Quality of Surface Waters for Irrigation Western States 1962

GEOLOGICAL SURVEY WATER-SUPPLY PAPER 1946

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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 hydrologist, and S. K. Love, chief, Quality of Water Branch. The data were collected under the supervision of the following:

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QUALITY OF SURFACE WATERS FOR IRRIGATION, WESTERN STATES, 1962

INTRODUCTION

The records of chemical analyses, other physical measurements, and discharge given in this report comprise the twelfth annual compilation of data for 73 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 the western conterminous 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).

Irrigation-Quality Network Stations, Western 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 (Mouse) 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	9-30-58
4	-8070	Missouri River at Nebraska City, Nebr	1- 4-51	
5	-2145	Yellowstone River at Billings, Mont	12-15-50	9-30-58
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, at Huron, S. Dak	Aug. 1956	
16	-6420	North Platte River below Alcova Dam, Wyo		
17	-6560	North Platte River below Guernsey Reservoir, Wyo.	12- 7-50	9-30-58
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 Julesburg, Colo	10- 1-45	
20	------	Republican River above Medicine Creek at Cambridge, Nebr.	12-22-50	9-30-58
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 Whitefield, Okla	9- 1-46	
31	-3316	Red River at Denison Dam, near Denison, 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 Labatos, Colo.	10-11-46	

Irrigation-Quality Network Stations, Western States—Continued

Irrigation network no.	Geological Survey station ident. no.	Stream and location	Date established	Date discontinued
44	8-3130	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, N. Mex	1933	----------
47	-3640	Rio Grande near El Paso, Tex[a]	1930	----------
48	-3705	Rio Grande below Old Fort Quitman, Tex[a]	1930	----------
49	-3715	Rio Grande at Upper Presidio, Tex[a]	1935	----------
50	-3775	Rio Grande at Langtry, Tex[a]	1945	----------
51	------	Rio Grande at Eagle Pass, Tex[a]	1938	1-30-55
	-4590	Rio Grande at Laredo, Tex[a]	7- 1-55	----------
52	------	Rio Grande at Roma, Tex[a]	1944	1-31-55
	------	Rio Grande at Chapeno, Tex[a]	July 1955	9-30-56
	-4613	Rio Grande at Falcon Dam-U.S. tailrace[a]	July 1955	----------
53	-3845	Pecos River below Alamogordo 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[a]	1935	Dec. 1954
	-4474	Pecos River near Shumla, Tex[a]	1- 1-55	----------
57	9- 711	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[b]	----------	----------
	-2345	Green River near Greendale, Utah	Oct. 1956	----------
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	9-30-58
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 below 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	9-30-58
75	10-1180	Bear River near Collinston, Utah	----------	----------
76	-1915	Sevier River below Piute Dam, near Marysvale, Utah.	Mar. 1958	----------
77	-2240	Sevier River near Lynndyl, Utah	3-22-51	----------
78	-3225	Humboldt River at Palisade, Nev	May 1962	----------
79	-3350	Humboldt River near Rye Patch, Nev[c]	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	----------

See footnotes at end of table.

Irrigation-Quality Network Stations, Western States—Continued

Irrigation network no.	Geological Survey station ident. no.	Stream or location	Date established	Date discontinued
83	-------	San Joaquin River at Antioch, Calif	----------	----------
84	11-3105	Calaveras River (Stockton diverting canal) at Stockton, Calif.	3- 1-51	10- 3-52
	-2535	San Joaquin River near Biola, Calif	1952	Oct. 1960
85	-3255	Mokelumne River at Woodbridge, Calif	3- 1-51	9-30-58[d]
86	-3780	Sacramento River near Red Bluff, Calif	----------	----------
87	-3910	Sacramento River at Knights Landing, Calif	2-26-51	May 1958
88	-4250	Feather River at Nicolaus, Calif	2-26-51	9-30-62[d]
89	-4465	American River at Fair Oaks, Calif	5- 1-51	9-30-62
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	9-30-58
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	9-30-58
100	-------	Boise River near Arrowrock, Idaho	----------	----------
101	-2125	Boise River at Notus, Idaho	11-21-50	----------
102	14-1057	Columbia River near The Dalles, Oreg	12- 1-50	----------
103	-3010	Deschutes 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	9-30-58
106	5- 560	Sheyenne River near Warwick, N. Dak[e]	1- 8-51	----------
107	6-6875	North Platte River at Lewellen, Nebr[e]	----------	----------
108	-8055	Platte River near Louisville, Nebr[e]	----------	----------
109	9-4150	Virgin River at Littlefield, Ariz[e]	July 1949	----------

[a]Operated by International Boundary and Water Commission.
[b]Dropped from list, replaced by Green River near Greendale, Utah.
[c]Operation suspended October 1958 to September 1959, reactivated May 1962.
[d]Discontinued as irrigation station, changed from daily to monthly sampling.
[e]Stations added by Subcommittee, October 1952.

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 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 periods (5 years or less), as would be required for intensive studies of specific projects, should not in general be included.

Plate 1 is a plot of the 109 network stations on streams in the Western States. The 73 stations in operation in 1962 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.

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 08-0100.00, this station number shown in this report is 8-100.

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. Army; the State engineers for each of the 19 Western States; and the Ministry of Hydraulic Resources of Mexico.

During 1961–62, 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 the 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 31 and 32 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 1961 and 1962. 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/l) and milliequivalents per liter (meq/l). However, for all practical purposes where concentrations of dissolved solids are less than about 7,000 parts per million, no correction for density of the water is necessary and the units reported in each method are considered to be synonymous.

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

EXPLANATION OF TABLES

The tables of analyses beginning on page 26 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 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, percent sodium, and sodium-adsorption-ratio, 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 and sodium-adsorption-ratio were obtained from composite-samples analysis.

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

Discharge records were obtained from the responsible Geological Survey Water Resources district 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 1.983471.

Analytical values are reported in equivalents per million (epm) 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.

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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" on page 11.

A program for automatically converting and computing the analytical values which are given in this report was established in 1962. Electronic digital computers perform the following calculations: Converting discharge values from cubic feet per second to acre-feet and constituent values from parts per million to equivalents per million; computing tons per acre-foot and total tons of the dissolved solids, percent sodium, sodium-adsorption-ratio, total discharge in acre-feet, total tons of dissolved solids, and discharge-weighted average of the individual constituents.

CRITERIA OF WATER QUALITY

The quality of an irrigation water is determined by the composition and concentration of the dissolved substances or solutes that are present in the water. The principal solutes are the cations; calcium, magnesium, and sodium, and the anions; bicarbonate, sulfate, and chloride. Boron, fluoride, and nitrate are usually present in low, but significant, concentrations. Small amounts of carbonate are found in many waters, as well as trace amounts of other less important constituents. The concentrations of the several ions show wide variations but, because of solubility limitations, sodium and chloride often predominate in more saline waters.

The analysis of an irrigation water should provide information on the suitability of its use and act as a guide for management practices. The first step in the interpretation of the analysis is the selection of criteria that will yield the type of information desired. The second step is the classification of the criteria in order to evaluate the water quality.

There are four principal hazards related to the chemical character of water for irrigation use. These are: total concentration, sodium, bicarbonate, and boron or other phytotoxic substances. Criteria that measure these hazards have been worked out and are in general use.

Total concentration is probably the more important single criterion for irrigation water quality and may be expressed in terms of parts per million (ppm) of dissolved solids, or as specific conductance (micromhos at 25°C). The latter is preferred. More than half of the irrigation waters in use in the Western States have specific conductance values below 750 micromhos (about 500 ppm

dissolved solids). Saline waters with specific conductance values greater than 2,250 micromhos (about 1,500 ppm dissolved solids) make up less than 10 percent of the total number of waters and an even smaller fraction of the total quantity of water being used. There are very few waters with specific conductance values greater than 5,000 micromhos (about 3,200 ppm dissolved solids) that are being used successfully, although they can be used for certain crops under very special conditions. Such waters are important, however, in that they constitute the only available supply in many arid regions.

Sodium is essentially unique among the cations in its effect upon the soil. When present in the soil in exchangeable form, even at low concentrations as compared with the other cations, it causes adverse chemical and physical conditions to develop. Exchangeable sodium tends to make a moist soil impermeable to air and water. This type of soil, upon drying, is hard and difficult to till, and forms dense crusts that interfere with germination and seedling emergence. The most reliable index of the sodium hazard, or the tendence of the irrigation water to form exchangeable sodium in the soil, is the sodium-adsorption-ratio, SAR (U.S. Salinity Laboratory Staff, 1954). It is a calculated value and is defined as:

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

where concentrations are expressed in equivalents per million.

A nomogram for determining the SAR value of an irrigation water with an exchangeable-sodium percentage (ESP) scale opposite the SAR scale is shown in figure 1 on page 12. The ESP scale is empirical but is based on a regression equation of high statistical significance. After the SAR value of an irrigation water is determined by use of the nomogram, it is possible to estimate from the central scale the ESP value of a soil that is at equilibrium with the irrigation water. Under field conditions, the actual ESP may be slightly higher than the estimated equilibrium value. This is because the total salt concentration of the soil solution is increased by evaporation and plant transpiration which results in a higher SAR and a correspondingly higher ESP.

Bicarbonate is important primarily in its relation to calcium and magnesium. There is a tendency for calcium to react with the bicarbonate and precipitate as calcium carbonate ($CaCO_3$). The corresponding magnesium salt is more soluble so there is less tendency for it to precipitate but it may be lost from a water by an indirect reaction. Magnesium enters the exchange complex of

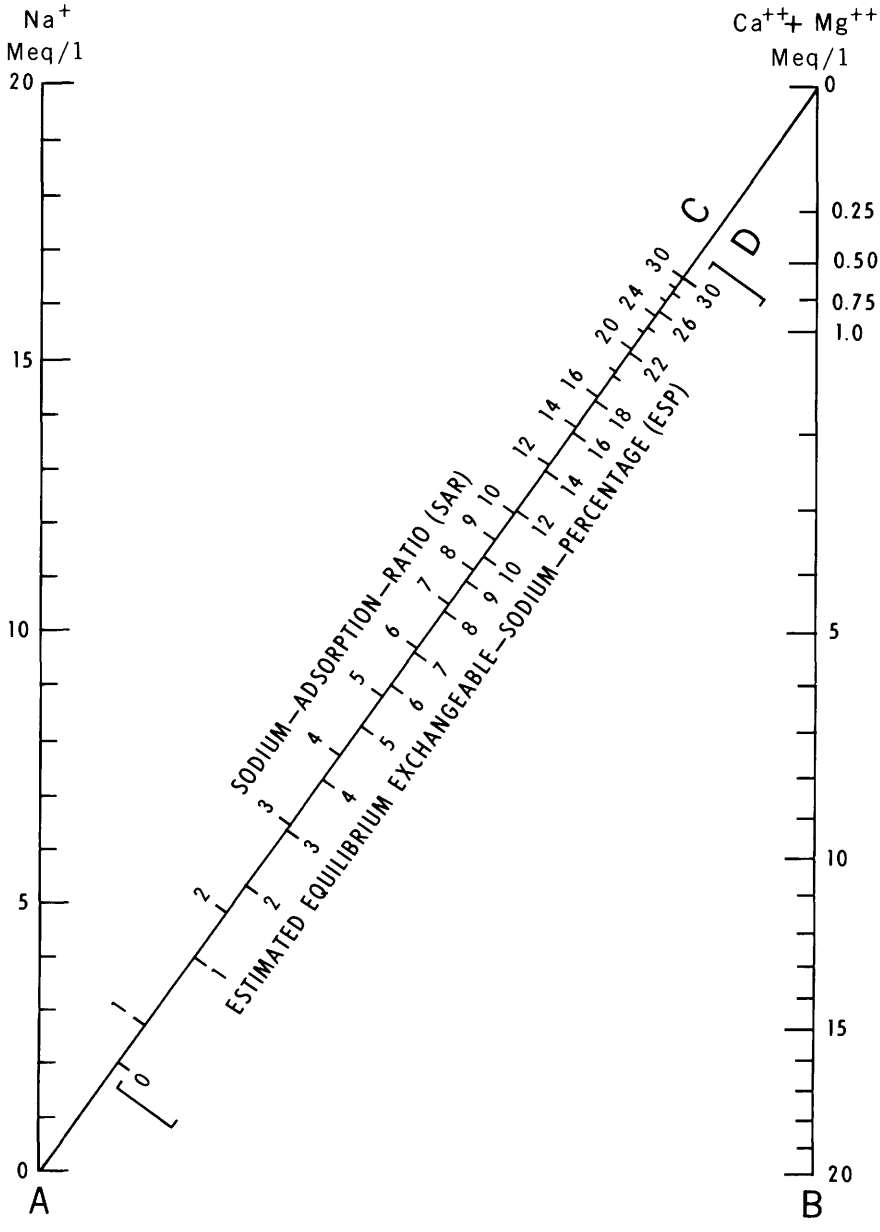

Figure 1.—Nomogram for determining the SAR value of irrigation water and for estimating the corresponding ESP value of a soil that is at equilibrium with the water (U. S. Salinity Laboratory Staff, 1954).

the soil, replacing calcium which reacts with bicarbonate and precipitates as $CaCO_3$. Ordinarily, magnesium will not replace calcium to any great extent but, if calcium is precipitated as it is released, the reaction proceeds toward completion.

As calcium and magnesium are lost from water, the relative proportion of sodium is increased with an attendant increase in the sodium hazard. This hazard can be evaluated in terms of the residual sodium carbonate (RSC) as proposed by Eaton (1950) and defined as

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

in which the concentrations are expressed in equivalents per million (epm). Studies by Wilcox et al. (1954) indicate that waters with more than 2.5 epm of RSC are probably not suitable for irrigation purposes. Water containing 1.25 epm to 2.5 epm are marginal, and those containing less than 1.25 epm of RSC are probably safe. Some marginal waters, with good management practices and proper use of amendments, particularly gypsum, may be made safe for irrigation use. A condition not provided for by the RSC concept has been encountered in recent years. If the concentrations of both calcium and bicarbonate are about equal and high, i.e., in the order of 10 epm or greater, the RSC will be low or possibly zero. Such waters will precipitate some calcium carbonate and should be considered at least marginal.

Phytotoxic substances: Boron. The occurrence of boron in toxic concentrations in certain irrigation waters makes it necessary to consider this constituent when assessing the quality of water.

Plant species differ markedly in the their tolerance to high concentrations of boron. In areas where boron occurs in excess in the soil or in the irrigation water, boron-tolerant crops may grow satisfactorily, whereas sensitive crops may fail.

Other substances. Very few substances other than boron occur in toxic concentrations in natural waters. However, many substances in industrial wastes that are discharged into surface streams are probably toxic to plants. Wilcox (1959) assembled information on a number of such substances for which the phytotoxic properties are known. If the presence of pollutants is suspected, great care should be exercised in the use of the water for irrigation.

The quality of irrigation water is classified by the amount of critical material determined in a water analysis. A water analysis is classified by plotting, as coordinates, the numerical value for specific conductance and SAR on figure 2, p. 14. The position of the point determines the quality classification of the

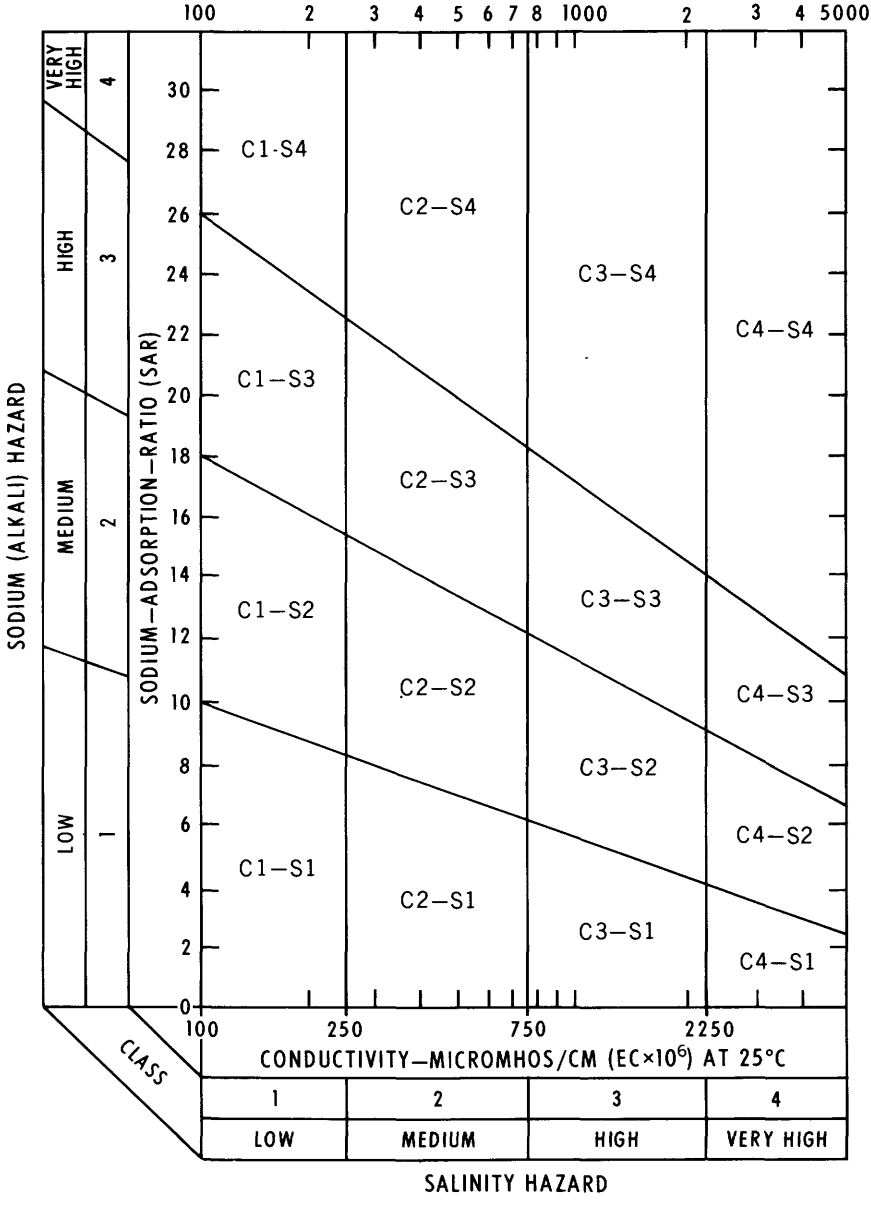

Figure 2.—Diagram for the classification of irrigation waters (U.S. Salinity Laboratory Staff, 1954).

water. The significance and interpretation of these quality ratings are summarized below.

Salinity Classification:

C1. Low-salinity water can be used for irrigation with most crops on most soils, with little likelihood that a salinity problem will develop. Some leaching is required, but this occurs under normal irrigation practices except in soils of extremely low permeability.

C2. Medium-salinity water can be used if a moderate amount of leaching occurs. Plants with moderate salt tolerance can be grown in most instances without special practices for salinity control.

C3. High-salinity water cannot be used on soil with restricted drainage. Even with adequate drainage, special management for salinity control may be required, and plants with good salt tolerance should be selected.

C4. Very high-salinity water is not suitable for irrigation under ordinary conditions but may be used occasionally under very special circumstances. The soil must be permeable, drainage must be adequate, irrigation water must be applied in excess to provide considerable leaching, and very salt-tolerant crops should be selected.

Sodium Classification:

S1. Low-sodium water can be used for irrigation on almost all soils, with little danger of the development of a sodium problem. However, sodium-sensitive crops, such as stone-fruit trees and avocados, may accumulate injurious amounts of sodium in the leaves.

S2. Medium-sodium water may present a moderate sodium problem in fine-textured (clay) soils unless there is gypsum in the soil. This water can be used on coarse-textured (sandy) or organic soils that take water well.

S3. High-sodium water may produce troublesome sodium problems in most soils and will require special management—good drainage, high leaching, and additions of organic matter. If there is plenty of gypsum in the soil, a serious problem may not develop for some time. If gypsum is not present, it or some similar material may have to be added.

S4. Very-high sodium water is generally unsatisfactory for irrigation except at low- or medium-salinity levels where the use

of gypsum or some other amendment makes it possible to use such water. (Wilcox and Durum, 1965.)

DISCUSSION OF RESULTS

HUDSON BAY AND UPPER MISSISSIPPI RIVER BASINS

Red River of the North basin.—During the 1962 water year, runoff in the Red River of the North basin was much higher than the long-term average. Gaging stations on the main stem reported increases of 2 to 3 times the long-term averages. The runoff was about 3 percent of the 32-year average for Souris River near Westhope, N. Dak., and about 56 percent of the 13-year average for Sheyenne River near Warwick, N. Dak. For the Souris River near Westhope, N. Dak., the weighted average of dissolved solids was 921 ppm for 1962 as compared with the 8-year average of 456 ppm; the dissolved-solids content was the lowest on record. For the Sheyenne River near Warwick, N. Dak., the weighted average of dissolved solids was 389 ppm as compared with the 12-year average of 399 ppm.

MISSOURI RIVER BASIN

Missouri River main stem.—Drought conditions that prevailed in the Missouri River basin upstream from Williston, N. Dak., in 1961 were eased by precipitation, which averaged about 2.5 inches above normal in central and eastern Montana. Damaging floods occurred on several minor tributaries. There was no new construction during the year.

The following dams regulate the Missouri River: Canyon Ferry and Fort Peck—upstream from Williston, N. Dak.; Garrison, Oahe, Fort Randall, and Gavins Point (Lewis and Clark)—between Williston, N. Dak., and Nebraska City, Nebr. Main-stem reservoirs had a total of 38,512,000 acre-feet on Sept. 30, 1962, an increase of 13,397,000 acre-feet from Sept. 30, 1961. At Williston, N. Dak., runoff during 1962 was about 67 percent greater than runoff dur- 1961 and about 7 percent greater than the 19-year average after operational level was reached at Fort Peck Reservoir. The weighted average of dissolved solids was 434 ppm compared with the average of 418 ppm for 1951–62. At Nebraska City, Nebr., runoff during 1962 was 16 percent greater than runoff during 1961 and about 3 percent less than the 33-year average. The weighted average of dissolved solids was 394 ppm as compared with 425 ppm for the period 1951–62.

Yellowstone River basin.— Runoff from the basin was 113 percent of the long-term average as compared with 46 percent for 1961.

Runoff of Powder River near Locate, Mont., was 178 percent of the 24-year average and was third highest on record.

The chemical constituents in the water did not vary significantly in proportion to the dissolved-solids content. In all tributaries sampled, except the Powder River, the dissolved-solids content was below average. The concentration in the Powder River was 307 percent of the 12-year average, and the annual dissolved-solids load was 248 percent of the previous maximum annual load. As in other years the Bighorn River was the major contributor to the dissolved-solids load.

Major reservoirs in operation in the Yellowstone River basin are Buffalo Bill Reservoir on the Shoshone River; Bull Lake, Pilot Butte, and Boysen Reservoirs on the Wind River; and Tongue River Reservoir in Montana. Yellowtail Dam is under construction on the Bighorn River. No significant changes in impoundment or diversions were made during the year. There were no variations in methodology from that proposed for irrigation network stations.

James River basin.—During the first 6 months of the 1962 water year, no flow was reported at most gaging stations in the James River basin. Runoff from record snow fall resulted in early spring flooding. Maximum stage for the 1962 flood exceeded that for the 1960 flood by about a foot. Rains in May again caused flood stages in the James River basin. Summer rains kept runoff above normal.

At the gaging station at Huron, S. Dak., the highest stage since 1922 was on Apr. 2, 1962, and runoff was over 5 times that for 1961 and almost 3 times the 23-year average. The weighted average of dissolved solids for 1962 was 375 ppm as compared with the 6-year average of 403 ppm and was 228,700 tons (highest on record) as compared with 7,920 tons for 1961. Although the samples for chemical analysis were collected upstream from the gage and upstream from the diversion of water to the city of Huron, the weighted average reflects only the quality of the water passing the gage.

Platte River basin.—Runoff from the North Platte River basin downstream from Guernsey, Wyo., was 71 percent of the 60-year average and 13 percent greater than runoff during 1961. No data are available for the chemical quality of the water in the Platte River basin in Wyoming, and no changes were made in impoundments or diversions in 1962. Precipitation and runoff varied considerably in the Platte River basin in Nebraska during the 1962 water year.

At South Platte River at Julesburg, Colo., runoff was 88 percent greater than that during 1961 and 83 percent greater than the 60-year average; the weighted average of dissolved solids for 1962 was 1,280 ppm as compared with the 12-year average of 1,220 ppm. At Platte River at Brady, Nebr., runoff was 20 percent less than that in 1961; the weighted average of dissolved solids for 1962 was 512 ppm as compared with 481 ppm for the 12-year average. At Supply Canal (Tri-County Diversion) near Maxwell, Nebr., the runoff was 13 percent greater than it was in previous years; the weighted average of dissolved solids for 1962 was 742 ppm as compared with the 12-year average of 572 ppm.

LOWER MISSISSIPPI RIVER BASIN

Arkansas River basin.—Runoff at Arkansas River below John Martin Reservoir, Colo., increased 29 percent over the preceding year, but was still 34 percent below the average discharge of 24 years of record.

Runoff at stations on the Arkansas River at Arkansas City, Kans., and on the Canadian River near Whitefield, Okla., was greater in 1962 than in 1961. Runoff at stations on the Arkansas River at Ralston, Okla., and on the Cimarron River at Perkins, Okla., was less in 1962 than in 1961. In 1962, runoff at the station on the Canadian River near Whitefield was about 24 percent less than the long-term average. At other stations, runoff exceeded the long-term average as follows: Arkansas River at Arkansas City, 57 percent; Arkansas River at Ralston, 46 percent; and Cimarron River at Perkins, 4 percent.

The greater runoff in 1962 of the Arkansas River at Arkansas City resulted in a lower dissolved-solids content. The weighted average dissolved-solids content of the water was 621 ppm in 1961 and 619 ppm in 1962. Runoff was about 16 percent greater in 1962. At the Ralston station, the weighted average dissolved-solids content was 530 ppm in 1961 and 619 ppm in 1962. Runoff was about 9 percent less in 1962 than in 1961.

The lower runoff in 1962 of the Cimarron River at Perkins resulted in a higher dissolved-solids content. Weighted averages were 2,320 ppm in 1961 and 2,410 ppm in 1962. Runoff was about 7 percent less in 1962 than in 1961. Higher runoff of the Canadian River near Whitefield resulted in a lower dissolved-solids content. Weighted averages were 451 ppm in 1961 and 416 ppm in 1962. Runoff was about 7 percent greater in 1962 than in 1961.

At all stations, weighted averages of percent sodium and sodium-adsorption-ratio were about the same in 1962 as in 1961.

Red River basin.—Water discharge of the Red River at Denison Dam near Dension, Tex., during the 1962 water year was 87 percent of the average discharge for the 39 years of record. The weighted average of dissolved-solids content was 1.56 tons per acre-foot, second only to the 1.60 tons per acre-foot in 1961, which was the highest since chemical-quality records began in 1944.

WESTERN GULF OF MEXICO BASINS

In the Western Gulf of Mexico basins from the Sabine River to the Nueces River, streamflow was generally below normal. In all the basins, the weighted average of dissolved-solids content in 1962 was greater than in 1961. Streamflow of the Neches River at Evadale, Tex., in 1962 was less than half the 1961 streamflow, and the weighted-average of dissolved-solids content increased from 0.10 tons per acre-foot in 1961 to 0.14 tons per acre-foot in 1962. Streamflow of the Brazos River at Richmond, Tex., was less than 30 percent of the 1961 streamflow, and the weighted average of dissolved-solids content increased from 0.42 to 0.75 tons per acre-foot.

Rio Grande basin.—In the 1962 water year, streamflow of the Pecos River below Red Bluff Dam near Orla, Tex., was less than 30 percent of the 25-year average and less than half the 1961 streamflow. The weighted average of dissolved-solids content increased from 8.53 tons per acre-foot in 1961 to 12.5 tons per acre-foot in 1962. Storage in Red Bluff Reservoir at the end of the 1962 water year was 30,300 acre-feet, only 10 percent of capacity.

COLORADO RIVER BASIN

Colorado River main stem.—Runoff of Colorado River at Glenwood Springs, Colo., was about twice that of the preceding year. Flow was also about 20 percent greater than the average for 63 years of record.

The flow of Colorado River near Cisco, Utah increased to more than double that of the preceding year. The flow at this station was 16 percent higher than that of the average for 51 years of record.

Discharge of Colorado River below Hoover Dam, Ariz.-Nev., is controlled by release from Lake Mead since February 1, 1935. The usable contents of Lake Mead increased by 33 percent during the water year, and the dissolved-solids content of water released was slightly higher than in 1961 water year. A steady increase in the mineralization of water released from Hoover Dam has been observed for the past few years. For example, in 1959 water year

the average concentration was 0.85 tons per acre-foot; in 1962 water year it is 0.99 tons per acre-foot.

Gunnison River basin.—Flow of the Gunnison River near Grand Junction, Colo., increased to better than double what it had been the previous year. The flow at this station was about 15 percent higher in 1962 than the average for 54 years of record.

Green River basin.—Discharge of the Green River near Greendale, Utah was about 3 times higher in 1962 than in 1961. The flow in 1962 was 38 percent higher than the average for the last 12 years.

The flow of the Green River at Green River, Utah increased to almost three times that of the previous year and was about 24 percent higher than the average for 63 years of record.

San Juan River basin.—Although flow of the San Juan River near Bluff, Utah increased 27 percent in 1962, it was still 24 percent below the average for 48 years of record. Navajo Dam, one of the four large storage units of the Colorado River Storage Project, was closed in June 1962 and water from the headwaters of the San Juan River basin began forming Navajo Lake. The dam and reservoir are about 40 miles east of Farmington, N. Mex.

Virgin River basin.—Flow of the Virgin River at Littlefield, Ariz., increased 31 percent over the average for the previous year, but remained 15 percent below the average for the past 33 years.

THE GREAT BASIN

Sevier Lake basin.—Discharge of Sevier River below Piute Dam near Marysvale, Utah increased 62 percent over the flow of the previous year, but it still remained 24 percent lower than the previous 50-year average.

Flow of Sevier River near Lynndyl, Utah (at gage) increased 63 percent, but still it was 14 percent lower than the average for 25 years of record. About 1,700 acre-feet of water entered the river during 1962 water year from a deep well just downstream from the sampling station and upstream from the gaging station. Discharge data in this report differ from those published for the gaging station by the amount added from the well.

Humboldt River basin.—A new station was established on the Humboldt River at Palisades, Nev. Chemical analysis for the new station covered the latter 45 percent of the annual flow. Runoff at the Humboldt River near Rye Patch, Nev., increased nearly 600 percent and the corresponding decrease in dissolved-solids content was about one-third of the average for the preceding year.

PACIFIC SLOPE BASINS IN CALIFORNIA

San Joaquin River basin. — Flow in the basin, although only half as great as the long-term average, was over three times as great as the preceding year. The chemical quality of the outflow showed an improvement over the preceding year. The weighted-average of dissolved solids for the San Joaquin River near Vernalis decreased from 578 ppm in the previous year to 321 ppm. The specific conductance at this station averaged 54 percent less than during the previous year.

Because of extensive development and widespread irrigation practices in the basin, the San Joaquin River channel at times carries mainly irrigation return water of poor chemical quality. The deterioration of the water quality is furthered by recycling the water from near the mouth of the river to mid-basin by means of pumps and canals.

Sacramento River basin. — Flow in the basin was 10 percent greater than during the 1961 water year. Water released from Folsom Reservoir increased the flow at American River at Fair Oaks about 50 percent over that of the preceding year. Changes in chemical quality at this station were slight inspite of the increased flow. The weighted-average of dissolved solids decreased from 54 ppm in 1961 to 43 ppm in 1962 and the specific conductance decreased from 65 micromhos to 61 micromhos. This station was discontinued at the end of the water year.

The flow at Feather River at the Nicolaus increased approximately 70 percent over that of the previous year. Chemical changes at the Nicolaus station were similar to those occurring on the American River. The weighted-average of dissolved solids decreased from 76 ppm in 1961 to 67 ppm in 1962 and the specific conductance decreased from 108 micromhos to 93 micromhos. This station was discontinued as an irrigation station at the end of the water year.

PACIFIC SLOPE BASINS IN WASHINGTON AND UPPER COLUMBIA RIVER BASIN

Columbia River main stem. — Average daily dissolved-solids load decreased 11 percent in 1962. This was primarily due to a 14 percent decrease in water discharge in comparison to the 1961 water year.

Yakima River basin. — Even though the dissolved-solids content in tons per acre-foot increased 17 percent from the previous year, a 37 percent decrease in water discharge caused a 20 percent decrease in the average tons per day of dissolved solids.

Summary of water discharge, and tonnages of dissolved solids—1961–62

Station	Runoff (acre-feet)	Dissolved solids (tons per acre-foot)
Red River of the North basin:		
Sheyenne River near Warwick, N. Dak	20,730	0.53
Souris (Mouse) River near Westhope, N. Dak	3,310	1.25
Missouri River main stem:		
Missouri River near Williston, N. Dak	17,200,000	.59
Missouri River at Nebraska City Nebr	23,680,000	.54
Yellowstone River basin:		
Yellowstone River near Sidney, Mont	10,450,000	.62
Bighorn River at Bighorn, Mont	2,017,000	.90
Tongue River at Miles City, Mont	338,400	.54
Powder River near Locate, Mont	761,300	1.83
James River basin:		
James River at Huron, S. Dak	448,600	.51
Platte River basin:		
Platte River at Brady, Nebr	202,800	.70
Supply Canal (Tri-County Diversion) near Maxwell, Nebr	993,400	1.01
South Platte River at Julesburg, Colo	614,600	1.74
Arkansas River basin:		
Arkansas River below John Martin Reservoir, Colo	168,400	2.41
Arkansas River at Arkansas City, Kans	2,030,000	.84
Arkansas River at Ralston, Okla	5,008,000	.83
Cimarron River at Perkins, Okla	973,600	3.27
Canadian River near Whitefield, Okla	3,396,000	.57
Arkansas River at Van Buren, Ark		
Red River basin:		
Red River at Denison Dam, near Denison, Tex	3,277,000	1.60
Sabine River basin:		
Sabine River near Ruliff, Tex	5,429,000	.14
Neches River basin:		
Neches River at Evadale, Tex	3,746,000	.14
Trinity River basin:		
Trinity River at Romayor, Tex	2,325,000	.40
Brazos River basin:		
Brazos River at Richmond, Tex	3,264,000	.76
Colorado River basin:		
Colorado River at Austin, Tex	1,023,000	.40
Colorado River at Wharton, Tex	1,243,000	.41
Guadalupe River basin:		
Guadalupe River at Victoria, Tex	661,900	.44
Nueces River basin:		
Nueces River near Mathis, Tex	80,080	.48
Rio Grande basin:		
Rio Grande above Culebra Creek, near Lobatos, Colo	326,560	.30
Rio Grande at Otowi Bridge, near San Ildefonso, N. Mex	1,039,600	.29
Rio Grande conveyance channel at San Marical, N. Mex	534,300	.56
Rio Grande floodway at San Marcial, N. Mex	213,718	.38
Rio Grande below Elephant Butte Dam, N. Mex	691,500	.53
Rio Grande near El Paso, Tex	366,400	1.08
Rio Grande below Fort Quitman, Tex	53,240	3.73
Rio Grande at Upper Presido, Tex	18,951	1.22
Rio Grande at Langtry, Tex	718,600	.86
Rio Grande at Laredo, Tex	1,312,000	.79
Rio Grande at Falcon Dam - U.S. tailrace	2,611,000	.63
Pecos River below Alamogordo Dam, N. Mex	135,600	1.89
Pecos River near Artesia, N. Mex	127,800	3.57
Pecos River below Red Bluff Dam, near Orla, Tex	44,450	12.50
Pecos River near Shumla, Tex	101,800	2.74

Summary of water discharge, and tonnages of dissolved solids—1961–62—Continued

Station	Runoff (acre-feet)	Dissolved solids (tons per acre-foot)
Colorado River main stem:		
Colorado River near Glenwood Springs, Colo	2,391,600	0.33
Colorado River near Cisco, Utah	6,696,000	.66
Colorado River at Lees Ferry, Ariz	14,770,000	.69
Colorado River near Grand Canyon, Ariz	15,250,000	.72
Colorado River below Hoover Dam, Ariz.-Nev	8,304,000	.99
Diversions and return flows at and below Imperial Dam:		
Yuma Main Canal below Colorado River siphon, at Yuma, Ariz.	351,000	1.11
Gunnison River basin:		
Gunnison River near Grand Junction, Colo	2,194,000	.64
Green River basin:		
Green River near Greendale, Utah	3,746,000	.14
Green River at Green River, Utah	5,828,300	.54
San Juan River basin:		
San Juan River near Archuleta, N. Mex.	933,300	.21
San Juan River near Bluff, Utah	1,511,000	.55
Virgin River basin:		
Virgin River at Littlefield, Ariz	141,900	2.16
Gila River basin:		
Gila River at Kelvin, Ariz	285,900	.85
Gila River below Gillespie Dam, Ariz	8,530	8.34
Salt River below Stewart Mountain Dam, Ariz	524,900	.93
Verde River below Bartlett Dam, Ariz	330,700	.35
Sevier Lake basin:		
Sevier River below Piute Dam, near Marysvale, Utah	119,500	----------
Sevier River near Lynndyl, Utah	121,300	1.85
Humboldt River basin;		
Humboldt River at Palisade, Nev	----------	----------
Humboldt River near Rye Patch, Nev	----------	----------
San Joaquin River basin:		
San Joaquin River near Vernalis, Calif	1,487,000	.44
Sacramento River basin:		
Feather River at Nicolaus, Calif	4,388,000	.09
American River at Fair Oaks, Calif	2,028,000	.06
Columbia River main stem:		
Columbia River at Northport, Wash	69,284,000	.12
Yakima River basin:		
Yakima River at Kiona, Wash	1,992,000	.21
Snake River main stem:		
Snake River near Heise, Idaho	4,397,000	.30
Snake River at King Hill, Idaho	6,123,000	.44
Boise River basin:		
Boise River at Notus, Idaho	306,200	.55
Columbia River main stem:		
Columbia River near The Dalles, Oreg	122,600,000	.13
Willamette River basin:		
Willamette River at Salem, Oreg	15,205,000	.07

SNAKE RIVER BASIN

Snake River main stem.— The average dissolved-solids content increased only 3 percent with a 19 percent increase in water discharge at the Heise, Idaho station. Downstream at King Hill, Idaho the discharge increased 13 percent, but the chemical quality showed no significant change from the previous water year.

Boise River basin.— The average daily dissolved-solids content remained essentially the same as the 1961 water year even though discharge increased 12 percent.

PACIFIC SLOPE BASINS IN OREGON AND LOWER COLUMBIA RIVER BASIN

Columbia River main stem.— Discharge decreased 10 percent and the average daily dissolved-solids load decreased 7 percent from the preceding water year. The average daily dissolved-solids content remained essentially the same.

Willamette River basin.— There was no significant change in chemical quality, even though discharge decreased 20 percent from the 1961 water year.

Discharge data and dissolved-solids loads for stations operated in 1962 are summarized in the table on p. 22.

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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.--2,070 square miles, approximately, of which about 1,310 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: January 1951 to September 1962.
Water temperatures: January 1951 to September 1962.
EXTREMES, 1961-62.--Specific conductance: Maximum daily, 1,060 micromhos Mar. 27; minimum, 280 micromhos Apr. 8.
Percent sodium: *Maximum*, 49 Aug. 26 to Sept. 12; *minimum*, 13 Oct. 1-31.
Sodium-adsorption-ratio: Maximum, 2.83 Aug 26 to Sept 12; minimum, 0.42 Oct. 1-31.
EXTREMES, 1951-62.--Specific conductance: Maximum daily, 1,940 micromhos Feb. 1, 1955; minimum daily, 208 micromhos Apr. 7, 1960.
Percent sodium: Maximum, 66 July 8-18, 1955; minimum, 10 Aug. 15-31, 1959.
REMARKS.--Daily samples for chemical analysis composited by discharge. Records of specific conductance of daily samples available in district office at Lincoln, Nebr.

Chemical analyses, water year October 1961 to September 1962

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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. 1-31, 1961.	98	--	4.14		.61	--	3.87	.00	--	--	--	--	--	277	0.38	37	13	0.42	446	7.7
Nov. 1-30.....	143	--	4.28		.78	--	4.00	.00	--	--	--	--	--	283	.38	55	15	.54	472	7.3
Dec. 1-31.....	129	21.0	2.89	1.48	1.09	0.08	4.38	.00	1.00	0.15	0.01	0.04	0.04	323	.44	57	20	.74	524	7.3
Jan. 1-31, 1962.	98	--	4.60		1.44	--	4.64	.00	--	--	--	--	--	347	.47	46	24	.95	566	7.3
Feb. 1-28.....	72	--	4.98		1.57	--	5.11	.00	--	--	--	--	--	405	.55	40	24	.99	619	7.4
Mar. 1-26.....	72	--	5.20		1.70	--	5.24	.00	--	--	--	--	--	400	.54	39	25	1.05	638	7.4
Mar. 27-29.....	234	--	5.60		2.04	--	5.72	.00	--	--	--	--	--	453	.62	144	27	1.22	702	7.8
Mar. 30-31.....	1,115	14.0	1.65	1.15	1.04	.25	2.61	.00	1.19	.10	.01	.08	.12	256	.35	388	26	.88	400	7.5
Apr. 1-10.....	5,534	--	1.96		.91	--	1.85	.00	--	--	--	--	--	200	.27	1,505	32	.92	314	7.3
Apr. 11.....	230	16.0	1.65	1.15	1.39	.23	2.64	.00	1.37	.18	.02	.14	.07	296	.40	93	32	1.18	436	7.7
Apr. 12-30.....	1,572	--	3.20		2.35	--	3.47	.00	--	--	--	--	--	354	.48	757	42	1.86	555	7.5
May 1-15.....	440	--	4.54		2.91	--	5.00	.00	--	--	--	--	--	447	.61	268	39	1.93	692	7.8
May 16-24.....	1,514	--	5.20		2.39	--	5.24	.00	--	--	--	--	--	462	.63	951	32	1.48	698	7.8
May 25-31.....	1,694	--	5.74		3.39	--	5.80	.00	--	--	--	--	--	560	.76	1,290	37	2.00	828	7.9
June 1-15.....	1,752	19.0	3.14	2.39	4.13	.21	6.31	.00	2.89	.48	.02	.03	.28	595	.81	1,418	42	2.49	877	7.8
June 16-24.....	2,749	--	4.44		3.35	--	5.49	.00	--	--	--	--	--	484	.66	1,810	43	2.25	720	8.2
June 25-July 31.	1,923	--	4.40		3.31	--	5.56	.13	--	--	--	--	--	468	.64	1,224	43	2.23	710	8.3
Aug. 1-25.....	843	--	4.36		3.78	--	6.23	.00	--	--	--	--	--	466	.63	534	46	2.56	730	7.7
Aug. 26-Sept. 12	314	--	4.34		4.18	--	6.54	.00	--	--	--	--	--	493	.67	211	49	2.83	770	8.0
Sept. 13-30.....	204	22.0	2.50	1.89	2.31	.07	5.28	.00	1.19	.18	.01	.02	.12	397	.54	110	34	1.56	606	7.9
Total or weighted average	20,730	--	3.84		2.40	--	4.27	0.01	--	--	--	--	--	389	0.53	10,980	35	1.70	592	7.6

5-1240. SOURIS (MOUSE) 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, 11 miles downstream from Boundary Creek, and at mile 358.2 downstream from international boundary (Geological Survey river plan and profile).
DRAINAGE AREA.--17,600 square miles, approximately, of which about 10,700 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: June 1954 to September 1962.
Water temperatures: October 1954 to September 1955, October 1956 to September 1959, October 1960 to September 1962.
EXTREMES, 1961-62.--Specific conductance: Maximum daily, 3,900 micromhos Dec. 28; minimum daily, 536 micromhos Apr. 5.
Percent sodium: Maximum, 48 Sept. 1-30, minimum, 37 Apr. 8.
Sodium-adsorption-ratio: Maximum, 5.50 Dec. 22-28; minimum, 1.60 Apr. 1-7.
EXTREMES, 1956-62.--Specific conductance: Maximum daily, 4,750 micromhos Feb. 21, 1961; minimum daily, 232 micromhos Apr. 18, 1957.
Percent sodium: Maximum, 72 Aug. 19-31, 1961; minimum, 29 Mar. 26 to Apr. 12, 1957.
REMARKS.--Daily samples for chemical analysis composited by discharge. Records of specific conductance of daily samples available in district office at Lincoln, Nebr.

Chemical analyses, water year October 1961 to September 1962

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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. 1-31, 1961.	683	4.6	2.89	5.84	8.00	0.59	5.56	0.00	9.79	1.78	0.03	0.13	0.27	1,080	1.47	1,002	46	3.83	1,560	7.1
Nov. 1-30.....	202	--	11.70		9.18	--	7.38	.00	11.43	--	--	--	--	1,350	1.84	371	44	3.79	1,870	7.4
Dec. 1-21.....	46	2.8	6.24	11.60	14.14	1.00	12.87	.00	16.30	3.05	.04	.13	.48	2,040	2.77	127	43	4.73	2,710	7.9
Dec. 22-28.....	19	--	26.60		20.05	--	20.16	.00	22.90	--	--	--	--	3,060	4.16	79	43	5.50	3,790	7.9
Apr. 1-7, 1962..	37	--	3.40		2.09	--	1.82	.00	3.21	--	--	--	--	363	.49	19	38	1.60	570	7.0
Apr. 8.....	6	3.9	1.45	2.22	2.31	.25	2.10	.00	3.50	.51	.02	.12	.11	400	.54	3	37	1.70	633	7.3
Apr. 9-19.....	41	--	4.80		3.18	--	2.69	.00	4.56	--	--	--	--	514	.70	29	40	2.05	783	7.0
Apr. 20-30.....	31	--	6.74		5.09	--	4.08	.00	6.62	--	--	--	--	764	1.04	32	43	2.77	1,120	7.1
May 1-12.....	117	--	9.60		6.79	--	4.98	.00	10.06	--	--	--	--	1,080	1.47	171	41	3.10	1,480	7.5
May 13.....	13	2.6	3.64	6.58	6.74	.59	5.43	.00	10.64	1.38	.03	.10	.24	1,150	1.56	20	38	2.98	1,550	7.8
May 14-31.....	175	--	9.22		6.53	--	5.16	.00	9.20	--	--	--	--	1,020	1.39	243	41	3.04	1,440	7.5
June 1-15.....	128	6.3	2.84	5.35	5.79	.51	5.08	.00	7.75	1.18	.02	.12	.28	914	1.24	159	40	2.86	1,290	7.5
June 16-30.....	158	--	6.76		4.74	--	4.28	.00	6.50	--	--	--	--	763	1.04	164	41	2.58	1,100	7.3
July 1-31.....	400	--	5.84		4.70	--	3.57	.00	6.16	--	--	--	--	699	.95	380	45	2.75	1,020	7.2
Aug. 1-18.....	400	--	5.96		5.22	--	3.67	.00	6.45	--	--	--	--	753	1.02	409	47	3.02	1,080	7.0
Aug. 19.....	20	25.0	1.95	4.11	5.31	.43	3.82	.00	6.64	.96	.02	.23	.25	812	1.10	22	45	3.05	1,100	7.5
Aug. 20-31.....	219	--	6.16		5.52	--	3.87	.00	6.27	--	--	--	--	778	1.06	232	47	3.15	1,120	7.4
Sept. 1-30.....	619	--	6.40		5.83	--	3.87	.00	7.27	--	--	--	--	814	1.11	685	48	3.26	1,160	7.3
Total or weighted average	3,310	--	7.65		6.38	--	4.73	0.00	--	--	--	--	--	921	1.25	4,150	45	3.20	1,310	7.2

PART 6. MISSOURI RIVER BASIN

MISSOURI RIVER MAIN STEM

6-3300. MISSOURI RIVER NEAR WILLISTON, N. DAK.

LOCATION.--At gaging station at Lewis and Clark Highway bridge, 5 miles southwest of Williston, Williams County, 25 miles downstream from Yellowstone River, and at mile 1,553.1.
DRAINAGE AREA.--164,500 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: December 1950 to September 1962.
Water temperatures: May 1951 to September 1962.
EXTREMES, 1961-62.--Specific conductance: Maximum daily, 1,360 micromhos Dec. 28; minimum daily, 380 micromhos July 2.
Percent sodium: Maximum, 38 July 16-31; minimum, 29 July 1-15.
Sodium-adsorption-ratio: Maximum, 2.01 Dec. 25-31; minimum, 1.04 July 1-15.
EXTREMES, 1950-62.--Specific conductance: Maximum daily, 1,360 micromhos Dec. 28, 1961; minimum daily, 297 micromhos Mar. 19, 1960.
Percent sodium: Maximum, 43 Apr. 25-30, 1957; minimum, 24 May 27 to June 2, 1956.
REMARKS.--Daily samples for chemical analyses composited by discharge. Records of specific conductance of daily samples available in district office at Lincoln, Nebr.

Chemical analyses, water year October 1961 to September 1962

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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. 1-31, 1961.	1,338,585	--	4.84		2.39	--	3.18	0.00	--	--	--	--	--	439	0.60	799,189	33	1.54	692	7.2
Nov. 1-30.....	1,043,702	--	4.88		2.48	--	3.28	.00	--	--	--	--	--	470	.64	667,135	34	1.59	712	7.6
Dec. 1-11.....	261,382	9.6	3.04	2.14	2.65	0.11	3.47	.00	3.98	0.31	0.03	0.01	0.06	491	.67	174,540	33	1.65	736	7.4
Dec. 12-24.....	281,316	--	4.90		2.22	--	3.33	.00	--	--	--	--	--	450	.61	172,165	31	1.42	686	7.4
Dec. 25-31.....	231,729	--	7.96		4.00	--	5.28	.00	--	--	--	--	--	771	1.05	242,982	33	2.01	1,090	7.7
Jan. 1-31, 1962.	1,029,917	--	5.46		2.52	--	3.67	.00	--	--	--	--	--	505	.69	707,347	32	1.53	763	7.3
Feb. 1-19.....	852,456	--	4.94		2.35	--	3.03	.00	--	--	--	--	--	475	.65	550,687	32	1.49	700	7.2
Feb. 20-22.....	183,273	--	6.08		3.05	--	3.11	.00	--	--	--	--	--	617	.84	153,788	33	1.75	871	7.2
Feb. 23-28.....	198,982	--	4.98		2.31	--	3.06	.00	--	--	--	--	--	470	.64	127,189	32	1.46	707	7.3
Mar. 1-11.....	337,309	8.3	3.34	2.06	2.44	.12	3.54	.00	3.89	.31	.04	.00	.14	485	.66	222,489	31	1.48	734	7.3
Mar. 12-23.....	526,255	--	5.38		2.78	--	3.34	.00	--	--	--	--	--	515	.70	368,589	34	1.70	763	7.2
Mar. 24.....	72,397	12.0	2.89	1.65	2.57	.12	2.90	.00	3.58	.68	.03	.04	.12	464	.63	45,685	36	1.70	695	7.8
Mar. 25-31.....	515,663	--	4.06		2.26	--	2.59	.00	--	--	--	--	--	401	.55	281,222	36	1.59	619	7.1
Apr. 1-10.....	568,264	--	4.50		2.57	--	2.92	.00	--	--	--	--	--	443	.60	342,368	36	1.71	677	7.4
Apr. 11-19.....	429,679	--	4.88		2.70	--	3.23	.00	--	--	--	--	--	471	.64	275,235	36	1.73	717	7.3
Apr. 20-24.....	185,058	--	5.32		3.09	--	3.34	.00	--	--	--	--	--	517	.70	130,118	37	1.89	787	7.6
Apr. 25-30.....	275,861	--	4.40		2.44	--	2.85	.00	--	--	--	--	--	433	.59	162,449	36	1.64	660	7.6
May 1-13.....	494,559	--	4.04		1.96	--	2.75	.00	--	--	--	--	--	389	.53	261,641	33	1.38	574	7.5
May 14-27.....	753,362	--	3.22		1.74	--	2.36	.00	--	--	--	--	--	320	.44	327,863	35	1.37	490	7.1
May 28-June 7...	882,109	--	5.54		3.22	--	2.90	.00	--	--	--	--	--	586	.80	703,006	37	1.93	819	7.2

June 8-14, 1962.	559,954	--	3.86	2.13	--	2.59	.00	--	--	--	--	--	395	.54	300,807	36	1.53	595	7.5
June 15-30.....	2,037,739	11.0	2.45 | 1.07	1.65	.09	2.29	.00	2.71	.15	.02	.02	.08	332	.45	920,080	31	1.25	517	7.6
July 1-15.....	1,257,025	--	3.12	1.31	--	2.31	.00	--	--	--	--	--	279	.38	476,965	29	1.04	439	8.0
July 16-31.....	1,108,205	--	3.86	2.35	--	2.57	.00	--	--	--	--	--	412	.56	620,949	38	1.69	615	7.8
Aug. 1-31.....	1,008,397	--	4.46	2.52	--	2.85	.00	--	--	--	--	--	444	.60	608,910	36	1.69	668	7.3
Sept. 1-30.....	774,744	11.0	2.45 | 2.39	2.87	.05	3.23	.00	4.16	.28	.03	.00	.16	493	.67	519,450	37	1.85	728	7.8
Total or weighted average	17,200,000	--	4.48	2.32	--	2.92	0.00	--	--	--	--	--	434	0.50	10,519,450	33	1.50	654	7.4

MISSOURI RIVER MAIN STEM--Continued

6-8070. 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 1962.
Water temperatures: May 1951 to September 1962.
EXTREMES, 1961-62.--Specific conductance: Maximum daily, 867 micromhos Nov. 1; minimum daily, 346 micromhos Apr. 4.
Percent sodium: Maximum, 37 Oct. 1-16; minimum, 16 Apr. 1-5.
Sodium-adsorption-ratio: Maximum, 1.75 Dec. 17 to Jan 28; minimum, 0.46 Apr. 1-5.
EXTREMES, 1951-62.--Specific conductance: Maximum daily, 936 micromhos Jan. 6, 1953; minimum daily, 327 micromhos Apr. 4, 1960.
Percent sodium: Maximum, 43 May 29, 1956; minimum, 16 Apr. 11-15, 1960, Apr. 1-5, 1962.
REMARKS.--Daily samples for chemical analysis composited by discharge. Records of specific conductance of daily samples available in district office at Lincoln, Nebr.

Chemical analyses, water year October 1961 to September 1962

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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. 1-16, 1961.	948,575	--	4.46		2.57	--	3.21	0.00	--	--	--	--	--	459	0.62	592,139	37	1.72	704	7.2
Oct. 17-31.....	429,620	--	5.00		2.57	--	3.85	.00	--	--	--	--	--	459	.62	268,186	34	1.62	743	7.3
Nov. 1-30.....	855,669	--	4.88		2.44	--	3.80	.00	--	--	--	--	--	455	.62	529,488	33	1.56	715	7.2
Dec. 1-12.....	314,896	21.0	3.24	1.73	2.44	0.17	3.85	.00	2.94	0.79	0.02	0.06	0.13	467	.64	199,997	32	1.55	724	7.3
Dec. 13-16.....	47,603	--	6.14		2.78	--	4.93	.00	--	--	--	--	--	554	.75	35,866	31	1.59	837	7.6
Dec. 17-Jan. 28. 1962.....	1,113,025	--	5.08		2.78	--	3.95	.00	--	--	--	--	--	499	.68	755,343	35	1.75	778	7.3
Jan. 29-Feb. 10.	388,324	--	4.44		2.31	--	3.41	.00	--	--	--	--	--	434	.59	229,204	34	1.55	678	7.6
Feb. 11-28.....	661,567	--	4.52		2.13	--	3.29	.00	--	--	--	--	--	434	.59	390,483	32	1.42	667	7.3
Mar. 1-18.....	528,754	--	4.94		2.39	--	3.67	.00	--	--	--	--	--	458	.62	329,350	33	1.52	706	7.5
Mar. 19-22.....	247,696	--	4.00		1.65	--	3.02	.00	--	--	--	--	--	366	.50	123,293	29	1.17	569	7.3
Mar. 23-26.....	540,694	--	3.64		1.17	--	2.80	.00	--	--	--	--	--	311	.42	228,692	24	.87	485	7.2
Mar. 27-29.....	678,347	--	3.08		.74	--	2.49	.00	--	--	--	--	--	247	.34	227,870	19	.60	396	7.5
Mar. 30-31.....	585,124	12.0	2.10	.80	.65	.26	2.39	.00	.98	.20	.02	.12	.06	220	.30	175,069	17	.54	365	7.4
Apr. 1-5.....	1,079,008	--	3.06		.57	--	2.39	.00	--	--	--	--	--	235	.32	344,851	16	.46	372	7.6
Apr. 6-13.....	1,175,484	--	3.46		.70	--	2.59	.00	--	--	--	--	--	265	.36	423,645	17	.53	420	7.0

Apr. 14-18, 1962	465,917	--	4.02		0.87	--	2.85	.00	--	--	--	--	--	315	0.43	199,599	18	0.61	490	7.5
Apr. 19-30.....	850,433	--	4.46		1.09	--	3.05	.00	--	--	--	--	--	356	.48	411,746	20	.73	548	7.2
May 1-21.....	1,368,714	--	5.14		2.04	--	3.51	.00	--	--	--	--	--	444	.60	826,484	28	1.28	695	7.3
May 22-31.....	964,364	--	4.22		1.44	--	3.08	.00	--	--	--	--	--	362	.49	474,775	25	.99	563	7.0
June 1-30.....	3,237,025	17.0	2.99	1.40	1.31	.20	3.20	.00	2.17	.34	.02	.07	.07	361	.49	1,589,250	22	.88	560	7.8
July 1-31.....	2,982,149	--	4.68		1.70	--	3.28	.00	--	--	--	--	--	408	.55	1,654,735	27	1.11	617	7.7
Aug. 1-31.....	2,117,018	--	5.12		2.26	--	3.34	.00	--	--	--	--	--	467	.64	1,344,561	31	1.41	688	7.2
Sept. 1-30.....	2,098,711	12.0	3.34	1.65	2.39	.17	3.21	.00	3.62	.51	.03	.05	.12	467	.64	1,332,933	32	1.51	705	7.6
Total or weighted average	23,680,000	--	4.47		1.74	--	3.20	0.00	--	--	--	--	--	394	0.54	12,690,000	25	1.10	607	7.4

YELLOWSTONE RIVER BASIN

6-3295. YELLOWSTONE RIVER NEAR SIDNEY, MONT.

LOCATION.--At bridge on State Highway 23, 2 miles south of Sidney, Richland County, 4.5 miles downstream from gaging station, 2 miles downstream from Fox Creek, and 30 miles upstream from mouth.
DRAINAGE AREA.--69,103 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1951 to September 1962.
Water temperatures: January 1951 to September 1962.
EXTREMES, 1961-62.--Specific conductance: Maximum daily, 1,180 micromhos Dec. 22-24; minimum daily, 332 micromhos July 2.
Percent sodium: Maximum, 40 Aug. 17-31; minimum, 28 June 25 to July 14.
Sodium-adsorption-ratio: Maximum, 2.18 Apr. 11-23; minimum, 0.96 June 25 to July 14.
EXTREMES, 1951-62.--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, 21 June 14-26, 1959.
REMARKS.--Daily samples for chemical analysis composited by discharge. Records of specific conductance of daily samples available in district office at Worland, Wyo. No appreciable inflow between gaging station and sampling point.

Chemical analyses, water year October 1961 to September 1962

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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. 1-21, 1961.	367,254	--	3.64	1.81	3.39	--	3.38	.00	5.45	--	--	--	--	576	.78	287,692	38	2.05	843	7.8
Oct. 22-31.....	172,899	--	3.39	1.65	3.05	--	3.16	.00	4.87	--	--	--	--	524	.71	123,215	38	1.92	770	7.7
Nov. 1-19.....	313,585	--	5.30		3.26	--	3.18	.00	5.25	--	--	--	--	544	.74	232,003	38	2.00	816	7.6
Nov. 20-30.....	153,207	--	5.66		3.44	--	3.43	.00	4.91	--	--	--	--	582	.79	121,267	38	2.04	859	7.6
Dec. 1-16.....	134,876	--	5.92		3.39	--	3.61	.00	5.00	--	--	--	--	615	.84	112,810	36	1.97	856	7.8
Dec. 17-27.....	95,804	17.0	4.19	3.45	4.31	0.09	4.79	.00	6.33	0.45	0.03	0.02	0.26	775	1.05	100,977	36	2.20	1,100	7.9
Dec. 28-Jan. 14, 1962.....	227,496	--	5.76		3.09	--	3.62	.00	4.77	--	--	--	--	560	.76	173,261	35	1.82	813	7.7
Jan. 15-19.....	29,355	--	5.84		3.39	--	3.70	.00	5.16	--	--	--	--	595	.81	23,754	37	1.99	843	7.9
Jan. 20-31.....	92,636	--	6.32		3.78	--	3.67	.00	5.98	--	--	--	--	662	.90	83,402	37	2.13	942	7.8
Feb. 1-6.....	91,839	--	5.72		3.18	--	3.54	.00	4.81	--	-	--	--	567	.77	70,819	36	1.88	844	7.5
Feb. 7-13.....	144,397	11.0	2.64	1.56	2.31	.10	2.59	.00	3.60	.24	.02	.02	.13	419	.57	82,283	35	1.59	632	7.6
Feb. 14-Mar. 2..	393,164	--	5.60		3.13	--	2.74	.00	5.41	--	--	--	--	576	.78	307,989	36	1.87	831	7.2
Mar. 3-15.....	151,152	--	7.10		3.96	--	3.93	.00	6.52	--	--	--	--	711	.97	146,158	36	2.10	1,010	7.7
Mar. 16-31.....	554,420	--	4.90		2.87	--	2.84	.00	4.52	--	--	--	--	506	.69	381,530	37	1.83	752	7.3
Apr. 1-10.....	219,372	--	5.92		3.52	--	3.44	.00	5.45	--	--	--	--	609	.83	181,693	37	2.05	889	7.5
Apr. 11-23.....	247,563	--	6.02		3.78	--	3.44	.00	8.20	--	--	--	--	629	.86	211,775	39	2.18	915	7.9
Apr. 24-May 10..	520,959	--	4.32		2.13	--	2.98	.00	3.27	--	--	--	--	407	.55	288,361	33	1.45	609	7.5
May 11-26.....	649,944	15.0	2.00	1.23	1.65	.07	2.36	.00	2.29	.16	.02	.01	.12	315	.43	278,436	33	1.30	482	7.5
May 27-June 6...	742,036	--	5.88		3.35	--	3.02	.00	5.91	--	--	--	--	604	.82	609,538	36	1.95	857	7.5
June 7-24.....	1,704,436	--	4.44		1.87	--	2.90	.00	3.12	--	--	--	--	398	.54	922,577	30	1.26	594	7.1
June 25-July 14.	1,544,727	--	3.00		1.17	--	2.18	.00	1.81	--	--	--	--	260	.35	546,216	28	.96	407	7.3

July 15-31, 1962	792,734	--	4.32	2.48	--	2.62	.00	3.83	--	--	--	--	435	.59	468,981	36	1.69	646	7.3
Aug. 1-16.....	392,886	--	4.68	2.65	--	2.77	.00	4.16	--	--	--	--	466	.63	248,995	36	1.73	692	7.4
Aug. 17-31.....	217,339	--	4.84	3.18	--	2.84	.00	4.75	--	--	--	--	508	.69	150,155	40	2.04	751	7.5
Sept. 1-9.....	130,921	--	5.06	3.18	--	3.21	.00	4.73	--	--	--	--	522	.71	92,943	39	2.00	781	7.5
Sept. 10-30.....	366,754	13.0	3.09 | 1.89	3.13	.09	3.10	.00	4.68	.31	.02	.00	.15	522	.71	260,366	38	1.98	767	7.8
Total or weighted average	10,450,000	--	4.65	2.49	--	2.88	0.00	4.01	--	--	--	--	458	0.62	6,507,000	35	1.60	677	7.4

YELLOWSTONE RIVER BASIN--Continued

6-2947. BIGHORN RIVER AT BIGHORN, MONT.

LOCATION.--At gaging station at bridge on U. S. Highway 10, 0.8 mile upstream from mouth, 1 mile southwest of Bighorn, Treasure County, and 4 miles east of Custer.
DRAINAGE AREA.--22,885 square miles.
RECORDS AVAILABLE.--Chemical analyses: February 1950 to September 1962.
Water temperature: April 1949 to September 1951, August 1952 to November 1958, June 1959 to September 1962.
Sediment records: July 1947 to September 1954, October 1955 to September 1958, October 1959 to September 1962.
EXTREMES, 1961-62.--Specific conductance: Maximum daily, 1,490 micromhos Dec. 14; minimum daily, 468 micromhos July 1.
Percent sodium: Maximum, 41 Oct. 1-31, May 18-31; minimum, 33 June 26-30.
Sodium-adsorption-ratio: Maximum, 2.83 Oct. 1-31; minimum, 1.32 June 26-30.
EXTREMES, 1951-62.--Specific conductance: Maximum daily, 1,940 micromhos July 10, 1961; minimum daily, 384 micromhos June 20, 1951.
Percent sodium: Maximum, 49 May 23-28, 1952; minimum, 27 June 20-21, 1955.
REMARKS.--Daily samples for chemical analysis composited by discharge. Records of specific conductance of daily samples available in district office at Worland, Wyo.

Chemical analyses, water year October 1961 to September 1962

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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. 1-12, 1961	78,569	--	5.24	2.88	5.70	--	4.03	0.00	9.51	--	--	--	--	917	1.25	97,985	41	2.83	1,240	8.1
Oct. 13-31.....	118,108	--	4.94	2.39	5.00	--	3.74	.00	8.47	--	--	--	--	820	1.12	131,714	41	2.61	1,130	7.9
Nov. 1-15.....	93,570	--	7.60		5.00	--	3.87	.00	8.06	--	--	--	--	807	1.10	102,695	40	2.57	1,130	7.4
Nov. 16-30.....	92,261	--	7.52		4.87	--	3.93	.00	7.70	--	--	--	--	798	1.09	100,129	39	2.51	1,120	7.7
Dec. 1-9.....	51,055	--	7.52		4.65	--	3.97	.00	6.93	--	--	--	--	797	1.08	55,339	38	2.40	1,110	7.8
Dec. 10-31.....	95,302	19.0	5.94	3.78	6.22	0.12	5.10	.00	10.33	0.56	0.03	0.02	0.25	1,060	1.44	137,387	39	2.82	1,410	8.2
Jan. 1-31, 1962	116,642	--	6.92		4.09	--	3.84	.00	6.33	--	--	--	--	720	.98	114,216	37	2.20	1,020	7.9
Feb. 1-20.....	194,698	--	5.80		3.35	--	2.95	.00	5.83	--	--	--	--	602	.82	159,403	37	1.97	864	7.1
Feb. 21-28.....	39,495	--	8.10		4.87	--	4.03	.00	8.24	--	--	--	--	851	1.16	45,710	38	2.42	1,160	7.6
Mar. 1-12.....	83,068	--	7.26		4.35	--	3.74	.00	7.04	--	--	--	--	740	1.01	83,599	37	2.28	1,040	7.5
Mar. 13-21.....	131,367	9.6	3.79	1.89	3.44	.09	3.03	.00	5.68	.31	.02	.02	.10	593	.81	105,945	37	2.04	854	7.6
Mar. 22-31.....	113,276	--	6.52		4.22	--	3.43	.00	6.64	--	--	--	--	701	.95	107,993	39	2.34	997	7.4
Apr. 1-17.....	123,378	--	7.56		5.09	--	3.84	.00	8.20	--	--	--	--	821	1.12	137,759	40	2.62	1,140	7.5
Apr. 18-23.....	56,767	--	6.50		4.13	--	3.51	.00	6.62	--	--	--	--	690	.94	53,270	39	2.29	991	7.6
Apr. 24-May 8..	139,954	--	5.70		3.35	--	3.20	.00	5.45	--	--	--	--	578	.79	110,015	37	1.98	845	7.2
May 9-17.....	75,314	--	4.82		2.57	--	2.72	.00	4.39	--	--	--	--	477	.65	48,858	35	1.65	707	7.1
May 18-31.....	142,897	--	5.80		4.05	--	3.20	.00	6.06	--	--	--	--	644	.88	125,155	41	2.38	929	7.7
June 1-13.....	131,246	--	5.48		3.31	--	3.05	.00	5.37	--	--	--	--	567	.77	101,207	38	2.00	821	7.2
June 14-25.....	212,263	--	4.70		2.65	--	2.82	.00	4.21	--	--	--	--	476	.65	137,411	36	1.73	702	7.2
June 26-30.....	121,388	14.0	2.15	1.32	1.74	.06	2.46	.00	2.60	.10	.01	.01	.07	343	.47	56,625	33	1.32	509	7.4

July 1-13, 1962	185,318	--	3.74	1.91	--	2.49	.00	2.94	--	--	--	--	359	.49	90,480	34	1.40	540	7.3
July 14-25.....	122,388	--	6.28	3.65	--	3.44	.00	6.10	--	--	--	--	648	.88	107,858	37	2.06	915	7.2
July 26-Aug. 5.	70,167	--	7.46	4.92	--	3.46	.00	8.12	--	--	--	--	801	1.09	76,437	40	2.55	1,100	7.4
Aug. 6-19.....	87,138	--	6.72	4.57	--	3.38	.00	7.29	--	--	--	--	730	.99	86,510	40	2.49	1,020	7.6
Aug. 20-31.....	52,435	13.0	4.74 | 2.55	4.96	.06	3.69	.00	8.12	.37	.02	.04	.16	806	1.10	57,477	40	2.60	1,120	7.5
Sept. 1-6.....	33,287	--	7.06	4.70	--	3.74	.00	7.70	--	--	--	--	777	1.06	35,175	40	2.50	1,090	7.8
Sept. 7-23.....	105,035	13.0	4.19 | 2.63	4.61	.09	3.52	.00	7.25	.34	.02	.02	.14	746	1.01	106,564	40	2.50	1,050	7.6
Sept. 24-30....	50,206	--	7.06	4.79	--	3.59	.00	7.79	--	--	--	--	783	1.06	53,463	40	2.55	1,090	7.7
Total or weighted average	2,017,000	--	6.26	3.91	--	3.37	0.00	6.32	--	--	--	--	662	0.90	2,626,000		2.18	937	7.4

YELLOWSTONE RIVER BASIN--Continued

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

LOCATION.--At gaging station, 4 miles south of Miles City, Custer County, and 8 miles upstream from mouth.
DRAINAGE AREA.--5,379 square miles.
RECORDS AVAILABLE.--Chemical analyses: January 1951 to September 1962.
Water temperatures: April 1949 to September 1962.
Sediment records: June 1946 to September 1951.
EXTREMES, 1961-62.--Specific conductance: Maximum daily, 1,420 micromhos Aug. 4; minimum daily, 346 micromhos Feb. 11.
Percent sodium: Maximum, 41 July 31 to Aug. 5; minimum, 20 Apr. 25 to May 8, June 8-11.
Sodium-adsorption-ratio: Maximum, 2.82 July 31 to Aug. 5; minimum, 0.65 June 8-11.
EXTREMES, 1951-62.--Specific conductance: Maximum daily, 2,390 micromhos Sept. 11, 1958; minimum daily, 288 micromhos June 21, 1953.
Percent sodium: Maximum, 69 May 4, 1955; minimum, 17 June 2-15, 1956, June 7-16, June 30 to July 12, 1957.
REMARKS.--Daily samples for chemical analysis composited by discharge. Records of specific conductance of daily samples available in district office at Worland, Wyo.

Chemical analyses, water year October 1961 to September 1962

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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. 1-21, 1961.	3,711	--	3.34	3.45	3.09	--	4.54	0.00	5.31	--	--	--	--	600	0.82	3,028	31	1.68	886	8.0
Oct. 22-31.....	1,198	--	3.59	4.03	3.74	--	5.23	.00	6.25	--	--	--	--	698	.95	1,137	33	1.92	1,010	8.0
Nov. 1-17.....	2,829	--	7.30		3.57	--	4.97	.00	5.64	--	--	--	--	654	.89	2,516	33	1.87	973	7.7
Nov. 18-22.....	339	12.0	3.34	5.02	4.92	0.13	5.74	.00	7.35	0.14	0.02	0.00	0.19	802	1.09	370	37	2.40	1,170	7.7
Nov. 23-30.....	1,541	--	7.66		3.61	--	4.98	.00	6.00	--	--	--	--	683	.93	1,431	32	1.84	1,000	7.7
Dec. 1-11.....	2,836	--	7.28		3.09	--	4.52	.00	4.93	--	--	--	--	645	.88	2,488	30	1.62	922	8.0
Dec. 12-31.....	5,355	--	9.28		3.48	--	5.77	.00	6.12	--	--	--	--	791	1.08	5,761	27	1.62	1,110	7.9
Jan. 1-8, 1962..	2,809	--	6.56		2.35	--	4.46	.00	3.89	--	--	--	--	536	.73	2,047	26	1.30	815	7.7
Jan. 9-22.....	3,055	--	8.64		2.78	--	5.74	.00	5.25	--	--	--	--	693	.94	2,879	24	1.34	994	8.1
Jan. 23-31.....	2,517	--	7.68		2.65	--	4.72	.00	5.33	--	--	--	--	634	.86	2,170	26	1.35	917	7.6
Feb. 1-12.....	5,427	--	2.70		1.09	--	2.23	.00	1.58	--	--	--	--	255	.35	1,882	29	.94	393	7.2
Feb. 13-24.....	6,141	--	4.84		1.48	--	3.34	.00	2.98	--	--	--	--	404	.55	3,374	23	.95	607	7.5
Feb. 25-Mar. 10.	10,524	--	8.62		2.48	--	5.43	.00	5.29	--	--	--	--	662	.90	9,475	22	1.19	951	7.9
Mar. 11-18.....	6,998	7.7	3.59	3.87	2.09	.14	4.75	.00	4.46	.28	.02	.02	.11	569	.77	5,415	22	1.08	843	7.9
Mar. 19-31.....	20,886	--	5.56		1.65	--	3.72	.00	3.31	--	--	--	--	439	.60	12,470	23	.99	677	7.6
Apr. 1-12.....	16,185	--	6.74		1.83	--	4.36	.00	3.96	--	--	--	--	516	.70	11,358	21	1.00	786	7.8
Mar. 13-24.....	10,949	--	7.02		2.18	--	4.47	.00	4.48	--	--	--	--	557	.76	8,294	24	1.16	832	7.7
Apr. 25-May 8...	19,188	--	5.90		1.44	--	3.84	.00	3.33	--	--	--	--	446	.61	11,639	20	.84	694	7.7

May 9-28, 1962..	32,608	--	4.30	1.39	--	3.21	.00	2.35	--	--	--	--	342	.47	15,167	24	.95	532	7.7
May 29-June 7...	23,226	--	3.30	1.39	--	2.80	.00	1.85	--	--	--	--	280	.38	8,845	30	1.08	458	7.3
June 8-11.....	11,187	7.7	1.80 | 1.48	.83	.06	2.59	.00	0.42	.00	.01	.00	.04	259	.35	3,940	20	.65	392	7.3
June 12-30.....	102,355	--	3.40	1.31	--	2.82	.00	1.81	--	--	--	--	289	.39	40,230	28	1.00	456	7.2
July 1-18.....	19,922	--	4.02	1.74	--	3.15	.00	2.52	--	--	--	--	347	.47	9,402	30	1.23	544	7.2
July 19-30.....	5,141	--	4.94	2.00	--	3.62	.00	3.16	--	--	--	--	415	.56	2,902	29	1.27	639	7.4
July 31-Aug. 5..	521	--	7.92	5.61	--	6.05	.00	7.27	--	--	--	--	829	1.13	588	41	2.82	1,180	8.0
Aug. 6-15.....	3,431	--	5.32	2.09	--	3.85	.00	3.41	--	--	--	--	442	.60	2,063	28	1.28	683	7.7
Aug. 16-31.....	4,253	--	5.92	2.57	--	4.23	.00	3.62	--	--	--	--	504	.69	2,915	30	1.49	763	7.8
Sept. 1-30.....	13,269	11.0	2.89 | 3.13	2.18	.12	3.97	.00	4.00	.09	.02	.01	.11	501	.68	9,041	26	1.25	743	7.3
Total or weighted average	338,400	--	4.85	1.68	--	3.49	0.00	2.88	--	--	--	--	397	0.54	182,800	23	1.08	609	7.4

6-3265. 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.
DRAINAGE AREA.--13,189 square miles.
RECORDS AVAILABLE.--Chemical analyses: December 1949 to September 1962.
Water temperatures: February 1951 to May 1954, October 1954 to September 1962.
Sediment records: March 1950 to September 1953.
EXTREMES, 1961-62.--Specific conductance: Maximum daily, 3,320 micromhos Dec. 16, minimum daily, 578 micromhos Feb. 1.
Percent sodium: Maximum, 47 July 14; minimum, 25 July 15-22.
Sodium-adsorption-ratio: Maximum, 4.75 Jan. 3; minimum, 1.77 July 15-22.
EXTREMES, 1951-62.--Specific conductance: Maximum daily, 9,270 micromhos Dec. 16, 1955; minimum daily, 317 micromhos July 5, 1961.
Percent sodium: Maximum, 83 Oct. 22-24, 1953; minimum, 17 Aug. 11-13, 1955.
REMARKS.--Daily samples for chemical analysis composited by discharge. Records of specific conductance of daily samples available in district office at Worland, Wyo.

Chemical analyses, water year October 1961 to September 1962

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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. 1-23, 1961.	5,246	--	8.83	4.69	10.01	--	3.84	.00	17.91	--	--	--	--	1,590	2.16	11,345	43	3.85	1,980	7.8
Oct. 24-Nov. 10.	4,034	--	12.76		9.27	--	3.90	.00	15.09	--	--	--	--	1,450	1.97	7,956	42	3.67	1,870	7.5
Nov. 11-30.....	3,245	8.2	9.03	6.50	13.05	0.19	4.20	.00	20.05	3.86	0.03	0.03	0.25	1,930	2.62	8,517	45	4.68	2,440	7.6
Dec. 1-11.....	2,182	--	15.20		10.14	--	4.29	.00	17.70	--	--	--	--	1,770	2.41	5,252	40	3.68	2,140	7.9
Dec. 12-Jan. 2, 1962.....	1,008	--	19.12		16.49	--	4.59	.00	26.65	--	--	--	--	2,560	3.48	3,509	46	5.33	3,040	7.8
Jan. 3.....	69	--	4.74	1.11	4.18	--	2.15	.17	6.97	--	--	--	--	--	--	--	--	4.75	952	8.3
Jan. 4-25.....	960	--	18.08		13.62	--	5.43	.00	26.86	--	--	--	--	2,280	3.10	2,977	42	4.53	2,710	7.7
Jan. 26-31.....	824	--	14.52		9.48	--	4.95	.00	16.86	--	--	--	--	1,660	2.26	1,859	40	3.52	2,060	7.6
Feb. 1-9.....	1,587	--	4.88		3.78	--	2.88	.00	5.43	--	--	--	--	590	.80	1,273	44	2.42	878	7.5
Feb. 10-22.....	73,797	--	7.96		3.92	--	2.80	.00	8.64	--	--	--	--	851	1.16	85,410	33	1.96	1,110	7.4
Feb. 23-Mar. 3..	2,446	--	13.04		8.70	--	3.33	.00	15.45	--	--	--	--	1,470	2.00	4,889	40	3.41	1,860	7.7
Mar. 4-19.....	10,536	--	13.98		9.31	--	3.65	.00	17.07	--	--	--	--	1,600	2.18	22,927	40	3.52	2,020	7.7
Mar. 20-24.....	20,747	7.3	4.24	2.39	4.35	.16	2.51	.00	7.33	.93	.02	.02	.10	734	1.00	20,711	39	2.39	1,040	7.7
Mar. 25-Apr. 3..	26,162	--	10.66		7.05	--	3.49	.00	12.33	--	--	--	--	1,200	1.63	42,696	40	3.05	1,580	7.5
Apr. 4-14.....	13,527	--	12.50		9.05	--	3.80	.00	15.53	--	--	--	--	1,470	2.00	27,044	42	3.62	1,890	7.7
Apr. 15-20.....	5,034	--	14.22		10.40	--	4.29	.00	17.07	--	--	--	--	1,670	2.27	11,433	42	3.90	2,110	7.8
Apr. 21-25.....	6,387	--	12.14		8.48	--	3.38	.00	14.45	--	--	--	--	1,390	1.89	12,074	41	3.44	1,810	7.5
Apr 26-May 11..	32,465	--	6.96		3.78	--	3.02	.00	6.75	--	--	--	--	706	.96	31,172	35	2.03	1,000	7.6
May 12-15.....	8,339	11.0	3.34	1.73	3.00	.09	2.66	.00	4.66	.59	.02	.02	.10	524	.71	5,942	37	1.89	764	7.5
May 16-23.....	11,488	--	5.84		4.35	--	3.29	.00	6.50	--	--	--	--	679	.92	10,609	43	2.55	979	7.6

May 24-31, 1962.	99,983	--	16.82	8.00	--	3.02	.00	19.78	--	--	--	--	1,770	2.41	240,679	32	2.76	2,100	7.4
June 1-9.....	73,386	12.0	11.08 | 5.10	8.13	.23	3.39	.00	19.53	.90	.02	.06	.19	1,690	2.30	168,671	33	2.86	2,020	7.3
June 10-13.....	21,755	--	12.48	7.70	--	3.20	.00	15.30	--	--	--	--	1,360	1.85	40,238	38	3.08	1,720	7.4
June 14-17.....	33,703	--	10.64	4.48	--	3.10	.00	11.10	--	--	--	--	1,020	1.39	46,753	30	1.94	1,320	7.5
June 18-29.....	135,955	--	13.66	5.96	--	2.82	.00	15.47	--	--	--	--	1,350	1.84	249,613	30	2.28	1,650	7.1
June 30-July 13.	43,597	--	11.28	6.09	--	3.06	.00	13.01	--	--	--	--	1,170	1.59	69,371	35	2.56	1,500	7.2
July 14.....	7,180	--	4.54	4.05	--	3.21	.00	5.18	.28	--	--	--	--	--	--	47	2.69	819	7.7
July 15-22.....	64,867	--	14.02	4.70	--	2.88	.00	15.09	--	--	--	--	1,290	1.75	113,803	25	1.77	1,560	7.4
July 23-31.....	11,746	--	16.60	10.66	--	3.47	.00	21.65	--	--	--	--	1,860	2.53	29,713	39	3.70	2,230	7.5
Aug. 1-13.....	17,353	--	17.72	9.44	--	3.13	.00	21.65	--	--	--	--	1,870	2.54	44,133	35	3.17	2,200	7.6
Aug. 14-31.....	8,819	11.0	13.17 | 6.33	12.18	.26	3.47	.00	25.61	1.86	.03	.03	.21	2,170	2.95	26,025	38	3.90	2,620	7.5
Sept. 1-8.....	2,206	--	19.94	14.88	--	3.21	.00	27.90	--	--	--	--	2,400	3.26	7,199	43	4.71	2,870	7.7
Sept. 9-26.....	5,570	--	17.30	13.05	--	3.38	.00	23.32	--	--	--	--	2,090	2.84	15,831	43	4.44	2,560	7.6
Sept. 27-30.....	5,133	--	17.12	12.75	--	4.10	.00	22.28	--	--	--	--	2,010	2.73	14,032	43	4.36	2,500	7.5
Total or weighted average	761,300	--	12.86	6.57	--	3.09	0.00	14.91	--	--	--	--	1,350	1.83	1,384,000	35	2.60	1,660	7.4

JAMES RIVER BASIN

6-4760. JAMES RIVER AT HURON, S. DAK.

LOCATION.--Just upstream from Chicago and North Western Railway Co. 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: April 1950 to September 1951, August 1956 to September 1962.
Water temperatures: August 1956 to September 1962.
EXTREMES, 1961-62.--Specific conductance: Maximum daily, 2,530 micromhos Feb. 24; minimum daily, 202 micromhos Mar. 27.
Percent sodium: Maximum, 62 Oct. 12-20, 22-26, 28-30; minimum, 24 Mar. 27-29.
Sodium-adsorption-ratio: Maximum, 6.28 Oct 12-20, 22-26, 28-30; minimum, 0.55 Mar. 27-29.
EXTREMES, 1956-62.--Specific conductance: Maximum daily, 2,640 micromhos Mar. 1, 1959; minimum daily, 176 micromhos Mar. 30, Apr. 2, 1960.
Percent sodium: Maximum, 62 Sept. 22-30, 1959, Oct. 12-20, 22-26, 28-30, 1962; minimum, 24 Mar. 29-30, 1960, Mar. 27-29, 1962.
REMARKS.--Records of specific conductance of daily samples available in district office at Lincoln, Nebr. During some periods, all flow is diverted from the channel near the sampling site and, therefore, does not pass the gaging station.

Chemical analyses, water year October 1961 to September 1962

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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. 12-20,22-26, 28-30, 1961...	799	5.9	2.50	3.78	11.14	0.51	4.75	0.00	8.58	4.46	0.02	0.04	0.66	1,130	1.54	1,228	62	6.28	1,730	7.3
Nov. 2, 3, 12...	64	8.6	2.84	3.70	9.22	.46	4.28	.00	8.58	3.36	.02	.01	.61	1,030	1.40	90	57	5.10	1,550	7.6
Feb. 23-28, 1962	208	13.0	7.14	6.33	11.66	.59	8.16	.00	13.43	3.98	.02	.10	.74	1,590	2.16	450	45	4.49	2,260	7.2
Mar. 1-23.....	260	--	8.32		5.26	--	4.98	.00	7.06	--	--	--	--	892	1.21	315	39	2.58	1,280	7.2
Mar. 24-26.....	1,636	--	4.56		2.83	--	2.82	.00	3.75	--	--	--	--	492	.67	1,095	38	1.87	758	7.3
Mar. 27-29.....	12,300	--	1.54		.48	--	1.11	.00	.90	--	--	--	--	153	.21	2,559	24	.55	247	7.0
Mar. 30-31.....	17,058	--	1.44		1.00	--	1.18	.00	1.00	--	--	--	--	182	.25	4,222	41	1.18	287	6.9
Apr. 1.....	10,909	7.0	.95	.65	1.44	.28	1.20	.00	1.52	.39	.02	.10	.10	224	.30	3,323	43	1.61	362	7.4
Apr. 2-7.....	63,753	--	1.32		.91	--	1.07	.00	1.04	--	--	--	--	168	.23	14,566	41	1.12	270	6.8
Apr. 8-11.....	21,326	--	1.56		.83	--	1.21	.00	1.10	--	--	--	--	182	.25	5,279	35	.94	279	7.0
Apr. 12-15.....	11,679	--	2.00		1.00	--	1.43	.00	1.44	--	--	--	--	222	.30	3,526	33	1.00	339	7.0
Apr. 16-30.....	23,147	--	2.76		1.65	--	2.08	.00	2.02	--	--	--	--	310	.42	9,759	37	1.41	480	7.2
May 1-21.....	27,491	--	4.62		3.18	--	3.85	.00	3.08	--	--	--	--	497	.68	18,582	41	2.09	776	7.7
May 22-31.....	34,017	--	3.70		2.26	--	2.75	.00	2.77	--	--	--	--	400	.54	18,505	38	1.66	618	7.5
June 1-30.....	82,116	--	4.30		2.61	--	3.38	.00	3.14	--	--	--	--	456	.62	50,925	38	1.78	707	7.4
July 1-14.....	27,019	--	4.76		3.26	--	4.33	.00	3.02	--	--	--	--	522	.71	19,181	41	2.11	791	7.4

July 15	1,860	24.0	2.54	2.30	3.70	.38	4.57	.00	3.04	1.18	.01	.03	.06	558	.76	1,412	41	2.37	832	7.7
July 16-31.....	23,738	--	4.82		3.26	--	4.67	.00	2.64	--	--	--	--	524	.71	16,917	40	2.10	798	7.4
Aug. 1-31.....	44,763	--	4.82		2.83	--	5.10	.00	1.89	--	--	--	--	491	.67	29,891	37	1.82	732	7.6
Sept. 1-29.....	43,140	--	4.88		2.48	--	5.34	.00	1.37	--	--	--	--	443	.60	25,991	34	1.59	688	7.5
Sept. 30.....	1,293	27.0	2.54	2.22	2.39	.33	5.18	.00	1.33	.73	.01	.01	.19	436	.59	767	32	1.55	671	7.7
Total or weighted average	448,600	--	3.51		2.61	--	3.11	0.00	2.11	--	--	--	--	375	0.51	228,600	43	1.60	578	7.2

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PLATTE RIVER BASIN

6-7660. PLATTE RIVER AT BRADY, NEBR.

LOCATION.--At gaging station at highway bridges, 0.5 mile and 2.5 miles south of Brady, Lincoln County, and 18 miles downstream from confluence of North Platte and South Platte Rivers.
DRAINAGE AREA.--56,900 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: November 1950 to September 1962.
Water temperatures: March 1951 to September 1962.
EXTREMES, 1961-62.--Specific conductance: Maximum daily, 1,460 micromhos Jan. 22 (chan. 1); minimum daily, 435 micromhos Sept. 17 (chan. 1).
Percent sodium: Maximum, 39 Aug. 1-31; minimum, 30 Mar. 1-31, June 1-30.
Sodium-adsorption-ratio: Maximum, 1.91 Aug. 1-31; minimum, 1.36 June 1-30.
EXTREMES, 1951-62.--Specific conductance: Maximum daily, 1,460 micromhos Jan. 22, 1962 (chan.1); minimum daily, 305 micromhos Jan. 13, 1956, Jan. 10, 1957 (chan. 1).
Percent sodium: Maximum, 46 Aug. 1-2, 1955; minimum, 22 Nov. 26, 1952.
REMARKS.--Daily samples for chemical analysis from each of two major channels composited by discharge. Composite period normally identical to those of Supply Canal (Tri-County Diversion) near Maxwell, Nebr. Records of specific conductance of daily samples taken at each of two major channels available in district office at Lincoln, Nebr.

Chemical analyses, water year October 1961 to September 1962

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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, 1961.	2,579	--	4.60		2.39	--	3.70	0.00	--	--	--	--	--	468	0.64	1,641	34	1.58	691	7.2
Oct. 11-31.....	5,998	--	4.46		2.26	--	3.69	.00	--	--	--	--	--	456	.62	3,720	34	1.51	675	7.2
Nov. 1-30.....	11,425	--	4.94		2.39	--	3.65	.00	--	--	--	--	--	496	.67	7,707	33	1.52	721	7.0
Dec. 1-16.....	7,680	36.0	3.89	1.89	2.91	0.28	3.93	.00	4.16	0.62	0.03	0.04	0.03	584	.79	6,100	32	1.71	841	7.6
Dec. 17-31.....	7,557	--	4.84		2.22	--	3.67	.00	--	--	--	--	--	488	.66	5,015	31	1.43	710	7.0
Jan. 1-31, 1962.	28,592	--	6.72		3.26	--	4.10	.00	--	--	--	--	--	665	.90	25,858	33	1.78	959	7.5
Feb. 1-28.....	26,325	--	5.48		2.52	--	3.47	.00	--	--	--	--	--	550	.75	19,691	32	1.52	779	7.2
Mar. 1-31.....	15,310	36.0	3.59	1.65	2.31	.25	3.57	.00	3.37	.54	.03	.03	.09	504	.69	10,494	30	1.42	735	7.5
Apr. 1-30.....	9,997	--	5.34		2.52	--	3.54	.00	--	--	--	--	--	519	.71	7,056	32	1.54	748	7.6
May 1-31.....	24,042	--	4.20		2.44	--	3.52	.00	--	--	--	--	--	443	.60	14,485	37	1.68	659	7.4
June 1-30.....	21,243	37.0	3.29	1.23	2.04	.28	3.65	.00	2.62	.42	.03	.02	.08	439	.60	12,683	30	1.36	644	7.6
July 1-31.....	15,187		4.40		2.13		3.46	.00						441	.60	9,109	33	1.44	649	7.7
Aug. 1-31.....	18,569		4.38		2.83		3.54	.00						481	.65	12,147	39	1.91	708	7.5
Sept. 1-30.....	8,331	34.0	3.14	1.32	2.61	.28	3.59	.00	3.12	.51	.03	.02	.12	479	.65	5,427	36	1.75	694	7.4
Total or weighted average	202,800	--	5.07		2.54	--	3.65	0.00	--	--	--	--	--	512	0.70	141,100	31	1.60	744	7.4

6-7657. 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 1962.
Water temperatures: March 1951 to September 1962.
EXTREMES, 1961-62.--Specific conductance: Maximum daily, 1,680 micromhos Jan. 23; minimum daily, 658 micromhos May 17.
Percent sodium: Maximum, 41 Aug. 1 to Sept. 30; minimum, 33 Feb. 1 to Mar. 31.
Sodium-adsorption-ratio: Maximum, 2.42 Jan. 1-31; minimum, 1.87 June 1-30.
EXTREMES, 1951-62.--Specific conductance: Maximum daily, 1,680 micromhos Jan. 23, 1962; 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.--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 given in reports of State Engineer.

Chemical analyses, water year October 1961 to September 1962

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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, 1961.	24,932	--	6.44		3.87	--	3.84	.00	--	--	--	--	--	693	.94	23,498	38	2.16	991	7.6
Oct. 11-31.....	54,940	--	4.74		3.13	--	3.57	.00	--	--	--	--	--	528	.72	39,451	40	2.03	794	7.4
Nov. 1-30.....	90,506	--	7.30		4.22	--	3.80	.00	--	--	--	--	--	758	1.03	93,301	37	2.21	1,070	7.4
Dec. 1-16.....	34,147	24.0	5.09	3.04	4.61	0.26	3.87	.00	7.81	1.04	0.03	0.02	0.08	846	1.15	39,289	35	2.29	1,160	7.6
Dec. 17-31.....	36,982	--	9.46		4.92	--	4.36	.00	--	--	--	--	--	954	1.30	47,982	34	2.26	1,300	7.6
Jan. 1-31, 1962.	65,915	--	10.60		5.57	--	4.26	.00	--	--	--	--	--	1,070	1.46	95,919	34	2.42	1,430	7.2
Feb. 1-28.....	88,915	--	9.60		4.79	--	4.06	.00	--	--	--	--	--	978	1.33	118,264	33	2.18	1,310	7.4
Mar. 1-31.....	97,581	27.0	5.99	3.04	4.65	.25	4.20	.00	8.33	1.10	.04	.04	.18	914	1.24	121,297	33	2.19	1,240	7.5
Apr. 1-30.....	71,464	--	7.62		4.35	--	3.21	.00	--	--	--	--	--	786	1.07	76,393	36	2.23	1,110	7.4
May 1-31.....	84,853	--	5.00		3.09	--	3.54	.00	--	--	--	--	--	538	.73	62,085	38	1.95	795	7.3
June 1-30.....	75,392	31.0	3.89	1.89	3.18	.28	3.43	.00	4.87	.73	.03	.02	.09	599	.81	61,417	34	1.87	866	7.4
July 1-31.....	85,775		5.98		3.57		3.38	.00						641	.87	74,775	37	2.06	923	7.6
Aug. 1-31.....	105,021		5.80		4.09		3.39	.00						654	.89	93,410	41	2.40	958	7.3
Sept. 1-30.....	76,998	20.0	2.99	1.65	3.48	.28	3.49	.00	4.04	.65	.03	.02	.15	534	.73	55,919	41	2.28	794	7.4
Total or weighted average	993,400	--	7.07		4.08	--	3.71	0.00	--	--	--	--	--	742	1.01	1,003,000	36	2.20	1,040	7.4

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

LOCATION.--At gaging station at bridge on U. S. Highway 385, 0.9 mile southeast of Julesburg, Sedgwick County, 3 miles upstream from Colorado-Nebraska State line, and 8 miles downstream from Lodgepole Creek.
DRAINAGE AREA.--23,138 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1962.
Water temperatures: October 1945 to September 1962.
EXTREMES, 1961-62.--Specific conductance: Maximum daily, 2,490 micromhos Jan. 22; minimum daily, 1,350 micromhos May 27.
Percent sodium: Maximum, 41 May 27-29; minimum, 33 Dec. 1-15.
Sodium-adsorption-ratio: Maximum, 3.06 Sept. 1-30, minimum, 2.49 Dec. 20-31.
EXTREMES, 1945-62.--Specific conductance: Maximum daily, 2,490 micromhos Jan. 22, 1962; 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.--Records of specific conductance of daily samples available in district office at Lincoln, Nebr.

Chemical analyses, water year October 1961 to September 1962

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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, 1961.	18,208	--	12.26		6.70	--	4.47	0.00	--	--	--	--	--	1,280	1.74	31,697	35	2.71	1,650	7.7
Oct. 11-31.....	57,648	--	11.92		6.26	--	4.62	.00	--	--	--	--	--	1,230	1.67	96,433	34	2.57	1,600	7.7
Nov. 1-30.....	84,258	--	12.12		6.53	--	4.80	.00	--	--	--	--	--	1,180	1.60	135,217	35	2.65	1,620	7.7
Dec. 1-15.....	33,114	19.0	7.93	4.77	6.53	0.28	5.03	.00	12.24	1.55	0.04	0.08	0.16	1,290	1.75	58,095	33	2.59	1,650	7.4
Dec. 16-19.....	11,568	--	14.04		7.31	--	5.49	.00	--	--	--	--	--	1,430	1.94	22,497	34	2.76	1,830	7.7
Dec, 20-31.....	34,108	--	12.12		6.13	--	4.93	.00	--	--	--	--	--	1,220	1.66	56,592	34	2.49	1,600	7.6
Jan. 1-11, 1962.	26,553	--	13.40		7.05	--	5.43	.00	--	--	--	--	--	1,370	1.86	49,473	34	2.72	1,750	7.8
Jan. 12-31.....	49,745	--	13.90		7.31	--	5.51	.00	--	--	--	--	--	1,420	1.93	96,068	34	2.77	1,770	7.7
Feb. 1-13.....	47,419	--	11.28		5.96	--	4.56	.00	--	--	--	--	--	1,140	1.55	73,518	35	2.51	1,510	7.6
Feb. 14-28.....	35,970	--	12.34		6.53	--	4.72	.00	--	--	--	--	--	1,250	1.70	61,149	35	2.63	1,630	7.7
Mar. 1-31.....	77,474	19.0	8.08	4.36	6.70	.23	4.77	.00	12.45	1.55	.04	.14	.23	1,290	1.75	135,921	35	2.69	1,670	7.4
Apr. 1-30.....	34,691	--	12.60		6.96	--	4.49	.00	--	--	--	--	--	1,290	1.75	60,862	36	2.77	1,660	7.4
May 1-15.....	955	--	13.10		7.35	--	4.16	.00	--	--	--	--	--	1,370	1.86	1,779	36	2.87	1,760	7.4
May 16-17.....	335	--	10.60		6.18	--	3.41	.00	--	--	--	--	--	1,130	1.54	515	37	2.68	1,490	7.5
May 18-26.....	3,588	--	13.96		8.70	--	4.44	.00	--	--	--	--	--	1,550	2.11	7,564	38	3.29	1,950	7.4
May 27-29.....	5,141	--	9.36		6.53	--	3.34	.00	--	--	--	--	--	1,070	1.46	7,481	41	3.02	1,450	7.6
May 30-June 30..	50,586	22.0	8.38	4.44	7.53	.38	4.34	.00	14.22	1.72	.04	.03	.25	1,390	1.89	95,629	36	2.97	1,770	7.6
July 1-30.....	15,947	--	12.70		7.35	--	4.15	.00	--	--	--	--	--	1,370	1.86	29,713	37	2.92	1,760	7.5
July 31-Aug. 7..	16,661	--	11.80		6.61	--	4.23	.00	--	--	--	--	--	1,250	1.70	28,324	36	2.72	1,610	7.5
Aug. 8-31.....	5,141	--	13.06		7.40	--	4.18	.00	--	--	--	--	--	1,390	1.89	9,719	36	2.89	1,770	7.6
Sept. 1-30.....	5,504	27.0	8.93	4.61	7.96	.41	4.13	.00	15.20	1.95	.04	.03	.27	1,470	2.00	11,004	36	3.06	1,860	7.6
Total or weighted average	614,600	--	12.46		6.73	--	4.75	0.00	--	--	--	--	--	1,280	1.74	106,900	35	2.70	1,660	7.6

ARKANSAS RIVER BASIN

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

LOCATION.--At gaging station 1.1 miles upstream from Caddoa Creek, 1.7 miles downstream from John Martin Dam, Bent County, and 2.9 miles southeast of Hasty.
DRAINAGE AREA.--18,917 square miles, of which 785 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: August 1942 to August 1943, October 1945 to July 1949, January 1951 to September 1962.
Water temperatures: January 1951 to September 1962.
EXTREMES, 1961-62.--Specific conductance: Maximum daily, 4,830 micromhos Nov. 7; minimum daily, 768 micromhos July 1.
Percent sodium: Maximum, 44 Feb. 23 to Mar. 31; minimum, 24 July 2-6.
Sodium-adsorption-ratio: Maximum, 6.28 Nov. 3-13, minimum, 1.50 July 2-6.
EXTREMES, 1951-62.--Specific conductance: Maximum daily, 5,180 micromhos Apr. 21, 1955; minimum daily, 643 micromhos July 6, 1960.
Percent sodium: Maximum, 44 Feb. 23 to Mar. 31, 1962; minimum, 23 July 1-10, 1955.
REMARKS.--Dashes omitted in potassium (K) column indicate sodium (Na) plus potassium (K) are calculated. Records of specific conductance of daily samples available in district office at Salt Lake City, Utah.

Chemical analyses, water year October 1961 to September 1962

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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. 15-24.....	11,052	15.0	8.58	4.44	5.83	0.15	3.47	0.00	13.93	1.16	0.05	0.12	0.18	1,290	1.75	19,389	31	2.28	1,610	7.7
Oct. 1-14, 1961	6,149		9.38	4.94	6.92	--	3.70	.00	--	--				1,400	1.90	11,707	33	2.59	1,780	7.8
Oct. 25-Nov. 1.	6,426		8.18	4.52	5.83	--	3.47	.00	--	--				1,270	1.73	11,100	31	2.31	1,570	8.1
Nov. 2.....	12		15.47	8.97	15.53	--	4.20	.00	--	--				2,760	3.75	46	39	4.44	3,090	8.2
Nov. 3-13.....	89		24.35	12.83	27.06	--	3.97	.00	--	--				4,510	6.13	549	42	6.28	4,770	7.8
Nov. 14-17.....	34		15.47	11.11	17.18	--	5.18	.00	--	--				2,940	4.00	136	39	4.71	3,330	8.1
Nov. 18-28.....	89		17.47	11.93	19.49	--	5.20	.00	--	--				3,400	4.62	414	40	5.08	3,730	7.9
Nov. 29-30.....	14		19.86	9.46	21.97	--	5.08	.00	--	--				3,810	5.18	74	43	5.74	4,110	8.0
Dec. 1-31.....	252		--	--	16.10		7.13	.00	33.31	2.74				2,940	4.00	1,008	37	4.36	3,270	7.7
Jan. 1-7, 1962.	54		--	--	17.66		7.51	.00	37.06	3.10				3,260	4.43	240	37	4.56	3,560	7.8
Jan. 8.....	7		--	--	24.19		6.33	.00	45.80	4.46				3,930	5.34	38	43	6.01	4,250	7.6
Jan. 9-29.....	133		--	--	16.05		8.23	.00	34.77	2.74				3,110	4.23	564	35	4.17	3,410	7.7
Jan. 30-31.....	12		--	--	11.79		5.72	.00	26.65	2.12				2,360	3.21	37	34	3.49	2,680	7.6
Feb. 1-22.....	161		--	--	18.84		7.69	.00	38.10	3.24				3,240	4.41	711	38	4.85	3,630	8.0
Feb. 23-Mar. 31	301		--	--	28.41		10.56	.00	48.93	4.80				4,010	5.45	1,641	44	6.70	4,380	7.8
Apr. 1-9.....	1,089		--	--	23.75		4.31	.00	49.55	5.08				4,090	5.56	6,057	40	5.66	4,510	7.7
Apr. 10-May 1..	37,833		--	--	15.01		4.20	.00	35.60	2.62				3,000	4.08	154,358	35	4.05	3,380	7.6
May 2-18.....	17,500		--	--	5.96		3.59	.00	13.60	1.07				1,190	1.62	28,322	33	2.40	1,560	7.5
May 19.....	319		--	--	15.18		4.13	.00	33.94	3.30				2,960	4.03	1,286	37	4.19	3,390	7.4
May 20-25.....	3,844		--	--	9.40		2.79	.00	21.65	1.55				1,810	2.46	9,462	36	3.26	2,180	7.4

ARKANSAS RIVER BASIN--Continued

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

Chemical analyses, water year October 1961 to September 1962--Continued

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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				
May 26-31, 1962	3,677		--	--	11.88		2.98	0.00	26.65	2.12				2,210	3.01	11,053	37	3.76	2,590	7.4
June 1-2.....	1,650		--	--	8.61		4.21	.00	19.72	1.58				1,730	2.35	3,883	34	2.96	2,120	7.6
June 3-17.....	12,823		--	--	6.57		3.69	.00	15.55	1.24				1,360	1.85	23,718	32	2.49	1,760	7.5
June 18-19.....	1,749		--	--	4.61		3.61	.00	10.62	.79				1,000	1.36	2,379	31	2.02	1,330	7.6
June 20-21.....	1,353		--	--	7.22		3.85	.00	16.97	1.41				1,510	2.05	2,778	32	2.64	1,880	7.5
June 22-23.....	2,265		--	--	4.65		3.51	.00	10.95	.85				1,020	1.39	3,142	30	2.02	1,360	7.7
June 24-25.....	1,222		--	--	8.35		3.52	.00	18.61	1.50				1,610	2.19	2,675	35	3.02	1,980	7.7
June 26-30.....	4,255		--	--	5.74		3.67	.00	14.57	.99				1,300	1.77	7,522	30	2.21	1,660	7.5
July 1.....	1,795		--	--	2.74		3.64	.00	4.56	.31				492	.67	1,201	32	1.61	768	7.4
July 2-6.....	5,752		--	--	3.52		3.31	.00	10.43	.79				944	1.28	7,385	24	1.50	1,300	7.6
July 7-9.....	2,249		--	--	6.57		4.05	.00	17.03	1.07				1,460	1.99	4,466	30	2.35	1,820	7.6
July 10.....	1,380		--	--	3.78		3.80	.00	9.06	.56				816	1.11	1,532	28	1.72	1,200	7.4
July 11-16.....	6,010		--	--	5.26		3.95	.00	13.12	.90				1,160	1.58	9,481	29	2.09	1,520	7.5
July 17-18.....	1,781		--	--	6.83		4.05	.00	16.43	1.24				1,450	1.97	3,512	31	2.50	1,820	7.5
July 19-21.....	3,291		--	--	5.22		3.75	.00	12.35	.90				1,090	1.48	4,878	31	2.15	1,450	7.5
July 22.....	1,706		--	--	3.48		3.67	.00	8.60	.51				812	1.10	1,884	27	1.62	1,160	7.3
July 23-27.....	5,990		--	--	5.74		3.82	.00	14.72	1.02				1,280	1.74	10,428	29	2.19	1,660	7.3
July 28-31.....	5,236		--	--	4.39		2.18	.00	11.51	.68				940	1.28	6,694	31	1.96	1,270	7.3
Aug. 1.....	1,174		--	--	4.57		2.36	.00	11.51	.76				996	1.35	1,591	31	2.03	1,330	7.4
Aug. 2-9.....	9,568		--	--	6.74		2.84	.00	16.91	1.18				1,450	1.97	18,869	32	2.53	1,800	7.7
Aug. 10.....	1,855		--	--	10.09		3.54	.00	24.15	1.69				1,990	2.71	5,019	34	3.25	2,380	7.6
Aug. 11-22.....	1,545		--	--	20.45		4.52	.00	42.89	3.53				3,500	4.76	7,353	40	5.24	3,950	7.6
Aug. 23-29.....	2,069		--	--	10.14		3.92	.00	23.73	1.86				2,020	2.75	5,683	34	3.25	2,400	8.2
Aug. 30-31.....	198		--	--	16.97		4.80	.00	37.68	3.19				3,160	4.30	852	37	4.47	3,600	7.4
Sept. 1-30.....	2,481		--	--	19.62		4.59	.00	41.43	3.41				3,390	4.61	11,440	40	5.08	3,840	7.6
Total or weighted average	168,400		--	--	8.76	--	3.70	0.00	21.08	1.59	--	--	--	1,770	2.41	406,600	--	2.87	2,140	7.6

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

LOCATION.--At gaging station at bridge on U. S. Highway 166, 0.1 mile downstream from St. Louis-San Francisco Railway Co. bridge, 0.5 mile west of Arkansas City, Cowley County, and 5.4 miles upstream from Walnut River.
DRAINAGE AREA.--43,713 square miles, of which 7,607 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: October 1951 to September 1962.
Water temperatures: October 1951 to September 1962.
EXTREMES, 1961-62.--Specific conductance: Maximum daily, 3,070 micromhos Jan. 11; minimum daily, 240 micromhos June 4.
Percent sodium: Maximum, 66 May 11-20, Aug. 26-27; minimum, 35 May 30.
Sodium-adsorption-ratio: Maximum, 7.51 May 11-20; minimum, 0.94 May 31.
EXTREMES, 1951-62.--Specific conductance: Maximum daily, 5,770 micromhos Jan. 16, 1957; minimum daily, 227 micromhos Aug. 28, 1960.
Percent sodium: Maximum, 79 Apr. 28, 1955; minimum, 27 Aug. 15, 1960.
Sodium-adsorption-ratio: Maximum, 16 Oct. 5, 1953, Aug. 7, 1955; minimum, 0.9 May 31, 1962.
REMARKS.--Dashes omitted in potassium (K) column indicate sodium (Na) plus potassium (K) are calculated. Records of specific conductance of daily samples available in district office at Oklahoma City, Okla.

Chemical analyses, water year October 1961 to September 1962

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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. 1-2, 1961..	7,279	--	5.40	6.31		3.34	0.00	2.37	5.98	--	--	--	723	0.98	7,158	54	3.84	1,170	8.1
Oct. 3-9.....	17,633	--	6.72	9.31		3.97	.00	2.87	9.17	--	--	--	994	1.35	23,837	58	5.08	1,620	8.2
Oct. 10-14.....	80,271	--	2.32	2.61		1.51	.00	.83	2.60	--	--	--	299	.41	32,641	53	2.42	495	7.9
Oct. 15-17.....	12,478	--	5.04	7.22		3.15	.00	2.04	7.05	--	--	--	786	1.07	13,338	59	4.55	1,260	8.1
Oct. 18-20.....	6,724	--	7.12	10.31		3.90	.00	2.96	10.58	--	--	--	1,070	1.46	9,785	59	5.46	1,770	8.2
Oct. 21-28.....	14,471	--	8.30	11.31		4.33	.00	3.44	11.85	--	--	--	1,210	1.65	23,814	58	5.55	1,970	7.9
Oct. 29.....	1,757	--	4.64	5.26		3.02	.00	1.79	5.08	--	--	--	627	.85	1,499	53	3.46	1,050	8.2
Oct. 30.....	1,809	--	8.20	11.61		4.26	.27	3.44	11.85	--	--	--	1,210	1.65	2,977	59	5.74	1,980	8.4
Oct. 31.....	6,724	--	5.84	7.66		3.47	.00	2.71	7.33	--	--	--	844	1.15	7,718	57	4.48	1,390	8.2
Nov. 1.....	14,559	--	3.36	3.48		2.26	.07	1.44	3.05	--	--	--	435	.59	8,613	51	2.68	719	8.3
Nov. 2-5.....	98,936	--	2.00	1.65		1.57	.00	.65	1.44	--	--	--	229	.31	30,812	45	1.65	389	8.0
Nov. 6-8.....	16,959	--	4.36	5.00		2.95	.00	1.62	4.80	--	--	--	568	.77	13,100	53	3.39	967	7.9
Nov. 9-15.....	25,269	--	6.60	8.66		4.03	.00	2.69	8.52	--	--	--	932	1.27	32,029	57	4.77	1,550	8.2
Nov. 16.....	11,603	--	5.44	6.44		3.11	.27	2.29	6.21	--	--	--	726	.99	11,457	54	3.90	1,220	8.6
Nov. 17-20.....	47,683	--	2.96	3.09		2.13	.00	1.02	2.88	--	--	--	376	.51	24,383	51	2.54	643	7.5
Nov. 21-22.....	12,020	--	4.88	6.31		3.21	.00	1.89	6.07	--	--	--	674	.92	11,018	56	4.04	1,150	7.7
Nov. 23-30.....	36,242	--	7.12	9.66		4.26	.00	3.19	9.31	--	--	--	1,030	1.40	50,768	58	5.12	1,680	7.8
Dec. 1-11.....	44,269	--	8.10	10.48		4.36	.27	4.21	9.73	--	--	--	1,160	1.58	69,839	56	5.21	1,820	8.4
Dec. 12-14.....	6,688	--	10,20	13.40		4.92	.00	4.83	13.82	--	--	--	1,530	2.08	13,917	57	5.93	2,350	7.9
Dec. 15-16.....	6,129	--	8.50	9.79		4.92	.00	3.79	9.59	--	--	--	1,190	1.62	9,919	54	4.75	1,820	7.4

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

Chemical analyses, water year October 1961 to September 1962--Continued

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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				
Dec. 17-20, 1961	19,740	--	6.32		7.09		3.61	0.00	3.02	6.77	--	--	--	848	1.15	22,765	53	3.99	1,360	7.8
Dec. 21-31.....	35,520	--	8.10		8.96		4.39	.00	3.64	9.03	--	--	--	1,090	1.48	52,655	53	4.45	1,710	8.1
Jan. 1-9, 1962..	24,224	17.0	6.09	3.13	10.92		4.56	.00	5.00	10.44	0.02	0.09	0.15	1,260	1.71	41,510	54	5.09	1,950	8.1
Jan. 10-11.....	1,888	--	12.40		17.01		5.11	.47	6.45	17.35	--	--	--	1,900	2.58	4,879	58	6.83	2,890	8.5
Jan. 12-20.....	22,064	--	9.40		12.31		4.85	.13	5.16	11.57	--	--	--	1,350	1.84	40,510	57	5.68	2,180	8.3
Jan. 21-27.....	15,467	--	8.70		11.09		4.36	.33	4.37	10.72	--	--	--	1,290	1.75	27,135	56	5.32	1,990	8.4
Jan. 28.....	5,950	--	5.72		6.39		2.79	.33	3.19	5.78	--	--	--	771	1.05	6,239	53	3.78	1,240	8.6
Jan. 29-31.....	56,053	--	2.48		2.09		1.74	.00	1.00	1.83	--	--	--	295	.40	22,488	46	1.88	482	7.8
Feb. 1-2.....	25,250	--	3.08		2.87		1.93	.00	1.42	2.62	--	--	--	413	.56	14,182	48	2.31	636	8.2
Feb. 3-4.....	14,876	--	4.40		5.13		2.59	.00	2.37	4.57	--	--	--	625	.85	12,645	54	3.46	975	8.2
Feb. 5-7.....	15,667	--	6.20		7.44		3.08	.40	3.71	6.43	--	--	--	902	1.23	19,220	55	4.22	1,370	8.5
Feb. 8-10.....	11,960	--	7.56		9.14		3.41	.67	4.58	8.04	--	--	--	1,110	1.51	18,055	55	4.70	1,640	8.5
Feb. 11-20.....	37,468	21.0	6.09	2.39	10.27		4.06	.20	5.73	8.60	.02	.13	.47	1,180	1.60	60,128	55	4.99	1,860	8.4
Feb. 21-28.....	24,167	--	9.50		12.48		4.13	.53	6.04	11.28	--	--	--	1,450	1.97	47,657	57	5.73	2,140	8.5
Mar. 1.....	1,216	--	9.30		15.92		3.05	.00	5.25	16.93	--	--	--	1,690	2.30	2,795	63	7.38	2,650	8.2
Mar. 2-10.....	25,831	--	8.80		11.18		4.06	.53	4.79	10.58	--	--	--	1,290	1.75	45,317	56	5.33	2,020	8.4
Mar. 11-20.....	26,698	--	9.20		11.48		4.33	.20	5.83	10.30	--	--	--	1,330	1.81	48,290	56	5.35	2,040	8.4
Mar. 21-31.....	30,436	18.0	6.54	2.80	12.14		4.16	.27	6.56	10.30	.02	.10	.16	1,360	1.85	56,295	57	5.62	2,110	8.4
Apr. 1-10.....	27,055	--	9.30		13.01		3.87	.40	6.87	11.14	--	--	--	1,450	1.97	53,352	58	6.03	2,170	8.4
Apr. 11-20.....	25,071	--	7.84		11.92		3.28	.27	5.73	10.49	--	--	--	1,230	1.67	41,939	60	8.02	2,010	8.5
Apr. 21-23.....	7,736	--	7.32		11.61		2.98	.27	5.31	10.38	--	--	--	1,150	1.56	12,098	61	6.07	1,920	8.5
Apr. 24.....	3,094	--	6.00		8.53		2.82	.40	3.96	7.33	--	--	--	920	1.25	3,871	59	4.92	1,470	8.6
Apr. 25-30.....	16,816	--	6.68		9.87		3.11	.27	4.27	8.89	--	--	--	1,040	1.41	23,784	60	5.40	1,720	8.5
May 1-10.....	19,815	--	4.74	2.47	12.44		3.44	.00	4.62	11.57	--	--	--	1,240	1.69	33,416	63	6.55	2,030	8.0
May 11-20.....	13,250	--	7.40		14.44		3.70	.00	4.89	13.26	--	--	--	1,390	1.89	25,047	66	7.51	2,250	7.8
May 21-27.....	9,316	--	8.20		12.70		3.25	.27	4.41	12.98	--	--	--	1,320	1.80	16,725	61	6.27	2,130	8.4
May 28-30.....	31,317	--	3.28		4.00		2.29	.07	1.27	3.67	--	--	--	453	.62	19,294	55	3.13	775	8.4
May 31.....	26,975	--	1.56		.83		1.31	.00	.40	.68	--	--	--	165	.22	6,053	35	.94	251	8.0
June 1-5.....	176,628	--	1.56		1.22		1.31	.00	.44	1.04	--	--	--	180	.24	43,239	44	1.38	290	8.0
June 6-8.....	52,620	--	2.24		2.04		1.61	.00	.69	1.97	--	--	--	257	.35	18,392	48	1.93	454	7.7

June 9-10, 1962.	14,420	--	3.48	4.52		2.29	.00	1.50	4.23	--	--	--	496	.67	9,727	57	3.43	836	8.0
June 11-18.....	28,181	--	5.04	7.79		3.15	.00	2.48	7.19	--	--	--	796	1.08	30,508	61	4.91	1,340	8.0
June 19-27.....	18,333	17.0	4.39 | 1.73	9.31		3.21	.00	3.91	8.24	.02	.04	.11	952	1.29	23,736	60	5.32	1,600	8.1
June 28.....	4,007	--	4.12	5.48		2.36	.27	2.27	4.68	--	--	--	596	.81	3,248	57	3.82	986	8.4
June 29-30.....	4,840	--	5.52	8.27		2.88	.00	3.64	7.28	--	--	--	878	1.19	5,779	60	4.97	1,430	7.8
July 1-5.....	9,055	--	6.10	9.05		2.98	.20	3.91	8.04	--	--	--	943	1.28	11,612	60	5.18	1,520	8.4
July 6-10.....	58,116	--	2.96	2.87		2.10	.00	1.31	2.40	--	--	--	362	.49	28,612	49	2.36	606	8.2
July 11-20.....	136,165	14.0	2.00 | .48	2.52		1.84	.00	.94	2.12	.02	.06	--	299	.41	55,370	50	2.27	519	7.6
July 21-23.....	27,806	--	3.08	4.00		2.00	.20	1.42	3.44	--	--	--	436	.59	16,488	57	3.22	722	8.5
July 24-25.....	29,970	--	2.12	2.00		1.64	.00	.77	1.69	--	--	--	259	.35	10,557	49	1.94	426	7.4
July 26-28.....	23,802	--	3.20	4.09		2.10	.13	1.35	3.72	--	--	--	447	.61	14,470	56	3.23	764	8.4
July 29-31.....	18,131	--	3.92	5.39		2.43	.20	1.96	4.74	--	--	--	575	.78	14,178	58	3.85	976	8.4
Aug. 1-5.....	37,170	--	3.48	4.05		2.43	.00	1.58	3.50	--	--	--	454	.62	22,950	54	3.07	783	8.2
Aug. 6-8.....	33,798	--	2.68	2.18		2.23	.00	.90	1.72	--	--	--	298	.41	13,698	45	1.88	499	8.2
Aug. 9-10.....	17,098	--	3.16	3.26		2.29	.13	1.17	2.82	--	--	--	395	.54	9,185	51	2.60	652	8.4
Aug. 11-13.....	15,667	--	4.08	4.87		2.79	.07	1.85	4.23	--	--	--	538	.73	11,464	54	3.41	921	8.3
Aug. 14-20.....	21,257	--	5.76	7.61		3.34	.20	3.06	6.77	--	--	--	806	1.10	23,301	57	4.49	1,350	8.4
Aug. 21-24.....	7,117	--	6.60	9.57		3.38	.40	3.71	8.69	--	--	--	1,000	1.36	9,679	59	5.27	1,630	8.5
Aug. 25.....	4,562	--	5.72	5.31		2.75	.00	2.91	5.36	--	--	--	652	.89	4,045	48	3.14	1,140	8.2
Aug. 26-27.....	10,889	--	2.80	5.39		2.39	.00	1.71	4.09	--	--	--	503	.68	7,449	66	4.56	860	8.2
Aug. 28-29.....	7,954	--	5.00	7.18		3.02	.13	2.77	6.26	--	--	--	743	1.01	8,037	59	4.54	1,250	8.3
Aug. 30-31.....	8,132	--	3.64	4.61		2.62	.07	1.48	4.09	--	--	--	498	.68	5,508	56	3.42	850	8.3
Sept. 1-3.....	11,026	--	4.52	6.48		2.72	.07	2.33	5.87	--	--	--	670	.91	10,047	59	4.31	1,140	8.3
Sept. 4-10.....	41,389	--	3.52	5.44		2.36	.00	1.67	4.06	--	--	--	514	.70	28,933	61	4.10	877	8.2
Sept. 11-15.....	24,020	--	4.80	6.74		3.08	.00	2.29	6.15	--	--	--	712	.97	23,259	58	4.35	1,190	7.8
Sept. 16-17.....	28,522	--	2.44	1.78		1.87	.00	.75	1.61	--	--	--	259	.35	10,047	42	1.61	448	7.9
Sept. 18-21.....	17,851	--	4.28	5.26		2.16	.00	1.96	5.42	--	--	--	618	.84	15,004	55	3.60	1,050	7.5
Sept. 22-26.....	70,334	--	2.56	2.00		2.00	.00	.83	1.72	--	--	--	282	.38	26,974	44	1.77	480	8.2
Sept. 27-30.....	26,579	--	3.92	3.57		2.49	.00	1.46	3.55	--	--	--	456	.62	16,483	48	2.55	774	8.0
Total or weighted average	2,030,000	--	4.44	5.44		2.61	--	2.21	4.96	--	--	--	619	0.84	1,709,000	--	3.40	1,000	8.0

ARKANSAS RIVER BASIN--Continued

7-1525. ARKANSAS RIVER AT RALSTON, OKLA.

LOCATION.--At gaging station at bridge on State Highway 18 at Ralston, Pawnee County, 2 miles downstream from Salt Creek, and 2 miles upstream from Grayhorse Creek.
DRAINAGE AREA.--54,465 square miles, of which 7,615 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: January 1950 to September 1962.
Water temperatures: January 1950 to September 1962.
EXTREMES, 1961-62.--Specific conductance: Maximum daily, 2,340 micromhos May 7; minimum daily, 265 micromhos July 10.
Percent sodium: Maximum, 69 Sept. 22; minimum, 31 Nov. 2-6, July 10.
Sodium-adsorption-ratio: Maximum, 7.23 June 15-25; minimum, 0.86 July 10.
EXTREMES, 1950-62.--Specific conductance: Maximum daily, 7,510 micromhos Sept. 14, 1955; minimum daily, 234 micromhos Sept. 13, 1961.
Percent sodium: Maximum, 87 May 1-2, 1957; minimum, 21 Aug. 14, 1961.
Sodium-adsorption-ratio (1951-62): Maximum, 25 May 1-2, 1957; minimum, 0.6 Aug. 14, 1961.
REMARKS.--Dashes omitted in potassium (K) column indicate sodium (Na) plus potassium (K) are calculated. Records of specific conductance of daily samples available in district office at Oklahoma City, Okla.

Chemical analyses, water year October 1961 to September 1962

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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. 1-9, 1961..	83,490	15.0	4.39	1.81	8.61		3.41	0.27	2.42	8.60	0.02	0.06	0.22	890	1.21	101,057	58	4.89	1,490	8.3
Oct. 10.....	16,860	--	5.40		5.61		3.21	.00	1.15	6.63	--	--	--	680	.92	15,592	51	3.42	1,130	8.2
Oct. 11-15.....	459,372	--	2.36		1.13		1.84	.00	.50	1.13	--	--	--	235	.32	146,815	32	1.04	354	7.8
Oct. 16-18.....	72,179	--	3.60		2.74		2.69	.00	.90	2.76	--	--	--	388	.53	38,087	43	2.04	642	7.8
Oct. 19-20.....	24,813	--	5.28		4.79		3.74	.00	1.39	4.94	--	--	--	612	.83	20,653	48	2.94	1,020	7.4
Oct. 21-31.....	81,316	--	6.92		7.31		4.20	.00	2.08	7.96	--	--	--	878	1.19	97,098	51	3.93	1,500	8.2
Nov. 1.....	9,362	--	7.00		7.09		4.03	.40	2.04	7.62	--	--	--	869	1.18	11,064	50	3.79	1,430	8.6
Nov. 2-6.....	570,843	--	2.08		.91		1.80	.00	.35	.85	--	--	--	194	.26	150,611	31	.90	312	8.1
Nov. 7-8.....	66,050	--	3.56		2.91		2.75	.00	.96	2.76	--	--	--	397	.54	35,661	45	2.18	659	7.9
Nov. 9-10.....	41,574	--	5.36		4.79		3.97	.00	1.42	4.74	--	--	--	597	.81	33,754	47	2.92	1,020	8.1
Nov. 11-16.....	121,150	--	7.10		5.87		4.20	.40	1.85	6.54	--	--	--	768	1.04	126,539	45	3.12	1,300	8.5
Nov. 17-22.....	229,091	--	3.88		3.13		2.62	.13	1.08	3.16	--	--	--	413	.56	128,676	45	2.25	718	8.4
Nov. 23-24.....	39,174	--	5.40		5.39		3.77	.00	1.52	5.50	--	--	--	672	.91	35,801	50	3.28	1,130	7.4
Nov. 25-30.....	85,960	--	7.12		7.87		4.49	.27	2.21	8.04	--	--	--	906	1.23	105,916	53	4.17	1,480	8.4
Dec. 1-10.....	114,982	--	8.10		8.61		4.92	.33	2.85	8.60	--	--	--	1,030	1.40	161,067	52	4.28	1,630	8.4
Dec. 11-17.....	82,945	--	7.44		6.87		4.49	.27	2.64	6.91	--	--	--	902	1.23	101,750	48	3.56	1,410	8.4
Dec. 18-24.....	112,754	--	5.96		5.57		3.84	.13	2.06	5.50	--	--	--	719	.98	110,256	48	3.23	1,150	8.4
Dec. 25-31.....	68,311	--	7.80		8.79		4.59	.20	2.77	9.03	--	--	--	1,040	1.41	96,619	53	4.45	1,650	8.4
Jan. 1-9, 1962..	73,386	11.0	6.09	2.30	9.40		5.05	.00	3.35	9.31	.02	.07	.10	1,110	1.51	110,784	53	4.59	1,770	8.2
Jan. 10-20.....	65,455	--	9.50		10.92		4.88	.47	4.06	11.00	--	--	--	1,260	1.71	112,163	53	5.01	2,010	8.5

Jan. 21-28, 1962	55,934	--	8.70	11.05		4.43	.53	3.79	11.00	--	--	--	1,210	1.65	92,045	56	5.30	1,960	8.5
Jan. 29-30.....	65,455	--	5.36	4.92		2.75	.40	2.06	5.08	--	--	--	661	.90	58,841	48	3.00	1,050	8.6
Jan. 31.....	47,603	--	3.72	2.44		2.26	.13	1.23	2.54	--	--	--	392	.53	25,378	40	1.79	645	8.3
Feb. 1-4.....	146,380	--	2.84	2.48		1.90	.00	.94	2.48	--	--	--	361	.49	71,867	47	2.08	574	8.2
Feb. 5.....	21,818	--	3.64	4.57		2.36	.00	1.54	4.29	--	--	--	517	.70	15,341	56	3.39	842	8.1
Feb. 6-9.....	59,504	--	5.56	6.53		2.69	.40	2.52	6.49	--	--	--	781	1.06	63,203	54	3.91	1,270	8.5
Feb. 10-17.....	82,211	--	7.56	8.22		3.97	.40	3.52	7.90	--	--	--	990	1.35	110,689	52	4.23	1,570	8.4
Feb. 18-28.....	105,316	--	8.30	9.00		4.26	.40	4.04	8.60	--	--	--	1,110	1.51	158,986	52	4.42	1,680	8.5
Mar. 1-10.....	67,041	14.0	6.29 | 2.71	9.92		5.11	.00	3.96	9.73	.01	.10	.32	1,190	1.62	108,500	52	4.67	1,900	8.1
Mar. 11-24.....	88,276	--	8.60	10.61		4.26	.40	4.37	10.16	--	--	--	1,190	1.62	142,886	55	5.12	1,860	8.4
Mar. 25-31.....	50,580	--	8.10	8.92		4.06	.00	3.89	9.08	--	--	--	1,140	1.55	78,420	52	4.43	1,700	8.0
Apr. 1-10.....	55,418	--	7.56	10.48		3.28	.33	4.48	9.93	--	--	--	1,110	1.51	83,659	58	5.39	1,830	8.6
Apr. 11-20.....	49,785	--	7.40	11.09		3.25	.13	4.37	10.72	--	--	--	1,140	1.55	77,187	60	5.77	1,920	8.3
Apr. 21-30.....	47,207	--	7.40	11.44		3.51	.00	4.06	11.28	--	--	--	1,190	1.62	76,399	61	5.95	1,960	8.2
May 1-10.....	53,256	8.4	4.89 | 2.63	13.27	0.14	3.70	.00	4.33	12.69	.02	.00	--	1,330	1.81	96,330	63	6.84	2,080	7.6
May 11-20.....	32,767	--	8.30	13.70		3.80	.27	4.37	13.54	--	--	--	1,420	1.93	63,280	62	6.73	2,240	8.5
May 21-30.....	28,721	--	7.92	13.40		3.38	.40	3.85	13.68	--	--	--	1,390	1.89	54,294	63	6.73	2,190	8.5
May 31.....	5,157	--	5.32	6.74		2.62	.13	2.10	7.19	--	--	--	782	1.06	5,485	56	4.13	1,280	8.4
June 1-6.....	220,165	--	2.48	1.57		1.97	.00	.62	1.47	--	--	--	249	.34	74,557	39	1.41	421	8.1
June 7-10.....	136,859	--	2.44	3.39		1.64	.00	.85	3.33	--	--	--	363	.49	67,565	58	3.07	631	8.0
June 11-12.....	44,628	--	3.68	6.09		2.36	.00	1.50	5.92	--	--	--	600	.82	36,417	62	4.49	1,030	8.0
June 13-14.....	31,696	--	4.60	8.22		2.49	.13	2.00	8.18	--	--	--	796	1.08	34,313	64	5.42	1,370	8.3
June 15-25.....	98,662	--	5.68	12.18		2.95	.13	2.94	11.85	--	--	--	1,110	1.51	148,940	68	7.23	1,880	8.3
June 26-30.....	37,686	--	6.16	9.79		3.02	.20	3.46	9.25	--	--	--	984	1.34	50,433	61	5.58	1,630	8.4
July 1-3.....	17,691	--	5.80	9.53		3.08	.00	3.21	9.03	--	--	--	962	1.31	23,145	62	5.59	1,570	7.8
July 4-7.....	17,891	--	6.12	11.22		3.25	.00	3.52	10.58	--	--	--	1,070	1.46	26,035	65	6.42	1,770	8.0
July 8-9.....	41,772	--	3.52	3.05		2.36	.00	1.46	2.76	--	--	--	418	.57	23,746	46	2.30	674	7.5
July 10.....	21,025	--	1.84	.83		1.64	.00	.17	.85	--	--	--	193	.26	5,519	31	.86	265	8.0
July 11-15.....	78,724	21.0	2.10 | .62	2.44	.15	1.97	.13	.94	2.20	.03	.09		358	.49	38,329	46	2.09	533	8.4
July 16.....	10,711	--	3.12	3.26		2.26	.00	1.10	3.02	--	--	--	416	.57	6,060	51	2.61	670	8.2

ARKANSAS RIVER BASIN--Continued

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

Chemical analyses, water year October 1961 to September 1962--Continued

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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 17-22, 1962	104,787	--	2.40		2.13		1.80	0.00	0.85	1.86	--	--	--	295	0.40	42,040	47	1.95	484	8.1
July 23-26.....	52,506	--	3.08		3.31		2.03	.07	1.19	3.10	--	--	--	423	.58	30,206	52	2.66	680	8.3
July 27-29.....	35,804	--	2.52		2.74		1.90	.07	.85	2.43	--	--	--	345	.47	16,799	52	2.44	543	8.3
July 30-31.....	18,843	--	3.60		6.13		2.23	.07	1.52	5.92	--	--	--	618	.84	15,837	63	4.57	1,020	8.3
Aug. 1-5.....	59,802	--	3.88		6.13		2.33	.13	1.50	6.07	--	--	--	636	.86	51,726	61	4.40	1,070	8.3
Aug. 6-8.....	31,894	--	4.60		8.31		2.69	.00	1.52	8.69	--	--	--	844	1.15	36,609	64	5.48	1,440	8.2
Aug. 9-10.....	24,020	--	3.48		5.44		2.29	.00	1.50	5.13	--	--	--	562	.76	18,359	61	4.12	952	7.4
Aug. 11-12.....	19,676	--	3.68		6.53		2.33	.00	1.64	6.21	--	--	--	642	.87	17,180	64	4.81	1,100	7.8
Aug. 13-20.....	47,508	--	5.48		9.22		3.21	.13	2.60	8.75	--	--	--	274	.37	17,703	63	5.57	1,490	8.4
Aug. 21-27.....	26,047	--	6.72		9.87		3.74	.13	3.25	9.45	--	--	--	1,010	1.37	35,778	60	5.39	1,690	8.3
Aug. 28-31.....	19,105	--	5.28		7.26		2.79	.13	2.50	7.11	--	--	--	776	1.06	20,162	58	4.47	1,300	8.4
Sept. 1-10.....	57,878	--	4.96		5.96		2.75	.13	2.17	5.87	--	--	--	688	.94	54,155	55	3.78	1,140	8.3
Sept. 11-17.....	47,123	--	4.24		5.31		2.49	.13	1.79	5.13	--	--	--	606	.82	38,837	56	3.64	1,010	8.3
Sept. 18-20.....	54,464	--	3.56		3.35		2.36	.00	1.23	3.30	--	--	--	445	.61	32,962	48	2.51	736	7.8
Sept. 21.....	8,132	--	3.12		3.44		2.10	.00	1.15	3.30	--	--	--	423	.58	4,678	52	2.75	700	8.2
Sept. 22.....	11,623	--	4.12		8.96		2.46	.00	1.83	8.80	--	--	--	812	1.10	12,836	69	6.24	1,410	8.2
Sept. 23-26.....	95,365	--	2.88		1.61		2.03	.00	.77	1.69	--	--	--	293	.40	38,001	36	1.34	475	8.1
Sept. 27-30.....	54,490	--	3.04		3.83		2.07	.00	1.06	3.72	--	--	--	435	.59	32,236	56	3.10	730	8.2
Total or weighted average	5,008,000	--	4.70		5.16		2.87	0.00	1.78	5.10	--	--	--	613	0.83	4,174,000	53	3.10	1,000	8.1

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

LOCATION.--At gaging station at bridge on U. S. Highway 64 and 71, at Van Buren, Crawford County, 1.3 miles downstream from Lee Creek, 8.6 miles downstream from Poteau River, and at mile 353.4.
DRAINAGE AREA.--150,483 square miles, of which 22,241 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1962.
Water temperatures: October 1945 to September 1962.
EXTREMES, 1961-62.--Specific conductance: Maximum daily, 2,440 micromhos July 4; minimum daily, 268 micromhos Feb. 9.
Percent sodium: Maximum, 63 Aug 17-21; minimum, 41 June 7-9.
Sodium-adsorption-ratio: Maximum, 4.96 Aug. 17-21; minimum, 1.73 Oct. 10-31.
EXTREMES, 1945-62.--Specific conductance: Maximum daily, 8,980 micromhos, Apr. 1, 1954; minimum daily, 132 micromhos May 11, 1948.
Percent sodium (1945-61): Maximum, 80 Oct. 21-24, 1946, Aug. 3-4, 1956; minimum, 18 July 22, 1959.
REMARKS.--Records of specific conductance of daily samples available in district office at Little Rock, Ark.

Chemical analyses, water year October 1961 to September 1962

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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. 10-31, 1961	1,925,236	12.0	1.90	0.56	1.91	0.08	1.92		0.67	1.78	0.02	0.06	--	264	0.36	691,237	43	1.73	463	8.0
Nov. 15-30.....	2,440,780	9.2	1.55	.76	1.96	.10	1.61		.71	1.81	.02	.07	--	254	.35	843,143	45	1.82	459	7.9
Feb. 1-8, 1962..	726,744	8.9	1.30	.62	1.96	.10	1.62		.50	1.78	.02	.02	.05	233	.32	230,291	49	2.00	414	6.7
Mar. 10-12.....	104,727	14.0	2.15	.82	2.48	.08	1.97		.94	2.60	.02	.08	--	359	.49	51,132	45	2.04	577	7.5
May 2-5.....	209,058	14.0	2.40	1.07	3.70	.08	2.20		1.19	3.78	.02	.04	.10	452	.61	128,512	51	2.81	749	7.4
June 7-9.....	390,764	18.0	2.25	.82	2.22	.08	2.07		.92	2.26	.03	.08	--	345	.47	183,346	41	1.79	547	7.4
July 15-18.....	179,464	17.0	2.10	.81	3.26	.09	1.95		.96	3.30	.02	.07	.08	404	.55	98,605	52	2.70	663	7.4
Aug. 17-21.....	78,942	15.0	2.99	.99	7.00	.13	2.62		1.64	6.77	.03	.05	.10	673	.92	72,254	63	4.96	1,160	7.4
Sept. 2-6.....	85,964	16.0	2.84	1.07	5.66	.11	2.43		1.54	5.50	.03	.05	--	588	.80	68,743	58	4.04	1,000	7.4

ARKANSAS RIVER BASIN--Continued

7-1610. CIMARRON RIVER AT PERKINS, OKLA.

LOCATION.--At gaging station at bridge on State Highway 40, 1 mile south of Perkins, Payne County, 1.5 miles upstream from Dugout Creek, and 4 miles downstream from Wildhorse Creek.
DRAINAGE AREA.--17,852 square miles, of which 4,926 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: October 1952 to September 1962.
Water temperatures: October 1952 to September 1962.
EXTREMES, 1961-62.--Specific conductance: Maximum daily, 14,600 micromhos June 8; minimum daily, 543 micromhos Oct. 11.
Percent sodium: Maximum, 90 June 8, Sept. 21-30; minimum, 58 Oct. 10-14.
Sodium-adsorption-ratio: Maximum, 47.50 June 8; minimum, 3.30 Oct. 10-14.
EXTREMES, 1952-62.--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, Apr. 1-2, 1957; minimum, 50 June 8, 1961.
Sodium-adsorption-ratio: Maximum, 98 Feb. 18-20, 1955; minimum, 1.5 Oct. 5-7, 1955.
REMARKS.--Dashes omitted in potassium (K) column indicate sodium (Na) plus potassium (K) are calculated. Records of specific conductance of daily samples available in district office at Oklahoma City, Okla.

Chemical analyses, water year October 1961 to September 1962

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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. 1-4, 1961..	11,441	--	5.36		12.53		2.85	0.00	2.60	12.41	--		--	1,080	1.47	16,804	70	7.65	1,890	8.2
Oct. 5-9.....	6,407	18.0	6.29	3.54	23.41		4.16	.33	5.00	23.62	0.02	0.04	0.45	2,360	3.21	20,563	75	13.27	3,970	8.4
Oct. 10-14.....	95,683	--	2.76		3.87		1.74	.00	1.27	3.61	--		--	401	.55	52,181	58	3.30	695	8.1
Oct. 15-16.....	4,899	--	4.16		6.87		2.43	.00	2.19	6.43	--		--	668	.91	4,451	62	4.77	1,150	8.2
Oct. 17.....	1,785	--	5.92		10.74		3.15	.27	2.87	10.38	--		--	1,030	1.40	2,501	64	6.25	1,710	8.4
Oct. 18-20.....	3,939	--	9.90		22.71		4.85	.13	5.04	22.57	--		--	2,010	2.73	10,768	70	10.21	3,350	8.3
Oct. 21-31.....	9,207	--	11.40		34.15		4.65	.27	6.77	33.85	--		--	2,690	3.66	33,684	75	14.30	4,460	8.4
Nov. 1.....	839	--	9.90		34.15		2.29	.13	7.18	34.42	--		--	2,700	3.67	3,081	78	15.35	4,600	8.3
Nov. 2-3.....	65,851	--	4.50		9.70		2.26	.00	2.19	9.73	--		--	830	1.13	74,333	68	6.47	1,510	8.0
Nov. 4-5.....	40,145	--	2.72		5.26		1.67	.00	1.27	5.02	--		--	476	.65	25,989	66	4.51	859	7.4
Nov. 6.....	7,220	--	4.90		11.53		1.84	.07	2.81	11.71	--		--	992	1.35	9,740	70	7.36	1,770	8.3
Nov. 7-15.....	26,366	15.0	6.54	3.29	38.41		4.03	.13	5.93	38.08	.01		.41	2,960	4.03	106,140	80	17.33	4,950	8.3
Nov. 16-22.....	39,570	--	9.30		25.23		3.67	.00	5.45	25.39	--		--	2,070	2.82	111,398	73	11.70	3,540	7.7
Nov. 23-24.....	7,795	--	11.50		60.90		4.49	.13	7.08	60.65	--		--	4,420	6.01	46,858	84	25.40	7,500	8.3
Nov. 25-26.....	5,355	--	11.40		41.80		5.05	.00	7.50	40.62	--		--	3,180	4.32	23,161	79	17.51	5,330	8.0
Nov. 27-30.....	8,283	--	13.40		44.81		5.31	.00	8.22	44.57	--		--	3,880	5.28	43,708	77	17.31	6,400	8.2
Dec. 1-14.....	24,520	--	13.60		51.33		5.70	.00	8.24	50.78	--		--	4,030	5.48	134,387	79	19.68	6,550	8.0
Dec. 15-22.....	18,724	--	12.00		41.63		5.05	.00	6.83	41.75	--		--	3,270	4.45	83,269	78	17.00	5,370	8.0
Dec. 23.....	1,888	--	11.80		60.47		2.23	.00	9.26	60.65	--		--	4,570	6.22	11,736	84	24.89	7,300	8.2
Dec. 24-27.....	6,823	--	14.60		75.26		4.72	.00	10.20	74.76	--		--	5,510	7.49	51,130	84	27.85	8,890	8.1
Dec. 28-29.....	3,705	--	17.36		95.70		5.69	.00	11.60	95.63	--		--	6,940	9.44	34,970	85	32.48	11,100	7.9

Dec. 30-31, 1961	3,300	--	14.60	53.94		5.90	.00	8.95	53.60	--		--	4,220	5.74	18,942	79	19.96	6,770	7.8
Jan. 1-10, 1962.	15,293	--	12.00	55.25		3.25	.00	9.60	54.16	--		--	4,200	5.71	87,351	82	22.55	6,680	8.1
Jan. 11-20.....	13,983	--	15.00	49.59		6.69	.00	9.79	47.96	--		--	4,030	5.48	76,641	77	18.11	6,340	8.0
Jan. 21-31.....	25,265	--	15.20	53.51		5.24	.00	10.04	53.60	--		--	4,230	5.75	145,347	78	19.41	6,700	8.2
Feb. 1.....	3,074	--	10.80	51.33		3.21	.33	7.39	51.34	--		--	3,800	5.17	15,888	83	22.09	6,390	8.4
Feb. 2-5.....	10,631	--	12.90	73.95		3.90	.27	9.16	73.35	--		--	5,250	7.14	75,908	85	29.12	8,650	8.4
Feb. 6-10.....	9,322	--	12.00	50.03		4.69	.33	8.33	48.52	--		--	3,770	5.13	47,797	81	20.42	6,260	8.4
Feb. 11-24.....	17,605	16.0	8.58 | 5.35	56.99		4.92	.13	9.58	56.42	.02		.68	4,370	5.94	104,632	80	21.59	7,190	8.5
Feb. 25-27.....	3,076	--	14.60	75.26		4.26	.07	10.83	74.76	--		--	5,550	7.55	23,220	84	27.85	9,010	8.3
Feb. 28.....	948	--	10.50	56.55		1.93	.00	9.37	55.86	--		--	4,100	5.58	5,287	84	24.68	6,530	8.2
Mar. 1-11.....	10,625	--	14.30	57.42		5.18	.00	10.14	56.42	--		--	4,590	6.24	66,328	80	21.47	7,210	8.1
Mar. 12.....	1,061	--	14.60	83.09		2.16	.00	12.22	83.22	--		--	6,120	8.32	8,832	85	30.75	9,610	8.2
Mar. 13.....	1,012	--	13.78	93.09		1.80	.00	12.18	92.81	--		--	6,900	9.38	9,493	87	35.46	10,900	8.1
Mar. 14.....	932	--	12.20	74.39		1.93	.00	10.78	73.91	--		--	5,500	7.48	6,973	86	30.12	8,760	8.1
Mar. 15-22.....	6,998	--	14.20	63.08		4.82	.00	10.33	62.06	--		--	4,830	6.57	45,966	82	23.67	7,720	8.2
Mar. 23-26.....	4,276	--	13.30	60.03		4.10	.27	9.54	59.24	--		--	4,450	6.05	25,881	82	23.28	7,170	8.4
Mar. 27-28.....	2,622	--	9.80	37.50		3.28	.40	6.91	36.67	--		--	3,040	4.13	10,841	79	16.94	4,960	8.5
Mar. 29-31.....	2,725	--	13.20	59.60		4.59	.00	9.68	58.68	--		--	4,530	6.16	16,790	82	23.20	7,230	7.9
Apr. 1-6.....	4,796	--	14.80	76.13		4.49	.27	8.54	77.58	--		--	5,680	7.72	37,048	84	27.98	9,470	8.4
Apr. 7-10.....	3,856	--	12.80	57.86		4.33	.40	8.95	56.98	--		--	4,370	5.94	22,916	82	22.87	7,300	8.4
Apr. 11-12.....	5,447	--	11.00	41.98		4.20	.47	7.39	40.90	--		--	3,270	4.45	24,222	79	17.90	5,160	8.5
Apr. 13.....	2,737	--	4.90	12.09		2.49	.20	3.02	11.28	--		--	1,040	1.41	3,871	71	7.73	1,830	8.5
Apr. 14-15.....	2,951	--	10.60	44.37		3.84	.20	7.08	43.73	--		--	3,320	4.52	13,326	81	19.27	5,330	8.4
Apr. 16-18.....	3,451	--	13.50	80.91		4.33	.20	9.37	80.40	--		--	5,680	7.72	26,660	86	31.14	9,440	8.3
Apr. 19.....	1,702	--	7.90	29.32		3.34	.40	5.83	27.65	--		--	2,240	3.05	5,184	79	14.75	3,900	8.6
Apr. 20.....	1,543	--	11.80	51.33		3.41	.40	8.33	50.78	--		--	3,810	5.18	7,996	81	21.13	6,360	8.5
Apr. 21-23.....	3,701	--	9.80	38.28		4.00	.27	6.56	37.24	--		--	2,850	3.88	14,346	80	17.29	4,970	8.5
Apr. 24-27.....	3,110	--	12.40	53.51		4.26	.13	8.33	53.03	--		--	3,880	5.28	16,411	81	21.49	6,660	8.3
Apr. 28.....	1,065	--	8.60	35.84		3.25	.20	5.73	35.26	--		--	2,630	3.58	3,810	81	17.29	4,570	8.4
Apr. 29-30.....	2,329	--	11.60	47.42		4.49	.00	8.12	46.55	--		--	3,530	4.80	11,179	80	19.69	6,070	8.2
May 1.....	1,369	--	8.70	30.84		3.54	.00	5.52	30.47	--		--	2,440	3.32	4,542	78	14.79	4,050	8.2

ARKANSAS RIVER BASIN--Continued

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

Chemical analyses, water year October 1961 to September 1962--Continued

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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				
May 2-5, 1962...	4,356	--	14.00		62.64		3.28	0.40	10.83	62.06	--		--	4,770	6.49	28,256	82	23.68	7,680	8.5
May 6-11.....	3,880	--	16.00		87.87		4.26	.00	7.91	91.68	--		--	6,530	8.88	34,455	85	31.07	10,700	8.2
May 12-20.....	3,374	17.0	8.38	5.10	67.43	0.19	4.46	.13	9.16	67.70	0.02		--	5,010	6.81	22,988	83	25.97	8,000	8.3
May 21-27.....	2,402	--	13.30		57.42		4.56	.00	9.12	56.98	--		--	4,440	6.04	14,504	81	22.27	7,170	8.0
May 28.....	1,089	--	7.30		17.92		2.82	.40	5.62	16.36	--		--	1,650	2.24	2,444	71	9.38	2,720	8.5
May 29.....	4,145	--	3.36		7.26		2.03	.07	1.46	7.05				672	.91	3,789	68	5.60	1,160	8.4
May 30-31.....	5,744	--	3.24		4.74		2.23	.00	1.23	4.51	--		--	509	.69	3,976	59	3.73	874	8.0
June 1.....	1,129	--	4.84		11.70		2.56	.27	2.46	11.23	--		--	1,000	1.36	1,535	71	7.52	1,720	8.5
June 2-4.....	14,477	--	2.80		4.13		2.00	.00	.90	4.01	--		--	420	.57	8,269	60	3.49	752	8.2
June 5.....	6,506	--	5.44		14.18		2.43	.40	3.39	13.40	--		--	1,230	1.67	10,883	72	8.60	2,050	8.5
June 6.....	6,268	--	11.00		52.20		2.13	.33	8.54	52.19	--		--	4,010	5.45	34,182	83	22.26	6,470	8.4
June 7.....	4,542	--	12.60		78.74		2.23	.13	8.64	80.40	--		--	5,860	7.97	36,199	86	31.37	9,370	8.4
June 8.....	3,967	--	15.40		131.81		2.28	.27	10.04	134.56	--		--	9,160	12.46	49,419	90	47.50	14,600	8.3
June 9-10.....	88,860	--	3.00		8.96		1.84	.13	1.52	8.46	--		--	747	1.02	90,274	75	7.32	1,290	8.4
June 11.....	31,736	--	2.24		3.61		1.70	.07	1.00	3.10	--		--	351	.48	15,149	62	3.41	598	8.3
June 12.....	14,003	--	3.72		6.18		1.97	.00	2.29	5.64	--		--	616	.84	11,731	62	4.53	1,050	8.2
June 13.....	7,140	--	5.00		10.09		2.33	.00	3.16	9.59	--		--	986	1.34	9,575	67	6.38	1,620	8.2
June 14-20.....	20,216	--	8.70		47.42		3.15	.07	5.31	47.39	--		--	3,480	4.73	95,676	84	22.73	5,770	8.3
June 21-24.....	6,109	--	9.60		46.98		3.44	.27	6.45	46.55	--		--	3,520	4.79	29,245	83	21.44	5,780	8.4
June 25.....	1,595	--	9.30		60.90		2.29	.13	6.45	61.50	--		--	4,440	6.04	9,630	87	28.24	7,280	8.3
June 26-28.....	14,489	--	9.90		47.42		3.02	.40	7.39	46.55	--		--	3,600	4.90	70,939	83	21.31	5,870	8.5
June 29.....	4,800	--	8.40		37.76		2.13	.13	6.66	37.24	--		--	2,960	4.03	19,323	82	18.42	4,830	8.3
June 30.....	5,574	--	10.40		53.07		2.10	.27	7.39	53.60	--		--	4,180	5.68	31,685	84	23.27	6,530	8.4
July 1.....	6,188	--	5.84		26.19		2.39	.00	3.54	26.09	--		--	1,990	2.71	16,748	82	15.32	3,360	8.2
July 2.....	3,888	--	4.72		16.88		2.26	.07	3.02	16.22	--		--	1,410	1.92	7,455	78	10.99	2,350	8.3
July 3.....	3,431	--	9.30		42.37		2.69	.13	5.93	42.88	--		--	3,350	4.56	15,633	82	19.65	5,410	8.3
July 4-5.....	4,919	--	10.00		51.77		3.08	.00	5.21	53.60	--		--	3,910	5.32	26,157	84	23.15	6,480	8.2
July 6-9.....	7,053	--	9.40		45.24		3.51	.27	5.21	45.70	--		--	3,430	4.66	32,902	83	20.87	5,640	8.4
July 10-11.....	3,903	--	7.08		29.54		2.88	.07	3.75	29.90	--		--	2,370	3.22	12,582	81	15.70	3,840	8.3
July 12.....	1,656	--	8.00		36.32		2.82	.00	4.83	36.67	--		--	2,840	3.86	6,397	82	18.16	4,650	8.0
July 13.....	1,404	--	12.50		63.51		3.08	.53	5.83	64.32	--		--	4,760	6.47	9,091	84	25.40	7,660	8.4

July 14, 1962...	1,178	--	13.34	93.09		3.85	.67	6.70	95.35	--		--	6,680	9.08	10,704	87	36.04	10,900	8.5
July 15-16.....	2,083	--	9.80	69.17		3.70	.27	6.04	69.11	--		--	4,880	6.64	13,822	88	31.25	8,070	8.4
July 17-18.....	2,507	--	8.60	49.16		3.54	.13	4.89	49.37	--		--	3,640	4.95	12,411	85	23.70	6,050	8.4
July 19.....	1,107	--	7.50	35.06		3.28	.27	3.75	35.26	--		--	2,650	3.60	3,989	82	18.11	4,430	8.4
July 20-21.....	2,118	--	9.60	80.04		3.54	.00	7.08	78.99	--		--	5,270	7.17	15,183	89	36.53	9,070	7.8
July 22-23.....	1,325	--	8.40	60.90		3.41	.00	5.93	59.81	--		--	4,120	5.60	7,424	88	29.72	7,130	8.1
July 24-28.....	2,717	--	10.20	50.90		3.28	.13	6.77	50.78	--		--	3,680	5.00	13,600	83	22.54	6,340	8.3
July 29.....	764	--	8.00	39.32		3.47	.07	4.83	38.93	--		--	2,770	3.77	2,877	83	19.66	4,840	8.3
July 30-31.....	10,810	--	9.30	59.16		3.08	.00	6.25	59.24	--		--	4,090	5.56	60,129	86	27.43	7,050	7.3
Aug. 1-3.....	23,623	--	5.80	27.71		2.03	.00	4.68	26.80	--		--	2,030	2.76	65,219	83	16.27	3,530	8.2
Aug. 4-6.....	12,912	--	5.00	17.44		1.90	.00	4.16	16.36	--		--	1,340	1.82	23,532	78	11.03	2,360	8.1
Aug. 7.....	2,083	--	10.00	44.37		2.36	.00	6.77	45.14	--		--	3,360	4.57	9,517	82	19.84	5,650	8.1
Aug. 8-9.....	2,951	--	9.60	77.00		2.62	.13	6.97	76.73	--		--	5,100	6.94	20,471	89	35.14	8,790	8.3
Aug. 10-30.....	11,040	21.0	6.19 | 4.03	59.60		2.92	.00	6.25	60.65	.02		--	4,280	5.82	64,262	85	26.37	7,240	8.0
Sept. 1-3.....	1,208	--	11.30	53.07		3.61	.13	6.66	54.16	--		--	3,820	5.20	6,275	82	22.33	6,610	8.3
Sept. 4-5.....	2,745	--	5.40	22.14		2.66	.00	3.44	21.44	--		--	1,710	2.33	6,384	80	13.47	2,850	8.2
Sept. 6-7.....	2,150	--	3.04	7.92		2.75	.00	1.71	6.49	--		--	618	.84	1,807	72	6.42	1,090	8.1
Sept. 8-9.....	1,579	--	4.70	14.88		2.46	.00	2.46	14.67	--		--	1,180	1.60	2,534	76	9.70	2,060	7.9
Sept. 10-11.....	1,142	--	6.70	23.10		3.21	.00	3.71	22.85	--		--	1,810	2.46	2,812	78	12.62	3,080	8.2
Sept. 12-14.....	1,327	--	8.40	35.54		3.05	.00	5.31	35.54	--		--	2,620	3.56	4,728	81	17.34	4,690	8.2
Sept. 15-16.....	2,602	--	4.50	16.49		1.97	.00	2.08	16.93	--		--	1,280	1.74	4,530	79	10.99	2,250	8.0
Sept. 17-19.....	1,244	--	8.80	42.37		3.74	.00	5.10	42.32	--		--	3,020	4.11	5,108	83	20.20	5,330	8.2
Sept. 20.....	3,352	--	10.80	57.42		3.67	.07	6.45	57.83	--		--	4,040	5.49	18,418	84	24.71	6,960	8.3
Sept. 21.....	4,542	--	12.74	108.75		2.84	.00	7.68	110.87	--		--	7,230	9.83	44,662	90	43.09	12,200	8.1
Sept. 22-30.....	24,420	--	6.40	55.68		2.23	.00	4.68	55.01	--		--	3,670	4.99	121,888	90	31.13	6,440	7.9
Total or weighted average	973,600	--	7.71	31.46		3.03	--	4.85	31.18	--	--	--	2,410	3.27	3,187,900	83	14.40	4,000	8.0

ARKANSAS RIVER BASIN--Continued

7-2450. CANADIAN RIVER NEAR WHITEFIELD, OKLA.

LOCATION.--At gaging station at bridge on State Highway 2, 0.8 mile north of Whitefield, Haskell County, and 5.5 miles upstream from Snake Creek.
DRAINAGE AREA.--47,576 square miles, of which 9,700 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: September 1944 to February 1945, September 1946 to September 1962.
Water temperatures: September 1944 to February 1945, September 1946 to September 1962.
EXTREMES, 1961-62.--Specific conductance: Maximum daily, 1,910 micromhos May 30; minimum daily, 239 micromhos Nov. 22.
Percent sodium: Maximum, 60 Aug. 21-31; minimum, 33 Apr. 1-3.
Sodium-adsorption-ratio: Maximum, 5.41 May 30-31; minimum, 1.12 Apr. 1-3.
EXTREMES, 1944-45, 1946-62.--Specific conductance: Maximum daily, 22,900 micromhos Nov. 11, 1956; minimum daily, 71.1 micromhos Jan. 2, 1948.
Percent sodium: Maximum, 80 Nov. 6-14, Dec. 21-23, 1947; minimum, 21 Mar. 5, 1959.
Sodium-adsorption-ratio (1951-62): Maximum, 33 Nov. 11, 1956; minimum, 0.4 Mar. 5, 1959.
REMARKS.--Dashes omitted in potassium (K) column indicate sodium (Na) plus potassium (K) are calculated. Records of specific conductance of daily samples available in district office at Oklahoma City, Okla.

Chemical analyses, water year October 1961 to September 1962

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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. 1-8, 1961..	82,576	--	2.96		3.13		1.84	0.00	0.71	3.55	--	--	--	384	0.52	43,124	51	2.57	653	7.9
Oct. 9-10.....	5,355	--	4.40		4.96		2.62	.00	1.08	5.64	--	--	--	563	.77	4,101	53	3.34	968	7.9
Oct. 11-20.....	93,699	--	3.72		3.57		2.36	.00	1.12	3.81	--	--	--	441	.60	56,197	49	2.62	756	8.1
Oct. 21-31.....	25,069	9.4	2.94	1.97	4.61		3.15	.00	1.25	5.02	0.02	0.07	0.10	535	.73	18,240	48	2.94	976	8.1
Nov. 1-3.....	16,316	--	4.84		5.52		2.75	.13	1.04	6.43	--	--	--	617	.84	13,691	53	3.55	1,070	8.4
Nov. 4.....	19,617	--	2.24		1.91		1.61	.00	.44	2.12	--	--	--	252	.34	6,723	46	1.81	442	8.1
Nov. 5-21.....	128,436	--	4.36		3.87		2.62	.00	1.44	4.18	--	--	--	486	.66	84,891	47	2.62	856	8.0
Nov. 22-28.....	277,686	--	2.12		1.35		1.54	.00	.52	1.41	--	--	--	203	.28	76,664	39	1.31	356	7.8
Nov. 29-30.....	18,347	--	3.48		3.09		2.23	.00	.90	3.44	--	--	--	404	.55	10,081	47	2.34	681	7.4
Dec. 1-5.....	32,350	--	4.76		3.96		2.92	.00	1.44	4.37	--	--	--	561	.76	24,682	45	2.57	908	8.0
Dec. 6-9.....	58,489	--	3.04		2.48		1.84	.00	.96	2.71	--	--	--	360	.49	28,636	45	2.01	580	7.5
Dec. 10-13.....	73,468	--	2.36		2.04		1.61	.00	.52	2.26	--	--	--	289	.39	28,876	46	1.88	465	8.0
Dec. 14-16.....	24,653	--	4.04		4.31		2.39	.00	1.06	4.88	--	--	--	535	.73	17,937	52	3.03	862	7.8
Dec. 17-18.....	44,152	--	3.28		3.18		2.20	.00	.81	3.44	--	--	--	408	.55	24,499	49	2.48	661	7.6
Dec. 19.....	20,628	--	3.68		4.22		2.00	.00	.75	5.13	--	--	--	530	.72	14,869	53	3.11	837	8.0
Dec. 20-22.....	40,957	--	3.04		2.61		2.03	.00	.75	2.88	--	--	--	356	.48	19,830	46	2.12	587	7.3
Dec. 23-27.....	41,950	--	4.20		3.44		2.72	.00	1.12	3.81	--	--	--	480	.65	27,385	45	2.37	777	7.8
Dec. 28-31.....	22,850	--	6.40		5.09		3.84	.00	2.21	5.42	--	--	--	721	.98	22,405	44	2.85	1,150	8.2
Jan. 1-6, 1962..	23,683	--	6.72		5.96		3.87	.27	1.75	6.77	--	--	--	810	1.10	26,089	47	3.25	1,270	8.4
Jan. 7-20.....	51,955	12.0	4.54	2.63	7.00		3.80	.33	1.71	8.32	.02	.04	.15	877	1.19	61,968	49	3.70	1,450	8.4

Jan. 21, 1962...	4,621	--	7.68	7.53		4.13	.27	2.04	8.75	--	--	--	983	1.34	6,178	49	3.84	1,500	8.4
Jan. 22.....	9,064	--	5.12	4.79		2.69	.40	1.50	5.30	--	--	--	641	.87	7,902	48	2.99	1,010	8.5
Jan. 23-25.....	34,352	--	2.56	2.22		1.70	.00	.75	2.31	--	--	--	323	.44	15,090	46	1.96	508	8.0
Jan. 26-28.....	28,443	--	4.12	4.00		2.43	.00	1.02	4.68	--	--	--	532	.72	20,579	49	2.79	848	8.1
Jan. 29-31.....	24,736	--	5.20	5.05		2.92	.00	1.46	5.87	--	--	--	650	.88	21,867	49	3.13	1,050	8.0
Feb. 1-10.....	45,759	--	6.92	6.39		3.74	.00	2.75	6.83	--	--	--	819	1.11	50,988	48	3.44	1,350	8.0
Feb. 11-24.....	45,235	--	7.04	7.00		3.87	.00	2.31	7.84	--	--	--	859	1.17	52,845	50	3.73	1,440	7.8
Feb. 25-27.....	32,567	--	3.52	2.83		1.77	.00	1.02	3.55	--	--	--	408	.55	18,071	45	2.13	681	8.2
Feb. 28.....	7,557	--	3.28	3.52		1.80	.07	1.08	3.86	--	--	--	434	.59	4,460	52	2.75	719	8.3
Mar. 1-5.....	31,240	--	4.56	4.79		2.43	.07	1.27	5.59	--	--	--	581	.79	24,684	51	3.17	991	8.3
Mar. 6-10.....	29,316	--	5.28	5.74		2.79	.07	1.35	6.83	--	--	--	684	.93	27,271	52	3.53	1,170	8.3
Mar. 11-20.....	26,638	--	8.32	6.35		3.64	.00	1.54	7.48	--	--	--	772	1.05	27,968	50	3.57	1,320	8.1
Mar. 21-25.....	122,182	--	3.40	3.22		2.00	.00	.90	3.72	--	--	--	415	.58	68,959	49	2.47	696	8.0
Mar. 26-31.....	127,815	--	2.48	2.13		1.57	.00	.56	2.48	--	--	--	317	.43	55,104	46	1.91	493	7.8
Apr. 1-3.....	46,473	--	2.52	1.26		1.44	.00	.46	1.86	--	--	--	235	.32	14,853	33	1.12	404	8.0
Apr. 4-10.....	41,597	--	4.04	3.52		2.36	.00	.75	4.46	--	--	--	476	.65	26,928	47	2.48	794	8.0
Apr. 11-14.....	22,469	--	5.16	5.26		2.62	.40	.77	6.63	--	--	--	648	.88	19,801	50	3.28	1,100	8.4
Apr. 15-17.....	23,486	--	3.80	3.87		2.10	.13	.62	4.82	--	--	--	485	.66	15,492	50	2.81	825	8.4
Apr. 18-20.....	41,492	--	2.88	2.31		1.90	.00	.62	2.65	--	--	--	339	.46	19,130	44	1.92	549	8.2
Apr. 21-22.....	16,403	--	3.76	3.13		2.23	.00	.81	3.86	--	--	--	441	.60	9,838	45	2.28	728	8.0
Apr. 23-29.....	329,613	8.8	1.50 | .58	1.65	0.07	1.48	.00	.46	1.92	.01	.00	--	236	.32	105,793	43	1.62	394	7.7
Apr. 30.....	20,628	--	3.96	4.13		2.10	.20	.83	4.96	--	--	--	494	.67	13,859	51	2.94	845	8.4
May 1-6.....	58,552	--	4.00	2.96		2.39	.00	.67	3.89	--	--	--	451	.61	35,913	43	2.09	740	8.2
May 7-13.....	22,770	--	5.56	5.00		3.28	.13	1.10	6.07	--	--	--	657	.89	20,346	47	3.00	1,090	8.3
May 14-20.....	10,566	10.0	3.84 | 2.88	7.53	.13	3.70	.00	1.69	8.75	.02	.00	--	898	1.22	12,904	52	4.11	1,440	8.1
May 21-27.....	8,858	--	7.28	8.27		4.06	.27	1.19	10.01	--	--	--	925	1.26	11,144	53	4.33	1,590	8.4
May 28-29.....	3,919	--	5.12	6.31		2.69	.00	.85	7.90	--	--	--	692	.94	3,689	55	3.94	1,220	8.0
May 30-31.....	10,453	--	6.84	10.01		2.95	.00	.90	12.98	--	--	--	1,140	1.55	16,206	59	5.41	1,790	8.1
June 1.....	8,410	--	5.72	8.18		2.29	.27	1.17	10.16	--	--	--	903	1.23	10,328	59	4.84	1,490	8.4
June 2-3.....	30,426	--	4.68	5.05		2.69	.20	.75	6.07	--	--	--	618	.84	25,573	52	3.30	1,030	8.4

ARKANSAS RIVER BASIN--Continued

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

Chemical analyses, water year October 1961 to September 1962--Continued

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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				
June 4-10, 1962.	137,593	--	3.04		2.57		2.16	0.00	0.75	2.68	--	--	--	339	0.46	63,436	46	2.08	585	8.2
June 11-12.....	109,884	--	3.12		2.52		2.26	.00	.92	2.48	--	--	--	353	.48	52,753	45	2.02	583	7.5
June 13-20.....	151,045	--	2.80		1.91		2.03	.00	.81	1.86	--	--	--	282	.38	57,929	41	1.62	485	7.7
June 21-24.....	59,464	--	3.36		2.22		2.49	.00	.81	2.26	--	--	--	321	.44	25,960	40	1.71	558	8.1
June 25.....	9,203	--	4.68		3.74		2.56	.27	1.79	3.78	--	--	--	503	.68	6,296	44	2.45	848	8.5
June 26-27.....	21,322	--	3.00		1.91		1.70	.00	.94	2.26	--	--	--	317	.43	9,192	39	1.56	545	8.2
June 28-30.....	24,159	--	5.32		4.52		2.43	.20	2.85	4.37	--	--	--	591	.80	19,418	46	2.77	986	8.4
July 1-12.....	49,317	14.0	3.34	1.97	4.92		2.95	.00	2.27	4.94	0.02	0.06	--	632	.86	42,389	48	3.01	1,060	7.9
July 13.....	8,132	--	3.52		3.05		2.36	.00	.94	3.27	--	--	--	399	.54	4,413	46	2.30	684	7.6
July 14-17.....	32,807	--	1.72		1.61		1.11	.00	.42	1.81	--	--	--	208	.28	9,280	48	1.74	364	7.3
July 18-20.....	5,885	--	3.04		3.44		1.84	.00	.83	3.81	--	--	--	385	.52	3,081	53	2.79	687	7.6
July 21-24.....	10,742	--	4.00		4.74		2.46	.07	.92	5.30	--	--	--	523	.71	7,641	54	3.35	910	8.3
July 25-26.....	58,909	--	1.52		1.00		1.31	.00	.29	.93	--	--	--	153	.21	12,258	40	1.15	258	7.7
July 27-30.....	41,177	--	1.68		1.65		1.21	.00	.31	1.83	--	--	--	215	.29	12,040	50	1.80	371	7.7
July 31.....	4,403	--	2.52		3.57		1.48	.00	.42	4.20	--	--	--	382	.52	2,288	59	3.18	662	8.0
Aug. 1-2.....	4,939	--	2.64		3.61		1.61	.00	.56	4.06	--	--	--	372	.51	2,499	58	3.14	670	7.6
Aug. 3-4.....	3,761	--	3.44		4.70		1.90	.00	.65	5.59	--	--	--	495	.67	2,532	58	3.58	891	7.7
Aug. 5-10.....	69,715	--	6.84		8.83		3.02	.07	4.96	7.62	--	--	--	984	1.34	93,295	56	4.77	1,580	8.3
Aug. 11-20.....	11,326	16.0	5.09	1.15	9.18	0.17	2.82	.07	3.54	8.46	.04	.06	.44	931	1.27	14,340	59	5.20	1,630	8.3
Aug. 21-31.....	4,865	--	6.28		9.35		3.54	.00	2.50	9.59	--	--	--	944	1.28	6,246	60	5.28	1,600	8.2
Sept. 1-2.....																				
Sept. 1-2.....	5,728	--	2.36		2.35		1.93	.00	.65	2.14	--	--	--	266	.36	2,072	50	2.16	466	7.9
Sept. 3-4.....	3,055	--	4.20		5.09		2.43	.00	1.35	5.50	--	--	--	566	.77	2,351	55	3.51	981	7.9
Sept. 5-10.....	42,153	--	2.88		3.61		1.77	.00	.90	3.81	--	--	--	403	.55	23,103	56	3.01	705	8.1
Sept. 11-15.....	27,769	11.0	1.85	.82	3.18	.10	1.51	.00	.71	3.53	.02	.04	.16	349	.47	13,180	53	2.75	624	8.1
Sept. 16-17.....	21,283	--	2.12		2.04		1.51	.00	.56	2.09	--	--	--	253	.34	7,323	49	1.99	444	7.7
Sept. 18.....	14,995	--	3.28		3.35		2.03	.00	1.27	3.33	--	--	--	412	.56	8,402	51	2.62	707	8.1
Sept. 19-21.....	32,924	--	1.76		1.78		1.25	.00	.35	1.95	--	--	--	228	.31	10,209	50	1.90	387	7.9
Sept. 22-26.....	42,585	--	3.08		2.83		1.97	.00	1.29	2.65	--	--	--	360	.49	20,850	48	2.28	612	8.1
Sept. 27-30.....	19,041	--	3.56		3.26		2.07	.00	1.67	3.10	--	--	--	421	.57	10,902	48	2.45	421	8.1
Total or weighted average	3,396,000	--	3.49		3.19	--	2.14	.02	1.01	3.52	--	--	--	416	0.57	1,920,300	45	2.30	694	7.9

RED RIVER BASIN

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

LOCATION (revised).--At gaging station immediately below Denison Dam, 1.7 miles upstream from Sand Creek, and 4 miles northwest of Denison, Grayson County.
DRAINAGE AREA.--39,719 square miles, of wbich 5,936 is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: May 1944 to September 1962.
Water temperatures: October 1945 to September 1962.
EXTREMES, 1961-62.--Specific conductance: Maximum daily, 2,250 micromhos Oct. 3; minimum daily, 1,710 micromhos June 1.
Percent sodium: Maximum, 60 Nov. 1-30, Dec. 1-31; minimum, 54 June 1-30.
Sodium-adeorption-ratio: Maximum, 6.32 Nov. 1-30; minimum, 5.15 Aug. 1-31.
EXTREMES, 1944-62.--Specific conductance: Maximum daily, 3,520 micromhos Aug. 14, 1944; minimum daily, 656 micromhos Oct. 16, 1945.
Percent sodium: Maximum, 66 Dec. 1-31, 1958; minimum, 31 Nov. 1-10, 1945.
REMARKS.--Sodium (Na) and potassium (K) values are calculated and reported as sodium (Na). Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, water year October 1961 to September 1962

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (calculated)			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. 1-31, 1961.	296,001	9.9	6.04	3.04	12.92		2.13		6.58	13.26	0.02	0.01		1,320	1.80	531,382	59	6.06	2,220	7.2
Nov. 1-30.....	270,208	7.9	5.84	2.80	13.14		2.15		6.58	12.98	.02	.05		1,300	1.77	477,728	60	6.32	2,190	7.2
Dec. 1-31.....	262,982	8.6	5.79	2.80	12.79		2.11		6.27	12.98	.02	.01		1,280	1.74	457,800	60	6.17	2,130	7.5
Jan. 1-31, 1962.	184,709	8.1	5.64	2.80	11.75		2.20		6.04	11.90	.02	.01		1,200	1.63	301,445	58	5.72	2,040	7.7
Feb. 1-28.....	102,022	8.7	5.59	2.80	11.16		2.21		6.04	11.28	.02	.01		1,170	1.59	162,337	57	5.46	1,980	7.6
Mar. 1-31.....	76,737	8.5	5.59	2.71	10.96		2.34		5.95	10.95	.02	.01		1,150	1.56	120,016	57	5.38	1,940	7.7
Apr. 1-30.....	118,949	7.4	5.44	2.63	10.83		2.33		5.66	10.86	.02	.01		1,130	1.54	182,800	57	5.39	1,900	7.5
May 1-31.....	75,322	8.8	5.54	2.63	10.61		2.36		5.66	10.72	--	.02		1,120	1.52	114,731	57	5.25	1,900	6.9
June 1-30.....	1,121,058	7.8	5.49	2.96	9.79		2.16		5.41	10.66	--	.02		1,080	1.47	1,646,610	54	4.76	1,900	7.0
July 1-31.....	278,108	11.0	5.44	2.88	10.83		2.36		5.70	11.06	.02	.02		1,140	1.55	431,179	57	5.31	1,950	7.4
Aug. 1-31.....	266,733	11.0	5.39	2.63	10.31		2.47		5.29	10.49	.02	.05		1,090	1.48	395,405	56	5.15	1,910	7.6
Sept. 1-30.....	224,450	11.0	4.99	2.47	10.35		2.28		5.33	10.16	.02	.02		1,060	1.44	323,567	58	5.36	1,800	7.3
Total or weighted average	3,277,000	8.9	5.56	2.83	11.00		2.22		5.77	11.36	--	0.02		1,150	1.60	5,145,000	57	5.36	1,990	7.2

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 12, 2.4 miles north of Ruliff, Newton County, 4.2 miles upstream from the Kansas City Southern Railway bridge, 4.2 miles downstream from Cypress Creek, and at mile 40.
DRAINAGE AREA.--9,329 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1946, October 1947 to September 1962.
Water temperatures: October 1947 to September 1962.
EXTREMES, 1961-62.--Specific conductance: Maximum daily, 482 micromhos Sept. 24; minimum daily, 72 micromhos Dec. 11-13.
Percent sodium: Maximum, 73 Oct. 10, Sept. 11-30; minimum, 55 Dec. 24-31.
Sodium-adsorption-ratio: Maximum, 3.56 July 11-16; minimum, 1.08 Dec. 24-31.
EXTREMES, 1945-46, 1947-62.--Specific conductance: Maximum daily, 774 micromhos Dec. 26, 1948; minimum daily, 33 micromhos May 22, 1953.
Percent sodium: Maximum, 86 Dec. 26-27, 1948; minimum, 14 Sept. 18-22, 27, 1958.
REMARKS.--Sodium (Na) and potassium (K) values are calculated and reported as sodium. Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, water year October 1961 to September 1962

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (calculated)			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. 1-9, 1961..	50,126	16.0	0.37	0.23	1.04		0.46		0.20	0.96	--	0.01		109	0.15	7,431	63	1.90	183	6.5
Oct. 10.....	6,288	17.0	.44	.26	1.96		.49		.29	1.86	--	.00		169	.23	1,445	73	3.29	301	6.9
Oct. 11-20.....	45,917	17.0	.45	.29	1.17		.56		.23	1.13	--	.01		125	.17	7,806	61	1.93	220	6.5
Oct. 21-31.....	33,404	18.0	.46	.27	1.35		.56		.21	1.30	--	.01		148	.20	6,723	65	2.23	235	6.3
Nov. 1-10.....	36,436	17.0	.39	.25	1.31		.49		.21	1.21	0.03	.02		127	.17	6,293	67	2.31	214	6.5
Nov. 11-20.....	127,696	11.0	.20	.14	.74		.20		.13	.71	--	.02		72	.10	12,504	69	1.80	118	6.1
Nov. 21-24.....	41,931	9.8	.17	.09	.44		.16		.09	.45	--	.01		51	.07	2,908	62	1.19	84	6.0
Nov. 25-30.....	106,834	12.0	.27	.17	1.00		.23		.25	.96	--	.02		97	.13	14,094	69	2.12	164	6.1
Dec. 1-7.....	118,489	18.0	.35	.23	1.13		.23		.27	1.18	--	.01		116	.16	18,693	66	2.10	219	6.5
Dec. 8-10.....	36,298	10.0	.34	.12	1.04		.33		.19	.96	--	.01		96	.13	4,739	69	2.17	131	6.3
Dec. 11-23.....	645,659	11.0	.17	.10	.41		.13		.17	.37	--	.01		51	.07	44,783	60	1.11	75	5.7
Dec. 24-31.....	479,048	10.0	.27	.12	.48		.16		.23	.45	--	.01		61	.08	39,742	55	1.08	101	5.8
Jan. 1, 1962....	50,777	10.0	.20	.10	.44		.20		.17	.37	--	.01		53	.07	3,660	59	1.13	86	6.9
Jan. 2-3.....	89,058	10.0	.36	.14	.65		.33		.23	.56	--	.03		77	.10	9,326	57	1.31	135	6.7
Jan. 4-8.....	158,678	7.4	.17	.15	.44		.13		.17	.39	.01	.07		54	.07	11,653	57	1.08	90	6.4
Jan. 9.....	26,380	10.0	.32	.12	.83		.34		.29	.62	--	.03		85	.12	3,050	65	1.76	140	6.4
Jan. 10-20.....	214,233	14.0	.39	.30	1.04		.28		.42	1.02	--	.01		114	.16	33,215	60	1.78	196	6.5
Jan. 21-31.....	333,818	12.0	.35	.26	.87		.23		.40	.82	--	.01		98	.13	44,491	59	1.57	170	6.3

Feb. 1-22, 1962.	530,618	13.0	.35	.26	1.04		.28		.40	.96	--	.00		108	.15	77,937	63	1.90	188	6.2
Feb. 23-24.....	28,205	19.0	.47	.41	1.70		.39		.58	1.58	--	.02		169	.23	6,483	66	2.56	295	6.6
Feb. 25-28.....	69,302	13.0	.42	.27	1.26		.33		.48	1.13	--	.02		127	.17	11,970	64	2.14	216	6.3
Mar. 1-10.....	206,479	12.0	.45	.35	1.22		.30		.52	1.18	.01	.02		130	.18	36,506	61	1.93	231	6.0
Mar. 11-20.....	204,099	12.0	.46	.34	1.17		.31		.52	1.13	--	.03		128	.17	35,530	60	1.86	226	6.1
Mar. 21-31.....	166,975	13.0	.50	.37	1.39		.43		.56	1.24	--	.02		144	.20	32,700	62	2.11	255	6.8
Apr. 1-7.....	68,033	14.0	.55	.39	1.52		.41		.54	1.50	.01	.02		168	.23	15,544	62	2.22	279	6.6
Apr. 8-10.....	28,009	14.0	.40	.24	1.04		.33		.40	.93	--	.02		112	.15	4,266	62	1.85	183	6.4
Apr. 11-14.....	38,971	15.0	.50	.38	1.39		.49		.48	1.27	--	.03		146	.20	7,738	61	2.10	257	5.8
Apr. 15.....	13,726	15.0	.55	.42	1.83		.49		.54	1.72	--	.03		177	.24	3,304	65	2.63	336	6.6
Apr. 16-29.....	179,552	15.0	.50	.39	1.39		.48		.48	1.30	--	.02		159	.22	38,826	61	2.08	260	6.5
Apr. 30.....	16,899	12.0	.37	.15	.96		.33		.29	.85	--	.02		98	.13	2,252	65	1.87	166	6.5
May 1-5.....	126,645	8.7	.22	.15	.61		.20		.23	.51	.01	.01		65	.09	11,195	62	1.41	107	5.8
May 6-20.....	458,777	15.0	.55	.37	1.17		.69		.33	1.07	--	.01		133	.18	82,984	56	1.73	232	6.3
May 21-31.....	77,782	16.0	.55	.39	1.26		.72		.33	1.16	--	.01		140	.19	14,810	57	1.84	244	6.2
June 1-5.....	35,365	14.0	.42	.26	1.26		.46		.27	1.18	.01	.02		126	.17	6,060	65	2.16	216	7.0
June 6-12.....	100,092	9.0	.29	.21	.87		.31		.25	.79	--	.00		87	.12	11,843	63	1.73	152	6.9
June 13-18.....	65,693	9.0	.26	.18	.57		.26		.17	.56	--	.01		67	.09	5,986	56	1.21	115	6.4
June 19-30.....	90,922	9.9	.34	.21	.87		.39		.19	.85	--	.00		91	.12	11,253	61	1.65	163	6.2
July 1-10.....	56,093	12.0	.40	.29	1.44		.48		.27	1.35	.02	.00		145	.20	11,061	68	2.45	223	6.5
July 11-16.....	26,515	14.0	.70	.49	2.74		.56		.48	2.91	--	.00		261	.35	9,412	70	3.56	422	6.1
July 17-31.....	46,502	16.0	.42	.31	1.57		.57		.25	1.47	--	.00		155	.21	9,803	68	2.58	242	6.5
Aug. 1-8.....	24,674	16.0	.35	.27	1.17		.56		.21	1.02	.01	.01		118	.16	3,960	65	2.11	188	6.2
Aug. 9-24.....	44,176	14.0	.50	.38	2.35		.72		.29	2.20	.03			198	.27	11,896	73	3.55	358	6.3
Aug. 25-31.....	13,898	14.0	.40	.28	1.70		.54		.23	1.58	--	.01		152	.21	2,873	71	2.91	257	6.2
Sept. 1-10.....	29,673	13.0	.32	.21	1.31		.46		.21	1.13	.01	.01		117	.16	4,722	71	2.54	199	6.0
Sept. 11-20.....	38,876	11.0	.34	.24	1.57		.56		.23	1.33	--	.01		132	.18	6,979	73	2.91	234	6.4
Sept. 21-30.....	41,772	8.8	.45	.29	2.00		.44		.37	1.92	--	.01		179	.24	10,169	73	3.30	308	6.1
Total or weighted average	5,429,000	12.0	0.35	0.24	0.96		0.32		0.32	0.89	--	0.01		103	0.14	760,600	62	1.70	175	6.1

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 and Santa Fe Railway Co. bridge at Evadale, Jasper County, 600 feet downstream from Mill Creek, 15 miles upstream from Village Creek, and at mile 55.
DRAINAGE AREA.--7,952 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1962.
Water temperatures: October 1947 to September 1962.
EXTREMES, 1961-62.--Specific conductance: Maximum daily, 277 micromhos Jan. 11; minimum daily, 87 micromhos Dec. 21.
Percent sodium: Maximum, 67 Dec. 1-10; minimum, 52 May 6-18.
Sodium-adsorption-ratio: Maximum, 2.24 Aug. 1-31; minimum, 1.11 May 6-18.
EXTREMES, 1947-62.--Specific conductance: Maximum daily, 422 micromhos Jan. 25, 1957; minimum daily, 44 micromhos Sept. 22, 1958.
Percent sodium: Maximum, 76 Jan. 21-31, 1957; minimum, 14 June 4-18, 1950.
REMARKS.--Sodium (Na) and potassium (K) values are calculated and reported as sodium (Na). Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, water year October 1961 to September 1962

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (calculated)			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. 1-8, 1961..	28,102	16.0	0.39	0.21	0.74		0.39		0.33	0.59	0.01	0.01		93	0.13	3,554	55	1.35	154	6.6
Oct. 9-20.....	29,704	18.0	.45	.25	1.04		.44		.35	.93	.01	.01		118	.16	4,767	60	1.77	198	6.6
Oct. 21-31.....	19,025	18.0	.46	.26	1.09		.51		.35	.93	.01	.01		121	.16	3,131	60	1.82	202	6.5
Nov. 1-13.....	30,323	15.0	.50	.25	1.17		.57		.35	.96	.02	.02		124	.17	5,114	61	1.92	207	6.5
Nov. 14-19.....	25,206	12.0	.32	.15	.70		.30		.23	.62	.01	.01		79	.11	2,708	60	1.43	127	6.2
Nov. 20-30.....	60,589	19.0	.44	.22	.87		.56		.29	.65	.01	.02		106	.14	8,735	57	1.51	187	6.9
Dec. 1-10.....	48,000	14.0	.39	.22	1.22		.57		.31	.93	.01	.02		119	.16	7,768	67	2.20	196	7.6
Dec. 11-17.....	114,643	12.0	.32	.21	1.04		.36		.35	.85	.01	.01		104	.14	16,215	66	2.01	168	7.1
Dec. 18-19.....	60,099	8.4	.20	.16	.65		.23		.25	.51	.02	.01		68	.09	5,558	64	1.53	111	7.1
Dec. 20-26.....	284,767	8.3	.17	.16	.48		.20		.25	.34	.01	.01		56	.08	21,688	59	1.16	91	6.7
Dec. 27-31.....	156,298	9.6	.25	.18	.57		.21		.35	.42	.01	.01		68	.09	14,454	57	1.22	113	6.6
Jan. 1-10, 1962.	216,198	13.0	.34	.21	.74		.16		.42	.68	.01	.01		89	.12	26,169	57	1.41	148	5.7
Jan. 11-20.....	127,200	15.0	.42	.28	1.09		.23		.52	1.02	.01	.00		120	.16	20,759	61	1.83	203	5.9
Jan. 21-31.....	201,884	15.0	.44	.27	.87		.21		.56	.79	.01	.01		109	.15	29,927	55	1.46	183	5.8
Feb. 1-10.....	205,289	14.0	.40	.26	.87		.21		.58	.71	.00	.01		105	.14	29,315	57	1.52	171	6.2
Feb. 11-20.....	198,545	12.0	.39	.27	.87		.21		.52	.79	.01	.01		103	.14	27,812	57	1.51	177	6.2
Feb. 21-28.....	90,700	15.0	.46	.31	1.04		.30		.58	.93	.01	.00		122	.17	15,049	58	1.68	204	6.4
Mar. 1-10.....	139,081	14.0	.50	.36	1.09		.36		.65	.93	.01	.01		129	.18	24,400	56	1.66	216	6.7
Mar. 11-20.....	133,507	13.0	.50	.33	1.17		.33		.65	.99	.01	.01		131	.18	23,786	59	1.83	221	6.4
Mar. 21-31.....	120,916	12.0	.50	.39	1.22		.36		.71	1.02	.01	.01		137	.19	22,529	58	1.83	231	6.6

Apr. 1-10, 1962.	66,585	11.0	.55	.44	1.22		.46		.65	1.10	.01	.00		140	.19	12,678	55	1.74	240	6.2
Apr. 11-20.....	78,843	12.0	.55	.44	1.17		.49		.60	1.07	--	.00		138	.19	14,797	54	1.67	242	6.0
Apr. 21-30.....	86,777	11.0	.50	.39	1.13		.48		.56	.96	--	.01		127	.17	14,988	56	1.69	223	6.0
May 1-5.....	130,413	11.0	.47	.30	.96		.39		.48	.85	.01	.01		112	.15	19,865	55	1.54	193	5.9
May 6-18.....	503,326	10.0	.32	.20	.57		.30		.31	.45	--	.01		73	.10	49,970	52	1.11	118	5.7
May 19-31.....	137,486	14.0	.50	.31	.91		.52		.35	.85	--	.02		113	.15	21,129	53	1.43	192	5.9
June 1-4.....	23,603	14.0	.47	.33	.96		.56		.33	.82	.01	.02		113	.15	3,627	55	1.51	189	6.8
June 5-7.....	26,378	9.6	.33	.21	.70		.36		.25	.62	--	.02		81	.11	2,906	57	1.35	136	6.1
June 8-15.....	62,868	12.0	.47	.31	.91		.56		.31	.82	--	.02		108	.15	9,234	54	1.46	186	6.2
June 16-30.....	116,331	13.0	.47	.27	.91		.52		.31	.79	--	.02		107	.15	16,928	55	1.50	185	6.3
July 1-15.....	75,362	16.0	.42	.32	1.00		.30	0.23	.37	.82	.01	.00		115	.16	11,787	57	1.60	186	8.6
July 16-31.....	42,938	15.0	.50	.35	1.04		.61		.37	.90	--	.00		121	.16	7,066	55	1.61	208	6.6
Aug. 1-31.....	74,769	19.0	.50	.37	1.48		.69		.40	1.24	.01	.01		A 161	.22	16,371	63	2.24	251	6.2
Sept. 1-30.....	29,633	18.0	.55	.39	1.31		.72		.35	1.16	.01	.01		A 148	.20	5,965	58	1.91	240	6.5
Total or weighted average	3,746,000	13.0	0.39	0.27	0.86		0.33	--	0.43	0.75	--	0.01		102	0.14	520,700	57	1.50	171	6.1

A Residue at 180°C.

TRINITY RIVER BASIN

8-665. TRINITY RIVER AT ROMAYOR, TEX.

LOCATION (revised).--At gaging station at bridge on State Highway 105, 1.9 miles south of Romayor, Liberty County, 1.9 miles downstream from Gulf, Colorado and Santa Fe Railway Co. bridge, 3.7 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 1962.
Water temperatures: February 1950 to September 1951, April 1953 to January 1959, March 1944 to September 1962.
EXTREMES, 1961-62.--Specific conductance: Maximum daily, 1,310 micromhos June 11; minimum daily, 235 micromhos Dec. 20.
Percent sodium: Maximum, 66 Nov. 17-30, June 11-12; minimum, 35 May 2-9, Aug. 4-15, Sept. 15-30.
Sodium-adsorption-ratio: Maximum, 5.23 June 11-12; minimum, 1.09 May 2-9.
EXTREMES, 1945-50, 1953-62.--Specific conductance: Maximum daily, 3,800 micromhos Oct. 30, 1956; minimum daily, 103 micromhos Nov. 9, 1946.
Percent sodium: Maximum, 86 Nov. 7, 1953; minimum, 23 June 11-20, 1946.
REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, water year October 1961 to September 1962

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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. 1-9, 1961..	29,008	17.0	2.10	0.40	2.83		2.03		0.87	2.40	--	0.03		338	0.46	13,335	53	2.53	555	7.6
Oct. 10-20.....	32,160	15.0	2.59	.51	5.13		2.56		1.29	4.32	--	.06		512	.70	22,394	62	4.12	854	7.7
Oct. 21-31.....	21,775	15.0	2.69	.49	4.48		2.69		1.35	3.53	--	.08		485	.66	14,362	58	3.55	794	7.6
Nov. 1-12.....	27,991	15.0	2.54	.49	4.87		2.41		1.23	4.18	0.03	.06		490	.67	18,653	62	3.96	835	7.4
Nov. 13-16.....	13,765	13.0	1.80	.35	3.61		1.59		.81	3.30	.02	.05		366	.50	6,852	63	3.49	626	7.2
Nov. 17-30.....	85,166	17.0	2.30	.50	5.35		2.16		1.35	4.49	.03	.11		507	.69	58,724	66	4.52	869	7.1
Dec. 1-17.....	234,516	14.0	2.10	.36	1.74		1.90		.87	1.38	--	.06		252	.34	80,373	41	1.57	446	7.4
Dec. 18.....	35,702	12.0	1.75	.33	1.31		1.57		.73	1.02	--	.05		202	.27	9,808	39	1.28	366	7.4
Dec. 19-23.....	167,207	11.0	1.15	.16	.96		.95		.52	.73	--	.05		141	.19	32,064	42	1.19	246	6.8
Dec. 24-31.....	110,820	12.0	1.70	.32	1.57		1.52		.73	1.30	--	.05		216	.29	32,555	44	1.56	387	7.4
Jan. 1-23, 1962.	161,449	15.0	2.30	.54	3.26		1.70		1.35	2.96	.02	.09		394	.54	86,511	53	2.74	663	7.4
Jan. 24-27.....	54,506	14.0	2.10	.44	2.83		1.59		1.23	2.43	.02	.09		344	.47	25,500	53	2.51	578	7.2
Jan. 28-31.....	130,116	16.0	1.10	.26	1.35		.89		.67	1.10	.01	.04		173	.24	30,614	50	1.63	296	7.3
Feb. 1-3.....	45,461	16.0	1.60	.24	1.48		1.10		.48	1.69	--	.05		204	.28	12,613	45	1.54	411	6.9
Feb. 4-15.....	82,401	16.0	2.15	.53	2.78		1.69		1.29	2.43	--	.05		344	.47	38,551	51	2.41	581	7.1
Feb. 16-24.....	71,708	15.0	2.40	.58	3.52		1.97		1.42	2.99	--	.09		398	.54	38,814	54	2.90	680	7.1
Feb. 25-28.....	43,755	15.0	2.00	.44	2.57		1.61		1.19	2.12	--	.07		318	.43	18,923	51	2.32	530	7.1
Mar. 1-10.....	111,808	14.0	2.30	.49	2.35		1.88		1.31	1.86	.02	.06		310	.42	47,138	46	1.99	532	6.9

Mar. 11-20, 1962	73,726	14.0	2.35	.54	2.87		1.90		1.31	2.48	.02	.05		345	.47	34,592	50	2.39	603	7.3
Mar. 21-31.....	43,462	13.0	2.40	.59	2.91		1.92		1.27	2.68	.02	.02		351	.48	20,747	49	2.38	623	7.0
Apr. 1-17.....	72,395	16.0	2.84	.63	4.52		2.36		1.75	3.72	.03	.12		488	.66	48,047	57	3.43	828	7.2
Apr. 18-27.....	71,742	13.0	2.30	.41	2.31		1.97		1.12	1.86	--	.08		315	.43	30,734	46	1.98	523	7.4
Apr. 28-30.....	77,754	16.0	1.75	.30	1.48		1.44		.73	1.33	--	.04		216	.29	22,841	42	1.46	372	7.4
May 1.....	34,909	15.0	1.95	.31	2.74		1.69		1.04	2.23	--	.04		303	.41	14,385	55	2.58	543	7.5
May 2-9.....	308,025	11.0	1.85	.30	1.13		1.69		.73	.76	.02	.06		212	.29	88,810	35	1.09	334	7.2
May 10-14.....	63,888	14.0	2.20	.35	1.44		2.00		.75	1.18	--	.04		254	.35	22,069	36	1.27	414	7.2
May 15-17.....	18,762	14.0	2.45	.57	2.13		2.36		.90	1.86	--	.05		302	.41	7,706	41	1.74	534	7.3
May 18-31.....	73,337	14.0	3.24	.47	2.83		3.06		1.21	2.20	--	.05		403	.55	40,194	43	2.08	657	7.6
June 1-10.....	37,825	14.0	3.09	.51	3.13		2.92		1.04	2.71	.02	.02		406	.55	20,885	46	2.33	693	7.1
June 11-12.....	6,545	19.0	3.04	.59	7.05		2.79		1.33	6.49	--	.06		631	.86	5,617	66	5.23	1,130	7.6
June 13-16.....	33,243	17.0	2.50	.59	4.31		2.28		1.33	3.72	--	.08		460	.63	20,797	58	3.47	796	7.3
June 17-26.....	68,370	17.0	2.15	.35	2.04		2.05		.85	1.58	--	.06		286	.39	26,593	45	1.83	475	7.1
June 27-30.....	13,924	13.0	2.64	.44	3.57		2.43		1.10	3.07	--	.06		402	.55	7,613	54	2.87	700	7.2
July 1-8.....	84,893	18.0	2.10	.42	3.31		1.98		1.00	2.76	.03	.07		362	.49	41,794	57	2.95	626	7.3
July 9-17.....	47,127	19.0	2.15	.37	1.87		2.16		.75	1.41	--	.06		280	.38	17,946	43	1.67	458	7.2
July 18-31.....	26,602	17.0	2.89	.47	3.31		2.93		.96	2.76	--	.03		404	.55	14,616	50	2.55	697	7.2
Aug. 1-3.....	14,442	25.0	3.39	.49	4.61		3.28		1.27	3.86	.03	.03		513	.70	10,076	54	3.31	865	7.9
Aug. 4-15.....	184,629	15.0	2.20	.30	1.35		2.23		.73	.85	--	.05		235	.32	59,008	35	1.21	392	7.2
Aug. 16-31.....	32,275	13.0	2.89	.43	2.83		2.92		.85	2.37	--	.02		358	.49	15,714	46	2.19	633	7.2
Sept. 1-10.....	23,405	14.0	2.79	.48	4.39		2.77		1.04	3.81	.03	.03		450	.61	14,324	57	3.44	796	7.2
Sept. 11-14.....	41,796	15.0	2.40	.37	5.00		2.29		1.21	4.18	--	.09		468	.64	26,602	64	4.25	820	7.2
Sept. 15-30.....	323,068	12.0	2.20	.36	1.35		2.23		.62	1.02	--	.04		227	.31	99,737	35	1.19	391	7.4
Total or weighted average	2,325,000	14.0	2.12	0.39	2.29		1.91		0.94	1.88	--	0.06		295	0.40	1,299,000	48	2.00	503	7.2

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 1962.
Water temperatures: November 1950 to September 1962.
EXTREMES, 1961-62.--Specific conductance: Maximum daily, 1,860 micromhos Aug. 8; minimum daily, 348 micromhos June 19.
Percent sodium: Maximum, 60 Aug. 1-10; minimum, 32 June 18-21, 23.
Sodium-adsorption-ratio: Maximum, 5.48 Aug. 1-10; minimum, 1.06 June 18-21, 23.
EXTREMES, 1945-62.--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. 27-21, 1947.
REMARKS.--Values reported for dissolved solids concentrations less than 1,000 ppm are residues on evaporation and for concentrations more than 1,000 ppm are calculated from determined constituents unless otherwise noted. Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, water year October 1961 to September 1962

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. 1-13, 1961.	93,909	16.0	3.99	1.15	6.09		2.72		2.62	5.87	0.02	0.01		725	0.99	92,595	54	3.80	1,150	7.4
Oct. 14-17.....	82,671	15.0	2.35	.61	1.96		2.31		.92	1.61	.02	.06		a 289	.39	32,493	40	1.61	507	7.6
Oct. 18-24.....	107,728	18.0	4.79	1.32	8.13		2.38		3.71	8.12	.02	.02		a 856	1.16	125,413	57	4.66	1,460	7.6
Oct. 25-31.....	82,195	14.0	3.39	1.07	3.57		2.95		1.62	3.41	.02	.02		511	.69	57,122	44	2.39	822	7.7
Nov. 1-10.....	88,443	12.0	3.29	.82	3.57		2.77		1.62	3.22	.02	.03		460	.63	55,330	46	2.49	777	7.2
Nov. 11-20.....	136,383	14.0	3.14	.73	3.57		2.62		1.60	3.16	.02	.02		447	.61	82,910	48	2.56	760	7.2
Nov. 21-30.....	142,988	12.0	2.94	.62	2.87		2.61		1.48	2.31	.02	.02		a 377	.51	73,313	45	2.15	628	7.2
Dec. 1-10.....	90,089	13.0	3.64	.99	3.48		3.05		1.56	3.44	.02	.03		a 468	.64	57,340	43	2.29	828	7.6
Dec. 11-20.....	150,962	12.0	3.49	.99	3.65		2.72		1.73	3.61	.02	.04		506	.69	103,886	45	2.44	835	7.5
Dec. 21-31.....	173,782	14.0	2.64	.71	2.65		2.03		1.37	2.57	.02	.03		a 357	.49	84,375	44	2.05	639	7.3
Jan. 1-15, 1962.	101,246	10.0	3.99	1.15	3.70		3.41		1.79	3.61	--	.03		517	.70	71,188	42	2.31	885	7.4
Jan. 16-27.....	70,405	11.0	4.44	1.23	4.83		3.54		2.42	4.51	--	.03		a 610	.83	58,408	46	2.87	1,040	7.5
Jan. 28-29.....	38,340	16.0	3.09	.77	2.35		2.70		1.19	2.26	--	.05		a 362	.49	18,876	38	1.69	627	7.4
Jan. 30-31.....	35,762	15.0	2.40	.56	2.31		1.90		1.27	2.06	--	.04		a 316	.43	15,369	44	1.90	543	7.2
Feb. 1-11.....	114,611	12.0	2.50	.69	2.31		2.05		1.25	2.14	.02	.02		340	.46	52,996	42	1.83	566	7.0
Feb. 12-18.....	39,168	9.4	3.34	.99	3.13		2.97		1.67	2.79	.02	.01		440	.60	23,438	42	2.13	750	7.0
Feb. 19-28.....	63,431	7.9	3.89	1.15	4.39		3.02		2.27	4.12	.02	.02		559	.76	48,223	47	2.77	961	7.3
Mar. 1-15.....	81,550	12.0	3.74	1.15	4.26		2.88		2.27	3.98	--	.00		a 536	.73	59,447	47	2.73	925	7.3

Mar. 16-31, 1962	65,502	12.0	4.04	1.32	5.31		3.25		2.56	4.85	--	.00		a 623	.85	55,499	50	3.24	1,030	7.3
Apr. 1-15.....	56,945	8.1	4.19	1.48	4.87		3.25		2.48	4.80	.02	.01		641	.87	49,643	46	2.89	1,080	7.0
Apr. 16-30.....	55,993	7.1	3.64	1.32	4.48		2.69		2.37	4.37	--	.01		582	.79	44,320	47	2.85	985	7.0
May 1-2, 8.....	40,106	16.0	3.59	.99	4.18		2.47		2.19	4.01	.02	.05		534	.73	29,126	48	2.76	896	7.4
May 3-7, 9-13...	98,995	16.0	2.74	.71	2.35		2.11		1.39	2.23	--	.06		366	.50	49,276	40	1.79	597	7.0
May 14-31.....	48,877	14.0	3.94	1.32	4.79		3.16		2.06	4.80	--	.01		629	.86	41,811	48	2.95	1,020	7.2
June 1-4.....	10,980	15.0	4.34	1.65	6.09		3.51		2.75	5.78	.02	.03		750	1.02	11,200	50	3.52	1,230	7.5
June 5.....	7,636	12.0	3.19	.90	5.35		1.79		2.62	5.02	--	.02		a 570	.78	5,920	57	3.74	1,090	7.8
June 6-12.....	74,961	12.0	2.40	.63	2.00		2.03		1.19	1.75	--	.05		a 297	.40	30,278	40	1.63	529	7.5
June 13-17.....	84,793	12.0	2.89	.65	2.48		2.08		1.50	2.37	--	.05		383	.52	44,167	41	1.86	630	7.6
June 18-21, 23..	52,403	7.9	2.05	.43	1.17		1.93		.79	.90	--	.02		a 210	.29	14,966	32	1.06	377	7.9
June 22.....	11,147	12.0	3.09	.75	3.18		2.20		1.64	3.16	--	.01		a 414	.56	6,276	45	2.29	741	7.6
June 24-30.....	62,479	10.0	4.69	1.32	7.61		2.18		3.52	7.90	--	.02		a			56	4.39	1,430	7.4
July 1.....	11,425	16.0	3.74	1.07	5.35		2.23		2.71	5.22	--	.00		609	.83	9,462	53	3.45	1,080	7.6
July 2-13.....	126,982	15.0	2.50	.64	2.96		2.05		1.48	2.51	.02	.02		391	.53	67,524	49	2.36	625	7.0
July 14-31.....	42,129	15.0	3.79	1.32	4.83		3.11		2.29	4.51	.02	.01		582	.79	33,346	49	3.02	1,010	7.0
Aug. 1-10.....	133,448	16.0	5.19	1.48	10.01		2.13		4.66	9.82	.03	.02		1,010	1.37	183,304	60	5.48	1,740	7.5
Aug. 11-31.....	138,829	12.0	4.44	1.40	8.00		2.21		3.77	7.84		.01		869	1.18	164,074	58	4.68	1,440	7.1
Sept. 1-13,15-30	412,308	13.0	4.19	1.32	7.09		2.36		3.29	6.91	.02	.01		770	1.05	431,769	56	4.27	1,300	7.3
Sept. 14.....	34,116	12.0	2.50	.64	2.65		2.10		1.50	2.17		.02		344	.47	15,961	46	2.12	603	7.6
Total or weighted average	3,264,000	13.0	3.55	1.02	4.59		2.52		2.22	4.39	--	0.02		556	0.76	2,469,000	50	2.94	941	7.3

a Calculated from determined constituents.

COLORADO RIVER BASIN

8-1580. COLORADO RIVER AT AUSTIN, TEX.

LOCATION.--At raw water intake at Austin City Waterplant, just downstream from Lamar Boulevard Bridge in Austin, Travis County, 0.5 mile downstream from Barton Creek, and 4.5 miles upstream from gaging station at Montopolis Bridge on U. S. Highway 183.
DRAINAGE AREA.--38,400 square miles, approximately, above gaging station, of which 11,900 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1962.
Water temperatures: October 1947 to September 1962.
EXTREMES, 1961-62.--Specific conductance: Maximum daily, 622 micromhos Aug. 6; minimum daily, 453 micromhos Nov. 2.
Percent sodium: Maximum, 32 Jan. 1-31, Aug. 25-31; minimum, 20 Feb. 1-28.
Sodium-adsorption-ratio: Maximum, 1.26 Jan. 1-31; minimum, 0.77 Feb. 1-28.
EXTREMES, 1947-62.--Specific conductance: Maximum daily, 622 micromhos Aug. 6, 1962; 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, Dec. 1-31, 1960, Jan. 1-31, 1961.
REMARKS.--Dashes omitted in potassium (K) column indicate sodium (Na) plus potassium (K) are calculated. Records of specific conductance of daily samples available in district office at Austin, Tex. No appreciable inflow between sampling point and gaging station except during periods of heavy local rains.

Chemical analyses, water year October 1961 to September 1962

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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. 1-31, 1961.	52,141	10.0	2.30	1.56	1.09		3.15		0.56	1.18	0.02	0.02		286	0.39	20,281	22	0.78	482	7.2
Nov. 1-30.....	172,264	11.0	1.95	1.48	1.48		2.82		.60	1.44	.02	.01		268	.36	62,787	30	1.13	464	7.2
Dec. 1-31.....	181,880	11.0	2.10	1.56	1.44		2.82		.65	1.58	.02	.01		278	.38	68,765	28	1.06	507	7.7
Jan. 1-31, 1962.	99,241	9.9	2.00	1.65	1.70		3.06		.71	1.55	.02	.02		294	.40	39,681	32	1.26	526	7.6
Feb. 1-28.....	13,384	11.0	2.79	1.81	1.17		3.74		.69	1.30	.01	.05		329	.45	5,989	20	.77	553	7.5
Mar. 1-31.....	10,760	9.5	2.40	1.48	1.61		3.16		.77	1.52	.01	.03		330	.45	4,829	29	1.16	540	7.5
Apr. 1-30.....	23,147	12.0	2.59	1.56	1.61		3.31		.73	1.66	.02	.02		326	.44	10,263	28	1.12	560	7.3
May 1-31.....	85,652	11.0	2.30	1.56	1.48	.10	3.00		.71	1.72	.02	.02		314	.43	36,577	27	1.06	532	7.5
June 1-30.....	111,987	10.0	2.20	1.56	1.48	.10	2.90		.71	1.69	.02	.01		306	.42	46,604	28	1.08	526	7.6
July 1-31.....	116,765	12.0	2.20	1.65	1.57		2.95		.73	1.72	.02	.01		298	.41	47,323	29	1.13	538	7.4
Aug. 1-24.....	83,639	12.0	2.15	1.56	1.52	.10	2.57		.77	1.75	.02	.15		310	.42	35,262	29	1.12	555	6.8
Aug. 25-31.....	21,049	12.0	2.00	1.56	1.65		2.69		.73	1.75	.02	.01		308	.42	8,817	32	1.24	520	7.7
Sept. 1-30.....	51,412	10.0	2.10	1.65	1.61		2.82		.73	1.78	--	.01		292	.40	20,417	30	1.18	538	7.6
Total or weighted average	1,023,000	11.0	2.14	1.57	1.50	--	2.90		0.68	1.60	0.02	0.02		293	0.40	407,600	28	1.10	516	7.3

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 1962.
Water temperatures: October 1945 to September 1948, March 1950 to September 1962.
EXTREMES, 1961-62.--Specific conductance: Maximum daily, 662 micromhos May 13; minimum daily, 204 micromhos Nov. 16.
Percent sodium: Maximum, 37 Aug. 1-31; minimum, 25 Nov. 1-13, 18-30, Feb. 1-17.
Sodium-adsorption-ratio: Maximum, 1.62 Aug. 1-31; minimum, 0.73 Nov. 14-17.
EXTREMES, 1944-62.--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.--Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, water year October 1961 to September 1962

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
			Calcium (Ca)	Magnesium (Mg)	Sodium (Na) a	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. 1-31, 1961.	91,248	14.0	2.40	1.40	1.31		3.20		0.71	1.16	0.02	0.02		303	0.41	37,601	26	0.95	496	7.7
Nov. 1-13.....	61,214	17.0	2.69	1.32	1.35		3.36		.71	1.21	.02	.05		308	.42	25,641	25	.95	508	7.4
Nov. 14-17.....	92,271	12.0	1.50	.55	.74		1.74		.37	.62	.02	.03		160	.22	20,078	27	.73	278	7.1
Nov. 18-30.....	101,929	14.0	2.40	1.23	1.22		2.90		.65	1.24	.02	.04		282	.38	39,092	25	.90	472	7.4
Dec. 1-31.....	210,226	15.0	2.59	1.40	1.52		3.26		.71	1.47	.02	.04		312	.42	89,203	28	1.08	530	7.9
Jan. 1-27, 1962.	137,579	11.0	2.59	1.56	1.78		3.57		.77	1.55	--	.05		342	.47	63,991	30	1.24	566	7.7
Jan. 28-31.....	24,373	13.0	2.20	1.15	1.52		2.70		.79	1.33	--	.04		274	.37	9,082	31	1.18	481	7.4
Feb. 1-17.....	34,899	11.0	3.09	1.40	1.52		3.80		.85	1.30	.02	.03		332	.45	15,758	25	1.02	574	7.6
Feb. 18-19.....	3,713	12.0	2.00	.90	1.13		2.59		.48	.93	.02	.03		225	.31	1,136	28	.94	391	8.0
Feb. 20-28.....	14,870	13.0	2.79	1.40	1.61		3.54		.90	1.33	.02	.03		324	.44	6,552	28	1.11	560	7.9
Mar. 1-31.....	49,989	11.0	2.89	1.56	1.74		3.56		1.06	1.50	.02	.04		366	.50	24,883	28	1.17	593	7.6
Apr. 1-15.....	20,648	13.0	2.99	1.48	1.78		3.65		1.00	1.58	.02	.02		361	.49	10,137	28	1.19	605	7.0
Apr. 16-27.....	16,780	14.0	2.99	1.48	1.83		3.54		1.04	1.69	--	.02		368	.50	8,398	29	1.22	606	7.2
Apr. 28-30.....	14,834	13.0	2.05	.90	1.39		2.62		.48	1.18	.02	.03		243	.33	4,902	32	1.15	416	7.8
May 1.....	3,947	12.0	1.95	.79	1.04		2.29		.50	.96	.02	.02		284	.39	1,525	28	.89	375	7.7
May 2-10.....	14,709	12.0	2.89	1.15	1.78		2.95		1.19	1.64	.02	.03		356	.48	7,122	31	1.25	578	7.0
May 11-20.....	10,711	12.0	2.89	1.40	1.74		3.46		.87	1.89	--	.02		351	.48	5,113	29	1.19	591	7.0
May 21-31.....	21,382	9.1	2.30	1.48	1.74		3.00		.75	1.78	--	.01		322	.44	9,364	32	1.27	552	6.9
June 1-30.....	111,332	13.0	2.40	1.15	1.61		2.87		.75	1.47	.02	.03		295	.40	44,666	31	1.21	507	7.1
July 1-31.....	72,494	12.0	2.30	1.40	1.70		3.03		.73	1.64	.00	.01		299	.41	29,479	31	1.25	547	7.5
Aug. 1-31.....	54,601	12.0	2.20	1.56	2.22		3.36		.79	1.81	.02	.01		332	.45	24,653	37	1.62	561	7.2
Sept. 1-30.....	78,783	14.0	2.25	1.32	1.96		3.18		.79	1.50	.02	.02		315	.43	33,751	35	1.47	510	7.1
Total or weighted average	1,243,000	13.1	2.44	1.31	1.54		3.11		0.73	1.39	0.02	0.03		303	0.41	512,100	29	1.10	511	7.4

a Calculated as sodium (Na).

GUADALUPE RIVER BASIN

8-1765. GUADALUPE RIVER AT VICTORIA, TEX.

LOCATION.--At gaging station at bridge on U. S. Highway 59 in Victoria, Victoria County, 1,300 feet upstream from Texas and New Orleans Railroad bridge, 10 miles upstream from Coleto Creek, and at mile 51.
DRAINAGE AREA.--5,161 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1946, October 1948 to September 1962.
Water temperatures: November 1950 to September 1962.
EXTREMES, 1961-62.--Specific conductance: Maximum daily, 817 micromhos Mar. 6; minimum daily, 257 micromhos Nov 18.
Percent sodium: Maximum, 35 Mar. 1-10; minimum, 24 Nov. 15-22, Feb 15-16, June 16-30.
Sodium-adsorption-ratio: Maximum, 1.55 Mar. 1-10; minimum, 70 Nov. 15-22.
EXTREMES, 1945-46, 1948-62.--Specific conductance: Maximum, daily 1,950 micromhos Jan. 11-17, 1946; minimum, daily 160 micromhos Oct. 31, 1960.
Percent sodium: Maximum, 67 July 23-24, 1950; minimum, 13 May 7-10, 1958.
REMARKS.--Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, water year October 1961 to September 1962

Date of collection	Ruaoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 18 °C)			Per-cent so-dium	So-dium adsorp-tion ratio	Specific conduct-ance (micro-mhos at 25°C)	pH
			Cal-cium (Ca)	Magne-sium (Mg)	So-dium (Na) a	Potas-sium (K)	Bicar-bonate (HCO_3)	Car-bonate (CO_3)	Sul-fate (SO_4)	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO_3)		Parts per mil-lion	Tons per acre-foot	Total tons				
Oct. 1-10, 1961.	17,970	18.0	2.84	1.48	1.44		3.77		0.71	1.18	0.02	0.06		342	0.47	8,358	25	0.98	552	7.6
Oct. 11-20.....	24,476	17.0	2.79	1.48	1.39		3.64		.67	1.24	.02	.07		335	.46	11,151	25	.95	545	7.6
Oct. 21-31.....	21,185	16.0	3.09	1.15	1.39		3.75		.65	1.13	.02	.08		343	.47	9,883	25	.96	532	7.6
Nov. 1-14.....	36,488	19.0	2.99	1.15	1.44		3.70		.62	1.16	.02	.07		320	.44	15,880	26	1.00	525	7.2
Nov. 15-22.....	76,784	15.0	1.90	.59	.78		2.16		.44	.62	.02	.05		189	.26	19,737	24	.70	331	7.0
Nov. 23-30.....	19,740	19.0	3.34	1.07	1.52		3.62		.87	1.35	.02	.07		348	.47	9,342	26	1.02	570	7.5
Dec. 1-15.....	30,436	17.0	3.54	1.73	1.83		4.43		.83	1.81	.02	.00		388	.53	16,061	26	1.13	665	7.6
Dec. 16-31.....	30,847	14.0	3.89	1.56	1.78		4.59		.87	1.69	.02	.08		432	.59	18,123	25	1.08	695	7.5
Jan. 1-31, 1962.	55,708	11.0	3.29	1.56	1.74		4.05		.90	1.52	.02	.09		360	.49	27,275	26	1.12	635	7.6
Feb. 1-14.....	23,437	15.0	2.54	1.56	1.91		3.25		.96	1.72	.02	.07		350	.48	11,156	32	1.34	590	7.9
Feb. 15-16.....	5,474	12.0	2.05	.63	.83		2.28		.52	.87		.06		208	.28	1,549	24	.71	370	7.9
Feb. 17-28.....	21,207	13.0	2.64	1.48	1.91		3.36		.90	1.69	.02	.06		346	.47	9,979	32	1.33	592	7.8
Mar. 1-10.....	15,590	15.0	2.69	1.56	2.26		3.43		.94	2.06	.01	.05		364	.50	7,718	35	1.55	637	7.6
Mar. 11-20.....	15,947	15.0	2.59	1.56	1.78		3.39		.83	1.64	.01	.06		343	.47	7,439	30	1.24	580	7.5
Mar. 21-31.....	16,473	13.0	2.84	1.56	1.87		3.59		.87	1.75	.01	.05		366	.50	8,199	30	1.26	608	7.6
Apr. 1-10.....	17,058	15.0	2.79	1.32	1.70		3.44		.77	1.50	.02	.06		349	.47	8,096	29	1.18	564	7.7
Apr. 11-20.....	15,154	17.0	2.94	1.48	1.96		3.67		.85	1.81	--	.05		388	.53	7,996	31	1.32	629	7.3
Apr. 21-30.....	24,000	14.0	2.79	1.23	1.48		3.44		.65	1.35	--	.05		330	.45	10,771	27	1.04	533	7.5

May 1-10, 1962..	19,855	24.0	2.84	1.15	1.87		3.29		.92	1.55	.02	0.06		340	.46	9,181	32	1.32	580	7.5
May 11-20.....	12,972	22.0	2.25	1.32	1.57		3.06		.71	1.33	--	.05		306	.42	5,398	31	1.17	504	7.5
May 21-31.....	13,025	20.0	2.40	1.32	1.61		3.31		.67	1.30	--	.03		313	.43	5,545	30	1.18	520	7.4
June 1-15.....	34,215	21.0	2.50	1.23	1.22		3.21		.54	1.13	.02	.05		284	.39	13,215	25	.89	473	7.5
June 16-30.....	18,179	20.0	2.64	1.32	1.22		3.51		.54	1.10	--	.04		296	.40	7,318	24	.87	502	7.3
july 1-10.....	13,488	21.0	2.20	1.40	1.39		3.10		.52	1.30	.02	.04		307	.42	5,631	28	1.04	494	7.2
July 11-20.....	9,600	18.0	2.59	1.32	1.52		3.52		.58	1.30	.02	.02		329	.45	4,295	28	1.09	532	7.5
July 21-31.....	8,356	19.0	2.50	1.40	1.39		3.52		.56	1.16	.02	.02		313	.43	3,557	26	1.00	519	7.4
Aug. 1-31.....	20,414	22.0	2.69	1.48	1.70		3.79		.67	1.38	.02	.02		333	.45	9,245	29	1.17	563	7.5
Sept. 1-10.....	9,779	21.0	2.59	1.48	1.65		3.61		.67	1.38	.02	.03		320	.44	4,256	29	1.16	541	7.6
Sept. 11-20.....	19,755	16.0	2.40	.90	1.31		2.97		.58	1.02	--	.04		263	.36	7,066	28	1.02	445	7.9
Sept. 21-30.....	14,261	17.0	2.79	1.07	1.31		3.51		.58	1.02	--	.04		290	.39	5,625	25	.94	486	7.6
Total or weighted average	661,900	17.0	2.76	1.28	1.51		3.45		0.71	1.33	0.02	0.05		321	0.44	289,040	27	1.10	537	7.4

a Calculated as sodium (Na).

NUECES RIVER BASIN

8-2110. NUECES RIVER NEAR MATHIS, TEX.

LOCATION.--At intake tower at Wesley E. Seale Dam, 0.6 mile upstream from gaging station at bridge on State Highway 359, and 4 miles southwest of Mathis, San Patricio County.
DRAINAGE AREA.--16,660 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1962.
Water temperatures: October 1947 to September 1962.
EXTREMES, 1961-62.--Specific conductance: Maximum daily, 773 micromhos July 28; minimum daily, 459 micromhos June 3.
Percent sodium: Maximum, 51 Aug. 1 to Sept. 30; minimum, 35 Nov. 1-30.
Sodium-adsorption-ratio: Maximum, 2.57 Aug. 1-31; minimum, 1.46 Nov. 1-30.
EXTREMES, 1947-62.--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.--Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, water year October 1961 to September 1962

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
			Calcium (Ca)	Magnesium (Mg)	Sodium (Na) a	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. 1-31, 1961.	6,764	18.0	2.89	0.52	2.04		3.31		0.67	1.44	0.02	0.02		334	0.45	3,072	37	1.57	529	7.9
Nov. 1-30.....	6,248	18.0	2.99	.59	1.96		3.43		.67	1.41	.02	.01		328	.45	2,787	35	1.46	540	7.6
Dec. 1-31.....	6,272	19.0	2.99	.57	2.04		3.36		.69	1.52	.02	.01		338	.46	2,883	36	1.53	552	7.6
Jan. 1-31, 1962.	6,579	18.0	3.04	.58	2.13		3.51		.71	1.52	.01	.01		340	.46	3,042	37	1.58	553	7.8
Feb. 1-28.....	6,220	18.0	3.09	.57	2.13		3.49		.71	1.55	.02	.01		354	.48	2,995	37	1.58	570	7.6
Mar. 1-31.....	5,878	20.0	3.09	.59	2.39		3.61		.79	1.66	.02	.01		368	.50	2,942	39	1.76	589	7.6
Apr. 1-30.....	6,367	22.0	2.99	.59	2.48		3.46		.79	1.78	.02	.01		366	.50	3,169	41	1.85	591	7.9
May 1-31.....	8,178	23.0	2.79	.66	2.57		3.23		.85	1.92	.02	.01		372	.51	4,137	43	1.95	602	7.4
June 1-30.....	6,129	21.0	2.50	.64	2.65		2.93		.81	2.03	.01	.01		352	.48	2,934	46	2.12	586	7.2
July 1-31.....	8,178	19.0	2.50	.63	2.87		3.03		.83	2.12	.02	.01		378	.51	4,204	48	2.30	616	7.4
Aug. 1-31.....	7,870	17.0	2.50	.63	3.22		3.10		.94	2.26	.02	.01		368	.50	3,939	51	2.57	643	7.7
Sept. 1-30.....	5,397	17.0	2.35	.60	3.05		2.87		.83	2.26	.02	.01		348	.47	2,554	51	2.51	603	7.0
Total or weighted average	80,080	19.0	2.80	0.60	2.48		3.27		0.78	1.80	0.02	0.01		355	0.46	38,700	42	1.91	583	7.5

a Calculated as sodium (Na).

RIO GRANDE BASIN

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

LOCATION.--Half a mile southeast of Lasauses, 7 miles upstream from Culebra Creek, and 15 miles upstream from gaging station near Lobatos, Conejos County.
DRAINAGE AREA.--7,700 square miles, approximately, upstream from gaging station (includes 2,940 square miles in closed basin in northern part of San Luis Valley, Colo.).
RECORDS AVAILABLE.--Chemical analyses: October 1946 to September 1962.
EXTREMES, 1961-62.--Specific conductance: Maximum daily, 788 micromhos Aug. 15; minimum daily, 151 micromhos Apr. 20.
Percent sodium: Maximum, 41 Nov. 21, July 1-7; minimum, 25 Apr. 27-29.
Sodium-adsorption-ratio: Maximum, 1.99 July 1-7; minimum, 0.62 Apr. 16-20, 22, 24-26.
EXTREMES, 1946-62.--Specific conductance: Maximum daily, 1,110 micromhos Sept. 21, 1959; minimum daily, 122 micromhos June 1, 1949.
Percent sodium: Maximum, 72 May 11-14, 1957; minimum, 16 Dec. 1, 3-10, 1946.
REMARKS.--Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. 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 local rainfall.

Chemical analyses, water year October 1961 to September 1962

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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. 1-11, 1961.	1,490	--	2.35	0.82	1.96	--	2.69	0.00	--	--	--	--	--	359	0.49	728	38	1.56	500	8.0
Oct. 12.....	145	--	2.05	.51	1.39	--	2.13	.00	--	--	--	--	--	280	.38	55	35	1.23	405	6.7
Oct. 13.....	220	--	2.40	.72	2.00	--	2.64	.13	--	--	--	--	--	352	.48	105	39	1.60	500	8.4
Oct. 14-17.....	865	--	2.10	.66	1.48	--	2.38	.00	--	--	--	--	--	298	.41	350	35	1.26	418	8.0
Oct. 18.....	182	--	2.54	.78	1.91	--	2.49	.13	--	--	--	--	--	360	.49	89	37	1.48	511	8.3
Oct. 19.....	179	--	2.30	.54	1.57	--	3.97	.00	--	--	--	--	--	288	.39	70	36	1.31	415	6.9
Oct. 20-27.....	1,363	--	2.40	.72	1.74	--	2.62	.00	--	--	--	--	--	343	.47	636	36	1.39	479	7.8
Oct. 28-31.....	865	--	2.10	.58	1.35	--	2.15	.00	--	--	--	--	--	281	.38	330	33	1.16	405	7.1
Nov. 1.....	323	--	1.40	.34	.83	--	1.70	.00	--	--	--	--	--	180	.24	79	32	.89	263	7.0
Nov. 2-3.....	1,849	--	1.05	.21	.61	--	1.18	.00	--	--	--	--	--	155	.21	390	33	.77	196	8.2
Nov. 4-6.....	4,867	--	1.30	.36	.78	--	1.62	.00	--	--	--	--	--	185	.25	1,225	32	.86	252	7.5
Nov. 7.....	1,075	--	2.20	.62	1.39	--	2.07	.00	--	--	--	--	--	308	.42	450	33	1.17	425	7.2
Nov. 8-18.....	10,647	30.0	1.35	.41	.78	0.10	1.57	.00	0.81	0.23	0.01	0.01	0.06	183	.25	2,650	30	.84	256	7.1
Nov. 19-20,22-30	8,400	--	1.60	.44	.91	--	1.80	.00	--	--	--	--	--	206	.28	2,353	31	.90	295	7.3
Nov. 21.....	783	--	.85	.33	.83	--	.52	.53	--	--	--	--	--	152	.21	162	41	1.08	216	9.3
Dec. 1-8.....	6,125	--	1.90	.12	.83	--	1.77	.00	--	--	--	--	--	201	.27	1,674	29	.82	294	7.4

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

Chemical analyses, water year October 1961 to September 1962--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				
Dec. 9-12,1961..	1,182	--	2.10	0.44	1.00	--	2.23	0.00	--	--	--	--	--	254	0.35	408	28	0.89	362	7.8
Dec. 13-17.....	2,450	--	1.65	.39	.74	--	1.84	.00	--	--	--	--	--	193	.26	643	27	.73	286	7.3
Dec. 18.....	536	--	2.05	.57	1.04	--	2.03	.00	--	--	--	--	--	254	.35	185	29	.91	372	7.8
Dec. 19-31.....	6,910	--	1.45	.33	.65	--	1.74	.00	--	--	--	--	--	172	.23	1,616	27	.69	252	7.4
Jan. 1-3, 1962..	1,607	--	1.40	.40	.65	--	1.69	.00	--	--	--	--	--	178	.24	389	27	.69	248	7.8
Jan. 4-5.....	1,071	--	1.50	.42	.87	--	1.87	.00	--	--	--	--	--	208	.28	303	31	.89	276	8.2
Jan. 6-29, 31...	13,388	--	1.30	.36	.70	--	1.66	.00	--	--	--	--	--	174	.24	3,168	30	.76	240	7.6
Jan. 30.....	536	--	1.50	.50	.96	--	1.67	.47	--	--	--	--	--	190	.26	138	32	.96	285	8.9
Feb. 1-17.....	17,129	30.0	1.20	.32	.65	0.10	1.49	.00	0.58	0.16	0.02	0.02	0.07	154	.21	3,588	29	.75	227	7.3
Feb. 18-20.....	3,445	--	1.40	.32	.78	--	1.56	.00	--	--	--	--	--	174	.24	815	31	.84	260	7.2
Feb. 21-28.....	7,759	--	1.60	.44	.78	--	1.69	.00	--	--	--	--	--	197	.27	2,079	28	.78	290	7.1
Mar. 1-23.....	18,978	--	1.65	.47	.87	--	1.80	.00	--	--	--	--	--	202	.27	5,214	29	.85	305	7.4
Mar. 24-26.....	1,749	--	1.90	.58	1.17	--	2.16	.00	--	--	--	--	--	243	.33	578	32	1.05	364	7.5
Mar. 27-31.....	3,124	--	1.60	.56	1.04	--	1.90	.00	--	--	--	--	--	226	.31	960	33	1.01	323	7.5
Apr. 1-13.....	12,428	30.0	1.70	.56	1.13	.12	2.10	.00	1.10	.28	.03	.01	.12	236	.32	3,989	32	1.06	343	7.3
Apr. 14-15.....	2,225	--	1.45	.47	.87	--	1.51	.23	--	--	--	--	--	211	.29	639	31	.89	278	8.7
Apr.16-20, 22, 24-26.....	30,490	--	1.00	.20	.48	--	1.13	.00	--	--	--	--	--	133	.18	5,515	29	.62	175	6.9
Apr. 21, 23.....	9,560	--	1.20	.40	.78	--	1.64	.00	--	--	--	--	--	179	.24	2,327	33	.88	239	7.2
Apr. 27-29.....	10,015	--	1.20	.26	.48	--	1.13	.00	--	--	--	--	--	152	.21	2,070	25	.56	205	6.9
Apr. 30-May 2...	9,539	--	1.70	.40	.78	--	1.46	.00	--	--	--	--	--	204	.28	2,646	27	.76	296	7.4
May 3-6.....	10,616	--	1.30	.30	.61	--	1.21	.00	--	--	--	--	--	171	.23	2,469	28	.68	228	8.0
May 7-16.....	37,349	--	1.35	.41	.70	--	1.26	.00	--	--	--	--	--	183	.25	9,295	28	.74	250	7.6
May 17-29.....	17,250	--	1.90	.60	1.17	--	1.67	.00	--	--	--	--	--	254	.35	5,959	32	1.05	367	7.9
May 30-June 1...	3,273	--	2.45	.75	1.70	--	1.98	.00	--	--	--	--	--	342	.47	1,522	35	1.34	490	7.7
June 2, 7-9.....	7,315	--	1.75	.53	1.13	--	1.74	.00	--	--	--	--	--	244	.33	2,427	33	1.06	353	7.7
June 3-6.....	5,911	--	2.25	.75	1.74	--	2.02	.00	--	--	--	--	--	324	.44	2,605	37	1.42	478	7.5
June 10-12.....	5,171	--	1.75	.61	1.22	--	1.74	.30	--	--	--	--	--	255	.35	1,793	34	1.12	351	8.7
June 13-21.....	15,245	--	2.20	.82	1.48	--	2.03	.00	--	--	--	--	--	301	.41	6,241	33	1.20	442	7.2
June 22-30.....	6,980	--	2.50	.82	2.00	--	2.61	.07	--	--	--	--	--	371	.50	3,522	38	1.55	518	8.3
July 1-7.....	4,374	--	2.89	1.15	2.83	--	2.75	.00	--	--	--	--	--	472	.64	2,807	41	1.99	664	7.9
July 8-10.....	2,707	--	2.40	.76	1.83	--	2.98	.00	--	--	--	--	--	334	.45	1,230	37	1.46	479	7.6
July 11-19,21-25	5,804	--	3.59	1.15	2.65	--	2.98	.00	--	--	--	--	--	504	.69	3,978	36	1.72	706	7.7

July 20, 1962...	232	--	2.99	.99	2.18	--	3.31	.00	--	--	--	--	--	415	.56	131	35	1.54	589	7.7
July 26-Aug. 2..	2,380	--	2.40	.80	1.74	--	3.08	.00	--	--	--	--	--	332	.45	1,075	35	1.38	478	7.7
Aug. 3-7.....	1,150	--	2.79	.90	2.18	--	3.05	.00	--	--	--	--	--	398	.54	623	37	1.60	569	7.5
Aug. 8-12.....	845	--	3.09	1.07	2.44	--	3.08	.00	--	--	---	--	--	440	.60	506	37	1.69	632	7.9
Aug. 13-20.....	771	--	3.54	1.23	2.96	--	3.16	.00	--	--	--	--	--	515	.70	540	38	1.91	735	7.8
Aug. 21.....	105	--	1.60	.30	1.00	--	2.00	.00	--	--	--	--	--	203	.28	29	35	1.03	289	7.9
Aug. 22-25.....	589	--	3.39	1.15	2.83	--	3.02	.00	--	--	--	--	--	504	.69	404	38	1.88	707	7.8
Aug. 26-31.....	994	--	2.59	.82	1.96	--	2.59	.00	--	--	--	--	--	363	.49	491	36	1.50	531	7.7
Sept. 1-30.....	3,999	31.0	2.50	.78	1.91	.18	2.79	.00	2.12	.37	.04	.01	.12	346	.47	1,882	36	1.50	509	7.8
Total or weighted average	326,560	--	1.64	0.48	0.99	--	1.71	--	--	--	--	--	--	221	0.30	98,140	30	0.90	313	7.3

8-3130. RIO GRANDE AT OTOWI BRIDGE, NEAR SAN ILDEFONSO, N. MEX.

LOCATION.--At gaging station on pier of former railway bridge, 400 feet downstream from bridge on State Highway 4, 1.8 miles southwest of San Ildefonso Pueblo, 2.5 miles downstream from Pojoaque River, and 7 miles west of Pojoaque, Santa Fe County.
DRAINAGE AREA.--14,300 square miles, approximately (includes 2,940 square miles in closed basin in San Luis Valley, Colo.).
RECORDS AVAILABLE.--Chemical analyses: October 1948 to September 1962.
Water temperatures: October 1948 to September 1962.
Sediment records: October 1947 to September 1962.
EXTREMES, 1961-62.--Specific conductance: Maximum daily, 589 micromhos July 10; minimum daily, 193 micromhos May 11.
Percent sodium: Maximum, 36 Sept. 22-30; minimum, 16 Apr. 19-30.
Sodium-adsorption-ratio: Maximum, 1.58 July 5-13; minimum, 0.40 Apr. 19-30.
EXTREMES, 1948-62.--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.--Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Flow affected by ice Jan. 11-19.

Chemical analyses, water year October 1961 to September 1962

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalsnts per million										Boron (B) ppm	Dissolved solids (calculated)			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, 1961.	9,064	28.0	2.25	0.59	1.00	--	2.56	0.00	1.08	0.19		0.00		239	0.33	2,946	26	0.84	367	8.1
Oct. 11-12.....	2,344	23.0	2.79	.73	1.52	--	2.84	.00	2.00	.21		.02		312	.42	995	30	1.15	481	7.9
Oct. 13-29.....	18,343	26.0	2.30	.58	1.04	--	2.58	.00	1.17	.21		.01		244	.33	6,087	27	.87	378	7.9
Oct. 30-Nov. 4..	8,997	25.0	2.40	.64	1.52	--	2.72	.00	1.71	.24		.01		289	.39	3,536	33	1.24	449	7.9
Nov. 5.....	4,324	24.0	2.79	.53	.74	--	2.69	.00	1.21	.13		.04		250	.34	1,470	18	.57	390	7.9
Nov. 6-30.....	87,769	24.0	1.95	.53	.61	--	2.00	.00	.96	.12		.01		194	.28	23,157	20	.55	301	7.9
Dec. 1-11.....	33,644	23.0	1.90	.62	.70	--	1.97	.00	1.15	.12		.01		204	.28	9,334	22	.62	316	7.9
Dec. 12-31.....	36,298	27.0	2.15	.65	.91	--	2.36	.00	1.23	.17		.02		236	.32	11,650	25	.77	363	8.0
Jan. 1-31, 1962.	41,074	32.0	1.90	.66	.96	--	2.36	.00	1.00	.18		.02		228	.31	12,624	27	.85	342	8.0
Feb. 1-9.....	15,031	28.0	2.00	.64	1.00	--	2.34	.00	1.10	.19		.01		230	.31	4,702	28	.87	354	8.0
Feb. 10.....	2,777	21.0	3.54	.82	1.52	--	3.08	.00	2.39	.19		.04		351	.48	1,326	27	1.08	545	7.5
Feb. 11-18.....	25,198	23.0	2.69	.71	1.13	--	2.39	.00	2.00	.15		.03		287	.39	9,835	25	.87	443	7.8
Feb. 19-28.....	22,831	26.0	2.10	.64	1.04	--	2.18	.00	1.48	.19		.02		244	.33	7,510	28	.89	376	7.8
Mar. 1-18.....	33,346	29.0	2.20	.58	1.04	--	2.29	.00	1.37	.20		.01		247	.34	11,202	27	.89	378	7.9
Mar. 19-26.....	19,137	23.0	2.45	.90	1.13	--	2.31	.00	2.02	.17		.02		282	.38	7,339	25	.87	439	7.8
Mar. 27-31.....	17,970	18.0	2.79	.90	1.00	--	2.41	.00	2.23	.14		.02		293	.40	7,181	21	.74	482	7.8
Apr. 1-4.....	16,725	23.0	2.84	.68	.87	--	2.57	.00	1.67	.13		.03		272	.37	6,187	20	.66	421	7.8
Apr. 5-15.....	81,396	22.0	2.40	.60	.74	--	2.34	.00	1.25	.12		.02		230	.31	19,205	20	.60	359	7.9
Apr. 16-18.....	26,479	18.0	2.00	.50	.61	--	1.64	.43	.94	.10		.00		189	.26	6,806	20	.54	290	8.9
Apr. 19-30.....	144,881	23.0	1.75	.35	.41	--	1.90	.00	.54	.07		.01		158	.21	31,132	18	.40	244	8.0

May 1-18, 1962..	173,228	21.0	1.60	.26	.43	--	1.57	.03	.62	.07		.01		147	.20	34,632	19	.44	229	8.3
May 19-30.....	57,481	21.0	1.75	.39	.57	--	1.77	.00	.85	.11		.01		172	.23	13,446	21	.55	270	7.7
May 31.....	3,055	20.0	1.95	.41	.83	--	1.97	.00	1.06	.16		.00		199	.27	827	26	.76	311	8.1
June 1-22.....	74,705	24.0	1.90	.62	1.04	--	1.88	.00	1.48	.20		.00		228	.31	23,165	29	.93	353	7.8
June 23-30.....	13,456	25.0	2.30	.68	1.44	--	2.28	.00	1.92	.27		.01		282	.38	5,161	33	1.18	438	7.8
July 1-4.....	5,101	25.0	2.40	.68	1.61	0.12	2.47	.00	1.94	.31		.01		302	.41	2,095	33	1.30	453	7.9
July 5-13.....	14,263	27.0	2.84	.90	2.13	.15	2.87	.00	2.69	.42		.00		380	.52	7,371	35	1.56	565	8.0
July 14-31.....	16,673	32.0	2.59	.81	1.74	.13	2.82	.00	2.04	.34		.01		334	.45	7,574	33	1.33	495	8.1
Aug. 1-10.....	6,565	32.0	2.54	.74	1.65	.13	2.92	.00	1.75	.34		.01		320	.44	2,857	33	1.29	474	8.1
Aug. 11-24.....	17,578	23.0	2.10	.38	.87	--	2.33	.00	.92	.17		.01		210	.29	5,020	26	.78	324	8.0
Aug. 25-31.....	3,166	29.0	2.30	.66	1.48	--	2.72	.00	1.50	.31		.01		282	.38	1,214	33	1.22	432	8.2
Sept. 1-5.....	2,291	29.0	2.30	.62	1.44	--	2.79	.00	1.33	.28		.01		274	.37	854	33	1.19	421	7.9
Sept. 6-17.....	13,258	25.0	2.00	.52	1.00	--	2.33	.00	1.00	.18		.01		219	.30	3,949	28	.89	335	8.0
Sept. 18-21.....	2,539	28.0	2.20	.60	1.31	--	2.75	.00	1.12	.26		.00		256	.35	884	32	1.10	393	8.1
Sept. 22-30.....	8,765	25.0	2.30	.62	1.61	--	2.75	.00	1.62	.23		.02		286	.39	3,409	36	1.33	442	7.9
Total or weighted average	135,600	15.0	15.92	3.01	2.38	--	2.04	0.00	17.29	2.02		0.01		1,390	1.89	256,000	11	0.80	1,730	7.5

RIO GRANDE BASIN--Continued

8-3583. RIO GRANDE CONVEYANCE CHANNEL AT SAN MARCIAL, N. MEX.

LOCATION.--At gaging station 1,800 feet west of San Marcial gage on railway bridge, about 18.5 miles southwest of San Antonio, and about 1 mile south of the site of the former village of San Marcial, Socorro County.
RECORDS AVAILABLE.--Chemical analyses: March 1954 to September 1962.
Water temperatures: March 1954 to September 1982.
Sediment records: March 1954 to September 1962.
EXTREMES, 1961-62.--Specific conductance: Maximum daily, 2,110 micromhos Sept. 30; minimum daily, 395 micromhos Jan 9.
Percent sodium: Maximum, 62 Sept. 1-24; minimum, 29 Nov. 9-30.
Sodium-adsorption-ratio: Maximum, 5.38 Sept.1-24; minimum, 1.10 Jan. 8-9.
EXTREMES, 1954-62.--Specific conductance: Maximum daily, 2,860 micromhos Oct. 25, 1958; minimum daily, 395 micromhos Jan. 9,1962.
Percent sodium: Maximum, 66 Oct. 1-20, Nov. 1-21, 1956, Oct. 1-9, 1959; minimum, 29 Nov. 9-30, 1961.
REMARKS.--Values reported for sodium (Na) are determined by analysis and do not include potassium (K). Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of discharge for water year October 1961 to September 1962 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 in Surface Water records as Rio Grande at San Marcial. Chemical analyses for Rio Grande floodway given on page

Chemical analyses, water year October 1961 to September 1962

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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. 1-31, 1961.	9,715	--	4.19	1.07	4.52	--	3.77	0.13	--	--	--	--	--	640	0.87	8,456	46	2.79	951	8.3
Nov. 1-2, 4.....	2,922	--	3.94	1.07	3.74	--	3.80	.00	--	--	--	--	--	788	1.07	3,131	43	2.36	834	8.2
Nov. 3.....	1,375	--	4.89	1.15	5.70	--	3.61	.00	--	--	--	--	--	560	.76	1,047	49	3.28	1,120	8.2
Nov. 5-8.....	8,870	--	3.89	.82	2.70	--	3.79	.00	--	--	--	--	--	495	.67	5,971	36	1.76	715	7.7
Nov. 9-30.....	71,913	28.0	3.09	.65	1.57	0.12	3.05	.00	1.81	0.62	0.03	0.03	0.09	351	.48	34,328	29	1.14	528	7.9
Dec. 1-19.....	55,361	--	2.99	.73	1.65	--	2.88	.00	--	--	--	--	--	349	.47	26,276	31	1.21	527	7.8
Dec. 20-31.....	21,517	--	3.39	.81	2.35	--	3.33	.00	--	--	--	--	--	424	.58	12,407	36	1.62	639	7.8
Jan. 1-7, 1962..	11,066	--	2.99	.65	2.09	--	2.95	.00	--	--	--	--	--	381	.52	5,734	36	1.55	565	7.9
Jan. 8-9.....	3,062	--	2.30	.34	1.26	--	2.13	.00	--	--	--	--	--	261	.35	1,087	32	1.10	396	8.0
Jan. 10-11.....	2,682	--	3.69	.82	2.83	--	3.70	.00	--	--	--	--	--	476	.65	1,736	39	1.88	718	8.0
Jan. 12.....	1,051	--	3.09	.59	2.18	--	3.02	.00	--	--	--	--	--	372	.51	532	37	1.60	580	7.7
Jan. 13-14.....	1,825	--	3.79	.90	3.31	--	3.64	.00	--	--	--	--	--	498	.88	1,236	41	2.16	777	7.7
Jan. 15-31.....	28,257	36.0	3.44	.80	2.65	.13	3.44	.00	2.42	1.13	.03	.05	.16	460	.63	17,677	38	1.82	675	8.0
Feb. 1-5.....	8,102	--	3.24	.82	2.57	--	3.31	.00	--	--	--	--	--	439	.60	4,838	39	1.80	658	7.6
Feb. 6-11.....	11,818	--	3.44	.90	3.48	--	3.29	.00	--	--	--	--	--	513	.70	8,245	44	2.36	763	7.8
Feb. 12.....	2,955	--	4.49	1.23	4.74	--	3.93	.00	--	--	--	--	--	672	.91	2,701	45	2.80	988	7.7
Feb. 13-15.....	9,003	--	3.64	.99	2.74	--	3.51	.00	--	--	--	--	--	474	.64	5,804	37	1.80	711	7.6
Feb. 18-28.....	37,156	--	3.04	.82	2.18	--	2.95	.00	--	--	--	--	--	401	.55	20,264	36	1.56	590	8.0
Mar. 1-31.....	47,345	--	3.49	.90	2.65	--	3.44	.00	--	--	--	--	--	452	.61	29,104	38	1.79	681	7.9
Apr. 1-14.....	28,713	--	3.29	.71	2.04	--	2.98	.00	--	--	--	--	--	400	.54	15,620	34	1.45	590	7.5

Apr. 15-30, 1962	39,669	--	2.89	.59	1.70	--	2.77	.00	--	--	--	--	--	319	0.43	17,210	33	1.28	507	7.6
May 1-22.....	52,931	27.0	2.69	.55	1.74	.09	2.62	.00	1.73	.73	.03	.02	.30	317	.43	22,820	34	1.37	494	7.6
May 23-31.....	19,119	--	3.19	.61	2.09	--	3.05	.00	--	--	--	--	--	370	.50	9,621	35	1.51	578	7.5
June 1-5.....	8,212	--	3.14	.70	2.61	--	2.95	.00	--	--	--	--	--	420	.57	4,690	40	1.88	630	7.6
June 6-7.....	2,221	--	3.39	.82	2.91	--	3.25	.00	--	--	--	--	--	472	.64	1,426	41	2.01	703	7.8
June 8-13.....	9,616	--	3.14	.62	2.35	--	2.92	.00	--	--	--	--	--	381	.52	4,983	38	1.71	600	7.9
June 14-24.....	12,545	--	3.34	.74	2.74	--	3.15	.00	--	--	--	--	--	436	.59	7,439	40	1.92	669	8.0
June 25-30.....	2,951	--	3.84	.99	4.05	--	3.61	.00	--	--	--	--	--	554	.75	2,224	46	2.60	862	8.0
July 1-19.....	9,007	--	4.09	1.07	4.18	--	3.64	.00	--	--	--	--	--	582	.79	7,129	45	2.60	895	7.9
July 20-31.....	3,665	--	4.59	1.15	5.57	--	3.67	.00	--	--	--	--	--	726	.99	3,619	49	3.29	1,100	7.7
Aug. 1-14.....	3,277	27.0	4.84	1.48	6.61	.20	3.95	.00	6.04	3.16	.04	.02	.33	830	1.13	3,699	50	3.72	1,260	7.9
Aug. 15-31.....	600	--	4.29	1.48	8.61	--	3.98	.00	--	--	--	--	--	905	1.23	739	60	5.07	1,430	8.1
Sept. 1-24.....	581	--	3.99	1.56	8.96	--	3.70	.00	--	--	--	--	--	920	1.25	727	62	5.38	1,440	8.1
Sept. 25-27.....	2,148	--	5.59	1.81	4.35	--	4.67	.00	--	--	--	--	--	737	1.00	2,153	37	2.26	1,050	7.6
Sept. 28-30.....	3,076	--	10.88	3.13	8.87	--	4.64	.00	--	--	--	--	--	1,530	2.08	6,401	39	3.35	1,940	7.6
Total or weighted average	534,300	--	3.28	0.77	2.34	--	3.11	0.00	--	--	--	--	--	414	0.56	301,100	33	1.61	622	7.8

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 18.5 miles southwest of San Antonio.
DRAINAGE AREA.--27,700 square miles, approximately (includes 2,940 square miles in closed basin in San Luis Valley, Colo.)
RECORDS AVAILABLE.--Chemical analyses: May 1905 to April 1907, July 1946 to September 1962.
Water temperatures: January 1949 to September 1962.
Sediment records: July 1946 to September 1962.
EXTREMES, 1961-62.--Specific conductance: Maximum daily, 1,680 micromhos July 25; minimum daily, 358 micromhos May 14.
Percent sodium: Maximum, 48, Sept. 29; minimum, 18 July 22-23.
Sodium-adsorption-ratio: Maximum, 3.09 July 24-28; minimum, 0.87 May 1-23.
EXTREMES, 1946-62.--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, 18 July 22-23, 1982.
REMARKS.--Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Records of chemical analyses and sediment loads for years prior to 1946 have been published in Water Bulletins of International Boundary and Water Commission. Records of 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 Surface Water Records. Chemical analyses for Rio Grande conveyance channel given on page No flow Oct. 1 to Nov. 7, 13-15, Nov. 26 to Feb. 15, Feb. 22 to Apr. 6, June 2 to July 21, 29, Aug. 1, Aug. 4 to Sept. 24, 30.

Chemical analyses, water year October 1961 to September 1962

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°)			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				
Nov. 8-12, 16-25, 1961...	455	28.0	2.99	0.57	1.65	0.11	2.90		1.81	0.82	0.03	0.04	0.09	337	0.48	209	31	1.24	509	7.9
Feb. 16-21, 1962	288	--	3.44	.82	2.44	--	3.31		--	--	--	--	--	454	.62	178	36	1.67	642	7.9
Apr. 7-20.....	26,575	30.0	3.09	.65	1.57	.12	3.08		1.83	.48	.04	.02	.12	348	.47	12,577	29	1.14	509	7.8
Apr. 21-30.....	66,962	--	2.69	.47	1.17	--	2.72		--	--	--	--	--	280	.38	25,499	27	.93	423	8.0
May 1-23.....	112,635	28.0	2.35	.55	1.04	08	2.46		1.19	.34	.03	.03	.09	263	.36	40,287	28	.87	386	7.8
May 24-June 1...	5,855	--	2.99	.49	1.48	--	2.95		--	--	--	--	--	326	.44	2,598	30	1.12	483	7.7
July 22-23.....	113	--	8.73	1.48	2.18	--	5.57		--	--	--	--	--	818	1.11	126	18	.98	1,110	7.8
July 24-28.....	28	--	8.18	2.47	7.13	--	7.83		--	--	--	--	--	1,100	1.50	42	40	3.09	1,590	7.4
July 30-31.....	18	--	3.89	.99	3.40	--	2.69		--	--	--	--	--	542	.74	13	41	2.18	805	7.9
Aug. 2-3.....	194	--	4.54	1.40	5.13	--	4.06		--	--	--	--	--	710	.97	188	46	2.98	1,050	7.8
Sept. 25-28.....	591	--	4.44	1.23	4.05	--	3.18		--	--	--	--	--	622	.85	500	42	2.40	908	7.7
Sept. 29.....	4	--	3.19	.69	3.57	--	1.90		--	--	--	--	--	502	.68	3	48	2.56	733	8.0
Total or weighted average	231,700	--	2.58	0.54	1.18	--	2.84		--	--	--	--	--	283	0.38	82,200	26	0.94	419	7.8

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

LOCATION.--At gaging station in Pedro Armendaris Grant, 1.0 mile downstream from dam, and 1.5 miles upstream from Cuchillo Negro River.
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 1962.
REMARKS.--Chemical analyses by the U. S. Department of Agriculture, Agricultural Research Service, U. S. Salinity Laboratory, Riverside, Calif.

Chemical analyses, water year October 1961 to September 1962

Date of collection	Number of samples	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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				
October, 1961	25	365	--	3.02	1.26	3.72	--	2.91		3.56	1.65	--	0.01	0.12	499	0.68	248	46	2.5	808	7.9
November.....	20	153	--	2.92	1.28	4.08	--	3.10		3.82	1.45	--	.01	.14	524	.71	109	49	2.8	814	7.8
December.....	20	180	--	3.04	1.24	4.29	--	3.20		3.93	1.50	--	.01	.16	536	.73	131	50	2.9	842	8.0
January, 1962	25	586	8	3.19	1.25	4.63	0.21	3.53		4.22	1.50	0.04	.01	.17	570	.78	457	50	3.1	889	8.0
February.....	20	66,780	--	3.14	1.04	3.24	--	2.75		3.49	1.25	--	.01	.14	470	.64	42,740	44	2.2	737	8.0
March.....	20	111,600	--	3.06	1.00	2.99	--	2.85		3.18	1.25	--	.01	.05	458	.62	69,140	42	2.1	711	8.1
April.....	20	114,700	--	2.99	1.11	2.78	--	2.83		3.13	1.10	--	.01	.09	437	.59	67,670	41	2.0	676	8.2
May.....	25	118,900	--	2.16	.84	2.58	--	2.05		2.76	1.00	--	.01	.12	340	.46	54,690	46	2.1	584	8.2
June.....	20	118,700	--	2.70	.78	2.04	--	2.60		2.22	.80	--	.01	.07	343	.47	55,790	37	1.5	548	7.8
July.....	20	92,260	14	2.56	.74	1.88	.13	2.45		2.07	.75	.07	.01	.08	336	.46	42,440	35	1.5	513	7.8
August.....	25	57,430	--	2.54	.64	2.01	--	2.60		1.94	.75	--	.01	.06	342	.47	26,990	39	1.6	520	7.7
September....	20	9,860	--	2.62	.74	2.51	--	3.03		2.31	.88	--	.01	.09	372	.51	5,030	43	1.9	603	7.8
Total or weighted average	--	691,500	--	2.72	0.89	2.51	--	2.59		2.70	0.99	--	0.01	0.09	389	0.53	365,435	41	1.9	614	8.0

RIO GRANDE BASIN--Continued

8-3640. 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 31).
RECORDS AVAILABLE.--Chemical analyses, 1933 to 1962.
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 1961 to September 1962 are given in earlier Bulletins.

Chemical analyses, water year October 1961 to September 1962

Date of collection	Number of samples	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids			Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
				Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)		Parts per million	Tons per acre-foot	Total tons				
October, 1961	31	7,490	--	5.80	2.80	14.82	--	4.10		11.40	8.25	--	0.01	0.41	1,514	2.06	15,400	63	7.1	2,270	8.0
November.....	30	5,830	--	6.18	2.60	14.76	--	4.70		10.67	8.40	--	.01	.27	1,563	2.13	12,400	63	7.0	2,300	8.1
December.....	31	7,190	--	6.67	2.66	15.67	--	4.81		12.00	8.60	--	.02	.41	1,667	2.27	16,300	63	7.3	2,400	8.2
January, 1962	27	5,009	27	6.04	2.32	12.96	0.25	4.30		9.96	7.35	0.05	.01	.31	1,395	1.90	9,520	60	6.3	2,090	7.8
February.....	28	3,694	--	6.12	2.72	15.94	--	4.55		11.58	8.85	--	.01	.44	1,614	2.20	8,130	64	7.6	2,400	8.1
March.....	31	46,501	--	4.20	1.32	5.15	--	3.30		4.61	2.90	--	.01	.17	687	.93	43,200	48	3.1	1,070	8.0
April.....	30	35,856	--	4.76	1.56	6.38	--	3.75		5.78	3.40	--	.01	.22	807	1.10	39,400	50	3.6	1,250	8.0
May.....	31	34,687	--	4.42	1.68	6.70	--	3.45		5.99	3.60	--	.01	.18	839	1.14	39,500	52	3.8	1,270	8.0
June.....	30	52,126	--	4.12	1.30	5.38	--	3.55		4.91	2.65	--	.01	.08	703	.96	50,000	50	3.3	1,080	8.0
July.....	33	63,855	21	3.61	1.33	5.36	.20	3.00		4.69	2.71	.04	.01	.16	679	.92	58,700	51	3.4	1,040	7.9
August.....	31	62,993	--	4.04	1.17	5.39	--	3.46		4.70	2.72	--	.01	.17	710	.97	61,000	51	3.3	1,050	7.8
September....	30	41,201	--	4.29	1.41	7.10	--	3.35		5.84	3.78	--	.01	.24	770	1.05	43,300	55	4.2	1,260	7.9
Total or weighted average	--	366,400	--	4.30	1.47	6.52	--	3.47		5.59	3.44	--	0.01	0.19	796	1.08	396,800	53	3.8	1,220	7.9

8-3705. 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 31).
RECORDS AVAILABLE.--Chemical analyses 1933 to 1962.
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 1961 to September 1962 given in International Boundary and Water Commission Water Bulletin Numbers 31 and 32. Records for previous years are given in earlier Bulletins.

Chemical analyses, water year October 1961 to September 1962

Date of collection	Number of samples	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids			Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
				Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)		Parts per million	Tons per acre-foot	Total tons				
October, 1961	4	1,770	--	20.92	9.84	59.36	--	4.77		26.32	59.10	--	0.01	0.79	5,812	7.90	14,000	66	15	8,300	8.0
November.....	5	4,280	--	12.14	5.02	26.45	--	5.40		16.17	24.60	--	.07	.49	2,947	4.01	17,200	62	9.7	4,360	8.1
December.....	4	2,780	--	15.27	6.50	36.54	--	4.80		20.04	35.88	--	.01	.59	3,884	5.28	14,700	64	12	5,680	8.1
January, 1962	4	1,770	27	18.24	8.12	47.20	0.32	5.15		23.29	45.55	0.05	.01	.53	4,703	6.40	11,300	64	13	6,880	8.1
February.....	4	488	--	26.40	15.60	81.61	--	3.35		34.65	85.10	--	.01	1.05	7,722	10.50	5,120	66	18	11,000	7.9
March.....	4	402	--	31.25	17.55	93.02	--	4.05		37.63	101.20	--	.01	1.01	6,932	12.10	4,860	66	19	12,500	7.9
April.....	4	943	--	26.15	10.90	67.24	--	4.70		30.23	70.00	--	.01	.88	6,552	8.91	8,400	64	16	9,550	7.8
May.....	5	1,259	--	21.64	10.04	57.48	--	4.21		26.67	58.62	--	.01	.76	5,683	7.73	9,730	64	14	8,270	7.8
June.....	4	815	--	28.70	11.62	79.29	--	3.40		34.14	84.25	--	.01	.52	7,726	10.50	8,580	66	18	11,100	7.8
July.....	11	6,513	23	8.64	3.16	18.56	.26	3.45		9.27	17.93	.04	.01	.31	1,937	2.63	17,100	61	7.6	3,020	7.7
August.....	5	3,405	--	16.78	6.35	37.72	--	3.53		18.83	39.10	--	.01	.54	3,638	5.22	17,600	63	11	5,810	7.7
September....	8	28,816	--	8.55	2.81	16.50	--	4.47		9.76	14.02	--	.03	.29	1,790	2.43	70,000	59	6.9	2,680	7.9
Total or weighted average	--	53,240	--	11.72	4.54	26.67	--	4.38		13.91	25.07	--	0.03	0.40	2,750	3.73	198,000	62	8.9	4,070	7.9

RIO GRANDE BASIN--Continued

8-3715. RIO GRANDE AT UPPER PRESIDIO, TEX.

LOCATION.--At gaging station, 7.8 river miles above the junction of the Rio Conchos, about 10 miles northwest of the towns of Presidio, Tex. and Ojinaga, Chihuahua, and 285.7 river miles below the American Dam at El Paso, Tex.
DRAINAGE AREA.--34,988 square miles (United States and Mexico; from International Boundary and Water Commission Water Bulletin Number 31).
RECORDS AVAILABLE.--Chemical analyses 1935 to 1962.
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 1961 to September 1962 are given in International Boundary and Water Commission Water Bulletin Numbers 31 and 32. Records for previous years are given in earlier Bulletins. No flow December 1961 to May 1962.

Chemical analyses, water year October 1961 to September 1962

Date of collection	Number of samples	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 160°C)			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				
October, 1961	6	713		4.84		1.72		2.37		--	0.75		--		479	0.65	463	26	1.1	645	--
November	1	1		5.60		1.55		1.80		--	.42		--		507	.69	1	22	.9	706	--
June	3	69		6.10		2.24		1.65		--	.66		--		622	.85	59	27	1.3	829	--
July	10	2,932	14	4.26	.57	4.84	0.18	2.28		4.63	2.97	0.04	0.04	0.18	638	.87	2,550	49	3.1	1,010	7.5
August	6	3,382		5.10	.59	5.72		2.33		5.04	4.15		.03		766	1.04	3,520	50	3.4	1,170	7.7
September	11	11,854		6.86		8.96		3.87		--	6.60		--		1,032	1.40	16,600	57	4.8	1,570	--
Total or weighted average	--	a 190,000	--	6.26		7.45	--	3.28		--	5.36	--	--	--	901	1.22	23,200	49	4.2	1,370	--

a Represents 100 percent of runoff.

8-3775. RIO GRANDE AT LANGTRY, TEX.

LOCATION.--At gaging station at Langtry, Tex., 24.1 river miles above the confluence with the Pecos River and 614.1 river miles below the American Dam at El Paso, Tex.
DRAINAGE AREA.--84,795 square miles (United States and Mexico; from International Boundary and Water Commission Water Bulletin Number 31).
RECORDS AVAILABLE.--Chemical analyses 1944 to 1962.
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 1961 to September 1962 are given in International Boundary and Water Commission Water Bulletin Numbers 31 and 32. Records for previous years are given in earlier Bulletins.

Chemical analyses, water year October 1961 to September 1962

Date of collection	Number of samples	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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				
October, 1961	3	68,400	--	3.16	1.82	4.60	--	2.90		5.04	1.72	--	0.04	0.27	660	0.90	61,600	48	2.9	944	8.0
November.....	8	51,000	--	4.16	1.50	5.04	--	3.05		5.82	1.98	--	.05	.23	718	.98	50,000	47	3.0	1,050	8.0
December.....	7	50,000	--	4.26	1.54	5.55	--	3.15		6.26	2.05	--	.06	.33	767	1.04	52,000	49	3.3	1,100	8.1
January, 1962	7	49,326	28	4.08	1.68	5.23	0.13	2.85		6.14	2.05	0.10	.05	.27	726	.99	48,800	47	3.1	1,070	7.8
February.....	7	41,001	--	3.84	1.76	5.05	--	2.50		6.12	2.10	--	.06	.29	720	.98	40,200	47	3.0	1,050	8.0
March.....	7	38,089	--	4.04	1.62	5.16	--	2.80		6.14	2.05	--	.05	.26	718	.98	37,300	48	3.1	1,080	8.1
April.....	6	28,852	--	3.56	1.60	4.14	--	2.70		4.91	1.80	--	.02	.20	609	.83	23,900	45	2.6	930	7.9
May.....	9	33,295	--	3.80	1.58	4.16	--	2.75		5.00	1.95	--	.01	.19	626	.85	28,300	44	2.5	943	8.0
June.....	8	60,201	--	3.55	.72	3.05	--	2.70		3.68	1.17	--	.03	.14	515	.70	42,100	42	2.1	744	7.8
July.....	10	106,127	22	3.70	.65	3.49	.15	2.65		4.28	1.10	.06	.04	.19	525	.71	75,400	44	2.4	796	7.7
August.....	9	41,477	--	4.36	.90	4.00	--	3.17		4.77	1.50	--	.05	.18	625	.85	35,300	43	2.5	914	7.7
September....	7	150,641	--	5.05	.57	3.50	--	3.36		4.52	1.37	--	.05	.16	606	.82	124,000	38	2.1	869	7.8
Total or weighted average	--	718,600	--	4.08	1.15	4.20	--	2.94		5.02	1.61	--	0.04	0.21	634	0.86	618,900	45	2.6	928	7.8

RIO GRANDE BASIN--Continued

8-4590. RIO GRANDE AT LAREDO, TEX.

LOCATION.--At gaging station, 0.9 mile downstream from the 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.--135,978 square miles (United States and Mexico; from International Boundary and Water Commission Bulletin No. 31).
RECORDS AVAILABLE.--Chemical analyses: July 1955 to September 1962.
REMARKS.--Chemical analyses by the U. S. Department of Agricultures, Agricultural Research Service, U. S. Salinity Laboratory, Riverside, Calif. Records of discharge, electrical conductvity of individual water samples, and these same chemical analyses for water year October 1961 to September 1982 are given in International Boundary and Water Commission Water Bulletin Numbers 31 and 32. Records for previous years are given in earlier Bulletins.

Chemical analyses, water year October 1961 to September 1962

Date of collection	Number of samples	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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				
October, 1981	31	152,600	--	4.82		3.48	--	2.75		--	2.05	--	--	--	559	0.76	116,000	42	2.2	831	--
November.....	30	135,700	--	4.86		3.53	--	2.77		--	2.40	--	--	--	552	.75	102,000	42	2.3	838	--
December.....	31	120,400	--	5.30		4.47	--	2.98		--	3.15	--	--	--	636	.86	104,000	46	2.7	984	--
January, 1962	31	115,281	24	3.56	1.88	4.56	0.10	2.70		4.03	3.30	0.05	0.07	0.17	629	.86	99,100	45	2.8	1,010	8.0
February.....	28	86,268	--	5.28		4.80	--	2.15		--	3.75	--	--	--	665	.90	77,600	48	2.9	1,040	--
March.....	31	76,553	--	5.39		5.27	--	2.27		--	4.25	--	--	--	678	.92	70,400	49	3.2	1,110	--
April.....	30	102,329	--	4.82		4.36	--	2.30		--	3.50	--	--	--	574	.78	79,800	47	2.8	947	--
May.....	31	66,363	--	4.84		4.09	--	2.31		--	3.50	--	--	--	563	.77	51,100	46	2.6	922	--
June 30.....	30	93,909	--	4.40		3.18	--	2.65		--	2.29	--	--	--	515	.70	65,700	42	2.1	804	--
July.....	31	108,668	22	3.68	1.06	3.88	.15	2.50		3.85	2.36	.04	.09	.19	575	.78	84,800	44	2.5	891	7.7
August.....	31	77,610	--	3.51	.87	4.01	--	2.47		3.90	2.20	--	.07	--	575	.78	60,500	48	2.7	864	7.7
September....	30	176,192	--	4.46		3.10	--	2.42		--	1.56	--	--	--	508	.69	122,000	41	2.1	753	--
Total or weighted average	--	1,312,000	--	4.88		3.95	--	2.55		--	2.71	--	--	--	579	0.79	1,032,000	45	2.5	900	7.8

8-4613. 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 31).
RECORDS AVAILABLE.--Chemical analyses: July 1955 to September 1962.
REMARKS.--Chemical analyses are by the U. S. Department of Agriculture, Agricultural Research Service, U. S. Salinity Laboratory, Riverside, Calif. Records of discharge, electrical conductivity of individual water samples and these same chemical analyses for water year October 1961 to September 1962 are given in International Boundary and Water Commission Bulletin Numbers 31 and 32. Records for previous years are given in earlier Bulletins.

Chemical analyses, water year October 1961 to September 1962

Date of collection	Number of samples	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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				
October, 1961	10	328,734	--	2.86	1.62	3.47	--	2.05		3.44	2.45	--	0.01	0.17	516	0.70	65,000	44	2.3	806	8.0
November.....	6	193,701	--	3.22	1.18	3.53	--	2.17		3.48	2.50	--	.01	.13	528	.72	37,000	45	2.4	813	7.8
December.....	12	171,763	--	3.18	1.33	3.61	--	2.20		3.55	2.45	--	.01	.18	540	.73	90,500	44	2.4	824	8.0
January, 1962	13	280,943	13	3.28	1.32	3.46	0.13	2.21		3.60	2.30	0.05	.01	.16	513	.70	197,000	42	2.3	831	7.9
February.....	12	367,384	--	3.43	1.21	3.50	--	2.25		3.62	2.40	--	.01	.16	531	.72	265,000	43	2.3	838	8.0
March.....	9	63,879	--	3.06	1.71	3.62	--	2.30		3.75	2.45	--	.01	.16	542	.74	47,300	43	2.3	858	8.2
April.....	12	222,174	--	3.48	1.24	3.74	--	2.35		3.74	2.55	--	.01	.17	543	.74	164,000	44	2.4	864	7.9
May.....	13	435,299	--	3.36	1.36	4.04	--	2.27		3.83	2.75	--	.01	.15	567	.77	335,000	46	2.6	897	8.0
June.....	12	367,596	--	3.32	1.30	4.08	--	2.30		3.89	2.83	--	.01	.19	584	.79	290,000	47	2.7	901	7.8
July.....	12	73,596	12	3.23	1.40	4.32	.14	2.20		3.95	2.94	.03	.01	.15	594	.81	59,600	48	2.8	922	7.8
August.....	13	69,337	--	3.21	1.33	4.42	--	2.16		3.99	2.93	--	.01	.18	565	.77	53,400	49	2.9	929	7.7
September....	9	36,407	--	3.25	1.36	4.47	--	2.17		4.07	3.05	--	.01	.11	595	.81	29,500	49	2.9	912	7.7
Total or weighted average	--	2,611,000	--	3.26	1.34	3.76	--	2.23		3.69	2.58	--	0.01	0.16	546	0.63	1,633,000	45	2.5	858	7.9

RIO GRANDE BASIN--Continued

8-3845. PECOS RIVER BELOW ALAMOGORDO DAM, N. MEX.

LOCATION.--At gaging station, 1,200 feet downstream from Alamogordo Dam, 1.5 miles downstream from Alamogordo Creek, and 4.5 miles northeast of Guadalupe, De Baca County.
DRAINAGE AREA.--4,390 square miles, approximately (contributing area).
RECORDS AVAILABLE.--Chemical analyses: June 1937 to September 1962.
Water temperatures: June 1959 to September 1962.
EXTREMES, 1961-62.--Specific conductance: Maximum daily, 1,890 micromhos Apr. 23; minimum daily, 1,330 micromhos Oct. 3-5, 10-11.
Sodium-adsorption-ratio: Maximum, 0.84 Feb. 1-28; minimum, 0.68 Oct. 1-31.
EXTREMES, 1937-62.--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 sodium (Na) are determined by analysis and do not include potassium (K). Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex.

Chemical analyses, water year October 1981 to September 1962

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. 1-31, 1961.	5,847	19.0	12.23	2.06	1.83		1.97		12.53	1.50		0.01		1,040	1.41	8,271	11	0.68	1,360	7.6
Nov. 1-30.....	1,749	18.0	13.57	2.71	2.26		2.13		14.62	1.72		.01		1,200	1.63	2,855	12	.79	1,540	7.8
Dec. 1-31.....	1,574	16.0	14.37	2.63	2.31		2.20		15.20	1.86		.02		1,250	1.70	2,676	12	.79	1,610	7.5
Jan. 1-31, 1962.	990	18.0	14.87	2.71	2.44		2.16		15.99	1.97		.01		1,310	1.78	1,764	12	.82	1,650	7.8
Feb. 1-28.....	944	18.0	15.17	3.62	2.57		2.20		17.16	2.09		.01		1,390	1.89	1,785	12	.84	1,710	7.4
Mar. 1-31.....	31,789	16.0	16.02	3.21	2.48		2.20		17.41	2.12		.01		1,410	1.92	60,959	11	.80	1,760	7.6
Apr. 1-30.....	4,255	14.0	16.87	3.13	2.57		2.20		18.16	2.23		.01		1,470	2.00	8,508	11	.81	1,810	7.4
May 1-31.....	19,430	15.0	16.37	3.21	2.44		2.10		17.99	2.12		.01		1,440	1.96	38,052	11	.78	1,770	7.4
June 1-30.....	29,455	13.0	16.27	3.13	2.39		2.03		17.70	2.12		.01		1,420	1.93	56,883	11	.77	1,750	7.6
July 1-31.....	4,513	15.0	17.02	3.21	2.48		2.07		18.49	2.12		.01		1,480	2.01	9,084	11	.78	1,810	7.3
Aug. 1-31.....	18,692	14.0	15.72	2.71	2.26		1.80		16.99	1.86		.01		1,350	1.84	34,319	11	.75	1,680	7.4
Sept. 1-30.....	16,304	15.0	16.07	2.80	2.35		1.92		17.57	1.89		.01		1,390	1.89	30,821	11	.76	1,740	7.4
Total or weighted average	135,600	15.0	15.92	3.01	2.38		2.04		17.29	2.02		0.01		1,390	1.89	256,000	11	0.80	1,730	7.5

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 1962.
Water temperatures: April 1949 to September 1962.
Sediment records: January 1949 to September 1962.
EXTREMES, 1961-62.--Specific conductance, Maximum daily, 16,600 micromhos May 25, 26; minimum daily, 682 micromhos Aug. 1.
Percent sodium: Maximum, 63 May 26-26; minimum, 17 Sept. 1-10.
Sodium-adsorption-ratio: Maximum, 20.65 May 25-26; minimum, 0.98 Aug. 1-2.
EXTREMES, 1937-62.--Specific conductance: Maximum daily, 22,600 micromhos June 23, 1959; minimum daily, 682 micromhos Aug. 1, 1962.
Percent sodium: Maximum, 71 May 16, 1950; minimum, 12 Mar. 25-31, 1951.
REMARKS.--Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex.

Chemical analyses, water year October 1961 to September 1962

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (calculated)			Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
			Calcium (Ca)	Magnesium (Mg)	Sodium (Na)a	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, 1961.	403	22.0	32.88	19.91	63.95		2.52		46.01	69.11		0.05		7,130	9.70	3,904	55	12.45	10,100	7.7
Oct. 11-16.....	331	20.0	31.44	15.79	47.85		2.29		41.43	50.78		.04		5,800	7.89	2,610	50	9.85	8,110	7.2
Oct. 17-28.....	1,114	19.0	26.70	12.50	32.63		2.16		35.60	33.85		.05		4,430	6.02	6,711	45	7.37	6,180	7.3
Oct. 29-31.....	303	21.0	28.69	13.90	40.46		2.43		37.48	42.88		.05		5,090	6.92	2,101	49	8.77	7,110	7.4
Nov. 1-4.....	1,523	19.0	14.67	4.44	10.61		2.66		16.72	10.16		.05		1,860	2.53	3,853	36	3.43	2,660	7.4
Nov. 5-7.....	613	21.0	16.57	5.84	14.88		2.52		19.49	15.29		.09		2,330	3.17	1,942	40	4.44	3,380	7.8
Nov. 8-10.....	579	27.0	20.86	8.97	22.79		2.52		25.82	23.70		.11		3,240	4.41	2,551	43	5.90	4,600	7.9
Nov. 11-20.....	2,460	21.0	22.46	9.54	25.06		2.72		27.48	26.38		.10		3,510	4.77	11,741	44	6.26	4,980	7.7
Nov. 21-30.....	2,321	20.0	25.95	11.85	33.84		3.13		32.48	36.39		.09		4,410	6.00	13,918	47	7.79	6,270	7.5
Dec. 1-31.....	6,395	18.0	26.35	12.09	34.02		3.31		33.10	35.83		.08		4,440	6.04	38,614	47	7.76	6,250	7.8
Jan. 1-11, 1962.	1,807	18.0	27.94	12.83	38.37		3.13		36.02	39.78		.04		4,850	6.60	11,916	48	8.50	6,820	7.8
Jan. 12-13.....	258	22.0	31.19	15.22	48.72		2.77		42.06	50.21		.15		5,840	7.94	2,048	51	10.11	8,100	8.0
Jan. 14-22.....	1,494	23.0	28.69	14.89	44.37		3.05		38.31	46.55		.06		5,380	7.32	10,932	50	9.51	7,580	8.0
Jan. 23-31.....	1,910	17.0	25.95	12.09	34.54		3.25		33.10	36.39		.07		4,460	6.07	11,586	48	7.92	6,280	7.7
Feb. 1-25.....	3,466	13.0	27.94	14.64	43.94		2.44		38.10	45.98		.02		5,300	7.21	24,984	51	9.52	7,450	7.5
Feb. 26-28.....	314	13.0	30.94	15.88	49.16		2.90		41.64	51.91		.02		5,880	8.00	2,508	51	10.16	8,250	7.1
Mar. 1-10.....	962	12.0	31.19	16.78	51.33		2.82		43.10	53.60		.03		6,080	8.27	7,954	52	10.48	8,510	7.3
Mar. 11.....	960	33.0	30.19	12.17	32.63		2.13		40.60	32.16		.01		4,690	6.38	6,123	44	7.09	6,310	7.4
Mar. 12-28.....	23,064	16.0	20.46	4.36	6.05		2.67		22.69	5.64		.04		1,990	2.71	62,420	20	1.72	2,520	7.5
Mar. 29-31.....	395	16.0	22.85	6.99	15.09		2.44		27.48	15.37		.06		2,850	3.88	1,529	34	3.91	3,800	7.4

a Determined.

RIO GRANDE BASIN--Continued

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

Chemical analyses, water year October 1961 to September 1962--Continued

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (calculated)			Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
			Calcium (Ca)	Magnesium (Mg)	Sodium (Na) a	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				
Apr. 1-4, 1962..	422	17.0	26.20	9.38	25.36		2.38		33.10	25.81		0.01		3,820	5.20	2,193	42	6.01	5,190	7.5
Apr. 5-11.....	782	18.0	28.69	12.09	34.80		2.29		38.10	35.54		.03		4,700	6.39	4,997	46	7.71	6,420	7.4
Apr. 12-19.....	806	20.0	31.69	15.88	48.72		2.43		42.89	51.34		.05		5,920	8.05	6,490	51	9.99	8,170	7.6
Apr. 20-30.....	812	20.0	34.33	18.67	59.60		2.84		47.47	62.63		.04		6,890	9.37	7,605	53	11.58	9,530	7.5
May 1-10.....	791	19.0	34.93	18.67	60.90		2.66		47.47	64.88		.04		7,010	9.53	7,545	53	11.76	9,700	7.6
May 11-24.....	442	19.0	36.28	22.54	80.04		2.88		51.43	85.76		.05		8,460	11.51	5,080	58	14.76	11,900	7.6
May 25-26.....	73	18.0	43.66	28.96	124.41		2.92		62.46	130.33		.02		11,800	16.05	1,178	63	20.65	16,600	7.2
May 27-29.....	309	17.0	37.28	24.76	82.22		2.75		55.38	86.60		.01		8,770	11.93	3,691	57	14.76	12,200	7.4
May 30-31.....	2,551	22.0	23.45	6.33	9.44		2.77		28.52	8.04		.02		2,520	3.43	8,742	24	2.45	3,110	7.6
June 1-19.....	29,131	18.0	20.46	3.95	5.18		2.56		22.69	4.68		.03		1,930	2.62	76,464	18	1.48	2,380	7.6
June 20.....	145	20.0	19.21	4.77	8.96		2.10		22.28	8.86		.06		2,120	2.88	417	27	2.59	2,770	7.8
June 21-23.....	260	17.0	20.96	6.25	13.05		1.87		25.40	13.26		.04		2,560	3.48	905	32	3.54	3,460	7.3
June 24-25.....	127	17.0	24.45	7.57	18.23		1.64		30.40	18.62		.02		3,190	4.34	551	36	4.56	4,270	7.3
June 26-28.....	177	18.0	27.45	10.20	28.28		1.67		35.60	28.21		.03		4,900	6.66	1,178	43	6.52	6,770	7.4
June 29-30.....	109	18.0	29.94	12.09	37.28		1.84		38.73	38.37		.03		4,900	6.66	727	47	8.13	6,770	7.4
July 1.....	71	16.0	29.44	13.00	39.85		1.74		41.02	40.06		.00		5,120	6.96	497	48	8.65	7,000	7.2
July 2.....	123	21.0	34.18	16.45	55.68		2.33		45.80	58.68		.03		6,540	8.89	1,094	52	11.07	9,170	7.9
July 3-9.....	597	17.0	25.95	10.86	28.84		1.75		35.39	28.77		.02		4,110	5.59	3,337	44	6.72	5,630	7.2
July 10-14.....	3,451	17.0	11.73	3.04	5.92		2.16		13.74	4.80		.04		1,320	1.80	6,196	29	2.18	1,880	7.6
July 15.....	101	17.0	11.98	3.21	9.48		1.80		14.37	8.41		.09		1,560	2.12	215	38	3.44	2,260	7.9
July 16-17.....	192	15.0	14.72	5.18	13.70		1.84		18.28	13.88		.05		2,120	2.88	555	41	4.34	3,060	7.6
July 18-19.....	97	17.0	15.97	6.42	18.44		1.67		20.65	18.68		.02		2,540	3.45	336	45	5.51	3,720	7.5
July 20.....	58	16.0	18.71	8.31	27.84		1.48		24.36	29.34		.01		3,390	4.61	265	51	7.57	5,070	7.5
July 21-23.....	95	16.0	21.56	10.28	34.80		1.87		28.32	36.67		.01		4,090	5.56	530	52	8.72	6,040	7.3
July 24-25.....	109	15.0	27.94	14.23	54.81		1.69		37.68	56.98		.05		5,890	8.01	874	56	11.94	8,480	7.3
July 26-27.....	379	16.0	25.95	12.42	36.11		1.79		35.19	36.67		.02		4,560	6.20	2,349	48	8.24	6,400	7.4
July 28-29.....	2,233	15.0	15.72	3.29	6.26		2.07		18.07	5.25		.00		1,630	2.22	4,951	25	2.03	2,160	7.7
July 30.....	2,241	13.0	11.73	2.30	4.92		1.84		12.87	4.34		.01		1,220	1.66	3,719	26	1.86	1,710	7.9
July 31.....	1,105	11.0	5.99	1.15	2.48		2.10		5.33	2.31		.03		605	.82	909	26	1.31	939	8.0
Aug. 1-2.....	4,058	17.0	5.19	1.07	1.74		3.70		2.81	1.58		.00		476	.65	2,627	22	.98	759	7.6

Aug. 3, 1962....	893	15.0	6.49	1.23	2.78		2.69		5.16	2.62		.00		646	.88	784	27	1.42	1,000	7.6
Aug. 4-5.....	742	15.0	13.87	3.62	9.09		1.93		15.62	8.91		.07		1,670	2.27	1,685	34	3.07	2,390	7.4
Aug. 6-8.....	422	16.0	15.97	5.02	15.40		2.13		18.74	15.57		.06		2,270	3.09	1,304	42	4.75	3,280	7.5
Aug. 9-13.....	151	14.0	17.71	6.91	26.71		1.84		22.28	26.66		.03		3,140	4.27	644	52	7.61	4,670	7.4
Aug. 14-20.....	61	15.0	22.75	9.46	41.24		1.92		30.81	40.82		.02		4,510	6.13	375	56	10.28	6,500	7.4
Aug. 21-26.....	14	18.0	29.54	13.66	60.03		2.18		40.18	60.65		.02		6,300	8.57	122	58	12.92	8,790	7.5
Aug. 27-30.....	73	20.0	34.28	16.29	74.82		2.34		46.85	75.32	0.05	.02		7,620	10.36	756	60	14.88	10,700	7.5
Aug. 31.....	2,182	16.0	22.85	5.76	10.70		2.49		27.90	9.03		.03		2,530	3.44	7,507	27	2.83	3,170	7.5
Sept. 1-10.....	18,208	16.0	19.56	3.45	4.74		2.11		21.24	4.15		.03		1,790	2.43	44,326	17	1.40	2,230	7.4
Sept. 11-14.....	641	18.0	21.86	5.35	10.44		2.10		25.19	10.32		.05		2,400	3.26	2,092	28	2.83	3,090	7.4
Sept. 15-17.....	268	17.0	23.70	8.06	18.62		1.61		29.98	18.62		.02		3,170	4.31	1,154	37	4.67	4,260	7.1
Sept. 18-21.....	234	20.0	27.54	11.02	30.97		1.90		37.48	31.03		.02		4,380	5.96	1,394	45	7.05	5,860	7.4
Sept. 22-26.....	339	21.0	30.19	13.98	44.37		2.29		39.35	45.70		.04		5,400	7.34	2,491	50	9.44	7,580	7.4
Sept. 27-28.....	540	15.0	26.95	11.27	29.01		2.49		33.73	30.47		.04		4,140	5.63	3,038	43	6.64	5,780	7.2
Sept. 29-30.....	524	14.0	22.21	8.23	20.05		1.93		28.32	19.89		.05		3,150	4.28	2,243	40	5.14	4,360	7.2
Total or weighted average	127,800	17.0	20.97	6.29	14.39		2.56		24.69	14.47	--	0.04		2,620	3.57	456,100	28	3.50	3,500	7.5

a Determined

RIO GRANDE BASIN--Continued

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 1962.
Water temperatures: March 1953 to September 1962.
EXTREMES, 1961-62.--Specific conductance: Maximum daily, 14,800 micromhos July 31, Aug. 1; minimum daily, 10,100 micromhos Feb. 1, 15.
Percent sodium: Maximum, 67 Dec. 1-31; minimum, 60 Feb. 1-28.
Sodium-adsorption-ratio: Maximum, 20.89 Sept. 1-30; minimum, 15.15 Feb. 1-28.
EXTREMES, 1937-62.--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.--Records of specific conductance of daily samples available in district office at Austin, Tex. Records of discharge are given for gaging station near Orla. 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 1961 to September 1962

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 ($Na)_a$	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. 1-31, 1961.	3,695	18.0	30.29	15.96	86.13		2.03		45.60	84.91				8,060	10.96	40,508	65	17.91	11,400	7.5
Nov. 1-30.....	101	19.0	30.79	17.19	83.52		2.15		44.76	84.35				7,970	10.84	1,096	64	17.05	11,300	7.1
Dec. 1-31.....	111	21.0	30.24	19.50	100.92		2.95		43.93	103.81				9,060	12.32	1,364	67	20.24	13,300	7.2
Jan. 1-31, 1962.	105	17.0	31.94	16.70	75.69		2.47		45.39	76.17	0.06			7,560	10.26	1,075	61	15.35	10,600	7.4
Feb. 1-28.....	61	15.0	32.19	17.19	75.26		2.33		45.39	77.01				7,580	10.31	630	60	15.15	10,300	7.6
Mar. 1-31.....	3,265	8.3	31.69	16.18	78.30		2.13		46.64	79.55				7,790	10.59	34,591	61	15.68	10,600	7.3
Apr. 1-30.....	6,783	5.4	31.54	17.44	89.18		1.98		46.22	89.99				8,370	11.38	77,218	65	18.02	11,700	7.5
May 1-31.....	4,747	6.3	32.29	20.07	93.96		1.92		49.76	94.79				8,870	12.06	57,262	64	18.36	12,300	7.1
June 1-30.....	3,540	6.4	34.48	20.24	101.36		1.93		50.18	103.81				9,420	12.81	45,358	65	19.38	13,300	7.5
July 1-31.....	10,822	7.2	34.73	22.37	106.14		1.90		54.76	106.63				9,880	13.44	145,411	65	19.86	14,200	6.9
Aug. 1-31.....	7,133	8.5	34.73	22.87	105.71		1.82		53.30	108.04				9,860	13.41	95,645	65	19.70	13,900	7.2
Sept. 1-30.....	4,088	9.8	33.48	22.05	110.06		1.87		52.67	110.87				9,990	13.59	55,540	66	20.89	13,400	7.0
Total or weighted average	44,450	8.3	33.23	20.37	98.28		1.93		50.69	99.25	--			9,190	12.50	555,700	65	18.96	12,900	7.1

a Calculated as sodium (Na).

8-4474. 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 the confluence with the Rio Grande. This 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. 31).
RECORDS AVAILABLE.--Chemical analyses: January 1955 to September 1962. Chemical analyses for the period July through December 1954 are available for a station near the mouth and for the period February 1935 through June 1954 for a station 4.7 river miles upstream at the Pecos High Bridge.
REMARKS.--Chemical analyses are by the U. S. Department of Agriculture, Agricultural Research Service, U. S. Salinity Laboratory, Riverside, Calif. Records of discharge, electrical conductivity for individual water samples, and these same chemical analyses for water year October 1961 to September 1962 are given in International Boundary and Water Commission Bulletin Numbers 31 and 32. Records of previous years given in earlier Bulletins for a station near the mouth and for a station 4.7 river miles upstream at the Pecos High Bridge.

Chemical analyses, water year October 1961 to September 1962

Date of collection	Number of samples	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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				
October, 1961	5	11,000	--	4.48	4.62	12.24	--	2.50		5.58	13.25	--	0.04	0.17	1,380	1.88	20,900	57	5.7	2,180	7.8
November.....	4	11,100	--	7.20	5.44	17.71	--	2.85		8.29	19.62	--	.04	.21	1,916	2.61	29,000	58	7.1	3,070	7.9
December.....	4	10,400	--	8.04	6.06	20.64	--	2.85		9.51	22.50	--	.04	.25	2,192	2.98	31,000	59	7.8	3,460	8.0
January, 1962	5	9,844	12	8.64	6.48	21.90	0.21	2.71	0.24	10.37	23.75	0.06	.04	.24	2,328	3.17	31,200	59	8.0	3,700	8.3
February.....	4	8,922	--	9.08	7.56	24.71	--	2.55		11.46	27.38	--	.03	.26	2,591	3.52	31,400	60	8.6	4,010	8.0
March.....	3	9,098	--	9.44	7.16	25.15	--	2.55		11.86	27.75	--	.03	.26	2,662	3.62	32,900	60	8.7	4,150	7.9
May.....	5	7,005	--	7.80	6.52	22.69	--	2.07		10.20	25.00	--	.01	.24	2,336	3.18	22,300	61	8.5	3,690	7.9
June.....	4	7,075	--	7.08	5.52	19.38	--	2.25		8.84	21.72	--	.01	.22	2,107	2.87	20,300	61	7.7	3,320	7.8
July.....	4	7,962	13	7.18	5.74	21.49	.19	2.15		9.37	23.58	.06	.01	.23	2,181	2.97	23,600	62	8.5	3,530	7.5
August.....	5	5,345	--	6.45	4.40	17.85	--	2.19		7.73	19.38	--	.01	.24	1,856	2.52	13,500	62	7.7	2,970	7.6
September....	3	14,030	--	4.99	2.56	9.90	--	2.68		4.29	10.40	--	.05	.13	1,075	1.46	20,500	57	5.1	1,750	8.0
Total or weighted average	--	101,800	--	7.18	5.51	18.79	--	2.54		8.59	20.57	--	.03	.22	2,000	2.72	276,800	60	7.4	3,160	7.9

COLORADO RIVER MAIN STEM

9-711. COLORADO RIVER NEAR GLENWOOD SPRINGS, COLO.

LOCATION.--At Shoshone powerplant, 6 miles upstream from gaging station at Glenwood Springs, Garfield County, and 6.5 miles upstream from Roaring Fork.
DRAINAGE AREA.--4,560 square miles, approximately, upstream from gaging station.
RECORDS AVAILABLE.--Chemical analyses: October 1941 to September 1962.
Water temperatures: May 1949 to September 1962.
EXTREMES, 1961-62.--Specific conductance: Maximum daily, 727 micromhos Sept. 8, 23; minimum daily, 241 micromhos May 15.
Percent sodium: Maximum, 44 Mar. 1; minimum, 7 Apr. 8.
Sodium-adsorption-ratio: Maximum, 1.96 Dec. 1-31; minimum, 0.22 Apr. 8.
EXTREMES, 1941-62.--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, 7 Apr. 8, 1962.
REMARKS.--Records of specific conductance of daily samples available in district office at Salt Lake City, Utah. Records of discharge are given for Colorado River at Glenwood Springs, Colo.

Chemical analyses, water year October 1961 to September 1962

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
			Calcium (Ca)	Magnesium (Mg)	Sodium (Na) a	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. 1-22, 1961.	97,484		3.26	2.00		1.93	0.00	1.69	1.64				311	0.42	41,232	38	1.57	513	7.5
Oct. 23-31.....	30,633		3.42	2.35		2.00	.00	1.73	2.03				339	.46	14,123	41	1.80	574	7.6
Nov. 1-30.....	80,569		3.76	2.52		2.08	.00	1.89	2.31				369	.50	40,433	40	1.84	627	7.6
Dec. 1-31.....	77,413		3.42	2.57		2.03	.00	1.69	2.26				344	.47	36,217	43	1.96	590	7.6
Jan. 1-31, 1962.	79,749		3.18	2.35		2.02	.00	1.50	2.00				321	.44	34,815	42	1.86	547	7.6
Feb. 1-28.....	90,581		3.22	2.13		1.95	.00	1.60	1.81				307	.42	37,819	40	1.68	526	7.5
Mar. 1.....	3,174		3.12	2.44		2.00	.00	1.64	1.92				324	.44	1,398	44	1.95	547	7.4
Mar. 2-18.....	65,752		2.76	1.48		1.79	.00	1.21	1.24				257	.35	22,982	35	1.26	441	7.7
Mar. 19-28.....	37,527		3.78	2.18		2.11	.00	1.89	1.97				355	.48	18,118	37	1.58	609	7.7
Mar. 29-31.....	15,608		3.22	1.31		2.16	.00	1.39	.96				271	.37	5,752	29	1.03	457	7.6
Apr. 1-7.....	39,001		3.48	1.39		2.28	.00	1.54	1.04				293	.40	15,541	29	1.06	494	7.8
Apr. 8.....	4,998		3.72	.30		3.51	.00	.48	.03				196	.27	1,332	7	.22	353	7.9
Apr. 9-16.....	57,743		3.54	1.09		2.34	.00	1.48	.79				279	.38	21,910	24	.82	463	7.8
Apr. 17-30.....	244,863		2.76	.52		2.16	.00	.83	.27				222	.30	73,929	16	.44	320	7.7
May 1-31.....	539,369		2.40	.61		1.77	.00	.92	.34				170	.23	124,702	20	.56	282	7.5
June 1-30.....	454,671		2.36	.61		1.61	.00	.98	.39				171	.23	105,738	21	.56	281	7.5
July 1-11.....	151,135		2.28	.65		1.48	.00	.98	.48				172	.23	35,353	22	.61	288	7.5
July 12-23.....	94,302		2.98	1.17		1.77	.00	1.50	.90				246	.33	31,550	28	.96	419	7.6
July 24-31.....	42,605		3.62	1.65		2.02	.00	1.94	1.33				310	.42	17,962	31	1.23	527	7.7
Aug. 1-31.....	110,309		3.80	2.18		2.11	.00	1.96	1.92				370	.50	55,507	36	1.58	614	7.4
Sept. 1-30.....	74,083		4.20	2.65		2.23	.00	2.19	2.45				429	.58	43,223	39	1.83	713	7.4
Total or weighted average	2,391,600		2.96	1.18		1.87	0.00	1.25	0.92				240	0.33	779,600	29	1.00	396	7.5

a Calculated Na + K as Na.

COLORADO RIVER MAIN STEM--Continued

9-1805. COLORADO RIVER NEAR CISCO, UTAH

LOCATION.--At gaging station, 1 mile downstream from Dolores River, 11 miles south of Cisco, Grand County, 36 miles downstream from Colorado-Utah State line, 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 1962.
Water temperatures: May 1949 to September 1959.
Sediment records: May 1930 to September 1962.
EXTREMES, 1961-62.--Specific conductance: Maximum daily, 2,120 micromhos Sept. 23; minimum daily, 354 micromhos May 15.
Percent sodium: Maximum, 50 Feb. 1-10; minimum, 19 May 1-17.
Sodium-adsorption-ratio: Maximum, 4.24 Sept. 1-30; minimum, 0.63 May 1-17.
EXTREMES, 1941-52, 1953-62.--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.--Records of specific conductance of daily samples available in district office at Salt Lake City, Utah.

Chemical analyses, water year October 1961 to September 1962

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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. 1-8, 1961..	98,523		5.29	2.30	4.05		2.77	0.00	6.60	2.14		0.10		756	1.03	101,297	35	2.08	1,080	8.1
Oct. 9-12.....	61,765		7.34	1.81	5.13		2.88	.00	8.85	2.45		.12		943	1.28	79,213	36	2.40	1,300	7.7
Oct. 13-31.....	196,683		5.34	2.22	4.44		2.82	.00	6.58	2.48		.08		776	1.06	207,571	37	2.28	1,120	8.0
Nov. 1-30.....	251,821		5.54	2.47	6.00		2.87	.00	7.25	3.75		.14		903	1.23	309,257	43	3.00	1,320	8.1
Dec. 1-6.....	43,831		5.39	2.71	5.52		2.85	.00	7.39	3.13		.26		868	1.18	51,741	41	2.74	1,270	8.1
Dec. 7-16.....	54,863		5.49	2.88	6.70		2.90	.00	7.50	4.46		.16		966	1.31	72,077	44	3.28	1,420	8.0
Dec. 17-31.....	98,271		5.94	3.29	8.53		2.92	.00	8.72	5.95		.18		1,140	1.55	152,359	48	3.97	1,680	8.0
Jan. 1-31, 1962.	182,249		5.94	2.22	6.53		3.08	.00	7.08	4.34		.16		948	1.29	234,970	44	3.23	1,400	7.7
Feb. 1-10.....	82,017		4.94	2.96	7.92		2.82	.00	6.93	5.92		.16		976	1.33	108,865	50	3.98	1,550	7.8
Feb. 11-28.....	179,298		5.04	2.06	4.96		2.95	.00	6.23	2.76		.13		758	1.03	184,835	41	2.63	1,160	7.8
Mar. 1-30.....	234,327		4.54	2.39	5.87		2.66	.00	6.04	3.95		.12		782	1.06	249,212	46	3.16	1,240	7.7
Mar. 31-Apr. 13.	204,071		4.09	1.56	3.13		2.69	.00	4.29	1.69		.09		550	.75	152,645	36	1.86	852	7.9
Apr. 14-20.....	264,635		3.24	.82	1.52		2.59	.00	2.23	.71		.07		336	.46	120,927	27	1.07	541	7.6
Apr. 21-30.....	596,826		2.40	.74	.96		2.11	.07	1.48	.39		.06		251	.34	203,733	23	.76	393	8.3
May 1-17.....	1,091,821		2.54	.90	.83		2.47	.00	1.29	.45		.03		254	.35	377,159	19	.63	406	7.7
May 18-31.....	511,220		2.64	1.23	1.48		2.18	.00	2.29	.85		.04		330	.45	229,435	28	1.06	529	7.7
June 1-5.....	183,471		3.14	.99	1.83		2.43	.00	2.77	.68		.05		334	.45	83,340	31	1.27	543	7.4
June 6-29.....	1,168,661		3.14	.76	1.17		1.98	.00	2.02	.54		.03		260	.35	413,239	23	.84	431	7.5
June 30.....	47,405		4.74	1.40	2.87		2.39	.00	5.95	.59		.07		534	.73	34,427	32	1.64	790	7.6
July 1-13.....	486,823		2.79	.99	1.48		2.25	.00	2.23	.79		.04		329	.45	217,824	28	1.08	519	7.4

COLORADO RIVER MAIN STEM--Continued

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

Chemical analyses, water year October 1961 to September 1962--Continued

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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 14-21, 1962	149,554		3.54	1.73	2.78		2.25	0.00	4.12	1.64		0.06		516	0.70	104,951	35	1.72	794	7.9
July 22-31.....	128,172		4.79	2.30	3.74		2.59	.00	6.06	2.17		.06		704	.96	122,717	35	1.99	1,040	7.7
Aug. 1-16.....	128,465		5.94	3.13	5.00		2.90	.00	8.14	2.93		.09		916	1.25	160,037	36	2.35	1,330	7.5
Aug. 17-31.....	77,564		7.63	4.44	6.70		3.15	.00	11.87	3.61		.15		1,240	1.69	130,803	36	2.73	1,720	7.4
Sept. 1-30.....	173,038		9.28	5.18	11.40		3.56	.00	14.82	7.33		.14		1,460	1.99	343,584	44	4.24	1,930	7.4
Total or weighted average	6,696,000		3.76	1.49	2.77		2.45		3.79	1.61		0.07		488	0.66	4,446,000	35	1.50	742	7.7

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 1962.
Water temperatures: July 1949 to September 1962.
Sediment records: October 1928 to December 1933, November 1942 to September 1944, October 1947 to September 1962.
EXTREMES, 1961-62.--Specific conductance: Maximum daily, 2,400 micromhos Sept. 26; minimum daily, 355 micromhos May 19.
Percent sodium: Maximum, 42 Mar. 1-31; minimum, 21 May 8-17.
Sodium-adsorption-ratio: Maximum, 3.31 Sept. 26; minimum, 0.70 May 13-17.
EXTREMES, 1942-45, 1947-62.--Specific conductance: Maximum daily, 2,430 micromhos Oct. 15, 1960; minimum daily, 318 micromhos June 9, 1948.
Percent sodium: Maximum, 46 Mar. 2, 4, 7, 10, 1944; minimum, 17 June 1-11, 1958.
REMARKS.--Values reported for sodium (Na) are determined by analysis and do not include potassium (K). Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex.

Chemical analyses, water year October 1961 to September 1962

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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, 1961....	23,008	--	8.03	2.47	4.57	--	4.70		--	--	--	--	--	966	1.31	30,227	30	1.99	1,350	7.1
Oct. 2-13.....	305,137	--	5.39	2.06	3.65	--	3.26		--	--	--	--	--	743	1.01	308,335	33	1.89	1,060	7.6
Oct. 14-15.....	62,678	--	7.29	2.30	3.92	--	3.26		--	--	--	--	--	909	1.24	77,485	29	1.79	1,240	7.7
Oct. 16-31.....	334,175	--	4.74	2.14	3.78	--	2.93		--	--	--	--	--	700	.95	318,135	35	2.04	1,040	7.8
Nov. 1-4.....	91,636	--	4.39	1.73	3.70	--	2.79		--	--	--	--	--	633	.86	78,888	38	2.11	948	7.8
Nov. 5-30.....	435,253	16.0	5.29	2.47	4.57	0.13	3.15		6.85	2.31	0.02	0.09	0.11	795	1.08	470,595	37	2.32	1,170	7.8
Dec. 1-14.....	211,152	--	5.24	2.71	4.92	--	3.31		--	--	--	--	--	835	1.14	239,785	38	2.46	1,220	7.7
Dec. 15-31.....	168,966	--	5.59	3.29	6.00	--	3.57		--	--	--	--	--	962	1.31	221,062	40	2.85	1,400	7.5
Jan. 1-31, 1962.	348,635	16.0	5.39	2.88	5.66	.14	3.41		7.25	3.33	.03	.16	.13	912	1.24	432,419	40	2.78	1,320	7.7
Feb. 1-18.....	444,139	--	5.19	2.55	5.18	--	3.65		--	--	--	--	--	819	1.11	494,700	40	2.63	1,220	7.6
Feb. 19-26.....	304,979	--	4.39	1.89	3.87	--	3.39		--	--	--	--	--	654	.89	271,260	38	2.18	956	7.7
Feb. 27-28.....	41,653	--	4.99	2.39	5.13	--	3.28		--	--	--	--	--	822	1.12	46,565	41	2.67	1,180	7.6
Mar. 1-31.....	598,274	--	4.89	2.39	5.35	--	3.33		--	--	--	--	--	832	1.13	676,959	42	2.81	1,210	7.7
Apr. 1-8.....	476,826	--	5.39	2.22	4.31	--	4.15		--	--	--	--	--	750	1.02	486,363	36	2.21	1,070	7.5
Apr. 9-19.....	638,182	--	4.34	1.65	3.13	--	3.70		--	--	--	--	--	586	.80	508,605	34	1.81	854	7.6
Apr. 20-23.....	407,643	--	4.49	1.48	1.96	--	4.43		--	--	--	--	--	499	.68	276,643	25	1.13	737	7.5
Apr. 24-30.....	868,185	--	3.09	.90	1.39	--	3.03		--	--	--	--	--	360	.49	425,063	26	.98	519	8.1
May 1-7.....	848,469	--	2.99	.99	1.22	--	3.11		--	--	--	--	--	340	.46	392,332	23	.86	493	7.8

COLORADO RIVER MAIN STEM--Continued

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

Chemical analyses, water year October 1961 to September 1962--Continued

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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				
May 8-12, 1962..	597,025	--	3.49	0.99	1.22	--	3.44		--	--	--	--	--	381	0.52	309,354	21	0.81	541	7.5
May 13-17.....	796,165	--	2.89	.81	.96	--	2.92		--	--	--	--	--	293	.40	317,256	21	.70	440	7.9
May 18-21.....	551,564	--	2.50	.54	.91	--	2.38		--	--	--	--	--	264	.36	198,033	23	.74	392	7.9
May 22-31.....	839,603	--	2.69	.99	1.39	--	2.52		--	--	--	--	--	336	.46	383,665	27	1.03	494	7.9
June 1-9.....	722,797	--	3.09	1.23	1.70	--	2.82		--	--	--	--	--	388	.53	381,405	28	1.15	575	7.6
June 10-July 2..	2,349,878	21.0	2.59	1.07	1.22	0.08	2.56		1.87	0.42	0.03	0.03	0.09	308	.42	984,317	25	.90	467	7.8
July 3-13.....	883,855	--	3.39	1.15	1.39	--	3.10		--	--	--	--	--	381	.52	457,978	23	.92	564	7.6
July 14-25.....	477,223	--	3.89	1.32	2.09	--	3.20		--	--	--	--	--	467	.64	303,094	29	1.29	697	7.5
July 26-31.....	159,233	--	4.39	1.81	2.83	--	3.41		--	--	--	--	--	588	.80	127,335	31	1.61	855	7.4
Aug. 1-18.....	327,070	--	4.44	2.30	3.74	--	3.00		--	--	--	--	--	702	.95	312,261	36	2.04	995	7.7
Aug. 19-29.....	122,095	--	4.99	2.80	4.65	--	3.13		--	--	--	--	--	831	1.13	137,986	37	2.36	1,170	7.7
Aug. 30-Sept. 17	158,206	11.0	5.79	3.70	5.96	.16	3.03		9.33	3.07	.04	.07	.14	1,030	1.40	221,614	38	2.74	1,410	7.8
Sept. 18-21.....	38,733	--	6.89	4.28	6.87	--	3.15		--	--	--	--	--	1,220	1.66	64,266	38	2.91	1,630	7.5
Sept. 22-25.....	52,189	--	7.24	3.45	5.96	--	3.49		--	--	--	--	--	1,120	1.52	79,494	36	2.58	1,490	7.4
Sept. 26.....	13,964	--	12.97	5.26	10.01	--	3.93		--	--	--	--	--	1,940	2.64	36,842	35	3.31	2,400	7.4
Sept. 27-30.....	71,786	--	8.73	4.28	6.79	--	3.93		--	--	--	--	--	1,370	1.86	133,751	34	2.66	1,730	7.5
Total or weighted average	14,770,000	--	3.79	1.53	2.50	--	3.10		--	--	--	--	--	508	0.69	10,204,000	28	1.40	740	7.7

COLORADO RIVER MAIN STEM--Continued

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

LOCATION.--At gaging station on left bank at Kaibab Bridge, 0.2 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 1962.
Water temperatures: October 1936 to October 1942, September 1943 to September 1962.
Sediment records: October 1925 to November 1942, September 1943 to September 1962.
EXTREMES, 1961-62.--Specific conductance: Maximum daily, 2,180 micromhos Sept. 27-30; minimum daily, 439 micromhos May 12.
Percent sodium: Maximum, 46 Dec. 17-31; minimum, 23 July 1-6.
Sodium-adsorption-ratio: Maximum, 3.62 Dec. 22-31; minimum, 87 July 1-6.
EXTREMES, 1937-42, 1943-62.--Specific conductance: Maximum daily, 2,900 micromhos Sept. 6, 1940; minimum daily, 341 micromhos June 15, 1942.
Percent sodium (1941-42, 1943-62): Maximum, 50 Jan. 12-14, 1957; minimum, 16 June 11-20, 1952.
REMARKS.--Values reported for sodium (Na) are determined by analysis and do not include potassium (K). Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex.

Chemical analyses, water year October 1961 to September 1962

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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-Nov. 30, 1961.	1,341,798	--	5.59	2.63	5.74	--	3.57	0.00	--	--	--	--	--	902	1.23	1,646,011	41	2.63	1,340	7.6
Dec. 1-16.....	249,473	--	5.44	2.71	5.83	--	3.47	.00	--	--	--	--	--	906	1.23	307,391	42	2.89	1,340	7.6
Dec. 17-21.....	40,423	--	5.19	3.13	7.05	--	3.57	.00	--	--	--	--	--	976	1.33	53,656	46	3.46	1,470	7.4
Dec. 22-31.....	119,266	--	6.04	3.21	7.79	--	3.82	.00	--	--	--	--	--	1,100	1.50	178,422	46	3.62	1,620	7.6
Jan. 1-31, 1962.	368,557	18.0	5.69	2.96	6.83	0.15	3.72	.00	7.14	4.57	0.02	0.14	0.17	989	1.35	495,723	44	3.26	1,480	7.7
Feb. 1-10.....	134,321	--	5.14	2.96	6.66	--	3.51	.00	--	--	--	--	--	937	1.27	171,167	45	3.31	1,430	7.7
Feb. 11-16.....	183,630	--	5.24	2.14	6.09	--	3.98	.00	--	--	--	--	--	840	1.14	209,779	45	3.17	1,280	7.5
Feb. 17-28.....	514,116	--	4.49	1.89	4.18	--	3.64	.00	--	--	--	--	--	667	.91	466,365	40	2.34	1,010	7.7
Mar. 1-31.....	610,203	18.0	5.14	2.47	6.18	.15	3.70	.00	6.43	3.55	.03	.09	.14	876	1.19	726,971	44	3.17	1,320	7.8
Apr. 1-12.....	755,464	--	5.09	2.14	4.35	--	4.36	.00	--	--	--	--	--	740	1.01	760,299	38	2.29	1,070	7.7
Apr. 13, 16-20..	394,750	--	4.09	1.65	3.09	--	3.64	.00	--	--	--	--	--	552	.75	296,347	35	1.82	827	7.9
Apr. 14-15.....	114,645	--	2.79	1.15	2.39	--	2.29	.27	--	--	--	--	--	424	.56	66,109	38	1.70	620	6.4
Apr. 21-26.....	691,200	--	3.29	1.23	1.83	--	3.38	.00	--	--	--	--	--	405	.55	380,713	29	1.21	605	8.1
Apr. 27-30.....	511,101	--	2.89	.99	1.39	--	3.08	.00	--	--	--	--	--	326	.44	226,602	26	1.00	509	8.2
May 1-4.....	540,932	--	2.64	.99	1.31	--	2.85	.00	--	--	--	--	--	317	.43	233,207	26	.97	479	7.9
May 5-7.....	340,542	--	3.49	.90	1.39	--	3.47	.00	--	--	--	--	--	352	.48	163,024	24	.94	555	7.6
May 8-23.....	2,182,453	18.0	2.74	.99	1.22	.08	2.79	.00	1.60	.56	.02	.04	.07	314	.43	931,995	24	.89	477	7.9

COLORADO RIVER MAIN STEM--Continued

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

Chemical analyses, water year October 1961 to September 1962--Continued

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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				
May 24-31, 1962.	652,165	--	2.99	1.15	1.61	--	2.93	0.00	--	--	--	--	--	359	0.49	318,413	28	1.12	557	7.8
June 1-10.....	803,107	--	3.04	1.23	1.87	--	2.79	.00	--	--	--	--	--	379	.52	413,954	30	1.28	597	7.7
June 11-30.....	2,046,942	--	2.79	1.07	1.35	--	2.70	.00	--	--	--	--	--	323	.44	899,181	26	.97	506	7.5
July 1-6.....	594,446	--	3.14	1.07	1.26	--	3.02	.00	--	--	--	--	--	347	.47	280,531	23	.87	532	7.4
July 7-15.....	635,504	--	3.49	1.07	1.70	--	3.15	.00	--	--	--	--	--	404	.55	349,171	27	1.12	613	7.5
July 16-18.....	142,036	--	3.39	1.40	2.13	--	2.95	.00	--	--	--	--	--	431	.59	83,256	31	1.38	662	7.6
July 19-31.....	449,177	19.0	3.64	1.65	3.00	0.11	2.87	0.00	3.66	1.81	0.02	0.04	0.14	523	.71	319,491	36	1.85	818	7.8
Aug. 1-21.....	396,744	--	4.59	2.63	4.61	--	3.36	.00	--	--	--	--	--	729	.99	393,348	39	2.43	1,120	7.7
Aug. 22-31.....	114,942	--	5.09	3.37	5.61	--	3.38	.00	--	--	--	--	--	852	1.16	133,186	40	2.73	1,320	7.6
Sept. 1-26.....	250,270	--	6.39	3.37	7.05	--	3.49	.00	--	--	--	--	--	1,040	1.41	353,982	42	3.19	1,580	7.7
Sept. 27-30.....	68,033	--	11.48	4.20	9.22	--	3.92	.00	--	--	--	--	--	1,620	2.20	149,890	37	3.29	2,180	7.5
Total or weighted average	15,250,000	--	3.82	1.61	2.96	--	3.20	--	--	--	--	--	--	531	0.72	11,008,000	31	1.70	803	7.7

COLORADO RIVER MAIN STEM--Continued

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

LOCATION.--At Hoover Dam, State line between Mohave County, Ariz., and Clark County, Nev., just downstream from gaging station.
DRAINAGE AREA.--167,800 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: October 1939 to September 1962.
Water temperatures: October 1941 to September 1962.

Chemical analyses, water year October 1961 to September 1962

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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. 2, 1961....	47,405	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1,020	--
Oct. 16.....	379,240	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1,020	--
Nov. 13.....	275,901	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1,040	--
Dec. 5.....	82,711	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1,030	--
Dec. 15.....	248,132	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1,030	--
Jan. 2, 1962....	33,640	12.0	4.94	2.30	3.96	0.10	2.61	0.00	6.29	2.34	0.02	0.05	0.13	684	0.93	31,293	35	2.08	1,040	8.1
Jan. 15.....	252,298	12.0	4.94	2.30	3.96	.10	2.61	.00	6.29	2.34	.02	.05	.13	684	.93	234,697	35	2.08	1,040	8.1
Feb. 1.....	19,071	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1,080	--
Feb. 15.....	286,066	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1,080	--
Mar. 1.....	28,066	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1,110	--
Mar. 15.....	420,992	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1,110	--
Apr. 2.....	63,868	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1,120	--
Apr. 16.....	510,942	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1,120	--
May 1.....	32,430	12.0	5.14	2.14	4.35	.11	2.67	.00	6.62	2.51	.01	.06	.14	738	1.00	32,549	37	2.28	1,120	8.2
May 15.....	486,446	12.0	5.14	2.14	4.35	.11	2.67	.00	6.62	2.51	.01	.06	.14	738	1.00	488,236	37	2.28	1,120	8.2
June 4.....	106,314	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1,110	--
June 15.....	398,678	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1,110	--
July 2.....	58,314	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1,110	--
July 16.....	466,512	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1,110	--
Aug. 1.....	29,653	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1,110	--
Aug. 15.....	444,793	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1,110	--
Sept. 4.....	117,818	12.0	5.09	2.14	4.48	.11	2.72	.00	6.48	2.54	.02	.07	.14	732	1.00	117,290	38	2.36	1,110	7.4
Sept. 14.....	412,364	12.0	5.09	2.14	4.48	.11	2.72	.00	6.48	2.54	.02	.07	.14	732	1.00	410,516	38	2.36	1,110	7.4
Total or weighted average a	8,304,000	12.0	5.04	2.14	4.26	0.11	2.66	0.00	6.52	2.48	0.02	0.06	0.14	725	0.99	8,221,000	38	2.30	1,090	7.7

a Includes estimated data for missing periods. Represents 100 percent of runoff for water year October 1961 to September 1962.

DIVERSIONS AND RETURN FLOWS 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 on Arizona Side of river, 3.5 miles downstream from siphon-drop powerplant and 0.2 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 1962.
Water temperatures: May 1960 to September 1962.
EXTREMES, 1961-62.--Specific conductance: Maximum daily, 1,600 micromhos July 7; minimum daily, 1,140 micromhos Apr. 5, 17.
Percent sodium: Maximum, 46 Feb. 1-28; minimum, 36 July 1-2, 7.
Sodium-adsorption-ratio: Maximum, 3.21 Feb. 1-28; minimum, 2.52 July 7.
EXTREMES, 1943-62.--Specific conductance: Maximum daily, 1,600 micromhos July 7, 1962; minimum daily, 795 micromhos Jan. 5, 1953.
Percent sodium: Maximum, 46 Nov. 21-30, 1953, Feb. 1-28, 1962; minimum, 32 several periods in 1945, 1946, 1948, 1949, and 1957.
REMARKS.--Values reported for sodium (Na) are determined by analysis and do not include potassium (K). Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex.

Chemical analyses, water year October 1961 to September 1962

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (calculated)			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. 1-31, 1961.	29,576	17.0	5.09	2.14	5.61		2.72		6.70	3.58		0.02		806	1.10	32,420	44	2.95	1,250	8.1
Nov. 1-30.....	21,124	14.0	4.99	2.47	5.87		2.82		6.79	3.72		.03		824	1.12	23,672	44	3.04	1,290	8.1
Dec. 1-31.....	9,346	17.0	5.09	2.55	6.26		2.98		7.06	4.15		.02		870	1.18	11,058	45	3.20	1,370	8.1
Jan. 1-31, 1962.	15,372	16.0	4.89	2.39	5.92		2.69		6.83	3.61		.03		819	1.11	17,122	45	3.10	1,260	8.0
Feb. 1-28.....	23,659	17.0	5.09	2.30	6.18		2.85		6.87	3.75		.03		840	1.14	27,028	46	3.21	1,290	8.0
Mar. 1-31.....	29,514	16.0	4.94	2.22	5.48		2.74		6.58	3.19		.03		782	1.06	31,389	43	2.90	1,200	8.0
Apr. 1-30.....	32,608	15.0	4.79	2.22	5.57		2.56		6.64	3.33		.03		783	1.06	34,724	44	2.97	1,200	8.1
May 1-31.....	37,815	15.0	4.89	2.47	5.92		2.70		6.89	3.50		.03		818	1.11	42,068	45	3.08	1,250	8.1
June 1-12.....	13,924	15.0	4.99	2.39	5.83		2.74		6.89	3.44		.03		815	1.11	15,433	44	3.04	1,260	7.9
June 13-18.....	6,141	14.0	5.89	2.71	5.83		2.39		7.00	5.02		.03		887	1.21	7,408	40	2.81	1,390	7.3
June 19-30.....	14,043	16.0	4.99	2.39	5.74		2.70		6.87	3.41		.03		811	1.10	15,489	44	2.99	1,250	7.8
July 1-2.....	1,388	10.0	6.49	3.54	5.66		1.70		7.00	7.14		.03		955	1.30	1,803	36	2.53	1,540	7.0
July 3-6.....	4,649	14.0	4.84	2.47	5.66		2.74		6.83	.33		.03		801	1.09	5,065	44	2.96	1,240	7.7
July 7.....	1,480	12.0	6.89	3.54	5.74		1.54		7.00	7.73		.03		983	1.34	1,978	36	2.52	1,600	7.0
July 8-31.....	31,989	15.0	4.84	2.47	5.66		2.69		6.87	3.36		.03		804	1.09	34,979	44	2.96	1,240	8.1
Aug. 1-12, 14-31	36,774	18.0	4.84	2.39	5.74		2.67		6.93	3.44		.03		813	1.11	40,660	44	3.02	1,250	8.1
Aug. 13.....	1,418	13.0	5.89	3.37	5.83		2.43		6.95	5.70		.03		917	1.25	1,769	39	2.71	1,460	7.5
Sept. 1-30.....	40,284	15.0	4.74	2.47	5.92		2.62		6.95	3.55		.03		817	1.11	44,761	45	3.12	1,270	8.1
Total or weighted average	351,000	16.0	4.94	2.39	5.79		2.69		6.83	3.52		0.03		814	1.11	388,800	44	3.00	1,260	8.0

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

LOCATION.--At bridge on State Highway 141, 180 feet downstream from gaging station, 0.4 mile downstream from Whitewater Creek, 0.5 mile south of Whitewater, and 8 miles southeast of Grand Junction, Mesa County.
DRAINAGE AREA.--7,870 square miles, approximately, upstream from gaging station.
RECORDS AVAILABLE.--Chemical analyses: October 1931 to September 1962.
Water temperatures: April 1949 to September 1962.
EXTREMES, 1961-62.--Specific conductance: Maximum daily, 2,010 micromhos Aug. 29; minimum daily, 287 micromhos May 13.
Percent sodium: Maximum, 38 Apr. 30; minimum, 11 Apr. 17.
Sodium-adsorption-ratio: Maximum, 2.11 Sept. 1-30; minimum, 0.34 Apr. 17.
EXTREMES, 1941-62.--Specific conductance: Maximum daily, 2,730 micromhos Sept. 10, 1956; minimum daily, 280 micromhos May 23, 1948.
Percent sodium (1950-62): Maximum, 39 Apr. 30, 1962; minimum, 10 June 2-5, 10, 1952.
REMARKS.--Dashes omitted in potassium (K) column indicate sodium (Na) plus potassium (K) are calculated. Records of specific conductance of daily samples available in district office at Salt Lake City, Utah.

Chemical analyses, water year October 1961 to September 1962

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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-Nov. 30, 1961.	193,345		9.76		4.18		3.28	0.00	10.35	0.31				884	1.20	232,447	30	1.89	1,160	7.5
Dec. 1-31.....	56,999		11.60		4.31		3.82	.00	11.70	.39				1,010	1.37	78,294	27	1.79	1,340	7.6
Jan. 1-31, 1962.	52,572		11.00		4.61		3.80	.00	11.43	.39				1,010	1.37	72,213	30	1.97	1,310	7.6
Feb. 1-28.....	58,092		11.00		4.44		3.59	.00	11.47	.39				990	1.35	78,215	29	1.89	1,310	7.5
Mar. 1-31.....	53,433		9.36		4.31		3.20	.00	10.04	.42				896	1.22	65,111	32	1.99	1,200	8.2
Apr. 1-3.....	9,562		7.36		2.78		3.06	.00	6.75	.34				648	.88	8,427	27	1.45	923	7.6
Apr. 4-16.....	84,085		5.44		1.48		2.95	.00	3.77	.18				429	.58	49,059	21	.90	650	7.6
Apr. 17.....	16,860		3.92		.48		2.82	.00	1.54	.03				276	.38	6,328	11	.34	438	7.5
Apr. 18-29.....	260,628		2.92		.52		2.13	.00	1.25	.04				209	.28	74,081	15	.43	338	7.9
Apr. 30.....	23,802		3.56		2.22		2.16	.00	3.60	.03				280	.38	9,064	38	1.66	431	7.4
May 1-3.....	52,798		3.28		.83		1.97	.00	2.06	.06				252	.34	18,095	20	.65	400	7.7
May 4-16.....	343,200		2.72		.52		1.80	.00	1.37	.07				204	.28	95,217	16	.45	337	7.7
May 17-31.....	178,512		3.76		.87		1.82	.00	2.73	.10				296	.40	71,862	19	.63	459	7.7
June 1-4.....	48,063		4.44		1.22		2.20	.00	3.35	.11				358	.49	23,401	22	.82	543	7.6
June 5-30.....	428,600		3.44		.87		1.82	.00	2.42	.06				266	.36	155,050	20	.66	420	7.5
July 1-12.....	138,573		4.56		1.31		2.15	.00	3.58	.14				366	.50	68,976	22	.86	554	7.6
July 13-19.....	36,793		7.16		2.04		2.67	.00	6.31	.23				584	.79	29,223	22	1.08	828	7.6
July 20-31.....	43,747		9.56		3.05		3.20	.00	9.10	.31				819	1.11	48,728	24	1.39	1,100	7.6
Aug. 1-9.....	20,422		12.80		4.00		3.52	.00	12.87	.39				1,070	1.46	29,718	24	1.56	1,400	7.6
Aug. 10-31.....	31,113		15.20		5.70		3.65	.00	16.72	.51				1,390	1.89	58,815	27	2.07	1,710	7.7
Sept. 1-30.....	62,777		15.72		5.92		3.93	.00	17.22	.48				1,450	1.97	123,796	27	2.11	1,780	7.5
Total or weighted average	2,194,000		5.56		1.81		2.40	--	4.81	0.16				468	0.64	1,396,000	25	1.00	662	7.6

GREEN RIVER BASIN

9-2345. GREEN RIVER NEAR GREENDALE, UTAH

LOCATION.--At gaging station, 0.5 mile downstream from Flaming Gorge Dam, 2 miles south of Dutch John, 4 miles northeast of Greendale, Daggett County, and 13 miles southeast of Linwood.
DRAINAGE AREA.--15,100 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: October 1956 to September 1962.
Water temperatures: October 1956 to September 1959.
Sediment records: October 1956 to September 1959.
EXTREMES, 1961-62.--Specific conductance: Maximum daily, 1,290 micromhos Feb. 15; minimum daily, 369 micromhos May 15.
Percent sodium: Maximum, 53 Mar. 29-31; minimum, 16 May 8.
Sodium-adsorption-ratio: Maximum, 3.72 Mar. 29-31; minimum, 0.60 May 8.
EXTREMES, 1956-58, 1959-62.--Specific conductance: Maximum daily, 1,340 micromhos Aug. 30, 1961; minimum daily, 325 micromhos June 2, 1961.
Percent sodium (1959-62): Maximum, 53 Mar. 29-30, 1962; minimum, 16 May 8, 1962.
REMARKS.--Dashes omitted in potassium (K) column indicate sodium (Na) plus potassium (K) are calculated. Records of specific conductance of daily samples available in district office at Salt Lake City, Utah.

Chemical analyses, water year October 1961 to September 1962

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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-Nov. 30, 1961.	117,846		5.70	2.83		3.25	0.00	4.75	0.54				513	0.70	82,219	33	1.67	766	7.6
Dec. 1-31.....	44,271		6.34	3.05		3.64	.00	5.21	.56				573	.78	34,500	32	1.71	837	7.7
Jan. 1-3, 1962..	5,355		5.58	2.31		3.34	.00	4.16	.39				473	.64	3,445	29	1.38	696	8.2
Jan. 4-29.....	34,707		5.54	2.22		3.28	.00	3.98	.51				472	.64	22,279	29	1.33	719	7.7
Jan. 30-31.....	2,777		5.40	2.04		3.29	.00	3.77	.39				443	.60	1,673	27	1.24	660	7.9
Feb. 1-11.....	18,240		5.08	2.13		3.20	.00	3.62	.39				425	.58	10,543	30	1.34	649	7.7
Feb. 12.....	2,579		7.00	4.57		3.64	.00	6.91	1.02				696	.95	2,441	39	2.44	976	7.5
Feb. 13-14.....	12,893		4.14	3.31		2.84	.00	3.85	.76				456	.62	7,995	44	2.30	701	7.8
Feb. 15-18.....	29,316		6.44	6.31		2.95	.00	7.77	2.03				784	1.07	31,258	49	3.52	1,160	7.6
Feb. 19-28.....	20,469		5.40	3.74		3.23	.00	4.87	1.04				554	.75	15,422	41	2.28	845	7.8
Mar. 1-28.....	80,529		5.76	3.39		3.36	.00	4.87	.90				551	.75	60,345	37	2.00	834	7.8
Mar. 29-31.....	69,025		5.36	6.09		2.59	.00	6.97	1.89				688	.94	64,585	53	3.72	1,040	7.6
Apr. 1-19.....	223,327		4.28	3.13		3.13	.00	3.48	.79				460	.63	139,713	42	2.14	710	7.8
Apr. 20-30.....	150,851		4.10	1.35		3.11	.00	1.96	.39				324	.44	66,471	25	.94	525	7.8
May 1-7.....	83,542		4.24	1.31		3.15	.00	2.00	.39				319	.43	36,244	24	.90	515	7.7
May 8.....	13,964		5.04	.96		4.52	.00	1.25	.23				404	.55	7,672	16	.60	672	7.5
May 9-27.....	254,116		3.72	1.04		2.82	.00	1.62	.34				280	.38	96,768	22	.77	457	7.8

May 28-31.....	42,906		4.62	1.78		3.31	.00	2.54	.56				379	.52	22,116	28	1.17	605	7.8
June 1-15.....	173,068		4.34	1.39		3.26	.00	2.10	.39				343	.47	80,733	24	.94	539	7.7
June 16-30.....	282,823		3.44	.91		2.74	.00	1.37	.24				262	.38	100,776	21	.70	416	7.8
July 1-31.....	297,354		3.64	1.31		2.85	.00	1.83	.28				289	.39	116,872	26	.97	466	7.5
Aug. 1-31.....	109,263		4.16	1.78		2.75	.00	2.85	.34				355	.48	52,752	30	1.24	564	7.5
Sept. 1-30.....	43,974		4.64	2.96		2.66	.00	4.41	.51				470	.64	28,108	39	1.94	717	7.5
Total or weighted average	2,113,000		4.30	1.98		3.00	0.00	2.78	0.51				378	0.51	108,500	32	1.30	540	7.7

9-3150. GREEN RIVER AT GREEN RIVER, UTAH

LOCATION.--At bridge on U. S. Highways 50 and 6 in town of Green River, Emery County, 1 mile upstream from gaging station.
DRAINAGE AREA.--40,600 square miles, approximately, upstream from gaging station.
RECORDS AVAILABLE.--Chemical analyses: August 1928 to September 1962.
Water temperatures: May 1949 to September 1959.
Sediment records: May 1930 to September 1962.
EXTREMES, 1961-62.--Specific conductance: Maximum daily, 2,010 micromhos Sept. 22; minimum daily, 345 micromhos June 29.
Percent sodium: Maximum, 44 Feb. 22-28; minimum, 24 May 1-31.
Sodium-adsorption-ratio: Maximum, 2.79 Sept. 22; minimum, 0.84 May 1-31.
EXTREMES, 1941-62.--Specific conductance: Maximum daily, 2,420 micromhos Sept. 29, 1943; minimum daily, 272 micromhos May 13, 1956.
Percent sodium: Maximum, 48 Sept. 19, 1960; minimum, 19 Aug. 7, 1957.
REMARKS.--Dashes omitted in potassium (K) column indicate sodium (Na) plus potassium (K) are calculated. Records of specific conductance of daily samples available in district office at Salt Lake City, Utah.

Chemical analyses, water year October 1961 to September 1962

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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. 1-11, 1961.	94,778		5.28		3.26		3.64	0.00	4.12	0.79				522	0.71	67,285	38	2.01	786	8.1
Oct. 12-14.....	26,717		7.12		4.70		3.38	.00	7.06	1.38				738	1.00	26,816	40	2.49	1,060	7.8
Oct. 15-31.....	112,756		5.52		3.31		3.21	.00	4.77	.85				535	.73	82,042	37	1.99	806	8.1
Nov. 1-30.....	160,661		6.24		3.52		3.49	.00	5.33	.96				590	.80	128,915	36	1.99	877	8.1
Dec. 1-12.....	65,359		6.32		3.70		3.67	.00	5.41	.93				605	.82	53,778	37	2.08	895	7.9
Dec. 13-31.....	60,298		7.60		4.13		4.29	.00	6.23	1.21				694	.94	56,911	35	2.12	1,020	8.2
Jan. 1-13, 1962.	53,556		6.12		3.57		3.57	.00	5.29	.82				574	.78	41,808	37	2.04	864	7.8
Jan. 14-Feb. 12.	118,413		6.52		3.26		4.06	.00	4.71	.99				580	.79	93,404	33	1.81	874	7.6
Feb. 13-21.....	279,372		4.92		3.05		3.00	.00	4.37	.59				490	.67	186,173	38	1.94	736	7.6
Feb. 22-28.....	66,173		5.72		4.57		3.08	.00	6.06	1.16				626	.85	56,337	44	2.70	928	8.0
Mar. 1-31.....	400,961		6.56		4.44		3.59	.00	6.29	1.13				698	.95	380,624	40	2.45	1,030	7.7
Apr. 1-12.....	358,215		5.28		3.52		3.25	.00	4.71	.85				556	.76	270,868	40	2.17	842	7.8
Apr. 13-21.....	275,980		4.72		2.57		3.16	.00	3.54	.59				452	.61	169,651	35	1.67	696	7.8
Apr. 22-30.....	458,777		3.42		1.26		2.72	.00	1.69	.28				282	.38	175,950	27	.96	453	8.1
May 1-31.....	1,349,653		3.38		1.09		2.61	.00	1.58	.28				268	.36	491,921	24	.84	436	8.1
June 1-15.....	477,521		3.66		1.39		2.82	.00	1.85	.37				308	.42	200,024	28	1.03	486	7.7
June 16-30.....	596,529		3.00		1.04		2.38	.00	1.39	.28				248	.34	201,197	26	.85	395	7.9
July 1-15.....	407,901		3.20		1.13		2.41	.00	1.60	.31				263	.36	145,898	26	.89	424	7.9
July 16-31.....	190,096		4.18		2.09		2.95	.00	2.71	.59				383	.52	99,017	33	1.44	599	7.7
Aug. 1-31.....	176,531		4.72		2.57		3.15	.00	3.35	.79				452	.61	108,517	35	1.67	697	7.7
Sept. 1-21.....	62,688		5.40		3.70		3.31	.00	4.66	1.13				564	.77	48,084	41	2.25	861	7.7
Sept. 22.....	5,851		17.00		8.13		5.87	.00	17.97	1.30				1,660	2.26	13,210	32	2.79	2,010	7.2
Sept. 23-30.....	29,482		8.00		5.31		3.44	.00	8.39	1.47				859	1.17	34,442	40	2.65	1,210	7.5
Total or weighted average	5,828,300		4.31		2.13		2.92	0.00	2.98	0.54				395	0.54	3,133,000	33	1.40	610	7.9

SAN JUAN RIVER BASIN

9-3555. SAN JUAN RIVER NEAR ARCHULETA, N. MEX.

LOCATION.--At gaging station, 0.5 mile upstream from Gobernador Canyon, 1 mile north of Archuleta, San Juan County, and 6.8 miles downstream from Navajo Dam.
DRAINAGE AREA.--3,260 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: December 1954 to September 1962.
Water temperatures: December 1954 to September 1962.
Sediment records: December 1954 to September 1962.
EXTREMES, 1961-62.--Specific conductance: Maximum daily, 511 micromhos Feb. 16; minimum daily, 118 micromhos June 13, 14.
Percent sodium: Maximum, 41 June 28; minimum, 14 Apr. 17-20.
Sodium-adsorption-ratio: Maximum, 1.53 Mar. 20; minimum, 30 Apr. 17-20.
EXTREMES, 1954-62.--Specific conductance: Maximum daily, 685 micromhos Jan. 5, 1960; 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 sodium (Na) are determined by analysis and do not include potassium (K). Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. Impounding started in reservoir above Navajo Dam on June 27, 1962.

Chemical analyses, water year October 1961 to September 1962

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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. 1-8, 1961..	9,679	--	1.70	0.28	0.74	--	1.79		--	--	--	--	--	173	0.24	2,277	27	0.74	270	7.6
Oct. 9-10.....	6,843	--	2.79	.61	.91	--	2.59		--	--	--	--	--	273	.37	2,541	21	.70	414	7.5
Oct. 11-13.....	6,551	--	1.60	.40	.70	--	1.67		--	--	--	--	--	173	.24	1,541	26	.70	271	7.4
Oct. 14-30.....	27,009	--	1.50	.22	.70	--	1.51		--	--	--	--	--	158	.21	5,804	29	.75	244	7.3
Oct. 31-Nov. 1..	3,483	--	1.80	.32	1.04	--	1.80		--	--	--	--	--	210	.29	995	33	1.01	321	7.6
Nov. 2-4.....	4,225	--	2.30	.70	1.09	--	2.05		--	--	--	--	--	265	.36	1,523	27	.89	406	7.4
Nov. 5-30.....	28,003	15.0	1.90	.30	.91	0.07	1.77		1.21	0.19	0.01	0.02	0.05	200	.27	7,617	29	.87	316	7.3
Dec. 1-10.....	7,894	--	1.50	.46	.91	--	1.56		--	--	--	--	--	182	.25	1,954	32	.92	295	7.0
Dec. 11-15.....	1,726	--	2.15	.47	1.09	--	2.15		--	--	--	--	--	233	.32	547	29	.95	367	7.3
Dec. 16-31.....	8,505	--	2.40	.58	1.31	--	2.29		--	--	--	--	--	275	.37	3,181	30	1.07	424	7.4
Jan. 1-14, 16-31, 1962...	14,936	21.0	2.40	.52	1.35	.08	2.29		1.79	.23	.02	.02	.07	274	.37	5,566	31	1.12	420	7.6
Jan. 15.....	456	--	2.54	.78	1.78	--	2.43		--	--	--	--	--	334	.45	207	35	1.38	496	8.1
Feb. 1-14.....	22,298	--	2.10	.54	1.44	--	2.03		--	--	--	--	--	256	.35	7,763	35	1.25	404	7.3
Feb. 15-16.....	4,661	--	2.79	.73	1.70	--	2.41		--	--	--	--	--	331	.45	2,098	32	1.28	505	7.6
Feb. 17-28.....	14,590	--	2.40	.82	1.35	--	2.05		--	--	--	--	--	289	.39	5,735	30	1.06	458	7.5
Mar. 1-19.....	18,165	--	2.30	.70	1.44	--	2.13		--	--	--	--	--	273	.37	6,744	32	1.17	428	7.6

SAN JUAN RIVER BASIN--Continued

9-3555. SAN JUAN RIVER NEAR ARCHULETA, N. MEX.--Continued.

Chemical analyses, water year October 1961 to September 1962--Continued

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			Per-cent so-dium	So-dium adsorp-tion ratio	Specific conduct-ance (micro-mhos at 25°C)	pH
			Cal-cium (Ca)	Magne-sium (Mg)	So-dium (Na)	Potas-sium (K)	Bicar-bonate (HCO_3)	Car-bonate (CO_3)	Sul-fate (SO_4)	Chlo-ride (Cl)	Fluo-ride (F)	Ni-trate (NO_3)		Parts per mil-lion	Tons per acre-foot	Total tons				
Mar. 20, 1962...	2,321	--	2.50	0.90	2.00	--	2.66		--	--	--	--	--	348	0.47	1,098	37	1.53	509	7.4
Mar. 21-29.....	23,457	--	2.50	.80	1.26	--	2.25		--	--	--	--	--	285	.39	9,092	28	.98	441	7.7
Mar. 30-31.....	7,458	--	2.30	.80	.83	--	2.03		--	--	--	--	--	244	.33	2,475	21	.66	377	7.5
Apr. 1-6.....	25,254	--	2.35	.82	.70	--	2.20		--	--	--	--	--	250	.34	8,586	18	.55	381	7.9
Apr. 7-16.....	60,615	--	1.80	.68	.48	--	1.90		--	--	--	--	--	188	.26	15,498	16	.43	290	7.5
Apr. 17-20.....	43,652	--	1.20	.52	.28	--	1.51		--	--	--	--	--	130	.18	7,718	14	.30	198	7.1
Apr. 21-30.....	112,106	--	.95	.35	.27	--	1.11		--	--	--	--	--	108	.15	16,466	17	.33	159	7.3
May 1-4.....	26,721	--	1.05	.31	.40	0.04	1.23		--	--	--	--	--	118	.16	4,288	22	.49	176	7.5
May 5-16.....	118,746	16.0	.80	.22	.27	.04	.98		0.33	0.03	0.01	0.01	0.05	97	.13	15,665	20	.38	135	7.3
May 17-24.....	42,938	--	1.05	.33	.35	--	1.28		--	--	--	--	--	119	.16	6,949	20	.42	178	7.2
May 25-28.....	24,873	--	.90	.26	.31	--	1.08		--	--	--	--	--	104	.14	3,518	21	.41	154	7.3
May 29-31.....	14,698	--	1.10	.38	.42	--	1.34		--	--	--	--	--	129	.18	2,579	22	.49	192	7.5
June 1-2.....	9,362	--	1.15	.31	.40	--	1.34		--	--	--	--	--	131	.18	1,668	22	.47	189	7.5
June 3-5.....	18,089	--	.95	.25	.30	--	1.11		--	--	--	--	--	108	.15	2,857	20	.39	155	7.3
June 6-17.....	86,281	--	.75	.21	.26	--	.92		--	--	--	--	--	92	.13	10,795	21	.37	126	7.3
June 18-19.....	9,699	--	1.00	.32	.33	--	1.21		--	--	--	--	--	112	.15	1,477	20	.41	168	7.4
June 20-27.....	40,019	--	.90	.20	.30	--	1.05		--	--	--	--	--	100	.14	5,443	22	.41	143	7.3
June 28.....	313	--	1.10	.36	1.00	--	1.61		--	--	--	--	--	168	.23	72	41	1.17	281	7.4
June 29-30.....	916	--	1.00	.28	.52	--	1.08		--	--	--	--	--	126	.17	157	29	.66	184	7.0
July 1-10.....	10,909	--	1.00	.32	.44	--	1.21		--	--	--	--	--	129	.18	1,914	25	.54	179	7.4
July 11.....	1,293	--	1.10	.30	.83	--	1.64		--	--	--	--	--	150	.20	264	37	.99	247	7.6
July 12-26.....	19,547	--	1.15	.29	.52	--	1.36		--	--	--	--	--	129	.18	3,429	27	.62	195	7.5
July 27-Aug. 3..	10,695	--	1.35	.41	.70	--	1.67		--	--	--	--	--	157	.21	2,284	28	.74	242	7.4
Aug. 4-31.....	25,547	--	1.65	.47	.87	--	1.97		--	--	--	--	--	194	.26	8,740	29	.85	295	7.9
Sept. 1-30.....	18,803	13.0	1.65	.51	.91	.07	2.03		.94	.10	.02	.01	.07	186	.25	4,756	29	.88	298	7.8
Total or weighted average	933,300	--	1.33	0.40	0.55	--	1.44		--	--	--	--	--	151	0.21	191,700	23	0.60	227	7.4

9-3795. SAN JUAN RIVER NEAR BLUFF, UTAH

LOCATION.--At bridge on State Highway 47, 1,800 feet downstream from gaging station 20 miles southwest of Bluff, San Juan County, and 114 miles upstream from mouth.
DRAINAGE AREA.--23,000 square miles, approximately, upstream from gaging station.
RECORDS AVAILABLE.--Chemical analyses: February to June 1927, October 1929 to September 1962.
Water temperatures: May 1944 to September 1961.
Sediment records: August to September 1928, July 1929 to September 1962.
EXTREMES, 1961-62.--Specific conductance: Maximum daily, 2,130 micromhos Sept. 8; minimum daily, 268 micromhos May 18.
Percent sodium: Maximum, 61 Sept. 26-30; minimum, 22 Apr. 18-30.
Sodium-adsorption-ratio: Maximum, 5.03 Sept. 26-30; minimum, 0.43 June 5-18.
EXTREMES, 1929-62.--Specific conductance (1941-62): Maximum daily, 2,790 micromhos Sept. 19, 1959; minimum daily, 208 micromhos June 17, 1952.
Percent sodium: Maximum, 61 Sept. 26-30, 1962; minimum, 11 May 21, 23-27, 29-31, July 1-10, 1944.
REMARKS.--Dashes omitted in potassium (K) column indicate sodium (Na) plus potassium (K) are calculated. Records of specific conductance of daily samples available in district office at Salt Lake City, Utah.

Chemical analyses, water year October 1981 to September 1962

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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, 1961.	26,598		5.72		2.83		2.90	0.00	5.02	0.62				538	0.73	19,461	33	1.67	800	7.6
Oct. 11.....	7,240		8.92		3.87		3.10	.00	8.89	.79				834	1.13	8,212	30	1.83	1,130	7.8
Oct. 12-Nov. 2..	72,873		5.60		2.83		2.56	.00	5.29	.56				544	.74	53,914	34	1.69	790	7.7
Nov. 3-Dec. 10..	81,477		7.32		3.39		2.82	.00	7.12	.79				706	.96	78,231	32	1.77	982	7.8
Dec. 11-31.....	25,283		10.28		5.39		4.08	.00	10.35	1.24				1,040	1.41	35,761	34	2.38	1,360	7.9
Jan. 1-31, 1962.	35,724		9.12		4.92		3.58	.00	9.39	1.10				910	1.24	44,212	35	2.30	1,240	7.8
Feb. 1-24.....	86,210		6.24		4.70		2.93	.00	7.29	.71				684	.93	80,196	43	2.68	984	7.9
Feb. 25-28.....	7,379		8.72		4.52		3.20	.00	9.14	.90				846	1.15	8,489	34	2.17	1,170	7.7
Mar. 1-21.....	36,196		8.40		4.09		3.16	.00	8.37	.96				829	1.13	40,809	33	2.00	1,150	7.9
Mar. 22-31.....	36,853		6.68		2.91		2.85	.00	6.08	.68				625	.85	31,325	30	1.59	904	7.9
Apr. 1-7.....	36,557		4.90		1.78		2.54	.00	3.77	.37				431	.59	21,428	27	1.14	642	7.7
Apr. 8-17.....	72,714		4.14		1.26		2.54	.00	2.80	.28				346	.47	34,216	23	.88	528	7.8
Apr. 18-30.....	205,456		2.68		.74		1.97	.00	1.31	.16				214	.29	59,796	22	.64	335	7.7
May 1-18.....	247,347		2.52		.87		1.64	.00	1.56	.17				201	.27	67,615	28	.78	322	7.7
May 19-31.....	98,809		3.26		1.28		1.75	.00	2.50	.25				280	.38	37,626	28	.99	438	7.8
June 1-4.....	28,007		3.70		1.39		2.08	.00	2.71	.28				325	.44	12,379	27	1.02	494	7.5
June 5-18.....	165,834		2.44		.48		1.49	.00	1.50	.18				210	.29	47,362	16	.43	325	7.7

SAN JUAN RIVER BASIN--Continued

9-3795. SAN JUAN RIVER NEAR BLUFF, UTAH--Continued

Chemical analyses, water year October 1961 to September 1962--Continued

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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				
June 19-30, 1962	102,871		2.78		0.87		1.54	0.00	1.87	0.24				242	0.33	33,857	24	0.74	375	7.5
July 1-13.....	50,410		3.94		1.83		1.85	.00	3.50	.42				367	.50	25,161	32	1.30	569	7.7
July 14-31.....	37,059		5.32		2.87		2.26	.00	5.27	.65				528	.72	26,611	35	1.76	782	7.5
Aug. 1-11.....	13,833		6.00		3.70		2.43	.00	6.45	.82				635	.86	11,946	38	2.13	929	8.1
Aug. 12-20.....	6,319		7.32		5.05		2.43	.00	8.93	.99				814	1.11	6,996	41	2.64	1,150	8.1
Aug. 21-31.....	3,295		9.32		6.00		2.72	.00	11.22	1.38				1,120	1.52	5,018	39	2.78	1,510	7.7
Sept. 1-20.....	6,545		11.60		9.31		2.72	.00	16.39	1.81				1,440	1.96	12,819	45	3.87	1,900	7.7
Sept. 21.....	585		7.76		5.52		3.47	.00	8.81	1.02				878	1.19	699	42	2.80	1,210	7.9
Sept. 22-25.....	3,039		10.90		8.18		3.15	.00	14.49	1.44				1,300	1.77	5,372	43	3.50	1,700	7.7
Sept. 26-30.....	16,215		5.00		7.96		4.21	.00	7.89	.85				834	1.13	18,392	61	5.03	1,210	7.4
Total or weighted average	1,511,000		4,29		1.96		2.18	0.00	3.69	0.41				403	0.55	827,900	31	1.20	592	7.7

9-4150. VIRGIN RIVER AT LITTLEFIELD, ARIZ.

LOCATION.--At gaging station, 0.4 mile downstream from Beaver Dam Wash, 0.4 mile upstream from Littlefield, Mohave County, and 36 miles upstream from waterline 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 1962.
Water temperatures: October 1947 to September 1962.
Sediment records: October 1947 to September 1962.
EXTREMES, 1961-62.--Specific conductance: Maximum daily, 4,010 micromhos Aug. 3; minimum daily, 990 micromhos Feb. 16.
Percent sodium: Maximum, 38 Nov. 1-24; minimum, 21 Sept. 29-30.
Sodium-adsorption-ratio: Maximum, 4.10 Nov. 1-24; minimum, 1.25 Feb. 16-17.
EXTREMES, 1949-62.--Specific conductance: Maximum daily, 4,090 micromhos Oct. 5, 1955; minimum daily, 734 micromhos Apr. 28, 1952.
Percent sodium: Maximum, 38 Nov. 1-24, 1961; minimum, 8 May 12, 1958.
REMARKS.--Records of specific conductance of daily samples available in district office at Salt Lake City, Utah.

Chemical analyses, water year October 1961 to September 1962

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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. 1-31, 1961.	5,515		25.20	13.35		5.03	0.00	22.07	11.43				2,510	3.41	18,827	35	3.76	3,260	7.8
Nov. 1-24.....	5,284		23.20	13.96		5.57	.00	20.01	11.57				2,380	3.24	17,103	38	4.10	3,150	7.6
Nov. 25-30.....	2,261		19.20	11.27		5.18	.00	15.99	9.31				1,960	2.67	6,027	37	3.64	2,650	7.8
Dec. 1-31.....	12,728		19.60	11.31		5.51	.00	15.93	9.45				1,980	2.69	34,274	37	3.61	2,670	7.6
Jan. 1-31, 1962.	10,207		19.90	11.66		5.61	.00	16.22	9.73				2,010	2.73	27,902	37	3.70	2,720	7.7
Feb. 1-7.....	2,277		18.80	10.92		5.43	.00	15.22	9.08				1,890	2.57	5,853	37	3.56	2,580	7.9
Feb. 8-15.....	18,518		12.60	5.05		3.72	.00	10.04	3.89				1,120	1.52	28,206	29	2.01	1,580	7.6
Feb. 16-17.....	3,166		8.70	2.61		2.98	.00	6.43	1.92				716	.97	3,083	23	1.25	1,040	7.6
Feb. 18.....	781		12.70	5.39		3.90	.00	9.83	4.37				1,160	1.58	1,233	30	2.14	1,620	7.6
Feb. 19-28.....	5,159		15.70	8.53		5.15	.00	12.18	6.91				1,540	2.09	10,805	35	3.04	2,160	7.7
Mar. 1-27.....	13,388		16.80	9.40		5.06	.00	13.57	7.56				1,630	2.22	29,679	36	3.24	2,290	7.7
Mar. 28-31.....	3,142		12.20	6.13		4.23	.00	9.16	4.94				1,140	1.55	4,871	33	2.48	1,670	7.8
Apr. 1-8.....	6,141		13.40	5.44		4.43	.00	9.47	4.94				1,180	1.60	9,855	29	2.10	1,720	7.8
Apr. 9-21.....	18,101		8.84	3.96		3.79	.00	5.87	3.13				768	1.04	18,906	31	1.88	1,190	7.6
Apr. 22-30.....	8,586		10.20	5.13		3.97	.00	7.18	4.18				944	1.28	11,024	33	2.27	1,430	7.7
May 1-10.....	5,078		14.20	6.92		4.54	.00	10.49	6.07				1,310	1.78	9,046	33	2.60	1,910	7.9
May 11-19.....	2,106		19.60	10.74		4.93	.00	16.51	8.89				1,910	2.60	5,472	35	3.43	2,640	7.7
May 20-31.....	1,464		26.00	12.14		5.11	.00	23.11	10.01				2,430	3.30	4,838	32	3.37	3,200	7.7
June 1-30.....	3,481		24.40	11.92		3.13	.00	23.32	9.87				2,440	3.32	11,551	33	3.41	3,170	7.5
July 1-31.....	3,849		24.40	12.01		3.00	.00	23.32	10.16				2,420	3.29	12,668	33	3.44	3,160	7.5

VIRGIN RIVER BASIN--Continued

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

Chemical analyses, water year October 1961 to September 1962--Continued

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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				
Aug. 1-2.....	230		25.00		12.01		2.88	.00	23.94	10.16				2,490	3.39	779	32	3.40	3,220	7.6
Aug. 3.....	129		37.60		13.79		5.93	.00	34.35	11.00				3,450	4.69	605	27	3.18	4,010	7.4
Aug. 4-31.....	2,982		25.20		12.53		3.44	.00	23.94	10.44				2,510	3.41	10,181	33	3.53	3,250	7.6
Sept. 1-28.....	5,609		26.40		11.88		4.57	.00	23.53	10.16				2,530	3.44	19,300	31	3.27	3,300	7.6
Sept. 29-30.....	1,650		23.20		6.22		4.13	.00	21.03	4.37				2,000	2.72	4,489	21	1.83	2,400	7.6
Total or weighted average	141,900		16.55		8.37		4.48	0.00	13.54	6.90				1,590	2.16	306,600	34	2.80	2,190	7.6

GILA RIVER BASIN

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 19.5 miles upstream from Ashurst-Hayden Dam.
DRAINAGE AREA.--18,011 square miles at gaging station, of which 5,125 square miles is below Coolidge Dam.
RECORDS AVAILABLE.--Chemical analyses: December 1950 to September 1962.
Water temperatures: December 1950 to September 1962.
Sediment records: January 1958 to September 1962.
EXTREMES, 1961-62.--Specific conductance: Maximum daily, 2,340 micromhos Sept. 24; minimum daily, 478 micromhos Dec. 16.
Percent sodium: Maximum, 53 Sept. 1-14; minimum, 19 Jan. 25-26.
Sodium-adsorption-ratio: Maximum, 3.76 Sept. 1-14; minimum, 0.72 Jan. 25-26.
EXTREMES, 1950-62.--Specific conductance: Maximum daily, 5,120 micromhos May 22, 1961; 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 sodium (Na) are determined by analysis and do not include potassium (K). Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. No appreciable inflow from Mineral Creek between sampling point and gaging station, except during periods of heavy local rains.

Chemical analyses, water year October 1961 to September 1962

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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, 1961.	3,074	--	5.39	1.23	5.05	--	3.44		--	--	--	--	--	757	1.03	3,165	43	2.77	1,130	8.1
Oct. 11-16.....	1,273	--	5.49	1.48	5.83	--	2.82		--	--	--	--	--	834	1.13	1,444	46	3.12	1,260	8.0
Oct. 17-31.....	2,898	17.0	6.59	1.81	6.09	.26	2.98		7.58	4.03	0.06	0.02	0.20	948	1.29	3,736	41	2.97	1,400	7.8
Nov. 1-6.....	926	--	7.39	1.81	6.35	--	2.33		--	--	--	--	--	1,000	1.36	1,259	41	2.96	1,500	7.8
Nov. 7-14.....	1,117	--	9.58	2.55	6.87	--	1.39		--	--	--	--	--	1,230	1.67	1,869	36	2.79	1,770	7.4
Nov. 15-22.....	2,126	--	6.79	1.81	7.05	--	2.54		--	--	--	--	--	994	1.35	2,874	45	3.40	1,530	7.8
Nov. 23-Dec. 6..	3,971	--	5.89	1.65	5.87	--	2.51		--	--	--	--	--	853	1.16	4,607	44	3.03	1,330	7.9
Dec. 7-8.....	746	--	4.59	1.48	4.83	--	2.88		--	--	--	--	--	654	.89	663	44	2.77	1,100	8.2
Dec. 9-12.....	4,094	--	4.04	.68	1.78	--	3.41		--	--	--	--	--	399	.54	2,222	27	1.16	644	7.9
Dec. 13-14.....	674	--	5.99	1.40	4.26	--	3.08		--	--	--	--	--	726	.99	666	37	2.22	1,140	7.9
Dec. 15-18.....	14,678	--	3.89	.71	1.13	--	3.02		--	--	--	--	--	361	.49	7,206	20	.75	563	8.0
Dec. 19.....	315	--	6.79	1.73	3.00	--	2.62		--	--	--	--	--	738	1.00	317	26	1.45	1,090	7.9
Dec. 20-24.....	464	--	14.07	3.70	5.83	--	2.93		--	--	--	--	--	1,540	2.09	972	25	1.96	2,010	7.8
Dec. 25.....	135	--	8.98	2.06	4.44	--	3.15		--	--	--	--	--	996	1.35	183	29	1.89	1,430	8.0
Dec. 26-31.....	1,738	--	4.94	1.40	3.87	--	2.25		--	--	--	--	--	665	.90	1,571	38	2.17	1,040	7.9
Jan. 1-3, 1962..	508	--	5.59	1.73	4.96	--	2.79		--	--	--	--	--	775	1.05	535	40	2.59	1,190	7.9
Jan. 4-16.....	5,286	--	4.39	1.40	3.48	--	2.20		--	--	--	--	--	592	.81	4,256	38	2.05	912	7.7
Jan. 17-19.....	982	--	5.59	1.65	4.22	--	2.29		--	--	--	--	--	733	1.00	979	37	2.22	1,110	8.0

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

Chemical analyses, water year October 1961 to September 1962--Continued

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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				
Jan. 20, 1962...	252	--	7.88	2.14	4.87	--	2.07		--	--	--	--	--	954	1.30	327	33	2.18	1,380	7.7
Jan. 21.....	169	--	11.73	3.04	6.31	--	2.29		--	--	--	--	--	1,390	1.89	319	30	2.32	1,860	8.0
Jan. 22-24.....	4,046	--	9.48	2.55	5.18	--	1.77		--	--	--	--	--	1,140	1.55	6,273	30	2.11	1,540	7.8
Jan. 25-26.....	6,228	--	3.79	.73	1.09	--	3.11		--	--	--	--	--	355	.48	3,007	19	.72	539	7.9
Jan. 27-28.....	1,182	--	5.29	1.32	2.61	--	2.39		--	--	--	--	--	616	.84	990	28	1.44	877	8.1
Jan. 29-30.....	540	--	8.48	2.30	4.96	--	3.61		--	--	--	--	--	1,030	1.40	756	31	2.14	1,410	8.0
Jan. 31-Feb. 1..	359	--	11.23	2.80	6.09	--	3.21		--	--	--	--	--	1,330	1.81	649	30	2.30	1,760	7.9
Feb. 2-18.....	7,418	--	5.04	1.56	3.83	--	2.31		--	--	--	--	--	682	.93	6,881	37	2.11	1,030	7.9
Feb. 19-21.....	3,439	--	3.54	1.07	3.26	--	2.46		--	--	--	--	--	511	.69	2,390	41	2.15	801	7.8
Feb. 22-28.....	8,969	--	4.29	1.48	3.18	--	2.15		--	--	--	--	--	580	.79	7,075	35	1.87	915	7.3
Mar. 1-31.....	36,647	29.0	3.24	1.15	3.13	0.12	2.29		2.71	2.57	0.04	0.02	0.10	467	.64	23,275	41	2.11	759	8.0
Apr. 1-5.....	3,650	--	3.44	1.15	3.74	--	2.59		--	--	--	--	--	511	.69	2,536	45	2.47	838	7.8
Apr. 6-13.....	4,459	--	3.89	1.48	4.57	--	2.69		--	--	--	--	--	608	.83	3,687	46	2.79	1,000	7.9
Apr. 14-17.....	2,317	--	5.29	2.22	4.44	--	2.08		--	--	--	--	--	771	1.05	2,429	37	2.29	1,210	7.4
Apr. 18-30.....	9,901	--	4.29	1.40	4.31	--	2.39		--	--	--	--	--	641	.87	8,632	43	2.55	1,030	7.5
May 1-31.....	23,550	33.0	3.69	1.40	4.18	.14	2.66		2.87	3.72	.06	.01	.10	578	.79	18,512	44	2.62	931	7.9
June 1-30.....	28,979	--	3.79	1.15	4.61	--	2.75		--	--	--	--	--	600	.82	23,646	48	2.93	989	7.9
July 1-31.....	39,537	35.0	3.84	1.48	5.22	.15	3.25		2.21	4.96	.06	.02	.12	639	.87	34,359	49	3.20	1,070	7.9
Aug. 1-31.....	38,676	--	3.94	1.48	5.92	--	2.98		--	--	--	--	--	697	.95	36,661	52	3.59	1,170	7.8
Sept. 1-14.....	17,466	--	4.14	1.56	6.35	--	3.21		--	--	--	--	--	747	1.02	17,745	53	3.76	1,230	7.6
Sept. 15-19.....	899	--	6.19	1.97	7.57	--	3.87		--	--	--	--	--	1,000	1.36	1,222	48	3.75	1,540	7.9
Sept. 20-25.....	503	--	12.08	3.62	8.27	--	2.29		--	--	--	--	--	1,640	2.23	1,123	34	2.95	2,160	7.7
Sept. 26.....	518	--	7.98	2.22	4.39	--	4.85		--	--	--	--	--	922	1.25	649	30	1.94	1,360	7.4
Sept. 27.....	1,006	--	4.24	1.40	2.35	--	5.24		--	--	--	--	--	464	.63	635	29	1.40	760	7.6
Sept. 28.....	119	--	6.19	1.23	3.65	--	3.02		--	--	--	--	--	724	.98	117	33	1.90	1,070	7.5
Sept. 29-30.....	109	--	9.78	2.06	6.66	--	3.57		--	--	--	--	--	1,230	1.67	182	36	2.74	1,700	7.9
Total or weighted average	285,900	--	4.18	1.37	4.41	--	2.78		--	--	--	--	--	624	0.85	242,600	45	2.60	1,000	7.8

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

LOCATION.--About 1 mile downstream from gaging station on Gila Bend Canal, 200 feet downstream from 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.--49,650 square miles.
RECORDS AVAILABLE.--Chemical analyses: December 1950 to September 1962.
Water temperatures: December 1950 to September 1962.
EXTREMES, 1961-62.--Specific conductance: Maximum daily, 10,800 micromhos Nov. 20; minimum daily, 1,010 micromhos Jan. 26, 27.
Percent sodium: Maximum, 82 Sept. 29-30; minimum, 44 Jan. 24-27.
Sodium-adsorption-ratio: Maximum, 18.37 Aug. 1-13; minimum, 3.03 Dec. 20.
EXTREMES, 1950-62.--Specific conductance: Maximum daily, 10,800 micromhos Nov. 20, 1961; minimum daily, 370 micromhos Aug. 2, 1955.
Percent sodium: Maximum, 82 Sept. 29-30, 1962; minimum, 36 Jan. 23-24, 1952.
REMARKS.--Values reported for sodium (Na) are determined by analysis and do not include potassium (K). 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.

Chemical analyses, water year October 1961 to September 1962

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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. 1-16, 1961.	194	21.0	20.76	14.81	73.95	0.33	4.95		35.39	68.27	0.16	0.76	3.80	6,750	9.18	1,777	67	17.54	9,860	7.7
Oct. 17-18.....	25	--	16.72	11.27	56.99	--	4.67		--	--	--	--	--	5,150	7.00	172	67	15.23	7,780	8.0
Oct. 19-31.....	191	--	19.16	14.07	68.30	--	4.95		--	--	--	--	--	6,330	8.61	1,643	67	16.76	9,190	8.0
Nov. 1-30.....	500	--	24.00	13.82	77.43	--	5.36		--	--	--	--	--	7,130	9.70	4,847	67	17.81	10,200	7.6
Dec. 1-15.....	244	--	22.90	15.30	77.87	--	5.21		--	--	--	--	--	7,210	9.81	2,392	67	17.82	10,300	7.7
Dec. 16-19.....	102	--	11.23	7.16	32.63	--	3.93		--	--	--	--	--	3,190	4.34	441	64	10.76	4,890	7.6
Dec. 20.....	153	--	4.29	1.07	4.96	--	2.43		--	--	--	--	--	640	.87	133	48	3.03	1,070	7.8
Dec. 21-31.....	733	--	24.65	15.38	77.87	--	6.44		--	--	--	--	--	7,350	10.00	7,328	66	17.40	10,400	7.8
Jan. 1-23, 1962.	598	--	22.65	15.79	74.82	--	5.33		--	--	--	--	--	7,050	9.59	5,730	66	17.06	10,200	7.7
Jan. 24-27.....	221	18.0	4.19	1.23	4.44	.16	2.43		4.56	3.02	.04	.13	.25	632	.86	190	44	2.69	1,020	7.6
Jan. 28-31.....	454	--	20.36	13.66	61.34	--	5.44		--	--	--	--	--	5,910	8.04	3,648	64	14.87	8,790	7.8
Feb. 1-5.....	210	--	20.71	13.66	61.77	--	5.65		--	--	--	--	--	5,990	8.15	1,713	64	14.90	8,820	7.7
Feb. 6-28.....	912	--	21.21	14.56	67.43	--	5.06		--	--	--	--	--	6,380	8.68	7,917	65	15.94	9,420	7.8
Mar. 1-31.....	935	--	21.96	14.81	69.17	--	5.34		--	--	--	--	--	6,610	8.99	8,402	65	16.13	9,660	7.7
Apr. 1-30.....	845	33.0	19.71	13.49	66.12	.28	5.10		32.27	60.37	.16	.77	3.10	6,180	8.40	7,102	66	16.23	8,940	7.7
May 1-25.....	555	--	19.96	14.07	68.73	--	4.57		--	--	--	--	--	6,340	8.62	4,789	67	16.66	9,200	7.7
May 26-31.....	125	--	15.72	11.27	56.55	--	4.39		--	--	--	--	--	5,070	6.90	862	68	15.39	7,540	7.8

GILA RIVER BASIN--Continued

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

Chemical analyses, water year October 1961 to September 1962--Continued

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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				
June 1-14, 1962	214	--	19.71	14.31	70.47	--	4.43		--	--	--	--	--	6,500	8.84	1,890	67	17.09	9,350	7.7
June 15-20.....	95	--	16.37	12.83	61.77	--	3.25		--	--	--	--	--	5,600	7.62	725	68	16.17	8,230	7.6
June 21-30.....	127	--	17.96	13.66	69.17	--	3.98		--	--	--	--	--	6,210	8.45	1,072	69	17.40	9,100	7.6
July 1-4, 6.....	62	--	16.07	11.93	60.90	--	4.02		--	--	--	--	--	5,720	7.78	486	69	16.28	8,090	7.9
July 5, 7-8.....	39	--	12.97	9.05	44.37	--	3.84		--	--	--	--	--	4,260	5.79	228	67	13.37	6,250	8.0
July 9-12.....	39	--	15.07	12.50	63.08	--	3.16		--	--	--	--	--	5,700	7.75	301	70	16.99	8,310	7.8
July 13-14.....	21	--	13.72	10.28	53.07	--	3.15		--	--	--	--	--	4,900	6.66	143	69	15.32	7,190	7.7
July 15-31.....	135	--	16.22	13.41	67.43	--	2.64		--	--	--	--	--	6,180	8.40	1,134	69	17.52	8,910	7.9
Aug. 1-13.....	124	--	18.21	14.97	74.82	--	2.72		--	--	--	--	--	6,940	9.44	1,168	69	18.37	9,840	7.8
Aug. 14-27.....	133	27.0	14.07	10.69	53.07	0.28	3.11		26.23	47.67	0.18	0.47	3.00	4,910	6.68	890	68	15.08	7,220	8.0
Aug. 28-31.....	33	--	16.72	13.49	65.69	--	3.62		--	--	--	--	--	6,100	8.30	276	68	16.90	8,730	7.6
Sept. 1-8.....	114	--	16.22	11.02	55.68	--	4.43		--	--	--	--	--	5,190	7.06	806	67	15.09	7,660	7.6
Sept. 9.....	13	--	4.99	1.65	7.22	.26	2.62		--	--	--	--	--	884	1.20	15	51	3.96	1,440	7.8
Sept. 10-13.....	57	--	15.22	11.19	54.81	--	3.90		--	--	--	--	--	5,020	6.83	390	67	15.08	7,560	7.7
Sept. 14-28.....	295	--	18.71	15.30	66.99	--	5.05		--	--	--	--	--	6,220	8.46	2,492	66	16.24	9,120	7.6
Sept. 29-30.....	36	--	1.75	.33	9.40	--	5.28		--	--	--	--	--	728	.99	36	82	9.22	1,150	7.8
Total or weighted average	8,530	--	19.79	13.47	65.34	--	4.91		--	--	--	--	--	6,130	8.34	71,130	63	16.00	891	7.7

9-5020. SALT RIVER BELOW STEWART MOUNTAIN DAM, ARIZ.

LOCATION.--Just downstream from dam, 3.5 miles upstream from 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 1962.
Water temperatures: December 1950 to September 1962.
EXTREMES, 1961-62.--Specific conductance: Maximum daily, 1,410 micromhos Aug. 14; minimum daily, 1,070 micromhos Apr. 14, 17.
Percent sodium: Maximum, 68 Sept. 1-30; minimum, 64 Oct. 1-31, Feb. 1 to Apr. 30.
Sodium-adsorption-ratio: Maximum, 5.69 Sept. 1-30; minimum, 4.87 Mar. 1-31.
EXTREMES, 1950-62.--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 sodium (Na) are determined by analysis and do not include potassium (K). Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. No inflow between sampling point and gaging station except during periods of heavy local rains.

Chemical analyses, water year October 1961 to September 1962

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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. 1-31, 1961.	16,048	19.0	2.64	0.90	6.66	0.13	2.69		0.94	6.60	0.02	0.02	0.13	600	0.82	13,095	64	5.00	1,080	7.9
Nov. 1-Dec. 31..	3,303	--	2.69	.90	6.66	--	2.69		--	--	--	--	--	615	.84	2,763	65	4.96	1,090	7.9
Jan. 1-31, 1962.	2,226	--	2.59	1.07	6.74	--	2.85		--	--	--	--	--	613	.83	1,856	65	4.98	1,110	7.9
Feb. 1-28.....	8,386	18.0	2.64	.99	6.70	.13	2.75		.96	6.77	.02	.01	.12	604	.82	6,889	64	4.97	1,100	8.1
Mar. 1-31.....	9,346	--	2.69	.99	6.61	--	2.72		--	--	--	--	--	597	.81	7,588	64	4.87	1,100	8.0
Apr. 1-30.....	57,779	23.0	2.59	1.07	6.70	.13	2.74		1.00	6.60	.03	.01	.12	615	.84	48,326	64	4.95	1,100	7.9
May 1-31.....	68,866	--	2.74	1.07	7.48	--	2.75		--	--	--	--	--	692	.94	64,811	66	5.42	1,210	7.8
June 1-30.....	78,545	--	2.74	1.07	7.83	--	2.75		--	--	--	--	--	692	.94	73,921	67	5.67	1,270	7.6
July 1-31.....	80,856	21.0	2.89	.99	8.09	.15	2.79		1.08	8.27	.02	.01	.14	717	.98	78,844	67	5.81	1,300	7.6
Aug. 1-31.....	118,425	--	2.69	1.40	7.83	--	2.82		--	--	--	--	--	709	.96	114,190	66	5.47	1,280	7.6
Sept. 1-30.....	81,104	--	2.59	1.15	7.79	--	2.75		--	--	--	--	--	681	.93	75,115	68	5.69	1,230	7.8
Total or weighted average	524,900	--	2.71	1.14	7.61	--	2.77		--	--	--	--	--	683	0.93	487,400	65	5.50	1,230	7.7

9-5100. VERDE RIVER BELOW BARTLETT DAM, ARIZ.

LOCATION (revised).--At gaging station, 0.2 mile downstream from Bartlett Dam, Maricopa County, 5.5 miles upstream from Camp Creek, and 18 miles east of Cave Creek. Prior to October 1, 1961, at site 2 miles downstream.
DRAINAGE AREA (revised).--6,185 square miles; 6,188 square miles at former site 2.2 miles downstream from Bartlett Dam.
RECORDS AVAILABLE.--Chemical analyses: December 1950 to September 1962.
Water temperatures: December 1950 to September 1962.
EXTREMES, 1961-62.--Specific conductance: Maximum daily, 770 micromhos Oct. 19-20; minimum daily, 261 micromhos May 28.
Percent sodium: Maximum, 30 Sept. 1-30; minimum, 9 Apr. 30.
Sodium-adsorption-ratio: Maximum, 1.30 Oct. 1-18; minimum, 0.32 Apr. 30.
EXTREMES, 1950-62.--Specific conductance: Maximum daily, 958 micromhos Nov. 10, 1956; minimum daily, 234 micromhos Jan. 13, 15, 1952.
Percent sodium: Maximum, 32 Sept. 1-13, 1961; minimum, 9 Apr. 30, 1962.
REMARKS.--Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. No flow Oct. 21 to Nov. 17, Dec. 31 to Jan. 1, Jan. 27 to Feb. 1.

Chemical analyses, water year October 1961 to September 1962

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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. 1-18, 1961.	8,569	25.0	2.69	2.47	2.09	0.12	4.62	0.00	1.77	0.85	0.02	0.04	0.22	409	0.56	4,766	28	1.30	669	8.0
Oct. 19-20.....	305	--	3.34	3.04	2.22	--	5.87	.00	--	--	--	--	--	468	.64	194	26	1.24	770	8.0
Nov. 18-Dec. 3..	3,012	--	3.49	2.22	1.83	--	5.11	.00	--	--	--	--	--	414	.56	1,696	24	1.08	687	7.9
Dec. 4-30.....	12,424	--	2.89	2.22	1.48	--	4.65	.00	--	--	--	--	--	360	.49	6,083	22	.92	602	8.2
Jan. 2-26, 1962.	10,463	20.0	2.84	2.39	1.48	.10	4.79	.00	1.27	.68	.02	.01	.19	358	.49	5,094	22	.91	604	8.2
Feb. 2-19.....	13,710	--	2.69	2.47	1.48	--	4.64	.13	--	--	--	--	--	348	.47	6,489	22	.92	600	8.3
Feb. 20.....	1,849	--	1.55	2.63	1.39	--	3.47	.27	--	--	--	--	--	293	.40	737	25	.96	517	8.5
Feb. 21-28.....	4,062	--	2.69	2.39	1.44	--	4.65	.00	--	--	--	--	--	348	.47	1,911	22	.90	587	8.2
Mar. 1-9.....	20,493	--	2.40	1.97	1.17	--	4.06	.00	--	--	--	--	--	296	.40	8,250	21	.79	510	8.1
Mar. 10-15.....	25,016	--	2.00	1.56	.83	--	3.26	.00	--	--	--	--	--	243	.33	8,267	19	.62	412	8.1
Mar. 16-31.....	66,359	18.0	1.75	1.32	.65	.06	2.79	.00	.58	.31	.01	.02	.10	207	.28	18,681	17	.53	351	8.0
Apr. 1-12.....	36,369	--	1.85	1.23	.74	--	2.92	.00	--	--	--	--	--	224	.30	11,079	19	.60	361	8.0
Apr. 13-19.....	12,038	--	1.65	1.15	.65	--	2.66	.00	--	--	--	--	--	206	.28	3,372	19	.55	325	7.9
Apr. 20-29.....	3,808	--	1.60	.99	.57	--	2.44	.00	--	--	--	--	--	186	.25	963	18	.50	296	8.0
Apr. 30.....	309	--	3.39	1.81	.52	.05	1.57	.00	--	3.67	--	--	--	460	.63	194	9	.32	623	7.3
May 1-31.....	12,974	19.0	1.50	.90	.48	.04	2.26	.00	.37	.25	.02	.01	.07	174	.24	3,070	16	.44	276	7.8
June 1-13.....	14,104	--	1.55	.82	.48	--	2.26	.00	--	--	--	--	--	172	.23	3,299	17	.44	277	7.9
June 14-30.....	21,074	--	1.60	.99	.52	--	2.51	.00	--	--	--	--	--	186	.25	5,331	17	.46	298	8.1
July 1-16.....	23,103	--	2.10	.99	.78	--	2.95	.00	--	--	--	--	--	220	.30	6,913	20	.63	368	7.6
July 17-28.....	16,399	--	2.05	1.73	1.17	--	3.41	.00	--	--	--	--	--	282	.38	6,289	24	.86	468	7.7
July 29-Aug. 2..	4,949	--	2.10	2.14	1.48	--	3.70	.00	--	--	--	--	--	310	.42	2,086	26	1.02	536	7.8
Aug. 3-31.....	9,894	26.0	2.35	2.39	1.83	.10	4.13	.00	1.71	.76	.02	.03	.22	384	.52	5,167	27	1.19	618	7.8
Sept. 1-30.....	9,402	--	2.00	2.55	1.91	--	4.00	.00	--	--	--	--	--	376	.51	4,808	30	1.27	610	7.9
Total or weighted average	330,700	--	2.03	1.55	0.96	--	3.29	--	--	--	--	--	--	255	0.35	115,000	19	0.70	424	7.9

SEVIER LAKE BASIN

10-1915. SEVIER RIVER BELOW PIUTE DAM, NEAR MARYSVALE, UTAH

LOCATION.--At outlet below Piute Dam, 0.8 mile upstream from gaging station and about 9 miles south of Marysvale, Piute County.
DRAINAGE AREA.--2,440 square miles, approximately, upstream from gaging station.
RECORDS AVAILABLE.--Chemical analyses: March 1958 to September 1959, February 1961 to September 1962.

Chemical analyses, water year October 1961 to September 1962

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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. 3, 1961....	702									0.37									468	
Oct. 10.....	3,570									.39									487	
Oct. 17.....	7,486									.39									497	
Dec. 14.....	305									.34									502	
Dec. 21.....	541									.37									531	
Jan. 5, 1962....	129									.37									537	
Jan. 15.....	357									.34									488	
Jan. 23.....	547									.34									487	
Jan. 30.....	714									.34									496	
Feb. 5.....	129									.34									492	
Feb. 12.....	357									.34									492	
Feb. 20.....	516									.28									454	
Feb. 28.....	778									.28									446	
Mar. 12.....	333									.28									441	
Mar. 21.....	583									.28									453	
Mar. 26.....	722									.28									453	
Apr. 3.....	284									.28									438	
Apr. 11.....	1,043									.28									438	
Apr. 16.....	1,517									.28									438	
Apr. 24.....	2,275									.28									438	

SEVIER LAKE BASIN--Continued

10-1915. SEVIER RIVER BELOW PIUTE DAM, NEAR MARYSVALE, UTAH--Continued

Chemical analyses, water year October 1961 to September 1962--Continued

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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				
May 10, 1962....	5,673									0.25									418	
May 15.....	8,509									.25									418	
May 28.....	15,884									.25									418	
June 5.....	2,787									.25									436	
June 14.....	7,803									.25									436	
June 21.....	11,704									.25									436	
July 6.....	5,843									.28									457	
July 12.....	11,687									.28									457	
July 23.....	22,399									.28									457	
Aug. 13.....	10,391									.39									478	
Aug. 23.....	18,385									.39									478	
Aug. 28.....	22,381									.39									478	
Total or weighted average a	335	27	2.35	1.56	1.09	0.09	4.26		0.50	0.31		0.02	0.12	285	0.39	47,720	22	0.8	460	

a Includes estimated data for missing periods. Represents 100 percent of runoff for water year October 1961 to September 1962.

10-2240. SEVIER RIVER NEAR LYNNDYL, UTAH

LOCATION.--At bridge on county road, 1.5 miles upstream from gaging station and about 2 miles south of Lynndyl, Millard County.
DRAINAGE AREA.--6,270 square miles, approximately, upstream from gaging station.
RECORDS AVAILABLE.--Chemical analyses: March 1951 to September 1962.
Water temperatures: March 1951 to September 1962.
EXTREMES, 1961-62.--Specific conductance: Maximum daily, 4,350 micromhos Mar. 1; minimum daily, 431 micromhos Feb. 4.
Percent sodium: Maximum, 57 Sept. 1-19; minimum, 23 Feb. 3-11.
Sodium-adsorption-ratio: Maximum, 7.21 Feb. 23-28; minimum, 0.82 Feb. 3-11.
EXTREMES, 1951-62.--Specific conductance: Maximum daily, 7,040 micromhos Jan. 21, 1955; minimum daily, 431 micromhos Feb. 4, 1962.
Percent sodium: Maximum, 61 Sept. 11-20, 1955; minimum, 23 Feb. 3-11, 1962.
REMARKS.--Dashes omitted in potassium (K) column indicate sodium (Na) plus potassium (K) are calculated. Records of specific conductance of daily samples available in district office at Salt Lake City, Utah. Discharges are adjusted to compensate for inflow from a deep well discharging to the river between the sampling site and the gaging station.

Chemical analyses, water year October 1961 to September 1962

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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. 1-31, 1961.	1,814		9.44		8.13		4.49	0.00	5.25	7.84				1,040	1.41	2,566	46	3.74	1,710	8.0
Nov. 1-Dec. 31..	4,392		9.36		7.00		4.69	.00	4.54	7.11				968	1.32	5,782	43	3.24	1,590	7.8
Jan. 1-31, 1962.	2,330		10.20		6.96		5.54	.00	4.50	7.11				1,000	1.36	3,169	41	3.08	1,630	7.9
Feb. 1-2.....	150		9.80		6.96		5.24	.00	4.50	7.00				960	1.31	196	42	3.14	1,590	8.0
Feb. 3-11.....	9,997		3.76		1.13		3.41	.00	.81	.65				275	.37	3,739	23	.82	465	7.7
Feb. 12-22.....	6,633		19.40		17.40		4.64	.00	14.39	17.77				2,260	3.07	20,386	47	5.59	3,480	7.7
Feb. 23-28.....	251		22.00		23.93		5.36	.00	16.45	24.12				2,860	3.89	977	52	7.21	4,340	7.7
Mar. 1-27.....	980		20.80		20.53		4.90	.00	15.76	20.65				2,520	3.43	3,359	50	6.37	3,860	7.9
Mar. 28-31.....	290		16.30		15.36		5.06	.00	11.14	15.46				1,900	2.58	750	49	5.38	2,950	7.8
Apr. 1-11.....	604		15.80		14.66		4.98	.00	10.66	14.81				1,830	2.49	1,504	48	5.22	2,880	7.8
Apr. 12-30.....	1,364		12.56		10.92		4.67	.00	7.95	10.86				1,360	1.85	2,523	47	4.36	2,200	7.8
May 1-31.....	34,187		10.56		12.57		5.11	.00	7.52	10.49				1,360	1.85	63,232	54	5.47	2,180	7.6
June 1-30.....	15,352		10.64		12.57		5.00	.00	7.54	10.66				1,370	1.86	28,604	54	5.45	2,220	7.8
July 1-31.....	24,472		10.20		12.62		5.16	.00	7.22	10.44				1,350	1.84	44,931	55	5.59	2,180	7.9
Aug. 1-7.....	4,929		10.16		12.88		5.23	.00	7.20	10.58				1,370	1.86	9,184	56	5.71	2,220	7.9
Aug. 8-23.....	6,982		15.80		20.01		5.03	.00	12.58	18.20				2,160	2.94	20,510	56	7.12	3,480	7.9
Aug. 24-31.....	1,016		10.08		12.66		5.05	.00	7.31	10.38				1,340	1.82	1,851	56	5.64	2,170	7.8
Sept. 1-19.....	3,343		11.50		15.18		4.90	.00	8.93	12.84				1,610	2.19	7,319	57	6.33	2,580	7.9
Sept. 20-25.....	280		9.04		8.66		4.43	.00	5.23	8.04				1,040	1.41	396	49	4.07	1,730	7.9
Sept. 26-30.....	153		13.70		16.36		4.84	.00	10.26	14.95				1,840	2.50	382	54	6.25	2,910	7.9
Total or weighted average	119,500		10.83		12.11		4.91	0.00	7.51	10.52				1,360	1.85	221,400	53	5.10	2,190	7.8

10-3225. HUMBOLDT RIVER AT PALISADE, NEV.

LOCATION.--At gaging station, 0.3 mile downstream from Southern Pacific Railroad bridge, 0.5 mile downstream from Palisade, Eureka County, and 0.8 mile upstream from Pine Creek.
DRAINAGE AREA.--5,010 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: May to September 1962.
Water temperatures: May to September 1962.
REMARKS.--Daily samples for chemical analysis composited by discharge. Records of specific conductance of daily samples available in district office at Sacramento, Calif.

Chemical analyses, May to September 1962

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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				
May 22-31, 1962.	3,396	34.0	2.20	0.60	2.00	0.20	3.84		0.73	0.39	0.02	0.01	0.00	322	0.44	1,487	39	1.64	463	8.1
June 1-10.....	3,322	33.0	2.10	.74	1.65	.16	3.61		.52	.34	.02	.02	.00	285	.39	1,288	36	1.39	414	8.1
June 11-17.....	3,233	31.0	2.00	.70	1.39	.15	3.36		.44	.34	.03	.01	.00	290	.39	1,275	33	1.20	374	8.2
June 18-22.....	4,264	32.0	2.30	.76	2.00	.20	4.08		.60	.34	.03	.01	.00	318	.43	1,844	38	1.62	470	8.1
June 23-30.....	3,324	32.0	2.15	.69	1.52	.16	3.74		.31	.25	.03	.01	.00	289	.39	1,307	34	1.28	395	8.2
July 1-10.....	1,585	30.0	2.30	.74	1.31	.14	3.87		.35	.18	.03	.02	.00	257	.35	554	29	1.06	392	8.0
July 11-20.....	793	30.0	2.30	.70	1.48	.15	3.90		.40	.25	.02	.03	.00	273	.37	295	32	1.21	405	8.1
July 21-31.....	381	30.0	2.50	.82	1.74	.17	4.29		.54	.34	.03	.02	.00	298	.41	154	33	1.35	462	8.2
Aug. 1-10.....	158	37.0	2.64	.99	2.18	.22	4.67		.71	.42	.02	.01	.00	338	.46	73	36	1.61	529	8.1
Aug. 11-20.....	87	37.0	2.74	1.15	2.44	.24	4.90		.90	.59	.02	.01	.10	377	.51	45	37	1.75	583	8.1
Aug. 21-31.....	69	38.0	2.74	1.15	2.44	.25	4.82		.92	.59	.03	.01	.00	382	.52	36	37	1.75	585	8.1
Sept. 1-10.....	54	38.0	2.64	1.23	2.26	.28	a 4.70		1.00	.68	.04	.02	.20	378	.51	28	35	1.62	575	8.5
Sept. 11-20.....	50	37.0	2.54	1.15	2.18	.26	b 4.44		1.02	.65	.03	.02	.30	360	.49	24	35	1.60	580	8.3
Sept. 21-30.....	52	38.0	2.50	1.07	2.18	.24	a 4.47		.96	.62	.03	.01	.30	349	.47	24	36	1.63	539	8.5

a Includes 0.33 equivalent per million of carbonate (CO_3).
b Includes 0.17 equivalent per million of carbonate (CO_3).

10-3350. HUMBOLDT RIVER NEAR RYE PATCH, NEV.

LOCATION.--At gaging station, 1,000 feet downstream from Rye Patch Dam, and 1.5 miles northwest of Rye Patch, Pershing County.
DRAINAGE AREA.--16,100 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: December 1951 to September 1958, October 1959 to September 1961, May to September 1962.
Water temperatures: December 1951 to September 1958, October 1959 to September 1961, May to September 1962.
EXTREMES, 1951-58, 1959-61.--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.--Daily samples for chemical analysis composited by discharge. Records of specific conductance of daily samples available in district office at Sacramento, Calif. Flow completely regulated by Rye Patch Reservoir.

Chemical analyses, May to September 1962

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				
May 22-31, 1962.	789	32.0	2.30	0.74	4.18	0.33	3.88	0.00	1.46	1.97	0.04	0.03	0.40	456	0.62	490	55	3.39	722	8.1
June 1-10.....	734	35.0	2.20	.82	3.65	.26	3.90	.00	1.31	1.47	.04	.01	--	416	.57	415	53	2.97	662	8.1
June 11-30.....	688	36.0	2.25	.90	3.52	.26	4.05	.00	1.27	1.30	.04	.01	--	414	.56	388	51	2.81	648	7.9
July 1-10.....	1,075	38.0	2.40	1.07	3.83	.28	4.59	.00	1.37	1.38	.03	.02	.30	453	.62	662	51	2.91	692	8.2
July 11-20.....	1,095	39.0	2.45	1.07	3.92	.33	4.84	.00	1.46	1.44	.03	.02	.40	472	.64	703	50	2.95	723	8.1
July 21-31.....	811	38.0	2.59	1.07	4.35	.33	5.20	.00	1.46	1.50	.03	.02	.40	497	.68	548	52	3.21	758	8.0
Aug. 1-10.....	377	41.0	2.50	1.23	4.52	.36	5.38	.00	1.31	1.64	.03	.02	.30	509	.69	261	53	3.31	771	8.0
Aug. 11-13.....	32	47.0	2.59	1.40	4.87	.33	5.34	.00	1.42	2.31	.03	.02	.30	554	.75	24	53	3.45	830	8.0
Aug. 14-20.....	300	43.0	2.59	1.23	4.52	.36	5.54	.00	1.31	1.69	.03	.02	.30	520	.71	212	52	3.27	775	8.1
Aug. 21-31.....	468	39.0	2.59	1.23	4.44	.38	5.38	.27	1.33	1.47	.03	.01	.30	510	.69	325	51	3.21	792	8.3
Sept. 1-10.....	343	43.0	2.69	1.23	4.39	.38	5.11	.67	1.37	1.47	.05	.04	.50	523	.71	244	50	3.13	785	8.6
Sept. 11-20.....	224	41.0	2.59	1.32	4.35	.38	5.23	.57	1.42	1.52	.05	.02	.50	523	.71	159	50	3.11	786	8.6
Sept. 21-30.....	208	40.0	2.64	1.23	4.44	.38	5.47	.33	1.29	1.52	.04	.03	.50	518	.70	147	51	3.19	793	8.5

PART 11. PACIFIC SLOPE BASINS IN CALIFORNIA

SAN JOAQUIN RIVER BASIN

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 1962.
Water temperatures: March 1951 to September 1962.
EXTREMES, 1961-62.--Specific conductance: Maximum daily, 1,490 micromhos Oct. 3, 4; minimum daily, 132 micromhos June 6.
Percent sodium: Maximum, 56 Jan. 11-20; minimum, 43 Feb. 13-21, May 11-13.
Sodium-adsorption-ratio: 4.34 Feb. 1-9; minimum, 1.01 May 11-13.
EXTREMES, 1951-58, 1959-62.--Specific conductance: Maximum daily, 2,350 micromhos Aug. 11, 1961; minimum daily, 60 micromhos June 21, 1953.
Percent sodium: Maximum, 56 Jan. 21-31, 1954; Jan. 11-20, 1961, Jan. 11-20, 1962; minimum, 27 Dec. 24-28, 1955.
REMARKS.--Records of specific conductance of daily samples available in district office at Sacramento, Calif.

Chemical analyses, water year October 1961 to September 1962

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, 1961.	6,684	35.0	3.64	3.04	7.74	0.07	3.70		2.50	7.79	0.01	0.04	0.40	884	1.20	8,036	53	4.23	1,500	7.8
Oct. 11-21.....	9,098	37.0	3.44	2.80	6.96	.07	3.61		2.31	6.88	.01	.05	.40	826	1.12	10,221	52	3.94	1,370	7.6
Oct. 22-31.....	9,402	35.0	3.19	2.80	6.57	.09	3.44		2.25	6.49	.01	.07	.30	765	1.04	9,781	52	3.80	1,300	8.0
Nov. 1-10.....	11,464	36.0	2.59	2.71	5.31	.09	2.92		1.85	5.44	.01	.07	.20	659	.90	10,275	50	3.26	1,060	7.6
Nov. 11-20.....	10,731	32.0	2.54	2.55	5.31	.10	2.85		1.98	5.50	.01	.07	.30	665	.90	9,705	51	3.33	1,070	8.0
Nov. 21-30.....	13,091	33.0	2.64	2.47	5.74	.13	3.08		2.00	5.47	.01	.07	.40	663	.90	11,804	52	3.59	1,100	7.9
Dec. 1-10.....	15,630	29.0	2.40	2.30	5.31	.14	3.05		1.77	4.85	.02	.05	.40	609	.83	12,945	52	3.46	1,020	7.8
Dec. 11-20.....	14,142	31.0	2.79	2.63	6.05	.12	3.21		2.23	5.75	.01	.08	.40	701	.95	13,483	52	3.67	1,150	8.1
Dec. 21-31.....	13,964	33.0	2.69	2.96	6.35	.11	3.18		2.39	6.04	.01	.08	.40	743	1.01	14,110	52	3.78	1,210	8.1
Jan. 1-10, 1962.	12,397	34.0	3.14	2.55	6.61	.11	3.15		2.46	6.35	.02	.10	.40	750	1.02	12,645	53	3.92	1,260	7.8
Jan. 11-20.....	16,007	26.0	2.84	2.47	6.79	.12	3.41		2.77	5.75	.02	.09	.60	736	1.00	16,022	56	4.16	1,220	8.1
Jan. 21-31.....	21,033	28.0	2.99	2.55	6.83	.14	3.25		2.89	5.92	.02	.08	.60	767	1.04	21,940	55	4.10	1,260	7.8
Feb. 1-9.....	13,870	26.0	3.39	2.55	7.48	.14	3.26		3.52	6.86	.01	.06	.70	840	1.14	15,846	55	4.34	1,380	8.2
Feb. 10-12.....	13,168	20.0	1.90	1.56	4.00	.18	2.21		2.00	3.55	.02	.07	.60	500	.68	8,954	52	3.04	799	7.2

Feb. 13-21, 1962	159,537	17.0	.80	.48	1.04	.10	1.11		.52	.82	.01	.04	.20	188	.26	40,790	43	1.31	260	7.1
Feb. 22-28.....	134,303	16.0	1.00	.56	1.57	.07	1.25		.77	1.24	.01	.04	.30	227	.31	41,462	49	1.77	339	7.4
Mar. 1-8.....	89,748	19.0	1.15	.90	2.22	.06	1.49		1.19	1.64	.01	.04	.30	286	.39	34,908	51	2.19	459	7.5
Mar. 9-12.....	73,150	17.0	.75	.64	1.22	.05	1.07		.65	.85	.02	.04	.00	184	.25	18,305	46	1.46	271	7.2
Mar. 13-20.....	105,441	19.0	1.00	.79	1.65	.05	1.21		.92	1.27	.01	.03	.20	228	.31	32,695	47	1.75	367	7.3
Mar. 21-31.....	96,436	18.0	1.15	1.07	2.18	.06	1.36		1.23	1.78	.01	.02	.20	279	.38	36,592	49	2.07	468	7.6
Apr. 1-6.....	34,512	18.0	1.40	1.15	2.78	.07	1.93		1.42	2.23	.01	.03	.20	337	.46	15,818	52	2.47	562	7.5
Apr. 7-14.....	30,244	19.0	1.70	1.40	3.74	.09	1.90		1.64	3.07	.01	.06	.30	421	.57	17,316	54	3.01	718	7.1
Apr. 15-18.....	10,774	21.0	2.25	1.73	4.22	.10	2.33		1.83	3.95	.01	.08	.40	492	.67	7,209	51	2.99	872	7.1
Apr. 19-20.....	6,684	19.0	1.50	1.23	2.78	.08	1.75		1.02	2.51	--	.07	.10	326	.44	2,964	50	2.38	564	7.3
Apr. 21-30.....	41,851	19.0	1.15	.76	2.00	.06	1.39		.60	1.78	.00	.05	.10	238	.32	13,546	50	2.05	418	7.3
May 1-5.....	17,474	20.0	1.35	.79	2.09	.06	1.72		.67	1.97	.01	.04	.10	262	.36	6,226	49	2.02	434	7.4
May 6-9.....	21,144	18.0	1.00	.58	1.48	.05	.82		.56	1.38	.01	.05	.10	186	.25	5,349	48	1.66	324	7.4
May 10.....	8,410	17.0	1.20	.64	2.18	.06	1.31		.85	1.75	--	.04	.10	a 246	.33	2,814	53	2.27	419	7.2
May 11-13.....	31,103	14.0	.65	.19	.65	.04	.67		.25	.59	.01	.04	.00	94	.13	3,976	43	1.01	162	7.1
May 14-16.....	23,546	17.0	1.00	.42	1.48	.06	1.07		.54	1.24	.01	.05	.10	173	.24	5,540	50	1.76	298	7.3
May 17-31.....	59,474	21.0	1.65	.90	2.70	.07	1.84		.96	2.37	.01	.05	.20	307	.42	24,832	51	2.39	541	7.5
June 1, 2.....	5,931	26.0	1.90	1.48	3.87	.09	2.28		1.29	3.50	--	.05	.00	a 432	.59	3,484	53	2.98	732	8.1
June 3-14.....	108,107	15.0	.55	.35	.78	.04	.74		.25	.73	.01	.02	.00	116	.16	17,055	45	1.17	187	7.6
June 15-25.....	73,396	17.0	.85	.49	1.39	.04	1.07		.46	1.13	.01	.02	.00	160	.22	15,971	50	1.70	277	7.8
June 26-30.....	20,648	23.0	1.35	.99	2.48	.07	1.64		.79	2.26	.01	.03	.00	293	.40	8,228	51	2.30	497	8.1
July 1-5.....	13,051	26.0	2.10	1.56	3.92	.09	2.38		1.27	3.72	.01	.06	.10	477	.65	8,467	51	2.89	785	7.7
July 6-16.....	19,549	28.0	2.50	1.89	4.57	.11	2.84		1.50	4.63	.01	.06	.20	566	.77	15,048	50	3.08	934	7.5
July 17-31.....	20,053	28.0	2.74	1.97	5.00	.12	2.66		1.50	5.36	.01	.06	.20	621	.84	16,936	51	3.26	1,030	7.5
Aug. 1-10.....	14,003	29.0	2.69	1.89	5.39	.12	2.95		1.44	5.28	.01	.09	.10	615	.84	11,712	53	3.56	1,010	7.6
Aug. 11-20.....	13,071	30.0	2.59	1.97	5.18	.13	2.95		1.31	5.25	.01	.11	.00	616	.84	10,950	52	3.42	991	7.5
Aug. 21-31.....	15,600	31.0	2.59	1.97	5.22	.13	3.05		1.42	5.22	.01	.09	.10	610	.83	12,942	53	3.45	994	7.5
Sept. 1-10.....	19,021	30.0	2.25	1.73	4.26	.11	2.85		1.27	4.29	.01	.04	.10	517	.70	13,374	51	3.02	877	7.9
Sept. 11-20.....	18,526	32.0	2.45	1.73	4.70	.11	3.00		1.31	4.51	.02	.05	.20	553	.75	13,933	52	3.25	919	8.0
Sept. 21-30.....	21,560	32.0	2.30	1.73	4.31	.11	2.93		1.31	4.26	.01	.06	.10	535	.73	15,687	51	3.04	886	7.9
Total or weighted average	1,487,000	20.46	1.39	1.04	2.56	0.08	1.66		1.04	2.28	0.01	0.04	0.19	321	0.44	649,900	49	2.20	524	7.4

a Calculated.

SACRAMENTO RIVER BASIN

11-4250. FEATHER RIVER AT NICOLAUS, CALIF.

LOCATION.--At gaging station at highway bridge at Nicolaus, Sutter County, and 2.9 miles downstream from Bear River.
DRAINAGE AREA.--5,920 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: March 1951 to September 1958, November 1959 to September 1962.
Water temperatures: March 1951 to September 1958, November 1959 to September 1962.
EXTREMES, 1961-62.--Specific conductance: Maximum daily, 170 micromhos Nov. 12; minimum daily, 64 micromhos Feb. 16, May 8, 9.
Percent sodium: Maximum, 29 Mar. 1-10; minimum, 16 Nov. 23-30.
Sodium-adsorption-ratio: Maximum, 0.49 Mar. 1-10; minimum, 0.26 Feb. 9-18.
EXTREMES, 1951-58, 1959-62.--Specific conductance (1951-55, 1956-58, 1959-62): Maximum daily, 291 micromhos July 26, 1958; minimum daily, 50 micromhos May 28, 1952.
Percent sodium (1951-54, 1957-58, 1959-62): Maximum, 29 Mar. 1-10, 1962; minimum, 8 June 21-30, 1951, Jan. 11-20, 1953.
REMARKS.--Values reported for sodium (Na) are determined by analysis and do not include potassium (K). Records of specific conductance of daily samples available in district office at Sacramento, Calif.

Chemical analyses, water year October 1961 to September 1962

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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. 1-31, 1961.	39,229		0.75	0.61	0.28		1.41							103	0.14	5,495	17	0.34	159	8.0
Nov. 1-22.....	42,895		.70	.58	.27		1.31							106	.14	6,184	18	.34	153	7.3
Nov. 23-30.....	29,228		.70	.46	.21		1.21							95	.13	3,776	16	.28	137	7.9
Dec. 1-31.....	215,944		.60	.44	.20		.98							64	.11	24,669	16	.27	129	7.2
Jan. 1-19, 1962.	45,362		.65	.43	.28		1.11							86	.12	5,308	21	.38	132	7.9
Jan. 20-31.....	95,159		.60	.40	.25		.89							90	.12	11,647	20	.36	125	7.1
Feb. 1-8.....	51,713		.60	.47	.31		1.03							86	.12	6,048	23	.43	129	7.2
Feb. 9-18.....	918,942		.40	.21	.14		.51							66	.09	82,484	19	.26	80	7.1
Feb. 19-28.....	274,116		.47	.31	.19		.67							73	.10	27,214	20	.31	98	7.2
Mar. 1-10.....	263,041		.50	.24	.30		.70							68	.09	26,176	29	.49	102	7.1
Mar. 11-20.....	189,144		.48	.34	.23		.77							68	.09	17,492	22	.37	104	7.3
Mar. 21-31.....	222,109		.50	.34	.21		.85							74	.10	22,353	20	.32	104	7.5
Apr. 1-10.....	307,636		.46	.26	.20		.72							66	.09	27,613	21	.33	92	7.5
Apr. 11-20.....	358,610		.44	.16	.16		.59							54	.07	26,351	21	.29	75	7.4
Apr. 21-30.....	261,223		.42	.18	.16		.61							55	.07	19,539	21	.29	75	7.4
May 1-15.....	332,033		.36	.20	.14		.57							54	.07	24,385	20	.27	72	7.2
May 16-31.....	224,116		.40	.22	.17		.66							62	.08	18,897	22	.31	79	7.8
June 1-15.....	172,145		.38	.23	.17		.62							53	.07	12,408	22	.32	77	7.0

June 16-30, 1962	107,647		.49	.22	.20		.75							62	.08	9,077	22	.33	91	7.1
July 1-7.....	16,842		.55	.39	.23		1.00							79	.11	1,809	20	.34	118	7.5
July 8-31.....	34,036		.60	.50	.24		1.15							89	.12	4,120	18	.33	129	7.8
Aug. 1-15.....	27,788		.65	.49	.26		1.20							89	.12	3,364	19	.35	129	7.4
Aug. 16-31.....	26,626		.60	.42	.29		1.28							92	.13	3,331	19	.37	139	7.1
Sept. 1-30.....	77,653		.60	.52	.27		1.23							90	.12	9,505	19	.36	136	7.5
Total or weighted average	4,353,000		0.46	0.27	0.19		0.70							67	0.09	399,200	21	0.31	93	7.2

SACRAMENTO RIVER BASIN--Continued

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

LOCATION.--At old highway bridge, 2.2 miles 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.--1,889 square miles, upstream from gaging station.
RECORDS AVAILABLE.--Chemical analyses: January to December 1906, March 1951 to September 1958, November 1959 to September 1962 (discontinued). Water temperatures: March 1951 to September 1958, November 1959 to September 1962.
EXTREMES, 1961-62.--Specific conductance: Maximum daily, 91 micromhos Jan. 7; minimum daily, 42 micromhos several days in July, Aug. 28. Percent sodium: Maximum, 25 May 1-8; minimum, 16 Oct. 1 to Nov. 30. Sodium-adsorption-ratio: Maximum, 0.31 Jan. 1 to Feb. 9; minimum, 0.21 Oct. 1 to Nov 30, May 9-31.
EXTREMES, 1951-58, 1959-62.--Specific conductance: Maximum daily, 112 micromhos Aug. 28, 1951; minimum daily, 29 micromhos June 3, 1952. Percent sodium (1951-54, 1957-58, 1959-62): Maximum, 34 Aug. 1, 1958; minimum, 8 Jan. 21-31, 1953.
REMARKS.--Records of specific conductance of daily samples available in district office at Sacramento, Calif. No inflow between sampling point and gaging station.

Chemical analyses, water year October 1961 to September 1962.

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (calculated)			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. 1-31, 1961.	36,770		0.36	0.24	0.11		0.49			--			--	48	0.07	2,400	16	0.21	68	7.5
Nov. 1-30.....	30,288		.36	.28	.12		.52			--			--	50	.07	2,060	16	.21	72	7.2
Dec. 1-31.....	30,436		.40	.20	.12		.56			--			--	53	.07	2,194	17	.22	76	7.0
Jan. 1-31, 1962.	21,521		.40	.22	.17		.62			--			--	56	.08	1,639	22	.31	80	7.6
Feb. 1-9.....	7,533		.45	.21	.18		.57			--			--	56	.08	574	21	.31	80	7.3
Feb. 10-16.....	66,075		.37	.23	.16		.52			--			--	53	.07	4,763	21	.29	76	7.1
Feb. 17-28.....	169,801		.36	.20	.14		.49			--			--	49	.07	11,316	20	.27	70	7.3
Mar. 1-31.....	424,449		.48	.12	.13		.46			--			--	52	.07	30,017	18	.25	74	7.2
Apr. 1-15.....	159,798		.55	.07	.14		.56			--			--	52	.07	11,301	19	.26	75	7.4
Apr. 16-30.....	182,588		.44	.06	.14		.46			--			--	43	.06	10,678	22	.28	62	7.2
May 1-8.....	72,643		.34	.08	.14		.39			--			--	39	.05	3,853	25	.30	56	7.4
May 9-31.....	117,380		.26	.18	.10		.38			--			--	34	.05	5,428	19	.21	49	7.1
June 1-30.....	124,185		.27	.05	.10		.34			--			--	32	.04	5,405	23	.24	46	7.4
July 1-31.....	209,919		.20	.12	.10		.34			0.08			0.00	32	.04	9,136	24	.25	45	7.3
Aug. 1-31.....	217,051		.27	.07	.09		.39			.06			.00	33	.04	9,741	21	.22	47	7.5
Sept. 1-30.....	157,924	11.0	.24	.10	.10	0.01	.33		0.01	.03	0.01		.00	32	.04	6,873	22	.24	46	--
Total or weighted average	2,028,000	--	0.36	0.12	0.12	--	0.43		--	--	--		--	43	0.06	117,400	22	0.20	61	7.3

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, Steven County, and 12 miles downstream from gaging station at international boundary.
DRAINAGE AREA.--59,700 square miles, approximately, upstream from gaging station.
RECORDS AVAILABLE.--Chemical analyses: February 1910 to January 1911, November 1951 to September 1962.
Water temperatures: November 1951 to September 1962.
EXTREMES, 1961-62.--Spcific conductance: Maximum daily, 184 micromhos Jan. 25, 27; minimum daily, 129 micromhos July 28.
Percent sodium: Maximum, 6 Mar. 9 to Apr. 30; minimum, 4 June 23 to July 15.
Sodium-adsorption-ratio: Maximum, 0.11 Feb. 9 to Apr. 8; minimum, 0.08 May 29 to Sept. 30.
EXTREMES, 1958-62.--Specific conductance: Maximum daily, 188 micromhos Mar. 2, 1959; minimum daily, 123 micromhos Aug. 2, 1960.
REMARKS.--Samples were collected at international boundary, Wash., 2.2 miles downstream from gaging station February 1910 to January 1911, November 1951 to June 1958. Records of specific conductance of daily samples available in district office at Portland, Oreg. No appreciable inflow between sampling point and gaging station except during periods of heavy local runoff.

Chemical analyses, water year October 1961 to September 1962

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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. 1-28, 1961.	3,182,281	4.2	1.10	0.34	0.08	0.02	1.21		0.29	0.02	0.01	0.00		87	0.12	376,527	5	0.09	152	7.6
Oct. 29-Nov. 27.	3,131,702	4.9	1.15	.38	.08	.02	1.29		.29	.02	.01	.01		90	.12	383,320	5	.09	157	7.5
Nov. 28-Dec. 8..	908,073	4.9	1.20	.40	.09	.03	1.31		.35	.02	.02	.00		99	.13	122,263	5	.10	168	7.4
Dec. 9-Jan. 8, 1962..	2,295,947	5.4	1.25	.40	.09	.03	1.38		.37	.03	.01	.01		101	.14	315,371	5	.10	175	7.6
Jan. 9-Feb. 8...	2,501,316	5.8	1.30	.39	.10	.03	1.41		.35	.02	.01	.01		107	.15	363,991	5	.10	173	7.6
Feb. 9-Mar. 8...	2,589,699	5.7	1.25	.44	.10	.03	1.43		.35	.00	.01	.01		105	.14	369,809	6	.11	175	7.6
Mar. 9-Apr. 8...	2,741,732	5.5	1.25	.43	.10	.03	1.41		.33	.04	.02	.00		109	.15	406,434	6	.11	178	7.7
Apr. 9-30.....	4,076,073	6.2	1.15	.35	.09	.03	1.31		.29	.01	.00	.01		94	.13	521,085	6	.11	161	7.5
May 1-28.....	8,413,884	5.7	1.10	.29	.08	.02	1.21		.25	.01	.00	.01		87	.12	995,531	5	.09	150	7.5
May 29-June 22..	12,293,553	5.8	1.00	.36	.07	.02	1.18		.27	.01	.01	.01		83	.11	1,387,696	5	.08	143	7.7
June 23-July 15.	10,790,003	5.0	1.00	.30	.06	.02	1.15		.25	.01	.01	.01		76	.10	1,115,255	4	.08	137	7.7
July 16-Aug. 14.	9,138,644	4.0	1.00	.26	.06	.02	1.11		.23	.01	.01	.01		76	.10	944,570	5	.08	133	7.8
Aug. 15-Sept. 8.	4,693,884	3.7	.95	.32	.07	.02	1.07		.25	.01	.01	.01		79	.11	504,311	5	.08	135	7.4
Sept. 9-30.....	2,526,982	3.3	1.00	.34	.07	.02	1.08		.29	.01	.01	.01		82	.11	281,809	5	.08	141	7.4
Total or weighted average	69,284,000	5.1	1.07	0.33	0.07	0.02	1.21		0.27	0.01	0.01	0.01		86	0.12	8,088,000	5	0.10	148	7.6

YAKIMA RIVER BASIN

12-5105. YAKIMA RIVER AT KIONA, WASH.

LOCATION.--At highway bridge downstream from gaging station at Kiona, Benton County, 3.5 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 1962.
Water temperatures: December 1952 to September 1962.
EXTREMES, 1961-62.--Specific conductance: Maximum daily, 409 micromhos Oct. 3, 10; minimum daily, 111 micromhos Apr. 9.
Percent sodium: Maximum, 27 Oct. 1-21, Dec. 23-27, May 25-28, June 30 to July 10, Aug. 9 to Sept. 30; minimum, 23 Jan. 9-14, Apr. 8-12.
Sodium-adsorption-ratio: Maximum, 0.89 Oct. 1-21, Aug. 28 to Sept. 30; minimum, 0.42 Apr. 8, 9.
EXTREMES, 1952-62.--Specific conductance: Maximum daily, 409 micromhos Oct. 3, 10, 1961; minimum daily, 99 micromhos Dec. 17, 1959.
REMARKS.--Records of specific conductance of daily samples available in district office at Portland, Oreg.

Chemical analyses, water year October 1961 to September 1962

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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)	Chlorids (Cl)	Fluoride (F)	Nitrate (NO_3)		Parts per million	Tons per acre-foot	Total tons				
Oct. 1-21, 1961.	83,931	32.0	1.70	1.07	1.04	0.10	3.08		0.50	0.21	0.02	0.05		226	0.31	25,797	27	0.89	373	8.1
Oct. 22-Nov. 10.	92,430	28.0	1.60	.90	.91	.09	2.80		.44	.21	.02	.04		213	.29	26,775	26	.82	341	8.0
Nov. 11-Dec. 10.	127,220	27.0	1.45	.90	.87	.08	2.62		.44	.21	.02	.04		200	.27	34,604	26	.80	314	7.9
Dec. 11-22.....	46,699	28.0	1.50	.99	.91	.08	2.66		.44	.21	.02	.06		219	.30	13,909	26	.82	325	7.9
Dec. 23-27.....	28,998	28.0	1.20	.75	.74	.07	2.11		.35	.17	.02	.06		179	.24	7,059	27	.75	263	7.5
Dec. 28-Jan. 8, 1962..	92,112	22.0	.95	.58	.57	.05	1.67		.27	.14	.01	.04		141	.19	17,663	26	.65	206	7.7
Jan. 9-14.....	85,091	19.0	.70	.39	.34	.04	1.18		.16	.08	.01	.04		100	.14	11,572	23	.46	144	7.7
Jan. 15-21.....	54,565	21.0	.85	.55	.48	.04	1.52		.23	.13	.01	.03		125	.17	9,276	25	.57	184	7.7
Jan. 22-Feb. 3..	87,798	22.0	.95	.55	.52	.05	1.61		.25	.14	.01	.04		129	.18	15,403	25	.60	201	7.7
Feb. 4-13.....	96,734	20.0	.80	.47	.43	.04	1.39		.18	.11	.01	.03		110	.15	14,471	25	.54	170	7.8
Feb. 14-23.....	85,825	23.0	.90	.54	.52	.05	1.59		.23	.13	.01	.03		126	.17	14,707	26	.61	194	7.8
Feb. 24-Mar. 23.	151,006	23.0	1.05	.67	.61	.06	1.93		.25	.17	.01	.02		153	.21	31,421	25	.66	234	7.9
Mar. 24-Apr. 7..	84,912	23.0	1.00	.65	.57	.06	1.85		.25	.16	.01	.02		146	.20	16,860	25	.62	220	7.8
Apr. 8, 9.....	39,293	19.0	.60	.35	.29	.04	1.07		.11	.07	.01	.02		100	.14	5,344	23	.42	127	7.2
Apr. 10-12.....	38,499	20.0	.70	.31	.32	.04	1.13		.15	.07	.01	.02		97	.13	5,079	23	.45	136	7.6
Apr. 13-23.....	96,000	21.0	.80	.45	.41	.05	1.38		.17	.08	.01	.03		109	.15	14,231	24	.52	166	7.5
Apr. 24-May 1...	40,161	22.0	1.05	.53	.57	.06	1.75		.27	.11	.01	.03		140	.19	7,647	26	.64	213	7.9
May 2-24.....	114,323	23.0	1.20	.68	.70	.07	2.07		.33	.14	.02	.03		161	.22	25,032	26	.72	253	7.7

May 25-28	37,765	23.0	1.00	.61	.61	.06	1.77	.29	.11	.01	.04	140	.19	7,191	27	.68	217	7.8
May 29-June 7...	82,651	22.0	1.00	.52	.52	.06	1.70	.25	.10	.01	.04	131	.18	14,725	25	.60	202	7.9
June 8-17.....	59,663	22.0	1.15	.61	.61	.07	1.93	.29	.13	.01	.04	147	.20	11,928	25	.65	233	7.9
June 18-23.....	51,709	20.0	.85	.49	.44	.05	1.44	.21	.08	.01	.04	111	.15	7,806	24	.53	176	7.8
June 24-29.....	34,120	21.0	1.00	.58	.52	.06	1.72	.29	.11	.01	.03	132	.18	6,125	24	.59	209	7.9
June 30-July 10.	34,647	25.0	1.55	.76	.87	.09	2.52	.46	.18	.02	.04	196	.27	9,236	27	.81	305	7.9
July 11-23.....	33,211	26.0	1.70	.99	1.00	.10	2.88	.52	.21	.02	.04	224	.30	10,117	26	.86	354	8.0
July 24-Aug. 8..	43,160	27.0	1.65	.90	.91	.10	2.79	.48	.20	.02	.06	212	.29	12,444	26	.81	336	8.2
Aug. 9-27.....	54,419	26.0	1.60	.90	.96	.10	2.82	.46	.20	.02	.05	209	.28	15,468	27	.86	333	8.2
Aug. 28-Sept. 6.	32,608	26.0	1.75	.99	1.04	.10	2.98	.48	.23	.02	.05	223	.30	9,889	27	.89	359	8.2
Sept. 7-30.....	82,877	29.0	1.75	.99	1.04	.10	3.05	.50	.23	.02	.05	226	.31	25,473	27	.89	373	8.1
Total or weighted average	1,992,000	23.7	1.15	0.68	0.66	0.07	2.02	0.31	0.15	0.01	0.04	158	0.21	427,300	25	0.70	245	7.8

PART 13. SNAKE RIVER BASIN

SNAKE RIVER MAIN STEM

13-375. SNAKE RIVER NEAR HEISE, IDAHO

LOCATION.--At Eagle Rock canal headgate, 1.2 miles upstream from Heise, Jefferson County, 1.6 miles downstream from Anderson canal headgate, 1.8 miles downstream from gaging station, 4.8 miles east of Ririe, and 21 miles upstream from Henrys Fork.
DRAINAGE AREA.--5,752 square miles upstream from gaging station.
RECORDS AVAILABLE.--Chemical analyses: January 1953 to September 1962.
Water temperatures: January 1953 to September 1962.
EXTREMES, 1961-62.--Specific conductance: Maximum daily, 591 micromhos Dec. 12; minimum daily, 297 micromhos July 28, 30, Aug. 10.
Percent sodium: Maximum, 18 Feb. 17-26; minimum, 9 June 21 to July 27.
Sodium-adsorption-ratio: Maximum, 0.65 Feb. 17-26; minimum, 0.24 July 5-27.
EXTREMES, 1953-62.--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.--Records of specific conductance of daily samples available in district office at Portland, Oreg. Approximately 2.5 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 the months of 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 heavy local runoff.

Chemical analyses, water year October 1961 to September 1962

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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. 1-13, 1961.	58,481	9.7	2.59	1.07	0.70	0.06	2.82		1.08	0.45	0.03	0.00	0.08	256	0.35	20,361	16	0.51	422	8.0
Oct. 14-24.....	53,695	--	3.60		.65	--	2.77		--	--	--	--	--	251	.34	18,329	15	.49	412	7.9
Oct. 25-Nov. 5..	40,058	--	3.96		.70	--	2.98		--	--	--	--	--	277	.38	15,091	15	.49	454	8.1
Nov. 6-18.....	40,354	--	4.14		.78	--	3.11		--	--	--	--	--	283	.38	15,531	16	.54	476	8.0
Nov. 19-Dec. 5..	53,175	--	4.46		.87	--	3.29		--	--	--	--	--	296	.40	21,406	16	.58	504	8.1
Dec. 6-8.....	9,241	--	4.16		.78	--	3.03		--	--	--	--	--	291	.40	3,657	16	.54	481	8.1
Dec. 9, 10.....	5,613	--	4.38		.78	--	3.25		--	--	--	--	--	302	.41	2,305	15	.53	499	8.0
Dec. 11, 12.....	6,149	--	5.24		1.00	--	3.82		--	--	--	--	--	362	.49	3,027	16	.62	588	8.2
Dec. 13-Jan. 5, 1962..	73,833	--	4.28		.78	--	3.18		--	--	--	--	--	294	.40	29,521	15	.54	485	8.1
Jan. 6-26.....	68,144	9.9	2.99	1.23	.74	.07	3.11		1.31	.54	.02	.01	.07	296	.40	27,432	15	.51	472	8.0
Jan. 27-Feb. 9..	42,319	--	4.30		.78	--	3.15		--	--	--	--	--	298	.41	17,151	15	.53	481	8.0
Feb. 10-13.....	18,978	--	3.26		.52	--	2.46		--	--	--	--	--	227	.31	5,859	14	.41	373	7.7
Feb. 14-16.....	11,306	--	4.10		.70	--	3.06		--	--	--	--	--	286	.39	4,397	15	.49	457	7.8
Feb. 17-26.....	23,306	--	4.32		.96	--	3.08		--	--	--	--	--	325	.44	10,301	18	.65	517	8.1
Feb. 27-Mar. 10.	36,583	--	4.34		.78	--	3.25		--	--	--	--	--	314	.43	15,622	15	.53	502	8.0
Mar. 11-Apr. 5..	59,873	--	4.92		.96	--	3.61		--	--	--	--	--	348	.47	28,337	16	.61	566	7.9

Apr. 6-13	20,819	9.7	3.49	1.32	.91	.08	3.61	1.39	.71	.02	.01	.06	340	.46	9,626	16	.59	548	7.8
Apr. 14-17.....	13,646	--	4.08		.70	--	3.13	--	--	--	--	--	290	.39	5,382	15	.49	471	7.6
Apr. 18-May 5...	335,389	--	3.80		.52	--	2.92	--	--	--	--	--	259	.35	118,137	12	.38	421	7.7
May 6-26.....	655,200	--	3.66		.44	--	2.84	--	--	--	--	--	233	.32	207,620	11	.32	394	8.0
May 27-June 20..	626,777	--	3.50		.39	--	2.79	--	--	--	--	--	218	.30	185,827	10	.29	374	8.0
June 21-July 4..	372,099	--	3.26		.34	--	2.72	--	--	--	--	--	202	.27	102,223	9	.27	339	8.0
July 5-27.....	565,686	8.4	2.25	.77	.30	.04	2.56	.62	.15	.02	.01	.05	192	.26	147,712	9	.24	318	7.9
July 28-Aug. 18.	480,873	--	2.84		.31	--	2.36	--	--	--	--	--	182	.25	119,026	10	.26	304	7.9
Aug. 19-Sept. 8.	379,833	--	2.92		.36	--	2.39	--	--	--	--	--	190	.26	98,149	11	.30	316	8.0
Sept. 9-30.....	345,862	--	3.08		.41	--	2.49	--	--	--	--	--	201	.27	94,545	12	.33	334	8.0
Total or weighted average	4,397,000	--	3.41		0.44	--	2.72	--	--	--	--	--	222	0.30	1,327,000	10	0.30	370	7.9

SNAKE RIVER MAIN STEM--Continued

13-1545. SNAKE RIVER AT KING HILL, IDAHO

LOCATION.--At county highway bridge, 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 1962.
Water temperatures: March 1951 to September 1962.
EXTREMES, 1961-62.--Specific conductance: Maximum daily, 560 ppm Oct. 10; minimum daily, 355 ppm Feb. 11.
Sodium-adsorption-ratio: Maximum, 1.10 Oct. 1 to Dec. 5; minimum, 0.90 Feb. 10-15.
EXTREMES, 1951-62.--Specific conductance: Maximum daily, 594 micromhos Oct. 3, 1952; minimum daily, 355 ppm Feb. 11, 1962.
REMARKS.--Records of specific conductance of daily samples available in district office at Portland, Oreg. No appreciable inflow between sampling point and gaging station except during periods of heavy local runoff.

Chemical analyses, water year October 1961 to September 1962

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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. 1-30, 1961.	485,445	37.0	2.35	1.73	1.57	0.13	3.67		1.21	0.73	0.03	0.06	0.10	346	0.47	228,431	27	1.10	546	8.2
Oct. 31-Nov. 15.	247,220	--	4.06		1.57	--	3.64		--	--	--	--	--	335	.46	112,633	28	1.10	533	8.2
Nov. 16-Dec. 5..	297,045	--	4.04		1.57	--	3.64		--	--	--	--	--	331	.45	133,718	28	1.10	530	6.0
Dec. 6-Jan. 5, 1962..	445,662	--	3.98		1.48	--	3.61		--	--	--	--	--	332	.45	201,225	27	1.05	529	8.0
Jan. 6-26.....	295,902	36.0	2.25	1.56	1.39	.13	3.47		1.06	.68	.03	.06	.10	328	.45	131,996	26	1.01	502	8.2
Jan. 27-Feb. 9..	205,710	--	3.88		1.48	--	3.51		--	--	--	--	--	330	.45	92,323	28	1.06	508	8.0
Feb. 10-15.....	134,955	--	2.72		1.04	--	2.52		--	--	--	--	--	238	.32	43,682	28	.90	380	7.6
Feb. 16-26.....	166,865	--	3.64		1.35	--	3.31		--	--	--	--	--	304	.41	68,989	27	1.00	485	7.6
Feb. 27-Mar. 23.	472,314	--	3.88		1.48	--	3.44		--	--	--	--	--	321	.44	206,193	28	1.06	520	7.9
Mar. 24-Apr. 7..	379,934	--	3.70		1.26	--	3.26		--	--	--	--	--	296	.40	152,946	25	.93	490	7.9
Apr. 8-28.....	391,704	29.0	2.35	1.40	1.26	.13	3.34		1.02	.65	.04	.06	.01	304	.41	161,946	25	.92	498	8.0
Apr. 29-May 28..	657,521	--	3.76		1.26	--	3.34		--	--	--	--	--	314	.43	280,788	25	.92	491	7.9
May 29-June 15..	307,970	--	3.80		1.31	--	3.39		--	--	--	--	--	314	.43	131,515	26	.95	496	8.1
June 16-30.....	228,466	--	3.84		1.39	--	3.43		--	--	--	--	--	316	.43	98,186	27	1.00	504	8.1
July 1-9.....	122,335	30.0	2.30	1.48	1.39	.11	3.41		1.06	.68	.04	.05	.08	304	.41	50,578	26	1.01	501	8.1
July 10-Aug. 5..	380,820	--	3.96		1.52	--	3.49		--	--	--	--	--	324	.44	167,805	28	1.08	520	8.2
Aug. 6-Sept. 4..	465,977	--	4.00		1.48	--	3.64		--	--	--	--	--	336	.46	212,933	27	1.05	526	8.2
Sept. 5-30.....	436,800	--	4.20		1.57	--	3.77		--	--	--	--	--	343	.47	203,758	27	1.08	549	8.4
Total or weighted average	6,123,000	--	3.88		1.42	--	3.48		--	--	--	--	--	322	0.44	2,680,000	26	1.00	512	8.0

BOISE RIVER BASIN

13-2125. BOISE RIVER AT NOTUS, IDAHO

LOCATION.--At highway bridge 1,100 feet downstream from gaging station, 0.2 mile southeast of Notus, Canyon County, and 7 miles northwest of Caldwell.
DRAINAGE AREA.--3,820 square miles, approximately, upstream from gaging station.
RECORDS AVAILABLE.--Chemical analyses: January 1939 to January 1940, November 1950 to September 1962.
Water temperatures: November 1950 to September 1962.
Sediment records: January 1939 to June 1940.
EXTREMES, 1961-62.--Specific conductance: Maximum daily, 862 ppm Apr. 19; minimum 337 ppm May 21.
Percent sodium: Maximum, 55 June 27-28; minimum, 44 May 19-27.
Sodium-adsorption-ratio: Maximum, 3.37 Apr. 17-20; minimum, 1.61 May 19-27.
EXTREMES, 1939-40, 1950-62.--Specific conductance: Maximum daily, 1,470 micromhos July 30, Aug. 26, 1939; minimum daily, 82 micromhos Apr. 27, 1952.
REMARKS.--Records of specific conductance of daily samples available in district office at Portland, Oreg. No appreciable inflow between gaging station and sampling point except during periods of heavy local runoff.

Chemical analyses, water year October 1961 to September 1962

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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. 1-4, 1961..	3,594	--	3.12		2.83	--	3.98		--	--	--	--	--	370	0.50	1,809	48	2.26	577	7.9
Oct. 5-24.....	19,200	35.0	2.30	1.15	3.18	0.13	4.47		1.62	0.51	0.03	0.09	0.14	420	.57	10,967	47	2.42	644	7.8
Oct. 25-29.....	7,349	--	3.68		3.44	--	4.82		--	--	--	--	--	443	.60	4,427	48	2.53	684	7.6
Oct. 30-Nov. 28.	37,845	--	3.76		3.35	--	4.69		--	--	--	--	--	444	.60	22,852	47	2.44	674	7.6
Nov. 29-Dec. 28.	33,917	--	3.72		3.31	--	4.56		--	--	--	--	--	436	.59	20,112	47	2.42	672	7.7
Dec. 29-Jan. 27, 1962.	30,169	36.0	2.64	1.23	3.39	.13	4.77		1.83	.59	.03	.10	.16	457	.62	18,750	46	2.44	695	7.7
Jan. 28-Feb. 9..	12,609	--	3.90		3.39	--	4.64		--	--	--	--	--	452	.61	7,751	47	2.43	695	7.4
Feb. 10-26.....	22,996	--	3.48		3.00	--	4.16		--	--	--	--	--	404	.55	12,635	46	2.28	626	7.8
Feb. 27-Mar. 26.	28,657	--	3.60		3.26	--	4.41		--	--	--	--	--	430	.58	16,759	48	2.43	658	7.6
Mar. 27-Apr. 14.	13,265	29.0	2.50	.99	3.39	.13	4.52		1.75	.62	.03	.10	.12	432	.59	7,794	48	2.57	670	7.6
Apr. 15, 16.....	532	--	2.52		2.31	--	3.05		--	--	--	--	--	306	.42	221	48	2.05	478	7.6
Apr. 17-20.....	176	--	4.04		4.79	--	4.77		--	--	--	--	--	553	.75	132	54	3.37	848	7.6
Apr. 21-23.....	450	--	2.52		2.44	--	3.02		--	--	--	--	--	314	.43	192	49	2.17	493	7.6
Apr. 24-27.....	332	--	3.28		3.70	--	4.00		--	--	--	--	--	440	.60	198	53	2.89	678	7.5
Apr. 28-May 7...	5,494	--	2.10		1.63	--	2.62		--	--	--	--	--	251	.34	1,876	47	1.78	398	7.6
May 8-11.....	833	--	2.74		3.05	--	3.72		--	--	--	--	--	366	.50	415	53	2.60	571	7.7

792-031 O-65--10

BOISE RIVER BASIN--Continued

13-2125. BOISE RIVER AT NOTUS, IDAHO--Continued

Chemical analyses, water year October 1961 to September 1962--Continued

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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				
May 12-18, 1962.	3,291	--	2.48		2.52	--	3.34		--	--	--	--	--	306	0.42	1,369	50	2.27	495	7.7
May 19-27.....	20,725	--	2.12		1.65	--	2.57		--	--	--	--	--	235	.32	6,624	44	1.61	380	7.5
May 28-31.....	5,950	--	2.40		2.09	--	3.02		--	--	--	--	--	292	.40	2,363	47	1.91	439	7.6
June 1-7.....	2,069	--	2.94		2.96	--	3.70		--	--	--	--	--	382	.52	1,075	50	2.44	575	8.0
June 8-11.....	522	--	3.24		3.74	--	4.10		--	--	--	--	--	449	.61	319	54	2.94	670	8.0
June 12-17.....	1,547	--	2.82		2.96	--	3.64		--	--	--	--	--	372	.51	783	51	2.49	570	7.8
June 18-23.....	762	--	3.52		4.18	--	4.47		--	--	--	--	--	487	.66	504	54	3.15	733	7.9
June 24-26.....	684	--	3.06		3.39	--	3.90		--	--	--	--	--	412	.56	383	53	2.74	622	7.6
June 27-28.....	327	--	3.46		4.18	--	4.43		--	--	--	--	--	490	.67	218	55	3.17	729	8.0
June 29-July 1..	1,089	--	2.82		3.05	--	3.61		--	--	--	--	--	369	.50	546	52	2.56	563	7.9
July 2-5.....	2,079	--	2.54		2.44	--	3.26		--	--	--	--	--	322	.44	910	49	2.16	490	7.8
July 6-10.....	1,369	30.0	2.10	0.90	3.26	0.11	3.90		1.71	0.62	0.03	0.06	0.11	396	.54	737	51	2.66	600	8.0
July 11-Aug. 7..	10,885	--	2.96		2.96	--	3.85		--	--	--	--	--	373	.51	5,522	50	2.43	580	7.9
Aug. 8-10.....	946	--	3.36		3.57	--	4.38		--	--	--	--	--	436	.59	561	51	2.75	671	8.1
Aug. 11-20.....	2,539	--	3.38		3.96	--	4.54		--	--	--	--	--	459	.62	1,585	54	3.05	700	8.2
Aug. 21-31.....	5,738	--	3.02		3.13	--	3.98		--	--	--	--	--	389	.53	3,036	51	2.55	590	8.1
Sept. 1-9.....	7,569	--	2.88		2.83	--	3.79		--	--	--	--	--	358	.49	3,685	50	2.36	550	8.0
Sept. 10-30.....	20,701	--	2.92		2.74	--	3.75		--	--	--	--	--	358	.49	10,079	48	2.27	542	8.1
Total or weighted average	306,200	--	3.35		3.05	--	4.19		--	--	--	--	--	401	0.55	167,200	47	2.40	617	7.7

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

COLUMBIA RIVER MAIN STEM

14-1057. COLUMBIA RIVER NEAR THE DALLES, OREG.

LOCATION.--At The Dalles Dam, 3.2 miles upstream from gaging station and 2.6 miles northeast of The Dalles, Wasco County.
DRAINAGE AREA.--237,000 square miles, approximately, upstream from gaging station.
RECORDS AVAILABLE.--Chemical analyses: December 1950 to September 1962.
Water temperatures: December 1950 to September 1962.
EXTREMES, 1961-62.--Specific conductance: Maximum daily, 235 micromhos Jan. 18; minimum daily, 114 micromhos June 25.
Percent sodium: Maximum, 22 Dec. 12 to Jan. 20, Mar. 29 to Apr. 13; minimum, 10 July 1-31.
Sodium-adsorption-ratio: Maximum, 0.53 Dec. 12 to Jan. 20; minimum, 0.18 July 1-31.
EXTREMES, 1950-62.--Specific condcutance: Maximum daily, 324 micromhos Dec. 7, 1955; minimum daily, 102 micromhos May 27, 1956.
REMARKS.--Records of specific conductance of daily samples available in district office at Portland, Oreg. Samples were collected at Maryhill Ferry for period December 1950 to August 1953 and from left bank of river at Rufus, Oreg. for period September 1953 to September 1958. No appreciable inflow between sampling point and gaging station except during periods of heavy local runoff.

Chemical analyses, water year October 1961 to September 1962

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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. 1-31, 1961.	5,701,745	9.2	1.05	0.53	0.44	0.04	1.51		0.42	0.14	0.01	0.01	0.01	120	0.16	930,525	21	0.49	203	8.0
Nov. 1-29.....	5,291,901	--	1.60		.42	--	1.51		--	--	--	--	--	117	.16	842,047	21	.47	201	7.7
Nov. 30-Dec. 11.	2,201,415	--	1.60		.40	--	1.49		--	--	--	--	--	124	.17	371,247	20	.45	199	7.8
Dec. 12-28.....	2,982,783	--	1.66		.48	--	1.57		--	--	--	--	--	133	.18	539,526	22	.53	213	7.9
Dec. 29-Jan. 20, 1962.	4,621,289	13.0	1.10	.53	.48	.04	1.54		.42	.14	.01	.02	.03	133	.18	835,899	22	.53	209	7.9
Jan. 21-31.....	2,570,182	--	1.40		.30	--	1.31		--	--	--	--	--	109	.15	381,004	18	.36	171	7.6
Feb. 1-28.....	7,125,421	--	1.64		.41	--	1.52		--	--	--	--	--	127	.17	1,230,703	20	.45	207	8.0
Mar. 1-8.....	1,723,240	--	1.62		.43	--	1.54		--	--	--	--	--	136	.18	318,730	21	.48	207	7.8
Mar. 9-28.....	4,320,000	--	1.76		.44	--	1.66		--	--	--	--	--	140	.19	822,528	20	.46	221	7.8
Mar. 29-Apr. 13.	5,252,231	18.0	1.05	.46	.44	.05	1.44		.37	.13	.02	.02	.01	131	.18	935,738	22	.50	196	7.3
Apr. 14-30.....	8,456,727	--	1.26		.27	--	1.18		--	--	--	--	--	102	.14	1,173,117	18	.35	156	7.3
May 1-31.....	18,766,016	--	1.14		.19	--	1.05		--	--	--	--	--	90	.12	2,296,960	14	.25	135	7.5
June 1-30.....	23,521,983	--	1.08		.16	--	1.00		--	--	--	--	--	69	.09	2,207,303	13	.21	125	7.7
July 1-31.....	14,640,198	6.5	.90	.32	.14	.02	1.13		.23	.03	.01	.01	.00	80	.11	1,592,854	10	.18	135	7.8
Aug. 1-31.....	9,610,512	--	1.32		.19	--	1.21		--	--	--	--	--	91	.12	1,189,397	12	.23	150	7.7
Sept. 1-17.....	3,432,595	--	1.40		.26	--	1.29		--	--	--	--	--	98	.13	457,496	15	.31	167	8.0
Sept. 18-30.....	2,367,074	--	1.48		.35	--	1.41		--	--	--	--	--	110	.15	354,114	19	.41	185	7.9
Total or weighted average	122,600,000	--	1.33		0.27	--	1.24		--	--	--	--	--	99	0.13	16,480,000	16	0.30	161	7.6

WILLAMETTE RIVER BASIN

14-1910. WILLAMETTE RIVER AT SALEM, OREG.

LOCATION.--At bridge on State 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 1962.
Water temperatures: February 1951 to September 1962.
EXTREMES, 1961-62.--Specific conductance: Maximum daily, 71 micromhos Oct. 1; minimum daily, 38 micromhos Apr. 9.
Percent sodium: Maximum, 31 Oct. 11 to Nov. 2; minimum, 25 Jan. 1-15.
Sodium-adsorption-ratio: Maximum, 0.41 Oct. 1-10; minimum, 0.29 Nov. 23-25.
EXTREMES, 1951-62.--Specific conductance: Maximum daily, 133 micromhos Nov. 7, 1954; minimum daily, 35 micromhos Jan. 20, 1953, Feb. 12, 1961.
REMARKS.--Records of specific conductance of daily samples available in district office at Portland, Oreg.

Chemical analyses, water year October 1961 to September 1962

Date of collection	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids (residue at 180°C)			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, 1961.	140,450	14.0	0.27	0.16	0.19	0.02	0.49		0.06	0.10	0.01	0.01	0.04	55	0.07	10,506	29	0.41	67	7.0
Oct. 11-Nov. 2..	588,496	--		.38	.17	--	.44		--	--	--	--	--	56	.08	44,820	31	.39	59	7.0
Nov. 3-22.....	542,281	--		.38	.15	--	.38		--	--	--	--	--	56	.08	41,300	28	.34	57	6.4
Nov. 23-25.....	429,203	--		.28	.11	--	.18		--	--	--	--	--	60	.08	35,023	28	.29	44	6.2
Nov. 26-Dec. 2..	814,869	--		.32	.13	--	.30		--	--	--	--	--	54	.07	59,844	28	.32	49	6.6
Dec. 3-31.....	2,205,223	--		.34	.13	--	.30		--	--	--	--	--	54	.07	161,952	27	.31	54	6.7
Jan. 1-15, 1962.	1,161,818	16.0	.25	.09	.12	.02	.38		.07	.06	.00	.01	.00	51	.07	80,584	25	.30	52	6.9
Jan. 16-Feb. 14.	1,093,686	--		.38	.15	--	.36		--	--	--	--	--	62	.08	92,220	28	.34	58	6.7
Feb. 15-Mar. 14.	1,381,765	--		.38	.15	--	.36		--	--	--	--	--	59	.08	110,873	29	.35	58	6.7
Mar. 15-Apr. 5..	1,951,854	--		.34	.14	--	.33		--	--	--	--	--	60	.08	159,271	29	.34	52	6.7
Apr. 6-15.....	766,612	14.0	.20	.11	.13	.02	.33		.06	.04	.01	.01	.01	53	.07	55,257	29	.34	46	6.7
Apr. 16-May 13..	1,637,792	--		.32	.13	--	.34		--	--	--	--	--	45	.06	100,233	28	.32	49	6.8
May 14-29.....	685,805	--		.34	.13	--	.36		--	--	--	--	--	49	.07	45,702	28	.33	52	6.7
May 30-June 29..	857,137	--		.38	.16	--	.41		--	--	--	--	--	49	.07	57,120	29	.36	57	6.9
June 30-July 14.	215,851	16.0	.30	.13	.17	.02	.51		.07	.07	.00	.01	.00	51	.07	14,971	28	.37	63	7.2
July 15-Aug. 13.	382,850	--		.42	.18	--	.49		--	--	--	--	--	53	.07	27,596	30	.39	65	7.1
Aug. 14-Sept. 11	349,208	--		.44	.18	--	.52		--	--	--	--	--	49	.07	23,271	29	.38	65	7.0
Sept. 12-30.....	14,598	--			.18	--	.46		--	--	--	--	--	63	.09	24,963	30	.40	66	6.9
Total or weighted average	15,205,000	--	0.35		0.14	--	0.35		--	--	--	--	--	54	0.07	1,120,500	27	0.30	54	6.7

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