Quality of Surface Waters for Irrigation Western States 1965

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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, E. L. Hendricks, chief hydrologist, G. W. Whetstone, assistant chief for Reports and Data Processing, under the general direction of S. M. Lang, chief, Reports Section, and B. A. Anderson, chief, Data Reports Unit.

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INTRODUCTION

The records of chemical analyses, other physical measurements, and discharge given in this report comprise the fifteenth annual compilation of data for 72 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 Committee on Hydrology, Water Resources Council (formerly the Subcommittee on Hydrology, Interagency Committee on Water Resources) 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 Committee 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). Four stations on the list were discontinued at the end of the 1963 water year, and two at the end of the 1964 water year. Two stations were added to the list in 1963, two in 1964, and two in 1965. This increased the original list to 115 stations.

Irrigation-Quality Network Stations, Western States

[Selected by Committee on Hydrology, Water Resources Council, 1950]

Irrigation network no.	Geological Survey station ident. no.	Stream and location	Date established	Date discontinued
1	5-1240	Souris (Mouse) River near Westhope, N. Dak.	June 1954	9-30-64
2	6-3300	Missouri River near Williston, N. Dak	12- 5-50	6-30-65
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[a]	12-15-50	.....
6	-3295	Yellowstone River near Sidney, Mont	1- 3-51	.....
7	-2595	Bighorn River at Thermopolis, Wyo	1- 1-51	1-21-54
	-2590	Wind River below Boysen Reservoir, Wyo[b]	11-24-53	.....
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	7-31-63
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- 9-51	.....
26	-1525	Arkansas River at Ralston, Okla	1- 1-50	9-30-63
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	11-30-64
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	.....

See footnotes at end of table.

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 Dam, N. Mex.	1933	Sept. 1963
47	-3640	Rio Grande near El Paso, Tex[c].....	1930	.....
48	-3705	Rio Grande at Fort Quitman, Tex[c].....	1930	.....
49	-3715	Rio Grande above Rio Conchos, near Presidio, Tex[c].	1935	.....
50	-3775	Rio Grande at Langtry, Tex[c].....	1945	.....
51	-4580	Rio Grande at Eagle Pass, Tex[c].....	1938	1-30-55
	-4590	Rio Grande at Laredo, Tex[c].....	7- 1-55	.....
52	-4625	Rio Grande at Roma, Tex[c].....	1944	1-31-55
	-4615	Rio Grande at Chapeno, Tex[c].....	July 1955	9-30-56
	-4613	Rio Grande below Falcon Dam, Tex[c].....	July 1955	.....
53	-3845	Pecos River below Alamogordo Dam, N. Mex.	6-2[c]-37	.....
54	-3696	Pecos River near Artesia, N. Mex.....	7- 1-37	.....
55	-4101	Pecos River below Red Bluff Dam, near Orla, Tex.	7- 1-37	.....
56	-4475	Pecos River near Comstock, Tex[c].....	1935	Dec. 1954
	-4474	Pecos River near Shumla, Tex[c].....	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	-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-[c]1-54	.....
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.....	12-10-51	.....

See footnotes at end of table.

Irrigation-Quality Network Stations, Western States--Continued

Irrigation network no.	Geological Survey station ident. no.	Stream and location	Date established	Date discontinued
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	6-30-63
83	-3372	San Joaquin River at Antioch, Calif.....	.....	.....
84	-3105	Calaveras River (Stockton diverting canal) at Stockton, Calif.	3- 1-51	10- 3-52
	-2535	San Joaquin River near Biola, Calif	1952	Sept. 1961
85	-3255	Mokelumne River at Woodbridge, Calif	3- 1-51	9-30-58
86	-3780	Sacramento River near Red Bluff, Calif.....	.....	.....
87	-3910	Sacramento River at Knights Landing, Calif..	2-26-51	5-31-60
88	-4250	Feather River at Nicolaus, Calif	2-26-51	9-30-62
89	-4465	American River at Fair Oaks, Calif.....	5- 1-51	9-30-62
90	12-3995	Columbia River at international boundary, Wash.	11-15-51	.....
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 Metaline 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[d].....	1- 8-51	.....
107	6-6875	North Platte River at Lewellen, Nebr[d].....	.....	.....
108	-8055	Platte River near Louisville, Nebr[d].....	.....	.....
109	9-4150	Virgin River at Littlefield, Ariz[d].....	July 1949	.....
110	7-3310	Washita River near Durwood, Okla[e].....	May 1944	.....
111	10-3120.2	Carson River near Silver Springs, Nev[e]	10- 1-62	.....
112	9-2150	Yampa River near Maybell, Colo[f].....	Nov. 1950	.....
113	10-3459	Truckee River at Floriston, Calif[f]	Jan. 1964	.....
114	6-1855	Missouri River near Culbertson, Mont[g].....	July 1965	.....
115	6-7680	Platte River near Overton, Nebr[g].....	Nov. 1958	.....

[a]Reactivated August 1963.
[b]Reactivated December 1960, irrigation records from October 1962.
[c]Operated by International Boundary and Water Commission.
[d]Stations added by Committee, October 1952.
[e]Added to the list in 1963.
[f]Added to the list in 1964.
[g]Added to the list in 1965.

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 115 network stations on streams in the Western States. The 72 stations in operation in 1965 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 Committee, as earlier records were included also. Proposed stations are identified by an open circle. Discontinued stations are identified by a half 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 8 digits, but 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.

This is the final report of this series for quality of surface waters for irrigation. Beginning with the 1966 water year, water-quality data for irrigation waters may be obtained from U.S. Geological Survey annual State releases or from the water-supply paper series, "Quality of Surface Waters of the United States." The irrigation network stations in these reports will be identified under the station name by "Irrigation network station" set in parentheses.

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 1964-65, 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, Presidio, Langtry, Falcon Dam 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 34 and 35 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 1964 and 1965. Analyses for six 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 Committee, where practicable, one sample was collected each day throughout the water year. In general, each sample was taken in an 8- or 12-ounce polyethylene bottle provided with a bakelite cap and polyseal insert 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 Committee 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 tors 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 develoned ethylenediamine tetraacetic acid titration test for hardness), sodium, dissolved solids, and specific conductance. In addition, four complete analyses (schedule 1) would be made each year, one analysis to be made on a composite sample during each quarter. Certain additional determinations above these minimum requirements were to be made if deemed necessary to define widely varying characteristics of the stream water.

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

REPORTING OF DATA

In order to release the data in the form most widely used in the evaluation of irrigation waters, the results of analyses in this compilation are given in equivalents per million, rather than the conventional unit part per million. Some agencies that actively participate in irrigation water-quality investigations prefer to express results in milligrams per liter (mg/1) and milliequivalents per liter (meq/1). However, for all practical purposes where concentrations of dissolved solids are less than about 7,000 parts per million, no correction for density of the water is necessary and the units reported in each method are considered to be synonymous.

If results are desired in parts per million they can be calculated by multiplying the reported values in equivalents per million

by the chemical combining weights of the individual constituents. Pertinent physical data and water discharge are also included in the tables.

EXPLANATION OF TABLES

The tables of analyses beginning on page 27 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-sample analysis.

Remarks include sources of data and additional explanation concerning the records.

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 daily mean 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. An equivalent per million is a unit chemical

combining weight of a constituent in a million unit weights of water. As previously discussed, for concentrations of dissolved solids that are normally encountered in water for irrigation, an equivalent per million is equal to a milliequivalent per liter. Silica, which is considered to be present in the colloidal state, and boron, are reported in parts per million. Percent sodium is calculated as follows:

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

At the recommendation of the Committee, 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 of 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 tendency 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

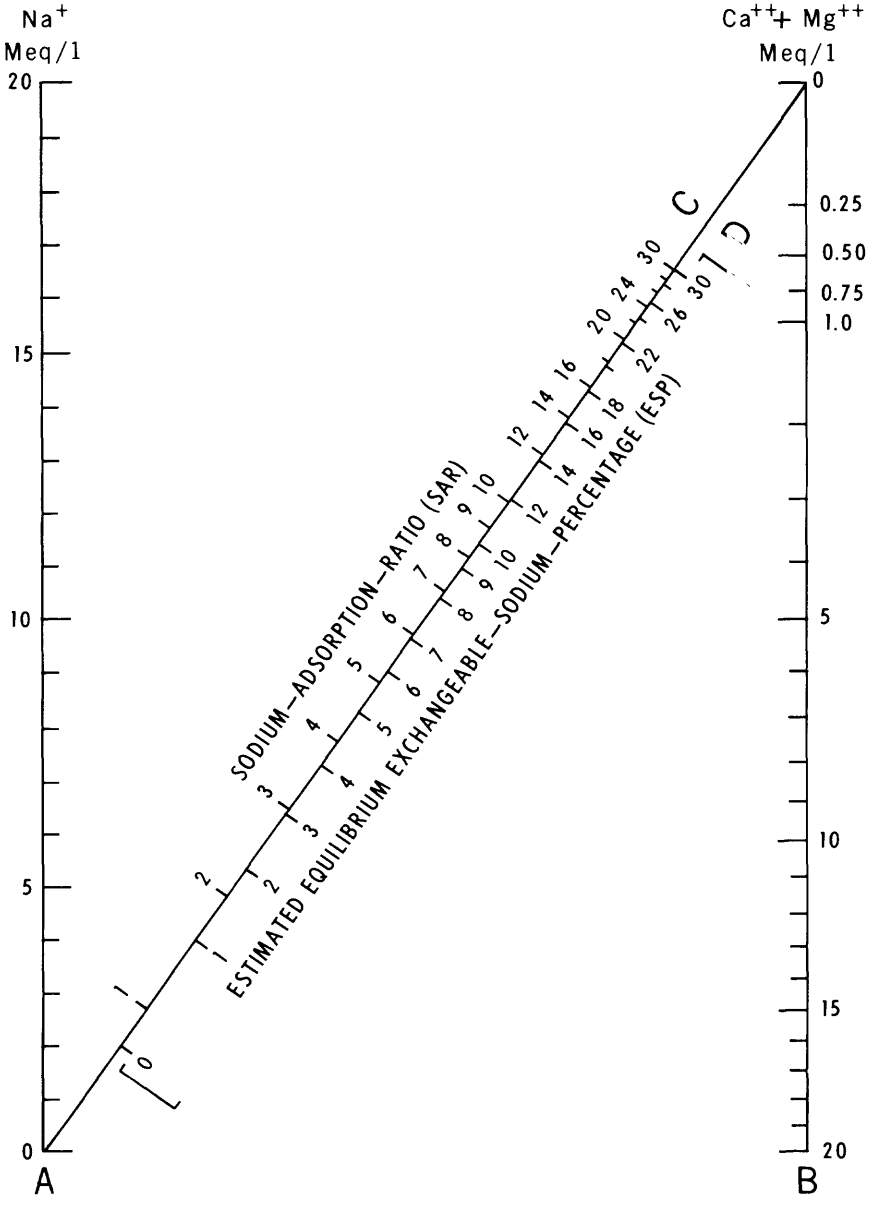

Figure 1.--Nomogram for determining the SAR value of irrigation water for estimating the corresponding ESP value of a soil that is at equilibrium with the water (U. S. Salinity Laboratory Staff, 1954).

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 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 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.

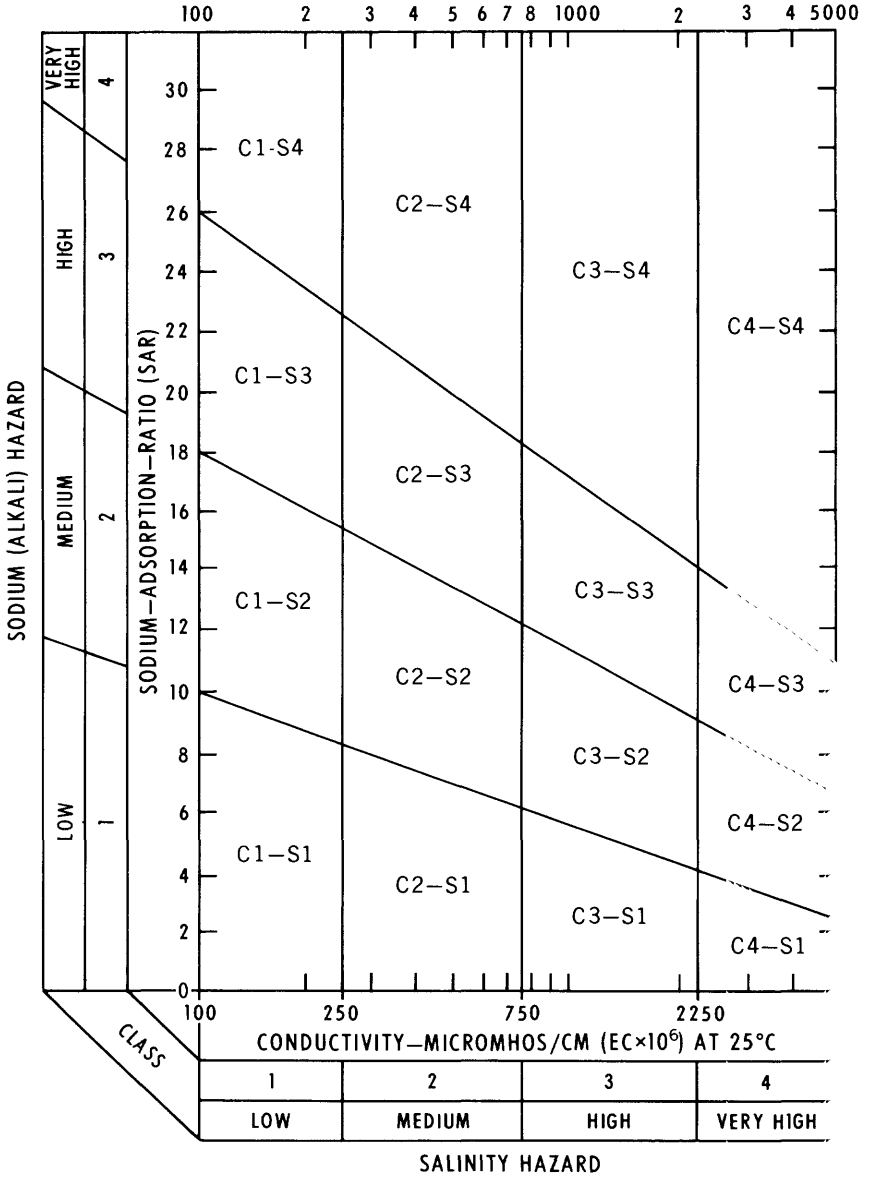

Figure 2.--Diagram for the classification of irrigation waters (U. S. Salinity Laboratory Staff, 1954).

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 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, 1967.)

DISCUSSION OF RESULTS

MISSOURI BIVER BASIN

Missouri River main stem.--Runoff in the Missouri River basin of Montana was generally above median to excessive during the 1965 water year. The weighted-average of dissolved-solids content for the Missouri River near Williston, N. Dak., was 426 ppm (0.58 ton per acre-foot) as compared with 439 ppm (0.60 ton per acre-foot) for 1964 and 422 ppm (0.57 ton per acre-foot) for the 15-year period of record.

Yellowstone River basin.--Runoff from streams in the Yellowstone River basin was generally excessive in the 1965 water year. Consequently, concentrations of dissolved solids were as much as 25 percent below average. The weighted average of dissolved-solids content near Sidney, Mont., was 382 ppm (0.52 ton per acre-foot) as compared with 403 ppm (0.55 ton per acre-foot) for 1964 and 432 ppm (0.59 ton per acre-foot) for the 14-year period of record. At Bighorn River at Bighorn, where runoff was among the highest in recent years, the weighted-average of dissolved-solids content was 558 ppm (0.76 ton per acre-foot) as compared with 611 ppm (0.83 ton per acre-foot) for 1964 and 713 ppm (0.97 ton per acre-foot) for the 13-year period of record. At Tongue River near Miles City, Mont., the weighted-average of dissolved-solids content was 452 ppm (0.61 ton per acre-foot) as compared with 376 ppm (0.51 ton per acre-foot) for 1964 and 460 ppm (0.62 ton per acre-foot) for the 13-year period of record.

James River basin.--Runoff in the basin in 1965 was low. The runoff of the James River at Huron, S. Dak., was only 63 percent

of the 26-year average. The weighted-average of dissolved-solids content decreased from 640 ppm (0.87 ton per acre-foot) in 1964 to 547 ppm (0.74 ton per acre-foot) in 1965.

At Huron, samples are collected just upstream from the streamflow gage and just upstream from the diversion of water to the city of Huron. At times, the diversions exceed inflow so that no water passes the gage. The weighted averages for the James River at Huron reflect only the quality of the water that passes the gage.

Platte River basin.--Runoff was considerably higher than in 1964. At the Colorado-Wyoming line runoff was 130 percent of the 50-year average. Release from Alcova Reservoir was only 81 percent of the 32-year average. At the Wyoming-Nebraska line the discharge was very close to the 37-year average. Storage in the main stream reservoirs except Guernsey increased during the year.

The chemical load above Seminoe Reservoir was 69 percent higher than in 1964 and was 127 percent of average. At Glenrock the load was 106 percent of average and only slightly higher than in 1964. Flow at the Wyoming-Nebraska line was about half that at Glenrock and the chemical load was probably in about the same proportion.

LOWER MISSISSIPPI RIVER BASIN

Arkansas River basin.--Extensive flooding occurred in Arkansas River basin in Colorado during the summer in 1965. John Martin Reservoir had a maximum contents of 429,000 acre-feet in Aug. 25, 1965, which was the highest for the 23 years of record. The flow of Arkansas River below John Martin Reservoir was about 470 percent of the 1964 flow, but only 108 percent of the average for the 27 years of record. The weighted average of dissolved-solids concentration decreased from 2,220 ppm (3.02 tons per acre-foot) in 1964 to 835 ppm (1.14 tons per acre-foot) in 1965, and the sodium adsorption ratio decreased from 3.4 in 1964 to 1.7 in 1965.

Runoff of the Arkansas River at Arkansas City, Kans., was about four times greater than in 1964 and nearly twice the long-term average. The relatively high flows resulted in significant improvement in water quality. The weighted average dissolved-solids content of 528 ppm (0.71 ton per acre-foot) was 34 percent lower than the 15-year average. The sodium adsorption ratio decreased from 4.9 in 1964 to 3.2.

Runoff at the Arkansas River station at Van Buren, Ark., was three times greater than the 1964 runoff but 23 percert less than the 38-year average. The higher runoff resulted in a decrease of dissolved-solids content.

Red River basin.--Water discharge of the Red River at Denison Dam near Denison, Tex., during the 1965 water year was 39 percent of the average for 42 years of record, but was about 30 percent greater than the 1964 average. The weighted average of dissolved-solids content was 1,070 ppm (1.46 tons per acre-foot) in 1965 as compared to 1,200 ppm (1.63 tons per acre-foot)in 1964.

WESTERN GULF OF MEXICO BASINS

In the Western Gulf of Mexico basins in Texas, streamflow was below normal in the Sabine and Neches basins and near normal or above from the Trinity River to the Nueces River. Streamflows were generally 3 to 7 times greater than the below normal streamflows of 1964. The weighted average of dissolved-solids content in 1965 was about the same as in 1964 for the Sabine and Neches. However, in Trinity River at Romayor, where streamflow equalled the 41 years average and was four times greater than in 1964, the weighted average of dissolved-solids content decreased from 351 ppm (0.48 ton per acre-foot) in 1964 to 219 ppm (0.30 ton per acre-foot) in 1965. Streamflow in Nueces River near Mathis in 1965 was more than 7 times the 1964 average and the weighted average of dissolved-solids content decreased from 358 ppm (0.49 ton per acre-foot) in 1964 to 238 ppm (0.32 ton per acre-foot) in 1965.

Rio Grande basin.--Streamflow in the middle Rio Grande substantially increased at all gaging stations when compared against the 1964 records. Rio Grande at Otowi Bridge, N. Mex., showed a three-fold increase bringing the annual average discharge to 5 percent above median. The annual dissolved solids for all stations went up correspondingly, but the concentrations remained close to the 1964 values.

Streamflow on the Pecos River increased approximately 100 percent at most stations when compared against 1964 records, but was still less than half the long-term averages. The water quality improved, and the Pecos River at Artesia, N. Mex., showed a

35 percent decrease in the weighted average of dissolved-solids content when compared against the 1964 value.

However, during the 1965 water year, streamflow of the Pecos River below Red Bluff Dam near Orla, Tex., was only half the 1964 streamflow and less than 10 percent of the 29-year average. The weighted average of dissolved-solids content increased from 9,080 ppm (12.4 tons per acre-foot) in 1964 to 12,100 ppm (16.5 tons per acre-foot) in 1965. Storage in Red Bluff Reservoir at the end of the 1965 water year was 53,000 acre-feet, only 17 percent of capacity.

COLORADO RIVER BASIN

Colorado River main stem.--The runoff of the Colorado River at Glenwood Springs, Colo., was 165 percent of the 1964 runoff, and as a result the weighted average of dissolved-solids content of the Colorado River near Glenwood Springs decreased from 376 ppm (0.51 ton per acre-foot in 1964 to 292 ppm (0.40 ton per acre-foot) in 1965. The sodium adsorption ratio dropped from 1.8 in 1964 to 1.2 in 1965.

The flow of the Colorado River near Cisco, Utah was 91 percent greater than that during 1964, was about 112 percent of the long-term average flow. Weighted average dissolved-solids content was 530 ppm (0.72 ton per acre-foot), which is about 200 ppm lower than that in 1964 and about 400 ppm lower than that in 1963.

The total flow (release) from Glen Canyon Dam (Lake Powell) during the 1964-65 water year was about $4\frac{1}{2}$ times as great as the previous year. This large increase in flow from Lake Powell caused a 31 percent decrease in the dissolved-solids content of the water flowing past the station at Lees Ferry.

At the station near Grand Canyon the flow and salinity conditions were similar to those at Lees Ferry. The total flow for the year was slightly more than four times that of the 1963-64 water year and concentration of dissolved-solids was 37 percent less than the previous year.

Total release from Hoover Dam was slightly less than the total release during the 1963-64 water year, and the concentration of dissolved-solids was about 14 percent higher. Perhaps the observed increase in dissolved-solids was caused by the higher-than-usual concentrations at Lees Ferry during the 1962-63 water year.

Diversions and return flows at and below Imperial Dam.--The flow of Yuma Main Canal below Colorado River Siphon at Yuma, Ariz., was the same as the previous year, whereas, the dissolved-solids concentration increased about 8 percent.

Gunnison River basin.--The runoff of Gunnison River near Grand Junction, Colo., increased again in 1965. The runoff was almost double that of 1964 and was 138 percent of the average of the 57 years of record. The weighted average of dissolved-solids concentration decreased frim 714 ppm (0.97 ton per acre-foot) in 1964 to 476 ppm (0.65 ton per acre-foot) in 1965. The decrease in sodium adsorption ratio was less pronounced, going from 1.1 in 1964 to 0.9 in 1965.

Green River basin.--The flow at Green River at Greendale, Utah was nearly double that during 1964 and nearly ten times that during 1963 although the contents of Flaming Gorge Reservoir increased by about the same amount in 1963, 1964, and 1965. Weighted average dissolved-solids content was 557 ppm (0.76 ton per acre-foot), which is about 100 ppm greater than during 1964 and about 100 ppm less than that during 1963. Reservoir contents at the end of the 1965 water year may be approaching stability, but the data for 1965 should not be regarded as representative of pre-reservoir conditions or of conditions after reservoir stage becomes fairly stable.

The flow of Green River at Green River, Utah was 84 percent greater than that in 1964 and was 111 percent of the long-term average. Average dissolved-solids contents was 472 ppm (0.64 ton per acre-foot) about the same as that during 1964.

San Juan River basin.--Discharges in the San Juan River basin were above median. The weighted average of dissolved-solids content for all water-quality stations showed up to 30 percent decreases with average concentrations less than 400 ppm.

The discharge at San Juan River near Bluff, Utah was 157 percent greater than that during 1964 and was 105 percent of the long-term average. Weighted average dissolved-solids content was about 400 ppm (0.54 ton per acre-foot), which is about 300 ppm less than that during 1964 and 450 ppm less than that during 1963.

Virgin River basin.--Flow at Virgin River at Littlefield, Ariz., was 36 percent greater than that during 1964 and was about 75 percent of the long-term average. Average dissolved-solids content was 1,690 ppm (2.30 tons per acre-foot), which is about 500 ppm less than that during 1964.

Gila River basin.--Water from the Gila River at Kelvin contained 1,070 ppm (1.46 tons per acre-foot) weighted average of dissolved-solids content which was about 9 percent greater than the previous year. The total flow past the station was about 12 percent less than the 1963-64 water year.

The total flow of the Salt River below Stewart Mountain Dam was 54 percent less during 1964-65 water year and the weighted-average concentration of dissolved-solids was 755 ppm (1.03 tons per acre-foot), which was about 8 percent greater than the previous year.

The total flow (release) from Bartlett Dam was 56 percent greater and the weighted average concentration of dissolved-solids was 36 percent less during the 1964-65 water year as compared to the 1963-64 water year.

The weighted-average concentration of the dissolved solids in the water below Gillespie Dam was 44 percent greater than the previous year. The total combined flow was 26 percent less than 1963-64 water year.

THE GREAT BASIN

Sevier Lake basin.--Discharge of Sevier River below Piute Dam near Marysvale, Utah was 22 percent greater than that during the preceding year, and was 58 percent of the long-term average discharge. Weighted average dissolved-solids content was 279 ppm (0.38 ton per acre-foot), which is about the same as that during 1964.

Average flow of Sevier River near Lynndyl, Utah (at gage) was 121 cfs and was 118 cfs at the water-quality station. The flow was about 10 percent greater than that during 1964 and was 63 percent of the long-term average; a large well discharges into the stream between the water-quality station and the gaging station. Weighted average dissolved-solids content was 1,280 ppm (1.74 tons per acre-foot), which is about 150 ppm less than that during 1963 and 1964.

Carson River basin.--Flow of the Carson River increased considerably over that of the preceding water year. The flow was 148 percent of the 54-year average and nearly three times that in 1964. The greater flow decreased the weighted average specific conductance from 288 to 204 micromhos and the sodium adsorption ratio from 1.1 to 0.7. A boron value of 0.5 ppm was reported for the period May 15-31. This value is inconsistent with preceding and following composite periods.

Humboldt River basin.--Runoff in the upper basin increased 18 percent over that of 1964 and was 142 percent of the 58-year average. Changes in water quality from the preceding years were insignificant. Release from the Rye Patch Reservoir dropped 3 percent from that of 1964 although a general improvement in chemical quality was noted. This is probably due to a flushing effect upon the reservoir by high flows of the last two years.

Pyramid and Winnemucca Lakes basin.--Flow in the basin was 183 percent of that in the preceding year and 124 percent of the average for the 66-year period of record. Most chemical constituents decreased slightly in concentration over the preceding year and the ratios remained constant.

PACIFIC SLOPE BASINS IN WASHINGTON AND UPPER COLUMBIA RIVER BASIN

Columbia River main stem.--No significant change in chemical quality occurred in the Columbia River at international boundary, during the 1965 water year. The total runoff increased to 81,120,000 acre-feet which was greater than it was during the 1964 water year. This represents a 5.0 percent increase over the 1964 total and is 13 percent higher than the 28-year average of 71,960,000 acre-feet per year.

Yakima River basin.--Runoff during the 1965 water year (3,051,000 acre-feet) in the Yakima River at Kiona was 70 percent greater than in the 1964 water year (1,796,000 acre-feet) and 6 percent greater than the 50-year average (2,870,000 acre-feet). Although this increase in runoff was very large, variations in chemical quality were not as pronounced. The weighted average dissolved-solids content was 134 ppm (0.18 ton per acre-foot) or 35 ppm (0.05 ton per acre-foot) lower than the 1964 weighted average.

SNAKE RIVER BASIN

Snake River main stem.--Runoff increased 22 percent at Heise, Idaho and 23 percent at King Hill, Idaho above that of the 1964 water year. The average tons per day of dissolved-solids content increased 16 and 17 percent respectively. There was a 5 percent decrease in the average dissolved-solids content at both stations.

Boise River basin.--Runoff increased 215 percent above that of the 1964 water year, and the average dissolved-solids content

Summary of water discharge, and tonnages of dissolved solids--1964-65

Station	Runoff (acre-foot)	Dissolved solids (tons per acre-foot)
Red River of the North basin:		
Sheyenne River near Warwick, N. Dak.	34,951	0.56
Missouri River main stem:		
Missouri River near Culbertson, Mont.	.....	.....
Missouri River near Williston, N. Dak	14,204,468	.58
Missouri River at Nebraska City, Nebr	24,575,409	.61
Yellowstone River basin:		
Yellowstone River at Billings, Mont	6,712,586	.23
Yellowstone River near Sidney, Mont	12,560,633	.52
Wind River below Boysen Reservoir, Wyo.	1,447,880	.52
Bighorn River at Bighorn, Mont.	3,965,926	.76
Tongue River at Miles City, Mont	435,420	.61
James River basin:		
James River at Huron, S. Dak	96,142	.74
Platte River basin:		
Platte River at Brady, Nebr	330,929	.71
Platte River near Overton, Nebr	899,530	.70
Supply Canal (Tri-County diversion) near Maxwell, Nebr.	955,194	.74
South Platte River at Julesburg, Colo.	435,425	1.23
Arkansas River basin:		
Arkansas River below John Martin Reservoir, Colo	280,086	1.14
Arkansas River at Arkansas City, Kans.	2,290,515	.71
Arkansas River at Van Buren, Ark	17,027,341	.59
Cimarron River at Perkins, Okla	367,006	2.53
Red River basin:		
Red River at Denison Dam, near Denison, Tex	1,406,401	1.46
Washita River near Durwood, Okla	590,496	.69
Sabine River basin:		
Sabine River near Ruliff, Tex	2,954,992	.16
Neches River basin:		
Neches River at Evadale, Tex	1,200,971	.16
Trinity River basin:		
Trinity River at Romayor, Tex	5,308,671	.30
Brazos River basin:		
Brazos River at Richmond, Tex.	7,430,456	.34
Colorado River basin:		
Colorado River at Austin, Tex	1,067,628	.38
Colorado River at Wharton, Tex	1,721,670	.33
Guadalupe River basin:		
Guadalupe River at Victoria, Tex	1,311,949	.32
Nueces River basin:		
Nueces River near Mathis, Tex.	569,899	.32
Rio Grande basin:		
Rio Grande above Culebra Creek, near Lobatos, Colo...	418,649	.29
Rio Grande at Otowi Bridge, near San Ildefonso, N. Mex.	1,177,868	.28
Rio Grande conveyance channel at San Marcial, N. Mex.	527,238	.55
Rio Grande floodway at San Marcial, N. Mex.	294,325	.47
Rio Grande at El Paso, Tex	199,508	.75
Rio Grande at Fort Quitman, Tex	.....	.....
Rio Grande above Rio Conchos, near Presidio, Tex.	.....	.....
Rio Grande at Langtry, Tex	815,151	.78
Rio Grande at Laredo, Tex.	2,093,870	1.28
Rio Grande below Falcon Dam, Tex	2,530,571	.57
Pecos River below Alamogordo Dam, N. Mex	102,285	2.07
Pecos River near Artesia, N. Mex.	85,928	3.14
Pecos River below Red Bluff Dam, near Orla, Tex.	5,992	16.05
Pecos River near Shumla, Tex.	209,528	1.92

Summary of water discharge, and tonnages of dissolved solids--1964-65--Continued

Station	Runoff (acre-feet)	Dissolved solids (tons per acre-foot)
Colorado River main stem:		
Colorado River near Glenwood Springs, Colo	1,660,628	0.40
Colorado River near Cisco, Utah	6,403,784	1.21
Colorado River at Lees Ferry, Ariz	10,819,975	.83
Colorado River near Grand Canyon, Ariz	10,982,057	.89
Colorado River below Hoover Dam, Ariz.-Nev	.....	.....
Diversions and return flows at and below Imperial Dam:		
Yuma Main Canal below Colorado River siphon, at Yuma, Ariz.	326,058	1.24
Gunnison River basin:		
Gunnison River near Grand Junction, Colo	2,610,809	.65
Green River basin:		
Green River near Greendale, Utah	1,612,055	1.62
Green River at Green River, Utah	5,133,943	.64
Yampa River near Maybell, Colo	1,288,912	.17
San Juan River basin:		
San Juan River near Archuleta, N. Mex	1,104,636	.24
San Juan River near Bluff, Utah	2,027,599	.54
Virgin River basin:		
Virgin River at Littlefield, Ariz	120,491	2.30
Gila River basin:		
Gila River at Kelvin, Ariz	258,331	1.46
Gila River below Gillespie Dam, Ariz	13,153	6.96
Salt River below Stewart Mountain Dam, Ariz	202,229	1.03
Verde River below Bartlett Dam, Ariz	623,621	.28
Sevier Lake basin:		
Sevier River below Piute Dam, near Marysvale, Utah	.....	.....
Sevier River near Lynndyl, Utah	84,537	1.74
Carson River basin:		
Carson River near Silver Springs, Nev	382,085	.19
Humboldt River basin:		
Humboldt River at Palisade, Nev	369,844	.37
Humboldt River near Rye Patch, Nev	134,266	.67
Pyramid and Winnemucca Lakes basin:		
Truckee River at Floriston, Calif	695,157	.08
Columbia River main stem:		
Columbia River at international boundary, Wash	77,876,628	.12
Yakima River basin:		
Yakima River at Kiona, Wash	3,051,052	1.18
Snake River main stem:		
Snake River near Heise, Idaho	6,160,980	.27
Snake River at King Hill, Idaho	9,051,768	.42
Boise River basin:		
Boise River at Notus, Idaho	2,281,577	.18
Columbia River main stem:		
Columbia River near The Dalles, Oreg	162,494,078	.13
Willamette River basin:		
Willamette River at Salem, Oreg	21,405,567	.06

decreased 49 percent, however, the average tons per day of dissolved-solids loads increased 62 percent.

PACIFIC SLOPE BASINS IN OREGON AND LOWER COLUMBIA RIVER BASIN

Columbia River main stem.--In the 1965 water year the runoff increased 21 percent with no significant change in the chemical quality when compared to the 1964 water year.

Willamette River basin.--Runoff in the 1965 water year was 25 percent greater than in the 1964 water year. The average dissolved-solids content decreased from 53 ppm (0.07 tons per acre-foot) in 1964 to 47 ppm (0.06 tons per acre-foot) in 1965. The average tons per day increased 14 percent.

Discharge data and dissolved-solids loads for stations operated in 1965 are summarized in the table on p. 23 .

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PART 5. HUDSON BAY AND UPPER MISSISSIPPI RIVER BASINS

RED RIVER OF THE NORTH BASIN

5-560. SHEYENNE RIVER NEAR WARWICK, N. DAK.

LOCATION.--At gaging station at highway bridge, 3.3 miles south of Warwick, Benson County
DRAINAGE AREA.--2,070 square miles, approximately, of which about 1,310 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: January 1951 to September 1965.
Water temperatures: January 1951 to September 1962, October 1963 to September 1964.
EXTREMES, 1964-65.--Specific conductance: Maximum daily, 1,340 micromhos Mar. 8, 9; minimum daily, 233 micromhos Apr 13
Percent sodium: Maximum, 50 Apr. 21-25; minimum, 22 Mar. 1-6.
Sodium-adsorption-ratio: Maximum, 2.75 Apr. 1-7; minimum, 0.91 Mar. 1-6.
EXTREMES, 1951-65.--Specific conductance: Maximum daily, 1,940 micromhos Feb. 1, 1955; minimum daily, 192 micromhos Mar 18, 1963.
Percent sodium: Maximum, 66 July 8-18, 1955; minimum, 10 Aug. 15-31, 1959, Oct. 1-15, 1963
Sodium-adsorption-ratio (1961-64): Maximum, 2.75 Apr. 1-7; minimum, 0.35 Sept. 22-30, 1963.
REMARKS.--Values reported for sodium (Na) are determined by analysis and do not include potassium (K). Daily samples for chemical analysis composited by discharge.

Chemical analyses, water year October 1964 to September 1965

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, 1964....	34	13	2.25	2.06	3.61	0.21	6.21	0.00	1.42	0.39	0.02	0.00	0.15	460	0.63	21	44	2.46	727	7.4
Oct. 2-8.....	200	--	2.98		1.87	--	3.82	.00	--	--	--	--	--	291	.40	79	39	1.53	463	7.5
Oct. 9-31.....	766	--	6.80		3.57	--	8.24	.00	--	--	--	--	--	593	.81	618	34	1.93	921	7.7
Nov. 1-25.....	446	--	6.80		3.61	--	8.28	.00	--	--	--	--	--	598	.81	363	35	1.96	929	7.7
Nov. 26-Dec. 15.	309	--	6.48		3.09	--	7.60	.00	--	--	--	--	--	549	.75	231	32	1.72	853	7.8
Dec. 16-31.....	124	--	6.56		2.91	--	7.47	.00	--	--	--	--	--	540	.73	91	31	1.61	840	7.8
Jan. 1-31, 1965.	123	--	5.68		2.09	--	6.24	.00	--	--	--	--	--	449	.61	75	27	1.24	707	7.5
Feb. 1-28.....	172	--	6.08		2.13	--	6.56	.00	--	--	--	--	--	482	.66	113	26	1.22	744	7.9
Mar. 1-6.....	31	--	5.34		1.48	--	5.43	.00	--	--	--	--	--	412	.56	17	22	.91	623	8.1
Mar. 7.....	34	--	8.10		4.26	--	8.57	.83	--	--	--	--	--	628	.85	29	34	2.12	1,080	8.4
Mar. 8-9.....	99	--	10.16		5.87	--	12.00	.00	--	--	--	--	--	944	1.28	127	37	2.61	1,360	8.2
Mar. 10-19.....	424	24.	2.99	1.81	1.70	.24	4.97	.00	1.25	.28	.02	.07	.10	397	.54	229	25	1.09	606	7.7
Mar. 20-31.....	169	--	5.46		2.13	--	5.80	.00	--	--	--	--	--	468	.64	108	28	1.29	709	8.0
Apr. 1-7.....	305	--	6.38		4.92	--	8.15	.20	2.37	--	--	--	--	679	.92	282	44	2.75	1,000	8.3
Apr. 8-10.....	1,172	--	4.36		1.44	--	4.65	.00	1.06	--	--	--	--	360	.49	574	25	.97	542	8.2

RED RIVER OF THE NORTH BASIN--Continued

5-560. SHEYENNE RIVER NEAR WARWICK, N. DAK.--Continued

Chemical analyses, water year October 1964 to September 1965--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				
Apr. 11-16, 1965	9,318	--	2.50		1.57	--	3.03	0.00	1.00	--	--	--	--	276	0.38	3,498	39	1.40	418	7.6
Apr. 17-20.....	3,261	--	3.08		2.70	--	4.16	.00	1.50	--	--	--	--	367	.50	1,628	47	2.17	561	7.8
Apr. 21-25.....	1,557	--	2.70		2.70	--	3.84	.00	1.48	--	--	--	--	350	.48	741	50	2.32	535	7.6
Apr. 26-May 19..	1,976	--	3.92		2.70	--	4.85	.00	1.56	--	--	--	--	408	.55	1,096	41	1.93	626	7.8
May 20-June 6...	1,292	21	2.99	2.39	3.26	0.23	6.42	.00	2.04	0.48	0.02	0.00	0.12	517	.70	909	37	1.99	792	8.2
June 7-30.....	619	27	3.19	3.21	4.74	.25	7.90	.47	2.50	.56	.02	.02	.22	670	.91	564	42	2.65	1,000	8.3
July 1-21.....	350	--	5.70		4.48	--	7.56	.00	--	--	--	--	--	597	.81	284	44	2.65	923	7.8
July 22-Aug. 5..	9,015	23	2.05	2.06	3.18	.17	5.90	.00	1.46	.27	.03	.01	.16	476	.65	5,836	43	2.22	677	8.2
Aug. 6-Sept. 30.	3,155	13	2.45	2.30	3.65	.21	7.06	.00	1.29	.39	.02	.00	.16	512	.70	2,197	42	2.37	765	8.2
Total or weighted average	34,951	--	3.87		2.68	--	5.08	--	--	--	--	--	--	415	0.56	19,710	41	1.93	618	7.8

PART 6. MISSOURI RIVER BASIN

MISSOURI RIVER MAIN STEM

6-1855. MISSOURI RIVER NEAR CULBERTSON, MONT.

LOCATION.--At gaging station at bridge of State Highway 16, 3 miles southeast of Culbertson, Roosevelt County, 10 miles downstream from Big Muddy Creek, and at mile 1,620.76.
DRAINAGE AREA.--91,557 square miles.
RECORDS AVAILABLE.--Chemical analyses: July to September 1965
Water temperatures: July to September 1965.

Chemical analyses, July to September 1965

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 1-9, 1965..	307,398	7.7	2.89	1.40	2.31	0.12	3.13	0.00	3.46	0.24	0.04	0.00	0.10	425	0.58	177,676	34	1.57	653	7.5
July 10-18.....	337,567	8.0	2.59	1.48	2.09	.12	3.08	.00	3.14	.16	.03	.00	.09	403	.55	185,014	33	1.46	618	7.2
July 19-31.....	388,840	8.6	2.69	1.65	2.00	.12	3.11	.00	3.21	.21	.04	.00	.10	406	.55	214,702	31	1.36	624	7.5
Aug. 1-15.....	460,264	7.5	2.79	1.65	2.09	.11	3.08	.00	3.25	.23	.04	.00	.11	403	.55	252,262	31	1.40	625	7.7
Aug. 16-31.....	479,524	7.3	2.89	1.56	2.04	.11	3.13	.00	3.25	.24	.04	.00	.10	395	.54	257,600	31	1.37	626	7.6
Sept. 1-15.....	453,124	7.5	2.89	1.56	2.00	.11	3.16	.00	3.25	.24	.04	.00	.09	406	.55	250,197	30	1.34	623	7.8
Sept. 16-30.....	478,711	7.5	2.84	1.65	2.09	.11	3.15	.00	3.39	.23	.04	.00	.11	413	.56	268,882	31	1.39	636	7.7

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, 29.3 miles downstream from Yellowstone River, and at mile 1,552.7.
DRAINAGE AREA.--164,500 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: December 1950 to June 1965 (discontinued).
Water temperatures: May 1951 to June 1965 (discontinued).
EXTREMES, October 1964 to June 1965.--Specific conductance: Maximum daily, 981 micromhos Nov. 27; minimum daily, 363 micromhos June 16.
Percent sodium: Maximum, 39 Apr. 14-30; minimum, 27 June 13-16.
Sodium-adsorption-ratio: Maximum, 1.90 Apr. 14-30; minimum, 92 June 13-16.
EXTREMES, 1950-65.--Specific conductance (1950-65): Maximum daily, 1,360 micromhos Dec. 28, 1961; minimum daily, 297 micromhos Mar. 19, 1960.
Percent sodium: Maximum, 44 Aug. 7-19, 30, 1964; minimum, 24 May 27 to June 2, 1956.
Sodium-adsorption-ratio (1961-65): Maximum, 2.27 Aug. 29 to Sept. 19, 1963; minimum, 92 June 13-16, 1965.
REMARKS.--Values reported for sodium (Na) are determined by analysis and do not include potassium (K). Daily samples for chemical analysis composited by discharge. Some spectrographic data available in district office at Lincoln, Nebr.

Chemical analyses, water year October 1964 to June 1965

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. 1, 1964.....	840,357	--	5.36		2.91	--	3.47	0.00	--	--	--	--	--	501	0.68	572,586	35	1.78	773	8.1
Nov. 2.....	26,380	8.1	3.24	2.14	2.91	0.13	3.47	.00	4.66	0.28	0.03	0.00	0.10	519	.71	18,620	35	1.78	773	7.9
Nov. 3-17.....	394,810	--	5.32		2.91	--	3.47	.00	--	--	--	--	--	521	.71	279,747	35	1.79	783	7.8
Nov. 18-Dec. 7..	402,248	--	5.98		3.31	--	3.90	.00	--	--	--	--	--	582	.79	318,387	36	1.91	859	8.1
Dec. 8-31.....	668,826	8.9	3.34	2.14	2.78	.10	3.64	.00	4.21	.31	.04	.00	.14	516	.70	469,356	33	1.68	767	7.8
Jan. 1-25, 1965.	941,653	--	5.36		2.61	--	3.52	.00	--	--	--	--	--	493	.67	631,359	33	1.59	750	7.4
Jan. 26-Feb. 14.	706,116	--	5.14		2.57	--	3.41	.00	--	--	--	--	--	480	.65	460,952	33	1.60	714	7.7
Feb. 15-22.....	303,868	--	4.49		2.39	--	3.25	.00	--	--	--	--	--	461	.63	190,513	33	1.52	696	7.3
Feb. 23-28.....	271,577	--	4.70		2.39	--	3.15	.00	--	--	--	--	--	448	.61	165,466	34	1.56	680	7.4
Mar. 1-12.....	474,843	9.1	3.04	1.81	2.39	.10	3.15	.00	3.85	.31	.03	.00	.14	457	.62	295,124	33	1.54	697	7.8
Mar. 13.....	40,066	--	4.94		2.70	--	2.85	.00	--	--	--	--	--	483	.66	26,319	35	1.72	727	7.6
Mar. 14-19.....	228,853	--	4.82		2.52	--	3.10	.00	--	--	--	--	--	462	.63	143,793	34	1.63	706	7.7
Mar. 20-31.....	392,499	--	5.22		2.65	--	3.33	.00	--	--	--	--	--	495	.67	264,224	34	1.64	747	7.8
Apr. 1-5.....	225,719	--	4.70		2.57	--	3.16	.00	--	--	--	--	--	459	.62	140,903	35	1.67	698	7.6
Apr. 6-8.....	436,344	--	4.12		2.39	--	2.75	.00	--	--	--	--	--	420	.57	249,240	37	1.67	637	7.5

Apr. 9-10, 1965.	168,595	--	4.20	2.26	--	2.72	.00	--	--	--	--	--	424	.58	97,219	35	1.56	635	7.9
Apr. 11-13.....	198,327	--	4.44	2.61	--	2.92	.00	--	--	--	--	--	455	.62	122,725	37	1.75	692	8.1
Apr. 14-30.....	1,120,145	--	4.58	2.87	--	3.02	.00	--	--	--	--	--	483	.66	735,801	39	1.90	715	7.7
May 1-June 12...	3,495,154	--	4.04	2.26	--	2.88	.00	3.25	--	--	--	--	399	.54	1,896,610	36	1.59	607	7.8
June 13-16.....	583,140	--	3.00	1.13	--	2.34	.00	1.73	--	--	--	--	262	.36	207,785	27	.92	409	7.6
June 17.....	190,413	10	2.30 .82	1.61	.08	2.66	.00	2.12	.16	.02	.02	.05	308	.42	79,760	33	1.29	471	7.7
June 18-27.....	1,577,454	--	3.60	1.39	--	2.59	.00	2.42	--	--	--	--	319	.43	684,363	28	1.04	492	7.5
June 28-30.....	517,091	--	2.88	1.17	--	2.11	.00	1.94	--	--	--	--	265	.36	186,360	29	.98	409	7.2
Total or weighted average	14,204,468	--	4.44	2.31	--	2.84	0.00	--	--	--	--	--	426	0.58	8,237,212	34	1.55	646	7.6

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, at mile 562.6.
DRAINAGE AREA.--414,400 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: January 1951 to September 1965.
Water temperatures: May 1951 to September 1965.
EXTREMES, 1964-65.--Specific conductance: Maximum daily, 942 micromhos Dec. 23; minimum daily 387 micromhos Mar. 17.
Percent sodium: Maximum, 41 July 1-31; minimum, 22 Apr. 3-9.
Sodium-adsorption-ratio: Maximum, 2.10 July 1-31; minimum, 0.72 Apr. 3-9.
EXTREMES, 1951-65.--Specific conductance: Maximum daily, 994 micromhos Dec. 17, 1962; minimum daily, 273 micromhos June 17, 1964.
Percent sodium: Maximum, 48 May 29, 1956; minimum, 16 Apr. 11-15, 1960, Apr. 1-5, 1962.
Sodium-adsorption-ratio (1961-65): Maximum, 2.19 Aug. 19, 1964; minimum, 0.46 Apr. 1-5, 1962.
REMARKS.--Values reported for sodium (Na) are determined by analysis and do not include potassium (K). Some spectrographic and radiochemical data are available in district office at Lincoln, Nebr. Daily samples for chemical analysis composited by discharge.

Chemical analyses, water year October 1964 to September 1965

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. 1-15, 1964.	987,174	--	4.88		3.05	--	3.33	0.00	--	--	--	--	--	499	0.68	669,935	38	1.95	761	8.2
Oct. 16.....	68,628	12	3.14	1.56	3.00	0.15	3.21	.00	4.08	0.51	0.03	0.02	0.12	500	.68	46,667	38	1.96	743	7.8
Oct. 17-31.....	1,014,843	--	4.92		3.13	--	3.33	.00	--	--	--	--	--	509	.69	702,515	39	2.00	775	8.0
Nov. 1-15, 17-30	1,864,245	--	4.92		3.13	--	3.25	.00	--	--	--	--	--	513	.70	1,300,646	39	2.00	781	8.2
Nov. 16.....	70,215	11	3.29	1.65	3.13	.14	3.20	.00	4.35	.48	.03	.01	.11	520	.71	49,656	38	1.99	775	7.6
Dec. 1-17.....	490,949	--	5.58		3.44	--	3.98	.00	--	--	--	--	--	570	.78	380,583	38	2.06	862	7.6
Dec. 18-19.....	26,777	--	5.80		3.18	--	4.46	.00	--	--	--	--	--	574	.78	20,903	35	1.86	848	7.6
Dec. 20-31.....	328,225	--	5.60		3.39	--	4.06	.00	--	--	--	--	--	579	.79	258,457	38	2.03	869	7.6
Jan. 1-29, 1965.	784,007	--	5.08		3.09	--	3.62	.00	--	--	--	--	--	526	.72	560,847	38	1.94	796	7.4
Jan. 30-Feb. 6..	177,560	--	5.22		3.05	--	3.82	.00	--	--	--	--	--	527	.72	127,261	37	1.88	792	7.4
Feb. 7-12.....	196,126	--	4.62		2.78	--	3.39	.00	--	--	--	--	--	480	.65	128,031	38	1.83	734	7.4
Feb. 13-20.....	217,388	--	4.42		2.65	--	3.28	.00	--	--	--	--	--	462	.63	136,589	38	1.78	711	7.4
Feb. 21-24.....	189,620	--	3.82		2.26	--	2.88	.00	--	--	--	--	--	401	.55	103,411	37	1.64	625	6.8
Feb. 25-27.....	101,931	--	3.68		1.78	--	2.80	.00	--	--	--	--	--	372	.51	51,569	33	1.31	559	7.4
Feb. 28.....	52,364	--	3.28		1.52	--	2.57	.00	--	--	--	--	--	320	.44	22,789	32	1.19	508	7.7

Mar. 1, 1965....	133,289	--	2.82	1.00	--	2.29	.00	--	--	--	--	--	272	.37	49,306	26	.84	414	7.7
Mar. 2-4.....	222,129	--	2.86	1.13	--	2.25	.00	--	--	--	--	--	281	.38	84,889	28	.95	438	7.6
Mar. 5-11.....	322,949	--	3.56	1.65	--	2.69	.00	--	--	--	--	--	348	.47	152,845	32	1.24	543	7.1
Mar. 12.....	67,636	14	2.50 .90	1.52	.26	2.69	.00	1.87	.48	.03	.11	.07	320	.44	29,435	29	1.17	510	7.1
Mar. 13-16.....	329,891	--	3.08	1.17	--	2.51	.00	--	--	--	--	--	284	.39	127,417	28	.95	454	7.2
Mar. 17-18.....	241,983	--	2.78	1.00	--	2.26	.00	--	--	--	--	--	258	.35	84,907	26	.85	410	7.4
Mar. 19-23.....	240,000	--	3.20	1.35	--	2.56	.00	--	--	--	--	--	308	.42	100,531	30	1.07	486	7.2
Mar. 24-27.....	146,380	--	4.20	2.04	--	3.15	.00	--	--	--	--	--	403	.55	80,228	33	1.41	630	7.3
Mar. 28-31.....	241,983	--	4.08	1.96	--	3.08	.00	--	--	--	--	--	385	.52	126,703	32	1.37	606	7.5
Apr. 1-2.....	273,124	--	3.72	1.57	--	2.88	.00	--	--	--	--	--	360	.49	133,721	30	1.15	537	7.4
Apr. 3-9.....	1,090,334	--	3.22	.91	--	2.52	.00	--	--	--	--	--	273	.37	404,819	22	.72	424	7.1
Apr. 10-13.....	539,107	--	3.44	1.00	--	2.59	.00	--	--	--	--	--	289	.39	211,891	23	.76	444	7.3
Apr. 14-17.....	383,603	--	3.94	1.35	--	2.93	.00	--	--	--	--	--	348	.47	181,552	25	.96	528	7.5
Apr. 18-30.....	965,395	--	4.66	2.09	--	3.26	.00	--	--	--	--	--	440	.60	577,692	31	1.37	661	7.4
May 1-21.....	1,550,321	--	5.70	2.74	--	4.13	.00	--	--	--	--	--	530	.72	1,117,471	32	1.62	791	7.2
May. 22-31.....	1,240,264	--	4.02	1.61	--	2.98	.00	--	--	--	--	--	370	.50	624,101	29	1.14	565	7.6
June 1-30.....	2,675,306	14	3.09 1.48	2.09	.18	3.29	.00	3.06	.45	.02	.05	.10	428	.58	1,557,242	30	1.38	652	8.1
July 1-31.....	2,476,106	--	4.58	3.18	--	3.23	.00	--	--	--	--	--	467	.64	1,572,624	41	2.10	705	7.3
Aug. 1-31.....	2,180,350	--	4.64	3.09	--	3.20	.00	--	--	--	--	--	508	.69	1,506,360	40	2.03	769	7.2
Sept. 1-30.....	2,687,207	14	2.79 1.56	2.44	.17	3.16	.00	3.54	.45	.03	.04	.12	450	.61	1,644,570	35	1.65	677	7.9
Total or weighted average	24,577,409	--	4.50	2.44	--	3.21	0.00	--	--	--	--	--	447	0.61	14,928,163	35	1.63	678	7.4

YELLOWSTONE RIVER BASIN

6-2145. YELLOWSTONE RIVER AT BILLINGS, MONT.

LOCATION.--At gaging station at City of Billings water department intake, 1 mile east of Billings, Yellowstone County, 12 miles upstream from Pryor Creek, and at mile 347.8.
DRAINAGE AREA.--11,783 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1950 to September 1958, July 1963 to September 1965.
Water temperatures: December 1950 to September 1958, July 1963 to September 1965.
EXTREMES, 1964-65.--Specific conductance: Maximum daily, 709 micromhos Dec. 21; minimum daily, 130 micromhos June 23.
Percent sodium: Maximum, 28 Oct. 1-16, Feb. 18-22, Aug. 1-19; minimum, 18 June 1-15.
Sodium-adsorption-ratio: Maximum, 1.23 Dec. 19-21; minimum, 0.33 June 1-15.
EXTREMES, 1950-58, 1963-65.--Specific conductance: Maximum daily, 1,210 micromhos Feb. 2, 1951; minimum daily, 129 micromhos May 22, 1954.
Percent sodium: Maximum, 37 Dec. 1, 1950; minimum, 13 May 20-23, June 15, 1956.
Sodium-adsorption-ratio (1963-65): Maximum, 1.92 Apr. 26, 27, 1964; minimum, 0.33 June 10-15, 1965.
REMARKS.--Daily samples for chemical analysis composited by discharge.

Chemical analyses, water year October 1964 to September 1965

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, 1964	90,700	15	2.25	1.40	1.44	0.09	2.95	0.00	1.98	0.21	0.03	0.01	0.22	299	0.41	36,882	28	1.06	497	7.9
Oct. 17-31	97,944	15	2.30	1.40	1.39	.09	2.88	.00	1.92	.20	03	01	.21	298	.41	39,695	27	1.02	484	7 9
Nov. 1-15	108,684	16	2.20	1.32	1.31	.08	2.79	.00	1.89	.20	.03	.01	.32	305	.41	45,082	27	.98	467	8.0
Nov. 16-30	93,719	17	2.30	1.32	1.31	.09	2.87	.00	1.89	.20	.03	.02	.49	310	42	39,512	26	.97	477	7.4
Dec. 1-18	92,826	16	2.35	1.23	1.26	.09	2.80	00	1.92	25	03	.02	.34	317	.43	40,019	26	94	475	7.5
Dec. 19-21	9,919	19	3.34	2.14	2.04	.09	3.77	.00	3.29	.20	.03	.05	24	460	.63	6,206	27	1.23	695	7.6
Dec. 22-31	81,620	18	2.25	1.15	1.22	.09	2.62	.00	1.77	.20	03	.03	.30	297	.40	32,968	26	93	455	7.3
Jan. 1-31, 1965	208,873	17	2.15	1.32	1.17	.08	2.61	.00	1.79	.21	.02	.02	.18	384	52	109,082	25	.89	448	7.2
Feb. 1-17	103,821	17	2.25	1.23	1.35	.09	2.67	.00	1.98	.21	.05	.01	22	310	.42	43,771	27	1.02	469	7 9
Feb. 18-22	39,868	13	1.80	1.07	1.13	.08	2.26	.00	1.58	.19	.05	.02	.20	258	.35	13,989	28	94	395	7.7
Feb. 23-Mar. 15	133,206	16	2.15	1.23	1.26	.09	2.57	.00	2.00	.22	03	00	23	290	39	52,536	27	.97	457	7 6
Mar. 16-21	27,669	16	2.25	1.32	1.31	.09	2.74	.00	1.83	.25	.03	.01	26	303	.41	11,402	26	98	480	7.7
Mar. 22-31	52,364	16	2.25	1.23	1.31	.09	2.70	.00	1.92	.24	04	01	24	303	41	21,578	27	.99	474	7 7
Apr. 1-17	155,006	13	2.15	.99	1.17	.09	2.52	.00	1.64	18	02	.02	.19	271	.37	57,129	27	.94	427	7.3
Apr. 18-30	151,204	13	1.85	.99	.91	.08	2.38	.00	1.19	.15	.02	.00	.17	227	.31	46,680	24	.77	365	7.3

May 1-15, 1965..	258,932	13	1.55	.90	.83	.06	2.11	.00	1.06	.12	02	.00	.11	204	28	71,838	25	75	324	7.1
May 16-31.....	439,220	12	1.25	.51	.48	.05	1.61	.00	.56	.07	02	00	08	145	.20	86,614	21	51	221	7.1
June 1-9.....	460,026	14	.90	.40	.28	03	1 26	.00	.31	06	.02	.00	05	106	14	66,317	18	.35	163	7.2
June 10-15.....	479,365	13	.80	.32	.25	.04	1.08	.00	.25	.05	.02	.01	03	94	.13	61,282	18	33	141	7 0
June 16-20.....	370,314	13	.90	.38	.34	.04	1.23	.00	.37	07	02	.00	.04	110	.15	55,399	21	.43	164	7.0
June 21-30.....	788,033	12	.85	.33	.30	.04	1.15	.00	.29	.06	.02	.00	06	96	13	102,886	20	39	147	7.1
July 1-12.....	774,030	11	75	.35	.33	.04	1.08	.00	.31	.06	01	00	04	111	.15	116,848	23	45	153	6.9
July 13-31.....	706,612	11	.90	.44	.48	.04	1 26	.00	.48	.10	.02	.00	.06	132	.18	126,851	26	58	185	7.0
Aug. 1-19.....	346,183	11	1.20	.64	.74	.06	1.70	.00	.79	10	.02	.00	.10	167	23	78,625	28	.77	262	7 3
Aug. 20-31.....	233,304	12	1.60	.82	.91	.07	2.20	.00	1.08	12	.02	.00	11	212	29	67,266	27	.83	336	7.2
Sept. 1-15.....	185,117	13	1.65	.99	.96	.07	2.25	.00	1.21	.14	.03	.00	.15	229	31	57,653	26	.83	358	7 4
Sept. 16-30.....	224,747	14	1.75	.90	.96	.07	2.29	.00	1.23	.13	.03	.00	11	228	.31	69,690	26	.83	358	7.4
Total or weighted average	6,712,586	13	1.28	0.65	0.65	0.05	1.69	0.00	0.79	0.11	0 02	0 00	0 10	171	0.23	1,557,345	25	0.66	256	7.1

YELLOWSTONE RIVER BASIN--Continued

6-3295. YELLOWSTONE RIVER NEAR SIDNEY, MONT.

LOCATION.--At bridge on State Highway 23, 2 miles south of Sidney, Richland County, 2 miles downstream from Fox Creek, 4 5 miles downstream from gaging station, and 30 miles from mouth.
DRAINAGE AREA.--69,103 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1950 to September 1965.
Water temperatures: January 1951 to September 1965.
EXTREMES, 1964-65.--Specific conductance: Maximum daily, 994 micromhos Apr. 21; minimum daily, 354 micromhos July 10.
Percent sodium: Maximum, 46 Mar. 22-31; minimum, 26 May 19-31.
Sodium-adsorption-ratio: Maximum, 2 22 Apr. 1-14; minimum, 84 May 19-31.
EXTREMES, 1951-65.--Specific conductance: Maximum daily, 2,780 micromhos Jan. 14, 1951; minimum daily, 193 micromhos Aug 15, 1964
Percent sodium: Maximum, 48 May 1-30, 1953; minimum, 7 Aug. 11-29, 1964.
Sodium-adsorption-ratio (1961-65): Maximum, 2.62 Aug. 30 to Sept. 13, 1964; minimum, 0.16 Aug. 11-29, 1964.
REMARKS.--Values reported for sodium (Na) are determined by analysis and do not include potassium (K). No appreciable inflow between gaging station and sampling point.

Chemical analyses, water year October 1964 to September 1965

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. 1-20, 1964.	260,390	--	6.72		3.52	--	3.57	0.00	5.48	--	--	--	--	600	0.82	212,478	34	1.92	883	7.8
Oct. 21-31.....	158,487	--	5.86		3.52	--	3.57	.00	5.52	--	--	--	--	595	.81	128,248	38	2.06	881	7.9
Nov. 1-18.....	261,628	--	5.84		3.57	--	3.47	.00	5.52	--	--	--	--	601	.82	213,844	38	2.09	885	7.5
Nov. 19-30.....	158,233	--	6.14		3.61	--	3.67	.00	5.62	--	--	--	--	621	.84	133,638	37	2.06	909	7.6
Dec. 1-16.....	169,976	--	5.76		3.35	--	3.59	.00	5.08	--	--	--	--	577	.78	133,383	37	1.97	853	7.7
Dec. 17-31.....	147,957	--	5.58		3.26	--	3.44	.00	4.96	--	--	--	--	563	.77	113,288	37	1.95	833	7.8
Jan. 1-31, 1965.	440,128	13	3.79	2.47	3.39	0.10	3.80	.00	5.33	0.42	0.03	0.03	0.20	606	.82	362,736	35	1.92	888	7.8
Feb. 1-20.....	270,347	--	5.14		3.13	--	3.18	.00	4.83	--	--	--	--	586	.80	215,456	38	1.95	793	7.7
Feb. 21-28.....	171,213	--	5.04		3.05	--	3.13	.00	4.62	--	--	--	--	531	.72	123,643	38	1.92	791	7.2
Mar. 1-21.....	443,603	--	3.08		2.31	--	2.23	.00	3.04	--	--	--	--	356	.48	214,775	43	1.86	545	7.2
Mar. 22-31.....	129,322	--	2.94		2.48	--	2.21	.00	2.96	--	--	--	--	351	.48	61,733	46	2.05	541	7.5
Apr. 1-14.....	765,580	--	4.08		3.18	--	1.84	.00	5.04	--	--	--	--	482	.66	501,853	44	2.22	721	7.4
Apr. 15-30.....	444,615	--	5.80		3.57	--	3.54	.00	5.45	--	--	--	--	600	.82	362,806	38	2.09	877	7.9
May 1-18.....	570,526	--	4.90		2.65	--	3.02	.00	4.52	--	--	--	--	506	.69	392,613	35	1.70	752	7.9
May 19-31.....	569,336	16	2.00	.82	1.00	.06	2.16	.00	1.58	.11	.02	.01	.06	251	.34	194,348	26	.84	381	7.3

June 1-10, 1965.	634,116	--	2.56	1.61	--	2.18	.00	2.02	--	--	--	--	274	.37	236,297	39	1.42	419	7.4
June 11-16.....	666,684	--	2.46	1.57	--	2.07	.00	1.92	--	--	--	--	271	.37	245,713	39	1.41	406	7.3
June 17-30.....	1,811,623	--	2.64	1.61	--	2.20	.00	1.96	--	--	--	--	278	.38	684,938	38	1.40	423	7.3
July 1-13.....	1,608,476	--	2.80	1.31	--	2.34	.00	1.79	--	--	--	--	263	.36	575,320	32	1.10	411	7.4
July 14-23.....	889,190	--	2.68	1.22	--	2.02	.00	1.83	--	--	--	--	249	.34	301,115	31	1.05	396	7.4
July 24-31.....	428,112	--	3.04	1.52	--	2.25	.00	2.27	--	--	--	--	298	.41	173,505	33	1.23	459	7.4
Aug. 1-12.....	407,722	--	4.24	2.09	--	2.85	.00	3.31	--	--	--	--	405	.55	224,573	33	1.43	614	7.3
Aug. 13-21.....	187,974	--	4.74	2.57	--	3.38	.00	3.73	--	--	--	--	457	.62	116,829	35	1.67	688	7.4
Aug. 22-31.....	310,413	--	4.80	2.52	--	3.38	.00	3.73	--	--	--	--	460	.63	194,195	34	1.63	694	7.6
Sept. 1-7.....	158,281	--	4.30	2.48	--	2.88	.00	3.64	--	--	--	--	431	.59	92,778	37	1.69	647	7.6
Sept. 8-17.....	174,387	12	2.40 2.22	2.70	.09	3.03	.00	4.08	.28	.03	.01	.14	464	.63	110,045	36	1.78	702	7.7
Sept. 18-30.....	322,314	--	4.68	2.78	--	3.06	.00	4.04	--	--	--	--	468	.64	205,146	37	1.82	704	7.8
Total or weighted average	12,560,633	--	3.76	2.13	--	2.59	0.00	3.14	--	--	--	--	382	0.52	6,525,296	36	1.24	574	7.4

YELLOWSTONE RIVER BASIN--Continued

6-2590. WIND RIVER BELOW BOYSEN RESERVOIR, WYO.

LOCATION.--At tailrace of powerplant at Boysen Dam, 0.6 mile upstream from gaging station, and 12.4 miles north of Shoshoni, Fremont County.
DRAINAGE AREA.--7,701 square miles upstream from gaging station.
RECORDS AVAILABLE.--Chemical analyses: November 1953 to September 1954, December 1960 to September 1965.
Water temperatures: December 1953 to September 1954, December 1960 to September 1965.
EXTREMES, 1964-65.--Specific conductance: Maximum daily, 879 micromhos Mar. 22; minimum daily, 395 micromhos Aug. 24.
Percent sodium: Maximum, 42 Mar. 16-31; minimum, 35 July 10 to Aug. 25.
Sodium-adsorption-ratio: Maximum, 2.23 Mar. 16-31; minimum, 1.27 Aug. 19-25.
EXTREMES, 1953-54, 1960-65.--Specific conductance: Maximum daily, 1,380 micromhos June 18, 1954; minimum daily, 395 micromhos Aug. 24, 1965.
Percent sodium: Maximum, 51 June 18-19, 1954; minimum, 35 July 10 to Aug. 25, 1965.
Sodium-adsorption-ratio (1963-65): Maximum, 3.04 Apr. 1-3, 1964; minimum, 1.27 Aug. 19-25, 1965.
REMARKS.--Daily samples for chemical analysis composited by equal-volume.

Chemical analyses, water year October 1964 to September 1965

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. 1-15, 1964.	28,711	9.0	2.20	1.23	2.44	0.06	2.33		3.41	0.19	0.02	0.00		377	0.51	14,721	41	1.86	580	7.8
Oct. 16-31.....	31,101	8.9	2.40	1.40	2.61	.08	2.46		3.69	.17	.02	.00		405	.55	17,130	40	1.90	619	7.5
Nov. 1-12.....	23,659	8.7	2.50	1.32	2.70	.07	2.54		3.79	.21	.01	.00		413	.56	13,289	41	1.95	639	7.7
Nov. 13-30.....	36,417	8.7	2.54	1.32	2.70	.07	2.54		3.75	.23	.01	.01		414	.56	20,504	41	1.94	641	7.5
Dec. 1-15.....	30,942	8.5	2.74	1.23	2.78	.06	2.59		3.93	.21	.02	.01		431	.59	18,137	41	1.97	657	7.3
Dec. 16-31.....	47,064	8.6	2.74	1.40	2.83	.06	2.66		4.12	.23	.02	.01		449	.61	28,739	40	1.96	685	7.3
Jan. 1-31, 1965.	76,306	9.5	2.79	1.48	3.00	.06	2.79		4.33	.25	.03	.01		486	.66	50,435	41	2.05	713	7.4
Feb. 1-28.....	66,422	8.8	2.79	1.56	3.05	.08	2.79		4.50	.24	.04	.00		482	.66	43,541	41	2.06	718	8.0
Mar. 1-15.....	44,598	9.9	2.99	1.40	3.09	.07	2.84		4.41	.23	.02	.00		495	.67	30,024	41	2.08	727	7.4
Mar. 16-31.....	48,333	9.8	3.19	1.56	3.44	.07	2.95		4.98	.26	.02	.01		532	.72	34,970	42	2.23	783	7.1
Apr. 1-16.....	50,650	9.4	3.04	1.65	3.26	.07	2.93		4.81	.25	.02	.00		518	.70	35,682	41	2.13	773	7.1
Apr. 17-30.....	45,707	9.4	2.99	1.73	3.26	.07	2.93		4.85	.25	.02	.00		524	.71	32,573	41	2.12	775	7.4
May 1-31.....	88,665	6.3	2.99	1.73	3.18	.06	2.90		4.93	.24	.02	00		501	.68	60,413	40	2.07	769	7.6
June 1-11.....	29,193	8.1	2.59	1.97	3.13	.07	2.84		4.43	.26	.02	.01		525	.71	20,844	40	2.07	744	7.2
June 12-30.....	146,485	8.3	2.40	1.48	2.52	.06	2.51		3.71	.22	.02	.00		417	.57	83,075	39	1.81	635	6.8

July 1-9, 1965..	138,722	8.9	2.05	1.15	1.91	.05	2.13	2.94	.17	.02	.00	335	.46	63,202	37	1.51	519	7.0
July 10-23.....	215,484	8.8	1.90	1.32	1.74	.05	2.05	2.85	.15	.01	.00	314	43	92,020	35	1.37	483	6.3
July 24-31.....	84,512	8.6	1.70	.99	1.48	.05	1.87	2.21	.13	.01	.00	271	.37	31,148	35	1.28	425	6.7
Aug. 1-9.....	57,660	8.7	1.75	.90	1.48	.08	1.88	2.21	.12	.01	00	269	.37	21,094	35	1.28	421	7.0
Aug. 10-18.....	37,595	9.1	1.80	.80	1.48	.09	1.85	2.21	.12	.01	.00	264	36	13,498	35	1.30	420	7.0
Aug. 19-25.....	23,199	9.3	1.65	.90	1.44	.07	1.82	2.12	.10	.01	00	255	.35	9,779	35	1.27	404	7.0
Aug. 26-31.....	19,018	9.2	1.80	.80	1.52	.06	1.88	2 21	.13	.02	.00	272	.37	7,035	36	1.34	419	7.5
Sept. 1-10.....	24,873	10	1.95	.90	1.61	.05	1.98	2.39	.14	.01	.00	292	.40	9,877	36	1 35	451	7.7
Sept. 11-20.....	21,898	10	2.00	.90	1.70	.06	2.02	2.50	.16	.01	.00	300	41	8,934	36	1.41	461	7 6
Sept. 21-30.....	25,666	10	2.10	.82	1.83	.06	2.10	2.71	.16	.01	.00	320	.44	11,170	38	1.51	487	7.6
Total or weighted average	1,447,880	8.8	2.35	1.32	2.35	0.06	2.39	3.52	0.12	0.02	0.01	392	0.53	771,399	39	1.73	595	6.8

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 1965.
Water temperatures: April 1949 to September 1951, August 1952 to November 1958, June 1959 to September 1965.
Sediment records: July 1947 to September 1954, October 1955 to September 1958, October 1959 to September 1965.
EXTREMES, 1964-65.--Specific conductance: Maximum daily, 1,440 micromhos Dec. 22; minimum daily, 473 micromhos July 14.
Percent sodium: Maximum, 41 Nov. 25-30; minimum, 30 June 12-22.
Sodium-adsorption-ratio: Maximum, 2.59 Nov. 25-30; minimum, 1.23 July 10-15.
EXTREMES, 1947-65.--Specific conductance (1951-65): Maximum daily, 1,940 micromhos July 10, 1961; minimum daily, 384 micromhos June 20, 1951.
Percent sodium: Maximum, 49 May 23, 1952; minimum, 27 June 20-21, 1955.
Sodium-adsorption-ratio (1961-65): Maximum, 2.97 Aug. 24-31, 1963; minimum, 1.15 June 29 to July 9, 1964.
REMARKS.--Values reported for sodium (Na) are determined by analysis and do not include potassium (K). Flow affected by ice Nov. 16-23, Nov. 28 to Apr. 2

Chemical analyses, water year October 1964 to September 1965

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, 1964.	105,858	--	7.40		4.79	--	3.80	0.00	7.70	--	--	--	--	780	1.06	6,244	39	1.82	1,100	7.7
Oct. 19-31.....	82,899	--	7.32		4.65	--	3.80	.00	7.45	--	--	--	--	766	1.04	86,361	39	2.43	1,050	7.7
Nov. 1-24.....	139,620	--	7.38		4.79	--	3.56	.00	7.93	--	--	--	--	780	1.06	148,109	39	2.49	--	7.5
Nov. 25-30.....	30,442	--	7.18		4.92	--	3.23	.00	8.08	--	--	--	--	790	1.07	32,707	41	2.59	1,100	7.5
Dec. 1-19.....	88,939	--	8.18		4.79	--	4.31	.00	7.93	--	--	--	--	827	1.12	100,031	37	2.37	1,160	7.4
Dec. 20-23.....	14,678	15	6.19	3.70	5.66	0.13	5.02	.00	10.51	0.54	0.04	0.02	0.17	995	1.35	19,862	36	2.54	1,360	7.4
Dec. 24-31.....	56,727	--	7.04		4.26	--	3.87	.00	6.81	--	--	--	--	724	98	55,856	38	2.27	1,030	7.4
Jan. 1-19, 1965.	119,615	--	4.54	2.71	4.05	--	4.02	.00	7.02	--	--	--	--	726	.99	118,103	36	2.12	1,030	7.8
Jan. 20-31.....	80,521	--	4.39	2.55	4.09	--	3.80	.00	7.06	--	--	--	--	722	98	79,065	37	2.19	1,040	8.0
Feb. 1-15.....	99,669	--	6.60		3.61	--	3.59	.00	6.14	--	--	--	--	660	90	89,463	35	1.99	939	7.4
Feb. 16-28.....	120,004	--	5.72		3.13	--	3.21	.00	5.25	--	--	--	--	582	.79	94,986	35	1.85	838	7.4
Mar. 1-16.....	162,645	--	5.96		3.39	--	3.34	.00	5.68	--	--	--	--	611	83	135,151	36	1.97	875	7.5
Mar. 17-31	134,093	--	6.84		3.96	--	3.79	.00	6.60	--	--	--	--	700	.95	127,656	37	2.14	997	7.7
Apr. 1-18.....	205,111	--	6.74		3.83	--	3.51	.00	6.56	--	--	--	--	688	94	191,918	36	2.09	971	7.7
Apr. 19-30.....	93,421	--	6.94		3.87	--	3.84	.00	6.48	--	--	--	--	703	.96	89,318	36	2.08	997	7.7
May 1-19.....	172,715	--	6.40		3.70	--	3.64	.00	6.08	--	--	--	--	653	89	153,384	37	2.07	939	7.7
May 20-31.....	119,532	--	5.44		2.57	--	3.26	.00	4.46	--	--	--	--	513	70	83,395	32	1.56	755	7.4
June 1-11.....	149,782	--	4.66		2.09	--	2.97	.00	3.58	--	--	--	--	431	.59	87,796	31	1.37	639	7.5

June 12-22, 1965	291,055	--	4.30	1.87	--	2 85	00	3.16	--	--	--	--	398	54	157,542	30	1 28	589	7.5
June 23-27.....	177,124	13	2.30 | 1.15	1.57	06	2.44	.00	2.62	14	02	01	05	335	46	80,698	31	1 19	497	7 8
June 28-July 9..	461,752	--	3.76	1.91	--	2.69	00	3 12	--	--	--	--	368	.50	231,098	34	1 40	550	7.4
July 10-15.....	197,792	12	2 35 | 1.07	1.61	.05	2.38	00	2 69	.13	02	00	05	341	.46	91,728	32	1 23	496	7.1
July 16-31.....	364,324	--	4.00	2 04	--	2.70	.00	3.06	--	--	--	--	390	.53	193,237	34	1.45	584	7 4
Aug. 1-12.....	115,581	--	5.00	2.96	--	2.95	00	4.87	--	--	--	--	518	70	81,424	37	1 87	762	7.5
Aug. 13-22.....	56,410	12	3.84 | 2.14	3.87	10	3.28	.00	6 33	.31	02	02	15	648	88	49,713	39	2.24	927	7.9
Aug. 22-31.....	105,898	--	6.40	4.35	--	3.39	.00	6.95	--	--	--	--	712	.97	102,543	40	2 43	1,010	7 9
Sept. 1-15.....	85,478	--	6.82	4.57	--	3 62	.00	7.14	--	--	--	--	747	1 01	86,373	40	2 47	1,040	7.8
Sept. 16-30.....	134,241	--	6.58	4.44	--	3 65	00	6 95	--	--	--	--	723	98	131,997	40	2.45	1,020	7.7
Total or weighted average	3,965,926	--	5.51	3.09	--	3.21	0.00	5.10	--	--	--	--	558	0.76	2,905,758	36	1.49	792	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 1965.
Water temperatures: April 1949 to September 1965.
Sediment records: June 1946 to September 1951.
EXTREMES, 1964-65.--Specific conductance: Maximum daily, 1,100 micromhos Apr. 26; minimum daily, 308 micromhos Apr. 3.
Percent sodium: Maximum, 34 July 5-21; minimum, 16 June 21-26.
Sodium-adsorption-ratio: Maximum, 1.46 Dec. 16-31; minimum, 0.47 June 21-26.
EXTREMES, 1949-65.--Specific conductance (1951-65): Maximum daily, 2,390 micromhos Sept. 11, 1958; minimum daily, 260 micromhos Feb. 8, 1963.
Percent sodium: Maximum, 69 May 4, 1955; minimum, 15 June 13-16, 1964.
Sodium-adsorption-ratio (1961-65): Maximum, 3.39 July 30 to Aug. 6, 1963; minimum, 0.45 June 13-16, 1964.
REMARKS.--Values reported for sodium (Na) are determined by analysis and do not include potassium (K).

Chemical analyses, water year October 1964 to September 1965

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. 1-17, 1964.	6,440	--	6.54		2.31	--	4.39	0.00	4.14	--	--	--	--	526	0.72	4,607	26	1.27	790	7.9
Oct. 18-31.....	6,359	--	6.90		2.18	--	4.46	.00	4.37	--	--	--	--	541	.74	4,679	24	1.17	808	7.9
Nov. 1-16.....	6,823	--	6.94		2.65	--	4.39	.00	5.00	--	--	--	--	571	.78	5,299	28	1.42	859	7.8
Nov. 17-30.....	4,637	--	7.62		2.70	--	4.46	.00	5.58	--	--	--	--	618	.84	3,898	26	1.38	914	7.6
Dec. 1-15.....	6,516	--	8.40		2.74	--	5.36	.00	5.48	--	--	--	--	653	.89	5,786	25	1.34	971	7.6
Dec. 16-31.....	3,808	--	9.20		3.13	--	5.97	.00	5.95	--	--	--	--	720	.98	3,729	25	1.46	1,060	7.6
Jan. 1-17, 1965.	5,226	--	9.06		3.09	--	5.97	.00	5.89	--	--	--	--	718	.98	5,104	25	1.45	1,050	7.6
Jan. 18-31.....	8,386	--	7.20		2.31	--	4.67	.00	4.50	--	--	--	--	562	.76	6,410	24	1.22	848	7.4
Feb. 1-18.....	12,639	--	3.79	4.11	2.44	0.11	5.16	.00	5.06	--	--	--	--	618	.84	10,623	23	1.23	901	8.1
Feb. 19-28.....	13,964	6.9	2.50	2.55	1.78	.13	3.61	.00	3.16	0.07	0.04	0.02	0 11	412	.56	7,824	26	1.12	630	8.1
Mar. 1-18.....	23,992	--	6.02		1.87	--	4.16	.00	3 62	--	--	--	--	474	.64	15,466	24	1.08	726	7.4
Mar. 19-30.....	11,568	--	8.46		2.70	--	5.56	.00	5.43	--	--	--	--	661	.90	10,399	24	1.31	974	7.9
Mar. 31-Apr. 6..	38,876	6.1	1.90	.90	1.17	.13	2.56	.00	1.39	07	.01	.02	05	245	.33	12,953	29	.99	396	6.9
Apr. 7-30.....	63,408	--	6.84		2.52	--	4.11	.00	5.25	--	--	--	--	639	.87	55,104	27	1 36	855	8.1
May 1-21.....	36,280	--	7.26		2.57	--	4.13	.00	5.58	--	--	--	--	609	.83	30,918	25	1.35	887	7.6

May 22-31, 1965.	24,734	--	5.28	1.61	--	3.33	.00	3.50	--	--	--	--	424	58	14,263	23	.99	643	7 4
June 1-8.....	18,184	--	3.80	1.13	--	2.77	.00	2.17	--	--	--	--	306	.42	7,568	23	.82	473	7.2
June 9-20.....	33,227	--	3.22	.87	--	2.56	.00	1.52	--	--	--	--	250	34	11,297	21	.69	389	7.6
June 21-26.....	21,743	9.4	1.75 / 1.15	.57	.05	2.43	.00	1.04	.04	.02	.00	.08	221	.30	6,535	16	.47	327	7.6
June 27-July 4..	18,296	--	3.62	1.00	--	2.92	.00	1.71	--	--	--	--	271	37	6,743	22	.74	440	7.3
July 5-21.....	31,258	--	3.86	1.96	--	3.33	.00	2.54	--	--	--	--	362	.49	15,389	34	1.41	566	7.4
July 22-31.....	6,129	9.2	2.64 / 2.22	1.96	.11	3.69	.00	3.16	.08	.01	.00	09	411	.56	3,426	28	1.26	645	7.9
Aug. 1-21.....	7,956	--	5.48	2.35	--	4.08	.00	3.75	--	--	--	--	473	.64	5,118	30	1.42	727	7.4
Aug. 22-31.....	5,236	--	5.28	1.83	--	3.93	.00	3.08	--	--	--	--	423	.58	3,012	26	1.12	664	7.4
Sept. 1-20.....	10,909	--	5.68	2.09	--	4.05	.00	3.54	--	--	--	--	463	.63	6,869	27	1 24	723	7.8
Sept. 21-30.....	8,826	--	6.00	1.83	--	4.00	.00	3.75	--	--	--	---	471	.64	5,654	23	1.05	710	8.2
Total or weighted average	435,420	--	5.42	1.87	--	3.69	0.00	3.52	--	--	--	--	452	0.61	267,803	26	1.14	689	7.4

JAMES RIVER BASIN

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

LOCATION.--At 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 1965.
Water temperatures: August 1956 to September 1965.
EXTREMES, 1964-65.--Specific conductance: Maximum daily, 3,170 micromhos Mar. 14; minimum daily, 412 micromhos Apr. 10,12.
Percent sodium: Maximum, 51 Nov. 20, minimum, 35 Apr. 19-20.
Sodium-adsorption-ratio: Maximum, 4.36 Mar. 21-24; minimum, 1.10 Apr. 9-13.
EXTREMES, 1956-65.--Specific conductance: Maximum daily, 3,170 micromhos Mar. 14, 1965; 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
Sodium-adsorption-ratio (1961-65): Maximum, 6.28 Oct. 12-20, 22-26, 28-30, 1961; minimum, 0.55 Mar. 27-29, 1962.
REMARKS.--Values reported for sodium (Na) are determined by analysis and do not include potassium (K). Daily samples for chemical analysis composited by discharge, and samples during periods of no flow at gage are composited by equal volume. Some spectrographic and radiochemical data 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. No flow past gage Oct. 1-2, 6, Oct. 9 to Nov. 13, Nov. 28 to Mar. 20, Aug. 11-16.

Chemical analyses, water year October 1964 to September 1965

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, 1964...	3	7.8	3.29	3.37	6.09	0.49	6.42	0.00	4.31	2.45	0.02	0.01	0.41	788	1.07	3	46	3.34	1,220	8.2
Oct. 4-5, 7-8..	26	--	7.46		6.09	--	6.05	.50	4.31	--	--	--	--	804	1.09	29	45	3.15	1,240	8.4
Nov. 14-17.....	258	7.2	2.94	3.78	6.61	.49	5.75	.60	4.87	2.60	.02	.02	.43	836	1.14	293	48	3.60	1,300	8.5
Nov. 18-19.....	52	--	6.88		6.70	--	6.42	.00	4.77	--	--	--	--	840	1.14	59	49	3.61	1,300	7.2
Nov. 20.....	30	--	6.40		6.70	--	6.26	.00	4.91	--	--	--	--	840	1.14	34	51	3.74	1,300	7.4
Nov. 21-27.....	22	--	7.36		7.22	--	6.85	.00	5.33	--	--	--	--	908	1.23	27	50	3.76	1,400	7.2
Mar. 21-24, 1965.....	103	5.5	7.88	9.79	12.96	.64	11.33	.00	15.51	4.43	.03	.03	.68	A1,850	2.52	260	41	4.36	2,650	8.2
Mar. 25-27.....	12	--	17.60		11.22	--	11.26	.00	14.57	--	--	--	--	1,800	2.45	29	39	3.78	2,460	8.2
Mar. 28-31.....	87	--	16.54		10.01	--	10.42	.00	12.24	--	--	--	--	1,670	2.27	198	38	3.48	2,300	8.0
Apr. 1.....	12	--	13.72		8.48	--	8.46	.00	11.62	--	--	--	--	1,360	1.85	22	38	3.24	1,940	7.9
Apr. 2-4.....	177	--	11.60		7.35	--	7.21	.00	9.22	--	--	--	--	1,170	1.59	281	39	3.05	1,690	7.9
Apr. 5-8.....	787	--	7.70		4.79	--	4.84	.00	6.23	--	--	--	--	786	1.07	841	38	2.44	1,140	7.5
Apr. 9-13.....	609	--	2.62		1.26	--	1.61	.00	2.08	--	--	--	--	271	.37	224	33	1.10	430	7.1
Apr. 14.....	89	--	2.76		1.35	--	1.74	.00	2.14	--	--	--	--	288	.39	35	33	1.15	455	7.0
Apr. 15-16.....	571	--	3.44		1.70	--	2.03	.00	2.83	--	--	--	--	347	.47	270	33	1.29	547	7.4

Apr. 17-18, 1965.....	420	--	4.14	2.31	--	2.51	.00	3.33	--	--	--	--	411	.56	235	36	1.60	652	7.4
Apr. 19-20.....	678	--	4.22	2.31	--	2.59	.00	3.37	--	--	--	--	412	.56	380	35	1.59	652	7.6
Apr. 21.....	916	6.3	3.34 | 2.71	4.35	.36	4.79	.00	4.08	1.44	.02	.01	.28	688	.94	857	40	2.50	1,000	7.5
Apr. 22-30.....	8,479	--	5.38	4.48	--	3.87	.00	4.48	--	--	--	--	640	.87	7,380	45	2.73	1,000	7.6
May 1-21.....	27,866	--	4.90	3.44	--	3.84	.00	3.48	--	--	--	--	542	.74	20,540	41	2.20	840	7.8
May 22.....	1,593	--	4.68	3.44	--	4.13	.00	2.89	--	--	--	--	508	.69	1,100	42	2.25	801	7.4
May 23-31.....	15,745	--	4.62	3.09	--	3.98	.00	2.79	--	--	--	--	484	.66	10,364	40	2.03	758	8.0
June 1-17.....	26,031	--	4.82	2.78	--	3.90	.00	3.04	--	--	--	--	486	.66	17,205	37	1.79	753	8.0
June 18-30.....	4,641	--	5.66	3.48	--	4.51	.00	3.50	--	--	--	-	570	.78	3,598	38	2.07	887	7.8
July 1-17.....	3,048	--	6.36	4.57	--	5.23	.00	4.14	--	--	--	--	668	.91	2,769	42	2.56	1,050	7.6
July 18.....	123	3.7	3.54 | 3.45	5.18	.41	5.67	.00	4.48	2.14	.02	.02	.28	756	1.03	126	41	2.77	1,150	7.9
July 19-31.....	1,075	--	7.12	5.52	--	5.80	.00	4.75	--	--	--	--	784	1.07	1,146	44	2.93	1,200	7.4
Aug. 1-10.....	177	--	8.00	5.96	--	6.02	.00	5.21	--	--	--	--	854	1.16	205	43	2.98	1,290	7.4
Aug. 17-31.....	547	--	7.80	6.05	--	5.83	.00	5.50	--	--	--	--	868	1.18	646	44	3.06	1,330	7.5
Sept. 1-12.....	348	--	7.70	6.61	--	6.15	.00	5.77	--	--	--	--	884	1.20	418	46	3.37	1,360	7.5
Sept. 13-30....	1,617	9.4	4.09 | 3.87	6.35	.46	6.38	.00	5.75	2.26	.02	.00	.38	883	1.20	1,942	43	3.18	1,330	8.2
Total or weighted average	B96,142	--	5.11	3.48	--	4.06	--	3.48	--	--	--	--	547	0.74	71,516	41	2.18	847	7.7

A Calculated from determined constituents.
B Mean discharge based on 365 days; mean discharge for 207 days of actual flow, 234 cfs.

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 1965.
Water temperatures: March 1951 to September 1965.
EXTREMES, 1964-65.--Specific conductance: Maximum daily, 974 micromhos July 1 (chan. 1), minimum daily, 398 micromhos Mar. 23 (chan. 1)
Percent sodium: Maximum, 39 July 26 to Aug. 31; minimum, 22 June 22.
Sodium-adsorption-ratio: Maximum, 1.91 July 26 to Aug. 31; minimum, 1.10 June 22.
EXTREMES, 1951-65.--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: 46 Aug. 1-2, 1955; minimum, 22 Nov. 26, 1952.
Sodium-adsorption-ratio (1961-65): Maximum, 2.19 July 24 to Aug. 17, 1964: minimum, 1.18 Mar. 1-20, 1964.
REMARKS.--Values reported for sodium (Na) are determined by analysis and do not include potassium (K). Daily samples for chemical analysis from each of two major channels composited by discharge. Composite periods normally identical to those of Supply Canal (Tri-County diversion) near Maxwell, Nebr.

Chemical analyses, water year October 1964 to September 1965

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, 1964.	7,686	--	4.30		2.39	--	3.74	0.00	--	--	--	--	--	438	0.60	4,578	36	1.63	659	8.0
Nov. 1-30.....	7,855	--	4.36		2.26	--	3.77	.00	--	--	--	--	--	439	.60	4,689	34	1.53	643	8.2
Dec. 1-31.....	9,100	39	2.94	1.40	2.18	0.26	3.77	.00	2.42	0.42	0.03	0.02	0.09	427	.58	5,285	32	1.48	640	7.7
Jan. 1-31, 1965.	9,408	39	2.99	1.15	1.91	.24	3.61	.00	2.21	.37	.03	.04	.07	406	.55	5,195	30	1.33	603	7.8
Feb. 1-28.....	9,552	--	4.08		1.87	--	3.52	.00	--	--	--	--	--	395	.54	5,132	31	1.31	587	8.1
Mar. 1-31.....	10,883	39	2.94	1.07	1.70	.23	3.54	.00	2.04	.31	.03	.04	.07	390	.53	5,773	29	1.20	572	7.4
Apr. 1-2.....	742	--	4.04		1.70	--	3.43	.00	--	--	--	--	--	386	.52	389	30	1.19	571	7.5
Apr. 3-7.....	3,412	--	4.00		1.70	--	3.39	.00	--	--	--	--	--	391	.53	1,814	30	1.20	576	7.5
Apr. 8-30.....	7,847	--	4.30		1.78	--	3.67	.00	--	--	--	--	--	408	.55	4,354	29	1.22	603	7.0
May 1-4, 6-31...	13,031	--	4.26		2.04	--	3.61	.00	--	--	--	--	--	420	.57	7,444	32	1.40	623	7.9
May 5.....	365	36	2.94	1.23	2.00	.25	3.49	.00	2.46	.39	.02	.02	.09	412	.56	204	31	1.38	621	7.5
June 1-4.....	1,539	--	4.32		2.00	--	3.74	.00	--	--	--	--	--	423	.58	885	32	1.36	626	8.2
June 5-7.....	4,760	--	3.52		1.65	--	3.20	.00	--	--	--	--	--	355	.48	2,298	32	1.25	530	8.2
June 8-21.....	11,163	--	4.40		2.00	--	3.93	.00	--	--	--	--	--	425	.58	6,452	31	1.35	625	8.2
June 22.....	7,379	28	5.59	1.56	2.09	.28	3.90	.00	5.02	.37	.04	.00	.12	619	.84	6,212	22	1.10	860	7.3

June 23-27, 1965	103,339	--	6.48	2.52	--	3.28	0.00	--	--	--	--	--	604	.82	84,887	28	1.40	862	8.0
June 28-July 4..	31,559	--	6.66	3.18	--	3.61	.00	--	--	--	--	--	657	.89	28,199	32	1.74	931	7.2
July 5-25.....	14,745	--	4.64	2.26	--	3.61	.00	--	--	--	--	--	468	.64	9,385	33	1.49	681	7.2
July 26-Aug. 31.	57,463	--	4.64	2.91	--	3.74	.00	--	--	--	--	--	508	.69	39,700	39	1.91	754	7.5
Sept. 1-30.....	19,101	37	3.14 | 1.23	2.22	.28	3.67	.00	2.62	.45	.03	.00	.08	434	.59	11,274	32	1.50	646	7.6
Total or weighted average	330,929	--	5.32	2.45	--	3.55	0.00	--	--	--	--	--	520	0.71	234,149	32	1.51	755	7.5

PLATTE RIVER BASIN--Continued

6-7680. PLATTE RIVER NEAR OVERTON, NEBR.

LOCATION.--At gaging station at highway bridge, 4 miles south of Overton, Dawson County, and 4 miles downstream from Plum Creek.
DRAINAGE AREA.--58,400 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: December 1951 to September 1952, November 1958 to September 1965.
Water temperatures: November 1958 to September 1965.
EXTREMES, 1964-65.--Specific conductance: Maximum daily, 908 micromhos July 3 (north chan.); minimum daily, 310 micromhos May 25 (south chan.).
Percent sodium: Maximum, 41 Oct. 1-31; minimum, 24 June 25.
Sodium-adsorption-ratio: Maximum, 2.10 Oct. 1-31; minimum, 1.19 June 25.
EXTREMES, 1958-65.--Specific conductance: Maximum daily, 1,420 micromhos Feb. 8, 1962 (south chan.); minimum daily, 299 micromhos Aug. 31, 1963 (south chan.).
REMARKS.--Values reported for sodium (Na) are determined by analysis and do not include potassium (K). Daily samples for chemical analysis composited by discharge.

Chemical analyses, water year October 1964 to September 1965

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, 1964.	54,294	--	4.58		3.18	--	3.70	0.00	3.39	--	--	--	--	485	0.66	35,812	41	2.10	748	8.0
Nov. 1-30.....	55,160	--	4.40		2.96	--	3.74	.00	3.21	--	--	--	--	484	.66	36,309	40	1.99	728	7.1
Dec. 1-31.....	61,180	30	2.94	1.73	2.91	0.28	3.98	.00	3.31	0.54	0.03	0.01	0.11	497	.68	41,353	37	1.91	748	7.9
Jan. 1-31, 1965.	66,776	27	3.24	1.40	2.78	.28	3.92	.00	3.19	.54	.03	.02	.10	481	.65	43,682	36	1.83	728	8.0
Feb. 1-28.....	70,865	--	4.80		2.70	--	3.88	.00	3.27	--	--	--	--	496	.67	47,803	36	1.74	740	7.6
Mar. 1-31.....	71,264	30	3.34	1.56	2.61	.28	3.84	.00	3.21	.45	.03	.04	.11	491	.67	47,587	33	1.67	735	7.2
Apr. 1-30.....	60,754	--	4.66		2.57	--	3.67	.00	3.16	--	--	--	--	480	.65	39,660	36	1.68	717	7.7
May 1-4, 6-23...	16,320	--	5.02		2.78	--	3.70	.00	3.69	--	--	--	--	511	.69	11,342	36	1.76	769	7.6
May 5.....	688	29	3.19	1.56	2.78	.31	3.54	.00	3.54	.59	.02	.02	.09	498	.68	466	35	1.81	751	7.7
May 24-31.....	38,099	--	3.76		2.00	--	2.93	.00	2.64	--	--	--	--	385	.52	19,948	35	1.46	592	7.9
June 1-24.....	66,073	--	4.88		2.57	--	3.84	.00	3.25	--	--	--	--	496	.67	44,570	34	1.64	718	7.5
June 25.....	19,716	21	5.34	1.32	2.18	.36	3.62	.00	5.02	.42	.04	.01	.10	595	.81	15,954	24	1.19	848	7.5
June 26-27.....	52,959	--	6.20		2.44	--	3.13	.00	5.10	--	--	--	--	604	.82	43,502	28	1.38	819	7.6
June 28.....	19,815	22	4.64	1.48	2.57	.31	3.36	.00	4.81	.62	.04	.02	.13	571	.78	15,387	29	1.47	842	7.1
June 29.....	15,055	23	4.89	1.48	2.52	.31	3.46	.00	4.96	.68	.04	.01	.12	601	.82	12,305	27	1.41	855	7.7

June 30-July 7, 1965.....	64,614	--	5.82	2.78	--	3.77	.00	4.33	--	--	--	--	567	.77	49,825	32	1.63	825	7.4
July 8-15.....	26,039	--	5.46	2.70	--	3.95	.00	3.79	--	--	--	--	542	.74	19,194	33	1.63	790	7.5
July 16-31.....	11,457	--	5.54	2.87	--	4.03	.00	3.98	--	--	--	--	558	.76	8,694	34	1.73	822	7.3
Aug. 1-24.....	18,089	--	5.20	3.00	--	3.90	.00	3.93	--	--	--	--	551	.75	13,555	37	1.86	811	6.9
Aug. 25.....	2,420	31	3.64 | 1.56	3.09	.33	3.92	.00	3.89	.62	.03	.02	.09	548	.75	1,803	36	1.91	808	7.5
Aug. 26-Sept.30.	107,893	--	5.24	2.87	--	3.77	.00	4.29	--	--	--	--	545	.74	79,970	35	1.77	806	7.3
Total or weighted average	899,530	--	5.05	2.71	--	3.72	0.00	3.68	--	--	--	--	514	0.70	628,721	35	1 71	759	7.4

PLATTE RIVER BASIN--Continued

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 1965.
Water temperatures: March 1951 to September 1965.
EXTREMES, 1964-65.--Specific conductance: Maximum daily, 1,200 micromhos Sept. 19, 26, 27, 29; minimum daily, 539 micromhos June 5.
Percent sodium: Maximum, 42 Oct. 1-31; minimum, 21 June 22.
Sodium-adsorption-ratio: Maximum, 2.20 Sept. 1-30; minimum, 1.10 June 22.
EXTREMES, 1951-65.--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, July 24 to Aug. 17, 1964; minimum, 21 June 22, 1965.
Sodium-adsorption-ratio (1961-65): Maximum, 2.57 Aug. 1-17, 1964, minimum; 1.10 June 22, 1965.
REMARKS.--Values reported for sodium (Na) are determined by analysis and do not include potassium (K). Composite periods normally identical to those of Platte River at Brady, Nebr. Daily samples for chemical analysis composited by discharge. Records of discharge given in reports of State engineer.

Chemical analyses, water year October 1964 to September 1965

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, 1964.	63,578	--	4.00		2.87	--	3.61	0.00	--	--	--	--	--	446	0.61	38,564	42	2.03	681	8.1
Nov. 1-30.....	56,707	--	4.04		2.74	--	3.52	.00	--	--	--	--	--	446	.61	34,396	40	1.93	678	8.1
Dec. 1-31.....	67,882	26	2.69	1.40	3.00	0.26	3.72	.00	3.04	0.54	0.03	0.00	0.12	462	.63	42,652	41	2.10	708	7.5
Jan. 1-31, 1965.	64,316	28	2.94	1.32	2.91	.26	3.57	.00	3.23	.51	.03	.03	.09	472	.64	41,286	39	2.00	710	7.3
Feb. 1-28.....	63,035	--	4.44		2.87	--	3.56	.00	--	--	--	--	--	485	.66	41,578	39	1.93	727	7.9
Mar. 1-31.....	61,672	30	3.14	1.40	2.87	.25	3.51	.00	3.50	.54	.03	.03	.10	497	.68	41,685	37	1.91	734	7.3
Apr. 1-2.....	4,046	--	4.52		2.52	--	3.38	.00	--	--	--	--	--	479	.65	2,636	36	1.68	717	7.7
Apr. 3-7.....	10,929	--	4.32		2.18	--	3.33	.00	--	--	--	--	--	454	.62	6,748	33	1.48	661	7.6
Apr. 8-30.....	45,620	--	4.78		3.00	--	3.39	.00	--	--	--	--	--	517	.70	32,076	39	1.94	769	7.6
May 1-4, 6-31...	86,162	--	4.54		3.13	--	3.49	.00	--	--	--	--	--	496	.67	58,121	41	2.08	756	7.7
May 5.....	2,995	27	3.14	1.65	3.18	.28	3.47	.00	4.06	.62	.03	.02	.13	531	.72	2,163	39	2.05	799	7.5
June 1-4.....	9,029	--	4.20		2.70	--	3.47	.00	--	--	--	--	--	464	.63	5,698	39	1.86	697	8.2
June 5-7.....	10,812	--	3.72		2.09	--	3.13	.00	--	--	--	--	--	394	.54	5,793	36	1.53	594	8.1
June 8-21.....	37,599	--	4.76		2.70	--	3.64	.00	--	--	--	--	--	502	.68	25,669	36	1.75	739	8.2
June 22.....	2,777	25	6.29	1.48	2.18	.36	4.44	.00	5.31	.39	.03	.00	.11	680	.92	2,568	21	1.10	924	7.2

June 23-24, 1965	5,871	--	6.90	2.31	--	3.28	.00	--	--	--	--	--	617	.84	4,927	25	1.24	874	7.8
June 25-27.....	10,056	--	6.62	2.74	--	3.21	.00	--	--	--	--	--	625	.85	8,548	29	1.51	895	8.1
June 28-July 4..	26,811	--	7.38	3.61	--	3.62	.00	--	--	--	--	--	722	.98	26,326	33	1.88	1,020	7.3
July 5-25.....	75,433	--	5.90	3.44	--	3.64	.00	--	--	--	--	--	631	.86	64,734	37	2.00	908	7.2
July 26-Aug. 31.	145,970	--	5.84	3.61	--	3.54	.00	--	--	--	--	--	640	.87	127,052	38	2.11	931	7.3
Sept. 1-30.....	103,894	6.4	4.34 1.97	3.92	.28	3.90	.00	5.41	.76	.03	.00	.13	671	.91	94,810	37	2.20	975	7.8
Total or weighted average	955,194	--	4.71	3.16	--	3.59	0.00	--	--	--	--	--	545	0.74	708,012	40	2.06	805	7.5

PLATTE RIVER BASIN--Continued

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 1965.
Water temperatures: October 1945 to September 1965.
EXTREMES, 1964-65.--Specific conductance: Maximum daily, 2,540 micromhos Apr. 3; minimum daily, 736 micromhos June 17.
Percent sodium: Maximum, 37 on many days during February, April, June, and July; minimum, 25 June 19-23.
Sodium-adsorption-ratio: Maximum, 3.26 Feb. 1-28; minimum, 1.21 June 19-23.
EXTREMES, 1945-65.--Specific conductance: Maximum daily, 3,000 micromhos Dec. 28, 30, 1962; minimum daily, 617 micromhos Aug. 19, 1953.
Percent sodium: Maximum, 82 Mar. 1-2, 1947; minimum, 25 June 19-23, 1964.
Sodium-adsorption-ratio: Maximum, 3.32 Jan. 15-31, 1963; minimum, 1.21 June 19-23, 1965.
REMARKS.--Values reported for dissolved solids less than 1,000 ppm are residues at 180°C, and values more than 1,000 ppm are calculated from the determined constituents unless otherwise noted. Values reported for sodium (Na) are determined by analysis and do not include potassium (K). Daily samples for chemical analysis composited by equal volume.

Chemical analyses, water year October 1964 to September 1965

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, 1964.	1,482	--	15.44		8.00	--	6.02	0.00	--	--	--	--	--	A1,560	2.12	3,144	34	2.88	1,990	8.2
Nov. 1-30.....	2,928	--	15.42		8.05	--	5.38	.00	--	--	--	--	--	A1,590	2.16	6,331	34	2.90	2,020	7.1
Dec. 1-31.....	4,642	33	11.58	4.44	8.40	0.54	5.70	.00	16.20	2.14	0.03	0.07	0.25	1,560	2.12	9,849	34	2.97	2,080	7.8
Jan. 1-31, 1965.	5,528	31	11.28	4.52	8.70	.43	5.34	.00	16.45	2.12	.04	.08	.26	1,560	2.12	11,728	35	3.10	2,030	7.6
Feb. 1-28.....	8,719	--	16.00		9.22	--	5.10	.00	--	--	--	--	--	A1,700	2.31	20,159	37	3.26	2,120	7.7
Mar. 1-31.....	7,194	23	10.58	4.94	8.00	.38	4.88	.00	16.66	2.00	.04	.03	.26	1,510	2.05	14,774	33	2.87	2,060	7.2
Apr. 1-15.....	2,710	--	15.12		8.70	--	4.33	.00	18.43	--	--	--	--	A1,620	2.20	5,972	37	3.16	2,070	7.4
Apr. 16-30.....	788	--	14.72		8.35	--	4.23	.00	--	--	--	--	--	A1,550	2.11	1,662	36	3.08	1,980	7.1
May 1-31.....	2,822	--	14.18		8.13	--	4.26	.00	--	--	--	--	--	A1,480	2.01	5,681	36	3.05	1,900	7.2
June 1-8.....	2,063	--	14.18		8.18	--	4.65	.00	--	--	--	--	--	A1,490	2.03	4,180	37	3.07	1,940	7.9
June 9-10.....	635	--	11.36		6.44	--	3.72	.00	--	--	--	--	--	A1,200	1.63	1,036	36	2.70	1,580	8.2
June 11-12.....	944	--	14.18		8.27	--	4.57	.00	--	--	--	--	--	A1,520	2.07	1,952	37	3.10	1,950	8.0
June 13-14.....	809	21	7.58	3.37	5.96	.28	4.25	.00	11.14	1.33	.04	.02	.23	1,070	1.46	1,178	35	2.55	1,480	7.8
June 15-17.....	7,436	--	5.22		2.31	--	2.87	.00	--	--	--	--	--	519	.71	5,249	31	1.43	758	7.9
June 18.....	4,046	20	5.99	2.06	3.57	.33	3.80	.00	7.02	.82	.03	.02	.13	770	1.05	4,237	30	1.78	1,070	7.6

June 19-23, 1965	170,579	--	6.70	2.22	--	3.43	.00	--	--	--	--	--	591	.80	137,104	25	1.21	844	7.9
June 24-26.....	43,617	--	6.78	3.09	--	3.13	.00	--	--	--	--	--	646	.88	38,320	31	1.68	928	8.0
June 27-28.....	17,653	--	7.44	3.57	--	3.36	.00	--	--	--	--	--	718	.98	17,238	32	1.85	1,020	8.1
June 29.....	6,744	21	7.88 | 3.78	6.26	.28	4.49	.00	11.76	1.41	.04	.02	.22	1,130	1.54	10,364	34	2.59	1,560	7.8
June 30.....	5,752	--	8.48	4.83	--	3.82	.00	--	--	--	--	--	930	1.26	7,275	36	2.34	1,270	7.9
July 1-27.....	36,899	--	11.04	6.39	--	4.25	.00	--	--	--	--	--	A1,150	1.56	57,709	37	2.72	1,530	6.8
July 28.....	4,681	19	5.59 | 1.97	3.52	.25	3.54	.00	6.75	.87	.04	.06	.14	732	1.00	4,660	31	1.81	1,030	7.6
July 29-Aug. 31.	72,833	--	12.62	6.96	--	4.36	.00	--	--	--	--	--	A1,290	1.75	127,778	36	2.77	1,690	7.2
Sept. 1-30.....	23,921	21	8.53 | 4.52	7.53	.31	4.75	.00	13.78	1.72	.04	.08	.24	1,300	1.77	42,292	33	2.95	1,790	7.5
Total or weighted average	435,425	--	9.36	4.48	--	3.85	0.00	--	--	--	--	--	910	1.23	539,872	32	2.07	1,240	7.6

A Residue at 180°C.

PART 7. LOWER MISSISSIPPI RIVER BASIN

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 1965.
Water temperatures: January 1951 to September 1965.
EXTREMES, 1964-65.--Specific conductance: Maximum daily, 4,620 micromhos Dec. 18, Feb. 1; minimum daily, 476 micromhos June 18.
Percent sodium: Maximum, 41 Oct. 1-12, Dec. 16 to Feb. 3; minimum, 11 June 18.
Sodium-adsorption-ratio: Maximum, 6.08 Jan. 1 to Feb. 3; minimum, 0.38 June 18.
EXTREMES, 1951-65.--Specific conductance: Maximum daily, 5,180 micromhos Apr. 21, 1955; minimum daily, 476 micromhos June 18, 1965.
Percent sodium: Maximum, 44 Feb. 23-28, Mar. 1-31, 1962; minimum, 4 May 27, 1964.
Sodium-adsorption-ratio: Maximum, 6.28 Nov. 3-13, 1961; minimum, 0.17 May 27, 1964.
REMARKS.--Where no potassium (K) is reported, sodium (Na) and potassium (K) are calculated and reported as sodium (Na). Additional samples were collected for more comprehensive definition of water quality at this station.

Chemical analyses, water year October 1964 to September 1965

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, 1964.	781		32.40		22.32		3.57	0.00	48.09	3.05				3,960	5.39	4,205	41	5.54	4,060	7.9
Oct. 13-31.....	1,180		25.40		17.10		4.06	.00	34.35	4.06				2,890	3.93	4,636	40	4.80	3,120	7.9
Nov. 1-30.....	1,607		28.20		17.49		4.75	.00	37.68	3.27				3,220	4.38	7,036	38	4.66	3,370	7.8
Dec. 1-6.....	315		29.60		18.79		4.92	.00	40.18	3.27				3,390	4.61	1,454	39	4.88	3,530	7.7
Dec. 7-10.....	222		33.80		22.97		4.59	.00	48.09	4.06				4,020	5.47	1,215	40	5.59	4,110	7.8
Dec. 11-15.....	236		30.60		19.58		4.16	.00	42.47	3.55				3,580	4.87	1,149	39	5.00	3,700	7.9
Dec. 16-31.....	92		36.80		25.67		4.95	.00	53.09	4.51				4,440	6.04	556	41	5.98	4,450	7.8
Jan. 1-31, 1965.	105		37.60		26.36		4.75	.00	54.34	4.85				4,460	6.07	634	41	6.08	4,550	7.5
Feb. 1-3.....	14		38.00		26.49		4.72	.00	54.96	4.80				4,530	6.16	84	41	6.08	4,550	7.6
Feb. 4-28.....	774		31.20		19.79		4.85	.00	42.47	3.67				3,540	4.81	3,724	39	5.01	3,680	7.7
Mar. 1-31.....	959		28.80		18.31		4.77	.00	38.93	3.39				3,280	4.46	4,279	39	4.83	3,550	7.8
Apr. 1-3.....	4,165		27.60		18.23		3.84	.00	38.73	3.33				3,120	4.24	17,674	40	4.91	3,560	8.0
Apr. 4-10.....	1,708		20.20		10.27		4.20	.00	24.36	1.92				2,090	2.84	4,854	34	3.23	2,450	8.2
Apr. 11-29.....	1,455		28.04		18.27		4.36	.00	20.75	3.39				3,180	4.32	6,286	39	1.53	3,620	8.1
Apr. 30.....	222		22.20		12.88		4.13	.00	28.52	2.43				2,360	3.21	713	37	3.86	2,770	8.2

May 1-2, 1965...	252	21.00	11.61	4.10	.00	26.44	2.09			2,170	2.95	743	36	3.58	2,520	7.6
May 3-5.....	446	26.00	15.40	4.43	.00	34.14	2.82			2,820	3.84	1,712	37	4.27	3,190	8.0
May 6-12.....	3,860	11.48	4.05	3.29	.13	11.16	.96			1,040	1.41	5,459	26	1.69	1,350	8.3
May 13-15.....	649	17.10	7.70	3.57	.00	19.53	1.69			1,660	2.26	1,464	31	2.63	1,990	7.8
May 16-17.....	401	20.20	9.57	4.25	.00	23.53	1.97			2,020	2.75	1,101	32	3.01	2,380	7.7
May 18-20.....	561	17.00	7.92	3.65	.00	19.61	1.66			1,670	2.27	1,274	32	2.72	2,040	7.7
May 21-23.....	287	27.20	14.88	4.98	.00	34.35	2.85			2,860	3.89	1,118	35	4.03	3,280	7.9
May 24-25.....	2,666	12.48	6.18	3.98	.00	13.64	1.02			1,200	1.63	4,351	33	2.47	1,600	7.5
May 26.....	1,226	24.40	8.22	4.95	.00	26.65	.90			2,200	2.99	3,668	25	2.35	2,420	7.3
May 27-28.....	2,257	10.80	3.39	3.79	.00	9.76	.65			928	1.26	2,849	24	1.46	1,240	7.7
May 29-31.....	2,993	8.68	2.61	3.10	.00	7.56	.62			733	1.00	2,984	23	1.25	1,020	7.6
June 1-4.....	2,285	11.48	4.44	2.98	.00	11.91	1.02			1,070	1.46	3,325	28	1.85	1,400	7.9
June 5-10.....	5,855	9.24	3.48	2.92	.00	9.06	.73			831	1.13	6,617	27	1.62	1,140	7.7
June 11-17.....	7,803	7.88	2.65	3.15	.00	6.87	.51			672	.91	7,131	25	1.34	954	7.9
June 18.....	34	4.48	.57	3.02	.00	1.89	.14			296	.40	14	11	.38	476	7.9
June 19-30.....	195	28.40	16.97	5.00	.00	36.85	3.50			3,100	4.22	823	37	4.50	3,570	8.0
July 1-6.....	436	26.80	18.10	3.03	.00	38.10	3.67			3,180	4.32	1,884	40	4.94	3,590	8.1
July 7.....	940	9.16	2.87	7.46	.00	3.83	.71			665	.90	850	24	1.34	1,110	8.2
July 8-24.....	34,933	6.28	2.44	2.26	.00	6.10	.37			575	.78	27,318	28	1.37	794	7.8
July 25.....	1,412	12.46	7.48	2.92	.00	15.68	1.35			1,400	1.90	2,689	38	3.00	1,690	7.8
July 26-27.....	2,995	6.52	2.48	2.02	.00	6.56	.42			608	.83	2,477	28	1.37	860	7.6
July 28.....	1,033	12.00	6.74	2.74	.00	14.80	1.21			1,310	1.78	1,841	36	2.75	1,630	7.6
July 29-31.....	10,967	6.48	2.48	2.00	.00	6.54	.42			599	.81	8,934	28	1.38	845	7.5
Aug. 1-21.....	71,643	6.64	2.78	2.02	.00	6.97	.42			611	.83	59,532	30	1.53	857	7.7
Aug. 22.....	3,610	13.72	7.87	3.13	.00	17.01	1.44			1,450	1.97	7,119	36	3.01	1,790	7.7
Aug. 23-31.....	55,517	6.80	2.91	2.10	.00	7.16	.45			643	.87	48,549	30	1.58	891	7.8
Sept. 1-20.....	48,873	7.56	3.31	2.18	.00	8.18	.51			765	1.04	50,847	30	1.70	1,000	7.7
Sept. 21-30.....	2,122	9.90	5.18	2.51	.10	11.66	.79			1,040	1.41	3,002	34	2.33	1,320	8.4
Total or weighted average	280,086	8.54	3.92	2.39	--	9.39	0.65			835	1.14	318,174	31	1.90	1,090	7.7

ARKANSAS RIVER BASIN--Continued

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, 5.4 miles upstream from Walnut River, and at mile 701.4.
DRAINAGE AREA.--43,713 square miles, of which 7,607 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: October 1951 to September 1965.
Water temperatures: October 1951 to September 1965.
Sediment records: September 1961 to September 1965.
EXTREMES, 1964-65.--Specific conductance: Maximum daily, 2,470 micromhos Mar. 27; minimum daily, 162 micromhos Nov. 17.
Percent sodium: Maximum, 78 Jan. 1-14, Feb. 27-28; minimum, 36 Apr. 4.
Sodium-adsorption-ratio: *Maximum*, 10.12 Mar. 5-17; *minimum*, 0.95 Nov. 16-18.
EXTREMES, 1951-65.--Specific conductance: Maximum daily, 5,770 micromhos Jan. 16, 1957; minimum daily, 162 micromhos Nov. 17, 1964.
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.--Values reported for sodium (Na) are determined by analysis and do not include potassium (K), Oct. 1 to Jan. 31; sodium (Na) and potassium (K) values are calculated and reported as sodium (Na), Feb. 1 to Sept. 30. Flow affected by ice Dec. 4-7, 17-21, Feb. 24, 25.

Chemical analyses, water year October 1964 to September 1965

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, 1964	6,367		7.50		13.05		--	--	2.87	13.26		--	--	1,200	1.63	10,391	64	6.74	2,020	--
Oct. 11-24	7,470		7.10		14.79		--	--	3.02	14.67		--	--	1,320	1.80	13,410	68	7.85	2,240	--
Oct. 25	1,071		7.00		9.31		--	--	2.50	9.73		--	--	1,000	1.36	1,457	57	4.98	1,650	--
Oct. 26-28	16,584		3.36		3.35		--	--	1.48	3.53		--	--	459	62	10,352	50	2.58	740	--
Oct. 29-31	3,832		5.50		9.09		--	--	2.39	8.97		--	--	918	1.25	4,784	62	5.48	1,530	--
Nov. 1-3	2,969		6.90		12.53		--	--	2.81	12.69		--	--	1,150	1.56	4,644	64	6.74	1,960	--
Nov. 4-7	41,851		2.72		2.09		--	--	.96	2.03		--	--	335	46	19,067	43	1.79	502	--
Nov. 8-15	14,122		7.00		9.66		--	--	2.60	10.16		--	--	1,020	1.39	19,590	58	5.16	1,680	--
Nov. 16-18	213,203		1.36		.78		--	--	.67	.71		--	--	186	25	53,932	37	.95	229	--
Nov. 19-21	42,944		2.80		2.39		--	--	1.02	2.65		--	--	341	46	19,916	46	2.02	570	--
Nov. 22-24	13,228		5.44		7.48		--	--	1.98	7.62		--	--	794	1.08	14,284	58	4.54	1,320	--
Nov. 25-30	15,376		8.20		10.27		--	--	2.81	11.71		--	--	1,170	1.59	24,466	56	5.07	1,900	--
Dec. 1-10	16,939		5.96		12.27		--	--	3.16	12.69		--	--	1,120	1.52	25,801	67	7.11	1,940	--
Dec. 11-13	21,261		3.52		3.57		--	--	1.48	3.67		--	--	448	.61	12,954	50	2.69	784	--
Dec. 14-16	8,586		3.84		7.22		--	--	2.06	7.56		--	--	698	.95	8,151	65	5.21	1,240	--

Dec. 17, 1964...	1,587	4.20	9.96	--	--	2.46	10.10	--	--	864	1.18	1,865	70	6.87	1,570	--
Dec. 18-31.....	22,187	5.68	11.79	--	--	3.12	12.92	--	--	1,140	1.55	34,399	67	7.00	1,970	--
Jan. 1-14, 1965.	21,021	3.80	13.09	--	--	3.33	14.11	--	--	1,250	1.70	35,735	78	9.50	2,030	--
Jan. 15-31.....	23,064	5.10	13.05	--	--	3.37	14.11	--	--	1,250	1.70	39,208	72	8.17	2,060	--
Feb. 1-10.....	13,012	4.72	14.36	1.02	.27	3.37	14.39	.01	--	1,170	1 59	20,704	75	9.34	2,060	8 7
Feb. 11-17.....	11,593	4.56	11.27	1.05	.53	3.23	11.00	.02	--	990	1 35	15,609	71	7.46	1,700	9.0
Feb. 18-26.....	14,513	4.16	13.96	.98	.13	3.02	13.96	.01	--	1,120	1.52	22,106	77	9.68	1,980	8.7
Feb. 27-28.....	4,443	2.84	9.83	.98	.00	2.33	9.37	.02	--	788	1.07	4,761	78	8.25	1,390	7.9
Mar. 1-4.....	11,472	3.32	9.92	.66	.53	2.69	9.37	.01	--	828	1 13	12,919	75	7 70	1,410	9.4
Mar. 5-17.....	20,938	4.32	14.88	.85	.27	3.37	14.67	.01	--	1,210	1.65	34,455	77	10 12	1,990	8.9
Mar. 18.....	1,914	4.24	8.92	1.38	.00	3.44	8.32	.02	--	877	1.19	2,283	68	6.12	1,430	8.0
Mar. 19-31.....	17,431	5.32	15.27	1.31	.53	3.75	14.95	.04	--	1,300	1.77	30,818	74	9.36	2,120	8.9
Apr. 1-3.....	13,263	7.52	14.18	3.47	.33	3.64	14.11	14	--	1,350	1 84	24,352	65	7 31	2,200	8.6
Apr. 4.....	15,233	2.36	1.31	1.34	.00	.85	1.35	.12	--	243	.33	5,034	36	1.20	377	8.0
Apr. 5.....	7,061	4.24	4.74	2.16	.07	2.14	4.51	10	--	571	78	5,483	53	3.26	926	8.3
Apr. 6.....	14,221	2.20	1.31	1.38	.00	.73	1.33	.08	--	241	.33	4,661	37	1.24	367	8.0
Apr. 7-8.....	10,274	4.36	4.70	2.33	.00	2.02	4.65	09	--	585	.80	8,174	52	3.18	962	7.8
Apr. 9-14.....	14,245	7.48	12.53	3.67	.27	3.54	12.41	.12	--	1,220	1.66	23,636	63	6.48	2,020	8 4
Apr. 15-17.....	8,747	5.84	9.61	3.08	.00	2.94	9.31	12	--	942	1 28	11,206	62	5.63	1,550	8.2
Apr. 18-25.....	14,947	5.48	14.49	3.51	.00	3.71	14.67	.09	--	1,350	1 84	27,443	73	8.75	2,250	8.2
Apr. 26-27.....	4,721	6.32	10.40	3.28	.00	3.44	9.87	.11	--	1,000	1 36	6,420	62	5.85	1,640	8.1
Apr. 28-30.....	5,939	6.80	13.09	3.57	.00	3.23	12.98	.10	--	1,220	1 66	9,853	66	7.10	2,020	8.1
May 1-13.....	20,602	5.36	15.75	1.74	.07	3.77	15.52	.00	--	1,280	1 74	35,865	75	9.62	2,220	8.4
May 14.....	9,977	5.12	9.61	3.02	.00	2.62	9.03	.07	--	870	1.18	11,805	65	6.01	1,530	8.2
May 15-16.....	20,212	2.00	2.31	1.41	.07	.90	1 89	02	13	261	35	7,174	54	2 31	444	8.4
May 17-26.....	34,195	3.56	7.66	1.38	.67	2.06	7.11	.01	--	676	92	31,438	68	5.74	1,170	9.1
May 27-28.....	28,939	1.48	1.65	.98	.13	.60	1.41	.00	--	195	.27	7,675	53	1 92	333	8.6
May 29-31.....	11,800	2.40	6.74	.39	.53	2 00	6.21	00	--	573	.78	9,195	74	6.16	997	9.4
June 1-3.....	13,109	4.12	7.13	1.77	.80	1.87	6.77	.03	.16	679	92	12,105	63	4.97	1,140	9.0
June 4-5.....	38,241	2.64	3.57	1.31	.60	1.02	3.24	.04	--	414	.56	21,531	57	3.10	636	9 2

ARKANSAS RIVER BASIN--Continued

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

Chemical analyses, water year October 1964 to September 1965--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 6-7, 1965..	106,512		1.28		1.26		0.79	0.47	0.35	0.93		0 00	0 16	160	0 22	23,177	50	1 58	265	9.2
June 8-15.....	248,648		1.76		1.87		1.11	40	48	1 64		01	--	218	30	73,719	52	1 99	375	9.0
June 16-20.....	84,337		1.76		3.48		.79	80	73	2 91		01	--	352	48	40,374	66	3.71	550	9.4
June 21-25.....	32,886		3.92		6.74		2.23	.47	1.81	6.15		01	--	659	90	29,474	63	4 82	1,100	8.7
June 26.....	17,375		3.20		2.83		1.51	.00	2.54	1.95		01	--	426	58	10,066	47	2.24	628	8.0
June 27-30.....	166,612		2.72		1.91		1.11	.20	2.31	1.02		01	--	328	45	74,322	41	1.64	477	8.8
July 1-12.....	232,328		5.24		4.26		2.13	.27	4.52	2 54		05	--	615	.84	194,319	45	2.63	930	8 5
July 13-14.....	14,539		6.80		6.70		2.85	.27	5.85	4.46		08	--	863	1.17	17,064	50	3 63	1,300	8.5
July 15-24.....	45,858		8.56		8.61		3.18	.53	6 87	6 49		08	--	1,150	1 56	71,722	50	4.16	1,690	8.6
July 25-31.....	22,048		9.00		10.53		3.44	.60	7.08	8 32		.08	--	1,240	1.69	37,182	54	4.96	1,900	8 7
Aug. 1-17.....	37,057		8.20		10.70		3 51	.27	6.45	8 52		13	--	1,170	1 59	58,965	57	5.28	1,880	8.4
Aug. 18-23.....	14,400		7.48		8.44		3.02	.27	6.04	6 49		.10	--	1,000	1.36	19,584	53	4.36	1,570	8.6
Aug. 24.....	2,717		4.80		6.18		2.10	.27	3.71	4 80		12	--	674	92	2,491	56	3.99	1,130	8.4
Aug. 25-31.....	14,037		7.44		9.14		3.02	.27	6 00	7.19		08	--	1,030	1 40	19,663	55	4.74	1,650	8.5
Sept. 1-6.....	45,556		4.00		3.70		1.38	.40	3.54	2.37		.00	--	502	68	31,102	48	2.61	780	8.9
Sept. 7-8.....	38,797		2.68		2.04		1.18	.93	2.25	1.18		.00	--	316	43	16,673	43	1.77	494	8.6
Sept. 9-18.....	58,374		5.48		5.83		1.70	00	6 50	3 10		.00	--	734	1.00	58,271	52	3.52	1,110	8.2
Sept. 19.....	15,015		3.20		3.31		1 25	.00	3 19	2 09		.00	--	452	.61	9,230	51	2.61	691	7.9
Sept. 20-26.....	185,772		2.16		1.78		1.05	.27	1 52	1.10		00	--	258	.35	65,184	45	1.72	405	8.8
Sept. 27-30.....	33,243		4.64		5.39		1.44	.27	4 79	3 53		.00	--	659	.90	29,794	54	3 54	1,030	8.6
Total or weighted average	2,290,515		3 53		4.61		--	--	2.39	3.95		0.00	--	528	0.71	1,643,487	57	3.23	840	--

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

LOCATION.--At gaging station near right bank on downstream side of pier of bridge on U.S. Highways 64 and 71 at Van Buren, Crawford County, 1.3 miles downstream from Lee Creek, 8.6 miles downstream from Poteau River, and at mile 353.4.
DRAINAGE AREA.--150,483 square miles, of which 22,241 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1965.
Water temperatures: October 1945 to September 1965.
EXTREMES, 1964-65.--Specific conductance: Maximum daily, 3,210 micromhos Dec. 29; minimum daily, 344 micromhos Nov. 26.
Percent sodium: Maximum, 79 Dec. 29-30; minimum, 43 July 16-31.
Sodium-adsorption-ratio: Maximum, 12.90 Dec. 29-30; minimum, 1.97 July 16-31.
EXTREMES, 1945-65.--Specific conductance: Maximum daily, 8,980 micromhos Apr. 1, 1954; minimum daily, 104 micromhos May 10, 1964.
Percent sodium: Maximum, 96 Apr. 21-24, 1964; minimum, 18 July 22, 1959.
Sodium-adsorption-ratio (1961-65): Maximum, 15.87 Feb. 25 to Mar. 1, 1964; minimum, 1.11 May 10, 1964.

Chemical analyses, water year October 1964 to September 1965

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. 1-7, 1964..	113,449	9.8	1.90	0.64	2.91	0.10	1.62	0.03	0.98	2.82	0.02	0.03	--	347	0.47	53,539	53	2.59	615	8.3
Oct. 8-Nov. 3...	118,032	6.7	3.19	.99	4.31	.10	2.57	.13	1.39	4.40	.04	.02	0.14	519	.71	83,312	50	2.98	919	8.4
Nov. 4-8.....	20,688	5.8	3.49	1.07	6.00	.12	2.79	.10	1.67	6.15	.04	.02	--	649	.88	18,260	56	3.97	1,160	8.4
Nov. 9-Dec. 3...	1,868,430	8.5	1.85	.61	2.39	.10	1.69	.00	.75	2.43	.02	.05	--	313	.43	795,353	48	2.16	549	7.7
Dec. 4-15.....	389,871	7.6	2.00	.58	4.57	.09	1.74	.00	.83	4.65	.02	.03	--	454	.62	240,722	63	4.03	830	8.1
Dec. 16-27.....	369,402	9.9	2.89	.99	8.96	.09	2.29	.00	1.42	9.25	.02	.04	--	830	1.13	416,981	69	6.43	1,470	8.1
Dec. 28.....	17,455	--	3.89	1.32	--	--	2.64	.20	--	16.28	--	--	--	--	--	--	--	--	2,350	8.5
Dec. 29-30.....	39,273	12	4.29	1.65	22.23	.10	2.62	.27	2.62	22.48	.03	.04	--	1,770	2.41	94,537	79	12.90	3,070	8.5
Dec. 31-Jan. 9, 1965.....	296,727	12	3.19	1.07	11.05	.10	2.34	.10	1.64	11.28	.02	.04	.14	968	1.32	390,636	72	7.57	1,730	8.3
Jan. 10-26.....	413,732	11	2.74	.90	7.22	.08	2.23	.00	1.39	7.42	.02	.04	.33	688	.94	387,121	66	5.35	1,230	8.1
Feb. 1-9.....	101,913	10	2.59	.90	4.00	.10	2.10	.13	1.00	4.18	.02	.04	--	453	.62	62,786	53	3.03	799	8.5
Feb. 10-23.....	348,774	9.3	1.70	.51	2.61	.07	1.48	.07	.73	2.68	.01	.04	--	313	.43	148,466	53	2.48	557	8.3
Feb. 24-26.....	83,306	10	2.00	.82	6.18	.07	1.64	.07	1.02	6.26	.01	.03	--	529	.72	59,934	68	5.20	1,030	8.3
Feb. 28-Mar. 22.	670,155	7.1	2.10	.80	3.39	.08	1.84	.07	.96	3.39	.01	.04	--	408	.55	371,856	53	2.82	713	8.4
Mar. 23-30.....	223,736	7.8	2.64	1.15	6.53	.08	2.07	.13	1.31	6.83	.02	.04	--	636	.86	193,522	63	4.74	1,100	8.5

ARKANSAS RIVER BASIN--Continued

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

Chemical analyses, water year October 1964 to September 1965--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				
Mar. 31-Apr. 25, 1965	3,338,658	12	2.05	0.73	2.65	0.09	1.84	0.07	0.90	2.54	0.02	0.04	0.03	319	0.43	1,448,443	48	2.25	587	8.3
Apr. 26-May 8	397,607	10	2.59	.99	4.13	.10	2.16	.13	1.12	4.23	.02	.05	--	449	.61	242,794	53	3.09	822	8.4
May 9-14	342,149	12	1.85	.63	2.61	.08	1.61	.00	.79	2.68	.01	.05	--	374	.51	174,031	50	2.34	557	8.1
May 15-26	481,269	11	2.64	1.07	6.53	.10	2.07	.13	1.29	6.63	.02	.04	--	597	.81	390,752	63	4.79	1,100	8.4
May 27-31	253,488	8.4	1.60	.76	2.61	.08	1.54	.00	.77	2.60	.02	.04	--	291	.40	100,320	52	2.41	543	8.2
June 1-20	1,790,281	8.4	2.35	.90	3.96	.10	2.07	.07	1.08	4.09	.02	.04	--	426	.58	1,037,217	54	3.11	787	8.3
June 21-30	1,111,140	9.8	1.85	.77	2.39	.09	1.77	.00	.71	2.40	.01	.05	--	290	.39	438,234	47	2.09	534	8.2
July 1-15	1,109,455	9.6	2.35	.90	3.92	.14	1.93	.07	1.15	4.01	.02	.05	.03	423	.58	638,247	54	3.07	778	8.3
July 16-31	583,299	7.3	2.25	.80	2.44	.14	2.00	.07	1.15	2.40	.01	.03	--	328	.45	260,198	43	1.97	599	8.3
Aug. 1-31	633,937	9.1	2.50	.80	3.09	.12	2.20	.00	1.23	3.10	.01	.03	.06	390	.53	336,240	48	2.41	683	8.1
Sept. 1-5	149,157	8.8	2.30	.82	3.78	.12	2.07	.00	1.10	3.67	.03	.03	--	404	.55	81,953	54	3.03	724	8.1
Sept. 7-9	72,000	9.4	3.54	1.07	8.66	.15	2.59	.00	2.44	8.12	.04	.02	--	783	1.06	76,671	65	5.70	1,380	8.1
Sept. 10-11	74,182	10	2.89	.99	5.18	.09	2.29	.00	1.87	5.02	.03	.03	--	542	.74	54,681	57	3.72	980	8.2
Sept. 12-16	210,645	11	3.44	1.32	8.40	.16	2.59	.00	2.56	7.90	.03	.03	--	778	1.06	222,879	63	5.44	1,390	8.2
Sept. 17-23	266,023	12	2.69	.99	4.35	.12	2.43	.00	1.48	4.23	.03	.03	--	479	.65	173,298	53	3.21	838	8.1
Sept. 24-28	833,455	12	2.99	.99	8.66	.15	2.16	.00	2.12	8.24	.05	.04	--	751	1.02	851,257	68	6.14	1,330	8.0
Sept. 29-30	305,653	11	2.20	.63	2.74	.06	1.90	.00	1.54	3.39	.05	.04	--	313	.43	130,110	49	2.31	663	8.1
Total or weighted average	17,027,341	9.9	2.25	0.81	4.05	0.10	1.95	--	1.10	4.03	0.02	0.04	--	431	0.59	9,974,350	57	3.14	778	8.1

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, 4 miles downstream from Wildhorse Creek, and at mile 87.3.
DRAINAGE AREA.--17,852 square miles, of which 4,926 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: October 1952 to September 1963, June to September 1965.
Water temperatures: October 1952 to September 1963, June to September 1965.
REMARKS.--Sodium (Na) and potassium (K) are calculated and reported as sodium (Na).

Chemical analyses, June to September 1965

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 16-19, 1965	12,361		5.04		50.90		2.36	0.00	2.60	50.78	0.03	0.08		3,420	4.65	57,493	91	32.06	6,010	7.9
June 20-21	2,642		7.64		75.69		2.56	.00	4.37	76.17	.03	.06		5,040	6.85	18,109	91	38.73	8,630	8.0
June 22	3,253		3.80		30.71		1.67	.40	1.83	30.47	.02	.10		2,120	2.88	9,379	89	22.28	3,790	8.4
June 23	2,281		2.72		15.57		1.64	.00	1.35	15.23	.02	.07		1,080	1.47	3,350	85	13.35	1,980	8.2
June 24	4,403		7.80		60.47		2.36	.67	4.37	60.65	.02	.19		4,120	5.60	24,673	89	30.62	7,070	8.4
June 25	8,251		10.00		87.87		2.95	.13	4.68	89.71	.05	.15		6,040	8.21	67,779	90	39.30	10,100	8.3
June 26-28	12,555		8.00		69.17		3.08	.00	4.68	69.11	.05	.13		4,720	6.42	80,595	90	34.58	8,110	8.2
June 29-30	4,602		6.32		46.11		2.23	.40	4.37	45.14	.01	.14		3,160	4.30	19,776	88	25.94	5,550	8.4
July 1	3,293		6.00		40.85		2.07	.20	2.12	42.32	.01	.04		3,060	4.16	13,702	87	23.58	5,290	8.4
July 2-3	5,217		8.40		73.95		2.39	.20	4.58	74.76	.10	.07		5,020	6.83	35,614	90	36.08	8,520	8.4
July 4-9	9,164		6.88		46.98		2.69	.27	4.16	46.55	.05	.08		3,270	4.45	40,753	87	25.33	5,600	8.6
July 10-18	9,086		9.00		57.43		2.52	.27	4.15	59.11	.04	.05		4,750	6.46	58,697	88	31.78	8,080	8.5
July 19-28	3,074		11.60		92.66		2.82	.20	6.56	94.50	.05	.06		6,420	8.73	26,843	89	38.47	10,600	8.5
July 29-31	4,058		4.64		27.54		2.03	.07	2.33	27.65	.03	.08		1,970	2.68	10,873	86	18.08	3,480	8.3
Aug. 1	659		4.64		26.10		2.75	.13	2.39	25.39	.03	.06		1,710	2.33	1,531	85	17.14	3,230	8.3

ARKANSAS RIVER BASIN--Continued

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

Chemical analyses, June to September 1965--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. 2, 1965....	440		7.16		41.89		2.62	0.13	3.91	42.32	0.02	0.04		2,970	4.04	1,779	85	22.14	5,310	8.4
Aug. 3-5.....	750		9.60		60.03		3.11	.07	5.00	61.50	.02	.03		4,300	5.85	4,385	86	27.40	7,370	8.4
Aug. 6-9.....	1,365		13.34		107.01		3.20	.27	7.16	109.45	.03	.03		7,450	10.13	13,826	89	41.43	12,400	8.4
Aug. 10-16.....	2,471		7.72		51.33		2.75	.20	3.85	52.19	.02	.05		3,500	4.76	11,764	87	26.13	6,220	8.4
Aug. 17-23.....	3,346		--		88.31		2.82	.13	6.87	90.27	.03	.07		5,850	7.96	26,634	42	35.90	10,200	8.3
Aug. 24-27.....	11,742		8.20		40.41		1.84	.00	5.73	40.90	.03	.09		2,900	3.94	46,311	83	19.96	5,190	8.0
Aug. 28-31.....	9,449		10.60		61.77		1.77	.00	7.29	63.47	.03	.00		4,150	5.64	53,332	85	26.83	7,640	7.4
Sept. 1-2.....	4,423		7.28		49.59		2.82	.07	4.58	49.37	.06	.19		3,360	4.57	20,212	87	25.99	6,000	8.3
Sept. 3-4.....	4,324		6.04		33.23		2.49	.00	4.12	32.44	.05	.18		2,280	3.10	13,408	85	19.12	4,090	8.1
Sept. 5.....	2,499		4.00		18.49		2.23	.00	1.98	18.05	.04	.18		1,320	1.80	4,487	82	13.07	2,470	8.1
Sept. 6-7, 1965.	4,007		5.84		29.49		2.16	.00	3.08	29.90	.04	.13		2,150	2.92	11,715	83	17.26	3,810	8.0
Sept. 8.....	1,230		10.40		53.07		2.33	.00	5.83	55.01	.05	.14		3,840	5.22	6,422	84	23.27	6,540	8.0
Sept. 9.....	952		14.20		99.62		2.69	.00	6.56	104.38	.05	.15		6,980	9.49	9,038	88	37.38	11,600	8.2
Sept. 10-12.....	2,071		12.30		68.30		2.29	.00	9.06	69.11	--	--		4,900	6.66	13,799	85	27.54	8,220	8.2
Sept. 13.....	496		16.76		108.32		2.85	.00	9.56	112.56	.04	.06		7,660	10.42	5,166	87	37.42	12,600	8.1
Sept. 14-19.....	2,011		16.00		83.96		3.15	.00	9.37	87.45	.03	.05		6,090	8.28	16,658	84	29.68	10,200	8.2
Sept. 20.....	885		6.00		38.02		1.77	.00	3.23	38.93	.02	.05		2,670	3.63	3,212	86	21.95	4,740	8.0
Sept. 21-23.....	198,565		2.92		5.35		1.70	.00	1.35	5.13	.01	.07		488	.66	131,784	65	4.43	893	8.1
Sept. 24.....	11,107		3.44		7.74		1.67	.00	2.10	7.33	.01	.08		676	.92	10,212	69	5.90	1,220	8.0
Sept. 25-26.....	9,878		4.88		12.05		1.64	.00	3.37	11.85	.01	.05		1,040	1.41	13,971	71	7.71	1,820	8.0
Sept. 27.....	2,678		5.88		19.49		1.97	.00	3.58	19.75	.01	.04		1,550	2.11	5,645	77	11.37	2,770	8.2
Sept. 28.....	3,094		7.76		36.28		2.03	.00	3.85	38.08	.02	.04		2,680	3.64	11,278	82	18.42	4,680	8.1
Sept. 29-30.....	4,324		9.40		60.90		2.49	.00	5.62	62.06	.03	.05		4,240	5.77	24,934	87	28.09	7,500	8.0
Total or weighted average	367,006		4.89		2.58		2.15	--	2.71	25.97	0.02	0.07		1,860	2.53	929,139	84	16.49	3,250	8.2

ARKANSAS RIVER BASIN

7-2450. CANADIAN RIVER NEAR WHITEFIELD, OKLA.

LOCATION.-- At gaging station near right bank on downstream side of pier of bridge on State Highway 2, 0.8 mile north of Whitefield, Haskell County, 5.5 miles upstream from Kings Creek (corrected), 8.2 miles downstream from Eufaula Dam, and at mile 18.8.
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 1964.
Water temperatures: September 1944 to February 1945, September 1946 to September 1964.
EXTREMES, 1963-64.--Specific conductance: Maximum daily, 2,150 micromhos Dec. 5; minimum daily, 95 micromhos May 12.
Percent sodium: Maximum, 64 Nov. 25-30; minimum, 8 May 12.
Sodium-adsorption-ratio: Maximum, 6.50 Nov. 25-30, minimum, 0.11 May 12.
EXTREMES, 1944-45, 1946-64.--Specific conductance: Maximum daily, 22,900 micromhos Nov. 11, 1956; minimum daily, 71 micromhos Jan. 2, 1948.
Percent sodium: Maximum, 80 Nov. 6-14, Dec. 21-23, 1947; minimum, 8 May 12, 1964.
Sodium-adsorption-ratio (1951-64): Maximum, 33 Nov. 11, 1956; minimum, 0.4 Mar. 5, 1959.
REMARKS.--Where no potassium (K) is reported, sodium (Na) and potassium (K) are calculated and reported as sodium.

Chemical analyses, water year October 1963 to September 1964

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. 1-15, 1963.	1,270	13	5.64		7.87		3.08	0.13	0.96	9.31	0.02	0.03	0.46	835	1.14	1,443	58	4.69	1,420	8.3
Oct. 16-31.....	778	--	5.84		8.83		2.95	.00	1.00	10.72	--	--	--	886	1.20	937	60	5.17	1,560	8.1
Nov. 1-24.....	1,571	--	5.48		8.87		2.59	.00	.83	10.95	--	--	--	886	1.20	1,893	62	5.36	1,550	8.0
Nov. 25-30.....	1,583	10	6.92		12.09		3.21	.07	1.85	13.82	.02	.04	.38	1,140	1.55	2,454	64	6.50	1,990	8.3
Dec. 1-6.....	1,868	--	7.28		11.88		3.18	.20	1.96	13.82	--	--	--	1,200	1.63	3,049	62	6.22	2,000	8.4
Dec. 7-19.....	4,616	--	5.84		8.00		3.15	.00	1.52	9.17	--	--	--	866	1.18	5,436	58	4.68	1,450	8.1
Dec. 20-31.....	3,689	9.4	7.68		11.53		3.74	.00	1.85	13.26	.02	.14	.23	1,190	1.62	5,971	60	5.88	1,960	8.2
Jan. 1-13, 1964.	3,816	--	7.08		11.40		3.08	.00	2.08	12.98	--	--	--	1,110	1.51	5,761	62	6.06	1,960	8.5
Jan. 14-31.....	4,534	--	7.28		10.57		3.47	.27	2.12	11.99	--	--	--	1,090	1.48	6,722	59	5.54	1,900	8.4
Feb. 1-6.....	2,380	9.0	7.76		11.53		3.25	.47	2.04	13.40	.03	.10	.30	1,200	1.63	3,884	60	5.85	2,030	8.6
Feb. 7-13.....	6,206	--	6.72		9.48		3.57	.33	2.00	10.58	--	--	--	960	1.31	8,103	59	5.17	1,640	8.5
Feb. 14-29.....	228	--	5.04		7.26		2.23	.00	.90	9.17	--	--	--	772	1.05	240	59	4.58	1,360	8.2
Mar. 1-9.....	348	16	4.76		7.26		2.07	.13	.92	.10	--	--	--	723	.98	342	60	4.71	1,300	8.3
Mar. 10-15.....	378	--	3.40		3.35		2.00	.20	.60	3.95	--	--	--	411	.56	212	50	2.57	719	8.4
Mar. 16-19.....	135	--	4.32		4.96		2.29	.13	.67	6.21	--	--	--	564	.77	103	53	3.37	994	8.3

ARKANSAS RIVER BASIN--Continued

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

Chemical analyses, water year October 1963 to September 1964--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				
Mar. 20-22, 1964	206	14	3.52		3.00		2.10	0.00	0.67	3.72	0.01	0.01	0.05	399	0.54	112	46	2.26	705	8.2
Mar. 23-31	187	--	5.00		4.87		2.92	.13	.77	6.07	--	--	--	595	.81	152	49	3.08	1,040	8.4
Apr. 1-3	327	16	4.16		6.18		1.87	.07	.77	7.62	--	--	--	610	.83	271	60	4.28	1,080	8.4
Apr. 4	323	--	1.28		.31		.85	.00	.44	.28	.01	.01	--	136	.18	60	19	.39	196	8.1
Apr. 5-6	532	--	1.36		1.26		1.02	.00	.44	1.18	--	--	--	187	.25	135	48	1.53	260	8.2
Apr. 7-9	179	--	2.08		1.78		1.25	.07	.40	2.17	--	--	--	246	.33	60	46	1.75	404	8.3
Apr. 10-26	398	18	3.00		3.87		1.57	.07	.48	4.74	.01	.01	.00	431	.59	233	56	3.16	737	8.4
Apr. 27-30	83	--	2.40		3.18		1.34	.07	.48	3.67	--	--	--	349	.47	39	57	2.90	589	8.5
May 1-8	127	14	4.24		4.18		2.59	.20	.52	5.08	.01	.02	.06	509	.69	88	50	2.87	866	8.5
May 9	42	--	2.92		2.26		2.00	.13	.50	2.54	--	--	--	362	.49	21	44	1.87	532	8.5
May 10-11	4,082	--	1.52		.32		1.25	.00	.23	.37	--	--	--	136	.18	755	17	.37	189	8.2
May 12	210	--	.80		.07		.39	.00	.31	.17	--	--	--	76	.10	22	8	.11	95	7.7
May 13-14	180	--	1.60		.48		.95	.00	.42	.68	.01	.02	--	184	.25	45	23	.53	217	8.2
May 15-16	111	--	2.08		1.52		1.51	.07	.42	1.61	--	--	.00	245	.33	37	42	1.49	358	8.3
May 17-20	144	--	3.64		2.44		2.49	.13	.42	3.05	--	--	--	389	.53	76	40	1.81	620	8.5
May 21-31	192	--	4.40		5.13		2.69	.13	.48	6.21	.01	.02	.15	540	.73	141	54	3.46	968	8.4
June 1-11	131	--	3.72		6.09		1.67	.00	.56	7.56	--	--	--	597	.81	106	62	4.47	1,060	8.2
June 12-30	98	--	4.00		6.92		1.51	.00	.52	8.89	--	--	--	657	.89	88	63	4.89	1,170	8.2
July 1	10	--	4.24		7.00		1.67	.13	.35	9.08	.01	.00	.26	720	.98	10	62	4.81	1,190	8.3
July 2	20	--	1.84		1.31		1.41	.00	.31	1.44	--	--	--	246	.33	7	41	1.36	341	8.2
July 3-4	12	--	2.88		2.87		1.87	.13	.23	3.50	--	--	--	358	.49	6	50	2.39	602	8.4
July 5-16	514	--	4.60		5.83		2.36	.27	.15	7.62	.01	.01	.04	638	.87	446	56	3.84	1,100	8.5
July 17-31	8,628	--	2.76		2.91		1.90	.07	.56	3.16	--	--	--	352	.48	4,130	51	2.48	597	8.3
Aug. 1-14	2,999	--	2.64		2.74		1.93	.00	.48	2.99	--	--	--	318	.43	1,297	51	2.39	564	8.1
Aug. 15-16	305	--	2.08		1.74		1.64	.00	.35	1.83	--	--	--	213	.29	88	46	1.71	386	8.0
Aug. 17-31	2,404	4.3	2.80		2.61		1.80	.00	.37	3.22	.02	.00	.04	318	.43	1,040	48	2.21	570	7.9
Sept. 1-22	8,815	--	3.00		3.00		2.43	.00	.35	3.24	--	--	--	333	.45	3,992	50	2.45	616	8.2
Sept. 23	1,198	--	1.16		.44		.66	.00	.27	.69	--	--	--	98	.13	130	27	.57	148	7.5
Sept. 24-30	4,984	5.8	2.44		2.35		1.97	.00	.35	2.43	.03	.02	.17	270	.37	1,830	49	2.13	478	8.0
Total or weighted average	70,841	--	4.55		5.79		2.54	--	1.06	6.86	--	--	--	643	0.87	61,997	56	2.50	1,110	8.1

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

LOCATION (revised).--At gaging station,1,800 feet downstream from Denison Dam powerhouse, 0.4 mile upstream from Shawnee Creek, and 4.5 miles north of Denison, Grayson County.
DRAINAGE AREA.--39,720 square miles, of which 5,936 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: May 1944 to September 1965.
Water temperatures: October 1945 to September 1965.
EXTREMES, 1964-65.--Specific conductance: Maximum daily, 2,390 micromhos Aug. 3; minimum daily, 1,640 micromhos Apr 21, 22, 26
Percent sodium: Maximum, 60 Nov. 1-30; minimum, 56 Apr. 1-30, May 1-31.
Sodium-adsorption-ratio: Maximum, 6.05 Nov. 1-30; minimum, 4.90 Apr. 1-30.
EXTREMES, 1944-65.--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.
Sodium-adsorption-ratio (1961-65): Maximum, 6.32 Nov. 1-30, 1962; minimum, 4.48 July 1-31, 1963.
REMARKS.--Where no potassium (K) is reported, sodium and potassium are calculated as sodium (Na). Values reported for dissolved solids are calculated from determined constituents. Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, water year October 1964 to September 1965

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, 1964	59,643	8.5	5.44	2.88	11.74	0.13	2.00	0.00	5.83	12.47	0.02	0.24		1,210	1.65	98,410	59	5.76	2,060	7.2
Nov. 1-30.....	48,496	6.2	5.39	2.88	12.31	--	1.97	.00	6.16	12.41	.02	.03		1,230	1.67	81,124	60	6.05	2,060	7.4
Dec. 1-31.....	55,892	3.4	5.19	2.88	11.44	--	1.98	.00	5.66	11.85	.02	.00		1,160	1.58	88,176	59	5.70	1,990	8.0
Jan. 1-31, 1965	112,830	3.0	5.04	2.63	10.35	.13	2.03	.00	5.41	11.06	.02	.01		1,090	1.48	167,259	57	5.29	1,880	7.5
Feb. 1-28.....	113,018	3.1	4.89	2.55	9.92	--	2.03	.00	4.91	10.38	.01	.01		1,030	1.40	158,316	57	5.14	1,790	7.5
Mar. 1-31.....	100,102	3.4	4.79	2.39	10.27	--	2.07	.00	5.33	10.01	.02	.02		1,040	1.41	141,584	59	5.42	1,720	7.2
Apr. 1-30.....	110,083	3.9	4.74	2.55	9.35	.12	2.10	.00	5.16	9.65	.02	.03		1,000	1.36	149,712	56	4.90	1,660	6.9
May 1-31.....	119,224	4.4	4.79	2.47	9.09	--	2.21	.00	4.91	9.17	.02	.04		969	1.32	157,119	56	4.77	1,720	7.2
June 1-30.....	165,302	6.0	4.79	2.22	9.70	--	2.43	.00	5.00	9.25	.02	.02		995	1.35	223,687	58	5.18	1,710	7.9
July 1-31.....	193,932	6.6	4.94	2.30	9.70	.12	2.33	.00	4.66	9.76	.02	.01		1,000	1.36	263,747	57	5.10	1,770	7.0
Aug. 1-31.....	166,385	9.5	5.59	2.39	11.44	.13	2.39	.00	5.66	11.85	.02	.02		1,180	1.60	267,015	59	5.73	2,080	7.1
Sept. 1-30.....	161,494	6.7	5.39	2.39	11.22	--	2.29	.00	5.33	11.34	.02	.01		1,130	1.54	248,184	59	5.69	1,980	7.1
Total or weighted average	1,406,401	5.6	5.10	2.47	10.36	--	2.21	0.00	5.22	10.52	0.02	0.02		1,070	1.46	2,044,333	58	5.29	1,850	7.2

RED RIVER BASIN--Continued

7-3310. WASHITA RIVER NEAR DURWOOD, OKLA.

LOCATION.--At gaging station at bridge on State Highway 18, 1.3 miles downstream from Caddo Creek, 4 miles north of Durwood, Carter County, and at mile 63.4.
DRAINAGE AREA.--7,202 square miles.
RECORDS AVAILABLE.--Chemical analyses: May 1944 to September 1965.
Water temperatures: April 1947 to September 1965.
EXTREMES, 1964-65.--Specific conductance: Maximum daily, 1,660 micromhos Mar. 24; minimum daily, 283 micromhos Nov. 19.
Percent sodium: Maximum, 35 Dec. 1-2; minimum, 9 Sept. 25.
Sodium-adsorption-ratio: Maximum, 2.12 July 30-31; minimum, 0.25 Sept. 25.
EXTREMES, 1944-65.--Specific conductance: Maximum daily, 2,120 micromhos Nov. 15, 1963; minimum daily, 95 micromhos Nov. 2, 1951.
Percent sodium: Maximum, 42 Aug. 1-14, 1964; minimum, 9 Sept. 25, 1965.
Sodium-adsorption-ratio (1962-65): Maximum, 2.82 Sept. 12, 1963; minimum, 0.25 Sept. 25, 1965.
REMARKS.--Sodium (Na) and potassium (K) values are calculated and reported as sodium (Na).

Chemical analyses, water year October 1964 to September 1965

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, 1964.	6,403		6.20		1.13		2.62	0.00	3.16	1.47		0.07	0.22	458	0.62	3,970	15	0.64	722	8.1
Oct. 13-23.....	2,575		6.32		2.04		2.95	.00	3.23	2.20		--	.26	519	.71	1,817	24	1.15	839	8.2
Oct. 24-31.....	1,184		9.00		2.48		2.36	.00	5.73	3.41		--	.29	750	1.02	1,207	22	1.17	1,150	8.0
Nov. 1-4.....	3,769		7.90		3.96		2.39	.00	5.83	3.58		.05	.35	761	1.03	3,900	33	1.99	1,130	8.2
Nov. 5-10.....	24,301		5.36		.57		2.29	.00	2.71	.93		--	--	392	.53	12,956	10	.35	580	8.2
Nov. 11-20.....	116,628		3.68		.70		2.16	.00	1.64	.59		--	--	286	.39	45,364	16	.51	429	8.0
Nov. 21-30.....	57,144		4.96		1.48		2.79	.00	2.31	1.35		--	--	410	.56	31,863	23	.94	638	8.2
Dec. 1-2.....	2,452		4.04		2.22		.66	.00	3.77	1.69		.00	.14	417	.57	1,390	35	1.56	620	7.6
Dec. 3-14.....	12,781		7.20		2.61		1.51	.00	5.83	2.48		--	--	674	.92	11,716	27	1.38	957	8.1
Dec. 15-31.....	13,083		10.20		3.48		2.16	.00	8.43	3.07		--	--	937	1.27	16,672	25	1.54	1,260	8.0
Jan. 1-14, 1965.	9,691		11.60		3.57		2.95	.00	8.85	3.27		.08	.23	1,030	1.40	13,575	24	1.48	1,380	8.1
Jan. 15-31.....	22,457		9.00		3.18		3.34	.00	6.25	2.60		--	--	788	1.07	24,067	26	1.50	1,120	8.2
Feb. 1-8.....	4,713		9.00		3.39		1.84	.00	7.60	2.93		--	--	891	1.21	5,711	27	1.60	1,160	8.0
Feb. 9-10.....	6,069		6.80		2.13		3.28	.13	3.54	1.95		.05	.10	592	.81	4,887	24	1.16	814	8.4
Feb. 11-15.....	7,547		7.70		2.35		2.79	.00	5.04	2.20		--	--	680	.92	6,980	23	1.20	956	8.2

Feb. 16-28, 1965	9,901	8.40	3.48	2.72	.00	6.35	2.79	--	--	806	1.10	10,854	29	1.70	1,120	8.0
Mar. 1-8.....	5,078	8.80	3.70	1.93	.00	7.50	3.05	.03	.41	787	1.07	5,435	30	1.76	1,170	8.0
Mar. 9-22.....	10,024	10.40	3.83	2.49	.00	8.37	3.39	--	--	904	1.23	12,324	27	1.68	1,290	8.1
Mar. 23-24.....	2,214	13.40	3.05	2.43	.00	10.93	3.10	--	--	1,130	1.54	3,402	19	1.18	1,470	8.0
Mar. 25-31.....	5,512	9.30	3.00	2.88	.13	6.56	2.71	.04	.13	795	1.08	5,960	24	1.39	1,120	8.3
Apr. 1-5.....	3,481	12.00	3.57	3.15	.20	8.79	3.44	--	--	1,030	1.40	4,876	23	1.46	1,390	8.3
Apr. 6-7.....	7,160	5.72	2.22	2.88	.07	2.77	2.20	--	--	529	.72	5,151	28	1.31	761	8.3
Apr. 8-16.....	20,154	8.50	2.04	3.51	.13	4.79	2.26	.02	.04	710	.97	19,461	19	.99	979	8.3
Apr. 17-30.....	16,772	9.00	2.26	3.44	.00	5.93	1.89	--	--	764	1.04	17,427	20	1.07	1,030	8.2
May 1-8.....	4,380	10.60	3.48	2.82	.20	8.12	2.93	--	--	910	1.24	5,420	25	1.51	1,290	8.4
May 9-10.....	3,332	6.00	2.00	2.69	.13	3.08	2.03	.05	.14	502	.68	2,275	25	1.16	764	8.4
May 11-13.....	4,296	7.20	2.96	2.10	.13	5.41	2.54	--	--	645	.88	3,769	29	1.56	965	8.4
May 14.....	7,180	3.60	1.04	2.16	.13	1.58	.79	--	--	292	.40	2,851	22	.78	454	8.3
May 15-25.....	21,753	7.70	2.44	2.95	.20	5.00	1.92	.05	.14	600	.82	17,750	24	1.24	920	8.4
May 26.....	4,879	2.68	.78	1.97	.00	.94	.54	--	--	210	.29	1,394	23	.68	342	8.2
May 27-31.....	18,258	4.80	1.61	2.62	.13	2.27	1.38	--	--	389	.53	9,659	25	1.04	616	8.3
June 1-14.....	16,300	8.00	2.52	2.98	.00	5.41	2.09	.06	.24	720	.98	15,961	24	1.26	1,010	8.2
June 15.....	3,689	2.24	.52	1.77	.00	.62	.39	--	--	222	.30	1,114	19	.49	289	8.2
June 16.....	7,180	2.96	1.13	1.97	.07	.98	1.07	--	--	300	.41	2,930	28	.93	413	8.3
June 17-19.....	10,651	8.00	2.22	2.52	.13	5.83	1.66	.09	.20	705	.96	10,212	22	1.11	945	8.3
June 20-25.....	9,140	5.90	1.61	2.39	.07	3.54	1.52	--	--	520	.71	6,464	21	.94	742	8.3
June 26-27.....	5,082	6.80	2.44	2.59	.13	4.21	2.31	--	--	628	.85	4,340	26	1.32	907	8.3
June 28-30.....	6,468	5.68	1.35	2.29	.00	3.85	.79	.10	.15	474	.64	4,170	19	.80	665	7.9
July 1-7.....	6,692	6.76	1.52	2.43	.00	4.83	1.02	--	--	556	.76	5,060	18	.83	789	8.2
July 8-12.....	1,974	8.40	1.78	2.72	.00	5.93	1.52	--	--	677	.92	1,817	18	.87	958	8.2
July 13-20.....	1,714	9.20	2.83	2.33	.00	7.54	2.14	.03	.18	819	1.11	1,909	24	1.32	1,140	8.0
July 21-29.....	1,075	10.20	3.57	2.39	.00	8.43	2.93	--	--	937	1.27	1,369	26	1.58	1,290	8.1
July 30-31.....	409	10.40	4.83	1.64	.00	9.58	4.01	--	--	1,050	1.43	583	32	2.12	1,440	7.9
Aug. 1-9.....	1,298	6.88	3.57	2.43	.27	4.75	2.93	.08	.29	648	.88	1,144	34	1.92	1,010	8.4
Aug. 10-17.....	6,411	3.56	1.17	2.16	.13	1.50	.96	--	--	275	.37	2,398	25	.88	467	8.4

RED RIVER BASIN--Continued

7-3310. WASHITA RIVER NEAR DURWOOD, OKLA.--Continued

Chemical analyses, water year October 1964 to September 1965--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. 18-20, 1965	1,541		10.40		3.05		2.23	0.13	8.64	2.43		--	--	893	1.21	1,872	23	1.34	1,240	8.4
Aug. 21-23.....	1,333		6.32		1.61		1.38	.00	5.25	1.24		0.05	0.14	515	.70	934	20	.91	760	8.0
Aug. 24.....	262		5.40		1.13		2.43	.00	3.44	.68		--	--	416	.57	148	17	.69	673	8.1
Aug. 25-31.....	4,096		5.12		1.74		2.10	.00	3.37	1.41		--	--	433	.59	2,412	25	1.09	672	8.2
Sept. 1-11.....	5,280		4.60		1.22		1.93	.07	2.64	1.10		.07	.00	333	.45	2,391	21	.80	570	8.3
Sept. 12-20.....	1,537		7.30		2.74		2.56	.13	4.89	2.48		--	--	615	.84	1,286	27	1.43	1,020	8.4
Sept. 21-23.....	7,462		3.36		1.22		2.10	.07	1.44	.96		--	--	251	.34	2,547	27	.94	459	8.3
Sept. 24.....	5,633		7.80		--		2.16	.13	4.48	.87		.10	--	552	.75	4,229	--	--	841	8.3
Sept. 25.....	8,430		3.28		.32		2.10	.07	1.21	.23		--	--	204	.28	2,339	9	.25	355	8.3
Sept. 26-30.....	43,498		4.32		.52		2.03	.00	2.56	.27		--	--	281	.38	16,623	11	.36	466	8.2
Total or weighted average	590,496		6.10		1.70		2.49	--	3.77	1.50		--	--	507	0.69	408,335	21	0.97	739	8.1

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 Co. bridge, and 4.5 miles downstream from Cypress Creek.
DRAINAGE AREA.--9,329 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1946, October 1947 to September 1965.
Water temperatures: October 1947 to September 1965.
EXTREMES, 1964-65.--Specific conductance: Maximum daily, 620 micromhos Jan. 21; minimum daily, 102 micromhos Jan. 25.
Percent sodium: Maximum, 80 Oct. 11-19; minimum, 44 June 12-30.
Sodium-adsorption-ratio: Maximum, 4.79 Oct. 11-19; minimum, 1.31 Apr. 1-16.
EXTREMES, 1945-46, 1947-65.--Specific conductance: Maximum daily, 774 micromhos Dec. 26, 1948; minimum daily, 28 micromhos Sept. 19, 1963.
Percent sodium: Maximum, 86 Dec. 26-27, 1948; minimum, 14 Sept. 18-22, 27, 1958.
Sodium-adsorption-ratio (1961-65): Maximum, 4.79 Oct. 11-19, 1964; minimum, 0.55 Sept. 18-21, 1963.
REMARKS.--Where no potassium (K) is reported, sodium and potassium are calculated as sodium (Na). Values reported for dissolved solids are calculated from determined constituents.

Chemical analyses, water year October 1964 to September 1965

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, 1964.	11,643	14	0.30	0.18	1.57	0.07	0.56	0.00	0.14	1.38	0.01	0.01		134	0.18	2,122	74	3.20	246	6.7
Oct. 11-19.....	9,997	13	.40	.36	2.96	--	.85	.00	.29	2.57	--	.01		225	.31	3,059	80	4.79	438	7.0
Oct. 20-31.....	9,306	15	.45	.31	2.18	--	.79	.00	.29	1.83	--	.01		181	.25	2,291	74	3.52	340	7.4
Nov. 1-13.....	9,695	17	.41	.27	1.96	--	.67	.00	.29	1.64	.02	.00		166	.23	2,189	74	3.36	297	6.7
Nov. 14-30.....	24,581	16	.32	.18	1.39	--	.44	.00	.18	1.27	--	.01		124	.17	4,145	73	2.77	221	6.4
Dec. 1-5.....	13,646	12	.24	.12	1.00	--	.28	.00	.19	.85	.01	.01		89	.12	1,652	73	2.35	153	6.4
Dec. 6-31.....	152,390	12	.35	.19	1.44	--	.33	.00	.29	1.35	--	.01		127	.17	26,321	73	2.77	230	6.3
Jan 1-17, 1965..	48,387	16	.50	.12	1.26	.06	.39	.00	.27	1.27	.01	.01		130	.18	8,555	65	2.26	223	6.5
Jan. 18-22.....	21,818	15	.80	.48	2.91	--	.46	.00	.60	3.13	--	.01		258	.35	7,656	70	3.65	490	6.6
Jan. 23-28.....	54,899	9.9	.25	.11	.78	--	.21	.00	.17	.76	--	.01		76	.10	5,674	69	1.85	137	6.3
Jan. 29-31.....	21,898	10	.41	.27	2.31	--	.31	.00	.37	2.31	--	.01		184	.25	5,480	77	3.95	347	7.3
Feb. 1-10.....	43,656	15	.46	.22	1.61	--	.33	.00	.40	1.55	.01	.02		149	.20	8,846	70	2.76	261	6.2
Feb. 11-14, 16-20.....	151,575	11	.27	.13	.78	--	.20	.00	.25	.71	--	.01		80	.11	16,491	66	1.74	134	7.0
Feb. 15.....	17,415	11	.35	.21	1.52	--	.20	.00	.40	1.47	--	.02		134	.18	3,174	73	2.87	241	6.7
Feb. 21-28.....	149,125	11	.35	.21	1.09	--	.20	.00	.40	1.04	--	.02		109	.15	22,106	66	2.05	195	6.5
Mar. 1-10.....	237,818	9.6	.50	.20	1.13	--	.36	.00	.42	1.04	.01	.01		117	.16	37,842	62	1.92	209	6.5
Mar. 11-31.....	257,290	10	.70	.30	1.22	--	.66	.00	.46	1.10	--	.01		137	.19	47,938	55	1.73	247	6.7
Apr. 1-16.....	459,531	9.7	.37	.19	.70	.07	.30	.00	.35	.65	.01	.01		88	.12	54,997	52	1.31	148	6.5

SABINE RIVER BASIN--Continued

8-305. SABINE RIVER NEAR RULIFF, TEX.--Continued

Chemical analyses, water year October 1964 to September 1965--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)	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. 17-30, 1965	90,803	18	0.65	0.35	1.61	--	0.56	0.00	0.52	1.50	--	0.01		168	0.23	20,747	62	2.27	294	6.5
May 1-14.....	44,263	19	.70	.48	2.09	--	.70	.00	.54	2.00	0.01	.01		205	.28	12,341	64	2.72	364	6.8
May 15-31.....	288,230	9.2	.41	.17	.96	--	.30	.00	.35	.85	--	.02		98	.13	38,415	62	1.77	176	6.3
June 1-11.....	260,727	11	.65	.21	.87	--	.67	.00	.35	.68	.01	.00		108	.15	38,296	50	1.32	188	6.5
June 12-30.....	376,784	9.6	1.10	.18	1.00	--	1.16	.00	.31	.79	--	.02		136	.18	69,690	44	1.25	244	7.0
July 1-31.....	113,629	13	.75	.23	1.13	0.08	.85	.00	.29	1.02	.01	.01		136	.18	21,017	52	1.62	241	6.8
Aug. 1-31.....	37,077	19	.60	.36	1.74	--	.87	.00	.27	1.52	.02	.02		170	.23	8,572	64	2.51	302	7.0
Sept. 1-23.....	18,339	19	.90	.52	1.78	--	.95	.00	.29	1.95	.01	.01		197	.27	4,913	56	2.12	342	6.9
Sept. 24-26, 28-30.....	24,182	12	.40	.40	1.48	--	.54	.00	.31	1.41	--	.02		141	.19	4,637	65	2.34	257	6.8
Sept. 27.....	6,288	10	.60	.48	3.26	--	.75	.00	.50	3.07	--	.01		259	.35	2,215	75	4.45	490	7.2
Total or weighted average	2,954,992	11	0.55	0.22	1.09	--	0.52	0.00	0.35	0.99	--	0.01		120	0.16	481,381	59	1.81	212	6.5

NECHES RIVER BASIN

8-410. NECHES RIVER AT EVADALE, TEX.

LOCATION (revised).--At gaging station at bridge on U.S. Highway 96, at Evadale, Jasper County, 0.8 mile upstream from Mill Creek, and 16 miles upstream from Village Creek.
DRAINAGE AREA.--7,951 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1947 to September 1965.
Water temperatures: October 1947 to September 1965.
EXTREMES, 1964-65.--Specific conductance: Maximum daily, 418 micromhos Oct. 17; minimum daily, 133 micromhos June 3.
Percent sodium: Maximum, 71 Oct. 14-31; minimum, 45 July 1-11.
Sodium-adsorption-ratio: Maximum, 3.57 Oct. 14-31; minimum, 1.25 June 15-30.
EXTREMES, 1947-65.--Specific conductance: Maximum daily, 422 micromhos Jan. 25, 1957; minimum daily, 23 micromhos Sept. 19, 1963.
Percent sodium: Maximum, 76 Jan. 21-31, 1957; minimum, 14 June 4-18, 1950.
Sodium-adsorption-ratio (1961-65): Maximum, 3.57 Oct. 14-31, 1964; minimum, 0.40 Sept. 17-21, 1963.
REMARKS.--Where no potassium (K) is reported, sodium and potassium are calculated as sodium (Na).

Chemical analyses, water year October 1964 to September 1965

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, 1964	4,848	18	0.50	0.52	1.44	0.07	1.03	0.00	0 29	1 21	0 02	0.00		158	0 21	1,042	57	2 01	276	7 8
Oct. 14-31	11,603	14	.65	.39	2.57	--	1.08	00	48	2.03	--	00		218	30	3,440	71	3 57	397	7.2
Nov. 1-30	11,187	18	.80	.42	2.04	--	.98	.00	.48	1.78	01	00		202	27	3,073	63	2 62	351	7.0
Dec. 1-10	3,570	17	.60	.34	1.74	--	.77	.00	40	1 47	01	02		169	.23	821	65	2 54	302	6 7
Dec. 11-23	9,180	14	.41	.23	.78	--	.39	00	29	73	--	02		96	.13	1,198	55	1 38	165	6.4
Dec. 24-31	5,728	15	.70	.26	2.09	--	79	00	46	1.78	--	02		190	.26	1,480	68	3 01	351	6 6
Jan. 1-31, 1965	38,614	14	.60	.28	2.00	.09	.72	.00	.54	1.72	01	02		189	26	9,925	67	3 02	333	6.7
Feb. 1-11	14,945	14	.60	.28	1.96	--	.67	.00	46	1 69	01	01		177	24	3,598	69	2.95	320	6 9
Feb. 12-28	81,027	12	.50	.24	1.48	--	49	00	42	1 27	--	.02		140	19	15,427	67	2 44	252	6 9
Mar. 1-15	106,929	9.9	.42	.18	1.04	--	.36	00	.46	79	.01	01		106	14	15,415	63	1 90	182	6.5
Mar. 16-31	102,284	11	.45	.27	1.13	--	.36	.00	.56	.93	--	.01		121	16	16,832	61	1.88	209	6 5
Apr. 1-30	255,451	11	.45	.23	.83	.08	.36	.00	48	73	01	01		106	14	36,826	52	1.42	178	6 3
May 1-23	97,261	5.2	.60	.40	1.13	--	.54	00	42	1 13	02	01		125	17	16,534	53	1 60	259	6 6
May 24-31	35,576	10	.42	.28	.83	--	39	.00	.33	79	--	01		98	13	4,742	54	1 39	181	6 3
June 1-14	176,025	11	.41	.23	.74	--	.39	.00	.29	65	.01	.02		89	12	21,306	54	1.31	154	6.1

NECHES RIVER BASIN--Continued

8-410. NECHES RIVER AT EVADALE, TEX.--Continued

Chemical analyses, water year October 1964 to September 1965--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 15-30, 1965	82,195	13.0	0.60	0.28	0.83	--	0.66	0.00	0.31	0.73	--	0.01		109	0.15	12,185	48	1.25	188	6.2
July 1-11.....	45,295	14.0	.60	.36	.87	0.09	.74	.00	.29	.87	0.02	.00		121	.16	7,454	45	1.26	208	6.8
July 12-31.....	39,511	15.0	.65	.35	1.13	--	.77	.00	.29	1.04	--	.01		133	.18	7,147	53	1.60	236	6.4
Aug. 1-31.....	38,922	14.0	.65	.35	1.22	--	.85	.00	.29	1.07	.01	.00		138	.19	7,305	55	1 72	249	6.6
Sept. 1-30	40,820	14.0	.70	.30	1.31	--	.90	.00	.29	1.10	01	.01		142	.19	7,883	57	1.85	255	6.8
Total or weighted average	1,200,971	11	0.50	0.27	1.04	--	0.51	0.00	0.40	0.93	--	0.01		119	0.16	193,633	57	1.67	209	6.3

8-665. TRINITY RIVER AT ROMAYOR, TEX.

LOCATION.--At gaging station at bridge on State Highway 105, 1.9 miles south of Romayor, Liberty County, 1.9 miles downstream from Gulf, Colorado and Santa Fe Railway Co. bridge, and 3.7 miles downstream from Big Creek.
DRAINAGE AREA.--17,186 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1945 to November 1949, February 1950 to September 1951, April 1953 to September 1965.
Water temperatures: February 1950 to September 1951, April 1953 to January 1959, March 1961 to September 1965.
EXTREMES, 1964-65.--Specific conductance: Maximum daily, 1,160 micromhos Sept. 12; minimum daily, 145 micromhos Jan. 24.
Percent sodium: Maximum, 64 Sept. 1-24, 25-30; minimum, 27 Feb. 16-18.
Sodium-adsorption-ratio: Maximum, 4.68 Sept. 1-24; minimum, 0.73 May 13-31.
EXTREMES, 1945-50, 1953-65.--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.
Sodium-adsorption-ratio (1961-65): Maximum, 7.13 Feb. 5-7, 1964; minimum, 0.73 May 13-31, 1965.
REMARKS.--Where no potassium (K) is reported, sodium and potassium are calculated as sodium (Na).

Chemical analyses, water year October 1964 to September 1965

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, 1964.	342,301	9.5	2.54	0.28	1.61	0.14	2.39	0.00	0.83	1.24	0.03	0.08		268	0.36	124,762	35	1.35	466	7.5
Nov. 1-15.....	145,190	8.0	2.30	.26	1.61	--	2.26	.00	.85	.93	.02	.08		242	.33	47,785	39	1.42	424	7.2
Nov. 16-30.....	157,448	11	2.45	.31	1.61	--	2.36	.00	.90	1.02	--	.06		255	.35	54,603	37	1.37	443	7.3
Dec. 1-31.....	502,108	7.6	2.20	.32	1.00	--	2.10	.00	.50	.82	.02	.06		199	.27	135,890	28	.89	369	7.3
Jan. 1-23, 1965.	156,887	8.8	2.54	.38	1.96	.12	2.43	.00	.94	1.58	.03	.08		295	.40	62,943	39	1.62	520	7.6
Jan. 24-26.....	61,170	8.0	1.00	.18	.78	--	.92	.00	.46	.51	--	.04		119	.16	9,900	40	1.02	204	6.8
Jan. 27-31.....	67,914	4.8	2.30	.42	2.44	--	2.18	.00	1.04	1.81	--	.10		298	.41	27,524	47	2.09	538	7.4
Feb. 1-12.....	124,602	9.2	2.54	.34	1.48	--	2.16	.13	.98	.93	.03	.10		255	.35	43,212	34	1.23	431	8.3
Feb. 13-14.....	55,736	15	1.65	.27	1.09	--	1.54	.00	.65	.76	--	.05		184	.25	13,947	36	1.11	297	8.2
Feb. 15.....	32,132	10	2.05	.19	2.26	--	1.93	.00	.71	1.53	--	.05		266	.36	11,624	50	2.14	463	8.0
Feb. 16-28.....	593,316	8.6	2.05	.19	.83	--	1.87	.00	.62	.51	--	.05		179	.24	144,437	27	.78	307	7.3
Mar. 1-11.....	282,764	8.1	2.30	.38	1.17	--	2.08	.00	.83	.87	.02	.06		223	.30	85,757	31	1.02	392	7.4
Mar. 12-30.....	174,411	8.1	2.84	.42	1.65	--	2.52	.00	1.12	1.18	--	.07		285	.39	67,602	34	1.29	490	7.7
Mar. 31.....	32,331	8.5	1.15	.27	.70	--	1.05	.00	.58	.45	--	.03		128	.17	5,628	33	.83	218	7.1
Apr. 1-14.....	326,559	9.4	1.80	.44	1.26	.10	1.67	.00	.79	1.07	.02	.05		214	.29	95,042	35	1.19	368	7.7
Apr. 15-30.....	64,614	7.5	3.04	.48	2.87	--	2.69	.00	1.42	2.20	--	.07		373	.51	32,777	45	2.16	653	7.3
May 1-11.....	33,535	14	3.09	.67	4.09	--	2.64	.00	1.60	3.41	.03	.12		465	.63	21,207	52	2.98	839	7.3
May 12.....	10,393	14	2.94	.34	2.96	--	2.47	.00	1.44	2.20	--	.12		374	.51	5,286	47	2.31	666	7.4

TRINITY RIVER BASIN--Continued

8-665. TRINITY RIVER AT ROMAYOR, TEX.--Continued

Chemical analyses, water year October 1964 to September 1965--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)	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 13-31, 1965.	1,124,549	16	1.70	0.14	0.70	--	1.54	0.00	0.46	0.51	--	0.02		156	0.21	238,584	27	0.73	264	6.5
June 1-14.....	684,774	10	2.20	.28	1.09	--	2.10	.00	.67	.73	0.02	.02		205	.28	190,915	31	.98	363	6.9
June 15-30.....	168,897	8.3	2.74	.22	1.83	--	2.82	.00	.90	.99	--	.05		275	.37	63,167	38	1.50	480	7.0
July 1-11.....	44,378	8.3	2.99	.31	1.96	0.11	2.90	.00	.83	1.64	.02	.02		308	.42	18,589	36	1.52	553	7.0
July 12-31.....	30,387	6.3	3.14	.38	2.96	--	3.15	.00	1.04	2.26	--	.01		367	.50	15,167	46	2.23	667	7.0
Aug. 1-31.....	41,197	8.5	3.19	.33	5.31	--	3.34	.00	1.50	3.89	.03	.02		512	.70	28,686	60	4.00	921	7.3
Sept. 1-24.....	33,132	12	2.99	.59	6.26	--	3.44	.00	1.60	4.71	.04	.02		574	.78	25,864	64	4.68	1,030	6.9
Sept. 25-30.....	17,946	10	2.00	.44	4.31	--	2.21	.00	1.17	3.27	--	.03		396	.54	9,665	64	3.91	730	6.8
Total or weighted average	5,308,671	10	2.16	0.28	1.28	--	2.02	--	0.71	0.93	--	0.05		219	0.30	1,580,572	34	1.16	382	6.9

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.
DRAINAGE AREA.--44,020 square miles, approximately, of which 9,240 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1965.
Water temperatures: November 1950 to September 1965.
EXTREMES, 1964-65.--Specific conductance: Maximum daily, 916 micromhos Sept. 18; minimum daily, 266 micromhos May 15.
Percent sodium: Maximum 46 Dec. 18-31; minimum, 21 May 13-17.
Sodium-adsorption-ratio: Maximum, 2.41 Dec. 18-31; minimum, 0.59 May 13-17.
EXTREMES, 1945-65.--Specific conductance: Maximum daily, 2,540 micromhos Sept. 4, 1951; minimum daily, 187 micromhos Aug. 31, 1947.
Percent sodium: Maximum, 76 Dec. 3-4, 1945; minimum, 18 Aug. 27-31, 1947.
Sodium-adsorption-ratio (1962-65): Maximum, 5.45 Aug. 1-10, 1962; minimum, 0.52 Sept. 28-30, 1964.
REMARKS.--Where no potassium (K) is reported, sodium and potassium are calculated as sodium (Na).

Chemical analyses, water year October 1964 to September 1965

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. 1-10, 1964.	77,792	9.1	2.30	0.36	0.78	0.09	2.29	0.00	0.58	0.65	0.02	0.03		203	0.28	21,477	22	0.68	355	7.8
Oct. 11-31.....	103,716	6.7	2.54	.82	1.74	--	2.57	.00	.83	1.72	--	.00		286	.39	40,341	34	1.34	510	8.0
Nov. 1-10.....	87,114	7.3	2.00	.64	1.83	--	2.07	.00	.85	1.50	.02	.02		255	.35	30,211	41	1.59	462	7.5
Nov. 11-20.....	77,078	7.7	1.90	.48	.96	--	2.07	.00	.56	.68	--	.03		188	.26	19,707	29	.88	338	7.5
Nov. 21-30.....	83,663	7.4	2.15	.65	1.57	--	2.26	.00	.81	1.27	--	.03		248	.34	28,218	36	1.32	444	7.5
Dec. 1-4.....	20,723	9.1	2.30	.58	1.13	--	2.49	.00	.44	1.02	.01	.04		222	.30	6,257	28	.94	413	7.3
Dec. 5-10.....	30,442	8.7	3.14	.82	3.26	--	2.75	.00	1.31	3.10	--	.04		415	.56	17,182	45	2.32	710	7.2
Dec. 11-17.....	56,565	6.8	2.40	.60	2.39	--	2.13	.00	.98	2.23	--	.04		310	.42	23,848	44	1.95	542	7.2
Dec. 18-31.....	59,508	5.9	3.04	.90	3.39	--	2.64	.00	1.44	3.24	--	.03		421	.57	34,072	46	2.41	764	7.2
Jan. 1-22, 1965.	88,015	4.4	3.14	.99	3.31	.11	2.79	.00	1.58	3.27	.02	.02		437	.59	52,309	44	2.30	780	7.6
Jan. 23-31.....	394,155	9.1	2.00	.46	.74	--	2.02	.00	.56	.56	--	.08		184	.25	98,633	23	.67	322	7.3
Feb. 1-16.....	335,127	9.4	2.89	.55	1.74	--	2.67	.00	.87	1.58	.02	.03		294	.40	133,997	34	1.33	534	7.1
Feb. 17-22.....	488,172	7.3	1.90	.40	.87	--	1.92	.00	.46	.76	--	.04		179	.24	118,841	27	.81	328	7.3
Feb. 23-28.....	192,436	8.1	2.40	.48	1.91	--	2.15	.00	.62	2.03	--	.00		272	.37	71,186	40	1.60	513	7.5
Mar. 1-31.....	383,252	7.7	3.09	.77	2.04	--	2.84	.00	1.04	1.89	.02	.12		336	.46	175,131	35	1.47	578	8.0
Apr. 1-3.....	51,632	6.8	3.04	.74	2.48	--	2.77	.00	1.44	1.97	.02	.04		358	.49	25,138	40	1.80	618	7.2
Apr. 4-15.....	265,150	8.1	2.30	.38	1.09	.09	2.21	.00	.67	1.02	--	.03		223	.30	80,415	28	.94	395	7.2
Apr. 16-22.....	77,419	8.6	2.74	.64	1.91	--	2.72	.00	.83	1.75	--	.01		300	.41	31,587	36	1.47	528	7.2

BRAZOS RIVER BASIN--Continued

8-1140. BRAZOS RIVER AT RICHMOND, TEX.--Continued

Chemical analyses, water year October 1964 to September 1965--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)	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. 23-30, 1965	42,859	6.4	2.99	0.90	2.31	--	2.88	0.00	1.23	2.09	--	0.01		351	0.48	20,459	37	1.65	615	7.1
May 1-12.....	65,574	8.6	2.84	.82	2.31	--	2.72	.00	1.21	1.95	0.02	.05		341	.46	30,410	39	1.70	617	7.0
May 13-17.....	327,868	8.9	2.05	.41	.65	--	2.18	.00	.50	.39	--	.03		175	.24	78,033	21	.59	311	7.1
May 18.....	107,107	8.5	2.50	.60	2.35	--	1.97	.00	1.23	2.20	--	.06		320	.44	46,613	43	1.89	584	7.5
May 19-27.....	1,616,965	9.7	2.20	.46	1.00	--	2.29	.00	.58	.76	--	.02		208	.28	457,407	27	.87	372	7.1
May 28-31.....	551,008	9.4	2.50	.64	2.00	--	2.25	.00	.96	1.92	--	.03		296	.40	221,814	39	1.60	554	7.0
June 1-4.....	423,511	11	2.50	.46	1.00	--	2.64	.00	.56	.73	.02	.01		223	.30	128,442	25	.82	396	7.9
June 5-8.....	170,975	11	2.59	.61	1.39	--	2.62	.00	.77	1.18	--	.02		261	.35	60,689	30	1.10	470	7.7
June 9-12.....	172,800	11	2.30	.54	1.00	--	2.43	.00	.62	.79	--	.02		219	.30	51,467	26	.84	391	7.8
June 13-30.....	419,504	9.1	2.64	.64	1.13	--	2.77	.00	.67	.96	--	.02		246	.33	140,349	26	.88	448	7.0
July 1-10.....	144,635	9.6	2.89	.67	1.09	0.08	2.98	.00	.73	1.07	.02	.02		267	.36	52,520	23	.82	479	7.2
July 11-31.....	178,774	9.9	3.24	.76	1.74	--	3.41	.00	.85	1.44	--	.02		319	.43	77,559	30	1.23	563	7.3
Aug. 1-31.....	227,935	8.1	3.04	.78	2.00	--	3.25	.00	.85	1.69	.02	.00		323	.44	100,127	34	1.45	581	7.4
Sept. 1-21, 24-25, 27-28..	84,645	10	3.44	1.07	3.39	--	3.41	.00	1.54	2.93	.02	.00		450	.61	51,803	43	2.26	796	7.3
Sept. 22-23, 26, 29-30.....	24,337	9.2	2.45	.59	1.35	--	2.52	.00	.75	1.10	--	.03		249	.34	8,242	31	1.09	445	7.2
Total or weighted average	7,430,456	9.0	2.45	0.56	1.39	--	2.44	0.00	0.74	1.20	--	0.03		251	0.34	2,460,586	32	1.13	450	7.2

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 1965.
Water temperatures: October 1947 to September 1965.
EXTREMES, 1964-65.--Specific conductance: Maximum daily, 685 micromhos Oct. 25; minimum daily, 343 micromhos Feb. 7.
Percent sodium: Maximum, 32 Oct. 1-31; minimum 17 Feb. 1 to Mar. 31.
Sodium-adsorption-ratio: Maximum, 1.38 Oct. 1-31; minimum, 0.57 Mar. 1-31.
EXTREMES, 1947-65.--Specific conductance: Maximum daily, 737 micromhos Jan. 12, 1964; 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.
Sodium-adsorption-ratio (1962-65): Maximum, 1.69 Sept. 1-30, 1964; minimum, 0.57 Mar. 1-31, 1965.
REMARKS.--Where no potassium (K) is reported, sodium and potassium are calculated as sodium (Na). Values reported for dissolved solids are calculated from determined constituents. 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 1964 to September 1965

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, 1964.	8,116	9.2	2.40	1.81	2.00	0.09	3.21	0.00	0.94	2.23	0.02	0.02		350	0.48	3,863	32	1.38	628	8.1
Nov. 1-30.....	6,605	11	3.09	1.48	1.39	--	3.90	.00	.75	1.24	.01	.05		323	.44	2,901	23	.92	562	8.0
Dec. 1-31.....	5,024	15	1.95	1.73	1.35	--	2.92	.00	.75	1.30	.01	06		280	.38	1,913	27	1 00	489	8.2
Jan. 1-31, 1965.	16,786	12	2.69	1.73	1.17	.07	3.47	.10	75	1.33	.02	07		312	.42	7,123	21	.79	539	8.3
Feb. 1-28.....	43,652	11	2.50	1.56	.87	.05	3.36	.00	.58	.96	.01	.11		272	.37	16,148	17	.61	485	7.7
Mar. 1-31.....	16,356	13	2.50	1.65	.83	--	3.36	.00	.60	.87	.01	.12		270	.37	6,006	17	.57	465	7.8
Apr. 1-30.....	52,364	8.8	2.69	1.73	1.17	.07	3.44	.00	.69	1.35	.02	.07		302	.41	21,507	21	79	531	7.6
May 1-31.....	256,157	12	2.50	1.56	1.65	--	3.02	.00	.79	1.86	.02	.04		316	.43	110,086	29	1.16	577	7.4
June 1-30.....	385,349	9	2.20	1.32	1.48	--	2.75	.00	.67	1.55	.02	.02		275	.37	144,120	30	1.12	498	7.2
July 1-31.....	114,059	9.3	2.35	1.15	1.13	.09	2.95	.00	.54	1.18	.02	.03		259	.35	40,176	24	.86	469	7.1
Aug. 1.....	2,856	8	2.50	1.56	1.48	--	2.62	.00	.58	2.34	--	.02		302	.41	1,173	27	1.04	592	7.8
Aug. 2-31.....	84,258	7.7	2.30	1.15	1.31	--	2.97	.00	.56	1.21	.01	.02		258	.35	29,564	27	.99	475	7.5
Sept. 1-30.....	76,046	7.5	2.40	1.15	1.22	--	2.93	.00	.56	1.24	.02	.03		259	.35	26,787	26	.91	476	7.1
Total or weighted average	1,067,628	9.8	2.37	1.38	1.40	--	2.96	--	0.67	1.49	0.01	0.04		283	0.38	411,367	27	1.02	513	7.2

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, and 12 miles upstream from Jones Creek.
DRAINAGE AREA.--41,380 square miles, approximately, of which 11,900 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: April 1944 to September 1965.
Water temperatures: October 1945 to September 1948, March 1950 to September 1965.
EXTREMES, 1964-65.--Specific conductance: Maximum daily, 683 micromhos Oct. 21, 25; minimum daily, 236 micromhos Feb. 18.
Percent sodium: Maximum, 32 May 1-11; minimum, 10 Mar. 1-31.
Sodium-adsorption-ratio: Maximum, 1.28 May 1-11; minimum, 0.33 Oct. 27.
EXTREMES, 1944-65.--Specific conductance: Maximum daily, 904 micromhos Oct. 29, 1963; minimum daily, 146 micromhos Sept. 27, 1957.
Percent sodium: Maximum, 43 Nov. 30, 1951; minimum, 7 Jan. 19-24, 1945.
Sodium-adsorption-ratio (1962-65): Maximum, 1.82 Sept. 1-18, 1964; minimum, 0.33 Oct. 27, 1964.
REMARKS.--Where no potassium (K) is reported, sodium and potassium are calculated as sodium (Na). Values reported for dissolved solids are calculated from determined constituents. Records of specific conductance of daily samples available in district office at Austin, Tex.

Chemical analyses, water year October 1964 to September 1965

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. 1-26, 28-31 1964	39,094	11	2.64	1.32	1.57	0.09	3.34	0.00	0.83	1.52	0.02	0.00		314	0.43	16,695	28	1.11	550	7.9
Oct. 27	1,458	12	2.00	.67	.38	--	1.95	.00	.52	.51	--	.04		173	.24	343	12	.33	299	8.1
Nov. 1-5, 8-30	29,657	9.6	2.79	1.15	1.39	--	3.08	.00	1.04	1.18	.02	.03		298	.41	12,019	26	.99	523	8.2
Nov. 6-7	3,610	12	1.70	.50	.78	--	1.88	.00	.54	.51	--	.04		173	.24	849	26	.75	293	8.2
Dec. 1-31	23,058	9	2.89	1.07	1.65	--	3.44	.00	.81	1.35	.02	.01		309	.42	9,690	29	1.17	547	7.5
Jan. 1-3, 10-21, 1965	9,521	4.6	3.09	1.40	1.57	.11	3.90	.00	.81	1.55	.02	.01		336	.46	4,351	25	1.04	604	8.1
Jan. 4-9	6,950	6	2.10	.82	1.22	--	2.59	.00	.50	1.02	--	.03		226	.31	2,136	29	1.01	412	7.5
Jan. 22-31	117,600	9.2	2.30	.64	.83	--	2.38	.00	.73	.59	--	.06		213	.29	34,066	22	.68	370	7.1
Feb. 1-13, 22-28	100,602	11	3.14	.82	1.13	--	3.21	.00	.90	.90	.02	.05		284	.39	38,856	22	.80	490	8.2
Feb. 14-21	178,830	8.4	2.05	.39	.48	--	2.16	.00	.44	.28	--	.04		163	.22	39,643	16	.43	280	8.0
Mar. 1-31	61,795	7.6	2.79	1.97	.52	--	3.11	.00	1.02	1.13	.01	.03		284	.39	23,868	10	.34	506	8.0
Apr. 1-30	50,579	4.6	2.84	.99	1.22	.08	2.88	.00	1.00	1.16	.02	.03		283	.38	19,467	24	.88	491	7.1
May 1-11	18,415	5.7	2.20	1.48	1.74	--	2.75	.00	.87	1.75	.02	.01		296	.40	7,413	32	1.28	552	7.1
May 12	9,045	7	3.09	1.40	1.83	--	3.34	.00	.87	2.03	--	.05		345	.47	4,244	29	1.22	653	7.9
May 13-23	269,673	8.8	2.25	.49	.70	--	2.29	.00	.54	.56	--	.05		194	.26	71,150	20	.59	347	7.2
May 24-29	84,175	9.2	2.84	1.23	1.48	--	3.16	.00	.75	1.58	--	.04		304	.41	34,801	27	1.04	558	8.0
May 30-31	83,107	13	2.00	.66	.91	--	2.16	.00	.46	.90	--	.04		204	.28	23,057	26	.79	366	7.8
June 1-2	48,674	12	2.50	.62	.96	--	2.56	.00	.71	.79	.02	.01		231	.31	15,292	24	.77	406	7.6
June 3-30	363,991	7.6	2.45	1.15	1.31	--	2.87	.00	.69	1.33	--	.02		268	.36	132,667	27	.97	501	6.8
July 1-31	114,859	8.9	2.30	1.32	1.13	.09	2.88	.00	.65	1.21	.02	.01		263	.36	41,083	23	.84	478	7.0
Aug. 1-31	51,281	9.4	2.15	1.15	1.48	--	2.85	.00	.65	1.24	.02	.00		262	.36	18,272	31	1.15	469	7.4
Sept. 1-30	55,696	9.6	2.30	1.65	.87	--	2.88	.00	.62	1.33	.01	.00		260	.35	19,694	18	.62	485	7.0
Total or weighted average	1,721,670	8.9	2.42	0.94	1.04	--	2.70	0.00	0.66	0.99	--	0.03		243	0.33	569,656	24	0.80	437	7.1

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 Co. bridge and 10 miles upstream from Coleto Creek.
DRAINAGE AREA.--5,161 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1945 to September 1946, October 1948 to September 1965.
Water temperatures: November 1950 to September 1965.
EXTREMES, 1964-65.--Specific conductance: Maximum daily, 721 micromhos Apr. 12; minimum daily, 230 micromhos Feb. 20.
Percent sodium: Maximum, 33 Aug. 1-31; minimum, 14 June 6-12.
Sodium-adsorption-ratio: Maximum, 1.30 Aug. 1-31; minimum, 0.38 June 6-12.
EXTREMES, 1945-46, 1948-65.--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.
Sodium-adsorption-ratio (1962-65): Maximum, 1.56 Sept. 10-15, 1963; minimum, 0.38 June 6-12, 1965.
REMARKS.--Where no potassium (K) is reported, sodium and potassium are calculated as sodium (Na).

Chemical analyses, water year October 1964 to September 1965

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, 1964.	51,281	12	2.59	0.99	0.78	0.07	3.21	0.00	0.46	0.65	0.02	0.04		240	0.33	16,738	18	0.59	429	7.5
Nov. 1-8.....	21,755	10	2.79	.99	1.09	--	3.44	.00	.50	.85	.02	.04		263	.36	7,781	22	.79	458	7.9
Nov. 9-19.....	19,658	10	2.30	.74	.70	--	2.82	.00	.44	.45	--	.03		205	.28	5,481	19	.56	362	7.7
Nov. 20-30.....	16,036	12	3.09	1.07	.83	--	3.88	.00	.46	.62	--	.04		270	.37	5,889	17	.57	467	7.9
Dec. 1-31.....	32,342	13	3.59	1.23	1.13	--	4.52	.00	.48	.87	.01	.05		319	.43	14,031	19	.73	545	7.8
Jan. 1-22,24, 1965.....	37,180	9.5	3.29	1.40	1.09	.06	4.33	.00	.54	.96	.02	.04		312	.42	15,776	19	.71	549	7.7
Jan. 23, 25-28..	54,744	9.4	1.85	.43	.74	--	2.07	.00	.37	.51	--	.06		170	.23	12,657	25	.69	290	8.1
Jan. 29-31.....	6,385	11	2.30	.52	.96	--	2.52	.00	.54	.68	--	.04		214	.29	1,858	25	.81	370	7.5
Feb. 1-8.....	33,068	10	2.50	.80	1.22	--	2.75	.00	.58	1.13	.01	.06		253	.34	11,378	27	.95	450	7.6
Feb. 9-15.....	59,883	9.5	2.20	.54	.74	--	2.34	.00	.54	.56	--	.05		196	.27	15,962	21	.63	348	7.6
Feb. 16-23.....	148,665	9.4	1.80	.34	.52	--	1.97	.00	.33	.31	--	.03		149	.20	30,125	20	.51	264	7.4
Feb. 24-28.....	21,382	11	2.94	.78	1.04	--	3.18	.00	.60	.93	--	.06		264	.36	7,677	22	.76	452	7.6
Mar. 1-31.....	78,151	11	3.54	1.40	1.17	--	4.06	.00	.71	1.27	.01	.07		331	.45	35,180	19	.75	575	7.6
Apr. 1-30.....	72,595	11	3.04	1.40	1.26	.06	3.77	.00	.69	1.24	.02	.06		315	.43	31,100	22	.85	564	8.0
May 1-12.....	25,515	12	3.04	1.40	1.26	--	3.82	.00	.62	1.18	.02	.05		310	.42	10,757	22	.85	556	8.0

GUADALUPE RIVER BASIN--Continued

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

Chemical analyses, water year October 1964 to September 1965--Continued

Date of collection	Ruaoff (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				
May 13-25, 1965.	207,622	10	2.25	0.55	0.70	--	2.52	0.00	0.42	0.51	--	0.04		194	0.26	54,779	20	0.59	351	7.2
May 26-31.....	32,906	13	3.29	.99	1.00	--	3.80	.00	.58	.85	--	.05		289	.39	12,933	19	.68	512	7.3
June 1-5.....	27,511	13	2.99	.77	1.04	--	3.21	.00	.65	.90	0.02	.04		268	.36	10,027	22	.76	473	7.6
June 6-12.....	143,841	9.4	2.10	.38	.42	0.10	2.26	.00	.33	.39	--	.02		169	.23	33,060	14	.38	299	7.0
June 13-14.....	11,048	18	2.89	.99	1.13	--	3.61	.00	.54	.85	--	.03		280	.38	4,207	23	.81	474	7.8
June 15-30.....	56,775	13	3.59	1.23	1.35	--	4.16	.00	.69	1.27	--	.05		337	.46	26,021	22	.87	599	7.4
July 1-31.....	68,620	13	2.89	1.15	1.09	.06	3.44	.00	.60	1.07	.02	.04		285	.39	26,597	21	.76	513	7.1
Aug. 1-31.....	42,918	13	2.40	.99	1.70	--	3.44	.00	.58	1.02	.01	.03		281	.38	16,402	33	1.30	489	7.7
Sept. 1-15.....	19,785	12	2.05	1.40	1.13	--	2.95	.00	.56	1.02	.02	.02		250	.34	6,727	25	.86	447	7.4
Sept. 16-30.....	22,284	13	2.69	1.32	1.13	--	3.61	.00	.56	.93	--	.03		279	.38	8,456	22	.80	511	7.7
Total or weighted average	1,311,949	11	2.56	0.82	0.99	--	3.00	0.00	0.50	0.73	--	0.40		236	0.32	421,599	23	0.76	418	7.3

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 1965.
Water temperatures: October 1947 to September 1964.
EXTREMES, 1964-65.--Specific conductance: Maximum daily, 599 micromhos Oct. 1; minimum daily, 340 micromhos June 2.
Percent sodium: Maximum, 49 Oct. 1-7; minimum, 20 Jan. 1-31.
Sodium-adsorption-ratio: Maximum, 2.39 Oct. 1-7; minimum, 0.65 Jan. 1-31.
EXTREMES, 1947-65.--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, 18 Dec. 1-31, 1958.
Sodium-adsorption-ratio (1961-65): Maximum, 2.57 Aug. 1-31, 1962; minimum, 0.65 Jan. 1-31, 1965
REMARKS.--Where no potassium (K) is reported, sodium and potassium are calculated as sodium (Na).

Chemical analyses, water year October 1964 to September 1965

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. 1-7, 1964..	40,848	21	2.05	0.59	2.74	0.23	3.18	0.00	0.62	1.69	0.02	0.04		329	0.45	18,277	49	2.39	552	7.6
Oct. 8-31.....	149,284	17	2.30	.34	1.22	--	2.90	.00	.37	.56	--	.02		222	.30	45,072	32	1.06	371	7.8
Nov. 1-30.....	22,850	12	2.35	.35	.96	--	2.88	.00	.33	.42	.02	.01		204	28	6,339	26	.82	354	7.6
Dec. 1-31.....	4,538	13	2.50	.42	.96	--	3.05	.00	.33	.48	.01	.01		215	.29	1,327	25	79	372	7.3
Jan. 1-31, 1965.	4,249	13	2.59	.35	.78	.17	3.15	.00	.31	.51	.02	.00		222	.30	1,283	20	.65	376	7.6
Feb. 1-28.....	69,810	15	2.59	.37	1.00	--	3.18	.00	31	.45	.02	.00		221	30	20,982	25	.82	377	7.4
Mar. 1-31.....	31,666	14	2.64	.56	1.04	--	3.28	.00	.37	59	.01	.01		236	.32	10,164	25	82	400	7.8
Apr. 1-30.....	6,188	16	2.69	.43	.96	.17	3.31	.00	.37	.62	.02	00		243	.33	2,045	23	.77	406	7.3
May 1-31.....	163,250	13	2.64	.42	1.39	--	3.29	.00	.42	.71	02	.00		248	.34	55,061	31	1.12	429	7.1
June 1-30.....	52,066	15	2.25	.27	1.17	--	2.66	.00	.44	.59	.01	.01		213	29	15,083	32	1.05	372	6.8
July 1-31.....	9,715	16	2.50	.34	1.00	.18	2.98	.00	.46	.59	.02	.01		233	.32	3,079	25	.84	400	7.0
Aug. 1-31.....	8,116	18	2.69	.35	1.39	--	3.31	.00	.48	.62	02	00		253	.34	2,793	31	1.13	429	7.6
Sept. 1-30.....	7,319	20	2.89	.43	1.44	--	3.54	.00	.48	.71	.02	.01		271	37	2,697	30	1.11	455	7.3
Total or weighted average	569,899	15	2.46	0.39	1.32	--	3.09	0.00	0.40	0.67	0.01	0.01		238	0.32	184,202	32	1.12	405	7.2

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

LOCATION.--Half a mile southeast of La Sauses, 7 miles upstream from Culebra Creek, and 15 miles upstream from gaging station near Lobatos, Conejos County.
DRAINAGE AREA.--7,700 square miles, 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 1965.
Water temperatures: July 1964 to September 1965.
EXTREMES, 1964-65.--Specific conductance: Maximum daily, 703 micromhos Aug. 25; minimum daily, 131 micromhos Nov. 12.
Percent sodium: Maximum, 47 Oct. 1-7; minimum, 26 Nov. 12-16.
Sodium-adsorption-ratio: Maximum, 2.11 Oct. 1-7; minimum, 0.53 Nov. 12-16.
EXTREMES, 1946-65.--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.
Sodium-adsorption-ratio: Maximum, 2.11 Oct. 1-7, 1964; minimum, 0.53 Nov. 12-16, 1964.
REMARKS.--Values reported for sodium (Na) are determined by analysis and do not include potassium (K). 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 1964 to September 1965

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. 1-7, 1964..	135	--	2.05	0.79	2.52	--	3.51	0.00	--	--	--	--	--	343	0.47	161	47	2.11	519	7.9
Oct. 8-31.....	1,466	--	1.90	.58	2.00	--	3.21	.00	--	--	--	--	--	294	.40	586	45	1.80	443	7.7
Nov. 1-9.....	807	--	2.20	.76	2.04	--	2.95	.00	--	--	--	--	--	333	.45	365	41	1.68	499	7.5
Nov. 10-11.....	1,055	--	.75	.29	.52	--	1.15	.00	--	--	--	--	--	122	.17	175	33	.73	167	7.0
Nov. 12-16.....	4,631	21	.65	.27	.36	0.08	.92	.00	0.31	0.07	0.01	0.02	0.04	99	.13	624	26	.53	135	7.0
Nov. 17.....	591	--	1.10	.32	.65	--	1.31	.00	--	--	--	--	--	156	.21	125	32	.77	213	7.1
Nov. 18-20.....	738	--	1.65	.49	1.13	--	2.00	.00	--	--	--	--	--	234	.32	235	35	1.09	341	7.3
Nov. 21-30.....	1,662	--	2.20	.74	1.78	--	2.92	.00	--	--	--	--	--	316	.43	714	38	1.47	460	7.5
Dec. 1-3.....	466	--	2.15	.77	1.70	--	2.95	.00	--	--	--	--	--	312	.42	198	37	1.40	451	7.7
Dec. 4-7.....	575	--	2.00	.52	1.26	--	2.36	.00	--	--	--	--	--	268	.36	210	33	1.13	385	7.7
Dec. 8-19.....	1,685	--	2.10	.62	1.39	--	2.56	.00	--	--	--	--	--	290	.39	665	34	1.20	417	7.3
Dec. 20-23.....	625	--	1.65	.55	.96	--	2.00	.00	--	--	--	--	--	228	.31	194	30	.91	329	7.4
Dec. 24.....	179	--	1.90	.58	1.35	--	2.56	.00	--	--	--	--	--	270	.37	66	35	1.21	382	7.4
Dec. 25-31.....	1,402	--	1.55	.41	.96	--	1.98	.00	--	--	--	--	--	216	.29	412	33	.97	302	7.2
Jan. 1-6, 1965..	1,571	--	1.50	.48	.91	--	1.95	.00	--	--	--	--	--	206	.28	440	32	.92	287	7.3
Jan. 7.....	298	--	.85	.43	.65	--	1.15	.00	--	--	--	--	--	139	.19	56	34	.82	182	7.0
Jan. 8-31.....	9,378	--	1.35	.37	.83	--	1.74	.00	--	--	--	--	--	182	.25	2,321	32	.89	257	7.3
Feb. 1-28.....	12,329	30	1.35	.37	.74	.13	1.67	.00	.69	.15	.02	.03	.03	182	.25	3,052	29	.80	255	7.2

Mar. 1-12, 1965.	6,379	--	1.40	.42	.74	--	1.70	.00	--	--	--	--	--	186	.25	1,614	29	.78	260	7.2
Mar. 13-31.....	15,489	--	1.60	.56	.96	--	1.74	.00	--	--	--	--	--	221	.30	4,655	31	.92	320	7.1
Apr. 1-11.....	7,222	--	2.20	.62	1.17	--	2.13	.00	--	--	--	--	--	277	.38	2,721	29	.99	419	7.4
Apr. 12-19.....	2,475	30	2.74	.90	1.78	.22	2.75	.00	2.44	.45	.03	.02	.05	368	.50	1,239	32	1.32	550	7.3
Apr. 20-30.....	10,865	--	1.55	.55	1.17	--	2.43	.00	--	--	--	--	--	230	.31	3,399	36	1.15	329	7.3
May 1-2.....	1,888	--	2.30	.66	1.22	--	1.64	.00	--	--	--	--	--	280	.38	719	29	1.00	414	7.3
May 3-9.....	16,800	--	1.20	.38	.61	--	1.13	.00	--	--	--	--	--	168	.23	3,838	28	.69	234	6.9
May 10-19.....	18,744	--	1.65	.63	1.04	--	1.85	.00	--	--	--	--	--	227	.31	5,787	31	.98	328	7.1
May 20-25.....	24,397	--	1.10	.34	.70	--	1.25	.00	--	--	--	--	--	172	.23	5,707	33	.82	222	7.1
May 26-31.....	13,686	--	1.65	.51	1.00	--	1.56	.00	--	--	--	--	--	228	.31	4,244	32	.96	333	7.1
June 1-11.....	31,636	--	1.35	.43	.96	--	1.97	.00	--	--	--	--	--	204	.28	8,777	35	1.02	283	7.3
June 12-16.....	20,529	--	1.55	.59	1.26	--	1.54	.00	--	--	--	--	--	246	.33	6,868	37	1.22	356	7.0
June 17-27.....	70,473	--	1.15	.43	.87	--	1.28	.00	--	--	--	--	--	184	.25	17,635	36	.98	259	7.1
June 28-30.....	12,615	--	1.70	.58	1.13	--	1.70	.00	--	--	--	--	--	240	.33	4,117	33	1.06	352	7.2
July 1-3.....	8,271	--	1.75	.59	1.17	--	1.87	.00	--	--	--	--	--	256	.35	2,880	33	1.09	356	7.4
July 4-16.....	44,093	--	1.40	.48	.83	--	1.98	.00	--	--	--	--	--	178	.24	10,674	31	.85	265	7.6
July 17-22.....	10,342	25	1.95	.65	1.26	.14	2.03	.00	1.67	.23	.03	.02	.08	264	.36	3,713	32	1.11	392	7.3
July 23-25.....	2,660	--	2.59	.90	1.83	--	2.54	.00	--	--	--	--	--	353	.48	1,277	34	1.38	523	7.3
July 26-31.....	9,663	--	1.85	.61	1.26	--	2.07	.00	--	--	--	--	--	262	.36	3,443	34	1.14	387	7.2
Aug. 1-8.....	19,517	--	1.45	.49	.91	--	2.07	.00	--	--	--	--	--	194	.26	5,149	32	.93	282	7.4
Aug. 9-11.....	3,642	--	1.95	.77	1.52	--	2.26	.00	--	--	--	--	--	289	.39	1,431	36	1.31	427	7.1
Aug. 12-31.....	8,569	--	3.04	.99	2.48	--	3.10	.00	--	--	--	--	--	438	.60	5,104	38	1.75	644	7.4
Sept. 1-20.....	5,990	--	2.64	.90	1.83	--	2.66	.00	--	--	--	--	--	366	.50	2,982	34	1.37	543	7.4
Sept. 21-30.....	13,111	--	1.10	.26	.52	--	1.16	.00	--	--	--	--	--	142	.19	2,532	28	.63	202	6.9
Total or weighted average	418,649	--	1.50	0.50	1.00	--	1.74	0 00	--	--	--	--	--	213	0.29	121,104	33	1.00	304	7.1

RIO GRANDE BASIN--Continued

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

LOCATION.--At gaging station, 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 1946 to September 1965.
Water temperatures: October 1948 to September 1965.
EXTREMES, 1964-65.--Specific conductance: Maximum daily, 585 micromhos Aug. 3; minimum daily, 225 micromhos May 8, June 6.
Percent sodium: Maximum, 31 Oct. 1-31; minimum, 16 Apr. 21-30.
Sodium-adsorption-ratio: Maximum, 1.08 Oct. 1-31, Dec. 1-31; minimum, 0.43 Apr. 21-30, May 1-31.
EXTREMES, 1946-65.--Specific conductance: Maximum daily, 1,310 micromhos Aug. 5, 1963; minimum daily, 165 micromhos June 13, 1952.
Percent sodium: Maximum, 43 Sept. 13-30, 1958; minimum, 12 Apr. 26-30, Aug. 1-7, 1958.
Sodium-adsorption-ratio (1961-65): Maximum, 1.56 July 5-13, 1962; minimum, 0.40 Apr. 19-30, 1962.
REMARKS.--Flow affected by ice Jan. 11-19.

Chemical analyses, water year October 1964 to September 1965

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, 1964.	14,388	30	2.35	0.57	1.31	--	2.88	0.00	1.10	0.25		0.01		263	0.36	5,146	31	1.08	407	8.1
Nov. 1-13.....	11,423	27	2.45	.61	1.26	--	2.85	.00	1.23	.25		.01		267	.36	4,148	29	1.02	422	8.0
Nov. 14-21.....	21,104	23	2.20	.60	.78	--	2.20	.00	1.27	.13		.02		225	.31	6,458	22	.66	354	7.8
Nov. 22-30.....	7,408	28	2.50	.70	1.26	--	2.79	.00	1.48	.26		.02		281	.38	2,831	28	1.00	433	8.0
Dec. 1-31.....	26,132	29	2.54	.78	1.39	--	2.98	.00	1.50	.28		.02		294	.40	10,449	30	1.08	452	8.1
Jan. 1-8, 1965..	9,283	27	2.30	.66	1.17	--	2.66	.00	1.29	.24		.02		260	.35	3,282	28	.97	403	8.0
Jan. 9-11.....	8,271	17	2.99	.71	1.35	--	2.43	.00	2.48	.17		.03		317	.43	3,566	27	.99	492	7.8
Jan. 12-31.....	24,912	25	2.30	.60	1.13	--	2.52	.00	1.33	.23		.01		253	.34	8,572	28	.94	398	8.0
Feb. 1-24.....	32,132	25	2.25	.63	1.13	--	2.43	.00	1.44	.21		.01		254	.35	11,100	28	.94	395	8.0
Feb. 25-28.....	6,553	23	2.50	.66	1.22	--	2.46	.00	1.75	.22		.02		276	.38	2,460	28	.97	432	7.8
Mar. 1-28.....	44,152	24	2.35	.63	1.17	--	2.28	.00	1.71	.21		.01		264	.36	15,852	28	.96	409	8.0
Mar. 29-31.....	6,426	21	2.64	.80	1.31	--	2.18	.00	2.42	.22		.01		303	.41	2,648	27	.99	469	7.9
Apr. 1-2.....	6,307	20	3.09	.82	1.17	0.09	2.67	.00	2.35	.19		.04		324	.44	2,779	23	.84	501	7.8
Apr. 3-20.....	54,268	21	2.50	.62	.87	.08	2.25	.00	1.67	.17		.03		256	.35	13,394	21	.70	393	7.9
Apr. 21-30.....	71,008	19	2.10	.36	.48	.07	2.03	.00	.81	.09		.04		184	.25	17,769	16	.43	290	7.8

May 1-31, 1965.	255,174	19	1.90	.18	.44	.06	1.72	.00	.75	.09		.02		164	.22	56,914	17	.43	255	7.8
June 1-30.....	268,959	18	1.70	.30	.61	.08	1.66	.00	.94	.12		.01		173	.24	63,281	23	.61	269	7.8
July 1-19.....	149,236	21	1.75	.35	.65	--	1.70	.00	.96	.10		.01		177	.24	35,924	24	.64	278	7.7
July 20-31.....	35,226	24	2.25	.43	1.09	--	2.20	.00	1.42	.17		.01		240	.33	11,498	29	.94	376	7.9
Aug. 1-2.....	10,116	23	2.74	.52	1.04	--	2.80	.00	1.31	.18		.02		263	.36	3,618	24	.82	419	7.6
Aug. 3-4.....	14,638	20	3.74	.70	1.00	--	2.46	.00	2.81	.12		.00		340	.46	6,769	18	.67	528	7.6
Aug. 5-13.....	29,633	24	2.10	.54	.91	--	2.05	.00	1.35	.15		.01		226	.31	9,108	26	.80	356	7.7
Aug. 14-31.....	23,278	25	2.64	.72	1.31	--	2.80	.00	1.69	.25		.01		292	.40	9,244	28	1.01	460	7.9
Sept. 1-24.....	34,274	23	2.50	.66	1.17	--	2.57	.00	1.56	.23		.01		269	.37	12,539	27	.94	428	8.0
Sept. 25-30....	13,567	22	1.70	.42	.74	--	1.75	.00	.96	.12		.01		182	.25	3,358	26	.72	284	8.0
Total or weighted average	1,177,868	21	2.04	0.40	0.75	--	1.98	0.00	1.12	1.41		0.02		205	0.28	328,007	24	0.68	319	7.8

RIO GRANDE BASIN--Continued

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

LOCATION (revised).--At gaging station in Pedro Armendaris Grant No. 34, 51 miles downstream from heading at San Acacia, 3 5 miles downstream from railroad bridge near Tiffany siding, 1.0 mile southwest of former site of San Marcial, Socorro County, and 0.4 mile northwest of Atchison, Topeka and Santa Fe Railway Co. bridge over floodway channel.
RECORDS AVAILABLE.--Chemical analyses: March 1954 to September 1965.
Water temperatures: March 1954 to September 1965.
Sediment records: March 1954 to September 1965.
EXTREMES, 1964-65.--Specific conductance: Maximum daily, 2,090 micromhos Sept. 4; minimum daily, 405 micromhos May 31
Percent sodium: Maximum, 60 Oct. 16-27, Nov. 1-2; minimum, 26 Apr. 24-30.
Sodium-adsorption-ratio: Maximum, 5.83 Oct. 16-27; minimum, 0.93 Apr. 24, 30.
EXTREMES, 1954-65.--Specific conductance: Maximum daily, 2,860 micromhos Oct 25, 1956; minimum dialy, 353 micromhos Jan. 8, 1963
Percent sodium: Maximum, 66 Oct. 1-20, Nov. 1-21, 1956, Oct. 1-9, 1959; minimum, 26 Apr. 24-30, 1965
Sodium-adsorption-ratio (1961-65): Maximum, 5.83 Oct. 16-27, 1964; minimum, 0.93 Apr. 24-30, 1965.
REMARKS.--Values reported for sodium (Na) are determined by analysis and do not include potassium (K). 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. Quality of Water records for Rio Grande floodway at San Marcial given on page 88 .

Chemical analyses, water year October 1964 to September 1965

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, 1964....	89	--	5.99	1.97	6.96	--	4.33	0.00	--	--	--	--	--	988	1.34	120	47	3.49	1,380	7.8
Oct. 2.....	63	--	4.79	1.48	4.48	--	3.80	.00	--	--	--	--	--	718	.98	62	42	2.53	1,010	8.0
Oct. 3-10.....	106	--	4.94	2.06	9.53	--	4.03	.00	--	--	--	--	--	1,070	1.46	155	58	5.09	1,660	7.8
Oct. 11-15.....	13	--	4.29	1.32	3.05	--	3.34	.40	--	--	--	--	--	562	.76	10	35	1.82	831	8.4
Oct. 16-27.....	69	44	4.94	2.14	10.96	0.31	4.06	.00	7.33	7.05	0.03	0.01	0.38	1,150	1.56	108	60	5.83	1,790	8.2
Oct. 28-31.....	21	--	4.29	1.23	3.18	--	3.47	.27	--	--	--	--	--	564	.77	16	36	1.91	813	8.4
Nov. 1-2.....	44	--	5.14	2.14	11.05	--	3.93	.27	--	--	--	--	--	1,180	1.60	70	60	5.79	1,840	8.3
Nov. 3-10.....	292	--	5.14	1.73	7.57	--	4.56	.00	--	--	--	--	--	950	1.29	377	52	4.08	1,390	8.0
Nov. 11-13.....	73	--	4.69	1.40	5.39	--	4.16	.00	--	--	--	--	--	752	1.02	75	47	3.09	1,100	8.0
Nov. 14-15.....	60	--	5.14	1.89	7.92	--	4.59	.00	--	--	--	--	--	962	1.31	78	53	4.22	1,440	8.0
Nov. 16-30.....	13,626	--	3.59	.90	2.35	--	3.57	.00	--	--	--	--	--	441	.60	8,173	34	1.57	660	7.8
Dec. 1-31.....	21,767	--	3.79	1.07	3.05	--	3.70	.00	--	--	--	--	--	510	.69	15,097	39	1.95	777	7.8
Jan. 1-31, 1965.	40,028	--	3.59	.90	2.44	--	3.47	.00	--	--	--	--	--	459	.62	24,987	35	1.62	691	7.8
Feb. 1-28.....	35,488	--	3.39	.90	2.52	--	3.34	.00	--	--	--	--	--	445	.61	21,477	37	1.72	681	7.8
Mar. 1-31.....	25,333	--	3.39	.90	2.61	--	3.26	.00	--	--	--	--	--	450	.61	15,504	38	1.78	690	7.8
Apr. 1-5.....	4,314	--	3.94	.99	2.61	--	3.70	.00	--	--	--	--	--	502	.68	2,945	35	1.66	750	7.7

Apr. 6-23, 1965.	29,240	--	3.49	.63	2.09	--	3.05	.00	--	--	--	--	--	403	.55	16,026	34	1.45	619	7.7
Apr. 24-30.....	20,965	--	2.74	.70	1.22	--	2.70	.00	--	--	--	--	--	310	.42	8,839	26	.93	472	7.7
May 1-14.....	36,655	--	2.50	.62	1.26	--	2.44	.00	--	--	--	--	--	282	.38	14,058	29	1.01	437	7.7
May 15.....	2,579	--	3.39	.65	1.52	--	3.28	.00	--	--	--	--	--	332	.45	1,164	27	1.07	526	7.8
May 16-31.....	43,795	--	2.45	.51	1.44	--	2.36	.00	--	--	--	--	--	288	.39	17,154	33	1.18	440	7.9
June 1-20.....	59,901	23	2.69	.57	1.44	.10	2.57	.00	1.71	.45	.02	.04	.01	278	.38	22,647	30	1.12	465	7.9
June 21.....	3,193	--	3.49	.67	1.65	--	2.79	.00	--	--	--	--	--	340	.46	1,477	28	1.15	582	7.8
June 22-30.....	26,777	--	2.74	.48	1.52	--	2.49	.00	--	--	--	--	--	285	.39	10,379	32	1.20	475	7.8
July 1-12.....	36,179	--	2.40	.60	1.39	--	2.36	.00	--	--	--	--	--	275	.37	13,531	32	1.14	448	7.8
July 13-24.....	34,036	--	2.99	.69	1.87	--	2.66	.00	--	--	--	--	--	348	.47	16,109	34	1.38	552	7.8
July 25-27.....	5,236	--	3.79	.90	2.91	--	3.08	.00	--	--	--	--	--	472	.64	3,361	38	1.90	746	7.8
July 28-30.....	4,808	--	4.19	1.15	3.52	--	3.20	.00	--	--	--	--	--	590	.80	3,858	40	2.16	875	7.8
July 31.....	1,983	--	7.68	2.63	7.48	--	4.03	.00	--	--	--	--	--	1,130	1.54	3,048	42	3.29	1,590	7.9
Aug. 1-4.....	10,314	--	7.39	1.97	4.48	--	3.70	.00	--	--	--	--	--	918	1.25	12,877	32	2.07	1,290	7.6
Aug. 5-15.....	24,436	--	3.54	.78	2.31	--	3.08	.00	--	--	--	--	--	432	.59	14,357	35	1.57	654	7.7
Aug. 16-31.....	11,012	--	4.49	1.32	4.13	--	3.74	.00	--	--	--	--	--	636	.86	9,525	42	2.43	956	7.7
Sept. 1-3.....	1,613	--	4.59	1.32	4.31	--	3.80	.00	--	--	--	--	--	652	.89	1,430	42	2.51	986	7.6
Sept. 4-5.....	2,634	--	9.48	3.13	7.96	--	4.72	.00	--	--	--	--	--	1,360	1.85	4,872	39	3.17	1,790	7.6
Sept. 6-30.....	30,496	25	4.69	1.15	3.74	.16	3.74	.00	4.83	1.24	.03	.00	.32	624	.85	25,880	38	2.19	933	7.7
Total or weighted average	527,238	--	3.29	0.80	2.18	--	2.98	0.00	--	--	--	--	--	404	0.55	289,846	35	1.52	621	7.7

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

LOCATION (revised).--At gaging station in Pedro Armendaris Grant No. 33, at Atchison, Topeka and Sante Fe Railway Co. bridge, 18.5 miles southwest of San Antonio, and 1.1 miles downstream from former site of San Marcial, Socorro County.
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 1965.
Water temperatures: January 1949 to September 1965.
Sediment records: July 1946 to September 1965.
EXTREMES, 1964-65.--Specific conductance: Maximum daily, 1,280 micromhos Aug. 4; minimum daily, 375 micromhos July 11.
Percent sodium: Maximum, 34 July 13-14, Sept. 6-15; minimum, 23 May 15.
Sodium-adsorption-ratio: Maximum, 2.10 Sept. 6-15; minimum, 0.88 May 15.
EXTREMES, 1946-65.--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, 1962.
Sodium-adsorption-ratio: (1961-65): Maximum, 7.73 Oct. 4-8, 1963; minimum, 0.18 July 12, 1964.
REMARKS.--Values reported for sodium (Na) are determined by analysis and do not include potassium (K). 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 in surface water records as Rio Grande at San Marcial. Quality of water records for Rio Grande conveyance channel at San Marcial given of page 86. No Flow Oct. 1 to Apr. 25, July 23-27, 29, 30, Aug. 11-14, Aug. 17 to Sept. 5, Sept 16-30.

Chemical analyses, water year October 1964 to September 1965

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				
Apr. 26-30, 1965	10,711	22	3.09	0.55	1.39	0.14	3.08	0.00	1.58	0.42	0.03	0.07	0.09	325	0.44	4,734	27	1.03	489	7.8
May 1-14	37,488	--	2.64	.60	1.26	--	2.69	.00	--	--	--	--	--	289	.39	14,734	28	.99	435	7.8
May 15	3,570	--	3.54	.82	1.31	--	3.54	.00	--	--	--	--	--	356	.48	1,729	23	.88	523	7.8
May 16-31	57,759	--	2.59	.49	1.22	--	2.52	.00	--	--	--	--	--	280	.38	21,995	28	.98	425	7.8
June 1-20	55,934	--	2.74	.52	1.26	--	2.67	.00	--	--	--	--	--	293	.40	22,289	28	.99	444	7.9
June 21-22	11,821	22	3.44	.56	1.48	.13	2.84	.00	2.33	.39	.02	.03	.07	359	.49	5,772	26	1.05	539	7.7
June 23-30	37,289	--	2.69	.43	1.31	--	2.56	.00	--	--	--	--	--	287	.39	14,555	29	1.04	436	7.7
July 1-3	6,724	--	3.09	.45	1.74	--	2.66	.00	--	--	--	--	--	342	.47	3,127	33	1.31	522	7.7
July 4-12	30,883	--	2.59	.37	1.13	--	2.43	.00	--	--	--	--	--	265	.36	11,130	28	.93	403	7.7
July 13-14	3,293	22	4.04	.90	2.61	.14	3.02	.00	3.71	.96	.02	.00	.13	493	.67	2,208	34	1.66	730	7.7
July 15-17	4,421	--	2.84	.56	1.52	--	2.57	.00	--	--	--	--	--	320	.44	1,924	31	1.17	484	7.8
July 18	1,174	--	5.59	1.48	2.74	--	3.21	.00	--	--	--	--	--	658	.89	1,051	28	1.46	921	7.8
July 19-22, 28,31	2,095	--	2.64	.52	1.57	--	2.34	.00	--	--	--	--	--	316	.43	909	33	1.35	467	7.8
Aug. 1-4	20,628	--	6.94	1.97	4.09	--	4.57	.00	--	--	--	--	--	847	1.15	23,762	31	1.94	1,180	7.6
Aug. 5-10, 15-16	8,696	--	4.09	1.07	2.39	--	3.34	.00	--	--	--	--	--	473	.64	5,594	32	1.49	724	7.6
Sept. 6-15	1,839	23	5.89	1.89	4.13	.13	4.70	.00	6.45	.90	.03	.00	.32	755	1.03	1,888	34	2.10	1,090	7.5
Total or weighted average	294,325	--	3.11	0.64	1.57	--	2.80	0.00	--	--	--	--	--	343	0.47	137,392	30	1.15	511	7.7

8-3640. RIO GRANDE AT EL PASO, TEX.

LOCATION.--At gaging station on downstream side of Courchesne Bridge, 5.6 miles upstream from the Santa Fe Street - Juarez Avenue Bridge between El Paso, Texas, and Cd. Juarez, and 1.7 miles upstream from the American Dam.
DRAINAGE AREA.--29,267 square miles.
RECORDS AVAILABLE.-- Chemical analyses: 1933 to 1965.
REMARKS.--Chemical analyses by U.S. Department of Agricultural Research Service, U.S. Salinity Laboratory, Riverside, Calif. Records of specific conductance of daily samples and records of discharge for water year October 1964 to September 1965 given in International Boundary and Water Commission Water Bulletins 34 and 35.

Chemical analyses, water year October 1964 to September 1965

Month	Number of samples	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids			Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
				Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)		Parts per million	Tons per acre-foot	Total tons				
October 1964	31	498	--	6.29	3.21	30.54	--	4.61	0.00	18.30	17.60	--	0.08	0.70	2,642	3 59	1,790	76	14.01	3,870	8.0
November....	29	482	--	5.44	2.55	26.67	--	4.39	.00	15.89	14.95	--	.12	.68	2,281	3.10	1,495	77	13 34	3,430	7.9
December....	28	498	--	6.04	2.39	26.97	--	4.61	.00	15.91	15 15	--	.13	.71	2,298	3.13	1,557	76	13.14	3,460	8.0
January 1965	30	498	25	5.59	2.63	26.06	0.26	4.44	.27	15.47	14.36	0.06	.13	.67	2,263	3 08	1,533	75	12.85	3,350	8.2
February....	28	450	--	5.59	2.39	26.71	--	4.90	.00	15.59	14.84	--	12	70	2,262	3.08	1,384	77	13 38	3,420	7.9
March.....	31	3,603	--	5.04	1.81	10.01	--	3.44	00	7.08	6.54	--	.07	.31	1,077	1 46	5,278	59	5.41	1,700	8.0
April.....	24	15,233	--	4.44	1.48	6.74	--	3.25	.00	5.48	4.15	--	--	.25	817	1.11	16,926	53	3 92	1,270	7.8
May.....	24	523	--	5.69	2.22	26.54	--	4.34	00	15.74	14.56	--	.12	.74	2,271	3 09	1,614	77	13.34	3,370	7.9
June.....	30	39,570	--	3.44	1.07	4.13	--	3.10	.00	3.64	2.20	--	.02	.14	547	.74	29,437	48	2.75	885	7 8
July.....	31	57,122	10	2.84	.90	2.83	.14	2.61	.00	2.71	1.35	.03	01	.10	431	.59	33,483	42	2 07	665	8.0
August.....	31	51,219	--	2.94	.82	2.91	--	2.75	.00	2.75	1.41	--	.01	.05	477	65	33,227	44	2.12	684	7 7
September...	32	29,812	--	3.59	1.07	3.87	--	3.05	.00	3.75	1.95	--	.02	.06	566	.77	22,948	45	2 54	854	8.0
Total or weighted average	--	199,508	--	4.30	1.02	4.05	--	2.90	--	3.55	2.14	--	0.02	1.11	555	0.75	150,672	43	2.48	848	--

RIO GRANDE BASIN--Continued

8-3705. RIO GRANDE AT FORT QUITMAN, TEX.

LOCATION.--At gaging station on the rectified channel of the Rio Grande, 1.5 miles downstream from Old Fort Quitman and 81.1 river miles downstream from the American Dam at El Paso.
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 1965.
REMARKS.--Chemical analyses by U.S. Department of Agriculture, Agricultural Research Service, U.S. Salinity Laboratory, Riverside, Calif. Records of Specific conductance of daily samples and records of discharge for water year October 1964 to September 1965 given in International Boundary and Water Commission Water Bulletin Numbers 34 and 35. No flow on many days during water year.

Chemical analyses, water year October 1964 to September 1965

Month	Number of samples	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids			Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
				Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)		Parts per million	Tons per acre-foot	Total tons				
May, 1965....	3	904		3.79	0.90	1.52		4.61	0.00	0.87	0.82		0.01	0.10	387	0.53	476	24	0.99	585	7.8
June.....	4	559		3.94	.76	1.44		4.80	.00	1.06	.34		.02	18	361	.49	275	23	.94	580	7.9
August.....	2	129		2.99	.44	1.26		3.80	.00	.62	.31		.02	.14	310	.42	54	27	.96	455	7.7
September....	2	65		4.14	1.07	1.65		5.39	.00	1.29	.34		.01	.02	417	.57	37	24	1.02	638	7.9

8-3715. RIO GRANDE ABOVE RIO CONCHOS, NEAR 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 1965.
REMARKS.--Chemical analyses by U.S. Department of Agriculture, Agricultural Research Service, U.S. Salinity Laboratory, Riverside, Calif. Records of specific conductance of daily samples and records of discharge for water year October 1964 to September 1965 given in International Boundary and Water Commission Water Bulletin Numbers 34 and 35. Records prior to 1964 were published under the title "Rio Grande at Upper Presidio." No flow on many days during water year.

Chemical analyses, water year October 1964 to September 1965

Month	Number of samples	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids			Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
				Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)		Parts per million	Tons per acre-foot	Total tons				
August, 1965	4	283		4.8		2.22		2.25			0.54				463	0.63	178	34	1.52	645	
September	5	2,071		4.4		2.39		2.25			.59				475	.65	1,338	35	1 61	680	

RIO GRANDE BASIN--Continued

8-3775. RIO GRANDE AT LANGTRY, TEX.

LOCATION.--At gaging station at Langtry, 24.1 river miles above the confluence with the Pecos River, and 614.1 river miles below the American Dam at El Paso.
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 1965.
REMARKS.--Chemical analyses by U.S. Department of Agriculture, Agricultural Research Service, U.S. Salinity Laboratory, Riverside, Calif.

Chemical analyses, water year October 1964 to September 1965

Month	Number of samples	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids			Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
				Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)		Parts per million	Tons per acre-foot	Total tons				
October 1964	4	64,562	--	4.29	0.90	3.87	--	3.15	0.00	4.77	1.41	--	0.07	0 25	614	0.84	53,912	43	2.40	905	8.0
November....	7	47,960	--	4.14	1.65	5.87	--	3.10	.00	6.54	2.14	--	.07	.31	781	1 06	50,942	50	3.45	1,130	8.0
December....	7	48,452	--	4.44	1.56	5.52	--	3.20	.00	6.45	2.06	--	.13	.22	773	1.05	50,937	48	3.19	1,120	8.0
January 1965	6	50,912	20	4.14	1.65	5.70	0.16	2.93	.13	6.48	1.95	0.09	.08	.32	795	1.08	55,046	49	3.35	1,100	8.1
February....	7	50,372	--	4.09	1.48	5.22	--	3.15	.00	5 87	1.89	--	.06	.23	729	.99	49,941	48	3.13	1,060	7.7
March.....	9	44,947	--	3.94	1.56	5.31	--	3.05	.00	5.93	1.95	--	.06	.30	721	.98	44,074	49	3.20	1,060	7.9
April.....	7	26,598	--	3.69	1.65	4.48	--	2.90	.00	5.27	1.86	--	.02	.31	650	.88	23,513	46	2.74	973	7.9
May.....	9	92,231	--	3.94	.90	1.91	--	3.44	.00	2.46	.85	--	.04	.17	418	.57	52,432	28	1 23	648	7.8
June.....	10	174,942	--	3.99	.47	1.35	--	3.56	.00	1.79	.51	--	.03	.08	346	.47	82,321	23	.90	553	8.0
July.....	8	35,663	17	4.19	.99	3.35	.14	3.46	.00	3.81	1.35	.08	.03	.11	573	.78	27,791	39	2.08	836	8 0
August.....	9	73,785	--	4.94	.99	3.78	--	3.51	.00	5.00	1.30	--	04	.03	663	.90	66,531	39	2.20	937	7.9
September...	9	104,727	--	4.74	.66	3.13	--	3.39	.00	4.37	.96	--	.06	.09	573	.78	81,612	37	1 91	834	8.0
Total or weighted average	--	815,151	--	4.24	1.02	3.49	--	3 32	0 00	4 26	1 27	--	0.05	0.17	576	0.78	639,052	40	2.15	850	--

8-4590. RIO GRANDE AT LAREDO, TEX.

LOCATION.--At gaging station, 0.9 mile downstream from the highway bridge between Laredo, Texas and Nueva Laredo, Tamaulipas, and 890.8 river miles below the American Dam at El Paso.
DRAINAGE AREA.--135,976 square miles (United States and Mexico; from International Boundary and Water Commission Water Bulletin Number 31).
RECORDS AVAILABLE.--Chemical analyses: July 1955 to September 1965.
REMARKS.--Chemical analyses by U.S. Department of Agriculture, Agricultural Research Service, U. S. Salinity Laboratory, Riverside, Calif. Records of specific conductance of daily samples and records of discharge for water year October 1964 to September 1965 given in International Boundary and Water Commission Water Bulletin Numbers 34 and 35.

Chemical analyses, water year October 1964 to September 1965

Month	Number of samples	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids			Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
				Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)		Parts per million	Tons per acre-foot	Total tons				
October 1964	31	365,851	--	4.82		2.87	--	2.85	0.00	--	2.14	--	--	--	496	0.67	246,789	37	1.85	777	--
November	30	177,917	--	5.34		4.00	--	2.80	.00	--	2.96	--	--	--	602	.82	145,664	43	2.45	947	--
December	31	140,807	--	5.46		4.44	--	2.80	.00	--	3.19	--	--	--	640	.87	122,558	45	2.69	1,000	--
January 1965	31	134,658	15	3.34	1.65	4.48	0.11	2.39	.00	4.10	3.16	0.05	0.10	0.23	659	.90	120,686	47	2.84	981	8.0
February	28	116,628	--	4.80		4.79	--	2.10	.00	--	3.41	--	--	--	7,920	10.77	1,256,225	50	3.09	1,010	--
March	31	103,299	--	5.54		5.39	--	2.66	.00	--	3.84	--	--	--	709	96	99,605	49	3.24	1,100	--
April	30	88,066	--	5.70		5.57	--	2.67	.00	--	4.34	--	--	--	718	.98	85,995	49	3.30	1,130	--
May	31	285,025	--	3.80		2.35	--	2.25	.00	--	1.81	--	--	--	408	.55	158,155	38	1.70	633	--
June	30	365,355	--	3.96		2.22	--	2.72	.00	--	1.78	--	--	--	388	.53	192,791	36	1.58	635	--
July	31	73,170	21	3.84	.99	4.57	.14	2.61	.00	3.58	3.58	.04	.07	.18	649	88	64,583	48	2.94	997	7.9
August	31	102,069	--	4.60		3.78	--	2.66	.00	--	2.85	--	--	--	562	76	78,014	45	2.50	861	--
September	30	141,025	--	4.68		3.48	--	2.66	.00	--	1.81	--	--	--	553	.75	106,062	43	2.27	834	--
Total or weighted average	--	2,093,870	--	4.68		3.48	--	2.62	0.00	--	2.55	--	--	--	940	1.28	2,677,127	43	1.72	835	--

RIO GRANDE BASIN--Continued

8-4613. RIO GRANDE BELOW FALCON DAM, TEX.

LOCATION.--U.S. tailrace at Falcon Dam.
DRAINAGE AREA.--164,482 square miles (United States and Mexico; from International Boundary and Water Commission Water Bulletin Number 31).
RECORDS AVAILABLE.--Chemical analyses: July 1955 to September 1965.
REMARKS.--Chemical analyses by U.S. Department of Agricultural Research Service, U.S. Salinity Laboratory, Riverside, Calif. Records of conductance of daily samples and records of discharge for water year October 1964 to September 1965 given in International Boundary and Water Commission Water Bulletin numbers 34 and 35.

Chemical analyses, water year October 1964 to September 1965

Month	Number of samples	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids			Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
				Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)		Parts per million	Tons per acre-foot	Total tons				
October, 1964	12	136,502	--	2.54	0.80	2.48	--	2.00	0.00	2.25	1.64	--	0.03	0.13	379	0.52	70,359	43	1.92	613	8.0
November	13	102,347	--	2.59	.80	2.22	--	2.10	.00	2.10	1.50	--	.04	.15	364	.50	50,666	40	1.70	579	7.8
December	11	111,907	--	2.79	.76	2.26	--	2.25	.00	2.04	1.50	--	.03	.13	367	.50	55,855	39	1.70	594	8.0
January, 1965	13	412,582	6.0	2.84	.90	2.22	0.14	2.39	.00	2.12	1.61	0.03	.03	.13	405	.55	227,250	36	1.62	609	8.0
February	11	140,509	--	2.99	.81	2.26	--	2.41	.00	2.12	1.61	--	.03	.08	397	.54	75,864	37	1.64	610	7 7
March	13	116,212	--	3.04	.79	2.39	--	2.51	.00	2.19	1.64	--	.01	.14	393	.53	62,113	38	1.73	637	7.9
April	13	404,628	--	3.09	.99	2.57	--	2.56	.00	2.52	1.81	--	.02	.18	433	.59	238,277	39	1.80	673	7.8
May	11	359,702	--	3.04	1.07	2.87	--	2.44	.00	2.50	2.06	--	.01	.16	419	.57	204,973	41	2.00	711	7.6
June	11	290,380	--	3.04	1.07	3.00	--	2.39	.00	2.73	2.20	--	01	.14	445	.61	175,738	42	2.09	733	7.8
July	12	229,964	10	2.99	.99	3.00	.12	2.25	.00	2.71	2.14	.03	.01	.19	455	.62	142,301	42	2.13	725	7.8
August	12	83,623	--	2.79	1.07	3.05	--	2.25	.00	2.60	2.20	--	--	.13	455	.62	51,746	44	2.13	720	7.8
September	10	142,215	--	2.79	1.07	3.05	--	2.20	.00	2.66	2.26	--	--	.16	454	.62	87,809	44	2.19	729	7.8
Total or weighted average	--	2,530,571	--	2.93	0.96	2.63	--	2.36	0.00	2.41	1.87	--	0.02	0.15	419	0.57	1,492,915	40	1.89	669	--

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 1965.
Water temperatures: June 1959 to September 1965.
EXTREMES, 1964-65.--Specific conductance: Maximum daily, 3,050 micromhos Apr. 19-22; minimum daily, 919 micromhos Aug. 1.
Percent sodium: Maximum, 12 Dec. 1 to Mar. 31, May 5 to June 30; minimum, 8 Aug. 1-2.
Sodium-adsorption-ratio: Maximum, 1.08 Feb. 1-28; minimum, 0.40 Aug. 1-2.
EXTREMES, 1937-65.--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.
Sodium-adsorption-ratio (1961-65): Maximum, 1.08 Feb. 1-28, 1965; minimum, 0.40 Aug. 27, 1963, Aug. 1-2, 1965.
REMARKS.--Values reported for sodium (Na) are determined by analysis and do not include potassium (K).

Chemical analyses, water year October 1964 to September 1965

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, 1964	4,544	16	24.45	4.36	3.22		2.02	0.00	27.27	2.71		0.04		2,100	2.86	12,977	10	0.85	2,440	7.5
Nov. 1-30.....	48	17	24.00	5.18	3.74		2.16	.00	27.69	3.05		.01		2,150	2.92	139	11	1.05	2,510	7.7
Dec. 1-31.....	18	16	23.50	5.26	3.87		2.39	.00	27.27	3.13		.01		2,130	2.90	53	12	1.02	2,490	7.8
Jan. 1-31, 1965	25	16	23.10	5.68	4.00		2.49	.00	27.07	3.24		.01		2,130	2.90	71	12	1.05	2,490	7.8
Feb. 1-28.....	22	18	23.45	5.76	4.13		2.52	.00	27.27	3.33		.01		2,160	2.94	65	12	1.08	2,540	7.8
Mar. 1-31.....	30,990	18	26.65	5.92	4.31		2.46	.00	30.81	3.67		.01		2,410	3.28	101,572	12	1.07	2,750	7.7
Apr. 1-30.....	4,403	16	28.84	6.17	4.48		2.23	.00	33.10	3.98		.02		2,570	3.50	15,390	11	1.07	2,910	7.6
May 1-4.....	651	14	23.10	4.94	3.57		1.97	.00	26.44	3.13		.03		2,060	2.80	1,823	11	.95	2,430	7.3
May 5-17.....	1,392	14	19.21	4.03	3.05		1.93	.00	22.07	2.65		.02		1,730	2.35	3,276	12	.89	2,090	7.7
May 18-31.....	1,872	12	12.67	2.47	2.09		1.87	.00	13.87	1.64		.02		1,130	1.54	2,876	12	.76	1,470	7.8
June 1-30.....	25,825	12	10.63	2.14	1.70		1.97	.00	11.53	1.30		.02		950	1.29	33,366	12	.67	1,250	7.8
July 1-9.....	18,387	12	9.68	1.89	1.44		2.02	.00	10.08	1.07		.03		846	1.15	21,155	11	.60	1,140	7.5
July 10-11.....	379	13	12.57	2.47	1.87		2.18	.00	13.45	1.47		.04		1,100	1.50	567	11	.68	1,430	7.5
July 12-28.....	3,355	14	14.77	2.63	2.18		2.08	.00	15.86	1.72		.03		1,280	1.74	5,840	11	.74	1,620	7.5
July 29-31.....	581	14	17.47	3.54	2.61		2.08	.00	19.36	2.17		.03		1,540	2.09	1,218	11	.81	1,900	7.5
Aug. 1-2.....	343	24	7.78	1.65	.87		6.26	.00	3.54	.65		.00		601	.82	280	8	.40	920	7.5
Aug. 3-12.....	972	13	11.83	2.47	1.74		2.07	.00	12.76	1.35		.05		1,050	1.43	1,388	11	.65	1,370	7.4
Aug. 13-31.....	3,769	12	9.28	1.48	1.22		1.97	.00	9.20	.87		.04		778	1.06	3,987	10	.53	1,060	7.6
Sept. 1-6.....	1,172	12	8.98	1.65	1.22		1.97	.00	9.04	.85		.03		765	1.04	1,220	10	.53	1,040	7.6
Sept. 7-30.....	3,537	13	11.33	2.30	1.44		2.07	.00	11.93	1.10		.02		976	1.33	4,695	10	.55	1,280	7.7
Total or weighted average	102,285	14	17.16	3.54	2.65		2.16	0.00	19.11	2.17		0.02		1,520	2.07	211,958	11	0.80	1,841	7.6

RIO GRANDE BASIN--Continued

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 1965.
Water temperatures: April 1949 to September 1965.
Sediment Records: January 1949 to September 1965.
EXTREMES, 1964-65.--Specific conductance: Maximum daily, 21,500 micromhos June 24; minimum daily, 720 micromhos July 29.
Percent sodium: Maximum, 68 June 24; minimum, 16 June 28-30.
Sodium-adsorption-ratio: Maximum, 27.00 June 24; minimum 0.72 July 29.
EXTREMES, 1937-65.--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.
Sodium-adsorption-ratio (1961-65): Maximum, 27.00 June 24, 1965; minimum, 0.72 July 29, 1965.
REMARKS.--Values reported for sodium (Na) are determined by analysis and do not include potassium (K). Values expressed in parts per million are multiplied by density when computing loads. No flow Oct. 5, 12, 13.

Chemical analyses, water year October 1964 to September 1965

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. 1-2, 1964..	4	19	17.27	8.31	32.54		1.54	0.00	25.61	30.47		0.14		3,580	4.87	19	56	9.10	5,400	6.8
Oct. 3-4.....	4	13	22.36	14.48	46.11		.75	.00	37.68	43.73		.09		5,090	6.92	27	56	10.74	7,340	6.5
Oct. 6-11, 14...	14	12	25.85	17.19	60.03		.87	.00	44.35	56.70		.04		6,290	8.55	119	58	12.94	9,050	6.8
Oct. 15.....	4	17	19.51	12.67	53.07		1.54	.00	31.65	51.34		.09		5,170	7.03	28	62	13.23	7,770	6.9
Oct. 16-17.....	8	2.0	17.86	10.78	38.89		2.90	.00	26.86	37.24		.13		4,110	5.59	44	58	10.28	6,220	7.1
Oct. 18-19.....	8	17	24.95	18.67	48.72		2.57	.00	43.31	45.98		.14		5,660	7.70	61	53	10.43	7,940	7.2
Oct. 20.....	4	19	29.29	22.95	65.25		2.74	.00	51.63	62.63		.09		7,170	9.75	39	56	12.77	10,100	7.4
Oct. 21-24.....	24	15	32.24	24.76	106.14		2.51	.00	50.18	110.87		.11		9,820	13.36	318	65	19.88	14,500	7.3
Oct. 25-26.....	18	15	29.34	21.63	77.43		2.61	.00	46.64	78.71		.11		7,760	10.55	188	60	15.34	11,300	7.2
Oct. 27-29.....	30	10	36.28	28.71	115.71		2.15	.00	57.05	120.17		.10		10,800	14.69	437	64	20.30	15,700	7.2
Oct. 30-31.....	22	8.1	34.73	26.24	95.70		2.15	.00	53.51	102.68		.07		9,500	12.92	282	61	17.33	13,300	7.3
Nov. 1-18.....	564	8.1	33.33	24.10	79.61		2.47	.00	49.97	82.94		.10		8,220	11.18	6,306	58	14.85	11,800	7.2
Nov. 19.....	407	17	24.85	8.97	17.88		2.69	.00	33.10	15.37		.05		3,250	4.42	1,797	35	4.35	4,200	7.4
Nov. 20-23.....	665	11	18.61	6.00	12.9		2.29	.00	22. 9	12.3		.09		2,360	3.21	2,134	34	3.69	3,280	7.3
Nov. 24-26.....	254	14	18.96	8.06	22.05		2.49	.00	23.73	22.85		.09		3,030	4.12	1,047	45	6.00	4,410	7.6

Nov. 27-30, 1964	286	18	23.55	12.42	33.06	--	3.21	.00	30.61	34.98	.11	4,210	5.73	1,635	48	7.80	6,080	7.5
Dec. 1-3.....	162	20	28.94	16.04	42.63	--	3.70	.00	37.68	46.55	.10	5,350	7.28	1,182	49	8.99	7,550	7.7
Dec. 4-31.....	1,938	11	29.19	17.85	49.16	--	2.88	.00	39.97	55.01	.04	5,900	8.02	15,553	51	10.14	8,420	7.7
Jan. 1-31, 1965.	2,127	11	28.69	19.33	53.94	--	2.10	.00	41.22	59.24	.02	6,210	8.45	17,968	53	11.01	8,850	7.6
Feb. 1-28.....	1,688	5.8	31.19	19.82	58.73	--	2.72	.00	42.89	66.29	.02	6,720	9.14	15,430	54	11.63	9,500	7.4
Mar. 1-19.....	1,349	6.3	32.29	21.55	64.82	--	2.67	.00	46.43	72.22	.04	7,280	9.90	13,358	55	12.49	10,600	7.2
Mar. 20-31.....	16,042	16	30.34	6.50	7.87	--	2.46	.00	34.98	7.90	.04	2,920	3.97	63,707	18	1.83	3,460	7.6
Apr. 1-5.....	3,590	18	30.34	7.24	7.48	--	2.10	.00	36.02	7.90	.03	2,960	4.03	14,452	17	1.73	3,400	7.6
Apr. 6-9.....	514	18	32.53	9.05	14.49	--	2.13	.00	39.14	15.80	.02	3,620	4.92	2,531	26	3.18	4,420	7.5
Apr. 10-15.....	502	17	33.73	12.26	26.97	--	2.07	.00	43.31	27.65	.01	4,580	6.23	3,128	37	5.62	5,920	7.4
Apr. 16-20.....	270	18	36.18	16.21	43.41	--	2.21	.00	48.72	46.55	.02	6,000	8.16	2,201	45	8.48	8,020	7.4
Apr. 21-30.....	426	19	38.77	19.00	63.51	--	2.79	.00	52.26	68.83	.02	7,520	10.23	4,361	52	11.82	10,500	7.5
May 1-11.....	399	15	35.58	21.80	64.82	--	2.52	.00	54.96	66.29	.03	7,550	10.27	4,100	53	12.10	10,200	7.6
May 12-14.....	109	16	38.27	21.55	87.00	--	2.97	.00	52.88	90.55	.09	8,890	12.09	1,317	59	15.91	12,700	7.3
May 15.....	595	20	31.94	12.50	27.84	--	3.21	.00	41.02	27.65	.07	4,500	6.12	3,642	39	5.91	5,950	7.5
May 16-21.....	1,122	16	26.75	7.65	13.22	.03	2.10	.00	3.29	12.98	.09	3,060	4.16	4,670	28	3.19	3,930	7.5
May 22-23.....	63	13	25.35	9.05	23.49	--	1.48	.00	32.69	23.70	.03	3,630	4.94	313	41	5.66	4,990	7.3
May 24-25.....	61	10	26.85	11.93	36.02	--	1.18	.00	36.23	37.80	.10	4,640	6.31	388	48	8.18	6,630	7.0
May 26.....	704	22	28.34	7.07	12.62	--	2.95	.00	33.73	11.28	.01	3,080	4.19	2,949	26	3.00	3,810	7.4
May 27-30.....	873	15	22.36	5.68	8.87	--	2.07	.00	26.65	8.18	.06	2,370	3.22	2,813	24	2.37	2,980	7.5
May 31.....	119	14	21.96	5.26	16.36	--	1.77	.00	25.61	16.22	.06	2,760	3.75	447	38	4.43	3,810	7.6
June 1-3.....	212	13	20.86	8.31	21.75	--	1.62	.00	26.23	22.71	.02	3,150	4.28	910	43	5.70	4,560	7.5
June 4-5.....	71	13	24.00	11.43	32.63	--	1.59	.00	32.69	34.13	.02	4,210	5.73	409	48	7.75	6,090	7.0
June 6-12.....	249	13	29.84	17.19	57.86	--	1.87	.00	42.68	59.24	.03	6,360	8.65	2,150	55	11.93	9,190	7.2
June 13-15.....	240	12	13.97	8.47	19.14	--	1.80	.00	17.57	20.88	.08	2,480	3.37	809	46	5.71	3,840	7.3

RIO GRANDE BASIN--Continued

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

Chemical analyses, water year October 1964 to September 1965--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)	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 16-20, 1965	63	7.7	19.96	11.43	38.45		1.97	0.00	27.07	40.34		0.09		4,230	5.75	365	55	9.71	6,420	7.2
June 21-23	34	6.6	24.45	15.55	57.86		1.98	.00	35.60	57.55		.12		5,830	7.93	269	59	12.94	8,670	7.2
June 24	71	10	44.06	33.32	167.91		2.08	.00	63.50	181.95		.09		14,700	19.99	1,428	68	27.00	21,500	7.5
June 25	678	17	17.56	8.06	29.15		3.15	.00	21.03	29.62		.01		3,290	4.47	3,035	53	8.14	4,900	7.5
June 26-27	2,705	16	18.51	4.85	6.83		2.49	.00	21.24	5.87		.08		1,910	2.60	7,028	23	2.00	2,510	7.5
June 28-30	4,177	18	14.17	3.21	3.39		2.82	.00	15.03	2.88		.03		1,330	1.81	7,556	16	1.15	1,770	7.5
July 1-4	6,046	15	14.47	2.80	3.48		2.23	.00	15.62	2.91		.10		1,350	1.84	11,100	17	1.18	1,760	7.5
July 5	2,122	16	17.66	3.54	5.13		2.43	.00	19.40	4.34		.06		1,690	2.30	4,878	19	1.58	2,180	7.6
July 6-14	10,425	15	14.27	2.55	3.70		2.16	.00	15.20	3.13		.05		1,330	1.81	18,857	18	1.27	1,770	7.5
July 15-16	210	15	15.17	3.62	7.79		1.70	.00	17.18	7.59		.03		1,690	2.30	483	29	2.54	2,370	7.5
July 17-18	91	16	16.97	4.44	11.96		1.74	.00	19.82	11.74		.01		2,110	2.87	262	36	3.66	2,980	7.6
July 19-21	67	15	20.36	6.83	20.27		1.70	.00	24.57	20.45		.02		2,930	3.98	268	43	5.50	4,220	7.5
July 22-28	40	15	24.15	8.64	28.32		1.57	.00	30.40	28.77		.02		3,780	5.14	207	46	6.99	5,440	7.5
July 29	2,797	7	5.69	.51	1.26		1.38	.00	5.04	1.04		.03		478	.65	1,818	17	.72	720	7.6
July 30	5,970	12	7.68	1.23	2.35		1.77	.00	7.37	2.03		.07		718	.98	5,830	21	1.11	1,070	7.7
July 31	5,177	13	15.97	1.81	5.13		2.16	.00	16.66	4.23		.06		1,490	2.03	10,490	22	1.72	2,010	7.6
Aug. 1-6	5,736	15	12.97	3.45	6.96		2.16	.00	13.82	7.76		.10		1,490	2.03	11,624	30	2.43	2,180	7.4
Aug. 7-10	435	15	15.27	5.35	15.05		1.97	.00	18.20	14.67		.08		2,190	2.98	1,295	42	4.69	3,210	7.3
Aug. 11-15	161	16	18.46	7.98	22.62		2.20	.00	23.32	22.43		.07		2,990	4.07	653	46	6.22	4,390	7.3
Aug. 16-22	139	16	22.70	11.27	38.54		2.52	.00	29.98	37.52		.10		4,350	5.92	821	53	9.35	6,370	7.3
Aug. 23	127	16	35.88	21.14	100.92		2.74	.00	48.30	104.09		.05		9,410	12.80	1,625	64	18.90	13,800	7.5
Aug. 24-30	274	15	24.20	10.20	32.19		2.08	.00	31.23	31.60		.04		4,050	5.51	1,507	48	7.76	5,790	7.3
Aug. 31	16	18	27.30	12.34	47.42		2.46	.00	36.64	45.98		.04		5,270	7.17	114	54	10.65	7,620	7.6
Sept. 1-10	621	14	20.56	11.27	36.54		2.43	.00	27.48	36.67		.08		4,100	5.58	3,462	53	9.16	6,100	7.3
Sept. 11-29	1,971	14	17.27	6.75	16.70		1.93	.00	21.03	16.78		.05		2,490	3.39	6,675	41	4.82	3,610	7.3
Sept. 30	34	16	26.45	13.57	49.59		2.49	.00	34.77	52.47		.02		5,460	7.43	250	55	11.09	8,060	7.7
Total or weighted average	85,928	14	20.47	6.17	13.31		2.28	0.00	23.73	13.74		0.06		2,530	3.44	295,169	33	11.58	3,369	7.5

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 1965.
Water temperatures: March 1953 to September 1965.
EXTREMES, 1964-65.--Specific conductance: Maximum daily, 23,500 micromhos May 28; minimum daily, 12,200 micromhos Sept. 28.
Percent sodium: Maximum, 73 May 1 to June 30; minimum, 66 Oct. 1-31.
Sodium-adsorption-ratio: Maximum, 30.83 May 1-31; minimum, 19.92 Oct. 1-31.
EXTREMES, 1937-65.--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.
Sodium-adsorption-ratio (1961-65): Maximum, 31.50 Sept. 20-30, 1964; minimum, 15.15 Feb. 1-28, 1962.
REMARKS.--Where no potassium (K) is reported, sodium and potassium are calculated as sodium (Na). Records of discharge are given for gaging station near Orla. Mean discharge values have been adjusted to exclude inflow from Salt (Screwbean) Draw which enters Pecos River between sampling point and gaging station. No flow July 7-15, Aug. 11-31, Sept. 1-21.

Chemical analyses, water year October 1964 to September 1965

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, 1964.	166	14	29.74	18.10	97.44	1.71	1.44	0.00	43.51	104.38				8,970	12.20	2,025	66	19.92	12,900	6.4
Nov. 1-30.....	173	7.7	30.74	24.02	133.11	--	1.70	.00	48.93	137.38				11,200	15.23	2,628	71	25.44	16,100	7.7
Dec. 1-31.....	191	6.4	32.68	21.31	136.16	--	1.62	.00	49.76	138.51				11,400	15.50	2,955	72	26.21	15,800	6.8
Jan. 1-31, 1965.	49	5.9	31.74	21.88	124.85	2.17	1.66	.00	48.93	133.15				11,000	14.96	736	69	24.11	15,400	7.3
Feb. 1-28.....	28	3.6	35.18	20.81	147.47	--	1.66	.00	50.38	151.21				12,200	16.59	461	72	27.87	16,800	7.0
Mar. 1-31.....	49	1.9	34.18	24.60	149.21	--	1.59	.00	52.26	154.03				12,400	16.86	830	72	27.52	17,100	7.0
Apr. 1-30.....	60	1.7	35.13	25.25	152.25	2.48	1.67	.00	56.63	159.39				13,000	17.68	1,052	71	27.71	20,000	7.3
May 1-31.....	74	3.1	38.02	26.98	175.74	--	1.75	.00	58.71	180.26				14,400	19.58	1,445	73	30.83	21,800	6.8
June 1-30.....	244	1.1	38.12	26.08	171.83	--	2.00	.00	59.13	174.90				14,100	19.18	4,678	73	30.33	19,900	7.0
July 1-6, 16-31.	2,714	6.9	37.57	25.01	163.13	--	2.20	.00	55.59	167.85				13,500	18.36	49,832	72	29.16	20,500	7.2
Aug. 1-10.....	14	3.5	36.58	23.61	156.17	2.51	2.08	.00	53.30	162.21				13,100	17.82	247	71	28.47	19,400	7.5
Sept. 3-21.....	716	13	34.63	23.36	152.69	--	3.00	.00	50.80	156.85				12,600	17.14	12,270	72	28.35	19,000	6.3
Sept. 22-30.....	1,514	12	27.35	17.27	111.36	--	2.79	.00	38.10	115.10				9,320	12.68	19,188	71	23.58	14,900	6.9
Total or weighted average	5,992	8.7	33.98	22.54	145.14	--	2.36	0.00	49.97	149.50				12,100	16.05	98,347	72	27.19	18,300	6.8

RIO GRANDE BASIN--Continued

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, which confluence is 638.2 river miles below the American Dam at El Paso.
DRAINAGE AREA.--35,162 square miles (from International Boundary and Water Commission Water Bulletin 31).
RECORDS AVAILABLE.--Chemical analyses: October 1954 to September 1965.
REMARKS.--Chemical analyses by U.S. Department of Agriculture, Agricultural Research Service, U.S. Salinity Laboratory, Riverside, Calif. Records of specific conductance of daily samples and records of discharge for water year October 1964 to September 1965 given in International Boundary and Water Commission Water Bulletin Numbers 34 and 35.

Chemical analyses, water year October 1964 to September 1965

Month	Number of samples	Runoff (acre-feet)	Silica (SiO_2) ppm	Equivalents per million										Boron (B) ppm	Dissolved solids			Percent sodium	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
				Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)		Parts per million	Tons per acre-foot	Total tons				
October 1964	3	30,621	--	5.84	3.45	11.18	--	3.34	0.00	5.50	11.90	--	0.08	0.13	1,292	1.76	53,804	55	5.19	2,100	7.9
November	4	15,471	--	5.99	4.03	13.14	--	3.20	.00	6.10	13.96	--	.07	.21	1,464	1.99	30,804	57	5.87	2,360	7.9
December	5	13,958	--	6.19	4.44	14.14	--	3.25	.00	6.39	15.23	--	.06	.19	1,586	2.16	30,106	57	6.13	2,520	7.9
January 1965	4	12,113	6.0	6.59	4.52	14.92	0.16	3.29	.00	6.75	16.25	0.05	.05	.20	1,727	2.35	28,450	57	6.33	2,620	8.0
February	4	10,385	--	6.79	5.02	17.23	--	3.20	.00	7.37	18.31	--	.05	.21	1,797	2.44	25,381	59	7.09	2,900	7.6
March	5	10,207	--	7.44	5.51	19.66	--	3.10	.00	8.47	21.38	--	.06	.27	2,040	2.77	28,318	60	7.73	3,290	8.0
April	4	11,068	--	7.88	6.09	21.71	--	2.70	.00	9.43	24.01	--	.03	.31	2,286	3.11	34,409	61	8.21	3,570	7.8
May	5	35,724	--	4.64	2.47	8.87	--	2.61	.00	3.83	9.56	--	.05	.12	1,037	1.41	50,383	56	4.71	1,650	8.0
June	5	39,749	--	4.74	2.63	9.70	--	2.70	.00	4.10	10.30	--	.03	.10	1,050	1.43	56,761	57	5.05	1,760	8.0
July	4	10,330	12	5.74	4.28	15.27	.21	2.70	.00	6.58	16.16	.04	.03	.28	1,611	2.19	22,632	60	6.82	2,620	7.8
August	5	10,084	--	5.19	3.87	13.44	--	2.44	.00	5.89	14.56	--	.03	.15	1,447	1.97	19,844	60	6.32	2,340	7.8
September	4	9,818	--	5.74	4.20	15.40	--	2.56	.00	6.35	16.76	--	.03	.13	1,625	2.21	21,698	61	6.91	2,620	8.0
Total or weighted average	--	209,528	--	5.70	3.71	12.84	--	2.91	0.00	5.68	13.81	--	0.05	0.16	1,412	1.92	402,590	58	5.92	2,273	--

PART 9. COLORADO RIVER BASIN

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 River.
DRAINAGE AREA.--4,560 square miles, approximately, upstream from gaging station.
RECORDS AVAILABLE.--Chemical analyses: October 1941 to September 1965.
Water temperatures: May 1949 to September 1965.
EXTREMES, 1964-65.--Specific conductance: Maximum daily, 1,100 micromhos Dec. 31; minimum daily, 259 micromhos June 20.
Percent sodium: Maximum, 50 Feb. 1-28; minimum, 2 Oct. 17.
Sodium-adsorption-ratio: Maximum, 4.06 Dec. 29-31; minimum, 0.05 Oct. 17.
EXTREMES, 1941-65.--Specific conductance: Maximum daily, 2,260 micromhos Aug. 10, 1947; minimum daily, 153 micromhos May 24, 1948.
Percent sodium (1941-65): Maximum, 53 Dec. 11-20, 1954; minimum, 2 Oct. 17, 1964.
Sodium-adsorption-ratio (1961-65): Maximum, 4.06 Dec. 29-31, 1964; minimum, 0.05 Oct. 17, 1964.
REMARKS.--Where no potassium (K) is reported, sodium (Na) and potassium (K) are calculated and reported as sodium (Na). Additional samples were collected for more comprehensive definition of water quality at this station. Minimum observed during water year: Hardness, 117 ppm June 10. Records of discharge are given for Colorado River at Glenwood Springs, Colo.

Chemical analyses, water year October 1964 to September 1965

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, 1964.	38,241		4.06		3.39		2.31	0.00	2.10	3.05				449	0.61	23,352	46	2.38	741	7.9
Oct. 17.....	1,983		4.16		.08		3.93	.00	.20	.11				212	.29	572	2	.05	366	7.8
Oct. 18-31.....	24,659		4.84		3.74		2.56	.00	2.56	3.44				532	.72	17,841	44	2.40	859	7.7
Nov. 1.....	1,575		3.60		.19		3.47	.00	.27	.05				180	.24	386	5	.14	309	7.9
Nov. 2-30.....	47,972		4.92		3.96		2.57	.00	2.79	3.53				543	.74	35,427	45	2.52	858	7.6
Dec. 1-28.....	46,318		4.62		4.00		2.47	.00	2.54	3.61				524	.71	33,008	46	2.63	843	7.6
Dec. 29-31.....	4,195		5.04		6.44		2.62	.00	3.21	5.64				666	.91	3,800	56	4.06	1,100	7.7
Jan. 1-31, 1965.	51,465		4.40		4.26		2.38	.00	2.48	3.81				517	.70	36,186	49	2.87	849	7.5
Feb. 1-28.....	43,708		4.44		4.52		2.43	.00	2.42	4.00				531	.72	31,564	50	3.04	874	7.6
Mar. 1-31.....	48,944		4.40		4.18		2.33	.00	2.42	3.81				508	.69	33,815	49	2.82	846	7.7
Apr. 1-22.....	68,422		4.20		2.48		2.25	.00	2.29	2.14				404	.55	37,594	37	1.71	653	7.6
Apr. 23-30.....	35,322		3.50		1.70		2.10	.00	1.67	1.41				312	.42	14,988	33	1.28	513	7.7
May 1-18.....	118,318		2.86		1.22		2.02	.00	1.15	.90				242	.33	38,941	30	1.02	407	7.5
May 19-31.....	144,345		2.50		.78		1.88	.00	.85	.56				200	.27	39,262	24	.70	327	7.5
June 1-30.....	446,459		2.46		.48		1.69	.00	.85	.39				188	.26	114,151	16	.43	307	7.8

COLORADO RIVER MAIN STEM--Continued

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

Chemical analyses, water year October 1964 to September 1965--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 1-31, 1965.	271,283		2.76		1.00		1.70	0.00	1.29	0.76				225	0.31	83,013	27	0.85	378	7.8
Aug. 1-9.....	70,084		2.84		1.22		1.80	.00	1.31	.93				237	.32	22,589	30	1.02	408	7.7
Aug. 10-19.....	44,350		3.76		2.18		2.07	.00	1.96	1.89				353	.48	21,292	37	1.59	598	7.9
Aug. 20-25.....	34,334		3.08		1.48		1.88	.00	1.52	1.16				258	.35	12,047	32	1.19	458	8.0
Aug. 26-31.....	23,266		3.52		2.44		1.97	.00	1.83	2.14				343	.47	10,853	41	1.84	610	8.2
Sept. 1-30.....	95,385		3.94		2.26		2.10	.00	2.06	2.03				368	.50	47,738	36	1.61	638	7.7
Total or weighted average	1,660,628		3.18		1.64		1.95	0.00	1.47	1.40				292	0.40	658,419	34	1.30	483	7.6

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 1965.
Water temperatures: May 1949 to September 1959, October 1964 to September 1965.
Sediment records: May 1930 to September 1965.
EXTREMES, 1964-65.--Specific conductance: Maximum daily, 2,080 micromhos Mar. 8; minimum daily, 359 micromhos May 24.
Percent sodium: Maximum, 58 Sept. 14-19; minimum, 16 Apr. 19-22.
Sodium-adsorption-ratio: Maximum, 5.49 Sept. 14-19; minimum, 0.67 Apr. 19-22.
EXTREMES, 1941-65.--Specific conductance: Maximum daily, 4,820 micromhos Dec. 13, 1957; minimum daily, 291 micromhos May 31, 1958.
Percent sodium: Maximum, 68 Mar. 26-28, 1964; minimum, 16 Apr. 19-22, 1965.
Sodium-adsorption-ratio (1961-65): Maximum, 9.28 Mar. 26-28, 1964; minimum, 0.63 May 1-17, 1963.
REMARKS.--Additional samples were collected to further define the quality of water at this station.

Chemical analyses, water year October 1964 to September 1965

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, 1964.	163,496		7.58	5.59	5.87		3.61	0.00	10.26	5.08		0.11		1,420	1.93	315,743	31	2.29	1,890	7.9
Nov. 1-30.....	181,904		6.99	5.18	6.39		3.74	.00	9.35	5.36		.12		1,330	1.81	329,028	34	2.59	1,810	7.9
Dec. 1-22.....	118,560		6.74	4.61	7.31		3.70	.00	9.60	5.22		.13		1,230	1.67	198,327	39	3.07	1,710	8.0
Dec. 23-31.....	62,694		5.54	3.54	6.74		3.28	.00	7.89	4.51		.13		1,050	1.43	89,526	43	3.17	1,490	7.8
Jan. 1-31, 1965.	161,774		4.54	5.18	8.57		3.47	.00	9.24	5.42		.13		1,140	1.55	250,814	47	3.89	1,620	7.8
Feb. 1-28.....	140,565		5.14	4.52	9.66		3.28	.00	9.12	6.77		.16		1,200	1.63	229,401	50	4.39	1,750	7.9
Mar. 1-15.....	71,643		6.79	2.63	10.14		3.31	.00	8.58	7.48		.14		1,230	1.67	119,844	52	4.67	1,820	7.6
Mar. 16-31.....	82,608		5.59	2.80	8.96		3.20	.00	7.95	6.07		.12		1,120	1.52	125,828	52	4.38	1,640	7.6
Apr. 1-5.....	43,299		5.09	3.29	6.66		3.18	.00	7.56	4.23		.09		958	1.30	56,414	44	3.25	1,400	8.0
Apr. 6-18.....	131,556		4.19	2.96	4.44		2.85	.00	5.77	2.93		.08		735	1.00	131,503	38	2.35	1,100	7.8
Apr. 19-22.....	103,458		2.99	3.62	1.22		2.74	.00	3.31	1.75		.03		482	.66	67,819	16	.67	734	7.9
Apr. 23-30.....	284,033		2.40	1.07	1.44		1.97	.00	2.19	.73		.04		320	.44	123,611	29	1.09	471	7.9
May 1-4.....	173,911		3.19	.70	1.35		2.69	.00	1.89	.62		.02		312	.42	73,794	26	.97	493	7.7
May 5-12.....	283,716		2.64	.58	1.26		2.23	.00	1.69	.56		.01		261	.35	100,708	28	.99	471	7.7
May 13-20.....	263,564		2.94	.82	1.48		2.20	.00	2.33	.73		.02		330	.45	118,287	28	1.08	516	7.6

COLORADO RIVER MAIN STEM--Continued

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

Chemical analyses, water year October 1964 to September 1965--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 21-27, 1965.	415,696		2.54	0.60	1.00		2.02	0.00	1.64	0.48		0.02		256	0.35	144,729	24	0.80	404	7.7
May 28-31.....	134,717		2.94	1.07	1.74		2.15	.00	2.83	.73		.02		350	.48	64,125	30	1.23	544	7.7
June 1-30.....	1,654,215		2.54	.99	.91		2.08	.00	1.81	.54		.01		278	.38	625,426	21	.69	444	7.9
July 1-15.....	621,223		2.79	.99	1.26		2.10	.00	2.23	.71		.03		308	.42	260,218	25	.92	486	7.5
July 16-24.....	294,545		3.74	1.40	1.57		2.56	.00	3.14	.99		.02		418	.57	167,443	23	.98	649	7.7
July 25-31.....	200,767		4.74	.76	3.18		2.59	.00	4.39	1.64		.04		564	.77	153,996	37	1.92	834	7.7
Aug. 1-9.....	206,360		2.54	3.21	2.57		2.64	.00	4.27	1.41		.04		518	.70	145,377	31	1.51	786	7.7
Aug. 10-19.....	110,598		4.49	4.36	6.48		2.79	.00	7.58	4.88		.07		951	1.29	143,043	42	3.08	1,410	7.9
Aug. 20-31.....	129,767		3.14	4.44	4.18		2.70	.00	6.60	2.43		.06		744	1.01	131,303	36	2.14	1,090	7.9
Sept. 1-13.....	142,385		5.84	3.37	5.74		2.70	.00	9.29	2.91		.06		906	1.23	175,442	38	2.68	1,370	8.1
Sept. 14-19.....	63,967		5.19	2.96	11.09		2.54	.00	7.20	9.45		.06		952	1.29	82,819	58	5.49	1,540	7.8
Sept. 20-30.....	162,764		6.19	3.13	4.61		2.98	.00	8.22	2.20		.47		856	1.16	189,483	33	2.14	1,230	7.8
Total or weighted average	6,403,784		3.58	1.89	2.83		2.47	0.00	3.98	1.83		0.10		889	1.21	4,614,051	34	1.71	791	7.7

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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 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 1965.
Water temperatures: July 1949 to September 1965.
Sediment records: October 1928 to September 1933, November 1942 to September 1944, October 1947 to September 1965.
EXTREMES, 1964-65.--Specific conductance: Maximum daily, 1,160 micromhos Feb. 10, Apr. 11, 26; minimum daily, 460 micromhos Aug. 10.
Percent sodium: Maximum, 39, Nov. 19 to Dec. 31, Feb. 1 to Mar. 31; minimum, 30 July 8 to September 30.
Sodium-adsorption-ratio: Maximum, 2.39 Feb. 1-28; minimum, 1.12 Aug. 1 to Sept. 30.
EXTREMES, 1942-45, 1947-65.--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.
Sodium-adsorption-ratio (1961-65): Maximum, 3.80 June 1-30, 1964; minimum, 0.70 May 13-17, 1962.
REMARKS.--Values reported for sodium (Na) are determined by analysis and do not include potassium (K). Flow completely regulated by Lake Powell since Mar. 13, 1963.

Chemical analyses, water year October 1964 to September 1965

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, 1964.	268,516	10	3.09	1.56	2.57	0.09	2.13	0.00	3.71	1.21	0.01	0.05	0.13	465	0.63	169,810	35	1.68	720	7.9
Nov. 1-9.....	90,845	--	3.09	1.56	2.61	--	2.36	.00	3.79	1.24	--	--	--	475	.65	58,686	36	1.71	736	7.7
Nov. 10-18.....	110,035	--	3.79	2.14	3.65	--	2.56	.00	5.29	1.75	--	--	--	621	.84	92,931	38	2.12	946	7.6
Nov. 19-30.....	146,618	--	4.34	2.39	4.26	--	2.69	.00	6.29	2.06	--	--	--	731	.99	145,762	39	2.32	1,070	7.5
Dec. 1-31.....	397,579	--	4.39	2.47	4.35	--	2.69	.00	6.37	2.14	--	--	--	733	1.00	396,338	39	2.35	1,090	7.5
Jan. 1-31, 1965.	558,246	--	4.79	1.97	4.22	--	2.69	.00	6.33	2.09	--	--	--	722	.98	548,153	38	2.29	1,070	7.6
Feb. 1-28.....	514,608	11	4.99	2.06	4.48	.14	2.75	.00	6.64	2.14	.02	.06	.15	753	1.02	526,999	39	2.39	1,100	7.6
Mar. 1-31.....	556,155	--	4.89	2.14	4.44	--	2.75	.00	6.64	2.03	--	--	--	740	1.01	559,715	39	2.37	1,090	7.8
Apr. 1-30.....	1,222,215	--	5.14	2.30	4.26	--	2.95	.00	6.85	2.03	--	--	--	754	1.03	1,253,308	36	2.21	1,120	7.8
May 1-26.....	1,772,985	--	4.69	2.47	4.00	--	2.95	.00	6.54	1.95	--	--	--	731	.99	1,762,631	36	2.12	1,090	7.8
May 27.....	112,264	--	2.79	1.40	1.87	--	2.29	.00	3.21	.82	--	--	--	368	.50	56,186	31	1.29	614	7.8
May 28-31.....	398,122	--	4.59	2.22	4.13	--	2.92	.00	6.25	1.86	--	--	--	680	0.92	366,272	38	2.24	1,060	7.9
June 1-27.....	2,244,436	11	4.24	2.06	3.83	.13	2.85	.00	5.64	1.78	.02	.06	.10	652	.89	1,990,187	37	2.16	99	7.5
June 28-30.....	79,140	--	2.84	1.32	1.83	--	2.33	.00	3.21	.82	--	--	--	368	.50	39,608	31	1.27	616	7.7
July 1-7.....	201,183	--	2.99	1.48	2.48	--	2.39	.00	3.58	.96	--	--	--	422	.57	115,463	36	1.66	675	7.5
July 8-31.....	526,017	--	2.40	1.23	1.57	--	2.13	.00	2.46	.56	--	--	--	320	.44	228,922	30	1.16	512	7.6
Aug. 1-31.....	870,664	12	2.30	.99	1.44	.06	1.97	.00	2.25	.51	.01	.04	.05	298	.41	352,863	30	1.12	475	7.5
Sept. 1-30.....	750,347	--	2.30	.99	1.44	--	1.97	.00	2.31	.51	--	--	--	296	.40	302,060	30	1.12	472	7.6
Total or weighted average	10,819,975	--	4.04	1.97	3.44	--	2.64	0.00	5.31	1.61	--	--	--	609	0.83	8,965,894	36	1.98	735	7.6

COLORADO RIVER MAIN STEM

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

LOCATION.--At gaging station in Grand Canyon National Park at Kaibab Bridge, 0.2 mile upstream from Bright Angel Creek, 4.5 miles 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 1965.
Water temperatures: October 1936 to October 1942, September 1943 to September 1965.
Sediment records: October 1925 to November 1942, September 1943 to September 1965.
EXTREMES, 1964-65.--Specific conductance: Maximum daily, 1,320 micromhos Mar. 22; minimum daily, 561 micromhos Sept. 3.
Percent sodium: Maximum, 44 Oct. 1-31; minimum, 23 Aug. 7-31.
Sodium-adsorption-ratio: Maximum, 3.19 July 31; minimum, 1.59 Aug. 7-31.
EXTREMES, 1925-42, 1943-65.--Specific conductance (1937-42, 1943-65): Maximum daily, 2,900 micromhos Sept. 6, 1940; minimum daily, 341 micromhos June 15, 1942.
Percent sodium (1941-42, 1943-65): Maximum, 61 Aug. 3-9, Sept. 12, 1964; minimum, 16 June 11-20, 1952.
Sodium-adsorption-ratio (1961-65): Maximum, 6.12 July 28, 1964; minimum, 0.87 July 1-6, 1962.

Chemical analyses, water year October 1964 to September 1965

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, 1964.	298,522	12	3.49	1.56	4.13	0.01	2.79	0.00	3.50	2.82	0 02	0.04	0.51	567	0.77	230,197	44	2.60	916	7.9
Nov. 1-30.....	370,711	--	3.94	1.89	4.52	--	2.82	.00	4.56	2.88	--	--	--	643	.87	324,179	33	2.65	1,030	7 9
Dec. 1-16.....	207,328	--	3.89	1.97	4.48	--	2.82	.00	4.56	2.85	--	--	--	627	.85	176,793	33	2.62	1,010	7.8
Dec. 17-31.....	205,349	--	5.54	2.22	5.18	--	3.16	.00	6.79	2.88	--	--	--	853	1.16	238,221	32	2.63	1,240	7.6
Jan. 1-9, 1965..	159,447	--	4.89	2.14	5.13	--	3.06	.00	6 31	2.99	--	--	--	803	1.09	174,129	33	2.74	1,190	7.6
Jan. 10-13.....	98,539	--	4.19	1.56	4.92	--	3.26	.00	5.04	2.60	--	--	--	688	94	92,201	35	2.90	1,040	7.6
Jan. 14-31.....	349,492	--	4.94	2.14	5.05	--	3.13	.00	6 25	2.93	--	--	--	793	1.08	376,920	33	2.68	1,180	7.7
Feb. 1-28.....	539,322	11	5.04	2.06	5.05	.13	2.98	.00	6.45	.28	.02	.06	.10	803	1.09	588,982	41	2.68	1,180	7.7
Mar. 1-31.....	567,899	--	5.09	2.30	5.22	--	3.15	.00	6.48	3.10	--	--	--	800	1.09	617,875	33	2.72	1,220	7.8
Apr. 1-30.....	1,251,372	--	4.99	2.14	4.65	--	3.15	.00	6.37	2.54	--	--	--	768	1.04	1,307,033	31	2.47	1,150	7 8
May 1-31.....	2,281,805	--	4.69	2.47	4.44	--	3.02	.00	6.39	2.14	--	--	--	761	1 03	2,361,577	30	2.35	1,100	7.9
June 1-28.....	2,230,929	--	4.19	2.14	3.83	--	2.88	.00	5.73	1.89	--	--	--	660	.90	2,002,482	28	2.15	1,000	7 9
June 29-30.....	51,174	13	2.94	1.48	2.87	.09	2.43	.00	3.37	1.58	.02	.05	.07	448	61	31,179	39	1.93	735	7.8
July 1-9.....	245,990	--	3.09	1.56	3.09	--	2.52	.00	3 62	1.64	--	--	--	477	.65	159,579	28	2.02	769	7.8
July 10-30.....	447,352	--	2.89	1.23	2.57	--	2.59	.00	2.62	1.47	--	--	--	408	.55	248,227	25	1.79	655	7.8

July 31, 1965...	30,942	--	3.19	.99	4.61	--	3.54	.00	3.16	2.12	--	--	--	510	.69	21,461	38	3.19	859	7.8
Aug. 1-6.....	152,926	--	2.94	1.07	2.74	--	2.75	.00	2.62	1 41	--	--	--	406	.55	84,439	27	1.93	671	7.7
Aug. 7-31.....	725,950	--	2.59	1.15	2.18	--	2.39	.00	2.44	1.18	--	--	--	360	.49	355,425	23	1.59	586	7.8
Sept. 1-30.....	767,008	12	2.54	1.15	2.26	.08	2.29	.00	2.46	1.24	.01	.04	.15	373	.51	389,088	37	1.66	587	7.8
Total or weighted average	10,982,057	--	4.17	1.98	4.00	--	2.88	0.00	5.25	2.03	--	--	--	655	0.89	9,779,987	39	2.28	989	7.8

COLORADO RIVER MAIN STEM--Continued

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

LOCATION.--At Hoover Dam, on 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 1965.
Water temperatures: October 1941 to September 1965.
REMARKS.--Records of specific conductance of individual samples available in district office at Tucson, Ariz.

Chemical analyses, water year October 1964 to September 1965

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. 5, 15, 26, 1964.....		10.0	4.79	2.22	4.57	0.13	2.59	0.00	6.31	2.68	0.02	0.03	0.19	740	1.01	39,045	39	2.44	1,130	7.9
Nov. 5, 16, 25..		9.8	4.84	2.30	4.70	.13	2.59	.00	6.43	2.74	.02	.03	.17	749	1.02	39,520	39	2.49	1,150	8.0
Dec. 4, 15, 23..		10.0	4.99	2.22	4.79	.13	2.46	.00	6.83	2.93	.02	.02	.16	777	1.06	40,997	39	2.52	1,170	7.5
Jan. 5, 15, 25, 1965.....		11.0	5.04	2.30	4.92	.13	2.43	.00	6.93	2.99	.02	.02	.16	794	1.08	41,894	40	2.57	1,190	7.6
Feb. 5, 15, 25..		11.0	4.99	2.39	4.96	.13	2.43	.00	7.04	3.05	.02	.02	.25	802	1.09	42,316	40	2.58	1,200	7.7
Mar. 4, 15, 25..		9.6	5.14	2.39	5.18	.14	2.49	.00	7.02	3.13	.02	.03	.17	845	1.15	44,585	40	2.67	1,220	7.8
Apr. 5, 15, 26..		9.9	5.29	2.30	5.09	.14	2.56	.00	7.20	3.13	.02	.02	.18	837	1.14	44,163	40	2.61	1,230	7.9
May 5, 17, 25...		9.8	5.34	2.22	5.18	.14	2.56	.00	7.37	3.16	.02	.02	.17	835	1.14	44,058	40	2.66	1,240	7.7
June 4, 14, 25..		9.2	5.19	2.39	5.05	.14	2.57	.00	7.04	3.16	.02	.02	.14	837	1.14	44,163	40	2.59	1,230	7.9
July 6, 15, 26..		9.4	4.94	2.55	5.18	.14	2.59	.00	7.12	3.10	.02	.03	.11	838	1.14	44,216	40	2.67	1,230	7.9
Aug. 5, 13, 25..		9.2	4.99	2.47	5.05	.14	2.66	.00	6.95	3.05	.02	.04	.18	819	1.11	43,213	40	2.61	1,220	8.0
Sept. 3, 15, 24.		9.0	4.99	2.47	5.00	.14	2.72	.00	6.91	3.02	.02	.03	.18	824	1.12	43,477	40	2.59	1,220	8.0

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 1965.
Water temperatures: May 1961 to September 1965.
EXTREMES, 1964-65.--Specific conductance: Maximum daily, 1,590 micromhos Dec. 28; minimum daily, 1,110 micromhos Apr. 17.
Percent sodium: Maximum, 47 Nov. 1 to Dec. 31; minimum, 43 Mar. 1-31, June 1-30.
Sodium-adsorption-ratio: Maximum, 3.57 Dec. 1-31; minimum, 3.01 Mar. 1-31.
EXTREMES, 1943-65.--Specific conductance: Maximum daily, 1,600 micromhos July 7, 1962; minimum daily, 795 micromhos Jan. 5, 1963.
Percent sodium: Maximum, 46 Nov. 21-30, 1953, Feb. 1-28, 1962, Jan. 1-31, 1963, Sept. 1-30, 1964; minimum, 32 several periods in 1945, 1946, 1948, 1949, and 1957.
Sodium-adsorption-ratio (1961-65): Maximum, 3.57 Dec. 1-31, 1964; minimum, 2.52 July 7, 1962.
REMARKS.--Values reported for sodium (Na) are determined by analysis and do not include potassium (K).

Chemical analyses, water year October 1964 to September 1965

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, 1964	27,608	16	5.19	2.30	6.48	0.14	2.79	0.00	7.29	4.03	0.02	0.01	0.19	894	1.22	33,567	46	3.35	1,370	8.1
Nov. 1-30.....	18,506	18	5.24	2.55	7.00	.13	2.88	.00	7.56	4.40	.03	.02	.21	928	1.26	23,356	47	3.55	1,440	8.2
Dec. 1-31.....	11,129	17	5.34	2.47	7.05	.13	2.98	.00	7.62	4.43	.03	.01	.22	934	1.27	14,137	47	3.57	1,450	8.2
Jan. 1-31, 1965	12,113	16	5.19	2.63	6.66	.14	2.92	.00	7.62	4.26	.03	.02	.20	928	1.26	15,288	46	3.37	1,410	8.0
Feb. 1-28.....	22,937	15	5.19	2.47	6.35	.14	2.84	.00	7.50	4.01	.02	.02	.18	924	1.26	28,823	45	3.25	1,370	8.1
Mar. 1-31.....	27,300	15	5.24	2.39	5.87	.14	2.79	.00	7.39	3.72	.02	.02	.16	880	1.20	32,673	43	3.01	1,330	8.1
Apr. 1-30.....	25,468	15	4.99	2.30	5.79	.14	2.72	.00	7.04	3.61	.02	.02	.15	846	1.15	29,302	44	3.03	1,280	8.1
May 1-31.....	33,511	15	5.39	2.55	6.35	.16	2.79	.00	7.58	3.89	.03	.02	.12	900	1.22	41,017	44	3.19	1,360	8.2
June 1-30.....	33,322	16	5.34	2.63	6.13	.16	2.72	.00	7.66	3.89	.02	.02	.13	898	1.22	40,696	43	3.07	1,380	8.1
July 1-31.....	40,397	15	5.14	2.88	6.44	.15	2.66	.00	7.77	3.98	.02	.02	.22	923	1.26	50,710	44	3.22	1,390	8.1
Aug. 1-31.....	36,339	15	5.09	2.71	6.53	.15	2.66	.00	7.77	4.09	.02	.02	.21	939	1.28	46,407	45	3.30	1,410	8.1
Sept. 1-30.....	37,428	17	5.29	2.71	6.70	.14	2.75	.00	7.95	4.29	.02	.02	.21	967	1.32	49,222	45	3.35	1,440	8.2
Total or weighted average	326,058	16	5.22	2.55	6.40	0.15	2.76	0.00	7.58	4.01	0.02	0.02	0.18	914	1.24	405,198	45	3.25	1,380	8.1

GUNNISON RIVER BASIN

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 1965.
Water temperatures: April 1949 to September 1965.
EXTREMES, 1964-65.--Specific conductance: Maximum daily, 2,020 micromhos Oct. 9; minimum daily, 317 micromhos May 24.
Percent sodium: Maximum, 33 Mar. 1-31, Aug. 27-31; minimum, 17 June 15-30.
Sodium-adsorption-ratio: Maximum, 2.48 Aug. 27-31; minimum, 0.52 June 15-30.
EXTREMES, 1941-65.--Specific conductance: Maximum daily, 2,730 micromhos Sept. 10, 1956; minimum daily, 280 micromhos May 23, 1948.
Percent sodium (1950-65): Maximum, 39 Apr. 30, 1962; minimum, 10 June 2-5, 10, 1952.
Sodium-adsorption-ratio (1961-65): Maximum, 2.64 Sept. 14-30, 1963; minimum, 0.34 Apr. 17, 1962.
REMARKS.--Where no potassium (K) is reported, sodium (Na) and potassium (K) are calculated and reported as sodium (Na). Additional samples were collected for more comprehensive definition of water quality at this station.

Chemical analyses, water year October 1964 to September 1965

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, 1964.	53,433		18.00		5.13		4.20	0.00	18.36	0.59				1,620	2.20	117,723	22	1.71	1,890	8.0
Nov. 1-30.....	64,800		15.00		5.96		4.10	.00	16.34	.51				1,360	1.85	119,854	28	2.18	1,630	7.9
Dec. 1-31.....	58,967		12.08		3.31		3.59	.00	11.28	.51				1,070	1.46	85,808	21	1.35	1,420	7.9
Jan. 1-31, 1965.	54,970		11.60		4.00		3.84	.00	11.24	.54				1,010	1.37	75,507	26	1.66	1,390	7.9
Feb. 1-28.....	44,763		9.40		4.05		2.33	.00	10.70	.42				940	1.28	57,225	30	1.87	1,130	7.7
Mar. 1-31.....	52,019		9.70		4.79		3.26	.00	10.76	.45				979	1.33	69,260	33	2.17	1,240	7.7
Apr. 1-17.....	68,011		6.36		2.78		2.72	.00	6.27	.15				600	.82	55,497	30	1.56	826	7.8
Apr. 18-21.....	35,425		4.40		1.39		2.43	.00	3.19	.15				368	.50	17,729	24	.94	538	7.7
Apr. 22-30.....	125,030		3.00		1.00		1.77	.00	2.12	.11				268	.36	45,571	25	.82	380	7.6
May 1-25.....	488,678		3.20		.78		2.00	.00	1.94	.03				250	.34	166,150	20	.62	388	7.7
May 26-31.....	93,029		4.32		1.17		2.00	.00	3.46	.05				355	.48	44,914	21	.80	529	7.8
June 1-4.....	63,074		4.20		1.00		2.07	.00	3.02	.11				333	.45	28,565	19	.69	492	7.4
June 5-14.....	214,413		3.68		.87		1.90	.00	2.52	.11				294	.40	85,731	19	.64	438	7.5
June 15-30.....	403,676		3.12		.65		1.67	.00	2.02	.10				247	.34	135,603	17	.52	373	7.7
July 1-2.....	35,742		3.28		1.00		1.69	.00	2.52	.08				280	.38	13,611	23	.78	400	7.5

July 3-16, 1965.	250,528		3.52	1.00		1.80	.00	2.60	.10				294	.40	100,171	22	.75	428	7.8
July 17-29.....	167,113		5.00	1.31		2.26	.00	3.93	.12				414	.56	94,092	21	.83	580	7.8
July 30-31.....	18,605		6.56	2.00		2.46	.00	5.95	.17				569	.77	14,397	23	1.10	760	7.6
Aug. 1-11.....	88,145		6.58	2.04		2.67	.00	5.77	.19				568	.77	68,091	24	1.13	789	7.6
Aug. 12-26.....	55,131		9.30	3.13		2.95	.00	9.16	.34				848	1.15	63,581	25	1.45	1,110	7.8
Aug. 27-31.....	14,340		12.42	6.18		3.33	.00	14.84	.42				1,200	1.63	23,404	33	2.48	1,490	8.0
Sept. 1-21.....	109,380		10.16	4.26		3.18	.00	10.89	.34				982	1.34	146,080	30	1.89	1,260	8.0
Sept. 22-30.....	51,537		9.06	3.96		3.13	.00	9.56	.34				884	1.20	61,959	30	1.86	1,160	8.0
Total or weighted average	2,610,809		5.46	1.74		2.28	0.00	4.75	0.17				476	0.65	1,690,523	24	1.05	651	7.7

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 1965.
Water temperatures: October 1956 to September 1959, October 1963 to September 1965.
Sediment records: October 1956 to September 1959.
EXTREMES, 1964-65.--Specific conductance: Maximum daily, 962 micromhos Aug. 30; minimum daily, 624 micromhos Nov. 15.
Percent sodium: Maximum, 38 Aug. 1 to Sept. 30; minimum, 25 Jan. 1-31.
Sodium-adsorption-ratio: Maximum, 2.15 Aug. 1-31; minimum, 1.10 Jan. 1-31.
EXTREMES, 1956-65.--Specific conductance (1956-58, 1959-65): Maximum daily, 1,340 micromhos Aug. 30, 1961; minimum daily, 325 micromhos June 2, 1961.
Percent sodium: Maximum, 53 Mar. 29-31, 1962; minimum, 16 May 8, 1962.
Sodium-adsorption-ratio (1961-65): Maximum, 3.72 Mar. 29-31, 1962; minimum, 0.60 May 8, 1962.
REMARKS.--Sodium (Na) and potassium (K) values are calculated and reported as sodium.

Chemical analyses, water year October 1964 to September 1965

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, 1964.	158,822		3.14	1.97	2.18		3.05	0.00	3.69	0.56				470	0.64	101,519	30	1.36	691	7.6
Nov. 1-30.....	139,418		3.04	1.81	2.26		2.98	.00	3.62	.51				442	.60	83,807	32	1.45	643	7.6
Dec. 1-31.....	193,747		3.24	1.81	1.78		3.15	.00	3.14	.54				456	.62	120,154	26	1.12	663	7.8
Jan. 1-31, 1965.	215,576		3.49	1.73	1.78		3.15	.00	3.39	.48				461	.63	135,157	25	1.10	671	7.9
Feb. 1-28.....	213,152		3.34	2.30	2.87		3.25	.00	4.68	.56				514	.70	149,002	34	1.71	736	8.0
Mar. 1-31.....	232,546		5.29	2.55	3.96		3.31	.00	7.95	.54				773	1.05	244,471	34	2.00	823	7.8
Apr. 1-30.....	203,504		3.74	2.63	3.44		3.59	.00	5.52	.73				611	.83	169,104	35	1.92	866	8.0
May 1-31.....	66,284		3.74	2.55	3.26		3.13	.00	5.60	.79				599	.81	53,997	34	1.84	896	7.8
June 1-30.....	85,626		3.69	2.88	3.18		3.08	.00	5.75	.87				632	.86	73,598	33	1.75	928	8.1
July 1-31.....	29,145		3.74	2.71	3.57		3.05	.00	6.02	.99				635	.86	25,170	36	1.99	944	7.8
Aug. 1-31.....	30,559		3.64	2.55	3.78		3.02	.00	5.93	1.02				636	.86	26,433	38	2.15	936	7.8
Sept. 1-30.....	43,676		3.44	2.55	3.61		2.95	.00	5.62	1.04				648	.88	38,491	38	2.09	913	7.7
Total or weighted average	1,612,055		3.68	2.22	2.78		3.20	0.00	4.87	0.62				557	0.76	1,220,903	32	1.62	764	7.8

GREEN RIVER BASIN--Continued

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, and 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 1965.
Water temperatures: May 1949 to September 1959, October 1964 to September 1965.
Sediment records: May 1930 to September 1965.
EXTREMES, 1964-65.-- Specific conductance: Maximum daily, 1,450 micromhos Aug. 21; minimum daily, 368 micromhos June 24.
Percent sodium: Maximum, 54 Sept. 1-4; minimum, 23 June 1-11.
Sodium-adsorption-ratio: Maximum, 3.17 Sept. 1-4; minimum, 0.79 June 1-11.
EXTREMES, 1941-65.--Specific conductance: Maximum daily, 2,620 micromhos Aug. 6, 1963; minimum daily, 272 micromhos May 13, 1956.
Percent sodium: Maximum, 54 Sept. 1-4, 1965; minimum, 19 Aug. 7, 1957.
Sodium-adsorption-ratio (1961-65): Maximum, 3.92 Oct. 1-6, 1963; minimum, 0.78 June 1-11, 1964.
REMARKS.--Additional samples were collected to further define the quality of water at this station. Sodium (Na) and potassium (K) values are calculated and reported as sodium.

Chemical analyses, water year October 1964 to September 1965

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, 1964.	195,838		3.54	2.22	3.13		3.38	0.00	4.54	0.99				574	0.78	152,879	35	1.84	833	7.6
Nov. 1-30.....	200,231		3.54	2.63	3.61		3.54	.00	5.18	1.04				616	.84	167,746	37	2.05	876	7.7
Dec. 1-31.....	266,856		3.44	2.47	3.00		3.54	.00	4.46	.90				592	.81	214,851	34	1.75	844	7.7
Jan. 1-15, 1965.	144,208		3.74	2.63	3.26		3.74	.00	4.89	.96				561	.76	110,025	34	1.83	872	7.9
Jan. 16-31.....	156,044		3.54	2.55	3.13		3.57	.00	4.79	.87				522	.71	110,778	34	1.79	817	7.9
Feb. 1-28.....	302,789		3.74	2.47	3.74		3.61	.00	5.43	.90				605	.82	249,135	38	2.12	874	8.0
Mar. 1-31.....	361,424		3.84	2.22	4.05		3.44	.00	5.66	1.02				644	.88	316,550	40	2.32	916	7.8
Apr. 1-22.....	341,891		3.69	3.13	3.39		3.51	.00	5.81	.87				637	.87	296,187	33	1.84	926	7.9
Apr. 23-30.....	176,132		2.69	2.14	2.61		2.85	.00	3.98	.59				468	.64	112,105	35	1.68	690	8.1
May 1-5.....	94,631		3.14	1.89	2.35		3.39	.00	3.41	.56				447	.61	57,528	32	1.48	682	7.8
May 6-15.....	223,140		2.59	1.23	1.83		2.90	.00	2.35	.42				341	.46	103,484	32	1.32	532	8.2
May 16-21.....	147,927		2.64	1.48	2.78		3.05	.00	3.31	.56				426	.58	85,703	40	1.94	658	7.9
May 22-31.....	353,058		2.15	1.07	1.31		2.59	.00	1.67	.31				274	.37	131,563	29	1.03	442	8.1
June 1-11.....	315,491		2.40	1.07	1.04		2.66	.00	1.52	.31				267	.36	114,561	23	.79	424	8.2
June 12-19.....	440,489		2.99	1.40	1.70		2.98	.00	2.62	.51				375	.51	224,650	28	1.14	571	7.6

GREEN RIVER BASIN--Continued

9-3150. GREEN RIVER AT GREEN RIVER, UTAH--Continued

Chemical analyses, water year October 1964 to September 1965--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 20-30, 1965	450,982		2.25	1.15	1.13		2.25	0.00	1.92	0.34				274	0.37	168,054	25	0.87	439	7.9
July 1-11.....	264,873		2.30	1.07	1.09		2.46	.00	1.69	.31				268	.36	96,541	24	.84	429	7.5
July 12.....	20,033		4.14	2.22	2.96		3.02	.00	5.85	.48				588	.80	16,020	32	1.66	836	8.0
July 13-18.....	89,280		2.79	1.32	1.57		2.85	.00	2.31	.51				340	.46	41,283	28	1.09	536	7.8
July 19.....	12,674		6.14	2.96	3.92		3.97	.00	8.52	.56				832	1.13	14,341	30	1.84	1,090	7.5
July 20-25.....	70,631		3.69	1.81	2.52		3.26	.00	4.10	.65				493	.67	47,357	31	1.52	738	7.5
July 26-31.....	88,399		3.94	2.14	3.44		3.41	.13	5.21	.79				592	.81	71,172	36	1.97	866	8.3
Aug. 1-18.....	139,025		3.54	2.39	3.92		3.36	.33	5.18	.96				580	.79	109,663	40	2.27	907	8.5
Aug. 19-28.....	73,111		5.29	3.70	5.52		4.06	.00	9.18	1.24				934	1.27	92,868	38	2.61	1,280	7.7
Aug. 29-31.....	16,007		2.74	3.04	4.26		3.34	.00	5.58	1.13				584	.79	12,713	42	2.51	937	8.1
Sept. 1-4.....	16,542		3.54	.00	4.22		3.69	.00	5.50	1.18				649	.88	14,601	54	3.17	964	7.9
Sept. 5-12.....	43,351		4.24	3.78	5.26		3.97	.00	7.81	1.50				859	1.17	50,644	40	2.63	1,220	7.7
Sept. 13-30.....	128,886		2.94	2.80	4.39		3.31	.23	5.85	1.21				648	.88	113,585	43	2.59	997	8.4
Total or weighted average	5,133,943		3.11	1.93	2.59		3.11	--	3.83	0.68				472	0.64	3,296,587	34	1.63	705	7.8

9-2510. YAMPA RIVER NEAR MAYBELL, COLO.

LOCATION.--At county bridge, 1 mile north of Maybell, Moffat County, and about 3.5 miles downstream from gaging station.
DRAINAGE AREA.--3,410 square miles, approximately, upstream from gaging station.
RECORDS AVAILABLE.--Chemical analyses: November 1950 to September 1965.
Water temperatures: November 1950 to September 1965.
Sediment records: December 1950 to May 1958.
EXTREMES, 1964-65.--Specific conductance: Maximum daily, 613 micromhos Nov. 20, 27, 30; minimum daily, 112 micromhos June 8, July 1.
Percent sodium: Maximum, 43 Oct. 1-31; minimum, 9 Apr. 15-18.
Sodium-adsorption-ratio: Maximum, 1.95 Oct. 1-31; minimum, 0.20 Apr. 15-18.
EXTREMES, 1950-65.--Specific conductance: Maximum daily, 947 micromhos Sept. 24, 1955; minimum daily, 94 micromhos June 14, 1959.
Percent sodium: Maximum, 47 Dec. 1-18, 1963; minimum, 9 Apr. 15-18, 1965.
Sodium-adsorption-ratio: Maximum, 2.73 Dec. 1-18, 1963; minimum, 0.18 June 1-9, 1964.
REMARKS.--Where no potassium (K) is reported, sodium (Na) and potassium (K) are calculated and reported as sodium (Na). Additional samples were collected for more comprehensive definition of water quality at this station.

Chemical analyses, water year October 1964 to September 1965

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, 1964	10,576		3.46		2.57		3.57	0.00	1.71	0.73				315	0.43	4,531	43	1.95	520	7.7
Nov. 1-30.....	13,745		3.88		2.35		3.61	.00	1.92	.68				350	.48	6,543	38	1.69	561	8.1
Dec. 1-31.....	16,786		3.92		2.48		3.36	.00	2.35	.68				359	.49	8,196	39	1.77	574	7.8
Jan. 1-31, 1965	16,602		3.74		2.09		3.31	.00	1.92	.59				328	.45	7,406	36	1.53	533	8.0
Feb. 1-28.....	14,773		3.88		2.35		3.34	.00	2.19	.71				360	.49	7,233	38	1.69	563	7.5
Mar. 1-31.....	17,524		3.84		2.26		2.98	.00	2.52	.62				378	.51	9,009	37	1.63	550	8.1
Apr. 1-7.....	13,870		4.30		1.31		2.75	.00	2.73	.13				371	.50	6,998	23	.89	544	7.5
Apr. 8-14.....	19,841		2.70		.83		1.97	.00	1.29	.25				232	.32	6,260	23	.71	331	7.4
Apr. 15-18.....	19,240		2.20		.21		1.61	.00	.73	.07				168	.23	4,396	09	.20	226	7.1
Apr. 19-23.....	42,446		2.24		.70		1.77	.00	1.04	.12				191	.26	11,026	24	.66	275	8.0
Apr. 24-26.....	30,704		1.64		.41		1.41	.00	.56	.09				141	.19	5,888	20	.45	194	7.6
Apr. 27-30.....	30,165		2.00		.57		1.61	.00	.83	.12				171	.23	7,015	22	.57	244	7.7
May 1-4.....	51,094		1.60		.31		1.44	.00	.40	.07				115	.16	7,991	16	.35	178	7.5
May 5-31.....	335,086		1.28		.30		1.07	.00	.44	.07				99	.13	45,116	19	.38	147	7.5
June 1-30.....	455,088		1.12		.28		.97	.00	.35	.08				79	.11	48,895	20	.37	136	7.2

GREEN RIVER BASIN--Continued

9-2510. YAMPA RIVER NEAR MAYBELL, COLO.--Continued

Chemical analyses, water year October 1964 to September 1965--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 1-10, 1965	72,159		0.98		0.35		0.97	0.00	0.29	0.07				78	0.11	7,655	26	0.50	127	7.6
July 11-19.....	38,309		1.26		.52		1.18	.00	.46	.13				106	.14	5,523	29	.66	172	7.2
July 20-22.....	9,937		2.00		.61		1.70	.00	.73	.16				157	.21	2,122	23	.61	254	7.7
July 23-31.....	29,597		2.40		.65		2.02	.00	.87	.17				172	.23	6,923	21	.60	293	7.8
Aug. 1-7.....	16,203		2.28		.65		1.95	.00	.77	.23				170	.23	3,746	22	.61	289	7.7
Aug. 8.....	1,648		.88		.33		.79	.00	.27	.15				90	.12	202	27	.50	120	7.8
Aug. 9-31.....	3,707		2.78		.87		2.23	.00	1.15	.28				206	.28	1,039	24	.74	362	7.7
Sept. 1-30.....	29,812		2.54		1.09		2.13	.00	1.06	.45				190	.26	7,703	30	.97	340	7.9
Total or weighted average	1,288,912		1.60		0.52		1.36	0.00	0.62	0.14				128	0.17	221,416	25	0.51	202	7.3

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 1965.
Water temperatures: December 1954 to September 1965.
Sediment records: December 1954 to September 1965 (discontinued).
EXTREMES, 1964-65.--Specific conductance: Maximum daily, 452 micromhos Mar. 12; minimum daily, 146 micromhos Sept. 30.
Percent sodium: Maximum, 41 Sept. 13-14; minimum, 19 June 23-30.
Sodium-adsorption-ratio: Maximum, 1.15 Sept. 13-14; minimum, 0.38 June 23-30, Sept 30.
EXTREMES, 1954-65.--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.
Sodium-adsorption-ratio (1961-65): Maximum, 1.53 Mar. 20, 1962; minimum, 0.30 Apr. 17-23, 1962.

Chemical analyses, water year October 1964 to September 1965

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, 1964.	28,284	13	1.50	0.40	0.78	0.06	1.61	0.00	1.00	0.10	0.01	0.00	0.07	172	0.23	6,616	29	0.80	269	7.8
Nov. 1-30.....	20,588	--	1.65	.47	1.00	--	1.77	.00	--	.11	--	--	--	200	.27	5,600	32	.97	314	8.0
Dec. 1-31.....	32,220	--	1.85	.51	.96	--	1.87	.00	--	.12	--	--	--	208	.28	9,114	29	.88	333	7.8
Jan. 1-31, 1965.	90,387	--	1.95	.47	.96	--	1.97	.00	--	--	--	--	--	212	.29	26,060	28	.87	336	8.2
Feb. 1-28.....	92,192	--	2.05	.43	1.00	--	2.03	.00	--	--	--	--	--	221	.30	27,709	29	.90	346	7.8
Mar. 1-31.....	51,834	13	2.20	.58	1.35	.07	2.07	.00	1.87	.17	.01	.01	.00	263	.36	18,540	32	1.14	398	7.8
Apr. 1-30.....	85,091	--	2.15	.69	1.17	--	2.07	.00	--	--	--	--	--	258	.35	29,857	29	.99	399	7.9
May 1-31.....	138,347	--	1.90	.58	.87	--	1.80	.00	--	--	--	--	--	213	.29	40,076	26	.78	332	7.8
June 1.....	3,967	--	1.80	.52	.74	--	1.77	.00	--	--	--	--	--	195	.27	1,052	24	.69	309	7.7
June 2-6.....	30,446	--	1.45	.43	.52	--	1.48	.00	--	--	--	--	--	168	.23	6,956	22	.54	245	7.4
June 7.....	3,451	--	1.75	.59	.78	--	1.74	.00	--	--	--	--	--	209	.28	981	25	.72	308	8.0
June 8-18.....	64,582	--	1.40	.46	.52	--	1.46	.00	--	--	--	--	--	161	.22	14,141	22	.54	246	7.5
June 19-22.....	44,588	--	1.30	.34	.42	--	1.31	.00	--	--	--	--	--	144	.20	8,732	20	.46	211	7.7
June 23-30.....	68,073	14	1.00	.28	.30	.04	1.11	.00	.52	.03	.01	.00	.00	117	.16	10,832	19	.38	163	7.7
July 1-6.....	43,795	--	.95	.31	.32	--	1.21	.00	--	--	--	--	--	112	.15	6,671	20	.41	160	7.4
July 7-27.....	53,316	--	1.10	.36	.70	--	1.21	.00	--	--	--	--	--	144	.20	10,441	32	.81	219	7.6
July 28-31.....	4,982	--	1.05	.27	.52	--	1.11	.00	--	--	--	--	--	127	.17	861	28	.64	190	7.6
Aug. 1-17.....	74,519	13	1.20	.38	.48	.05	1.28	.00	.73	.06	.01	.11	.06	136	.18	13,783	23	.54	207	7.2

SAN JUAN RIVER BASIN--Continued

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

Chemical analyses, water year October 1964 to September 1965--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. 18-31, 1965	61,646	--	1.05	0.31	0.39	--	1.15	0.00	--	--	--	--	--	121	0.16	10,145	22	0.47	182	7.5
Sept. 1-12.....	52,364	--	1.10	.30	.40	--	1.10	.00	--	--	--	--	--	124	.17	8,831	22	.48	187	7.7
Sept. 13-14.....	3,237	--	1.10	.30	.96	--	1.10	.00	--	--	--	--	--	156	.21	687	41	1.15	242	7.5
Sept. 15-20.....	19,517	--	.95	.29	.37	--	1.05	.00	--	--	--	--	--	114	.16	3,026	23	.48	168	7.8
Sept. 21-29.....	34,631	--	1.00	.24	.65	--	1.02	.00	--	--	--	--	--	136	.18	6,405	35	.83	196	7.7
Sept. 30.....	2,579	--	.90	.26	.29	--	1.02	.00	--	--	--	--	--	108	.15	379	20	.38	146	7.6
Total or weighted average	1,104,636	--	1.55	0.44	0.74	--	1.57	0.00	--	--	--	--	--	178	0.24	267,495	27	0.74	272	7.6

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 1965.
Water temperatures: May 1944 to September 1961, October 1964 to September 1965.
Sediment records: August to September 1928, July 1929 to September 1965.
EXTREMES, 1964-65.--Specific conductance: Maximum daily, 1,450 micromhos Nov. 19; minimum daily, 308 micromhos July 10.
Percent sodium: Maximum, 47 Jan. 9-11, Aug. 2-4; minimum, 20 June 21-30.
Sodium-adsorption-ratio: Maximum, 3.24 Jan. 9-11; minimum, 0.60 June 21-30.
EXTREMES, 1929-65.--Specific conductance (1941-65): 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.
Sodium-adsorption-ratio (1961-65): Maximum, 5.03 Sept. 26-30, 1962; minimum, 0.30 Apr. 17-23, 1962.
REMARKS.--Additional samples were collected to further define the quality of water at this station. Sodium (Na) and potassium (K) values are calculated and reported as sodium.

Chemical analyses, water year October 1964 to September 1965

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, 1964	36,524		6.09	3.04	5.39		3.29	0.00	10.16	0.90				929	1.26	46,145	37	2.52	1,230	7.5
Nov. 1-30.....	42,188		6.69	3.78	5.39		3.74	.00	11.16	.99				1,050	1.43	60,245	34	2.36	1,350	7.3
Dec. 1-18.....	27,455		6.44	3.78	5.18		3.51	.00	10.89	.99				1,020	1.39	38,086	34	2.29	1,310	7.6
Dec. 19-31.....	32,747		5.04	2.71	3.96		3.05	.00	7.93	.73				762	1.04	33,936	34	2.01	1,030	7.6
Jan. 1-8, 1965.	26,102		4.44	1.89	3.96		3.18	.00	6.41	.71				634	.86	22,507	38	2.22	890	7.6
Jan. 9-11.....	14,358		5.14	1.73	6.00		3.57	.00	8.64	.65				826	1.12	16,130	47	3.24	1,120	7.7
Jan. 12-23.....	48,032		3.19	2.22	3.00		2.66	.00	5.25	.51				533	.72	34,817	36	1.82	755	7.8
Jan. 24-31.....	32,989		2.00	2.88	2.57		2.49	.00	4.48	.45				465	.63	20,862	34	1.64	669	7.8
Feb. 1-28.....	119,849		3.74	1.65	2.65		2.51	.00	5.00	.48				517	.70	84,268	33	1.62	731	7.6
Mar. 1-13.....	47,187		3.79	2.63	2.09		2.75	.00	5.21	.51				537	.73	34,461	25	1.16	759	7.7
Mar. 14-31.....	38,130		4.59	4.61	3.78		3.02	.00	9.10	.85				864	1.18	44,805	29	1.76	1,130	7.7
Apr. 1-7.....	25,422		4.39	2.39	2.65		3.11	.00	5.83	.51				609	.83	21,056	28	1.44	858	7.6
Apr. 8-10.....	7,480		5.39	2.96	3.48		3.23	.00	7.95	.68				774	1.05	7,873	29	1.70	1,040	7.6
Apr. 11-20.....	37,388		4.19	1.81	2.70		2.82	.00	5.31	.56				543	.74	27,611	31	1.56	788	7.7
Apr. 21-30.....	94,711		2.89	1.32	1.61		2.43	.00	3.10	.28				356	.48	45,855	28	1.11	538	7.7
May 1-13.....	110,515		3.19	.99	1.39		2.54	.00	2.77	.28				338	.46	50,802	25	.96	525	7.7

SAN JUAN RIVER BASIN--Continued

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

Chemical analyses, water year October 1964 to September 1965--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 14-18, 1965.	38,162		3.74	1.48	2.13		2.93	0.00	4.02	0.37				442	0.60	22,940	29	1.32	667	7.8
May 19-31.....	139,369		2.94	.82	1.26		2.26	.00	2.58	.23				305	.41	57,810	25	.92	481	7.6
June 1-20.....	248,331		2.94	.76	1.13		2.29	.00	2.35	.20				307	.42	104,299	23	.83	467	7.6
June 21-30.....	170,817		2.45	.60	.74		1.90	.00	1.73	.15				241	.33	55,987	20	.60	374	7.6
July 1-11.....	153,556		2.10	.54	.83		1.82	.00	1.50	.14				207	.28	43,229	24	.72	326	7.4
July 12.....	8,212		2.59	.68	1.35		2.02	.00	2.37	.22				278	.38	3,105	29	1.05	412	7.5
July 13-25.....	84,730		3.59	1.15	2.09		2.72	.00	3.73	.37				426	.58	49,089	31	1.36	629	7.6
July 26-27.....	20,172		5.69	1.07	3.57		3.61	.00	6.41	.34				658	.89	18,051	35	1.94	909	7.7
July 28-29.....	16,899		3.69	1.07	1.91		2.84	.00	3.54	.26				420	.57	9,653	29	1.24	610	7.8
July 30-31.....	11,623		4.14	1.65	2.83		3.02	.00	5.18	.37				552	.75	8,726	33	1.66	780	7.7
Aug. 1.....	6,823		4.99	2.14	2.48		3.52	.00	5.68	.39				612	.83	5,679	26	1.31	857	7.5
Aug. 2-4.....	44,348		4.19	1.89	5.44		3.64	.00	7.52	.34				761	1.03	45,899	47	3.12	1,060	7.9
Aug. 5-17.....	81,713		2.94	1.15	1.61		2.21	.00	3.21	.31				364	.50	40,451	28	1.12	546	7.9
Aug. 18-20.....	20,511		3.34	1.56	2.57		2.74	.00	4.37	.39				484	.66	13,501	34	1.64	702	7.3
Aug. 21-29.....	49,930		2.30	1.73	1.70		2.05	.00	3.33	.34				364	.50	24,717	30	1.20	543	7.8
Aug. 30-31.....	14,420		3.94	1.56	2.44		3.05	.00	4.37	.48				500	.68	9,805	31	1.47	730	7.7
Sept. 1-11.....	65,455		3.34	1.32	1.91		2.43	.00	3.85	.31				426	.58	37,922	29	1.25	627	7.6
Sept. 12-15.....	22,294		2.74	1.23	1.65		1.97	.00	3.37	.31				375	.51	11,370	29	1.17	546	7.7
Sept. 16-20.....	22,731		3.89	1.65	2.52		2.43	.00	5.14	.48				532	.72	16,446	31	1.52	752	7.8
Sept. 21-30.....	66,426		2.59	1.40	1.52		1.84	.00	3.39	.28				370	.50	33,426	28	1.08	541	7.6
Total or weighted average	2,027,599		3.36	1.32	2.04		2.49	0.00	4.00	0.37				399	0.54	1,201,564	30	1.33	629	7.6

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 1965.
Water temperatures: October 1947 to September 1965.
Sediment records: October 1947 to September 1965.
EXTREMES, 1964-65.--Specific conductance: Maximum daily, 3,700 micromhos Aug. 12; minimum daily, 1,100 micromhos Apr. 20.
Percent sodium: Maximum, 45 May 14-24; minimum, 24 Sept. 6-8.
Sodium-adsorption-ratio: Maximum, 4.23 Mar. 1-31; minimum, 1.73 Apr. 17-22.
EXTREMES, 1949-65.--Specific conductance: Maximum daily, 4,490 micromhos Aug. 12, 1964; minimum daily, 734 micromhos Apr. 28, 1952.
Percent sodium: Maximum, 45 May 14-24, 1965; minimum, 8 May 12, 1958.
Sodium-adsorption-ratio (1961-65): Maximum, 5.23 Mar. 29, 1963; minimum, 1.25 Feb. 16-17, 1962.
REMARKS.--Additional samples were collected to further define the quality of water at this station.

Chemical analyses, water year October 1964 to September 1965

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, 1964.	3,283		26.20		12.01		4.06	0.00	22.90	11.23				2,630	3.58	11,744	31	3.32	3,200	7.5
Nov. 1-30.....	6,545		23.40		13.44		5.15	.00	20.05	11.62				2,440	3.32	21,720	36	3.93	3,100	7.8
Dec. 1-31.....	8,731		21.00		13.09		5.43	.00	17.78	10.86				2,190	2.98	26,005	38	4.04	2,860	7.8
Jan. 1-31, 1965.	8,670		20.60		12.66		5.36	.00	16.91	11.00				2,130	2.90	25,115	38	3.94	2,810	7.8
Feb. 1-28.....	7,831		20.40		12.75		5.21	.00	17.20	10.72				2,120	2.88	22,578	38	3.99	2,790	7.6
Mar. 1-31.....	7,686		18.80		12.96		4.39	.00	16.91	10.44				2,040	2.77	21,324	41	4.23	2,730	7.8
Apr. 1-4.....	1,301		17.00		12.18		4.62	.00	15.49	9.08				1,880	2.56	3,327	42	4.18	2,620	7.8
Apr. 5-16.....	14,376		12.50		6.92		3.74	.00	10.89	4.80				1,250	1.70	24,440	36	2.77	1,760	7.7
Apr. 17-22.....	8,093		9.80		3.83		3.65	.00	6.60	3.39				869	1.18	9,564	28	1.73	1,250	7.8
Apr. 23-30.....	6,617		10.70		6.83		4.10	.00	8.49	4.94				1,100	1.50	9,899	39	2.95	1,600	7.8
May 1-7.....	6,401		10.50		6.79		3.88	.00	8.45	4.94				1,080	1.47	9,401	39	2.96	1,600	7.8
May 8-13.....	1,940		16.60		11.14		4.56	.00	14.72	8.46				1,770	2.41	4,670	40	3.87	2,480	7.8
May 14-16.....	2,392		9.80		7.87		3.92	.00	8.33	5.42				1,100	1.50	3,579	45	3.56	1,660	7.7
May 17-24.....	8,537		7.76		6.26		3.47	.00	6.52	4.01				876	1.19	10,170	45	3.18	1,350	8.2
May 25-31.....	4,693		12.70		6.31		4.20	.00	9.22	5.59				1,190	1.62	7,595	33	2.50	1,760	7.9
June 1-9.....	5,141		12.60		6.18		3.80	.00	9.29	5.70				1,170	1.59	8,181	33	2.46	1,760	8.0
June 10-20.....	2,553		18.60		9.31		4.31	.00	15.28	8.32				1,780	2.42	6,919	33	3.05	2,470	7.7
June 21-30.....	1,182		27.20		11.88		4.11	.00	24.57	10.30				2,560	3.48	4,116	30	3.22	3,290	7.6
July 1-31.....	3,173		25.80		12.92		3.28	.00	24.57	10.86				2,520	3.43	10,874	33	3.60	3,290	7.8
Aug. 1-31.....	4,765		27.20		12.75		4.34	.00	24.78	10.72				2,610	3.55	16,915	32	3.46	3,360	7.7
Sept. 1-5.....	875		27.60		12.18		4.29	.00	24.98	10.49				2,570	3.50	3,057	31	3.28	3,340	8.0
Sept. 6-8.....	2,922		19.20		6.05		4.79	.00	15.89	4.57				1,590	2.16	6,318	24	1.95	2,070	7.8
Sept. 9-30.....	2,479		27.80		12.62		4.41	.00	24.98	11.00				2,580	3.51	8,697	31	3.38	3,360	7.9
Total or weighted average	120,491		16.74		9.49		4.32	0.00	14.17	7.72				1,690	2.30	276,208	36	3.28	2,280	7.7

GILA RIVER BASIN

9-4740. GILA RIVER AT KELVIN, ARIZ.

LOCATION.--Just upstream from 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 upstream from gaging station, of which 5,125 square miles is downstream from Coolidge Dam.
RECORDS AVAILABLE.--Chemical analyses: December 1950 to September 1965.
Water temperatures: December 1950 to September 1965.
Sediment records: January 1958 to September 1965.
EXTREMES, 1964-65.--Specific conductance: Maximum daily, 2,930 micromhos Nov. 3; minimum daily, 602 micromhos Sept. 4.
Percent sodium: Maximum, 59 Aug. 1-16; minimum, 4 Sept. 4.
Sodium-adsorption-ratio: Maximum, 5.45 July 1-29; minimum, 0.15 Sept. 4.
EXTREMES, 1950-65.--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, 4 Sept. 4, 1965.
Sodium-adsorption-ratio: Maximum, 7.56 July 1-14, 1964; minimum 0.15 Sept. 4, 1965.
REMARKS.--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 1964 to September 1965

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, 1964.	2,107	--	10.08	2.55	5.48	--	2.20		--	--	--	--	--	1,280	1.74	3,668	30	2.18	1,690	7.8
Oct. 17-19.....	1,613	--	7.19	1.81	2.87	--	3.88		--	--	--	--	--	796	1.08	1,746	24	1.35	1,110	7.6
Oct. 20.....	171	--	8.28	2.30	4.74	--	3.25		--	--	--	--	--	1,030	1.40	239	31	2.06	1,440	7.6
Oct. 21-22.....	292	--	9.13	2.55	5.26	--	2.98		--	--	--	--	--	1,160	1.58	460	31	2.18	1,590	7.7
Oct. 23-25.....	399	--	9.88	2.71	5.66	--	3.05		--	--	--	--	--	1,260	1.71	683	31	2.25	1,720	7.8
Oct. 26-28.....	212	--	15.77	4.44	6.96	--	2.39		--	--	--	--	--	1,900	2.58	549	26	2.19	2,350	7.6
Oct. 29-31.....	171	--	19.76	5.43	7.74	--	1.88		--	--	--	--	--	2,340	3.18	543	24	2.18	2,740	7.4
Nov. 1-2.....	101	--	14.57	4.20	8.00	--	2.75		--	--	--	--	--	1,860	2.53	256	30	2.61	2,380	7.9
Nov. 3-13.....	489	29	19.06	5.76	8.27	0.66	2.26		26.23	5.70	0.06	0.01	0.29	2,300	3.13	1,529	24	2.35	2,760	7.7
Nov. 14-16.....	174	--	13.97	4.20	7.05	--	3.54		--	--	--	--	--	1,730	2.35	410	28	2.34	2,230	7.7
Nov. 17-19.....	218	--	19.66	6.33	6.57	--	2.10		--	--	--	--	--	2,280	3.10	677	20	1.82	2,640	7.6
Nov. 20-30.....	759	--	13.57	4.20	7.53	--	2.69		--	--	--	--	--	1,780	2.42	1,838	30	2.52	2,260	7.8
Dec. 1-3.....	240	--	16.17	4.61	8.09	--	1.48		--	--	--	--	--	2,020	2.75	659	28	2.51	2,470	7.8
Dec. 4-7.....	575	--	10.18	2.63	6.79	--	2.66		--	--	--	--	--	1,300	1.77	1,017	35	2.68	1,810	7.6
Dec. 8-17.....	2,836	--	6.44	1.97	6.13	--	2.98		--	--	--	--	--	944	1.28	3,641	42	2.99	1,450	7.6
Dec. 18-31.....	5,887	--	8.18	2.96	6.48	--	3.21		--	--	--	--	--	1,140	1.55	9,127	37	2.75	1,670	7.7

Jan. 1-7, 1965..	1,416	--	13.42	4.36	7.18	--	3.06	--	--	--	--	--	1,710	2.33	3,294	29	2.41	2,190	7.5
Jan. 8-9.....	2,475	--	6.89	2.30	2.35	--	2.39	--	--	--	--	--	734	1.00	2,471	20	1.10	1,070	7.8
Jan. 10-11.....	367	--	8.68	2.96	5.26	--	2.28	--	--	--	--	--	1,100	1.50	549	31	2.18	1,550	7.5
Jan. 12-16.....	540	--	14.77	4.61	6.92	--	2.23	--	--	--	--	--	1,810	2.46	1,328	26	2.22	2,260	7.5
Jan. 17-20.....	349	--	18.66	5.51	6.70	--	2.80	--	--	--	--	--	2,140	2.91	1,016	22	1.93	2,560	7.5
Jan. 21-22.....	240	--	9.28	2.96	4.87	--	2.72	--	--	--	--	--	1,120	1.52	366	28	1.97	1,540	7.5
Jan. 23-31.....	734	--	13.67	4.77	6.70	--	2.23	--	--	--	--	--	1,720	2.34	1,716	27	2.21	2,200	7.4
Feb. 1-3.....	264	--	17.17	5.59	6.92	--	2.36	--	--	--	--	--	2,050	2.79	736	23	2.05	2,470	7.5
Feb. 4.....	226	--	13.02	4.77	5.92	--	3.28	--	--	--	--	--	1,490	2.03	458	25	1.98	2,090	7.8
Feb. 5-6.....	468	--	7.19	2.22	6.92	--	2.79	--	--	--	--	--	1,080	1.47	688	42	3.19	1,610	7.8
Feb. 7-8.....	4,030	26	4.39	1.23	2.74	.15	2.52	3.75	2.06	.03	.01	.23	551	.75	3,020	32	1.63	845	7.7
Feb. 9-11.....	2,660	--	5.39	1.73	2.96	--	2.52	--	--	--	--	--	681	.93	2,463	29	1.57	968	7.7
Feb. 12-14.....	970	--	7.09	1.89	4.52	--	3.25	--	--	--	--	--	912	1.24	1,203	34	2.14	1,310	7.9
Feb. 15-18.....	652	--	8.58	3.45	6.35	--	2.95	--	--	--	--	--	1,250	1.70	1,109	35	2.59	1,700	8.0
Feb. 19-21.....	411	--	12.57	4.36	7.83	--	3.51	--	--	--	--	--	1,660	2.26	927	32	2.69	2,190	7.9
Feb. 22-28.....	2,596	--	6.49	2.14	7.13	--	3.38	--	--	--	--	--	1,020	1.39	3,602	45	3.44	1,570	7.9
Mar. 1-9.....	3,927	--	5.84	2.14	7.05	--	3.34	--	--	--	--	--	942	1.28	5,031	47	3.53	1,500	7.9
Mar. 10-13.....	3,285	--	5.64	1.97	5.96	--	3.11	--	--	--	--	--	870	1.18	3,886	44	3.05	1,360	7.7
Mar. 14-26.....	6,936	--	.65	.29	.70	--	3.31	--	--	--	--	--	1,030	1.40	9,716	43	1.02	1,600	7.8
Mar. 27-31.....	2,638	--	5.49	1.97	7.26	--	3.21	--	--	--	--	--	908	1.23	3,258	49	3.76	1,490	8.0
Apr. 1-14.....	6,664	--	6.14	2.14	6.92	--	3.38	--	--	--	--	--	982	1.34	8,901	46	3.40	1,550	8.0
Apr. 15-30.....	5,141	--	6.59	2.55	7.87	--	3.25	--	--	--	--	--	1,100	1.50	7,691	46	3.68	1,690	8.0
May 1-31.....	11,314	26	6.39	2.47	9.09	.26	3.44	6.23	8.41	.05	.01	.17	1,150	1.56	17,695	50	4.32	1,800	8.1
June 1-30.....	15,055	--	5.99	2.30	10.66	--	3.41	--	--	--	--	--	1,220	1.66	24,979	56	5.23	1,920	8.0
July 1-29.....	18,292	--	5.19	2.39	10.61	--	3.57	--	--	--	--	--	1,160	1.58	28,857	58	5.45	1,930	7.7
July 30-31.....	1,702	--	5.24	2.14	8.53	--	4.33	--	--	--	--	--	1,020	1.39	2,361	54	4.44	1,630	7.7
Aug. 1-16.....	10,790	--	4.59	1.97	9.40	--	3.51	--	--	--	--	--	1,040	1.41	15,261	59	5.19	1,700	7.8
Aug. 17.....	2,281	--	3.69	.99	3.61	--	2.90	--	--	--	--	--	540	.73	1,675	44	2.36	850	8.2
Aug. 18-31.....	8,525	--	4.79	1.89	8.18	--	3.16	--	--	--	--	--	966	1.31	11,200	55	4.47	1,540	7.7
Sept. 1-3.....	3,047	--	4.84	2.22	9.18	--	2.85	--	--	--	--	--	1,050	1.43	4,351	57	4.88	1,690	7.6
Sept. 4.....	839	--	5.29	.90	.26	--	3.87	--	--	--	--	--	408	.55	466	4	.15	602	7.7
Sept. 5-30.....	123,253	26	4.99	1.56	7.48	.23	3.23	4.79	5.25	.06	.05	.23	812	1.10	135,578	52	4.13	1,658	7.7
Total or weighted average	258,331	--	5.94	2.14	7.48	--	3.23	--	--	--	--	--	1,070	1.46	332,893	48	3.72	1,658	7.7

GILA RIVER BASIN--Continued

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

LOCATION.--Approximately 1 mile downstream from gaging station on Gila Bend Canal, which is 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 1965.
Water temperatures: December 1950 to September 1965.
EXTREMES, 1964-65.--Specific conductance: Maximum daily, 10,300 micromhos Oct. 13-15, 23, Nov. 23, 24; minimum daily, 601 micromhos Sept. 5.
Percent sodium: Maximum, 68 Sept. 1-2; minimum, 21 Sept. 3-5.
Sodium-adsorption-ratio: Maximum, 17.42 Sept. 1-2; minimum, 1.28 Sept. 3-5.
EXTREMES, 1950-65.--Specific conductance: Maximum daily, 11,000 micromhos Nov. 10, 12-15, 1962; minimum daily, 370 micromhos Aug. 2, 1955.
Percent sodium: Maximum, 84 Oct. 1-5, 1962; minimum, 21 Sept. 3-5, 1965.
Sodium-adsorption-ratio (1961-65): Maximum, 18.37 Aug. 1-31, 1962; minimum, 1.01 Aug. 23, 1964.
REMARKS.--Values reported for sodium (Na) are determined by analysis and do not include potassium (K). 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. No samples collected during June.

Chemical analyses, water year October 1964 to September 1965

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. 1-17, 1964.	543	--	20.96	15.46	71.78	--	6.33		--	--	--	--	--	6,640	9.03	4,902	66	16.82	9,530	7.8
Oct. 18.....	133	--	10.08	6.50	30.54	--	3.80		--	--	--	--	--	2,930	3.98	530	65	10.61	4,470	7.6
Oct. 19-31.....	302	--	21.51	16.70	73.95	--	5.72		--	--	--	--	--	7,030	9.56	2,884	66	16.92	10,000	7.9
Nov. 1-4.....	79	--	21.46	16.12	71.34	--	6.33		--	--	--	--	--	6,820	9.28	736	65	16.46	9,780	7.9
Nov. 5-11.....	143	--	17.56	12.67	55.68	--	6.06		--	--	--	--	--	5,320	7.24	1,035	65	14.32	7,860	7.6
Nov. 12-16.....	117	--	22.75	16.45	73.95	--	6.92		--	--	--	--	--	7,000	9.52	1,114	65	16.70	9,970	8.0
Nov. 17-20.....	111	--	17.07	12.17	52.20	--	5.80		--	--	--	--	--	5,070	6.90	766	64	13.65	7,460	7.8
Nov. 21-22.....	69	--	9.88	6.58	29.01	--	5.28		--	--	--	--	--	2,810	3.82	265	64	10.11	4,440	7.6
Nov. 23-27.....	111	32	23.20	17.03	75.26	0.31	7.16		38.10	69.68	0.16	0.97	0.53	7,240	9.85	1,094	65	16.78	10,200	7.8
Nov. 28-30.....	76	--	17.37	12.83	55.68	--	6.36		--	--	--	--	--	5,310	7.22	546	65	14.33	7,860	7.8
Dec. 1-7.....	219	--	20.56	15.46	64.38	--	6.42		--	--	--	--	--	6,260	8.51	1,868	64	15.17	9,010	8.0
Dec. 8-10.....	85	--	18.16	12.83	52.64	--	5.83		--	--	--	--	--	5,210	7.09	603	63	13.37	7,600	8.1
Dec. 11-16.....	175	--	21.06	15.38	65.25	--	6.49		--	--	--	--	--	6,420	8.73	1,527	64	15.29	9,130	7.9
Dec. 17.....	30	--	12.77	8.47	35.84	--	5.44		--	--	--	--	--	3,580	4.87	145	63	11.00	5,430	7.8
Dec. 18.....	30	--	20.16	14.48	65.25	--	6.29		--	--	--	--	--	6,220	8.46	252	65	15.68	9,010	7.8

Dec. 19, 1964...	46	--	12.77	8.47	34.80	--	5.31	--	--	--	--	--	--	3,590	4.88	223	62	10.68	5,450	7.6
Dec. 20-22.....	141	--	20.56	14.81	65.25	--	6.65	--	--	--	--	--	--	6,370	8.66	1,222	65	15.52	9,130	7.9
Dec. 23-24.....	60	--	17.71	12.67	53.07	--	6.16	--	--	--	--	--	--	5,290	7.19	428	64	13.62	7,760	7.7
Dec. 25-31.....	222	--	21.56	16.04	69.60	--	6.79	--	--	--	--	--	--	6,660	9.06	2,012	65	16.05	9,530	8.0
Jan. 1-6, 1965..	244	--	13.57	10.61	44.37	--	5.97	--	--	--	--	--	--	4,260	5.79	1,413	65	12.76	6,370	7.7
Jan. 7-10.....	303	22	6.19	4.28	16.83	.26	3.29	--	9.66	14.67	.07	.27	.10	1,680	2.28	692	61	7.36	2,680	7.6
Jan. 11-12.....	159	--	13.72	10.28	44.81	--	5.72	--	--	--	--	--	--	4,300	5.85	928	65	12.93	6,340	7.6
Jan. 13-31.....	618	--	20.56	16.62	72.65	--	5.39	--	--	--	--	--	--	6,940	9.44	5,833	66	16.85	9,800	7.9
Feb. 1-28.....	1,855	--	21.01	15.38	70.04	--	5.59	--	--	--	--	--	--	6,660	9.06	16,801	66	16.42	9,350	7.8
Mar. 1-13.....	632	--	21.31	15.46	70.04	--	5.87	--	--	--	--	--	--	6,540	8.89	5,619	66	16.33	9,520	7.8
Mar. 14-15.....	177	--	16.32	12.50	51.77	--	5.21	--	--	--	--	--	--	4,850	6.60	1,164	64	13.64	7,320	7.7
Mar. 16-31.....	695	--	20.41	15.96	67.86	--	5.74	--	--	--	--	--	--	6,420	8.73	6,068	65	15.91	9,340	7.8
Apr. 1-4.....	208	--	18.76	11.85	55.68	--	5.44	--	--	--	--	--	--	5,370	7.30	1,518	65	14.23	7,800	7.8
Apr. 5.....	125	--	16.62	9.38	41.76	--	5.24	--	--	--	--	--	--	4,300	5.85	731	62	11.58	6,260	7.8
Apr. 6.....	121	--	11.68	4.69	22.40	--	4.26	--	--	--	--	--	--	2,450	3.33	403	58	7.83	3,700	7.8
Apr. 7.....	131	--	2.74	.90	5.22	--	3.08	--	--	--	--	--	--	600	.82	107	59	3.86	930	7.8
Apr. 8-12.....	567	--	5.89	1.97	8.70	--	4.52	--	--	--	--	--	--	1,010	1.37	779	53	4.39	1,680	7.6
Apr. 13-30.....	739	--	19.26	12.50	59.60	--	5.28	--	--	--	--	--	--	5,680	7.72	5,709	65	14.95	8,330	7.7
May 1-31.....	978	--	17.32	12.26	53.94	--	4.03	--	--	--	--	--	--	5,350	7.28	7,113	65	14.03	7,800	7.8
July 1-27.....	439	--	18.26	13.33	59.16	--	5.02	--	--	--	--	--	--	5,740	7.81	3,428	65	14.89	8,390	7.8
July 28-29.....	60	22	13.77	9.05	40.37	.36	6.06	--	18.70	37.80	.15	.01	2.30	3,850	5.24	312	64	11.95	5,960	7.7
July 30-31.....	81	--	20.06	14.72	66.99	--	5.87	--	--	--	--	--	--	6,360	8.65	703	66	16.06	9,200	7.7
Aug. 1-31.....	627	--	18.01	12.83	58.73	--	5.08	--	--	--	--	--	--	5,690	7.74	4,853	66	14.95	8,280	7.7
Sept. 1-2.....	23	--	19.81	14.56	72.21	--	4.26	--	--	--	--	--	--	6,610	8.99	207	68	17.42	9,560	7.7
Sept. 3-5.....	851	26	5.19	1.81	2.39	1.76	7.06	--	.23	2.31	.00	.01	.17	516	.70	597	21	1.28	871	7.5
Sept. 6-8.....	470	--	13.32	6.66	28.45	--	5.00	--	--	--	--	--	--	3,000	4.08	1,918	59	9.00	4,610	7.6
Sept. 9-30.....	358	--	18.96	12.01	53.51	--	5.28	--	--	--	--	--	--	5,340	7.26	2,599	63	13.60	7,780	7.8
Total or weighted average	13,153	--	17.05	11.99	53.07	--	5.47	--	--	--	--	--	--	5,120	6.96	91,692	65	13.29	7,420	7.7

GILA RIVER BASIN--Continued

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, which is 6 miles upstream from Verde River, Maricopa County.
DRAINAGE AREA.--6,232 square miles, upstream from gaging station, of which 21 miles is downstream from Stewart Mountain Dam.
RECORDS AVAILABLE.--Chemical analyses: December 1950 to September 1965.
Water temperatures: December 1950 to September 1965.
EXTREMES, 1964-65.--Specific conductance: Maximum daily, 1,440 micromhos June 19, Sept. 21-27; minimum daily, not determined.
Percent sodium: Maximum, 70 Nov. 1-30, July 1 to Sept. 30; minimum, 68 Mar. 1-8, May 12-31.
Sodium-adsorption-ratio: Maximum, 6.72 Sept. 1-30; minimum, 6.01 May 12-31.
EXTREMES, 1950-65.--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.
Sodium-adsorption-ratio (1961-65): Maximum, 6.72 Sept. 1-30, 1965, Sept. 1-30, 1964; minimum, 4.87 Mar. 1-31, 1962.
REMARKS.--Values reported for sodium (Na) are determined by analysis and do not include potassium (K). No samples collected during December, January, Feb. 1-26, Mar. 9 to May 11. No inflow between sampling point and gaging station except during periods of heavy local rains.

Chemical analyses, water year October 1964 to September 1965

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, 1964	21,459	--	2.60	1.15	8.53	--	2.82	0.00	--	--	--	--	--	738	1.00	21,459	69	6.23	1,350	8.0
Nov. 1-30.....	5,409	--	2.50	1.15	8.53	--	2.70	00	--	--	--	--	--	723	.98	5,318	70	6.31	1,340	7.8
Feb. 27-28, 1965.....	1,531		2.74	1.07	8.57	--	2.79	00	--	--	--	--	--	727	.99	1,514	69	6.21	1,330	7.6
Mar. 1-8.....	6,061	21	2.69	1.07	8.35	0.15	2.75	.00	1.04	8.52	0.03	0.01	0.10	725	.99	5,977	68	6.09	1,330	7.7
May 12-31.....	16,225	20	2.79	1.07	8.35	.15	2.85	00	1.04	8.52	.02	.01	.08	757	1.03	16,704	68	6.01	1,340	7.8
June 1-30.....	33,858	--	2.64	1.23	8.57	--	2.79	00	--	--	--	--	--	736	1.00	33,890	69	6.15	1,340	7.8
July 1-31.....	45,993	--	2.59	1.15	8.79	--	2.75	.00	--	--	--	--	--	751	1.02	46,975	70	6.42	1,400	7.8
Aug. 1-31.....	32,896	21	2.59	1.23	9.14	.16	2.75	.00	1.06	9.31	.02	.01	.15	761	1.03	34,046	70	6.60	1,430	7.8
Sept. 1-30.....	38,797	20	2.50	1.23	9.18	.16	2.69	.00	1.06	9.42	.02	.01	.17	790	1.07	41,683	70	6.72	1,420	7.7
Total or weighted average	A202,229	--	1.18	2.59	8.80	--	2.76	0.00	--	--	--	--	--	755	1.03	207,566	70	6.41	1,380	7.7

A Based on 100 percent of flow.

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

LOCATION.--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.
DRAINAGE AREA.--6,185 square miles.
RECORDS AVAILABLE.--Chemical analyses: December 1950 to September 1965.
Water temperatures: December 1950 to September 1965.
EXTREMES, 1964-65.--Specific conductance: Maximum daily, 665 micromhos Oct. 27; minimum daily, 225 micromhos May 14.
Percent sodium: Maximum, 27 Oct. 9-31; minimum, 13 May 1 to June 30.
Sodium-adsorption-ratio: Maximum, 1.17 Oct. 9-31; minimum, 0.31 June 1-30.
EXTREMES, 1950-65.--Specific conductance: Maximum daily, 958 micromhos Nov. 10, 1956; minimum daily, 225 micromhos May 14, 1965.
Percent sodium: Maximum, 32 Sept. 1-13, 1961; minimum, 9 Apr. 30, 1962.
Sodium-adsorption-ratio (1961-65): Maximum, 1.36 Aug. 1-17, 1963; minimum, 0.31 June 1-30, 1965.
REMARKS.--Values reported for sodium (Na) are determined by analysis and do not include potassium (K).

Chemical analyses, water year October 1964 to September 1965

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, 1964..	7,109	--	2.35	2.06	1.44	--	4.00	--	--	--	--	--	--	326	0.44	3,152	25	0.97	542	8.1
Oct. 9-31.....	5,748	--	2.50	2.63	1.87	--	4.70	--	--	--	--	--	--	391	.53	3,057	27	1.17	642	8.2
Nov. 1-30.....	7,914	25	2.64	2.63	1.83	0.09	4.64	0.20	1.54	0.73	0.02	0.01	0.47	392	.53	4,219	25	1.12	646	8.4
Dec. 1-31.....	14,511	--	2.69	2.63	1.78	--	4.79	.20	--	--	--	--	--	385	.52	7,598	25	1.09	648	8.4
Jan. 1-13, 1965.	2,236	--	2.35	2.88	1.61	--	4.67	.23	--	--	--	--	--	383	.52	1,164	24	1.00	624	8.3
Jan. 14-18.....	873	17	1.55	1.15	.48	.06	2.46	--	.50	.22	.02	.02	.11	187	.25	222	15	.41	302	7.9
Jan. 19-31.....	1,472	--	1.75	1.73	.91	--	3.28	--	--	--	--	--	--	249	.34	499	21	.69	415	8.0
Feb. 1-23.....	1,578	--	1.80	1.56	.87	--	3.21	--	--	--	--	--	--	244	.33	524	21	.67	401	8.2
Feb. 24-28.....	2,985	--	1.75	1.32	.70	--	2.85	--	--	--	--	--	--	220	.30	893	19	.56	354	8.1
Mar. 1-31.....	77,413	--	1.75	1.40	.70	--	2.88	--	--	--	--	--	--	216	.29	22,741	18	.56	359	8.0
Apr. 1-13.....	39,219	--	1.90	1.15	.70	--	2.93	--	--	--	--	--	--	220	.30	11,734	19	.56	357	8.0
Apr. 14-30.....	100,516	--	1.70	.82	.52	--	2.41	--	--	--	--	--	--	183	.25	25,017	17	.47	291	7.8
May 1-31.....	80,364	18	1.35	.69	.32	.04	1.97	--	.33	.11	.01	.01	.01	152	.21	16,613	13	.32	231	7.9
June 1-30.....	68,073	--	1.40	.68	.32	--	1.97	--	--	--	--	--	--	162	.22	14,998	13	.31	231	8.0
July 1-12.....	44,747	--	1.50	.74	.44	--	2.16	--	--	--	--	--	--	162	.22	9,859	16	.41	259	7.7
July 13-31.....	32,448	--	1.80	.80	.52	--	2.66	--	--	--	--	--	--	181	.25	7,987	17	.46	299	7.9
Aug. 1-15.....	49,864	--	1.95	.99	.70	--	2.84	--	--	--	--	--	--	208	.28	14,106	19	.57	347	7.8
Aug. 16-31.....	42,875	--	2.10	1.56	1.04	--	3.33	--	--	--	--	--	--	272	.37	15,860	22	.77	450	8.0
Sept. 1-30.....	43,676	21	2.10	1.56	1.09	.09	3.28	--	1.06	.45	.11	.01	.14	274	.37	16,275	23	.80	455	8.1
Total or weighted average	623,621	--	1.76	1.07	0.65	--	2.69	--	--	--	--	--	--	208	0.28	176,518	19	0.54	335	7.9

10. THE GREAT BASIN

SEVIER LAKE BASIN

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

LOCATION.--At gaging station, 0.8 mile downstream from Piute Dam, and 8 miles south of Marysvale, Piute County.
DRAINAGE AREA.--2,440 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: March 1958 to September 1959, February 1961 to September 1965.

Chemical analyses, water year October 1964 to September 1965

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. 9, 1964...	159	--	4.08		1.35	--	4.13	0.00	0.79	0.51	--	--	--	295	0.40	64	25	0.94	478	7.6
Dec. 21.....	5	--	4.32		1.48	--	4.69	.00	.67	.45	--	--	--	327	.44	2	26	1.01	509	7.6
Jan. 15, 1965..	6	32	2.54	1.81	1.35	0.07	4.75	.00	.71	.42	0.02	0.02	0.06	322	.44	3	23	.91	500	8.2
Jan. 27.....	7	--	4.56		1.35	--	4.82	.00	.71	.39	--	--	--	280	.38	3	23	.89	506	7.8
Feb. 10.....	167	--	4.00		1.35	--	4.36	.00	.60	.39	--	--	--	249	.34	56	25	.95	447	8.1
Mar. 22.....	260	--	3.80		1.31	--	4.20	.00	.60	.31	--	--	--	277	.38	98	26	.95	449	7.9
Apr. 19.....	349	--	4.00		1.26	--	4.33	.00	.60	.34	--	--	--	293	.40	139	24	.89	455	8.2
Apr. 22.....	698	23	2.00	1.73	1.26	.08	4.11	.00	.56	.42	.01	.01	.07	275	.37	261	25	.92	447	8.2
May 19.....	212	--	4.00		1.17	--	4.16	.00	.65	.37	--	--	--	296	.40	85	23	.83	460	7.5
June 21.....	37	--	3.56		1.13	--	3.77	.00	.60	.34	--	--	--	262	.36	13	24	.85	413	8.1
July 21.....	619	16	2.20	1.56	.91	.08	3.77	.00	.58	.27	.02	.00	.06	240	.33	202	19	.67	423	8.0
July 26.....	176	--	3.72		.87	--	3.80	.00	.46	.31	--	--	--	248	.34	60	19	.64	426	7.5
Aug. 30.....	561	--	4.00		1.17	--	4.18	.00	.65	.34	--	--	--	274	.37	209	23	.83	458	8.2
Sept. 16.....	686	23	2.54	1.81	1.26	.10	4.13	.30	.77	.39	.02	.00	.08	313	.43	292	22	.85	486	8.5
Sept. 30.....	81	--	4.20		1.44	--	4.51	.00	.69	.42	--	--	--	318	.43	35	25	.99	515	7.9

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 1965.
Water temperatures: March 1951 to September 1965.
EXTREMES, 1964-65.--Specific conductance: Maximum daily, 4,080 micromhos Sept. 8, 10, 13; minimum daily, 1,170 micromhos Apr. 17.
Percent sodium: Maximum, 61 Sept. 6-14; minimum, 36 Apr. 16-21.
Sodium-adsorption-ratio: Maximum, 9.13 Sept. 6-14; minimum, 2.22 Apr. 16-21.
EXTREMES, 1951-65.--Specific conductance: Maximum daily, 8,300 micromhos Dec. 27, 1962; minimum daily, 431 micromhos Feb. 4, 1962.
Percent sodium: Maximum, 65 Aug. 20-23, 1963; minimum, 23 Feb. 3-11, 1962.
Sodium-adsorption-ratio (1961-65): Maximum, 12.84 Dec. 25-27, 1962; minimum, 0.82 Feb. 3-11, 1962.
REMARKS.-- Additional samples were collected to further define the quality of water at this station. Discharges are adjusted to compensate for inflow from deep well discharging to the river between the sampling point and the gaging station.

Chemical analyses, water year October 1964 to September 1965

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. 1-7, 1964..	250		10.00		12.62		4.46	0.00	7.22	10.95				1,300	1.77	442	56	5.64	2,090	8.0
Oct. 8-31.....	1,166		8.16		7.83		4.00	.00	4.60	7.39				912	1.24	1,447	49	3.88	1,480	8.2
Nov. 1-30.....	2,035		8.56		7.26		4.06	.00	4.58	7.19				916	1.25	2,535	46	3.51	1,470	8.0
Dec. 1-31.....	2,496		8.80		7.05		4.33	.00	4.48	7.05				921	1.25	3,127	44	3.36	1,470	8.0
Jan. 1-8, 1965..	755		9.92		7.74		4.82	.00	5.08	7.76				1,040	1.41	1,068	44	3.48	1,630	8.1
Jan. 9-31.....	703		13.76		16.40		5.44	.00	10.04	14.67				1,830	2.49	1,748	54	6.25	2,720	8.1
Feb. 1.....	19		14.40		17.84		5.64	.00	11.06	15.52				1,980	2.69	51	55	6.65	2,960	7.8
Feb. 2-28.....	1,757		9.60		7.35		4.46	.00	5.00	7.48				1,000	1.36	2,389	43	3.36	1,600	7.9
Mar. 1-31.....	1,328		10.40		9.83		4.72	.00	6.06	9.45				1,190	1.62	2,149	49	4.31	1,860	8.2
Apr. 15.....	2,139		10.96		11.22		4.87	.00	7.02	10.30				1,350	1.84	3,928	51	4.79	2,150	8.0
Apr. 16-21.....	605		7.96		4.44		4.16	.00	3.12	5.13				722	.98	594	36	2.22	1,210	8.2
Apr. 22-30.....	8,622		10.84		13.62		4.80	.13	7.97	11.57				1,500	2.04	17,589	56	5.85	2,390	8.3
May 1-31.....	26,317		10.12		12.62		4.62	.00	7.39	10.72				1,380	1.88	49,391	55	5.61	2,230	8.1
June 1-30.....	12,258		9.28		11.01		4.80	.00	6.29	9.17				1,210	1.65	20,172	54	5.11	1,960	8.1
July 1-26.....	17,379		9.04		8.66		4.44	.00	5.39	7.87				1,070	1.46	25,290	49	4.07	1,730	8.1
July 27-29.....	538		9.12		11.53		4.41	.00	6.52	9.70				1,240	1.69	907	56	5.40	2,020	8.0
July 30, 31.....	349		8.56		10.01		4.39	.00	5.64	8.52				1,100	1.50	522	54	4.84	1,830	7.9

SEVIER LAKE BASIN--Continued

10-2240. SEVIER RIVER NEAR LYNNDYL, UTAH--Continued

Chemical analyses, water year October 1964 to September 1965--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. 1-23, 1965	3,353		10.76		15.14		4.33	0.00	8.83	12.75				1,590	2.16	7,251	58	6.53	2,540	8.0
Aug. 24-29.....	211		13.48		19.36		4.84	.00	11.39	16.59				2,000	2.72	573	59	7.46	3,160	8.1
Aug. 30, 31....	42		9.20		11.35		4.72	.00	6.39	9.45				1,230	1.67	70	55	5.29	2,020	8.0
Sept. 1-5.....	224		9.36		11.05		4.67	.00	6.50	9.25				1,270	1.73	387	54	5.11	2,010	8.1
Sept. 6-14.....	1,191		16.40		26.14		4.77	.00	15.72	22.06				2,680	3.64	4,340	61	9.13	4,090	8.2
Sept. 15-30....	800		10.80		11.40		4.16	.33	7.20	10.49				1,360	1.85	1,480	51	4.90	2,140	8.5
Total or weighted average	84,537		9.89		12.97		4.59	--	6.75	9.87				1,280	1.74	147,450	57	5.83	2,060	8.1

10-3120.2. CARSON RIVER NEAR SILVER SPRINGS, NEV.

LOCATION.--On U.S. Highway 95 alternate, at Weeks Bridge, 4.5 miles downstream from gaging station at Fort Churchill, and approximately 8.5 miles south of Silver Springs, Lyon County.
DRAINAGE AREA.--1,450 square miles, approximately, upstream from gaging station.
RECORDS AVAILABLE.--Chemical analyses: October 1962 to September 1965.
Water temperatures: October 1962 to September 1965.
EXTREMES, 1964-65.--Specific conductance: Maximum daily, 669 micromhos Oct. 6, 14; minimum daily, 103 micromhos June 14.
Percent sodium: Maximum, 40 Oct. 1-13; minimum, 27 Apr. 21-30, May 1-31.
Sodium-adsorption-ratio: Maximum, 1.91 Oct. 1-31, minimum, 0.49 Apr. 21-30.
EXTREMES, 1962-65.--Specific conductance: Maximum daily, 685 micromhos Aug. 17, 1963; minimum daily, 102 micromhos June 21, 1963.
Percent sodium: Maximum, 39 Aug. 1 to Sept. 30, 1964; minimum, 25 May 13-31, 1963.
Sodium-adsorption-ratio: Maximum, 1.91 Oct. 1-31, 1964; minimum, 0.46 May 13-24, June 16-22, 1963.
REMARKS.--Records of discharge given for Carson River near Fort Churchill. No appreciable inflow between gaging station and sampling point.

Chemical analyses, water year October 1964 to September 1965

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, 1964.	6	--	2.84	1.40	2.78	0.01	3.51	0.00	3.08	0.42	--	0.04	0.3	448	0.61	4	40	1.91	665	8.2
Nov. 1-10.....	2	--	2.50	.90	2.13	.09	2.79	.00	2.42	.31	--	.02	.30	357	.49	1	38	1.63	553	7.7
Nov. 11-30.....	2,896	--	2.15	.73	1.83	.07	2.39	.00	1.98	.31	--	.02	.20	304	.41	1,197	38	1.52	457	7.9
Dec. 1-22.....	4,538	24	1.90	.90	1.57	.09	2.21	.00	1.77	.31	0.04	.02	.30	274	.37	1,691	35	1.32	424	7.8
Dec. 23-31.....	47,306	9.1	.85	.11	.61	.08	1.08	.00	.62	.12	.03	.02	.10	149	.20	9,586	37	.88	189	8.2
Jan. 1-11, 1965.	19,309	23	1.15	.45	.83	.07	1.49	.00	.85	.19	.02	.04	.10	175	.24	4,596	33	.92	254	8.0
Jan. 12-31.....	25,745	24	1.35	.49	.96	.08	1.69	.00	.87	.21	.02	.03	.20	195	.27	6,828	33	1.00	289	7.7
Feb. 1-28.....	22,881	--	1.45	.39	.91	.06	1.54	.00	1.15	.20	--	.00	.10	180	.24	5,601	33	.95	284	8.2
Mar. 1-31.....	20,844	--	1.35	.33	.87	.04	1.43	.00	1.04	.18	--	.00	.10	173	.24	4,904	34	.95	267	7.6
Apr. 1-20.....	13,527	--	1.25	.43	.91	.06	1.44	.00	1.02	.17	--	.02	.20	187	.25	3,440	34	1.00	270	7.9
Apr. 21-30.....	29,554	--	.60	.24	.32	.04	.82	.00	.29	.05	--	.02	.10	97	.13	3,899	27	.49	125	7.5
May 1-14.....	31,101	--	.85	.25	.44	.05	1.03	.00	.42	.08	--	.02	.10	120	.16	5,076	27	.59	164	7.8
May 15-31.....	44,172	--	.75	.17	.35	.05	.92	.00	.27	.05	--	.02	.50	103	.14	6,188	27	.52	136	7.5
June 1-16.....	49,825	--	.70	.16	.35	.04	.90	.00	.25	.05	--	.03	.00	79	.11	5,353	28	.54	121	7.2
June 17-30.....	24,020	--	.80	.26	.52	.05	1.15	.00	.35	.07	--	.04	.10	110	.15	3,593	32	.72	166	7.6
July 1-9.....	12,942	--	.85	.31	.57	.06	1.18	.00	.48	.08	--	.02	.10	119	.16	2,095	32	.74	180	7.2
July 10-21.....	8,331	--	1.35	.39	.91	.08	1.70	.00	.87	.16	--	.02	.20	178	.24	2,017	34	.98	272	7.5
July 22-31.....	4,225	--	1.70	.60	1.22	.10	2.18	.00	1.25	.20	--	.04	.20	240	.33	1,379	34	1.14	355	7.6

CARSON RIVER BASIN--Continued

10-3120.2. CARSON RIVER NEAR SILVER SPRINGS, NEV.--Continued

Chemical analyses, water year October 1964 to September 1965--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. 1-13, 1965.	2,940	--	2.10	0.78	1.65	0.12	2.61	0.00	1.69	0.27	--	0.03	0.20	292	0.40	1,167	36	1.38	447	8.0
Aug. 14-25.....	11,306	--	1.40	.30	.87	.10	1.88	.00	.60	.14	--	.04	.10	176	.24	2,706	33	.95	260	7.5
Aug. 26-31.....	1,107	--	2.05	.77	1.52	.12	2.44	.00	1.69	.26	--	.03	.30	295	.40	444	34	1.28	437	7.9
Sept. 1-8.....	349	--	2.74	.99	2.09	.13	2.93	.00	2.54	.34	--	.04	.20	401	.55	190	35	1.53	573	7.7
Sept. 9-15.....	2,541	--	1.65	.63	1.31	.12	2.34	.00	1.10	.22	--	.03	.20	250	.34	864	35	1.22	359	7.8
Sept.16-30.....	2,618	--	2.15	.77	1.74	.11	2.66	.00	1.85	.27	--	.04	.20	315	.43	1,122	36	1.44	464	8.1
Total or weighted average	382,085	--	1.01	0.29	0.65	0.06	1.25	0.00	0.62	0.12	--	0.02	0.15	142	0.19	73,941	32	0.81	204	7.5

HUMBOLDT RIVER BASIN

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 1962 to September 1965.
Water temperatures: May 1962 to September 1965.
EXTREMES, 1964-65.--Specific conductance: Maximum daily, 616 micromhos Nov. 15; minimum daily, 337 micromhos July 16.
Percent sodium: Maximum, 36 Nov. 1-30; minimum, 29 July 16-31.
Sodium-adsorption-ratio: Maximum, 1.66; minimum, 0.99 July 16-31.
EXTREMES, 1962-65.--Specific conductance: Maximum daily, 695 micromhos Jan. 13, 1963; minimum daily, 331 micromhos May 21, 1964.
Percent sodium: Maximum, 39 May 22-31, 1962; minimum, 28 July 1-20, 1963.
Sodium-adsorption-ratio: Maximum, 1.75 Aug. 11-31, 1962; minimum, 0.99 July 16-31, 1965.

Chemical analyses, water year October 1964 to September 1965

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, 1964.	2,084	--	2.50	1.15	1.87	0.15	4.52	0.00	0.69	0.45	--	0.01	0.20	329	0.45	933	33	1.39	537	8.2
Nov. 1-30.....	4,070	--	2.79	1.23	2.35	.19	4.88	.00	.85	.56	--	.02	.40	382	.52	2,114	36	1.66	587	8.2
Dec. 1-19.....	5,012	--	2.40	1.07	1.83	.15	3.95	.23	.87	.45	0.03	.03	.20	332	.45	2,263	34	1.39	501	8.5
Dec. 20-31.....	10,187	31	2.10	.82	1.35	.16	3.25	.00	.85	.34	.03	.04	.10	280	.38	3,879	30	1.12	422	8.0
Jan. 1-31, 1965.	21,582	34	2.25	.99	1.52	.14	3.65	.00	.83	.39	.03	.04	.10	295	.40	8,659	31	1.20	460	8.1
Feb. 1-28.....	32,711	--	2.40	.44	1.48	.14	3.02	.17	.81	.39	--	.01	.10	262	.36	11,656	33	1.24	407	8.4
Mar. 1-31.....	26,870	--	2.15	.77	1.39	.13	3.20	.00	.75	.39	--	.01	.10	266	.36	9,721	31	1.15	413	7.9
Apr. 1-16.....	20,660	--	2.05	.75	1.31	.15	3.00	.00	.77	.37	--	.02	.20	268	.36	7,530	31	1.10	405	8.1
Apr. 17-30.....	25,575	--	1.85	.79	1.31	.16	2.88	.00	.71	.34	--	.04	.10	257	.35	8,939	32	1.14	379	8.1
May 1-31.....	61,365	--	2.10	.78	1.48	.17	3.46	.00	.71	.34	--	.03	.40	295	.40	24,619	33	1.23	426	8.0
June 1-30.....	94,850	--	2.15	.65	1.31	.14	3.62	.00	.40	.22	--	.04	.20	258	.35	33,281	31	1.10	392	7.8
July 1-15.....	29,693	--	2.05	.65	1.22	.12	3.47	.07	.35	.18	--	.02	.10	230	.31	9,288	30	1.05	371	8.3
July 16-31.....	15,297	--	2.00	.62	1.13	.13	3.36	.00	.33	.17	--	.03	.10	226	.31	4,702	29	.99	359	8.1
Aug. 1-31.....	13,343	--	2.35	.74	1.65	.17	4.02	.00	.56	.31	--	.04	.20	293	.40	5,317	34	1.33	452	8.2
Sept. 1-30.....	6,545	--	2.40	1.15	1.91	.20	4.34	.10	.71	.39	--	.04	.20	335	.46	2,982	34	1.44	510	8.4
Total or weighted average	369,844	--	2.15	0.73	1.40	0.15	3.44	--	0.60	0.31	--	0.03	0.20	270	0.37	135,883	33	1.17	410	8.0

HUMBOLDT RIVER BASIN--Continued

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 1962 to September 1965.
Water temperatures: December 1951 to September 1958, October 1959 to September 1961, May 1962 to September 1965.
EXTREMES, 1964-65.--Specific conductance: Maximum daily, 862 micromhos Feb. 10; minimum daily, 729 micromhos July 13, 14.
Percent sodium: Maximum, 59 Mar. 16-31; minimum, 54 Oct. 1-16, July 1-31.
Sodium-adsorption-ratio: Maximum, 3.79 Nov. 1-30; minimum, 2.97 July 1-31.
EXTREMES, 1951-58, 1959-61, 1962-65.--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.
Sodium-adsorption-ratio (1963-65): Maximum, 4.05 Apr. 1-30, 1964; minimum, 2.97 July 1 to 31, 1965.
REMARKS.--Flow completely regulated by Rye Patch Reservoir.

Chemical analyses, water year October 1964 to September 1965

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, 1964.	7,553	--	2.10	1.32	4.35	0.31	5.06	0.13	--	--	--	--	0.50	503	0.68	5,167	54	3.33	791	8.3
Oct. 17-31.....	167	--	2.20	1.40	5.05	.26	5.18	.00	--	--	--	--	.60	518	.70	117	57	3.76	809	8.2
Nov. 1-30.....	351	--	2.15	1.40	5.05	.22	4.98	.23	--	--	--	--	.50	525	.71	251	57	3.79	823	8.4
Dec. 1-31.....	258	--	2.10	1.40	4.70	.31	4.88	.27	--	1.89	0.04	--	.50	515	.70	181	55	3.55	814	8.4
Jan. 1-31, 1965.	148	45	2.35	1.15	4.79	.28	5.11	.07	1.48	1.97	.04	0.03	.60	537	.73	108	56	3.62	828	8.3
Feb. 1-28.....	128	--	2.25	1.32	4.92	--	5.11	.00	--	--	--	--	--	519	.71	90	58	3.68	832	8.0
Mar. 1-15.....	158	--	2.30	1.32	4.92	--	5.11	.00	--	--	--	--	--	536	.73	115	58	3.66	845	7.9
Mar. 16-31.....	4,221	--	2.25	1.23	4.92	--	5.18	.00	--	--	--	--	--	534	.73	3,065	59	3.73	829	8.1
Apr. 1-30.....	21,600	--	1.95	1.40	4.61	--	4.85	.23	--	--	--	--	--	529	.72	15,540	58	3.57	816	8.4
May 1-31.....	21,152	--	2.00	1.40	4.35	--	4.62	.27	--	--	--	--	--	511	.69	14,700	56	3.34	786	8.5
June 1-30.....	20,172	--	2.10	1.15	4.13	--	4.36	.33	--	1.72	--	--	--	470	.64	12,894	56	3.24	745	8.4
July 1-31.....	31,789	--	2.25	1.07	3.83	--	4.49	.13	--	1.69	--	--	--	470	.64	20,320	54	2.97	736	8.3
Aug. 1-31.....	13,835	--	2.30	1.07	4.13	--	4.33	.33	--	1.69	--	--	--	475	.65	8,937	55	3.19	747	8.5
Sept. 1-30.....	12,734	--	2.30	1.07	4.09	--	4.62	.13	--	1.75	--	--	--	481	.65	8,330	55	3.15	755	8.3
Total or weighted average	134,266	--	2.14	1.21	4.21	--	4.55	--	--	--	--	--	--	492	0.67	89,814	56	3.25	767	8.3

PYRAMID AND WINNEMUCCA LAKES BASIN

10-3460. TRUCKEE RIVER AT FLORISTON, CALIF.

LOCATION.--At bridge at Floriston, Nevada County, 0.2 mile above flume diversion, 2.5 miles upstream from gage at Farad, and 1.8 miles upstream from Farad.
DRAINAGE AREA.--932 square miles, upstream from gaging station.
RECORDS AVAILABLE.--Chemical analyses: January 1964 to September 1965.
Water temperatures: January 1964 to September 1965.
EXTREMES, 1964-65.--Specific conductance: Maximum daily, 118 micromhos Oct. 30; minimum daily, 39 micromhos Dec. 23.
Percent sodium: Maximum, 27 Nov. 1-30; minimum, 20 Dec. 22-31, Apr. 1-19, Aug. 1 to Sept. 30.
Sodium-adsorption-ratio: Maximum, 0.47 Nov. 1-30; minimum, 0.26 June 1-30.
EXTREMES, January 1964 to September 1965.--Specific conductance: Maximum daily, 141 micromhos Feb. 3, 1964; minimum daily, 39 micromhos Dec. 23, 1964.
Percent sodium: Maximum, 28 Jan. 1-31, 1964; minimum, 20 Dec. 22-31, 1964, Apr. 1-19, Aug. 1 to Sept. 30, 1965.
Sodium-adsorption-ratio: Maximum, 0.54 Jan. 1-31, 1964; minimum, 0.26 June 1-30, 1965.
REMARKS.--Records of daily discharge data given for Truckee River at Farad.

Chemical analyses, water year October 1964 to September 1965

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, 1964.	23,796	19	0.50	0.26	0.27	0.03	0.92	0.00	0.06	0.02	0.00	0.02	0.10	72	0.10	2,330	25	0.43	100	7.3
Nov. 1-30.....	17,851	20	.50	.26	.29	.03	.92	.00	.08	.05	.00	.01	.00	74	.10	1,797	27	.47	105	7.4
Dec. 1-21.....	13,870	17	.48	.30	.24	.07	.89	.00	.08	.08	.04	.04	.00	85	.12	1,603	22	.39	104	7.3
Dec. 22-31.....	108,893	9.5	.24	.12	.10	.04	.36	.00	.04	.04	.01	.02	.00	45	.06	6,664	20	.23	48	7.3
Jan. 1-18, 1965.	54,625	17	.34	.13	.17	.04	.51	.00	.02	.04	.03	.03	.00	64	.09	4,755	25	.35	66	7.2
Jan. 19-31.....	26,817	18	.41	.18	.18	.04	.64	.00	.10	.04	.03	.02	.00	58	.08	2,115	22	.33	80	7.4
Feb. 1-28.....	59,369	17	.60	.10	.20	.03	.75	.00	.10	.07	.00	.01	.00	59	.08	4,764	21	.33	95	7.2
Mar. 1-19.....	19,258	23	.55	.19	.22	.03	.75	.00	.08	.07	.00	.01	.00	70	.10	1,833	22	.36	97	7.1
Mar. 20-31.....	20,469	24	.55	.11	.20	.03	.70	.00	.08	.05	.00	.01	.00	69	.09	1,921	22	.34	85	7.2
Apr. 1-19.....	32,372	20	.43	.22	.17	.03	.69	.00	.02	.05	.02	.02	.00	70	.10	3,082	20	.30	90	7.4
Apr. 20-30.....	38,836	17	.38	.14	.14	.01	.54	.00	.04	.03	.01	.02	.00	62	.08	3,275	21	.28	86	7.1
May 1-31.....	100,840	20	.29	.19	.14	.01	.52	.00	.02	.02	.01	.02	.00	57	.08	7,817	23	.29	66	7.3
June 1-30.....	74,975	19	.33	.13	.13	.02	.51	.00	.04	.02	.00	.03	.10	52	.07	5,302	21	.26	61	7.1
July 1-31.....	37,815	21	.40	.14	.15	.02	.61	.00	.02	.02	.00	.04	.00	56	.08	2,880	21	.28	70	7.1
Aug. 1-31.....	34,310	21	.42	.20	.17	.04	.70	.00	.06	.03	.00	.03	.10	67	.09	3,126	20	.30	81	7.5
Sept. 1-30.....	31,061	21	.48	.15	.17	.03	.70	.00	.04	.03	.00	.03	.10	64	.09	2,704	20	.30	82	7.4
Total or weighted average	695,157	18	0.39	0.16	0.16	0.03	0.59	0.00	0.05	0.04	0.01	0.02	0.10	59	0.08	55,968	22	0.30	73	7.2

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

COLUMBIA RIVER MAIN STEM

12-3995. COLUMBIA RIVER AT INTERNATIONAL BOUNDARY, WASH.

LOCATION.--At bridge on State Highway 22 at Northport, Stevens County, and 12 miles downstream from gaging station at international boundary.
DRAINAGE AREA.--59,700 square miles, approximately, upstream from gaging station.
RECORDS AVAILABLE.--Chemical analyses: February 1910 to January 1911, November 1951 to September 1965.
Water temperatures: November 1951 to September 1965.
EXTREMES, 1964-65.--Specific conductance: Maximum daily, 181 micromhos Feb. 20; minimum daily, 129 micromhos Aug. 8.
Percent sodium: Maximum, 7 Mar. 22 to Apr. 13; minimum, 5 Oct. 1 to Nov. 7, June 7 to Sept. 30.
Sodium-adsorption-ratio: 0.13 Mar. 22 to Apr. 13; minimum, 0.05 Oct. 1-21.
EXTREMES, 1958-65.--Specific conductance: Maximum daily, 257 micromhos Feb. 23, 1963; minimum daily, 123 micromhos Aug. 2, 1960, Aug. 12, 1963.
Percent sodium (1961-65): Maximum, 7 Mar. 22 to Apr. 13, 1965; minimum, 3 July 13 to Aug. 11, 1963.
Sodium-adsorption-ratio (1961-65): Maximum, 0.13 Nov. 23 to Dec. 15, 1963, Mar. 22 to Apr. 13; minimum, 0.05 July 13 to Aug. 11, 1963, Oct. 1-21, 1964.
REMARKS.--No appreciable inflow between sampling point and gaging station except during periods of heavy local runoff.

Chemical analyses, water year October 1964 to September 1965

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, 1964.	313,388	3.5	1.00	0.34	0.07	0.02	1.15	0.00	0.27	0.00	0.00	0.00		80	0.11	34,473	5	0.05	140	7.6
Oct. 21-Nov. 7..	2,406,347	4.0	1.00	.39	.08	.02	1.21	.00	.27	.01	.01	.00		84	.11	274,901	5	.09	148	7.5
Nov. 8-30.....	2,819,306	4.1	1.10	.38	.10	.03	1.28	.00	.29	.03	.02	.01		88	.12	337,415	6	.12	160	7.7
Dec. 1-31.....	2,742,347	4.1	1.20	.35	.10	.03	1.33	.00	.31	.03	.01	.01		96	.13	358,041	6	.12	166	7.8
Jan. 1-31, 1965.	2,853,025	5.4	1.20	.44	.11	.02	1.41	.00	.35	.03	.01	.01		100	.14	388,011	6	.12	171	7.7
Feb. 1-28.....	3,015,669	5.6	1.20	.51	.11	.02	1.41	.00	.35	.03	.01	.01		104	.14	426,536	6	.12	176	7.8
Mar. 1-21.....	2,615,802	5.3	1.20	.48	.11	.02	1.43	.00	.33	.04	.01	.01		100	.14	355,749	6	.12	174	7.7
Mar. 22-Apr. 13.	2,878,611	6.6	1.25	.44	.12	.03	1.44	.00	.33	.03	.01	.00		101	.14	395,406	7	.13	176	7.7
Apr. 14-May 10..	6,961,983	6.1	1.15	.37	.10	.02	1.31	.00	.29	.01	.01	.01		91	.12	861,615	6	.12	158	7.8
May 11-June 6...	11,041,190	5.5	1.05	.37	.10	.02	1.25	.00	.25	.01	.02	.00		85	.12	1,276,362	6	.11	146	7.7
June 7-July 5...	16,870,809	5.4	1.00	.40	.07	.02	1.20	.00	.23	.00	.01	.01		84	.11	1,927,321	5	.09	142	7.6
July 6-31.....	10,546,115	4.6	1.00	.36	.07	.02	1.18	.00	.23	.00	.01	.01		83	.11	1,190,445	5	.08	139	7.6
Aug. 1-20.....	5,835,372	3.6	1.00	.31	.07	.01	1.11	.00	.23	.00	.01	.00		78	.11	619,016	5	.08	134	7.6
Aug. 21-Sept. 13	4,774,611	3.3	1.00	.36	.08	.02	1.15	.00	.25	.01	.00	.01		82	.11	532,465	5	.09	139	7.5
Sept. 14-30.....	2,202,053	4.5	1.10	.39	.08	.02	1.21	.00	.31	.01	.01	.01		90	.12	269,531	5	.09	152	7.5
Total or weighted average	77,876,628	4.9	1.07	0.39	0.09	0.02	1.25	0.00	0.27	0.01	0.01	0.01		87	0.12	9,247,287	6	0.11	149	7.6

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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 1965.
Water temperatures: December 1952 to September 1965.
EXTREMES, 1964-65.--Specific conductance: Maximum daily, 369 micromhos Aug. 18; minimum daily, 121 micromhos Apr. 23.
Percent sodium: Maximum, 26 Oct. 1-15, Nov. 4 to Dec. 31, June 26 to Aug. 30; minimum, 22 Apr. 2-21, May 5 to 28.
Sodium-adsorption-ratio: Maximum, 0.84 Oct. 1-15; minimum, 0.45 Apr. 22 to May 4.
EXTREMES, 1952-65.--Specific conductance: Maximum daily, 409 micromhos Oct. 3, 10, 1961; minimum daily, 99 micromhos Dec. 17, 1959.
Percent sodium: Maximum, 28 Oct. 1-31, 1962, Dec. 14 to Jan. 3, 1964; minimum, 23 on several days during 1962-64.
Sodium-adsorption-ratio (1961-65): Maximum, 0.89 on many days in 1961-63; minimum, 0.42 Apr. 8, 9, 1962.

Chemical analyses, water year October 1964 to September 1965

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. 1-15, 1964	63,669	26	1.50	1.07	0.96	0.10	2.84	0.00	0.46	0.20	0.02	0.05		213	0.29	18,444	26	0.84	336	8.0
Oct. 16-Nov. 3.	102,129	25	1.40	1.07	.87	.09	2.70	.00	.44	.20	.02	.05		203	.28	28,196	25	.78	322	7.9
Nov. 4-26.....	101,276	26	1.50	.99	.91	.09	2.64	.13	.44	.21	.02	.05		208	.28	28,649	26	.82	329	8.4
Nov. 27-Dec. 3.	39,431	23	1.30	.76	.74	.07	2.28	.00	.35	.17	.02	.05		177	.24	9,492	26	.73	275	8.2
Dec. 4-18.....	98,479	20	1.00	.59	.57	.06	1.79	.00	.27	.13	.01	.04		138	.19	18,483	26	.63	216	8.1
Dec. 19-23.....	32,529	21	1.20	.69	.70	.09	2.05	.00	.33	.17	.02	.06		161	.22	7,123	26	.72	259	7.9
Dec. 24-31.....	108,377	18	.70	.50	.44	.06	1.33	.00	.21	.11	.01	.04		111	.15	16,361	26	.56	166	7.7
Jan 1-29, 1965.	267,471	18	.90	.46	.48	.05	1.51	.00	.25	.11	.01	.03		118	.16	42,924	25	.58	186	8.0
Jan. 30-Feb. 2.	141,223	22	.70	.35	.38	.08	1.11	.00	.21	.07	.01	.06		112	.15	21,511	25	.53	151	7.2
Feb. 3-20.....	318,823	21	.80	.53	.48	.06	1.48	.00	.23	.10	.01	.03		119	.16	51,598	26	.59	183	7.9
Feb. 21-Mar. 18	413,593	19	.75	.42	.37	.04	1.31	.00	.17	.07	.01	.02		101	.14	56,811	23	.48	152	7.8
Mar. 19-Apr. 1.	153,005	19	.80	.48	.43	.04	1.38	.00	.21	.10	.01	.02		108	.15	22,473	24	.53	167	7.9
Apr. 2-17.....	116,152	18	.90	.60	.44	.05	1.57	.00	.25	.11	.01	.02		120	.16	18,956	22	.50	195	7.7
Apr. 18-21.....	43,478	20	.85	.44	.37	.04	1.39	.00	.19	.08	.01	.03		109	.15	6,445	22	.46	166	8.0
Apr. 22-May 4..	200,350	18	.70	.37	.33	.04	1.18	.00	.15	.06	.01	.02		93	.13	25,340	23	.45	140	7.9

YAKIMA RIVER BASIN--Continued

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

Chemical analyses, water year October 1964 to September 1965--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 5-28, 1965..	223,736	18	0.90	0.57	0.43	0.06	1.56	0.00	0.23	0.10	0.01	0.03		119	0.16	36,209	22	0.50	187	7.8
May 29-June 2...	59,107	17	.80	.45	.38	.04	1.34	.00	.19	.08	.01	.02		103	.14	8,280	23	.48	162	7.7
June 3-16.....	150,783	19	.85	.44	.41	.05	1.43	.00	.20	.09	.01	.03		111	.15	22,762	24	.52	169	7.8
June 17-25.....	62,658	22	1.10	.62	.57	.06	1.87	.00	.29	.13	.01	.04		145	.20	12,356	24	.61	223	7.9
June 26-July 8..	48,734	25	1.50	.81	.83	.08	2.51	.00	.42	.18	.01	.06		193	.26	12,792	26	.77	297	8.1
July 9-31.....	75,273	25	1.65	.90	.91	.09	2.77	.00	.46	.19	.01	.06		210	.29	21,498	26	.81	326	8.0
Aug. 1-30.....	106,512	24	1.65	.99	.96	.10	2.88	.00	.46	.20	.02	.06		216	.29	31,289	26	.83	338	8.1
Aug. 31-Sept. 4.	23,702	27	1.45	.80	.78	.06	2.49	.00	.37	.16	.02	.06		189	.26	6,092	25	.74	293	7.9
Sept. 5-30.....	100,562	24	1.75	.99	.83	.10	2.95	.00	.48	.16	.01	.05		225	.31	30,772	23	.71	351	8.0
Total or weighted average	3,051,052	20	1.00	0.58	0.52	0.06	1.70	--	0.27	0.11	0.01	0.04		134	0.18	554,856	25	0.59	206	7.8

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, approximately 4.8 miles east of Ririe, and approximately 21 miles upstream from Henrys Fork.
DRAINAGE AREA.--5,752 square miles upstream from gaging station.
RECORDS AVAILABLE.--Chemical analyses: January 1953 to September 1965.
Water temperatures: January 1953 to September 1965.
EXTREMES, 1964-65.--Specific conductance: Maximum daily, 454 micromhos Feb. 12; minimum daily, 268 micromhos July 24.
Percent sodium: Maximum, 16 Nov. 6-18; minimum, 10 June 19 to Aug. 17.
Sodium-adsorption-ratio: Maximum, 0.51 Nov. 6-16; minimum, 0.26 June 19 to SAug. 17.
EXTREMES, 1953-65.--Specific conductance: Maximum daily, 791 micromhos Nov. 13, 1956; minimum daily, 240 micromhos June 27, 1954.
Percent sodium: Maximum, 22 Nov. 30, 1963; minimum, 7 June 11-20, 1953, May 1-10, June 1-10, 1955.
Sodium-adsorption-ratio (1961-65): Maximum, 0.85 Nov. 30, 1963; minimum, 0.24 July 5-27, 1962.
REMARKS.--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 1964 to September 1965

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. 1-22, 1964.	208,145	8.1	2.35	1.07	0.52	0.06	2.69	0.00	0.90	0.34	0.02	0.00	0.00	225	0.31	63,693	13	0.40	373	7.9
Oct. 23-Nov. 5..	74,253	--	3.80		.61	--	2.92	.00	--	--	--	--	--	254	.35	25,650	14	.44	419	8.0
Nov. 6-16.....	48,611	--	3.72		.70	--	2.82	.00	--	--	--	--	--	255	.35	16,858	16	.51	428	8.2
Nov. 17-18.....	10,374	--	3.32		.61	--	2.47	.00	--	--	--	--	--	226	.31	3,188	16	.47	380	8.2
Nov. 19-Dec. 15.	130,671	--	3.94		.65	--	3.03	.00	--	--	--	--	--	262	.36	46,561	14	.46	441	8.2
Dec. 16-31.....	84,067	--	3.88		.65	--	3.00	.00	--	--	--	--	--	257	.35	29,383	14	.47	436	8.1
Jan. 1-8, 1965..	44,604	--	3.92		.65	--	2.97	.00	--	--	--	--	--	262	.36	15,893	14	.47	436	7.8
Jan. 9-25.....	114,139	7.8	2.69	.99	.61	.06	2.90	.00	1.10	.45	.01	.01	.08	248	.34	38,497	14	.45	420	7.9
Jan. 26-29.....	20,073	--	3.84		.70	--	2.82	.00	--	--	--	--	--	256	.35	6,989	15	.50	432	8.1
Jan. 30-Feb. 28.	432,476	--	3.72		.61	--	2.84	.00	--	--	--	--	--	243	.33	142,925	14	.45	411	8.1
Mar. 1-20.....	416,529	--	3.64		.57	--	2.75	.00	--	--	--	--	--	237	.32	134,256	13	.42	397	7.8
Mar. 21-Apr. 19.	631,934	--	3.54		.57	--	2.69	.00	--	--	--	--	--	232	.32	199,388	14	.43	393	7.9
Apr. 20-May 10..	486,089	11	2.25	.99	.52	.05	2.57	.00	.81	.28	.02	.02	.03	215	.29	142,132	14	.41	356	7.6
May 11-29.....	524,588	--	3.06		.44	--	2.56	.00	--	--	--	--	--	196	.27	139,834	12	.35	334	7.7
May 30-June 18..	585,521	--	2.94		.36	--	2.52	.00	--	--	--	--	--	185	.25	147,317	11	.29	315	7.6

SNAKE RIVER MAIN STEM--Continued

13-375. SNAKE RIVER NEAR HEISE, IDAHO--Continued

Chemical analyses, water year October 1964 to September 1965--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-July 17, 1965.....	918,605	--	2.68		0.30	--	2.31	0.00	--	--	--	--	--	164	0.22	204,886	10	0.26	281	7.9
July 18-Aug. 17.	775,359	8.0	1.90	.69	.30	0.03	2.20	.00	0.50	0.14	0.02	0.01	0.06	160	.22	168,718	10	.26	277	7.8
Aug. 18-Sept. 16	500,965	--	2.84		.34	--	2.29	.00	--	--	--	--	--	179	.24	121,955	11	.28	303	7.9
Sept. 17-30.....	153,977	--	3.12		.43	--	2.47	.00	--	--	--	--	--	205	.28	42,929	12	.34	339	7.8
Total or weighted average	6,160,980	--	3.14		0.44	--	2.54	0.00	--	--	--	--	--	202	0.27	1,691,052	12	0.35	341	7.8

SNAKE RIVER MAIN STEM--Continued

13-1545. SNAKE RIVER AT KING HILL, IDAHO

LOCATION.--At county highway bridge, approximately 400 yards downstream from gaging station at King Hill, Elmore county, and 20 miles downstream from Big Wood River.
DRAINAGE AREA.--35,800 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: March 1951 to September 1965.
Water temperatures: March 1951 to September 1965.
EXTREMES, 1964-65.--Specific conductance: Maximum daily, 561 micromhos Oct. 26; minimum daily, 329 micromhos Dec. 23.
Percent sodium: Maximum, 26 Dec. 22, June 1-5, July 12 to Sept. 12; minimum, 21 Apr. 7 to May 6.
Sodium-adsorption-ratio: Maximum, 1.04 Aug. 20 to Sept. 12; minimum, 0.70 Dec. 23, 24.
EXTREMES, 1951-65.--Specific conductance: Maximum daily, 594 micromhos Oct. 3, 1952; minimum daily, 329 micromhos Dec. 23, 1964.
Percent sodium (1962-65): Maximum, 30 Apr. 14, 15, 1963; minimum, 21 June 17 to July 4, 1963, Apr. 7 to May 6, 1965.
Sodium-adsorption-ratio (1961-65): Maximum, 1.26 Apr. 14, 15, 1963; minimum, 0.70 Dec. 23, 24, 1965.
REMARKS.--No appreciable inflow between gaging station and sampling point except during periods of heavy local runoff.

Chemical analyses, water year October 1964 to September 1965

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. 1-25, 1964.	469,934	27	2.45	1.81	1.48	0.12	3.70	0.10	1.21	0.73	0.04	0.06	0.04	339	0.46	216,658	25	1.01	548	8.3
Oct. 26-Nov. 22.	612,020	--	4.32		1.44	--	3.80	.07	--	--	--	--	--	339	.46	282,166	25	.98	554	8.3
Nov. 23-Dec. 21.	617,772	--	4.20		1.44	--	3.80	.00	--	--	--	--	--	337	.46	283,137	25	.99	550	8.1
Dec. 22.....	31,736	--	3.40		1.17	--	2.88	.17	--	--	--	--	--	302	.41	13,034	26	.90	449	8.5
Dec. 23-24.....	99,174	--	2.50		.78	--	2.28	.00	--	--	--	--	--	206	.28	27,784	24	.70	335	7.5
Dec. 25-29.....	144,397	--	3.62		1.22	--	3.23	.00	--	--	--	--	--	298	.41	58,521	25	.91	476	7.9
Dec. 30-Jan. 16, 1965.....	393,084	28	2.54	1.65	1.39	.13	3.70	.00	1.15	.71	.05	.07	.00	336	.46	179,624	24	.96	539	8.1
Jan. 17-28.....	318,466	--	3.94		1.26	--	3.52	.00	--	--	--	--	--	316	.43	136,864	24	.90	507	8.2
Jan. 29-31.....	110,199	--	3.92		.91	--	2.59	.00	--	--	--	--	--	247	.34	37,119	23	.74	388	7.9
Feb. 1-11.....	387,491	--	3.90		1.26	--	3.21	.17	--	--	--	--	--	309	.42	162,839	24	.90	486	8.4
Feb. 12-Mar. 10.	1,093,567	--	4.10		1.26	--	3.38	.13	--	--	--	--	--	321	.44	477,408	24	.88	509	8.3
Mar. 11-Apr. 6..	772,780	--	3.90		1.26	--	3.41	.00	--	--	--	--	--	307	.42	322,651	24	.90	491	8.2
Apr. 7-May 6....	1,145,455	20	2.30	1.32	1.00	.10	3.02	.13	.96	.56	.04	.04	.06	279	.38	434,631	21	.74	449	8.3
May 7-31.....	638,182	--	3.70		1.09	--	3.21	.00	--	--	--	--	--	284	.39	246,491	23	.80	448	7.9
June 1-5.....	110,777	--	3.86		1.35	--	3.41	.00	--	--	--	--	--	312	.42	47,005	26	.97	494	7.9

SNAKE RIVER MAIN STEM--Continued

13-1545. SNAKE RIVER AT KING HILL, IDAHO--Continued

Chemical analyses, water year October 1964 to September 1965--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 6-16, 1965	218,836	--	3.54		1.13	--	3.15	0.00	--	--	--	--	--	278	0.38	82,738	24	0.85	440	7.9
June 17-20	81,640	--	3.66		1.22	--	3.25	.00	--	--	--	--	--	292	.40	32,421	25	.90	460	7.0
June 21-July 3	249,677	--	3.64		1.22	--	3.21	.13	--	--	--	--	--	294	.40	99,831	25	.90	469	8.3
July 4-5	54,942	--	3.92		1.31	--	3.44	.00	--	--	--	--	--	317	.43	23,687	25	.93	492	8.0
July 6-11	106,274	--	3.56		1.09	--	3.21	.13	--	--	--	--	--	276	.38	39,891	23	.82	453	8.3
July 12-Aug. 8	445,908	30	2.40	1.65	1.44	0.12	3.62	.00	1.10	0.71	0.04	0.07	0.02	328	.45	198,911	26	1.01	520	8.2
Aug. 9-19	185,302	--	4.08		1.44	--	3.67	.00	--	--	--	--	--	326	.44	82,155	26	1.01	524	8.2
Aug. 20-Sept. 12	421,718	--	4.28		1.52	--	3.61	.20	--	--	--	--	--	340	.46	195,002	26	1.04	545	8.4
Sept. 13-30	342,137	--	4.40		1.48	--	3.57	.20	--	--	--	--	--	334	.45	155,412	25	1.00	550	8.4
Total or weighted average	9,051,768	--	3.95		1.26	--	3.41	--	--	--	--	--	--	312	0.42	3,835,980	24	0 90	499	8.1

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.
RECORDS AVAILABLE.--Chemical analyses: January 1939 to January 1940, November 1950 to September 1965.
Water temperatures: November 1950 to September 1965.
Sediment records: January 1939 to June 1940.
EXTREMES, 1964-65.--Specific conductance: Maximum daily, 702 micromhos Oct. 23; minimum daily, 106 micromhos May 7.
Percent sodium: Maximum, 46 Oct. 1-13, Aug. 5-7; minimum, 34 Apr. 1 to June 2.
Sodium-adsorption-ratio: Maximum, 2.24 Nov. 1-24; minimum, 0.63 May 9-22.
EXTREMES, 1939-40, 1950-65.--Specific conductance: Maximum daily, 1,470 micromhos July 30, Aug. 26, 1939; minimum daily, 82 micromhos Apr. 27, 1952.
Percent sodium (1961-65): Maximum, 55 June 27-28, 1962, May 16-17, 1963; minimum, 34 Apr. 1 to June 2.
Sodium-adsorption-ratio (1961-65): Maximum, 3.37 Apr. 17-20, 1962; minimum, 0.63 May 9-22, 1965.
REMARKS.--No appreciable inflow between gaging station and sampling point except during periods of heavy local runoff.

Chemical analyses, water year October 1964 to September 1965

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, 1964.	16,399	--	3.06		2.57	--	3.84	0.00	--	--	--	--	--	340	0.46	7,583	46	2.07	532	7.9
Oct. 14-31.....	27,741	34	2.50	1.32	3.05	0.14	4.56	.00	1.67	0.51	0.04	0.10	0.08	417	.57	15,732	44	2.21	645	7.9
Nov. 1-24.....	35,084	--	3.70		3.05	--	4.52	.00	--	--	--	--	--	412	.56	19,658	45	2.24	642	7.9
Nov. 25-Dec. 16.	38,662	--	3.18		2.48	--	3.82	.00	--	--	--	--	--	353	.48	18,561	44	1.97	553	7.9
Dec. 17-Jan. 6, 1965..	41,944	--	2.86		2.26	--	3.44	.00	--	--	--	--	--	325	.44	18,539	44	1.89	502	7.9
Jan. 7-10.....	8,251	--	2.06		1.48	--	2.43	.00	--	--	--	--	--	232	.32	2,603	42	1.46	353	8.0
Jan. 11-28.....	119,568	16	.85	.30	.70	.07	1.31	.00	.35	.13	.03	.06	.01	126	.17	20,489	36	.92	186	7.8
Jan. 29-Feb. 7..	110,102	--	.98		.57	--	1.11	.00	--	--	--	--	--	110	.15	16,471	37	.81	158	7.6
Feb. 8-Mar. 7...	385,928	--	.90		.48	--	1.05	.00	--	--	--	--	--	111	.15	58,260	35	.71	141	7.2
Mar. 8-31.....	331,985	--	.90		.44	--	1.03	.00	--	--	--	--	--	97	.13	43,796	33	.65	133	7.5
Apr. 1-18.....	188,652	15	.70	.20	.48	.04	1.03	.00	.21	.07	.02	.03	.04	101	.14	25,913	34	.71	136	7.2
Apr. 19-May 8....	225,917	--	.76		.39	--	.85	.00	--	--	--	--	--	86	.12	26,423	34	.64	115	7.3
May 9-22.....	170,388	--	.76		.39	--	.92	.00	--	--	--	--	--	82	.11	19,002	34	.63	120	7.4
May 23-June 2...	139,615	--	.80		.42	--	.95	.00	--	--	--	--	--	86	.12	16,329	34	.66	125	7.6
June 3-5.....	24,653	--	.92		.52	--	1.11	.00	--	--	--	--	--	95	.13	3,185	36	.77	155	7.4

BOISE RIVER BASIN--Continued

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

Chemical analyses, water year October 1964 to September 1965--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 6-15, 1965.	53,038	--	1.12		0.65	--	1.34	0.00	--	--	--	--	--	119	0.16	8,584	37	0.87	186	7.2
June 16-29.....	137,010	--	.86		.48	--	1.02	.00	--	--	--	--	--	91	.12	16,956	36	.73	142	7.4
June 30-July 7..	51,983	--	1.00		.61	--	1.21	.00	--	--	--	--	--	104	.14	7,352	38	.86	167	7.5
July 8-12.....	26,797	--	1.10		.70	--	1.31	.00	--	--	--	--	--	116	.16	4,227	39	.94	184	7.8
July 13.....	2,499	--	1.66		1.22	--	2.03	.00	--	--	--	--	--	186	.25	632	42	1.34	284	8.2
July 14-Aug. 4..	33,120	24	1.50	0.67	1.70	0.09	2.72	.00	0.81	0.28	0.03	0.06	0.06	242	.33	10,900	43	1.63	374	7.7
Aug. 5-7.....	3,070	--	2.50		2.13	--	3.46	.00	--	--	--	--	--	287	.39	1,198	46	1.91	451	7.6
Aug. 8-Sept. 7..	52,203	--	2.38		1.87	--	2.90	.00	--	--	--	--	--	247	.34	17,536	44	1.71	413	7.9
Sept. 8-14.....	15,703	--	1.98		1.44	--	2.36	.07	--	--	--	--	--	213	.29	4,549	42	1.44	339	8.3
Sept. 15-16.....	4,919	--	2.20		1.65	--	3.05	.00	--	--	--	--	--	233	.32	1,559	43	1.58	391	7.7
Sept. 17-30.....	36,346	--	3.32		2.48	--	3.97	.00	--	--	--	--	--	351	.48	17,352	43	1.92	570	7.8
Total or weighted average	2,281,577	--	1.16		0.73	--	1.38	--	--	--	--	--	--	130	0.18	403,389	39	1.21	189	7.4

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 1965.
Water temperatures: December 1950 to September 1965.
EXTREMES, 1964-65.--Specific conductance: Maximum daily, 253 micromhos Dec. 27, 28; minimum daily, 105 micromhos June 16, 24.
Percent sodium: Maximum, 29 Dec. 27-29; minimum, 12 June 17-28.
Sodium-adsorption-ratio: Maximum, 0.75 Dec. 27-29; minimum, 0.21 June 17-28.
EXTREMES, 1950-65.--Specific conductance: Maximum daily, 324 micromhos Dec. 7, 1955; minimum daily, 97 micromhos June 11, 1964.
Percent sodium (1961-65): Maximum, 29 Dec. 27-29, 1964; minimum, 9 July 10 to Aug. 4, 1964.
Sodium-adsorption-ratio (1961-65): Maximum, 0.75 Dec. 27-29, 1964; minimum, 0.15 July 11 to Aug. 4, 1964.
REMARKS.--No appreciable inflow between sampling point and gaging station except during periods of heavy local runoff.

Chemical analyses, water year October 1964 to September 1965

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, 1964.	7,440,000	6.3	1.05	0.44	0.33	0.05	1.41	0.00	0 35	0.08	0.01	0.01	0.04	107	0 15	1,082,669	18	0.39	184	7 6
Nov. 1-29.....	6,177,719	--	1.58		.48	--	1.51	.00	--	--	--	--	--	115	.16	966,195	23	54	202	8.0
Nov. 30-Dec. 9..	2,588,430	--	1.66		.48	--	1.56	.00	--	--	--	--	--	126	.17	443,553	22	53	213	8.0
Dec. 10-26.....	5,583,868	--	1.48		.40	--	1.41	.00	--	--	--	--	--	114	16	865,723	21	47	191	7 6
Dec. 27-29.....	1.541,157	--	1.70		.70	--	1.66	.00	--	--	--	--	--	152	.21	318,588	29	75	242	7.5
Dec. 30-Jan. 2, 1965..	1,358,281	--	1.24		.48	--	1.20	.00	--	--	--	--	--	115	.16	212,435	28	.61	172	7.3
Jan. 3-26.....	7,654,611	13	1.05	.55	.44	.05	1.51	.00	.42	.13	.02	--	--	118	.16	1,228,412	21	.49	189	7 9
Jan. 27-Feb. 3..	4,027,240	--	1.08		.42	--	1.43	.00	--	--	--	--	--	107	.15	586,044	28	57	142	7.5
Feb. 4-7.....	1,951,735	--	1.60		.32	--	1.05	.00	--	--	--	.02	00	121	.16	321,178	17	.36	206	7.8
Feb. 8-15.....	3,793,983	--	1.44		.42	--	1.57	.00	--	--	--	--	--	118	.16	608,858	23	.50	187	7.7
Feb. 16-Mar. 15.	11,618,380	--	1.56		.43	--	1.25	.00	--	--	--	--	--	120	.16	1,896,120	22	49	194	7.7
Mar. 16-Apr. 12.	8,952,595	--	1.64		.42	--	1.49	.00	--	--	--	--	--	120	.16	1,461,063	20	.46	199	7.7
Apr. 13-23.....	5,751,273	13	.95	.44	.30	.04	1.28	.00	.31	.08	.02	.01	.00	106	.14	829,103	18	.36	171	7.7
Apr. 24-May 17..	18,584,330	--	1.24		.25	--	1.15	.00	--	--	--	--	--	95	13	2,401,095	17	31	148	7 6
May 18-26.....	7,258,314	--	1.04		.19	--	1.03	.00	--	--	--	--	--	79	.11	779,833	15	26	132	7.3
May 27-June 16..	19,997,553	--	1.00		14	--	.93	.00	--	--	--	--	--	59	.08	1,604,604	13	20	115	7.3
June 17-28.....	11,410,512	7.8	.75	.29	.15	.02	.98	.00	19	.02	.01	.01	.00	69	.09	1,070,762	12	.21	120	7 6
June 29-July 16.	12,538,710	--	1.12		.17	--	1.07	.00	--	--	--	--	--	79	.11	1,347,159	13	23	133	7.6
July 17-Aug. 2..	7,694,677	--	1.16		.17	--	1.15	.00	--	--	--	--	--	81	.11	847,646	13	22	143	7.7
Aug. 3-17.....	5,248,264	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aug. 18-31.....	4,440,198	--	1.42		.22	--	1.28	.00	--	--	--	--	--	100	.14	603,867	14	26	162	7 6
Sept. 1-18.....	4,316,430	--	1.48		.29	--	1.38	.00	--	--	--	--	--	106	.14	622,256	16	.33	176	7.5
Sept. 19-30.....	2,565,818	--	1.60		.41	--	1 51	.00	--	--	--	--	--	119	16	415,252	20	.46	199	7 5
Total or weighted average	162,494,078	--	1.27		0.29	--	1.23	0.00	--	--	--	--	--	96	0.13	20,512,415	19	0.36	161	7.5

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 1965.
Water temperatures: February 1951 to September 1965.
EXTREMES, 1964-65.--Specific conductance: Maximum daily, 92 micromhos Dec. 23; minimum daily, 30 micromhos Jan. 29.
Percent sodium: Maximum, 30 Oct. 1-30, Dec. 24-28, Apr. 20 to Sept. 3; minimum, 23 Dec. 23.
Sodium-adsorption-ratio: Maximum, 0.43 July 6 to Sept. 3; minimum, 0.26 Dec. 23.
EXTREMES, 1951-65.--Specific conductance: Maximum daily, 133 micromhos Nov. 7, 1954; minimum daily, 30 micromhos Jan. 29, 1965.
Percent sodium (1961-65): Maximum, 31 Oct. 11 to Nov. 2, 1961, Sept. 1-30, 1964; minimum, 23 Dec. 23, 1964.
Sodium-adsorption-ratio (1961-65): Maximum, 0.43 July 6 to Sept. 3, 1965; minimum, 0.26 Dec. 23, 1965.

Chemical analyses, water year October 1964 to September 1965

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, 1964.	553,329	15	0.27	0.13	0.19	0.04	0.48	0.00	0.05	0.08	0.01	0.01	0.01	47	0.06	35,369	30	0.42	61	7.2
Oct. 31-Nov. 22.	541,507	--	.42		.17	--	.49	.00	--	--	--	--	--	51	.07	37,559	29	.37	61	7.5
Nov. 23-24.....	73,388	--	.40		.16	--	.46	.00	--	--	--	--	--	56	.08	5,589	29	.36	58	7.1
Nov. 25-Dec. 22.	3,834,287	--	.32		.13	--	.31	.00	--	--	--	--	--	46	.06	239,873	29	.33	52	6.7
Dec. 23.....	565,289	--	.38		.11	--	.84	.00	--	--	--	.00	--	--	--	--	23	.26	92	6.5
Dec. 24-28.....	2,519,008	--	.24		.10	--	.25	.00	--	--	--	--	--	46	.06	157,589	30	.30	35	6.8
Dec. 29-Jan. 26, 1965.....	5,110,711	-- 13	.20	.11	.11	.03	.30	.00	.06	.06	.01	.02	.00	44	.06	305,825	25	.29	45	6.9
Jan. 27-Feb. 5..	2,737,190	--	.28		.10	--	.28	.00	--	--	--	--	--	43	.06	160,071	27	.28	40	6.8
Feb. 6-12.....	705,739	--	.34		.14	--	.36	.00	--	--	--	--	--	53	.07	50,870	29	.34	50	6.8
Feb. 13-Mar. 11.	1,073,752	--	.40		.16	--	.38	.00	--	--	--	--	--	64	.09	93,459	29	.36	61	6.7
Mar. 12-25.....	321,005	--	.44		.17	--	.36	.00	--	--	--	--	--	70	.10	30,560	28	.36	69	6.5
Mar. 26-Apr. 19.	559,835	14	.26	.16	.17	.02	.36	.00	.15	.08	.01	.04	.00	50	.07	38,069	28	.38	71	6.5
Apr. 20-28.....	414,863	--	.34		.13	--	.31	.00	--	--	--	--	--	57	.08	32,160	28	.33	51	6.6
Apr. 29-May 6...	224,370	--	.40		.17	--	.36	.00	--	--	--	--	--	63	.09	19,224	30	.38	60	6.6
May 7-June 5....	715,835	--	.38		.16	--	.31	.00	--	--	--	--	--	52	.07	50,624	30	.37	60	6.4
June 6-July 5...	429,084	--	.44		.19	--	.48	.00	--	--	--	--	--	51	.07	29,761	30	.40	68	6.8
July 6-Aug. 5...	336,768	16	.30	.17	.21	.02	.51	.00	.07	.10	.01	.02	.03	56	.08	25,648	30	.43	72	6.9
Aug. 6-Sept. 3..	335,403	--	.48		.21	--	.49	.00	--	--	--	--	--	55	.07	25,088	30	.43	71	6.9
Sept. 4-30.....	354,204	--	.46		.19	--	.46	.00	--	--	--	--	--	55	.07	26,494	29	.40	68	6.9
Total or weighted average	21,405,567	--	0.33		0.13	--	0.33	0.00	--	--	--	--	--	47	0.06	1,363,832	28	0.36	50	6.7

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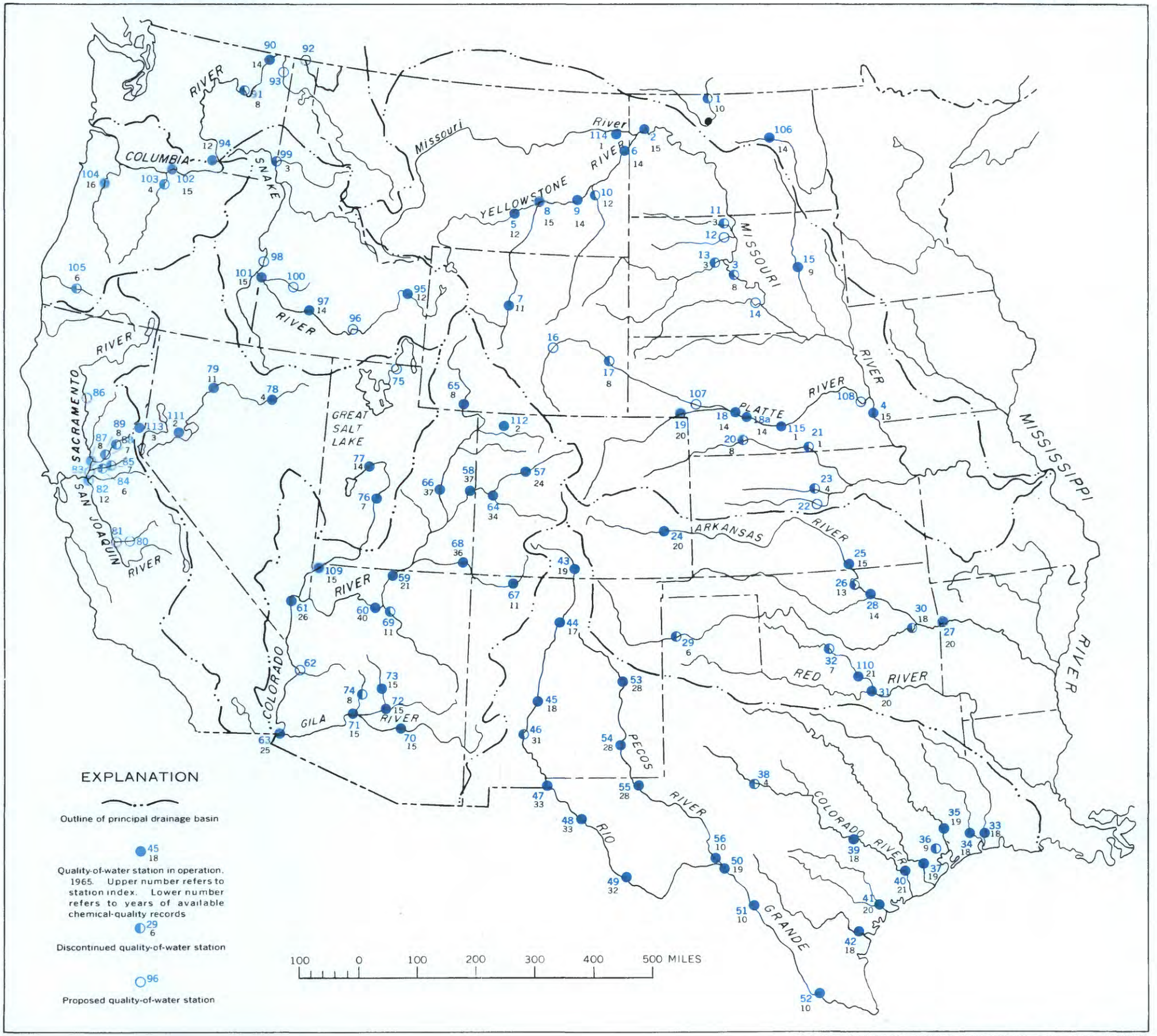

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WATER-QUALITY STATIONS IN WESTERN STATES FOR IRRIGATION STUDY