Quality of Surface Waters for Irrigation Western United States 1958

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 L. B. Leopold, chief hydraulic engineer, and S. K. Love, chief, Quality of Water Branch.

The data were collected and computed under supervision of district supervisors, Quality of Water Branch as follows:

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QUALITY OF SURFACE WATERS FOR IRRIGATION, WESTERN UNITED STATES, 1958

INTRODUCTION

The records of chemical analyses, other physical measurements, and discharge given in this report comprise the eighth annual compilation of data for 81 irrigation network stations in operation west of the Mississippi River.

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

In recognition of this problem the Subcommittee on Hydrology, 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 streams 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, Interagency Committee on Water Resources, 1950]

Irrigation network no.	Geological Survey station ident. no.	Stream and location	Date established	Date discontinued
1	5-1240	Souris River near Westhope, N. Dak.	June 1954	.....
2	6-3300	Missouri River near Williston, N. Dak	12- 5-50	.....
3	-4400	Missouri River at Pierre, S. Dak.	10- 3-50	.....
4	-8070	Missouri River at Nebraska City, Nebr	1- 4-51	.....
5	-2145	Yellowstone River at Billings, Mont	12-15-50	.....
6	-3295	Yellowstone River near Sidney, Mont	1- 3-51	.....
7	-2595	Bighorn River at Thermopolis, Wyo	1- 1-51	1-21-54
	-2590	Wind River below Boysen Dam, Wyo	11-24-53	9-30-54
8	-2947	Bighorn River at Bighorn, Mont	10- 2-50	.....
9	-3085	Tongue River at Miles City, Mont	1- 4-51	.....
10	-3265	Powder River near Locate, Mont.	1- 4-51	.....
11	-3580	Grand River near Wakpala, S. Dak	1-17-51	11-20-53
12	-3610	Moreau River at Promise, S. Dak	.....	.....
13	-4395	Cheyenne River near Eagle Butte, S. Dak.	1-17-51	11-20-53
14	-4520	White River near Oacoma, S. Dak.	.....	.....
15	-4760	James River upstream from diversion, at Huron, S.Dak.[a]	Aug.1956	.....
16	-6420	North Platte River below Alcova Dam, Wyo.	.....	.....
17	-6560	North Platte River below Guernsey Reservoir, Wyo	12- 7-50	.....
18	-7660	Platte River at Brady, Nebr	2-28-51	.....
18a	-7657	Supply Canal (Tri-County Diversion near Maxwell, Nebr.	3- 1-51	.....
19	-7640	South Platte River at Juleburg, Colo	10- 1-45	.....
20	.....	Republican River above Medicine Creek at Cambridge, Nebr.	12-22-50	.....
21	-8535	Republican River near Hardy, Nebr.	Aug.1956	Sept. 1957
22	-8655	Smoky Hill River near Langley, Kans	.....	.....
23	-8680	Saline River near Wilson (or Russell), Kans.	.....	10- 3-52
	-8695	Saline River near Tescott, Kans.	4- 3-50	9-30-53
24	7-1305	Arkansas River below John Martin Reservoir, Colo.	1-10-51	.....
25	-1465	Arkansas River at Arkansas City, Kans	10- 8-51	.....
26	-1525	Arkansas River at Ralston, Okla	1- 1-50	.....
27	-2505	Arkansas River at Van Buren, Ark	10- 1-45	.....
28	-1640	Cimarron River at Mannford, Okla.	10- 1-49	9-30-52
	-1610	Cimarron River at Perkins, Okla.	10- 1-52	.....
29	.....	Canadian River near Tascosa, Tex.	6- 2-48	9-30-53
30	-2450	Canadian River near Whitfield, Okla.	9- 1-46	.....
31	-3316	Red River at Denison Dam, near Dennison, Tex	5- 1-44	.....
32	-3280	Washita River near Tabler, Okla	9-10-46	10- 3-52
33	8- 305	Sabine River near Ruliff, Tex.	10- 1-47	.....
34	- 410	Neches River at Evadale, Tex.	10- 1-47	.....
35	- 665	Trinity River at Romayor, Tex.	9- 1-45	.....
36	.....	San Jacinto River near Huffman, Tex	9- 1-45	4- 5-54
37	-1140	Brazos River at Richmond, Tex	9- 1-45	.....
38	.....	Colorado River at Robert Lee, Tex	10- 1-47	9-30-51
39	-1580	Colorado River at Austin, Tex	10- 1-47	.....
40	-1620	Colorado River at Wharton, Tex.	4-11-44	.....
41	-1765	Guadalupe River at Victoria, Tex.	9- 1-45	.....
42	-2110	Nueces River near Mathis, Tex	10- 1-47	.....
43	-2492	Rio Grande above Culebra Creek, near Lobatos, Colo..	10-11-46	.....
44	-3130	Rio Grande at Otowi Bridge, near San Ildefonso, N. Mex.	10-23-47	.....
45	-3585	Rio Grande at San Marcial, N. Mex.	7- 1-48	Oct. 1954
	-3583	Rio Grande conveyance channel at San Marcial, N. Mex.	Oct. 1954	.....
	-3584	Rio Grande floodway at San Marcial, N. Mex.	Oct. 1954	.....
46	-3610	Rio Grande below Elephant Butte Dam, N. Mex	1933	.....
47	.....	Rio Grande near El Paso, Tex[b]	1930	.....
48	.....	Rio Grande below Old Fort Quitman, Tex[b]	1930	.....
49	.....	Rio Grande at Upper Presidio, Tex[b]	1935	.....
50	.....	Rio Grande at Langtry, Tex[b]	1945	.....
51	.....	Rio Grande at Eagle Pass, Tex[b]	1938	1-30-55
	.....	Rio Grande at Laredo, Tex[b]	7- 1-55	.....
52	.....	Rio Grande at Roma, Tex[b]	1944	1-31-55

Irrigation-Quality Network Stations in Western United States—Continued

Irrigation network no.	Geological Survey station ident. no.	Stream and location	Date established	Date discontinued
52	.....	Rio Grande at Chapeno, Tex[b]	July 1955	9-30-56
	.....	Rio Grande at Falcon Dam-U.S. tailrace[b]	July 1955	.....
53	8-3845	Pecos River below Alamorgordo Dam, N. Mex	6-26-37	.....
54	-3965	Pecos River near Artesia, N. Mex	7- 1-37	.....
55	-4101	Pecos River below Red Bluff Dam, near Orla, Tex	7- 1-37	.....
56	.....	Pecos River near Comstock, Tex[b]	1935	Dec. 1954
	.....	Pecos River near Shumla, Tex[b]	1- 1-55	.....
57	9- 725	Colorado River near Glenwood Springs, Colo	Oct. 1941	.....
58	-1805	Colorado River near Cisco, Utah	Oct. 1928	.....
59	-3800	Colorado River at Lees Ferry, Ariz	10- 1-47	.....
60	-4025	Colorado River near Grand Canyon, Ariz	Oct. 1925	.....
61	-4215	Colorado River below Hoover Dam, Ariz-Nev	Oct. 1939	.....
62	-4280	Colorado River below Parker Dam, Ariz-Calif	.....	.....
63	-5255	Colorado River (Yuma Main Canal) below Colorado River Siphon, at Yuma, Ariz.	Oct. 1942	.....
64	-1525	Gunnison River near Grand Junction, Colo	Oct. 1931	.....
65	-2255	Green River near Linwood, Utah	.....	.....
66	-3150	Green River at Green River, Utah	Oct. 1928	.....
67	-3565	San Juan River near Blanco, N. Mex	10- 1-45	12-31-54
	-3555	San Juan River near Archuleta, N. Mex	12-31-54	.....
68	-3795	San Juan River near Bluff, Utah	Oct. 1929	.....
69	-4012	Little Colorado River at Cameron, Ariz	1-17-51	.....
70	-4740	Gila River at Kelvin, Ariz	12- 1-50	.....
71	-5195	Gila River below Gillespie Dam, Ariz	12- 1-50	.....
72	-5020	Salt River at Stewart Mountain Dam, Ariz	12- 9-50	.....
73	-5100	Verde River below Bartlett Dam, Ariz	12- 9-50	.....
74	-5136	Agua Fria River below Lake Pleasant Dam, Ariz	12- 1-50	.....
75	10-1180	Bear River near Collinston, Utah	.....	.....
76	-1915	Sevier River near Marysville, Utah	.....	.....
77	-2240	Sevier River near Lynndyl, Utah	3-22-51	.....
78	-3225	Humboldt River at Palisade, Nev	.....	.....
79	-3350	Humboldt River near Rye Patch, Nev	12-10-51	.....
80	11-2510	San Joaquin River below Friant Dam, Calif	.....	.....
81	-2540	San Joaquin River near Mendota, Calif	.....	.....
82	-3035	San Joaquin River near Vernalis, Calif	3- 1-51	.....
83	.....	San Joaquin River at Antioch, Calif	.....	.....
84	-3105	Calaveras River (Stockton diverting canal) at Stockton, Calif.	3- 1-51	10- 3-52
	-2535	San Joaquin River near Biola, Calif	1952	.....
85	-3255	Mokelumne River at Woodbridge, Calif	3- 1-51	.....
86	-3780	Sacramento River near Red Bluff, Calif	.....	.....
87	-3910	Sacramento River at Knights Landing, Calif	2-26-51	.....
88	-4250	Feather River at Nicolaus, Calif	2-26-51	.....
89	-4465	American River at Fair Oaks, Calif	5- 1-51	.....
90	12-3995	Columbia River at international boundary	11-15-51	9-30-57
	-3995	Columbia River at Northport, Wash	10- 1-57	.....
91	-4365	Columbia River at Grand Coulee Dam, Wash	11-25-50	.....
92	-3220	Kootenai River at Porthill, Idaho	.....	.....
93	-3985	Pend Oreille River near Netaline Falls, Wash	.....	.....
94	-5105	Yakima River at Kiona, Wash	12-30-52	.....
95	13- 375	Snake River near Heise, Idaho	1- 8-53	.....
96	- 815	Snake River near Minidoka, Idaho	.....	.....
97	-1545	Snake River at King Hill, Idaho	3-27-51	.....
98	-2690	Snake River at Weiser, Idaho	.....	.....
99	-3435	Snake River near Clarkston, Wash	11-14-51	Feb. 1956
	.....	Snake River at Central Ferry, near Pomeroy, Wash	9-28-55	.....
100	.....	Boise River near Arrowrock, Idaho	.....	.....
101	-2125	Boise River at Notus, Idaho	11-21-50	.....
102	14-	Columbia River at Maryhill Ferry, near Rufus, Oreg	12- 1-50	.....
103	-3010	Dischutes River at Moody, near Biggs, Oreg	Dec. 1952	2-15-54
104	-1910	Willamette River at Salem, Oreg	2- 1-51	.....
105	-3615	Rogue River at Grants Pass, Oreg	1- 5-53	.....
106	5- 560	Sheyenne River near Warwick, N. Dak	1- 8-51	.....

Irrigation-Quality Network Stations in Western United States—Continued

No.	Geological Survey station ident. no.	Stream and location	Date established	Date discontinued
		Stations added by Subcommittee, October 2, 1952		
107	6-6875	North Platte River at Lewellen, Nebr.	.....	.....
108	-8055	Platte River near Louisville, Nebr.	.....	.....
109	9-4150	Virgin River at Littlefield, Ariz.	July 1949	.....

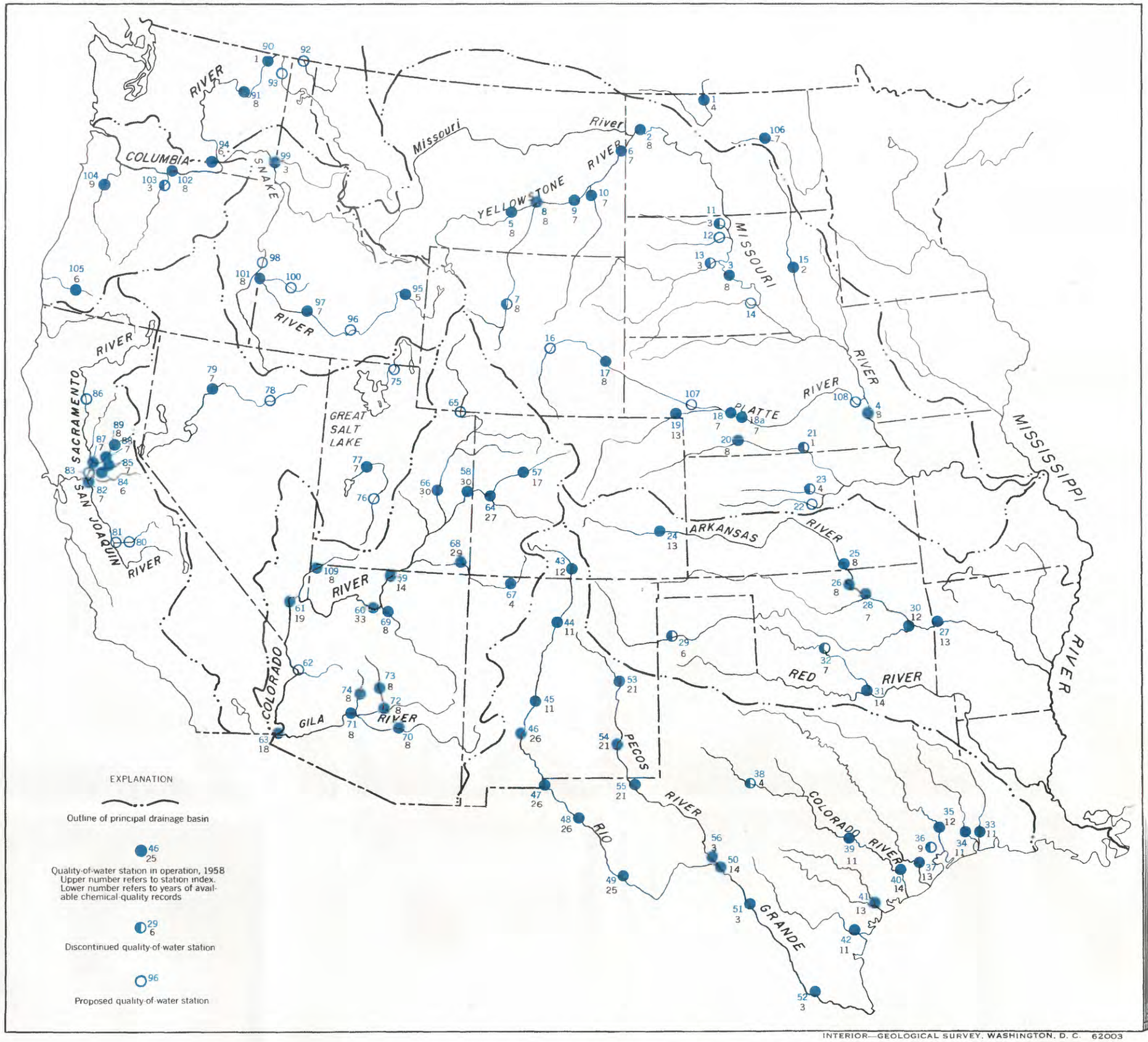
[a]Formerly published as James River at Huron, S. Dak.
[b]Operated by International Boundary and Water Commission.

responsibility of the Geological Survey. The scope of the chemical analyses would provide for the calculation of the salt burden of stream 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 streamflow gaging stations. The most nearly up-to-date list of gaging stations currently operated by the U.S. Geological Survey (which comprises all but a small percentage of all gaging stations) will be found in the most recently published Geological Survey water-supply papers for the areas involved.
4. Consideration should be given to the location of irrigation development areas that are now affecting or are likely to affect the chemical quality of the river water.
5. Only those stations should be proposed that are likely to reflect important changes in chemical quality over a period of years. Stations operated for relatively short period (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 81 stations in operation in 1958 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.



INTERIOR—GEOLOGICAL SURVEY, WASHINGTON, D. C. 62003

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

To facilitate identification, each Geological Survey gaging station and sampling station has been assigned a station number. The station numbers were assigned according to Geological Survey practice in reporting records of streamflow: Stations on tributary streams are listed between stations on the main stem in the order in which those tributaries enter the main stem. However, in this report the numbers will not all appear in increasing numerical order because all the main stem stations on a river are reported before listing the stations on the tributaries.

The complete number for each station has eight digits, but the station number as shown in this report just to the left of the station name consists of only the digits essential for identification. For example, for a station with the complete number 04-0100.00, this station number shown in this report is 4-100.

During the 1958 water year, two stations were relocated. James River at Huron, S. Dak., was relocated to James River upstream from diversion, at Huron, S. Dak., and Columbia River at international boundary was relocated to Columbia River at Northport, Wash. The Republican River near Hardy, Nebr., was discontinued.

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 1957–58, 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, Falcon Dam U.S. tailrace 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 27 and 28 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 1957 and 1958. Analyses for seven Rio Grande main stem stations and for the Pecos River near Shumla, Tex., were obtained from the U. S. Salinity Laboratory, Riverside, Calif.

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

COLLECTION OF SAMPLES

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

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

EXAMINATION OF SAMPLES

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

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

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

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/1) and milliequivalents per liter (meq/1). 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 22 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 of 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 20.

DISCUSSION OF RESULTS

Discharge data and dissolved-solids loads for stations operated in 1958 are summarized in the following table.

HUDSON BAY AND UPPER MISSISSIPPI RIVER BASINS

Red River of the North basin.— Precipitation in the Red River of the North basin in North Dakota was less than the long-term mean. Runoff was in the median range during the fall, above normal during the winter because of unusually mild temperatures, and greatly deficient during late spring and summer in much of the basin. Runoff for Sheyenne River at Warwick was 17,100 acre-feet compared with a 9-year average of 45,460 acre-feet, and runoff for Souris River near Westhope was 27,810 acre-feet compared with a 23-year average of 158,400 acre-feet. Although the runoff was about 7 percent less at Warwick and about 50 percent less at Westhope than in 1957, the dissolved-solids content increased by about 20 percent at both stations. The dissolved-solids content at Warwick was the highest since 1953.

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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.	17,100	0.69
Souris River near Westhope, N. Dak.	27,810	.95
Missouri River main stem		
Missouri River near Williston, N. Dak.	12,160,000	.60
Missouri River at Pierre, S. Dak.	12,590,000	.60
Missouri River at Nebraska City, Nebr.	20,130,000	.58
Yellowstone River basin		
Yellowstone River at Billings, Mont.	4,327,000	.27
Yellowstone River near Sidney, Mont.	7,380,000	.61
Bighorn River at Bighorn, Mont.	2,813,000	.86
Tongue River at Miles City, Mont.	194,300	.64
Powder River near Locate, Mont.	274,200	1.56
James River basin		
James River upstream from diversion, at Huron, S. Dak.	77,140	.91
Platte River basin		
North Platte River below Guernsey Reservoir, Wyo.	1,049,000	.48
Platte River at Brady, Nebr.	367,500	.75
Supply Canal (Tri-County Diversion) near Maxwell, Nebr.	1,032,000	.93
South Platte River at Julesburg, Colo.	657,500	1.44
Kansas River basin		
Republican River above Medicine Creek, at Cambridge, Nebr.	260,400	.44
Arkansas River basin		
Arkansas River below John Martin Reservoir, Colo.	191,500	1.54
Arkansas River at Arkansas City, Kans.	2,318,000	.96
Arkansas River at Ralston, Okla.	4,403,000	1.01
Cimarron River at Perkins, Okla.	687,600	4.80
Canadian River near Whitefield, Okla.	4,478,700	.71
Arkansas River at Van Buren, Ark.	25,641,700	.61
Red River basin		
Red River at Denison Dam, near Denison, Tex.	3,128,000	1.14
Sabine River basin		
Sabine River near Ruliff, Tex.	8,900,000	.12
Neches River basin		
Neches River at Evadale, Tex.	6,128,000	.11
Trinity River at Romayor, Tex.	8,467,000	.29
Brazos River basin		
Brazos River at Richmond, Tex.	8,590,000	.41
Colorado River basin		
Colorado River at Austin, Tex.	3,151,000	.29
Colorado River at Wharton, Tex.	4,437,000	.29
Guadalupe River basin		
Guadalupe River at Victoria, Tex.	2,564,000	.36
Nueces River basin		
Nueces River near Mathis, Tex.	1,113,000	.32
Rio Grande basin		
Rio Grande above Culebra Creek, near Lobatos, Colo.	409,400	.26
Rio Grande at Otowi Bridge, near San Ildefonso, N. Mex.	1,526,000	.30
Rio Grande conveyance channel at San Marcial, N. Mex.	44,980	.94
Rio Grande floodway at San Marcial, N. Mex.	1,346,000	.56
Rio Grande below Elephant Butte Dam, N. Mex.	781,700	.71
Rio Grande near El Paso, Tex.	365,226	.94
Rio Grande below Fort Quitman, Tex.	.....	.....
Rio Grande at Upper Presido, Tex.	.....	.....
Rio Grande at Langtry, Tex.	951,600	.72
Rio Grande at Laredo, Tex.	2,496,970	.61
Rio Grande at Falcon Dam - U.S. tailrace.	1,832,300	.60
Pecos River below Alamogordo Dam, N. Mex.	218,000	1.01
Pecos River near Artesia, N. Mex.	228,600	2.53
Pecos River below Red Bluff Dam near Orla, Tex.	52,860	8.02
Pecos River near Shumla, Tex.	266,700	1.87
Colorado River main stem		
Colorado River near Glenwood Springs, Colo.	1,723,000	.36
Colorado River near Cisco, Utah.	6,354,000	.75
Colorado River at Lees Ferry, Ariz.	14,220,000	.73
Colorado River near Grand Canyon, Ariz.	14,550,000	.78
Colorado River below Hoover Dam, Ariz.-Nev.	12,270,000	.90

Summary of water discharge, and tonnages of dissolved solids

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..	323,700	1.02
Gunnison River basin		
Gunnison River near Grand Junction, Colo	2,383,000	.72
Green River basin		
Green River at Green River, Utah	4,466,000	.59
San Juan River basin		
San Juan River near Archuleta, N. Mex	1,455,000	.23
San Juan River near Bluff, Utah	2,551,000	.50
Little Colorado River basin		
Little Colorado River at Cameron, Ariz		
Virgin River basin		
Virgin River at Littlefield, Ariz	294,600	1.71
Gila River basin		
Gila River at Kelvin, Ariz	313,500	.75
Gila River below Gillespie Dam, Ariz	25,210	4.98
Salt River below Stewart Mountain Dam, Ariz	283,800	1.07
Verde River below Bartlett Dam, Ariz	421,900	.33
Agua Fria River below Lake Pleasant Dam, Ariz	15,340	.34
Sevier Lake basin		
Sevier River near Lynndyl, Utah	150,800	1.77
Humboldt River basin		
Humboldt River near Rye Patch, Nev	135,500	.67
San Joaquin River basin		
San Joaquin River near Biola, Calif	1,165,000	.07
San Joaquin River near Vernalis, Calif	6,056,000	.21
Mokelumne River at Woodbridge, Calif	804,400	.06
Sacramento River basin		
Sacramento River at Knights Landing, Calif		
Feather River at Nicolaus, Calif	10,030,000	.10
American River at Fair Oaks, Calif	2,088,412	.07
Columbia River main stem		
Columbia River at Northport, Wash	65,870,000	.11
Columbia River at Grand Coulee Dam, Wash	75,621,000	.11
Yakima River basin		
Yakima River at Kiona, Wash	2,140,000	.21
Snake River main stem		
Snake River near Heise, Idaho	4,349,000	.30
Snake River at King Hill, Idaho	7,074,500	.44
Snake River at Central Ferry, near Pomeroy, Wash	26,640,000	.18
Boise River basin		
Boise River at Notus, Idaho	1,285,000	.18
Columbia River main stem		
Columbia River at Maryhill Ferry, near Rufus, Oreg	130,800,000	.14
Willamette River basin		
Willamette River at Salem, Oreg	18,790,000	.07
Rogue River basin		
Rogue River at Grants Pass, Oreg	3,568,000	.11

MISSOURI RIVER BASIN

Missouri River main stem.—The Missouri River is regulated by the following dams: Canyon Ferry and Fort Peck, upstream from Williston, N. Dak.; Garrison and Oahe, between Williston, N. Dak., and Pierre, S. Dak.; and Fort Randall and Gavins Point, between Pierre, S. Dak., and Nebraska City, Nebr. Closure of the Oahe Dam was made in August 1958. The Missouri River will be virtually one large reservoir extending from Williston, N. Dak., to Yankton, S. Dak., after completion of Big Bend, a dam that will be built between the Oahe and Fort Randall Dams in South Dakota.

The total amount of water in storage in the main-stem reservoirs on Sept. 30, 1958, was slightly more than 23,000,000 acre-feet, the most that has ever been in storage and which is an increase of about 1,500,000 acre-feet since Sept. 30, 1957. Eventually, some of the water stored in the reservoirs is to be used for irrigation; but currently, the water from Canyon Ferry Reservoir is used partly for irrigation, and the water from the other reservoirs is used for electric power generation, flood control, pollution control, municipal supply, navigation, and recreation.

In general, precipitation was more than long-term mean in the basin downstream from Yankton, S. Dak.; but it was less than long-term mean in the basin upstream from Yankton, and drought conditions prevailed in parts of eastern Montana and western North Dakota. Because of the tremendous amount of storage and control upstream from Yankton, local variations in climatic conditions only slightly affect the chemical quality of the water.

The average chemical quality, weighted with discharge, for the 1958 water year was about the same as that for previous years. For example, the average dissolved-solids content at Williston was 439 ppm for 1958 compared with 416 ppm for the 8-year period 1951–58; at Pierre, 44 ppm compared with 440 ppm; at Nebraska City, 425 ppm compared with 431 ppm.

Fluctuations in water quality were apparent at all three sites on the main stem, but those at Nebraska City were relatively small; those at Williston are due to variations in flow from Fort Peck Reservoir and from the Yellowstone River, and those at Pierre are due to variations in inflow from the tributaries between Garrison Reservoir and Pierre. Closure of Oahe Dam will probably cause the flow at Pierre to be fairly uniform in quality.

Yellowstone River Basin.—Runoff for the whole basin was less than in 1956 and 1957, and also less than the long-term average. Likewise runoff from the basin above Billings, Mont., was less than in 1956 and 1957, and also less than the long-term average.

The dissolved-solids load at Sidney, Mont., was less than the loads in 1956 and 1957, but higher than the 1955 load. The discharge during the 1956 and 1957 years was comparatively high. The decrease in load in 1958 was caused primarily by a decrease in load carried by the Yellowstone River and its tributaries above Billings, and by a decrease in load carried by the Bighorn River at Bighorn, Mont. Weighted-averages of the chemical constituents were greater during 1958 than in 1957 at all stations and also greater than those recorded in 1956, with the single exception of the Bighorn River at Bighorn. Twenty-six percent of the dissolved-solids load at Sidney was contributed by the Yellowstone River

above Billings, 54 percent by the Bighorn River, 3 percent by the Tongue River, and 9 percent by the Powder River. Eight percent of the dissolved-solids load at Sidney is assumed to have been contributed by minor tributaries and the Yellowstone Valley between Billings and Sidney.

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

There were no significant changes in impoundment or diversion, and no variations in methodology from that proposed for irrigation network stations.

James River basin.—The James River has a low gradient and becomes a series of pools during periods of low flow. Many small dams and diversions along the river impound water for public supply.

Runoff for James River at Huron, S. Dak., was only 77,140 acre-feet compared with a 16-year average of 166,500 acre-feet. The dissolved-solids content increases significantly during the winter.

Platte River basin.—Since the completion of Glendo Reservoir near Glendo, Wyo., in October, six reservoirs are in operation on the main stem of the North Platte River. Glendo Reservoir was filled for the first time with the water released from Pathfinder Reservoir near Alcova, Wyo., which was emptied to allow work to proceed on a new penstock and powerplant. For North Platte River below Guernsey Reservoir, Wyo., runoff was the highest since 1953, and the annual average dissolved-solids content was the lowest for the 7 years of record.

Streamflow was exceptionally high in the South Platte River in Colorado, mainly because of full reservoirs and low irrigation demands. The runoff for South Platte River at Julesburg increased 75 percent over that of 1957. It was the highest runoff of any year for which water-quality records have been obtained. The weighted averages increased by about one-tenth over those of 1957 but were considerably lower than those of other years of record.

For Platte River at Brady, Nebr., and Supply Canal near Maxwell, Nebr., which are below the confluence of the North and South Platte Rivers, runoff was the highest since 1952, and dissolved-solids content was the highest on record. The high dissolved-solids content was due to the fact that during 1958 the amount of inflow from the South Platte River was proportionately greater than that from the North Platte River, and water from the South Platte River is generally much more mineralized than water from the North Platte River.

Kansas River basin.—Precipitation in the Kansas River basin, especially during late winter and summer, was substantially above the long-term mean. However, control by irrigation dams minimized flooding.

Controls, upstream from the station Republican River above Medicine Creek at Cambridge, Nebr., include Trenton Dam (Swanson Lake), Nebr., on the Republican River, Bonny Reservoir, Colo., on the South Fork Republican River, and Enders Reservoir, Nebr., on Frenchman Creek. Runoff for this station was only 0.8 percent higher than in 1957, but it was the highest since 1951; reservoirs were full from the previous year and irrigation demands were low. The dissolved-solids content increased by about 10 percent over that of 1957 but was almost identical to the 8-year average of 322 ppm.

Water-quality observations for Republican River near Hardy, Nebr., were discontinued Sept. 30, 1957.

LOWER MISSISSIPPI RIVER BASIN

Arkansas River basin.—Discharge at the Arkansas City, Kans., station was slightly greater in 1958 than in 1957. However, discharges at stations in Oklahoma were considerably less for the 1958 water year. Annual discharges were about one-half the 1957 values at the Whitefield station on the Canadian River and the Tulsa station on the Arkansas River. The greatest percent decrease in discharge occurred at the Perkins station on the Cimarron River, where runoff was 2,498,000 acre-feet in 1957 but only 687,600 acre-feet in 1958.

The decrease in runoff in the Arkansas River basin in Oklahoma increased the weighted average of dissolved-solids content at the sampling stations. The greatest increase occurred in the Cimarron River at Perkins, Okla., where the dissolved solids increased from 1,430 ppm in 1957 to 3,550 ppm in 1958. At Ralston, Okla., the flow was about two million acre-feet less than in 1957 and dissolved solids increased from 573 ppm to 741 ppm. Although the highly mineralized water from the Salt Fork of the Arkansas River normally accounts for a considerable part of this increase, the major reason was the high flow and abnormally high dissolved-solids content at the Arkansas City station.

The most unusual change in dissolved-solids content occurred at the Arkansas City station in Kansas, where this content increased from 483 ppm in 1957 to 707 ppm in 1958 but the amount

of runoff remained about the same. The increase in dissolved-solids content during 1958 was due to the different runoff characteristics above the station. During 1957, intense rains produced a peak discharge of 73,100 cfs as compared to a peak discharge of 22,100 cfs during 1958. Sixty percent of the runoff in 1957 occurred during the two high-flow months but only 38 percent of the annual runoff occurred during the two high-flow months of 1958. This greater percentage of dilute runoff during 1957 resulted in the lower dissolved-solids content for that year although the annual flow, for both years were about the same.

The percent sodium and the sodium-adsorption ratios in the Arkansas River at Arkansas City, Kans., and in the Canadian River at Whitefield, Okla., changed little from 1957 to 1958. At the Perkins station on the Cimarron River, the percent sodium increased from 75 in 1957 to 83 in 1958. At the Ralston station on the Arkansas River the percent sodium dropped from 63 in 1957 to 58 in 1958 because of a considerable decrease of saline water contributed to the Arkansas River by the Salt Fork Arkansas River.

Runoff at Arkansas River at Van Buren, Ark., during the 1958 water year was 25.6 million acre-feet, compared to 39.9 million acre-feet in 1957, 4.3 million acre-feet in 1956, and 9.3 million acre-feet in 1955. The concentrations of all the major constituents show a slight increase over those of the previous year. Dissolved solids increased from 356 ppm to 447 ppm and the percent sodium increased from 52 to 54. The sodium-adsorption ratio increased from 2.5 to 2.9.

Red River basin.— Discharge for the Red River at Denison Dam, near Denison, Tex., during the 1958 water year was 81 percent of the long-time average, but was less than half the discharge for 1957. Average dissolved-solids content was the same both years.

WESTERN GULF OF MEXICO BASINS

In the Western Gulf of Mexico basins from the Sabine River to the Nueces River, the runoff for 1958 was above average for the second successive water year, and the average dissolved-solids content remained about the same for all stations as reported in 1957.

Rio Grande basin.—A trend toward higher annual runoffs improved the chemical quality of surface water in New Mexico. This is particularly true in the Pecos River basin where the weighted average of dissolved solids was lower in 1958 than in the several preceding years. Pecos River below Alamogordo Dam, N. Mex.,

and Pecos River near Artesia, N. Mex., are sensitive indicators of this change. The same trend was noted for the main channel stations of the Rio Grande; however, it is not so apparent because different origins of runoff as well as artificial controls have acted to partially obscure this trend.

Runoff at the station, Pecos River below Red Bluff Dam, near Orla, Tex., was only 28 percent of the 21-year average but was 20 percent greater than in 1957. Weighted average dissolved-solids content decreased from 10.9 tons per acre-foot in 1957 to 8.02 tons per acre-foot in 1958. Storage in Red Bluff Reservoir increased during the water year from 14,000 acre-feet to 72,000 acre-feet.

COLORADO RIVER BASIN

Colorado River main stem.— There was an increase in the dissolved-solids content for the stations at Glenwood Springs, Colo., and Cisco, Utah. This change may be attributed to a slight decrease is runoff as compared to the preceding year. There was no significant change in chemical character of the water at either station.

The quality of the water at the station below Hoover Dam, Ariz-Nev., was relatively constant due to the mixing effect of Lake Mead. However, there was a 14 percent decrease in dissolved-solids content for this station. This was probably the result of increased storage in Lake Mead during the preceding year.

Diversions and return flows at and below Imperial Dam.— There has been a trend toward better quality of water in the Colorado River basin. This can be seen best by comparing the weighted-average value for dissolved solids at Yuma Main Canal at Yuma, Ariz., with figures for past years.

Green River basin.— Discharge for the Green River at Green River, Utah decreased by 21 percent as compared with last year's flow. Total loads for this station decreased only 6 percent since the decrease in discharge was accompanied by a 16 percent increase in dissolved-solids content. Percent sodium remained relatively unchanged at this station.

San Juan River basin.— There was no significant change in discharge or dissolved-solids content at San Juan River near Bluff, Utah. The weighted-average analysis shows that the quality of the water continued to be high in calcium and sulfate content. During periods of low flow there is a considerable increase in sodium content.

Virgin River basin.— Percentage composition of the water remained unchanged for the Virgin River at Littlefield, Ariz. Although the dissolved-solids content decreased 40 percent, the total load past the Littlefield station increased 77 percent. The increase in total load was the result principally of nearly a threefold increase in runoff at this station.

Gila River basin.— Runoff in the Gila River basin was considerably higher than the previous year. A better quality of water might have been expected, but such a prospect was only partially realized due largely to the rigorous control of runoff. Furthermore, the quality at certain stations such as the Gila River at Kelvin, Ariz., is affected by complex ground-water factors as well as to river management of upstream storage.

THE GREAT BASIN

Sevier Lake basin.— Flow past the Sevier River station near Lynndyl, Utah increased 90 percent and was accompanied by a corresponding increase in total loads of 88 percent. The dissolved-solids content and percentage composition of the water at this station remained unchanged, probably as the result of storage at Sevier Bridge Reservoir.

Humbolt River basin.— The percentage composition of the weighted-average analysis for the Humboldt River near Rye Patch, Nev., remained unchanged. A 5 percent decrease in dissolved-solids content was accompanied by an increase in discharge of 10 percent and an increase in total loads of 6 percent.

PACIFIC SLOPE BASINS IN CALIFORNIA

San Joaquin River basin.—Flow in the basin was considerably greater than that of the preceding year and approximately 175 percent of a long-term average for the basin. The chemical quality of the outflow showed a marked improvement in the 1957 water year. The weighted-dissolved-solids load for the San Joaquin River near Vernalis, Calif., decreased from 0.42 to 0.21 ton per acre-foot. Average specific conductance at this station was 52 percent less than that of the previous year.

Because of impoundment of water behind Friant Dam and extensive irrigation in the San Joaquin Valley, the San Joaquin River channel at times carries mainly irrigation return water of poor chemical quality.

Sacramento River basin.— Flow in the basin was about 100 percent greater than that of the 1957 water year, although the American River at Fair Oaks, Calif., showed little change in runoff because of the operation of Folsom Reservoir just upstream from the station. There was little change in chemical quality of the American River at Fair Oaks from that of the preceding year.

Release of water from Shasta Reservoir for salinity control in the delta area and large quantities of dilute waters from the Feather and American Rivers help to maintain better chemical quality in the Sacramento River than that which prevails in the San Joaquin River.

PACIFIC SLOPE BASINS IN WASHINGTON AND UPPER COLUMBIA RIVER BASIN

Columbia River main stem.— The dissolved-solids content in tons per acre-foot, for Columbia River at Northport, Wash., was the same as that reported for the last five years for the station at international boundary. At Grand Coulee Dam, further downstream, the tons per acre-foot remained the same as the previous two years.

Yakima River basin.— The tons per acre-foot value continued to increase as it has in the previous years. Streamflow decreased 40 percent over the previous year, which in turn was 40 percent less than that for 1956.

SNAKE RIVER BASIN

Snake River main stem.— There were no significant changes in chemical data reported during the 1958 water year for the Snake River near Heise, Idaho. Values for total-salt load and tons per acre-foot of the Snake River at King Hill, Idaho were similar to previous years with little or no variation in percent sodium and sodium-adsorption ratio. Downstream at Central Ferry, percent sodium, sodium-adsorption-ratio, and tons per acre-foot were identical to last year.

Boise River basin.— Decreases in total-salt content and tons per acre-foot accompanied the decrease in discharge, however percent sodium and sodium-adsorption-ratio remained the same as last year.

PACIFIC SLOPE BASINS IN OREGON AND LOWER COLUMBIA RIVER BASIN

Columbia River main stem.—Total-salt content decreased 10 percent as compared to the previous year, however the tons per acre-foot remained the same.

Willamette River basin.—A slight increase in total-salt content was observed at the Salem station but due to an increase in discharge, the tons per acre-foot values remained the same as last year.

Rouge River basin.— Increase in discharge and tons per acre-foot raised the total-salt load 30 percent over the 1957 value.

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 resume 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 practics, largely determine the effectiveness of irrigation activity.

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PART 5. HUDSON BAY AND UPPER MISSISSIPPI RIVER BASINS

RED RIVER OF THE NORTH BASIN

5-560. 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 1958.
Water temperatures: January 1951 to September 1958.
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 1,510 micromhos Mar. 4; minimum daily, 440 micromhos Apr. 8.
Percent sodium: Maximum, 51 July 8-17; minimum, 25 Aug. 25 to Sept. 30.
EXTREMES, 1951-58.--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 at 180°C. Records of specific conductance of daily samples available in district office at Lincoln, Nebr. Records of discharge for water year October 1957 to September 1958 given in WSP 1558.

Chemical analyses, water year October 1957 to September 1958

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. 1-18, 1957	1,200	--	5.40		2.48	--	5.85	--	--	--	--	--	465	0.63	756	31	1.5	716	8.0
Oct. 19-Nov. 19	1,490	--	6.36		3.18	--	6.79	--	--	--	--	--	548	.75	1,120	33	1.8	855	7.7
Nov. 20-Dec. 17	662	--	6.96		3.57	--	7.38	--	--	--	--	--	604	.82	543	34	1.9	941	8.0
Dec. 18-Jan. 13, 1958	454	27	4.34	3.54	4.74	0.18	8.52	3.56	0.68	0.02	0.01	0.19	736	1.00	454	37	2.4	1,110	8.1
Jan. 14-31	367	--	5.04	4.40	6.53	--	10.26	--	--	--	--	--	902	1.23	451	41	3.0	1,360	7.5
Feb. 1-17	274	--	9.20		5.79	--	10.18	--	--	--	--	--	846	1.15	315	39	2.7	1,280	7.4
Feb. 18-23	50	--	7.20		3.57	--	7.64	--	--	--	--	--	612	.83	42	33	1.9	943	7.6
Feb. 24-Mar. 6.	1,010	--	7.72		6.35	--	9.18	--	--	--	--	--	842	1.15	1,160	45	3.2	1,250	7.7
Mar. 7-12	401	16	2.40	2.12	4.00	.31	5.54	2.54	.48	.01	.07	.19	524	.71	285	45	2.7	804	7.9
Mar. 13-Apr. 3.	1,670	--	3.46		2.39	--	4.02	--	--	--	--	--	354	.48	802	41	1.8	565	7.3

Apr. 4-12, 1958.	1,950	--	2.74	1.91	--	3.16	--	--	--	--	--	287	0.39	761	41	1.6	462	7.1
Apr. 13-15	305	--	3.54	2.91	--	4.33	--	--	--	--	--	391	.53	162	45	2.2	614	7.6
Apr. 16-May 14.	1,540	--	4.52	3.57	--	5.56	--	--	--	--	--	479	.65	1,000	44	2.4	755	7.5
May 15-June 9 ..	1,020	--	5.64	3.96	--	6.74	--	--	--	--	--	538	.73	745	41	2.4	850	7.7
June 10-30	555	--	5.62	3.31	--	6.67	--	--	--	--	--	507	.69	383	37	2.0	798	7.6
July 1-7.....	1,430	19	2.25 | 2.15	2.31	0.15	5.02	1.33	0.39	0.02	0.03	0.15	394	.54	772	34	1.6	629	7.5
July 8-17.....	1,570	--	5.38	5.52	--	6.98	--	--	--	--	--	647	.88	1,380	51	3.4	970	7.8
July 18-Aug. 3..	861	--	4.28	3.70	--	5.38	--	--	--	--	--	483	.66	568	46	2.5	750	7.1
Aug. 4-24	187	--	4.32	3.05	--	5.31	--	--	--	--	--	435	.59	110	41	2.1	689	7.1
Aug. 25-Sept. 30	117	23	2.59 | 1.61	1.44	.12	4.29	1.12	.18	.01	.03	.14	327	.44	51	25	1.0	523	7.3
Total or weighted average[a]	17,100	--	5.14	3.52	--	5.95	--	--	--	--	--	509	0.69	11,860	41	2.2	789	--

a Represents 100 percent of runoff for water year October 1957 to September 1958.

RED RIVER OF THE NORTH BASIN--Continued

5-1240. 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 1958.
Water temperatures (revised): October 1954 to September 1955, October 1956 to September 1958.
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 1,960 micromhos Mar. 5; minimum daily, 288 micromhos Mar. 26.
Percent sodium: Maximum, 47 Aug. 1 to Sept. 30; minimum, 36 Mar. 26 to Apr. 4, Apr. 26 to June 28.
EXTREMES, 1954-58.--Specific conductance: Maximum daily, (1956-58), 1,960 micromhos Mar. 5, 1958; minimum daily (1954-55, 1956-58), 232 micromhos Apr. 18, 1957.
Percent sodium: Maximum, 48 Sept. 10-26, 1954; minimum, 29 Mar. 26 to Apr. 12, 1957.
REMARKS.--Values reported for dissolved solids are residues at 180°C. Records of specific conductance of daily samples available in district office at Lincoln, Nebr. Records of discharge for water year October 1957 to September 1958 given in WSP 1558.

Chemical analyses, water year October 1957 to September 1958

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. 1-30, 1957 ..	1,180	--	2.79	4.01	5.22	--	7.06	4.04	0.79	--	0.13	0.19	726	0.99	1,170	43	2.8	1,080	7.5
Oct. 31-Nov.30 ..	7,200	--	3.24	4.28	5.13	--	6.85	5.18	.79	--	.04	.17	767	1.04	7,490	40	2.6	1,140	7.8
Dec. 1-27.....	3,030	4.4	3.79	5.25	5.66	0.38	8.20	5.64	.93	0.03	.02	.17	871	1.18	3,580	38	2.7	1,290	7.9
Dec. 28-Jan. 23, 1958	877	--	4.54	6.02	7.40	--	10.87	6.00	1.61	--	.03	.29	1,060	1.44	1,260	40	3.2	1,570	8.0
Jan. 24-Feb. 9 ...	696	4.5	5.34	6.70	8.09	--	11.69	6.97	1.66	--	.04	.28	1,180	1.60	1,110	40	3.3	1,720	7.9
Feb. 10-28	411	9.1	6.44	6.92	8.27	--	12.78	7.12	1.72	--	.11	.28	1,280	1.74	715	38	3.2	1,840	7.9
Mar. 1-5	3.8	--	5.99	7.37	8.27	--	12.92	7.33	1.80	--	.08	.25	1,280	1.74	7	38	3.2	1,830	8.1
Mar. 26-Apr. 4 ..	31	--	1.65	1.95	2.13	--	3.52	1.85	.45	--	.07	.10	358	.49	15	36	1.6	573	7.4
Apr. 5-25	274	--	1.80	2.36	2.74	--	4.05	2.29	.56	--	.07	.12	421	.57	156	39	1.9	670	7.6
Apr. 26-May 13 ..	1,190	--	1.95	2.51	2.61	--	4.10	2.96	.48	--	.05	.12	434	.59	702	36	1.7	685	7.7

May 14-31, 1958 .	2,760	--	2.20	2.86	2.91	--	4.62	2.89	0.56	--	0.03	0.14	495	0.67	1,850	36	1.8	768	7.4
June 1-28.....	4,970	11	2.20	3.16	3.26	0.33	4.87	3.39	.59	0.02	.11	.18	553	.75	3,730	36	2.0	831	7.3
June 29-July 31...	2,150	--	1.45	2.99	3.83	--	4.03	3.54	.68	--	--	.21	561	.76	1,630	46	2.6	819	6.8
Aug. 1-31.....	1,770	--	1.95	3.47	4.74	--	5.38	3.96	.85	--	.31	.23	663	.90	1,590	47	2.9	975	7.1
Sept. 1-30	1,270	26	2.25	3.67	5.57	.43	6.38	4.23	.96	.03	.26	.21	745	1.01	1,280	47	3.2	1,080	7.1
Total or weighted average[a].....	27,810	--	2.79	3.91	4.61	--	6.28	4.35	0.79	--	0.09	0.18	697	0.95	26,290	40	2.5	1,040	--

a Includes estimates for missing data. Represents 100 percent of runoff for water year October 1957 to September 1958.

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PART 6. MISSOURI RIVER BASIN

MISSOURI RIVER MAIN STEM

6A-3300. 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 1958.
Water temperatures: May 1951 to September 1958.
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 957 micromhos Jan. 10, 12; minimum daily, 337 micromhos June 1.
Percent sodium: Maximum, 38 May 1-11; minimum, 25 May 28 to June 5.
EXTREMES, 1950-58.--Specific conductance: Maximum daily, 957 micromhos Jan. 10, 12, 1958; minimum daily, 317 micromhos June 17, 1957.
Percent sodium: Maximum, 43 Apr. 25-30, 1957; minimum, 24 May 27 to June 2, 1956.
REMARKS.--Values reported for dissolved solids are residues 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 1957 to September 1958 given in WSP 1559.

Chemical analyses, water year October 1957 to September 1958

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, 1957 ..	886,800	--	4.90		2.74	--	3.28	--	--	--	--	--	483	0.66	585,300	36	1.8	732	8.0
Nov. 1-30	859,000	--	5.08		2.96	--	3.47	--	--	--	--	--	511	.69	592,700	37	1.9	762	7.8
Dec. 1-27	657,500	--	5.26		2.83	--	3.51	--	--	--	--	--	504	.69	453,700	35	1.7	760	7.9
Dec. 28-Jan. 13, 1958.....	355,000	19	3.64	2.44	3.22	0.13	4.02	5.18	0.37	0.03	0.03	0.19	599	.81	287,600	34	1.8	876	7.7
Jan. 14-Feb. 12..	726,900	--	5.28		2.78	--	3.44	--	--	--	--	--	502	.68	494,300	34	1.7	764	7.6
Feb. 13-22.....	194,000	--	5.48		2.91	--	3.67	--	--	--	--	--	520	.71	137,700	35	1.8	785	7.7
Feb. 23-Mar. 27 .	964,400	9.4	3.09	1.87	2.74	.10	3.20	4.27	.34	.03	.01	.15	492	.67	646,100	35	1.7	730	7.9
Mar. 28-Apr. 30 .	1,175,000	--	4.82		2.70	--	3.15	--	--	--	--	--	486	.66	775,500	36	1.7	738	7.0
May 1-11	293,800	--	4.92		2.96	--	3.16	--	--	--	--	--	497	.68	199,800	38	1.9	746	7.3
May 12-22	396,900	12	2.45	1.49	1.91	.09	2.75	2.98	.22	.02	.02	.13	375	.51	202,400	32	1.4	570	7.4

May 23-27, 1958 .	312,000	--	3.20		1.31	--	2.43	--	--	--	--	--	278	0.38	118,600	29	1.0	440	7.3
May 28-June 5....	717,000	24	1.95	0.83	.96	0.07	2.23	1.44	0.07	0.02	0.01	0.09	240	.33	236,600	25	.8	365	7.0
June 6-16.....	784,500	--	3.16		1.61	--	2.38	--	--	--	--	--	302	.41	321,600	34	1.3	460	7.4
June 17-20.....	276,700	--	4.18		1.91	--	2.59	--	--	--	--	--	389	.53	146,700	31	1.3	585	7.6
June 21-July 7....	1,010,000	--	3.56		1.78	--	2.57	--	--	--	--	--	336	.46	464,600	33	1.3	519	7.5
July 8-24.....	639,100	--	4.22		2.44	--	2.85	--	--	--	--	--	424	.58	370,700	37	1.7	643	7.3
July 25-Aug. 11 ..	568,900	--	5.18		2.65	--	3.08	--	--	--	--	--	510	.69	392,500	34	1.6	746	7.1
Aug. 12-28.....	440,900	--	4.54		2.44	--	3.00	--	--	--	--	--	446	.61	268,900	35	1.6	671	6.9
Aug. 29-Sept. 12 .	426,000	--	4.60		2.57	--	3.06	--	--	--	--	--	456	.62	264,100	36	1.7	688	7.0
Sept. 13-30	470,900	9.6	2.89	1.81	2.57	.09	3.25	3.98	.27	.04	.01	.14	463	.63	296,700	35	1.7	695	7.6
Total or weighted average[a]	12,160,000	--	4.50		2.39	--	3.03	--	--	--	--	--	439	0.60	7,256,000	35	1.6	661	--

a Represents 100 percent of runoff for water year October 1957 to September 1958.

MISSOURI RIVER MAIN STEM--Continued

6A-4400. MISSOURI RIVER AT PIERRE, S. DAK.

LOCATION (revised).--At gaging station at Chicago and North Western Railway Co. bridge at Pierre, Hughes County, 1.2 miles upstream from Bad River.
DRAINAGE AREA.--243,500 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: October 1950 to September 1958.
Water temperatures: March 1951 to September 1958.
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 923 micromhos Aug. 5; minimum daily, 564 micromhos Apr. 3.
Percent sodium: Maximum, 40 Apr. 5-28, Aug. 3-5; minimum, 36 Jan. 14 to Feb. 25, Mar. 30, Aug. 18 to Sept. 30.
EXTREMES, 1951-58.--Specific conductance: Maximum daily, 1,150 micromhos May 25-26, 1957; 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 at 180°C. Daily samples for chemical analyses composited by discharge. Records of specific conductance of daily samples available in district office at Lincoln, Nebr. Records of discharge for water year October 1957 to September 1958 given in WSP 1559.

Chemical analyses, water year October 1957 to September 1958

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, 1957.	861,800	--	4.10		2.48	--	2.87	--	--	--	--	--	423	0.58	499,800	38	1.7	640	7.9
Nov. 1-30	627,500	--	4.10		2.57	--	2.90	--	--	--	--	--	421	.57	357,700	39	1.8	642	7.8
Dec. 1-31	633,000	8.4	2.54	1.54	2.48	0.10	2.95	3.50	0.24	0.03	0.00	0.12	414	.56	354,500	37	1.7	641	7.3
Jan. 1-13, 1958.	208,300	--	4.54		2.74	--	3.26	--	--	--	--	--	465	.63	131,200	38	1.8	705	7.7
Jan. 14-31.....	553,600	--	3.94		2.22	--	2.80	--	--	--	--	--	394	.54	298,900	36	1.6	611	7.7
Feb. 1-25	669,400	--	4.04		2.31	--	2.88	--	--	--	--	--	410	.56	374,900	36	1.6	625	7.6
Feb. 26-Mar. 7.	286,200	--	3.94		2.39	--	2.74	--	--	--	--	--	400	.54	154,500	38	1.7	619	7.1
Mar. 8-29.....	733,700	9.1	2.84	1.64	2.87	.11	2.97	4.06	.25	.03	.00	.18	462	.63	462,200	38	1.9	701	7.6
Mar. 30.....	97,390	--	4.48		2.57	--	3.21	--	--	--	--	--	434	.59	57,460	36	1.7	671	7.7
Mar. 31-Apr. 4.	351,300	--	3.80		2.31	--	2.64	--	--	--	--	--	387	.53	186,200	38	1.7	595	7.4

Apr. 5-28, 1958.	1,001,000	--	4.44	2.96	--	2.98	--	--	--	--	--	465	0.63	630,600	40	2.0	710	7.5
Apr. 29-May 31.	1,402,000	--	4.28	2.78	--	2.98	--	--	--	--	--	439	.60	841,200	39	1.9	675	7.4
June 1-10	445,300	--	4.56	2.78	--	3.13	--	--	--	--	--	461	.63	280,500	38	1.8	705	7.4
June 11-18.....	548,200	9.8	3.19 | 1.43	2.91	0.15	2.98	4.54	0.26	0.02	0.01	0.19	495	.67	367,300	38	1.9	742	7.5
June 19-July 8 ..	1,249,000	--	4.40	2.83	--	3.08	--	--	--	--	--	456	.62	774,400	39	1.9	690	7.4
July 9-31.....	699,000	--	4.64	2.87	--	3.21	--	--	--	--	--	479	.65	454,400	38	1.9	725	7.5
Aug. 1-2	35,090	--	4.96	2.87	--	3.03	--	--	--	--	--	501	.68	23,860	37	1.8	750	7.1
Aug. 3-5	12,420	--	5.60	3.78	--	3.06	--	--	--	--	--	627	.85	10,560	40	2.3	903	7.1
Aug. 6-17	128,800	--	5.12	3.31	--	3.10	--	--	--	--	--	550	.75	96,600	39	2.1	815	7.0
Aug. 18-28	279,300	--	4.84	2.78	--	3.11	--	--	--	--	--	489	.67	187,100	36	1.8	736	7.0
Aug. 29-Sept. 30	1,764,000	7.9	2.79 | 1.65	2.52	.12	3.02	3.83	.27	.03	.01	.14	443	.60	1,058,000	36	1.7	674	7.1
Total or weighted average[a]	12,590,000	--	4.34	2.65	--	2.98	--	--	--	--	--	444	0.60	7,602,000	38	1.8	676	--

a Represents 100 percent of runoff for water year October 1957 to September 1958.

MISSOURI RIVER MAIN STEM--Continued

6B-8070. 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 1958.
Water temperatures: May 1951 to September 1958.
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 832 micromhos Jan. 7; minimum daily, 421 micromhos Aug. 10.
Percent sodium: Maximum, 41 July 11-13; minimum, 30 Feb. 26 to Mar. 5.
EXTREMES, 1951-58.--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 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 1957 to September 1958 given in WSP 1560.

Chemical analyses, water year October 1957 to September 1958

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, 1957 ..	2,132,000	--	4.58		3.00	--	3.13	--	--	--	--	--	482	0.66	1,407,000	40	2.0	728	7.7
Nov. 1-30	1,153,000	--	4.58		2.57	--	3.29	--	--	--	--	--	452	.61	703,300	36	1.7	689	7.9
Dec. 1-24	667,200	21	3.29	1.49	2.39	0.14	3.52	3.04	0.68	0.03	0.05	0.10	450	.61	407,000	33	1.5	692	7.7
Dec. 25-31.....	205,700	--	4.36		2.18	--	3.26	--	--	--	--	--	411	.56	115,200	33	1.5	641	7.8
Jan. 1-12, 1958 ..	228,100	--	5.28		2.78	--	3.87	--	--	--	--	--	499	.68	155,100	34	1.7	772	7.8
Jan. 13-Feb. 22..	1,049,000	--	4.66		2.52	--	3.41	--	--	--	--	--	462	.63	660,900	35	1.6	696	7.8
Feb. 23-25	107,700	--	4.04		2.13	--	3.05	--	--	--	--	--	409	.56	60,310	35	1.5	617	7.9
Feb. 26-Mar. 5 ..	600,000	--	3.32		1.39	--	2.57	--	--	--	--	--	312	.42	252,000	30	1.1	484	7.3
Mar. 6-23	714,000	18	3.04	1.30	2.04	.20	3.29	2.69	.59	.02	.06	.22	415	.56	399,800	31	1.4	618	7.6
Mar. 24-Apr. 5 ..	635,500	--	4.24		1.96	--	3.15	--	--	--	--	--	402	.55	349,500	32	1.4	615	7.2
Apr. 6-16	857,100	--	4.16		1.87	--	3.00	--	--	--	--	--	384	.52	445,700	31	1.3	592	7.3
Apr. 17-May 1 ...	1,039,000	--	4.36		2.26	--	3.15	--	--	--	--	--	427	.58	602,600	34	1.5	616	7.4

May 2-31, 1958 ..	1,956,000	--	4.40		2.44	--	3.11	--	--	--	--	--	431	0.59	1,154,000	36	1.6	660	7.5
June 1-30.....	1,995,000	13	3.59	0.77	2.52	0.15	2.97	3.48	0.54	0.02	0.02	0.11	448	.61	1,217,000	36	1.7	675	7.3
July 1-10	733,500	--	4.30		2.31	--	3.11	--	--	--	--	--	420	.57	418,100	35	1.6	645	7.4
July 11-13	275,500	--	3.42		2.35	--	2.54	--	--	--	--	--	371	.50	137,800	41	1.8	578	7.5
July 14-19	413,400	--	4.08		2.48	--	2.85	--	--	--	---	--	423	.58	239,800	38	1.7	648	7.4
July 20-30	980,200	--	3.72		2.00	--	2.77	--	--	--	--	--	367	.50	490,100	35	1.5	566	7.4
July 31-Aug. 2 ...	319,700	--	3.16		1.44	--	2.44	--	--	--	--	--	303	.41	131,100	31	1.1	475	6.8
Aug. 3-5.....	201,500	--	3.38		1.57	--	2.59	--	--	--	--	--	326	.44	88,660	32	1.2	507	6.8
Aug. 6-11.....	624,000	--	2.82		1.26	--	2.20	--	--	--	--	--	276	.38	237,100	31	1.1	434	6.7
Aug. 12-20.....	619,200	--	4.06		2.22	--	2.87	--	--	--	--	--	405	.55	340,600	35	1.6	623	7.0
Aug. 21-Sept. 5 ..	1,004,000	--	4.38		2.57	--	2.98	--	--	--	--	--	459	.62	622,500	37	1.7	701	
Sept. 6-7.....	174,100	--	3.88		2.48	--	2.74	--	--	--	--	--	403	.55	95,760	39	1.8	631	6.8
Sept. 8-30	1,447,000	11	2.89	1.49	2.74	.14	3.05	3.75	.51	.03	.01	.13	456	.62	897,100	38	1.8	694	7.3
Total or weighted average [a] ...	20,130,000	--	4.26		2.35	--	3.05	--	--	--	--	--	425	0.58	11,630,000	36	1.6	647	--

a Represents 100 percent of runoff for water year October 1957 to September 1958.

6A-2145. 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 1958 (discontinued).
Water temperatures: December 1950 to September 1958 (discontinued).
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 573 micromhos Feb. 10; minimum daily, 134 micromhos May 29.
Percent sodium: Maximum, 32 Apr. 23 to May 3;, minimum, 16 June 19.
EXTREMES, 1950-58.--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 at 180°C. Records of specific conductance available in district office at Worland, Wyo. Records of discharge for water year October 1957 to September 1958 given in WSP 1559.

Chemical analyses, water year October 1957 to September 1958

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, 1957..	261,100	--	3.28		1.35	--	2.70	--	--	--	--	--	287	0.39	101,800	29	1.1	448	7.6
Nov. 1-30	232,300	--	3.48		1.39	--	2.77	--	--	--	--	--	305	.41	95,240	29	1.1	473	7.8
Dec. 1-31	191,100	19	2.25	1.35	1.35	0.09	2.82	1.98	0.20	0.02	0.02	0.16	300	.41	78,350	27	1.0	486	7.5
Jan. 1-31, 1958..	151,600	--	3.68		1.35	--	2.85	--	--	--	--	--	319	.43	65,190	27	1.0	495	7.8
Feb. 1-16	63,990	--	3.84		1.44	--	2.87	--	--	--	--	--	323	.44	28,160	27	1.0	510	7.4
Feb. 17-26	58,970	--	3.40		1.44	--	2.54	--	--	--	--	--	300	.41	24,180	30	1.1	478	7.4
Feb. 27-Mar. 31.	168,800	26	2.15	1.33	1.44	.09	2.62	2.14	.25	.03	.02	.23	312	.42	70,900	29	1.1	489	7.4
Apr. 1-19	106,000	--	3.34		1.35	--	2.59	--	--	--	--	--	290	.39	41,340	29	1.0	468	7.3
Apr. 20-22	21,320	--	2.84		1.04	--	2.36	--	--	--	--	--	247	.34	7,250	27	.9	390	7.3
Apr. 23-May 3...	78,780	--	3.44		1.61	--	2.62	--	--	--	--	--	317	.43	33,880	32	1.2	500	7.3
May 4-7.....	46,730	--	3.16		1.17	--	2.69	--	--	--	--	--	265	.36	16,820	27	.9	418	7.5
May 8-11.....	77,610	--	2.64		.74	--	2.29	--	--	--	--	--	215	.29	22,510	22	.6	328	7.4
May 12-18.....	169,300	--	1.84		.48	--	1.62	--	--	--	--	--	154	.21	35,550	21	.5	236	7.1
May 19-20.....	62,480	--	1.38		.39	--	1.30	--	--	--	--	--	120	.16	1,000	22	.5	183	7.5
May 21-31.....	590,900	11	.85	.35	.26	.03	1.12	.35	.01	.01	.02	.04	104	.14	82,730	17	.3	152	7.0

June 1-3	142,200	--	1.12	.33	--	1.03	--	--	--	--	--	96	.13	18,490	23	.4	150	7.1
June 4.....	46,800	--	1.40	.48	--	1.21	--	--	--	--	--	120	.16	7,490	25	.6	165	7.4
June 5-12	350,100	--	1.26	.36	--	1.20	--	--	--	--	--	109	.15	52,520	22	.5	170	7.1
June 13-18	223,100	--	1.50	.48	--	1.41	--	--	--	--	--	128	.17	37,930	24	.8	203	7.1
June 19.....	35,700	--	2.64	.52	--	2.33	--	--	--	--	--	187	.25	8,920	16	.5	298	7.6
June 20-26	242,800	--	1.50	.48	--	1.39	--	--	--	--	--	125	.17	41,280	24	.6	201	7.2
June 27-July 2 ...	154,700	--	1.50	.48	--	1.38	--	--	--	--	--	124	.17	26,300	24	.6	205	7.1
July 3, 1958	21,620	--	2.76	0.74	--	2.43	--	--	--	--	--	214	0.29	6,270	21	0.6	343	7.3
July 4-18.....	266,200	--	2.06	.74	--	1.84	--	--	--	--	--	170	.23	61,230	26	.7	280	7.3
July 19-26.....	90,640	--	2.30	.96	--	1.97	--	--	--	--	--	195	.27	24,470	29	.9	321	7.1
July 27.....	12,810	--	2.96	1.00	--	2.46	--	--	--	--	--	242	.33	4,230	25	.8	387	7.4
July 28-Aug. 8 ...	128,600	--	2.64	.96	--	2.20	--	--	--	--	--	222	.30	38,580	27	.8	349	7.2
Aug. 9-31	154,800	--	3.04	1.26	--	2.52	--	--	--	--	--	271	.37	57,280	29	1.0	423	7.3
Sept. 1-30	175,900	--	3.56	1.48	--	2.82	--	--	--	--	--	310	.42	73,880	29	1.1	493	7.7
Total or weighted average[a]	4,327,000	--	2.32	0.83	--	1.95	--	--	--	--	--	200	0.27	1,168,000	26	0.8	314	--

a Represents 100 percent of runoff for water year October 1957 to September 1958.

6A-3295. 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 1958.
Water temperatures: January 1951 to September 1958.
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 1,020 micromhos July 24; minimum daily, 284 micromhos June 3.
Percent sodium: Maximum, 41 Sept. 1-30; minimum 22 May 26-31.
EXTREMES, 1951-58.--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, May 26-31, 1958.
REMARKS.--Values reported for dissolved solids are residues at 180°C. Records of specific conductance of daily samples available in district office at Worland, Wyo. Records of discharge for gaging station near Sidney for water year October 1957 to September 1958 given in WSP 1559. No appreciable inflow between gaging station and sampling station.

Chemical analyses, water year October 1957 to September 1958

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, 1957	522,300	--	5.12		3.05	--	3.18	--	--	--	--	--	518	0.70	365,600	37	1.9	785	7.7
Nov. 1-30	523,000	--	5.28		3.26	--	3.31	--	--	--	--	--	541	.74	387,000	38	2.0	801	7.5
Dec. 1-26	350,500	13	3.44	2.20	3.22	0.10	3.54	5.12	0.28	0.02	0.01	0.22	561	.76	266,400	36	1.9	826	7.6
Dec. 27-Jan. 12, 1958	203,900	--	6.14		3.48	--	3.80	--	--	--	--	--	618	.84	171,300	36	2.0	891	7.8
Jan. 13-31	255,900	--	5.68		3.09	--	3.51	--	--	--	--	--	566	.77	197,000	35	1.8	822	7.8
Feb. 1-13	139,600	--	6.00		3.26	--	3.54	--	--	--	--	--	586	.80	111,700	35	1.9	862	7.3
Feb. 14-17	27,970	--	6.56		3.39	--	3.90	--	--	--	--	--	659	.90	25,170	34	1.9	956	7.4
Feb. 18-Mar. 4	241,800	--	4.96		3.00	--	2.98	--	--	--	--	--	507	.69	166,800	38	1.9	756	7.2
Mar. 5-27	359,200	10	3.29	2.17	3.48	.10	3.26	5.21	.37	.02	.02	.12	553	.75	269,400	38	2.1	826	7.7
Mar. 28-Apr. 2	138,800	--	5.08		3.26	--	3.02	--	--	--	--	--	521	.71	98,550	39	2.0	783	7.3
Apr. 3-30	361,300	--	5.74		3.70	--	3.23	--	--	--	--	--	601	.82	296,300	39	2.2	881	7.3
May 1-11	171,800	--	5.36		3.26	--	3.18	--	--	--	--	--	570	.78	134,000	38	2.0	829	7.6
May 12-15	96,340	--	4.50		2.31	--	2.93	--	--	--	--	--	447	.61	58,770	34	1.5	657	7.5
May 16-21	174,900	--	3.82		1.57	--	2.66	--	--	--	--	--	346	.47	82,200	29	1.1	523	7.3
May 22-25	181,900	--	3.36		1.22	--	2.51	--	--	--	--	--	285	.39	70,940	27	.9	444	7.4
May 26-31	428,000	13	1.90	.70	.74	.05	2.13	1.19	.05	.01	.04	.06	220	.30	128,400	22	.6	334	7.5

June 1-4, 1958 ..	246,900	--	2.16	0.87	--	1.82	--	--	--	--	--	192	0.26	64,190	29	0.8	304	7.2
June 5-10.....	354,000	--	2.76	1.44	--	2.11	--	--	--	--	--	270	.37	131,000	34	1.2	416	7.2
June 11-15.....	300,700	11	2.40 | 0.96	1.48	0.06	2.39	2.33	0.12	0.02	0.03	0.08	310	.42	126,300	30	1.1	472	7.3
June 16-20.....	278,900	--	4.26	1.96	--	2.80	--	--	--	--	--	397	.54	150,600	32	1.3	595	7.2
June 21-26	292,600	--	3.42	1.70	--	2.34	--	--	--	--	--	324	.44	128,700	33	1.3	502	7.2
June 27-July 3 ..	313,000	--	3.14	1.44	--	2.31	--	--	--	--	--	292	.40	125,200	31	1.1	459	7.1
July 4-8	205,900	--	3.12	2.04	--	2.49	--	--	--	--	--	334	.45	92,660	40	1.6	514	7.2
July 9-13.....	150,000	--	3.72	2.48	--	2.41	--	--	--	--	--	405	.55	82,500	40	1.8	618	7.2
July 14-23	187,500	--	4.32	2.52	--	2.62	--	--	--	--	--	445	.61	114,380	37	1.7	669	7.2
July 24	16,010	--	7.52	3.65	--	3.34	--	--	--	--	--	724	.98	15,690	33	1.9	1,020	7.2
July 25-Aug. 6 ..	220,300	--	5.72	3.26	--	3.05	--	--	--	--	--	595	.81	178,400	36	1.9	848	7.5
Aug. 7-31.....	291,100	--	4.84	3.13	--	3.05	--	--	--	--	--	524	.71	206,700	39	2.0	773	7.4
Sept. 1-30	345,700	--	4.86	3.35	--	3.08	--	--	--	--	--	542	.74	255,800	41	2.1	786	7.3
Total or weighted average[a]	7,380,000	--	4.48	2.52	--	2.87	--	--	--	--	--	448	0.61	4,502,000	36	1.7	668	--

a Represents 100 percent of runoff for water year October 1957 to September 1958.

6A-2947. BIGHORN RIVER AT BIGHORN, MONT.

LOCATION.--At gaging station at bridge on U. S. Highway 10, three-quarters of a mile upstream from mouth, 1 mile southwest of Bighorn, Treasure County, and 4 miles east of Custer.
RECORDS AVAILABLE.--Chemical analyses: February 1950 to September 1958.
Water temperatures: April 1949 to September 1951, August 1952 to September 1958.
Sediment records: July 1947 to September 1954, October 1955 to September 1958 (discontinued).
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 1,380 micromhos July 24; minimum daily, 574 micromhos May 27.
Percent sodium: Maximum, 43 July 17-23; minimum, 30 May 23-31.
EXTREMES, 1951-58.--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 at 180°C. Records of specific conductance of daily samples available in district office at Worland, Wyo. Records of discharge for water year October 1957 to September 1958 given in WSP 1559.

Chemical analyses, water year October 1957 to September 1958

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, 1957.	245,000	--	6.20		4.00	--	3.34	--	--	--	--	--	671	0.91	223,000	39	2.3	954	7.6
Nov. 1-29	243,100	--	6.02		3.83	--	3.34	--	--	--	--	--	641	.87	211,500	39	2.2	910	7.7
Nov. 30-Dec. 25	164,100	12	4.29	2.47	3.92	0.09	3.64	6.45	0.37	0.03	0.02	0.13	676	.92	151,000	36	2.1	966	7.7
Dec. 26-Jan. 31, 1958	287,400	--	5.86		3.26	--	3.34	--	--	--	--	--	591	.80	229,900	36	1.9	858	7.8
Feb. 1-17	132,900	--	5.84		3.26	--	3.34	--	--	--	--	--	581	.79	105,000	36	1.9	850	7.7
Feb. 18-Mar. 18	243,400	18	3.84	2.20	3.61	.09	3.34	5.93	.34	.02	.01	.19	624	.85	206,900	37	2.1	894	7.7
Mar. 19-Apr. 4.	105,200	--	6.76		4.35	--	3.51	--	--	--	--	--	736	1.00	105,200	39	2.4	1,010	7.4
Apr. 5-22	86,260	--	6.94		4.35	--	3.44	--	--	--	--	--	750	1.02	87,980	39	2.3	1,040	7.3
Apr. 23-May 2..	53,690	--	6.82		4.48	--	3.49	--	--	--	--	--	736	1.00	53,690	40	2.4	1,040	7.3
May 3-7.....	38,020	--	6.84		4.35	--	3.77	--	--	--	--	--	714	.97	36,880	39	2.4	1,020	7.3
May 8-13.....	36,460	--	6.46		3.83	--	3.62	--	--	--	--	--	665	.90	32,810	37	2.1	955	7.3
May 14-22.....	68,870	--	5.68		3.09	--	3.29	--	--	--	--	--	562	.76	52,340	35	1.8	814	7.3
May 23-31.....	117,400	--	4.48		1.96	--	3.05	--	--	--	--	--	409	.56	65,740	30	1.3	620	7.3
June 1-2.....	19,360	--	4.78		2.48	--	3.05	--	--	--	--	--	458	.62	12,000	34	1.6	683	7.4
June 3-9.....	68,050	--	5.72		3.61	--	2.95	--	--	--	--	--	610	.83	56,480	39	2.1	866	7.3
June 10-11.....	20,490	--	7.74		4.74	--	3.77	--	--	--	--	--	821	1.12	22,950	38	2.4	1,120	7.7
June 12-14.....	35,780	--	5.98		3.83	--	3.13	--	--	--	--	--	652	.89	31,840	39	2.2	916	7.2

June 15, 1958...	16,010	--	8.68	5.00	--	3.80	--	--	--	--	--	913	1.24	19,850	37	2.4	1,220	7.2
June 16-23.....	92,470	--	5.96	3.83	--	3.26	--	--	--	--	--	650	.88	81,370	39	2.2	934	7.3
June 24-July 2..	123,600	13	3.04 | 1.56	2.44	0.07	2.70	4.31	0.22	0.02	0.01	0.10	466	.63	77,870	34	1.6	675	7.1
July 3-8.....	53,080	--	5.44	3.26	--	3.03	--	--	--	--	--	565	.77	40,870	37	2.0	825	7.2
July 9-16.....	35,460	--	6.80	4.70	--	3.38	--	--	--	--	--	769	1.05	37,230	41	2.5	1,080	7.0
July 17-23.....	25,410	--	7.56	5.66	--	3.36	--	--	--	--	--	890	1.21	30,750	43	2.9	1,230	7.1
July 24.....	4,050	--	9.08	6.22	--	3.57	--	--	--	--	--	1,030	1.40	5,670	41	2.9	1,380	7.2
July 25-28.....	19,400	--	8.32	5.74	--	3.52	--	--	--	--	--	962	1.31	25,410	41	2.8	1,300	7.2
July 29-Aug. 4..	59,940	--	7.20	4.79	--	3.61	--	--	--	--	--	806	1.10	65,930	40	2.5	1,100	7.5
Aug. 5-31.....	201,400	--	5.08	3.39	--	2.88	--	--	--	--	--	568	.77	155,100	40	2.1	815	7.6
Sept. 1-21.....	166,200	--	5.04	3.39	--	2.88	--	--	--	--	--	569	.77	128,000	40	2.1	821	7.6
Sept. 22-30.....	50,620	--	6.88	4.57	--	3.51	--	--	--	--	--	766	1.04	52,640	40	2.5	1,070	7.7
Total or weighted average[a]....	2,813,000	--	5.96	3.65	--	3.28	--	--	--	--	--	630	0.86	2,419,000	38	2.1	898	--

a Represents 100 percent of runoff for water year October 1957 to September 1958.

YELLOWSTONE RIVER BASIN--Continued

6A-3085. TONGUE RIVER AT MILES CITY, MONT.

LOCATION.--At gaging station, 4 miles south of Miles City, Custer County, and 8 miles upstream from mouth.
RECORDS AVAILABLE.--Chemical analyses: January 1951 to September 1958.
Water temperatures: April 1949 to September 1958.
Sediment records: June 1946 to September 1951.
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 2,390 micromhos Sept. 11; minimum daily, 337 micromhos June 1.
Percent sodium: Maximum, 51 Sept. 12-27; minimum, 18 May 28-31.
EXTREMES, 1951-58.--Specific conductance: Maximum daily, 2,400 micromhos Sept. 11, 1958; minimum daily, 288 micromhos June 21, 1953.
Percent sodium: Maximum, 69 May 4, 1955; minimum, 17 June 7-16, June 30 to July 12, 1957.
REMARKS.--Values reported for dissolved solids are residues at 180°C. Records of specific conductance of daily samples available in district office at Worland, Wyo. Records of discharge for water year October 1957 to September 1958 given in WSP 1559.

Chemical analyses, water year October 1957 to September 1958

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. 1-15, 1957.	12,130	--	6.80		1.91	--	4.26	--	--	--	--	--	524	0.71	8,610	22	1.0	790	7.9
Oct. 16-Nov. 1..	3,350	--	8.12		3.65	--	5.21	--	--	--	--	--	712	.97	3,250	31	1.8	1,020	7.9
Nov. 2-29	9,330	--	7.50		3.44	--	5.00	--	--	--	--	--	655	.89	8,300	31	1.8	949	7.8
Nov. 30-Dec. 31	10,340	5.1	3.94	4.70	3.26	0.12	5.54	5.91	0.16	0.02	0.01	0.10	699	.95	9,820	27	1.6	1,010	8.0
Jan 1-25, 1958..	8,500	--	9.12		3.18	--	5.93	--	--	--	--	--	733	1.00	8,500	26	1.5	1,050	8.2
Jan. 26-Feb. 5 .	3,170	--	7.88		2.78	--	5.16	--	--	--	--	--	633	.86	2,730	26	1.4	933	7.8
Feb. 6-22	4,920	--	8.60		3.18	--	5.82	--	--	--	--	--	688	.94	4,620	27	1.5	1,020	7.8
Feb. 23-24	1,010	--	6.40		3.09	--	4.59	--	--	--	--	--	555	.75	758	33	1.7	852	7.5
Feb. 25-26	1,130	--	4.32		2.48	--	3.44	--	--	--	--	--	404	.55	622	36	1.7	636	7.6
Feb. 27-Mar. 1.	1,370	--	6.28		2.22	--	4.21	--	--	--	--	--	528	.72	986	26	1.3	782	7.4
Mar. 2-20.....	8,220	9.1	3.34	3.82	2.61	.10	4.87	4.83	.13	.02	.00	.12	579	.79	6,490	26	1.4	867	7.8
Mar. 21-25.....	3,150	--	6.36		2.18	--	4.16	--	--	--	--	--	517	.70	2,200	26	1.2	799	7.2
Mar. 26-Apr. 8.	5,510	--	7.32		3.00	--	4.72	--	--	--	--	--	608	.83	4,570	29	1.6	913	7.6
Apr. 9-30	9,130	--	7.12		2.74	--	4.43	--	--	--	--	--	592	.81	7,400	28	1.5	885	7.5
May 1-9.....	3,210	--	7.26		2.74	--	4.43	--	--	--	--	--	610	.83	2,660	27	1.4	899	7.6

May 10, 1958 ...	69	--	8.14	4.26	--	5.51	--	--	--	--	--	746	1.01	70	34	2.1	1,100	7.8
May 11-16.....	3,720	--	7.16	2.31	--	4.33	--	--	--	--	--	584	.79	2,940	24	1.2	856	7.6
May 17-20.....	6,620	--	5.84	1.52	--	3.64	--	--	--	--	--	440	.60	3,970	21	.9	671	7.5
May 21-27.....	10,170	--	4.32	1.09	--	3.11	--	--	--	--	--	316	.43	4,370	20	.7	509	7.5
May 28-31.....	8,490	--	3.26	.70	--	2.62	--	--	--	--	--	235	.32	2,720	18	.5	380	7.4
June 1-2	2,930	--	2.96	.74	--	2.46	--	--	--	--	--	220	.30	879	20	.6	348	7.4
June 3-8	4,140	--	4.08	1.78	--	3.26	--	--	--	--	--	357	.49	2,030	30	1.2	556	7.3
June 9-14.....	9,090	9.8	2.40 | 1.32	1.74	0.10	3.16	2.25	0.01	0.02	0.05	0.07	341	.46	4,180	31	1.3	522	7.2
June 15	1,960	--	3.40	1.31	--	2.95	--	--	--	--	--	283	.38	745	28	1.0	449	7.5
June 16-30	21,050	--	3.76	1.17	--	2.84	--	--	--	--	--	298	.41	8,630	24	.9	473	7.3
July 1.....	1,760	--	3.88	2.04	--	3.47	--	--	--	--	--	364	.50	880	34	1.5	560	7.2
July 2-3.....	6,280	--	4.06	1.48	--	3.15	--	--	--	--	--	336	.46	2,890	27	1.0	527	7.4
July 4-7.....	16,890	--	2.86	2.31	--	2.98	--	--	--	--	--	323	.44	7,430	45	1.9	504	7.4
July 8-26.....	8,310	--	4.98	2.48	--	3.79	--	--	--	--	--	452	.61	5,070	33	1.6	693	7.3
July 27.....	268	--	7.00	3.96	--	4.85	--	--	--	--	--	684	.93	249	36	2.1	1,000	7.6
July 28-Aug. 14.	4,780	--	5.92	2.61	--	4.38	--	--	--	--	--	516	.70	3,350	31	1.5	779	7.3
Aug. 15-29	857	--	8.36	7.22	--	7.11	--	--	--	--	--	982	1.34	1,150	46	3.5	1,400	7.7
Aug. 30-Sept. 10	1,530	--	6.32	3.13	--	4.79	--	--	--	--	--	572	.78	1,190	33	1.8	863	7.6
Sept. 11.....	36	--	13.76	13.83	--	12.33	--	--	--	--	--	1,790	2.43	87	50	5.3	2,390	8.0
Sept. 12-27.....	619	--	9.96	10.27	--	8.98	--	--	--	--	--	1,260	1.71	1,060	51	4.6	1,770	7.9
Sept. 28-30.....	292	--	7.28	5.57	--	6.20	--	--	--	--	--	804	1.09	318	43	2.9	1,180	7.9
Total or weighted average[a]	194,300	--	5.66	2.22	--	4.00	--	--	--	--	--	475	0.64	124,300	28	1.3	716	--

a Represents 100 percent of runoff for water year October 1957 to September 1958.

6A-3265. 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 1958.
Water temperatures: February 1951 to September 1958.
Sediment records: March 1950 to September 1953.
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 3,440 micromhos Jan. 15; minimum daily, 567 micromhos May 26.
Percent sodium: Maximum, 48 July 3-11; minimum, 22 June 15-20.
EXTREMES, 1951-58.--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 at 180°C. Records of specific conductance of daily samples available in district office at Worland, Wyo. Records of discharge for water year October 1957 to September 1958 given in WSP 1559.

Chemical analyses, water year October 1957 to September 1958

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. 1-23, 1957.	4,310	--	13.24		8.53	--	3.70	--	--	--	--	--	1,470	2.00	8,620	39	3.3	1,840	7.7
Oct. 24-Nov. 20.	12,010	--	11.88		7.05	--	3.87	--	--	--	--	--	1,260	1.71	20,540	37	2.9	1,630	7.8
Nov. 21-Dec. 5 .	3,950	--	13.36		7.48	--	4.57	--	--	--	--	--	1,410	1.92	7,580	36	2.9	1,780	7.8
Dec. 6-28	5,400	14	9.13	5.99	8.70	0.14	5.51	16.86	1.38	0.02	0.05	0.08	1,610	2.19	11,830	36	3.2	1,980	7.8
Dec.29-Jan.14, 1958	5,260	--	18.28		10.44	--	6.16	--	--	--	--	--	1,950	2.65	13,940	36	3.5	2,350	8.0
Jan. 15	337	--	28.00		16.88	--	6.52	--	--	--	--	--	3,100	4.22	1,420	38	4.5	3,440	8.0
Jan. 16-26.....	3,470	--	15.64		8.70	--	5.47	--	--	--	--	--	1,630	2.22	7,700	36	3.1	2,080	8.0
Jan. 27-Feb. 19.	7,400	--	14.08		7.57	--	5.11	--	--	--	--	--	1,460	1.99	14,730	35	2.9	1,830	7.6
Feb. 20	377	--	6.32		5.39	--	1.25	--	--	--	--	--	820	1.12	422	46	3.0	1,130	7.2
Feb. 21-22	833	--	12.00		8.13	--	4.69	--	--	--	--	--	1,350	1.84	1,530	40	3.3	1,750	7.8
Feb. 23	545	--	7.72		5.35	--	3.54	--	--	--	--	--	862	1.04	567	41	2.7	1,190	7.7
Feb. 24-26	2,040	--	6.14		4.22	--	2.95	--	--	--	--	--	666	.91	1,860	41	2.4	975	7.5
Feb. 27-Mar. 14	8,150	--	9.84		5.83	--	3.31	--	--	--	--	--	1,050	1.43	11,650	37	2.6	1,390	7.2
Mar. 15-19.....	2,670	--	11.24		7.00	--	3.47	--	--	--	--	--	1,220	1.66	4,430	38	3.0	1,600	7.3
Mar. 20-27.....	6,410	13	6.09	3.81	6.00	.14	3.34	10.93	1.38	.02	.06	.11	1,070	1.46	9,360	37	2.7	1,420	7.6
Mar. 28-Apr. 2.	6,090	--	11.78		7.79	--	3.72	--	--	--	--	--	1,280	1.74	10,600	40	3.2	1,680	7.3
Apr. 3-12	7,680	--	12.68		9.22	--	3.80	--	--	--	--	--	1,470	2.00	15,360	42	3.7	1,930	7.3
Apr. 13-25	10,340	--	12.96		9.57	--	3.77	--	--	--	--	--	1,560	2.12	21,920	42	3.8	2,070	7.3

Apr. 26-May 3, 1958	7,000	--	9.66	6.35	--	3.43	--	--	--	--	--	1,080	1.47	10,290	40	2.9	1,440	7.5
May 4-12	6,260	--	11.82	7.35	--	3.80	--	--	--	--	--	1,310	1.78	11,140	39	3.1	1,690	7.5
May 13-16	8,580	--	7.90	4.05	--	3.67	--	--	--	--	--	780	1.06	9,090	34	2.0	1,090	7.3
May 17-24	17,370	--	6.04	2.35	--	3.11	--	--	--	--	--	542	.74	12,850	28	1.4	791	7.3
May 25-31	16,400	--	4.80	1.78	--	2.69	--	--	--	--	--	427	.58	9,510	27	1.1	631	7.4
June 1-3	4,550	--	4.80	1.96	--	2.39	--	--	--	--	--	455	.62	2,820	29	1.3	662	7.3
June 4-10	19,490	--	8.06	3.96	--	3.29	--	--	--	--	--	805	1.09	21,240	33	2.0	1,090	7.4
June 11	4,200	--	7.24	2.65	--	3.74	--	--	--	--	--	644	.88	3,700	27	1.4	886	8.0
June 12-14	5,900	--	9.72	4.35	--	3.15	--	--	--	--	--	955	1.30	7,670	31	2.0	1,240	7.4
June 15-20	17,510	14	11.98 5.18	4.83	0.22	3.67	17.76	0.82	0.03	0.02	0.15	1,560	2.12	37,120	22	1.6	1,810	7.0
June 21-July 2	8,530	--	14.04	7.70	--	3.49	--	--	--	--	--	1,490	2.03	17,320	35	2.9	1,850	7.3
July 3-11	27,920	--	6.58	4.92	--	3.23	--	--	--	--	--	777	1.06	29,600	48	2.7	1,080	7.3
July 12-20	9,740	--	16.66	7.66	--	3.51	--	--	--	--	--	1,680	2.28	22,210	31	2.7	2,010	7.0
July 21-24	11,570	--	18.84	6.00	--	3.54	--	--	--	--	--	1,730	2.35	27,190	24	2.0	1,970	7.0
July 25-Aug. 14	19,810	--	14.44	7.05	--	3.67	--	--	--	--	--	1,480	2.01	39,820	33	2.6	1,810	7.4
Aug. 15-31	1,590	--	13.96	10.35	--	3.62	--	--	--	--	--	1,680	2.28	3,620	43	3.9	2,070	7.4
Sept. 1-14	405	--	14.32	11.57	--	3.97	--	--	--	--	--	1,890	2.57	1,040	45	4.3	2,330	7.6
Sept. 15-30	124	--	15.16	13.05	--	4.43	--	--	--	--	--	2,060	2.80	347	46	4.7	2,540	7.4
Total or weighted average[a]	274,200	--	11.16	5.83	--	3.60	--	--	--	--	--	1,150	1.56	427,800	34	2.5	1,480	--

a Represents 100 percent of runoff for water year October 1957 to September 1958.

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JAMES RIVER BASIN

6A-4760. JAMES RIVER UPSTREAM FROM DIVERSION, AT HURON, S. DAK.
(Formerly published as James River at Huron, S. Dak.)

LOCATION (revised).--Just upstream from Chicago and North Western Railway bridge, 135 feet upstream from gaging station, 150 feet upstream from city dam at Huron, Beadle County, and 300 feet upstream from bridge on U. S. Highway 14.
DRAINAGE AREA.--16,800 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: August 1956 to September 1958.
Water temperatures: August 1956 to September 1958.
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 1,930 micromhos Jan. 15; minimum daily, 558 micromhos Apr. 1.
Percent sodium: Maximum, 54 Oct. 7-10, 14-31, Dec. 21 to Jan. 8; minimum, 42 July 11-24.
EXTREMES, 1956-58.--Specific conductance: Maximum daily, 2,270 micromhos Mar. 9, 1957; minimum daily, 483 micromhos Mar. 30, 1957.
Percent sodium: Maximum, 55 May 1-10, 1957; minimum, 30 Mar. 29 to Apr. 4, 1957.
REMARKS.--Values reported for dissolved solids are residues 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 at Huron, for water year October 1957 to September 1958 given in WSP 1559.

Chemical analyses, water year October 1957 to September 1958

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. 7-10, 14-31, 1957	553	14	3.19	3.57	8.57	0.51	6.10	6.56	2.76	0.02	0.01	0.50	963	1.31	724	54	4.6	1,450	7.8
Nov. 1-24	909	24	3.44	4.16	8.22	.43	6.06	7.18	2.51	.02	.02	.52	970	1.32	1,200	51	4.2	1,450	7.8
Nov. 25-Dec. 20	2,040	25	4.74	4.58	8.05	.38	7.15	7.77	2.68	.02	.01	.49	1,080	1.47	3,000	45	3.7	1,580	7.8
Dec. 21-Jan. 8, 1958	2,000	15	4.34	4.46	10.88	.41	7.08	7.91	4.34	.03	.00	.08	1,160	1.58	3,160	54	5.2	1,740	7.7
Jan. 9-24	1,380	14	4.34	4.94	10.88	.49	7.41	8.54	4.51	.03	.03	.12	1,240	1.69	2,330	53	5.1	1,850	7.7
Jan. 25-Feb. 11	1,040	9.5	3.99	4.77	10.01	.46	7.69	7.70	3.67	.03	.02	.64	1,170	1.59	1,650	52	4.8	1,730	7.8
Feb. 12-23	744	13	3.99	5.21	10.70	.46	8.24	8.33	3.86	.03	.02	.71	1,260	1.71	1,270	53	5.0	1,840	7.8
Feb. 24-25	179	17	3.59	4.81	9.79	.43	7.51	7.56	3.38	.03	.02	.40	1,150	1.56	279	53	4.8	1,690	8.1
Feb. 26-Mar. 2	1,030	15	4.09	5.47	10.53	.46	8.52	8.18	3.53	.03	.02	.63	1,250	1.70	1,750	51	4.8	1,830	7.9
Mar. 3-14	2,700	16	3.39	4.13	7.79	.36	6.75	6.18	2.59	.03	.02	.47	960	1.31	3,540	50	4.0	1,430	7.7

Mar. 15-19, 1958.	930	20	4.09	5.27	9.96	0.41	8.65	7.77	3.44	0.03	0.03	0.64	1,220	1.66	1,540	50	4.6	1,790	7.8
Mar. 20-22	992	18	3.64	4.56	8.70	.38	a7.55	6.81	2.99	.03	.04	.55	1,060	1.44	1,430	50	4.3	1,570	8.3
Mar. 23-28	5,030	15	2.54	2.94	5.74	.33	4.88	4.58	2.00	.02	.08	.38	718	.98	4,930	50	3.5	1,100	7.7
Mar. 29-Apr. 5 ..	9,990	12	1.65	1.67	3.13	.31	2.90	2.60	1.07	.02	.05	.16	429	.58	5,790	46	2.4	676	7.8
Apr. 6-30.....	21,270	11	2.20	2.38	4.31	.33	4.02	3.37	1.55	.02	.03	.22	552	.75	15,950	47	2.8	862	7.8
May 1-31	13,950	9.1	2.25	2.53	4.18	.33	4.43	3.25	1.38	.02	.01	.27	558	.76	10,600	45	2.7	872	7.8
June 1-13.....	3,880	12	3.29	2.09	4.48	.36	4.56	4.10	1.44	.02	.03	.31	618	.84	3,260	44	2.7	961	7.4
June 14-28.....	3,140	12	3.84	2.42	5.48	.38	5.33	4.60	1.78	.02	.03	.40	720	.98	3,080	45	3.1	1,100	7.4
June 29-July 10...	3,870	23	3.04	3.16	5.96	.38	5.38	4.46	2.40	.02	.02	.40	743	1.01	3,910	48	3.4	1,150	7.3
July 11-24	1,240	20	2.20	2.40	3.61	.33	3.51	3.62	1.30	.02	.04	.32	518	.70	868	42	2.4	810	7.2
July 25-Aug.3,5-7	281	15	2.05	2.33	4.13	.38	3.88	3.60	1.52	.04	.05	.34	538	.73	205	46	2.8	863	7.6
Total or weighted average[b].....	77,140	13	2.64	2.82	5.31	0.36	4.75	4.25	1.86	0.02	0.03	0.30	672	0.91	70,470	48	3.2	1,030	--

a Includes 0.27 equivalent per million of carbonate (CO_3).
b Represents 100 percent of runoff for water year October 1957 to September 1958.

PLATTE RIVER BASIN

6B-6560. 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 1958 (discontinued).
Water temperatures: October 1951, April to September 1952, March to September 1953, May to August 1954, November 1954 to September 1958 (discontinued).
Sediment records: April 1947 to June 1953.
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 1,010 micromhos Apr. 26; minimum daily, 466 micromhos Aug. 1.
Percent sodium: Maximum, 37 Apr. 24 to May 6; minimum, 26 July 11-20, 21-31, Sept. 1-30.
EXTREMES, 1951-58.--Specific conductance: Maximum daily (1954-58), 1,430 micromhos Mar. 1, 1957; minimum daily, 354 micromhos June 27, 1955.
Percent sodium: Maximum, 43 Apr. 26 to May 14, 1957; minimum, 24 June 27, 1955, June 19 to July 11, 1956.
REMARKS.--Values reported for dissolved solids are residues at 180°C. During period December 1950 to Nov. 4, 1954 samples collected at gaging station. Records of specific conductance of daily samples available in district office at Worland, Wyo. Records of discharge for water year October 1957 to September 1958 given in WSP 1560. No appreciable inflow between gaging station and sampling station except during periods of heavy local precipitation.

Chemical analyses, water year October 1957 to September 1958

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. 1-12, 1957	288	--	4.36		2.22	--	2.66	3.58	--	--	--	--	419	0.57	164	34	1.5	638	7.6
Oct. 13-18	131	--	5.02		2.70	--	3.03	4.29	--	--	--	--	492	.67	88	35	1.7	734	7.8
Oct. 19-Nov. 30	873	--	5.62		2.96	--	3.34	--	--	--	--	--	558	.76	663	34	1.8	816	7.8
Dec. 1-31	678	12	3.74	2.04	3.09	0.14	3.44	4.87	0.56	0.03	0.01	0.10	558	.76	515	34	1.8	831	7.8
Jan. 1-31, 1958	768	--	5.92		3.13	--	3.51	--	--	--	--	--	577	.78	599	35	1.8	852	7.8
Feb. 1-28	722	--	6.08		3.22	--	3.47	--	--	--	--	--	570	.78	563	35	1.8	866	7.7
Mar. 1-31	859	9.5	3.64	2.24	3.26	.14	3.44	5.14	.54	.02	.01	.12	580	.79	679	35	1.9	854	8.0
Apr. 1-23	25,560	--	5.74		3.05	--	3.18	--	--	--	--	--	572	.78	19,940	35	1.8	832	7.4
Apr. 24-May 6	24,570	--	6.46		3.83	--	3.21	--	--	--	--	--	673	.92	22,600	37	2.1	964	7.5
May 7-12	11,480	--	5.76		3.26	--	2.93	--	--	--	--	--	589	.80	9,180	36	1.9	860	7.1
May 13-20	24,580	--	5.22		2.87	--	2.82	--	--	--	--	--	521	.71	17,450	35	1.8	775	7.4
May 21-28	48,480	--	4.50		2.09	--	2.61	--	--	--	--	--	432	.59	28,600	32	1.4	645	7.4

May 29-June 30, 1958	141,900	12	2.59	1.29	1.70	0.10	2.46	2.81	0.31	0.02	0.01	0.10	360	0.49	69,530	30	1.2	543	7.3
July 1-10	86,340	--	3.62		1.31	--	2.52	--	--	--	--	--	315	.43	37,130	27	1.0	481	7.6
July 11-20	95,560	--	3.58		1.26	--	2.61	--	--	--	--	--	312	.42	40,140	26	.9	474	7.9
July 21-31	96,580	--	3.58		1.26	--	2.59	--	--	--	--	--	311	.42	40,560	26	.9	474	7.8
Aug. 1-31.....	296,600	--	3.60		1.31	--	2.56	--	--	--	--	--	316	.43	127,500	27	1.0	479	7.4
Sept. 1-30	192,800	--	3.94		1.39	--	2.70	--	--	--	--	--	347	.47	90,620	26	1.0	521	7.2
Total or weighted average[a].....	1,049,000	--	3.92		1.57	--	2.62	--	--	--	--	--	355	0.48	503,500	29	1.1	535	--

a Represents 100 percent of runoff for water year October 1957 to September 1958.

PLATTE RIVER BASIN

6B-7660. 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 1958.
Water temperatures: March 1951 to September 1958.
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 1,240 micromhos Mar. 3 (chan. 1); minimum daily, 313 micromhos July 19 (chan. 4).
Percent sodium: Maximum, 39 Aug. 5-20; minimum, 29 Mar. 10-31.
EXTREMES, 1951-58.--Specific conductance: Maximum daily, 1,240 micromhos Mar. 3, 1958 (chan. 1); minimum daily, 305 micromhos Jan. 13, 1956, Jan. 10, 1957 (chan. 1).
Percent sodium: Maximum, 46 Aug. 1-22, 1955; minimum, 22 Nov. 26, 1952.
REMARKS.--Values reported for dissolved solids are residues 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 1957 to September 1958 given in WSP 1560.

Chemical analyses, water year October 1957 to September 1958

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										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)	Boron (B) ppm	Parts per million	Tons per acre-foot	Total tons				
Oct. 1-31, 1957..	12,980	--	4.28		2.18	--	3.77	--	--	--	--	--	438	0.60	7,790	34	1.5	640	7.6
Nov. 1-30	11,650	--	4.46		2.18	--	3.87	--	--	--	--	--	440	.60	6,990	33	1.5	648	8.0
Dec. 1-9	3,080	--	4.76		2.26	--	3.95	--	--	--	--	--	455	.62	1,910	32	1.5	680	7.8
Dec. 10-12	1,020	--	5.22		2.57	--	4.21	--	--	--	--	--	517	.70	714	33	1.6	757	8.0
Dec. 13-31	7,880	40	3.19	1.25	2.09	0.26	3.64	2.71	0.45	0.03	0.03	0.07	436	.59	4,650	31	1.4	642	7.9
Jan. 1-5, 1958...	3,810	--	5.36		2.91	--	4.06	--	--	--	--	--	548	.75	2,860	35	1.8	794	7.9
Jan. 6-31	11,990	--	4.28		1.96	--	3.57	--	--	--	--	--	424	.58	6,950	31	1.3	624	7.8
Feb. 1-5	1,970	--	4.88		2.31	--	3.67	--	--	--	--	--	488	.66	1,300	32	1.5	706	7.6
Feb. 6-11	2,490	--	4.72		2.22	--	3.70	--	--	--	--	--	474	.64	1,590	32	1.5	685	7.7
Feb. 12-15	2,010	--	5.76		2.83	--	4.00	--	--	--	--	--	571	.78	1,570	33	1.7	820	7.7
Feb. 16-17	752	--	4.40		1.87	--	3.61	--	--	--	--	---	431	.59	444	30	1.3	623	7.3
Feb. 18-20	1,520	--	4.16		1.87	--	3.41	--	--	--	--	---	412	.56	851	31	1.3	600	7.5
Feb. 21-26	4,290	--	3.92		1.78	--	3.11	--	--	--	--	---	383	.52	2,230	31	1.3	565	7.3
Feb. 27-28	912	--	6.96		3.44	--	4.20	--	--	--	--	--	682	.93	848	33	1.8	975	7.7
Mar. 1-4.....	5,800	--	8.08		4.35	--	4.20	--	--	--	--	--	817	1.11	6,440	35	2.2	1,140	7.5

Mar. 5-9, 1958 ..	3,820	--	5.24	2.44	--	3.61	--	--	--	--	--	517	0.70	2,670	32	1.5	751	7.4
Mar. 10-31	18,320	34	3.24 | 1.26	1.96	0.24	3.59	2.54	0.39	0.03	0.03	0.09	427	.58	10,630	29	1.3	627	7.6
Apr. 1-22	17,040	--	4.76	2.26	--	3.57	--	--	--	--	--	466	.64	10,910	32	1.5	665	7.5
Apr. 23-25	2,960	--	4.64	2.18	--	3.47	--	--	--	--	--	458	.62	1,640	32	1.4	670	7.3
Apr. 26-May 12..	9,480	--	4.70	2.16	--	3.62	--	--	--	--	--	457	.62	5,880	32	1.4	676	7.5
May 13-16	7,040	--	3.58	1.61	--	3.16	--	--	--	--	--	350	.48	3,380	31	1.2	523	7.3
May 17-19.....	6,230	--	5.40	2.65	--	3.59	--	--	--	--	--	536	.73	4,550	33	1.6	777	7.3
May 20-31.....	83,370	--	7.32	3.65	--	3.44	--	--	--	--	--	724	.98	81,700	33	1.9	1,020	7.5
June 1-11.....	60,750	35	4.29 | 2.17	3.18	.38	3.26	5.79	.73	.04	.01	.15	640	.87	52,850	32	1.6	914	7.2
June 12-27	7,620	--	4.92	2.39	--	3.44	--	--	--	--	--	483	.66	5,030	33	1.5	712	7.3
June 28-July 4 ...	2,550	--	6.06	3.00	--	3.36	--	--	--	--	--	607	.83	2,120	33	1.7	867	7.3
July 5-8.....	1,530	--	5.02	2.39	--	3.54	--	--	--	--	--	512	.70	1,070	32	1.5	739	7.4
July 9-10.....	1,070	--	5.78	2.87	--	3.11	--	---	--	--	--	596	.81	867	33	1.7	859	7.4
July 11-31.....	16,790	--	4.44	2.04	--	3.39	--	--	--	--	--	437	.59	9,910	31	1.4	646	7.3
Aug. 1-4	1,860	--	5.06	2.52	--	3.97	--	--	--	--	--	518	.70	1,300	33	1.6	755	7.7
Aug. 5-20	39,880	--	4.22	2.74	--	3.92	--	--	--	--	--	473	.64	25,520	39	1.9	702	7.6
Aug. 21-Sept. 10.	7,520	--	4.42	2.52	--	3.47	--	--	--	--	--	476	.65	4,690	36	1.7	705	7.2
Sept. 11-30.....	7,490	35	3.19 | 1.41	2.52	.28	3.57	3.23	.54	.03	.02	.11	477	.65	4,870	34	1.7	696	7.4
Total or weighted average [a]	367,500	--	5.54	2.78	--	3.54	--	--	--	--	--	555	0.75	277,100	33	1.7	801	--

a Represents 100 percent of runoff for water year October 1957 to September 1958.

PLATTE RIVER BASIN--Continued

6B-7657. 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 1958.
Water temperatures: March 1951 to September 1958.
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 1,440 micromhos Mar. 1; minimum daily, 641 micromhos Oct. 20.
Percent sodium: Maximum, 41 Oct. 1-31; minimum, 33 Feb. 27-28, May 17-19, June 1-11.
EXTREMES, 1951-58.--Specific conductance: Maximum daily, 1,440 micromhos Mar. 1, 1958; minimum daily, 403 micromhos Jan. 9, 1957.
Percent sodium: Maximum, 48 Aug. 1 to Sept. 15, 1955; minimum, 32 Feb. 25 to Mar. 22, May 19-28, 1957.
REMARKS.--Values reported for dissolved solids are residues 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 1957 to September 1958 given in reports of State Engineer.

Chemical analyses, water year October 1957 to September 1958

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, 1957 ..	72,970	--	4.22		3.96	--	3.59	--	--	--	--	--	478	0.65	47,430	41	2.0	706	7.7
Nov. 1-30	63,210	--	4.58		3.09	--	3.56	--	--	--	--	--	500	.68	42,980	40	2.0	727	7.8
Dec. 1-9.....	20,210	--	5.26		3.26	--	3.70	--	--	--	--	--	574	.78	15,760	38	2.0	825	7.6
Dec. 10-12.....	6,780	--	6.56		4.22	--	4.03	--	--	--	--	--	713	.97	6,580	39	2.3	1,020	7.8
Dec. 13-31.....	45,960	31	4.19	1.85	3.61	0.28	3.87	5.31	0.73	0.03	0.02	0.11	647	.88	40,440	36	2.1	925	7.7
Jan. 1-5, 1958 ...	8,080	--	7.48		4.87	--	4.39	--	--	--	--	--	803	1.09	8,810	39	2.5	1,120	8.1
Jan. 6-31.....	65,950	--	6.36		3.78	--	4.02	--	--	--	--	--	675	.92	60,670	37	2.1	959	7.9
Feb. 1-5.....	13,030	--	6.56		3.65	--	3.93	--	--	--	--	--	689	.94	12,250	36	2.0	974	7.6
Feb. 6-11.....	16,190	--	8.00		4.87	--	4.29	--	--	--	--	--	822	1.12	18,130	38	2.4	1,160	7.8
Feb. 12-15.....	9,760	--	8.96		5.26	--	4.49	--	--	--	--	--	912	1.24	12,100	37	2.5	1,270	7.7
Feb. 16-17.....	5,450	--	7.88		4.44	--	4.23	--	--	--	--	--	800	1.09	5,940	36	2.2	1,120	7.6
Feb. 18-20.....	8,150	--	9.24		4.83	--	4.52	--	--	--	--	--	931	1.27	10,350	34	2.3	1,280	7.8
Feb. 21-26.....	17,490	--	8.24		4.44	--	4.20	--	--	--	--	--	842	1.15	20,110	35	2.2	1,170	7.5
Feb. 27-28.....	3,420	--	5.80		2.91	--	3.57	--	--	--	--	--	584	.79	2,700	33	1.7	835	7.6
Mar. 1-4	5,820	--	9.84		5.44	--	4.39	--	--	--	--	--	1,010	1.37	7,700	36	2.5	1,360	7.5

Mar. 5-9, 1958...	12,580	--	7.28		3.78	--	3.84	--	--	--	--	--	735	1.00	12,580	34	2.0	1,030	7.3
Mar. 10-31.....	63,510	27	5.44	2.72	4.35	0.26	4.06	7.58	0.93	0.03	0.03	0.18	819	1.11	70,500	34	2.1	1,140	7.7
Apr. 1-22.....	77,430	--	8.60		4.79	--	3.65	--	--	--	--	--	885	1.20	92,920	36	2.3	1,220	7.1
Apr. 23-25.....	10,650	--	8.74		5.09	--	3.36	--	--	--	--	--	921	1.25	13,310	37	2.4	1,260	7.4
Apr. 26-May 12 ..	47,310	--	7.36		4.26	--	3.33	--	--	--	--	--	773	1.05	49,680	37	2.2	1,080	7.2
May 13-16	13,860	--	6.72		3.87	--	3.20	--	--	--	--	--	702	.95	13,170	37	2.1	997	7.2
May 17-19	11,480	--	7.80		3.78	--	3.46	--	--	--	--	--	773	1.05	12,050	33	1.9	1,070	7.3
May 20-31	46,910	--	7.60		3.87	--	3.38	--	--	--	--	--	764	1.04	48,790	34	2.0	1,070	7.4
June 1-11.....	39,890	34	4.64	2.50	3.65	.22	3.29	6.62	.82	.04	.01	.16	704	.96	38,290	33	1.9	997	7.2
June 12-27.....	40,260	--	6.40		3.48	--	3.38	--	--	--	--	--	652	.89	35,830	35	1.9	939	7.5
June 28-July 4 ...	18,270	--	7.22		3.83	--	3.36	--	--	--	--	--	757	1.03	18,820	35	2.0	1,050	7.1
July 5-8	12,560	--	6.70		3.57	--	3.21	--	--	--	--	--	704	.96	12,060	35	2.0	991	7.4
July 9-10	6,150	--	6.80		3.61	--	3.15	--	--	--	--	--	706	.96	5,900	35	2.0	1,010	7.3
July 11-31	68,230	--	6.34		3.31	--	3.25	--	--	--	--	--	660	.90	61,410	34	1.9	938	7.2
Aug. 1-4	14,740	--	6.92		3.78	--	3.20	--	--	--	--	--	731	.99	14,590	35	2.0	1,030	7.4
Aug. 5-20.....	64,840	--	6.30		3.70	--	3.41	--	--	--	--	--	687	.93	60,300	37	2.1	985	7.4
Aug. 21-Sept. 10 .	67,020	--	5.26		3.35	--	3.47	--	--	--	--	--	572	.78	52,280	39	2.1	848	7.1
Sept. 11-30	54,000	29	3.09	1.47	2.91	.26	3.59	3.66	.56	.03	.02	.12	497	.68	36,720	38	1.9	739	7.4
Total or weighted average[a]	1,032,000	--	6.54		3.74	--	3.62	--	--	--	--	--	685	0.93	961,200	36	2.1	972	--

a Represents 100 percent of runoff for water year October 1957 to September 1958.

6B-7640. SOUTH PLATTE RIVER AT JULESBURG, COLO.

LOCATION.--At gaging station at bridge on State Highway 51, 0.9 mile (revised) southeast of Julesburg, Sedgwick County, 3 miles upstream from Colorado-Nebraska State line, and 8 miles downstream from Lodgepole Creek.
DRAINAGE AREA.--22,800 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1958.
Water temperatures: October 1945 to September 1958.
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 2,000 micromhos Oct. 16-18; minimum daily, 807 micromhos June 1-2.
Percent sodium: Maximum, 38 June 25-30, July 3-25; minimum, 33 May 11 to June 7.
EXTREMES, 1945-58.--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 at 180°C. Records of specific conductance of daily samples available in district office at Lincoln, Nebr. Records of discharge for water year October 1957 to September 1958 given in WSP 1560.

Chemical analyses, water year October 1957 to September 1958

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, 1957	15,940	--	14.40		7.83	--	4.98	--	--	--	--	--	1,550	2.11	33,630	35	2.9	1,960	7.7
Nov. 1-30	22,350	--	14.80		8.18	--	5.28	--	--	--	--	--	1,560	2.12	47,380	36	3.0	1,970	7.5
Dec. 1-Jan. 2, 1958	31,340	26	9.73	4.75	7.87	0.38	5.47	14.78	1.72	0.04	0.04	0.22	1,480	2.01	62,990	35	2.9	1,890	7.7
Jan. 3-31	54,590	--	14.08		7.18	--	5.54	--	--	--	--	--	1,420	1.93	105,400	34	2.7	1,840	7.8
Feb. 1-18	30,530	--	13.88		7.35	--	5.11	--	--	--	--	--	1,400	1.90	58,010	35	2.8	1,800	8.0
Feb. 19-Mar. 7	20,480	--	14.12		7.53	--	4.98	--	--	--	--	--	1,460	1.99	40,760	35	2.8	1,840	7.5
Mar. 8-31	40,670	19	8.73	5.03	7.13	.28	4.93	14.18	1.61	.05	.09	.24	1,430	1.94	78,900	34	2.7	1,790	7.8
Apr. 1-17	37,210	--	12.76		6.96	--	4.56	--	--	--	--	--	1,340	1.82	67,720	35	2.8	1,720	7.4
Apr. 18-22	6,640	--	13.88		8.00	--	4.79	--	--	--	--	--	1,470	2.00	13,280	37	3.0	1,860	7.5
Apr. 23-27	6,870	--	11.84		6.53	--	4.21	--	--	--	--	--	1,250	1.70	11,680	36	2.7	1,630	7.5
Apr. 28	2,700	--	13.28		7.22	--	4.67	--	--	--	--	--	1,410	1.92	5,180	35	2.8	1,800	7.6
Apr. 29-May 6	25,980	--	10.40		5.79	--	3.95	--	--	--	--	--	1,070	1.46	37,930	36	2.5	1,430	7.4
May 7-10	9,820	--	11.76		6.44	--	4.31	--	--	--	--	--	1,210	1.65	16,200	35	2.7	1,590	7.3
May 11-24	136,600	--	7.64		3.83	--	3.08	--	--	--	--	--	757	1.03	140,770	33	2.0	1,060	7.3
May 25	12,830	--	5.76		2.78	--	2.85	--	--	--	--	--	560	.76	9,750	33	1.6	809	7.4

May 26-June 7, 1958	134,800	--	6.24	3.09	--	2.92	--	--	--	--	--	606	0.82	110,500	33	1.8	879	7.5
June 8-14	14,570	--	9.00	4.87	--	3.64	--	--	--	--	--	902	1.23	17,920	35	2.3	1,250	7.5
June 15-23	11,010	20	6.89 | 4.13	6.22	0.31	4.06	11.78	1.33	0.04	0.01	0.22	1,170	1.59	17,510	35	2.7	1,520	7.4
June 24	1,090	--	6.64	3.35	--	2.98	--	--	--	--	--	676	.92	1,000	34	1.8	937	7.4
June 25-30	6,390	--	11.36	7.00	--	3.56	--	---	--	--	--	1,230	1.67	10,670	38	2.9	1,610	7.4
July 1-2	2,460	--	8.90	5.09	--	3.23	--	--	--	---	--	941	1.28	3,150	36	2.4	1,270	7.5
July 3-25	20,810	--	11.36	6.92	--	4.02	--	--	--	--	--	1,200	1.63	33,920	38	2.9	1,580	7.4
July 26	928	--	7.08	3.96	--	3.47	--	--	--	--	--	740	1.01	937	36	2.1	1,030	7.3
July 27-31	2,670	--	11.64	6.87	--	3.90	--	--	--	--	--	1,260	1.71	4,570	37	2.9	1,630	7.3
Aug. 1-28	3,110	--	11.48	6.22	--	3.93	--	--	--	--	--	1,220	1.66	5.160	35	2.6	1,600	7.4
Aug. 29-Sept. 19	2,420	--	11.76	6.53	--	3.97	--	--	--	--	---	1,260	1.71	4,140	36	2.7	1,630	7.2
Sept. 20-30	2,750	30	8.33 | 4.45	7.22	.38	4.29	13.97	1.72	.04	.04	.25	1,380	1.88	5,170	35	2.9	1,770	7.5
Total or weighted average [a]	657,500	--	10.36	5.48	--	4.00	--	--	--	--	--	1,060	1.44	944,200	35	2.4	1,400	--

a Represents 100 percent of runoff for water year October 1957 to September 1958.

KANSAS RIVER BASIN

REPUBLICAN RIVER ABOVE MEDICINE CREEK AT CAMBRIDGE, NEBR.

LOCATION (revised).--At bridge on State Highway 47, 2 miles upstream from gaging station at Cambridge, Furnas County, 1.5 miles upstream from Medicine Creek, and 3.3 miles upstream from Cambridge diversion dam.
DRAINAGE AREA.--13,200 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: December 1950 to September 1958.
Water temperatures: December 1950 to September 1958.
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 658 micromhos Jan. 4; minimum daily, 331 micromhos July 23.
Percent sodium: Maximum, 25 May 17 to June 16, Aug 16 to Sept. 14; minimum, 12 July 20-25.
EXTREMES, 1950-58.--Specific conductance: Maximum daily (1951-58), 830 micromhos Aug. 21, 1952; minimum daily, 267 micromhos Aug.17, 1954.
Percent sodium: Maximum, 31 Sept. 7-8, 19-21, 1955, Aug. 8-29, 1957; minimum, 9 July 11-14, 1953.
REMARKS.--Values reported for dissolved solids are residues at 180°C. Records of specific conductance of daily samples available in district office at Lincoln, Nebr. Water discharge computed by subtracting the discharge of Medicine Creek below Harry Strunk Lake from that of the Republican River at Cambridge. Records of discharge for the gaging stations for water year October 1957 to September 1958 given in WSP 1560.

Chemical analyses, water year October 1957 to September 1958

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, 1957.	8,860	--	3.94		1.00	--	4.23	--	--	--	--	--	320	0.44	3,900	20	0.7	485	7.8
Nov. 1-30	12,880	--	4.28		1.09	--	4.59	--	--	--	--	--	335	.46	5,920	20	.7	524	7.6
Dec. 1-31	10,190	50	3.09	1.47	1.17	0.33	4.85	0.79	0.24	0.05	0.04	0.09	361	.49	4,990	19	.8	549	7.5
Jan. 1-5, 1958..	1,250	--	5.34		1.39	--	5.62	--	--	--	--	--	432	.59	738	21	.9	638	7.8
Jan. 6-31.....	13,130	--	4.12		1.04	--	4.36	--	--	--	--	--	338	.46	6,040	20	.7	507	7.6
Feb. 1-28	24,250	--	3.76		1.13	--	3.90	--	--	--	--	--	311	.42	10,190	23	.8	493	7.2
Mar. 1-31.....	36,980	32	2.59	1.35	1.13	.33	4.10	.96	.22	.05	.05	.09	332	.45	16,640	21	.8	506	7.6
Apr. 1-30	40,140	--	4.00		1.26	--	4.08	--	--	--	--	--	335	.46	18,460	24	.9	514	7.2
May 1-13.....	15,360	--	3.94		1.26	--	4.02	--	--	--	--	--	331	.45	6,910	24	.9	514	7.4
May 14-16.....	6,790	--	3.18		.78	--	3.29	--	--	--	--	--	258	.35	2,380	20	.6	402	7.3

May 17-June 16, 1958	30,930	--	3.82	1.26	--	3.98	--	--	--	--	--	331	0.45	13,920	25	0.9	514	7.5
June 17-23	6,100	26	2.35 | 1.17	1.04	0.36	3.61	0.98	0.22	0.05	0.05	0.12	293	.40	2,440	21	.8	459	7.1
June 24-July 3	5,550	--	3.76	1.22	--	3.93	--	--	--	--	--	324	.44	2,440	24	.9	499	7.6
July 4-10	4,830	--	3.38	.87	--	3.49	--	--	--	--	--	286	.39	1,880	20	.7	439	7.5
July 11-19	4,010	--	3.66	1.13	--	3.84	--	--	--	--	--	314	.43	1,720	24	.8	482	7.3
July 20-25	12,000	--	3.00	.40	--	3.18	--	--	--	--	--	233	.32	3,840	12	.3	358	7.4
July 26-28	1,310	--	3.52	.78	--	3.79	--	--	--	--	--	290	.39	511	18	.6	449	7.5
July 29-Aug. 15	5,450	--	3.68	1.13	--	3.75	--	--	--	--	--	317	.43	2,340	23	.8	494	7.1
Aug. 16-Sept. 14	11,750	--	3.50	1.17	--	3.57	--	--	--	--	--	309	.42	4,940	25	.9	486	7.0
Sept. 15-30	8,640	29	2.40 | 1.22	1.22	.36	3.75	1.06	.20	.05	.06	.11	312	.42	3,630	23	.9	485	7.5
Total or weighted average[a]	260,400	--	3.84	1.13	--	4.00	--	--	--	--	--	321	0.44	113,800	23	0.8	495	--

a Represents 100 percent of runoff for water year October 1957 to September 1958.

PART 7. LOWER MISSISSIPPI RIVER BASIN

ARKANSAS RIVER BASIN

7-1305. 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 1958 (daily samples).
Water temperatures: January 1951 to September 1958.
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 4,040 micromhos Apr. 21; minimum daily, 946 micromhos Oct 6-7.
Percent sodium: Maximum, 38 Nov. 2-30, Feb. 2 to Apr. 22, May 15-19, 27-28; minimum, 30 Oct. 1-31, July 1-31.
EXTREMES, 1951-58.--Specific conductance: Maximum daily, 5,180 micromhos Apr. 21, 1955; minimum daily, 818 micromhos Aug. 17, 20, 1957.
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 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 1957 to September 1958 given in WSP 1561.

Chemical analyses, water year October 1957 to September 1958

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, 1957.	20,890	13	5.74	2.47	3.57	--	2.59	8.58	0.62	0.04	0.04	0.14	802	1.09	22,770	30	1.8	1,090	7.4
Nov. 1	22	--	9.53	5.51	8.26	--	3.47	--	--	--	--	--	1,630	2.22	49	35	3.0	2,020	7.7
Nov. 2-30	356	--	12.87	9.38	13.40	--	5.67	--	--	--	--	--	2,280	3.10	1,100	38	4.0	2,910	7.8
Dec. 1-31.....	334	--	13.87	10.36	13.92	--	6.56	--	--	--	--	--	2,700	3.67	1,230	36	4.0	3,070	7.7
Jan. 1-Feb. 1, 1958	481	18	14.07	9.95	14.09	--	6.23	28.94	2.48	.04	.05	.29	2,680	3.64	1,750	37	4.1	3,080	7.8
Feb. 2-28	313	--	14.87	11.76	16.01	--	6.44	--	--	--	--	--	3,040	4.13	1,290	38	4.4	3,420	7.7
Mar. 1-31.....	356	26	14.37	12.43	16.70	0.09	6.75	33.52	3.02	.04	.05	.37	3,010	4.09	1,460	38	4.6	3,260	7.6
Apr. 1-22	256	--	15.47	13.33	17.49	--	6.64	--	--	--	--	--	3,150	4.28	1,100	38	4.6	3,460	7.8
Apr. 23-30	2,090	--	7.58	4.92	5.92	--	3.28	--	--	--	--	--	1,260	1.71	3,570	32	2.4	1,580	7.5
May 1-14.....	5,480	--	7.29	5.11	5.48	--	3.41	--	--	--	--	--	1,150	1.56	8,550	31	2.2	1,480	7.6
May 15-19, 27-28	156	--	13.22	10.38	14.70	--	5.02	--	--	--	--	--	2,660	3.62	565	38	4.3	2,980	7.6
May 20-26.....	1,120	--	7.98	5.62	6.35	--	3.34	--	--	--	--	--	1,350	1.84	2,060	32	2.4	1,660	7.7
May 29-June 2 ..	571	--	9.28	6.22	7.83	--	3.82	--	--	--	--	--	1,610	2.19	1,250	34	2.8	1,930	7.4
June 3-30	23,590	--	7.48	4.42	5.35	--	3.06	--	--	--	--	--	1,170	1.59	37,510	31	2.2	1,450	7.6

July 1-31, 1958 .	32,500	16	7.14	4.66	5.13	0.08	3.00	12.64	0.93	0.04	0.03	0.16	1,130	1.54	50,050	30	2.1	1,420	7.5
Aug. 1-31	55,100	--	6.94	4.06	5.00	--	2.85	--	--	--	--	--	1,120	1.52	83,750	31	2.1	1,390	7.5
Sept. 1-30.....	47,910	--	7.09	4.51	5.18	--	2.77	--	--	--	--	--	1,160	1.58	75,700	31	2.2	1,440	7.6
Total or weighted average	191,500	--	7.04	4.28	5.13	--	2.92	--	--	--	--	--	1,130	1.54	294,900	31	2.2	1,410	--

ARKANSAS RIVER BASIN--Continued

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

LOCATION.--At gaging station on bridge at U. S. Highway 166, half a mile west of Arkansas City, Cowley County, and 5.4 miles upstream from Walnut River.
DRAINAGE AREA.--43,713 square miles, of which 7,607 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: October 1951 to September 1958.
Water temperatures: October 1951 to September 1958.
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 2,690 micromhos Feb. 11-20; minimum daily, 419 micromhos Sept. 17-20.
Percent sodium: Maximum, 62 Oct. 21-23, Nov. 1-18, 23-30, Feb. 1-10; minimum, 42 Aug. 1-4.
EXTREMES, 1951-58.--Specific conductance: Maximum daily, 5,770 micromhos Jan. 16, 1957; minimum daily, 259 micromhos Oct. 4, 1955.
Percent sodium: Maximum, 79 Apr. 28, 1955; minimum, 36 May 27-29, 1955.
REMARKS.--Values reported for dissolved solids are residues 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 1957 to September 1958 given in WSP 1561.

Chemical analyses, water year October 1957 to September 1958

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, 1957.	24,220	22	4.64	1.89	9.22		3.87	3.48	9.16	0.03	0.11	0.34	1,000	1.36	32,970	59	5.1	1,710	8.2
Oct. 11-20	21,680	--	5.09	2.51	10.76		4.13	3.75	10.43	--	.05	--	1,110	1.51	32,760	59	5.5	1,890	7.6
Oct. 21-23.....	6,110	--	5.69	2.21	12.69		4.39	4.02	12.13	--	.05	--	1,250	1.70	10,400	62	6.4	2,090	8.2
Oct. 24-31.....	30,530	--	3.94	1.58	8.66		3.25	2.71	8.18	--	.04	--	859	1.17	35,690	61	5.2	1,440	7.9
Nov. 1-10	28,130	--	5.09	2.21	11.68		4.13	3.69	11.00	--	.16	--	1,110	1.51	42,500	62	6.1	1,850	8.1
Nov. 11-18	21,780	--	5.69	2.31	13.22		4.33	4.60	12.13	--	.16	--	1,270	1.73	37,650	62	6.6	2,190	8.1
Nov. 19-20.....	10,930	--	3.49	1.55	5.84		2.95	2.75	5.08	--	.10	--	649	.88	9,660	54	3.7	1,090	7.9
Nov. 21-22	6,430	--	4.29	1.91	8.71		3.44	3.73	7.61	--	.13	--	898	1.22	7,860	58	4.9	1,500	8.0
Nov. 23-30.....	19,340	--	5.79	2.61	13.52		4.39	5.10	12.27	--	.16	--	1,310	1.78	34,490	62	6.6	2,190	7.9
Dec. 1-10	20,490	--	6.59	3.21	13.21		4.98	6.18	11.70	--	.15	--	1,480	2.01	41,290	57	6.0	2,390	7.5
Dec. 11-20.....	17,990	--	6.89	3.01	14.55		4.72	6.58	12.97	--	.18	--	1,510	2.05	36,990	60	6.5	2,410	7.9
Dec. 21-31.....	20,820	--	6.89	2.91	14.35		4.62	6.54	12.83	--	.16	--	1,480	2.01	41,950	59	6.5	2,400	8.1
Jan. 1-10, 1958.	17,600	17	6.79	2.91	14.75		4.69	7.06	12.83	.02	.16	.54	1,470	2.00	35,210	60	6.7	2,450	8.0
Jan. 11-20.....	19,090	--	6.64	2.96	15.01		4.52	6.91	12.97	--	.21	--	1,520	2.07	39,500	61	6.9	2,410	8.2
Jan. 21-31.....	24,580	--	6.39	3.11	14.97		4.46	6.85	12.97	--	.19	--	1,490	2.03	49,840	61	6.9	2,440	8.0

Feb. 1-10, 1958..	20,130	--	6.89	3.11	16.35	4.69	7.12	14.38	--	0.16	--	1,600	2.18	43,840	62	7.3	2,570	8.1
Feb. 11-20	15,630	--	7.48	3.42	16.94	5.05	7.35	15.23	--	.21	--	1,680	2.28	35,740	61	7.3	2,690	8.1
Feb. 21-28	20,140	--	6.09	2.81	14.01	4.29	6.39	12.07	--	.16	--	1,380	1.88	37,830	61	6.6	2,240	8.1
Mar. 1-7	22,650	--	5.84	2.86	11.86	3.67	6.04	10.29	--	.19	--	1,320	1.80	40,700	58	5.7	2,050	8.2
Mar. 8	7,160	--	2.99	.93	4.56	2.43	2.08	3.89	--	.08	--	538	.73	5,240	54	3.3	888	8.1
Mar. 9-10.....	24,610	--	4.84	2.26	9.65	3.31	4.60	8.74	--	.10	--	1,080	1.47	36,190	58	5.1	1,710	8.1
Mar. 11-13	36,400	--	2.94	.98	4.41	2.16	2.04	4.00	--	.13	--	553	.75	27,400	53	3.2	885	8.0
Mar. 14-15	16,720	--	3.39	1.41	6.23	2.49	2.89	5.50	--	.15	--	709	.96	16,140	56	4.0	1,130	8.1
Mar. 16-22	44,650	--	4.39	2.11	8.90	3.15	4.08	7.11	--	.16	--	936	1.27	56,890	55	4.4	1,460	8.0
Mar. 23-29	80,390	--	3.29	1.31	5.18	2.36	2.73	4.57	--	.12	--	646	.68	70,690	53	3.4	1,010	7.8
Mar. 30-31	39,070	--	2.79	1.17	3.66	2.23	2.75	3.05	--	.09	--	509	.69	27,070	48	2.6	782	8.0
Apr. 1-5.....	78,840	--	2.64	.96	3.55	2.23	1.77	3.07	--	.08	--	457	.62	49,050	50	2.6	881	8.2
Apr. 6-10	36,650	--	4.14	1.66	6.67	2.98	3.44	5.92	--	.13	--	790	1.07	39,420	53	3.9	1,290	8.2
Apr. 11-20	50,660	--	5.69	2.41	10.84	3.87	5.43	9.31	--	.13	--	1,180	1.60	81,370	57	5.3	1,780	8.0
Apr. 21-30	43,240	--	5.99	2.61	11.78	3.77	6.35	10.15	--	.11	--	1,300	1.77	76,520	58	5.7	2,040	8.0
May 1-5	29,870	--	4.74	2.86	8.20	a3.41	4.52	7.76	--	.11	--	982	1.34	39,930	52	4.2	1,570	8.3
May 6-10	63,290	--	2.59	1.01	4.32	2.10	1.81	3.95	--	.06	--	510	.69	43,940	55	3.2	842	8.0
May 11-20	62,160	17	4.19	1.41	8.31	2.95	3.60	7.47	0.02	.08	0.08	887	1.21	75,060	60	5.0	1,420	7.8
May 21-27	48,400	--	3.49	1.31	5.36	2.56	2.79	4.79	--	.04	--	643	.87	42,360	53	3.5	1,050	8.2
May 28-31	18,780	--	5.04	2.16	8.99	3.15	5.91	7.05	--	.08	--	1,020	1.39	26,080	56	4.7	1,560	8.1
June 1-10.....	42,390	--	5.19	2.41	9.25	3.08	6.50	7.19	--	.08	--	1,090	1.48	62,890	55	4.7	1,650	7.9
June 11-20.....	30,270	--	6.69	3.11	13.26	3.74	8.24	11.00	--	.08	--	1,460	1.99	60,150	58	6.0	2,230	7.9
June 22-23.....	9,800	--	4.79	2.41	8.95	3.08	5.68	7.33	--	.06	--	1,010	1.37	13,470	55	4.7	1,600	8.2
June 24-30.....	40,240	--	3.74	1.46	6.37	2.62	3.66	5.22	--	.07	--	738	1.00	40,430	55	4.0	1,090	7.8

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

ARKANSAS RIVER BASIN--Continued

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

Chemical analyses, water year October 1957 to September 1958--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 1-3, 1958 ..	18,390	--	3.34	0.98	5.29		2.52	2.87	4.17	--	0.05	--	577	0.78	14,440	55	3.6	980	8.2
July 4-10	216,700	--	1.70	.46	2.07		1.64	1.02	1.52	--	.05	--	248	.34	73,150	49	2.0	434	7.8
July 11-13	46,910	--	2.25	.47	2.72		2.20	1.02	2.17	--	.05	--	319	.43	20,370	50	2.3	553	8.1
July 14-17	41,730	--	3.04	.88	4.50		2.46	2.10	3.81	--	.05	--	510	.69	28,970	53	3.2	859	8.1
July 18-20	83,700	--	1.95	.41	2.29		1.70	1.21	1.69	--	.05	--	274	.37	31,220	49	2.1	472	7.9
July 21-30	153,300	--	2.69	.79	3.90		2.29	1.96	3.07	--	.06	--	455	.62	94,940	53	3.0	751	7.9
July 31	23,010	--	1.95	.53	2.62		1.97	.94	2.14	--	.05	--	312	.42	9,770	51	2.4	525	8.1
Aug. 1-4	110,500	--	2.00	.60	1.87		2.23	.79	1.41	--	.04	--	269	.37	40,450	42	1.6	440	8.2
Aug. 5-7.....	59,290	--	3.09	.81	3.05		b2.88	1.83	2.20	--	.04	--	418	.57	33,730	44	2.2	683	8.4
Aug. 8-10	27,730	--	3.69	1.41	4.68		b3.05	2.73	3.95	--	.05	--	589	.80	22,230	48	2.9	949	8.4
Aug. 11-20	57,680	--	5.14	1.96	8.12		c3.61	4.89	6.63	--	.09	--	947	1.29	74,350	53	4.3	1,510	8.5
Aug. 21-31.....	50,940	--	4.74	1.96	8.40		a3.58	4.12	7.33	--	.07	--	924	1.26	64,070	56	4.6	1,500	8.3
Sept. 1-6	23,880	--	5.09	2.11	9.16		3.57	4.46	8.23	--	.10	--	1,150	1.56	37,380	56	4.8	1,650	8.2
Sept. 7-10	18,530	--	3.84	1.52	7.25		d2.66	3.25	6.63	--	.07	--	804	1.09	20,280	57	4.4	1,300	8.4
Sept. 11-14	21,220	--	3.49	1.39	6.16		2.56	2.81	5.58	--	.09	--	730	.99	21,090	56	3.9	1,140	8.1
Sept. 15-16	7,480	--	4.39	1.71	8.96		2.95	3.71	8.32	--	.08	--	964	1.31	9,810	59	5.1	1,530	8.2
Sept. 17-20	94,950	--	1.85	.35	1.75		1.54	.83	1.52	--	.08	--	236	.32	30,500	44	1.7	419	7.8
Sept. 21-27	72,810	--	2.69	.79	3.78		2.29	1.46	3.44	--	.07	--	473	.64	46,880	52	2.9	761	7.8
Sept. 28-30	17,790	--	3.94	1.26	6.72		3.08	2.33	6.43	--	.08	--	784	1.07	18,990	56	4.2	1,230	7.9
Total or weighted average	2,318,000	--	3.64	1.40	6.32		2.79	3.04	5.44	--	0.09	---	707	0.96	2,231,000	56	4.0	1,140	--

a Includes 0.20 equivalent per million of carbonate (CO_3).
b Includes 0.13 equivalent per million of carbonate (CO_3).
c Includes 0.27 equivalent per million of carbonate (CO_3).
d Includes 0.07 equivalent per million of carbonate (CO_3).

7-1525. ARKANSAS RIVER AT RALSTON, OKLA.

LOCATION.--At gaging station, at bridge on State Highway 18 at Ralston, Pawnee County, 2 miles downstream from Salt Creek, and 2 miles upstream from Grayhorse Creek.
DRAINAGE AREA.--54,465 square miles, of which 7,615 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: January 1950 to September 1958.
Water temperatures: January 1950 to September 1958.
EXTREMES,1957-58.--Specific conductance: Maximum daily, 3,420 micromhos June 30; minimum daily, 363 micromhos July 13.
Percent sodium: Maximum, 78 June 30; minimum, 30 Apr. 23-29.
EXTREMES, 1950-58.--Specific conductance: Maximum daily, 7,510 micromhos Sept. 14, 1955; minimum daily, 251 micromhos Oct. 5, 1955.
Percent sodium: Maximum, 87 May 1-2, 1957; minimum, 36 July 18-20, 1950.
REMARKS.--Values reported for dissolved solids are residues 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 1957 to September 1958 given in WSP 1561.

Chemical analyses, water year October 1957 to September 1958

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, 1957 ..	46,930	18	4.94	2.06	11.27		3.61	3.44	11.84	0.02	0.07	0.26	1,150	1.56	73,460	62	6.0	1.950	8.2
Oct. 11-20.....	38,180	--	5.19	2.31	14.61		3.54	3.85	14.66	--	.06	--	1,330	1.81	69,130	66	7.5	2,310	7.6
Oct. 21-31.....	55,950	--	5.49	2.31	15.43		4.10	4.12	14.95	--	.06	--	1,380	1.68	105,100	68	7.8	2,380	8.0
Nov. 1-10	49,130	--	5.54	2.06	15.23		3.70	3.93	15.09	--	.11	--	1,360	1.85	90,960	67	7.8	2,340	8.0
Nov. 11-20	51,990	--	6.39	2.61	14.62		4.33	4.23	14.95	--	.11	--	1,420	1.93	100,500	62	6.9	2,420	7.9
Nov. 21-24.....	47,150	--	4.24	1.76	8.86		3.05	2.71	9.02	--	.08	--	890	1.21	57,120	60	5.1	1,530	7.8
Nov. 25-30	34,270	--	5.49	2.11	13.10		3.87	4.04	12.69	--	.10	--	1,240	1.67	57,650	63	6.7	2,140	7.9
Dec. 1-10.....	40,600	--	6.69	2.81	15.36		4.59	4.93	15.23	--	.11	--	1,480	2.01	81,600	62	7.0	2,500	8.1
Dec. 11-20	33,040	--	6.84	3.16	14.62		5.38	4.67	14.24	--	.13	--	1,470	2.00	66,120	59	6.5	2,430	8.2
Dec. 21-31	37,940	--	6.69	3.01	15.40		4.82	5.23	14.95	--	.10	--	1,510	2.05	77,990	61	7.0	2,530	8.1
Jan. 1-10, 1958 ..	31,640	14	6.59	3.01	14.70		a4.99	5.35	14.24	.01	.11	.55	1,450	1.97	62,440	60	6.7	2,450	8.3
Jan. 11-18.....	27,730	--	6.39	2.81	14.62		b4.92	5.08	13.68	--	.14	--	1,420	1.93	53,600	61	8.8	2,380	8.4
Jan. 19.....	3,690	--	5.44	3.16	7.27		c5.12	2.71	7.90	--	.14	--	915	1.24	4,600	46	3.5	1,560	8.5
Jan. 20-22	11,350	--	4.69	2.31	9.28		4.23	3.23	8.74	--	.08	--	982	1.34	15,170	57	5.0	1,630	8.2

a Includes 0.47 equivalent per million of carbonate (CO_3).
b Includes 0.40 equivalent per million of carbonate (CO_3).
c Includes 0.53 equivalent per million of carbonate (CO_3).

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

Chemical analyses, water year October 1957 to September 1958--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. 23, 25-28, 1958	19,320	--	5.84	3.16	14.84		4.39	5.25	14.10	--	0.10	--	1,480	2.01	38,920	62	7.0	2,440	8.2
Jan. 24, 29	7,870	--	4.49	2.21	7.63		4.36	2.66	7.19	--	.12	--	881	1.20	9,440	53	4.2	1,460	8.2
Jan. 30-31	8,010	--	6.24	3.06	16.23		4.46	5.60	15.37	--	.10	--	1,580	2.15	17,230	64	7.5	2,610	8.2
Feb. 1-9	35,480	--	6.79	3.11	15.70		4.56	5.43	15.51	--	.10	--	1,530	2.08	73,900	61	7.1	2,530	8.2
Feb. 10	3,390	--	4.59	1.71	4.04		d5.29	1.48	3.38	--	.19	--	612	.83	2,830	39	2.3	1,060	8.6
Feb. 11-16	17,930	--	6.24	2.66	10.16		5.80	3.35	9.73	--	.18	--	1,100	1.50	26,850	53	4.8	1,820	8.2
Feb. 17-20	10,370	--	5.69	2.11	3.61		6.49	1.42	3.16	--	.34	--	627	.85	8,850	32	1.8	1,050	7.9
Feb. 21	2,960	--	5.24	2.06	5.88		f5.65	1.94	5.36	--	.23	--	754	1.03	3,030	45	3.1	1,270	8.5
Feb. 22-28	25,730	--	6.14	2.76	14.52		g4.72	4.75	13.82	--	.13	--	1,390	1.89	48,680	62	6.9	2,280	8.3
Mar. 1-6	30,860	--	5.94	2.76	13.68		3.87	5.16	13.25	--	.10	--	1,360	1.85	57,140	61	6.6	2,250	8.2
Mar. 7-9	18,960	--	4.44	1.46	5.96		h3.38	2.48	5.92	--	.08	--	726	.99	18,740	50	3.5	1,250	8.4
Mar. 10-20	264,800	--	3.09	1.15	4.59		2.49	1.73	4.51	--	.10	--	535	.73	192,800	52	3.2	924	8.1
Mar. 21-24	84,500	--	3.79	1.41	5.90		2.88	2.21	5.92	--	.09	--	688	.94	79,130	53	3.7	1,170	7.9
Mar. 25-27	152,900	--	2.69	.91	3.84		2.13	1.42	3.81	--	.08	--	455	.62	94,720	52	2.9	779	7.9
Mar. 28-31	132,700	--	3.09	1.15	5.41		2.33	1.92	5.30	--	.10	--	587	.80	106,030	56	3.7	1,010	7.9
Apr. 1-5	231,500	--	2.54	1.06	4.44		2.13	1.54	4.29	--	.08	--	509	.69	160,400	55	3.3	865	7.9
Apr. 6-9	99,490	--	3.99	1.21	6.28		2.95	2.25	6.20	--	.08	--	677	.92	91,690	55	3.9	1,160	8.2
Apr. 10	17,220	--	2.69	1.15	2.02		2.79	1.06	1.92	--	.09	--	373	.51	8,740	34	1.5	661	8.2
Apr. 11-20	131,700	--	3.89	1.11	2.41		3.87	1.08	2.40	--	.06	--	424	.58	76,030	33	1.5	751	8.2
Apr. 21	9,360	--	4.69	1.71	3.78		4.43	1.77	3.89	--	.09	---	612	.83	7,800	37	2.1	1,010	8.2
Apr. 22	10,080	--	4.69	2.81	9.49		h3.06	4.10	9.73	--	.10	--	1,080	1.47	14,810	56	4.9	1,810	8.4
Apr. 23-29	62,360	--	5.34	2.46	3.37		h5.12	2.00	3.95	--	.10	--	654	.89	55,520	30	1.7	1,070	8.4
Apr. 30	7,540	--	5.49	2.91	12.44		a3.35	5.14	12.27	--	.08	--	1,280	1.74	13,130	60	6.1	2,110	8.6

a Includes 0.47 equivalent per million of carbonate (CO_3).
d Includes 0.60 equivalent per million of carbonate (CO_3).
f Includes 0.73 equivalent per million of carbonate (CO_3).
g Includes 0.33 equivalent per million of carbonate (CO_3).
h Includes 0.27 equivalent per million of carbonate (CO_3).

May 1-4, 1958...	31,890	--	5.49	2.71	12.02	3.47	4.85	11.64	--	0.06	--	1,230	1.67	53,400	59	5.9	2.050	8.2
May 5-6	28,070	--	4.09	2.01	8.21	2.88	2.91	8.46	--	.06	--	879	1.20	33,580	57	4.7	1,480	8.2
May 7-10	75,930	--	3.04	1.28	5.68	2.33	1.96	5.64	--	.07	--	612	.83	63,250	57	3.9	1,050	8.2
May 11-20	106,800	--	4.89	1.91	11.43	3.15	3.71	11.28	--	.09	--	1,100	1.50	160,000	63	6.2	1,860	8.2
May 21-31	94,670	17	4.54	1.86	9.70	2.95	3.83	9.16	0.02	.08	0.19	995	1.35	128,200	60	5.4	1,630	7.6
June 1-9	62,160	--	5.29	2.31	11.53	h3.19	5.45	10.43	--	.06	--	1,180	1.60	99,850	60	5.9	1,920	8.4
June 10-11.....	14,680	--	4.14	1.86	7.85	i2.89	3.98	6.91	--	.07	--	874	1.19	17,460	57	4.5	1,430	8.3
June 12-21.....	45,200	--	5.64	2.56	11.97	3.21	5.64	11.28	--	.04	--	1,230	1.67	75,690	59	5.9	2,040	8.0
June 22-23.....	19,680	--	3.29	1.55	6.62	2.36	2.50	6.54	--	.06	--	728	.99	19,500	58	4.3	1,210	8.2
June 24.....	19,830	--	2.15	.73	4.71	1.90	1.17	4.46	--	.06	--	466	.63	12,580	62	3.9	826	8.1
June 25-26.....	27,970	--	3.29	1.35	10.31	2.10	2.77	10.01	--	.07	--	934	1.27	35,560	69	6.8	1,610	7.9
June 27-28.....	58,510	--	2.35	.93	5.35	1.97	1.48	5.13	--	.05	--	526	.72	41,900	62	4.2	927	7.8
June 29.....	23,400	--	3.09	1.15	9.07	1.90	2.33	9.02	--	.06	--	838	1.14	26,700	68	6.3	1,430	8.1
June 30.....	21,220	--	5.39	2.11	26.63	2.03	5.81	26.23	--	.06	--	2,110	2.87	60,960	78	14	3,420	8.2
July 1.....	18,490	--	5.54	2.06	21.81	2.03	6.18	21.15	--	.05	--	2,030	2.76	51,080	74	11	3,350	8.1
July 2-4	46,610	--	5.29	1.71	14.37	2.16	5.48	13.68	--	.05	--	1,340	1.82	85,020	67	7.7	2,210	8.0
July 5	50,980	--	2.89	.79	5.06	2.10	1.79	4.79	--	.06	--	542	.74	37,610	58	3.7	928	8.1
July 6-9	356,400	--	2.15	.65	3.53	1.61	1.29	3.38	--	.05	--	398	.54	193,100	56	3.0	686	7.9
July 10.....	44,030	--	2.74	.94	8.07	1.77	1.98	7.95	--	.05	--	724	.98	43,400	69	5.9	1,260	8.1
July 11-12	67,240	--	3.29	1.19	9.83	1.87	2.75	9.64	--	.05	--	860	1.17	78,720	69	6.6	1,510	8.0
July 13	32,730	--	1.30	.34	1.91	1.16	.56	1.78	--	.05	--	216	.29	9,620	54	2.1	363	7.9
July 14-16	76,680	--	3.04	.96	5.54	2.16	1.92	5.41	--	.05	--	586	.80	61,170	58	3.9	1,000	8.0
July 17-18	29,730	--	3.94	1.34	7.03	2.66	2.69	6.91	--	.05	--	751	1.02	30,400	57	4.3	1,280	8.1
July 19-31	312,800	--	2.79	.89	4.47	2.20	1.81	4.09	--	.05	--	491	.67	209,100	55	3.3	850	8.0

h Includes 0.27 equivalent per million of carbonate (CO_3).
i Includes 0.20 equivalent per million of carbonate (CO_3).

ARKANSAS RIVER BASIN--Continued

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

Chemical analyses, water year October 1957 to September 1958--Continued

Date of collection	Runoff (acre-feet)	Silica (SiO_3) 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, 1958....	19,830	--	3.34	1.26	5.50		j2.42	2.77	4.79	--	0.12	--	616	0.84	16,630	54	3.6	1,030	8.5
Aug. 2-7	195,200	--	2.50	.70	2.83		j2.36	1.23	2.40	--	.04	--	368	.50	97,770	47	2.2	622	8.4
Aug. 8-9.....	43,830	--	3.44	1.06	4.56		2.85	2.17	4.00	--	.04	--	547	.74	32,640	50	3.0	927	7.6
Aug. 10-11.....	30,150	--	3.89	1.31	6.48		j2.95	2.71	5.92	--	.10	--	713	.97	29,260	55	4.0	1,200	8.3
Aug. 12	15,950	--	4.39	1.61	8.35		h2.83	3.00	8.46	--	.06	--	913	1.24	19,820	58	4.8	1,530	8.5
Aug. 13-20.....	87,230	--	4.24	1.56	7.18		3.02	3.37	6.49	--	.10	--	815	1.11	96,780	55	4.2	1,350	8.1
Aug. 21-31	80,090	--	4.99	3.81	7.16		i3.45	3.98	8.46	--	.07	--	979	1.33	106,700	45	3.4	1,610	8.4
Sept. 1-10	60,750	--	5.04	1.96	9.75		3.25	3.81	9.64	--	.05	--	1,070	1.46	88,490	58	5.2	1,720	8.1
Sept. 11-13	21,740	--	4.29	1.71	9.37		2.85	3.21	9.25	--	.06	--	976	1.33	28,880	61	5.4	1,580	8.1
Sept. 14-15	18,720	--	3.59	1.21	7.50		2.39	2.50	7.33	--	.08	--	800	1.09	20,390	61	4.8	1,300	8.0
Sept. 16-17	26,740	--	2.35	.81	3.37		1.93	1.23	3.33	--	.04	--	446	.61	16,230	52	2.7	698	8.1
Sept. 18	10,310	--	4.19	1.41	8.24		k2.89	2.56	8.32	--	.07	--	840	1.14	11,790	60	4.9	1,420	8.4
Sept. 19-20	87,470	--	2.30	.40	2.22		2.03	.83	2.00	--	.06	--	285	.39	33,930	45	1.9	520	8.0
Sept. 21-23	60,040	--	2.20	.40	2.87		1.84	1.02	2.54	--	.07	--	356	.48	29,100	52	2.5	582	8.0
Sept. 24-28	66,030	--	2.74	.90	4.54		2.23	1.50	4.37	--	.08	--	516	.70	46,380	56	3.4	857	7.9
Sept. 29-30	18,010	--	3.49	1.27	7.10		2.62	2.04	7.11	--	.09	--	758	1.03	18,580	60	4.6	1,240	8.1
Total or weighted average	4,403,000	--	3.69	1.40	7.05		2.75	2.50	6.82	--	0.07	--	741	1.01	4,441,000	58	4.4	1,230	--

h Includes 0.27 equivalent per million of carbonate (CO_3).
i Includes 0.20 equivalent per million of carbonate (CO_3).
j Includes 0.13 equivalent per million of carbonate (CO_3).
k Includes 0.07 equivalent per million of carbonate (CO_3).

7-1610. CIMARRON RIVER AT PERKINS, OKLA.

LOCATION.--At gaging station at bridge on State Highway 40, 1 mile south of Perkins, Payne County, 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 1958.
Water temperatures: October 1952 to September 1958.
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 16,700 micromhos Jan. 29-31; minimum daily, 771 micromhos Sept. 13.
Percent sodium: Maximum, 89 Mar. 15-19; minimum, 53 June 26.
EXTREMES, 1952-58.--Specific conductance: Maximum daily, 32,400 micromhos Mar. 18, 1957; minimum daily, 438 micromhos Oct. 5, 1955.
Percent sodium: Maximum, 94 Feb. 18-20, 1955; minimum, 53 May 21, June 24, 1957.
REMARKS.--Values reported for dissolved solids are residues 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 1957 to September 1958 given in WSP 1561.

Chemical analyses, water year October 1957 to September 1958

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, 1957..	2,202	--	7.58	3.62	49.63		4.26	5.81	50.76	--	--	--	3,740	5.09	10,300	82	21	6,270	8.1
Oct. 3-10	6,410	--	8.78	5.22	67.61		4.20	7.47	69.94	--	--	--	4,850	6.60	42,300	83	26	8,270	8.0
Oct. 11-12	1,880	--	9.18	5.72	76.03		3.64	8.33	78.96	--	--	--	5,460	7.43	13,980	84	28	9,210	8.0
Oct. 13-14, 16..	4,190	--	11.43	6.11	97.95		3.59	10.66	101.24	--	--	--	6,850	9.32	39,020	85	33	11,400	8.0
Oct. 15	1,130	--	12.13	6.57	134.84		3.56	10.95	139.03	--	--	--	9,290	12.63	14,300	88	44	15,100	8.1
Oct. 17-20	9,380	--	10.38	4.22	70.08		2.69	10.08	71.91	--	--	--	5,150	7.00	65,760	83	26	8,730	7.8
Oct. 21-23	3,680	--	9.78	4.02	75.79		3.38	8.66	77.55	--	--	--	5,330	7.25	26,710	85	29	9,030	7.9
Oct. 24-28	5,150	--	10.93	6.21	92.75		4.67	9.62	95.60	--	--	--	6,430	8.74	45,100	84	32	10,800	8.0
Oct. 29-31	3,070	--	13.82	7.18	136.11		5.34	12.74	139.03	--	--	--	9,330	12.69	39,000	87	42	15,200	8.0
Nov. 1-2	1,630	--	12.67	6.01	130.14		4.69	11.03	133.10	--	--	--	9,650	13.12	21,370	87	43	15,600	7.9
Nov. 3-10	6,280	--	11.73	6.59	98.13		4.84	10.37	101.24	--	--	--	7,670	10.43	65,560	84	32	12,600	8.2
Nov. 11-20	10,780	21	10.73	5.23	102.22		5.13	9.56	104.06	0.01	--	0.79	7,140	9.71	104,800	86	36	11,500	8.1
Nov. 21	1,200	--	11.93	6.95	119.14		4.29	11.91	121.82	--	--	--	9,040	12.29	14,770	86	39	14,700	8.2
Nov. 22	1,130	--	6.89	3.51	52.96		3.93	5.85	53.58	--	--	--	4,120	5.60	6,340	84	23	7,120	8.1
Nov. 23-26	3,870	--	11.13	6.01	97.82		4.74	10.37	99.83	--	--	--	7,490	10.19	39,500	85	33	12,200	8.1
Nov. 27-30	3,210	--	12.52	8.18	115.74		5.34	11.22	117.88	--	--	--	8,920	12.13	38,920	86	38	14,400	8.2

ARKANSAS RIVER BASIN--Continued

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

Chemical analyses, water year October 1957 to September 1958--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. 1-10, 1957..	6,720	--	10.83	8.69	105.48		5.98	11.01	108.01	--	--	--	8,200	11.15	74,990	84	34	13,400	8.1
Dec. 11-20.....	5,790	--	10.83	8.31	100.05		5.26	11.28	102.65	--	--	--	7,770	10.57	61,240	84	32	12,700	8.2
Dec. 21-31	6,700	--	10.73	7.81	93.32		5.33	10.92	95.60	--	--	--	7,350	10.00	67,000	83	31	12,000	8.2
Jan. 1-10, 1958 ..	5,360	17	11.03	6.31	103.96		4.77	11.10	106.88	0.01	--	0.46	7,370	10.02	53,770	86	35	11,900	8.0
Jan. 11-20.....	6,200	--	10.33	6.41	93.13		4.77	10.91	94.19	--	--	--	7,160	9.74	60,450	85	32	11,900	8.1
Jan. 21-28.....	6,530	--	10.33	6.41	93.58		5.16	9.56	95.60	--	--	--	7,220	9.82	64,170	85	32	12,000	8.2
Jan. 29-31.....	2,170	--	11.73	6.57	138.43		4.88	11.70	140.15	--	--	--	10,200	13.87	30,070	88	46	16,700	8.2
Feb. 1-10	6,740	--	10.73	6.79	113.77		4.90	11.33	115.06	--	--	--	8,670	11.79	79,570	87	38	14,100	8.0
Feb. 11-20	6,070	--	11.13	7.19	96.22		5.56	10.56	98.42	--	--	--	7,370	10.02	60,930	84	32	12,000	8.1
Feb. 21-28	5,220	--	10.73	7.39	110.59		4.64	11.83	112.24	--	--	--	8,480	11.53	60,240	86	37	13,800	8.2
Mar. 1-8	5,050	--	9.13	6.03	100.24		a4.12	10.04	101.24	--	--	--	6,720	9.19	46,470	87	36	11,100	8.4
Mar. 9-10	2,580	--	7.58	4.82	72.35		a4.27	7.16	73.32	--	--	--	4,990	6.79	17,500	85	29	8,360	8.3
Mar. 11-12	3,160	--	6.79	4.41	53.65		b4.46	6.81	53.58	--	--	--	3,820	5.20	16,440	83	23	6,440	8.4
Mar. 13-14	3,290	--	8.78	5.02	86.31		a3.88	8.81	87.42	--	--	--	6,030	8.20	27,030	86	33	9,890	8.4
Mar. 15-19	7,690	--	8.33	5.21	105.64		a3.96	8.62	106.60	--	--	--	7,080	9.63	74,090	89	41	11,700	8.4
Mar. 20-22	4,070	--	9.53	5.63	108.56		4.51	9.51	109.70	--	--	--	7,310	9.94	40,460	68	39	11,900	8.2
Mar. 23	2,200	--	4.79	2.61	42.96		2.69	3.96	43.71	--	--	--	3,060	4.16	9,170	85	22	5,300	8.2
Mar. 24	1,410	--	7.39	4.61	79.59		b3.81	7.41	80.37	--	--	--	5,450	7.41	10,480	87	32	9,010	8.4
Mar. 25-28	4,330	--	10.33	6.39	127.68		4.64	10.60	129.16	--	--	--	8,550	11.63	50,370	88	44	13,500	8.2
Mar. 29	3,670	--	5.69	3.31	59.65		2.69	5.33	60.63	--	--	--	4,150	5.64	20,730	87	28	7,070	8.2
Mar. 30-31	5,220	--	5.59	3.41	44.82		3.74	4.96	45.12	--	--	--	3,180	4.32	22,560	83	21	5,530	8.2
Apr. 1-3	5,430	--	6.89	4.61	73.31		3.54	7.95	73.32	--	--	--	5,000	6.80	36,960	86	31	8,420	8.0
Apr. 4	5,320	--	4.14	1.96	21.15		a2.70	3.54	20.87	--	0.14	--	1,660	2.26	12,010	78	12	2,800	8.4
Apr. 5	3,770	--	5.29	2.71	39.74		c2.62	5.08	40.04	--	--	--	3,000	4.08	15,390	83	20	5,110	8.5
Apr. 6-10	6,990	--	7.19	4.21	63.31		a3.81	7.45	63.45	--	--	--	4,570	6.22	43,470	85	27	7,720	8.4
Apr. 11-14	4,430	--	8.68	5.52	79.59		a4.11	9.31	80.37	--	--	--	5,690	7.74	34,340	85	30	9,420	8.4

a Includes 0.27 equivalent per million of carbonate (CO_3).
b Includes 0.40 equivalent per million of carbonate (CO_3).
c Includes 0.33 equivalent per million of carbonate (CO_3).

Apr. 15-18, 1958.	5,410	--	8.38	5.22	60.51	d4.86	8.62	60.63	--	--	--	4,520	6.15	33,300	82	23	7,530	8.6
Apr. 19	1,050	--	8.18	5.42	78.06	e3.48	9.22	78.96	--	--	--	5,580	7.59	7,980	85	30	9,410	8.7
Apr. 20.....	2,360	--	5.29	3.11	43.20	b2.79	5.10	43.71	--	--	--	3,160	4.30	10,150	84	21	5,390	8.5
Apr. 21.....	2,480	--	6.14	4.16	52.11	f3.52	6.72	52.17	--	--	--	3,840	5.22	12,960	83	23	6,440	8.9
Apr. 22.....	4,800	--	3.49	1.81	20.40	c2.56	2.75	20.30	--	0.09	--	1,550	2.11	10,130	79	13	2,710	8.5
Apr. 23-24	4,980	--	5.19	3.21	34.33	a3.35	5.54	33.84	--	--	--	2,560	3.48	17,350	80	17	4,360	8.5
Apr. 25-26	3,670	--	10.53	4.83	89.05	g3.89	10.56	89.96	--	--	--	6,300	8.57	31,470	85	32	10,300	8.4
Apr. 27-30	4,680	--	7.78	4.32	60.05	h4.19	8.18	59.78	--	--	--	4,430	6.02	28,250	83	24	7,420	8.3
May 1-3	2,960	--	8.58	5.02	65.68	4.16	8.85	66.27	--	--	--	4,810	6.54	19,360	83	25	7,830	8.2
May 4-6	4,420	--	6.64	3.76	45.01	a3.81	6.48	45.12	--	--	--	3,430	4.66	20,620	81	20	5,690	8.3
May 7-10	4,290	--	8.98	5.42	79.67	3.87	9.83	80.37	--	--	--	5,720	7.78	33,440	85	30	9,320	8.2
May 11	1,150	--	10.73	6.39	130.44	g3.17	12.41	131.98	--	--	--	9,040	12.29	14,160	88	45	14,600	8.3
May 12-20	7,440	--	8.58	4.22	67.94	g4.17	8.89	67.68	--	--	--	4,880	6.64	49,410	84	27	8,050	8.3
May 21-30	6,470	--	9.93	6.01	105.36	3.56	11.14	106.60	--	--	--	7,470	10.16	65,830	87	37	12,100	8.2
May 31	2,120	--	6.39	4.61	63.64	3.34	7.85	63.45	--	--	--	4,530	6.16	13,090	85	27	7,420	8.2
June 1.....	1,520	--	4.29	1.81	23.63	h2.33	3.37	23.97	--	.06	--	1,870	2.54	3,860	79	14	3,240	8.3
June 2-9.....	9,210	--	12.87	3.21	44.42	a2.86	13.93	43.71	--	--	--	4,000	5.44	50,160	73	16	6,390	8.5
June 10.....	506	--	11.18	5.62	71.22	1.87	12.83	73.32	--	--	--	5,700	7.75	3,920	81	25	9,220	8.0
June 11-16.....	2,490	--	12.33	5.41	84.98	b3.69	11.89	87.14	--	--	--	6,620	9.00	22,410	83	29	11,000	8.5
June 17.....	1,440	--	8.98	4.22	65.79	b3.09	8.22	67.68	--	--	--	4,790	6.51	9,380	83	26	7,940	8.4

a Includes 0.27 equivalent per million of carbonate (CO_3).
b Includes 0.40 equivalent per million of carbonate (CO_3).
c Includes 0.33 equivalent per million of carbonate (CO_3).
d Includes 0.53 equivalent per million of carbonate (CO_3).
e Includes 0.60 equivalent per million of carbonate (CO_3).
f Includes 0.80 equivalent per million of carbonate (CO_3).
g Includes 0.20 equivalent per million of carbonate (CO_3).
h Includes 0.13 equivalent per million of carbonate (CO_3).

ARKANSAS RIVER BASIN--Continued

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

Chemical analyses, water year October 1957 to September 1958--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 18, 1958	1,860	--	4.99	2.11	25.25		h2.98	3.60	25.66	--	0.10	--	1,930	2.62	4,900	78	13	3,380	8.6
June 19	1,150	--	3.39	1.41	15.36		h2.36	2.77	14.95	--	.08	--	1,180	1.60	1,840	76	9.9	2,080	8.4
June 20	1,040	--	4.99	2.01	31.37		a2.73	4.06	31.58	--	--	--	2,280	3.10	3,240	82	17	3,890	8.9
June 21-22	25,250	--	6.19	2.21	48.33		g2.59	5.64	48.50	--	--	--	3,360	4.57	115,500	85	24	5,790	8.4
June 23-25	49,190	--	4.39	1.61	12.21		1.90	4.85	11.42	--	.04	--	1,140	1.55	76,330	67	7.0	1,970	8.2
June 26	54,940	--	3.09	1.11	4.69		1.84	2.21	4.79	--	.05	--	539	.73	40,310	53	3.2	935	8.2
June 27	37,490	--	2.99	.61	8.46		1.77	1.89	8.32	--	.08	--	835	1.14	42,610	70	6.3	1,470	8.1
June 28	16,500	--	5.59	1.41	26.65		2.16	4.83	26.51	--	.15	--	2,020	2.75	45,380	79	14	3,450	8.2
June 29-30	14,800	--	5.19	1.61	33.64		g2.46	4.14	33.84	--	--	--	2,370	3.22	47,740	83	18	4,130	8.6
July 1-8	24,320	--	6.19	2.21	37.01		c3.44	5.31	36.66	--	--	--	2,750	3.74	91,030	82	18	4,680	8.5
July 9	7,160	--	7.19	4.21	49.98		g2.63	7.99	50.76	--	--	--	3,730	5.07	36,360	81	21	6,220	8.4
July 10	6,720	--	10.58	3.02	69.96		h2.49	9.16	71.91	--	--	--	5,000	6.80	45,760	84	27	8,200	8.4
July 11	5,730	--	7.39	2.21	38.60		h2.20	7.93	38.07	--	--	--	2,880	3.92	22,470	80	18	4,710	8.3
July 12	8,430	--	7.19	2.41	51.13		h2.29	6.27	52.17	--	--	--	3,620	4.92	41,540	84	23	6,070	8.3
July 13-16	15,130	--	5.99	2.61	44.39		g3.08	5.35	44.56	--	--	--	3,170	4.31	65,310	84	21	5,390	8.4
July 17-20	6,980	--	5.99	3.21	35.65		a3.52	6.08	35.25	--	--	--	2,710	3.69	25,750	79	17	4,520	8.4
July 21-25	6,870	--	6.94	3.46	42.41		3.54	6.97	42.30	--	---	--	3,200	4.35	29,910	80	19	5,370	8.2
July 26	1,720	--	5.34	2.56	29.75		3.08	4,96	29.61	--	--	--	2,200	2.99	5,160	79	15	4,090	8.1
July 27-28	4,760	--	8.28	6.12	71.04		2.66	6.64	76.14	--	--	--	4,970	6.76	32,210	83	26	8,730	8.2
July 29	4,190	--	5.94	1.26	41.45		3.74	5.43	39.48	--	--	--	2,860	3.89	16,290	85	22	4,940	8.2
July 30-31	9,760	--	3.89	1.41	12.54		2.56	1.67	13.54	--	.07	--	1,020	1.39	13,550	70	8.3	2,060	8.1
Aug. 1	2,220	--	5.59	2.21	17.05		2.36	5.75	16.64	--	.10	--	1,710	2.33	5,170	69	8.6	2,850	8.0
Aug. 2-4	8,010	--	7.98	4.02	48.75		2.49	7 50	50.76	--	--	--	3,710	5.05	40,460	80	20	6,240	8.1
Aug. 5	3,130	--	7.19	2.41	26.37		2.20	8.29	25.38	--	.10	--	2,430	3.30	10,370	73	12	4,030	8.2
Aug. 6-7	3,270	--	9.98	2.82	19.22		2.10	11.51	18.33	--	.08	--	2,000	2.72	8,900	60	7.6	3,100	7.9
Aug. 8	1,050	--	11.38	3.42	23.63		2.43	12.12	23.83	--	.05	--	2,460	3.35	3,520	61	8.7	3,790	8.2

a Includes 0.27 equivalent per million of carbonate (CO_3).
c Includes 0.33 equivalent per million of carbonate (CO_3).
g Includes 0.20 equivalent per million of carbonate (CO_3).
h Includes 0.13 equivalent per million of carbonate (CO_3).

Aug. 9, 1958 ...	992	--	11.78	3.02	38.56	2.49	10.85	40.04	--	--	--	3,480	4.73	4,700	72	14	5,690	8.2
Aug. 10-17.....	6,380	--	9.58	4.42	63.55	3.34	9.35	64.86	--	--	--	4,620	6.26	40,130	82	24	7,650	8.2
Aug. 18	1,680	--	5.79	2.41	39.85	2.75	4.41	40.89	--	--	--	2,860	3.89	6,560	83	20	4,990	8.1
Aug. 19-20	4,010	--	4.59	1.61	25.10	2.43	3.39	25.38	--	0.10	--	1,860	2.53	10,140	80	14	3,290	8.1
Aug. 21.....	5,280	--	1.90	.70	5.59	1.77	.87	5.47	--	.08	--	488	.66	3,500	68	4.9	894	7.9
Aug. 22	2,820	--	3.29	1.31	15.10	1.90	1.94	15.79	--	.07	--	1,200	1.63	4,600	77	10	2,110	8.0
Aug. 23-24	3,650	--	4.14	2.06	23.87	2.29	3.73	23.97	--	.08	--	1,800	2.45	8,940	79	14	3,150	7.8
Aug. 25-26.....	7,060	--	7.19	3.61	60.61	2.62	6.75	62.04	--	--	--	4,210	5.73	40,470	85	26	7,220	8.2
Aug. 27-28.....	6,880	--	4.54	1.96	32.41	2.29	5.04	31.58	--	--	--	2,320	3.16	21,740	83	18	4,070	7.9
Aug. 29-30	3,590	--	3.59	1.61	15.75	2.10	3.50	15.23	--	.12	--	1,260	1.71	6,160	75	9.8	2,220	8.0
Aug. 31.....	1,020	--	6.39	2.41	33.79	2.49	4.85	35.25	--	--	--	2,590	3.52	3,600	79	16	4,390	8.2
Sept. 1-10	6,640	--	7.58	3.92	64.45	3.25	6.43	66.27	--	--	--	4,590	6.24	41,490	85	27	7,760	8.1
Sept. 11	7,300	--	5.04	2.16	25.35	2.82	4.29	25.38	--	.06	--	1,900	2.58	18,880	78	13	3,300	8.0
Sept. 12	8,050	--	3.24	1.40	9.81	2.56	2.69	9.16	--	.04	--	883	1.20	9,680	68	6.5	1,550	8.2
Sept. 13.....	2,420	--	2.15	.89	4.12	1.84	1.33	3.95	--	.04	--	416	.57	1,370	58	3.3	771	8.0
Sept. 14.....	1,390	--	2.84	1.24	7.58	1.87	2.29	7.47	--	.03	--	700	.95	1,330	65	5.3	1,250	7.9
Sept. 15-16	5,630	--	5.69	2.61	26.17	2.36	5.29	26.79	--	.03	--	2,040	2.77	15,630	76	13	3,520	7.8
Sept. 17-19	14,300	--	2.25	.99	6.23	1.74	1.52	6.15	--	.06	--	572	.78	11,140	66	4.9	1,010	7.7
Sept. 20	2,420	--	3.79	1.97	14.46	2.39	3.00	14.80	--	.03	--	1,210	1.65	3,990	72	8.5	2,140	8.0
Sept. 21	2,080	--	6.24	2.76	37.12	2.26	6.64	37.22	--	--	--	2,730	3.71	7,740	80	17	4,740	8.1
Sept. 22	1,330	--	6.29	3.31	18.30	2.10	7.12	18.61	--	.07	--	1,690	2.30	3,070	66	8.4	2,830	8.0
Sept. 23	1,070	--	8.18	3.02	27.42	2.69	7.45	28.48	--	--	--	2,380	3.24	3,470	71	12	4,020	8.1
Sept. 24	1,050	--	8.38	3.32	43.49	3.18	6.89	45.12	--	--	--	3,230	4.39	4,620	79	18	5,560	8.2
Sept. 25-30	4,340	--	8.58	4.02	64.55	3.57	7.31	66.27	--	--	--	4,610	6.27	27,250	84	26	7,840	8.1
Total or weighted average	687,600	--	6.69	3.21	47.68	3.05	6.31	48.22	--	--	--	3,530	4.80	3,304,000	83	21	5,900	--

ARKANSAS RIVER BASIN--Continued

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

LOCATION.--At gaging station at bridge on U. S. Highways 64 and 71, at Van Buren, Crawford County, 1.3 miles downstream from Lee Creek, 8.6 miles downstream from Poteau River.
DRAINAGE AREA.--150,483 square miles, of which 22,241 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1958.
Water temperatures: October 1945 to September 1958.
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 3,240 micromhos Oct. 26; minimum daily, 373 micromhos May 5.
Percent sodium: Maximum, 75 Oct. 26-27; minimum, 41 July 24-26, 28-31.
EXTREMES, 1945-58.--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 at 180°C. Records of specific conductance of daily samples available in district office at Fayetteville, Ark. Records of discharge for water year October 1957 to September 1958 given in WSP 1561.

Chemical analyses, water year October 1957 to September 1958

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. 1-4, 1957 ..	124,600	--	2.10	0.78	4.83	0.17	1.61	1.17	5.02	--	0.04	0.05	492	0.67	83,480	61	4.0	848	7.6
Oct. 5-6	32,810	--	3.04	1.15	6.96	.22	2.18	1.73	7.33	--	.05	--	716	.97	31,830	61	4.8	1,190	7.8
Oct. 7-17	126,100	7.5	3.84	1.48	9.96	.33	2.84	2.17	10.43	0.01	.02	.10	955	1.30	163,900	64	6.1	1,650	7.7
Oct. 18-22, 29-30	88,540	--	4.44	1.81	12.96	.31	2.82	2.06	14.38	--	.04	.15	1,210	1.65	146,100	66	7.4	2,030	7.8
Oct. 23-25, 28, 31	78,350	--	4.69	1.97	16.05	.31	2.70	3.08	17.20	--	.03	.15	1,460	1.99	155,900	70	8.8	2,470	7.8
Oct. 26-27.....	32,350	--	4.99	2.22	23.49	.43	2.56	3.29	24.82	--	.03	--	1,940	2.64	85,400	75	12	3,320	7.8
Nov. 1-2, 8	85,820	--	3.19	1.64	8.79	.21	2.28	2.00	9.31	--	.05	.00	841	1.14	97,830	64	5.7	1,520	7.7
Nov. 3-7	76,090	--	4.34	1.73	12.62	.26	2.79	2.39	13.40	--	.03	.15	1,180	1.60	121,700	67	7.2	2,020	7.9
Nov. 9-13	249,500	--	2.40	.99	5.79	.16	1.74	1.06	6.60	--	.03	.15	576	.78	194,600	62	4.4	1,040	7.2
Nov. 14-17, 27..	148,400	--	3.09	1.32	8.61	.20	2.07	1.73	9.25	--	.03	.15	796	1.08	160,300	65	5.8	1,390	7.4
Nov. 18-23, 28	419,500	3.7	1.80	.74	4.31	.15	1.39	.92	4.65	.02	.02	.05	437	.59	247,500	62	3.8	724	7.6
Nov. 24-26, 29-30	181,500	--	2.50	.90	6.61	.15	1.85	1.52	6.82	--	.05	.35	626	.85	154,300	65	5.1	1,080	7.1
Dec. 1, 3.....	48,000	--	2.35	.80	4.92	.14	1.88	.98	5.30	--	.04	--	496	.67	32,160	60	3.9	847	7.7
Dec. 2, 4, 7-12 .	151,900	6.9	3.04	1.48	8.96	.22	2.43	1.83	9.16	.02	.02	--	874	1.19	180,800	65	6.0	1,410	7.5
Dec. 5-6	39,690	--	3.94	1.48	11.88	.23	2.67	2.17	12.07	--	.06	--	1,060	1.44	57,150	68	7.2	1,820	7.4

Dec. 13, 18-20, 25-26, 1957 ...	96,970	--	4.59	1.73	12.88	0.26	3.05	2.64	13.68	--	0.06	0.10	1,190	1.62	157,100	66	7.3	2,080	7.7
Dec. 14-17.....	55,970	--	3.54	1.32	8.87	.20	2.57	1.69	9.59	--	.06	.07	866	1.18	66,040	64	5.7	1,530	7.8
Dec. 21-24, 27, 29	129,400	--	3.49	1.73	9.53	.21	2.43	1.96	10.29	--	.04	.15	948	1.29	166,900	64	5.9	1,520	7.4
Dec. 28, 30-31..	95,200	--	2.15	1.07	5.13	.14	1.57	1.17	5.58	--	.04	.05	540	.73	69,500	60	4.0	927	7.4
Jan. 1, 3-4, 1958	54,290	--	3.09	1.23	6.96	.14	2.13	1.50	7.61	--	.04	.10	728	.99	53,750	61	4.7	1,210	7.9
Jan. 2, 5-6, 9-10	79,890	--	4.24	1.89	11.79	.25	2.77	2.66	12.55	--	.04	.10	1,140	1.55	123,800	65	6.8	1,830	7.9
Jan. 7-8, 11-12, 16, 19.....	92,290	--	3.64	1.64	8.70	.20	2.51	2.23	9.25	--	.05	.13	906	1.23	113,500	61	5.3	1,480	7.8
Jan. 13-15, 17 ..	69,640	--	2.99	1.23	6.83	.17	2.20	1.50	7.39	--	.05	.07	721	.98	68,250	61	4.7	1,200	7.9
Jan. 18, 24-26 ..	168,000	--	2.20	1.07	5.26	.14	1.57	1.67	5.41	--	.05	.05	562	.76	127,700	61	4.1	927	7.7
Jan. 20-23, 27-28	200,100	6.8	2.64	1.32	6.66	.18	1.84	1.48	7.33	0.02	.04	.05	689	.94	188,100	62	4.7	1,140	7.6
Jan. 29-31.....	75,570	--	3.19	1.64	8.18	.19	2.13	1.94	8.88	--	.04	.10	904	1.23	92,950	62	5.3	1,390	7.9
Feb. 1-3, 7-8...	187,000	--	2.89	1.40	6.79	.17	2.05	1.67	7.39	--	.04	.07	725	.99	185,100	60	4.6	1,180	8.0
Feb. 4-6	56,170	--	4.14	2.06	11.74	.25	2.79	2.52	12.69	--	.04	.07	1,230	1.67	93,800	65	6.7	1,890	8.0
Feb. 9-10	97,190	--	1.85	.81	3.61	.12	1.36	.94	4.06	--	.05	--	428	.58	56,370	56	3.1	735	7.7
Feb. 11-19	222,000	5.6	2.99	1.40	7.00	.18	2.00	1.67	7.90	.02	.04	.10	750	1.02	226,400	61	4.7	1,230	8.1
Feb. 20, 26-27..	62,320	--	4.04	1.97	10.70	.25	2.67	2.31	11.62	--	.05	.05	1,140	1.55	96,600	63	6.2	1,770	8.0
Feb. 21-25, 28 ..	117,300	--	3.19	1.32	7.31	.17	2.31	1.71	7.90	--	.09	.07	778	1.06	124,300	61	4.9	1,300	8.1
Mar. 1-4	109,300	--	2.64	1.23	5.83	.16	1.92	1.56	6.49	--	.04	.05	658	.89	97,260	59	4.2	1,080	7.8
Mar. 5, 7	55,930	--	3.19	1.56	8.22	.18	2.13	1.96	8.97	--	.03	--	876	1.19	66,560	63	5.3	1,390	7.9
Mar. 6 a	25,190	--	--	--	--	--	2.51	2.39	13.48	--	.00	--	1,230	1.67	42,070	--	--	1,990	7.7
Mar. 8-14	801,700	6.3	2.10	.82	3.57	.13	1.54	1.04	3.95	.02	.05	.05	429	.58	465,000	54	2.9	716	7.7
Mar. 15-23	1,320,000	--	2.10	.82	2.57	.11	1.74	.92	2.82	--	.06	.05	375	.51	673,200	46	2.1	588	7.8
Mar. 24-31	1,861,000	--	1.95	.68	2.09	.10	1.66	.92	2.14	--	.19	.00	303	.41	763,000	43	1.8	495	8.1

a Not included in weighted average, loads estimated from specific conductance.

ARKANSAS RIVER BASIN--Continued

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

Chemical analyses, water year October 1957 to September 1958--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. 1-8, 11-12, 1958	1,716,000	7.9	2.10	0.82	2.35	0.07	1.84	0.92	2.48	0.02	0.06	0.00	351	0.48	823,700	44	1.9	572	8.0
Apr. 9-10, 13-15	497,500	---	2.25	.82	3.18	.10	1.90	1.21	3.10	--	.03	.05	443	.60	298,500	50	2.6	653	7.5
Apr. 16-20	418,300	--	2.74	1.07	4.18	.09	2.13	1.46	4.37	--	.03	.00	550	.75	313,700	52	3.0	824	7.7
Apr. 21-25	654,300	--	2.00	.77	2.87	.08	1.64	1.08	2.96	--	.04	.05	391	.53	346,800	50	2.4	585	7.4
Apr. 26-30	362,000	--	2.40	1.07	4.18	.09	2.03	1.54	4.09	--	.04	.05	531	.72	260,600	54	3.2	783	7.6
May 1-3	273,300	--	1.90	.99	3.65	.07	1.56	1.27	3.67	--	.03	.03	455	.62	169,400	55	3.0	679	7.7
May 4-11	1,415,000	6.5	1.65	.66	1.74	.06	1.48	.67	1.83	.01	.04	.00	270	.37	523,600	42	1.6	422	7.1
May 12-18	771,600	--	1.95	.72	2.52	.08	1.67	.98	2.54	--	.03	.00	346	.47	362,700	48	2.2	525	7.5
May 19-25	454,600	--	2.20	.90	3.52	.08	1.70	1.08	3.78	--	.05	.03	436	.59	268,200	53	2.8	686	7.2
May 26-31	284,200	--	2.54	1.07	4.65	.10	1.84	1.46	5.02	--	.08	.05	550	.75	213,200	56	3.5	868	7.8
June 1-2	63,670	--	2.64	1.23	4.61	.12	2.00	1.48	5.05	--	.09	--	563	.77	49,030	54	3.3	894	7.9
June 3-7	132,500	8.3	3.34	1.56	7.00	.13	2.43	2.19	7.39	.02	.10	.10	789	1.07	141,800	58	4.8	1,210	7.8
June 8-10	53,870	--	3.99	1.89	9.40	.16	2.88	2.87	9.93	--	.08	.05	1,020	1.39	74,880	61	5.5	1,590	7.8
June 11-12	38,540	--	4.69	2.38	14.05	.24	3.11	3.96	14.10	--	.01	--	1,380	1.88	72,460	66	7.5	2,110	8.1
June 13-16	72,020	--	3.84	1.97	8.35	.19	2.77	3.39	7.90	--	.02	.14	942	1.28	92,190	58	4.9	1,460	8.0
June 17-21	236,200	--	2.25	1.07	4.18	.12	1.84	1.31	4.37	--	.01	.11	519	.71	167,700	55	3.2	812	7.3
June 22-23, 26-29	1,256,000	--	1.80	.72	2.44	.09	1.70	.75	2.54	--	.02	.12	347	.47	590,300	48	2.2	546	7.7
June 24-25, 30	401,500	--	2.15	.90	3.18	.10	1.97	1.10	3.24	--	.01	--	401	.55	220,800	50	2.6	664	7.7
July 1-4, 10	649,600	8.1	2.20	.80	3.92	.10	1.72	1.23	3.98	.01	.05	.14	463	.63	409,200	56	3.2	729	7.8
July 5-7	257,300	--	2.20	.79	5.52	.14	1.61	1.50	5.41	--	.01	--	566	.77	198,100	64	4.5	922	7.5
July 8-9	340,800	--	1.90	.58	2.31	.10	1.72	.75	2.31	--	.01	--	340	.46	156,800	47	2.1	524	7.6
July 11	186,400	--	2.00	.59	2.17		1.75	.96	2.03	--	.02	--	b269	.37	68,970	--	--	466	7.9

b Calculated from determined constituents.

July 12-15, 1958.	1,028,000	--	2.40	0.72	2.65	0.12	2.23	1.08	2.54	--	0.01	0.10	399	0.54	555,100	45	2.1	605	8.0
July 16-22.....	1,545,000	--	2.00	.54	1.96	.12	1.75	.79	1.97	--	.03	.07	293	.40	618,000	42	1.7	479	7.8
July 23, 27	280,500	--	2.45	.82	3.13	.14	2.11	1.35	3.10	--	.02	--	393	.53	148,700	48	2.4	670	8.0
July 24-26, 28-31	849,500	--	2.00	.67	1.96	.11	1.84	1.12	1.83	--	.01	.05	306	.42	356,800	41	1.7	494	7.9
Aug. 1-2, 8-10..	505,000	--	2.10	.71	2.61	.13	c1.97	1.06	2.54	--	.05	.04	357	.49	247,400	47	2.2	565	8.3
Aug. 3-7.....	402,400	--	2.50	.82	4.26	.14	c2.14	1.34	4.09	--	.05	.11	500	.68	273,600	55	3.3	783	8.3
Aug. 11-21	738,600	6.6	2.20	.90	2.61	.14	1.88	1.25	2.65	0.02	.04	.09	390	.53	391,500	45	2.1	585	8.0
Aug. 22.....	103,100	--	2.94	1.15	5.34		2.20	1.98	5.22	--	.03	--	b544	.74	76,290	--	--	941	8.0
Aug. 23-31.....	592,500	--	2.00	.82	3.18	.10	1.90	.90	3.16	--	.05	.05	391	.53	314,000	52	2.7	631	8.1
Sept. 1-2, 6	75,770	--	2.84	1.15	4.92	.15	2.52	1.59	4.79	--	.06	.05	584	.79	59,860	54	3.5	912	8.2
Sept. 3	26,180	--	4.19	1.81	14.47		2.77	1.87	15.79	--	.04	--	b1,170	1.59	41,630	--	--	2,250	8.1
Sept. 4-5, 7-10..	137,100	6.8	3.19	1.40	6.35	.16	2.61	2.25	6.34	.03	.05	.10	724	.98	134,400	57	4.2	1,110	8.0
Sept. 11-13, 15-16	143,400	--	2.74	1.07	4.70	.14	2.23	1.81	4.65	--	.04	.03	528	.72	103,200	54	3.4	859	7.8
Sept. 14, 18	77,360	--	3.34	1.23	7.09	.14	2.43	1.96	7.19	--	.06	--	724	.98	75,810	60	4.7	1,170	7.9
Sept. 17, 19-23 .	347,100	--	2.54	.90	3.70	.13	2.10	1.46	3.72	--	.06	.08	454	.62	215,200	51	2.8	741	7.7
Sept. 24-30	365,400	--	2.15	.59	2.22	.11	1.90	.92	2.20	--	.05	.09	319	.43	157,100	44	1.9	521	7.7
Total or weighted average.....	25,641,700	--	2.25	0.90	3.65	--	1.85	1.17	3.78	--	0.05	--	447	0.61	15,641,440	54	2.9	717	--

b Calculated from determined constituents.
c Includes 0.07 equivalent per million of carbonate (CO_3).

ARKANSAS RIVER BASIN--Continued

7-2450. 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 1958.
Water temperatures: September 1944 to February 1945, September 1946 to September 1958.
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 3,270 micromhos Oct. 21-23; minimum daily, 402 micromhos Aug. 22-23.
Percent sodium: Maximum, 64 Oct. 21-23; minimum, 44 Aug. 22-23.
EXTREMES, 1944-45, 1946-58.--Specific conductance: Maximum daily, 22,900 micromhos Nov. 11, 1956; minimum daily, 71.7 micromhos Jan. 2, 1948.
Percent sodium: Maximum, 80 Nov. 6-14, Dec. 21-23, 1947; minimum, 36 Sept. 25-26, 1957.
REMARKS.--Values reported for dissolved solids are residues 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 1957 to September 1958 given in WSP 1561.

Chemical analyses, water year October 1957 to September 1958

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, 1957 ..	8,910		2.79	1.49	4.24		2.51	0.67	5.30		0.04		504	0.69	6,110	50	2.9	916	7.9
Oct. 4-6.....	5,850		3.34	1.78	5.08		2.75	.87	6.54		.04		638	.87	5,080	50	3.2	1,170	7.8
Oct. 7-10.....	4,970		3.64	2.04	7.37		2.56	.83	9.64		.02		802	1.09	5,430	56	4.4	1,450	7.7
Oct. 11-14.....	4,510		4.89	2.71	10.42		3.05	.85	14.10		.02		1,120	1.52	6,880	58	5.3	1,950	7.8
Oct. 15-20.....	9,220		5.89	3.51	14.40		3.18	.85	19.74		.03		1,500	2.04	18,830	61	6.6	2,600	7.8
Oct. 21-23.....	4,290		6.39	4.41	19.35		2.69	.92	26.51		.03		1,860	2.53	10,870	64	8.3	3,270	7.8
Oct. 24-31.....	14,740		5.09	3.31	12.75		3.11	1.35	16.64		.05		1,320	1.80	26,490	60	6.2	2,300	7.8
Nov. 1.....	2,340		5.99	4.01	14.92		3.47	1.67	19.74		.04		1,690	2.30	5,380	60	6.7	2,840	8.1
Nov. 2-7.....	13,860		4.49	2.61	10.30		3.28	1.81	12.27		.04		1,080	1.47	20,380	59	5.5	1,850	8.0
Nov. 8.....	23,600		2.10	.82	2.77		2.23	.62	2.79		.05		336	.46	10,800	49	2.3	585	7.9
Nov. 9	29,750		3.49	1.71	7.10		2.23	.40	9.59		.08		856	1.16	34,670	58	4.4	1,380	7.8
Nov. 10	25,590		2.15	1.01	4.23		1.74	.19	5.41		.05		488	.66	17,000	57	3.4	818	7.7
Nov. 11.....	22,810		1.50	.50	2.47		1.84	.14	2.43		.06		258	.35	8,010	55	2.5	440	7.6
Nov. 12.....	11,500		1.65	.71	2.61		1.34	.16	3.41		.06		324	.44	5,070	53	2.4	563	7.6
Nov. 13-14	15,850		2.94	1.46	5.34		2.33	.58	6.77		.06		641	.87	13,830	55	3.6	1,100	7.8
Nov. 15-17	28,110		3.89	2.11	8.20		2.66	.75	10.72		.07		980	1.33	37,490	58	4.7	1,620	7.8
Nov. 18.....	16,030		2.84	1.60	5.78		2.33	.56	7.28		.05		667	.91	14,550	57	3.9	1,140	7.8

Nov. 19-21, 1957.	48,260		1.60	0.64	2.27	1.41	0.35	2.71		0.04		296	0.40	19,440	50	2.1	507	7.5
Nov. 22-23	13,270		2.69	1.51	5.12	2.33	.60	6.34		.05		571	.78	10,310	55	3.5	1,030	7.8
Nov. 24-27.....	15,430		3.84	2.26	7.21	3.15	.79	9.31		.06		831	1.13	17,460	54	4.1	1,470	7.9
Nov. 28-30	8,070		4.79	2.91	9.70	3.87	.94	12.55		.04		1,080	1.47	11,870	56	4.9	1,880	8.0
Dec. 1-8	16,290		5.29	4.01	11.49	4.39	1.10	15.23		.07		1,360	1.85	30,150	55	5.3	2,400	8.0
Dec. 9-10.....	6,310		3.64	2.26	7.73	2.88	.83	9.87		.05		811	1.10	6,960	57	4.5	1,450	8.0
Dec. 11-12	3,570		4.94	2.76	9.82	3.54	.96	12.97		.05		1,140	1.55	5,530	56	5.0	2,010	7.9
Dec. 13-20	10,980		5.84	3.36	12.57	4.03	1.04	16.64		.06		1,400	1.90	20,930	58	5.9	2,450	8.1
Dec. 21-25	13,330		5.49	3.31	12.45	3.61	.96	16.64		.04		1,400	1.90	25,410	59	5.9	2,430	8.1
Dec. 26-28	53,890		2.00	.88	4.20	1.51	.40	5.13		.04		444	.60	32,570	59	3.5	784	7.6
Dec. 29-31	13,840		3.09	1.51	7.86	1.80	.48	10.15		.03		773	1.05	14,570	63	5.2	1,350	7.6
Jan. 1-10, 1958 ..	19,950	13	4.64	2.66	10.92	--	3.34	.94	13.82	0.01	.05	0.28	1,090	1.48	29,610	60	5.7	1,920	8.0
Jan. 11-15.....	9,540		5.19	3.21	10.19		3.93	1.06	13.54		.06		1,220	1.66	15,840	55	5.0	2,090	8.1
Jan. 16-17	5,570		4.09	2.41	9.86		3.02	.87	12.41		.06		1,060	1.44	8,040	60	5.5	1,740	8.1
Jan. 18-20.....	8,350		4.44	2.76	11.28		3.08	.96	14.38		.06		1,200	1.63	13,640	61	5.9	1,970	8.1
Jan. 21-22.....	55,930		2.54	1.54	5.98		2.00	.54	7.47		.03		664	.90	50,560	59	4.2	1,110	7.9
Jan. 23-27.....	63,210		2.30	1.22	4.53		1.97	.54	5.50		.04		534	.73	45,950	56	3.4	888	7.9
Jan. 28-31.....	18,510		2.94	1.82	6.40		2.36	.71	8.04		.05		738	1.00	18,590	57	4.1	1,230	7.9
Feb. 1-2	7,200		3.49	2.31	7.55		2.88	.83	9.59		.05		853	1.16	8,360	57	4.4	1,420	8.2
Feb. 3-6	17,080		4.64	2.96	10.04		a3.74	1.17	12.69		.04		1,080	1.47	25,110	57	5.2	1,820	8.4
Feb. 7-8	25,820		2.79	1.57	5.74		2.23	.77	7.05		.05		646	.88	22,710	57	3.9	1,070	8.1
Feb. 9	10,250		3.29	1.91	7.69		1.84	.83	10.15		.07		841	1.14	11,740	60	4.8	1,440	8.1
Feb. 10.....	7,620		2.54	1.30	5.40		1.84	.58	6.77		.05		600	.82	6,220	58	3.9	1,030	8.0

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

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ARKANSAS RIVER BASIN--Continued

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

Chemical analyses, water year October 1957 to September 1958--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. 11, 1958...	5,280		2.64	1.52	5.86		1.80	0.56	7.61		0.05		673	0.92	4,830	58	4.0	1,120	8.1
Feb. 12-14.....	11,330		3.74	2.16	9.55		2.23	.77	12.41		.04		1,010	1.37	15,570	62	5.6	1,660	8.0
Feb. 15-18	14,240		3.59	2.61	7.17		2.75	.98	9.59		.05		863	1.17	16,730	54	4.1	1,420	8.2
Feb. 19-20.....	6,530		4.44	2.96	10.39		3.25	.96	13.54		.04		1,120	1.52	9,950	58	5.4	1,870	8.2
Feb. 21-28.....	24,220		5.29	3.31	11.32		a2.89	1.02	15.93		.08		1,290	1.75	42,530	57	5.5	2,140	8.5
Mar. 1-2	12,160		3.84	2.36	8.65		b2.83	1.25	10.72		.05		892	1.21	14,760	58	4.9	1,510	8.4
Mar. 3-7	15,030		5.59	3.61	14.59		3.02	1.54	19.18		.05		1,460	1.99	29,880	61	6.8	2,430	8.2
Mar. 8	15,910		3.99	2.41	10.15		2.52	1.02	12.97		.04		1,030	1.40	22,300	61	5.7	1,760	8.2
Mar. 9	43,640		1.90	.70	2.36		1.57	.35	2.99		.05		322	.44	19,130	48	2.1	543	8.1
Mar. 10	35,700		2.50	1.02	4.76		1.51	.25	6.49		.03		534	.73	25,950	57	3.6	944	8.1
Mar. 11-20	210,200		2.25	1.11	3.89		1.74	.67	4.79		.05		440	.60	125,900	54	3.0	787	7.9
Mar. 21-31	299,100		2.15	1.13	3.70		1.77	.65	4.51		.05		424	.58	172,600	53	2.9	744	8.1
Apr. 1-4.....	87,270		2.05	.99	3.18		1,80	.56	3.81		.05		398	.54	47,280	51	2.6	669	8.0
Apr. 5-11.....	66,210		2.89	1.79	5.58		2.23	.87	7.11		.05		642	.87	57,860	54	3.8	1,110	8.1
Apr. 12-20	71,150		3.69	2.31	8.02		2.43	.96	10.58		.05		896	1.22	86,780	57	4.6	1,500	8.2
Apr. 21-30	252,600		2.30	1.30	3.60		2.00	.79	4.37		.04		451	.61	155,100	50	2.7	769	8.0
May 1	13,190		2.74	1.58	5.34		1.97	.87	6.77		.05		624	.85	11,200	55	3.6	1,030	8.2
May 2	19,520		2.05	1.11	3.49		1.74	.58	4.29		.04		425	.58	11,290	52	2.8	706	8.1
May 3-10	338,600		1.50	.66	1.86		1.39	.29	2.31		.03		256	.35	118,000	46	1.8	443	7.8
May 11-17	132,600		1.80	1.00	2.86		1.67	.35	3.61		.03		362	.49	65,330	51	2.4	613	7.9
May 18-20	24,830		3.19	1.61	6.38		2.03	.44	8.69		.02		753	1.02	25,450	57	4.1	1,230	8.2
May 21-27	36,710		3.99	2.51	8.69		2.95	1.21	11.00		.03		1,030	1.40	19,070	57	4.8	1,620	8.2
May 28-30	15,910		5.19	2.71	12.79		2.82	2.04	15.79		.04		1,410	1.92	30,530	62	6.4	2,160	8.2
May 31	3,710		3.59	2.01	8.72		2.46	1.12	10.72		.02		924	1.26	4,670	61	5.2	1,350	8.2

a Includes 0.40 equivalent per million of carbonate (CO_3).
b Includes 0.27 equivalent per million of carbonate (CO_3).

June 1, 1958	6,010		4.74	3.06	12.43	c3.02	1.50	15.65		0.06		1,330	1.81	10,880	61	6.3	2,150	8.4
June 2-4.....	19,850		3.69	2.31	8.23	2.85	1.87	9.45		.06		940	1.28	25,410	58	4.8	1,500	8.2
June 5-10.....	19,700		4.89	3.21	13.23	3.29	3.41	14.52		.11		1,390	1.89	37,270	62	6.6	2,190	8.2
June 11-16.....	10,520		4.39	2.81	11.31	3.31	2.17	12.97		.06		1,180	1.60	16,900	61	6.0	1,930	8.2
June 17-20.....	95,350		2.45	1.27	5.31	1.90	.58	6.49		.06		598	.81	77,610	59	3.9	986	8.0
June 21-25.....	328,700		2.20	.96	2.95	2.10	.90	3.05		.06		373	.51	166,900	48	2.3	633	8.1
June 26-30.....	291,400		1.80	.68	2.26	1.74	.56	2.37		.07		301	.41	119,400	48	2.0	487	8.0
July 1-9	233,100		1.65	.67	1.92	1.57	.44	2.20		.03		270	.37	85,680	45	1.8	454	7.8
July 10	23,010		3.09	1.71	4.98	2.43	1.69	5.58		.08		676	.92	21,170	51	3.2	1,010	8.0
July 11-14	78,090		3.39	1.61	5.96	2.69	2.56	5.64		.07		696	.95	73,980	54	3.8	1,130	8.0
July 15	13,960		3.74	1.66	8.00	1.80	1.10	10.43		.07		945	1.29	17,960	60	4.9	1,470	7.9
July 16-20	44,970		2.74	1.42	5.09	2.00	1.29	5.92		.04		591	.80	36,170	55	3.5	992	7.9
July 21-31	97,150		3.69	1.71	7.02	2.85	2.79	6.71		.07		795	1.08	105,100	57	4.3	1,290	8.1
Aug. 1-4.....	32,150		3.59	1.81	7.60	2.56	2.33	8.04		.07		805	1.09	35,230	58	4.6	1,380	8.0
Aug. 5	7,360		4.64	2.36	12.16	2.43	1.83	14.80		.10		1,230	1.67	12,320	63	6.5	2,100	8.1
Aug. 6-7	19,780		3.69	1.71	7.72	2.75	2.64	7.61		.12		784	1.07	21,100	59	4.7	1,360	7.8
Aug. 8-10	46,930		2.00	.80	3.03	1.90	.83	3.05		.05		368	.50	23,510	52	2.6	615	7.5
Aug. 11-12	40,820		2.00	.80	2.82	1,64	.50	3.44		.04		341	.46	18,950	50	2.4	587	7.9
Aug. 13-16.....	24,560		2.40	1.10	4.79	1.77	1.12	5.36		.04		500	.68	16,710	58	3.6	877	8.1
Aug. 17	6,720		1.90	.80	2.23	1.70	.73	2.43		.07		292	.40	2,670	45	1.9	506	8.0
Aug. 18.....	6,350		2.15	1.04	3.67	1.74	1.02	4.06		.05		426	.58	3,680	53	2.9	729	8.0
Aug. 19-21.....	108,800		2.89	1.31	6.10	1.77	.87	7.61		.05		645	.88	95,500	59	4.2	1,130	7.9

c Includes 0.33 equivalent per million of carbonate (CO_3).

ARKANSAS RIVER BASIN--Continued

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

Chemical analyses, water year October 1957 to September 1958--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. 22-23, 1958	189,600		1.50	0.70	1.71		1.64	0.19	2.03		0.05		227	0.31	58,590	44	1.6	402	7.9
Aug. 24-26.....	66,530		1.85	.55	2.07		1.64	.21	2.59		.03		275	.37	24,900	46	1.9	471	8.0
Aug. 27.....	12,220		1.85	.75	2.51		1.57	.29	3.21		.04		324	.44	5,390	49	2.2	549	7.9
Aug. 28-31	35,210		2.69	1.31	4.30		2.10	.94	5.22		.04		505	.69	24,200	52	3.0	882	8.2
Sept. 1-8	38,940		3.54	1.82	6.10		2.59	1.75	7.05		.07		700	.95	37,100	53	3.7	1,180	8.2
Sept. 9-10	5,590		4.09	2.35	7.39		2.95	1.54	9.31		.03		851	1.16	6,480	53	4.1	1,460	8.2
Sept. 11	3,630		4.49	2.47	8.03		d3.11	1.42	10.43		.03		944	1.28	4,660	54	4.3	1,590	8.3
Sept. 12-17	45,900		3.84	2.16	7.30		d2.82	2.35	8.04		.09		816	1.11	50,980	55	4.2	1,380	8.3
Sept. 18-19	18,050		2.94	1.54	5.69		2.23	1.39	6.49		.06		627	.85	15,410	56	3.8	1,070	8.2
Sept. 20	6,620		3.89	2.27	8.68		2.43	1.48	10.86		.07		955	1.30	8,610	58	4.9	1,580	8.2
Sept. 21-27	30,800		3.49	1.87	6.91		2.56	1.75	7.90		.06		759	1.03	31,830	56	4.2	1,290	8.2
Sept. 28-29	16,500		2.10	1.10	3.16		1.84	1.04	3.44		.04		387	.53	8,690	50	2.5	673	8.2
Sept. 30	3,750		3.09	1.71	5.26		2.59	1.64	5.78		.05		572	.78	2,920	52	3.4	1,080	8.1
Total or weighted average.....	4,478,700		2.50	1.32	4.43		2.02	0.81	5.36		0.06		520	0.71	3,170,000	54	3.2	879	--

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

7-3316. 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 1958.
Water temperatures: October 1945 to September 1958.
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 2,030 micromhos Aug. 21; minimum daily, 1,230 micromhos Oct. 9, Nov. 6.
Percent sodium: Maximum, 59 Aug. 1-31; minimum, 51 Oct. 1-31.
EXTREMES, 1944-58.--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, Jan. 1-31, 1957; minimum, 31 Nov. 1-10, 1945.
REMARKS.--Values reported for dissolved solids are residues at 180°C. 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 1957 to September 1958 given in WSP 1561. No appreciable inflow between dam and gaging station except during periods of heavy local rains.

Chemical analyses, water year October 1957 to September 1958

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, 1957.	351,700	15	4.24	1.64	6.24		2.16	3.60	6.34		0.02		733	1.00	351,700	51	3.6	1,240	8.2
Nov. 1-30	350,000	11	4.59	1.64	6.84		2.18	3.83	7.05		.01		790	1.07	588,500	52	3.9	1,330	8.2
Dec. 1-31	323,400	10	4.54	1.73	6.83		2.18	3.85	7.05		.02		852	1.16	375,100	52	3.8	1,320	7.9
Jan. 1-31, 1958..	102,600	8.8	4.54	1.56	7.57		2.20	4.27	7.19		.01		845	1.15	118,000	55	4.3	1,370	8.1
Feb. 1-28	244,200	9.6	4.39	1.48	6.87		2.25	3.66	6.82		.01		815	1.11	271,100	54	4.0	1,330	7.9
Mar. 1-31.....	98,990	7.6	4.54	1.73	7.18		2.33	3.64	7.47		.01		813	1.11	109,900	53	4.0	1,360	8.2
Apr. 1-30	184,200	9.2	4.54	1.73	7.27		2.36	3.83	7.33		.02		839	1.14	210,000	54	4.1	1,380	7.5
May 1-31.....	708,500	11	4.49	1.56	7.88		2.15	3.87	7.90		.01		a832	1.13	800,600	57	4.5	1,440	7.7
June 1-30	139,500	8.8	4.64	1.97	8.13		2.43	3.89	8.40		.02		914	1.24	173,000	55	4.5	1,510	7.8
July 1-31.....	175,600	9.0	4.74	1.73	8.55		2.38	3.93	8.69		.02		966	1.31	230,000	57	4.7	1,550	7.6
Aug. 1-31	152,800	8.8	4.79	1.97	9.73		2.36	4.21	9.81		.01		a975	1.33	203,200	59	5.3	1,670	7.8
Sept. 1-30.....	96,020	9.4	4.99	1.97	9.55		2.43	4.35	9.73		.01		a981	1.33	127,700	58	5.1	1,700	8.0
Weighted average	3,128,000	11	4.54	1.64	7.44		2.23	3.85	7.56		0.02		837	1.14	3,565,000	55	4.2	1,400	--

a Calculated from determined constituents.

PART 8. WESTERN GULF OF MEXICO BASINS

SABINE RIVER BASIN

8-305. 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 Co. bridge, 4.5 miles downstream from Cypress Creek and at mile 40.
DRAINAGE AREA.--9,440 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1946, October 1947 to September 1958.
Water temperatures: October 1947 to September 1958.
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 579 micromhos Oct. 14; minimum daily, 43.4 micromhos Sept. 23.
Percent sodium: Maximum, 80 Oct. 7-15, 16-21; minimum, 14 Sept. 18-22, 27.
EXTREMES, 1945-46, 1947-58.--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, 14 Sept. 18-22, 27, 1958.
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 water year October 1957 to September 1958 given in WSP 1562.

Chemical analyses, water year October 1957 to September 1958

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, 1957....	29,890	13	0.32	0.14	1.17		0.46	0.17	0.99		0.01		106	0.14	4,180	72	2.4	178	7.4
Oct. 7-15.....	37,630	13	.60	.22	3.21		.66	.29	3.07		.01		a 261	.35	13,170	80	5.0	457	7.4
Oct. 16-21.....	51,070	8.8	.17	.02	.76		.23	.14	.56		.02		64	.09	4,600	80	2.5	117	6.8
Oct. 22-31.....	182,600	8.8	.26	.05	1.06		.23	.25	.87		.02		90	.12	21,910	77	2.7	153	6.8
Nov. 1-8	172,600	8.8	.34	.13	.85		.33	.25	.73		.01		86	.12	20,710	64	1.8	149	6.5
Nov. 9-20.....	533,400	8.8	.24	.12	.62		.21	.20	.56		.01		65	.09	48,010	63	1.5	107	6.2
Nov. 21-30.....	679,900	7.2	.17	.12	.45		.16	.20	.37		.01		50	.07	47,590	61	1.2	83	6.1
Dec. 1-6	321,300	8.8	.30	.13	.62		.28	.23	.54		.00		69	.09	28,920	59	1.3	120	6.6
Dec. 7-18.....	554,200	11	.45	.20	.92		.36	.33	.87		.01		102	.14	77,590	59	1.6	175	6.7
Dec. 19-31.....	253,000	13	.39	.21	.90		.33	.31	.85		.01		100	.14	35,420	60	1.6	169	6.6
Jan 1-12, 1958 ...	286,500	14	.40	.23	1.12		.30	.37	1.07		.01		116	.16	45,840	64	2.0	199	6.9
Jan. 13-22	233,100	12	.35	.18	.87		.28	.35	.76		.01		94	.13	30,300	62	1.7	159	6.2
Jan. 23, 31	410,400	8.8	.21	.13	.61		.20	.23	.51		.01		64	.09	36,940	64	1.5	108	6.8

a Residue at 180°C.

Feb. 1-10, 1958..	316,000	9.6	0.38	0.21	0.92		0.28	0.37	0.85		0.01		97	0.13	41,080	61	1.7	168	6.5
Feb. 11-21.....	258,200	12	.41	.22	.98		.33	.40	.87		.01		106	.14	36,150	61	1.7	179	6.5
Feb. 22-28.....	190,600	7.6	.30	.18	.77		.23	.31	.70		.01		81	.11	20,970	62	1.6	141	6.3
Mar. 1-10	212,800	13	.40	.21	1.00		.26	.37	.96		.02		108	.15	31,920	62	1.8	180	6.9
Mar. 11-17, 26-31	283,100	12	.48	.25	.87		.36	.37	.85		.02		105	.14	39,630	54	1.4	177	7.0
Mar. 18-25	144,900	8.4	.50	.32	1.23		b .40	.52	1.13		.00		128	.17	24,630	60	1.9	231	8.8
Apr. 1-15	306,600	12	.50	.26	1.09	0.05	--	.42	--		.01		--	--	--	57	1.8	206	--
Apr. 16-22.....	151,000	11	.42	.19	.78	.05	--	.27	--		.02		--	--	--	54	1.4	153	--
Apr. 23-30.....	114,000	14	.60	.27	1.70	.06	--	.46	--		.00		--	--	--	65	2.6	282	--
May 1-11	308,000	9.2	.32	.12	.74		.26	.29	.62		.01		79	.11	33,880	63	1.6	136	6.3
May 12-25	720,000	7.0	.27	.14	.54		.28	.21	.45		.01		61	.08	57,600	57	1.2	103	6.5
May 26-31	457,200	8.0	.50	.17	.61		.62	.19	.45		.02		80	.11	50,290	48	1.1	143	6.4
June 1-6.....	271,700	11	.60	.26	.72		.70	.21	.65		.02		98	.13	35,320	46	1.1	172	7.9
June 7-18, 23-23 .	113,000	17	.70	.30	1.57		.75	.33	1.47		.02		163	.22	24,860	61	2.2	285	7.2
June 19-22, 25-30	137,300	10	.35	.16	.93		.34	.23	.85		.02		92	.13	17,850	65	1.8	159	6.7
July 1-10	123,200	14	.50	.27	1.04		.56	.33	.90		.02		117	.16	19,710	57	1.7	202	6.9
July 11-20	75,710	15	.50	.26	1.33		.62	.29	1.16		.02		134	.18	13,630	64	2.2	230	6.8
July 21-31	76,110	14	.50	.27	1.17		.62	.29	1.02		.01		124	.17	12,940	60	1.9	213	6.4
Aug. 1-10	32,790	18	.70	.27	1.23		.97	.25	.96		.02		a 150	.20	6,560	56	1.8	238	7.6
Aug. 11-21.....	26,140	19	.70	.25	1.27		.93	.25	1.02		.02		a 153	.21	5,490	57	1.8	246	6.9
Aug. 22-31.....	102,400	9.2	.26	.12	.76		.26	.19	.68		.01		75	.10	10,240	67	1.7	135	6.4
Sept. 1-11	60,320	12	.28	.15	.85		.46	.19	.62		.01		85	.12	7,240	66	1.8	139	7.0
Sept. 12-17	25,900	14	.40	.22	1.47		.52	.20	1.35		.02		134	.18	4,660	70	2.6	234	6.8
Sept. 18-22, 27...	165,900	4.0	.65	.08	.13	.04	.69	.12	.10		.02		54	.07	11,610	14	.2	93	7.0
Sept. 23-26, 28-30	481,800	4.6	.11	.07	.23	.05	.16	.07	.21		.01		32	.04	19,270	50	.8	52	6.8
Total or weighted average	8,900,000	9.7	0.36	0.17	0.78		0.34	0.27	0.68		0.01		85	0.12	1,068,000	60	1.5	146	--

a Residue at 180°C.
b Includes 0.07 equivalent per million of carbonate (CO_3).

NECHES RIVER BASIN

8-410. NECHES RIVER AT EVADALE, TEX.

LOCATION.--At gaging station at bridge on U. S. Highway 96, 200 feet upstream from Gulf, Colorado & Santa Fe Railway Co. bridge at Evadale, Jasper County, 600 feet downstream from Mill Creek, 15 miles upstream from Village Creek, and at mile 55.
DRAINAGE AREA.--7,923 square miles (revised).
RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1958.
Water temperatures: October 1947 to September 1958.
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 274 micromhos July 21; minimum daily, 44.1 micromhos Sept. 22.
Percent sodium: Maximum, 73 Oct. 27-31; minimum, 40 May 22-31, Sept. 21-22, 24.
EXTREMES, 1947-58.--Specific conductance: Maximum daily, 422 micromhos Jan. 25, 1957; minimum daily, 44.1 micromhos Sept. 22, 1958.
Percent sodium: Maximum, 76 Jan. 21-31, 1957; minimum, 14 June 4-18, 1950.
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 water year October 1957 to September 1958 given in WSP 1562.

Chemical analyses, water year October 1957 to September 1958

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, 1957..	15,150	16	0.55	0.28	1.07		0,85	0.25	0.76	0.03	0.01		121	0.16	2,420	56	1.7	195	7.5
Oct. 14-26	113,300	13	.43	.23	1.06		.70	.25	.73	.03	.01		108	.15	17,000	62	1.8	185	7.3
Oct. 27-31.....	112,300	9.4	.15	.12	.73		.28	.27	.39	.05	.01		67	.09	10,110	73	2.0	101	6.8
Nov. 1-10	226,900	8.6	.22	.12	.60		.20	.25	.45	.03	.01		64	.09	20,420	64	1.5	103	6.4
Nov. 11-20	295,700	9.8	.25	.14	.60		.21	.23	.51	.03	.01		67	.09	26,610	61	1.4	109	6.6
Nov. 21-30	464,100	7.2	.22	.12	.45		.23	.21	.31	.03	.01		52	.07	32,490	57	1.1	82	6.3
Dec. 1-8	490,900	12	.23	.15	.48		.26	.23	.34	.03	.00		61	.08	39,270	56	1.1	94	6.7
Dec. 9-17	299,700	14	.31	.18	.57		.30	.29	.45	.02	.00		75	.10	29,970	54	1.2	119	6.7
Dec. 18-31	247,800	17	.42	.26	.71		.38	.40	.59	.02	.00		96	.13	32,210	51	1.2	154	6.9
Jan. 1-10, 1958..	230,000	13	.35	.21	.72		.31	.37	.56	.03	.01		88	.12	27,600	56	1.4	139	6.4
Jan. 11-20.....	231,100	13	.39	.22	.79		.33	.42	.62	.02	.01		95	.13	30,040	56	1.4	149	6.4
Jan. 21-31.....	502,000	9.4	.23	.14	.50		.23	.27	.34	.02	.01		61	.08	40,160	57	1.2	91	6.3
Feb. 1-6	198,000	9.8	.30	.17	.47		.25	.31	.37	--	.01		64	.09	17,820	50	1.0	104	6.6
Feb. 7-22	321,600	12	.40	.24	.93		.26	.48	.79	.03	.01		104	.14	45,020	59	1.6	170	6.4
Feb. 23-28	140,400	4.2	.34	.19	.69		.28	.37	.56	--	.01		76	.10	14,040	57	1.3	131	7.4

Mar. 1-10, 1958 .	196,500	12	0.42	0.24	0.82	0.30	0.46	0.68	0.02	0.02	99	0.13	25,540	55	1.4	163	6.9
Mar. 11-20	156,300	12	.48	.30	.86	.36	.52	.73	.02	.01	108	.15	23,440	52	1.4	176	6.9
Mar. 21-31	122,500	12	.50	.31	.94	.39	.54	.79	.02	.01	115	.16	19,600	54	1.5	192	7.1
Apr. 1-10	80,910	14	.55	.35	.99	.43	.58	.87	.00	.01	125	.17	13,750	52	1.5	207	6.5
Apr. 11-20	107,700	14	.55	.37	1.15	.43	.56	1.07	.00	.01	134	.18	19,390	56	1.7	223	6.4
Apr. 21-30	97,310	13	.50	.32	1.06	.46	.50	.90	.01	.01	122	.17	16,540	56	1.7	202	7.2
May 1-9.....	143,600	14	.45	.23	1.02	.43	.50	.73	.03	.01	113	.15	21,540	60	1.7	190	6.3
May 10-21.....	454,200	8.2	.40	.15	.62	.33	.33	.68	.02	.01	88	.12	54,500	60	1.6	145	6.3
May 22-31.....	287,700	11	.60	.17	.52	.41	.29	.56	.01	.02	84	.11	31,650	40	.8	151	6.2
June 1-10.....	40,200	15	.50	.27	.75	.66	.27	.56	.02	.01	100	.14	5,630	49	1.2	161	6.8
June 11-20	23,090	18	.55	.27	.81	.72	.29	.59	.02	.01	109	.15	3,460	50	1.2	174	6.8
June 21-30.....	61,650	14	.50	.28	1.68	.67	.29	.65	.05	.02	107	.15	9,250	54	1.4	187	7.0
July 1-10	49,820	17	.44	.25	1.04	.56	.37	.73	.05	.02	116	.16	7,970	60	1.8	183	6.7
July 11-20.....	31,460	17	.47	.27	.94	.52	.42	.68	.04	.02	114	.16	5,030	56	1.5	180	6.6
July 21-31.....	39,270	15	.49	.28	.99	.49	.42	.79	.05	.01	116	.16	6,280	56	1.6	196	6.5
Aug. 1-10	38,240	16	.47	.29	.98	.59	.40	.73	.01	.01	118	.16	6,120	56	1.6	192	7.2
Aug. 11-20	28,340	18	.50	.30	.95	.67	.37	.68	.01	.02	117	.16	4,530	54	1.5	189	6.8
Aug. 21-31	14,590	17	.50	.28	1.11	.79	.35	.73	.01	.01	124	.17	2,480	59	1.8	201	7.0
Sept. 1-10.....	9,520	18	.50	.32	1.28[•]	.98	.29	.85	.01	.02	138	.19	1,810	60	1.9	230	7.3
Sept. 11-20, 27 ..	36,980	15	.45	.25	1.14	.79	.29	.73	.01	.02	118	.16	6,240	62	1.9	192	7.2
Sept. 21-22, 24 ..	47,230	4.0	.20	.08	0.21 | 0.04	.15	.17	.17	.01	.02	35	.05	2,360	40	.6	53	6.9
Sept. 23, 25-26, 28-30.....	170,100	7.8	.20	.11	.55	.26	.23	.34	.01	.02	58	.08	13,610	64	1.4	95	6.7
Total or weighted average	6,128,000	11	0.35	0.19	0.70	0.33	0.33	0.54	0.02	0.01	83	0.11	674,100	56	1.3	134	--

TRINITY RIVER BASIN

8-665. TRINITY RIVER AT ROMAYOR, TEX.

LOCATION.--At gaging station at bridge on State Highway 105, 1.9 miles south of Romayor, Liberty County, 2.0 miles downstream from Gulf, Colorado and Santa Fe Railway Co. bridge, 4.1 miles downstream from Big Creek, and at mile 94.
DRAINAGE AREA.--17,192 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1945 to November 1949, February 1950 to September 1951, April 1953 to September 1958. Water temperatures: February 1950 to September 1951, April 1953 to September 1958.
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 1,970 micromhos Oct. 5; minimum daily, 127 micromhos Oct. 19. Percent sodium: Maximum, 82 Oct. 2, 4-5; minimum, 26 May 17-31.
EXTREMES, 1945-50, 1953-58.--Specific conductance: Maximum daily, 3,800 micromhos Oct. 30, 1956; mimimum 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. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1957 to September 1958 given in WSP 1562.

Chemical analyses, water year October 1957 to September 1958

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, 6-7, 9-14, 1957	18,560	13	2.05	0.42	4.48		2.07	0.71	4.17		0.00		406	0.55	10,210	64	4.0	779	7.4
Oct. 2, 4-5	8,150	9.6	2.20	.50	12.60		2.10	.77	12.41		.02		a911	1.24	10,110	82	11	1,590	8.1
Oct. 8, 15-16	90,540	12	1.50	.21	1.12		1.66	.42	.73		.02		168	.23	20,820	40	1.2	293	8.0
Oct. 17-20	349,100	7.2	.75	.12	.55		.85	.17	.39		.01		86	.12	41,890	39	.8	144	7.9
Oct. 21-26, 29-31	435,500	11	1.30	.19	.97		1.34	.42	.68		.02		146	.20	87,100	39	1.1	251	8.2
Oct. 27-28	79,740	14	1.92	.28	1.89		1.92	.54	1.58		.05		241	.33	26,310	46	1.8	422	7.9
Nov. 1-2, 4-10	148,400	14	1.90	.30	1.53		1.80	.67	1.24		.02		222	.30	44,520	41	1.5	378	7.7
Nov. 3, 20	61,230	--	--	--	--		--	--	--		--		--	--	--	--	--	977	7.8
Nov. 11-19	367,300	10	1.70	.26	1.16		1.57	.56	.96		.03		184	.25	91,820	37	1.2	325	7.5
Nov. 21-30	709,300	10	1.65	.24	.84		1.52	.46	.73		.02		160	.22	156,000	31	.9	276	7.4
Dec. 1-12	266,000	13	2.25	.35	1.43		2.00	.75	1.24		.04		238	.32	85,120	35	1.3	414	8.1
Dec. 13-26	134,500	15	2.99	.49	2.76		2.59	1.15	2.40		.10		a387	.53	71,280	44	2.1	633	8.2
Dec. 27-31	149,600	10	1.70	.20	1.26		1.48	.65	.99		.04		188	.26	38,900	40	1.3	325	8.2
Jan. 1-12, 16-19 1958	253,400	14	2.30	.35	2.00		2.07	.94	1.58		.06		a298	.41	103,900	43	1.7	472	8.2
Jan. 13-15, 20-23	304,700	11	1.15	.16	.84		1.03	.50	.59		.03		133	.18	54,850	39	1.0	228	7.8
Jan. 24-31	232,500	12	1.80	.25	1.35		1.59	.73	1.02		.06		205	.28	65,100	40	1.3	356	7.9

a Residue at 180°C.

Feb. 1-10, 1958	121,300	12	2.69	0.43	2.14	2.25	1.10	1.83		0.08		a336	0.46	55,800	41	1.7	536	8.1
Feb. 11-23.....	140,100	14	2.50	.45	2.42	2.10	1.06	2.14		.07		a344	.47	65,850	45	2.0	553	8.2
Feb. 24-28.....	148,900	12	1.10	.21	1.01	.90	.54	.85		.03		144	.20	29,780	44	1.2	241	7.6
Mar. 1-10	100,100	15	2.15	.45	2.25	1.70	1.04	2.06		.05		293	.40	40,040	46	2.0	511	7.7
Mar. 11-20	186,600	15	2.45	.46	2.22	1.98	1.23	1.86		.06		a324	.44	82,100	43	1.8	528	7.8
Mar. 21-31	139,500	12	2.79	.44	1.94	2.46	.98	1.64		.09		a311	.42	58,590	38	1.5	519	7.9
Apr. 1-18	209,800	15	2.79	.30	1.73	2.41	1.06	1.27		.08		288	.39	81,820	36	1.4	532	7.8
Apr. 19-27.....	133,800	14	2.50	.32	2.32	2.15	.96	1.95		.08		a332	.45	60,210	45	2.0	516	7.7
Apr. 28-30, May 1-3	170,400	10	2.15	.17	1.25	1.90	.75	.87		.05		211	.29	49,420	35	1.2	374	7.5
May 4-16	1,015,000	13	1.80	.16	.73	1.77	.48	.39		.05		161	.22	223,300	27	.7	268	7.6
May 17-31.....	1,187,000	13	2.50	.21	.96	2.43	.56	.65		.03		212	.29	344,200	26	.8	365	7.8
June 1-10.....	239,000	15	2.79	.41	1.51	2.57	.73	1.35		.06		a284	.39	93,210	32	1.2	474	7.7
June 11-20.....	109,200	11	2.89	.40	1.43	2.46	.75	1.44		.07		a284	.39	42,590	30	1.1	479	7.7
June 21-30.....	139,900	15	2.35	.36	1.79	2.08	.77	1.58		.07		a276	.38	53,160	40	1.5	458	7.8
July 1-10	119,500	14	2.40	.35	1.44	2.28	.69	1.16		.06		245	.33	39,440	34	1.2	433	7.7
July 11-20	113,900	13	2.35	.32	1.84	2.11	.79	1.55		.06		a283	.38	43,280	41	1.6	460	7.7
July 21-31	40,860	11	2.64	.35	1.89	2.47	.73	1.64		.04		a301	.41	16,750	39	1.5	491	7.7
Aug. 1-15	39,770	9.0	2.89	.41	3.33	2.95	1.06	2.59		.03		a390	.53	21,080	50	2.6	674	8.2
Aug. 16-31	56,630	10	2.79	.38	2.99	2.87	1.04	2.20		.05		a370	.50	28,320	49	2.4	630	8.0
Sept. 1-10	21,650	15	2.40	.37	3.18	2.34	.90	2.65		.06		a374	.51	11,040	53	2.7	633	8.1
Sept. 11-21	38,010	11	2.54	.42	3.28	2.38	1.04	2.79		.03		a374	.51	19,390	53	2.7	653	8.0
Sept. 22-30	387,400	8.8	1.40	.19	.91	1.38	.42	.68		.02		147	.20	77,480	36	1.0	262	7.6
Total or weighted average.....	8,467,000	12	2.00	0.26	1.35	1.85	0.65	1.04		0.04		215	0.29	2,455,000	37	1.3	366	--

a Residue at 180°C.

BRAZOS RIVER BASIN

8-1140. BRAZOS RIVER AT RICHMOND, TEX.

LOCATION.--At gaging station at bridge on U. S. Highway 59 in Richmond, Fort Bend County, 925 feet downstream from Texas and New Orleans Railroad Co. bridge, and at mile 93.
DRAINAGE AREA.--44,020 square miles, approximately, of which 9,240 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1958.
Water temperatures: November 1950 to September 1958.
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 1,160 micromhos July 28; minimum daily, 234 micromhos Sept. 30.
Percent sodium: Maximum, 50 Aug. 21-31; minimum, 20 Oct. 16-22.
EXTREMES, 1945-58.--Specific conductance: Maximum daily, 2,540 micromhos Sept. 4, 1951; minimum daily, 187 micromhos Aug. 31, 1947.
Percent sodium: Maximum, 76 Dec. 3-4, 1945; minimum, 18 Aug. 27-31, 1947.
REMARKS.--Values reported for dissolved solids are residues at 180°C. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1957 to September 1958 given in WSP 1562.

Chemical analyses, water year October 1957 to September 1958

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, 11-14, 1957	21,060	14	3.69	1.07	3.57		3.02	2.23	3.07	--	0.01		504	0.69	14,530	43	2.3	839	8.0
Oct. 2-10	75,810	11	2.35	.61	1.74	0.11	2.21	1.02	1.55	--	.03		298	.41	31,080	36	1.4	502	7.9
Oct. 16-22	1,027,000	7.8	1.55	.33	.48	.08	1.62	.44	.37	--	.03		a142	.19	195,100	20	.5	246	8.0
Oct. 23-31	644,200	7.8	2.00	.41	1.13	.11	1.79	.73	1.13	--	.03		a214	.29	186,800	31	1.0	383	7.9
Nov. 1-10	253,200	9.6	2.54	.52	1.48	.12	2.26	.85	1.55	--	.05		276	.38	96,220	32	1.2	472	7.5
Nov. 11-22	383,200	11	3.09	.59	1.96	.11	2.28	1.42	2.03	--	.06		346	.47	180,100	34	1.4	585	7.9
Nov. 23-30	410,400	10	2.10	.35	1.09	.10	1.87	.71	1.04	--	.05		228	.31	127,200	30	1.0	370	7.8
Dec. 1-10	246,100	11	3.34	.72	2.22		2.74	1.44	2.00	--	.10		374	.51	125,500	35	1.6	607	8.1
Dec. 11-20	120,100	13	4.14	.90	2.75		3.23	1.96	2.48	--	.12		466	.63	75,660	35	1.7	755	8.1
Dec. 21-31	138,000	13	4.29	.99	2.89		3.44	2.02	2.59	--	.12		485	.66	91,080	35	1.8	778	8.1
Jan. 1-10, 1958	138,600	14	2.89	.64	1.52	.10	2.44	1.10	1.44	--	.10		317	.43	59,600	30	1.1	515	7.5
Jan. 11-20	154,600	15	3.09	.73	1.65	.10	2.74	1.15	1.61	--	.10		342	.47	72,660	30	1.2	561	7.7
Jan. 21-31	292,700	9.6	2.35	.52	1.44	.10	1.97	.98	1.41	--	.07		274	.37	108,300	33	1.2	454	7.4
Feb. 1-10	120,500	7.6	3.29	.75	1.91	.10	2.74	1.33	2.00	--	.06		377	.51	61,460	32	1.4	626	8.1
Feb. 11-20	98,640	12	3.99	1.00	2.44	.10	3.36	1.62	2.45	--	.09		456	.62	61,160	32	1.5	758	8.2
Feb. 21-28	594,800	7.2	2.94	.68	1.57	.08	2.56	1.17	1.58	--	.06		316	.43	255,800	30	1.2	558	8.2

a Calculated from determined constituents.

Mar. 1-10, 1958 .	411,800	14	2.59	0.61	1.09	0.09	2.46	0.73	1.02	0.02	0.13		268	0.36	148,200	25	0.9	432	8.1
Mar. 11-20.....	246,300	14	3.49	.81	2.04	.09	2.90	1.25	2.03	.02	.14		398	.54	133,000	32	1.4	628	8.2
Mar. 21-31.....	195,800	13	3.39	.90	1.74	.09	3.02	1.21	1.75	.02	.15		382	.52	101,800	28	1.2	605	8.1
Apr. 1-10.....	102,100	12	4.09	1.15	2.31	.09	3.49	1.62	2.31	--	.24		466	.63	64,320	30	1.4	746	7.4
Apr. 11-20.....	86,180	14	3.89	1.15	2.57	.09	3.26	1.71	2.65	--	.13		462	.63	54,290	33	1.6	759	7.5
Apr. 21-30.....	167,900	13	3.69	.99	2.22	.09	3.11	1.58	2.20	--	.12		414	.56	94,020	32	1.5	684	7.3
May 1-10.....	852,500	13	2.10	.44	.83	.09	1.90	.69	.79	---	.06		210	.29	247,200	24	.7	345	7.4
May 11-20.....	502,400	11	3.19	.82	2.52	.10	2.52	1.42	2.68	---	.05		394	.54	271,300	38	1.8	680	7.2
May 21-31.....	209,600	11	3.29	.82	1.78	.09	3.02	1.06	1.89	--	.10		355	.48	100,600	30	1.2	603	7.4
June 1-10.....	93,360	15	3.29	.90	1.91	.08	3.06	1.19	1.92	--	.05		368	.50	46,680	31	1.3	615	7.8
June 11-20	56,450	14	3.29	.99	2.74	.10	3.06	1.35	2.71	--	.04		421	.57	32,180	38	1.9	712	7.6
June 21-30.....	146,100	14	2.59	.68	1.52	.09	2.44	1.04	1.41	---	.06		298	.41	59,900	31	1.2	495	7.6
July 1-3, 11-14 ..	173,300	13	2.10	.58	1.26	.09	2.03	.75	1.13	--	.04		a234	.32	55,460	31	1.1	412	7.4
July 4-10.....	59,520	16	3.49	.99	2.61	.11	3.18	1.35	2.51	--	.05		451	.61	36,310	36	1.7	723	7.2
July 15-31.....	156,000	14	3.99	1.07	4.83	.13	2.56	2.23	5.16	--	.02		632	.86	134,200	48	3.0	1,040	7.2
Aug. 1-10.....	20,820	13	3.84	1.23	4.65	.12	3.08	2.12	4.62	---	.01		605	.82	17,070	47	2.9	1,010	8.0
Aug. 11-20.....	29,710	13	3.69	1.40	4.61	.12	3.10	2.23	4.62	--	.02		609	.83	24,660	47	2.9	1,020	7.8
Aug. 21-31.....	63,930	13	3.79	1.40	5.31	.12	3.00	2.35	5.16	--	.01		645	.88	56,260	50	3.3	1,070	7.8
Sept. 1-9.....	43,020	14	2.40	.63	1.70	.12	2.29	1.04	1.52	--	.03		a288	.39	16,780	35	1.4	498	8.1
Sept. 10-24.....	113,200	13	3.19	1.07	4.05	.13	2.61	1.60	4.34	--	.02		a498	.68	76,980	48	2.8	875	8.2
Sept. 25-30.....	141,000	12	1.50	.35	.65	.10	1.56	.58	.48	--	.03		a159	.22	31,020	25	.7	270	7.7
Total or weighted average.....	8,590,000	11	2.69	0.63	1.61	0.10	2.33	1.04	1.61	--	0.07		303	0.41	3,522,000	32	1.2	508	--

a Calculated from determined constituents.

COLORADO RIVER BASIN

8-1580. 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, approximately, above gaging station, of which 11,900 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1958.
Water temperatures: October 1947 to September 1958.
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 507 micromhos July 4; minimum daily, 283 micromhos Oct. 15.
Percent sodium: Maximum, 24 Oct. 1-31; minimum, 17 Mar. 1-31, Aug. 1-31.
EXTREMES, 1947-58.--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 at 180°C. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1957 to September 1958 given in WSP 1562. No appreciable inflow between sampling point and gaging station except during periods of heavy local rains.

Chemical analyses, water year October 1957 to September 1958

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, 1957..	352,300	9.6	1.95	0.61	0.79		2.44	0.29	0.56	0.02	0.04		193	0.26	91,600	24	0.7	325	8.1
Nov. 1-30.....	373,000	9.2	2.00	.63	.80		2.39	.35	.62	.01	.06		192	.26	96,980	23	.7	330	7.8
Dec. 1-31.....	295,100	7.8	2.15	.67	.78		2.49	.35	.68	.02	.06		204	.26	82,630	22	.7	345	7.9
Jan. 1-31, 1958..	229,200	9.2	2.20	.72	.74		2.54	.37	.68	.01	.06		a201	.27	61,880	20	.6	355	8.0
Feb. 1-28.....	242,100	9.4	2.30	.81	.86		b2.69	.40	.79	.02	.07		238	.32	77,470	22	.7	389	8.5
Mar. 1-31.....	353,400	10	2.45	.81	.67		2.75	.42	.68	.02	.06		223	.30	106,000	17	.5	394	7.9
Apr. 1-30.....	241,800	9.6	2.40	.81	.86		2.75	.48	.76	.02	.06		233	.32	77,380	21	.7	392	7.5
May 1-31.....	263,400	10	2.40	.82	.95		2.92	.44	.73	.02	.06		232	.32	84,290	23	.7	394	8.0
June 1-30.....	284,300	9.0	2.30	.99	.73		2.82	.42	.68	.02	.08		235	.32	90,980	18	.6	388	7.6
July 1-31.....	258,400	8.4	2.30	1.07	.74		2.87	.42	.73	.01	.08		229	.31	80,100	18	.6	388	7.8
Aug. 1-31.....	164,600	9.4	2.25	1.07	.69		2.85	.40	.68	.02	.06		226	.31	51,030	17	.5	383	7.9
Sept. 1-30.....	93,920	9.2	2.05	.99	.80		2.74	.37	.68	.02	.03		a206	.28	26,300	21	.6	374	8.0
Total or weighted average	3,151,000	9.2	2.25	0.81	0.78		2.67	0.40	0.68	0.02	0.06		216	0.29	913,800	20	0.6	369	--

a Calculated from determined constituents.

b Includes 0.17 equivalents per million carbonate (CO_3).

8-1620. COLORADO RIVER AT WHARTON, TEX.

LOCATION.--At gaging station at bridge on U. S. Highway 59, in Wharton, Wharton County, 1,000 feet downstream from Texas and New Orleans Railroad Co. bridge, 12 miles upstream from Jones Creek, and at mile 67.
DRAINAGE AREA.--41,380 square miles, approximately, of which 11,900 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: April 1944 to September 1958.
Water temperatures: October 1945 to September 1948, March 1950 to September 1958.
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 637 micromhos Aug. 26; minimum daily, 170 micromhos Oct. 17.
Percent sodium: Maximum, 22 Nov. 23-27; minimum, 12 Oct. 15-19.
EXTREMES, 1944-58.--Specific conductance: Maximum daily, 765 micromhos Feb. 5, 1957; minimum daily, 146 micromhos Sept. 27, 1957.
Percent sodium: Maximum, 43 Nov. 1-30, 1951; minimum, 7 Jan. 19-24, 1945.
REMARKS.--Values reported for dissolved solids are residues at 180°C. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1957 to September 1958 given in WSP 1562.

Chemical analyses, water year October 1957 to September 1958

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. 1-14, 20-31, 1957	386,400	12	2.40	0.56	0.61	0.10	2.64	0.44	0.56	--	0.06		a209	0.28	108,200	17	0.5	360	8.1
Oct. 15-19	373,100	8.4	1.45	.25	.25	.09	1.54	.27	.19	--	.04		a118	.16	59,700	12	.3	199	7.9
Nov. 1-22, 28-30	331,100	9.4	2.30	.58	.61	.10	2.47	.44	.62	--	.09		208	.28	92,710	17	.5	350	8.0
Nov. 23-27	157,900	8.0	1.60	.30	.57	.09	1.66	.31	.51	--	.04		a146	.20	31,580	22	.6	249	7.6
Dec. 1-31	350,700	11	2.59	.69	.70	.10	2.79	.46	.76	--	.09		232	.32	112,200	17	.5	388	8.0
Jan. 1-31, 1958	352,200	13	2.25	.66	.65	.10	2.39	.54	.65	--	.08		219	.30	105,700	18	.5	356	7.8
Feb. 1-22	171,100	12	2.74	.90	.74	.10	3.05	.56	.76	--	.08		259	.35	59,880	17	.5	429	8.1
Feb. 23, 27-28	95,400	4.2	--	.49	.44	.08	--	.42	.34	--	.01		--	--	--	--	--	332	8.8
Feb. 24-26	277,300	9.6	1.60	.26	.29	.08	1.61	.40	.18	--	.05		a131	.18	49,910	13	.3	217	7.8
Mar. 1-31	436,000	11	2.64	.90	.74	.09	2.98	.54	.73	0.02	.12		258	.35	152,600	17	.6	429	7.8
Apr. 1-30	314,100	13	2.59	.90	.74	.10	2.97	.54	.79	.02	.08		254	.35	109,900	17	.6	413	7.9
May 1-31	359,500	13	2.54	.90	.65	.09	2.87	.52	.71	--	.10		245	.33	118,600	16	.5	406	7.8
June 1-30	236,800	14	2.25	.99	.70	.09	2.72	.48	.79	--	.05		238	.32	75,780	17	.5	388	7.8
July 1-31	236,400	13	2.25	.99	.70	.09	2.75	.46	.79	--	.06		226	.31	73,280	17	.5	393	7.7

a Calculated from determined constituents.

COLORADO RIVER BASIN--Continued

8-1620. COLORADO RIVER AT WHARTON, TEX.--Continued

Chemical analyses, water year October 1957 to September 1958--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. 1-31, 1958	142,400	11	2.00	1.15	0.78	0.09	2.61	0.48	0.93	---	0.05		a224	0.30	42,720	19	0.6	389	7.7
Sept. 1-8, 12-21, 27-30	98,700	15	2.20	.99	.78	.09	2.70	.56	.73	---	.04		229	.31	30,600	19	.6	389	8.0
Sept. 9-11, 22-26	117,600	15	1.75	.44	.48	.09	1.87	.48	.37	---	.04		165	.22	25,870	17	.5	274	7.6
Total or weighted average	4,437,000	11	2.25	0.69	0.61	0.09	2.51	0.46	0.62	---	0.07		211	0.29	1,287,000	17	0.5	354	--

a Calculated from determined constituents

8-1765. GUADALUPE RIVER AT VICTORIA, TEX.

LOCATION.--At gaging station at bridge on U. S. Highway 59 in Victoria, Victoria County, 1,300 feet upstream from Texas and New Orleans Railroad Co. 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 1958.
Water temperatures: November 1950 to September 1958.
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 760 micromhos Aug. 3; minimum daily, 185 micromhos Oct. 18.
Percent sodium: Maximum, 28 June 1-10; minimum, 13 May 7-10.
EXTREMES, 1945-46, 1948-58.--Specific conductance: Maximum daily, 1,950 micromhos Jan. 11-17, 1946; minimum daily, 184 micromhos Oct. 24, 1956.
Percent sodium: Maximum, 67 July 23-24, 1950; minimum, 13 May 7-10, 1958.
REMARKS.--Values reported for dissolved solids are residues at 180°C. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1957 to September 1958 given in WSP 1562.

Chemical analyses, water year October 1957 to September 1958

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, 1957 ..	63,230	17	1.90	0.41	0.48	0.13	2.16	0.37	0.39		0.04		a 176	0.24	15,180	16	0.4	287	8.0
Oct. 4-15.....	36,020	19	3.69	1.15	1.57	.10	4.06	.81	1.69		.07		398	.54	19,450	24	1.0	642	8.0
Oct. 16, 22-27 ..	115,600	12	2.35	.60	.65	.10	2.61	.44	.62		.06		223	.30	34,680	18	.5	361	7.9
Oct. 17-21.....	242,600	9.6	1.55	.30	.32	.11	1.80	.23	.28		.03		a 134	.18	43,670	14	.3	227	7.9
Oct. 28-31.....	31,020	14	3.24	.99	1.30	.10	3.54	.60	1.41		.12		a 317	.43	13,340	23	.9	545	8.0
Nov. 1-11.....	49,710	20	3.94	1.15	1.26	.07	4.36	.73	1.27		.15		373	.51	25,350	20	.8	616	7.9
Nov. 12-22	82,350	16	3.24	.90	.96	.09	3.51	.67	.96		.13		304	.41	33,760	18	.7	496	7.7
Nov. 23-30.....	118,400	15	2.20	.60	.65	.10	2.39	.46	.65		.08		218	.30	35,520	18	.5	351	7.9
Dec. 1-10	48,240	21	3.44	1.32	1.13	.07	3.92	.69	1.18		.16		346	.47	22,670	19	.7	565	7.9
Dec. 11-20.....	35,940	19	3.29	1.56	1.44	.06	3.80	.81	1.47		.18		364	.50	17,970	23	.9	605	8.0
Dec. 21-31	38,160	18	3.39	1.56	1.39	.06	3.92	.85	1.49		.16		373	.51	19,460	22	.9	614	7.8
Jan. 1-13, 1958 .	59,390	16	3.69	1.23	1.39	.08	3.92	.92	1.44		.13		370	.50	29,700	22	.9	611	7.9
Jan. 14-20.....	88,940	12	2.35	.64	.70	.11	b 2.44	.52	.73		.09		225	.31	27,570	18	.6	368	8.4
Jan. 21-31	102,000	14	2.79	.90	.96	.08	3.03	.65	.90		.12		272	.37	37,740	20	.7	452	7.7

a Calculated from determined constituents.
b Includes 0.13 equivalent per million of carbonate (CO_3).

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GUADALUPE RIVER BASIN--Continued

8-1765. GUADALUPE RIVER AT VICTORIA, TEX.--Continued

Chemical analyses, water year October 1957 to September 1958--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, 1958.	45,700	15	--	1.32	1.17	0.06	--	0.77	1.27		0.15		--	--	--	--	--	612	8.2
Feb. 11-22.....	65,470	13	3.79	1.40	1.17	.06	4.21	.79	1.33		.14		370	0.50	32,740	18	0.7	612	8.1
Feb. 23-28.....	368,900	9.6	1.65	.35	.40	.09	1,80	.31	.37		.05		a145	.20	73,780	16	.4	248	8.0
Mar. 1-10	114,600	15	3.34	1.40	1.09	.06	3.74	.77	1.30		.18		a332	.45	51,570	19	.7	569	7.7
Mar. 11-20	66,130	17	3.34	1.48	1.09	.06	3.80	.79	1.30		.19		368	.50	33,060	18	.7	604	7.8
Mar. 21-31	60,460	16	2.59	1.56	1.26	.05	3.08	.85	1.44		.19		342	.47	28,420	23	.9	617	7.9
Apr. 1-5.....	23,400	18	2.00	1.07	1.00	.08	2.33	.65	1,07		.14		251	.34	7,960	24	.8	409	7.5
Apr. 6-17	49,110	14	--	1.48	1.39	.06	--	.85	1.52		.18		--	--	--	--	--	649	--
Apr. 18-30.....	47,370	17	3.79	1.48	1.30	.06	4.26	.87	1.41		.16		382	.52	24,630	20	.8	636	7.1
May 1-6	44,470	15	2.54	1.32	1.22	.07	3.02	.69	1.24		.11		292	.40	17,790	24	.9	513	7.9
May 7-10	106,900	12	2.20	.58	.44	.10	2.46	.35	.45		.07		a188	.26	27,790	13	.4	327	8.0
May 11-21	70,370	18	3.84	1.23	1.13	.07	4.33	.65	1,07		.16		378	.51	35,890	18	.7	597	7.6
May 22-31	42,210	16	3.84	1.48	1.26	.06	4.46	.73	1.24		.18		393	.53	22,370	19	.8	635	7.5
June 1-10.....	30,170	18	2.59	1.56	1.65	.06	3.28	.75	1.75		.07		347	.47	14,180	28	1.1	588	7.7
June 11-20.....	25,940	18	3.14	1.56	1.44	.06	3.87	.73	1.55		.07		352	.48	12,450	23	.9	604	7.6
June 21-30.....	48,850	15	3.14	1.32	.87	.06	3.77	.56	.93		.10		308	.42	20,520	16	.6	514	7.6
July 1-10	29,510	12	2.98	1.15	1.00	.07	3.70	.46	1.02		.02		a282	.38	11,210	19	.7	520	7.8
July 11-20	26,360	19	3.09	1.32	1.17	.08	3.72	.60	1.21		.08		336	.46	12,130	21	.8	543	7.5
July 21-31	20,850	18	2.84	1.48	1.30	.07	3.72	.62	1.35		.07		332	.45	9,380	23	.9	558	7.7
Aug. 1-10	15,530	15	2.79	1.48	1.44	.07	3.70	.67	1.44		.07		336	.46	7,140	25	1.0	573	7.6
Aug. 11-20.....	14,450	19	2.79	1.40	1.44	.06	3.67	.67	1.30		.07		334	.45	6,500	25	1.0	563	7.9
Aug. 21-31.....	15,700	18	2.74	1.40	1.39	.06	3.72	.69	1.21		.06		326	.44	6,910	25	1.0	551	7.8
Sept. 1-10	15,410	16	2.74	1.56	1.35	.06	3.72	.69	1.30		.06		a318	.43	6,630	24	.9	552	7.8
Sept. 11-21	23,170	17	2.79	1.23	1.13	.07	3.59	.58	1.04		.06		a293	.40	9,270	22	.8	517	8.1
Sept. 22-30	81,220	14	2.20	.76	.57	.08	2.69	.42	.51		.06		a206	.28	22,740	16	.5	357	8.0
Total or weighted average	2,564,000	14	2.64	0.90	0.87	0.08	3.00	0.56	0.87		0.10		264	0.36	923,000	19	0.7	441	--

a Calculated from determined constituents.

8-2110. 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 1958.
Water temperatures: October 1947 to September 1958.
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 743 micromhos May 10; minimum daily, 247 micromhos Feb. 28.
Percent sodium: Maximum, 44 May 1-31; minimum, 30 Mar. 1-16.
EXTREMES, 1947-58.--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, 22 June 1-30, 1957.
REMARKS.--Values reported for dissolved solids are residues at 180°C. Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge for water year October 1957 to September 1958 given in WSP 1562.

Chemical analyses, water year October 1957 to September 1958

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, 1957 ..	125,000	14	1.90	0.25	1.04	0.18	2.20	0.54	0.59	0.03	0.05		a203	0.28	35,000	31	1.0	338	8.0
Nov. 1-30.....	46,410	14	2.30	.38	1.57	.18	2.70	.71	1.07	--	.04		271	.37	17,170	35	1.4	440	7.7
Dec. 1-31	5,620	21	2.15	.37	1.96	.16	2.52	.79	1.16	.02	.06		296	.40	2,250	42	1.7	459	7.6
Jan. 1-10, 1958 ..	77,210	19	2.20	.39	2.04	.15	2.52	.87	1.24	.02	.06		300	.41	31,660	43	1.8	471	7.9
Jan. 11-31.....	229,900	12	1.60	.21	1.17	.13	1.75	.54	.68	.03	.06		a186	.25	57,480	38	1.2	306	7.5
Feb. 1-28	286,800	14	1.85	.27	1.35	.13	2.07	.58	.90	--	.07		221	.30	86,040	38	1.3	363	7.8
Mar. 1-16	252,900	16	2.15	.30	1.13	.15	2.41	.58	.70	.03	.05		231	.31	78,400	30	1.0	371	7.6
Mar. 17-31	16,230	15	3.04	.54	1.83	.16	3.26	.83	1.33	.02	.09		338	.46	7,470	33	1.4	551	7.7
Apr. 1-30	5,190	17	3.14	.71	2.26	.16	3.26	1.12	1.80	--	.09		370	.50	2,600	36	1.6	608	7.4
May 1-31	5,140	15	2.84	.80	3.00	.18	3.02	1.42	2.40	--	.06		415	.56	2,880	44	2.2	691	7.4
June 1-20.....	6,170	17	2.89	.72	2.87	.20	3.16	1.25	2.31	--	.02		396	.54	3,330	43	2.1	670	7.8
July 1-31	10,210	21	3.04	.71	2.61	.23	3.46	1.04	2.03	--	.02		406	.55	5,620	40	1.9	649	7.5
Aug. 1-31	7,240	23	3.29	.66	1.91	.25	3.80	.77	1.55	.02	.01		368	.50	3,620	31	1.4	586	8.1
Sept. 1-30	39,220	23	3.24	.60	1.83	.24	3.92	.67	1.41	--	.01		a348	.47	18,430	31	1.3	570	8.1
Total or weighted average	1,113,000	15	2.00	0.30	1.35	0.15	2.28	0.62	0.87	--	0.06		233	0.32	356,200	36	1.3	380	--

a Calculated from determined constituents.

RIO GRANDE BASIN

8-2492. RIO GRANDE ABOVE CULEBRA CREEK, NEAR LOBATOS, COLO.

LOCATION.--One-half 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 1958.
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 958 micromhos July 14; minimum daily, 157 micromhos May 9.
Percent sodium: Maximum, 45 Aug. 19; minimum, 28 Nov. 23-30.
EXTREMES, 1946-58.--Specific conductance: Maximum daily, 1,070 micromhos July 26, 1948; minimum daily, 122 micromhos June 1, 1949.
Percent sodium: Maximum, 72 May 11-14, 1957; minimum, 16 Dec. 1, 3-10, 1946.
REMARKS.--Values reported for dissolved solids are residues at 180°C. Records of specific conductance of daily samples available in district office at Albuquerque, N. Max. Records of discharge for gaging station near Lobatos for water year October 1957 to September 1958 given in WSP 1562. 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 1957 to September 1958

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)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)		Parts per million	Tons per acre-foot	Total tons				
Oct. 1-10, 1957	1,780	37	3.09	1.07	2.61	0.17	2.11	0.47	3.71	0.59	0.04	0.00	0.21	464	0.63	1,120	38	1.8	675	8.9
Oct. 11-18	1,650	--	3.19	.99	2.39	--	2.87	.00	--	--	--	--	--	452	.61	1,010	36	1.6	648	7.9
Oct. 19-21	758	--	2.99	.99	2.35	--	2.05	.67	--	--	--	--	--	431	.59	447	37	1.7	626	8.7
Oct. 22-23	551	--	2.20	.78	1.57	--	3.49	.00	--	--	--	--	--	267	.36	198	35	1.3	437	8.1
Oct. 24-28	1,540	--	1.75	.61	1.17	--	1.97	.83	--	--	--	--	--	240	.33	508	33	1.1	345	9.0
Oct. 29.....	527	--	1.45	.37	.83	--	.67	1.03	--	--	--	--	--	177	.24	126	31	.9	273	9.6
Oct. 30-31	3,190	--	.95	.27	.52	--	1.11	.00	--	--	--	--	--	126	.17	542	30	.7	182	7.7
Nov. 1-7	12,160	--	1.00	.25	.52	--	1.10	.00	--	--	--	--	--	126	.17	2,070	29	.7	185	7.2
Nov. 8-10	5,440	--	1.05	.31	.61	--	.98	.37	--	--	--	--	--	136	.18	979	31	.7	206	8.9
Nov. 11-12	2,590	--	1.35	.43	.91	--	1.74	.00	--	--	--	--	--	188	.26	673	34	1.0	269	7.6
Nov. 13-15	3,430	--	1.60	.47	1.04	--	2.07	.00	--	--	--	--	--	206	.28	960	33	1.0	317	7.7
Nov. 16	1,200	--	1.40	.41	.87	--	1.51	.10	--	--	--	--	--	187	.25	300	32	.9	277	8.3
Nov. 17-20	4,370	--	1.75	.49	1.13	--	2.13	.00	--	--	--	--	--	246	.33	1,440	34	1.1	346	7.7
Nov. 21-22	1,490	--	2.30	.64	1.26	--	2.20	.00	--	--	--	--	--	300	.41	611	30	1.0	426	7.7
Nov. 23-30	6,310	--	1.80	.49	.91	--	1.88	.00	--	--	--	--	--	228	.31	1,960	28	.9	327	7.9

Dec. 1-31,1957	23,490	--	1.65	0.51	0.96	--	2.33	0.00	--	--	--	--	--	220	0.30	7,050	31	0.9	309	7.7
Jan. 1-25, 1958	12,780	38	1.60	.49	.91	0.15	2.29	.00	0.62	0.14	0.02	0.02	0.09	211	.29	3,710	29	.9	298	7.5
Jan. 26-31	2,950	--	1.45	.37	.74	--	1.85	.00	--	--	--	--	--	180	.24	708	29	.8	263	7.8
Feb. 1-3, 5 ...	2,050	--	1.70	.63	1.26	--	1.90	1.03	--	--	--	--	--	275	.37	758	35	1.2	338	9.2
Feb. 4, 6-17 ..	7,170	--	1.45	.35	1.13	--	2.00	.00	--	--	--	--	--	198	.27	1,940	39	1.2	275	7.8
Feb. 18-28 ...	9,030	--	1.50	.54	1.30	--	1.93	.10	--	--	--	--	--	225	.31	2,800	39	1.3	323	8.4
Mar. 1-14	12,670	--	1.55	.47	1.22	--	1.93	.00	--	--	--	--	--	226	.31	3,930	38	1.2	326	8.0
Mar. 15-23 ...	6,280	--	1.95	.54	1.48	--	2.29	.00	--	--	--	--	--	267	.36	2,260	37	1.3	383	8.1
Mar. 24-31 ...	5,530	--	2.35	.78	1.96	--	2.72	.00	--	--	--	--	--	354	.48	2,650	39	1.6	504	7.7
Apr. 1-19.....	12,140	46	2.59	.82	1.83	.17	2.75	.00	2.27	.45	.05	.00	.19	375	.51	6,190	34	1.4	522	7.9
Apr. 20.....	861	--	1.75	.57	1.13	--	1.87	.00	--	--	--	--	--	240	.33	284	33	1.0	341	7.3
Apr. 21-30 ...	28,730	--	1.10	.39	.65	--	1.26	.00	--	--	--	--	--	152	.21	6,030	30	.8	210	7.3
May 1-7.....	15,830	--	1.35	.45	.87	--	1.54	.00	--	--	--	--	--	185	.25	3,960	33	.9	267	7.3
May 8-15	48,370	--	.95	.21	.57	--	.98	.00	--	--	--	--	--	122	.17	8,220	33	.7	170	7.2
May 16-31	94,850	--	1.15	.30	.65	--	1.15	.00	--	--	--	--	--	155	.21	19,920	31	.8	213	7.4
June 1-8	36,840	--	1.25	.35	.83	--	1.38	.00	--	--	--	--	--	185	.25	9,210	34	.9	248	7.5
June 9-10	10,930	--	.90	.20	.61	--	1.28	.00	--	--	--	--	--	122	.17	1,860	36	.8	174	7.6
June 11-14	13,300	--	1.25	.35	1.00	--	1.69	.00	--	--	--	--	--	190	.26	3,460	38	1.1	271	7.6
June 15-21	7,370	--	1.85	.51	1.48	--	2.16	.00	--	--	--	--	--	278	.38	2,800	39	1.4	391	7.7
June 22-25	1,690	--	2.30	.72	1.83	--	2.77	.00	--	--	--	--	--	340	.46	777	38	1.5	486	8.0
June 26	278	--	1.85	.51	1.04	--	2.39	.20	--	--	--	--	--	242	.33	92	31	1.0	348	8.6
June 27	266	--	2.54	.76	1.87	--	2.82	.00	--	--	--	--	--	380	.52	138	36	1.5	535	7.8
June 28-29	490	--	3.09	.90	2.35	--	2.92	.00	--	--	--	--	--	450	.61	299	37	1.7	638	7.9
June 30-July 3.	980	--	3.59	1.15	2.83	--	2.82	.27	--	--	--	--	--	538	.73	715	37	1.8	751	8.5

8-2492. RIO GRANDE ABOVE CULEBRA CREEK, NEAR LOBATOS, COLO.--Continued

Chemical analyses, water year October 1957 to September 1958--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)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)		Parts per million	Tons per acre-foot	Total tons				
July 4-10, 1958	1,300	--	3.94	1.23	3.18	--	2.88	0.00	--	--	--	--	--	598	0.81	1,050	38	2.0	834	8.2
July 11-15....	595	--	4.34	1.40	3.48	--	3.02	.00	--	--	--	--	--	651	.89	530	38	2.1	916	8.2
July 16-19 ...	525	--	3.19	1.07	2.83	--	3.03	.00	--	--	--	--	--	495	.67	352	40	1.9	708	7.9
July 20-21 ...	252	--	2.79	.99	2.44	--	2.82	.00	--	--	--	--	--	442	.60	151	39	1.8	619	7.9
July 22-24 ...	317	--	3.34	1.32	3.44	--	2.46	.47	--	--	--	--	--	581	.79	250	42	2.2	805	8.7
July 25-27 ...	335	--	3.14	1.23	2.96	--	3.15	.00	--	--	--	--	--	500	.68	228	40	2.0	720	7.8
July 28.....	105	--	3.94	1.32	3.70	--	3.25	.00	--	--	--	--	--	620	.84	88	41	2.3	874	8.2
July 29	89	--	2.50	1.32	3.00	--	3.15	.00	--	--	--	--	--	480	.65	58	44	2.2	687	7.6
July 30-Aug. 2	297	--	4.09	.90	3.31	--	3.05	.00	--	--	--	--	--	575	.78	232	40	2.1	809	7.9
Aug. 3.....	71	--	2.79	.82	2.39	--	2.80	.00	--	--	--	--	--	421	.57	40	40	1.8	597	7.3
Aug. 4.....	93	--	3.54	1.23	3.26	--	2.92	.00	--	--	--	--	--	563	.77	72	41	2.1	782	7.6
Aug. 5	73	--	2.84	.82	2.39	--	2.87	.00	--	--	--	--	--	433	.59	43	40	1.8	605	7.9
Aug. 6-18 ...	708	--	3.39	1.23	3.39	--	3.25	.00	--	--	--	--	--	558	.76	538	42	2.2	781	7.6
Aug. 19.....	77	--	2.99	.99	3.22	--	3.72	.00	--	--	--	--	--	514	.70	54	45	2.3	710	8.2
Aug. 20-24...	418	--	2.84	.90	2.57	--	3.00	.00	--	--	--	--	--	452	.61	255	41	1.9	636	7.7
Aug. 25-29 ..	341	--	3.19	1.15	2.70	--	3.34	.00	--	--	--	--	--	480	.65	222	38	1.8	683	7.2
Aug. 30-Sept. 7	407	--	2.74	.90	2.65	--	3.23	.00	--	--	--	--	--	449	.61	248	42	2.0	624	8.2

Sept. 8-10, 1958.....	99	--	3.29	1.15	3.09	--	3.23	0.00	--	--	--	--	--	524	0.71	70	41	2.1	737	7.8
Sept. 11-12..	85	--	3.74	1.40	3.61	--	3.23	.00	--	--	--	--	--	594	.81	69	41	2.3	831	--
Sept. 13-15..	149	--	2.69	.90	2.48	--	3.00	.23	--	--	--	--	--	424	.58	86	41	1.9	595	8.4
Sept. 16-17..	190	--	2.40	.76	1.96	--	2.85	.00	--	--	--	--	--	354	.48	91	38	1.6	507	7.5
Sept. 18-20..	305	--	1.85	.57	1.48	--	2.46	.00	--	--	--	--	--	274	.37	113	38	1.3	397	7.7
Sept. 21-23..	216	--	2.30	.72	1.78	--	3.16	.00	--	--	--	--	--	326	.44	95	37	1.4	478	7.5
Sept. 24-25..	145	--	2.50	.82	2.04	--	2.70	.00	--	--	--	--	--	367	.50	72	38	1.6	540	7.4
Sept. 26-28..	171	--	2.40	.70	1.96	--	2.93	.00	--	--	--	--	--	352	.48	82	39	1.6	504	7.8
Sept. 29-30..	95	--	2.79	.90	2.22	--	3.06	.00	--	--	--	--	--	414	.56	53	38	1.6	595	7.6
Total or weighted average...	409,400	--	1.40	0.40	0.91	--	a1.59	0.00	--	--	--	--	--	193	0.26	106,400	34	1.0	271	--

a Includes carbonate as bicarbonate.

8-3130. 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, 1¼ 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 San Luis Valley, Colo.).
RECORDS AVAILABLE.--Chemical analyses: October 1946 to September 1958.
Water temperatures: October 1948 to September 1958.
Sediment records: October 1947 to September 1958.
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 619 micromhos Apr. 20; minimum daily, 203 micromhos June 12.
Percent sodium: Maximum, 43 Sept. 13-30; minimum, 12 Apr. 26-30, Aug. 1-7.
EXTREMES, 1946-58.--Specific conductance: Maximum daily, 1,230 micromhos Aug. 26, 1951; minimum daily, 165 micromhos June 13, 1952.
Percent sodium: Maximum, 43 Sept. 13-30, 1958; minimum, 12 Apr. 26-30, Aug. 1-7, 1958.
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 1957 to September 1958 given in WSP 1562.

Chemical analyses, water year October 1957 to September 1958

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. 1, 1957	62,750	24	2.79	0.78	1.26		2.74	1.71	0.31		0.02		294	0.40	25,100	26	0.9	443	7.7
Nov. 2-4	14,440	19	1.90	.47	.91		2.15	.90	.20		.02		199	.27	3,900	28	.8	319	7.7
Nov. 5-7	15,920	23	2.59	.78	1.04		2.87	1.25	.28		.03		266	.36	5,730	24	.8	387	7.5
Nov. 8-30	63,910	23	2.05	.74	1.13		2.62	1.06	.25		.02		239	.32	20,450	29	1.0	366	7.5
Dec. 1-31	58,300	25	2.05	.63	1.00		2.29	.96	.25		.02		222	.30	17,490	27	.9	348	7.6
Jan. 1-31, 1958	45,440	36	2.00	.49	1.04		2.39	.98	.31		.01		236	.32	14,540	29	.9	348	8.1
Feb. 1-17	24,660	31	1.85	.51	1.04		2.21	.98	.28		.01		222	.30	7,400	31	1.0	335	7.7
Feb. 18-22	12,940	28	2.89	.78	1.35		2.75	2.14	.28		.01		323	.44	5,690	27	1.0	485	8.0
Feb. 23-25	9,380	24	3.34	.80	1.17		3.02	2.17	.27		.02		333	.45	4,220	22	.8	511	7.7
Feb. 26-28	8,030	27	2.30	.72	1.30		2.18	2.04	.27		.00		284	.39	3,130	30	1.1	430	7.9
Mar. 1-3	4,970	30	2.10	.67	1.30		2.26	1.60	.34		.00		267	.36	1,790	32	1.1	404	7.9
Mar. 4-6	6,160	24	2.74	.70	1.30		2.74	1.83	.34		.00		300	.41	2,530	27	1.0	469	7.5
Mar. 7-17	23,750	26	1.90	.72	1.22		2.00	1.73	.27		.00		254	.35	8,310	52	1.1	384	8.0
Mar. 18-31	36,010	26	2.35	.72	1.39		2.26	2.08	.31		.00		293	.40	14,400	31	1.1	442	8.2

Apr. 1-8, 1958 ..	24,910	22	2.74	0.76	1.17		2.57	2.02	0.27		0.00		297	0.40	9,960	25	0.9	457	7.7
Apr. 9-13	24,370	20	3.29	.82	1.17		2.93	2.14	.23		.01		323	.44	10,720	22	.8	508	7.7
Apr. 14-25.....	121,800	23	3.64	.66	.83		3.16	1.92	.16		.03		317	.43	52,370	16	.6	490	7.5
Apr. 26-30.....	71,250	25	3.09	.39	.48		2.93	.98	.11		.03		244	.33	23,510	12	.4	382	7.6
May 1-7.....	91,540	23	2.99	.37	.52		2.95	.71	.20		.02		231	.31	28,380	13	.4	372	7.6
May 8-31.....	445,700	23	2.30	.25	.48		2.49	.42	.14		.02		184	.25	111,400	16	.4	289	7.8
June 1-11.....	151,100	21	1.85	.25	.52		2.10	.46	.11		.01		163	.22	33,240	20	.5	253	7.4
June 12-15	30,560	22	1.50	.23	.57		1.77	.37	.16		.01		145	.20	6,110	25	.6	221	7.5
June 16-21	22,290	22	1.90	.33	.87		2.16	.75	.23		.01		194	.26	5,800	28	.8	304	7.4
June 22-24	9,660	23	2.35	.43	.91		2.84	.69	.20		.01		222	.30	2,900	25	.8	350	7.5
June 25-27	16,660	37	2.05	.35	.65		2.25	.65	.17		.01		202	.27	4,500	21	.6	291	7.7
June 28-30	4,670	22	2.35	.51	1.09		2.44	1.25	.28		.01		244	.33	1,540	28	.9	377	7.4
July 1-25	19,690	32	2.69	.61	1.35		2.82	1.48	.34		.01		293	.40	7,880	29	1.1	449	7.7
July 26-31	12,070	23	1.90	.25	.91		1.97	.81	.20		.01		191	.26	3,140	30	.9	289	7.8
Aug. 1-7.....	23,810	21	2.05	.43	.35		2.07	.54	.23		.01		172	.23	5,480	12	.3	269	7.4
Aug. 8-10.....	7,530	20	2.74	.51	.78		2.72	1.12	.25		.01		245	.33	2,480	19	.6	384	7.7
Aug. 11-14	7,820	19	2.10	.37	.61		2.10	.73	.20		.01		185	.25	1,960	20	.5	293	7.4
Aug. 15-31.....	13,410	32	2.40	.67	1.13		2.77	1.15	.31		.01		264	.36	4,830	27	.9	401	7.6
Sept. 1-4	4,570	28	2.35	.53	1.13		2.66	1.10	.28		.02		251	.34	1,550	28	.9	380	7.7
Sept. 5-12	15,520	20	2.15	.37	.57		2.07	.85	.17		.02		191	.26	4,040	18	.5	291	7.6
Sept. 13-30	19,610	14	2.00	.39	1.78		1.31	1.92	.99		.00		266	.36	7,060	43	1.6	395	7.7
Total or weighted average	1,526,000	24	2.45	0.44	0.74		2.51	0.96	0.20		0.02		224	0.30	457,800	20	0.6	347	--

8-3583. 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 1958.
Water temperatures: March 1954 to September 1958.
Sediment records: March 1954 to September 1958.
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 1,520 micromhos June 23; minimum daily, 626 micromhos Sept. 13.
Percent sodium: Maximum, 53 July 16-31; minimum, 37 Sept. 13.
EXTREMES, 1954-58.--Specific conductance: Maximum daily, 2,860 micromhos Oct. 25, 1956; minimum daily, 527 micromhos June 24, July 2, 1957.
Percent sodium: Maximum, 66 Oct. 1-20, Nov. 1-21, 1956; minimum, 34 July 1-5, 1957.
REMARKS.--Values reported for dissolved solids are residues 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 1957 to September 1958 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 1562. Chemical analyses for Rio Grande Floodway given on page 100.

Chemical analyses, water year October 1957 to September 1958

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. 1-11, 1957	4,480	31	4.44	1.40	5.35	0.19	3.77	4.54	2.71	0.03	0.05	0.18	700	0.95	4,260	47	3.1	1,080	8.0
Oct. 12-13	1,620	--	2.99	.70	2.57	--	2.41	--	--	--	--	--	405	.55	891	41	1.9	699	7.5
Oct. 14-31	10,540	--	4.04	1.15	5.26	--	3.16	--	--	--	--	--	679	.92	10,000	50	3.3	1,080	8.2
Nov. 1-30	2,850	--	5.09	1.81	6.22	--	4.92	--	--	--	--	--	837	1.14	3,250	47	3.3	1,260	7.9
Dec. 1-31	25	--	4.79	1.89	5.74	--	4.80	--	--	--	--	--	777	1.06	26	46	3.1	1,180	8.1
Jan. 1-31, 1958	24	32	3.59	1.97	5.92	.19	3.67	5.56	2.34	.03	.01	.07	762	1.04	25	51	3.5	1,120	8.2
Feb. 1-28	21	--	5.14	1.97	5.92	--	5.18	--	--	--	--	--	842	1.15	24	45	3.1	1,230	8.0
Mar. 1-31	26	--	5.54	1.97	5.74	--	5.38	--	--	--	--	--	840	1.14	30	43	3.0	1,230	7.9
Apr. 1-30	33	34	5.24	1.89	5.83	.22	5.28	5.14	2.71	.03	.01	.09	852	1.16	38	44	3.1	1,260	8.1
May 1, 8-31 a	23	--	6.74	2.22	6.79	--	5.41	--	--	--	--	--	960	1.31	30	43	3.2	1,440	7.9
June 1-20	112	--	4.79	1.89	5.74	--	6.20	--	--	--	--	--	800	1.09	122	46	3.1	1,170	8.0
June 21-30	67	--	5.79	1.97	6.35	--	5.64	--	--	--	---	--	920	1.25	84	45	3.2	1,320	8.1

a No flow May 2-7.

July 1-6, 1958 ..	40	--	5.39	1.73	5.35	--	5.51	--	--	--	--	--	812	1.10	44	43	2.8	1,190	8.1
July 7-15	4,380	33	3.89	1.15	4.35	0.18	3.61	3.87	2.06	0.03	0.01	0.07	620	.84	3,880	45	2.8	922	8.0
July 16-31	4,150	--	4.39	1.32	6.35	--	3.90	--	--	--	--	--	726	.99	4,110	53	3.8	1,170	8.2
Aug. 1-31.....	7,050	--	4.34	1.15	5.66	--	3.90	--	--	--	--	--	772	1.05	7,400	51	3.4	1,110	7.9
Sept. 1-11	2,380	--	4.49	1.32	6.09	--	3.90	--	--	--	--	--	770	1.05	2,500	51	3.6	1,160	8.0
Sept. 13.....	512	--	3.34	.74	2.44	--	3.02	--	--	--	--	--	424	.58	297	37	1.7	626	7.7
Sept. 12, 14-30..	6,650	--	4.34	.99	4.52	--	3.64	--	--	--	--	--	650	.88	5,850	46	2.8	967	7.7
Total or weighted average	44,980	--	4.24	1.23	5.22	--	3.65	--	--	--	--	--	693	0.94	42,280	49	3.2	1,060	--

RIO GRANDE BASIN--Continued

8-3584. RIO GRANDE FLOODWAY AT SAN MARCIAL, N. MEX.

LOCATION.--At gaging station at Atchison, Topeka and Santa Fe Railway Co. 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 San Luis Valley, Colo.).
RECORDS AVAILABLE.--Chemical analyses: July 1946 to September 1958.
Water temperatures: January 1949 to September 1958.
Sediment records: July 1946 to September 1958.
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 2,010 micromhos Aug. 26; minimum daily, 344 micromhos June 4.
Percent sodium: Maximum, 51 Feb. 10-22; minimum, 26 May 11-31.
EXTREMES, 1946-58.--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 residues 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 1957 to September 1958 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 1562. Chemical analyses for Rio Grande Conveyance Channel given on page 98.

Chemical analyses, water year October 1957 to September 1958

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, 1957..	16	--	4.34	1.23	3.35	--	3.72	--	--	--	--	--	584	0.79	13	38	2.0	859	7.9
Oct. 4-6a	5.9	33	4.39	1.23	3.83	0.16	3.70	4.33	1.41	0.04	0.04	0.02	600	.82	5	40	2.3	902	8.2
Oct. 8-9,11-13a.	3,790	--	4.49	1.32	3.65	--	3.56	--	--	--	--	--	627	.85	3,220	39	2.1	912	7.9
Oct. 14	4,160	--	7.24	1.73	4.35	--	4.28	--	--	--	--	--	879	1.20	4,990	33	2.1	1,230	8.0
Oct. 15-16.....	4,020	--	5.84	1.40	4.22	--	3.59	--	--	--	--	--	758	1.03	4,140	37	2.2	1,060	7.9
Oct. 17-18	1,660	--	4.74	1.15	3.61	--	3.90	--	--	--	--	--	630	.86	1,430	38	2.1	914	7.7
Oct. 19-20	2,730	--	4.29	1.15	2.52	--	3.43	--	--	--	--	--	514	.70	1,910	32	1.5	754	7.8
Oct. 21-22	25,420	--	6.89	1.64	3.74	--	4.06	--	--	--	--	--	809	1.10	27,960	30	1.8	1,100	7.8
Oct. 23-27	27,940	--	6.84	1.64	4.09	--	3.34	--	--	--	--	--	850	1.16	32,410	33	2.0	1,150	7.7
Oct. 28	1,930	--	5.59	1.15	3.70	--	b2.84	--	--	--	--	--	720	.98	1,890	35	2.0	991	8.4
Oct. 29-31	3,700	--	3.94	.82	2.74	--	3.36	--	--	--	--	--	500	.68	2,520	37	1.8	737	7.9
Nov. 1-3	7,040	--	3.94	.82	2.52	--	3.51	--	--	--	--	--	478	.65	4,580	35	1.6	709	7.8
Nov. 4-6	16,400	--	3.14	.70	1.83	--	2.90	--	--	--	--	--	370	.50	8,200	32	1.3	553	--
Nov. 7-8	14,830	--	4.59	1.07	3.13	--	2.43	--	--	--	--	--	608	.83	12,310	36	1.9	883	8.2
Nov. 9	7,040	--	6.04	1.23	3.74	--	3.52	--	--	--	--	--	721	.98	6,900	34	2.0	1,010	7.5

a No flow Oct. 7, 10, July 12-Aug. 23, 28-Sept. 8.
b Includes 0.27 equivalent per million of carbonate (CO_3).

Nov. 10-11, 1957	11,920	--	5.09	1.15	3.44	--	2.79	--	--	--	--	--	654	0.89	10,610	36	2.0	916	7.7
Nov. 12-30	56,360	--	3.74	.90	2.91	--	c3.26	--	--	--	--	--	488	.66	37,200	39	1.9	747	8.4
Dec. 1-31	62,170	--	3.69	.99	3.04	--	3.29	--	--	--	--	--	501	.68	42,280	39	2.0	765	7.8
Jan. 1-31, 1958	50,820	56	3.74	.90	3.65	0.14	3.47	3.44	1.61	0.05	0.02	0.16	562	.76	38,620	43	2.4	814	8.2
Feb. 1-9	13,460	--	3.74	.99	4.44	--	3.49	--	--	--	--	--	626	.85	11,440	48	2.9	912	8.1
Feb. 10-22	22,740	--	4.19	1.07	5.48	--	3.75	--	--	--	--	--	719	.98	22,290	51	3.4	1,070	8.1
Feb. 23-28	19,020	--	4.04	.99	4.18	--	3.62	--	--	--	--	--	595	.81	15,410	45	2.6	894	7.7
Mar. 1-31	72,250	--	3.69	.99	4.00	--	3.31	--	--	--	--	--	570	.78	56,360	46	2.6	849	7.8
Apr. 1-4	8,200	--	3.94	.90	3.52	--	3.62	--	--	--	--	--	552	.75	6,150	42	2.3	820	7.8
Apr. 5-25	124,800	32	3.54	.90	2.31	.13	3.15	2.96	.73	.05	.03	.11	444	.60	74,880	34	1.6	656	7.6
Apr. 26-30	62,980	--	3.24	.68	1.48	--	2.87	--	--	--	--	--	352	.48	30,230	27	1.1	524	7.7
May 1-10	114,600	--	2.89	.61	1.30	--	2.72	--	--	--	--	--	316	.43	49,280	27	1.0	468	7.6
May 11-31	325,900	--	2.59	.51	1.09	--	2.56	--	--	--	--	--	275	.37	120,600	26	.9	409	7.7
June 1-15	176,000	--	2.40	.51	1.17	--	2.44	--	--	--	--	--	272	.37	65,120	29	1.0	400	7.9
June 16-24	66,310	--	2.59	.54	1.74	--	2.59	--	--	--	--	--	324	.44	29,180	36	1.4	482	7.8
June 25-30	19,210	--	2.99	.99	3.26	--	2.92	--	--	--	--	--	480	.65	12,490	45	2.3	720	7.9
July 1-2	3,950	--	3.09	.82	2.83	--	3.00	--	--	--	--	--	452	.61	2,410	42	2.0	671	8.2
July 3-11 a	5,170	40	3.64	.90	3.48	.16	3.43	3.31	1.47	.05	.02	.16	528	.72	3,720	43	2.3	783	7.9
Aug. 24-27 a	678	--	11.58	3.45	8.79	--	3.87	--	--	--	--	--	1,600	2.18	1,480	37	3.2	2,010	7.4
Sept. 9-10	371	--	11.28	3.04	8.83	--	3.93	--	--	--	--	--	1,570	2.14	794	38	3.3	1,980	7.2
Sept. 11	186	--	6.59	2.06	5.35	--	3.44	--	--	--	--	--	939	1.28	238	38	2.6	1,300	7.3
Sept. 12	1,100	--	10.18	3.04	8.00	--	4.85	--	--	--	--	--	1,410	1.92	2,110	38	3.1	1,790	6.9
Sept. 13	1,200	--	4.04	1.15	4.39	--	3.31	--	--	--	--	--	637	.87	1,040	46	2.7	942	7.7
Sept. 14-30	5,940	--	3.54	.99	2.87	--	3.39	--	--	--	--	--	492	.67	3,980	39	1.9	726	7.6
Total or weighted average	1,346,000	--	3.29	0.76	2.18	--	2.92	--	--	--	----	--	411	0.56	753,800	35	1.5	604	--

a No flow Oct. 7, 10, July 12 to Aug. 23, Aug. 28 to Sept. 8.
c Includes 0.20 equivalent per million of carbonate (CO_3).

RIO GRANDE BASIN--Continued

8-3610. RIO GRANDE BELOW ELEPHANT BUTTE DAM, N. MEX.

LOCATION.--At gaging station 1.0 miles 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 1958.
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 1957 to September 1958 given in WSP 1562.

Chemical analyses, water year October 1957 to September 1958

Month	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 1957	20	434	--	3.26	1.09	3.32	--	2.25	4.47	1.20	--	(a)	0.14	518	0.70	304	43	2.3	763	8.0
November...	20	381	--	3.48	1.35	3.81	--	2.01	5.51	1.30	--	(a)	.14	570	.78	297	44	2.5	859	8.1
December...	25	522	--	4.02	1.39	4.00	--	2.85	5.27	1.40	--	0.01	.13	611	.83	433	43	2.4	913	7.9
January 1958	20	43,090	10	3.64	1.21	3.46	0.13	2.47	4.93	1.10	0.03	0	.10	571	.78	33,610	41	2.2	818	8.1
February ...	20	69,750	--	3.79	1.21	2.94	--	2.53	4.64	.98	--	.01	.09	554	.75	521,310	37	1.9	781	8.1
March.....	25	118,500	--	3.76	1.01	3.13	--	2.51	4.59	.95	--	.01	.12	532	.72	85,320	40	2.0	778	8.1
April.....	20	102,700	--	3.72	1.19	3.12	--	2.60	4.45	1.10	--	.01	.14	538	.73	74,970	39	2.0	782	8.3
May.....	20	81,240	--	3.64	1.15	3.28	--	2.60	4.39	1.22	--	.01	.13	535	.73	59,310	41	2.1	784	8.2
June.....	25	113,200	--	3.63	1.16	3.25	--	2.75	4.27	1.20	--	.01	.13	538	.73	82,640	40	2.1	794	7.9
July.....	20	113,900	16	3.58	1.21	3.14	.13	2.80	4.04	1.22	.03	.01	.13	511	.69	78,590	39	2.0	768	7.9
August.....	20	107,800	--	3.23	1.13	2.96	--	2.55	3.80	1.15	--	(a)	.10	465	.63	67,910	40	2.0	726	8.0
September ..	25	40,180	--	3.29	1.05	2.78	--	2.67	3.58	1.10	--	.01	.12	498	.68	27,320	39	1.9	713	7.9
Total or weighted average		791,700	--	3.60	1.15	3.12	--	2.62	4.29	1.12	--	--	0.12	524	0.71	68,780	40	2.0	772	--

a Less than 0.01 equivalent per million.

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 27).
RECORDS AVAILABLE.--Chemical analyses: 1933 to 1958.
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 1957 to September 1958 given in International Boundary and Water Commission Water Bulletin Numbers 27 and 28. Records for previous years are given in earlier Bulletins.

Chemical analyses, water year October 1957 to September 1958

Month	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 1957	29	2,370	--	5.16	1.94	17.23	--	3.70	10.56	10.50	--	(a)	0.44	1,559	2.12	5,020	71	9.1	2,420	8.1
November	30	553	--	8.46	4.37	47.15	--	b5.81	23.85	30.64	--	0.01	.90	3,829	5.21	2,880	79	19	5,690	8.3
December	30	440	--	7.61	3.96	40.64	--	b5.62	21.01	25.84	--	(a)	.81	3,346	4.55	2,000	78	17	5,040	8.2
January 1958	31	405	48	7.08	3.42	38.06	0.44	c5.45	19.99	23.42	0.07	(a)	.77	3,116	4.24	1,720	78	17	4,660	8.3
February	28	358	--	7.69	3.84	38.58	--	5.50	20.42	24.60	--	(a)	.81	3,252	4.42	1,580	77	16	4,780	8.2
March	31	29,700	--	4.23	1.32	4.48	--	2.77	5.12	2.35	--	(a)	.12	667	.91	27,000	45	2.7	996	8.1
April	30	35,000	--	4.21	1.34	4.71	--	2.90	5.32	2.20	--	(a)	.17	672	.91	31,800	46	2.8	991	8.0
May	31	42,900	--	4.22	1.31	4.20	--	2.81	5.21	1.95	--	(a)	.20	666	.91	39,000	43	2.5	971	7.8
June	30	55,000	--	4.22	1.36	4.38	--	3.05	5.23	1.95	--	(a)	.11	668	.91	50,000	44	2.6	986	7.8
July	31	68,100	16	4.20	1.37	4.47	.23	3.00	5.12	2.10	.03	.01	.15	700	.95	64,700	44	2.7	997	8.0
August	31	66,000	--	4.17	1.30	4.42	--	3.05	4.94	2.15	--	.01	.13	657	.89	58,700	45	2.7	979	8.0
September	30	64,400	--	4.25	1.25	4.73	--	3.00	4.80	2.45	--	.01	.22	684	.93	59,900	46	2.9	1,020	7.7
Total or weighted average		365,226	--	4.24	1.34	4.75	--	2.98	5.19	2.33	--	--	0.16	694	0.94	50,630	45	2.8	1,020	--

a Less than 0.01 equivalent per million.
b Includes 0.24 equivalent per million of carbonate (CO_3).
c Includes 0.32 equivalent per million of carbonate (CO_3).

RIO GRANDE BASIN--Continued

RIO GRANDE BELOW OLD FORT QUITMAN, TEX.

LOCATION.--At gaging station at the rectified channel of the Rio Grande, 1.5 miles below Old Fort Quitman, and 81.1 river miles below the American Dam at El Paso, Tex.
DRAINAGE AREA.--32,035 square miles (United States and Mexico; from International Boundary and Water Commission Water Bulletin Number 27).
RECORDS AVAILABLE.--Chemical analyses: 1933 to 1958.
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 1957 to September 1958 given in International Boundary and Water Commission Water Bulletin Numbers 27 and 28. Records for previous years are given in earlier Bulletins. No flow November to March. No samples collected April to August.

Chemical analyses, water year October 1957 to September 1958

Month	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 1957	2	1,150		1.59	0.33	2.56		2.67	1.23	0.55		0.04	0.19	256	0.35	402	57	2.6	425	8.0
September 1958.....	4	19,300		3.88	.80	2.52		2.15	4.05	1.00		.05	.06	491	.67	12,900	35	1.6	720	7.8

RIO GRANDE AT UPPER PRESIDIO, TEX.

LOCATION.--At gaging station, 7.8 river miles above junction of Rio Conchos, about 10 miles northwest of the towns of Presidio, Tex., and Ojinaga, Chihuahua, and 285.7 river miles below American Dam at El Paso, Tex.
DRAINAGE AREA.--34,988 square miles (United States and Mexico; from International Boundary and Water Commission Water Bulletin Number 27).
RECORDS AVAILABLE.--Chemical analyses: 1935 to 1958.
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 1957 to September 1958 given in International Boundary and Water Commission Water Bulletin Numbers 27 and 28. Records for previous years are given in earlier Bulletins. No flow November to April.

Chemical analyses, water year October 1957 to September 1958

Month	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 1957	5	2,480		3.11		1.57		2.05		0.50				296	0.40	992	34	1.3	471	
May 1958 ...	1	3.8		8.92		1.76		1.30		.50				817	1.11	4.2	16	.8	1,010	
June.....	2	106		8.47		1.78		1.40		.40				769	1.05	111	17	.9	972	
July.....	6	306	14	3.22	0.51	2.37	0.14	2.60	2.59	.95	0.03	0.06	0.11	427	.58	177	38	1.7	605	8.0
August.....	8	3,110		3.83		2.18		2.80		.52				399	.54	1,680	36	1.6	601	
September ..	12	19,300		3.91		2.34		2.03		.80				428	.58	11,200	37	1.7	635	

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RIO GRANDE BASIN--Continued

RIO GRANDE AT LANGTRY, TEX.

LOCATION.--At gaging station at Langtry, Tex., 24.1 river miles above the confluence with Pecos River, and 614.1 river miles below the American Dam at El Paso, Tex.
DRAINAGE AREA.--84,795 square miles (United States and Mexico; from International Boundary and Water Commission Water Bulletin Number 27).
RECORDS AVAILABLE.--Chemical analyses; 1944 to 1958.
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 1957 to September 1958 given in International Boundary and Water Commission Water Bulletin Numbers 27 and 28.

Chemical analyses, water year October 1957 to September 1958

Month	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 1957	8	107,000	--	4.76	0.89	2.53	--	2.85	4.67	0.80	--	0.03	0.10	552	0.75	80,200	31	1.5	790	8.0
November...	5	43,400	--	5.36	1.44	4.72	--	2.95	6.63	2.02	--	.04	.18	783	1.06	46,000	41	2.6	1,120	8.2
December...	5	40,100	--	4.71	1.81	5.46	--	2.90	6.96	2.28	--	.04	.26	822	1.12	44,900	46	3.0	1,170	7.9
January 1958	6	35,900	29	4.41	1.76	5.48	0.14	2.85	6.53	2.32	0.08	.04	.27	779	1.06	38,100	46	3.1	1,130	8.1
February ...	6	29,100	--	4.37	1.86	5.56	--	2.91	6.51	2.42	--	.04	.24	784	1.07	31,100	47	3.2	1,140	8.0
March.....	7	28,800	--	4.39	1.82	5.21	--	2.89	6.32	2.30	--	.03	.24	764	1.04	30,000	46	3.0	1,110	8.2
April.....	7	17,100	--	3.16	1.72	3.46	--	2.70	4.10	1.70	--	.02	.26	553	.75	12,800	41	2.2	833	8.0
May.....	9	27,400	--	3.31	1.35	2.18	--	2.75	3.08	1.09	--	.04	.18	457	.62	17,000	32	1.4	679	8.0
June	6	30,900	--	4.00	1.13	3.08	--	3.05	4.12	1.25	--	.04	.16	548	.75	23,200	38	1.9	811	8.0
July.....	5	34,500	20	3.79	1.15	2.59	.14	3.31	3.22	1.02	.05	.05	.16	500	.68	23,500	34	1.6	736	7.9
August.....	4	44,400	--	3.84	.80	2.36	--	a3.27	2.91	.88	--	.04	.11	452	.61	27,100	34	1.5	688	8.1
September...	8	513,000	--	3.88	.73	2.02	--	2.75	3.21	.65	--	.07	.14	438	.60	308,000	30	1.3	636	7.8
Total or weighted average.....		951,600	--	4.10	1.00	2.78	--	2.84	4.04	1.04	--	0.05	0.16	525	0.72	185,900	34	1.7	763	--

a Includes 0.12 equivalent per million of carbonate (CO_3).

RIO GRANDE AT LAREDO, TEX.

LOCATION.--At gaging station, 0.9 mile downstream from highway bridge between Laredo, Tex., and Nuevo Laredo, Tamaulipas, Mex., and 890.8 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 No. 27).
RECORDS AVAILABLE.--Chemical analyses: July 1955 to September 1958.
REMARKS.--Chemical analyses are by 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 1957 to September 1958 given in International Boundary and Water Commission Water Bulletin Numbers 27 and 28. Records for previous years are given in earlier Bulletins.

Chemical analyses, water year October 1957 to September 1958

Month	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 1957	14	251,300	--	4.54		2.80	--	2.55	--	1.95	--	--	--	478	0.65	163,000	38	1.9	740	--
November...	8	136,400	--	5.91		4.08	--	2.85	--	3.32	--	--	--	646	.88	120,000	41	2.4	1,000	--
December...	8	114,800	--	5.93		5.24	--	2.69	--	4.10	--	--	--	734	1.00	114,000	47	3.1	1,130	--
January 1958	15	144,000	14	3.64	1.78	4.69	0.13	2.47	3.81	3.90	0.04	0.06	0.15	645	.88	127,000	46	2.9	1,030	7.9
February ...	10	126,900	--	5.89		5.32	--	2.70	--	4.35	--	--	--	702	.95	121,000	47	3.1	1,120	--
March.....	12	106,700	--	5.50		4.96	--	2.51	--	4.20	--	--	--	664	.90	96,000	47	3.0	1,060	--
April.....	10	65,350	--	6.23		5.87	--	2.55	--	5.42	--	--	--	774	1.05	68,600	49	3.3	1,220	--
May.....	14	181,700	--	4.00		2.39	--	2.35	--	2.25	--	--	--	428	.58	105,000	37	1.7	666	--
June.....	12	303,400	--	3.37		1.40	--	2.53	--	1.25	--	--	--	303	.41	124,000	29	1.1	487	--
July.....	14	114,700	15	3.33	1.21	2.91	.13	2.60	2.48	2.40	.03	.06	.12	493	.67	76,800	38	1.9	762	8.0
August.....	11	96,220	--	4.58		3.13	--	2.55	--	2.32	--	--	--	495	.67	64,500	41	2.1	777	--
September...	30	855,500	--	3.45		1.16	--	2.45	--	.70	--	--	--	296	.40	342,000	25	.9	462	--
Total or weighted average.....		2,496,970	--	4.31		2.65	--	2.53	--	1.87	--	--	--	450	0.61	193,470	35	1.7	705	--

RIO GRANDE BASIN--Continued

RIO GRANDE AT FALCON DAM - U. S. TAILRACE

LOCATION.--U. S. Tailrace at Falcon Dam.
DRAINAGE AREA.--164,482 square miles (from International Boundary and Water Commission Water Bulletin Number 27).
RECORDS AVAILABLE.--Chemical analyses: July 1955 to September 1958.
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 1957 to September 1958 given in International Boundary and Water Commission Bulletin Numbers 27 and 28. Records for previous years are given in earlier Bulletins.

Chemical analyses, water year October 1957 to September 1958

Month	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 1957	12	198,000	--	2.74	0.84	2.28	--	2.30	1.81	1.80	--	0.01	0.13	370	0.50	99,000	39	1.7	602	8.0
November...	6	77,500	--	2.85	.95	2.36	--	2.47	1.95	1.92	--	.01	.14	383	.52	40,300	38	1.7	630	8.0
December...	10	130,000	--	2.95	1.07	2.34	--	2.40	2.06	1.92	--	.01	.11	410	.56	72,800	37	1.7	648	7.8
January 1958	5	46,100	10	3.01	.99	2.73	0.13	2.35	2.28	2.25	0.03	.01	.14	426	.58	26,700	40	1.9	689	7.8
February ...	4	16,600	--	3.12	1.07	2.68	--	2.40	2.38	2.10	--	.01	.10	427	.58	9,630	39	1.8	682	8.2
March.....	6	22,600	--	3.12	1.11	2.74	--	2.50	2.36	2.20	--	.01	.13	439	.60	13,600	39	1.9	699	8.2
April.....	12	226,000	--	3.06	1.21	2.82	--	2.47	2.46	2.25	--	.01	.16	454	.62	140,000	40	1.9	724	7.8
May.....	10	260,000	--	3.16	1.10	2.97	--	2.35	2.57	2.40	--	.01	.15	473	.64	166,000	41	2.0	740	7.9
June.....	13	408,000	--	2.98	1.11	3.16	--	2.25	2.63	2.55	--	.01	.23	470	.64	261,000	44	2.2	756	7.8
July.....	7	79,500	9	2.87	1.18	3.06	.12	2.20	2.55	2.45	.03	.01	.12	461	.63	50,100	42	2.2	737	8.0
August.....	7	133,000	--	2.85	1.15	3.10	--	2.18	2.53	2.50	--	.01	.13	454	.62	82,500	44	2.2	735	8.0
September...	5	235,000	--	2.73	1.13	2.94	--	2.11	2.42	2.35	--	.01	.08	439	.60	141,000	43	2.1	713	7.8
Total or weighted average		1,832,300	--	2.44	1.09	2.85	--	2.30	2.39	2.29	--	0.01	0.11	442	0.60	143,700	41	2.0	709	--

8-3845. 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 1958.
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 1,560 micromhos Feb. 14; minimum daily, 648 micromhos May 25.
Percent sodium: Maximum, 15 Jan. 1 to Mar. 31, Aug. 1-31; minimum, 9 Oct. 1-25.
EXTREMES, 1937-58.--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 1957 to September 1958 given in WSP 1562.

Chemical analyses, water year October 1957 to September 1958

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. 1-25, 1957..	1,620	14	10.68	1.56	1.23		2.07	10.31	1.07		0.02		871	1.18	1,910	9	0.5	1,150	7.7
Oct. 26-31.....	222	13	9.13	1.15	1.23		1.95	8.58	.96		.02		744	1.01	224	11	.5	1,010	7.7
Nov. 1-30	357	12	9.03	1.23	1.63		2.05	8.89	.93		.02		767	1.04	371	14	.7	1,040	7.7
Dec. 1-31	216	14	10.08	1.73	1.94		2.16	10.43	1.13		.03		890	1.21	261	14	.8	1,180	7.8
Jan. 1-31, 1958..	187	12	11.58	2.06	2.34		2.33	12.22	1.41		.02		1,030	1.40	262	15	.9	1,350	7.8
Feb. 1-28	133	14	12.97	2.55	2.82		2.46	14.14	1.72		.02		1,190	1.62	215	15	1.0	1,530	7.7
Mar. 1-31	20,530	14	12.67	2.22	2.60		2.29	13.60	1.58		.02		1,130	1.54	31,620	15	.9	1,430	7.8
Apr. 1-30	32,020	12	12.18	2.14	1.88		2.20	12.55	1.44		.01		1,050	1.43	45,790	12	.7	1,370	7.5
May 1-7.....	15,490	13	9.03	1.73	1.67		2.16	9.16	1.10		.01		798	1.09	16,880	13	.7	1,070	7.4
May 8-23.....	44,850	16	7.63	1.48	1.29		2.13	7.39	.87		.01		668	.91	40,810	12	.6	921	7.4
May 24-31.....	18,970	14	5.69	1.15	.90		1.95	5.16	.62		.01		492	.67	12,110	12	.5	711	7.4
June 1-30	28,290	13	5.89	.99	1.16		1.95	5.43	.65		.01		514	.70	19,800	14	.6	731	7.4
July 1-31.....	11,740	13	6.64	1.23	1.30		2.00	6.43	.73		.01		587	.80	9,390	14	.7	827	7.4
Aug. 1-31	22,650	11	7.63	1.28	1.60		2.02	7.58	.85		.01		670	.91	20,610	15	.8	921	7.5
Sept. 1-30	20,700	14	7.73	1.56	1.25		1.97	7.66	.90		.01		676	.92	19,040	12	.6	965	7.5
Total or weighted average	218,000	14	8.48	1.56	1.52		2.08	8.43	0.99		0.01		741	1.01	220,200	13	0.7	1,000	--

8-3965. PECOS RIVER NEAR ARTESIA, N. MEX.

LOCATION.--At gaging station at bridge on State Highway 83, 4.3 miles east of Artesia, Eddy County, 7.0 miles north of mouth of Rio Penasco, and 17 miles north of McMillan Dam.
DRAINAGE AREA.--15,300 square miles, approximately (contributing area).
RECORDS AVAILABLE.--Chemical analyses: July 1937 to September 1958.
Water temperatures: April 1949 to September 1958.
Sediment records: January 1949 to September 1958.
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 9,490 micromhos Feb. 12; minimum daily, 727 micromhos July 8.
Percent sodium: Maximum, 56 Aug. 1; minimum, 17 May 14-31.
EXTREMES, 1937-58.--Specific conductance: Maximum daily, 20,700 micromhos Sept. 10, 1955; minimum daily, 727 micromhos July 8,1958.
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 1957 to September 1958 given in WSP 1562.

Chemical analyses, water year October 1957 to September 1958

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, 1957...	206	14	15.57	4.36	11.33		1.92	18.59	10.72		0.03		1,970	2.68	552	36	3.6	2,710	7.4
Oct. 3-4	155	15	17.61	6.17	15.59		1.61	22.07	15.65		.04		2,470	3.36	521	40	4.5	3,450	7.6
Oct. 5-7	220	15	20.51	7.65	22.10		1.57	26.23	22.42		.04		3,130	4.26	937	44	5.9	4,410	7.7
Oct. 8-10	307	13	23.25	9.95	29.67		1.64	31.02	30.17		.04		3,890	5.29	1,620	47	7.3	5,480	7.3
Oct. 11	135	15	22.11	9.54	27.39		a 1.35	30.19	27.50		.00		3,670	4.99	674	46	6.9	5,080	8.6
Oct. 12	139	16	20.21	7.81	19.20		2.39	25.19	19.60		.04		2,940	4.00	556	41	5.1	4,100	7.8
Oct. 13-14	835	12	6.54	2.06	4.34		2.20	6.37	4.37		.00		795	1.08	902	34	2.1	1,200	8.1
Oct. 15	295	14	11.88	4.61	11.96		2.36	14.05	11.98		.06		1,760	2.39	705	42	4.2	2,580	8.2
Oct. 16-17	410	15	19.81	6.66	20.38		2.10	24.98	19.74		.03		2,930	3.98	1,630	44	5.6	4,060	7.9
Oct. 18-20	734	15	18.01	6.66	16.70		2.38	22.28	16.64		.07		2,580	3.51	2,580	40	4.8	3,610	7.6
Oct. 21-22	385	19	18.31	5.35	13.84		2.25	21.24	13.96		.05		2,350	3.20	1,230	37	4.0	3,260	7.4
Oct. 23-27	1,030	20	20.71	7.73	21.20		2.67	25.61	21.29		.07		3,090	4.20	4,330	43	5.6	4,310	7.7
Oct. 28-29	319	22	21.21	10.03	25.02		3.05	27.90	25.24		.07		3,470	4.72	1,510	44	6.3	4,840	7.8
Oct. 30-31	292	19	24.55	11.43	32.74		3.31	32.06	33.28		.07		4,230	5.75	1,680	48	7.7	5.910	7.6
Nov. 1-30.....	4,380	18	26.15	13.49	40.03		2.92	35.19	41.45		.11		4,880	6.64	29,100	50	9.0	6,830	8.2
Dec. 1-31.....	4,140	6.2	27.54	14.06	46.09		3.33	36.64	47.66		.06		5,340	7.26	30,100	53	10	7,550	8.2

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

Jan. 1-4, 1958 ..	524	1.4	27.15	15.21	47.37	3.44	36.64	49.63	0.02	5,440	7.40	3,880	53	10	7,760	--
Jan. 5-7	567	18	24.75	13.08	41.23	3.54	32.27	43.15	.10	4,810	6.54	3,710	52	9.5	6,880	8.0
Jan. 8-19	1,920	13	26.55	14.64	45.77	3.23	36.85	46.81	.07	5,300	7.21	13,800	53	10	7,500	7.8
Jan. 20-31	1,590	7.8	27.54	15.46	48.44	2.93	39.14	49.35	.02	5,580	7.59	12,070	53	10	7,910	8.2
Feb. 1-28.....	3,570	17	28.14	17.43	55.80	2.75	41.64	56.96	.02	6,180	8.40	29,990	55	12	8,720	7.4
Mar. 1-10	1,550	19	27.15	16.04	49.82	2.64	39.56	50.76	.05	5,690	7.74	12,000	54	11	8,020	7.7
Mar. 11-15.....	1,050	15	25.75	10.94	39.05	2.44	35.19	38.07	.04	4,680	6.36	6,680	52	9.1	6,480	8.1
Mar. 16	984	18	26.15	10.53	28.86	3.82	35.19	26.51	.02	4,080	5.55	5,460	44	6.7	5,400	7.2
Mar. 17-20	4,800	20	18.01	5.26	7.57	2.85	20.38	7.56	.05	1,950	2.65	12,720	25	2.2	2,560	7.6
Mar. 21-26	10,930	18	16.47	3.13	5.36	2.56	18.03	4.34	.03	1,610	2.19	23,940	21	1.7	2,050	7.5
Mar. 27-28	780	15	17.32	5.02	10.31	2.56	20.40	9.64	.05	2,060	2.80	2,180	32	3.1	2,760	7.6
Mar. 29-30	456	15	18.71	6.17	15.33	2.61	22.90	14.66	.04	2,520	3.43	1,560	38	4.3	3,410	7.7
Mar. 31-Apr. 2 .	545	18	22.01	8.96	21.45	2.69	27.27	22.42	.04	3,250	4.42	2,410	41	5.4	4,470	7.8
Apr. 3-4.....	282	18	23.55	11.35	29.07	2.33	32.27	29.33	.04	3,960	5.39	1,520	45	7.0	5,430	7.7
Apr. 5-8.....	474	21	28.94	12.66	40.90	2.43	39.14	40.89	.04	5,100	6.94	3,290	50	9.0	6,930	8.2
Apr. 9-15.....	780	17	28.74	18.34	52.00	2.80	45.18	51.04	.06	6,080	8.27	6,450	52	11	8,230	7.2
Apr. 16-24.....	1,570	17	27.35	14.89	43.29	2.56	39.77	43.15	.05	5,260	7.15	11,230	51	9.4	7,200	7.6
Apr. 25.....	1,360	22	21.61	7.98	14.75	2.79	28.11	13.40	.04	2,800	3.81	5,180	33	3.8	3,610	7.6
Apr. 26-30.....	17,530	16	18.11	3.54	5.52	2.54	20.20	4.40	.03	1,750	2.38	41,720	20	1.7	2,210	7.6
May 1-13.....	23,600	16	14.97	3.21	4.68	2.43	16.45	3.95	.03	1,470	2.00	47,200	20	1.6	1,890	7.6
May 14-31	47,120	16	12.67	2.22	3.09	2.28	13.20	2.48	.02	1,160	1.58	74,450	17	1.1	1,520	7.5
June 1-4, 8-11...	9,650	25	10.98	2.06	3.83	2.39	11.47	2.99	.02	1,090	1.48	14,300	23	1.5	1,470	7.9
June 5-7	2,260	36	12.62	2.96	6.52	2.44	13.74	5.89	.03	1,420	1.93	4,360	30	2.3	1,950	7.9
June 12-26	10,350	23	11.33	2.63	5.17	2.74	11.78	4.57	.04	1,210	1.65	17,080	27	2.0	1,700	7.6
June 27-28	702	29	11.23	2.80	6.24	2.51	12.08	5.64	.04	1,290	1.75	1,230	31	2.4	1,810	7.8
June 29-30	319	33	13.47	4.36	13.32	2.44	15.68	12.97	.06	1,950	2.65	845	43	4.5	2,810	8.1

RIO GRANDE BASIN--Continued

8-3965. PECOS RIVER NEAR ARTESIA, N. MEX.--Continued

Chemical analyses, water year October 1957 to September 1958--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 1-2, 5-6, 1958	1,500	36	19.01	6.41	18.37		2.16	23.73	17.82		0.08		2,760	3.75	5,620	42	5.2	3,790	7.9
July 3-4	371	31	20.31	5.35	10.30		2.20	24.57	9.08		.11		2,310	3.14	1,160	29	2.9	2,950	8.0
July 7-8	3,390	22	5.64	1.23	2.51		3.18	3.87	2.26		.07		574	.78	2,640	27	1.4	907	7.7
July 9	904	24	12.38	3.04	6.55		2.72	14.20	5.02		.03		1,400	1.90	1,720	30	2.4	1,900	7.4
July 10-13	4,360	25	10.48	2.30	4.02		2.36	11.49	2.90		.05		1,080	1.47	6,410	24	1.6	1,470	7.9
July 14-15	246	27	11.88	3.45	7.38		2.20	13.74	6.74		.03		1,440	1.96	482	32	2.7	2,020	8.2
July 16-19	232	28	16.47	5.02	15.32		2.11	20.20	14.44		.06		2,320	3.16	733	42	4.7	3,230	7.8
July 20-25	553	33	19.51	7.48	24.23		2.18	25.40	23.58		.06		3,200	4.35	2,410	47	6.6	4,470	8.1
July 26-31	56	29	22.21	10.20	37.34		2.21	30.61	36.66		.07		4,310	5.86	328	54	9.3	6,120	7.7
Aug. 1	2.2	40	24.55	13.08	47.07		1.36	37.89	45.40		.05		5,250	7.14	16	56	11	7,230	7.9
Aug. 2-10	7,260	23	15.17	3.29	7.28		2.18	17.70	5.61		.05		1,660	2.26	16,410	28	2.4	2,180	7.7
Aug. 11-14	109	20	18.31	5.35	14.46		1.59	23.11	13.37		.05		2,420	3.29	359	38	4.2	3,270	7.0
Aug. 15-19	50	29	21.71	8.47	33.02		1.92	28.52	32.71		.05		3,920	5.33	266	52	8.5	5,570	6.1
Aug. 20-21	785	27	17.42	3.87	9.87		2.15	21.24	7.73		.04		2,010	2.73	2,140	32	3.0	2,620	7.9
Aug. 22-31	19,230	22	14.47	2.55	4.95		2.15	16.07	3.72		.03		1,430	1.94	37,310	23	1.7	1,850	7.7
Sept. 1-5, 9	2,710	27	16.17	4.19	9.45		2.15	19.28	8.35		.03		1,910	2.60	7,050	32	3.0	2,560	7.8
Sept. 6-8	639	28	16.72	5.35	14.15		1.85	21.24	13.08		.05		2,300	3.13	2,000	39	4.3	3,110	8.0
Sept. 10-23, 28-30	25,720	19	14.27	2.47	5.53		2.21	15.62	4.40		.04		1,440	1.96	50,410	25	1.9	1,900	7.6
Sept. 24-27	1,230	21	15.57	4.69	12.62		2.39	18.18	12.24		.07		2,060	2.80	3,440	38	4.0	2,910	7.8
Total or weighted average	228,600	19	15.62	4.19	9.66		2.44	17.99	8.97		0.04		1,860	2.53	578,400	33	3.1	2,500	--

8-4101. PECOS RIVER BELOW RED BLUFF DAM NEAR ORLA, TEX.

LOCATION.--Just below dam, 3 miles upstream from Salt (Screwbean) Draw, 5 miles northwest of Orla, Reeves County, and 14 miles upstream from gaging station near Orla.
DRAINAGE AREA.--20,720 square miles, approximately (contributing area).
RECORDS AVAILABLE.--Chemical analyses: July 1937 to September 1958.
Water temperatures: March 1953 to September 1958.
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 15,900 micromhos May 16; minimum daily, 6,130 micromhos July 7.
Percent sodium: Maximum, 73 Sept. 14-30; minimum, 56 Aug. 1-23.
EXTREMES, 1937-58.--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 1957 to September 1958 given in WSP 1562. Mean discharge values reported below have been adjusted to exclude inflow from Salt (Screwbean) Draw which enters Pecos River between sampling point and gaging station.

Chemical analyses, water year October 1957 to September 1958

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, 1957 ..	2,200	8.6	23.45	11.76	81.91		1.87	32.06	83.19				7,050	9.59	21,100	70	20	10,500	7.5
Nov. 1-30	620	8.2	23.90	14.23	89.17		2.20	33.73	91.37				7.640	10.4	6,450	70	20	11,800	7.4
Dec. 1-31.....	664	7.8	24.35	13.82	72.26		2.25	33.73	74.45				6,650	9.04	6,000	65	17	9,910	7.9
Jan. 1-31, 1958 ..	662	6.6	24.75	12.34	64.78		2.13	32.06	67.68				6,150	8.36	5,530	64	15	9,250	7.7
Feb. 1-28	552	7.2	24.35	13.65	65.17		2.18	33.31	67.68				6,230	8.47	4,680	63	15	9,470	8.1
Mar. 1-31	694	4.6	24.35	13.65	67.95		2.28	33.73	69.94				6,390	8.69	6,030	64	16	9,560	7.3
Apr. 1-30	8,720	3.8	25.15	15.38	72.82		2.20	37.27	73.88				6,840	9.30	81,100	64	16	9,970	7.5
May 1-31	2,560	10	28.64	17.68	100.08		2.11	41.64	102.65				8,800	12.0	30,720	68	21	12,900	7.2
June 1-30.....	11,250	10	25.70	12.50	67.59		1.88	36.23	67.68				6,420	8.73	98,210	64	15	9,350	7.6
July 1-31	13,260	15	22.70	9.54	43.57		1.95	31.23	42.58				4,660	6.34	84,070	57	11	6,740	7.4
Aug. 1-23.....	6,870	17	24.95	10.86	46.10		1.84	32.90	47.09				5,020	6.83	46,920	56	11	7,250	7.8
Aug. 24-31.....	417	18	27.84	14.06	79.57		2.29	37.68	81.50				7,350	10.0	4,170	66	17	10,800	7.6
Sept. 1-13	4,140	16	22.70	9.79	45.79		1.75	30.81	45.68		0.04		4,800	6.53	27,030	58	11	7,020	7.9
Sept. 14-30	239	16	20.71	12.83	91.87		2.90	28.32	94.19				7,480	10.2	2,440	73	22	11,700	7.3
Total or weighted average	52,860	11	24.50	12.09	60.46		1.97	34.14	60.10		--		5,900	8.02	423,900	62	14	8,620	--

RIO GRANDE BASIN--Continued

PECOS RIVER NEAR SHUMLA, TEX.

LOCATION.--At gaging station 13.0 river miles upstream from the Pecos High Bridge, and 18.5 river miles above confluence with Rio Grande, which confluence is 638.2 river miles below the American Dam at El Paso, Tex.
DRAINAGE AREA.--35,308 square miles (from International Boundary and Water Commission Water Bulletin No. 27).
RECORDS AVAILABLE.--Chemical analyses: January 1955 to September 1958. 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 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 1957 to September 1958 given in International Boundary and Water Commission Water Bulletin Numbers 27 and 28. Records of previous years are given in earlier Bulletins for station near the mouth and for a station 4.7 river miles upstream at the Pecos High Bridge.

Chemical analyses, water year October 1957 to September 1958

Month	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 1957	5	26,500	--	5.30	3.52	10.91	--	2.60	5.51	11.85	--	0.05	0.18	1,270	1.72	45,600	55	5.2	2,040	8.0
November...	4	21,600	--	7.10	4.82	16.27	--	2.77	7.98	17.50	--	.05	.22	1,780	2.42	52,300	58	6.7	2,810	8.2
December...	5	13,600	--	8.35	6.12	19.26	--	3.00	9.79	21.20	--	.04	.20	2,180	2.97	40,400	57	7.2	3,380	7.9
January 1958	3	13,400	14	8.22	6.41	21.30	0.19	2.66	10.29	23.10	0.04	.05	.22	2,290	3.11	41,700	59	7.9	3,560	8.0
February ...	(a)	12,200	--	8.30	6.70	22.06	--	2.62	10.56	24.10	--	.04	.26	2,400	3.24	39,500	60	8.0	3,700	8.0
March.....	1	12,900	--	9.09	7.27	24.26	--	2.96	11.41	26.44	--	.04	.21	2,600	3.53	45,500	60	8.5	4,030	8.2
April.....	2	10,600	--	8.01	6.86	22.11	--	2.40	10.54	24.44	--	.02	.34	2,410	3.28	34,800	60	8.1	3,740	7.9
May.....	4	37,300	--	6.48	4.22	14.16	--	2.65	6.92	15.40	--	.04	.20	1,630	2.22	50,000	57	6.1	2,580	8.0
June.....	5	13,700	--	6.24	4.55	14.83	--	2.35	7.22	16.40	--	.03	.21	1,660	2.25	30,800	58	6.4	2,650	8.0
July.....	5	15,600	14	5.00	2.99	9.02	.13	2.60	4.58	9.95	.03	.05	.15	1,100	1.50	23,400	53	4.5	1,760	7.8
August.....	4	10,300	--	5.80	4.29	13.17	--	2.40	6.45	14.75	--	.03	.24	1,510	2.05	21,100	57	5.9	2,420	7.8
September...	5	79,000	--	2.91	.86	2.12	--	2.45	1.15	2.30	--	.04	.05	366	.50	39,500	36	1.5	616	7.8
Total or weighted average.....		266,700	--	5.68	3.72	15.38	--	2.59	5.95	13.02	--	0.04	0.16	1,370	1.87	41,500	51	5.0	2,170	--

a No samples collected; estimated.

COLORADO RIVER MAIN STEM

9-725. COLORADO RIVER NEAR GLENWOOD SPRINGS, COLO.

LOCATION.--At Shoshone power plant, 6 miles upstream from gaging station at Glenwood Springs, Garfield County, which is half a mile upstream from Roaring Fork.
DRAINAGE AREA.--4,560 square miles, approximately (above gaging station).
RECORDS AVAILABLE.--Chemical analyses: October 1941 to September 1958.
Water temperatures: May 1949 to September 1958.
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 1,000 micromhos Dec. 14; minimum daily, 187 micromhos May 31, June 1.
Percent sodium: Maximum, 48 Jan. 2; minimum, 18 May 8-31.
EXTREMES, 1941-58.--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 at 180°C. 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 1957 to September 1958 given in WSP 1563. No appreciable inflow between Shoshone power plant and gaging station except during periods of heavy local rains.

Chemical analyses, water year October 1957 to September 1958

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, 1957 ..	75,270	14	3.32	1.08	2.87	0.06	2.29	2.44	2.62	0.01	0.01	0.06	444	0.60	45,160	39	1.9	750	8.0
Nov. 1-30.....	71,680	13	3.20	1.04	2.78	.06	a 2.29	2.35	2.57	.00	.00	.05	429	.58	41,570	39	1.9	738	8.4
Dec. 1-13, 15-31.	61,500	14	2.96	1.08	2.91	.06	2.23	2.10	2.71	.00	.00	.08	420	.57	35,060	42	2.1	725	7.8
Dec. 14	1,630	15	3.84	1.36	4.48	.08	2.62	3.06	4.09	--	.01	--	b 587	.80	1,300	46	2.8	1,000	8.2
Jan. 1, 3-31, 1958.	60,370	12	2.66	.90	2.91	.06	2.05	1.81	2.54	.01	.02	.03	396	.54	32,600	45	2.2	684	7.8
Jan. 2.....	1,720	13	3.36	1.20	4.18	.06	2.43	2.56	3.81	.02	.03	--	b 526	.72	1,240	48	2.8	901	7.9
Feb. 1-28.....	57,730	11	2.54	.86	2.78	.06	1.93	1.62	2.54	.02	.02	.05	373	.51	29,440	45	2.1	661	7.6
Mar. 1-31.....	72,520	11	2.60	.88	2.78	.06	1.93	1.83	2.54	.02	.02	.05	393	.53	38,440	44	2.1	666	7.7
Apr. 1-30.....	102,200	12	2.39	.91	2.00	.05	1.97	1.77	1.64	.02	.02	.05	330	.45	45,990	37	1.6	546	7.6
May 1-7	48,930	15	2.18	.67	1.04	.06	2.02	1.12	.79	.02	.04	.04	242	.33	16,150	26	.9	387	7.9
May 8-31	497,000	12	1.57	.38	.43	.04	1.56	.58	.28	.02	.03	.06	156	.21	104,400	18	.4	243	7.8
June 1-21	366,400	10	1.34	.39	.52	.04	1.21	.58	.42	.02	.02	.04	146	.20	73,280	23	.6	236	7.8
June 22-30.....	72,850	9.5	1.76	.58	.96	.05	1.46	1.04	.85	.02	.02	.02	209	.28	20,400	29	.9	347	7.7

a Includes 0.17 equivalent per million of carbonate (CO_3).
b Calculated from determined constituents.

COLORADO RIVER MAIN STEM--Continued

9-725. COLORADO RIVER NEAR GLENWOOD SPRINGS, COLO.--Continued

Chemical analyses, water year October 1957 to September 1958--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 1-6, 1958....	30,010	11	2.20	0.70	1.44	0.05	1.67	1.54	1.24	0.02	0.01	0.09	283	0.38	11,400	33	1.2	473	7.6
July 7-31	74,200	9.7	2.84	.96	2.52	.06	2.13	2.08	2.23	.01	.01	.05	412	.56	41,550	39	1.8	669	7.8
Aug. 1-31.....	66,860	9.9	3.08	1.18	2.78	.07	2.20	2.31	2.54	.01	.02	.05	432	.59	39,450	39	1.9	720	7.7
Sept. 1-30	62,350	8.8	2.98	1.04	2.87	.06	2.08	2.25	2.59	.02	.02	.01	416	.57	35,540	41	2.0	708	7.8
Total or weighted average	1,723,000	11	2.10	0.66	1.44	0.05	1.72	1.25	1.24	0.02	0.02	0.05	262	0.36	620,300	34	1.2	434	--

9-1805. 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 1958.
Water temperatures: May 1949 to September 1958.
Sediment records: May 1930 to September 1958.
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 4,820 micromhos Dec. 13; minimum daily, 291 micromhos May 31.
Percent sodium: Maximum, 56 Dec. 11-31; minimum, 23 May 5-31.
EXTREMES, 1941-52, 1953-58.--Specific conductance: Maximum daily, 4,820 micromhos; Dec. 13, 1957; minimum daily, 291 micromhos May 31, 1958.
Percent sodium: Maximum, 57 Mar. 2, 4, 1955; minimum, 18 June 1-10, 1957.
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 1957 to September 1958 given in WSP 1563.

Chemical analyses, water year October 1957 to September 1958

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, 1957 ..	292,100	14	7.84	4.84	7.74	0.14	3.05	13.28	4.29		0.23	0.17	1,310	1.78	519,900	38	3.1	1,890	7.1
Nov. 1-30.....	299,500	13	6.00	3.64	7.05	.13	3.06	9.37	4.51		.23	.10	1,060	1.44	431,300	42	3.2	1,630	7.1
Dec. 1-10	78,780	13	5.60	3.96	7.18	.13	3.10	8.54	5.02		.23	.09	1,040	1.41	111,100	43	3.3	1,620	7.1
Dec. 11-31.....	159,900	13	5.64	3.84	12.44	.26	2.46	8.89	10.43		.39	.09	1,360	1.85	295,800	56	5.7	2,220	6.6
Jan. 1-31, 1958 ..	200,200	13	5.56	3.72	8.87	.19	3.05	8.47	6.34		.29	.09	1,120	1.52	304,300	48	4.1	1,760	8.0
Feb. 1-28	225,100	12	5.16	3.44	7.35	.18	3.03	7.95	4.74		.19	.08	986	1.34	301,600	46	3.5	1,550	8.0
Mar. 1-31	254,200	13	4.80	3.16	7.13	.17	3.00	7.41	4.94		.15	.08	948	1.29	327,900	47	3.6	1,520	8.1
Apr. 1-15	152,800	14	4.16	2.72	5.22	.13	3.06	5.77	3.41		.11	.06	752	1.02	155,900	43	2.8	1,190	8.0
Apr. 16-30, May 1-4	714,400	11	2.60	1.00	1.26	.08	2.21	1.98	.70		.05	.04	296	.40	285,800	26	.9	484	8.0
May 5-31	1,921,000	12	2.00	.72	.83	.05	1.85	1.37	.39		.05	.04	221	.30	576,300	23	.7	358	8.0

COLORADO RIVER MAIN STEM--Continued

9-1805. COLORADO RIVER NEAR CISCO, UTAH--Continued

Chemical analyses, water year October 1957 to September 1958--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 1-19, 1958 ..	1,254,000	9.9	2.36	0.78	1.17	0.05	1.85	1.96	0.59		0.04	0.02	269	0.37	464,000	27	0.9	441	7.8
June 20-30.....	305,400	9.8	2.74	1.24	1.91	.06	1.88	2.96	1.16		.05	.03	369	.50	153,200	32	1.4	604	7.9
July 1-10.....	122,400	10	4.16	2.48	3.92	.09	2.41	5.54	2.43		.08	.15	646	.88	107,700	37	2.2	1,010	6.9
July 11-31.....	111,600	7.7	6.60	4.08	7.53	.16	3.06	10.95	4.65		.16	.12	1,170	1.59	177,400	41	3.2	1,730	6.9
Aug. 1-17, 19-31 .	106,300	11	9.12	6.44	9.44	.20	3.23	16.24	5.08		.27	.18	1,570	2.14	227,500	37	3.4	2,190	7.8
Aug. 18.....	3,030	9.6	10.50	7.80	17.14	.41	3.02	19.61	12.69		.31	--	2,230	3.03	9,180	48	5.7	3,180	7.2
Sept. 1-13, 15-30.	146,300	14	9.00	5.92	9.35	.17	3.64	15.99	4.74		.19	.21	1,540	2.09	305,800	38	3.4	2,120	7.4
Sept. 14.....	6,820	13	9,50	7.00	20.62	.36	3.31	16.86	17.26		.31	--	2,320	3.16	21,550	55	7.2	3,490	7.9
Total or weighted average.....	6,354,000	12	3.54	1.89	3.35	0.09	2.29	4.50	2.09		0.10	0.06	553	0.75	4,766,000	38	2.0	859	--

9-3800. COLORADO RIVER AT LEES FERRY, ARIZ.

LOCATION.--At gaging station at head of Marble Gorge at Lees Ferry, Coconino County, just upstream from Paria River, 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 1958.
Water temperatures: July 1949 to September 1958.
Sediment records: October 1928 to December 1933, November 1942 to September 1944, October 1947 to September 1958.
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 2,080 micromhos Oct. 16; minimum daily, 372 micromhos June 7.
Percent sodium: Maximum, 41 Jan. 1-31; minimum, 17 June 1-11.
EXTREMES, 1928-30, 1942-45, 1947-58.--Specific conductance (1942-45, 1947-58): Maximum daily, 2,280 micromhos Oct. 15, 1945; minimum daily, 318 micromhos June 9, 1948.
Percent sodium (1942-44, 1947-58): Maximum, 46 Mar. 2, 4, 7, 10, 1944; minimum, 17 June 1-11, 1958.
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 1957 to September 1958 given in WSP 1563.

Chemical analyses, water year October 1957 to September 1958

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. 1-14, 1957	207,000	14	6.84	2.71	5.66	0.16	3.93	8.16	3.16	0.04	0.11	0.10	950	1.29	267,000	37	2.6	1,400	7.7
Oct. 15-16	48,580	20	13.47	3.45	6.83	.26	5.11	16.55	2.17	.03	.13	.11	1,530	2.08	101,000	28	2.3	1,990	7.4
Oct. 17-20	101,700	16	8.28	2.96	6.83	.20	3.65	11.58	3.16	.04	.19	.09	1,170	1.59	161,700	37	2.9	1,640	7.8
Oct. 21-22	86,460	19	7.78	2.30	5.61	.19	4.33	9.56	1.64	.04	.16	.17	997	1.36	117,600	35	2.5	1,400	7.7
Oct. 23-24	121,200	21	12.57	2.88	6.79	.25	3.43	17.38	1.64	.03	.27	.16	1,490	2.03	246,000	30	2.4	1,890	7.8
Oct. 25-31	182,800	17	8.08	2.47	5.05	.18	3.44	10.83	1.64	.03	.14	.09	1,020	1.39	254,100	32	2.2	1,410	7.9
Nov. 1-4	126,500	16	6.54	2.63	4.78	.16	3.72	8.68	1.75	.04	.12	.19	895	1.22	154,300	34	2.2	1,280	7.8
Nov. 5-6	125,300	--	11.88	3.29	--	--	4.18	--	1.97	--	--	--	a1,390	1.89	236,800	--	--	1,810	7.5
Nov. 7-30	595,900	18	6.89	2.80	5.48	.16	3.77	9.37	2.20	.04	.11	.11	971	1.32	786,600	36	2.5	1,380	7.8
Dec. 1-31	516,500	17	5.89	2.88	5.74	.16	3.82	8.04	2.88	.03	.11	.20	919	1.25	645,600	39	2.7	1,350	7.8
Jan. 1-31, 1958	397,000	18	5.69	3.04	6.09	.16	3.80	7.99	3.21	.03	.14	.15	937	1.27	504,200	41	2.9	1,410	7.7
Feb. 1-25	440,800	15	5.79	2.63	5.74	.15	3.84	7.66	2.85	.02	.11	.11	892	1.21	533,400	40	2.8	1,320	7.8
Feb. 26-28	94,990	12	5.09	2.30	4.78	.16	3.67	6.77	1.92	.04	.11	.19	769	1.05	99,740	39	2.5	1,160	7.8

a Residue at 180°C.

COLORADO RIVER MAIN STEM--Continued

9-3800. COLORADO RIVER AT LEES FERRY, ARIZ.--Continued

Chemical analyses, water year October 1957 to September 1958--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. 1-31, 1958	696,100	14	5.29	2.47	5.09	0.15	3.80	7.08	2.23	0.03	0.09	0.12	812	1.10	765,700	39	2.6	1,210	7.8
Apr. 1-14	379,000	14	4.84	2.47	4.44	.14	3.65	6.35	1.86	.03	.08	.25	735	1.00	379,000	37	2.3	1,110	7.7
Apr. 15, 17	62,070	13	5.39	1.15	3.31	.15	3.70	4.52	1.66	.03	.08	.13	609	.83	51,520	33	1.8	930	7.6
Apr. 16	29,750	--	3.19	1.23	--	--	2.92	--	.65	--	--	--	a 413	.56	16,660	--	--	587	7.7
Apr. 18-30	1,103,000	13	3.79	.82	1.48	.12	3.15	2.42	.62	.04	.05	.13	374	.51	562,500	24	1.0	611	7.8
May 1-14	1,275,000	23	2.94	2.34	1.48	.10	3.87	2.39	.62	.03	.05	.10	404	.55	701,200	22	.9	642	7.7
May 15-31	2,716,000	22	2.99	.91	1.00	.06	3.02	1.58	.39	.03	.04	.12	302	.41	1,114,000	20	.7	474	8.0
June 1-11	2,060,000	17	2.89	.75	.78	.05	2.82	1.33	.31	.03	.03	.09	266	.36	741,600	17	.6	428	7.7
June 12-17	740,500	18	3.09	.75	.96	.06	2.87	1.60	.39	.04	.03	.08	293	.40	296,200	20	.7	464	7.8
June 18-30	877,100	21	3.19	1.07	1.44	.07	2.84	2.19	.66	.04	.03	.10	350	.48	421,000	25	1.0	561	7.9
July 1-9	308,000	21	3.34	1.32	2.26	.09	2.66	3.23	1.13	.02	.03	.13	437	.59	181,700	32	1.5	677	8.0
July 10-17	154,500	18	3.84	1.72	3.13	.11	2.72	4.37	1.72	.03	.02	.11	547	.74	114,300	36	1.9	864	7.8
July 18-27	123,500	16	4.49	2.11	4.31	.14	2.88	5.89	2.34	.04	.03	.15	692	.94	116,100	39	2.4	1,080	7.8
July 28-31	41,940	20	5.49	3.31	5.57	.17	3.06	8.12	3.21	.03	.08	.13	906	1.23	51,590	38	2.7	1,360	8.0
Aug. 1-26	230,600	19	5.99	3.41	6.13	.18	3.20	9.35	3.27	.04	.09	.19	996	1.35	311,300	39	2.8	1,480	7.8
Aug. 27-31	55,540	20	8.73	3.27	7.79	.22	4.00	12.16	3.61	.05	.18	.22	1,270	1.73	96,080	39	3.2	1,780	7.6
Sept. 1-27	283,700	19	8.23	4.09	7.35	.21	3.61	12.93	3.38	.02	.16	.20	1,270	1.73	490,800	37	3.0	1,780	7.8
Sept. 28-30	35,650	21	7.24	2.96	5.92	.17	3.82	10.04	2.62	.02	.15	.21	1,040	1.41	50,270	36	2.6	1,490	7.8
Total or weighted average	14,220,000	18	4.29	1.64	2.70	0.10	3.29	4.14	1.21	0.03	0.06	0.12	536	0.73	10,380,000	31	1.6	822	--

a Residue at 180°C.

9-4025. 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 1958.
Water temperatures: October 1936 to October 1942, September 1943 to September 1958.
Sediment records: October 1925 to November 1942, September 1943 to September 1958.
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 2,110 micromhos Nov. 6; minimum daily, 381 micromhos June 14.
Percent sodium: Maximum, 45 July 16-31; minimum, 21 June 1-20.
EXTREMES, 1937-42, 1943-58, Specific conductance: Maximum daily, 2,900 micromhos Sept. 6, 1940; minimum daily, 341 micromhos June 15, 1942.
Percent sodium: (1941-42, 1943-58): Maximum, 50 Jan. 12-14, 1957; minimum, 16 June 11-20, 1952.
REMARKS.--Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Values reported for dissolved solids are calculated from determined constituents. Records of discharge for water year October 1957 to September given in WSP 1563.

Chemical analyses, water year October 1957 to September 1958

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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, 1957	186,700	13	8.08	1.23	6.26	0.17	3.44	8.31	3.89	0.04	0.10	0.17	986	1.34	250,200	40	2.9	1,490	7.7
Oct. 14	24,990	12	7.04	3.62	6.35	.21	4.06	9.22	3.95	--	.02	.25	1,060	1.44	35,990	37	2.7	1,660	7.3
Oct. 15-16	59,700	12	5.64	2.96	5.66	.17	3.44	7.89	3.05	.02	.09	.16	894	1.22	72,830	39	2.7	1,320	8.0
Oct. 17-19	84,280	15	7.93	3.70	7.26	.23	3.38	12.80	2.88	.03	.03	.23	1,220	1.66	139,900	38	3.0	1,860	7.7
Oct. 20-22	85,670	14	7.53	3.95	7.35	.22	4.26	10.81	3.67	.04	.13	.21	1,180	1.60	137,100	39	3.1	1,650	7.6
Oct. 23	75,970	13	6.84	2.63	5.13	--	3.25	8.91	2.26	--	.09	--	911	1.24	94,200	35	2.4	1,300	7.6
Oct. 24-25	109,700	16	9.53	3.70	6.52	.13	3.28	14.37	2.09	.02	.11	.23	1,260	1.74	190,900	33	2.5	1,890	7.7
Oct. 26-31	156,500	14	8.23	3.21	5.26	.14	3.44	10.37	2.82	.03	.09	.17	1,050	1.43	223,800	31	2.2	1,480	7.7
Nov. 1-5	186,200	20	7.14	2.47	5.66	.18	4.16	8.85	2.54	.02	.05	.11	974	1.32	245,800	37	2.6	1,440	7.7
Nov. 6-7	115,800	26	12.08	2.80	7.35	.23	1.90	18.55	2.20	.02	.18	.14	1,520	2.07	239,700	33	2.7	1,920	8.2
Nov. 8-30	589,600	25	6.24	2.96	5.96	.15	3.49	9.02	2.79	.03	.10	.12	972	1.32	778,300	39	2.8	1,430	8.0
Dec. 1-31	536,900	21	5.54	3.21	6.31	.15	3.72	8.58	2.54	.02	.10	.08	942	1.28	667,200	41	3.0	1,410	8.0
Jan. 1-31, 1958	414,800	22	5.34	3.21	6.96	.15	3.61	7.54	4.34	.03	.13	.11	966	1.31	543,400	44	3.4	1,490	8.0
Feb. 1-26	535,800	20	5.49	2.71	6.22	.15	3.85	7.31	3.58	.02	.08	.16	911	1.24	664,400	43	3.1	1,400	7.8
Mar. 1-31	748,800	17	5.09	2.55	5.74	.15	3.87	6.70	2.90	.02	.05	.10	833	1,13	846,100	42	2.9	1,270	7.6

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COLORADO RIVER MAIN STEM--Continued

9-4025. COLORADO RIVER NEAR GRAND CANYON, ARIZ.--Continued

Chemical analyses, water year October 1957 to September 1958--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. 1-19, 1958.	565,400	16	4.89	2.71	4.78	0.16	3.93	6.02	2.43	0.02	0.05	0.08	760	1.03	582,400	38	2.5	1,170	7.6
Apr. 20-22	250,300	18	4.59	1.89	3.18	.16	4.00	4.21	1.52	.02	.05	.07	592	.81	202,700	32	1.8	926	7.5
Apr. 23-30	763,700	17	3.74	1.23	1.91	.12	3.34	2.71	.87	.02	.03	.06	419	.57	435,300	27	1.2	668	7.7
May 1-11	852,700	17	3.74	1.15	1.83	.12	3.51	2.46	.87	.02	.04	.04	409	.56	477,500	27	1.2	644	7.7
May 12-31	3,047,000	17	2.99	.99	1.17	.09	3.11	1.64	.54	.02	.02	.02	312	.42	1,280,000	22	.8	498	7.7
June 1-20.....	3,128,000	21	2.59	1.15	1.04	.07	2.62	1.60	.51	.04	.03	.08	290	.39	1,220,000	21	.8	443	7.8
June 21-30	634,200	16	3.04	1.15	1.74	.09	2.66	2.44	.93	.04	.02	.06	367	.50	317,100	29	1.2	584	7.7
July 1-7	268,700	21	3.29	1.27	2.31	.08	2.67	3.00	1.35	.02	.02	.20	432	.59	158,500	33	1.5	682	7.9
July 8-15	192,100	15	3.89	1.47	3.26	.10	2.95	3.85	2.03	.02	.02	.16	538	.73	140,200	37	2.0	852	7.7
July 16-31	222,400	15	6.24	3.08	7.74	.16	3.38	9.20	4.54	.02	.06	.21	1,070	1.46	324,700	45	3.6	1,610	8.0
Total or weighted average[a]	a13,840,000	19	4.09	1.73	3.00	0.11	3.21	4.16	1.49	0.03	0.05	0.08	548	0.75	10,380,000	34	1.8	837	--
Total or weighted average[b]	b14,550,000	--	--	--	--	--	--	--	--	--	--	--	570	0.78	11,350,000	--	--	--	--

a Represents 95 percent of runoff for water year. Average for 304 days of flow.
b Includes estimated data for missing periods. Represents 100 percent of runoff for water year.

9-4215. COLORADO RIVER BELOW HOOVER DAM, ARIZ., NEV.

LOCATION.--At Hoover Dam, state line between Mohave County, Ariz., and Clark County, Nev., about 1 mile upstream from gaging station.
DRAINAGE AREA.--167,800 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: October 1939 to September 1958.
Water temperatures: October 1941 to September 1958.
EXTREMES, 1939-57.--Specific conductance: Maximum daily, 1,580 micromhos June 20, 1955; minimum daily, 712 micromhos Nov. 22-26, 1952.
Percent sodium: Maximum, 41 during several periods in 1951, 1952 and 1956; minimum, 32 Jan. 21-22, 25-29, 31, June 12-17, 19-20, 1944.
REMARKS.--Values reported for dissolved solids are residues at 180°C. Records of specific conductance of daily samples prior to August 1957 and of semi-monthly samples thereafter available in district office at Salt Lake City, Utah. Records of discharge for water October 1957 to September 1958 given in WSP 1563.

Chemical analyses, water year October 1957 to September 1958

Date of collection	Runoff (acre-feet) [a]	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 [b]				
Oct. 1, 15, 1957.	696,600	11	4.80	2.28	4.39	0.12	2.72	6.20	2.54	0.02	0.04	0.15	753	1.02	710,500	38	2.3	1,120	8.2
Nov. 1, 15.....	956,300	11	4.72	2.28	4.39	.12	2.70	6.41	2.40	.02	.05	.15	750	1.02	977,500	38	2.3	1,110	8.0
Dec. 3, 16	1,081,000	11	4.56	2.08	4.13	.10	2.62	6.04	2.20	.02	.04	.14	700	.95	1,027,000	38	2.3	1,050	7.9
Jan. 2, 15, 1958.	1,245,000	11	4.32	2.00	3.78	.10	2.54	5.70	2.06	.02	.04	.12	656	.89	1,108,000	37	2.1	982	7.9
Feb. 3, 14.....	845,500	12	4.46	2.04	4.00	.13	2.66	5.91	2.14	.02	.05	.14	689	.94	794,800	38	2.2	1,020	7.7
Mar. 4, 17	1,435,000	13	4.30	1.98	3.65	.09	2.56	5.50	1.92	.02	.05	.12	656	.89	1,277,000	36	2.1	971	7.7
Apr. 1, 14.....	1,473,000	11	4.28	2.00	3.74	.10	2.59	5.60	1.97	.02	.05	.13	656	.89	1,311,000	37	2.1	971	7.7
May 2, 15.....	1,115,000	12	4.08	1.88	3.35	.12	2.49	4.77	1.92	.02	.05	.09	611	.83	925,400	36	1.9	918	8.0
June 2, 17	818,600	9.4	4.20	1,84	3.39	.09	2.52	5.37	1.69	.02	.04	.12	624	.85	695,800	36	2.0	928	7.8
July 1, 15	894,400	11	4.22	1.88	3.61	.09	2.56	5.37	1.92	.01	.05	.12	629	.86	769,200	37	2.1	935	7.9
Aug. 1, 15.....	911,200	10	4.18	1.84	3.44	.10	2.52	5.27	1.83	.02	.05	.15	611	.83	756,300	36	2.0	922	7.6
Sept. 3, 17.....	792,000	10	4.12	1.88	3.39	.13	2.56	5.25	1.69	.02	.06	.54	614	.84	665,300	36	2.0	930	7.6
Total or weighted average	12,270,000	11	4.34	1.97	3.74	0.11	2.59	5.60	2.00	0.02	0.05	0.16	661	0.90	11,040,000	37	2.1	985	--

a Represents runoff in acre-feet for entire month.
b Represents total loads for month.

DIVERSIONS AND RETURN FLOW AT AND BELOW IMPERIAL DAM

9-5255. YUMA MAIN CANAL BELOW COLORADO RIVER SIPHON, AT YUMA, ARIZ.

LOCATION.--At gaging station on Yuma Main Canal below Colorado River Siphon drop powerplant, on Arizona side of river, 3½ miles downstream from siphon, 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 1958.
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 1,330 micromhos Oct. 21; minimum daily, 1,020 micromhos Apr. 29, Aug. 22.
Percent sodium: Maximum, 45 Oct. 1-31; minimum, 40 Feb. 1-28.
EXTREMES, 1943-58.--Specific conductance: Maximum daily, 1,520 micromhos Jan. 16, 1957; minimum daily, 795 micromhos Jan. 5, 1953.
Percent sodium: Maximum, 46 Nov. 21-30, 1953; minimum, 32 several periods in 1945, 1946, 1948, 1949, and 1957.
REMARKS.--Values reported for dissolved solids are residues 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 1957 to September 1958 given in WSP 1563.

Chemical analyses, water year October 1957 to September 1958

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, 1957..	24,160	16	4.99	2.38	6.09	0.14	2.77	7.27	3.61	0.02	0.03	0.18	850	1.16	28,030	45	3.2	1,300	8.0
Nov. 1-30.....	13,950	17	4.89	2.71	5.83	.14	2.79	7.12	3.38	.02	.03	.18	840	1.14	15,900	43	3.0	1,260	7.9
Dec. 1-31.....	14,310	17	4.84	2.38	5.48	.14	2.77	8.95	3.10	.02	.02	.17	810	1.10	15,740	43	2.9	1,230	8.0
Jan. 1-31, 1958..	16,880	19	4.59	2.38	5.26	.13	2.79	6.62	2.82	.02	.03	.18	770	1.05	17,720	43	2.8	1,160	8.1
Feb. 1-28.....	18,390	18	4.89	2.30	4.87	.13	2.98	6.16	2.99	.03	.04	.20	785	1.07	19,670	40	2.6	1,190	7.6
Mar. 1-31.....	28,650	22	4.69	2.14	4.87	.12	2.98	6.20	2.48	.03	.04	.18	777	1.06	30,370	41	2.6	1,120	7.6
Apr. 1-30.....	31,300	22	4.64	2.06	4.96	.12	2.88	6.06	2.54	.04	.04	.15	747	1.02	31,930	42	2.7	1,110	7.6
May 1-31.....	35,740	21	4.49	2.14	4.87	.12	2.82	6.08	2.54	.03	.04	.18	736	1.00	35,740	42	2.7	1,100	7.8
June 1-30.....	33,530	22	4.54	1.97	4.87	.12	2.75	6.00	2.59	.04	.03	.19	740	1.01	33,870	42	2.7	1,090	8.0
July 1-31	38,700	22	4.39	2.14	4.70	.12	2.69	5.91	2.48	.04	.03	.20	706	.96	37,150	41	2.6	1,070	7.8
Aug. 1-31.....	32,250	20	4.24	2.06	4.87	.12	2.59	5.98	2.48	.02	.03	.14	710	.97	31,280	43	2.7	1,060	8.0
Sept. 1-30	35,800	18	4.34	1.97	4.96	.12	2.62	5.98	2.57	.03	.03	.18	713	.97	34,730	44	2.8	1,080	8.1
Total or weighted average	323,700	20	4.59	2.14	5.05	0.13	2.77	6.25	2.71	0.03	0.03	0.18	753	1.02	330,200	42	2.8	1,130	--

GUNNISON RIVER BASIN

9-1525. 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 1958.
Water temperatures: April 1949 to September 1958.
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 2,210 micromhos Sept. 15; minimum daily, 285 micromhos May 26.
Percent sodium: Maximum, 32 Feb. 1-28; minimum, 18 May 11-31.
EXTREMES, 1941-58.--Specific conductance: Maximum daily, 2,730 micromhos Sept. 10, 1956; minimum daily, 280 micromhos May 23, 1948.
Percent sodium (1950-58): Maximum, 35 Sept. 21-30, 1956, Feb. 11-20, 1957; minimum, 10 June 2-5, 10, 1952.
REMARKS.--Values reported for dissolved solids are residues 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 1957 to September 1958 given in WSP 1563.

Chemical analyses, water year October 1957 to September 1958

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, 1957	106,200	21	8.56	5.64	5.92	0.16	3.36	16.24	0.56		0.15	0.22	1,410	1.92	203,900	29	2.2	1,700	8.0
Nov. 1-30	111,100	18	5.96	4.28	4.18	.12	3.43	10.70	.42		.11	.19	975	1.33	147,800	29	1.9	1,270	7.4
Dec. 1-31	91,890	17	5.64	3.96	3.87	.13	3.21	9.74	.39		.12	.16	929	1.26	115,800	28	1.8	1,230	8.0
Jan. 1-31, 1958	65,490	19	6.00	4.40	4.57	.13	3.51	11.28	.45		.13	.12	1,020	1.39	91,030	30	2.0	1,320	7.9
Feb. 1-28	70,100	17	6.04	4.56	5.09	.15	3.46	11.87	.51		.13	.13	1,100	1.50	105,200	32	2.2	1,390	7.9
Mar. 1-31	82,160	17	5.32	3.80	4.13	.10	3.15	9.83	.42		.12	.14	911	1.24	101,900	31	1.9	1,200	8.1
Apr. 1-15	49,330	19	4.88	3.32	3.31	.12	3.25	8.04	.39		.09	.13	777	1.06	52,290	28	1.6	1,050	7.8
Apr. 16-19	42,940	18	3.92	1.52	1.65	.08	a3.61	3.25	.24		.06	--	b433	.59	25,330	23	1.0	638	8.3
Apr. 20-30	162,100	16	2.48	1.14	.96	.06	2.34	2.17	.16		.05	.09	300	.41	66,460	21	.7	446	8.0
May 1-10	201,100	17	2.70	.78	.83	.07	2.49	1.73	.11		.05	.12	283	.38	76,420	19	.6	418	8.0
May 11-31	671,800	16	2.12	.64	.61	.06	1.88	1.42	.08		.04	.08	220	.30	201,500	18	.5	334	7.8
June 1-26	540,300	15	2.64	1.04	.96	.07	2.02	2.44	.14		.03	.06	301	.41	221,500	20	.7	448	6.8
June 27-30, July 1-3	44,230	15	4.00	2.20	1.96	.08	2.33	5.50	.28		.03	.09	540	.73	32,290	24	1.1	752	7.2

a Includes 0.10 equivalent per million of carbonate (CO_3).
b Calculated from determined constituents.

GUNNISON RIVER BASIN--Continued

9-1525. GUNNISON RIVER NEAR GRAND JUNCTION, COLO.--Continued

Chemical analyses, water year October 1957 to September 1958--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 4-12, 1958..	24,860	14	6.40	3.76	3.65	0.11	3.00	10.37	0.39		0.06	0.18	929	1.26	31,320	26	1.6	1,200	7.2
July 13-31, Aug. 1-6.....	34,850	15	9.24	5.56	6.74	.19	3.49	17.68	.70		.07	.31	1,510	2.05	71,440	31	2.5	1,820	7.0
Aug. 7-14	11,400	14	5.36	3.24	3.74	.13	2.85	9.06	.42		.10	.20	823	1.12	12,770	30	1.8	1,110	6.8
Aug. 15-31.....	22,210	13	8.92	5.32	6.61	.17	3.34	17.28	.68		.05	.25	1,470	2.00	44,420	31	2.5	1,770	6.9
Sept. 1-30	51,140	15	10.50	6.30	7.00	.14	3.62	19.45	.62		.10	.32	1,700	2.31	118,100	29	2.4	1,980	7.5
Total or weighted average	2,383,000	16	3.79	2.06	2.04	0.09	2.47	5.16	0.23		0.06	0.11	530	0.72	1,716,000	26	1.2	713	--

GREEN RIVER BASIN

9-3150. GREEN RIVER AT GREEN RIVER, UTAH

LOCATION.--At gaging station, 1 mile southeast of the town of Green River, Emery County, 22 miles upstream from San Rafael River, and 117 miles upstream from mouth.
DRAINAGE AREA.--40,600 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: August 1928 to September 1958.
Water temperatures: May 1949 to September 1958.
Sediment records: May 1930 to September 1958.
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 1,750 micromhos Sept. 13; minimum daily, 324 micromhos June 1.
Percent sodium: Maximum, 43 Sept. 1-12, 15-30; minimum, 24 May 10-31.
EXTREMES, 1941-58.--Specific conductance: Maximum daily, 2,420 micromhos Sept. 29, 1943; minimum daily, 272 micromhos May 13, 1956.
Percent sodium (1950-58): Maximum, 47 Nov. 21-24, 26, Dec. 1-10, 1954; minimum, 19 Aug. 7, 1957.
REMARKS.--Values reported for dissolved solids are residues 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 1957 to September 1958 given in WSP 1563.

Chemical analyses, water year October 1957 to September 1958

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, 1957	184,800	8.7	3.72	2.84	4.35	0.07	3.44	6.43	1.07		0.03	0.18	694	0.94	173,700	40	2.4	1,030	8.0
Nov. 1-30	228,100	10	3.80	3.16	4.26	.06	3.74	6.33	1.02		.04	.17	705	.96	219,000	38	2.3	1,040	7.9
Dec. 1-31	148,900	11	4.00	3.22	4.26	.06	3.97	6.20	1.13		.03	.18	711	.97	144,400	37	2.2	1,050	8.0
Jan. 1-31, 1958	127,700	12	4.02	3.06	3.92	.06	4.05	5.87	1.16		.03	.17	686	.93	118,800	35	2.1	1,020	8.0
Feb. 1-28	183,600	12	3.48	2.72	3.87	.06	3.47	5.60	.99		.06	.19	632	.86	157,900	38	2.2	950	8.1
Mar. 1-31	246,200	10	3.52	2.84	4.31	.06	3.57	6.18	1.07		.05	.17	677	.92	226,500	40	2.4	1,020	7.9
Apr. 1-22	256,900	13	3.46	2.66	3.70	.07	3.54	5.45	.90		.05	.16	617	.84	215,800	37	2.1	910	8.1
Apr. 23-30	175,200	13	2.56	1.60	1.87	.05	2.93	2.50	.45		.07	.09	379	.52	91,100	31	1.3	579	8.0
May 1-9	181,100	15	2.82	1.74	2.09	.07	3.31	2.83	.51		.07	.14	405	.55	99,600	31	1.4	616	8.2
May 10-31	1,130,000	14	2.34	1.18	1.13	.05	2.85	1.46	.28		.05	.03	276	.38	429,400	24	.9	435	8.0
June 1-30	1,174,000	11	2.14	.98	1.17	.05	2.43	1.58	.28		.03	.07	259	.35	410,900	27	.9	411	8.0
July 1-31	224,000	11	2.84	1.90	2.57	.07	3.08	3.58	.79		.02	.17	454	.62	138,900	35	1.7	702	7.2
Aug. 1-31	110,200	8.5	3.36	2.36	3.87	.08	3.34	5.12	1.02		.03	.15	612	.83	91,470	40	2.3	915	7.6
Sept. 1-12,15-30	87,110	8.6	3.62	2.76	4.96	.09	3.46	6.79	1.38		.03	.17	727	.99	86,240	43	2.8	1,070	7.6
Sept. 13-14	8,650	11	9.32	3.92	6.66	.13	3.57	15.74	1.07		.01	.19	1,350	1.84	15,920	33	2.6	1,700	7.4
Total or weighted average	4,466,000	12	2.84	1.81	2.35	0.06	3.05	3.31	0.59		0.04	0.10	431	0.59	2,635,000	33	1.5	655	--

SAN JUAN RIVER BASIN

9-3555. 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 1958.
Water temperatures: December 1954 to September 1958.
Sediment records: December 1954 to September 1958.
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 591 micromhos Feb. 18; minimum daily, 121 micromhos June 10.
Percent sodium: Maximum, 36 Feb. 17-23; minimum, 13 Apr. 17-23.
EXTREMES, 1954-58.--Specific conductance: Maximum daily, 659 micromhos Nov. 22, 1956; minimum daily, 101 micromhos July 2, 1957.
Percent sodium: Maximum, 45 Feb. 13-17, 1957; minimum, 13 Apr. 17-23, 1958.
REMARKS.--Values reported for dissolved solids are residues 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 1957 to September 1958 given in WSP 1563.

Chemical analyses, water year October 1957 to September 1958

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. 1-12, 1957 ..	16,510	14	1.50	0.37	0.74	0.07	1.75	0.77	0.11	0.04	0.01	0.05	172	0.23	3,800	28	0.8	264	7.5
Oct. 13	2,640	--	1.75	.31	1.00	--	1.80	--	--	--	--	--	206	.28	739	33	1.0	304	8.2
Oct. 14	2,400	--	2.00	.47	1.26	--	2.00	--	--	--	--	--	239	.33	792	34	1.1	362	8.1
Oct. 15-18	7,280	--	1.70	.43	.87	--	1.80	--	--	--	--	--	196	.27	1,970	29	.8	292	8.2
Oct. 19	4,720	--	2.50	.33	1.04	--	2.72	--	--	--	--	--	257	.35	1,650	27	.9	373	8.0
Oct. 20	4,580	--	3.19	.72	1.13	--	3.21	--	--	--	--	--	321	.44	2,020	22	.8	494	7.5
Oct. 21	5,490	--	2.00	.39	1.04	--	2.15	--	--	--	--	--	227	.31	1,700	30	1.0	339	8.1
Oct. 22	5,450	--	2.64	.58	1.00	--	3.03	--	--	--	--	--	270	.37	2,020	24	.8	409	8.0
Oct. 23-31	18,240	--	1.95	.58	.87	--	2.31	--	--	--	--	--	215	.29	5,290	26	.8	321	7.5
Nov. 1-27.....	63,840	--	1.90	.39	.83	--	1.72	--	--	--	--	--	193	.26	16,600	27	.8	297	7.5
Nov. 28-30.....	3,680	--	2.15	.51	1.00	--	2.08	--	--	--	--	--	240	.33	1,210	27	.9	365	7.6
Dec. 1.....	889	--	2.40	.58	1.22	--	a2.43	--	--	--	--	--	278	.38	338	29	1.0	409	8.5
Dec. 2	1,500	--	2.00	.51	.87	--	a2.59	--	--	--	--	--	227	.31	465	26	.8	329	8.5
Dec. 3-16	23,760	--	1.65	.47	.65	--	1.69	--	--	--	--	--	184	.25	5,940	23	.6	271	7.5
Dec. 17-19.....	5,410	--	1.75	.51	1.13	--	1.90	--	--	--	--	--	216	.29	1,570	33	1.1	337	7.3
Dec. 20-28.....	9,690	--	2.20	.47	1.09	--	2.13	--	--	--	--	--	252	.34	3,290	29	.9	376	7.5
Dec. 29-31.....	2,520	--	2.30	.63	1.22	--	2.29	--	--	--	--	--	273	.37	932	29	1.0	414	7.6

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

Jan. 1-31, 1958 .	21,860	18	2.40	0.54	1.17	0.06	2.34	1.64	0.16	0.04	0.00	0.09	267	0.36	7,870	28	1.0	411	7.6
Feb. 1-16.....	18,380	--	2.20	.57	1.26	--	2.28	--	--	--	--	--	270	.37	6,800	31	1.1	409	7.5
Feb. 17-23.....	18,390	--	2.89	.72	2.00	--	3.59	--	--	--	--	--	354	.48	8,830	36	1.5	543	7.6
Feb. 24-28	14,530	--	2.50	.82	1.30	--	2.69	--	--	--	--	--	301	.41	5,960	28	1.0	456	7.7
Mar. 1-19.....	27,970	--	2.59	.99	1.39	--	2.69	--	--	--	--	--	332	.45	12,590	28	1.0	489	7.6
Mar. 20-31	48,680	--	2.35	.99	1.09	--	2.62	--	--	--	--	--	293	.40	19,470	25	.8	433	7.8
Apr. 1-16.....	78,230	16	2.59	1.15	.91	.08	2.74	1.87	.13	.01	.02	.08	300	.41	32,070	19	.7	445	7.7
Apr. 17-23.....	119,000	--	2.25	.67	.44	--	2.51	--	--	--	--	--	217	.30	35,700	13	.4	328	7.7
Apr. 24-30.....	81,700	--	1.50	.43	.37	--	1.70	--	--	--	--	--	156	.21	17,160	16	.4	237	7.6
May 1-6	68,410	--	1.40	.41	.36	--	1.57	--	--	--	--	--	146	.20	13,680	17	.4	222	7.5
May 7-20	210,200	--	1.10	.31	.27	--	1.31	--	--	--	--	--	122	.17	35,730	16	.3	174	7.3
May 21-31.....	180,900	--	.95	.21	.24	--	1.15	--	--	--	--	--	107	.15	27,140	17	.3	146	7.3
June 1-23	244,200	--	.85	.20	.25	--	.98	--	--	--	--	--	96	.13	31,750	19	.3	135	7.2
June 24-28	20,330	--	1.00	.21	.36	--	1.11	--	--	--	--	--	115	.16	3,250	23	.5	167	7.2
June 29-July 4....	14,750	--	1.30	.35	.52	--	1.46	--	--	--	--	--	150	.20	2,950	24	.6	225	7.6
July 5-10	9,960	17	1.60	.49	.74	.07	1.79	1.02	.10	.02	.00	.09	190	.26	2,590	26	.7	288	7.5
July 11-14.....	5,820	--	1.55	.41	.65	--	1.72	--	--	--	--	--	173	.24	1,400	25	.7	267	7.4
July 15-31.....	17,420	--	1.85	.53	.91	--	2.13	--	--	--	--	--	218	.30	5,230	28	.8	333	7.5
Aug. 1-8	7,910	--	1.95	.49	1.13	--	2.25	--	--	--	--	--	225	.31	2,450	32	1.0	344	7.7
Aug. 9.....	1,140	--	2.54	.99	1.30	--	2.57	--	--	--	--	--	318	.43	490	27	1.0	469	7.5
Aug. 10-18.....	9,230	--	2.05	.57	1.09	--	2.36	--	--	--	--	--	235	.32	2,950	29	1.0	359	7.5
Aug. 19-20.....	2,240	--	2.40	.74	1.22	--	2.52	--	--	--	--	--	276	.38	851	28	1.0	418	7.5
Aug. 21-31.....	14,460	--	1.95	.57	1.00	--	2.23	--	--	--	--	--	216	.29	4,190	28	.9	331	7.6
Sept. 1-14.....	17,360	--	2.00	.53	1.17	--	2.29	--	--	--	--	--	232	.32	5,560	32	1.0	357	7.5
Sept. 15-30	22,710	--	1.65	.43	.87	--	1.87	--	--	--	--	--	189	.26	5,900	29	.9	289	7.6
Total or weighted average	1,455,000	--	1.55	0.45	0.57	--	1.72	--	--	--	--	--	172	0.23	334,600	22	0.6	255	--

SAN JUAN RIVER BASIN

9-3795. 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 1958.
Water temperatures: May 1944 to September 1958.
Sediment records: August to September 1928, July 1929 to September 1958.
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 1,520 micromhos Sept. 15; minimum daily, 239 micromhos June 11.
Percent sodium: Maximum, 39 Aug. 1-31; minimum, 19 May 1-31, June 1-15.
EXTREMES, 1929-58.--Specific conductance (1941-58): 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 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 1957 to September 1958 given in WSP 1563.

Chemical analyses, water year October 1957 to September 1958

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, 1957...	150,200	13	4.46	1.78	3.26	0.09	2.90	6.16	0.56		0.06	0.09	633	0.86	129,200	34	1.9	897	7.8
Nov. 1-30.....	141,300	12	4.04	1.76	2.35	.07	2.61	5.14	.51		.06	.06	532	.72	101,700	29	1.4	770	7.8
Dec. 1-31.....	87,760	10	4.40	2.02	2.70	.07	2.75	5.91	.62		.08	.06	597	.81	71,090	29	1.5	861	7.8
Jan. 1-31, 1958 ..	52,900	10	5.30	2.56	3.61	.09	3.16	7.70	.85		.09	.06	760	1.03	54,490	31	1.8	1,060	8.3
Feb. 1-28.....	118,600	10	4.60	2.16	3.39	.10	2.95	6.79	.59		.11	.06	677	.92	109,100	33	1.8	956	8.0
Mar. 1-31.....	159,300	11	4.60	2.16	2.96	.09	2.87	6.31	.68		.09	.06	641	.87	138,600	30	1.6	920	8.0
Apr. 1-17.....	125,800	12	3.96	1.96	2.00	.08	2.85	4.64	.51		.05	.06	520	.71	89,320	25	1.2	747	7.9
Apr. 18-30.....	287,300	12	2.54	.92	.91	.05	2.29	2.02	.14		.04	.05	280	.38	109,200	21	.7	423	8.0
May 1-31	742,600	11	1.89	.54	.57	.05	1.77	1.17	.14		.03	.03	193	.26	193,100	19	.5	303	7.8

June 1-15, 1958...	361,600	12	1.78	0.29	0.48	0.04	1.59	1.00	0.10		0.03	0.01	172	0.23	83,170	19	0.5	267	7.8
June 16-29.....	140,000	11	2.02	.45	.78	.05	1.52	1.67	.20		.04	.00	220	.30	42,000	24	.7	343	7.7
June 30, July 1-17	60,230	9.9	3.20	.96	1.78	.06	1.95	3.75	.37		.05	.07	398	.54	32,520	30	1.2	595	7.5
July 18-26	13,420	8.3	4.04	1.72	3.18	.09	2.34	6.04	.73		.09	.05	594	.81	10,870	35	1.9	864	7.6
July 27-31	5,820	12	4.96	2.00	4.39	.12	2.79	7.87	.93		.11	.12	765	1.04	6,050	38	2.3	1,080	7.7
Aug. 1-31.....	42,400	12	4.80	2.16	4.57	.12	3.06	7.77	.87		.09	.13	749	1.02	43,250	39	2.4	1,070	7.7
Sept. 1-11, 13-14 16, 21-30	42,380	11	4.58	2.10	4.09	.08	3.05	6.72	.79		.07	.13	700	.95	40,260	38	2.2	1,000	7.5
Sept. 12-15	6,930	14	7.28	3.20	5.92	.12	3.77	12.03	.79		.04	.22	1,090	1.48	10,260	36	2.6	1,420	7.5
Sept. 17-20	12,040	13	3.42	1.22	1.96	.06	2.52	3.58	.39		.06	.09	448	.61	7,340	29	1.3	665	7.5
Total or weighted average	2,551,000	11	2.94	1.07	1.57	0.06	2.20	3.19	0.31		0.05	0.04	368	0.50	1,276,000	28	1.1	541	--

LITTLE COLORADO RIVER BASIN

9-4012. 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 3 miles downstream from Coconino damsite, 9.5 miles downstream from Moenkopi Wash, 9.5 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 1958 (discontinued).
Water temperatures: October 1951 to September 1958.
Sediment records: October 1947 to September 1956 (monthly), October 1956 to September 1958 (daily).
REMARKS.--Values reported for dissolved solids are residues 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 for water year October 1957 to September 1958 given in WSP 1563. Appreciable inflow between sampling site and gaging station during periods of storm runoff. Most of this inflow is from Moenkopi Wash but other arroyos may at times become sizeable contributors.

Chemical analyses, water year October 1957 to September 1958

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. 8-12, 1957 ..		20	2.10	0.43	7.87	0.09	4.95	2.42	3.10	0.01	0.02	0.26	642	0.87		75	7.0	1,060	7.9
Oct. 13		--	.43	.04	5.22	--	a4.27	--	--	--	--	--	382	.52		92	11	596	8.5
Oct. 14-20		--	2.40	.47	6.96	--	5.41	--	--	--	--	--	638	.87		71	5.8	1,050	7.9
Oct. 21-22		--	1.60	.23	7.13	--	5.02	--	--	--	--	--	560	.76		80	7.5	930	8.1
Oct. 23-24		--	8.03	2.30	5.22	--	5.67	--	--	--	--	--	970	1.32		34	2.3	1,610	7.5
Oct. 25-31		--	3.74	.74	6.44	--	4.13	--	--	--	--	--	702	.95		59	4.3	1,150	7.7
Nov. 1.....		--	1.05	.16	7.22	--	5.08	--	--	--	--	--	544	.74		86	9.3	884	8.0
Nov. 2.....		--	5.09	1.23	7.40	--	6.46	--	--	--	--	--	878	1.19		54	4.2	1,460	7.4
Nov. 3-6.....		--	2.59	.51	6.52	--	4.72	--	--	--	--	--	626	.85		68	5.2	1,020	7.9
Nov. 7.....		--	3.19	.70	10.44	--	4.72	--	--	--	--	--	900	1.22		73	7.5	1,500	7.7
Nov. 8-19.....		--	2.20	.27	3.92	--	3.31	--	--	--	--	--	396	.54		61	3.5	663	7.9
Nov. 20-23.....		--	2.84	.58	5.31	--	2.72	--	--	--	--	--	548	.75		61	4.1	915	7.4
Nov. 24-30.....		--	3.04	.58	8.70	--	2.43	--	--	--	--	--	775	1.05		71	6.5	1,290	7.9
Dec. 1-21.....		--	2.59	.51	7.74	--	2.39	--	--	--	--	--	680	.92		71	6.2	1,130	7.9
Dec. 26-31.....		--	1.95	.27	5.05	--	1.87	--	--	--	--	--	447	.61		69	4.8	746	7.8
Jan. 1-9, 1958 ...		10	2.35	.43	6.09	.12	1.93	2.04	5.10	.02	.02	.06	564	.77		68	5.2	932	7.4
Jan. 10-17		--	2.84	.70	8.26	--	2.13	--	--	--	--	--	740	1.01		70	6.2	1,230	7.7
Jan. 18-19		--	2.20	.51	5.92	--	2.03	--	--	--	--	--	538	.73		69	5.1	898	7.9
Jan. 20-23		--	2.64	.82	8.09	--	2.62	--	--	--	--	--	726	.99		70	6.2	1,200	7.5

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

Feb. 5-10, 1958 .		--	0.43	0.00	6.00	--	b3.77	--	--	--	--	--	404	0.55		93	13	663	8.4
Feb. 15-17.....		--	3.44	1.23	16.88	--	3.25	--	--	--	--	--	1,290	1.75		78	11	2,250	7.9
Feb. 18-21.....		--	2.74	.78	10.88	--	2.36	--	--	--	--	--	918	1.25		76	8.2	1,530	8.0
Feb. 22-25.....		--	2.40	.63	8.70	--	2.33	--	--	--	--	--	732	1.00		74	7.1	1,220	8.0
Feb. 26-28.....		--	1.50	.23	5.09	--	2.75	--	--	--	--	--	423	.58		75	5.5	708	8.1
Mar. 1-9		--	1.40	.23	3.70	--	2.29	--	--	--	--	--	332	.45		69	4.1	548	8.2
Mar. 10-12		--	2.59	.47	4.65	--	2.69	--	--	--	--	--	487	.66		60	3.8	800	7.7
Mar. 13-17		--	3.04	.63	5.92	--	2.62	--	--	--	--	--	608	.83		62	4.4	1,010	7.7
Mar. 18-22		--	3.09	.90	8.53	--	3.44	--	--	--	--	--	788	1.07		68	6.0	1,310	8.2
Mar. 23-24		--	1.85	.39	5.74	--	3.64	--	--	--	--	--	513	.70		72	5.4	825	8.1
Mar. 25-31		--	1.45	.23	3.39	--	2.72	--	--	--	--	--	314	.43		67	3.7	509	8.1
Apr. 1-30.....		13	1.75	.20	2.70	0.09	2.29	0.96	1.52	0.01	0.01	0.09	290	.39		57	2.7	481	8.1
May 1-7.....		--	2.15	.39	3.61	--	2.49	--	--	--	--	--	363	.49		59	3.2	621	7.9
May 8-11		--	1.65	.33	6.05	--	2.85	--	--	--	--	--	444	.60		75	6.1	752	8.2
May 12-15.....		--	1,80	.35	6.00	--	2.13	--	--	--	--	--	499	.68		74	5.8	855	7.7
June 25-26		--	2.40	.67	11.31	--	5.29	--	--	--	--	--	856	1.16		79	9.1	1,450	8.0
July 8-10		--	1.10	.25	14.27	--	6.26	--	--	--	--	--	940	1.28		91	17	1,480	8.1
July 11-12		--	1.60	.41	21.40	--	5.98	--	--	--	--	--	1,410	1.92		91	21	2,230	8.2
July 25		--	.26	.04	6.00	--	a4.50	--	--	--	--	--	--	--		95	15	595	8.7
July 26		--	1.15	.16	9.40	--	4.11	--	--	--	--	--	664	.90		88	12	1,020	8.0
July 29-31		--	1.25	.31	11.83	--	4.98	--	--	--	--	--	832	1.13		88	13	1,380	8.2

a Includes 0.27 equivalent per million of carbonate (CO_3).
b Includes 0.20 equivalent per million of carbonate (CO_3).

LITTLE COLORADO RIVER BASIN--Continued

9-4012. LITTLE COLORADO RIVER AT CAMERON, ARIZ.--Continued

Chemical analyses, water year October 1957 to September 1958--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. 1-2, 7, 23, 1958		--	1.75	0.45	12.53	--	5.54	--	--	--	--	--	906	1.23		85	12	1,420	8.0
Aug. 8-10		--	1.25	.35	9.74	--	5.21	--	--	--	--	--	666	.91		86	11	1,080	8.1
Aug. 11-12, 22		--	1.75	.53	11.83	--	5.18	--	--	--	--	--	840	1.14		84	11	1,370	8.0
Aug. 13-15, 21		--	1.40	.27	9.83	--	5.18	--	--	--	--	--	700	.95		85	11	1,100	8.0
Aug. 16		--	2.25	.58	6.09	--	7.44	--	--	--	--	--	510	.69		88	5.1	837	8.1
Aug. 17		--	.70	.10	8.09	--	3.64	--	--	--	--	--	540	.73		91	13	851	8.2
Aug. 18-20, 24		--	.95	.58	8.26	--	4.95	--	--	--	--	--	620	.84		84	9.4	927	8.0
Aug. 25-31		--	2.10	.57	8.70	--	5.24	--	--	--	--	--	718	.97		77	7.5	1,090	7.8
Sept. 1-2		--	2.20	.51	9.22	--	4.85	--	--	--	--	--	740	1.01		77	7.9	1,130	7.9
Sept. 3		--	.28	.04	5.66	--	a3.91	--	--	--	--	--	380	.52		95	14	562	8.6
Sept. 4-6		--	1.95	.37	6.70	--	3.25	--	--	--	--	--	--	--		74	6.2	853	8.0
Sept. 7-8		--	2.79	.74	10.88	--	2.10	--	--	--	--	--	868	1.18		76	8.2	1,360	7.6
Sept; 9-19		--	1.80	.35	7.35	--	4.29	--	--	--	--	--	579	.79		77	7.1	870	7.7
Sept. 20-30		--	1.45	.27	5.83	--	2.92	--	--	--	--	--	461	.63		77	6.3	727	8.0

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

VIRGIN RIVER BASIN

9-4150. 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 1958.
Water temperatures: October 1947 to September 1958.
Sediment records: October 1947 to September 1958.
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 4,000 micromhos Aug. 11; minimum daily, 823 micromhos Apr. 24.
Percent sodium: Maximum, 37 Feb. 24-25, 27-28; minimum 8 May 12.
EXTREMES, 1949-58.--Specific conductance: Maximum daily, 4,090 micromhos Oct. 5, 1955; minimum daily, 734 micromhos Apr. 28, 1952.
Percent sodium (1953-58): Maximum, 37 Feb. 24-25, 27-28, 1958; minimum, 8 May 12, 1958.
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 1957 to September 1958 given in WSP 1563.

Chemical analyses, water year October 1957 to September 1958

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, 1957 ..	14,550	19	17.40	7.00	10.14	0.51	3.95	22.07	9.31		0.07	0.84	2,220	3.02	43,940	29	2.9	2,990	7.6
Nov. 1-30	20,630	19	13.20	5.90	9.22	.41	4.31	16.32	8.32		.06	.60	1,800	2.45	50,540	32	3.0	2,550	7.8
Dec. 1-16, 20-31 .	11,170	20	11.60	6.50	10.14	.61	4.20	14.74	9.31		.05	.72	1,760	2.39	26,700	35	3.4	2,610	7.9
Dec. 17-19	4,260	18	6.88	2.56	3.78	.24	3.41	6.95	3.10		.03	.25	831	1.13	4,810	28	1.7	1,290	7.8
Jan. 1-31, 1958 ..	9,820	18	12.10	6.90	10.44	.61	4.52	15.26	9.73		.04	.69	1,830	2.49	24,450	35	3.4	2,710	7.7
Feb. 1-5	3,210	17	11.40	6.50	10.27	.59	4.59	14.07	9.59		.05	.71	1,740	2.37	7,610	36	3.4	2,610	7.6
Feb. 6-11.....	4,910	14	8.60	3.88	6.35	.33	4.13	9.99	5.36		.04	.41	1,190	1.62	7,950	33	2.5	1,810	7.8
Feb. 12-23.....	5,500	16	10.70	5.60	8.61	.51	4.88	12.95	7.76		.05	.53	1,560	2.12	11,660	34	3.0	2,320	8.0
Feb. 24-25, 27-28	2,730	13	9.28	4.12	7.92	.33	4.31	11.70	5.36		.04	.42	1,330	1.81	4,940	37	3.1	1,830	7.9
Feb. 26.....	2,540	8.3	6.72	2.08	2.87	.19	2.72	6.52	1.69		.02	--	698	.95	2,410	24	1.4	1,130	7.9
Mar. 1-15	7,370	20	10.50	5.60	6.67	.43	4.59	13.18	8.04		.04	.58	1,580	2.15	15,850	35	3.1	2,320	8.0
Mar. 16	1,560	32	5.12	1.56	1.96	.18	4.56	2.58	1.55		.03	--	524	.71	1,110	22	1.1	900	8.0
Mar. 17-31	32,240	17	8.16	2.92	3.96	.23	3.44	8.72	3.16		.03	.27	953	1.30	41,910	26	1.7	1,410	8.0

VIRGIN RIVER BASIN--Continued

9-4150. VIRGIN RIVER AT LITTLEFIELD, ARIZ.--Continued

Chemical analyses, water year October 1957 to September 1958--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. 1-5, 1958..	13,140	20	6.20	2.44	3.31	0.20	3.44	6.29	2.59		0.03	0.23	757	1.03	13,530	27	1.6	1,140	8.0
Apr. 6-15	13,280	20	7.60	3.64	5.22	.26	4.16	8.59	4.17		.04	.36	1,030	1.40	18,590	31	2.2	1,540	8.0
Apr. 16-30	37,110	14	5.44	2.36	2.83	.17	3.51	4.87	2.31		.06	.20	649	.88	32,660	26	1.4	1,020	8.0
May 1-11, 13-24	55,480	16	5.36	2.00	2.70	.17	3.49	4.46	2.40		.04	.24	622	.85	47,160	26	1.4	990	8.0
May 12	6,110	21	23.40	3.20	2.39	.24	3.34	24.36	1.30		.02	--	1,910	2.60	15,890	8	.7	2,120	7.0
May 25-31, June 1-4	10,370	17	7.08	3.00	4.65	.25	3.98	6.77	3.98		.03	.35	899	1.22	12,650	31	2.1	1,400	7.8
June 5-30.....	4,770	24	14.30	8.00	10.35	.64	3.88	20.15	9.16		.04	.76	2,080	2.83	13,500	31	3.1	2,820	7.9
July 1-31.....	6,000	23	16.60	8.90	11.01	.69	4.43	22.90	9.87		.05	.90	2,330	3.17	19,020	30	3.1	3,090	7.8
Aug. 1-31	5,440	27	16.50	8.60	11.74	.69	3.43	23.94	10.01		.04	.92	2,370	3.22	17,520	31	3.3	3,120	7.6
Sept. 1-30	22,390	10	19.70	6.90	9.31	.54	3.80	24.57	7.90		.03	.67	2,300	3.13	70,080	26	2.6	2,590	7.7
Total or weighted average.....	294,600	17	9.93	4.11	5.87	0.33	3.80	11.39	5.08		0.4	0.43	1,260	1.71	503,800	29	2.2	1,770	--

9-4740. GILA RIVER AT KELVIN, ARIZ.

LOCATION.--Just above mouth of Mineral Creek, 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, (above gaging station) of which 5,125 square miles is below Coolidge Dam.
RECORDS AVAILABLE.--Chemical analyses: December 1950 to September 1958.
Water temperatures: December 1950 to September 1958.
Sediment records: January to September 1958.
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 2,390 micromhos Nov. 16; minimum daily, 509 micromhos June 25.
Percent sodium: Maximum, 51 Mar. 1-7, 11-12, 15-17, 20-21; minimum, 17, Oct. 31, July 18.
EXTREMES, 1950-58.--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 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 1957 to September 1958 given in WSP 1563.
No appreciable inflow from Mineral Creek between sampling point and gaging station, except during periods of heavy local rains.

Chemical analyses, water year October 1957 to September 1958

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. 1-11, 1957	3,560	27	3.29	0.90	2.91	0.18	3.67	2.04	1.55	0.05	0.02	0.19	458	0.62	2,210	40	2.0	714	7.8
Oct. 12-13	2,570	--	5.34	1.07	2.00	--	3.39	--	--	--	--	--	545	.74	1,900	24	1.1	796	7.3
Oct. 14	173	--	5.49	1.07	3.39	--	3.31	--	--	--	--	--	660	.90	156	34	1.9	977	7.4
Oct. 15	476	--	4.34	.66	1.39	--	3.36	--	--	--	--	--	410	.56	267	22	.9	611	7.5
Oct. 16	123	--	5.49	1.15	3.26	--	2.92	--	--	--	--	--	666	.91	112	33	1.8	971	7.4
Oct. 17	127	--	5.79	1.23	3.52	--	3.51	--	--	--	--	--	703	.96	122	33	1.9	1,040	7.4
Oct. 18-22	202	--	7.39	2.30	5.22	--	3.34	--	--	--	--	--	1,000	1.36	275	35	2.4	1,400	7.3
Oct. 23-30	196	--	12.87	3.21	8.87	--	3.98	--	--	--	--	--	1,710	2.33	457	36	3.1	2,230	7.8
Oct. 31	1,090	--	6.29	1.23	1.57	--	3.67	--	--	--	--	--	595	.81	883	17	.8	825	7.1
Nov. 1	532	--	4.24	.50	1.61	--	3.20	--	--	--	--	--	407	.55	293	25	1.1	617	7.4
Nov. 2-4	244	--	8.03	1.89	5.48	--	4.11	--	--	--	--	--	1,030	1.40	342	36	2.5	1,440	8.0
Nov. 5-15	363	--	14.87	2.96	7.70	--	3.90	--	--	--	--	--	1,760	2.39	868	30	2.6	2,230	7.7
Nov. 16-19	1,040	--	7.98	2.14	5.74	--	4.34	--	--	--	--	--	1,050	1.43	1,490	36	2.6	1,500	7.9
Nov. 20-26	319	--	11.88	2.80	7.92	--	4.36	--	--	--	--	--	1,520	2.07	660	35	2.9	2,030	7.9
Nov. 27-30	803	--	3.39	.99	3.92	--	3.46	--	--	--	--	--	517	.70	562	47	2.6	825	7.7
Dec. 1-31	16,490	--	3.29	1.07	3.74	--	3.43	--	--	--	--	--	508	.69	11,380	46	2.5	800	7.9

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GILA RIVER BASIN--Continued

9-4740. GILA RIVER AT KELVIN, ARIZ.--Continued

Chemical analyses, water year October 1957 to September 1958--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. 1-31, 1958 ..	5,580	16	5.34	1.56	5.57	0.18	3.75	4.83	4.20	0.06	0.01	0.18	800	1.09	6,080	44	3.0	1,240	8.1
Feb. 1-4, 7, 19-28	6,630	--	4.69	1.47	5.83	--	3.90	--	--	--	--	--	760	1.03	6,830	49	3.3	1,120	7.6
Feb. 5-6.....	2,710	--	5.19	.85	1.74	--	4.52	--	--	--	--	--	508	.69	1,870	22	1.0	726	7.7
Feb. 8-18	1,600	--	7.34	2.06	8.26	--	4.21	--	--	--	--	--	1,070	1.46	2,340	47	3.8	1,510	7.8
Mar. 1-7, 11-12, 15-17, 20-21....	10,720	--	4.24	1.40	5.87	--	3.85	--	--	--	--	--	720	.98	10,510	51	3.5	1,050	7.8
Mar. 8-10, 13-14, 18-19	9,650	--	3.59	.85	3.26	--	3.59	--	--	--	--	--	540	.73	7,040	42	2.2	763	8.1
Mar. 22-31	13,000	--	3.69	1.11	4.22	--	3.61	--	--	--	--	--	590	.80	10,400	47	2.7	895	7.6
Apr. 1-18	18,320	57	3.29	1.31	3.92	.14	3.33	2.44	2.79	.05	.02	.15	581	.79	14,470	45	2.6	837	8.2
Apr. 19-30.....	11,910	--	2.84	.98	3.57	--	2.84	--	--	--	--	--	460	.63	7,500	48	2.6	697	7.4
May 1-31.....	30,600	--	2.74	.94	2.87	--	2.77	--	--	--	--	--	445	.61	18,670	44	2.1	656	7.6
June 1-30.....	38,430	--	2.30	.90	2.83	--	2.59	--	--	--	--	--	437	.59	22,670	47	2.2	620	8.1
July 1-15, 17	24,830	56	3.44	.94	3.13	.13	3.80	1.31	2.48	.05	.05	.13	492	.67	16,640	41	2.1	748	7.9
July 18	2,140	--	14.02	3.02	3.39	--	4.80	--	--	--	--	--	1,360	1.85	3,960	17	1.2	1,700	7.1
July 19	2,380	--	6.44	2.24	3.04	--	5.74	--	--	--	--	--	652	.89	2,120	26	1.5	1,070	7.1
July 20-28	15,880	--	3.39	1.03	3.26	--	3.59	--	--	--	--	--	498	.68	10,800	42	2.2	774	7.7
July 16, 29-31 ...	8,820	--	5.34	1.48	2.91	--	5.47	--	--	--	--	--	590	.80	7,060	30	1.6	912	7.7
Aug. 1-7.....	16,250	--	3.94	1.22	3.31	--	4.28	--	--	--	--	--	540	.73	11,860	39	2.1	822	7.7
Aug. 8-31.....	37,660	--	4.29	1.23	3.18	--	4.56	--	--	--	--	--	546	.74	27,870	37	1.9	836	7.7
Sept. 1-7.....	10,390	--	5.09	1.37	3.31	--	4.87	--	--	--	--	--	610	.83	8,620	34	1.8	928	7.6
Sept. 8-16, 24-25	13,750	--	4.29	1.21	3.26	--	4.00	--	--	--	--	--	565	.77	10,590	37	2.0	850	7.8
Sept. 17-23, 26-30	4,010	--	5.39	1.53	4.39	--	3.59	--	---	--	--	--	753	1.02	4,090	39	2.4	1,080	7.7
Total or weighted average.....	313,500	--	3.79	1.15	3.48	--	3.67	--	--	--	--	--	549	0.75	235,100	41	2.2	818	--

9-5020. SALT RIVER BELOW STEWART MOUNTAIN DAM, ARIZ.
(Formerly published as Salt River at Stewart Mountain Dam, Ariz.)

LOCATION.--Just below dam, 3½ miles above gaging station below Stewart Mountain Dam, and 6 miles upstream from Verde River, Maricopa County.
DRAINAGE AREA.--6,211 square miles.
RECORDS AVAILABLE.--Chemical analyses: December 1950 to September 1958.
Water temperatures: December 1950 to September 1958.
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 1,580 micromhos July 7; minimum daily, 980 micromhos Sept. 17.
Percent sodium: Maximum, 71 Apr. 8-9, 28-30; minimum, 68 Sept. 10-30.
EXTREMES, 1950-58.--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 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 1957 to September 1958 given in WSP 1563. No flow Nov. 13 to Feb. 17, Mar. 2-6, Mar. 27 to Apr. 7, Apr. 10-27. No inflow between sampling point and gaging station except during periods of heavy local rains.

Chemical analyses, water year October 1957 to September 1958

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. 12, 1957	4,040	--	2.54	1.23	8.87	--	2.67	--	--		--	--	784	1.07	4,320	70	6.5	1,380	7.5
Feb. 18-Mar. 1, 7-26, 1958	6,290	15	2.59	1.15	8.92	0.15	2.69	1.15	8.74		0.01	0.00	770	1.05	6,600	70	6.5	1,360	7.8
Apr. 8-9, 28-30	2,770	--	2.64	1.15	9.22	--	2.67	--	--		--	--	782	1.06	2,940	71	6.7	1,380	7.9
May 1-31	35,770	--	2.84	1.15	9.00	--	2.75	--	--		--	--	797	1.08	38,630	69	6.4	1,440	7.6
June 1-30	47,800	19	2.94	1.15	9.79	.16	2.80	1.23	10.01	0.03	.01	.27	832	1.13	54,010	70	6.8	1,520	7.6
July 1-31	59,180	--	3.09	1.07	9.83	--	2.80	--	--		--	--	844	1.15	68,060	70	6.8	1,560	7.7
Aug. 1-31	74,480	--	2.84	1.15	9.48	--	2.79	--	--		--	--	825	1.12	83,420	70	6.7	1,510	7.8
Sept. 1-9	28,970	--	2.54	.82	7.83	--	2.49	--	--		--	--	663	.90	26,070	70	6.0	1,240	7.8
Sept. 10-30	24,530	--	2.20	.82	6.44	--	2.29	--	--		--	--	550	.75	18,400	68	5.2	1,050	7.7
Total or weighted average	283,800	--	2.79	1.07	9.09	--	2.70	--	--	--	--	--	784	1.07	303,700	70	6.5	1,440	--

GILA RIVER BASIN--Continued

9-5100. 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 1958.
Water temperatures: December 1950 to September 1958.
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 702 micromhos Nov. 9; minimum daily, 259 micromhos Apr. 29.
Percent sodium: Maximum, 26 Sept. 1-30; minimum, 17 Apr. 17-30.
EXTREMES, 1950-58.--Specific conductance: Maximum daily, 958 micromhos Nov. 10, 1956; 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 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 1957 to September 1958 given in WSP 1563.

Chemical analyses, water year October 1957 to September 1958

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, 1957	16,620	24	2.30	2.22	1.52	0.08	4.16	1.33	0.73	0.03	0.01	0.22	352	0.48	7,980	25	1.0	566	7.9
Nov. 1-8	752	--	2.40	2.22	1.52	--	4.31	--	--	--	--	--	370	.50	376	25	1.0	578	7.9
Nov. 9	214	--	4.14	1.89	1.39	--	3.85	--	--	--	--	--	524	.71	152	19	.8	702	7.9
Nov. 10-21	2,840	--	1.70	1.32	.74	--	2.84	--	--	--	--	--	228	.31	880	20	.6	360	7.7
Nov. 22-30	3,700	--	2.40	1.97	1.17	--	4.10	--	--	--	--	--	330	.45	1,660	21	.8	524	8.1
Dec. 1-31	16,970	--	2.45	2.06	1.30	--	4.23	--	--	--	--	--	341	.46	7,810	22	.9	549	8.2
Jan. 1-29, 1958	9,280	22	2.45	2.06	1.35	.08	4.21	1.12	.68	.02	.01	.20	344	.47	4,360	23	.9	546	8.2
Jan. 30-31	24	--	2.74	1.97	1.44	--	4.38	--	--	--	--	--	372	.51	12	23	.9	569	8.2
Feb. 1-28	7,360	--	2.40	2.22	1.44	--	4.39	--	--	--	--	--	354	.48	3,530	24	.9	563	8.1
Mar. 1-25	32,220	--	2.30	2.06	1.35	--	4.16	--	--	--	--	--	336	.46	14,820	24	.9	528	8.2
Mar. 26-31	31,870	--	2.15	1.81	1.13	--	3.75	--	--	--	--	--	301	.41	13,070	22	.8	471	8.2

Apr. 1-5, 1958..	20,740	23	1.95	1.64	1.00	0.07	3.44	0.73	0.39	--	0.01	0.00	273	0.37	7,670	21	0.7	428	8.0
Apr. 6-16	30,800	--	1.80	1.15	.74	--	2.90	--	--	--	--	--	226	.31	9,550	20	.6	353	8.0
Apr. 17-19.....	7,480	--	1.60	1.15	.57	--	2.49	--	--	--	--	--	220	.30	2,240	17	.5	325	7.9
Apr. 20-30	29,770	--	1.50	.90	.48	--	2.29	--	--	--	--	--	184	.25	7,440	17	.4	272	7.9
May 1-31	42,950	--	1.50	.90	.57	--	2.41	--	--	--	--	--	173	.24	10,310	19	.5	288	8.1
June 1-30.....	61,130	--	1.65	.90	.61	--	2.61	--	--	--	--	--	180	.24	14,670	19	.5	309	8.0
July 1-31	72,370	22	1.80	1.15	.74	.05	2.97	.40	.37	--	.02	.14	219	.30	21,710	20	.6	353	8.1
Aug. 1-31	25,610	--	2.05	1.48	1.04	--	3.39	--	--	--	--	--	256	.35	8,960	23	.8	428	8.2
Sept. 1-30	9,200	--	1.90	1.73	1.30	--	3.44	--	--	--	--	--	290	.39	3,590	26	1.0	460	8.1
Total or weighted average.....	421,900	--	1.90	1.40	0.87	--	3.16	--	--	--	--	--	245	0.33	139,200	21	0.7	393	--

GILA RIVER BASIN--Continued

9-5136. 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.--1,459 square miles (above Lake Pleasant).
RECORDS AVAILABLE.--Chemical analyses: December 1950 to September 1958. (Discontinued).
Water temperatures: December 1950 to September 1958. (Discontinued).
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 523 micromhos June 22; minimum daily, 346 micromhos Aug. 11.
Percent sodium: Maximum, 27 June 22-30; minimum, 24 July 1-31.
EXTREMES, 1950-58.--Specific conductance: Maximum daily, 698 micromhos Oct. 19, 1955; minimum daily, 241 micromhos Jan. 29, 1952.
Percent sodium: Maximum, 37 June 23-28, 1957; minimum, 14 Jan. 29-31, Feb. 1-10, 1952.
REMARKS.--Values reported for dissolved solids are residues at 180°C. Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Samples collected from diversion canal when there is flow. Records of discharge furnished by Maricopa County Water District through Surface Water Branch, Tucson District for water year October 1957 to September 1958. Monthly diversions to canal below Lake Pleasant diversion dam published as Agua Fria River at Lake Pleasant Dam in WSP 1563. No flow Oct. 1 to June 21, Sept. 13-30.

Chemical analyses, June to September 1958

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 22-30, 1958	1,270		2.15	1.05	1.17		3.21						281	0.38	483	27	0.9	477	7.3
July 1-31	5,310	22	2.10	.94	1.00	0.08	2.95	0.60	0.42	0.02	0.06	0.07	244	.33	1,750	24	.8	405	7.4
Aug. 1-31	5,970		1.90	1.10	1.04		2.93						251	.34	2,030	26	.8	396	7.5
Sept. 1-12	2,790		1.95	.95	1.00		2.93						244	.33	921	26	.8	381	7.6
Total or weighted average	15,340	--	2.00	0.99	1.04	--	2.97	--	--	--	--	--	250	0.34	5,220	26	0.9	403	--

9-5195. 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 diverts from right bank at Gillespie Dam.
DRAINAGE AREA.--49,620 square miles.
RECORDS AVAILABLE.--Chemical analyses: December 1950 to September 1958.
Water temperatures: December 1950 to September 1958.
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 10,000 micromhos Nov. 24; minimum daily, 683 micromhos Aug. 16.
Percent sodium: Maximum, 77 Nov. 5-7; minimum, 47 Aug. 10-11.
EXTREMES, 1950-58.--Specific conductance: Maximum daily, 10,200 micromhos Oct. 3, 1951; minimum daily, 370 micromhos Aug. 2, 1955.
Percent sodium: Maximum, 77 Nov. 5-7, 1957; minimum, 36 Jan. 23-24, 1952.
REMARKS.--Values reported for dissolved solids are residues at 180°C. 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 1957 to September 1958 given in WSP 1563.

Chemical analyses, water year October 1957 to September 1958

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. 1-21, 1957	641	32	18.21	12.09	65.25	0.26	5.33	28.52	62.04	0.14	0.60	3.7	5,930	8.06	5,170	68	17	9,120	7.7
Oct. 22	56	--	7.83	4.11	25.45	--	4.25	--	--	--	--	--	2,270	3.09	173	68	10	3,650	7.7
Oct. 23	46	--	14.77	9.29	50.90	--	5.56	--	--	--	--	--	4,640	6.31	290	68	15	6,930	8.0
Oct. 24-31	260	--	19.21	12.09	69.60	--	5.52	--	--	--	--	--	6,420	8.73	2,270	69	18	9,150	7.9
Nov. 1-4	1,330	--	3.29	1.07	7.74	--	a2.87	--	--	--	--	--	747	1.02	1,360	64	5.2	1,270	8.6
Nov. 5-7	1,650	--	1.85	.31	7.18	--	4.18	--	--	--	--	--	574	.78	1,290	77	6.9	927	8.2
Nov. 8	61	--	6.44	2.55	19.49	--	4.61	--	--	--	--	--	1,740	2.37	145	68	9.2	2,790	7.6
Nov. 9	56	--	15.67	11.18	52.64	--	6.29	--	--	--	--	--	4,850	6.60	370	66	14	7,170	7.7
Nov. 10	54	--	18.01	10.77	58.72	--	6.51	--	--	--	--	--	5,450	7.41	400	67	15	7,950	7.9
Nov. 11-22	533	--	20.21	14.06	70.47	--	5.90	--	--	--	--	--	6,570	8.94	4,770	67	17	9,430	7.9
Nov. 23-30	299	--	21.21	14.31	73.08	--	6.18	--	--	--	--	--	6,760	9.19	2,750	67	17	9,720	7.9
Dec. 1-31	1,360	--	21.61	13.65	73.52	--	6.18	--	--	--	--	--	6,770	9.21	12,530	68	17	9,720	7.8
Jan. 1-17, 1958	738	32	20.51	13.41	66.12	.33	5.92	30.19	62.60	.14	.82	3.7	6,080	8.27	6,100	66	16	9,500	7.7
Jan. 18	40	--	17.81	11.51	61.34	--	5.43	--	--	--	--	--	5,620	7.64	306	68	16	8,270	7.9
Jan. 19-31	498	--	20.41	13.08	68.73	--	6.03	--	--	--	--	--	6,420	8.73	4,350	67	17	9,250	8.0

a Includes 0.30 equivalent per million of carbonate (CO_3).

GILA RIVER BASIN--Continued

9-5195. GILA RIVER BELOW GILLESPIE DAM, ARIZ.--Continued

Chemical analyses, water year October 1957 to September 1958--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. 1-4, 1958..	161	--	19.51	11.43	66.99	--	6.10	--	--	--	--	--	6,370	8.66	1,390	68	17	8,940	7.9
Feb. 5.....	133	--	15.37	8.88	47.85	--	5.02	--	--	--	--	--	4,580	6.23	829	66	13	6,630	7.4
Feb. 6.....	284	--	4.14	.99	4.78	--	1.93	--	--	--	--	--	568	.77	219	48	3.0	922	8.2
Feb. 7	113	--	6.24	2.96	16.53	--	2.56	--	--	--	--	--	1,540	2.09	236	64	7.7	2,330	7.4
Feb. 8	175	--	8.73	4.52	26.97	--	3.54	--	--	--	--	--	2,460	3.35	586	67	10	3,770	7.4
Feb. 9	617	--	3.19	.58	5.66	--	4.00	--	--	--	--	--	528	.72	444	60	4.1	893	7.6
Feb. 10	912	--	4.34	1.15	5.31	--	3.08	--	--	--	--	--	628	.85	775	49	3.2	927	7.6
Feb. 11.....	135	--	2.40	.78	5.05	--	3.21	--	--	--	--	--	452	.61	82	61	4.0	766	7.6
Feb. 12.....	99	--	7.53	3.54	23.92	--	4.06	--	--	--	--	--	2,050	2.79	276	68	10	3,240	7.6
Feb. 13-14.....	186	--	17.22	9.79	53.50	--	6.20	--	--	--	--	--	5,100	6.94	1,290	66	15	7,360	8.0
Feb. 15-28	926	--	20.01	13.08	67.42	--	6.26	--	--	--	--	--	6,400	8.70	8,060	67	17	9,030	7.8
Mar. 1-10	553	--	20.61	12.50	66.12	--	6.00	--	--	--	--	--	6,370	8.66	4,790	67	16	8,940	8.0
Mar. 11-13	230	--	19.01	12.50	60.03	--	5.75	--	--	--	--	--	5,800	7.89	1,810	66	15	8,230	7.8
Mar. 14	103	--	4.74	1.97	15.44	--	2.36	--	--	--	--	--	1,180	1.60	165	70	8.4	1,980	7.4
Mar. 15-16.....	468	--	7.73	3.78	26.75	--	3.41	--	--	--	--	--	2,150	2.92	1,370	70	11	3,470	7.7
Mar. 17	131	--	2.40	1.15	4.52	--	2.36	--	--	--	--	--	480	.65	85	56	3.4	747	7.8
Mar. 18-19	175	--	14.27	5.84	42.20	--	4.84	--	--	--	--	--	3,570	4.86	850	68	13	5,340	8.2
Mar. 20-30	817	--	19.81	12.91	62.64	--	6.02	--	--	--	--	--	6,050	8.23	6,720	66	15	8,520	7.9
Mar. 31	85	--	20.61	12.50	53.94	--	6.06	--	--	--	--	--	--	--	--	62	13	7,600	7.6
Apr. 1-30	1,650	32	19.61	11.92	63.08	0.31	6.00	29.56	60.63	0.25	0.48	2.6	6,150	8.36	13,790	66	16	8,780	7.8
May 1-31	1,090	--	19.01	12.09	61.77	--	5.51	--	--	--	--	--	6,060	8.24	8,980	67	16	8,710	7.9
June 1-30	783	--	17.22	11.92	63.08	--	4.59	--	--	--	--	--	6,020	8.19	6,410	68	17	8,620	7.8

July 1, 1958	14	--	16.27	12.50	68.73	--	3.28	--	--	--	--	--	6,340	8.62	121	70	18	9,070	7.5
July 2	14	--	9.73	5.51	25.93	--	2.85	--	--	--	--	--	2,500	3.40	48	63	9.4	3,970	7.5
July 3-4	28	--	5.74	2.71	15.92	--	3.84	--	--	--	--	--	1,330	1.81	51	65	7.8	2,240	7.8
July 5-17	204	30	14.87	10.94	60.90	0.31	3.18	27.90	56.96	0.18	0.34	2.6	5,620	7.64	1,560	70	17	8,160	7.7
July 18-Aug. 9, 12-15	1,040	--	6.44	2.80	17.40	--	3.47	--	--	--	--	--	1,550	2.11	2,190	65	8.1	2,490	7.7
Aug. 10-11.....	468	--	4.54	1.40	5.22	--	4.33	--	--	--	--	--	690	.94	440	47	3.0	1,080	7.6
Aug. 16-17	325	--	2.40	.78	5.00	--	2.11	---	--	--	--	---	488	.66	214	61	4.0	777	8.1
Aug. 18	99	--	8.33	3.95	26.62	--	3.49	--	--	--	--	--	2,370	3.22	319	68	11	3,660	7.4
Aug. 19-20	196	--	12.48	7.65	38.06	--	4.88	--	--	--	--	--	3,640	4.95	970	65	12	5,500	7.9
Aug. 21-22	549	--	3.34	.99	4.78	--	3.38	--	--	--	--	--	566	.77	423	52	3.3	867	7.7
Aug. 23	46	--	4.34	1.40	8.18	--	2.93	--	--	--	--	--	850	1.16	53	59	4.8	1,330	7.7
Aug. 24	32	--	8.33	3.54	18.70	--	3.51	--	--	--	--	--	1,900	2.58	83	61	7.7	2,890	7.9
Aug. 25-27.....	89	--	13.87	10.77	46.11	--	4.49	--	--	--	--	--	4,230	5.75	512	65	13	6,540	7.9
Aug. 28	119	--	17.61	11.51	60.03	--	4.56	--	--	--	--	--	5,340	7.26	864	67	16	8,210	7.6
Aug. 29-30	143	--	5.34	2.14	10.61	--	3.36	--	--	--	---	--	1,030	1.40	200	59	5.5	1,690	7.8
Aug. 31	30	--	7.53	3.13	16.88	--	3.11	--	--	--	--	--	1,580	2.15	64	61	7.3	2,590	7.6
Sept. 1, 4, 9-13.	1,180	--	12.28	7.40	36.10	--	4.38	--	--	--	--	--	3,610	4.91	5,790	65	12	5,310	8.1
Sept. 2-3, 20-30.	696	--	16.47	11.51	54.81	--	4.57	--	--	--	--	--	5,440	7.40	5,150	66	15	7,810	7.8
Sept. 5-8, 19....	656	--	8.33	3.70	20.01	--	3.62	--	--	--	--	--	2,040	2.77	1,820	62	8.2	3,160	8.0
Sept. 14, 16-18..	1,220	--	4.94	2.14	13.92	--	3.08	--	--	--	--	--	1,380	1.88	2,290	66	7.4	2,100	7.8
Sept. 15	607	--	2.59	.78	4.78	--	2.61	--	--	--	--	--	540	.73	443	59	3.7	800	7.8
Total or weighted average.....	25,210	--	12.18	7.24	38.58	--	4.56	--	--	--	--	--	3,660	4.98	125,500	67	12	5,360	--

PART 10. THE GREAT BASIN

SEVIER LAKE BASIN

10-2240. 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 1958.
Water temperatures: March 1951 to September 1958.
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 3,860 micromhos Mar. 1; minimum daily, 1,510 micromhos Sept. 6.
Percent sodium: Maximum, 56 Aug. 1-31; minimum, 43 Dec. 12-31, Jan. 1-9, 11-12.
EXTREMES, 1951-58.--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 1957 to September 1958 given in WSP 1564.

Chemical analyses, water year October 1957 to September 1958

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, Nov. 1-7 1957	3,690	15	4.00	6.28	9.74	0.12	4.80	6.12	9.45		0.04	0.25	1,180	1.60	5,900	48	4.3	2,000	7.5
Nov. 8-30	766	19	6.10	10.40	18.79	.14	5.95	11.45	18.47		.04	.43	2,090	2.84	2,180	53	6.5	3,390	7.6
Dec. 1-11	292	20	7.00	10.60	20.49	.16	6.13	12.58	19.60		.06	.54	2,250	3.06	894	54	6.9	3,620	7.9
Dec. 12-31	1,550	14	4.58	6.38	8.44	.10	4.97	5.58	8.74		.07	.20	1,110	1.51	2,340	43	3.6	1,890	7.8
Jan. 1-9, 11-12, 1958	906	15	4.78	6.92	8.74	.11	5.33	5.50	9.31		.08	.23	1,160	1.58	1,430	43	3.8	1,970	7.9
Jan. 10, 13-25, 29-31	567	19	6.62	9.98	18.84	.15	5.92	11.70	18.33		.07	.50	2,110	2.87	1,630	53	6.5	3,420	7.8
Jan. 26-28	91	12	4.54	6.98	9.27	.12	4.88	6.20	9.87		.05	.25	1,200	1.63	148	44	3.9	2,050	8.0
Feb. 1-2	50	18	5.90	10.40	20.53	.17	5.74	12.60	19.18		.05	.50	2,200	2.99	150	55	7.2	3,520	7.7
Feb. 3-25	1,690	15	4.56	6.52	9.48	.12	4.93	6.54	9.45		.04	.21	1,210	1.65	2,790	46	4.0	2,020	8.0
Feb. 26-28	258	19	6.90	11.60	21.27	.19	5.90	13.80	20.59		.05	.45	2,370	3.22	831	53	7.0	3,720	7.9
Mar. 1-20	678	21	6.08	9.64	18.10	.17	5.51	11.16	17.20		.04	.39	2,000	2.72	1,840	53	6.5	3,180	8.0
Mar. 21-31	1,050	18	4.20	7.08	8.92	.12	4.80	6.18	9.45		.03	.20	1,180	1.60	1,680	44	3.8	1,950	8.0
Apr. 1-30	13,060	20	4.28	6.68	10.44	.13	5.18	6.56	9.87		.08	.25	1,260	1.71	22,330	48	4.5	2,060	8.0
May 1-31	47,400	23	4.24	6.44	12.62	.15	5.83	7.31	9.87		.18	.45	1,370	1.86	88,160	54	5.5	2,240	8.1

June 1-30, 1958 ..	28,230	19	3.76	5.80	10.66	0.15	5.44	6.23	8.46		0.14	0.31	1,190	1.62	45,730	52	4.9	1,950	8.1
July 1-31	25,070	21	3.52	5.84	10.83	.16	5.18	6.23	8.60		.11	.32	1,180	1.60	40,110	53	5.0	1,940	7.8
Aug. 1-31.....	19,670	21	3.68	6.88	13.40	.17	5.10	7.70	11.00		.08	.36	1,410	1.92	37,770	56	5.8	2,300	8.0
Sept. 1-5, 10-30 .	5,410	22	3.68	7.12	12.83	.15	5.03	7.70	11.42		.05	.34	1,410	1.92	10,390	54	5.5	2,300	7.9
Sept. 6-9	353	23	2.80	5.28	7.40	.12	4.29	4.27	7.33		.04	.22	914	1.24	438	47	3.7	1,530	7.8
Total or weighted average	150,800	21	3.99	6.41	11.79	0.15	5.41	6.91	9.70		0.12	0.36	1,300	1.77	266,900	53	5.2	2,130	--

HUMBOLDT RIVER BASIN

10-3350. 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 1958.
Water temperatures: December 1951 to September 1958.
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 953 micromhos Feb. 4; minimum daily, 427 micromhos Jan. 25.
Percent sodium: Maximum, 59 Jan. 1-24, 26-31; minimum, 51 Oct. 1-31, July 1-31.
EXTREMES, 1951-58.--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 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 1957 to September 1958 given in WSP 1564.

Chemical analyses, water year October 1957 to September 1958

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B) ppm	Dissolved solids: Parts per million	Tons per acre-foot	Total tons	Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
Oct. 1-31, 1957..	6.1	43	2.36	1.32	4.26	0.38	5.54	1.29	1.52		0.01	0.43	516	0.70	4	51	3.1	797	7.7
Nov. 1-30	6.0	43	2.36	1.32	4.52	.38	a5.51	1.39	1.69		.01	.46	525	.71	4	53	3.3	813	--
Dec. 1-31.....	6.1	43	2.28	1.44	4.52	.36	5.51	1.48	1.72		.01	.52	526	.72	4	53	3.3	814	8.2
Jan. 1-24, 26-31, 1956.....	6.0	50	2.36	1.16	5.39	.23	5.29	1.56	2.43		.02	.55	565	.77	5	59	4.1	565	7.8
Jan. 25.....	.20	20	1.08	.64	2.22	.20	2.46	1.19	.70		.02	--	b266	.36	0	54	2.4	427	7.9
Feb. 1-2	.40	30	1.54	.94	3.31	.25	3.80	1.06	1.18		.02	--	b366	.50	0	55	3.0	584	8.0
Feb. 3-28	5.2	46	2.32	1.40	5.05	.31	5.44	1.54	2.09		.01	.52	545	.74	4	56	3.7	866	8.2
Mar. 1-31.....	3,620	47	2.32	1.36	4.92	.33	5.52	1.37	2.03		.01	.51	544	.74	2,680	55	3.6	853	8.2
Apr. 1-30	24,860	42	2.20	1.46	4.92	.33	5.36	1.42	2.06		.01	.52	536	.73	18,150	55	3.6	853	8.2
May 1-31.....	32,240	34	2.32	1.08	4.31	.28	4.87	1.35	1.78		.01	.42	483	.66	21,280	54	3.3	793	8.1
June 1-30	11,680	32	2.28	1.04	3.87	.28	4.59	1.35	1.52		.01	.36	450	.61	7,120	52	3.0	726	7.9
July 1-31.....	33,270	35	2.32	1.14	3.96	.33	4.70	1.33	1.58		.01	.36	463	.63	20,960	51	3.0	733	7.9
Aug. 1-31.....	10,690	37	2.36	1.06	4.31	.36	4.88	1.39	1.80		.01	.39	490	.67	7,160	53	3.3	774	7.7
Sept. 1-30	19,100	35	2.32	1.14	4.57	.33	5.21	1.35	1.92		.02	.41	509	.69	13,180	55	3.5	790	7.7
Total or weighted average.....	135,500	36	2.30	1.15	4.35	0.31	4.97	1.35	1.78		0.01	0.41	491	0.67	90,780	54	3.3	783	--

a Includes 0.60 equivalents per million of carbonate (CO_3).
b Calculated from determined constituents.

PART 11. PACIFIC SLOPE BASINS IN CALIFORNIA

SAN JOAQUIN RIVER BASIN

11-2535. 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 1958.
Water temperatures: November 1952 to September 1958.
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 198 micromhos Nov. 29; minimum daily, 36 micromhos June 1.
Percent sodium: Maximum, 44 Dec. 23-31; minimum, 24 Nov. 29.
EXTREMES, 1952-58.--Specific conductance: Maximum daily, 198 micromhos Nov. 29, 1957; minimum daily, 32.7 micromhos June 18, 1956.
Percent sodium: Maximum, 49 Nov. 1-5, 7-10, 1952; minimum, 24 Nov. 29, 1957.
REMARKS.--Values reported for dissolved solids are residues at 180°C. Records of specific conductance of daily samples available in district office at Sacramento, Calif. Records of discharge for water year October 1957 to September 1958 given in WSP 1565.
No appreciable inflow between sampling point and gaging station except during periods of heavy local runoff.

Chemical analyses, water year October 1957 to September 1958

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. 1-22, 1957..	3,570	12	0.33	0.10	0.31	0.03	0.51	0.02	0.14	0.01	0.01	0.00	69	0.09	321	40	0.7	82	6.9
Oct. 23-25.....	454	12	.50	.17	.35	.04	.67	.06	.42	.01	.00	.00	90	.12	54	33	.6	119	7.2
Oct. 26-31.....	869	12	.39	.17	.36	.04	.67	.05	.27	.01	.00	.02	87	.12	104	38	.7	97	7.3
Nov. 1-20.....	2,870	13	.22	.28	.36	.04	.69	.00	.18	.01	.01	.00	60	.08	230	40	.7	92	6.8
Nov. 21-28	1,090	14	.34	.16	.36	.04	.69	.00	.17	.01	.02	.00	65	.09	98	40	.7	92	6.8
Nov. 29.....	135	--	1.00	.08	.35	--	.74	--	--	--	--	--	131	.18	24	24	.5	198	6.8
Nov. 30-Dec. 17..	2,400	13	.40	.18	.40	.04	.72	.08	.23	.00	.01	.00	68	.09	216	39	.7	103	6.8
Dec. 18-22	1,960	11	.25	.10	.27	.04	.46	.08	.12	--	.02	.00	56	.08	157	41	.6	68	7.1
Dec. 23-31.....	1,110	13	.39	.16	.48	.05	.79	.09	.17	.00	.04	.00	72	.10	111	44	.9	107	6.9
Jan. 1-17, 1958..	1,300	15	.50	.17	.48	.05	.85	.02	.26	.00	.03	.00	84	.11	143	40	.8	121	7.2
Jan. 18-20.....	1,200	11	.34	.10	.32	--	.49	.12	.24	--	.02	.10	62	.08	96	42	.7	87	7.3
Jan. 21.....	301	--	.70	.23	.39	--	.44	--	--	--	--	--	124	.17	51	30	.6	135	7.1
Jan. 22-25.....	1,460	10	.25	.08	.25	.03	.36	.04	.19	.00	.01	.10	48	.07	102	41	.6	68	7.0
Jan. 26-Feb. 18..	4,290	14	.39	.17	.40	.05	.74	.06	.20	.01	.02	.10	73	.10	429	40	.8	105	7.1

SAN JOAQUIN RIVER BASIN--Continued

11-2535. SAN JOAQUIN RIVER NEAR BIOLA, CALIF.--Continued

Chemical analyses, water year October 1957 to September 1958--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. 19-25, 1958.	2,060	14	0.46	0.20	0.40	0.05	0.79	0.06	0.21	0.01	0.01	0.00	82	0.11	227	36	0.7	113	7.2
Feb. 26-28	3,130	16	.50	.26	.38	.09	.93	.06	.16	--	.02	.10	108	.15	470	31	.6	123	7.6
Mar. 1-16	5,390	23	.55	.29	.48	.06	1.08	.04	.23	.01	.03	.30	100	.18	970	35	.7	138	7.3
Mar. 17-23	13,340	20	.48	.30	.42	.07	.92	.16	.17	.00	.04	.10	94	.12	1,600	33	.7	111	7.3
Mar. 24-31	72,970	14	.12	.31	.23	.04	.46	.08	.16	.00	.01	.20	59	.07	5,110	33	.5	71	6.8
Apr. 1-5	58,990	17	.32	.28	.24	.05	.56	.16	.18	.00	.02	.10	69	.09	5,310	27	.4	87	6.8
Apr. 6-14	134,700	14	.33	.11	.20	.03	.49	.04	.13	.01	.01	.10	50	.07	9,430	30	.4	71	7.3
Apr. 15-30.....	228,500	14	.28	.07	.19	.03	.39	.04	.13	.01	.01	.10	54	.07	16,000	33	.5	63	6.4
May 1-7	89,890	15	.26	.09	.15	.03	.34	.06	.11	.01	.01	.10	60	.08	7,190	28	.4	57	6.8
May 8-June 8	360,200	13	.19	.04	.12	.03	.26	.04	.07	.01	.01	.00	47	.06	21,610	32	.4	42	6.7
June 9-12.....	28,010	11	.16	.06	.12	.03	.23	.04	.04	.01	.01	.00	39	.05	1,400	32	.4	37	6.7
June 13-27.....	93,580	12	.20	.08	.12	.03	.28	.07	.04	.01	.01	.00	41	.06	5,610	28	.3	43	6.7
June 28-July 11 ..	27,270	15	.23	.08	.19	.02	.36	.06	.09	.01	.02	.10	46	.06	1,640	37	.5	60	6.7
July 12-16	4,150	13	.26	.09	.19	.02	.39	.04	.13	.01	.02	.10	46	.06	249	34	.5	63	6.6
July 17-31	4,830	19	.35	.13	.30	.03	.59	.08	.11	.01	.01	.00	60	.08	386	37	.6	88	7.3
Aug. 1-12	3,360	18	.35	.12	.29	.02	.62	.08	.11	.01	.01	.10	59	.08	269	37	.6	84	7.5
Aug. 13-31.....	4,960	16	.29	.13	.27	.02	.56	.02	.11	.01	.02	.10	55	.07	347	38	.6	77	7.2
Sept. 1-15	4,030	13	.31	.12	.27	.02	.57	.02	.11	.01	.01	.10	55	.07	282	38	.6	77	7.4
Sept. 16-30	2,870	13	.34	.14	.30	.03	.62	.05	.14	.01	.01	.10	59	.08	230	37	.6	86	7.4
Total or weighted average [a]	1,165,000	b14	0.24	0.10	0.17	b0.03	0.38	b0.05	b0.11	b0.01	b0.01	b0.06	53	0.07	81,550	31	0.4	59	--

a Represents 100 percent of runoff for water year October 1957 to September 1958.
b Includes estimates for missing data.

11-3035. SAN JOAQUIN RIVER NEAR VERNALIS, CALIF.

LOCATION.--At gaging station 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 1958.
Water temperatures: March 1951 to September 1958.
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 817 micromhos Aug. 3; minimum daily, 90.3 micromhos June 22.
Percent sodium: Maximum, 55 Jan. 16-27; minimum, 35 May 1-18, May 19 to June 6.
EXTREMES, 1951-58.--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 at 180°C. Records of specific conductance of daily samples available in district office at Sacramento, Calif. Records of discharge for water year October 1957 to September 1958 given in WSP 1565.

Chemical analyses, water year October 1957 to September 1958

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. 1-11, 1957.	36,460	32	1.70	1.16	3.00	0.11	2.29	0.79	2.96	0.00	0.05	0.17	383	0.52	18,960	50	2.5	638	7.9
Oct. 12-17.....	32,670	24	1.10	.88	1.91	.07	1.49	.69	1.89	.00	.05	.07	256	.35	11,430	48	1.9	429	7.2
Oct. 18-31.....	57,280	25	1.10	1.14	2.39	.07	1.69	.73	2.31	.01	.03	.08	307	.42	24,060	51	2.3	506	7.3
Nov. 1-8.....	30,090	24	1.10	1.08	2.35	.07	1.56	.60	2.37	.01	.03	.06	303	.41	12,340	51	2.3	502	7.5
Nov. 9-19.....	50,920	21	.90	.88	1.83	.05	1.21	.56	1.86	.01	.03	.04	262	.36	18,330	50	1.9	405	6.9
Nov. 20-30.....	52,780	21	.80	1.00	1.87	.06	1.28	.52	1.86	.01	.03	.03	270	.37	19,530	50	2.0	407	7.1
Dec. 1-10.....	50,860	20	.90	.84	1.87	.05	1.25	.62	1.80	.01	.03	.13	263	.36	18,310	51	2.0	404	7.0
Dec. 11-13.....	16,220	20	.85	.95	1.78	.06	1.25	.58	1.69	.01	.03	.10	249	.34	5,510	49	1.9	388	7.0
Dec. 14-29.....	77,730	22	.85	1.09	2.13	.07	1.48	.65	2.00	.01	.04	.08	286	.39	30,310	51	2.2	448	7.0
Dec. 30-31.....	8,530	22	1.00	1.32	2.48	.07	1.70	.75	2.43	.01	.04	.03	331	.45	3,840	51	2.3	491	7.1
Jan. 1-15, 1958.	57,400	22	1.35	1.06	2.87	.08	1.64	.92	2.82	.01	.03	.10	334	.45	25,830	54	2.6	581	8.2
Jan. 16-27.....	61,860	18	1.30	.96	2.87	.09	1.72	1.04	2.43	.00	.03	.10	318	.43	26,600	55	2.7	560	7.7
Jan. 28-Feb. 5..	69,180	17	1.05	.77	2.13	.10	1.66	.77	1.69	.01	.03	.20	250	.34	23,520	53	2.2	440	7.9

SAN JOAQUIN RIVER BASIN--Continued

11-3035. SAN JOAQUIN RIVER NEAR VERNALIS, CALIF.--Continued

Chemical analyses, water year October 1957 to September 1958--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. 6-10, 1958 .	55,100	16	0.90	0.64	1.61	0.09	1.46	0.60	1.21	0.01	0.02	0.13	208	0.28	15,430	50	1.8	346	7.7
Feb. 11-19	73,290	21	1.20	.90	2.44	.09	1.75	1.00	1.86	.01	.03	.21	290	.39	28,580	53	2.4	490	7.3
Feb. 20-28	133,800	15	.90	.70	1.57	.08	1.44	.65	1.16	.01	.02	.14	210	.29	38,800	48	1.8	346	7.3
Mar. 1-16.....	210,900	22	.90	.78	1.78	.06	1.48	.75	1.33	.01	.04	.50	227	.30	63,270	51	1.9	366	7.3
Mar. 17-22.....	160,300	17	.65	.51	.83	.06	.98	.44	.59	.01	.04	.20	137	.18	28,850	40	1.1	205	7.2
Mar. 23-Apr. 2..	450,000	20	.65	.51	.96	.06	1.15	.35	.68	.01	.03	.00	151	.19	85,500	44	1.3	232	7.4
Apr. 3-11	668,600	20	.60	.48	.65	.06	1.08	.25	.42	.01	.03	.10	125	.16	107,000	36	.9	184	7.3
Apr. 12-20	484,400	19	.80	.52	1.00	.07	1.28	.40	.65	.01	.03	.20	168	.20	96,880	42	1.2	252	7.3
Apr. 21-30	430,800	20	.60	.52	.83	.05	1.08	.31	.62	.00	.03	.20	136	.18	77,540	42	1.1	199	7.4
May 1-18.....	720,800	19	.60	.40	.57	.04	.82	.29	.45	.00	.02	.00	110	.15	108,100	35	.8	162	6.8
May 19-June 6 ...	907,400	15	.44	.20	.35	.02	.59	.10	.34	.00	.01	.00	64	.10	90,740	35	.6	109	6.5
June 7-15	263,400	17	.55	.25	.57	.03	.72	.20	.51	.00	.01	.10	102	.14	36,680	41	.9	148	6.7
June 16-18	63,670	16	.65	.35	.83	.04	.93	.20	.68	.01	.01	.00	117	.16	10,190	44	1.2	192	8.2
June 19-30	352,500	15	.46	.18	.48	.03	.61	.06	.45	.00	.01	.00	83	.10	35,250	42	.8	129	6.7
July 1-3.....	58,990	18	.55	.27	.65	.03	.69	.20	.56	.01	.02	.10	109	.14	8,260	43	1.0	163	6.5
July 4-9.....	80,490	22	1.00	.30	1.17	.04	1.03	.40	1.02	.01	.03	.00	164	.22	17,710	47	1.5	268	6.6
July 10-24.....	89,790	27	1.20	1.08	2.22	.06	1.66	.75	2.09	.00	.04	.10	282	.38	34,120	49	2.1	489	6.7
July 25-31.....	22,330	32	2.00	1.40	3.52	.09	2.39	1.12	3.38	.01	.04	.20	425	.58	12,950	50	2.7	739	7.0
Aug. 1-31	94,410	34	2.10	1.50	3.70	.10	2.51	1.27	3.52	.01	.03	.10	455	.61	57,590	50	2.8	737	7.1
Sept. 1-10.....	36,000	29	2.69	.51	3.22	.10	2.51	.92	3.10	.01	.03	.30	398	.54	19,440	49	2.5	676	7.8
Sept. 11-30	97,430	29	1.50	1.06	2.31	.08	2.02	.52	2.20	.01	.06	.10	313	.43	41,890	47	2.0	506	7.5
Total or weighted average [a]	6,056,000	19	0.75	0.51	1.04	0.05	1.08	0.37	0.85	0.01	0.02	0.09	158	0.21	1,272,000	44	1.2	245	--

a Represents 100 percent of runoff for water year October 1957 to September 1958.

11-3255. 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 1958.
Water temperatures: March 1951 to September 1958.
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 91.4 micromhos Jan. 25; minimum daily, 34.2 micromhos May 30.
Percent sodium: Maximum, 29 Aug. 1-15; minimum, 20 Nov. 1-10.
EXTREMES, 1951-58.--Specific conductance: Maximum daily, 202 micromhos Dec. 15, 1952; minimum daily, 29.4 micromhos July 9, 1952.
Percent sodium (1951-54, 1957-58): Maximum, 33 Nov. 21-30, 1952; minimum, 10 Dec. 22-23, 1952.
REMARKS.--Values reported for dissolved solids are residues at 180°C. Records of specific conductance of daily samples available in district office at Sacramento, Calif. Records of discharge for water year October 1957 to September 1958 given in WSP 1565.

Chemical analyses, water year October 1957 to September 1958

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, 1957 ..	4,945		0.22	0.12	0.10	--	0.30						30	0.04	198	23	0.2	42.0	7.0
Oct. 11-20.....	6,426		.24	.12	.10	--	.31						33	.04	257	22	.2	41.9	6.8
Oct. 21-30.....	7,928		.22	.06	.09	--	.28						32	.04	317	24	.2	47.0	6.7
Nov. 1-10	6,855		.24	.12	.09	--	.26						41	.06	411	20	.2	48.4	6.7
Nov. 11-20	8,204		.22	.08	.08	--	.26						33	.04	328	21	.2	38.8	6.8
Nov. 21-30	8,753		.22	.10	.10	--	.23						31	.04	350	24	.2	46.1	6.7
Dec. 1-18	15,200		.21	.08	.10	--	.26						50	.07	1,060	26	.3	41.6	6.4
Dec. 19-28.....	8,305		.21	.08	.10	--	.21						51	.07	581	26	.3	47.6	6.4
Dec. 29-Jan. 13, 1958.....	17,080		.21	.06	.10	--	.25						50	.07	1,200	27	.3	42.0	6.5
Jan. 14-23.....	11,700		.24	.12	.11	--	.21						58	.08	936	23	.3	57.8	6.4
Jan. 24-31.....	11,550		.38	.20	.18	--	.30						83	.11	1,270	24	.3	90.3	6.7
Feb. 1-5	3,539		.34	.19	.18	--	.31						63	.09	319	25	.3	82.3	7.2
Feb. 6-14	10,950		.27	.12	.14	--	.30						42	.06	657	26	.3	60.4	6.8
Feb. 15-Mar. 10	82,020		.27	.09	.13	--	.33						40	.05	4,100	27	.3	57.4	6.8
Mar. 11-20.....	28,930		.27	.12	.13	--	.36						44	.06	1,740	25	.3	59.2	7.2
Mar. 21-31.....	49,840		.32	.09	.12	--	.38						50	.07	3,490	23	.3	62.5	6.7

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SAN JOAQUIN RIVER BASIN--Continued

11-3255. MOKELUMNE RIVER AT WOODBRIDGE, CALIF.

Chemical analyses, water year October 1957 to September 1958--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. 1-16, 1958.	107,600		0.34	0.14	0.13	--	0.41						73	0.10	10,760	21	0.3	66.1	6.8
Apr. 17-30.....	49,350		.32	.14	.15	--	.41						70	.10	4,940	25	.3	65.0	6.7
May 1-18	49,340		.28	.14	.12	0.03	.43	0.08	0.09	0.01	0.01	0.00	a 68	.07	3,450	21	.3	61.4	7.2
May 19-24	24,160		.26	.10	.10	--	.36						51	.07	1,690	22	.2	50.9	7.5
May 25-31	57.080		.18	.09	.10	--	.28						49	.07	4,000	27	.3	40.7	6.8
June 1-30.....	163,200		.16	.10	.10	.02	.26						25	.03	4,900	26	.3	38.5	6.5
July 1-31.....	31,270		.18	.11	.09	.01	.26						32	.04	1,250	23	.2	41.0	6.5
Aug. 1-15	7,632		.17	.07	.10	--	.25						30	.04	305	29	.3	37.3	6.6
Aug. 16-31	8,614		.16	.08	.09	--	.23						22	.03	258	27	.3	34.9	6.6
Sept. 1-15	10,810		.16	.08	.08	--	.25						36	.05	540	25	.2	34.3	7.2
Sept. 16-30	13,000		.20	.07	.08	--	.28						36	.05	650	23	.2	39.0	6.6
Total or weighted average[b]	804,400		0.24	0.11	0.11	--	0.33	--	--	--	--	--	46	0.06	48,260	24	0.03	52,0	--

a Includes 15 parts per million of silica (SiO_2).
b Represents 100 percent of runoff for water year October 1957 to September 1958.

11-3910. 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 May 1958.
Water temperatures: March 1951 to May 1958.
EXTREMES, Oct. 1957 to May 1958.--Specific conductance: Maximum daily, 187 micromhos Mar. 5-14; minimum daily, 116 micromhos Jan. 23-31.
Percent sodium: Maximum, 28 Oct. 1-10; minimum, 20 Apr. 1-30.
EXTREMES, 1951-57.--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 at 180°C. Records of specific conductance of daily samples available in district office at Sacramento, Calif. Records of discharge for water year October 1957 to September 1958 given in WSP 1565. 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, October 1957 to May 1958

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, 1957...	205,400	26	0.60	0.56	0.48	0.05	1.23	0.25	0.25	0.00	0.02	0.05	122	0.17	34,920	28	0.6	179	7.4
Oct. 11	23,210	--	.50	.44	.26	.04	.92	.18	.11	--	.03	.12	--	--	--	21	.4	120	7.5
Oct. 12-16	187,200	27	.65	.50	.42	.04	1.25	.20	.16	.00	.01	.04	118	.16	29,950	26	.6	158	7.3
Oct. 17-19	97,190	22	.55	.37	.27	.04	.95	.12	.14	.00	.03	.09	99	.13	12,630	22	.4	125	7.1
Oct. 20-31	289,600	25	.65	.51	.43	.04	1.21	.20	.19	.00	.01	.05	120	.16	46,340	26	.6	165	7.2
Nov. 1-11.....	227,100	26	.65	.51	.42	.04	1.29	.18	.18	.00	.00	.08	117	.16	36,340	26	.6	160	7.6
Nov. 12-27.....	462,000	27	.65	.53	.37	.04	1.25	.25	.14	.00	.00	.07	117	.16	73,920	23	.5	153	7.0
Nov. 28-30.....	75,970	29	.70	.58	.48	.04	1.39	.23	.21	.00	.01	.01	129	.18	13,670	27	.6	182	7.2
Dec. 1-17.....	349,100	28	.70	.49	.44	.04	1.39	.04	.22	.00	.01	.01	121	.16	55,860	26	.6	161	7.6
Dec. 18-31.....	536,900	26	.60	.46	.35	.04	1.15	.12	.15	.00	.01	.03	106	.14	75,170	24	.5	138	7.3
Jan. 1-6, 1958....	244,200	28	.70	.58	.52	.04	1.41	.20	.23	.00	.01	.02	132	.18	43,960	28	.6	179	7.6
Jan. 7-17	448,100	22	.60	.40	.31	.04	1.10	.10	.17	.00	.01	.02	95	.13	58,250	23	.4	137	7.2
Jan. 18-22	188,400	25	.70	.56	.36	.04	1.25	.18	.26	.00	.00	.04	117	.16	30,140	22	.5	164	7.5
Jan. 23, 31.....	388,200	19	.50	.38	.25	.04	.92	.06	.16	.00	.01	.02	99	.13	50,470	21	.4	116	7.3

SACRAMENTO RIVER BASIN--Continued

11-3910. SACRAMENTO RIVER AT KNIGHTS LANDING, CALIF.--Continued

Chemical analyses, October 1957 to May 1958--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. 1-26, 1958 ..	1,396,000	22	0.60	0.45	0.31	0.04	1.11	0.12	0.13	0.00	0.02	0.00	99	0.13	181,500	22	0.4	141	7.1
Feb. 27-Mar. 4 ..	326,900	22	.75	.42	.35	.04	1.20	.14	.15	.00	.02	.02	102	.14	45,770	22	.5	154	7.1
Mar. 5-14.....	443,300	26	.85	.62	.40	.04	1.46	.16	.21	.00	.01	.10	131	.18	79,790	21	.5	187	7.6
Mar. 15-31.....	736,500	22	.65	.47	.32	.04	1.10	.18	.16	.00	.01	.00	107	.15	110,500	22	.4	144	7.5
Apr. 1-30.....	1,379,000	26	.75	.59	.34	.02	1.33	.23	.18	.01	.01	.10	119	.16	220,600	20	.4	174	7.1
May 1-6.....	163,000	23	.70	.54	.37	.03	1.28	.23	.16	.01	.00	.10	108	.15	24,450	23	.5	167	7.4
May 7-14.....	235,800	22	.65	.41	.34	.02	1.10	.14	.17	.01	.01	.10	99	.13	30,650	24	.5	148	7.7

11-4250. FEATHER RIVER AT NICOLAUS, CALIF.

LOCATION.--At gaging station at Nicolaus, Sutter County, 0.3 mile downstream from old highway bridge site, and 2.9 miles downstream from from Bear River.
RECORDS AVAILABLE.--Chemical analyses: March 1951 to September 1958.
Water temperatures: March 1951 to September 1958.
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 291 micromhos July 26; minimum daily, 55.2 micromhos May 21.
Percent sodium: Maximum, 22 Apr. 1-8; minimum, 9 Oct. 8-14, 18-24.
EXTREMES, 1951-58.--Specific conductance (1951-55, 56-58): Maximum daily, 291 micromhos July 26, 1958; minimum daily, 50 micromhos May 28, 1952.
Percent sodium (1951-54, 57-58): 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 at 180°C. Records of specific conductance of daily samples available in district office at Sacramento, Calif. Records of discharge for water year October 1957 to September 1958 given in WSP 1565.

Chemical analyses, water year October 1957 to September 1958

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, 1957...	39,170	19	0.70	0.38	0.24	0.04	1.21	0.10	0.09	0.00	0.01	0.01	93	0.13	5,090	18	0.3	135	7.5
Oct. 8-14	40,440	19	1.35	.85	.22	.05	2.16	.18	.09	.00	.02	.04	151	.21	8,490	9	.2	236	7.9
Oct. 15-17	26,620	16	.55	.41	.21	.04	1.03	.09	.10	.00	.01	.00	90	.12	3,190	17	.3	119	7.2
Oct. 18-24	48,850	18	1.20	.79	.21	.05	1.98	.17	.11	.00	.01	.01	133	.18	8,790	9	.2	215	7.4
Oct. 25-28	33,220	16	.65	.40	.22	.04	1.08	.10	.18	.00	.00	.00	96	.13	4,320	17	.3	134	7.2
Oct. 29-Nov. 3 ..	41,990	15	.90	.54	.22	.04	1.31	.09	.31	.00	.00	.01	118	.16	6,720	13	.3	170	7.4
Nov. 4-14	69,600	16	.80	.49	.21	.04	1.29	.10	.16	.00	.02	.00	101	.14	9,740	14	.3	157	7.1
Nov. 15	5,950	--	.50	.36	.20	--	.95	--	--	--	--	--	94	.13	774	19	.3	114	7.1
Nov. 16-17	16,260	12	.43	.29	.14	.03	.64	.11	.10	--	.03	.00	80	.11	1,790	16	.2	94	7.1
Nov. 18-30	97,010	--	.55	.49	.16	--	.95	--	--	--	--	--	74	.10	9,700	13	.2	111	6.9
Dec. 1-17	143,600	--	.60	.44	.18	--	1.00	--	--	--	--	--	78	.11	15,800	15	.2	120	6.7
Dec. 18-19	71,010	--	.38	.44	.13	--	.57	--	--	--	--	--	68	.09	6,390	14	.2	82	6.9
Dec. 20-31	226,600	--	.44	.36	.14	--	.72	--	--	--	--	--	61	.08	18,130	15	.2	96	6.7
Jan. 1-24, 1958..	341,600	--	.50	.38	.17	--	.90	--	--	--	--	--	79	.11	37,580	16	.3	106	6.8
Jan. 25-26.....	47,290	--	.50	.46	.16	--	.77	--	--	--	--	--	76	.10	4,730	14	.2	100	6.8
Jan. 27-28	87,870	--	.34	.30	.14	--	.59	--	--	--	--	--	87	.12	10,540	18	.2	81	7.0
Jan. 29-31	126,900	--	.40	.28	.16	--	.64	--	--	--	--	--	76	.10	12,690	19	.3	87	7.0

SACRAMENTO RIVER BASIN--Continued

11-4250. FEATHER RIVER AT NICOLAUS, CALIF.--Continued

Chemical analyses, water year October 1957 to September 1958--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. 1-12, 1958..	650,600	--	0.39	0.29	0.14	--	0.61	--	--	--	--	--	71	0.10	65,060	17	0.2	87	7.2
Feb. 13-24	1,016,000	--	.39	.27	.16	--	.59	--	--	--	--	--	71	.10	101,600	20	.3	84	7.1
Feb. 25-28	565,300	--	.43	.26	.16	--	.62	--	--	--	--	--	76	.10	56,530	19	.3	88	7.0
Mar. 1-5.....	279,700	--	.40	.30	.16	--	.62	--	--	--	--	--	76	.10	27,970	19	.3	85	7.2
Mar. 6-21.....	477,000	--	.46	.30	.14	--	.70	--	--	--	--	--	72	.10	47,700	16	.2	92	7.2
Mar. 22-31.....	690,200	--	.38	.26	.13	--	.57	--	--	--	--	--	70	.10	69,020	17	.2	80	7.0
Apr. 1-8	759,700	--	.35	.27	.17	--	.52	--	--	--	--	--	63	.09	68,370	22	.3	76	6.8
Apr. 9-15	386,800	--	.48	.30	.16	--	.69	--	--	--	--	--	75	.10	38,680	17	.3	99	6.8
Apr. 16-30	901,100	--	.38	.40	.14	--	.69	--	--	--	--	--	68	.09	81,100	15	.2	84	7.2
May 1-9.....	462,000	19	.38	.27	.12	0.03	.62	0.10	0.07	0.00	0.01	0.00	64	.09	41,580	15	.2	75	6.8
May 10-18.....	484,600	--	.34	.28	.10	--	.56	--	--	--	--	--	51	.07	33,920	14	.2	66	6.7
May 19-31.....	687,900	--	.32	.24	.10	--	.49	--	--	--	--	--	53	.07	48,150	15	.2	61	6.7
June 1-30	837,500	--	.38	.21	.11	--	.56	--	--	---	--	--	63	.09	75,380	16	.2	76	6.6
July 1-11.....	78,190	--	.48	.34	.16	--	.84	--	--	--	--	--	70	.10	7,820	16	.2	98	7.5
July 12-15.....	16,130	--	.70	.49	.18	--	1.25	--	--	--	--	--	89	.12	1,940	13	.2	133	7.0
July 16-31.....	59,210	--	.65	.47	.20	--	1.18	--	--	--	--	--	88	.12	7,110	15	.3	132	7.0
Aug. 1-31	82,450	--	.70	.48	.22	--	1.23	--	--	--	--	--	90	.12	9,890	16	.3	140	7.3
Sept. 1-30	136,100	--	.65	.43	.20	--	1.13	--	--	--	--	--	87	.12	16,330	16	.3	126	7.1
Total or weighted average [a]	10,030,000	--	0.42	0.30	0.14	--	0.67	--	--	--	--	--	70	0.10	1,003,000	16	0.2	87	--

a Represents 100 percent of runoff for water year October 1957 to September 1958.

SACRAMENTO RIVER BASIN--Continued

11-4465. AMERICAN RIVER AT FAIR OAKS, CALIF.

LOCATION.--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 1958.
Water temperatures: March 1951 to September 1958.
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 87 micromhos Nov. 24; minimum daily, 36 micromhos July 28.
Percent sodium: Maximum, 34 Aug. 1; minimum, 14 Nov. 24.
EXTREMES, 1951-58.--Specific conductance: Maximum daily, 112 micromhos Aug. 28, 1951; minimum daily, 29.1 micromhos June 3, 1952.
Percent sodium (1951-54, 1957-58): Maximum, 34 Aug. 1, 1958; minimum, 8 Jan. 21-31, 1953.
REMARKS.--Values reported for dissolved solids are residues at 180°C. Records of specific conductance of daily samples available in district office at Sacramento, Calif. Records of discharge for water year October 1957 to September 1958 given in WSP 1565.

Chemical analyses, water year October 1957 to September 1958

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, 1957 ..	14,680		0.30	0.12	0.09	--	0.39						38	0.05	734	18	0.2	52	6.7
Oct. 4-23	61,790		.32	.20	.10	--	.46						43	.06	3,710	16	.2	60	6.9
Oct. 24-31.....	36,950		.34	.18	.11	--	.49						45	.06	2,220	17	.2	69	6.8
Nov. 1-23.....	113,500		.33	.18	.09	--	.49						58	.08	9,080	15	.2	64	6.7
Nov. 24.....	3,290		.55	.14	.11	--	.51						94	.13	428	14	.2	87	6.6
Nov. 25-30	14,730		.35	.17	.10	--	.49						60	.08	1,180	16	.2	65	6.9
Dec. 1-17.....	32,900		.35	.19	.10	--	.49						62	.08	2,630	16	.2	67	6.8
Dec. 16-31	38,200		.36	.19	.10	--	.51						59	.08	3,060	15	.2	68	6.7
Jan. 1-9, 1958 ..	23,660		.40	.24	.11	--	.49						53	.07	1,660	15	.2	76	7.1
Jan. 10-26.....	73,010		.38	.26	.11	--	.49						55	.07	5,110	15	.2	75	6.7
Jan. 27-28.....	8,850		.42	.20	.11	--	.51						67	.09	796	15	.2	79	6.8
Jan. 29-31.....	17,300		.44	.20	.11	--	.51						58	.08	1,380	15	.2	82	6.6
Feb. 1-18	218,900		.36	.22	.11	--	.51						57	.08	17,510	16	.2	72	7.1
Feb. 19-21.....	96,990		.38	.18	.12	--	.52						54	.07	6,790	18	.2	73	6.9
Feb. 22-24.....	40,340		.34	.19	.11	--	.49						65	.09	3,630	17	.2	69	7.1

SACRAMENTO RIVER BASIN--Continued

11-4465. AMERICAN RIVER AT FAIR OAKS, CALIF.--Continued

Chemical analyses, water year October 1957 to September 1958--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. 25-Mar. 3, 1958	198,000		0.32	0.19	0.11	--	0.51						64	0.09	17,820	18	0.2	68	6.8
Mar. 4-23	220,100		.32	.16	.10	--	.46						61	.08	17,610	17	.2	65	7.1
Mar. 24-31	223,700		.33	.18	.10	--	.52						61	.08	17,900	16	.2	68	7.7
Apr. 1-10	530,800		.31	.21	.12	--	.51						64	.09	47,770	19	.2	69	7.1
Apr. 11-18	178,700		.31	.22	.12	--	.54						68	.09	16,080	18	.2	71	7.3
Apr. 19-30	184,500		.32	.15	.10	--	.49						59	.08	14,760	18	.2	64	7.2
May 1-13	198,400		.28	.09	.09	--	.43						55	.07	13,890	20	.2	55	7.2
May 14-23	217,500		.24	.08	.09	--	.36						49	.07	15,220	22	.2	47	7.0
May 24-31	263,600		.23	.02	.07	--	.33						46	.06	15,820	22	.2	42	6.9
June 1-3	82,310		.22	.14	.09	0.01	.28						31	.04	3,290	20	.2	48	6.3
June 4-30	408,400		.16	.12	.09	.01	.30						31	.04	16,340	24	.2	39	6.6
July 1-31	229,600		.22	.11	.09	.01	.30						45	.06	13,780	21	.2	45	--
Aug. 1	7,480		.20	.17	.20	.02	.56						76	.10	748	34	.7	63	8.0
Aug. 2-31	216,600		.24	.04	.09	.02	.26						35	.05	10,830	23	.2	39	6.7
Sept. 1-16	100,400		.14	.16	.07	.02	.30						28	.04	4,020	18	.2	40	6.5
Sept. 17-18	12,300		.22	.17	.16	.02	.46						56	.08	984	28	.4	57	6.7
Sept. 19-30	74,900		.22	.10	.07	.02	.30						25	.03	2,250	17	.2	41	6.5
Total or weighted average[a]	2,086,412		0.28	0.15	0.10	--	0.43						52	0.07	289,900	19	0.2	58	--

a Represents 100 percent of runoff for water year October 1957 to September 1958.

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

COLUMBIA RIVER MAIN STEM

12-3995. COLUMBIA RIVER AT NORTHPORT, WASH.

LOCATION.--At bridge on State Highway 22 at Northport, Stevens County and 12 miles downstream from gaging station at international boundary.
DRAINAGE AREA.--59,700 square miles, approximately (above gaging station).
RECORDS AVAILABLE.--Chemical analyses: February 1910 to January 1911, November 1951 to September 1958.
Water temperatures: November 1951 to September 1958.
EXTREMES, 1951-58.--Specific conductance: Maximum daily, 192 micromhos Dec. 3, 1955; minimum daily, 126 micromhos June 21, 1957.
REMARKS.--Samples collected at international boundary, 2.2 miles downstream from gaging station February 1910 to January 1911, November 1951 to June 1958. Values reported for dissolved solids are residues 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 1957 to September 1958 given in WSP 1566. No appreciable inflow between sampling point and gaging station except during periods of heavy local runoff.

Chemical analyses, water year October 1957 to September 1958

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, 1957.	3,359,000	5.6	1.15	0.37	0.09	0.02	1.25	0.29	0.02	0.01	0.02	0.02	89	0.12	403,100	6	0.1	159	7.0
Nov. 1-30.....	2,948,000	--	--	--	--	--	1.41	--	--	--	--	--	104	.14	412,700	--	--	169	7.6
Dec. 1-31.....	2,468,000	--	--	--	.10	--	1.41	--	--	--	--	--	101	.14	345,500	--	--	174	7.7
Jan. 1-31, 1958.	1,904,000	7.2	1.30	.38	.08	.02	1.31	.40	.01	.01	.01	.04	102	.14	266,600	4	.1	174	7.9
Feb. 1-28.....	1,848,000	--	--	--	.09	--	1.34	--	--	--	--	--	100	.14	258,700	--	--	170	7.4
Mar. 1-31.....	2,932,000	--	--	--	.08	--	1.25	--	--	--	--	--	91	.12	351,800	--	--	155	7.2
Apr. 1-30.....	3,439,000	7.2	1.00	.32	.08	.03	1.18	.23	.01	.01	.02	.00	82	.11	378,300	6	.1	138	7.0
May 1-23.....	6,693,000	--	--	--	.07	--	1.10	--	--	--	--	--	75	.10	669,300	--	--	130	6.9
May 24-July 12..	26,320,000	--	--	--	.06	--	1.10	--	--	--	--	--	74	.10	2,632,000	--	--	132	6.9
July 13-Aug. 31.	10,290,000	--	--	--	.05	--	1.08	--	--	--	--	--	78	.11	1,132,000	--	--	132	7.0
Sept. 1-30.....	3,665,000	--	--	--	.07	--	1.08	--	--	--	--	--	79	.11	403,200	--	--	135	7.0
Total or weighted average[a].....	43,170,000	--	--	--	0.07	--	1.16	--	--	--	--	--	82	0.11	4,749,000	--	--	142	--
Total or weighted average[b].....	65,870,000	--	--	--	0.07	--	1.15	--	--	--	--	--	81	0.11	7,246,000	--	--	140	--

a Represents 66 percent of runoff for water year October 1957 to September 1958.
b Includes estimated data for missing periods. Represents 100 percent of runoff for water year October 1957 to September 1958.

COLUMBIA RIVER MAIN STEM

12-4365. COLUMBIA RIVER AT GRAND COULEE DAM, WASH.

LOCATION.--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.
RECORDS AVAILABLE.--Chemical analyses: November 1950 to September 1958.
Water temperatures: November 1950 to September 1958.
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 170 micromhos Jan. 1; minimum daily, 122 micromhos June 6.
EXTREMES, 1950-58.--Specific conductance: Maximum daily, 193 micromhos Apr. 24, 25, 1955; minimum daily, 122 micromhos June 1, 1957, June 6, 1958.
REMARKS.--Values reported for dissolved solids are residues at 180°C. Records of specific conductance of daily samples available in district office at Portland, Oreg. Records of discharge for water year October 1957 to September 1958 given in WSP 1566.

Chemical analyses, water year October 1957 to September 1958

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, 1957..	3,643,000	5.1	0.95	0.37	0.06	0.02	1.11	0.23	0.01	0.01	0.01	0.03	76	0.10	364,300	4	0.1	133	7.2
Nov. 1-30.....	3,422,000	--	--	--	--	--	--	--	--	--	--	--	80	.11	376,400	--	--	151	--
Dec. 1-31.....	3,245,000	--	--	--	--	--	--	--	--	--	--	--	88	.12	389,400	--	--	155	--
Jan. 1-31, 1958..	3,500,000	5.9	1.20	.30	.08	.03	1.31	.27	.02	.01	.01	.05	90	.12	420,000	5	.1	157	7.5
Feb. 1-28.....	3,484,000	--	--	--	--	--	--	--	--	--	--	--	90	.12	418,100	--	--	161	--
Mar. 1-31	4,829,000	--	--	--	--	--	--	--	--	--	--	--	97	.13	627,800	--	--	166	--
Apr. 1-30	5,046,000	9.4	1.10	.44	.11	.03	1.29	.33	.03	.01	.01	.05	97	.13	656,000	7	.1	164	7.4
May 1-12	2,739,000	--	--	--	--	--	--	--	--	--	--	--	99	.13	356,100	--	--	156	--
May 13-31	9,315,000	--	--	--	--	--	--	--	--	--	--	--	84	.11	1,025,000	--	--	137	--
June 1-30	17,780,000	--	--	--	--	--	--	--	--	--	--	--	76	.10	1,778,000	--	--	126	--
July 1-31	9,443,000	5.8	1.00	.28	.07	.04	1.11	.21	.01	.02	.01	.01	79	.11	1,039,000	5	.1	129	7.1
Aug. 1-31.....	5,381,000	--	--	--	--	--	--	--	--	--	--	--	78	.11	591,900	--	--	129	--
Sept. 1-30	3,799,000	--	--	--	--	--	--	--	--	--	--	--	76	.10	379,900	--	--	130	--
Total or weighted average	75,621,000	--	--	--	--	--	---	--	--	--	--	--	83	0.11	8,318,000	--	--	140	--

YAKIMA RIVER BASIN

12-5105. 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 1958.
Water temperatures: December 1952 to September 1958.
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 366 micromhos July 14, 15; minimum daily, 114 micromhos May 27.
EXTREMES, 1952-58.--Specific conductance: Maximum daily, 387 micromhos Sept. 29, 1955; minimum daily, 101 micromhos May 9-10, 1957.
REMARKS.--Values reported for dissolved solids are residues at 180°C. Records of specific conductance of daily samples available in district office at Portland, Oreg. Records of discharge for water year October 1957 to September 1958 given in WSP 1566.

Chemical analyses, water year October 1957 to September 1958

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. 1-17, 1957..	92,730	25	1.65	0.90	0.91	0.10	2.70	0.48	0.22	0.01	0.05	0.02	210	0.29	26,890	26	0.8	332	7.5
Oct. 18-31.....	74,520	--	--	--	.87	--	2.66	--	--	--	--	--	206	.28	20,870	--	--	321	7.9
Nov. 1-30	124,200	--	--	--	.91	--	2.74	--	--	--	--	--	209	.28	34,780	--	--	331	7.8
Dec. 1-15	63,930	--	--	--	.83	--	2.51	--	--	--	--	--	193	.26	16,620	--	--	302	7.9
Dec. 16-31	71,310	--	--	--	.78	--	2.43	--	--	--	--	--	182	.25	17,830	--	--	286	7.8
Jan. 1-20, 1958..	86,720	30	1.35	.81	.78	.07	2.36	.37	.20	.01	.04	.05	174	.24	20,810	26	.8	286	8.0
Jan. 21-31.....	60,380	--	--	--	.65	--	2.03	--	--	--	--	--	159	.22	13,280	--	--	248	7.8
Feb. 1-20	132,700	--	--	--	.61	--	1.95	--	--	--	--	--	154	.21	27,870	--	--	238	7.7
Feb. 21-28	112,200	--	--	--	.43	--	1.48	--	--	--	--	--	123	.17	19,070	--	--	176	7.5
Mar. 1-11.....	114,100	--	--	--	.52	--	1.64	--	--	--	--	--	126	.17	19,400	--	--	189	7.9
Mar. 12-23.....	67,460	--	--	--	.61	--	2.07	--	--	--	--	--	154	.21	14,170	--	--	240	8.0
Mar. 24-31.....	59,440	--	--	--	.52	--	1.84	--	--	--	--	--	140	.19	11,290	--	--	215	7.8

YAKIMA RIVER BASIN--Continued

12-5105. YAKIMA RIVER AT KIONA, WASH.--Continued

Chemical analyses, water year October 1957 to September 1958--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. 1-20, 1958.	171,100	20	0.95	0.55	0.48	0.04	1.69	0.21	0.13	0.01	0.00	0.04	127	0.17	29,090	24	0.6	191	7.8
Apr. 21-27	92,390	--	--	--	.37	--	1.31	--	--	--	--	--	100	.14	12,930	--	--	148	7.8
Apr. 28-30	22,710	--	--	--	.48	--	1.61	--	--	--	--	--	125	.17	3,861	--	--	185	7.9
May 1-4.....	28,190	--	--	--	.52	--	1.74	--	--	--	--	--	129	.18	5,074	--	--	193	7.9
May 5-14.....	111,800	--	--	--	.38	--	1.28	--	--	--	--	--	103	.14	15,650	--	--	148	7.4
May 15-20.....	52,980	--	--	--	.44	--	1.46	--	--	--	--	--	118	.16	8,477	--	--	170	7.6
May 21-31.....	175,000	--	--	--	.38	--	1.07	--	--	--	--	--	84	.11	19,250	--	--	125	7.3
June 1-8	69,820	--	--	--	.44	--	1.52	--	--	--	--	--	117	.16	11,170	--	--	173	7.2
June 9-20.....	58,270	--	--	--	.61	--	1.95	--	--	--	--	--	144	.20	11,650	--	--	229	7.1
June 21-July 15..	67,190	27	1.60	.92	.96	.10	2.70	.46	.23	.02	.04	.00	202	.27	18,140	27	.9	318	7.4
July 16-Aug. 13.	67,140	--	--	--	1.04	--	3.00	--	--	--	--	--	219	.30	20,140	--	--	349	7.3
Aug. 14-31	56,310	--	--	--	.96	--	2.90	--	--	--	--	--	218	.30	16,890	--	--	343	7.3
Sept. 1-30.....	108,000	--	--	--	.87	--	2.88	--	--	--	--	--	213	.29	31,320	--	--	343	7.4
Total or weighted average	2,140,000	--	--	--	0.65	--	2.00	--	--	--	--	--	153	0.21	449,500	--	--	237	--

PART 13. SNAKE RIVER BASIN

SNAKE RIVER MAIN STEM

13-375. 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 1958.
Water temperatures: January 1953 to September 1958.
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 639 micromhos Dec. 5; minimum daily, 307 micromhos July 2.
Percent sodium: Maximum, 16 Dec. 4-6; minimum, 10 July 1-31.
EXTREMES, Jan. 1953-58.--Specific conductance: Maximum daily, 791 micromhos Nov. 13, 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 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 1957 to September 1958 given in WSP 1567. About 2 percent of normal annual streamflow of 5,000,000 acre-feet is diverted by Anderson Canal between sampling point and gaging station. This diversion occurs during May to November except for leakage through the headgate. No other diversion or appreciable inflow between sampling point and gaging station except during periods of local rains.

Chemical analyses, water year October 1957 to September 1958

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, 1957	209,400	8.1	2.66	1.04	0.48	0.05	2.85	1.02	0.40		0.02	0.08	246	0.33	69,100	11	0.4	415	7.4
Nov. 1-30	167,100	6.3	2.84	1.12	.57	.04	3.05	1.17	.40		.01	.08	262	.36	60,160	12	.4	444	7.2
Dec. 1-3, 7-31	131,200	7.0	3.32	.98	.61	.06	3.05	1.31	.48		.03	.06	274	.37	48,540	12	.4	461	7.6
Dec. 4-6	6,970	8.0	3.38	1.90	1.04	.09	3.57	1.83	.90		.04	.16	362	.49	3,420	16	.6	595	7.8
Jan. 1-31, 1958	141,400	7.0	2.98	1.30	.65	.06	3.16	1.29	.48		.03	.07	282	.38	53,730	13	.4	474	7.6
Feb. 1-28	130,300	6.9	3.02	1.24	.65	.06	3.21	1.25	.51		.03	.08	282	.38	49,510	13	.4	480	7.7
Mar. 1-31	141,700	7.2	3.08	1.28	.65	.06	3.26	1.33	.54		.03	.08	288	.39	55,260	13	.4	491	7.9
Apr. 1-30	190,400	9.8	2.86	1.24	.61	.05	3.05	1.29	.48		.02	.07	272	.37	70,450	13	.4	462	8.0
May 1-31	829,700	12	2.46	.96	.44	.04	2.72	.98	.04		.02	.02	230	.31	257,200	11	.3	375	7.9
June 1-30	754,300	9.5	2.23	.79	.36	.04	2.46	.75	.10		.02	.03	200	.27	203,700	11	.3	332	7.5
July 1-31	763,000	9.1	2.16	.82	.34	.04	2.41	.73	.19		.03	.06	188	.26	198,400	10	.3	321	7.4
Aug. 1-31	526,300	8.9	2.20	.92	.39	.05	2.54	.75	.23		.02	.06	202	.27	142,100	11	.3	341	7.5
Sept. 1-30	356,900	9.1	2.34	.98	.48	.05	2.69	.90	.31		.02	.05	218	.30	107,100	12	.4	371	7.9
Total or weighted average	4,349,000	9.3	2.45	0.99	0.44	0.05	2.69	0.92	0.23		0.02	0.05	224	0.30	1,305,000	11	0.3	375	--

SNAKE RIVER MAIN STEM--Continued

13-1545. 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 1958.
Water temperatures: March 1951 to September 1958.
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 573 micromhos Oct. 10; minimum daily, 413 micromhos June 1.
Percent sodium: Maximum, 27 Oct. 1-31, Nov. 1-30, Dec. 1-31, Aug. 8-31, Sept. 16-30; minimum, 24 Apr. 1-30, May 16-31.
EXTREMES, 1951-58.--Specific conductance: Maximum daily, 594 micromhos Oct. 3, 1952; minimum daily, 394 micromhos May 7, 1952.
Percent sodium: Maximum, 29 July 21-31, 1951; minimum, 17 Apr. 1-10, 1951.
REMARKS.--Values reported for dissolved solids are residues at 180°C. Records of specific conductance of daily samples available in district office at Portland, Oreg. Records of discharge for water year October 1957 to September 1958 given in WSP 1567.

Chemical analyses, water year October 1957 to September 1958

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, 1957	608,000		2.50	1.73	1.57		3.72	1.27	0.76		0.06	0.06	350	0.48	291,800	27	1.1	553	7.9
Nov. 1-30	555,200		2.59	1.64	1.57		3.74	1.25	.73		.07	.03	345	.47	260,900	27	1.1	548	8.0
Dec. 1-31	278,900		2.50	1.64	1.52		3.67	1.25	.73		.06	.05	339	.46	278,900	27	1.1	543	7.9
Jan. 1-31, 1958	637,900		2.69	1.43	1.44		3.64	1.17	.76		.05	.10	334	.45	287,100	26	1.0	537	8.0
Feb. 1-28	606,500		2.50	1.46	1.35		3.46	1.08	.70		.06	.10	321	.44	266,900	25	1.0	519	8.0
Mar. 1-31	673,600		2.30	1.66	1.30		a3.37	1.06	.70		.05	.07	308	.42	282,900	25	.9	499	8.4
Apr. 1-30	685,100		2.35	1.49	1.22		3.34	1.08	.65		.05	.09	302	.41	280,900	24	.9	483	8.0
May 1-15	297,000		2.30	1.42	1.22		3.28	1.02	.59		.04	.12	296	.40	118,800	25	.9	461	7.7
May 16-31	316,000		2.20	1.36	1.13		3.13	.94	.54		.04	--	278	.38	120,100	24	.8	436	7.6
June 1-30	541,600		2.30	1.62	1.30		3.44	1.10	.68		.05	.11	311	.42	227,500	25	.9	488	7.9
July 1-19	291,600		2.30	1.66	1.39		3.54	1.15	.70		.05	.09	328	.45	131,200	26	1.0	504	7.7
July 20-Aug. 7	313,200		2.30	1.74	1.44		3.57	1.17	.70		.06	--	326	.44	137,800	26	1.0	508	7.9
Aug. 8-31	400,400		2.45	1.79	1.48		3.65	1.19	.68		.05	.06	340	.46	184,200	27	1.0	526	7.7
Sept. 1-15	265,500		2.50	1.72	1.52		3.72	1.25	.73		.06	--	348	.47	124,800	26	1.1	535	7.7
Sept. 16-30	276,700		2.45	1.83	1.57		3.75	1.27	.73		.06	.09	355	.48	132,800	27	1.1	544	7.8
Total or weighted average	7,074,500		2.50	1.56	1.39		3.51	1.15	0.70		0.05	0.08	325	0.44	3,113,000	26	1.0	515	--

a Includes 0.27 equivalent of carbonate (CO_3).

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 July 1958.
Water temperatures: October 1955 to July 1958.
EXTREMES, 1957-58.--Specific conductance: Maximum, 418 micromhos Oct. 1-31; minimum, 61 micromhos Mar. 24-30.
Percent sodium: Maximum, 39 Oct. 1-31; minimum, 26 Mar. 24-30.
EXTREMES, 1955-58.--Specific conductance: Maximum daily, 449 micromhos Oct. 18, 1956; minimum, 61 micromhos Mar. 24-30, 1958.
Percent sodium: Maximum, 39 Oct. 1-31, 1957; minimum, 25 Mar. 20-24, 26-29, Apr. 2-7, 9-14, 16-21, 23-26, 30, 1956, May 22-31,1957.
REMARKS.--Values reported for dissolved solids are residues at 180°C. Records of specific conductance of daily samples available in district office at Portland, Oreg. Records of discharge for gaging station near Clarkston for water year October 1957 to September 1958 given in WSP 1567. No appreciable inflow between sampling point and gaging station except during periods of heavy local runoff.

Chemical analyses, water year October 1957 to July 1958

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, 1957 ..	1,572,000		1.70	1.15	1.70		2.74	1.08	0.48		0.03	0.04	264	0.36	565,900	39	1.4	418	7.7
Nov. 1-30.....	1,403,000		1.85	.90	1.30		2.64	1.00	.45		.04	.07	247	.34	477,000	31	1.1	406	7.8
Dec. 1-31.....	1,633,000		1.70	.90	1.17		2.46	.90	.39		.04	.08	238	.32	522,600	31	1.0	379	7.7
Jan. 1-21, 1958...	1,040,000		1.65	.99	1.26		2.52	.94	.48		.00	.02	223	.30	312,000	32	1.1	386	8.0
Jan. 22-31.....	536,100		1.20	.72	.91		1.88	.65	.34		.01	--	172	.23	123,300	32	.9	284	8.2
Feb. 1-11.....	750,100		1.20	.68	.83		1.87	.56	.28		.03	.08	176	.24	180,000	30	.9	267	8.0
Feb. 12-23.....	1,344,000		1.00	.54	.65		1.54	.44	.20		.03	--	152	.21	282,200	29	.7	220	8.0
Feb. 24-Mar. 5 ..	1,238,000		1.00	.64	.70		1.64	.48	.24		.03	--	159	.22	272,400	29	.8	235	7.8
Mar. 6-12	542,300		.70	.28	.43		1.07	.29	.13		.01	--	100	.14	75,920	29	.6	147	7.9
Mar. 13-23	821,200		.60	.24	.38		.93	.25	.02		.02	.04	99	.13	106,800	31	.6	126	7.6
Mar. 24-30	755,900		.31	.13	.16		.51	.10	.01		.00	--	58	.08	60,470	26	.3	61	6.9
Mar. 31-Apr. 21 .	3,396,000		.46	.20	.30		.74	.19	.07		.00	.00	72	.10	339,600	30	.5	98	7.0
May 22-June 14 ..	7,976,000		.60	.22	.36		.90	.21	.08		.01	.00	87	.12	957,100	30	.6	121	6.9
June 15-July 2 ...	2,720,000		.70	.26	.37		1.03	.23	.08		.01	.00	93	.13	353,600	27	.5	133	7.0
July 3-16	912,400		1.25	.67	1.09		1.98	.75	.34		.01	.06	190	.26	237,200	32	1.1	299	7.3
Total or weighted average	26,640,000		0.90	0.46	0.65		1.39	0.44	0.19		0.01	--	133	0.18	4,795,000	32	0.8	201	--

BOISE RIVER BASIN

13-2125. 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 1958.
Water temperatures: November 1950 to September 1958.
Sediment records: January 1939 to June 1940.
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 722 micromhos Jan. 2; minimum daily 117 micromhos May 18.
Percent sodium: Maximum, 50 July 19-31, Aug. 1-8; minimum, 30 May 1-15.
EXTREMES, 1939-40, 1950-58.--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 at 180°C. Records of specific conductance of daily samples available in district office at Portland, Oreg. Records of discharge for water year October 1957 to September 1958 given in WSP 1567.

Chemical analyses, water year October 1957 to September 1958

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. 1-18, 1957.	43,570		1.80	0.73	2.00		3.11	1.15	0.34		0.05	0.06	283	0.38	16,560	43	1.8	447	8.1
Oct. 19-31.....	24,620		2.50	1.15	2.87		4.28	1.62	.51		.07	--	401	.55	13,540	44	2.1	622	7.6
Nov. 1-30	45,620		2.99	1.15	3.04		4.75	1.85	.54		.09	.03	432	.59	26,920	42	2.1	667	7.7
Dec. 1-31	43,490		3.14	1.07	3.04		4.82	1.81	.51		.08	.05	438	.60	26,090	42	2.1	677	7.7
Jan. 1-31. 1958.	38,780		3.29	1.15	2.91		5.08	.77	.54		.06	.09	451	.61	23,660	45	2.0	684	8.0
Feb. 1-13	18,490		2.89	1.11	2.83		4.56	1.69	.54		.09	.12	422	.57	10,540	41	2.0	646	7.9
Feb. 14-19	39,750		1.60	.36	.91		2.07	.56	.17		.07	--	177	.24	9,540	32	.9	285	7.4
Feb. 20-27	19,630		2.15	.93	2.31		3.39	1.48	.45		.11	.11	334	.45	8,834	43	1.9	532	7.8
Feb. 28-Mar. 4.	26,570		1.10	.38	.83		1.59	.50	.10		.05	--	150	.20	5,314	37	1.0	233	7.5
Mar. 5-8.....	19,680		1.45	.59	1.39		2.26	.90	.28		.07	--	227	.36	7,085	40	1.4	348	8.2
Mar. 9-31.....	186,300		.90	.26	.65		1.31	.40	.10		.04	.08	115	.13	24,220	35	.9	182	7.5
Apr. 1-12	95,480		.90	.22	.61		1.28	.33	.11		.03	--	116	.16	15,280	35	.8	169	7.3
Apr. 13-23,25-30	116,400		.75	.25	.48		1.15	.25	.07		.03	.04	101	.14	16,300	32	.7	147	7.3
Apr. 24	5,355		1.15	.17	.52		a1.53	--	.04		.00	--	118	.16	857	--	.6	231	10.2
May 1-15.....	138,000		.80	.14	.44		1.11	.23	.08		.03	--	101	.14	19,320	30	.6	142	7.4

a Includes 1.50 equivalents or carbonate (CO_3).

May 16-31, 1958	163,400	0.00	0.18	0.44	0.95	0.20	0.14	0.03	0.01	87	0.12	19,610	33	0.7	124	7.3
June 1-15.....	120,400	.70	.18	.52	1.07	.29	.10	.02	.04	96	.13	15,650	35	.8	144	7.0
June 16-23.....	41,400	.70	.32	.70	1.25	.35	.13	.02	--	109	.15	6,210	40	1.0	167	7.2
June 24-28.....	14,630	1.05	.35	1.04	1.74	.56	.20	.03	--	153	.21	3,072	41	1.2	242	7.3
June 29-July 5 ..	6,655	1.60	.68	1.87	2.82	1.04	.34	.05	--	263	.36	2,396	44	1.8	398	7.4
July 6-18.....	6,048	1.90	.94	2.39	3.54	1.46	.48	.04	.03	348	.47	2,843	43	2.0	524	7.5
July 19-Aug. 8 ..	16,160	2.00	.80	2.61	3.47	1.29	.45	.05	--	333	.45	7,272	50	2.2	499	7.4
Aug. 9-31	16,870	2.15	.89	2.87	3.87	1.52	.56	.05	.09	378	.51	8,604	48	2.3	565	7.5
Sept. 1-10.....	12,950	1.85	.99	2.35	3.54	1.33	.42	.05	--	338	.46	5,957	44	2.0	505	7.6
Sept. 11-30.....	24,980	2.10	1.10	2.44	3.74	1.46	.42	.06	.09	359	.49	12,240	43	1.7	533	7.5
Total or weighted average	1,285,000	1.25	0.42	1.09	1.95	0.60	0.20	0.04	--	178	0.18	231,000	39	1.2	270	--

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PART 14. PACIFIC SLOPE BASINS IN OREGON AND LOWER COLUMBIA RIVER BASIN

COLUMBIA RIVER MAIN STEM

14-1057. COLUMBIA RIVER AT MARYHILL FERRY NEAR RUFUS, OREG.

LOCATION (revised).--At Maryhill Ferry about 2½ miles downstream from Rufus, Sherman County, about 6 miles upstream from the Deschutes River, and about 20 miles upstream from gaging station at The Dalles, Wasco County.
DRAINAGE AREA.--237,000 square miles, approximately (above gaging station at The Dalles).
RECORDS AVAILABLE.--Chemical analyses: December 1950 to September 1958.
Water temperatures: December 1950 to September 1958.
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 240 micromhos Dec. 3; minimum daily, 103 micromhos May 30.
EXTREMES, 1950-58.--Specific conductance: Maximum daily, 324 micromhos Dec. 7, 1955; minimum daily, 102 micromhos May 27, 1956.
REMARKS.--Values reported for dissolved solids are residues at 180°C. Records of specific conductance of daily samples available in district office at Portland, Oreg. Records of discharge for gaging station at The Dalles for water year October 1957 to September 1958 given in WSP 1568. Discharge records include the flow 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 1957 to September 1958

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, 1957.	6,121,000	9.4	1.25	0.55	0.52	0.05	1.66	0.48	0.15	0.01	0.01	0.04	134	0.18	1,102,000	22	0.5	230	7.5
Nov. 1-30	5,673,000	--	--	--	.48	--	1.67	--	--	--	--	--	136	.18	1,021,000	--	--	231	7.5
Dec. 1-31	5,942,000	--	--	--	.48	--	1.70	--	--	--	--	--	138	.19	1,129,000	--	--	231	7.6
Jan. 1-31, 1958.	6,147,000	18	1.25	.55	.44	.05	1.67	.42	.16	.01	.00	.04	135	.18	1,106,000	19	.5	223	7.9
Feb. 1-16	3,749,000	--	--	--	.44	--	1.64	--	--	--	--	--	138	.19	712,300	--	--	221	7.7
Feb. 17-28	4,522,000	--	--	--	.39	--	1.44	--	--	--	--	--	128	.17	768,700	--	--	188	7.4
Mar. 1-31.....	9,354,000	--	--	--	.39	--	1.57	--	--	--	--	--	126	.17	1,590,000	--	--	198	8.0
Apr. 1-17.....	5,720,000	15	1.10	.40	.37	.05	1.46	.33	.11	.01	.02	.02	124	.17	972,400	19	.4	188	7.7
Apr. 18-22	2,626,000	--	--	--	.33	--	1.29	--	--	--	--	--	111	.15	393,900	--	--	168	7.9
Apr. 23-30	4,163,000	--	--	--	.26	--	1.13	--	--	--	--	--	96	.13	541,200	--	--	140	8.1
May 1-9.....	4,500,000	--	--	--	.29	--	1.25	--	--	--	--	--	105	.14	630,000	--	--	157	7.5
May 10-17.....	5,328,000	--	--	--	.23	--	1.07	--	--	--	--	--	90	.12	639,400	--	--	133	7.5
May 18-31.....	14,490,000	--	--	--	.17	--	.89	--	--	--	--	--	76	.10	1,449,000	--	--	113	7.2

June 1-22, 1958 .	21,630,000	--	--	--	0.17	--	1.02	--	--	--	--	--	79	0.11	2,379,000	--	--	121	7.1
June 23-30.....	5,353,000	--	--	--	.17	--	1.51	--	--	--	--	--	109	.15	803,000	--	--	172	7.1
July 1-31.....	12,370,000	7.2	0.90	0.48	.16	0.03	1.28	0.25	0.05	0.01	0.00	0.02	91	.12	1,484,000	10	0.2	149	7.0
Aug. 1-13	3,416,000	--	--	--	.25	--	1.31	--	--	--	--	--	100	.14	478,200	--	--	165	7.0
Aug. 14-31	4,003,000	--	--	--	.29	--	1.34	--	--	--	--	--	102	.14	560,400	--	--	172	7.1
Sept. 1-14.....	2,690,000	--	--	--	.23	--	1.29	--	--	--	--	--	97	.13	349,700	--	--	162	7.0
Sept. 15-30.....	3,055,000	--	--	--	.48	--	1.61	--	--	--	--	--	133	.18	549,900	--	--	220	--
Total or weighted average	130,800,000	--	--	--	0.29	--	1.31	--	--	--	--	--	106	0.14	18,310,000	--	--	167	--

WILLAMETTE RIVER BASIN

14-1910. 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 1958.
Water temperatures: February 1951 to September 1958.
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 76 micromhos Oct. 1; minimum daily, 36 micromhos Dec. 6.
EXTREMES, 1951-58.--Specific conductance: Maximum daily, 133 micromhos Nov. 7, 1954; minimum daily, 35 micromhos Jan. 20, 1953.
REMARKS.--Values reported for dissolved solids are residues at 180°C. Records of specific conductance of daily samples available in district office at Portland, Oreg. Records of discharge for water year October 1957 to September 1958 given in WSP 1568.

Chemical analyses, water year October 1957 to September 1958

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, 1957.	591,100	15	0.30	1.11	0.19	0.03	0.51	0.05	0.07	0.01	0.01	0.05	52	0.07	41,380	30	0.4	65	6.6
Nov. 1-11	159,800	--	--	--	.18	--	.49	--	--	--	--	--	54	.07	11,190	--	--	68	6.9
Nov. 12-30	631,500	--	--	--	.17	--	.46	--	--	--	--	--	49	.07	44,200	--	--	60	7.0
Dec. 1-10	466,500	--	--	--	.13	--	.36	--	--	--	--	--	47	.06	27,990	--	--	51	6.8
Dec. 11-20	598,200	--	--	--	.15	--	.38	--	--	--	--	--	52	.07	41,870	--	--	55	6.9
Dec. 21-31	2,354,000	--	--	--	.12	--	.33	--	--	--	--	--	53	.07	164,800	--	--	45	6.8
Jan. 1-15, 1958.	1,579,000	16	.24	.10	.13	.02	.36	.05	.06	.01	.02	.02	50	.07	110,500	27	.3	51	7.1
Jan. 16-31.....	2,014,000	--	--	--	.13	--	.36	--	--	--	--	--	48	.07	141,000	--	--	48	6.8
Feb. 1-28	4,102,000	--	--	--	.13	--	.39	--	--	--	--	--	48	.07	287,100	--	--	50	7.0
Mar. 1-31.....	1,502,000	--	--	--	.17	--	.44	--	--	--	--	--	52	.07	105,100	--	--	62	6.9
Apr. 1-14	472,100	15	.26	.13	.15	.03	.46	.08	.07	.01	.01	.03	52	.07	33,050	26	.3	58	6.8
Apr. 15-27, 29-30	1,246,000	--	--	--	.14	--	.39	--	--	--	--	--	44	.06	747,600	--	--	47	6.9
Apr. 28	72,200	--	--	--	--	--	.56	--	--	--	--	--	62	.08	5,776	28	--	70	6.8
May 1-10.....	371,100	--	--	--	.16	--	.44	--	--	--	--	--	49	.07	35,980	--	--	56	6.9
May 11-31.....	560,900	--	--	--	.16	--	.46	--	--	--	--	--	46	.06	33,650	--	--	56	6.8

June 1-30, 1958.	808,700	--	--	--	0.17	--	0.39	--	--	--	--	--	49	0.07	56,610	--	--	56	6.6
July 1-31.....	450,600	16	0.26	0.16	.19	0.04	.52	0.04	0.08	0.02	0.01	0.02	54	.07	31,540	29	0.4	64	6.4
Aug. 1-21.....	246,300	--	--	--	.20	--	.51	--	--	--	--	--	57	.08	19,700	--	--	67	6.4
Aug. 22-Sept. 8.	212,100	--	--	--	.20	--	.52	--	--	--	--	--	57	.08	16,970	--	--	66	6.7
Sept. 9-30.....	347,100	--	--	--	.18	--	.49	--	--	--	--	--	56	.08	27,770	--	--	62	6.6
Total or weighted average	18,790,000	--	--	--	0.14	--	0.39	--	--	--	--	--	50	0.07	1,315,000	--	--	53	--

ROGUE RIVER BASIN

14-3615. 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 1958.
Water temperatures: January 1953 to September 1958.
EXTREMES, 1957-58.--Specific conductance: Maximum daily, 104 micromhos Oct. 11, Mar. 17, 18, 22; minimum daily, 63 micromhos May 19, 23, 26.
Percent sodium: Maximum, 27 Oct. 1-31; minimum, 19 Feb. 1-28, Mar. 1-15.
EXTREMES, 1953-58.--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 at 180°C. Records of specific conductance of daily samples available in district office at Portland, Oreg. Records of discharge for water year October 1957 to September 1958 given in WSP 1568.

Chemical analyses, water year October 1957 to September 1958

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, 1957.	110,600		0.47	0.24	0.26		0.82	0.04	0.09		0.01	0.07	79	0.11	12,170	27	0.4	100	7.0
Nov. 1-30	165,900		.49	.24	.26		.89	.06	.08		.01	.03	82	.11	18,250	25	.4	101	7.2
Dec. 1-31	393,000		.45	.24	.22		.82	.05	.06		.01	.04	86	.12	47,160	23	.4	91	7.1
Jan. 1-31,1958..	617,600		.48	.24	.19		.79	.06	.05		.01	.05	79	.11	67,940	21	.3	90	7.3
Feb. 1-28	810,600		.48	.20	.17		.79	.05	.04		.01	.06	83	.11	89,170	19	.3	86	7.9
Mar. 1-15.....	188,900		.47	.27	.18		.84	.06	.04		.00	--	71	.10	18,890	19	.3	93	7.3
Mar. 16-31.....	152,000		.55	.29	.23		.92	.06	.06		.00	.05	78	.11	16,720	22	.4	102	7.2
Apr. 1-30	325,900		.47	.25	.21		.87	.05	.06		.00	.02	73	.10	32,590	21	.4	93	7.2
May 1-15.....	130,800		.37	.20	.17		.70	.04	.04		.00	.03	64	.09	11,770	22	.3	73	6.8
May 18-31.....	145,100		.32	.19	.15		.64	.04	.03		.00	--	61	.08	11,810	21	.3	66	8.8
June 1-30	241,800		.39	.20	.18		.72	.04	.03		.01	.04	69	.09	21,710	22	.3	76	6.9
July 1-29.....	112,700		.39	.23	.20		.79	.04	.06		.01	.03	74	.10	11,270	22	.4	82	7.1
July 30-Aug. 19.	54,860		.40	.22	.23		.77	.05	.04		.01	.02	75	.10	5,486	26	.4	83	7.0
Aug. 20-Sept. 9.	55,040		.37	.25	.22		.80	.03	.06		.01	--	77	.10	5,504	24	.4	87	7.0
Sept. 10-30.....	62,820		.40	.28	.24		.82	.03	.06		.01	.03	81	.11	6,910	26	.4	91	7.1
Total or weighted average	3,568,000		0.45	0.23	0.20		0.80	0.05	0.05		0.01	0.04	78	0.11	392,500	22	0.3	88	--

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