.8
Sept. 1-10	11,800	13	5.96	1.56	9.96	.17	2.07	5.75	9.93	.03	.02	.22	1,080	1.47	17,350	56	5.1	1,790	7.6
Sept. 11-20	9,350	14	6.04	1.48	9.53	.16	2.54	5.35	9.59	.02	.02	.21	1,050	1.43	13,370	55	4.9	1,740	8.1
Sept. 21-30	14,690	12	6.35	1.73	11.05	.18	2.08	6.25	11.28	.02	.02	.23	1,190	1.62	23,800	57	5.5	1,960	7.6
Total or weighted average	1,567,000	12	4.74	1.15	7.22	0.15	2.23	3.85	7.33	0.03	0.02	0.18	834	1.13	1,771,000	54	4.2	1,380	--

a Residue on evaporation at 180°C.
b Calculated from determined constituents.

COLORADO RIVER AT AUSTIN, TEX.

LOCATION.--At raw-water intake at Austin City Water Plant, just downstream from bridge on U. S. Highway 290 in Austin, Travis County, half a mile downstream from Barton Creek, and 4.5 miles upstream from gaging station at Montopolis bridge on U. S, Highway 183.
DRAINAGE AREA.--38,400 square miles above gaging station approximately, of which 11,900 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1956.
Water temperatures: October 1947 to September 1956.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 459 micromhos June 22; minimum daily, 368 micromhos May 2.
Percent sodium: Maximum, 33 Oct. 1-31; minimum, 27 Dec. 1-31, Apr. 1-30.
EXTREMES, 1947-56.--Specific conductance: Maximum daily, 591 micromhos July 1, 1948; minimum daily, 243 micromhos Dec. 2, 1953.
Percent sodium: Maximum, 46 Nov. 1-30, 1951; minimum, 15 Nov. 1-30, 1953, Jan. 1-31, 1954
REMARKS.--Values reported for dissolved solids are residues on evaporation at 180°C unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1955 to September 1956 given in WSP 1442. No appreciable inflow between sampling point and gaging station except during periods of heavy local rains.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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. 1-31, 1955...	137,900	7.4	2.10	0.82	1.45		2.57	0.48	1.30	0.01	0.01		249	0.34	46,890	33	1.2	425	7.8
Nov. 1-30	103,100	8.8	2.04	.82	1.36		2.47	.48	1.24	.02	.01		a 233	.32	32,990	32	1.1	410	8.1
Dec. 1-31.....	31,140	7.8	2.24	.90	1.15		2.62	.48	1.16	.02	.01		a 234	.32	9,960	27	.9	421	8.0
Jan. 1-31, 1956 ..	20,150	6.4	2.22	.76	1.36		2.64	.50	1.18	.01	.01		a 237	.32	6,450	31	1.1	424	7.9
Feb. 1-29.....	31,460	6.8	2.14	.82	1.19		2.62	.44	1.07	.01	.01		a 226	.31	9,750	29	1.0	405	7.9
Mar. 1-31.....	29,850	7.2	2.20	.90	1.20		2.72	.48	1.07	.02	.01		247	.34	10,150	28	1.0	430	8.1
Apr. 1-30.....	57,470	8.0	2.10	.90	1.13		2.61	.46	1.02	.02	.02		a 225	.31	17,820	27	.9	423	8.1
May 1-31.....	141,400	11	2.02	.76	1.30		2.47	.48	1.07	.02	.04		228	.31	43,830	32	1.1	405	7.9
June 1-30.....	135,200	7.8	2.10	.76	1.34		2.59	.44	1.13	.02	.02		a 230	.31	41,910	32	1.1	414	8.1
July 1-31.....	146,500	7.8	2.16	.82	1.26		2.64	.46	1.10	.02	.02		232	.32	46,880	30	1.0	416	7.7
Aug. 1-31.....	97,320	8.0	2.14	.82	1.27		2.67	.46	1.07	.02	.01		235	.32	31,140	30	1.0	419	8.0
Sept. 1-30.....	34,600	7.0	2.04	.82	1.32		2.64	.44	1.07	.02	.01		236	.32	11,070	32	1.1	411	8.2
Total or weighted average	966,100	8.2	2.10	0.81	1.31		2.59	0.46	1.13	0.02	0.02		234	0.32	309,200	31	1.1	416	--

a Calculated from determined constituents.

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 1956.
Water temperatures: October 1945 to September 1948, March 1950 to September 1956.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 559 micromhos Sept. 23; minimum daily, 266 micromhos Feb. 12.
Percent sodium: Maximum, 30 Oct. 1-31; minimum, 24 Feb. 10-17.
EXTREMES, 1944-56.--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 at 180°C unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1955 to September 1956 given in WSP 1442.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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 31, 1955 ..	160,400	10	2.23	0.79	1.35	0.13	2.67	0.48	1.30	0.03	0.02	0.14	a252	0.34	54,540	30	1.1	454	7.8
Nov. 1-30.....	106,000	6.4	2.18	.82	1.30	.14	2.62	.48	1.30	.03	.02	.13	a 246	.33	34,980	29	1.1	435	7.9
Dec. 1-31.....	47,970	7.8	2.45	.99	1.30	.13	3.08	.50	1.24	.01	.01	.07	274	.37	17,750	27	1.0	477	8.2
Jan. 1-31, 1956 ..	28,350	5.2	2.80	.90	1.39	.12	3.57	.54	1.24	.01	.01	--	288	.39	11,060	27	1.0	507	8.1
Feb. 1-9, 18-29 ..	33,340	7.6	2.38	.80	1.13	.12	2.84	.52	1.07	.01	.03	.10	a246	.33	11,000	26	.9	441	8.0
Feb. 10-17	25,000	8	1.79	.49	.74	.10	1.93	.44	.68	.01	.04	.18	178	.24	6,000	24	.7	313	7.7
Mar. 1-31	31,320	8	2.45	1.07	1.35	.13	3.15	.56	1.27	.02	.01	.12	a273	.37	11,590	27	1.0	487	7.8
Apr. 1-30.....	44,570	7.4	2.10	.82	1.22	.14	2.54	.50	1.18	.02	.02	.11	243	.33	14,710	29	1.0	429	7.6
May 1 31	87,550	--	2.01	.79	1.13	.14	2.43	.50	1.04	--	--	--	238	.32	28,020	28	1.0	401	7.9
June 1-30	73,470	8.8	1.97	.77	1.17	.14	2.44	.46	1.13	.03	.02	.14	229	.31	22,780	29	1.0	403	7.8
July 1-31	49,020	8.4	1.94	.82	1.17	.14	2.49	.46	1.13	.02	.01	.00	a228	.31	15,200	29	1.0	413	7.8
Aug. 1-31	40,230	12	2.12	.82	1.22	.13	2.72	.44	1.13	.02	.01	.06	a241	.33	13,280	28	1.0	427	8.1
Sept. 1-30	28,250	11	2.23	.99	1.35	.14	b3.05	.46	1.24	.02	.01	.15	265	.36	10,170	29	1.1	470	8.3
Total or weighted average	755,500	8.6	2.20	0.82	1.26	0.13	2.67	0.48	1.18	0.02	0.02	0.11	246	0.33	249,300	29	1.0	435	--

a Calculated from determined constituents.

b Includes 0.03 equivalent per million of carbonate (CO_3).

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GUADALUPE RIVER BASIN

GUADALUPE RIVER AT VICTORIA, TEX.

LOCATION.--At gaging station at bridge on U. S. Highway 59 in Victoria, Victoria County, 1,300 feet upstream from Texas and New Orleans bridge,,10 miles upstream from Coleto Creek and at mile 51.
DRAINAGE AREA.--5,161 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1946, October 1948 to September 1956.
Water temperatures: November 1950 to September 1956.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 905 micromhos Jan. 1; minimum daily, 478 micromhos May 14.
Percent sodium: Maximum, 49 Aug. 1-10; minimum, 31 Jan. 11-20, Feb. 21-29.
EXTREMES, 1945-46, 1948-56.--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 calculated from determined constituents unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1955 to September 1956 given in WSP 1442.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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, 1956 .	2,140	22	2.40	1.07	2.04	0.11	3.51	0.50	1.66	0.03	0.01	0.25	324	0.44	942	36	1.5	570	8.1
Oct. 11-20	1,950	20	2.59	1.23	2.13	.10	3.77	.54	1.69	.03	.01	.15	340	.46	897	35	1.5	592	8.1
Oct. 21-31	2,070	17	2.59	1.15	2.22	.10	3.80	.54	1.80	.03	.01	.24	343	.47	973	37	1.6	604	8.0
Nov. 1-10.....	2,000	16	2.84	1.32	2.35	.10	4.03	.60	2.00	.03	.01	.26	369	.50	1,000	36	1.6	639	8.0
Nov. 11-20	2,100	16	2.89	1.23	2.39	.10	a4.12	.60	1.97	.03	.02	.25	372	.51	1,070	36	1.7	642	8.5
Nov. 21-30.....	2,260	15	2.99	1.32	2.87	.10	4.20	.65	2.40	.03	.01	.27	405	.55	1,240	39	2.0	699	8.0
Dec. 1-10.....	3,970	16	2.99	1.40	2.48	.10	4.31	.62	2.00	.02	.04	.18	b396	.54	2,140	36	1.7	680	8.1
Dec. 11-20.....	3,300	16	2.99	1.48	2.35	.09	4.29	.67	1.97	.02	.02	.18	b390	.53	1,750	34	1.6	675	7.9
Dec. 21-31.....	3,960	13	3.09	1.48	2.44	.09	4.16	.65	2.17	.02	.01	.15	b389	.53	2,100	34	1.6	684	8.0
Jan. 1-10, 1956..	3,760	13	3.47	1.07	2.87	.10	4.02	.75	2.65	.01	.01	.22	b422	.57	2,140	38	1.9	737	8.1
Jan. 11-20	3,460	12	3.53	1.07	2.09	.09	4.36	.67	1.69	.01	.01	.22	371	.50	1,730	31	1.4	637	8.1
Jan. 21-31	4,750	11	3.50	.90	2.18	.09	4.26	.62	1.75	.01	.01	.20	366	.50	2,380	33	1.5	636	8.1

a Includes 0.20 equivalent per million of carbonate (CO_3).
b Residue on evaporation at 180°C.

GUADALUPE RIVER BASIN--Continued

GUADALUPE RIVER AT VICTORIA, TEX.--Continued

Chemical analyses, water year October 1955 to September 1956--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 (micromhos 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, 1956	4,320	13	2.94	1.40	2.18	0.08	4.13	0.67	1.78	0.01	0.02	0.09	362	0.49	2,120	33	1.5	612	8.2
Feb. 11-20	6,640	13	3.04	1.48	2.18	.08	4.25	.62	1.80	.01	.02	.17	368	.50	3,320	32	1.5	628	8.2
Feb. 21-29	3,720	14	2.69	1.15	1.78	.09	3.74	.56	1.41	.01	.03	.06	317	.43	1,600	31	1.3	538	8.2
Mar. 1-10	3,500	20	2.99	1.40	2.31	.10	3.88	.71	2.09	.02	.02	.21	381	.52	1,820	34	1.6	656	8.0
Mar. 11-20	3,000	15	2.94	1.48	2.26	.10	4.10	.69	2.03	.02	.02	.18	377	.51	1,530	33	1.5	659	8.0
Mar. 21-31	3,227	13	2.79	1.56	2.18	.09	4.00	.69	1.89	..02	.01	.20	363	.49	1,580	33	1.5	630	7.8
Apr. 1-10	2,330	14	2.72	1.40	2.35	.09	3.90	.65	1.92	.02	.01	.18	b362	.49	1,140	36	1.6	640	7.8
Apr. 11-20	2,350	15	2.68	1.48	2.48	.09	3.93	.69	2.03	.02	.01	.22	b378	.51	1,200	37	1.7	660	8.1
Apr. 21-30	4,680	15	2.68	1.48	2.44	.09	3.93	.67	2.03	.02	.01	.22	b374	.51	2,390	36	1.7	650	8.1
May 1-10	5,120	15	2.36	1.64	2.78	.10	3.52	.69	2.54	.03	.03	.19	b388	.53	2,710	40	2.0	682	8.0
May 11-20	6,520	22	2.34	.90	1.87	.11	2.85	.48	1.80	.02	.03	.14	b304	.41	2,670	36	1.5	524	8.0
May 21-31	2,150	17	2.37	.99	2.44	.12	2.95	.62	2.28	.03	.03	.18	b348	.47	1,010	41	1.9	606	7.9
June 1-10	1,270	21	2.40	1.15	2.65	.12	3.36	.62	2.31	.03	.02	.22	364	.50	635	42	2.0	633	8.2
June 11-20	1,140	19	2.84	1.32	3.31	.12	c3.33	.65	3.44	.03	.02	.16	427	.58	661	44	2.3	758	8.4
June 21-30	1,140	18	2.69	1.07	2.91	.11	c3.12	.56	3.07	.03	.01	.19	388	.53	604	43	2.1	690	8.4
July 1-10	883	23	2.57	.99	2.35	.12	3.34	.48	2.20	.03	.01	.12	348	.47	415	39	1.8	600	7.7
July 11-20	1,440	23	2.39	.99	2.26	.12	3.41	.46	1.92	.03	.01	.13	333	.45	648	39	1.7	577	7.9
July 21-31	986	19	2.61	.99	3.13	.13	3.41	.65	2.76	.03	.03	.19	392	.53	523	46	2.3	698	7.9
Aug. 1-10	764	22	2.33	1.15	3.48	.13	3.54	.65	2.85	.03	.01	.16	407	.55	420	49	2.6	718	8.2
Aug. 11-20	553	24	2.20	.90	2.65	.13	3.39	.42	1.97	.03	.01	.13	339	.46	255	45	2.1	591	8.1
Aug. 21-31	994	20	2.37	.99	3.09	.13	3.59	.54	2.40	.03	.01	.13	376	.51	507	47	2.4	661	8.1
Sept. 1-10	1,380	23	2.27	1.23	3.05	.13	3.74	.56	2.43	.03	.02	.30	385	.52	718	46	2.3	679	8.1
Sept. 11-20	1,060	21	2.25	1.23	3.35	.12	3.84	.60	2.57	.03	.02	.33	400	.54	572	48	2.5	709	8.0
Sept. 21-30	631	19	2.19	1.23	3.18	.12	3.74	.58	2.48	.03	.01	.31	b388	.53	334	47	2.4	685	8.2
Total or weighted average	95,500	16	2.79	1.32	2.39	0.10	3.85	0.62	2.03	0.02	0.02	0.19	368	0.50	47,750	36	1.7	639	--

b Residue on evaporation at 180°C.

c Includes 0.17 equivalent per million of carbonate (CO_3).

NUECES RIVER NEAR MATHIS, TEX.

LOCATION.--At intake tower at Lake Corpus Christi, 0.8 mile upstream from gaging station at bridge on State Highway 359, 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 1956.
Water temperatures: October 1947 to September 1956.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 788 micromhos Apr. 29 ; minimum daily, 355 micromhos Sept. 14-15.
Percent sodium: Maximum, 56 May 1-30, June 1-30; minimum, 32 Nov. 1-30, Dec. 1-31.
EXTREMES, 1947-56.--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 at 180°C unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1955 to September 1956 given in WSP 1442.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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. 1-31, 1955	41,310	22	2.30	0.32	1.52	0.20	2.90	0.54	0.85	0.04	0.06	0.28	267	0.36	14,870	35	1.3	430	7.9
Nov. 1-30	3,660	22	2.59	.31	1.44	.20	3.18	.48	.82	.03	.05	.22	284	.39	1,430	32	1.2	435	7.8
Dec. 1-31	2,790	21	2.58	.38	1.52	.20	3.29	.50	.85	.02	.03	.10	294	.40	1,120	32	1.2	444	7.7
Jan. 1-31, 1956	3,200	18	2.76	.30	1.74	.20	3.41	.56	.90	.02	.02	.18	300	.41	1,310	35	1.4	472	8.1
Feb. 1-29	3,040	19	2.81	.39	1.83	.20	3.56	.58	1.04	.01	.01	.23	a303	.41	1,250	35	1.4	497	8.2
Mar. 1-31	3,630	21	2.94	.42	2.00	.23	3.72	.65	1.18	.02	.03	.18	332	.45	1,630	36	1.5	542	7.9
Apr. 1-30	2,920	21	2.99	.51	3.18	.23	4.25	.75	1.75	.03	.03	.22	410	.56	1,640	46	2.4	666	7.9
May 1-31	4,310	20	2.39	.39	3.78	.23	3.75	.79	2.14	.03	.06	.26	409	.56	2,410	56	3.2	679	7.8
June 1-30	6,310	21	2.24	.34	3.52	.21	3.47	.79	1.86	.03	.06	.34	382	.52	3,280	56	3.1	624	8.0
July 1-31	6,790	22	2.34	.34	3.48	.21	3.46	.85	1.92	.04	.05	.14	378	.51	3,460	55	3.0	638	7.7
Aug. 1-31	11,280	22	2.38	.38	3.65	.22	3.74	.90	1.86	.04	.04	.12	410	.56	6,320	55	3.1	652	8.2
Sept. 1-30	44,030	17	1.74	.26	1.74	.19	2.25	.67	.96	.03	.07	.14	254	.35	15,410	44	7.9	406	7.8
Total or weighted average	133,300	20	2.20	0.32	2.09	0.20	2.93	0.65	1.16	0.03	0.06	0.20	296	0.40	53,320	43	1.9	480	--

a Calculated from determined constituents.

RIO GRANDE BASIN

RIO GRANDE ABOVE CULEBRA CREEK, NEAR LOBATOS, COLO.

LOCATION.--Half a mile southeast of La Sauces, 7 miles upstream from Culebra Creek, and 15 miles upstream from gaging station near Lobatos, Conejos County.
DRAINAGE AREA.--7,700 square miles, approximately, above gaging station (includes 2,940 square miles in closed basin in northern part of San Luis Valley, Colo.).
RECORDS AVAILABLE.--Chemical analyses: October 1946 to September 1956.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 997 micromhos June 13, minimum daily, 213 micromhos Nov. 3.
Percent sodium: Maximum, 50 Sept. 24-30; minimum, 27 Feb. 11-20.
EXTREMES, 1946-56.--Specific conductance: Maximum daily, 1,070 micromhos July 26, 1948; minimum daily, 122 micromhos June 1, 1949.
Percent sodium: Maximum, 66 May 18-21, 30-31, 1955; minimum, 16 Dec. 1, 3-10, 1946.
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 Albuquerque, N. Mex. Records of discharge for gaging station near Lobatos for water year October 1955 to September 1956 given in WSP 1442. Culebra Creek which enters the Rio Grande between the sampling point and the gaging station is usually dry at its mouth. Inflow from this and other sources between sampling point and gaging station occurs only after heavy rainfall.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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. 1-2, 4-10, 1955	299	41	2.10	0.71	1.61	0.19	3.08	1.15	0.28	0.04	0.01	0.14	298	0.41	123	35	1.4	432	7.4
Oct. 3	24	--	1.20	.27	0.72		1.57	.60	.01	--	.01	--	--	--	--	33	.8	222	7.4
Oct. 11-20	656	--	1.85	.76	1.74	--	2.90	--	--	--	--	--	289	.39	256	40	1.5	425	7.5
Oct. 21-31	698	--	2.05	.74	1.87	--	2.95	--	--	--	--	--	306	.42	293	40	1.6	450	7.4
Nov. 1-10	1,520	--	1.65	.58	1.39	--	2.34	--	--	--	--	--	246	.33	502	38	1.3	355	7.3
Nov. 11-20	1,230	--	1.85	.68	2.18	--	2.69	--	--	--	--	--	318	.43	529	46	1.9	474	7.4
Nov. 21-30	1,880	--	1.85	.61	1.48	--	2.69	--	--	--	--	--	263	.36	677	38	1.3	383	7.4
Dec. 1-10	1,900	--	2.10	.72	1.57	--	2.87	--	--	--	--	--	305	.41	779	36	1.3	440	7.7
Dec. 11-20	2,580	--	1.65	.51	1.00	--	2.20	--	--	--	--	--	223	.30	774	32	1.0	319	7.2
Dec. 21-31	4,130	--	1.40	.39	.78	--	1.85	--	--	--	--	--	180	.24	991	30	.8	265	7.1
Jan. 1-4, 6-10, 1956	3,530	32	1.45	.41	.91	--	1.87	.83	.17	.02	.02	.08	200	.27	953	31	.9	286	7.4
Jan. 5	387	--	1.75	.99	1.84		3.77	.48	.31	--	.02	--	--	--	--	40	1.6	414	7.4
Jan. 11-20	4,260	--	1.35	.45	.74	--	1.85	--	--	--	--	--	181	.25	1,060	29	.8	264	7.1
Jan. 21-31	4,040	--	1.50	.45	.78	--	2.08	--	--	--	--	--	193	.26	1,050	29	.8	282	7.3

Feb. 1-3, 1956...	942	--	2.40	.82	1.39	--	3.84	--	--	--	--	--	320	.44	414	30	1.1	454	7.5
Feb. 4-10.....	2,480	--	1.40	.43	.70	--	1.77	--	--	--	--	--	185	.25	620	28	.7	265	7.3
Feb. 11-20.....	3,920	--	1.35	.39	.65	--	1.74	--	--	--	--	--	173	.24	941	27	.7	251	7.3
Feb. 21-29.....	3,900	--	1.20	.37	.65	--	1.70	--	--	--	--	--	160	.22	858	29	.7	236	7.3
Mar. 1-10	4,270	--	1.36	.39	.74	--	1.79	--	--	--	--	--	169	.23	982	30	.8	254	7.2
Mar. 11-20	2,510	--	1.75	.63	1.13	--	2.25	--	--	--	--	--	237	.32	803	32	1.0	352	7.5
Mar. 21-31	2,250	--	1.90	.76	1.44	--	2.23	--	--	--	--	--	282	.38	855	35	1.2	399	7.5
Apr. 1-10.....	1,610	36	2.05	.74	1.52	0.16	2.31	1.69	0.39	0.03	0.01	0.12	300	.41	660	34	1.3	429	7.9
Apr. 11-15.....	512	--	2.20	.90	2.00	--	2.52	--	--	--	--	--	334	.45	230	39	1.6	504	7.6
Apr. 16-20.....	446	--	2.69	1.07	2.48	--	2.62	--	--	--	--	--	422	.57	254	40	1.8	617	7.7
Apr. 21-24.....	410	--	2.10	.72	1.70	--	2.59	--	--	--	--	--	312	.42	172	38	1.4	454	7.6
Apr. 25-May 1 ...	1,480	--	1.55	.57	1.30	--	2.00	--	--	--	--	--	240	.33	488	38	1.3	343	7.9
May 2-5	555	--	1.70	.63	1.57	--	1.98	--	--	--	--	--	266	.36	200	40	1.5	389	7.3
May 6-13	2,210	--	1.15	.51	.87	--	1.64	--	--	--	--	--	186	.25	552	34	1.0	259	7.3
May 14-27	4,430	--	1.55	.67	1.44	--	2.36	--	--	--	--	--	250	.34	1,510	39	1.4	357	7.5
May 28-29	1,130	--	2.05	.74	1.48	--	2.28	--	--	--	--	--	294	.40	452	35	1.3	418	7.6
May 30-June 12 ..	12,600	--	1.50	.63	1.22	--	1.79	--	--	--	--	--	238	.32	4,030	36	1.2	335	7.3
June 13-25.....	2,460	--	3.79	1.73	3.92	--	2.77	--	--	--	--	--	628	.85	2,090	42	2.4	892	7.5
June 26-30.....	375	--	2.99	1.23	2.83	--	2.87	--	--	--	--	--	466	.63	236	40	2.0	677	7.6
July 1-10	426	32	2.89	1.07	2.65	.23	2.90	3.21	.62	.05	.01	.19	448	.61	260	39	1.9	646	7.7
July 11-31	263	--	2.30	1.23	2.74	--	3.06	--	--	--	--	--	414	.56	147	44	2.1	600	8.0
Aug. 1-4	47	--	2.05	1.07	2.78	--	3.26	--	--	--	--	--	388	.53	25	47	2.2	578	7.7
Aug. 5-10	a 37	--	1.80	.90	2.57	--	3.02	--	--	--	--	--	353	.48	18	49	2.2	519	7.8
Aug. 16-18.....	5.2	--	2.50	.99	2.44	--	3.70	--	--	--	--	--	382	.52	3	41	1.8	562	7.6
Aug. 19-31.....	108	--	1.90	.90	2.44	--	3.49	--	--	--	--	--	351	.48	52	47	2.1	512	7.5
Sept. 1-9, 11-12..	a 39	--	1.95	.99	2.70	--	3.16	--	--	--	--	--	376	.51	20	48	2.2	552	7.9
Sept. 13, 15, 17-23	a 26	--	1.65	.82	2.35	--	3.16	--	--	--	--	--	324	.44	11	49	2.1	474	7.9
Sept. 24-30	49	--	1.70	.90	2.61	--	3.10	--	--	--	--	--	350	.48	24	50	2.3	512	7.9
Total or weighted average	76,670	--	1.65	0.60	1.22	--	2.10	--	--	--	--	--	241	0.33	25,300	35	1.2	348	--

a No flow Aug. 11-15, Sept. 10, 14, 16.

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, 400 feet downstream from bridge on State Highway 4, 1¾ miles southwest of San Ildefonso Pueblo, 2½ miles downstream from Pojoaque River, and 7 miles west of Pojoaque, Santa Fe County.
DRAINAGE AREA.--14,300 square miles, approximately (includes 2,940 square miles in closed basin in northern part of San Luis Valley, Colo.).
RECORDS AVAILABLE.--Chemical analyses: October 1946 to September 1956.
Water temperatures: October 1948 to September 1956.
Sediment records: October 1947 to September 1956.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 792 micromhos Aug. 11; minimum daily, 255 micromhos Apr. 24.
Percent sodium: Maximum, 33 June 18-26; minimum, 18 May 1-10.
EXTREMES, 1946-56.--Specific conductance: Maximum daily, 1,230 micromhos Aug. 26, 1951; minimum daily, 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 calculated from determined constituents. Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of discharge for water year October 1955 to September 1956 given in WSP 1442.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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, 1955 ..	4,630	32	2.05	0.82	1.09		2.85	0.90	0.28		0.00		247	0.34	1,570	28	0.9	379	7.9
Oct. 11-20.....	5,400	30	2.05	.71	1.17		2.85	.96	.25		.00		248	.34	1,840	30	1.0	383	7.8
Oct. 21-31.....	6,400	33	2.15	.76	1.22		2.92	1.06	.27		.00		262	.36	2,300	30	1.0	393	8.0
Nov. 1-10	6,680	31	2.25	.90	1.39		3.00	1.31	.34		.01		285	.39	2,610	31	1.1	438	7.8
Nov. 11-20	7,250	30	2.20	.90	1.30		2.88	1.29	.28		.01		274	.37	2,680	30	1.0	419	7.9
Nov. 21-30	7,650	32	2.25	.90	1.39		2.95	1.35	.34		.01		286	.39	2,980	31	1.1	428	7.8
Dec. 1-10.....	7,950	31	2.30	.82	1.39		2.93	1.33	.34		.01		284	.39	3,100	31	1.1	436	7.9
Dec. 11-20	8,980	34	2.25	.90	1.39		2.88	1.37	.28		.01		286	.39	3,500	31	1.1	430	8.1
Dec. 21-31	11,900	32	2.05	.76	1.13		2.59	1.12	.24		.01		250	.34	4,050	29	1.0	377	7.8
Jan. 1-10, 1956 ..	10,240	32	2.00	.78	1.13		2.47	1.23	.25		.01		250	.34	3,480	29	1.0	378	7.8
Jan. 11-20.....	11,120	27	2.10	.72	1.09		2.46	1.12	.27		.01		241	.33	3,670	28	.9	376	7.6
Jan. 21-31.....	12,210	27	2.20	.80	1.13		2.52	1.29	.25		.01		254	.35	4,270	27	.9	397	7.8
Feb. 1-10	9,490	30	2.10	.80	1.13		2.52	1.23	.23		.01		252	.34	3,230	28	.9	388	8.2
Feb. 11-20	10,340	30	2.10	.78	1.13		2.46	1.23	.24		.01		250	.34	3,520	28	.9	381	7.8
Feb. 21-28	9,800	26	2.40	.78	1.13		2.57	1.46	.23		.01		266	.36	3,530	26	.9	402	7.6

Feb. 29, Mar. 1, 8-11, 15, 1956..	8,530	30	2.20	.82	1.13		2.43	1.50	.20		.01		263	.36	3,070	27	.9	404	7.8
Mar. 2-7, 21-25..	14,900	26	2.79	.90	1.22		2.69	1.94	.21		.03		304	.41	6,110	25	.9	472	7.6
Mar. 12-14, 16-20	9,030	27	2.40	.82	1.26		2.59	1.64	.25		.02		281	.38	3,430	28	1.0	434	7.7
Mar. 26-31.....	10,640	24	2.35	.74	.83		2.49	1.19	.17		.03		239	.33	3,510	21	.7	376	7.8
Apr. 1-20.....	34,930	22	2.20	.54	.74		2.34	.94	.17		.02		212	.29	10,130	21	.6	336	7.7
Apr. 21-30	24,490	19	1.90	.58	.57		2.11	.73	.16		.02		182	.25	6,120	19	.5	291	7.6
May 1-10.....	26,510	18	2.05	.47	.57		2.29	.60	.14		.01		182	.25	6,630	18	.5	295	7.8
May 11-20.....	13,290	22	1.85	.54	.87		2.23	.79	.17		.01		198	.27	3,590	27	.8	317	7.7
May 21-31.....	17,590	23	1.90	.61	.91		2.33	.87	.19		.01		209	.28	4,930	27	.8	329	7.7
June 1-10.....	20,760	23	1.75	.54	.78		2.00	.85	.15		.01		190	.26	5,400	25	.7	298	7.6
June 11-17.....	7,940	23	1.90	.63	1.00		2.07	1.23	.19		.01		220	.30	2,380	28	.9	348	7.5
June 18-26.....	4,120	27	2.45	.90	1.65		2.59	1.96	.37		.01		311	.42	1,730	33	1.3	483	7.8
June 27-30.....	4,300	21	1.85	.51	.78		2.03	1.02	.15		.01		198	.27	1,160	25	.7	301	7.8
July 1-4.....	4,010	23	1.85	.45	.70		2.03	.83	.17		.01		189	.26	1,040	23	.7	295	7.8
July 5.....	531	--	2.00	.61	1.13		2.29	1.29	.28		--		214	.29	154	30	1.0	369	7.9
July 6-12.....	2,200	30	2.15	.74	1.35		2.75	1.25	.28		.01		266	.36	792	32	1.1	412	8.0
July 13-14.....	551	30	2.00	.72	1.22		2.74	1.06	.25		.01		249	.34	187	31	1.0	382	8.1
July 15.....	1,040	28	2.45	.82	1.48		2.84	1.64	.31		.01		297	.40	416	31	1.2	462	8.0
July 16-22.....	6,910	24	1.70	.51	.70		2.02	.79	.13		.01		183	.25	1,730	24	.7	284	7.9
July 23-29.....	2,160	25	1.90	.67	1.22		2.64	.85	.27		.01		229	.31	670	32	1.1	361	8.0
July 30-31.....	835	30	2.40	.63	1.17		3.25	.71	.24		.01		253	.34	284	28	1.0	392	7.6
Aug. 1-10	4,250	31	2.59	.74	1.22		2.88	1.27	.28		.02		279	.38	1,620	27	.9	428	7.6
Aug. 11.....	922	27	5.49	1.56	1.96		4.39	4.04	.37		.03		542	.74	682	22	1.0	792	7.5
Aug. 12-31	11,370	27	2.40	.64	.96		2.67	1.00	.26		.01		243	.33	3,750	24	.8	378	7.6
Sept. 1, 3-30	14,290	30	2.20	.61	1.09		2.64	.98	.28		.01		243	.33	4,720	28	.9	371	7.9
Sept. 2.....	888	31	3.69	.99	1.74		3.70	2.37	.37		.02		396	.54	480	27	1.1	602	7.7
Total or weighted average.....	377,100	26	2.15	0.68	1.00		2.47	1.10	0.22		0.01		236	0.32	120,700	26	0.8	366	--

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 1956.
Sediment records: March 1954 to September 1956.
Water temperatures: March 1954 to September 1956.

EXTREMES, 1955-56.--Specific conductance: Maximum daily, 2,790 micromhos Aug. 4; minimum daily, 776 micromhos Oct. 2.
Percent sodium: Maximum, 64 Sept. 21-27, 30; minimum, 38 Aug. 2-8.

EXTREMES, 1954-56.--Specific conductance: Maximum daily, 2,790 micromhos Aug. 4, 1956; minimum daily, 622 micromhos May 28, 1954.
Percent sodium: Maximum, 64 Sept. 21-27, 30, 1956; minimum, 36 July 25, 28-29, 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 Albuquerque, N. Mex. Records of discharge for water year October 1955 to September 1956 furnished by Santa Fe district office of Surface Water Branch; records of composite discharge for Rio Grande conveyance channel at San Marcial and Rio Grande floodway at San Marcial given under Rio Grande at San Marcial in WSP 1442. No flow in Rio Grande floodway during 1956 water year.

CORRECTION.--WSP 1465: Reference to records of discharge in REMARKS should read: "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 and Rio Grande floodway at San Marcial given under Rio Grande at San Marcial in WSP 1392," instead of, "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, water year October 1955 to September 1956

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 (micromhos 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, 1955 ..	5,920	27	5.44	1.89	5.00	0.18	3.64	6.56	2.20	0.03	0.06	0.29	806	1.10	6,510	40	2.6	1,150	7.7
Oct. 11-20.....	1,670	--	4.79	1.81	6.52	--	4.05	--	--	--	--	--	850	1.16	1,940	50	3.6	1,260	7.7
Oct. 21-31.....	1,200	--	4.99	1.97	7.40	--	4.16	--	--	--	--	--	916	1.25	1,500	52	4.0	1,370	7.8
Nov. 1-10.....	954	--	4.74	1.81	7.18	--	4.00	--	--	--	--	--	876	1.19	1,140	52	4.0	1,310	8.0
Nov. 11-20.....	1,670	--	4.99	1.97	6.52	--	4.31	--	--	--	--	--	863	1.17	1,950	48	3.5	1,280	7.9
Nov. 21-30.....	4,790	--	4.34	1.56	4.35	--	3.95	--	--	--	--	--	650	.88	4,220	42	2.5	962	7.7
Dec. 1-10.....	6,720	--	4.29	1.48	4.00	--	3.80	--	--	--	--	--	617	.84	5,640	41	2.3	912	7.8
Dec. 11-20.....	7,560	--	3.99	1.40	3.70	--	3.64	--	--	--	--	--	578	.79	5,970	41	2.3	855	7.9
Dec. 21-31.....	11,110	--	3.79	1.32	3.70	--	3.54	--	--	--	--	--	570	.78	8,670	42	2.3	863	7.9
Jan. 1-10, 1956 ..	10,590	29	3.79	1.23	3.39	.13	3.41	3.60	1.49	.03	.03	.19	541	.74	7,840	40	2.1	813	8.0
Jan. 11-20.....	11,020	--	3.74	1.48	4.22	--	3.51	--	--	--	--	--	595	.81	8,930	45	2.6	875	8.1
Jan. 21-31.....	12,500	--	3.74	1.48	4.26	--	3.51	--	--	--	--	--	586	.80	10,000	45	2.6	885	8.0

Feb. 1-10, 1956 .	12,000	--	3.74	1.40	4.13	--	3.54	--	--	--	--	--	584	0.79	9,480	45	2.6	871	8.1
Feb. 11-20	11,300	--	3.84	1.56	4.48	--	3.57	--	--	--	--	--	612	.83	9,380	45	2.7	921	7.8
Feb. 21-29	9,940	--	3.84	1.48	4.44	--	3.61	--	--	--	--	--	609	.83	8,250	45	2.7	913	7.8
Mar. 1-10	10,860	--	3.84	1.48	3.96	--	3.56	--	--	--	--	--	598	.81	8,800	43	2.4	894	7.9
Mar. 11-21	7,120	--	4.19	1.56	4.61	--	3.64	--	--	--	--	--	660	.90	6,410	44	2.7	1,000	7.8
Mar. 22-30	2,910	--	4.29	1.56	5.35	--	3.75	--	--	--	--	--	726	.99	2,880	48	3.1	1,100	7.8
Mar. 31-Apr. 10	8,020	31	4.09	1.32	4.52	0.18	3.56	4.27	2.14	0.04	0.02	0.19	642	.87	6,980	45	2.8	970	7.8
Apr. 11-17.....	2,480	--	4.54	1.64	5.87	--	3.82	--	--	--	--	--	776	1.06	2,630	49	3.3	1,170	8.0
Apr. 18-30.....	9,380	--	3.84	1.40	4.57	--	3.39	--	--	--	--	--	628	.85	7,970	47	2.8	963	7.7
May 1-13	11,840	--	3.49	1.32	3.70	--	3.21	--	--	--	--	--	543	.74	8,760	43	2.4	834	7.6
May 14-21	3,370	--	4.29	1.56	5.18	--	3.67	--	--	--	--	--	702	.95	3,200	47	3.0	1,070	7.6
May 22-31	1,130	--	5.14	1.89	7.48	--	4.13	--	--	--	--	--	928	1.26	1,420	52	4.0	1,400	7.6
June 1-30.....	2,400	--	4.74	1.97	8.31	--	4.05	--	--	--	--	--	970	1.32	3,170	55	4.5	1,440	8.0
July 1-10	299	33	4.99	1.81	8.31	.21	3.98	6.54	4.96	.03	.03	.26	984	1.34	401	54	4.5	1,500	7.7
July 11-17.....	a65	--	4.79	2.30	8.87	--	3.75	--	--	--	--	--	1,050	1.43	93	56	4.7	1,570	8.1
Aug. 2-8	3,130	--	13.87	5.10	11.66	--	4.97	--	--	--	--	--	2,010	2.73	8,540	38	3.8	2,490	7.5
Aug. 9-18	149	--	4.34	2.22	10.40	--	3.92	--	--	--	--	--	1,080	1.47	219	61	5.7	1,640	8.0
Aug. 19-25	2,310	--	9.03	3.70	10.35	--	4.95	--	--	--	--	--	1,480	2.01	4,640	45	4.1	1,990	7.5
Aug. 26-31.....	63	--	4.89	2.22	8.79	--	3.90	--	--	--	--	--	1,040	1.41	89	55	4.7	1,540	8.0
Sept. 1-10	99	--	4.54	2.06	8.31	--	4.26	--	--	--	--	--	947	1.29	128	56	4.6	1,440	7.9
Sept. 11-20	133	--	4.54	2.38	11.22	--	4.49	--	--	--	--	--	1,160	1.58	210	62	6.0	1,800	8.0
Sept. 21-27, 30..	a93	--	4.89	2.38	12.88	--	4.54	--	--	--	--	--	1,280	1.74	162	64	6.7	2,000	7.9
Total or weighted average	174,830	--	4.24	1.56	4.61	--	3.62	--	--	--	--	--	665	0.90	157,300	44	2.7	985	--

a No flow July 18 to Aug. 1, Sept. 28-29.

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 1956.
Water temperatures: January 1949 to September 1956.
Sediment records: July 1946 to September 1956.
EXTREMES, 1946-56.--Specific conductance: Maximum daily, 2,730 micromhos Apr. 8, 1953; minimum daily, 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 at 180°C. 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 1955 to September 1956 furnished by Santa Fe district office of Surface Water Branch; records of composite discharge for Rio Grande conveyance channel at San Marcial and Rio Grande floodway at San Marcial given under Rio Grande at San Marcial in WSP 1442. Chemical analyses for Rio Grande conveyance channel given on page 96. No flow in Rio Grande floodway during 1956 water year.

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, Colo.).
RECORDS AVAILABLE.--Chemical analyses, 1933 to 1956.
REMARKS.--Chemical analyses by the U. S. Department of Agriculture, Agricultural Research Service, U. S. Salinity Laboratory, Riverside, Calif. Records of discharge for water year October 1955 to September 1956 given in WSP 1442.

Chemical analyses, water year October 1955 to September 1956

Date of collection	Number of samples	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million									Boron (B) ppm	Dissolved solids			Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos 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				
October 1955	25	519	--	5.19	2.14	6.73	--	1.60	10.21	2.60	--	(b)	0.25	952	1.29	670	48	3.5	1,360	7.8
November ..	20	227	--	5.90	2.16	6.95	--	2.41	10.32	2.60	--	0.01	.21	1,010	1.37	311	46	3.5	1,410	8.1
December ..	20	456	--	6.00	2.30	7.05	--	a 2.49	10.19	2.75	--	.01	.22	1,005	1.37	625	46	3.5	1,410	8.3
January 1956	25	294	14	5.66	2.30	6.98	0.22	2.55	9.86	2.60	0.04	.01	.16	989	1.35	397	46	3.5	1,410	8.1
February ...	20	316	--	5.85	2.27	7.02	--	2.70	9.86	2.65	--	.01	.18	1,013	1.38	436	46	3.5	1,410	8.1
March	20	57,900	--	5.08	1.89	6.66	--	2.25	9.01	2.60	--	(b)	.19	896	1.22	70,640	49	3.6	1,300	8.0
April	25	39,290	--	4.41	1.85	5.80	--	2.30	7.21	2.60	--	(b)	.15	801	1.09	42,830	48	3.3	1,170	8.1
May	20	1,780	--	5.10	1.78	6.65	--	3.50	7.67	2.70	--	(b)	.21	916	1.25	2,220	49	3.6	1,290	8.1
June	20	53,790	--	4.76	1.73	5.53	--	3.25	6.34	2.55	--	(b)	.14	794	1.08	58,090	46	3.1	1,160	8.1
July	25	47,900	17	4.32	1.78	5.64	.21	3.05	5.95	2.80	.04	(b)	.18	769	1.05	50,300	47	3.2	1,130	8.1
August	20	35,000	--	4.10	1.91	5.85	--	2.90	5.89	3.15	--	(b)	.16	772	1.05	36,750	49	3.4	1,170	8.0
September ..	25	16,090	--	4.68	2.16	7.08	--	2.90	7.34	3.80	--	(b)	.25	918	1.25	20,110	51	3.8	1,370	7.8
Total		253,562	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

a Includes 0.30 equivalent per million of carbonate (CO_3).
b Less than 0.01 equivalent per million.

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 1956.
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 1955 to September 1956 given in International Boundary and Water Commission Water Bulletin Numbers 25 and 26. Data for previous years are given in earlier Bulletins.

Chemical analyses, water year October 1955 to September 1956

Date of collection	Number of samples	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids			Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos 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				
October 1955	31	1,480	--	2.95	1.36	13.32	--	3.00	7.21	7.70	--	(a)		0.34	1,142	1.55	2,290	76	9.1	1,800	8.1
November	30	391	--	5.40	2.39	24.02	--	b3.90	13.82	14.35	--	(a)		.54	2,045	2.78	1,090	76	12	3,120	8.5
December	21	272	--	6.92	3.16	34.16	--	c5.37	19.54	19.80	--	(a)		.76	2,840	3.86	1,050	77	15	4,190	8.3
January 1956	29	234	32	7.68	3.11	34.24	0.41	d5.40	19.96	19.90	0.10	(a)		.78	2,890	3.93	920	75	15	4,250	8.1
February	29	211	--	8.30	3.85	38.12	--	c5.30	22.23	22.70	--	0.01		.71	3,175	4.32	912	76	15	4,700	8.2
March	31	11,000	--	6.51	2.25	8.29	--	3.20	9.29	4.75	--	.02		.18	1,133	1.54	16,900	49	4.0	1,630	8.0
April	30	17,800	--	5.71	2.10	7.32	--	3.27	8.40	3.55	--	(a)		.21	994	1.35	24,000	48	3.7	1,430	8.1
May	31	1,220	--	6.18	2.34	13.33	--	3.50	11.01	7.40	--	.01		.5	1,407	1.91	2,330	61	6.5	2,090	8.0
June	30	7,340	--	5.30	1.98	7.52	--	e3.15	7.82	4.02	--	.01		.17	961	1.31	9,620	51	3.9	1,430	8.0
July	31	9,920	20	4.60	1.91	7.30	.28	f3.07	7.06	3.85	05	.01		.21	926	1.26	12,500	52	4.0	1,350	8.1
August	26	4,870	--	4.95	1.73	8.87	--	3.30	7.44	4.85	--	.01		.25	1,005	1.37	6,670	57	4.8	1,530	7.9
September	30	4,300	--	4.72	1.90	8.90	--	3.20	7.66	4.95	--	(a)		.35	1,018	1.38	5,930	57	4.9	1,530	7.8
Total		59,038	--	--	--	--	--	--	--	--	--	--		--	--	--	--	--	--	--	--

a Less than 0.01 equivalent per million.
b Includes 0.42 equivalent per million of carbonate (CO_3).
c Includes 0.44 equivalent per million of carbonate (CO_3).
d Includes 0.84 equivalent per million of carbonate (CO_3).
e Includes 0.10 equivalent per million of carbonate (CO_3).
f Includes 0.16 equivalent per million of carbonate (CO_3).

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 Boundry and Water Commission Water Bulletin Number 20).
RECORDS AVAILABLE.--Chemical analyses 1933 to 1956.
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 1955 to September 1956 given in International Boundary and Water Commission Water Bulletin Numbers 25 and 26. Data for previous years are given in earlier Bulletins. No Flow on many days during March to July, and September 1956.

Chemical analyses, water year October 1955 to September 1956

Date of collection	Number of samples	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million									Boron (B) ppm	Dissolved solids			Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos 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				
October 1955	4	2,900		1.31	0.58	4.34		2.28	2.51	1.45		0.02	0.30	401	0.55	1,600	4.5	70	643	8.2
November...	5	23.2		38.65	21.02	83.90		4.05	30.93	109.5		(a)	.55	9,320	12.7	295	15	58	12,800	7.8
December ..	4	23.8		36.25	18.83	76.85		4.05	28.65	99.62		(a)	.66	8,434	11.5	274	15	58	11,800	7.7
January 1956	4	24.6	18	34.95	18.26	75.00	0.60	3.10	27.08	99.00	0.03	(a)	.65	8,224	11.2	276	15	58	11,600	7.8
February...	6	23.0		35.25	19.91	77.20		1.80	27.54	102.1		.01	.62	8,464	11.5	264	15	58	11,800	7.8
August	2	5,600		2.91	.78	1.45		3.80	1.07	.30		.01	.17	294	.40	2,240	1.1	28	472	8.1

a Less than 0.01 equivalent per million.

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 the towns 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 1956.
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 1955 to September 1956 given in International Boundary and Water Commission Water Bulletin Numbers 25 and 26. Data for previous years are given in earlier Bulletins. No flow on many days during December 1955 to July 1956 and September 1956.

Chemical analyses, water year October 1955 to September 1956

Date of collection	Number of samples	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million									Boron (B) ppm	Dissolved solids			Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos 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				
October 1955	9	10,900		3.68		2.42		2.37		0.85				407	0.55	6,000	1.8	40	611	
November ..	6	5.0		33.03		34.84		2.75		39.92				4,550	6.19	31.0	8.6	51	6,220	
August 1956.	6	2,350		2.90		1.66		2.30		.55				276	.38	893	1.4	36	455	

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.--Chemical analyses 1944 to 1956.
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 1955 to September 1956 given in International Boundary and Water Commission Water Bulletin Numbers 25 and 26. Data for previous years are given in earlier Bulletins.

Chemical analyses, water year October 1955 to September 1956

Date of collection	Number of samples	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million									Boron (B) ppm	Dissolved solids			Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos 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				
October 1955	13	175,000	--	3.98	0.81	2.22	--	2.75	3.39	0.90	--	0.03	0.13	454	0.62	108,500	1.4	32	668	8.0
November...	8	54,000	--	4.55	1.68	4.48	--	a3.13	5.63	1.95	--	.03	.21	700	.95	51,300	2.5	42	1,020	8.4
December ..	9	42,600	--	4.50	1.89	4.72	--	b3.15	5.91	2.15	--	.03	.18	727	.99	42,170	2.6	42	1,050	7.8
January 1956	9	38,200	26	4.55	1.80	4.60	0.16	3.00	5.74	2.25	0.07	.03	.22	717	.98	37,400	2.6	41	1,050	8.0
February ...	8	37,200	--	4.69	1.88	5.21	--	3.00	6.31	2.40	--	.02	.21	760	1.03	38,300	2.9	44	1,110	8.0
March	5	30,600	--	3.96	1.85	4.66	--	2.70	5.70	2.15	--	.01	.21	680	.92	28,200	2.7	45	999	8.0
April	8	21,200	--	3.36	1.91	3.99	--	2.55	4.75	2.00	--	.01	.17	597	.81	17,200	2.5	43	893	8.0
May	9	28,000	--	3.15	1.17	1.90	--	c3.01	2.28	1.00	--	.02	.16	384	.52	14,600	1.3	31	605	8.1
June	4	32,400	--	3.75	.98	3.28	--	d3.00	3.65	1.40	--	.03	.17	525	.71	23,000	2.1	41	783	8.0
July	4	20,200	20	3.60	1.60	4.24	.15	2.65	5.08	1.80	.07	.01	.18	616	.84	17,000	2.6	44	914	8.0
August	7	42,100	--	4.28	1.24	3.39	--	2.90	4.69	1.40	--	.04	.15	577	.78	32,800	2.0	38	867	7.8
September ..	4	43,800	--	4.72	1.35	4.46	--	e2.95	5.90	1.80	--	.03	.24	697	.95	41,600	2.6	42	1,010	8.2
Total		565,300	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

a Includes 0.28 equivalent per million of carbonate (CO_3).
b Includes 0.20 equivalent per million of carbonate (CO_3).
c Includes 0.12 equivalent per million of carbonate (CO_3).
d Includes 0.10 equivalent per million of carbonate (CO_3).
e Includes 0.16 equivalent per million of carbonate (CO_3).

RIO GRANDE BASIN--Continued

RIO GRANDE AT LAREDO, TEX.

LOCATION.--At gaging station 0.9 mile downstream from highway bridge between Laredo, Tex., and Nuevo Laredo, Tamaulipas, which is 885.8 river miles below the American Dam at El Paso, Tex.
DRAINAGE AREA.--135,976 square miles in United States and Mexico. (From International Boundary and Water Commission Water Bulletin Number 24).
RECORDS AVAILABLE.--Chemical analyses July 1955 to September 1956.
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 1955 to September 1956 given in International Boundary and Water Commission Water Bulletin Numbers 25 and 26. Data for previous years are given in earlier Bulletins.

Chemical analyses, water year October 1955 to September 1956

Date of collection	Number of samples	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million									Boron (B) ppm	Dissolved solids			Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos 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				
October 1955	20	255,200	--	4.98		2.48	--	a2.71	--	1.30	--	--	--	500	0.68	173,500	33	1.6	736	--
November...	19	120,000	--	5.21		4.27	--	2.40	--	3.00	--	--	--	618	.84	100,800	45	2.6	950	--
December...	31	101,700	--	5.40		4.30	--	2.70	--	3.30	--	--	--	627	.85	66,440	44	2.6	978	--
January 1956	31	91,720	16	3.69	1.99	4.56	0.11	2.60	3.92	3.70	0.04	0.04	0.12	649	.88	80,700	44	2.7	1,020	7.9
February....	29	72,680	--	6.41		5.41	--	2.85	--	4.30	--	--	--	755	1.03	74,900	46	3.0	1,180	--
March.....	31	49,380	--	6.60		6.34	--	2.55	--	5.15	--	--	--	818	1.11	54,800	49	3.5	1,300	--
April.....	30	36,250	--	6.10		5.80	--	2.37	--	4.95	--	--	--	748	1.02	37,000	49	3.3	1,200	--
May.....	31	39,430	--	5.90		5.21	--	2.33	--	4.65	--	--	--	685	.93	36,700	47	3.0	1,120	--
June.....	30	18,040	--	5.80		5.54	--	2.25	--	4.90	--	--	--	733	1.00	18,000	49	3.3	1,160	--
July.....	31	46,220	12	3.04	1.36	3.53	.15	2.37	2.96	2.65	.04	(b)	.27	500	.68	31,400	44	2.4	805	7.8
August.....	31	36,970	--	4.80		3.69	--	2.20	--	2.70	--	--	--	549	.75	27,700	43	2.4	864	--
September...	30	101,400	--	4.33		2.56	--	2.35	--	2.90	--	--	--	427	.58	58,800	37	1.7	695	--
Total.....		968,990	--	--		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

a Includes 0.12 equivalent per million of carbonate (CO_3).
b Less than 0.01 equivalent per million.

RIO GRANDE AT CHAPENO, TEX.

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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.
DRAINAGE AREA.--164,538 square miles in United States and Mexico. (From International Boundary and Water Commission Bulletin Number 24).
RECORDS AVAILABLE.--Chemical analyses July 1955 to September 1956.
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 1955 to September 1956 given in International Boundary and Water Commission Bulletin Numbers 25 and 26. Data for previous years are given in earlier Bulletins.

Chemical analyses, water year October 1955 to September 1956

Date of collection	Number of samples	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million									Boron (B) ppm	Dissolved solids			Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos 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				
October 1955	9	86,400	--	3.18	1.12	2.66	--	a2.25	2.75	2.02	--	0.03	0.21	445	0.61	52,700	38	1.8	700	8.2
November...	10	110,000	--	3.20	.99	2.86	--	2.30	2.90	1.90	--	.03	.10	444	.60	66,000	41	2.0	703	8.0
December...	10	186,000	--	3.30	1.25	2.74	--	2.40	2.94	2.00	--	.03	.14	449	.61	113,500	38	1.8	710	8.0
January 1956	13	345,000	14	3.24	1.28	2.78	0.15	a2.55	2.97	1.95	0.03	.02	.10	457	.62	213,900	37	1.9	723	7.9
February...	10	349,000	--	3.62	1.17	2.98	--	b2.65	3.13	2.10	--	.02	.09	484	.66	230,300	38	1.9	755	8.1
March	8	167,000	--	3.84	1.31	3.22	--	2.70	3.32	2.45	--	.02	.11	524	.71	118,600	38	2.0	824	8.0
April	8	152,000	--	3.82	1.37	3.41	--	2.67	3.49	2.50	--	.01	.19	541	.74	109,500	40	2.1	859	8.1
May	10	237,000	--	3.79	1.60	3.92	--	2.45	3.88	3.05	--	.02	.17	580	.79	187,200	42	2.4	928	8.0
June	9	276,000	--	3.79	1.61	4.18	--	c2.40	3.93	3.20	--	.01	.13	611	.83	129,100	44	2.5	948	8.1
July	5	18,300	9	4.00	1.60	4.91	.14	2.55	4.27	3.80	.04	(d)	.26	682	.93	17,020	46	2.9	1,060	8.0
August	7	25,900	--	4.20	1.96	5.57	--	2.41	4.75	4.50	--	(d)	.26	735	1.00	25,900	47	3.2	1,170	8.0
September ..	7	80,900	--	3.88	2.12	5.29	--	2.35	4.64	4.40	--	(d)	.24	703	.96	77,660	47	3.1	1,120	8.0
Total		2,033,500	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

a Includes 0.12 equivalent per million of carbonate (CO_3).
b Includes 0.20 equivalent per million of carbonate (CO_3).
c Includes 0.16 equivalent per million of carbonate (CO_3).
d Less than 0.01 equivalent per million.

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 1956.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 2,920 micromhos Sept. 23, 25, 27, 29, 30; minimum daily, 1,070 micromhos Oct. 1.
Percent sodium: Maximum, 15, Nov. 21-25, Nov. 27 to Dec. 20; minimum, 10, Aug. 1-31.
EXTREMES, 1937-56.--Specific conductance: Maximum daily, 3,200 micromhos Jan. 14, 1948; minimum daily, 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 calculated from determined constituents. Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of discharge for water year October 1955 to September 1956 given in WSP 1442.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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, 1955	2,070	13	9.58	2.30	1.48		2.00	10.06	1.07		0.01		849	1.15	2,380	11	0.6	1,130	7.5
Oct. 11-20	1,840	14	10.03	2.30	1.57		2.07	10.53	1.16		.01		889	1.21	2,230	11	.6	1,180	7.6
Oct. 21-31	2,020	13	10.38	2.47	1.65		2.15	10.99	1.27		.01		927	1.26	2,550	11	.6	1,230	7.7
Nov. 1-10	15	15	11.08	3.04	2.09		2.28	12.43	1.47		.01		1,040	1.41	21	13	.8	1,360	7.7
Nov. 11-20	26	16	11.88	4.03	2.48		2.61	13.70	1.80		.02		1,160	1.58	41	13	.9	1,500	7.7
Nov. 21-25, 27-30	a6.9	21	13.87	5.02	3.35		2.95	16.86	2.48		.03		1,430	1.94	13	15	1.1	1,810	7.7
Dec. 1-20	24	21	13.97	4.77	3.39		2.82	16.99	2.43		.01		1,420	1.93	46	15	1.1	1,800	7.8
Dec. 21-30	a2.2	20	13.67	4.77	3.09		3.08	16.34	2.31		.01		1,380	1.88	4	14	1.0	1,770	7.7
Jan. 4-10, 1956	5.4	17	15.57	4.52	2.91		2.69	17.97	2.26		.01		1,480	2.01	11	13	.9	1,840	7.9
Jan. 11-31	2,660	14	18.81	4.11	2.87		2.51	20.82	2.48		.01		1,670	2.27	6,040	11	.8	2,020	7.9
Feb. 1-10	6.3	17	16.17	3.87	2.78		2.59	17.84	2.20		.01		1,470	2.00	13	12	.9	1,830	7.5
Feb. 11-20	6.9	16	15.97	4.28	2.91		2.61	18.16	2.31		.01		1,490	2.03	14	13	.9	1,860	7.5
Feb. 21-29	5.9	19	15.87	4.69	3.04		2.75	18.28	2.37		.01		1,510	2.05	12	13	.9	1,880	7.4
Mar. 1-10	267	19	15.47	4.77	2.96		2.74	17.91	2.23		.01		1,480	2.01	537	13	.9	1,860	7.6
Mar. 11-20	1,660	15	16.27	3.78	2.52		2.18	18.16	2.20		.01		1,460	1.99	3,300	11	.8	1,810	7.5
Mar. 21-31	1,460	15	15.77	4.03	2.44		2.26	18.09	2.03		.01		1,450	1.97	2,880	11	.8	1,770	7.6
Apr. 1-30	4,310	15	15.97	4.19	2.52		2.26	18.55	2.03		.01		1,480	2.01	8,660	11	.8	1,800	7.5
May 1-31	3,780	15	16.72	4.28	2.65		2.18	19.40	2.20		.00		1,540	2.09	7,900	11	.8	1,880	7.6

a No flow Nov. 26, Dec. 31 to Jan. 3.

June 1-30.....	28,380	15	17.81	4.19	2.96		2.11	20.38	2.40		.00		1,620	2.20	62,440	12	.9	1,970	7.4
July 1-31.....	29,710	16	18.31	4.77	3.04		2.18	21.44	2.23		.01		1,690	2.30	68,330	12	.9	2,030	7.5
Aug. 1-31.....	48,970	17	18.61	4.52	2.61		2.21	21.03	2.12		.02		1,660	2.26	110,700	10	.8	1,970	7.4
Sept. 1-10.....	1,320	18	24.55	5.67	3.92		2.80	27.90	3.16		.04		2,210	3.01	3,970	11	1.0	2,510	7.4
Sept. 11-30.....	2,190	16	27.94	6.83	4.48		2.21	32.90	3.98		.03		2,550	3.47	7,600	11	1.1	2,840	7.4
Total or weighted average.....	130,800	16	17.96	4.44	2.78		2.20	20.57	2.20		0.01		1,630	2.22	290,400	11	0.8	1,960	--

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 1956.
Water temperatures: April 1949 to September 1956.
Sediment records: January 1949 to September 1956.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 14,700 micromhos Sept. 28; minimum daily, 1,300 micromhos Oct. 4.
Percent sodium: Maximum, 60 Sept. 26-30; minimum, 15 Aug. 10-31.
EXTREMES, 1937-56.--Specific conductance: Maximum daily, 20,700 micromhos Sept. 10, 1955; minimum daily, 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 calculated from determined constituents. Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of discharge for water year October 1955 to September 1956 given in WSP 1442.
CORRECTION.--WSP 1465: Nitrate value for period May 11, 19-20, 1955 should be 0.04 epm instead of 0.42 epm and nitrate value for period May 12-18, 1955 should be 0.05 epm instead of 0.47 epm.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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. 1-5, 1955 ...	20,740	17	13.37	3.45	5.83		1.88	15.64	5.22		0.04		1,460	1.99	41,270	26	2.0	1,950	7.9
Oct. 6-10.....	4,420	21	19.61	6.66	17.40		2.59	24.36	17.20		.05		2,760	3.75	16,580	40	4.8	3,820	7.5
Oct. 11-20.....	4,210	20	23.35	10.53	26.19		2.46	32.06	25.66		.04		3,740	5.09	21,430	44	6.4	5,070	7.6
Oct. 21-31.....	2,790	21	26.15	14.06	35.89		2.34	37.27	36.38		.04		4,690	6.38	17,800	47	8.0	6,470	7.4
Nov. 1-10.....	2,260	25	26.95	15.46	39.15		2.67	39.14	39.76		.05		5,030	6.84	15,460	48	8.5	6,890	7.9
Nov. 11-20.....	1,950	19	28.14	18.01	45.24		3.23	41.43	46.53		.05		5,580	7.59	14,800	50	9.4	7,690	7.7
Nov. 21-30.....	1,810	16	29.34	18.34	50.02		3.05	42.89	50.48		.02		5,920	8.05	14,570	51	10	8,170	7.8
Dec. 1-10.....	1,990	14	29.14	18.59	50.46		3.31	42.68	50.48		.02		5,920	8.05	16,020	51	10	8,150	7.9
Dec. 11-20.....	2,200	14	28.14	17.43	47.42		3.15	40.39	48.79		.04		5,650	7.68	16,900	51	9.9	7,850	7.5
Dec. 21-31.....	2,230	13	27.94	18.18	49.16		3.34	40.39	50.20		.02		5,750	7.82	17,440	52	10	7,950	7.7
Jan. 1-10, 1956..	1,620	23	28.94	20.31	53.07		2.64	43.31	54.99		.03		6,180	8.40	13,610	52	11	8,700	7.8
Jan. 11-20.....	1,610	23	29.89	19.74	53.50		3.11	43.72	55.84		.04		6,270	8.53	13,730	52	11	8,780	7.9
Jan. 21-30.....	1,710	21	28.34	19.74	49.16		2.61	42.26	51.89		.04		5,910	8.04	13,750	51	10	8,370	7.9
Jan. 31-Feb. 10..	2,510	23	25.35	17.60	42.63		2.62	37.48	45.68		.06		5,230	7.11	17,850	50	9.2	7,520	7.8

Feb. 11-20, 1956	2,700	21	26.95	17.76	47.85		3.23	38.52	49.91		.05		5,600	7.62	20,570	52	10	8,010	7.8
Feb. 21-29.....	1,610	17	29.54	19.74	49.16		2.85	43.31	51.32		.04		5,970	8.12	13,070	50	9.9	8,360	7.4
Mar. 1-10	1,340	14	30.49	23.85	56.12		2.49	47.05	59.78		--		6,660	9.06	12,140	51	11	9,330	7.4
Mar. 11-20	1,310	15	31.29	24.26	59.16		2.61	48.51	63.45		--		6,960	9.47	12,410	52	11	9,720	7.4
Mar. 21-31	1,130	17	31.09	24.43	57.42		2.77	49.14	61.48		--		6,880	9.36	10,580	51	11	9,530	7.6
Apr. 1-May 1 ...	2,650	13	32.73	24.92	64.82		2.57	51.43	69.09		--		7,460	10.1	26,760	53	12	10,500	7.1
May 2	1,700	15	27.94	9.95	27.75		1.97	34.98	27.92		.01		4,060	5.52	9,380	42	6.4	5,610	7.3
May 3-4	1,010	8.9	19.11	6.17	11.14		1.92	23.94	10.86		.00		2,320	3.16	3,190	31	3.1	3,090	7.6
May 5-6	363	15	21.81	8.55	15.92		1.75	28.52	16.64		.06		2,940	4.00	1,450	34	4.1	3,910	7.7
May 7-10	456	10	26.95	15.05	28.97		1.97	38.52	30.74		.03		4,400	5.98	2,730	41	6.3	5,920	7.2
May 11-31.....	1,570	20	33.08	22.70	55.68		2.70	50.18	60.91		.00		6,890	9.37	14,710	50	11	9,460	7.3
June 1-22	882	22	33.33	25.91	74.39		2.54	52.26	76.42		--		8,010	10.9	9,610	56	14	11,100	7.4
June 23-30.....	8,590	21	25.35	7.81	9.48		2.29	31.44	8.04		.04		2,710	3.69	31,700	22	2.3	3,290	7.4
July 1-10	12,990	18	22.41	6.09	5.48		2.03	26.65	4.37		.03		2,160	2.94	38,190	16	1.5	2,570	7.4
July 11-12	424	18	23.35	6.83	9.48		1.98	28.52	8.74		.04		2,530	3.44	1,460	24	2.4	3,130	7.3
July 13-15	432	18	25.45	9.46	16.01		1.62	33.31	15.37		.03		3,210	4.37	1,890	31	3.8	4,110	7.1
July 16-24	9,340	18	22.21	5.84	6.66		2.05	26.86	5.64		.04		2,240	3.05	28,490	19	1.8	2,740	7.4
July 25-31	873	17	25.05	9.20	17.57		1.70	32.27	17.34		.03		3,260	4.43	3,870	34	4.2	4,250	7.3
Aug. 1-8	809	22	27.25	13.57	30.71		2.00	38.31	31.02		.06		4,440	6.04	4,890	43	6.8	5,910	7.8
Aug. 9	583	24	32.29	17.02	48.72		2.56	43.72	51.61		.06		6,010	8.17	4,760	50	9.8	8,150	7.4
Aug. 10-31	25,360	16	21.51	5.76	4.96		2.03	25.40	4.29		.05		2,070	2.82	71,520	15	1.3	2,450	7.6
Sept. 1-7.....	3,010	20	21.21	6.83	10.70		2.02	26.44	9.87		.03		2,460	3.35	10,080	28	2.9	3,140	7.8
Sept. 8-13	414	28	26.55	12.91	30.15		2.18	37.06	29.89		.02		4,320	5.88	2,430	43	6.8	5,810	7.8
Sept. 14-17	167	27	30.09	18.59	50.02		2.26	44.76	49.63		.02		5,990	8.15	1,360	51	10	8,140	7.5
Sept. 18-25	162	31	32.29	21.30	61.34		2.33	49.76	60.91		--		6,970	9.48	1,540	53	12	9,470	7.8
Sept. 26-30	105	24	36.68	26.07	95.26		2.05	56.42	97.01		--		9,480	12.9	1,350	60	17	13,200	7.7
Total or weighted average	132,100	18	22.85	9.79	20.27		2.28	29.98	20.30		--		3,290	4.47	590,500	38	5.0	4,370	--

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 1956.
Water temperatures: March 1953 to September 1956.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 12,800 micromhos Oct. 1-2; minimum daily, 4,950 micromhos Feb. 4.
Percent sodium: Maximum, 67 Oct. 1-31; minimum, 48 Feb. 1-8.
EXTREMES, 1937-56.--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 calculated from 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 1955 to September 1956 given in WSP 1442. Runoff values reported below have been adjusted to reflect inflow from Salt (Screwbean) Draw which enters Pecos River between sampling point and gaging station.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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. 1-31, 1955 ..	2,160	18	25.50	13.32	77.99		2.16	34.56	80.09		--		7,050	9.59	20,710	67	18	10,500	7.6
Nov. 1-30.....	1,770	13	23.55	9.70	47.06		2.26	30.61	47.38		0.06		4,900	6.66	11,790	59	12	7,120	7.8
Dec. 1-31.....	1,970	13	23.25	10.69	43.44		2.38	31.23	43.71		.06		4,730	6.43	12,670	56	11	6,760	7.8
Jan. 1-31, 1956 ..	1,930	13	24.55	10.53	44.16		2.57	32.06	44.56		.05		4,850	6.60	12,740	56	11	6,810	7.8
Feb. 1-8.....	516	14	22.46	7.65	28.27		2.05	28.11	28.20		.02		3,620	4.92	2,540	48	7.3	5,090	8.0
Feb. 9-29.....	1,290	14	24.55	12.34	45.91		2.49	33.73	46.53		.05		5,060	6.88	8,880	55	11	7,390	8.0
Mar. 1-17, 26-31.	3,820	9.6	24.45	11.35	51.65		2.11	32.27	53.02		.05		5,320	7.24	27,660	59	12	7,070	8.0
Mar. 18-25	452	8.8	26.55	13.41	59.27		2.16	36.44	60.63		--		6,030	8.20	3,710	60	13	9,310	8.0
Apr. 1-30.....	16,900	11	23.95	9.21	37.17		1.87	31.23	37.22		.01		4,330	5.89	99,540	53	9.1	6,170	7.9
May 1-31.....	8,010	12	25.55	9.95	46.38		1.80	33.52	46.53		.03		5,030	6.84	54,790	57	11	7,280	7.5
June 1-30	13,400	12	25.65	9.87	41.93		1.61	33.52	42.30		.02		4,770	6.49	86,970	54	10	6,710	7.7
July 1-31.....	18,890	14	27.64	10.94	46.15		1.67	36.23	46.81		.02		5,210	7.09	133,900	54	11	7,440	7.7
Aug. 1-31.....	14,500	14	29.64	12.01	53.56		1.77	39.56	53.86		.02		5,850	7.96	115,400	56	12	8,090	7.7
Sept. 1-30	4,700	17	32.04	14.39	73.75		1.95	44.35	73.88		--		7,340	9.98	46,910	61	15	10,200	7.9
Total or weighted average	90,330	13	26.50	10.77	47.42		1.84	34.98	47.66		--		5,190	7.06	637,700	56	11	7,340	--

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, which confluence is 638.2 river miles below the American Dam at El Paso, Tex.
DRAINAGE AREA.--35,162 square miles (from International Boundary and Water Commission Water Bulletin Number 24).
RECORDS AVAILABLE.--Chemical analyses, January 1955 to September 1956. Chemical analyses for the period July 1954 through December 1954 are available for a station near the mouth and for the period February 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 for individual water samples, and these same chemical analyses for water year October 1955 to September 1956 given in International Boundary and Water Commission Bulletin Numbers 25 and 26. Data for 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 1955 to September 1956

Date of collection	Number of samples	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million									Boron (B) ppm	Dissolved solids			Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos 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				
October 1955	4	18,400	--	5.79	3.99	11.00	--	2.85	5.87	12.10	--	0.09	0.20	1,280	1.74	32,020	53	5.0	2,100	8.0
November...	4	12,200	--	6.30	4.78	12.91	--	2.85	7.00	14.30	--	.09	.09	1,532	2.08	25,380	54	5.5	2,410	7.9
December...	5	12,300	--	6.62	5.28	13.37	--	2.95	7.39	15.10	--	.06	.18	1,580	2.15	26,440	53	5.5	2,500	8.0
January 1956	4	12,400	12	7.58	5.73	16.28	0.21	a2.97	8.72	17.98	0.04	.05	.13	1,875	2.55	31,600	55	6.3	2,920	8.1
February ...	3	11,600	--	9.82	6.60	22.64	--	b2.85	11.62	24.65	--	.04	.22	2,478	3.37	39,100	58	7.9	3,800	8.1
March.....	5	10,000	--	9.28	7.29	23.10	--	2.55	11.85	25.40	--	.02	.26	2,494	3.39	33,900	58	8.0	3,890	8.1
April.....	6	8,040	--	8.51	6.86	21.68	--	2.10	11.01	23.80	--	.01	.24	2,331	3.17	25,500	59	7.8	3,650	7.9
May.....	10	9,780	--	7.52	6.40	19.22	--	1.85	9.90	21.55	--	.02	.26	2,084	2.83	27,700	58	7.3	3,320	7.8
June.....	4	5,820	--	5.78	5.01	15.24	--	1.60	7.58	16.90	--	.01	.26	1,654	2.25	13,100	59	6.6	2,630	7.8
July.....	4	5,520	6	5.62	4.38	13.92	.19	1.70	6.82	15.60	.05	.01	.24	1,533	2.08	11,500	58	6.2	2,460	7.9
August	5	5,220	--	5.52	5.00	13.15	--	1.90	6.52	15.05	--	.01	.11	1,425	1.94	10,100	56	5.7	2,390	8.0
September ..	4	6,410	--	5.72	4.46	12.91	--	c2.25	6.73	14.25	--	.01	.22	1,405	1.91	12,200	56	5.7	2,320	7.9
Total.....		117,690	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

a Includes 0.44 equivalent per million of carbonate (CO_3).
b Includes 0.20 equivalent per million of carbonate (CO_3).
c Includes 0.10 equivalent per million of carbonate (CO_3).

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 (above gaging station).
RECORDS AVAILABLE.--Chemical analyses: October 1941 to September 1956.
Water temperatures: May 1949 to September 1956.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 1,200 micromhos Nov. 3; minimum daily, 200 micromhos June 4.
Percent sodium: Maximum, 44 Jan. 21-31, Sept. 21-30; minimum, 11 May 21-31.
EXTREMES, 1941-56.--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, 11 May 21-31, 1956.
REMARKS.--Values reported for dissolved solids are residues on evaporation at 180°C unless otherwise noted. Records of specific conductance of daily samples available in district office at Salt Lake City, Utah. Records of discharge for gaging station at Glenwood Springs for water year October 1955 to September 1956 given in WSP 1443. No appreciable inflow between Shoshone powerplant and gaging station except during periods of heavy local rains.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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, 1955..	22,160	12	3.04	1.07	2.52	0.07	2.13	2.23	2.40	0.02	0.01	0.04	402	0.55	12,190	38	1.8	683	7.7
Oct. 11-22.....	23,370	12	3.34	1.15	3.00	.07	2.25	2.48	2.90	.02	.01	.04	456	.62	14,490	40	2.0	768	7.5
Oct. 23-31.....	15,150	13	3.99	1.32	3.83	.07	2.39	3.21	3.50	.02	.01	.03	554	.75	11,360	42	2.4	908	7.5
Nov. 1-10.....	14,570	16	4.19	1.48	3.96	.08	2.65	3.37	3.69	.01	.03	--	592	.81	11,800	41	2.3	971	7.9
Nov. 11-20.....	19,960	14	3.54	1.23	3.00	.07	2.33	2.81	2.79	.01	.01	.05	483	.66	13,170	38	1.9	797	7.5
Nov. 21-30.....	20,080	14	3.29	1.15	3.04	.07	2.26	2.54	2.79	.01	.01	--	464	.63	12,650	40	2.0	769	7.4
Dec. 1-10.....	16,600	15	3.39	1.23	3.00	.06	2.36	2.62	2.79	.02	.02	--	467	.64	10,620	39	2.0	780	7.6
Dec. 11-20.....	17,640	14	3.09	1.15	2.70	.06	2.21	2.44	2.34	.01	.02	.04	436	.59	10,410	39	1.9	733	7.7
Dec. 21-31.....	21,010	14	3.19	1.23	2.70	.06	2.16	2.42	2.48	.01	.01	--	424	.58	12,190	38	1.8	713	7.7
Jan. 1-10, 1956..	16,230	15	3.14	1.23	3.04	.06	2.23	2.42	2.88	.01	.02	--	452	.61	9,900	41	2.0	758	7.6
Jan. 11-20.....	17,180	17	2.89	1.23	2.83	.08	2.10	2.17	2.74	.01	.02	.06	422	.57	9,790	40	2.0	716	7.7
Jan. 21-31.....	18,130	13	2.94	1.15	3.22	.06	2.15	2.23	3.05	.01	.02	--	444	.60	10,880	44	2.2	756	7.8
Feb. 1-10	15,840	15	3.04	1.07	2.96	.07	2.16	2.21	2.88	.01	.01	--	444	.60	9,500	41	2.1	740	7.7
Feb. 11-20.....	16,900	13	2.79	.99	2.78	.06	2.07	1.89	2.79	.02	.01	.05	392	.53	8,960	42	2.0	661	7.5

Feb. 21-29, 1956	15,480	13	2.74	.99	2.87	.06	2.07	1.85	2.68	.01	.03	--	397	.54	8,360	43	2.1	678	7.8
Mar. 1-10	18,850	13	2.84	1.07	2.96	.07	2.07	2.06	2.88	.01	.03	--	428	.58	10,930	43	2.1	715	7.6
Mar. 11-20	19,560	13	2.99	1.07	2.83	.07	2.08	2.14	2.71	.01	.02	0.06	427	.58	11,340	41	2.0	708	7.5
Mar. 21-31	30,190	13	3.64	1.23	2.57	.09	2.28	2.91	2.26	.01	.04	--	464	.63	19,020	34	1.6	736	7.5
Apr. 1-10.....	28,150	14	2.89	1.23	2.61	.08	2.20	2.33	2.26	.01	.03	--	422	.57	16,050	38	1.8	683	7.5
Apr. 11-20.....	33,820	13	2.69	1.07	1.96	.06	2.13	2.08	1.64	.01	.02	.06	356	.48	16,230	34	1.4	571	7.4
Apr. 21-30.....	57,920	13	2.25	.81	1.09	.05	1.84	1.50	.90	.02	.03	--	262	.36	20,850	26	.9	413	7.5
May 1-10	89,530	14	2.44	.68	.74	.05	2.03	1.21	.62	.02	.04	--	237	.32	28,650	19	.6	376	7.6
May 11-20.....	114,700	13	2.04	.48	.57	.04	1.82	.81	.45	.02	.02	.03	190	.26	29,820	18	.5	304	7.6
May 21-31	217,400	12	2.04	.38	.29	.03	1.80	.69	.28	.02	.02	--	172	.23	50,000	11	.3	271	7.4
June 1-10.....	180,500	9.0	1.52	.44	.38	.03	1.38	.65	.37	.02	.01	--	144	.20	36,100	16	.4	235	7.4
June 11-20.....	99,530	11	1.68	.62	.78	.03	1.49	1.00	.68	.02	.02	.04	188	.26	25,880	25	.7	319	7.6
June 21-30.....	49,530	11	2.28	.82	1.52	.05	1.77	1.54	1.41	.02	.01	--	281	.38	18,820	33	1.2	474	7.5
July 1-10	39,210	12	2.66	1.12	1.91	.05	2.15	2.23	1.64	.01	.01	--	362	.49	19,210	32	1.4	594	7.4
July 11-20	33,300	12	3.14	1.12	2.22	.06	2.16	2.52	1.92	.01	.01	.03	394	.54	17,980	34	1.5	645	7.5
July 21-30	28,840	12	3.12	1.24	2.44	.06	2.25	2.52	2.14	.01	.01	--	416	.57	16,440	36	1.6	678	7.9
July 31	3,000	16	8.64	1.28	2.31	.11	2.21	8.12	1.95	--	.05	--	a791	1.08	3,240	19	1.0	1,100	7.9
Aug. 1-10.....	28,010	12	3.48	1.14	2.61	.07	2.34	2.75	2.31	.01	.03	--	446	.61	17,090	36	1.7	727	7.5
Aug. 11-15, 17-20	23,170	12	3.70	1.08	2.44	.07	2.18	2.87	2.31	.02	.04	.02	444	.60	13,900	33	1.6	726	7.3
Aug. 16.....	3,270	17	9.00	1.16	1.87	.15	2.79	7.66	1.75	--	.01	--	a774	1.05	3,430	15	.8	1,090	7.2
Aug. 21-31	27,910	12	3.26	1.08	2.44	.07	2.13	2.56	2.23	.02	.02	--	420	.57	15,910	36	1.7	691	7.5
Sept. 1-10	22,710	11	2.92	1.00	2.87	.06	1.97	2.29	2.43	.02	.01	--	403	.55	12,490	42	2.1	660	7.6
Sept. 11-20	24,730	10	2.72	.88	2.78	.07	1.87	2.10	2.51	.02	.01	.04	387	.53	13,110	43	2.1	642	7.5
Sept. 21-30	25,390	9.4	2.64	.84	2.78	.06	1.88	1.94	2.54	.02	.01	--	419	.57	14,470	44	2.1	628	7.6
Weighted average	1,469,000	12	2.50	0.80	1.52	0.05	1.92	1.60	1.38	0.02	0.02	--	299	0.41	602,300	31	1.2	488	--

a Calculated from determined constituents.

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 1956.
Water temperatures: May 1949 to September 1956.
Sediment records: May 1930 to September 1956.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 2,560 micromhos Sept. 9, 10; minimum daily, 360 micromhos June 4.
Percent sodium: Maximum, 50 Mar. 2, 5, 7, 9, 12, 15; minimum, 22 May 21-31.
EXTREMES, 1941-52, 1953-56.--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 calculated from 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 1955 to September 1956 given in WSP 1443.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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, 1955...	37,210	17	8.88	6.50	9.26	0.18	3.16	16.22	5.08		0.23	--	1,560	2.12	78,890	37	3.3	2,180	7.6
Oct. 11-20	38,260	16	9.03	6.66	9.83	.20	3.10	16.74	5.42		.19	0.19	1,610	2.19	83,790	38	3.5	2,220	7.8
Oct. 21-31	43,890	16	9.33	6.83	10.09	.20	3.38	16.95	5.36		.24	--	1,650	2.24	98,310	38	3.5	2,260	7.9
Nov. 1, 3, 7, 10, 14 .	24,810	18	8.43	5.67	10.09	.20	3.67	14.37	5.87		.18	.17	1,520	2.07	51,360	41	3.8	2,130	7.7
Nov. 16, 18, 21, 23, 25, 28, 30 ..	42,030	17	6.79	4.61	9.09	.20	3.18	11.39	5.92		.18	--	1,290	1.75	73,550	44	3.8	1,900	7.9
Dec. 2, 5, 7, 9, 12 14	31,970	17	6.49	4.85	9.27	.21	2.98	11.47	6.06		.24	.17	1,300	1.77	56,590	45	3.9	1,910	8.2
Dec. 16, 19, 21, 23, 27, 30.....	35,290	15	6.39	4.28	8.53	.19	3.25	10.12	5.70		.26	.16	1,200	1.63	57,520	44	3.7	1,800	7.9
Jan. 3, 6, 9, 11, 13, 1956	23,370	15	6.09	4.44	9.83	.21	2.97	10.43	6.77		.26	.15	1,270	1.73	40,430	48	4.3	1,930	7.9
Jan. 16, 18, 20, 23, 25, 27, 30	36,260	13	5.74	4.19	9.44	.21	2.87	10.06	6.43		.26	.13	1,220	1.66	60,190	48	4.2	1,850	8.0

Feb. 3, 6, 8, 10, 13, 15, 1956	28,840	14	6.14	4.36	10.48	.23	3.15	10.06	7.84		.27	.13	1,310	1.78	51,340	49	4.6	2,030	8.1
Feb. 17, 20, 24, 27, 29	24,950	13	5.54	4.03	9.44	.21	3.05	9.14	6.54		.19	.11	1,170	1.59	39,670	49	4.3	1,820	7.8
Mar. 2, 5, 7, 9, 12, 15	30,840	13	5.39	3.78	9.48	.21	2.92	8.81	6.77		.21	.11	1,160	1.58	48,730	50	4.4	1,800	8.2
Mar. 19, 21, 23, 26, 28	35,150	14	5.19	3.45	8.05	.20	2.75	8.12	5.70		.21	.14	1,040	1.41	49,560	48	3.9	1,610	8.2
Mar. 30, Apr. 2, 4, 6, 9, 12	52,320	16	4.19	2.38	4.31	.13	2.75	5.23	2.76		.13	.09	673	.92	48,130	39	2.4	1,040	7.4
Apr. 16, 18, 20, 23-30	172,700	14	3.34	1.73	2.35	.08	2.57	3.37	1.44		.08	.06	454	.62	107,100	31	1.5	718	7.7
May 1-10	241,900	17	3.16	1.32	1.91	.07	2.46	2.91	1.10		.10	--	402	.55	133,000	30	1.3	630	7.8
May 11-20	259,200	15	2.76	1.20	1.52	.05	2.16	2.46	.96		.08	.07	344	.47	121,800	27	1.1	548	7.5
May 21-31	504,200	13	2.64	1.00	1.04	.05	2.29	1.83	.56		.07	--	285	.39	196,600	22	.8	461	7.5
June 1-10	509,800	11	2.20	.88	1.00	.05	1.80	1.71	.56		.07	--	252	.34	173,300	24	.8	405	7.6
June 11-20	290,600	10	2.80	1.16	1.57	.07	2.03	2.63	.96		.07	.07	344	.47	136,600	28	1.1	552	7.4
June 21-30	123,400	11	4.08	2.00	3.57	.07	2.26	5.16	2.03		.11	--	597	.81	99,950	37	2.0	897	7.5
July 1-10	85,920	12	5.84	2.96	5.00	.10	2.72	8.24	2.88		.15	--	874	1.19	102,200	36	2.4	1,270	7.8
July 11-20	46,870	11	7.04	3.68	6.96	.10	2.92	10.66	3.89		.18	.12	1,110	1.51	70,770	39	3.0	1,570	7.9
July 21-31	39,370	10	8.96	5.68	9.14	.15	3.21	15.32	4.96		.18	--	1,490	2.03	79,920	38	3.4	2,060	7.6

COLORADO RIVER MAIN STEM--Continued

COLORADO RIVER NEAR CISCO, UTAH--Continued

Chemical analyses, water year October 1955 to September 1956--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 (micromhos 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				
Aug. 1-10, 1956 ..	47,900	14	8.96	4.32	7.18	0.14	3.38	13.41	3.89		0.19	--	1,310	1.78	85,260	35	2.8	1,810	7.5
Aug. 11-20	35,540	13	9.52	6.16	8.79	.20	3.34	16.70	4.54		.21	0.15	1,560	2.12	75,340	36	3.1	2,140	7.7
Aug. 21-31	35,290	13	9.84	6.04	8.40	.19	3.41	16.11	4.48		.24	--	1,530	2.08	73,400	34	3.0	2,100	7.7
Sept. 1-10	23,350	9.0	10.36	7.32	10.35	.19	3.29	19.03	5.64		.27	--	1,780	2.42	56,510	37	3.5	2,420	7.6
Sept. 11-20	26,740	8.3	10.28	7.40	10.35	.19	3.28	18.78	5.61		.27	.19	1,770	2.41	64,440	37	3.5	2,390	7.5
Sept. 21-30	31,400	9.7	9.84	6.88	9.87	.17	3.39	17.91	5.19		.27	--	1,690	2.30	72,220	37	3.4	2,270	7.6
Total or weighted average a	2,959,000	13	4.14	2.22	3.52	0.09	2.44	5.33	2.09		0.12	--	617	0.84	2,486,000	35	2.0	921	--
Total or weighted average b	3,604,000	13	4.39	2.55	4.31	0.11	2.54	5.98	2.68		0.13	--	702	0.95	3,424,000	38	2.3	1,050	--

a Represents 82 percent of runoff for water year October 1955 to September 1956.
b Includes estimated data for missing periods. Represents 100 percent of runoff for water year October 1955 to September 1956.

COLORADO RIVER AT LEES FERRY, ARIZ.

LOCATION (revised).--At gaging station at head of Marble Gorge at Lees Ferry, Coconino County, just upstream from Paria River, 16 miles downstream from site of Glen Canyon Dam, 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 1956.
Water temperatures: July 1949 to September 1956.
Sediment records: October 1928 to December 1933, November 1942 to September 1944, October 1947 to September 1956.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 1,960 micromhos Aug. 26; minimum daily, 403 micromhos June 12.
Percent sodium: Maximum, 42 Feb. 11 to Mar. 10; minimum, 22 May 11 to June 10.
EXTREMES, 1928-30, 1942-45, 1947-56.--Specific conductance (1942-45, 1947-56): Maximum daily, 2,280 micromhos Oct. 15, 1945; minimum daily, 318 micromhos June 9, 1948.
Percent sodium: Maximum, 46 (1942-44, 1947-56) Mar. 2, 4, 7, 10, 1944; minimum 21 June 21-30, 1949, June 1-10, 1951.
REMARKS.--Values reported for dissolved solids are calculated from determined constituents. Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of discharge for water year October 1955 to September 1956 given in WSP 1443.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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, 1955.	68,810	16	7.58	4.85	7.61	0.18	3.57	12.58	3.69	0.02	0.12	0.19	1,260	1.71	117,700	38	3.1	1,760	7.7
Oct. 11-20	68,290	12	7.09	4.77	7.61	.18	3.52	11.97	3.78	.02	.10	.24	1,220	1.66	113,400	39	3.1	1,730	7.6
Oct. 21-31.....	76,480	13	7.24	5.10	8.13	.19	3.51	12.70	3.95	.02	.11	.23	1,280	1.74	133,100	39	3.3	1,810	7.6
Nov. 1-10	77,930	13	7.39	5.10	8.22	.19	3.72	12.83	3.98	.02	.11	.23	1,300	1.77	137,900	39	3.3	1,830	7.7
Nov. 11-20	93,080	14	7.14	4.85	7.83	.18	3.92	11.83	3.92	.02	.11	.20	1,240	1.89	157,300	39	3.2	1,760	7.8
Nov. 21-30	104,500	14	6.69	4.44	7.26	.17	3.84	10.68	3.78	.02	.11	.18	1,150	1.56	163,000	39	3.1	1,660	7.6
Dec. 1-10	115,000	14	6.34	4.03	6.74	.16	3.79	9.76	3.41	.02	.11	.20	1,060	1.44	165,600	39	3.0	1,550	7.6
Dec. 11-20	89,890	16	5.99	4.03	6.61	.16	3.69	9.39	3.38	.02	.10	.21	1,030	1.40	125,800	39	3.0	1,510	7.7
Dec. 21-31	121,500	16	6.34	4.03	6.92	.17	3.87	9.51	3.84	.02	.11	.19	1,070	1.46	177,400	40	3.0	1,580	7.6
Jan. 1-10, 1956.	130,000	15	5.39	3.70	6.00	.14	3.62	8.37	2.99	.02	.09	.18	935	1.27	165,100	39	2.8	1,380	7.6
Jan. 11-20	105,000	15	5.59	3.37	6.31	.15	3.56	8.31	3.27	.02	.10	.18	947	1.29	135,400	41	3.0	1,420	7.8
Jan. 21-31	137,800	14	5.49	3.37	6.31	.14	3.64	8.12	3.33	.02	.09	.18	939	1.28	176,400	41	3.0	1,410	7.7
Feb. 1-10	95,280	14	5.49	3.62	6.52	.15	3.54	8.58	3.33	.02	.10	.17	966	1.31	124,800	41	3.1	1,450	8.0
Feb. 11-20	95,010	15	6.24	3.78	7.40	.17	3.88	9.35	4.12	.02	.12	.24	1,080	1.47	139,700	42	3.3	1,610	7.6
Feb. 21-29	90,110	15	5.79	3.37	6.79	.16	3.70	8.60	3.67	.02	.12	.22	996	1.35	121,600	42	3.1	1,490	7.7

COLORADO RIVER MAIN STEM--Continued

COLORADO RIVER AT LEES FERRY, ARIZ.--Continued

Chemical analyses, water year October 1955 to September 1956--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 (micromhos 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, 1956	113,200	14	5.69	3.29	6.66	0.16	3.65	8.49	3.38	0.02	0.10	0.20	972	1.32	149,400	42	3.1	1,460	7.8
Mar. 11-20	150,200	13	5.19	2.96	5.83	.14	3.52	7.52	2.88	.02	.10	.23	868	1.18	177,200	41	2.9	1,310	7.7
Mar. 21-31	247,200	12	4.89	2.63	5.31	.15	3.51	6.66	2.59	.02	.11	.17	794	1.08	267,000	41	2.7	1,210	7.7
Apr. 1-10	274,800	15	4.69	1.97	3.78	.13	3.97	4.79	1.64	.03	.11	.09	640	.87	239,100	36	2.1	980	7.5
Apr. 11-24	356,700	14	4.14	1.81	3.31	.13	3.38	4.33	1.55	.03	.07	.09	569	.77	274,700	35	1.9	880	7.7
Apr. 25-30	266,300	14	3.49	1.40	2.39	.12	3.06	3.19	1.07	.03	.08	.08	449	.61	162,400	32	1.5	703	7.7
May 1-10	509,000	16	3.39	1.40	1.74	.10	3.29	2.44	.79	.02	.07	.15	394	.54	274,900	26	1.1	622	7.6
May 11-20	656,200	15	3.34	1.15	1.30	.10	3.29	1.92	.59	.03	.05	.12	346	.47	308,400	22	.9	554	7.6
May 21-31	1,024,000	15	3.19	1.15	1.26	.09	3.02	2.02	.56	.03	.05	.13	336	.46	471,000	22	.9	536	7.6
June 1-10	1,245,000	14	2.64	.99	1.04	.08	2.64	1.64	.45	.03	.04	.12	283	.38	473,100	22	.8	450	7.7
June 11-20	894,500	15	2.50	.99	1.04	.09	2.41	1.67	.48	.03	.03	.11	276	.38	339,900	23	.8	435	7.6
June 21-30	453,700	14	2.74	1.15	1.48	.09	2.47	2.21	.73	.03	.03	.14	329	.45	204,200	27	1.1	521	7.6
July 1-5	138,200	13	3.09	1.48	1.91	.10	2.67	2.83	.93	.03	.03	.17	393	.53	73,250	29	1.3	624	7.7
July 6-15	217,500	14	4.34	1.89	2.96	.16	2.98	4.66	1.41	.03	.06	.16	566	.77	167,500	32	1.7	862	7.5
July 16-23	113,100	13	3.94	2.06	3.09	.13	2.80	4.60	1.64	.03	.04	.16	559	.76	85,960	34	1.8	860	7.6
July 24-29	66,930	13	4.54	2.71	4.05	.15	3.02	6.06	2.03	.03	.05	.20	692	.94	62,910	35	2.1	1,050	7.6
July 30-Aug. 20	270,000	18	6.64	3.04	5.00	.18	4.21	8.10	2.26	.02	.10	.17	912	1.24	334,800	34	2.3	1,320	7.6
Aug. 21-31	106,500	17	7.73	3.87	6.39	.21	3.85	10.97	2.96	.03	.16	.17	1,130	1.54	164,000	35	2.7	1,610	7.5
Sept. 1-20	115,900	14	6.44	4.19	6.09	.18	3.33	9.97	3.24	.02	.08	.21	1,040	1.41	163,400	36	2.6	1,500	7.6
Sept. 21-30	50,110	11	6.84	5.26	7.44	.18	3.13	12.14	4.06	.02	.09	.20	1,220	1.66	83,180	38	3.0	1,740	7.6
Total or weighted average	8,740,000	15	4.04	1.97	3.04	0.12	3.15	4.41	1.49	0.03	0.06	0.14	558	0.76	6,642,000	33	1.8	846	--

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 1956.
Water temperatures: October 1936 to October 1942, September 1943 to September 1956.
Sediment records: October 1925 to November 1942, September 1943 to September 1956.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 2,150 micromhos Oct. 3; minimum daily, 446 micromhos May 29.
Percent sodium: Maximum, 45, Feb. 11 to Mar. 10, Sept. 10-30; minimum, 20, June 8.
EXTREMES, 1937-42, 1943-56.--Specific conductance: Maximum daily, 2,900 micromhos Sept. 6, 1940; minimum daily, 341 micromhos June 15, 1942.
Percent sodium (1941-42, 1943-56): 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 calculated from determined constituents. Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of discharge for water year October 1955 to September 1956 given in WSP 1443.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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, 1955	75,790	15	7.98	4.61	9.79	0.24	4.05	12.41	6.06	0.03	0.18	0.27	1,410	1.92	145,500	43	3.9	2,040	7.6
Oct. 11-20	76,110	11	7.29	4.61	9.22	.24	3.95	11.22	5.81	.03	.12	.21	1,310	1.78	135,500	43	3.8	1,930	7.5
Oct. 21-31	84,520	12	7.34	4.85	9.48	.21	3.82	11.74	5.92	.03	.15	.23	1,340	1.82	153,800	43	3.8	1,990	7.7
Feb. 1-10, 1956	108,400	12	5.29	3.45	7.13	.16	3.69	7.70	4.23	.02	.09	.17	967	1.32	143,100	44	3.4	1,480	7.8
Feb. 11-20	101,700	13	5.29	3.21	7.00	.16	3.69	7.56	4.17	.02	.09	.18	953	1.30	132,200	45	3.4	1,470	7.9
Feb. 21-29	100,100	14	5.14	3.29	7.00	.15	3.70	7.41	4.17	.02	.08	.19	945	1.29	129,100	45	3.4	1,460	7.8
Mar. 1-10	119,800	13	5.09	3.29	6.96	.15	3.69	7.29	4.20	.02	.08	.19	936	1.27	152,100	45	3.4	1,440	7.9
Mar. 11-20	158,900	12	4.99	3.13	6.61	.15	3.64	7.02	3.86	.02	.08	.18	897	1.22	193,900	44	3.3	1,390	7.8
Mar. 21-29	159,800	16	5.14	2.88	6.52	--	3.70	6.91	3.95	.02	.09	.09	899	1.22	195,000	44	3.3	1,390	7.7
Mar. 30-Apr. 12	402,200	16	4.54	2.14	4.35	.14	3.85	4.87	2.23	.03	.08	.10	673	.92	370,000	39	2.4	1,040	7.7
Apr. 13-23	261,600	17	3.94	1.81	4.05	.14	3.15	4.35	2.34	.03	.07	.12	607	.83	217,100	41	2.4	952	7.7
Apr. 24-30	286,700	16	3.69	1.73	3.09	.13	3.31	3.62	1.64	.03	.07	.10	523	.71	203,600	36	1.9	825	7.7
May 1-13	722,200	15	3.34	1.40	2.09	.12	3.26	2.46	1.13	.03	.06	.08	412	.56	404,400	30	1.4	659	7.7
May 14-24	690,300	16	2.89	1.23	1.61	.09	2.80	1.98	.85	.03	.05	.06	342	.47	324,400	28	1.1	547	7.7
May 25-31	712,500	12	2.69	1.07	1.44	.10	2.49	1.94	.73	.03	.05	.08	314	.43	306,400	27	1.1	503	7.8

COLORADO RIVER MAIN STEM--Continued

COLORADO RIVER NEAR GRAND CANYON, ARIZ.--Continued

Chemical analyses, water year October 1955 to September 1956--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 (micromhos 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 1-3, 6-7,1956	594,500	17	3.19	1.07	1.30	0.08	3.10	1.75	0.62	0.03	0.04	0.06	329	0.45	267,500	23	0.9	520	7.9
June 4-5	252,000	--	2.94	1.15	1.26	--	2.95	--	--	--	--	--	a324	.44	110,900	24	.9	495	7.9
June 8	126,100	--	3.74	1.15	1.22	--	3.75	--	--	--	--	--	a347	.47	59,270	20	.8	563	7.6
June 9-17	925,700	18	2.89	.99	1.26	.08	2.88	1.60	.62	.03	.03	.06	309	.42	388,800	24	.9	489	7.7
June 18-28	618,100	16	2.89	1.23	1.61	.09	2.85	1.96	.93	.03	.02	.07	344	.47	290,500	28	1.1	550	7.7
June 29-July 4	186,800	--	3.14	1.48	2.31	--	2.85	--	--	--	--	--	a417	.57	106,500	33	1.5	668	7.5
July 5-29	452,800	14	4.19	2.30	4.05	.13	3.06	4.83	2.51	.03	.04	.10	640	.87	393,900	38	2.2	1,000	7.7
July 30-Aug. 27	372,000	17	6.19	3.13	6.00	.22	3.93	7.79	3.44	.03	.06	.18	944	1.28	476,200	39	2.8	1,410	7.7
Aug. 28-Sept. 9	100,400	--	6.24	3.78	7.31	--	3.85	--	--	--	--	--	a1,100	1.50	150,600	42	3.3	1,620	7.3
Sept. 10-23	80,990	11	6.09	4.11	8.40	.20	3.41	9.18	5.81	.03	.08	.20	1,140	1.55	125,500	45	3.7	1,740	7.7
Sept. 24-30	38,990	9.9	6.64	4.93	9.61	.21	3.36	11.03	6.63	.03	.09	.22	1,300	1.77	69,010	45	4.0	1,960	7.8
Total or weighted average	b7,809,000	15	3.79	1.81	3.13	0.12	3.16	3.77	1.83	0.03	0.06	0.10	531	0.72	5,622,000	35	1.9	824	--
Total or weighted average	c8,860,000	15	4.09	2.06	3.70	0.13	3.29	4.48	2.20	0.03	0.06	0.11	600	0.82	7,265,000	37	2.1	927	--

a Residue on evaporation at 180°C.

b Represents 88 percent of runoff for water year October 1955 to September 1956.

c Includes estimated data for missing periods. Represents 100 percent of runoff for water year October 1955 to September 1956.

COLORADO RIVER BELOW HOOVER DAM, ARIZ.-NEV.

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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 1956.
Water temperatures: October 1941 to September 1956.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 1,270 micromhos Sept. 24; minimum daily, 1,160 micromhos Jan. 17, Mar. 2, 5, 7, Apr. 4.
Percent sodium: Maximum, 41 Mar. 1-10, Aug. 1-10, 11-20, 21-31; minimum, 38 on several periods during the year.
EXTREMES, 1939-56.--Specific conductance: Maximum daily, 1,580 micromhos June 20, 1955; minimum daily, 712 micromhos Nov. 22-26, 1952.
Percent sodium (1941-44, 1950-56): Maximum, 41 during several periods in 1951, and 1956; minimum, 32 Jan. 21-22, 25-29, 31 June 12-17, 19-20, 1944.
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 Salt Lake City, Utah. Records of discharge for water year October 1955 to September 1956 given in WSP 1443.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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, 1955 ..	155,400	--	5.44	2.30	4.91	--	2.80	--	--	--	--	--	836	1.14	177,200	39	2.5	1,220	7.9
Oct. 11-20.....	188,600	14	5.09	2.71	4.91	0.13	2.79	7.31	2.82	0.02	0.06	0.17	806	1.10	207,500	38	2.5	1,210	8.0
Oct. 21-31.....	182,100	--	5.49	2.22	4.91	--	2.84	--	--	--	--	--	830	1.13	205,800	39	2.5	1,210	8.0
Nov. 1-10.....	157,000	--	5.44	2.30	4.78	--	2.82	--	--	--	--	--	832	1.13	177,400	38	2.4	1,220	7.9
Nov. 11-20.....	151,600	--	5.44	2.30	4.96	--	2.82	--	--	--	--	--	827	1.12	169,800	39	2.5	1,220	7.9
Nov. 21-30.....	178,700	--	5.39	2.47	5.00	--	2.80	--	--	--	--	--	817	1.11	198,400	39	2.5	1,200	8.2
Dec. 1-10.....	166,700	--	5.39	2.47	4.87	--	2.79	--	--	--	--	--	804	1.09	181,700	38	2.5	1,190	7.8
Dec. 11-20.....	150,900	--	5.29	2.55	4.87	--	2.75	--	--	--	--	--	796	1.08	163,000	38	2.5	1,190	8.1
Dec. 21-31.....	174,900	--	5.34	2.38	4.87	--	2.75	--	--	--	--	--	803	1.09	190,600	39	2.5	1,190	8.1
Jan. 1-10, 1956 ..	177,500	--	5.39	2.30	4.87	--	2.75	--	--	--	--	--	801	1.09	193,500	39	2.5	1,190	8.2
Jan. 11-20.....	205,600	13	4.99	2.71	4.70	.12	2.75	7.08	2.79	.02	.05	.18	795	1.08	222,000	38	2.4	1,180	7.5
Jan. 21-31.....	200,000	--	5.49	2.47	4.92	--	2.82	--	--	--	--	--	818	1.11	222,000	38	2.5	1,210	8.2
Feb. 1-10.....	190,000	--	5.34	2.22	4.87	--	2.74	--	--	--	--	--	799	1.09	207,100	39	2.5	1,190	7.8
Feb. 11-20.....	145,100	--	5.49	2.22	4.92	--	2.79	--	--	--	--	--	803	1.09	158,200	39	2.5	1,200	7.8
Feb. 21-29.....	163,600	--	5.44	2.38	4.92	--	2.80	--	--	--	--	--	819	1.11	181,600	39	2.5	1,210	7.9

COLORADO RIVER MAIN STEM--Continued

COLORADO RIVER BELOW HOOVER DAM, ARIZ.-NEV.--Continued

Chemical analyses, water year October 1955 to September 1956--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 (micromhos 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, 1956..	187,500	--	4.56	2.72	5.00	--	2.36	--	--	--	--	--	810	1.10	206,200	41	2.6	1,200	8.2
Mar. 11-20.....	252,300	--	5.00	2.68	5.00	--	2.69	--	--	--	--	--	828	1.13	285,100	39	2.5	1,210	8.0
Mar. 21-31.....	329,500	--	5.04	2.72	5.05	--	2.72	--	--	--	--	--	834	1.13	372,300	39	2.6	1,230	7.7
Apr. 1-10.....	275,100	--	4.76	2.72	5.05	--	2.49	--	--	--	--	--	827	1.12	308,100	40	2.6	1,220	7.8
Apr. 11-20.....	276,300	12	5.12	2.74	5.22	0.14	2.77	7.37	3.05	0.02	0.06	0.17	843	1.15	317,700	39	2.6	1,240	7.5
Apr. 21-30.....	288,800	--	5.00	2.72	5.09	--	2.75	--	--	--	--	--	844	1.15	332,100	40	2.6	1,240	7.7
May 1-10	257,100	--	5.00	2.80	5.09	--	2.75	--	--	--	--	--	841	1.14	293,100	39	2.6	1,240	8.0
May 11-20.....	219,800	--	4.92	2.72	5.09	--	2.59	--	--	--	--	--	833	1.13	248,400	40	2.6	1,230	7.6
May 21-31.....	271,500	--	5.12	2.56	5.09	--	2.69	--	--	--	--	--	860	1.17	317,700	40	2.6	1,240	8.0
June 1-10	240,800	--	5.28	2.60	5.09	--	2.82	--	--	--	--	--	871	1.18	284,100	39	2.6	1,250	7.6
June 11-20	276,300	--	5.20	2.76	5.09	--	2.85	--	--	--	--	--	846	1.15	317,700	39	2.5	1,250	7.6
June 21-30	267,000	--	5.28	2.68	5.09	--	2.88	--	--	--	--	--	876	1.19	317,700	39	2.5	1,260	--
July 1-10.....	239,000	--	5.28	2.72	5.09	--	2.88	--	--	--	--	--	879	1.20	286,800	39	2.5	1,250	7.6
July 11-20.....	271,000	12	5.32	2.62	5.22	.14	2.90	7.33	2.99	.02	.07	.22	854	1.16	314,400	39	2.6	1,260	7.2
July 21-31.....	272,300	--	5.40	2.80	5.09	--	2.92	--	--	--	--	--	884	1.20	326,800	38	2.5	1,260	7.4
Aug. 1-10.....	204,500	--	5.08	2.84	5.48	--	2.95	--	--	--	--	--	867	1.18	241,300	41	2.8	1,250	7.7
Aug. 11-20.....	207,100	--	5.52	2.44	5.48	--	2.95	--	--	--	--	--	851	1.16	240,200	41	2.7	1,250	7.8
Aug. 21-31.....	284,100	--	5.44	2.56	5.48	--	2.92	--	--	--	--	--	850	1.16	329,600	41	2.7	1,250	7.8
Sept. 1-10.....	217,000	--	4.96	3.02	5.26	--	2.92	--	--	--	--	--	846	1.15	249,600	40	2.6	1,240	7.8
Sept. 11-19.....	190,500	--	4.84	3.22	5.35	--	2.95	--	--	--	--	--	849	1.15	219,100	40	2.7	1,250	7.6
Sept. 20-30.....	202,700	--	5.24	2.64	5.22	--	2.88	--	--	--	--	--	848	1.15	233,100	40	2.6	1,270	8.0
Total or weighted average	7,818,000	--	5.19	2.63	5.09	--	2.79	--	--	--	--	--	837	1.14	8,913,000	39	2.6	1,230	

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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 powerplant, and a quarter of a mile downstream from upper highway bridge over Colorado River at Yuma, Yuma County.
RECORDS AVAILABLE.--Chemical analyses: September 1926 to September 1928. October 1942 to September 1956.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 1,410 micromhos Jan. 25, 26, Feb. 13; minimum daily, 1,280 micromhos Oct. 5, 6.
Percent sodium: Maximum, 43 Oct. 11-20, Dec. 11-Jan. 1, Jan. 6 to Feb. 20, Sept. 1-30; minimum, 41 Mar. 21 to May 31.
EXTREMES, 1943-56.--Specific conductance: Maximum daily, 1,410 micromhos Jan. 25, 26, Feb. 13, 1956, minimum daily, 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 at 180°C. Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of discharge for water year October 1955 to September 1956 given in WSP 1443.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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, 1955.	9,910	16	4.94	2.88	5.83	0.14	2.72	7.54	3.36	0.02	0.02	0.21	881	1.20	11,890	42	3.0	1,290	--
Oct. 11-20	9,580	14	4.89	2.88	5.87	.14	2.67	7.58	3.38	.02	.02	.20	884	1.20	11,500	43	3.0	1,300	7.9
Oct. 21-31	8,400	14	4.94	2.96	5.92	.14	2.75	7.62	3.38	.02	.02	.22	889	1.21	10,160	42	3.0	1,300	8.0
Nov. 1-10	8,990	14	5.04	3.04	5.96	.14	2.84	7.66	3.47	.02	.02	.22	899	1.22	10,970	42	3.0	1,320	8.0
Nov. 11-20	7,380	13	5.09	3.04	5.92	.14	2.84	7.70	3.44	.02	.02	.21	912	1.24	9,150	42	2.9	1,320	8.1
Nov. 21-30	6,120	14	5.24	2.96	6.00	.14	2.93	7.77	3.55	.02	.02	.20	923	1.26	7,710	42	3.0	1,340	8.1
Dec. 1-10	3,940	16	5.29	2.96	6.13	.14	3.03	7.87	3.72	.02	.02	.24	947	1.29	5,080	42	3.0	1,380	8.1
Dec. 11-20	4,810	15	5.29	2.88	6.22	.13	3.02	7.91	3.78	.02	.02	.24	949	1.29	6,200	43	3.1	1,380	8.1
Dec. 21-31	6,350	16	5.24	2.88	6.13	.14	3.00	7.87	3.75	.02	.02	.26	946	1.29	88,190	43	3.0	1,380	8.1
Jan. 1, 6-20, 1956	a 8,900	17	5.24	2.80	6.26	.14	3.02	7.89	3.78	.02	.02	.27	962	1.31	11,660	43	3.1	1,380	8.2
Jan. 21-31	7,990	15	5.39	2.80	6.31	.14	3.05	7.89	3.86	.02	.02	.26	964	1.31	10,470	43	3.1	1,400	8.2
Feb. 1-10	5,170	19	5.29	2.80	6.13	.14	2.85	7.89	3.69	.02	.03	.26	949	1.29	6,670	43	3.0	1,370	8.2
Feb. 11-20	8,050	18	5.34	2.80	6.22	.14	3.05	7.89	3.72	.02	.03	.25	957	1.30	10,460	43	3.1	1,380	8.2
Feb. 21-29	8,290	16	5.39	2.88	6.09	.14	3.03	7.85	3.72	.02	.03	.25	947	1.29	10,690	42	3.0	1,380	8.2

a No flow Jan. 2-5.

DIVERSIONS AND RETURN FLOW AT AND BELOW IMPERIAL DAM--Continued

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

Chemical analyses, water year October 1955 to September 1956--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 (micromhos 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, 1956 .	8,750	16	5.49	2.71	6.05	0.15	2.92	7.95	3.52	0.03	0.04	0.23	914	1.24	10,850	42	3.0	1,360	8.1
Mar. 11-20.....	9,950	15	5.59	2.63	6.00	.14	2.95	7.91	3.47	.03	.04	.22	917	1.25	12,440	42	3.0	1,350	8.0
Mar. 21-30.....	11,250	16	5.49	2.71	5.92	.15	2.93	7.85	3.44	.02	.03	.23	909	1.24	13,950	41	2.9	1,340	8.0
Apr. 1-10	7,790	12	5.49	2.71	5.83	.14	2.88	7.81	3.38	.02	.03	.22	894	1.22	9,500	41	2.9	1,330	8.1
Apr. 11-20	9,060	14	5.44	2.71	5.87	.15	2.90	7.79	3.38	.02	.04	.22	897	1.22	11,050	41	2.9	1,330	8.2
Apr. 21-30	9,010	14	5.44	2.80	5.74	.14	2.95	7.75	3.47	.01	.03	.28	922	1.25	11,260	41	2.8	1,330	7.9
May 1-31	32,420	15	5.44	2.71	5.79	.15	2.90	7.77	3.52	.02	.03	.27	928	1.26	40,850	41	2.9	1,340	7.9
June 1-30	32,230	15	5.29	2.71	5.83	.15	2.77	7.81	3.55	.02	.03	.24	917	1.25	40,290	42	2.9	1,340	7.8
July 1-31	32,320	15	5.19	2.80	5.79	.15	2.74	7.81	3.50	.02	.03	.27	920	1,25	40,400	42	2.9	1,330	7.9
Aug. 1-31	30,180	17	5.09	2.96	6.00	.15	2.75	7.87	3.55	.02	.03	.30	897	1.22	36,820	42	3.0	1,340	7.7
Sept. 1-30	35,590	14	5.24	2.88	6.13	.15	2.72	7.93	3.67	.02	.03	.30	909	1.24	44,130	43	3.0	1,360	7.7
Total or weighted average	322,500	15	5.29	2.80	5.96	0.14	2.84	7.81	3.55	0.02	0.03	0.26	917	1.20	387,000	42	3.0	1,340	

GUNNISON 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 upstream from mouth and Grand Junction, Mesa County.
DRAINAGE AREA.--8,020 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: October 1931 to September 1956.
Water temperatures: April 1949 to September 1956.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 2,730 micromhos Sept. 10; minimum daily, 380 micromhos May 10.
Percent sodium: Maximum, 35 Sept. 21-30; minimum, 19 June 1-10.
EXTREMES, 1941-56.--Specific conductance: Maximum daily, 2,730 micromhos Sept. 10, 1956; minimum daily, 280 micromhos May 23, 1948.
Percent sodium (1950-56): Maximum, 35 Sept. 21-30, 1956; minimum, 10 June 2-5, 10, 1952.
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 Salt Lake City, Utah. Records of discharge for water year October 1955 to September 1956 given in WSP 1443.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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. 1-2, 1955...	2,170	--	6.79	3.37	4.26	--	2.59	--	--	--	--	--	--	--	--	30	1.9	1,290	8.2
Oct. 3-10.....	8,010	--	11.43	6.17	7.91	--	3.24	--	--	--	--	--	1,780	2.42	19,380	31	2.7	2,140	8.2
Oct. 11-20	13,170	23	11.38	7.98	8.57	0.13	3.24	24.15	0.85	0.04	0.19	0.35	1,930	2.62	34,510	31	2.8	2,260	7.8
Oct. 21-31	14,600	--	11.98	6.91	8.52	--	3.80	--	--	--	--	--	1,880	2.56	37,380	31	2.8	2,220	7.9
Nov. 1-10	15,810	--	11.48	6.50	7.87	--	4.36	--	--	--	--	--	1,750	2.38	37,630	30	2.6	2,090	7.8
Nov. 11-20	18,360	--	9.98	5.67	6.44	--	4.23	--	--	--	--	--	1,520	2.07	38,010	29	2.3	1,890	7.7
Nov. 21-30	19,750	--	8.88	5.02	5.87	--	3.98	--	--	--	--	--	1,330	1.81	35,750	30	2.2	1,670	7.7
Dec. 1-10	18,420	--	7.44	5.26	6.09	--	2.88	--	--	--	--	--	1,290	1.75	32,240	32	2.4	1,620	8.0
Dec. 11-20	18,020	--	6.79	4.77	5.39	--	2.67	--	--	--	--	--	1,160	1.58	28,470	32	2.2	1,480	8.1
Dec. 21-31	20,600	--	7.09	4.69	5.52	--	3.06	--	--	--	--	--	1,170	1.59	32,750	32	2.3	1,480	8.1
Jan. 1-10, 1956..	15,860	--	7.53	5.02	5.70	--	3.61	--	--	--	--	--	1,230	1.67	26,490	31	2.3	1,540	8.1
Jan. 11-20.....	16,470	20	6.34	5.35	5.66	.15	2.97	13.85	.56	.03	.16	.22	1,190	1.62	26,680	32	2.3	1,490	7.9
Jan. 21-31.....	17,870	--	6.84	4.85	5.74	--	3.18	--	--	--	--	--	1,180	1.60	28,590	33	2.4	1,510	7.8
Feb. 1-10	15,040	--	7.58	4.93	5.79	--	3.62	--	--	--	--	--	1,240	1.69	25,420	32	2.3	1,560	8.2
Feb. 11-20	16,020	--	6.99	4.44	5.22	--	2.97	--	--	--	--	--	1,120	1.52	24,350	31	2.2	1,460	8.1
Feb. 21-29	13,230	--	6.49	4.77	5.52	--	3.51	--	--	--	--	--	1,130	1.54	20,370	33	2.3	1,450	7.8
Mar. 1-10	14,640	--	5.70	4.58	5.26	--	2.90	--	--	--	--	--	1,080	1.47	21,520	34	2.3	1,390	8.0
Mar. 11-20.....	15,370	--	5.60	4.52	5.13	--	2.87	--	--	--	--	--	1,060	1.44	22,130	34	2.3	1,350	8.2
Mar. 21-31.....	26,320	--	5.20	3.32	3.57	--	3.11	--	--	--	--	--	818	1.11	29,220	30	1.7	1,080	8.1

GUNNISON RIVER BASIN--Continued

GUNNISON RIVER NEAR GRAND JUNCTION, COLO.--Continued

Chemical analyses, water year October 1955 to September 1956--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 (micromhos 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. 1-10, 1956..	29,670	--	4.04	2.16	2.39	--	2.85	--	--	--	--	--	576	0.78	23,140	28	1.4	805	8.1
Apr. 11-20	42,860	22	3.82	1.78	1.91	0.08	2.74	4.60	0.28	0.02	0.09	0.10	489	.67	28,720	25	1.1	705	7.9
Apr. 21-30	69,360	--	3.24	1.16	1.13	--	2.59	--	--	--	--	--	361	.49	33,990	30	.8	531	7.8
May 1-10.....	99,110	--	3.04	1.04	1.00	--	2.36	--	--	--	--	--	332	.45	44,600	20	.7	487	8.0
May 11-20.....	80,450	--	2.88	1.20	1.09	--	2.07	--	--	--	--	--	342	.47	37,810	21	.8	505	7.8
May 21-31.....	144,300	--	2.84	1.10	.96	--	2.13	--	--	--	--	--	322	.44	63,490	20	.7	480	7.5
June 1-10	143,500	--	2.72	1.10	.91	--	1.98	--	--	--	--	--	315	.43	61,700	19	.7	472	7.3
June 11-20	85,390	--	3.16	1.40	1.30	--	2.02	--	--	--	--	--	391	.53	45,260	22	.9	571	7.3
June 21-30	32,600	--	5.40	2.20	2.74	--	2.56	--	--	--	--	--	688	.94	30,640	26	1.4	931	7.6
July 1-10.....	18,890	--	7.68	3.84	4.65	--	2.92	--	--	--	--	--	1,120	1.52	28,710	29	1.9	1,390	7.8
July 11-20.....	7,370	14	11.90	7.40	8.18	.18	3.16	23.53	.90	.03	.11	.33	1,940	2.64	19,460	30	2.6	2,210	7.5
July 21-27.....	4,620	--	13.12	7.92	9.66	--	2.59	--	--	--	--	--	2,190	2.98	13,770	31	3.0	2,410	7.5
July 28-31, Aug. 1-10	18,960	--	6.88	3.84	4.70	--	2.98	--	--	--	--	--	1,040	1.41	26,730	30	2.0	1,330	7.8
Aug. 11-20	8,370	--	11.60	6.40	8.22	--	3.31	--	--	--	--	--	1,830	2.49	20,840	31	2.7	2,090	7.9
Aug. 21-31	7,360	--	12.88	7.44	9.22	--	3.47	--	--	--	--	--	2,090	2.84	20,900	31	2.9	2,310	7.9
Sept. 1-10.....	5,050	--	14.48	8.00	9.74	--	3.67	--	--	--	--	--	2,290	3.11	15,710	30	2.9	2,500	7.9
Sept. 11-20.....	6,740	--	14.72	8.40	10.48	--	3.54	--	--	--	--	--	2,380	3.24	21,840	31	3.1	2,590	8.0
Sept. 21-30.....	8,510	--	12.88	7.84	10.96	--	3.47	--	--	--	--	--	2,200	2.99	25,440	35	3.4	2,490	7.6
Total or weighted average.....	1,113,000	--	4.99	2.63	2.96	--	2.61	--	--	--	--	--	717	0.98	1,091,000	28	1.5	936	

GREEN RIVER BASIN

GREEN RIVER AT GREEN RIVER, UTAH

LOCATION.--At gaging station, 1 mile southeast of 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 1956.
Water temperatures: April 1949 to September 1956.
Sediment records: May 1930 to September 1956.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 1,350 micromhos Nov. 24; minimum daily, 272 micromhos May 13.
Percent sodium: Maximum, 43 Oct. 1-10, 11-20, 21-31, Nov. 1-10; minimum, 22 June 21-30.
EXTREMES, 1941-56.--Specific conductance: Maximum daily, 2,420 micromhos Sept. 29, 1943; minimum daily, 272 micromhos May 13, 1956.
Percent sodium (1950-56): 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 at 180°C. Records of specific conductance of daily samples available in district office at Salt Lake City, Utah. Records of discharge for water year October 1955 to September 1956 given in WSP 1443.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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, 1955	24,890	10	3.69	2.80	5.00	0.09	3.34	6.81	1.55		0.02	--	742	1.01	25,140	43	2.8	1,080	8.0
Oct. 11-20	23,780	13	4.14	3.21	5.61	.09	3.67	7.62	1.64		.02	0.25	821	1.12	26,630	43	2.9	1,190	7.9
Oct. 21-31	28,520	9.4	4.19	3.04	5.61	.09	3.67	7.77	1.58		.01	--	828	1.13	32,230	43	3.0	1,190	7.8
Nov. 1-10	28,300	10	4.19	3.21	5.61	.08	3.87	7.62	1.52		.02	--	822	1.12	31,700	43	2.9	1,180	7.8
Nov. 11-20	27,590	11	4.19	3.12	5.31	.08	4.00	7.27	1.41		.01	.24	796	1.08	29,800	42	2.8	1,160	7.9
Nov. 21-30	30,370	17	4.49	3.62	5.22	.06	4.29	7.66	1.47		.04	--	842	1.15	34,930	39	2.6	1,210	7.8
Dec. 1-10	39,130	18	4.19	3.13	4.44	.06	4.03	6.37	1.30		.05	--	732	1.00	39,130	38	2.3	1,060	7.8
Dec. 11-20	30,450	18	4.49	3.70	4.83	.06	4.33	7.37	1.41		.05	.24	829	1.13	34,410	37	2.4	1,190	7.7
Dec. 21-31	57,380	16	4.19	3.13	4.35	.06	4.02	6.29	1.27		.05	--	719	.98	56,230	37	2.3	1,050	7.7
Jan. 1-10, 1956	47,010	14	3.69	2.71	4.35	.06	3.67	5.91	1.10		.05	--	664	.90	42,310	40	2.4	975	7.7
Jan. 11-20	53,410	15	3.74	2.88	4.22	.06	3.79	5.68	1.21		.04	.18	666	.91	48,600	39	2.3	978	7.7
Jan. 21-31	54,150	13	3.69	2.96	4.05	.07	3.64	6.04	1.18		.03	--	674	.92	49,820	38	2.2	1,000	8.0
Feb. 1-10	27,280	14	4.54	3.54	4.92	.07	4.39	7.22	1.44		.02	--	823	1.12	30,550	38	2.4	1,190	7.9
Feb. 11-20	36,460	13	4.19	3.37	4.70	.07	4.18	6.85	1.44		.03	.12	780	1.06	38,650	38	2.4	1,140	8.2
Feb. 21-29	36,100	13	4.04	3.21	4.35	.07	3.97	6.43	1.30		.03	--	732	1.00	36,100	37	2.3	1,070	8.2
Mar. 1-10	65,430	13	3.79	2.80	4.00	.07	3.64	5.87	1.13		.03	--	665	.90	58,890	38	2.2	982	7.9
Mar. 11-20	62,140	14	3.68	2.16	3.87	.07	3.47	5.29	1.04		.06	.17	611	.83	51,580	40	2.3	907	7.6
Mar. 21-31	186,600	16	3.52	1.96	3.57	.09	3.64	4.60	.96		.08	--	570	.78	145,500	39	2.2	858	7.7

GREEN RIVER BASIN--Continued

GREEN RIVER AT GREEN RIVER, UTAH--Continued

Chemical analyses, water year October 1955 to September 1956--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 (micromhos 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. 1-10, 1956	121,800	16	3.00	1.64	2.65	0.08	3.18	3.50	0.68		0.09	--	455	0.62	75,520	36	1.7	697	7.8
Apr. 11-20	106,500	15	3.00	1.80	2.61	.08	3.15	3.54	.79		.07	0.09	458	.62	66,030	35	1.7	702	8.0
Apr. 21-30	231,800	16	2.60	1.24	1.44	.08	2.98	1.87	.45		.09	--	322	.44	102,000	27	1.0	512	7.8
May 1-10	247,500	14	2.40	1.12	1.09	.06	2.77	1.48	.37		.06	--	277	.38	94,050	23	.8	447	7.6
May 11-20	276,700	14	1.92	.94	.96	.05	2.26	1.27	.28		.05	.08	233	.32	88,540	25	.8	372	8.0
May 21-31	470,700	13	2.18	.98	1.04	.05	2.39	1.46	.31		.06	--	256	.35	164,700	24	.8	411	7.8
June 1-10	567,300	13	2.22	.90	.96	.05	2.56	1.23	.28		.06	--	246	.33	187,200	23	.8	393	7.8
June 11-20	418,300	12	1.86	.90	.83	.05	2.26	1.06	.25		.04	.07	212	.29	121,300	23	.7	347	7.5
June 21-30	221,800	12	2.56	.88	1.00	.05	2.79	1.50	.25		.02	--	266	.36	79,850	22	.8	416	7.8
July 1-10	131,800	12	2.60	1.28	1.48	.06	2.92	2.08	.45		.01	--	326	.44	57,990	27	1.1	500	7.8
July 11-20	88,400	13	2.68	1.48	1.74	.06	2.95	2.58	.51		.02	.08	370	.50	44,200	29	1.2	555	8.0
July 21-31	73,510	11	2.96	1.52	2.22	.08	3.11	3.00	.59		.03	--	406	.55	40,430	33	1.5	611	7.8
Aug. 1-10	75,070	12	3.60	1.76	2.96	.08	3.25	4.33	.85		.04	--	515	.70	52,550	35	1.8	767	7.9
Aug. 11-15	27,790	13	3.32	1.72	3.09	.10	3.25	4.08	.93		.05	.15	505	.69	19,180	38	2.0	762	8.0
Aug. 16-20	23,290	15	2.24	2.72	2.74	.09	3.28	3.64	.73		.02	.12	466	.63	14,670	35	1.7	718	7.5
Aug. 21-31	42,960	9.1	3.20	1.84	2.74	.10	3.25	3.79	.87		.04	--	473	.64	27,490	35	1.7	728	8.0
Sept. 1-10	29,040	9.3	3.20	1.88	3.00	.07	3.28	3.79	.99		.02	--	492	.67	19,460	37	1.9	751	7.8
Sept. 11-20	23,150	9.0	3.24	2.04	3.31	.07	3.26	4.25	1.13		.03	.11	526	.72	16,670	38	2.0	803	7.8
Sept. 21-30	20,230	7.5	3.44	2.32	3.70	.08	3.34	4.83	1.21		.01	--	577	.78	15,780	39	2.2	871	7.7
Total or weighted average	4,056,000	13	2.69	1.48	2.00	0.06	2.90	2.73	0.56		0.05	--	380	0.52	2,109,000	32	1.4	583	--

SAN JUAN RIVER NEAR ARCHULETA, N. MEX.

LOCATION.--At gaging station 4½ miles downstream from Los Pinos River and 4½ miles northeast of Archuleta, San Juan County.
DRAINAGE AREA.--3,240 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: December 1954 to September 1956.
Water temperatures: December 1954 to September 1956.
Sediment records: December 1954 to September 1956.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 653 micromhos Aug. 17; minimum daily, 115 micromhos May 31, June 1.
EXTREMES, 1954-56.--Specific conductance: Maximum daily, 653 micromhos Aug. 17, 1956; minimum daily, 115 micromhos May 31, June 1, 1956.
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 Albuquerque, N. Mex. Records of discharge for water year October 1955 to September 1956 given in WSP 1443. Flow affected by ice Nov. 17, Dec. 4-26, Jan. 31 to Feb. 14.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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. 1-10,1955 ..	6,330	13	1.95	0.58	1.22	0.10	2.33	1.31	0.24	0.02	0.01	0.08	236	0.32	2,030	32	1.1	370	7.6
Oct. 11-31.....	13,150	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	375	--
Nov. 1-15.....	8,750	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	396	--
Nov. 16-30	7,770	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	463	--
Dec. 1-31.....	15,180	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	477	--
Jan. 1-10, 1956..	4,760	19	2.40	.78	1.61	.09	2.47	2.12	.28	.03	.00	.11	306	.42	2,000	33	1.3	464	7.8
Jan. 11-31.....	11,310	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	445	--
Feb. 1-29	14,750	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	489	--
Mar. 1-21	22,820	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	472	--
Mar. 22-31	24,980	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	313	--
Apr. 1-10	22,740	18	1.55	.43	.57	.07	1.57	.94	.11	.02	.01	.09	178	.24	5,460	22	.6	259	7.4
Apr. 11-30	55,980	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	211	--
May 1-18	86,040	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	167	--
May 19-31	87,470	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	138	--
June 1-20.....	102,100	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	142	--
June 21-30	14,790	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	260	--
July 1-10	11,130	13	1.70	.47	.96	.09	2.00	1.04	.16	.03	.01	.08	199	.27	3,010	30	.9	311	7.6

SAN JUAN RIVER BASIN--Continued

SAN JUAN RIVER NEAR ARCHULETA, N. MEX.--Continued

Chemical analyses, water year October 1955 to September 1956--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 (micromhos 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				
July 11-31, 1956.	13,660	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	376	--
Aug. 1-31.....	22,980	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	374	--
Sept. 1-30	11,180	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	391	--
Total or weighted average	558,000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	249	--

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.
RECORDS AVAILABLE.--Chemical analyses: February to June 1927, October 1929 to September 1956.
Water temperatures: May 1944 to September 1956.
Sediment records: August to September 1928, July 1929 to September 1956.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 2,310 micromhos Aug. 3; minimum daily, 282 micromhos June 5.
Percent sodium: Maximum, 56 Aug. 3; minimum, 20 June 1-10.
EXTREMES, 1929-56.--Specific conductance (1941-56): Maximum daily, 2,310 micromhos Aug. 3, 1956; 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 at 180°C unless otherwise noted. Records of specific conductance of daily samples available in district office at Salt Lake City, Utah. Records of discharge for water year October 1955 to September 1956 given in WSP 1443.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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, 1955..	7,860	16	4.89	1.81	3.74	0.11	3.13	6.70	0.73		0.09	--	678	0.92	7,230	35	2.0	970	8.0
Oct. 11-20	7,410	15	5.49	2.30	4.39	.11	3.28	8.16	.93		.09	0.12	794	1.08	8,000	36	2.2	1,110	7.9
Oct. 21-31	9,300	13	5.24	2.30	4.22	.10	3.28	7.70	.85		.07	--	759	1.03	9,580	36	2.2	1,080	7.6
Nov. 1-10	8,750	13	5.79	2.63	4.57	.10	3.46	8.74	.96		.10	--	849	1.15	10,060	35	2.2	1,180	7.9
Nov. 11-20.....	10,680	12	6.04	3.04	4.70	.10	3.46	9.51	1.02		.10	.12	910	1.24	13,240	34	2.2	1,240	7.9
Nov. 21-30.....	11,480	14	6.49	3.54	4.87	.08	3.62	10.20	.93		.10	--	978	1.33	15,270	33	2.2	1,290	7.9
Dec. 1-10	11,710	14	6.59	3.54	5.09	.12	3.59	10.60	1.04		.11	--	996	1.35	15,810	33	2.3	1,330	7.9
Dec. 11-20	10,340	16	6.59	3.37	5.00	.12	3.70	10.20	1.02		.11	.14	987	1.34	13,860	33	2.2	1,320	7.6
Dec. 21-31.....	13,380	16	6.44	3.37	4.70	.12	3.56	9.99	1.02		.10	--	959	1.30	17,390	32	2.1	1,280	7.6
Jan. 1-10, 1956 .	11,880	14	5.99	3.21	4.57	.12	3.39	9.49	.96		.11	--	908	1.23	14,610	33	2.1	1,230	7.9
Jan. 11-20	11,870	14	5.99	3.21	4.52	.12	3.33	9.41	.96		.09	.13	900	1.22	14,480	33	2.1	1,220	7.8
Jan. 21-31	16,730	13	5.79	3.21	4.70	.11	3.18	9.64	.90		.11	--	903	1.23	20,580	34	2.2	1,220	7.8
Feb. 1-10	11,680	16	5.99	3.37	5.00	.10	3.25	10.33	1.02		.13	--	968	1.32	15,420	35	2.3	1,290	7.9
Feb. 11-20	12,080	16	6.04	3.29	4.65	.10	3.31	9.87	.96		.13	.12	932	1.27	15,340	33	2.2	1,250	8.2
Feb. 21-29	10,250	15	6.09	3.45	4.74	.10	3.16	10.22	.96		.12	--	952	1.29	13,220	33	2.2	1,270	7.9
Mar. 1-10	17,640	16	5.39	2.63	4.22	.10	3.03	8.54	.79		.14	--	821	1.12	19,760	34	2.1	1,120	7.8
Mar. 11-20.....	17,510	15	4.89	2.38	3.09	.09	2.79	6.93	.65		.10	.08	676	.92	16,110	30	1.6	945	7.9
Mar. 21-25	13,010	17	4.64	2.14	2.87	.09	2.92	6.10	.59		.10	--	629	.86	11,190	29	1.6	884	7.8
Mar. 26-31	26,340	15	3.29	1.32	1.61	.08	2.44	3.39	.34		.11	--	405	.55	14,490	26	1.1	593	7.7

SAN JUAN RIVER BASIN--Continued

SAN JUAN RIVER NEAR BLUFF, UTAH--Continued

Chemical analyses, water year October 1955 to September 1956--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 (micromhos 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. 1-10, 1956.	34,830	15	3.09	1.32	1.61	0.06	2.16	3.52	0.34		0.06	--	397	0.54	18,810	26	1.1	580	7.7
Apr. 11-20.....	34,200	14	2.89	1.15	1.48	.06	2.11	3.16	.34		.05	0.05	364	.50	17,100	27	1.0	537	7.7
Apr. 21-30.....	37,590	14	2.89	1.15	1.48	.06	2.15	3.10	.31		.05	--	358	.49	18,420	27	1.0	532	7.5
May 1-10	62,180	14	2.50	.90	1.17	.06	2.03	2.33	.24		.05	--	302	.41	25,490	25	.9	450	7.5
May 11-20	65,020	15	2.52	.72	.96	.05	2.07	1.96	.18		.03	.05	270	.37	24,060	23	.8	408	7.6
May 21-31	113,700	14	2.20	.62	.78	.04	1.74	1.67	.15		.04	--	232	.32	36,380	21	.7	355	7.7
June 1-10	115,600	13	2.02	.50	.65	.04	1.67	1.35	.14		.02	--	202	.27	31,210	20	.6	316	7.5
June 11-20	62,300	13	2.18	.62	.91	.04	1.61	1.87	.20		.03	.05	242	.33	20,560	24	.8	372	7.6
June 21-30	25,440	11	2.54	.86	1.65	.05	a1.61	3.08	.34		.02	--	332	.45	11,450	32	1.3	502	8.4
July 1-2, 4, 6-10	14,100	17	4.52	1.00	2.65	.10	2.75	4.91	.56		.05	--	528	72	10,150	32	1.6	765	7.6
July 3, 5	3,720	19	7.52	1.76	3.70	.14	2.46	10.08	.68		.13	--	886	1.20	4,460	28	1.7	1,170	8.1
July 11-22.....	5,970	13	4.64	1.52	4.44	.14	2.20	7.50	.79		.04	.10	684	.93	5,550	41	2.5	971	7.4
July 23-30	6,820	21	9.68	2.72	9.09	.19	4.69	15.62	1.07		.02	--	1,410	1.92	13,090	42	3.7	1,820	7.5
July 31, Aug. 1-2, 4-10.....	15,030	20	5.84	1.52	6.00	.15	4.52	8.41	.62		.04	--	872	1.19	17,890	44	3.1	1,210	7.6
Aug. 3.....	3,750	24	10.00	2.24	15.33	--	6.56	20.32	.68		.01	--	b1,780	2.42	9,080	56	6.2	2,310	6.7
Aug. 11-20	10,410	18	6.72	2.04	6.39	.16	4.28	10.12	.85		.05	.17	1,020	1.39	14,470	42	3.0	1,380	7.7
Aug. 21-31.....	7,130	16	5.68	1.40	5.26	.13	3.62	7.99	.76		.08	--	830	1.13	8,060	42	2.8	1,150	7.6
Sept. 1-10	2,170	13	5.84	2.08	5.96	.15	2.62	9.99	1.16		.14	--	946	1.29	2,800	42	3.0	1,300	7.5
Sept. 11-20.....	1,140	9.7	6.16	2.96	8.13	.15	2.15	13.66	1.66		.12	.14	1,170	1.59	1,810	47	3.8	1,580	7.4
Sept. 21-30	536	7.0	7.08	4.12	9.79	.15	2.34	16.57	2.17		.15	--	1,430	1.94	1,040	46	4.1	1,890	7.5
Total or weighted average.....	861,600	14	3.59	1.40	2.26	0.07	2.38	4.46	0.42		0.06	--	475	0.65	560,000	31	1.4	674	--

a Includes 0.20 equivalent per million of carbonate (CO_3).
b Calculated from determined constituents.

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 1956.
Water temperatures: October 1952 to September 1956.
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 Albuquerque, N. Mex. Records of discharge for station near Cameron (below Moenkopi Wash) for water year October 1955 to September 1956 given in WSP 1443. 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, February to August 1956

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 (micromhos 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. 18-19, 1956			3.19	1.15	14.31		4.64						1,120	1.52		77	9.8	1,890	8.0
Feb. 20-29.....			2.20	.82	11.61		4.03						908	1.23		79	9.4	1,530	8.0
Mar. 1			5.14	2.38	16.23		3.54						1,450	1.97		68	8.4	2,400	7.9
Mar. 2-9			3.24	1.32	12.57		3.05						1,050	1.43		73	8.3	1,820	8.0
Mar. 10-11			1.60	.47	7.70		2.80						596	.81		79	7.6	1,040	8.1
Mar. 12-31			1.35	.51	4.83		2.29						400	.54		72	5.0	707	8.2
Apr. 1-10			1.70	.51	4.78	0.09	2.10	1.06	3.86	0.02	0.01	0.18	424	.58		68	4.5	744	7.7
Apr. 11			2.15	.72	5.79		2.26						534	.73		67	4.8	926	7.7
Apr. 16			3.54	1.15	10.57		2.52						922	1.25		69	6.9	1,630	7.6
Apr. 17-18.....			2.15	.67	6.66		2.44						577	.78		70	5.6	1,010	7.9
Apr. 19-23.....			1.60	.43	6.00		2.44						485	.66		75	6.0	860	7.9
Apr. 30-May 2 ..			2.30	.82	9.61		2.66						756	1.03		75	7.7	1,360	7.7
July 24			1.00	.16	8.79		4.16						678	.92		88	12	992	8.0
July 27-28, 30-31			.30	.07	6.66		a4.94						454	.62		95	15	676	8.7
Aug. 1-5.....			13.77	7.15	11.14		8.26						1,910	2.60		35	3.4	2,530	7.4
Aug. 6-9			5.69	2.96	6.96		10.05						1,210	1.65		45	3.4	1,950	7.6
Aug. 18			15.77	7.65	6.96		7.85						1,860	2.53		23	2.0	2,300	7.1
Aug. 19-29			2.00	.99	10.14		6.23						734	1.00		77	8.3	1,230	7.9

a Includes 0.40 equivalent per million of carbonate (CO_3).

VIRGIN RIVER BASIN

VIRGIN RIVER AT LITTLEFIELD, ARIZ.

LOCATION.--At gaging station, three-eighths of a mile downstream from Beaverdam Wash, three-eighths of a mile upstream from Littlefield, Mohave County, and 36 miles upstream from water line of Lake Mead at elevation 1,221 feet above mean sea level.
DRAINAGE AREA.--5,090 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: July 1949 to September 1956.
Water temperatures: October 1947 to September 1956.
Sediment records: October 1947 to September 1956.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 4,090 micromhos Oct. 5; minimum daily, 1,520 micromhos Jan. 28.
Percent sodium: Maximum, 35 Feb. 11-20, Mar. 11-20; minimum, 23 July 21-31.
EXTREMES, 1949-56.--Specific conductance: Maximum daily, 4,090 micromhos Oct. 5, 1955; minimum daily, 734 micromhos Apr. 28, 1952.
Percent sodium (1953-56): Maximum, 35 Jan. 1-10, 1955, Feb. 11-20, Mar. 11-20, 1956; minimum, 16 Aug. 11-20, 1955.
REMARKS.--Values reported for dissolved solids are calculated from 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 1955 to September 1956 given in WSP 1443.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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, 1955..	1,760	27	20.36	9.37	10.83	1.20	5.31	25.40	10.29		0.95	0.95	2,590	3.52	6,200	26	2.8	3,340	7.7
Oct. 11-20	1,550	28	18.36	9.54	11.48	1.00	4.75	24.36	10.86		.03	1.0	2,520	3.43	5,320	28	3.1	3,310	7.6
Oct. 21-31	2,120	28	17.96	9.62	13.57	.97	4.29	24.98	12.27		.03	1.1	2,620	3.56	7,550	32	3.7	3,490	7.6
Nov. 1-10	2,280	26	18.16	8.88	13.57	1.00	4.93	23.73	12.55		.04	.98	2,590	3.52	8,030	33	3.7	3,460	7.7
Nov. 11-20.....	4,320	21	17.37	6.91	10.65	.74	4.54	21.03	9.59		.05	.63	2,220	3.02	13,050	30	3.1	2,970	7.7
Nov. 21-30.....	3,620	24	15.17	6.99	10.61	.64	4.92	18.30	9.73		.05	.71	2,060	2.80	10,140	32	3.2	2,820	7.8
Dec. 1-10.....	4,760	23	14.27	6.58	10.00	.56	4.75	17.13	8.97		.04	.69	1,930	2.62	12,470	32	3.1	2,690	7.8
Dec. 11-20.....	4,040	24	13.57	6.66	10.18	.59	5.00	16.24	9.25		.04	.69	1,900	2.58	10,420	33	3.2	2,660	7.8
Dec. 21-31	4,460	25	13.57	7.15	10.18	.61	4.80	16.80	9.25		.04	.69	1,920	2.61	11,640	32	3.2	2,690	7.8
Jan. 1-10, 1956..	3,300	24	14.12	7.40	10.96	.61	4.75	18.36	9.93		.09	.80	2,060	2.80	9,240	33	3.3	2,820	7.6
Jan. 11-20	3,070	24	13.72	7.65	11.31	.61	4.31	18.99	10.43		.09	.82	2,090	2.84	8,720	34	3.5	2,890	7.6
Jan. 21-31	8,540	21	11.98	5.84	9.14	.49	3.46	15.55	7.95		.09	.61	1,700	2.31	19,730	33	3.1	2,360	7.7
Feb. 1-10	4,560	22	12.67	6.58	10.09	.54	4.82	16.30	9.16		.08	.69	1,870	2.54	11,580	34	3.3	2,610	7.6
Feb. 11-20	3,770	22	12.57	6.91	10.66	.56	4.29	16.91	9.53		.08	.70	1,910	2.60	9,800	35	3.4	2,680	7.6
Feb. 21-29.....	3,040	21	13.12	7.24	10.66	.56	4.54	17.34	9.64		.08	.73	1,960	2.67	8,120	34	3.3	2,740	7.4
Mar. 1-10	2,710	21	13.52	7.73	11.05	.59	4.39	18.54	10.15		.07	.78	2,050	2.79	7,560	34	3.4	2,840	7.5
Mar. 11-20.....	3,010	21	13.17	7.40	11.22	.59	4.57	17.61	10.21		.07	.70	2,010	2.73	8,220	35	3.5	2,830	7.5
Mar. 21-31.....	2,020	22	16.27	9.05	11.61	.69	5.05	21.86	10.58		.06	.81	2,330	3.17	6,400	31	3.3	3,150	7.4

Apr. 1-10, 1956 .	2,040	23	15.67	8.96	11.61	.69	4.51	21.44	10.49		.08	.84	2,280	3.10	6,320	31	3.3	3,120	7 4
Apr. 11-20.....	1,800	27	15.50	8.60	11.92	.69	4.06	22.28	11.00		.05	.89	2,330	3.17	5,710	32	3.4	3,180	7.5
Apr. 21-30.....	1,910	26	15.00	8.90	11.74	.69	4.00	21.86	10.72		.05	.88	2,290	3.11	5,940	32	3.4	3,130	7.7
May 1-10	1,710	27	15.40	9.20	11.74	.69	3.82	22.69	10.72		.05	.91	2,330	3.17	5,420	32	3.3	3,170	7.6
May 11-20.....	1,410	25	15.80	9.40	11.44	.72	3.43	23.53	10.86		.04	.96	2,370	3.22	4,540	31	3.2	3,200	7.5
May 21-31	1,400	24	17.00	9.60	11.18	.72	4.06	24.36	10.58		.04	1.0	2,440	3.32	4,650	29	3.1	3,230	7.6
June 1-10	1,260	25	16.60	9.70	11.18	.74	3.79	24.36	10.43		.03	1.0	2,420	3.29	4,150	29	3.1	3,240	7.5
June 11-20	1,240	24	17.00	9.80	11.18	.74	4.20	24.15	10.58		.04	1.0	2,430	3.30	4,090	29	3.1	3,240	7.5
June 21-30	1,920	22	18.00	9.90	11.31	.74	5.10	24.57	10.58		.03	.98	2,500	3.40	6,530	28	3.0	3,310	7.5
July 1-10	1,340	26	18.90	9.50	11.14	.72	4.00	25.40	10.29		.06	1.3	2,510	3.41	4,570	28	3.0	3,330	7.5
July 11-20	1,420	26	18.60	8.90	11.09	.72	3.46	24.78	10.43		.06	1.4	2,460	3.35	4,760	28	3.0	3,270	7.5
July 21-31.....	4,830	24	24.30	7.80	9.57	.64	4.49	28.11	9.08		.04	1.2	2,660	3.62	17,480	23	2.4	3,350	7.3
Aug. 1-10.....	1,560	26	19.50	8.80	11.09	.72	4.33	25.40	9.87		.05	.92	2,510	3.41	5,320	28	2.9	3,220	7.8
Aug. 11-20	1,160	26	16.80	9.70	11.74	.74	3.56	24.36	10.58		.04	.99	2,440	3.32	3,850	30	3.2	3,190	7.7
Aug. 21-31.....	1,310	25	16.90	9.70	11.88	.74	3.59	24.36	10.58		.04	1.0	2,440	3.32	4,350	30	3.3	3,180	7.4
Sept. 1-10.....	1,240	26	16.80	9.60	11.70	.74	3.80	24.36	10.43		.02	1.1	2,440	3.32	4,120	30	3.2	3,190	7.5
Sept. 11-20	1,140	23	17.60	9.60	11.70	.74	4.59	24.36	10.43		.02	1.0	2,470	3.36	3,830	30	3.2	3,220	7.4
Sept. 21-30	1,180	22	18.00	9.40	11.70	.74	4.92	24.15	10.43		.02	.98	2,480	3.37	3,980	29	3.2	3,220	7.5
Total or weighted average.....	92,820	24	15.57	7.81	10.83	0.67	4.41	20.36	9.87		0.06	0.83	2,170	2.95	273,800	31	3.2	2,940	--

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, 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 1956.
Water temperatures: December 1950 to September 1956.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 3,020 micromhos Sept. 27; minimum daily, 650 micromhos Aug. 18.
Percent sodium: Maximum, 56 June 1-30, Aug. 15; minimum 9 July 11-18, Sept. 10-30.
EXTREMES, 1950-56.--Specific conductance: Maximum daily, 3,860 micromhos July 15, 1955; minimum daily, 407 micromhos Jan. 20, 1952.
Percent sodium: Maximum, 67 July 15, 1955; minimum, 9 July 11-18, Sept. 10-30, 1956.
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 Albuquerque, N. Mex. Records of discharge for water year October 1955 to September 1956 given in WSP 1443. No appreciable inflow from Mineral Creek between sampling point and gaging station, except during periods of heavy local rains.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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, 1955 ..	4,210	22	3.54	1.23	3.70	0.16	3.72	2.77	2.00	0.05	0.03		527	0.72	3,030	43	2.4	830	7.7
Oct. 11-20.....	3,400	--	2.99	1.07	4.05	--	3.29	--	--	--	--		498	.68	2,310	50	2.8	790	7.7
Oct. 21-31.....	3,300	--	2.89	1.15	4.18	--	3.46	--	--	--	--		489	.67	2,210	51	2.9	797	7.9
Nov. 1-10.....	3,510	--	2.99	1.15	4.09	--	3.39	--	--	--	--		498	.68	2,390	50	2.9	797	7.8
Nov. 11-20.....	3,990	--	3.09	.99	4.05	--	3.46	--	--	--	--		500	.68	2,710	50	2.8	791	7.8
Nov. 21-22.....	317	--	5.24	1.89	5.92	--	4.29	--	--	--	--		796	1.08	342	45	3.1	1,230	8.2
Nov. 23-30	2,730	--	3.34	1.32	4.35	--	3.72	--	--	--	--		--	--	--	48	2.8	867	7.9
Dec. 1-10.....	3,180	--	3.99	1.40	4.61	--	3.92	--	--	--	--		617	.84	2,670	46	2.8	971	7.9
Dec. 11-20.....	3,540	--	3.49	1.23	4.31	--	3.79	--	--	--	--		549	.75	2,660	48	2.8	897	7.9
Dec. 21-31.....	5,400	--	3.19	1.07	4.13	--	3.62	--	--	--	--		503	.68	3,670	49	2.8	833	7.8
Jan. 1-10, 1956 ..	845	33	6.64	2.80	7.66	.26	4.62	7.85	4.71	.07	.02		1,090	1.48	1,250	44	3.5	1,600	8.2
Jan. 11-20.....	668	--	6.84	2.80	8.70	--	4.36	--	--	--	--		1,140	1.55	1,040	47	4.0	1,670	8.0
Jan. 21-28, 30-31	1,190	--	6.44	2.71	7.87	--	3.90	--	--	--	--		1,050	1.43	1,700	46	3.7	1,530	8.0
Jan. 29.....	1,280	--	4.39	1.64	3.61	--	4.20	--	--	--	--		598	.81	1,040	37	2.1	880	7.5

Feb. 1-10, 1956..	1,210	--	6.59	2.88	7.92	--	4.46	--	--	--	--		1,050	1.43	1,730	46	3.6	1,550	8.1
Feb. 11-20.....	2,680	--	4.54	1.81	6.00	--	4.06	--	--	--	--		700	.95	2,550	49	3.4	1,120	8.1
Feb. 21-29.....	2,710	--	3.79	2.14	5.61	--	3.87	--	--	--	--		646	.88	2,380	49	3.3	1,050	8.2
Mar. 1-10	4,940	--	3.39	1.40	4.92	--	3.65	--	--	--	--		586	.80	3,950	51	3.2	945	8.0
Mar. 11-20	6,970	--	3.09	1.40	4.92	--	3.61	--	--	--	--		538	.73	5,090	52	3.3	905	8.0
Mar. 21-31	10,910	--	3.14	1.40	4.92	--	3.65	--	--	--	--		550	.75	8,180	52	3.3	925	8.0
Apr. 1-10.....	8,380	13	3.34	1.32	5.13	0.18	3.80	2.12	3.92	0.05	0.01		578	.79	6,620	51	3.4	991	7.9
Apr. 11-20.....	6,970	--	3.49	1.56	5.66	--	3.85	--	--	--	--		623	.85	5,920	53	3.6	1,050	8.2
Apr. 21-30.....	4,250	--	3.69	1.56	5.92	--	3.92	--	--	--	--		676	.92	3,910	53	3.7	1,120	8.0
May 1-31	14,620	--	3.54	1.81	6.31	--	3.97	--	--	--	--		710	.97	14,190	54	3.8	1,160	8.0
June 1-30.....	13,480	--	3.89	2.38	7.83	--	3.93	--	--	--	--		858	1.17	15,770	56	4.4	1,390	7.8
July 1-10	85	33	13.77	6.17	8.35	.28	3.06	18.93	6.32	.05	.03		1,930	2.62	223	29	2.6	2,420	8.0
July 11-18	26	--	27.44	11.27	3.92	--	4.88	--	--	--	--		2,830	3.85	100	9	.9	2,920	7.5
July 19-22	1,300	--	4.89	2.22	3.87	--	7.03	--	--	--	--		636	.86	1,120	35	2.1	961	7.7
July 23-27	455	--	7.58	3.13	5.66	--	6.57	--	--	--	--		1,020	1.39	632	35	2.4	1,440	7.8
July 28-31	2,110	--	4.54	1.81	2.52	--	6.83	--	--	--	--		498	.68	1,430	28	1.4	768	7.7
Aug. 1	272	--	18.51	3.78	2.35	--	2.97	--	--	--	--		1,630	2.22	604	10	.7	1,850	7.2
Aug. 2-3.....	198	--	7.24	2.14	5.83	--	4.20	--	--	--	--		952	1.29	255	38	2.7	1,400	7.6
Aug. 4-11.....	237	--	10.28	3.04	9.48	--	3.29	--	--	--	--		1,460	1.99	472	42	3.7	2,070	7.5
Aug. 12-14.....	145	--	7.09	2.14	4.26	--	5.38	--	--	--	--		834	1.13	164	32	2.0	1,210	7.4
Aug. 15.....	135	--	7.83	2.06	12.57	--	3.59	--	--	--	--		1,360	1.85	250	56	5.7	2,250	7.3
Aug. 16.....	127	--	7.14	2.14	7.35	--	3.18	--	--	--	--		1,050	1.43	182	44	3.4	1,610	7.3
Aug. 17-18.....	678	--	3.54	1.07	2.09	--	3.26	--	--	--	--		431	.59	400	31	1.4	650	7.4
Aug. 19-20.....	254	--	5.29	2.06	3.26	--	6.64	--	--	--	--		617	.84	213	31	1.7	964	7.6
Aug. 21-28.....	439	--	6.64	2.63	7.96	--	4.11	--	--	--	--		1,100	1.50	658	46	3.7	1,660	7.7
Aug. 29.....	95	--	5.59	2.14	3.18	--	7.75	--	--	--	--		560	.76	72	29	1.6	972	7.3
Aug. 30-31.....	71	--	6.54	2.63	4.74	--	5.49	--	--	--	--		857	1.17	83	34	2.2	1,250	7.7

GILA RIVER BASIN--Continued

GILA RIVER AT KELVIN, ARIZ.--Continued

Chemical analyses, water year October 1955 to September 1956--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 (micromhos 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				
Sept. 1-3, 1956..	36	--	9.88	3.29	8.57	--	3.95	--	--	--	--		1,390	1.89	68	39	3.3	1,970	7.8
Sept. 4-7.....	26	--	16.62	6.74	8.74	--	4.23	--	--	--	--		2,100	2.86	74	27	2.6	2,640	7.7
Sept. 8.....	12	--	13.67	4.03	5.74	--	2.69	--	--	--	--		1,520	2.07	25	24	1.9	1,940	7.4
Sept. 9.....	7.9	--	20.21	7.40	5.92	--	3.90	--	--	--	--		2,190	2.98	24	18	1.6	2,540	7.2
Sept. 10-30.....	41	--	27.25	11.02	4.00	--	4.16	--	--	--	--		2,790	3.79	155	9	.9	2,910	7.7
Total or wieghted average.....	121,500	--	3.74	1.64	5.39	--	3.88	--	--	--	--		644	0.88	106,900	50	3.3	1,040	--

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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 (above gaging station).
RECORDS AVAILABLE.--Chemical analyses: December 1950 to September 1956.
Water temperatures: December 1950 to September 1956.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 9,750 micromhos Oct. 2, 22; minimum daily, 4,990 micromhos Nov. 26-29.
Percent sodium: Maximum, 70 July 27-31; minimum, 64 Feb. 3.
EXTREMES, 1950-56.--Specific conductance: Maximum daily, 10,200 micromhos Oct. 3, 1951; minimum daily, 370 micromhos Aug. 2, 1955.
Percent sodium: Maximum, 70 July 27-31, 1956; minimum, 36 Jan. 23-24, 1952.
REMARKS.--Values reported for dissolved solids are calculated from 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 1955 to September 1956 given in WSP 1443.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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, 1955..	988	32	19.41	14.47	65.68		6.06	27.48	64.01		0.71	3.0	5,930	8.06	7,960	66	16	8,890	7.4
Oct. 11-20.....	744	37	20.11	13.82	69.16		6.11	28.52	65.99		.69	2.8	6,140	8.35	6,210	67	17	9,200	7.6
Oct. 21-31.....	702	34	20.01	14.47	68.73		5.75	28.94	67.68		.73	3.6	6,200	8.43	5,920	67	17	9,300	7.5
Nov. 1-10.....	639	33	20.51	14.56	71.34		6.21	29.77	67.96		.82	3.8	6,340	8.62	5,510	67	17	9,420	7.6
Nov. 11-20.....	585	32	19.91	15.13	72.21		5.72	29.77	69.37		.82	3.7	6,390	8.69	5,080	67	17	9,430	7.6
Nov. 21-25, 30..	412	36	20.21	14.47	69.14		5.82	29.98	67.12		.90	3.8	6,260	8.51	3,510	67	17	9,380	7.6
Nov. 26-29.....	311	32	8.73	7.40	33.67		2.47	13.10	33.84		.52	1.3	3,010	4.09	1,270	68	12	4,990	7.9
Dec. 1-10.....	650	34	18.21	14.89	67.86		5.80	28.32	64.01		.87	3.1	6,000	8.16	5,300	67	17	9,040	7.5
Dec. 11-20.....	666	34	20.21	14.47	70.47		5.77	29.77	67.12		.81	3.2	6,270	8.53	5,680	67	17	9,300	7.6
Dec. 21-31.....	771	33	20.21	14.31	68.73		6.11	29.36	65.42		.81	3.2	6,160	8.38	6,460	67	17	9,180	7.6
Jan. 1-10, 1956..	646	34	20.21	14.31	70.47		5.95	29.56	66.55		.90	3.1	6,250	8.50	5,490	67	17	9,300	7.6
Jan. 11-31.....	1,600	37	19.81	14.06	66.56		5.87	29.15	64.58		.58	3.4	6,040	8.21	13,140	66	16	9,220	7.7
Feb. 1, 6-29....	1,980	37	19.41	14.89	64.82		5.97	28.73	64.30		.60	3.5	5,980	8.13	16,100	65	16	9,130	7.6
Feb. 2-3	226	22	11.88	8.22	36.10		4.52	16.61	34.40		.39	2.8	3,370	4.58	1,040	64	11	5,370	7.4
Feb. 4.....	95	37	15.37	10.86	48.72		5.54	22.07	46.81		.45	2.9	4,510	6.13	582	65	13	7,000	7.5

GILA RIVER BASIN--Continued

GILA RIVER BELOW GILLESPIE DAM, ARIZ.--Continued

Chemical analyses, water year October 1955 to September 1956--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 (micromhos 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. 5, 1956	93	38	16.92	11.84	55.24		5.83	25.19	51.89		0.56	3.3	5,050	6.87	639	66	15	7,690	7.6
Mar. 1-31	2,290	32	19.01	14.89	66.99		5.83	28.73	64.01		.60	3.7	6,000	8.16	18,690	66	16	9,080	7.8
Apr. 1-30.....	2,260	33	18.41	13.90	64.38		6.33	27.48	60.63		.47	3.6	5,740	7.81	17,650	67	16	8,800	7.7
May 1-31	1,530	--	17.02	14.89	67.86		4.49	--	--		--	--	a 6,060	8.24	12,610	68	17	9,000	7.7
June 1-30	982	--	15.37	14.56	67.42		3.15	--	--		--	--	a 5,940	8.08	7,930	69	17	8,870	7.6
July 1-2, 4-10...	230	17	15.67	13.90	65.68	0.33	2.36	29.15	63.73	0.13	.39	3.1	5,780	8.09	1,860	69	17	8,740	7.4
July 3	30	--	11.48	8.64	38.50		3.02	--	--		--	--	a 3,620	4.92	148	66	12	5,630	7.2
July 11-23	297	--	15.37	13.41	63.08		1.87	--	--		--	--	a 5,760	7.83	2,330	69	17	8,500	7.3
July 24-26	145	--	9.98	8.96	43.06		1.97	--	--		--	--	a 3,920	5.33	773	69	14	5,970	7.2
July 27-31	192	--	13.07	12.58	59.16		2.18	--	--		--	--	a 5,310	7.22	1,390	70	17	7,900	7.3
Aug. 1-31.....	948	--	15.27	13.49	61.77		2.92	--	--		--	--	a 5,720	7.78	7,380	68	16	8,380	7.6
Sept. 1-30	908	--	15.87	13.65	60.90		3.95	--	--		--	--	a 5,690	7.74	7,030	67	16	8,310	7.8
Total or weighted average	20,910	--	18.21	14.15	65.25	--	5.28	--	--		--	--	6,020	8.19	171,300	67	16	8,860	--

a Residue on evaporation at 180°C.

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 1956.
Water temperatures: December 1950 to September 1956.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 1,630 micromhos Sept. 29; minimum daily, 1,360 micromhos Oct. 28-29, Nov. 1
Percent sodium: Maximum, 70 Dec. 10-16, May 1-31, Sept. 1-30; minimum, 68 Oct. 1-10, 21-28, Jan 17 to Feb. 12, Feb. 20 to Apr. 10, July 1-10.
EXTREMES, 1950-56.--Specific conductance: Maximum daily, 2,490 micromhos Aug. 20, 1951; minimum daily, 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 at 180°C. 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 1955 to September 1956 given in WSP 1443. No inflow between sampling point and gaging station except during periods of heavy local rains.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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, 1955.	11,890	20	2.79	1.40	9.22	0.15	2.90	1.17	9.25	0.02	0.02	0.20	788	1.07	12,720	68	6.4	1,420	7.6
Oct. 11-20	9,760	--	2.54	1.40	8.92	--	2.88	--	--	--	--	--	700	.95	9,270	69	6.4	1,400	7.6
Oct. 21-28	4,960	--	2.59	1.48	8.61	--	2.95	--	--	--	--	--	739	1.01	5,010	68	6.0	1,380	7.4
Oct. 29-Nov. 11.	a117	--	2.69	1.40	9.14	--	3.18	--	--	--	--	--	777	1.06	124	69	6.4	1,410	7.8
Dec. 10-16	a368	--	2.74	1.40	9.48	--	b3.25	--	--	--	--	--	844	1.15	423	70	6.6	1,440	8.4
Jan. 17-31, 1956	4,980	--	2.89	1.56	9.40	--	3.00	--	--	--	--	--	821	1.12	55,580	68	6.3	1,450	8.0
Feb. 1-12, 20-29	a8,220	--	3.04	1.48	9.40	--	2.97	--	--	--	--	---	816	1.11	9,120	68	6.3	1,460	8.0
Mar. 1-10	20,860	--	2.99	1.48	9.40	--	2.97	--	--	--	--	--	812	1.10	22,900	68	6.3	1,450	7.9
Mar. 11-20	19,100	--	2.84	1.64	9.40	--	2.97	--	--	--	--	--	820	1.12	21,390	68	6.3	1,470	7.9
Mar. 21-31.....	22,210	--	2.94	1.64	9.57	--	2.95	--	--	--	--	--	827	1.12	24,880	68	6.3	1,480	7.9
Apr. 1-10	21,010	15	2.99	1.40	9.48	.17	2.93	1.25	9.76	.02	.03	.21	825	1.12	23,530	68	6.4	1,490	7.7
Apr. 11-30	31,620	--	2.89	1.56	9.92	--	2.97	--	--	--	--	--	868	1.18	37,310	69	6.7	1,530	7.7
May 1-31	49.230	--	2.84	1.56	10.05	--	2.98	--	--	--	--	--	880	1.20	59,080	70	6.8	1,550	7.8
June 1-30	85,740	--	2.84	1.64	10.14	--	2.92	--	--	--	--	--	894	1.22	104,600	69	6.8	1,550	8.0
July 1-10	33,950	14	2.99	1.56	10.09	.17	3.02	1.33	10.55	.03	.02	.18	886	1.20	40,740	68	6.7	1,580	7.8
July 11-31.....	67,720	--	3.04	1.56	10.14	--	3.00	--	--	--	--	--	882	1.20	81,260	69	6.7	1,590	7.7
Aug. 1-31	91,930	--	2.94	1.56	10.05	--	2.93	--	--	--	--	--	877	1.19	109,400	69	6.7	1,580	7.7
Sept. 1-30.....	86,840	--	2.74	1.56	10.14	--	2.77	--	--	--	--	--	867	1.18	102,500	70	6.9	1,570	7.6
Total or Weighted average	570,600	--	2.89	1.56	9.92	--	2.93	--	--	--	--	--	863	1.17	667,500	69	6.7	1,540	--

a No flow Nov. 12 to Dec. 9, Dec. 17 to Jan. 16, Feb. 13-19.
b Includes 0.27 equivalent per million of carbonate (CO_3),

GILA RIVER BASIN--Continued

VERDE RIVER BELOW BARTLETT DAM, ARIZ.

LOCATION.--At gaging station 2¼ miles downstream from Bartlett Dam, Maricopa County, and 3½ miles upstream from Camp Creek.
DRAINAGE AREA.--6,188 square miles.
RECORDS AVAILABLE.--Chemical analyses: December 1950 to September 1956.
Water temperatures: December 1950 to September 1956.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 808 micromhos Oct. 28; minimum daily, 494 micromhos Nov. 11.
Percent sodium: Maximum, 30 Sept. 18-30; minimum, 20 Nov. 21-30.
EXTREMES, 1950-56.--Specific conductance: Maximum daily, 808 micromhos Oct. 28, 1955; minimum daily, 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 at 180°C. Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of discharge for water year October 1955 to September 1956 given in WSP 1443.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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, 1955.	2,410	23	2.00	1.97	1.39	0.11	3.62	1.25	0.62	0.02	0.02	0.20	314	0.43	1,040	25	1.0	511	7.8
Oct. 11-20	1,820	--	2.00	2.22	1.57	--	3.95	--	--	--	--	--	325	.44	801	27	1.1	542	7.8
Oct. 21-31	2,990	--	2.45	2.38	1.61	--	4.74	--	--	--	--	--	352	.48	1,440	25	1.0	600	7.7
Nov. 1-10	5,470	--	2.25	2.06	1.26	--	4.02	--	--	--	--	--	294	.40	2,190	23	.9	520	7.9
Nov. 11-20	4,530	--	2.30	2.06	1.22	--	4.16	--	--	--	--	--	288	.39	1,770	22	.8	522	8.2
Nov. 21-30	349	--	2.69	2.38	1.30	--	4.74	--	--	--	--	--	348	.47	164	20	.8	592	8.0
Dec. 1-10	726	--	2.69	2.55	1.48	--	4.74	--	--	--	--	--	360	.49	356	22	.9	608	8.0
Dec. 11-20	9,880	--	2.59	2.38	1.30	--	4.62	--	--	--	--	--	338	.46	4,540	21	.8	571	7.9
Dec. 21-31	12,710	--	2.69	2.47	1.39	--	4.72	--	--	--	--	--	354	.48	6,100	21	.9	594	8.0
Jan. 1-10, 1956.	3,070	15	2.54	2.55	1.39	.11	4.59	1.25	.65	.02	.01	.21	352	.48	1,470	21	.9	588	8.2
Jan. 11-20	2,680	--	2.59	2.80	1.52	--	4.69	--	--	--	--	--	353	.48	1,290	22	.9	613	8.2
Jan. 21-31	878	--	2.74	2.55	1.52	--	4.79	--	--	--	--	--	354	.48	421	22	.9	619	8.1
Feb. 1-10	2,270	--	2.64	2.63	1.44	--	4.62	--	--	--	--	--	345	.47	1,070	21	.9	599	--
Feb. 11-20	2,500	--	2.69	2.80	1.48	--	a5.72	--	--	--	--	--	356	.48	1,200	21	.9	612	8.3
Feb. 21-29	504	--	2.69	2.80	1.52	--	4.84	--	--	--	--	--	363	.49	247	22	.9	619	8.2

a Includes 0.13 equivalent per million of carbonate (CO_3).

Mar. 1-31, 1956 .	30,680	--	2.59	2.63	1.52	--	4.69	--	--	--	--	--	366	0.50	15,340	23	.9	606	8.2
Apr. 1-10	7,030	16	2.69	2.47	1.44	.10	4.67	1.25	0.59	0.03	.01	.20	360	.49	3,440	21	.9	603	8.1
Apr. 11-30	8,050	--	2.59	2.63	1.52	--	4.72	--	--	--	--	--	375	.52	4,190	23	.9	598	8.2
May 1-31	16,420	--	2.54	2.80	1.57	--	4.79	--	--	--	--	--	380	.52	8,540	23	1.0	614	8.2
June 1-30	28,490	--	2.35	2.96	1.70	--	b4.72	--	--	--	--	--	392	.53	15,100	24	1.0	632	8.2
July 1-10	7,900	20	2.40	3.04	1.87	.10	4.88	1.62	.85	.03	.01	.26	410	.56	4,420	25	1.1	667	8.2
July 11-Aug. 1...	20,840	--	2.10	3.13	2.04	--	4.57	--	--	--	--	--	404	.55	11,460	28	1.3	671	8.0
Aug. 2-8	5,350	--	2.15	2.06	1.44	--	3.74	--	--	--	--	--	336	.46	2,460	25	1.0	538	8.0
Aug. 9-31	12,890	--	2.20	2.71	1.87	--	4.39	--	--	--	--	--	387	.53	6,830	28	1.2	632	8.1
Sept. 1-17	5,460	--	2.30	2.96	2.04	--	4.70	--	--	--	--	--	414	.56	3,060	28	1.3	673	8.0
Sept. 18-30.....	2,920	--	2.30	3.21	2.31	--	4.85	--	--	--	--	--	444	.60	1,750	30	1.4	725	8.1
Total or weighted average	198,900	--	2.45	2.71	1.61	--	4.61	--	--	--	--	--	372	0.51	101,400	24	1.0	614	--

b Includes 0.10 equivalent per million of carbonate (CO_3).

GILA RIVER BASIN--Continued

AGUA FRIA RIVER BELOW LAKE PLEASANT DAM, ARIZ.

LOCATION.--At water-stage recorder on canal 1¼ 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 (revised).--1,459 square miles (above Lake Pleasant).
RECORDS AVAILABLE.--Chemical analyses: December 1950 to September 1956.
Water temperatures: December 1950 to September 1956.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 698 micromhos Oct. 19; minimum daily, 353 micromhos Oct. 1.
Percent sodium: Maximum, 36 Oct. 21 to Nov. 3; minimum, 25 Oct. 1-13.
EXTREMES, 1950-56.--Specific conductance: Maximum daily, 698 micromhos Oct. 19, 1955; minimum daily, 241 micromhos Jan. 29, 1952.
Percent sodium: Maximum, 36 Oct. 21 to Nov. 3, 1955; minimum, 14 Jan. 29-31, Feb. 1-10, 1952.
REMARKS.--Values reported for dissolved solids are residues on evaporation at 180°C. 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 1955 to September 1956. Monthly diversions to canal below Lake Pleasant diversion dam are published as Agua Fria River at Lake Pleasant Dam in WSP 1443, and correction shown in WSP 1513.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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. 1-13, 1955 ..	873	24	1.50	1.32	1.00	0.13	2.92	0.50	0.51	0.01	0.02	0.25	229	0.31	271	25	0.8	378	7.2
Oct. 14-20.....	97	--	2.69	2.22	2.22	--	5.34	--	--	--	--	--	400	.54	52	31	1.4	636	7.7
Oct. 21-Nov. 3...	a 174	--	2.20	2.47	2.61	--	5.54	--	--	--	--	--	387	.53	92	36	1.7	672	7.5
June 10-22, 1956 .	2,320	--	1.70	1.56	1.44	--	3.08	--	--	--	--	--	263	.36	835	31	1.1	446	7.2
June 23-30.....	1,760	--	1.50	1.32	1.17	--	2.66	--	--	--	--	--	234	.32	563	29	1.0	387	7.2
July 1-10	1,770	15	1.40	1.32	1.17	.14	2.67	.65	.65	.03	.04	.15	232	.32	566	29	1.0	380	7.5
July 11-31	4,090	--	1.65	1.40	1.22	--	3.08	--	--	--	--	--	244	.33	1,350	29	1.0	420	7.2
Aug. 1-18, 23-31	a 5,130	--	1.90	1.48	1.17	--	3.10	--	--	--	--	--	263	.36	1,850	26	.9	428	7.4
Sept. 1-20	a 2,700	--	1.90	1.56	1.39	--	3.25	--	--	--	--	--	251	.34	918	29	1.1	455	7.6
Total or weighted average.....	18,910	--	1.75	1.48	1.26	--	3.06	--	--	--	--	--	252	0.34	6,430	28	1.0	425	--

a No flow Nov. 4 to June 9, Aug. 19-22, Sept. 21-30.

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 (above gaging station).
RECORDS AVAILABLE.--Chemical analyses: March 1951 to September 1956.
Water temperatures: March 1951 to September 1956.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 4,530 micromhos Oct. 28; minimum daily, 1,140 micromhos Apr. 17, 19.
Percent sodium: Maximum, 60 Aug. 21-31, Sept. 11-21; minimum, 34 Apr. 17-20.
EXTREMES, 1951-56.--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, 34 Apr. 17-20, 1956.
REMARKS.--Values reported for dissolved solids are calculated from 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 1955 to September 1956 given in WSP 1444.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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, 1955 ..	1,070	20	3.89	7.24	11.00	0.15	4.75	6.62	10.58		0.06	0.27	1,280	1.74	1,860	49	4.7	2,120	8.1
Oct. 11-21.....	821	22	4.44	8.14	12.96	.16	4.82	7.91	12.47		.05	.32	1,480	2.01	1,650	50	5.2	2,410	8.1
Oct. 22-31.....	389	33	6.39	12.91	26.79	.22	5.06	16.09	24.96		.07	.58	2,760	3.75	1,460	58	8.6	4,230	7.9
Nov. 1-10.....	411	28	6.09	11.35	23.00	.20	5.15	13.78	21.01		.04	.55	2,390	3.25	1,340	57	7.8	3,750	8.0
Nov. 11-15.....	196	26	6.49	11.43	22.57	.19	5.54	13.95	21.43		.05	.52	2,420	3.29	645	55	7.5	3,760	7.9
Nov. 16-20.....	436	20	4.24	6.83	8.17	.12	4.74	5.73	8.60		.06	.22	1,110	1.51	658	42	3.5	1,860	8.1
Nov. 21-30.....	847	19	4.69	7.81	10.13	.13	4.87	7.16	10.44		.07	.25	1,310	1.78	1,510	45	4.1	2,120	8.0
Dec. 1-5.....	329	20	4.44	7.65	10.04	.13	4.46	7.02	10.38		.08	.24	1,280	1.74	572	45	4.1	2,080	8.0
Dec. 6-10.....	167	26	7.29	12.01	24.39	.19	6.03	15.20	22.28		.07	.52	2,590	3.52	588	56	7.9	4,000	7.9
Dec. 11-20.....	262	25	7.14	12.17	24.61	.20	5.74	15.30	23.13		.06	.53	2,620	3.56	933	56	7.9	4,070	7.9
Dec. 21-31.....	268	24	7.09	12.25	25.26	.20	5.77	15.26	23.13		.06	.52	2,630	3.58	959	56	8.1	4,090	7.9
Jan. 1-10, 1956 ..	278	30	5.94	11.76	23.53	.19	4.64	14.70	22.00		.07	.53	2,470	3.36	934	57	7.9	3,880	7.7
Jan. 11-20.....	305	28	6.29	11.43	22.84	.19	5.06	13.99	21.21		.07	.53	2,410	3.28	1,000	56	7.7	3,780	7.8
Jan. 21-31.....	387	25	6.59	11.60	22.84	.19	5.26	14.72	21.57		.05	.51	2,460	3.35	1,300	55	7.6	3,870	7.9
Feb. 1-10.....	377	25	7.48	12.58	24.23	.20	5.85	15.53	23.07		.06	.51	2,640	3.59	1,350	54	7.6	4,110	7.8
Feb. 11-20.....	389	25	6.09	10.53	20.71	.17	5.08	12.62	19.46		.06	.49	2,210	3.01	1,170	55	7.2	3,490	7.8

SEVIER LAKE BASIN--Continued

SEVIER RIVER NEAR LYNNDYL, UTAH--Continued

Chemical analyses, water year October 1955 to September 1956--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 (micromhos 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. 21-28, 1956.	329	23	6.39	11.60	22.05	0.19	5.11	14.24	21.09		0.06	0.50	2,400	3.26	1,070	55	7.3	3,780	7.9
Feb. 29, Mar. 1-10	524	19	5.44	8.72	12.96	.16	5.06	8.83	13.48		.05	.34	1,600	2.18	1,140	48	4.9	2,590	7.9
Mar. 11-20	680	17	4.49	7.90	11.01	.13	4.72	7.31	11.22		.05	.28	1,360	1.85	1,260	47	4.4	2,240	7.8
Mar. 21-31	522	18	5.14	8.88	14.05	.17	5.03	9.08	13.96		.04	.35	1,640	2.23	1,160	50	5.3	2,680	7.7
Apr. 1-10.	307	21	6.24	11.10	20.84	.21	5.41	12.80	19.80		.03	.49	2,250	3.06	939	54	7.1	3,570	7.7
Apr. 11-16.	246	21	5.19	9.13	15.79	.17	5.11	9.79	15.09		.05	.40	1,770	2.41	593	52	5.9	2,840	8.0
Apr. 17-20.	871	24	2.84	4.85	4.09	.10	a 4.36	2.77	4.79		.06	.14	676	.92	801	34	2.1	1,160	8.3
Apr. 21-30	6,810	28	4.09	6.41	12.57	.16	4.88	7.22	10.86		.14	.37	1,370	1.86	12,670	54	5.5	2,220	8.1
May 1-10	7,190	28	3.94	6.25	12.57	.16	4.88	7.10	10.66		.18	.37	1,360	1.85	13,300	55	5.6	2,210	8.0
May 11-20	11,240	27	3.89	6.17	12.62	.16	4.87	7.06	10.58		.19	.36	1,350	1.84	20,680	55	5.6	2,190	8.0
May 21-31	7,460	25	3.99	6.58	13.31	.17	4.85	7.56	11.22		.16	.37	1,410	1.92	14,320	55	5.8	2,290	8.0
June 1-10	4,980	26	3.44	6.60	13.01	.17	4.26	7.66	11.51		.16	.38	1,390	1.89	9,410	56	5.8	2,300	7.9
June 11-20	5,710	27	3.80	6.48	13.22	.18	4.69	7.60	11.62		.16	.38	1,420	1.93	11,020	56	5.8	2,320	7.7
June 21-30	8,410	27	3.84	6.88	13.96	.18	4.85	7.89	12.18		.18	.39	1,480	2.01	16,900	56	6.0	2,420	7.8
July 1-10	7,840	26	3.76	7.04	14.44	.18	4.75	8.14	12.83		.18	.43	1,530	2.08	16,310	57	6.2	2,500	7.8
July 11-13, 17-20.	2,840	22	4.04	7.72	15.62	.20	4.77	8.91	14.16		.12	.43	1,640	2.23	6,330	57	6.4	2,690	7.6
July 14-16	470	26	4.80	10.16	22.05	.24	5.00	12.70	19.51		.12	.54	2,220	3.02	1,420	59	8.1	3,510	8.0
July 21-23, 26-31.	2,500	21	3.84	7.60	15.62	.22	4.59	8.93	14.16		.10	.43	1,640	2.23	5,580	57	6.5	2,680	7.7
July 24-25	666	16	2.56	4.76	5.26	.10	4.36	2.89	5.30		.03	--	710	.97	646	41	2.8	1,240	7.8
Aug. 1-10	2,110	20	3.60	8.24	15.96	.19	4.72	8.91	14.80		.07	--	1,670	2.27	4,790	57	6.6	2,730	8.0
Aug. 11-20	3,230	19	3.36	8.32	16.92	.19	4.57	9.16	15.09		.04	.53	1,700	2.31	7,460	59	7.0	2,770	7.9
Aug. 21-31	2,740	18	3.36	8.20	17.27	.19	4.39	9.49	14.80		.02	.49	1,700	2.31	6,330	60	7.2	2,750	7.6
Sept. 1-6, 9-10	837	13	3.52	8.72	17.49	.19	4.51	9.79	15.37		.02	.46	1,750	2.38	1,990	58	7.1	2,840	7.9
Sept. 7-8	184	14	2.80	5.80	7.66	.12	4.21	4.66	7.61		.03	.21	945	1.29	237	47	3.7	1,600	8.2
Sept. 11-21	1,530	15	3.20	8.56	17.75	.18	4.29	9.74	15.37		.02	.47	1,740	2.37	3,630	60	7.3	2,830	7.8
Sept. 22-30	536	14	3.68	6.84	10.31	.13	4.79	6.29	9.87		.04	.29	1,210	1.65	884	49	4.5	1,990	7.5
Total or weighted average	87,690	25	3.94	7.15	14.05	0.17	4.77	8.06	12.41		0.14	0.39	1,500	2.04	178,900	56	6.0	2,440	--

a Includes 8 equivalents per million of carbonate (CO_3).

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 1956.
Water temperatures: December 1951 to September 1956.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 1,420 micromhos Apr. 6; minimum daily, 384 micromhos June 24.
Percent sodium: Maximum, 65 Apr. 6-10, 11-20; minimum, 21 June 24.
EXTREMES, 1951-56.--Specific conductance: Maximum daily, 4,010 micromhos Sept. 2, 1954; minimum daily, 384 micromhos June 24, 1956.
Percent sodium: Maximum, 71 Sept. 1-5, 1954; minimum, 21 June 24, 1956.
REMARKS.--Values reported for dissolved solids are residues on evaporation at 180°C unless otherwise noted. Records of specific conductance of daily samples available in district office at Salt Lake City, Utah. Records of discharge for water year October 1955 to September 1956 given in WSP 1444. No appreciable inflow between gaging station and sampling point except during periods of local rains.

Chemical analyses, April to September 1956

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 (micromhos 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. 6-10, 1956 ..	1,500	36	2.59	1.64	8.83	0.46	4.61	2.12	6.97		0.03	0.86	818	1.11	1,660	65	6.1	1,400	8.1
Apr. 11-20.....	5,020	35	2.50	1.56	8.40	.43	a 4.56	2.02	6.23		.03	.77	769	1.05	5,270	65	5.9	1,310	8.3
Apr. 21-30.....	8,370	35	2.35	1.40	7.00	.41	4.47	1.87	4.96		.04	.69	679	.92	7,700	63	5.1	1,140	8.2
May 1-10	13,660	33	2.20	1.23	5.39	.33	b 4.21	1.67	3.19		.03	.51	548	.75	10,240	59	4.1	898	8.3
May 11-20	13,500	35	2.20	1.15	4.05	.31	4.10	1.58	2.12		.03	.41	479	.65	8,780	53	3.1	764	8.0
May 21-31	13,970	40	2.48	1.16	3.61	.28	4.33	1.50	1.58		.02	--	464	.63	8,800	48	2.7	714	8.2
June 1-10	8,350	36	2.44	1.16	3.52	.28	4.36	1.50	1.52		.02	--	457	.62	5,180	48	2.6	708	7.9
June 11-20	5,500	39	2.48	1.24	3.78	.28	4.54	1.54	1.52		.02	.32	470	.64	3,520	49	2.8	732	7.9
June 21-23, 25-30.	7,060	39	2.52	1.24	3.92	.28	4.72	1.54	1.55		.02	--	478	.65	4,590	49	2.9	744	7.9
June 24	639	43	2.04	1.04	.83	.05	2.98	.65	.39		.00	--	c 253	.34	217	21	.7	384	6.9
July 1-10	12,560	36	2.64	1.28	3.92	.31	4.98	1.56	1.55		.02	--	498	.68	8,540	48	2.8	758	8.1
July 11-22	13,000	43	2.64	1.40	4.48	.33	b 5.31	1.58	1.61		.02	.42	530	.72	9,360	51	3.2	803	8.4
July 23-31	6,730	42	2.64	1.36	4.48	.33	5.51	1.58	1.58		.01	--	535	.73	4,910	51	3.2	815	7.8

a Includes 0.27 equivalent per million of carbonate (CO_3).
b Includes 0.33 equivalent per million of carbonate (CO_3).
c Calculated from determined constituents.

HUMBOLDT RIVER BASIN--Continued

HUMBOLDT RIVER NEAR RYE PATCH, NEV.--Continued

Chemical analyses, April to September 1956--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 (micromhos 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				
Aug. 1-10, 1956 ..	4,440	40	2.64	1.36	4.48	0.33	5.57	1.54	1.55		0.01	--	529	0.72	3,200	51	3.2	811	7.9
Aug. 11-20	4,090	40	2.56	1.36	4.48	.36	5.56	1.48	1.55		.01	0.56	527	.72	2,940	51	3.2	807	8.1
Aug. 21-31.....	5,970	38	2.46	1.40	4.35	.36	5.57	1.39	1.49		.01	.44	532	.72	4,300	51	3.1	798	8.2
Sept. 1-10	6,780	39	2.46	1.38	4.44	.36	5.59	1.42	1.61		.00	.48	533	.72	4,880	51	3.2	795	8.3
Sept. 11-20	4,080	40	2.46	1.34	4.57	.38	5.57	1.58	1.66		.01	.44	530	.72	2,940	52	3.3	803	8.1
Sept. 21-30	1,600	40	2.36	1.48	4.83	.38	d5.57	1.58	1.75		.01	.49	537	.73	1,170	53	3.5	816	8.4
Total or weighted average	e137,700	38	2.45	1.32	4.61	0.33	4.80	1.58	2.23		0.02	--	528	0.72	99,140	53	3.4	828	--

d Includes 0.40 equivalent per million of carbonate (CO_3).
e Represents 99 percent of runoff for water year October 1955 to September 1956.

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 1956.
Water temperatures: November 1952 to September 1956.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 116 micromhos Dec. 24; minimum daily, 32.7 micromhos June 18.
Percent sodium: Maximum, 44 June 1-10, Sept. 11-20, 29; minimum, 27 Jan. 26.
EXTREMES, 1952-56.--Specific conductance: Maximum daily, 170 micromhos Jan. 3, 1953; minimum daily, 32.7 micromhos June 18, 1956.
Percent sodium: Maximum, 49 Nov. 1-5, 7-10, 1952; minimum, 27 Jan. 26, 1956.
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 Sacramento, Calif. Records of discharge for water year October 1955 to September 1956 given in WSP 1445. No appreciable inflow between sampling point and gaging station except during periods of heavy local runoff.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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, 1955...	1,700	12	0.34	0.12	0.35	0.03	0.62	0.07	0.14	0.01	0.01	0.14	56	0.08	136	41	0.7	82.5	7.4
Oct. 11-20.....	1,560	12	.36	.12	.37	.03	.66	.04	.17	.01	.01	.10	62	.08	125	42	.7	93.3	7.5
Oct. 21-31.....	1,660	12	.34	.12	.35	.03	.66	.04	.15	.02	.01	.09	60	.08	133	41	.7	88.2	7.1
Nov. 1-10.....	1,350	12	.36	.12	.36	.04	.69	.04	.15	.02	.01	.09	62	.08	108	41	.7	91.1	6.9
Nov. 11-20.....	1,450	11	.36	.11	.34	.04	.66	.04	.15	.02	.01	.08	62	.08	116	40	.7	88.5	7.3
Nov. 21-30.....	1,110	12	.40	.14	.40	.04	.74	.08	.16	.01	.01	.04	68	.09	100	41	.8	98.8	7.5
Dec. 1-9.....	1,410	14	.39	.16	.38	.03	.75	.04	.16	.02	.02	.06	80	.11	155	39	.7	98.8	7.5
Dec. 10-23.....	11,870	12	.29	.08	.27	.04	.49	.02	.14	.02	.02	.11	64	.09	1,070	39	.6	71.7	7.0
Dec. 24-25.....	12,280	--	.50	.18	.31	.10	.72	.10	.10	--	.09	.12	--	--	--	29	.5	110	7.7
Dec. 26-31.....	80,110	11	.24	.08	.16	.05	.38	.04	.06	.02	.03	.15	60	.08	6,410	29	.4	54.3	7.2
Jan. 1-10, 1956 ..	113,800	11	.22	.04	.14	.04	.34	.02	.06	.02	.02	.09	44	.06	6,830	32	.4	45.8	7.2
Jan. 11-25.....	137,600	12	.22	.05	.17	.03	.36	.02	.08	.02	.01	.08	55	.07	9,630	36	.5	50.2	7.2
Jan. 26.....	12,140	--	.40	.16	.22	.04	.48	--	--	--	.04	.11	86	.12	1,460	27	.4	86.6	7.5
Jan. 27-31.....	61,530	13	.28	.08	.18	.03	.44	.02	.08	.02	.01	.11	62	.08	4,920	32	.4	60.9	7.1
Feb. 1-10.....	112,500	12	.26	.07	.18	.03	.46	.00	.04	.02	.02	.14	48	.07	7,880	33	.4	49.4	7.2
Feb. 11-20.....	69,300	14	.28	.08	.22	.03	.49	.04	.05	.02	.02	.13	50	.07	4,850	36	.5	58.4	7.2
Feb. 21-29.....	42,350	13	.30	.07	.22	.03	.51	.05	.06	.02	.01	.10	50	.07	2,960	36	.5	58.9	7.1

SAN JOAQUIN RIVER BASIN--Continued

SAN JOAQUIN RIVER NEAR BIOLA, CALIF.--Continued

Chemical analyses, water year October 1955 to September 1956--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 (micromhos 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. 2-3, 5-7, 9-10, 1956	6,560	14	0.38	0.04	0.32	0.03	0.62	0.05	0.08	0.02	0.01	0.11	59	0.08	525	41	0.7	76.2	7.2
Mar. 11-20	40,190	12	.26	.07	.19	.03	.44	.04	.04	.02	.01	.09	46	.06	2,410	35	.5	50.7	6.9
Mar. 21, 25-26, 28-30	25,800	12	.27	.08	.20	.03	.46	.05	.05	.02	.00	.12	45	.06	1,550	35	.5	50.7	6.9
Apr. 1-13	40,470	17	.26	.08	.21	.03	.49	.02	.08	.02	.00	.09	54	.07	2,830	36	.5	65.1	6.9
Apr. 14-19	5,510	19	.40	.11	.32	.04	.69	.00	.14	.02	.02	.15	76	.10	551	37	.6	86.4	6.9
Apr. 21-30	30,040	13	.24	.07	.19	.03	.44	.01	.07	.02	.01	.01	49	.07	2,100	35	.5	53.9	6.5
May 1-10	31,300	13	.22	.12	.18	.04	.41	.05	.06	.02	.01	.03	39	.05	1,560	33	.4	55.8	6.8
May 11-19	40,220	15	.20	.07	.16	.03	.38	.02	.06	.02	.00	.08	36	.05	2,010	35	.4	43.4	6.7
May 20-29, 31	87,170	14	.18	.08	.14	.03	.36	.01	.04	.01	.00	.01	34	.05	4,360	32	.4	36.3	6.8
May 30	9,300	13	.25	.01	.14	.03	.34	--	.08	--	.00	.06	26	.04	372	32	.4	38.7	6.9
June 1-10	83,560	14	.18	.02	.17	.03	.36	.01	.06	.01	.01	.02	35	.05	4,180	44	.6	43.0	6.7
June 11-20	55,700	14	.16	.04	.16	.03	.34	.01	.04	.01	.01	.04	34	.05	2,780	41	.5	38.1	6.9
June 21-30	16,410	11	.22	.02	.16	.03	.38	.01	.04	.01	.02	.05	34	.05	820	37	.5	44.7	6.6
July 1-10	4,410	12	.26	.16	.24	.03	.57	.02	.06	.00	.01	.11	54	.07	309	34	.5	65.4	7.3
July 11-20	2,860	12	.28	.22	.27	.02	.75	.00	.05	.01	.00	.04	56	.08	229	34	.5	72.4	7.4
July 21-28	2,180	12	.28	.10	.23	.03	.56	.00	.05	.00	.01	.04	50	.07	153	36	.5	62.8	7.3
Aug. 7-19	3,690	12	.24	.10	.24	.03	.52	.05	.06	.00	.02	.00	50	.07	221	39	.6	60.9	6.9
Aug. 20-31	3,140	12	.26	.09	.24	.03	.54	.04	.06	.00	.01	.00	48	.06	188	39	.6	62.4	7.0
Sept. 1-10	2,350	11	.27	.07	.24	.03	.51	.02	.07	.01	.01	.01	51	.07	164	39	.6	65.7	6.7
Sept. 11-20, 29	3,580	12	.25	.07	.28	.03	.52	.00	.07	.01	.01	.05	52	.07	251	44	.7	66.9	7.0
Sept. 21-28, 30	9,490	12	.18	.06	.16	.02	.30	.02	.07	.01	.01	.09	40	.05	474	38	.5	42.6	6.8
Total or weighted average[a]	1,168,000	b13	0.24	0.07	0.18	0.03	0.41	c0.02	c0.06	b0.02	0.01	0.08	c48	c0.07	c81,760	35	0.5	51.7	--

a Represents 97 percent of runoff for water year October 1955 to September 1956.
b Represents 95 percent of runoff for water year October 1955 to September 1956.
c Represents 96 percent of runoff for water year October 1955 to September 1956.

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 1956.
Water temperatures: March 1951 to September 1956.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 1,150 micromhos Nov. 14; minimum daily, 62.7 micromhos Dec. 26.
Percent sodium: Maximum, 53 Oct. 1-10, 11-20; minimum, 27 Dec. 24-28.
EXTREMES, 1951-56.--Specific conductance: Maximum daily, 1,150 micromhos Nov. 14, 1955; minimum daily, 60.0 micromhos June 21, 1953.
Percent sodium: Maximum, 56 Jan. 21-31, 1954; minimum, 27 Dec. 24-28, 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 Sacramento, Calif. Records of discharge for water year October 1955 to September 1956 given in WSP 1445.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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, 1955..	13,260	39	2.64	1.78	5.18	0.13	3.11	1.42	4.85	0.01	0.09	0.22	593	0.81	10,740	53	3.5	988	8.2
Oct. 11-20	16,020	39	2.45	1.67	4.74	.13	2.92	1.35	4.46	.01	.07	.27	552	.75	12,020	53	3.3	918	8.0
Oct. 21-31	19,870	33	2.15	1.49	4.05	.11	2.43	1.25	4.03	.01	.04	.18	495	.67	13,310	52	3.0	819	8.2
Nov. 1-10.....	20,130	32	2.05	1.37	3.48	.10	2.13	1.06	3.92	.01	.04	.13	465	.63	12,680	50	2.7	773	8.1
Nov. 11-17.....	11,290	40	2.69	1.91	5.05	.13	a 2.79	1.46	5.50	.01	.09	.23	640	.87	9,820	52	3.3	1,040	8.4
Nov. 18-30.....	32,290	31	1.85	1.21	3.31	.09	2.07	.96	3.38	.01	.05	.19	418	.57	18,410	51	2.7	698	7.6
Dec. 1-10.....	30,590	26	1.55	1.11	2.70	.09	1.72	.83	2.82	.01	.04	.12	352	.48	14,680	50	2.3	591	7.3
Dec. 11-23.....	48,500	25	1.30	.90	2.04	.08	1.49	.65	2.14	.01	.03	.12	288	.39	18,920	47	1.9	472	7.9
Dec. 24-28.....	367,100	12	.40	.24	.26	.06	.59	.10	.23	.01	.04	.09	71	.10	36,710	27	.5	105	7.4
Dec. 29-31.....	224,300	12	.42	.28	.39	.06	.66	.19	.27	.01	.03	.12	86	.12	26,920	34	.7	125	7.1
Jan. 1-13, 1956..	732,300	16	.55	.29	.48	.05	.79	.19	.34	.02	.03	.06	101	.14	102,500	35	.7	142	7.6
Jan. 14-16	124,400	18	.65	.35	.65	.06	.95	.25	.45	.02	.03	.17	119	.16	19,900	38	.9	177	7.6
Jan. 17-31	806,300	16	.55	.35	.52	.05	.87	.19	.40	.02	.02	.03	103	.14	112,900	36	.8	154	7.7

a Includes 0.10 equivalent per million of carbonate (CO_3).

SAN JOAQUIN RIVER BASIN--Continued

SAN JOAQUIN RIVER NEAR VERNALIS, CALIF.--Continued

Chemical analyses, water year October 1955 to September 1956--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 (micromhos 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. 1-9, 1956 ..	435,000	18	0.70	0.36	0.74	0.05	1.10	0.27	0.51	0.01	0.02	0.10	128	0.17	73,950	40	1.0	205	7.3
Feb. 10-23.....	402,600	17	.80	.40	.96	.05	1.15	.38	.73	.01	.02	.07	149	.20	80,520	43	1.2	235	7.5
Feb. 24-26.....	76,760	15	.90	.54	1.26	.05	1.16	.69	.99	.01	.02	.18	184	.25	19,190	46	1.5	298	7.2
Feb. 27-29.....	79,540	12	.75	.50	1.13	.05	1.10	.48	.82	.02	.02	.27	152	.21	16,700	47	1.4	247	7.1
Mar. 1-13	286,400	16	.80	.48	.91	.05	1.15	.29	.73	.01	.02	.16	152	.21	60,140	41	1.1	234	6.8
Mar. 14-24.....	122,600	19	1.10	.98	1.91	.06	1.62	.73	1.66	.01	.02	.16	248	.34	41,680	47	1.9	400	6.9
Mar. 25-27.....	20,150	24	1.60	1.44	2.78	.08	1.92	1.08	2.79	.01	.03	.28	378	.51	10,280	47	2.3	627	6.9
Mar. 28-Apr. 12.	134,700	22	1.15	.84	1.83	.06	1.43	.67	1.81	.01	.02	.21	248	.34	45,800	47	1.8	415	7.1
Apr. 13-24.....	160,000	19	.80	.45	1.04	.04	1.05	.35	.90	.01	.02	.17	150	.20	32,000	45	1.3	252	6.9
Apr. 25-30.....	109,100	17	.65	.31	.78	.04	.82	.27	.68	.01	.02	.09	116	.16	17,460	44	1.1	189	6.8
May 1-5.....	96,180	17	.55	.35	.61	.04	.85	.21	.51	.02	.02	.11	95	.13	12,500	39	.9	161	6.8
May 6-13.....	252,700	17	.44	.23	.43	.04	.66	.15	.34	.02	.01	.07	76	.10	25,270	38	.7	114	6.9
May 14-22.....	181,200	18	.55	.24	.61	.04	.77	.15	.51	.02	.01	.05	94	.13	23,560	42	1.0	150	7.1
May 23-31.....	329,300	15	.35	.18	.30	.04	.54	.08	.25	.02	.01	.05	60	.08	26,340	35	.6	96.9	6.7
June 1-13	411,800	15	.36	.21	.36	.03	.57	.10	.28	.01	.01	.01	71	.10	41,180	37	.7	95.8	6.9
June 14-21	156,500	16	.48	.28	.52	.04	.66	.14	.51	.02	.01	.02	90	.12	18,780	40	.8	135	7.0
June 22-24	62,880	13	.36	.23	.44	.04	.51	.15	.37	.02	.01	.01	76	.10	6,290	41	.8	105	7.2
June 25-30	97,790	15	.48	.32	.61	.04	.67	.21	.56	.01	.01	.09	98	.13	12,710	42	1.0	153	6.9
July 1-4	61,730	16	.60	.30	.78	.04	.79	.27	.73	.01	.02	.05	124	.17	10,490	46	1.2	181	6.6
July 5-14.....	74,260	24	1.25	.71	1.91	.06	1.48	.60	1.86	.01	.03	.11	241	.33	24,510	49	1.9	413	7.5
July 15-27.....	50,180	32	2.00	1.60	3.26	.09	2.28	1.00	3.41	.01	.04	.15	421	.57	28,600	47	2.4	719	7.7
July 28-31.....	27,990	17	.70	.44	1.04	.04	.90	.35	.96	.01	.02	.05	150	.20	5,600	47	1.4	231	7.3
Aug. 1-10.....	48,850	19	1.05	.83	1.78	.06	1.57	.48	1.64	.00	.02	.17	237	.32	15,630	48	1.8	389	7.8
Aug. 11-20.....	32,970	28	1.80	1.34	3.18	.11	b2.33	.96	3.27	.01	.03	.19	398	.54	17,800	49	2.5	672	8.3
Aug. 21-31.....	35,130	25	1.50	1.52	3.04	.08	2.33	.65	3.13	.01	.03	.20	389	.53	18,620	50	2.5	657	7.8

b Includes 0.07 equivalent per million of carbonate (CO_3).

Sept. 1-10, 1956.	33,860	32	1.80	1.06	2.91	.08	2.16	.69	2.93	0.01	.03	.13	376	.51	17,270	50	2.4	620	7.5
Sept. 11-20.....	37,250	28	1.60	.96	2.57	.08	2.07	.60	2.51	.02	.04	.13	336	.46	17,140	49	2.3	558	7.4
Sept. 21-30.....	41,060	28	1.45	1.01	2.48	.07	2.10	.62	2.37	.01	.03	.11	310	.42	17,250	50	2.2	528	6.9
Total or weighted average c.....	6,305,000	17	0.70	0.42	0.83	0.05	0.97	0.29	0.73	0.01	0.02	0.09	134	0.18	1,135,000	42	1.0	210	--

c Represents 100 percent of runoff for water year October 1955 to September 1956.

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 1956.
Water temperatures: March 1951 to September 1956.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 85.1 micromhos Jan. 16; minimum daily, 30.9 micromhos May 28.
EXTREMES, 1951-56.--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 at 180°C. Records of specific conductance of daily samples available in district office at Sacramento, Calif. Records of discharge for water year October 1955 to September 1956 given in WSP 1445.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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, 1955 ..	2,530	--	0.29	0.05	0.12	--	0.39		--	--	--	--	39	0.05	126	--	0.3	51.6	6.8
Oct. 11-18	2,560	--	.26	.06	.12	--	.38		--	--	--	--	38	.05	128	--	.3	50.2	6.6
Dec. 1-10.....	6,500	--	.22	.07	.10	--	.33		--	--	--	--	36	.05	325	--	.3	43.6	7.0
Dec. 11-20.....	6,620	--	.23	.07	.10	--	.33		--	--	--	--	38	.05	331	--	.3	45.1	6.7
Dec. 21-31.....	113,100	--	.24	.10	.10	--	.33		--	--	--	--	47	.06	6,790	--	.3	48.4	7.0
Jan. 1-10, 1956 ..	63,000	--	.24	.09	.10	--	.33		--	--	--	--	46	.06	3,780	--	.3	48.8	7.2
Jan. 11-15	23,190	--	.27	.10	.15	--	.38		--	--	--	--	50	.07	1,620	--	.4	58.1	7.1
Jan. 16	7,830	--	.44	.14	.15	--	.30		--	--	--	--	71	.10	783	--	.3	85.9	7.4
Jan. 17-31	117,200	--	.25	.09	.10	--	.38		--	--	--	--	51	.07	8,200	--	.3	49.0	7.3
Feb. 1-10	43,580	--	.28	.08	.12	--	.46		--	--	--	--	50	.07	3,050	--	.3	64.6	6.9
Feb. 11-20.....	32,670	--	.24	.10	.12	--	.43		--	--	--	--	48	.07	2,290	--	.3	60.5	7.0
Feb. 21-29.....	28,380	--	.26	.08	.12	--	.44		--	--	--	--	46	.06	1,700	--	.3	55.8	7.0
Mar. 1-10	30,590	--	.25	.10	.12	--	.43		--	--	--	--	44	.06	1,840	--	.3	56.6	6.8
Mar. 11-20	27,770	--	.27	.08	.12	--	.39		--	--	--	--	42	.06	1,670	--	.3	58.2	6.7
Mar. 21-31	25,780	--	.31	.09	.14	--	.43		--	--	--	--	45	.06	1,550	--	.3	58.7	6.5

Apr. 1-10, 1956 ..	21,750	--	0.24	0.12	0.11	--	0.44	--	--	--	--	49	0.07	1,520	--	0.3	52.6	6.8
Apr. 11-20	26,480	--	.24	.11	.11	--	.43	--	--	--	--	47	.06	1,590	--	.3	49.3	6.7
Apr. 21-30.....	28,050	--	.22	.10	.11	--	.41	--	--	--	--	44	.06	1,680	--	.3	46.6	6.7
May 1-10	42,090	--	.18	.12	.11	--	.41	--	--	--	--	49	.07	2,950	--	.3	45.8	6.7
May 11-17	31,240	--	.18	.11	.14	--	.38	--	--	--	--	49	.07	2,190	--	.4	54.1	6.5
May 18-25	33,780	--	.15	.08	.09	--	.33	--	--	--	--	38	.05	1,690	--	.3	35.6	6.5
May 26	6,290	--	.17	.07	.15	--	.33	--	--	--	--	53	.07	440	--	.4	44.7	6.7
May 27-31	36,360	--	.14	.08	.09	--	.31	--	--	--	--	46	.06	2,180	--	.3	37.5	6.5
June 1-2, 4-15 ...	74,380	15	.16	.08	.11	0.03	.34	0.04	0.00	0.01	0.02	36	.05	3,720	29	.3	37.2	7.3
June 3	6,940	16	.16	.12	.20	.06	.36	.12	--	.08	.03	a 48	.07	486	37	.5	57.8	7.1
Aug. 5-20.....	2,550	10	.17	.07	.09	.02	.31	.06	.00	.01	.00	31	.04	102	26	.3	36.2	6.7
Aug. 21-31.....	1,840	10	.16	.08	.08	.02	.30	.04	.00	.02	.00	32	.04	74	24	.2	35.4	6.7
Sept. 1-15	4,660	--	.16	.08	.08	--	.34	--	--	--	--	30	.04	186	--	.2	35.1	6.9
Sept. 16-30	7,770	--	.18	.07	.08	--	.36	--	--	--	--	32	.04	311	--	.2	37.2	6.8
Total or weighted average [b]	855,500	--	0.22	0.09	0.11	--	0.38	--	--	--	--	46	0.06	51,330	--	0.3	49.5	--

a Calculated from determined constituents.
b Represents 90 percent of runoff for water year October 1955 to September 1956.

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 1956.
Water temperatures: March 1951 to September 1956.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 273 micromhos Sept. 20; minimum daily, 83.7 micromhos Dec. 9.
Percent sodium: Maximum, 36 Sept. 14-16, 20; minimum, 19 Mar. 22-31.
EXTREMES, 1951-56.--Specific conductance: Maximum daily, 447 micromhos Sept. 9, 1952; minimum daily, 83.7 micromhos Dec. 9, 1955.
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 at 180°C. Records of specific conductance of daily samples available in district office at Sacramento, Calif. Records of discharge for water year October 1955 to September 1956 given in WSP 1445. 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 1955 to September 1956

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 (micromhos 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, 1955..	114,400	30	0.70	0.62	0.52	0.05	1.49	0.19	0.19	0.01	0.01	0.00	126	0.17	19,450	28	0.6	187	7.7
Oct. 11-20	117,800	30	.70	.58	.48	.05	1.46	.19	.17	.01	.01	.00	122	.17	20,030	26	.6	179	7.8
Oct. 21-31	124,900	30	.70	.56	.48	.04	1.46	.15	.18	.01	.01	.04	120	.16	19,980	27	.6	180	7.8
Nov. 1-10.....	113,800	31	.70	.58	.52	.04	1.49	.17	.18	.01	.01	.01	127	.17	19,350	28	.7	180	7.9
Nov. 11-20	127,800	30	.70	.62	.52	.04	1.51	.25	.18	.01	.01	.20	122	.17	21,730	28	.6	184	7.9
Nov. 21-22.....	35,900	30	.70	.57	.52	.04	1.52	.18	.14	.01	.01	.23	124	.17	6,100	29	.7	175	7.1
Nov. 23-24.....	52,760	20	.50	.37	.39	.04	.82	.29	.10	.03	.06	.28	104	.14	7,390	30	.6	132	7.0
Nov. 25-30.....	97,210	26	.70	.56	.57	.04	1.30	.29	.27	.02	.03	.21	131	.18	17,500	30	.7	186	7.2
Dec. 1-7.....	94,990	31	.75	.55	.52	.04	1.38	.21	.23	.01	.02	.10	132	.18	17,100	28	.6	188	8.1
Dec. 8-10	108,100	19	.40	.22	.19	.03	.61	.10	.07	.02	.04	.11	78	.11	11,890	22	.3	85.6	7.1
Dec. 11-19	185,600	28	.70	.58	.57	.04	1.30	.27	.25	.02	.02	.15	132	.18	33,410	30	.7	190	7.6
Dec. 20-31.....	585,700	22	.55	.37	.30	.04	.92	.21	.13	.02	.02	.12	106	.14	82,000	24	.4	127	7.5
Jan. 1-10, 1956 .	485,600	21	.55	.41	.30	.03	1.00	.15	.12	.02	.01	.10	99	.13	63,130	23	.4	128	7.3
Jan. 11-19	440,900	19	.55	.33	.28	.03	.93	.17	.11	.02	.01	.06	96	.13	57,320	23	.4	122	7.2
Jan. 20-31	588,300	21	.60	.44	.32	.03	1.05	.19	.14	.02	.01	.13	112	.15	88,240	23	.4	139	7.4
Feb. 1-10.....	431,200	25	.75	.51	.37	.03	1.34	.19	.14	.01	.01	.10	116	.16	68,990	22	.5	156	7.5
Feb. 11-21.....	355,000	26	.85	.53	.37	.03	1.46	.21	.16	.01	.02	.07	122	.17	60,350	21	.4	176	7.4
Feb. 22-29	393,500	19	.60	.44	.32	.03	1.08	.17	.13	.01	.01	.05	108	.15	59,020	23	.4	137	7.3

Mar. 1-11, 1956.	488,900	25	.70	.48	.32	.03	1.28	.15	.11	.01	.02	.04	108	.15	73,340	21	.4	146	7.6
Mar. 12-21.....	329,100	25	.80	.56	.37	.03	1.46	.12	.14	.01	.01	.02	118	.16	52,660	21	.4	170	7.6
Mar. 22-31	279,700	25	.75	.51	.31	.03	1.38	.10	.10	.01	.01	.04	109	.15	41,960	19	.4	152	7.5
Apr. 1-10.....	217,400	25	.80	.63	.39	.03	1.48	.25	.13	.01	.01	.01	120	.16	34,780	21	.5	173	7.4
Apr. 11-20.....	208,200	28	.80	.65	.40	.03	1.48	.25	.13	.01	.01	.04	124	.17	35,390	21	.5	182	7.3
Apr. 21-28.....	127,900	24	.75	.69	.40	.04	1.51	.21	.10	.01	.02	.17	124	.17	21,740	21	.5	171	7.4
Apr. 29-May 4...	87,930	25	.85	.73	.70	.04	1.66	.33	.23	.01	.01	.15	154	.21	18,470	30	.8	218	7.2
May 5-10	147,400	23	.60	.46	.33	.04	1.10	.17	.11	.01	.01	.14	108	.15	22,110	23	.4	132	6.9
May 11-20	314,000	22	.60	.44	.34	.03	1.10	.17	.11	.01	.01	.10	126	.17	53,380	24	.5	132	7.0
May 21-31	272,500	22	.65	.47	.40	.03	1.21	.17	.13	.01	.01	.14	116	.16	43,600	26	.5	145	7.3
June 1-10	203,900	27	.70	.64	.70	.04	1.54	.31	.25	.01	.01	.11	132	.18	36,700	34	.9	199	7.3
June 11-20	148,600	30	.80	.68	.78	.04	1.66	.35	.28	.01	.01	.08	146	.20	29,720	34	.9	217	7.7
June 21-30	127,000	30	.80	.68	.78	.03	1.69	.35	.28	.01	.01	.17	145	.20	25,400	34	.9	220	7.5
July 1-10	123,000	27	.75	.69	.74	.03	1.62	.33	.25	.01	.01	.11	135	.18	22,140	33	.9	209	7.6
July 11-20	140,600	27	.70	.74	.70	.03	1.59	.33	.24	.01	.01	.11	132	.18	25,310	32	.8	206	7.4
July 21-31.....	153,900	25	.70	.68	.65	.03	1.57	.27	.23	.01	.00	.13	129	.18	27,700	32	.8	198	6.7
Aug. 1-15.....	192,300	26	.80	.75	.83	.03	1.80	.40	.27	.01	.01	.09	150	.20	38,460	34	.9	229	7.5
Aug. 16-31.....	213,400	26	.80	.76	.87	.04	1.84	.38	.28	.01	.01	.07	154	.21	44,810	35	1.0	238	7.6
Sept. 1-10	146,500	26	.80	.79	.87	.03	1.88	.40	.27	.01	.01	.15	158	.21	30,760	35	1.0	239	7.6
Sept. 11-13,17-19	109,800	23	.80	.72	.78	.03	1.80	.35	.25	.01	.01	.06	147	.20	21,960	34	.9	225	7.7
Sept. 14-16, 20..	75,830	26	.85	.79	.96	.04	2.00	.40	.31	.02	.01	.13	164	.22	16,680	36	1.1	254	7.6
Sept. 21-30.....	183,300	27	.70	.54	.52	.04	1.46	.20	.17	.01	.01	.11	120	.16	29,330	29	.7	181	7.5
Total or weighted average	8,745,000	24	0.70	0.53	0.44	0.03	1.31	0.21	0.16	0.01	0.01	0.09	119	0.16	1,399,000	26	0.6	164	--

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SACRAMENTO RIVER BASIN--Continued

FEATHER RIVER AT NICOLAUS, CALIF.

LOCATION (revised).--At highway bridge at Nicolaus, Sutter County, just 0.3 mile upstream from gaging station and 2.6 miles downstream from Bear River.
RECORDS AVAILABLE.--Chemical analyses: March 1951 to September 1956.
Water temperatures: March 1951 to September 1956.
EXTREMES, 1951-55.--Specific conductance: Maximum daily, 245 micromhos June 21, 1954; minimum daily, 50.0 micromhos May 28, 1952.
Percent sodium (1951-54): Maximum, 27 Dec. 1-2, 4, 7, 1952; minimum, 8 June 21-30, 1951, Jan. 11-20, 1953.
REMARKS.--Values reported for dissolved solids are residues on evaporation at 180°C unless otherwise noted. Records of specific conductance of daily samples available in district office at Sacramento, Calif. Records of discharge for water year October 1955 to September 1956 given in WSP 1445. Samples were not obtained from Dec. 11, 1955 to May 20, 1956 because of the flood of December 1955.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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, 1955	20,410	--	0.70	0.52	0.27	--	1.36	--	--	--	---	--	96	0.13	2,650	--	0.4	149	7.8
Oct. 11-20	26,480	--	.70	.50	.27	--	1.31	--	--	--	--	--	97	.13	3,440	--	.3	147	7.7
Oct. 21-31	28,780	--	.70	.48	.26	--	1.33	--	--	--	--	--	94	.13	3,740	--	.3	144	7.7
Nov. 1-10	28,500	--	.65	.51	.25	--	1.30	--	--	--	--	--	92	.13	3,700	--	.3	141	7.7
Nov. 11-20	41,300	--	.65	.49	.24	--	1.23	--	--	--	--	--	91	.12	4,960	--	.3	140	7.6
Nov. 21-30	60,770	--	.60	.40	.21	--	1.05	--	--	--	--	--	84	.11	6,680	--	.3	123	7.4
Dec. 1-6	48,600	--	.70	.40	.24	--	1.12	--	--	--	--	--	87	.12	5,830	--	.3	132	7.7
Dec. 7-10	56,370	--	.50	.38	.20	--	.82	--	--	--	--	--	76	.10	5,640	--	.3	110	6.9
Apr. 23, 1956	37,880	15	.36	.24	.12	0.02	.72	0.00	0.02	0.02	0.01	0.00	57	.08	3,030	16	.2	69.8	7.6
May 21-31	462,500	--	.30	.20	.12	--	.44	--	--	--	--	--	56	.08	37,000	--	.2	67.2	6.9
June 1-10	291,200	--	.33	.21	.11	--	.64	--	--	--	--	--	56	.08	23,300	--	.2	66.1	7.0
June 11-20	196,200	--	.37	.22	.11	--	.67	--	--	--	--	--	58	.08	15,700	--	.2	69.8	6.8
June 21-30	136,600	--	.41	.24	.13	--	.77	--	--	--	--	--	62	.08	10,930	--	.2	78.9	7.1
July 1-10	67,000	20	.50	.38	.22	.03	.98	.08	.06	.01	.01	.01	82	.11	7,370	19	.3	103	7.3
July 11-18	28,680	36	1.10	.70	.23	.04	1.87	.12	.10	.01	.01	.01	a139	.19	5,450	11	.3	189	7.5

a Calculated from determined constituents.

July 19, 1956 ...	3,230	22	.70	.38	.24	.03	1.25	.12	.09	--	.02	.05	a95	.13	420	16	.3	127	7.5
July 20-24	12,850	22	1.20	.86	.23	.04	2.26	.10	.01	0.00	.01	.10	134	.18	2,310	10	.2	206	7.9
July 25-31	21,020	23	.70	.52	.25	.03	1.31	.10	.07	.00	.00	.18	100	.14	2,940	17	.3	140	7.8
Aug. 1-15	42,800	22	.65	.57	.24	.04	1.34	.08	.09	.00	.01	.11	92	.13	5,560	16	.3	146	7.6
Aug. 16-31.....	47,250	18	.70	.46	.22	.03	1.26	.06	.09	.00	.01	.12	95	.13	6,140	16	.3	135	7.7
Sept. 1-16	63,970	--	.65	.45	.24	--	1.28	--	--	--	--	--	86	.12	7,680	--	.3	135	7.2
Sept. 17-21.....	27,110	--	1.20	.82	.25	--	2.08	--	--	--	--	--	128	.17	4,610	--	.2	217	7.5
Sept. 22, 28-30 ..	22,100	--	.60	.48	.21	--	1.21	--	--	--	--	--	106	.14	3,090	--	.3	125	7.0
Sept. 23-27.....	28,800	--	.90	.66	.21	--	1.64	--		--	--	--	105	.14	4,030	--	.2	172	7.2
Total [b]	1,800,000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

a Calculated from determined constituents.
b Represents 17 percent of runoff for water year October 1955 to September 1956.

SACRAMENTO RIVER BASIN--Continued

AMERICAN RIVER AT FAIR OAKS, CALIF.

LOCATION (revised).--In San Juan Grant at old highway bridge just downstream from gaging station, 1,500 feet upstream from new highway bridge 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 1956.
Water temperatures: March 1951 to September 1956.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 80.6 micromhos Dec. 22; minimum daily, 36.4 micromhos July 28.
EXTREMES, 1951-56.--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 at 180°C. Records of specific conductance of daily samples available in district office at Sacramento, Calif. Records of discharge for water year October 1955 to September 1956 given in WSP 1445.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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, 1955..	18,870	--	0.39	0.16	0.13	--	0.61		--	--	--	--	54	0.07	1,320	--	0.2	72.3	7.5
Oct. 11-20.....	18,720	--	.40	.16	.12	--	.62		--	--	--	--	50	.07	1,310	--	.2	70.1	7.6
Oct. 21-31.....	11,720	--	.40	.18	.12	--	.62		--	--	--	--	48	.07	820	--	.2	72.0	7.4
Nov. 1-10	10,570	--	.41	.16	.13	--	.62		--	--	--	--	48	.07	740	--	.2	73.5	7.6
Nov. 11-20	10,590	--	.40	.17	.12	--	.61		--	--	--	--	48	.07	741	--	.2	70.7	7.5
Nov. 21-30	11,550	--	.40	.15	.11	--	.61		--	--	--	--	48	.07	808	--	.2	70.7	7.5
Dec. 1-10	12,400	--	.40	.18	.12	--	.59		--	--	--	--	52	.07	868	--	.2	72.3	7.5
Dec. 11-22	28,240	--	.43	.18	.13	--	.61		--	--	--	--	56	.08	2,260	--	.2	77.3	7.4
Dec. 23-31.....	862,400	--	.30	.09	.08	--	.41		--	--	--	--	47	.06	51,740	--	.2	50.0	7.1
Jan. 1-10, 1956 .	215,900	--	.31	.13	.08	--	.46		--	--	--	--	48	.07	15,110	--	.2	54.5	7.2
Jan. 11-20.....	384,400	--	.31	.15	.09	--	.48		--	--	--	--	50	.07	26,910	--	.2	58.5	7.3
Jan. 21-31.....	405,600	--	.32	.13	.09	--	.49		--	--	--	--	50	.07	28,390	--	.2	62.6	7.2
Feb. 1-10.....	121,400	--	.32	.18	.10	--	.59		--	--	--	--	50	.07	8,500	--	.2	62.6	7.6
Feb. 11-20.....	108,800	--	.33	.18	.10	--	.61		--	--	--	--	48	.07	7,620	--	.2	63.7	7.5
Feb. 21-29	89,790	--	.33	.18	.10	--	.61		--	--	--	--	48	.07	6,290	--	.2	62.3	7.0
Mar. 1-10	109,800	--	.34	.18	.10	--	.61		--	--	--	--	50	.07	7,690	--	.2	65.0	7.1
Mar. 11-20	102,900	--	.35	.20	.10	--	.62		--	--	--	--	53	.07	7,200	--	.2	66.6	7.2
Mar. 21-31	119,400	--	.34	.20	.11	--	.64		--	--	--	--	50	.07	8,360	--	.2	69.3	7.1

Apr. 1-10, 1956 .	88,680	--	.28	.24	.10	--	.62		--	--	--	--	50	.07	6,210	--	.2	68.9	6.8
Apr. 11-20.....	79,870	--	.30	.20	.10	--	.59		--	--	--	--	48	.07	5,590	--	.2	60.9	6.8
Apr. 21-30.....	68,370	--	.24	.22	.09	--	.52		--	--	--	--	44	.06	4,100	--	.2	57.8	6.9
May 1-10	71,720	--	.26	.18	.09	--	.49		--	--	--	--	41	.06	4,300	--	.2	50.7	6.9
May 11-20	63,490	--	.29	.10	.09	--	.48		--	--	--	--	40	.05	3,170	--	.2	56.9	6.9
May 21-31	257,100	--	.28	.08	.08	--	.44		--	--	--	--	37	.05	12,860	--	.2	46.2	6.7
June 1-15.....	256,400	--	.25	.14	.08	--	.44		--	--	--	--	34	.05	12,820	--	.2	47.9	6.7
June 16-30	145,900	--	.24	.10	.08	--	.41		--	--	--	--	34	.05	12,820	--	.2	42.0	6.7
July 1-15	128,700	--	.21	.10	.07	--	.38		--	--	--	--	37	.05	6,440	--	.2	40.2	6.6
July 16-31	133,700	--	.19	.11	.07	--	.36		--	--	--	--	38	.05	6,680	--	.2	38.2	7.0
Aug. 1-15.....	134,500	13	.20	.10	.08	0.03	.39		0.01	0.00	0.01	0.00	36	.05	6,720	19	.2	38.6	6.8
Aug. 16-31.....	109,400	12	.24	.08	.09	.02	.41		.03	.00	.01	.00	38	.05	5,470	20	.2	41.9	6.7
Sept. 1-15	71,800	13	.27	.06	.08	.02	.41		.03	.00	.01	.00	38	.05	3,590	19	.2	42.4	6.8
Sept. 16-30	67,640	13	.26	.10	.09	.03	.44		.03	.00	.02	.00	38	.05	3,380	18	.2	46.3	6.7
Total or weighted average.....	4,321,000	--	0.29	0.13	0.09	--	0.48		--	--	--	--	45	0.06	259,300	--	0.2	53.3	--

PART 12. PACIFIC SLOPE BASINS IN WASHINGTON AND UPPER COLUMBIA RIVER BASIN

COLUMBIA RIVER MAIN STEM

COLUMBIA RIVER AT INTERNATIONAL BOUNDARY

LOCATION (revised).--At cableway 2.2 miles downstream from gaging station and international boundary, 2.7 miles downstream from Pend Oreille River, and about 10 miles upstream from Northport, Stevens County, Wash.
DRAINAGE AREA.--59,700 square miles, approximately (above gaging station).
RECORDS AVAILABLE.--Chemical analyses: February 1910 to January 1911, November 1951 to September 1956.
Water temperatures: November 1951 to September 1956.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 192 micromhos Dec. 3; minimum daily, 130 micromhos Aug. 2, 3.
Percent sodium: Maximum, 6 Nov. 17 to Dec. 31, Jan. 12 to Feb. 29, Mar. 16 to June 16; minimum, 4 July 20-29.
EXTREMES, 1951-56.--Specific conductance: Maximum daily, 192 micromhos Dec. 3, 1955; minimum daily, 129 micromhos July 28, Aug. 5, 8, 9, 1955.
Percent sodium: Maximum, 8 Apr. 1-11, 1955; minimum, 3 July 21 to Aug. 20, 1954.
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 Portland, Oreg. Records of discharge for gaging station at International Boundary for water year October 1955 to September 1956 given in WSP 1446. No appreciable inflow between sampling point and gaging station except during periods of heavy local runoff.

Chemical analyses, November 1955 to September 1956

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 (micromhos 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. 17-30, 1955	1,706,000		1.10	0.42	0.10		1.33	0.25	0.03		0.02	0.01	96	0.13	211,800	6	0.1	157	7.8
Dec. 1-14	1,389,000		1.20	.40	.10		1.31	.33	.01		.02	--	101	.14	194,500	6	.1	165	7.9
Dec. 15-31	1,762,000		1.20	.44	.10		1.34	.31	.04		.01	.04	100	.14	246,700	6	.1	164	7.9
Jan. 1-10, 1956	995,900		1.20	.42	.09		1.33	.33	.02		.01	--	101	.14	139,400	5	.1	165	7.9
Jan. 11-20	963,000		1.20	.46	.10		1.36	.33	.02		.01	.05	102	.14	134,800	6	.1	167	7.9
Jan. 21-31	951,100		1.20	.46	.10		1.36	.33	.02		.01	--	103	.14	133,200	6	.1	169	7.9
Feb. 1-15	1,359,000		1.25	.45	.10		1.41	.35	.03		.01	--	99	.13	176,700	6	.1	176	7.8
Feb. 16-29	1,126,000		1.25	.53	.11		1.48	.35	.03		.01	.04	105	.14	157,600	6	.1	181	7.5
Mar. 1-15	1,239,000		1.25	.49	.10		1.44	.35	.03		.01	--	101	.14	173,500	5	.1	178	7.4
Mar. 16-31	1,817,000		1.15	.51	.10		1.41	.29	.03		.01	.05	97	.13	236,200	6	.1	171	7.5
Apr. 1-15	2,188,000		1.15	.49	.10		1.41	.29	.03		.00	--	100	.14	306,300	6	.1	165	7.2
Apr. 16-30	4,409,000		1.05	.41	.10		1.31	.25	.03		.00	.02	92	.13	573,200	6	.1	153	7.7
May 1-15	5,099,000		1.00	.44	.10		1.28	.25	.02		.00	--	89	.12	611,900	6	.1	149	7.3
May 16-31	9,689,000		.95	.39	.09		1.18	.21	.02		.01	.02	82	.11	1,066,000	6	.1	138	7.4

June 1-16, 1956...	13,750,000		.95	.39	.09		1.21	.19	.02		.01	--	82	.11	1,512,000	6	.1	138	7.6
June 17-30.....	8,918,000		.95	.39	.07		1.18	.20	.01		.01	--	82	.11	981,000	5	.1	138	7.3
July 1-19.....	8,667,000		1.00	.32	.07		1.20	.20	.01		.01	--	78	.11	953,400	5	.1	137	6.8
July 20-31.....	4,728,000		.95	.35	.06		1.13	.20	.02		.01	0.01	75	.10	472,800	4	.1	134	6.9
Aug. 1-31.....	6,955,000		1.00	.35	.07		1.16	.23	.01		.01	.02	76	.10	695,500	5	.1	137	6.8
Sept. 1-30.....	4,043,000		1.10	.36	.07		1.26	.27	.01		.00	.00	85	.12	485,200	5	.1	149	7.7
Total or weighted average[a]	81,750,000		1.00	0.39	0.08		1.25	0.23	0.02		0.01	--	85	0.12	9,810,000	5	0.1	145	--
Total or weighted average[b]	87,400,000		1.05	0.39	0.08		1.25	0.23	0.02		0.01	--	86	0.12	10,490,000	5	0.1	146	--

a Represents 94 percent of runoff for water year October 1955 to September 1956.
b Includes estimated data for missing periods. Represents 100 percent of runoff for water year October 1955 to September 1956.

COLUMBIA RIVER MAIN STEM--Continued

COLUMBIA RIVER AT GRAND COULEE DAM, WASH.

LOCATION (revised).--At Grand Coulee Dam, 1½ miles north of Grand Coulee, Grant County, 2,500 feet upstream from gaging station, and 14.5 miles upstream from Nespelem River.
DRAINAGE AREA.--74,100 square miles, approximately (above gaging station).
RECORDS AVAILABLE.--Chemical analyses: November 1950 to September 1956.
Water temperatures: November 1950 to September 1956.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 166 micromhos Apr. 6, 11; minimum daily, 123 micromhos June 1.
EXTREMES, 1950-56.--Specific conductance: Maximum daily, 193 micromhos Apr. 24, 25, 1955; minimum daily, 123 micromhos Sept. 16, 17, 1955, June 1, 1956.
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 Portland, Oreg. Records of discharge for water year October 1955 to September 1956 given in WSP 1446.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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, 1955..	1,301,000	4.1	0.95	0.31	0.07	0.03	1.10	0.20	0.01	0.01	0.01	0.01	74	0.10	130,100	5	0.1	129	7.3
Oct. 11-20	1,161,000	--	--	--	--	--	--	--	--	--	--	--	72	.10	116,100	--	--	130	--
Oct. 21-31	1,363,000	--	--	--	--	--	--	--	--	--	--	--	80	.11	149,900	--	--	142	--
Nov. 1-10.....	1,323,000	--	--	--	--	--	--	--	--	--	--	--	78	.11	145,500	--	--	140	--
Nov. 11-20.....	1,356,000	--	--	--	--	--	--	--	--	--	--	--	77	.10	135,600	--	--	140	--
Nov. 21-30.....	1,260,000	--	--	--	--	--	--	--	--	--	--	--	82	.11	138,600	--	--	146	--
Dec. 1-10.....	1,197,000	--	--	--	--	--	--	--	--	--	--	--	86	.12	143,600	--	--	149	--
Dec. 11-20.....	1,132,000	--	--	--	--	--	--	--	--	--	--	--	88	.12	135,800	--	--	151	--
Dec. 21-31.....	1,503,000	--	--	--	--	--	--	--	--	--	--	--	85	.12	180,400	--	--	149	--
Jan. 1-10, 1956..	1,427,000	5.2	1.05	.37	.10	.04	1.21	.25	.03	.01	.01	.09	85	.12	171,200	6	.1	147	7.4
Jan. 11-20	1,267,000	--	--	--	--	--	--	--	--	--	--	--	89	.12	152,000	--	--	144	--
Jan. 21-31	1,332,000	--	--	--	--	--	--	--	--	--	--	--	88	.12	159,800	--	--	146	--
Feb. 1-10.....	1,344,000	--	--	--	--	--	--	--	--	--	--	--	90	.12	161,300	--	--	147	--
Feb. 11-20.....	1,305,000	--	--	--	--	--	--	--	--	--	--	--	87	.12	156,600	--	--	145	--
Feb. 21-29.....	1,137,000	--	--	--	--	--	--	--	--	--	--	--	86	.12	136,400	--	--	145	--
Mar. 1-10.....	1,210,000	--	--	--	--	--	--	--	--	--	--	--	86	.12	145,200	--	--	145	--
Mar. 11-20	1,148,000	--	--	--	--	--	--	--	--	--	--	--	90	.12	137,800	--	--	149	--
Mar. 21-31.....	1,745,000	--	--	--	--	--	--	--	--	--	--	--	92	.13	226,800	--	--	154	--

Apr. 1-10, 1956 .	2,134,000	7.9	1.10	0.42	0.10	0.03	1.34	0.29	0.03	0.01	0.00	0.04	95	0.13	277,400	6	0.1	161	7.2
Apr. 11-20.....	2,505,000	--	--	--	--	--	--	--	--	--	--	--	98	.13	325,600	--	--	163	--
Apr. 21-30.....	5,858,000	--	--	--	--	--	--	--	--	--	--	--	98	.13	761,500	--	--	161	--
May 1-20.....	9,858,000	--	--	--	--	--	--	--	--	--	--	--	89	.12	1,183,000	--	--	144	--
May 21-31.....	7,229,000	--	--	--	--	--	--	--	--	--	--	--	80	.11	795,200	--	--	132	--
June 1-10	9,405,000	--	--	--	--	--	--	--	--	--	--	--	77	.10	940,500	--	--	127	--
June 11-20	7,919,000	--	--	--	--	--	--	--	--	--	--	--	81	.11	871,100	--	--	131	--
June 21-30	6,443,000	--	--	--	--	--	--	--	--	--	--	--	79	.11	708,700	--	--	133	--
July 1-31.....	13,500,000	7.4	.95	.34	.07	.02	1.16	.20	.01	.01	.01	.01	78	.11	1,485,000	5	.1	137	7.6
Aug. 1-31.....	6,948,000	--	--	--	--	--	--	--	--	--	--	--	78	.11	764,300	--	--	132	--
Sept. 1-30	4,286,000	--	--	--	--	--	--	--	--	--	--	--	77	.10	428,600	--	--	136	--
Total or weighted average	99,600,000	--	--	--	--	--	--	--	--	--	--	--	83	0.11	10,960,000	--	--	140	--

YAKIMA RIVER BASIN

YAKIMA RIVER AT KIONA, WASH.

LOCATION.--At highway bridge just 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 1956.
Water temperatures: December 1952 to September 1956.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 355 micromhos Aug. 16; minimum daily, 112 micromhos June 2.
Percent sodium: Maximum, 30 Jan. 22-31; minimum, 21 Apr. 11-30.
EXTREMES, 1952-56.--Specific conductance: Maximum daily, 387 micromhos Sept. 29, 1955; minimum daily, 112 micromhos June 15, 1955, June 2, 1956.
Percent sodium: Maximum, 30 Jan. 22-31, 1956; minimum, 21 Apr. 11-30, 1956.
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 Portland, Oreg. Discharge records for water year October 1955 to September 1956 given in WSP 1446.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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, 1955..	48,930		1.50	0.90	0.91		a2.75	0.46	0.20		0.04	--	207	0.28	13,700	26	0.8	324	8.3
Oct. 11-21	68,110		1.35	.82	.83		2.47	.40	.18		.03	0.04	188	.26	17,710	27	.8	293	8.0
Oct. 22-31	65,260		1.25	.76	.74		2.29	.33	.17		.03	--	173	.24	15,660	26	.7	269	8.1
Nov. 1-5, 8-10 ..	75,510		.90	.60	.52		1.67	.25	.13		.00	--	133	.18	13,590	25	.6	202	7.8
Nov. 6-7, 11-19 .	140,900		.75	.44	.37		1.28	.17	.10		.00	.06	100	.14	19,730	24	.5	154	7.3
Nov. 20-30.....	148,500		.65	.49	.40		1.21	.20	.09		.02	--	98	.13	19,300	26	.5	150	7.3
Dec. 1-10.....	136,400		.65	.49	.43		1.23	.21	.11		.01	--	100	.14	19,100	28	.6	154	7.6
Dec. 11, 13-21..	191,600		.65	.30	.34		1.08	.16	.07		.01	.06	89	.12	22,990	26	.5	132	7.4
Dec. 12, 22-31..	231,500		.65	.49	.44		1.26	.23	.10		.02	--	110	.15	34,720	27	.6	161	7.4
Jan. 1-12, 1956..	216,600		.65	.45	.39		1.23	.19	.10		.01	--	95	.13	28,160	25	.5	151	7.5
Jan. 13-21	107,900		.90	.64	.61		1.69	.31	.14		.02	.01	134	.18	19,420	28	.7	213	7.8
Jan. 22-31	97,270		1.00	.77	.74		1.92	.35	.17		.03	--	153	.21	20,430	30	.8	242	7.9
Feb. 1-10	68,510		1.05	.72	.65		1.93	.31	.17		.03	--	152	.21	14,390	27	.7	238	7.9
Feb. 11-20	88,240		.90	.70	.57		1.72	.27	.14		.03	.04	131	.18	15,880	26	.6	210	8.0
Feb. 21-29	82,890		1.00	.64	.52		1.72	.29	.14		.04	--	135	.18	14,920	24	.6	214	7.9
Mar. 1-10	111,100		1.00	.66	.65		1.80	.29	.16		.04	--	141	.19	21,110	28	.7	224	8.0
Mar. 11-20	135,900		.80	.66	.48		1.57	.23	.12		.04	.04	123	.17	23,100	24	.6	192	8.0
Mar. 21-31.....	272,700		.75	.55	.41		1.39	.15	.09		.05	--	119	.16	43,630	24	.5	168	7.6

a Includes 0.10 equivalent per million of carbonate (CO_3).

Apr. 1-10, 1956 .	217,800		.70	.44	.34		1.26	.14	.08		.02	--	104	.14	30,490	23	.5	149	7.2
Apr. 11-20.....	267,000		.65	.40	.29		1.16	.11	.08		.02	0.01	102	.14	37,380	21	.4	135	7.2
Apr. 21-30.....	300,100		.65	.39	.29		1.16	.10	.08		.01	--	102	.14	42,010	21	.4	132	7.0
May 1-10, 15-16 .	238,500		.75	.39	.35		1.28	.15	.08		.02	--	102	.14	33,390	23	.5	148	7.3
May 11-14, 17-21	247,100		.65	.37	.30		1.13	.12	.08		.02	--	95	.13	32,120	22	.4	131	7.2
May 22-31	319,300		.60	.34	.28		1.07	.10	.06		.02	.01	86	.12	38,320	22	.4	122	7.2
June 1-10	315,200		.60	.35	.28		1.08	.11	.06		.01	--	87	.12	37,820	22	.4	122	7.3
June 11-12, 16, 23-30.....	209,000		.65	.44	.36		1.21	.14	.08		.01	--	98	.13	27,170	25	.5	142	7.6
June 13-15,17-22	233,100		.60	.35	.30		1.11	.13	.06		.00	--	86	.12	27,970	23	.4	128	7.3
July 1-24	198,100		.90	.58	.52		1.64	.23	.11		.01	--	129	.18	35,660	26	.6	194	7.6
July 25-31	31,200		1.40	.99	.87		2.62	.42	.19		.02	--	199	.27	8,420	27	.8	307	8.2
Aug. 1-11	43,460		1.65	.90	.91		2.79	.48	.19		.05	--	212	.29	12,600	26	.8	327	7.9
Aug. 12-22	39,770		1.75	.99	1.00		3.02	.52	.21		.05	.08	234	.32	12,730	26	.9	354	8.1
Aug. 23-31.....	40,900		1.60	.90	.91		2.75	.48	.20		.06	--	215	.29	11,860	26	.8	328	7.9
Sept. 1-15	69,080		1.65	.90	.91		2.79	.44	.19		.05	--	212	.29	20,030	26	.8	323	7.9
Sept. 16-30	63,910		1.65	.99	.91		2.92	.46	.20		.05	.02	222	.30	19,170	26	.8	340	7.9
Total or weighted average	5,121,000		0.80	0.50	0.44		1.43	0.20	0.10		0.02	--	115	0.16	819,400	25	0.5	170	--

PART 13. SNAKE RIVER BASIN

SNAKE RIVER MAIN STEM

SNAKE RIVER NEAR HEISE, IDAHO

LOCATION.--At Eagle Rock Canal headgate, 1¼ miles upstream from Heise, Bonneville County, 1 5/8 miles downstream from Anderson Canal headgate, 1¾ miles downstream from gaging station, about 4¾ 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 1956.
Water temperatures: January 1953 to September 1956.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 648 micromhos Feb. 2; minimum daily, 250 micromhos June 5.
Percent sodium: Maximum, 16 Jan. 11-20, Feb. 1-10, Apr. 1-10; minimum, 8 May 21-31, June 11-20.
EXTREMES, 1953-56.--Specific conductance: Maximum daily, 648 micromhos Feb. 2, 1956; 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 at 180°C. Records of specific conductance of daily samples available in district office at Salt Lake City, Utah. Records of discharge for water year October 1955 to September 1956 given in WSP 1447.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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, 1955 ..	56,790	13	3.34	1.56	0.61	0.07	3.34	1.54	0.48		0.03	--	310	0.42	23,850	11	0.4	503	7.8
Oct. 11-20.....	55,540	13	2.99	1.56	.61	.06	3.08	1.54	.48		.02	0.05	294	.40	22,220	12	.4	482	7.7
Oct. 21-31.....	60,970	13	3.04	1.56	.61	.06	3.08	1.56	.48		.02	--	298	.41	25,000	12	.4	484	7.7
Nov. 1-10.....	53,140	13	3.19	1.56	.61	.06	3.24	1.60	.51		.02	--	307	.42	22,320	11	.4	505	7.6
Nov. 11-20.....	51,810	12	3.39	1.64	.65	.05	3.41	1.69	.56		.03	.07	329	.45	23,310	11	.4	533	7.6
Nov. 21-30.....	56,690	12	3.34	1.56	.65	.05	3.33	1.52	.54		.02	--	309	.42	23,810	12	.4	509	7.8
Dec. 1-10.....	49,630	12	3.44	1.64	.70	.05	3.44	1.62	.56		.02	--	330	.45	22,330	12	.4	533	7.6
Dec. 11-20.....	48,540	13	3.64	1.73	.70	.06	3.62	1.75	.62		.02	.05	349	.47	22,810	11	.4	562	7.6
Dec. 21-31.....	94,570	12	3.09	1.40	.61	.06	3.20	1.31	.48		.02	--	291	.40	37,830	12	.4	478	7.6
Jan. 1-10, 1956 ..	59,600	11	3.49	1.56	.65	.05	3.57	1.52	.51		.02	--	325	.44	26,220	11	.4	523	7.9
Jan. 11-20.....	54,900	13	2.35	1.48	.74	.05	2.51	1.50	.54		.02	.06	264	.36	19,760	16	.5	438	8.0
Jan. 21-31.....	55,400	11	2.84	1.56	.78	.05	2.95	1.60	.62		.02	--	294	.40	22,160	15	.5	493	7.9
Feb. 1-10.....	42,190	12	2.89	1.64	.87	.06	2.88	1.83	.68		.02	--	316	.43	18,140	16	.6	520	8.0
Feb. 11-20.....	42,640	12	3.04	1.64	.74	.06	3.16	1.69	.56		.02	.05	312	.42	17,910	14	.5	519	7.8
Feb. 21-29.....	41,490	12	3.24	1.56	.74	.06	3.31	1.60	.56		.02	--	317	.43	17,840	13	.5	523	7.8

Mar. 1-10, 1956.	46,630	11	3.04	1.56	0.74	.06	3.13	1.64	.62		.02	--	312	.42	19,580	14	.5	514	7.8
Mar. 11-20	62,600	14	3.04	1.32	.70	.06	3.18	1.37	.51		.02	0.06	289	.39	24,410	14	.5	476	7.8
Mar. 21-31	130,500	14	2.30	.99	.57	.06	2.54	.90	.37		.02	--	223	.30	39,150	14	.4	372	7.8
Apr. 1-10	142,700	14	2.20	.90	.61	.05	2.49	.81	.39		.01	--	213	.29	41,380	16	.5	361	7.6
Apr. 11-20	225,800	14	2.25	.90	.52	.05	2.61	.71	.31		.02	.06	209	.28	63,220	14	.4	350	7.7
Apr. 21-30	294,300	14	2.56	.88	.39	.04	3.08	.62	.22		.02	--	222	.30	88,290	10	.3	364	7.9
May 1-10	307,000	13	2.48	.88	.39	.05	2.90	.62	.22		.01	--	216	.29	89,030	10	.3	358	7.7
May 11-20	393,300	13	2.20	.72	.39	.04	2.57	.52	.19		.01	.09	193	.26	102,300	12	.3	320	7.8
May 21-31	635,300	9.2	2.28	.64	.26	.02	2.59	.42	.15		.01	--	179	.24	152,500	8	.2	305	7.5
June 1-10	632,900	10	1.96	.68	.25	.03	2.36	.40	.11		.01	--	164	.22	139,200	9	.2	276	7.6
June 11-20	561,500	10	1.88	.72	.24	.03	2.23	.44	.14		.01	.04	163	.22	123,500	8	.2	271	7.6
June 21-30	373,100	10	2.04	.76	.28	.03	2.36	.58	.16		.02	--	177	.24	89,540	9	.2	298	7.6
July 1-10	319,100	11	1.96	.76	.30	.05	2.16	.58	.18		.05	--	181	.25	79,780	10	.3	298	7.3
July 11-20	265,800	11	1.96	.76	.33	.05	2.20	.69	.19		.03	.06	183	.25	66,450	11	.3	304	7.3
July 21-31	272,300	12	1.92	.72	.35	.05	2.10	.69	.20		.02	--	184	.25	68,080	12	.3	296	7.2
Aug. 1-10	206,900	13	2.04	.84	.44	.07	2.62	.77	.20		.02	--	198	.27	55,860	13	.4	315	7.3
Aug. 11-20	183,900	13	2.20	.64	.44	.07	2.29	.79	.22		.01	.05	204	.28	51,490	13	.4	322	7.5
Aug. 21-31	203,900	14	2.08	.64	.44	.07	1.13	.77	.25		.02	--	192	.26	53,010	13	.4	313	7.3
Sept. 1-10	177,500	13	2.00	.76	.48	.07	2.16	.77	.25		.01	--	198	.27	47,920	14	.4	315	7.3
Sept. 11-20	145,900	13	2.32	.80	.48	.07	2.39	.90	.28		.01	.07	220	.30	43,770	13	.4	347	7.6
Sept. 21-30	117,300	12	2.52	.88	.52	.07	2.59	1.04	.34		.01	--	234	.32	37,540	13	.4	378	7.7
Total or weighted average	6,523,000	12	2.30	0.90	0.40	0.05	2.54	0.73	0.25		0.02	--	206	0.28	1,826,000	11	0.3	340	--

SNAKE RIVER MAIN STEM--Continued

SNAKE RIVER AT KING HILL, IDAHO

LOCATION.--At county highway bridge about 400 yards downstream from gaging 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 1956.
Water temperatures: March 1951 to September 1956.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 578 micromhos Oct. 16; minimum daily, 399 micromhos June 5.
Percent sodium: Maximum, 28 Nov. 1-10, Dec. 1-10, 21-31, July 11-31, Aug. 17-31, Sept. 16-30; minimum, 20 June 1-10.
EXTREMES, 1951-56.--Specific conductance: Maximum daily, 594 micromhos Oct. 3, 1952; minimum daily, 394 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 at 180°C. Records of specific conductance of daily samples available in district office at Portland, Oreg. Records of discharge for water year October 1955 to September 1956 given in WSP 1447.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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, 1955...	177,500		2.35	1.73	1.57		3.74	1.25	0.76		0.05	--	351	0.48	85,200	27	1.1	560	8.0
Oct. 11-20.....	186,500		2.40	1.73	1.57		3.79	1.29	.79		.05	0.02	355	.48	89,520	27	1.1	563	8.2
Oct. 21-31.....	198,900		2.30	1.73	1.52		a3.69	1.23	.73		.05	--	340	.46	91,490	27	1.1	547	8.3
Nov. 1-10.....	187,700		2.40	1.73	1.61		3.77	1.25	.76		.05	--	350	.48	90,100	28	1.1	557	8.2
Nov. 11-20.....	175,900		2.35	1.73	1.48		3.70	1.23	.73		.05	.06	347	.47	82,670	26	1.0	552	8.2
Nov. 21-30.....	181,200		2.40	1.64	1.52		3.72	1.23	.73		.05	--	344	.47	85,160	27	1.1	554	8.2
Dec. 1-10.....	178,200		2.40	1.81	1.57		3.67	1.25	.73		.05	--	350	.48	85,540	28	1.1	551	7.7
Dec. 11-20.....	174,800		2.45	1.73	1.57		3.64	1.25	.76		.06	--	346	.47	82,160	27	1.1	552	7.8
Dec. 21-31.....	233,300		2.30	1.56	1.48		3.39	1.17	.70		.05	.15	328	.45	105,000	28	1.1	518	7.9
Jan. 1-10, 1956 ..	206,600		2.40	1.81	1.52		3.64	1.25	.73		.05	--	342	.47	97,100	27	1.0	546	8.0
Jan. 11-20.....	224,900		2.40	1.64	1.44		3.51	1.17	.73		.05	--	334	.45	101,200	26	1.0	531	8.1
Jan. 21-31.....	264,000		2.40	1.73	1.48		3.57	1.25	.76		.05	.10	342	.47	124,100	26	1.0	540	8.1
Feb. 1-10.....	236,600		2.50	1.64	1.44		3.65	1.17	.79		.04	--	349	.47	111,200	25	1.0	540	8.2
Feb. 11-20.....	232,900		2.45	1.64	1.39		3.59	1.19	.73		.04	.19	339	.46	107,100	25	1.0	529	8.2
Feb. 21-29.....	221,200		2.45	1.56	1.35		3.52	1.15	.73		.04	--	326	.44	97,330	25	1.0	521	8.3
Mar. 1-10	262,200		2.40	1.56	1.30		3.44	1.15	.73		.04	--	317	.43	112,700	24	.9	511	8.3
Mar. 11-20	250,500		2.40	1.56	1.26		3.43	1.12	.70		.04	.14	316	.43	107,700	24	.9	507	8.4
Mar. 21-31	371,300		2.25	1.48	1.17		3.23	1.04	.65		.04	--	296	.40	148,500	24	.9	477	8.1

a Includes 0.07 equivalent per million of carbonate (CO_3).

Apr. 1-10, 1956 ..	382,400		2.54	1.40	1.13		3.36	1.04	.65		.04	--	307	.42	160,600	22	.8	492	8.1
Apr. 11-20.....	254,100		2.40	1.40	1.22		3.31	1.06	.68		.04	0.08	303	.41	104,200	24	.9	489	8.2
Apr. 21-30.....	306,600		2.30	1.56	1.22		3.28	1.06	.68		.04	--	302	.41	125,700	24	.9	489	8.1
May 1-11	349,100		2.40	1.32	1.17		3.33	1.00	.65		.03	--	297	.40	139,600	23	.9	479	7.9
May 12-21	250,800		2.30	1.48	1.26		3.43	1.00	.68		.03	.11	309	.42	105,300	25	.9	488	7.9
May 22-31	308,700		2.20	1.40	1.22		3.25	.94	.62		.03	--	292	.40	123,500	25	.9	462	7.9
June 1-10	540,900		2.25	1.15	.87		3.08	.79	.48		.03	--	257	.35	189,300	20	.7	414	8.0
June 11-20	378,400		2.20	1.23	1.00		3.18	.83	.51		.03	.04	267	.36	136,200	22	.8	432	7.8
June 21-30	285,400		2.20	1.32	1.04		3.21	.87	.51		.03	--	276	.38	108,500	23	.8	440	8.0
July 1-10	153,300		2.20	1.56	1.44		3.47	1.06	.68		.04	--	317	.43	65,920	27	1.1	496	8.0
July 11-20	151,400		2.20	1.64	1.52		3.52	1.10	.73		.04	.08	326	.44	66,620	28	1.1	511	8.0
July 21-31	177,300		2.20	1.73	1.52		3.54	1.10	.70		.05	--	330	.45	79,780	28	1.1	517	7.9
Aug. 1-16.....	271,900		2.30	1.64	1.48		3.59	1.19	.68		.06	--	331	.45	122,400	27	1.1	525	8.0
Aug. 17-31.....	249,300		2.40	1.73	1.57		3.67	1.21	.73		.07	.02	346	.47	117,200	28	1.1	537	8.1
Sept. 1-15	261,300		2.50	1.64	1.57		3.70	1.25	.73		.06	--	344	.47	122,800	27	1.1	545	8.1
Sept 16-30	280,000		2.40	1.73	1.61		3.70	1.27	.73		.07	.04	346	.47	131,600	28	1.1	547	8.1
Total or weighted average.....	8,565,000		2.35	1.56	1.35		3.46	1.10	0.68		0.04	--	318	0.43	3,683,000	26	1.0	506	--

SNAKE RIVER MAIN STEM--Continued

SNAKE RIVER AT CENTRAL FERRY, NEAR POMEROY, WASH.

LOCATION.--At bridge on U. S. Highway 295 at Central Ferry, Garfield County, 14 miles northwest of Pomeroy, and about 36 miles downstream from gaging station near Clarkston.
DRAINAGE AREA.--103,200 square miles, approximately (above gaging station).
RECORDS AVAILABLE.--Chemical analyses: October 1955 to September 1956.
Water temperatures: October 1955 to September 1956.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 434 micromhos Oct. 25; minimum daily, 73 micromhos May 25, 27.
Percent sodium: Maximum, 36 Sept. 1-19, 30; minimum, 25 Mar. 20-24, 26-29, Apr. 2-7, 9-13, Apr. 14, 16-21, 23-26, 30.
REMARKS.--Chemical quality samples were collected at station near Clarkston, Wash. (1 mile downstream from gaging station) from November 1951 to September 1955. Values reported for dissolved solids are residues on evaporation at 180°C. Records of specific conductance of daily samples abailable in district office at Portland, Oreg. Records of discharge for gaging station near Clarkston for water year October 1955 to September 1956 given in WSP 1447. No appreciable inflow between sampling point and gaging station except during periods of heavy local runoff.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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, 1955...	435,200	20	1.65	1.07	1.44	0.11	2.62	1.06	0.48	0.02	0.03	--	256	0.35	152,300	34	1.2	415	8.0
Oct. 11-20.....	506,000	23	1.55	.99	1.35	.10	2.47	1.02	.45	.02	.04	0.04	246	.33	167,000	34	1.2	396	7.9
Oct. 21-31.....	512,300	23	1.60	.99	1.44	.10	2.57	1.06	.51	.02	.03	--	257	.35	179,300	35	1.3	413	8.0
Nov. 1-5, 9-11, 15-20.....	730,500	24	1.50	.99	1.26	.10	2.43	.96	.45	.02	.04	.02	238	.32	233,800	33	1.1	383	8.0
Nov. 6-8, 12-14, 21-30.....	1,028,000	21	1.25	.81	1.00	.09	1.98	.75	.34	.02	.04	--	197	.27	277,600	32	1.0	309	7.7
Dec. 1-4, 13-15, 20-21.....	612,300	22	1.35	.67	.96	.08	1.90	.69	.34	.02	.04	--	191	.26	159,200	31	1.0	296	7.7
Dec. 5-12, 16-19.	676,800	25	1.45	.90	1.09	.09	2.18	.81	.39	.03	.04	.08	218	.30	203,000	31	1.0	347	7.7
Dec. 26-31.....	825,900	--	.80	.35	.48	.06	1.08	--	.16	--	.05	--	--	--	--	28	.6	166	7.6
Jan. 1-14, 1956...	1,130,000	25	1.20	.62	.83	.07	1.69	.58	.28	.02	.04	--	174	.24	271,200	31	.9	258	7.0
Jan. 15-31.....	1,601,000	26	1.20	.69	.87	.08	1.80	.58	.28	.02	.04	.02	188	.26	416,300	31	.9	274	7.0
Feb. 1-10, 12-14, 17-19.....	1,045,000	25	1.50	.82	1.04	.08	2.16	.75	.39	.02	.04	--	214	.29	303,000	30	1.0	334	7.6
Feb. 11, 15-16, 20-29.....	988,200	24	1.45	68	.91	.08	1.97	.65	.34	.02	.04	.04	194	.26	256,900	29	.9	301	7.6

Mar. 1-19, 1956..	1,648,000	25	1.35	.71	.83	.08	1.92	.60	.31	.02	.04	.02	187	.25	412,000	28	.8	286	7.7
Mar. 20-31.....	2,306,000	23	.85	.49	.48	.07	1.25	.33	.18	.01	.04	--	141	.19	438,400	25	.6	182	7.4
Apr. 1-13.....	2,246,000	22	1.00	.46	.52	.07	1.38	.37	.22	.01	.03	--	138	.19	426,700	25	.6	202	7.6
Apr. 14-30.....	5,190,000	17	.60	.23	.30	.05	.82	.20	.09	.01	.02	.01	98	.13	674,700	25	.5	120	7.3
May 1-14	3,926,000	17	.65	.25	.39	.04	.93	.25	.13	.02	.01	--	94	.13	510,400	29	.6	135	7.1
May 15-31.....	7,541,000	11	.43	.20	.25	.04	.67	.16	.08	.01	.01	.04	68	.09	678,700	27	.4	92	6.8
June 1-6, 13-16...	3,984,000	15	.65	.22	.33	.04	.92	.23	.11	.01	.01	--	85	.12	478,100	27	.5	126	7.2
June 7-12, 17-20..	3,052,000	16	.70	.37	.38	.04	1.05	.27	.14	.02	.01	.01	96	.13	396,800	26	.5	146	7.2
June 21-30.....	1,850,000	16	.80	.36	.44	.05	1.18	.31	.17	.02	.01	--	106	.14	259,000	27	.6	165	7.1
July 1-8, 12-13...	1,116,000	16	.75	.35	.48	.05	1.15	.33	.16	.02	.01	--	105	.14	156,200	29	.6	165	7.4
July 9-11, 14-20..	823,100	17	.95	.44	.70	.06	1.41	.46	.23	.02	.02	.08	133	.18	148,200	33	.8	210	7.5
July 21-31.....	663,600	18	1.20	.58	.96	.07	1.84	.60	.34	.02	.01	--	174	.24	159,300	34	1.0	279	7.7
Aug. 1-15.....	779,100	23	1.45	.68	1.17	.09	2.15	.83	.37	.02	.03	.09	206	.28	218,100	35	1.1	330	7.5
Aug. 16-31.....	760,500	24	1.50	.79	1.30	.09	2.29	.92	.42	.02	.03	--	223	.30	228,200	35	1.2	357	7.6
Sept. 1-30.....	1,385,000	23	1.60	.90	1.44	.10	2.52	1.06	.45	.02	.03	.06	247	.34	470,900	36	1.3	402	7.8
Total or weighted average[a].....	47,360,000	18	0.90	0.44	0.57	0.06	1.31	0.42	0.20	0.02	0.02	--	131	0.18	8,525,000	29	0.7	194	--
Total or weighted average[b].....	48,460,000	18	0.90	0.44	0.57	0.06	1.29	0.42	0.20	0.02	0.02	--	130	0.18	8,723,000	29	0.7	193	--

a Represents 98 percent of runoff for water year October 1955 to September 1956.
b Includes estimated data for missing periods. Represents 100 percent of runoff for water year October 1955 to September 1956.

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 1956.
Water temperatures: November 1950 to September 1956.
Sediment records: January 1939 to June 1940.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 757 micromhos Nov. 17; minimum daily, 112 micromhos Apr. 5, 9.
Percent sodium: Maximum, 49 July 11-20, Aug. 1-20; minimum, 30 Apr. 21-30.
EXTREMES, 1939-40, 1950-56.--Specific conductance: Maximum daily, 1,470 micromhos July 30, Aug. 26, 1939; minimum daily, 82 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 at 180°C. Records of specific conductance of daily samples available in district office at Portland, Oreg. Records of discharge for water year October 1955 to September 1956 given in WSP 1447.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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. 1-6, 17-20, 1955	10,850		2.30	1.07	3.22		4.25	1.83	0.54		0.07	--	404	0.55	5,970	48	2.5	633	8.2
Oct. 7-16	13,550		1.90	.99	2.52		3.56	1.42	.45		.06	0.04	331	.45	6,100	46	2.1	527	8.0
Oct. 21-31	17,420		2.59	1.15	3.39		a4.65	1.98	.56		.05	--	441	.60	10,450	47	2.5	683	8.3
Nov. 1-10	14,180		2.64	1.15	3.52		4.79	2.06	.59		.06	--	452	.61	8,650	47	2.6	700	8.1
Nov. 11-20	13,600		2.74	1.15	3.52		4.87	2.08	.62		.05	.02	464	.63	8,570	46	2.5	715	8.0
Nov. 21-30	13,320		2.74	1.15	3.48		4.77	2.02	.62		.05	--	452	.61	8,130	47	2.5	702	8.0
Dec. 1-10	12,840		2.64	1.40	3.39		4.74	2.02	.62		.05	--	460	.63	8,090	46	2.4	696	7.9
Dec. 11-20	11,660		2.74	1.23	3.44		4.77	2.04	.62		.05	.15	459	.62	7,230	46	2.4	703	8.1
Dec. 21-31	15,180		2.50	1.23	3.22		4.47	1.89	.59		.05	--	435	.59	8,960	46	2.4	665	7.7
Jan. 1-9, 1956	10,240		2.69	1.23	3.35		4.69	2.00	.62		.05	--	458	.62	6,350	46	2.4	697	7.9
Jan. 10-19	13,300		2.54	1.07	3.13		4.33	1.92	.59		.07	.12	427	.58	7,710	45	2.3	654	7.9
Jan. 20-31	40,050		1.35	.54	1.44		2.18	.90	.25		.06	--	222	.30	12,020	42	1.5	330	7.4
Feb. 1-6, 9	22,040		1.30	.59	1.39		2.23	.85	.26		.05	--	225	.31	6,830	41	1.4	328	7.8
Feb. 7-8	3,210		2.25	1.07	2.57		3.90	--	.51		.05	--	--	--	--	--	2.0	569	8.0
Feb. 10, 12-16, 21-24	86,360		.85	.28	.65		1.23	.35	.12		.05	--	126	.17	14,680	37	.9	179	7.6

a Includes 0.10 equivalent per million of carbonate (CO_3).

Feb. 11, 17-20, 25-29, 1956....	105,200		.75	.25	.57		1.13	.29	.10		.04	.08	111	.15	16,830	37	.8	156	7.5
Mar. 1-10	112,100		.70	.25	.52		1.10	.27	.10		.03	--	103	.14	15,690	35	.8	150	7.4
Mar. 11-21	141,000		.75	.24	.48		1.08	.25	.08		.03	.01	102	.14	19,740	33	.7	147	7.4
Mar. 22-31	134,500		.65	.24	.44		1.02	.23	.08		.03	--	97	.13	17,480	32	.7	136	7.7
Apr. 1-10	119,600		.65	.14	.39		.93	.17	.07		.02	--	88	.12	14,350	31	.6	119	7.1
Apr. 11-20.....	65,570		.65	.20	.44		.97	.21	.08		.02	.06	93	.13	8,520	34	.7	132	7.1
Apr. 21-30	66,190		.75	.18	.48		1.21	.25	.11		.03	--	104	.14	9,270	30	.7	150	7.1
May 1-11, 23-27.	149,800		.65	.18	.44		.98	.23	.08		.02	--	91	.12	17,980	34	.7	131	7.0
May 12-22, 28-31	137,300		.60	.21	.44		.97	.23	.08		.02	.05	91	.12	16,480	34	.7	131	7.1
June 1-13, 17-19.	140,600		.60	.17	.44		.97	.23	.08		.02	.08	90	.12	16,870	34	.7	130	7.0
June 14, 16, 20, 21	23,400		.85	.25	.83		1.41	.42	.16		.03	--	133	.18	4,210	41	1.1	199	7.3
June 22-30	12,690		1.35	.54	1.52		2.36	.85	.31		.05	--	226	.31	3,930	43	1.6	349	7.6
July 1-10	8,430		1.65	.64	2.04		2.88	1.15	.39		.03	--	274	.37	3,120	46	1.9	432	7.7
July 11-20	5,470		1.95	.74	2.65		3.46	1.44	.48		.04	.05	336	.46	2,520	49	2.3	516	7.9
July 21-31.....	8,540		1.80	.81	2.39		3.28	1.27	.42		.05	--	314	.43	3,670	48	2.1	484	7.8
Aug. 1-10.....	6,930		1.95	.90	2.70		3.61	1.44	.45		.05	--	342	.47	3,260	49	2.3	532	7.9
Aug. 11-20	5,870		2.15	.81	2.96		3.88	1.58	.51		.05	.04	374	.51	2,990	49	2.4	579	8.0
Aug. 21-31.....	8,690		1.90	.99	2.83		3.72	1.54	.54		.05	--	362	.49	4,260	48	2.4	560	8.0
Sept. 1-10	8,240		2.10	.90	2.78		3.84	1.56	.51		.05	--	368	.50	4,120	47	2.3	567	8.1
Sept. 11-20.....	9,240		1.95	.99	2.70		3.74	1.56	.45		.06	.05	355	.48	4,440	46	2.2	545	8.0
Sept. 21-30.....	9,890		1.95	.99	2.65		3.70	1.50	.45		.06	--	352	.48	4,750	46	2.2	541	8.0
Total or weighted average.....	1,577, 000		0.95	0.35	0.87		1.54	0.48	0.16		0.03	--	147	0.20	315,400	39	1.1	218	--

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 (revised).--At Maryhill Ferry about 2½ miles downstream from Rufus, Sherman County, about 9 miles upstream from gaging station near The Dalles, Wasco County, and 3.4 miles upstream from the Deschutes River.
DRAINAGE AREA.--237,000 square miles, approximately (above gaging station near The Dalles).
RECORDS AVAILABLE.--Chemical analyses: December 1950 to September 1956.
Water temperatures: December 1950 to September 1956.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 324 micromhos Dec. 7; minimum daily, 102 micromhos May 27.
EXTREMES, 1950-56.--Specific conductance: Maximum, 324 micromhos Dec. 7, 1955; minimum daily, 102 micromhos May 27, 1956.
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 Portland, Oreg. Records of discharge for gaging station near The Dalles for water year October 1955 to September 1956 given in WSP 1448. Discharge records include the inflow of the Deschutes River, which on the average amounts to less than 5 percent of the flow at the gaging station.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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, 1955..	2,085,000	11	1.10	0.52	0.44	0.04	1.51	0.42	0.12	0.01	0.02	0.02	124	0.17	354,400	21	0.5	208	7.8
Oct. 11-20	2,055,000	--	--	--	.44	--	1.56	--	--	--	--	--	126	.17	349,400	--	--	211	7.4
Oct. 21-31.....	2,212,000	--	--	--	.44	--	1.51	--	--	--	--	--	121	.16	353,900	--	--	207	7.5
Nov. 1-5, 20-25..	2,650,000	--	--	--	.43	--	1.46	--	--	--	--	--	120	.16	424,000	--	--	200	7.7
Nov. 6-8, 15-19 26-27.....	2,450,000	--	--	--	.41	--	1.46	--	--	--	--	--	118	.16	392,000	--	--	201	7.5
Nov. 9-14, 28-30.	2,327,000	--	--	--	.44	--	1.64	--	--	--	--	--	136	.18	418,900	--	--	224	7.4
Dec. 1, 16-22....	2,077,000	--	--	--	.33	--	1.18	--	--	--	--	--	114	.16	332,300	--	--	160	7.5
Dec. 2-15	3,390,000	--	--	--	.57	--	1.90	--	--	--	--	--	163	.22	745,800	--	--	163	7.4
Dec. 23-31	3,937,000	--	--	--	.31	--	1.26	--	--	--	--	--	114	.16	629,900	--	--	166	7.4
Jan. 1-10, 1956..	3,092,000	16	.95	.47	.33	.05	1.33	.25	.14	.01	.02	.01	115	.16	494,700	18	.4	193	7.6
Jan. 11-20.....	3,150,000	--	--	--	.36	--	1.33	--	--	--	--	--	119	.16	504,000	--	--	175	7.4
Jan. 21-30.....	3,221,000	--	--	--	.43	--	1.44	--	--	--	--	--	127	.17	547,600	--	--	193	7.2

Feb. 1-10, 1956..	2,461,000	--	--	--	.40	--	1.51	--	--	--	--	--	125	.17	418,400	--	--	198	7.7
Feb. 11-20	2,501,000	--	--	--	.48	--	1.57	--	--	--	--	--	136	.18	450,200	--	--	216	7.7
Feb. 21-29	2,471,000	--	--	--	.44	--	1.54	--	--	--	--	--	136	.18	444,800	--	--	211	7.6
Mar. 1-10.....	2,759,000	--	--	--	.44	--	1.51	--	--	--	--	--	133	.18	496,600	--	--	204	8.0
Mar. 11-20.....	2,640,000	--	--	--	.44	--	1.54	--	--	--	--	--	133	.18	475,200	--	--	207	7.6
Mar. 21-31.....	4,921,000	--	--	--	.39	--	1.34	--	--	--	--	--	128	.17	836,600	--	--	179	7.4
Apr. 1-10	4,695,000	18	0.95	0.49	.31	0.05	1.36	0.29	0.11	0.01	0.02	0.06	116	.16	751,200	17	0.4	176	7.3
Apr. 11-20	5,823,000	--	--	--	.27	--	1.21	--	--	--	--	--	106	.14	815,200	--	--	156	7.4
Apr. 21-30	9,711,000	--	--	--	.18	--	1.11	--	--	--	--	--	90	.12	1,165,000	--	--	137	7.4
May 1-10.....	8,767,000	--	--	--	.21	--	1.10	--	--	--	--	--	92	.13	1,140,000	--	--	136	7.3
May 11-20.....	9,360,000	--	--	--	.20	--	1.00	--	--	--	--	--	84	.11	1,030,000	--	--	126	7.3
May 21-31.....	14,460,000	--	--	--	.17	--	.85	--	--	--	--	--	74	.10	1,446,000	--	--	108	7.3
June 1-10.....	15,540,000	--	--	--	.17	--	1.02	--	--	--	--	--	79	.11	1,709,000	--	--	123	7.0
June 11-20.....	12,740,000	--	--	--	.17	--	1.16	--	--	--	--	--	84	.11	1,401,000	--	--	141	7.2
June 21-30.....	9,747,000	--	--	--	.17	--	1.16	--	--	--	--	--	85	.12	1,170,000	--	--	142	7.3
July 1-10.....	7,113,000	11	.90	.35	.18	.04	1.16	.23	.04	.01	.02	.06	87	.12	853,600	12	.2	143	6.8
July 11-20.....	6,054,000	--	--	--	.18	--	1.26	--	--	--	--	--	92	.13	787,000	--	--	153	7.3
July 21-31.....	5,651,000	--	--	--	.20	--	1.26	--	--	--	--	--	93	.13	734,600	--	--	156	7.3
Aug. 1-31	9,757,000	--	--	--	.30	--	1.39	--	--	--	--	--	102	.14	1,366,000	--	--	174	7.4
Sept. 1-30.....	6,867,000	--	--	--	.43	--	1.54	--	--	--	--	--	117	.16	1,099,000	--	--	201	7.6
Total or weighted average.....	176,700,000	--	--	--	0.27	--	1.25	--	--	--	--	--	100	0.14	24,740,000	--	--	159	--

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 1956.
Water temperatures: February 1951 to September 1956.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 70 micromhos Aug. 29; minimum daily, 38 micromhos Dec. 24.
EXTREMES, 1951-56.--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 at 180°C. Records of specific conductance of daily samples available in district office at Portland, Oreg. Records of discharge for water year October 1955 to September 1956 given in WSP 1448.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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. 1-5, 20-25, 1955	228,200	15	0.27	0.12	0.17	0.03	0.46	0.04	0.06	0.00	0.01	0.01	52	0.07	15,970	29	0.4	60	7.0
Oct. 6-8, 15-19, 26-28	356,800	--	--	--	.16	--	.44	--	--	--	--	--	46	.06	21,410	--	--	55	7.0
Oct. 9-14, 29-31	536,300	--	--	--	.13	--	.34	--	--	--	--	--	43	.06	32,180	--	--	47	6.6
Nov. 1-9	648,800	--	--	--	.13	--	.39	--	--	--	--	--	44	.06	38,930	--	--	51	6.6
Nov. 10-20, 24	819,800	--	--	--	.14	--	.39	--	--	--	--	--	50	.07	57,390	--	--	53	6.6
Nov. 21-23, 25-30	1,515,000	--	--	--	.12	--	.36	--	--	--	--	--	48	.07	106,000	--	--	50	6.7
Dec. 1-10	1,538,000	--	--	--	.13	--	.38	--	--	--	--	--	47	.06	92,280	--	--	51	6.5
Dec. 11-15, 17-21	1,887,000	--	--	--	.11	--	.36	--	--	--	--	--	39	.05	94,350	--	--	46	6.8
Dec. 16, 22-31	3,275,000	--	--	--	.11	--	.33	--	--	--	--	--	50	.07	229,200	--	--	45	6.5
Jan. 1-18, 1956	3,504,000	13	.20	.11	.13	.02	.36	.04	.07	.02	.01	.05	46	.06	210,200	28	.3	46	6.7
Jan. 19-31	2,363,000	--	--	--	.13	--	.39	--	--	--	--	--	42	.06	141,800	--	--	47	6.9
Feb. 1-10	490,100	--	--	--	.17	--	.49	--	--	--	--	--	55	.07	34,310	--	--	63	6.7
Feb. 11-20	455,800	--	--	--	.16	--	.43	--	--	--	--	--	52	.07	31,910	--	--	57	6.8
Feb. 21-29	941,800	--	--	--	.15	--	.39	--	--	--	--	--	58	.08	75,340	--	--	52	7.0
Mar. 1-10	1,153,000	--	--	--	.14	--	.38	--	--	--	--	--	52	.07	80,710	--	--	50	6.6
Mar. 11-20	554,000	--	--	--	.15	--	.43	--	--	--	--	--	52	.07	38,780	--	--	56	6.7
Mar. 21-31	975,500	--	--	--	.13	--	.36	--	--	--	--	--	44	.06	58,530	--	--	46	6.7

Apr. 1-10, 1956 ..	647,000	16	.22	.11	.14	.02	.39	.05	.06	.01	.01	.01	47	.06	38,820	29	.3	51	6.5
Apr. 11-20.....	698,600	--	--	--	.13	--	.38	--	--	--	--	--	43	.06	41,920	--	--	47	6.8
Apr. 21-30.....	631,900	--	--	--	.13	--	.36	--	--	--	--	--	42	.06	37,910	--	--	45	6.6
May 1-10	516,300	--	--	--	.13	--	.39	--	--	--	--	--	45	.06	30,980	--	--	47	6.7
May 11-20	637,500	--	--	--	.13	--	.36	--	--	--	--	--	45	.06	38,250	--	--	47	6.6
May 21-31	572,000	--	--	--	.13	--	.38	--	--	--	--	--	44	.06	34,320	--	--	46	6.6
June 1-10.....	454,200	--	--	--	.13	--	.39	--	--	--	--	--	42	.06	27,250	--	--	49	6.5
June 11-20	382,200	--	--	--	.12	--	.39	--	--	--	--	--	40	.05	19,110	--	--	48	6.5
June 21-30	346,700	--	--	--	.14	--	.43	--	--	--	--	--	43	.06	20,800	--	--	51	6.5
July 1-10	222,500	18	.24	.12	.16	.04	.44	.04	.06	.01	.01	.04	46	.06	13,350	29	.4	56	6.4
July 11-20	172,000	--	--	--	.17	--	.46	--	--	--	--	--	48	.07	12,090	--	--	60	6.7
July 21-31	154,100	--	--	--	.19	--	.49	--	--	--	--	--	53	.07	10,790	--	--	62	6.6
Aug. 1-15.....	191,800	--	--	--	.19	--	.49	--	--	--	--	--	53	.07	13,430	--	--	63	6.7
Aug. 16-31.....	194,300	--	--	--	.20	--	.51	--	--	--	--	--	53	.07	13,600	--	--	64	6.7
Sept. 1-16	219,000	--	--	--	.18	--	.46	--	--	--	--	--	49	.07	15,330	--	--	61	6.6
Sept. 17-30	214,900	--	--	--	.17	--	.46	--	--	--	--	--	50	.07	15,040	--	--	59	6.6
Total or weighted average	27,500,000	--	--	--	0.13	--	0.38	--	--	--	--	--	47	0.06	1,650,000	--	--	49	--

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 1956.
Water temperatures: January 1953 to September 1956.
EXTREMES, 1955-56.--Specific conductance: Maximum daily, 206 micromhos Apr. 26; minimum daily, 61 micromhos May 28.
Percent sodium: Maximum, 27 Aug. 1 to Sept. 15; minimum, 20 Feb. 21-29, Mar. 11-20.
EXTREMES, 1953-56.--Specific conductance: Maximum daily, 251 micromhos Feb. 21, 1954; minimum daily, 58 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 at 180°C. Records of specific conductance of daily samples available in district office in Portland, Oreg. Records of discharge for water year October 1955 to September 1956 given in WSP 1448.

Chemical analyses, water year October 1955 to September 1956

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 (micromhos 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, 1955	23,330		0.39	0.24	0.24		0.82	0.04	0.07		0.00	--	78	0.11	2,570	26	0.4	92	7.2
Oct. 11-20	31,600		.42	.25	.26		.85	.05	.09		.00	0.00	84	.11	3,480	26	.4	97	7.1
Oct. 21-31	31,480		.39	.25	.25		.85	.04	.06		.01	--	79	.11	3,460	26	.4	94	7.2
Nov. 1-10	32,770		.41	.28	.25		.85	.05	.08		.00	--	80	.11	3,600	26	.4	94	7.0
Nov. 11-20	62,900		.43	.24	.24		.80	.05	.07		.00	.04	81	.11	6,920	26	.4	92	7.0
Nov. 21-30	93,660		.41	.24	.24		.77	.06	.08		.01	--	86	.12	11,240	26	.4	92	7.0
Dec. 1-10	132,900		.45	.24	.22		.75	.07	.08		.01	--	84	11	14,620	24	.4	94	6.9
Dec. 11-20	204,200		.41	.25	.19		.77	.05	.07		.01	.10	86	.12	24,500	21	.3	90	6.9
Dec. 21-31	595,600		.41	.25	.18		.75	.05	.06		.01	--	84	.11	65,520	21	.3	86	7.0
Jan. 1-4, 10, 12, 28-31, 1956	154,900		.46	.25	.22		.88	.06	.08		.01	--	87	.12	18,590	23	.4	93	6.9
Jan. 5-9, 11,13-16	310,900		.43	.25	.20		.75	.05	.06		.01	.02	89	.12	37,310	23	.3	88	6.9
Jan. 17-27	416,900		.38	.21	.18		.69	.04	.04		.01	--	77	.10	41,690	23	.3	75	--
Feb. 1-10	104,300		.47	.25	.21		.82	.07	.06		.01	--	81	.11	11,470	22	.4	92	6.8
Feb. 11-20	94,040		.45	.29	.20		.82	.07	.06		.01	.01	83	.11	10,340	21	.3	92	7.1
Feb. 21-29	281,200		.48	.29	.20		.85	.07	.07		.02	--	86	.12	33,740	20	.3	97	7.1
Mar. 1-10	151,500		.49	.30	.22		.89	.07	.08		.01	--	89	.12	18,180	21	.4	99	7.6
Mar. 11-20	130,000		.55	.30	.22		.95	.06	.06		.01	.02	93	.13	16,900	20	.3	104	7.5
Mar. 21-31	160,500		.45	.25	.20		.84	.05	.06		.01	--	83	.11	17,660	21	.3	91	7.2

Apr. 1-9, 10,1956	107,900		.49	.30	.22		.92	0.07	.07		.01	--	84	.11	11,870	21	.4	102	7.5
Apr. 10-18, 20 ...	123,300		.41	.25	.20		.80	.06	.06		.00	0.01	75	.10	12,330	22	.3	110	--
Apr. 21-30.....	126,700		.43	.25	.20		.84	.06	.06		.01	--	76	.10	12,670	21	.3	93	7.3
May 1-10	126,700		.34	.21	.18		.69	.04	.06		.00	--	65	.09	11,400	23	.3	75	7.0
May 11-20.....	141,800		.33	.22	.17		.67	.04	.04		.00	--	65	.09	12,760	23	.3	73	7.1
May 21-31	122,500		.29	.18	.15		.61	.04	.04		.00	--	59	.08	9,800	22	.3	68	6.8
June 1-10	100,100		.33	.18	.16		.66	.04	.04		.00	--	61	.08	8,010	22	.3	69	6.9
June 11-20	81,100		.33	.18	.17		.67	.04	.04		.01	--	64	.09	7,300	22	.3	72	7.0
June 21-30	63,250		.34	.23	.18		.70	.04	.05		.01	--	68	.09	5,690	22	.3	77	7.0
July 1-10	45,180		.36	.25	.20		.74	.04	.05		.01	--	74	.10	4,520	24	.4	83	7.1
July 11-20	39,230		.33	.22	.20		.74	.03	.05		.01	--	73	.10	3,920	24	.4	77	7.1
July 21-31.....	36,480		.34	.24	.21		.75	.03	.05		.01	--	77	.10	3,650	25	.4	83	7.1
Aug. 1-15.....	45,680		.37	.21	.23		.79	.03	.04		.00	--	76	.10	4,570	27	.4	85	7.1
Aug. 16-31.....	49,750		.36	.23	.23		.79	.03	.04		.00	.02	76	.10	4,980	27	.4	85	7.3
Sept. 1-15.....	41,570		.39	.24	.26		.85	.04	.06		.00	--	79	.11	4,570	27	.5	90	7.2
Sept. 16-30.....	46,610		.41	.25	.23		.84	.03	.07		.00	.04	78	.11	5,130	24	.4	93	7.3
Total or weighted average	4,311,000		0.42	0.25	0.20		0.77	0.05	0.06		0.01	--	80	0.11	474,200	22	0.3	88	--

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