1964

Water Quality Records in Colorado

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

Prepared in cooperation with the
State of Colorado and with other agencies

United States
Department of the Interior
Geological Survey

WATER QUALITY RECORDS IN COLORADO

1964

Prepared in cooperation with

Colorado Water Conservation Board
Bureau of Reclamation, U.S. Department of the Interior
Soil Conservation Service, U.S. Department of Agriculture

Copies of this report may be obtained from

Subdistrict Office, Water Resources Division
U.S. Geological Survey
7200 West Alameda, Unit 198
Denver, Colorado 80226

or

District Office, Water Resources Division
U.S. Geological Survey
8002 Federal Building
125 South State St.
Salt Lake City, Utah 84111

Streamflow records for most of the water quality stations in this report are contained in the following companion volume:

Surface Water Records of Colorado

CONTENTS

[*Symbols after station name designate type of data; c, chemical; t, water temperature; s, sediment.*]

ILLUSTRATIONS

WATER QUALITY RECORDS IN COLORADO, 1964

INTRODUCTION

The quality-of-water investigations of the U.S. Geological Survey are concerned with the chemical and physical characteristics of surface and ground water supplies of the Nation. The basic records for the 1964 water year for quality of surface waters within the State of Colorado are given in this report. Data for a few water-quality stations in bordering states and selected data on chemical quality of ground water in Colorado are also included. Nearly all of these data were collected by the Water Resources Division of the U.S. Geological Survey, under the direction of R. F. Langford, district chemist.

The Geological Survey began publishing annual basic records of chemical quality, water temperatures, and suspended sediment in 1941 in the water-supply paper series, "Quality of Surface Waters of the United States." The records prior to 1948 were published each year in a single volume for the entire country, and in two volumes in 1948 and 1949. Beginning in 1950, the records were published in four volumes and beginning in 1959 in five volumes; each volume covered an area where boundaries coincided with those of certain natural drainage areas. The records for quality of surface waters in Colorado are contained in Parts 5-6, 7-8, and 9-14 of the water-supply series. These publications are available in most major public libraries. (See "Annual Series of Water-Supply Papers for Quality of Surface Waters" p. 16.)

Distribution of this report is limited and it is primarily for local and immediate use. The records will be published in the Geological Survey water-supply papers at 5-year intervals. The first compilation will cover only the years 1964 and 1965.

COOPERATION

Most data in this report were obtained as part of the Federal Program of the U.S. Geological Survey or in cooperation with the Bureau of Reclamation, U.S. Department of the Interior. Investigations of some ground water and surface water were made under cooperative agreement between

the U.S. Geological Survey and the Colorado Water Conservation Board, Felix Sparks, director. Investigations of fluvial sediment in Kiowa Creek basin were made in cooperation with the Soil Conservation Service, U.S. Department of Agriculture.

Records for Rio Grande above Culebra Creek near Lobatos, Rio Blanco near Pagosa Springs, and Navajo River above Chromo, Colo., were obtained by the New Mexico District of the U.S. Geological Survey as part of the water-quality program of that district. Records for South Platte River at Julesberg, Colo., were obtained by the Nebraska District of the U.S. Geological Survey.

DEFINITION OF TERMS AND ABBREVIATIONS

The terms and abbreviations of water-quality and hydrologic data, as used in the text and tabular data of this report, are defined as follows:

Acre-foot (ac-ft) is a quantity of water required to cover 1 acre to a depth of 1 foot and is equal to 43,560 cubic feet or 325,851 gallons. The term is commonly used in measuring volumes of water used or stored.

Cfs-day is the volume of water represented by a flow of 1 cubic foot per second for 24 hours. It equals 86,400 cubic feet, 1.983471 acre-feet, or 646,317 gallons.

Channel (watercourse) is an open conduit either naturally or artificially created which periodically or continuously contains moving water, or which forms a connecting link between two bodies of water. River, creek, run, branch, anabranch, and tributary are some of the terms used to describe natural channels. Natural channels may be single or braided. Canal and floodway are some of the terms used to describe artificial channels.

Cubic feet per second (cfs) is a unit expressing rates of discharge. One cubic foot per second is equal to the discharge of a stream of rectangular cross section, 1 foot wide and 1 foot deep, flowing water at an average velocity of 1 foot per second.

Discharge, in its simplest concept, means outflow; therefore, the use of this term is not restricted as to course or location, and it can be applied to describe the flow of water from a pipe or from a drainage basin. It is also correct to speak of the discharge of a canal or stream into a lake, a stream, or an ocean.

Daily mean discharge is the mean discharge for one day.

Mean daily discharge is the arithmetic mean discharge for the same day during a specific period of years.

Mean discharge is the arithmetic mean of individual daily mean discharges during a specific period.

Instantaneous discharge (at time of sampling). If the discharge value at the time of sampling is reported instead of daily mean value, the heading of the discharge column will be "Discharge (cfs)."

Drainage area is that area, in a specified location, measured in a horizontal plane, which is enclosed by a drainage divide.

Drainage basin is a part of the surface of the earth that is occupied by a drainage system, which consists of a surface stream or a body of impounded surface water together with all tributary surface streams and bodies of impounded surface water.

Equivalents per million (epm) is a unit for expressing the concentration of chemical constituents in terms of the interreacting values of the electrically charged particles, or ions, in solution. One equivalent per million of a positively charged ion will react with one equivalent per million of a negatively charged ion. Parts per million is converted to equivalents per million by multiplying by the reciprocal of the combining weight of the ion.

Conversion factors: Parts per million to equivalents per million

Ion	Multiply by	Ion	Multiply by
Aluminum (Al^{+3}).....	0.11119	Hydroxide (OH^{-1})....	0.05880
Arsenic (As^{+3}).....	.04004	Iodide (I^{-1}).....	.00788
Barium (Ba^{+2}).....	.01456	Iron (Fe^{+3}).....	.05372
Beryllium (Be^{+2})....	.22192	Lead (Pb^{+2}).....	.00965
Bicarbonate (HCO_3^{-1})	.01639	Lithium (Li^{+1}).....	.14411
Bromide (Br^{-1}).....	.01251	Magnesium (Mg^{+2})....	.08226
Cadmium (Cd^{+2}).....	.01779	Manganese (Mn^{+2})....	.03640
Calcium (Ca^{+2}).....	.04990	Nickel (Ni^{+2}).....	.03406
Carbonate (CO_3^{-2})...	.03333	Nitrate (NO_3^{-1}).....	.01613
Chloride (Cl^{-1}).....	.02821	Phosphate (PO_4^{-3})...	.03159
Chromium (Cr^{+6}).....	.11539	Potassium (K^{+1}).....	.02557
Cobalt (Co^{+2}).....	.03394	Sodium (Na^{+1}).....	.04350
Copper (Cu^{+2}).....	.03148	Strontium (Sr^{+2})....	.02282
Fluoride (F^{-1}).....	.05264	Sulfate (SO_4^{-2}).....	.02082
Hydrogen (H^{+1}).....	.99209	Zinc (Zn^{+2}).....	.03060

Gage height is the water-surface elevation referred to some arbitrary gage datum. Gage height is often used interchangeably with the more general term "stage," although gage height is more appropriate when used with a reading on a gage.

Gaging station is a particular site on a stream, canal, lake, or reservoir where systematic observations of gage height or discharge are obtained. When used in connection with a discharge record, the term is applied only to those gaging stations where a continuous record of discharge is obtained.

Hardness of water is the property of water attributable to the presence of alkaline earths and is expressed as equivalent calcium carbonate ($CaCO_3$). Hardness is a physical-chemical characteristic, not a substance.

Particle size is the diameter, in millimeters (mm) of suspended sediment or bed material determined by sieve and sedimentation methods.

Particle size classification is the classification recommended by the American Geophysical Union Subcommittee

on sediment terminology (Lane and others, 1947, p. 937). According to this classification, a particle having a diameter:

Less than 0.004 mm is clay.
Between 0.004 and 0.062 mm is silt.
Between 0.062 and 2.0 mm is sand.

Parts per million (ppm) is a unit for expressing the concentration of chemical constituents by weight, usually as grams of constituents per million grams of a solution. In the laboratory the results are expressed in weights of solutes in a given volume of water. To express the results in parts per million, the data must be converted. For most waters this conversion is made by assuming that a liter of water weighs 1 kilogram; and thus milligrams per liter is equivalent to parts per million. Parts per million, for suspended sediment, is computed as 1 million times the ratio of the weight of sediment to the weight of the mixture of water and sediment.

Sediment is solid material both mineral and organic that is transported by, suspended in, or deposited by water. The amount, characteristics and cause of the occurrence of sediment in streams are influenced by environmental factors. Some major factors are: degree of slope, length of slope, soil characteristics, land usage, and amount and intensity of precipitation.

Sediment discharge is the rate at which dry weight of sediment passes a section of a stream or is the quantity of sediment, as measured by dry weight, or by volume, that is discharged in a given time.

Solute is any substance derived from the atmosphere, vegetation, soil, or rocks and dissolved in water.

Specific conductance is a measure of the ability of a water to conduct an electrical current and is expressed in micromhos per centimeter at 25°C. Because the specific conductance is related to the number and specific chemical types of ions in solution, it can be used for approximating the salinity of the water. The following general relations are applicable:

Specific conductance x (0.65 ± 0.05) = ppm dissolved solids;

$$\frac{\text{Specific conductance}}{100} = \frac{\text{total epm}}{2}$$

Sodium-adsorption-ratio (SAR) is the expression of relative activity of sodium ions in exchange reaction with soil and is an index of sodium or alkali hazard to the soil. This ratio should be known especially for water used for irrigating farm land.

Stage is the height of a water surface above an established datum plane; also gage height.

Streamflow is the discharge that occurs in a natural channel. Although the term "discharge" can be applied to the flow of a canal, the word "streamflow" uniquely describes the discharge in a surface stream course. The term "streamflow" is more general than "runoff," as streamflow may be applied to discharge whether or not it is affected by diversion or regulation.

Suspended sediment is the sediment that at any given time is maintained in suspension by the upward components of turbulent currents or that exists in suspension as a colloid.

Thermograph is a thermometer for continuously recording variations of temperature automatically on a chart. The term "temperature recorder" is used to indicate the location of the thermograph in station descriptions in the table headings.

Tons per acre-foot indicates the dry weight of dissolved solids in one acre-foot of water. It is computed by multiplying the concentration in parts per million by 0.00136.

Tons per day is a quantity of a substance in solution or suspension that passes a stream section during a 24-hour period.

Water year in Geological Survey reports dealing with water supply is the 12-month period, October 1 through September 30. The water year is designated by the calendar year in which it ends and which includes 9 of the 12 months. Thus, the year ended September 30, 1964, is called the "1964 water year."

Weighted average is used in this report to indicate discharge-weighted average. It is computed by multiplying the discharge for the sampling period by the concentrations of individual constituents for the corresponding period

and dividing the sum of the products by the sum of the discharges. A discharge-weighted average approximates the composition of water that would be found in a reservoir containing all of the water passing a given station during the year after thorough mixing in the reservoir.

STATION NUMBERS AND WELL NUMBERS

A station number has been assigned as an added means of identification for each stream location where regular measurements of streamflow and determinations of water quality have been made. The numbers have been assigned to conform with the standard downstream order of listing gaging stations. The numbering system consists of two digits followed by a hyphen and a six digit number. The notation to the left of the hyphen identifies the Part or hydrologic region used by the Geological Survey for reporting hydrologic data. The number to the right of the hyphen represents the position of the location in the standard downstream order listing the stations within each of the parts. The assigned numbers are in numerical order but are not consecutive. They are so selected from the complete six digit number scale that intervening numbers will be available for future assignments to new locations. The identification number for each station in this report is printed to the left of the station name and contains only the essential digits. For example, the number is printed as 9-100 for a station whose complete identification number is 09-0100.00.

The well numbers used in this report indicate their location. The numbering system, which is illustrated on page 8, is based on the U.S. Bureau of Land Management's system of land subdivision. The number shows the location of the well or test hole by quadrant, township, range, section, and position within the section. The capital letter at the beginning of the location number indicates the quadrant in which the well is located. Four quadrants are formed by the intersection of the base line and the principal meridian--A indicates the northeast quadrant, B the northwest, C the southwest, and D the southeast. The first numeral indicates the township, the second the range, and the third the section in which the well is located. Lowercase letters following the section number locate the well within the section. The first letter denotes the quarter section, the second the quarter-quarter section, the third the quarter-quarter-quarter section, and the fourth

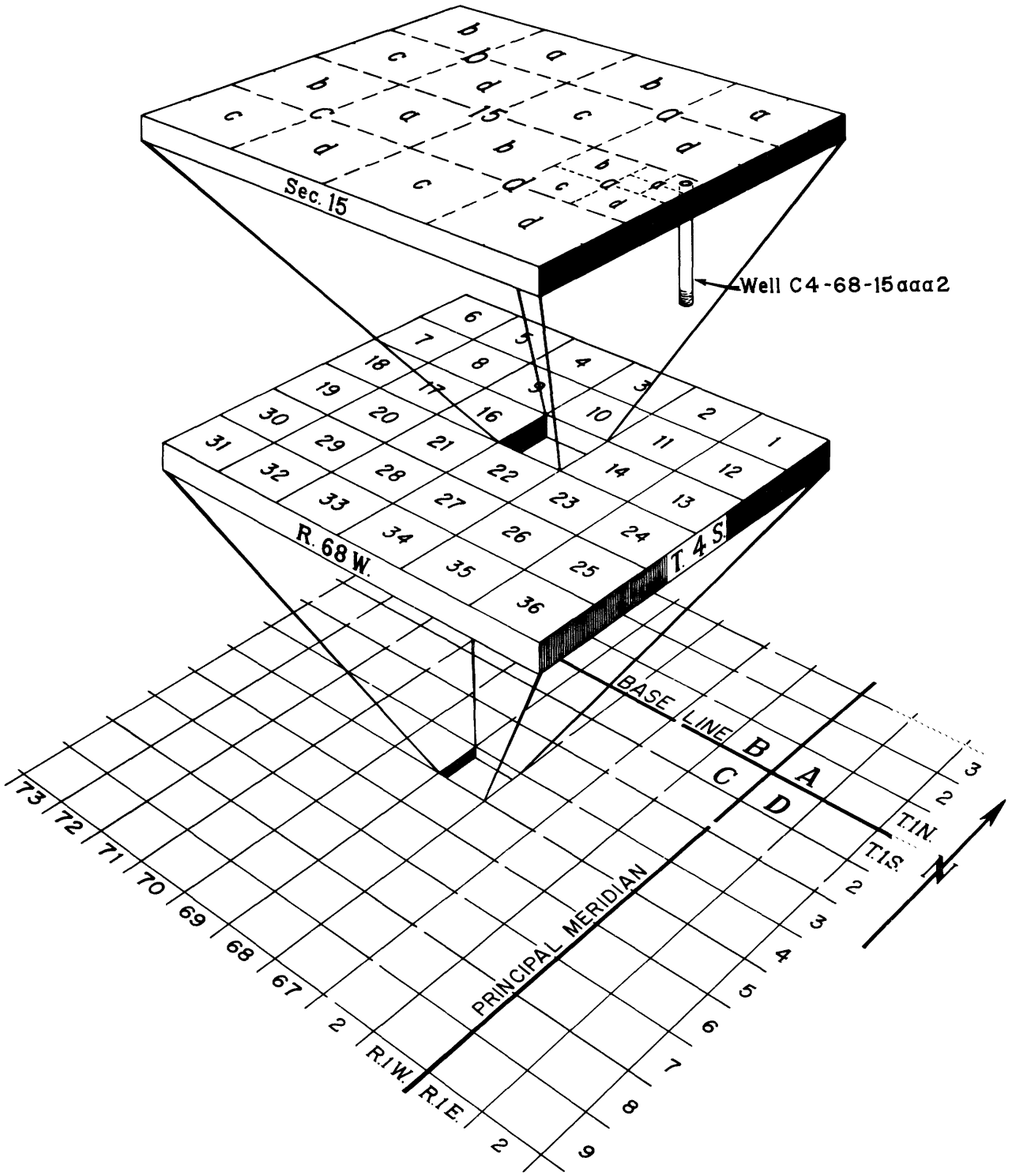

Figure 1.—System of numbering wells in Colorado.

the quarter-quarter-quarter-quarter section. The letters are assigned within the section in a counterclockwise direction beginning with (a) in the northeast quarter of the section. Letters are assigned within each quarter section, quarter-quarter section, and quarter-quarter-quarter section in the same manner. Where two or more locations are within the smallest subdivision, consecutive numbers beginning with 2 are added to the letters in the order in which the wells or test holes were inventoried. For example, C4-68-15daaa2 indicates a well in the northeast quarter of the northeast quarter of the northeast quarter of the southeast quarter of sec. 15, T. 4 S., R. 68 W., and shows that this is the second well inventoried in the quarter-quarter-quarter-quarter section. The capital letter C indicates the township is south of the base line and that the range is west of the principal meridian.

COLLECTION AND EXAMINATION OF SAMPLES

Water samples for analyses are usually collected at or near points on streams where gaging stations are maintained by the U.S. Geological Survey for measurement of water discharge. Discharge records for streams in Colorado have been released in a report, "Surface Water Records of Colorado, 1964."

Data on the quality of surface water were collected daily at some sites and less frequently at other sites; the locations of the sites are shown on the map on page 10. Data on the quality of ground water were collected at least once during the water year at 130 wells in a Statewide network of observation wells; the areas in which these network wells are located are shown on the map on page 11.

Solutes

The methods of collecting and compositing water samples for determining the concentration of solutes are described by Rainwater and Thatcher (1960). One sample can define adequately the water quality at a given time if the mixture of solutes throughout the stream cross-section is homogeneous. However, the concentration of solutes at different locations in the stream cross-section may vary widely with different rates of water discharge depending on the source of material and the turbulence and mixing of the stream. It is necessary to sample some streams at several verticals across the channel to determine accurately the solute load.

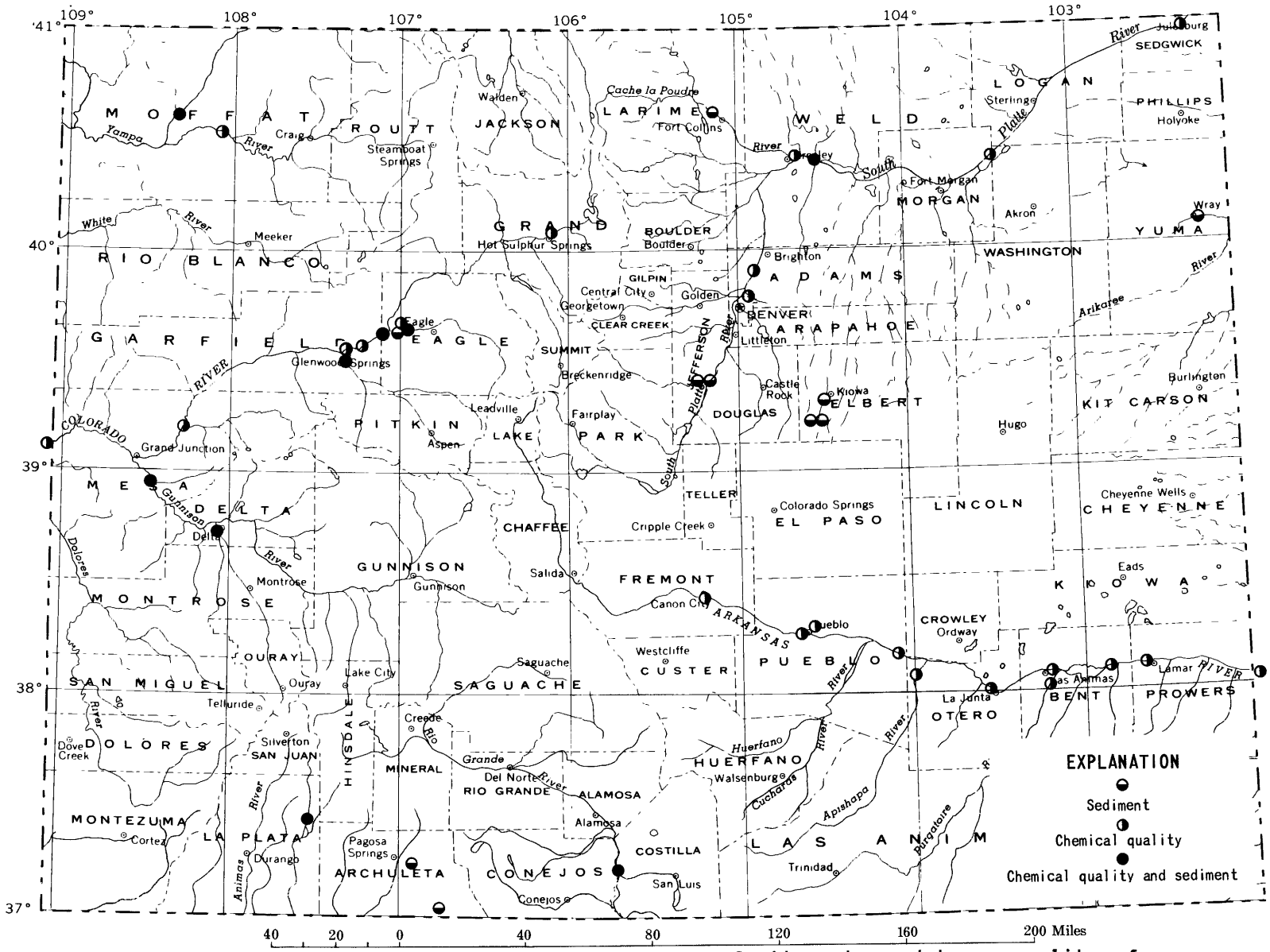

Figure 2.—Map of Colorado showing locations of sites where data on quality of surface water were obtained during the 1964 water year. Water-temperature data were obtained daily at some of these sites.

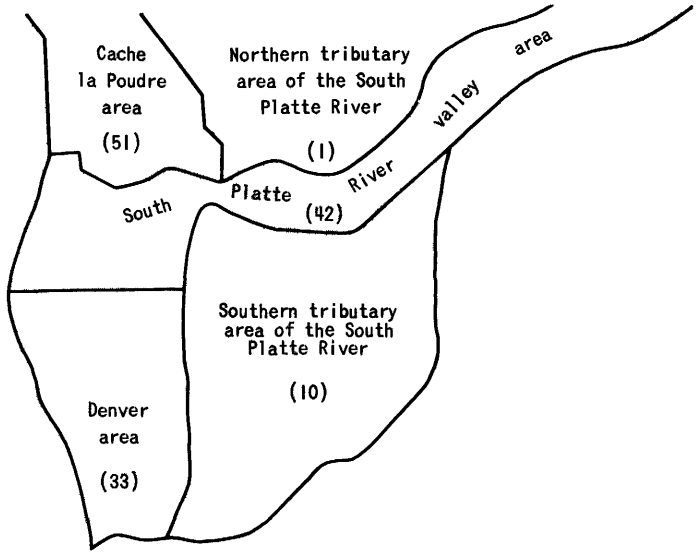

Figure 3.— Map of Colorado showing areas where data were obtained on the chemical quality of ground water.

For this report, samples collected daily are generally composited in equal volume for 2-to 31-day periods. The composite periods are selected on the basis of specific conductance of daily samples and fluctuations of water discharge.

For surface-water sites at which water-quality data were collected less frequently than daily, the data may represent conditions only at the time of sampling. For such sites, however, observations obtained over a period of years show relations that are useful in predicting the long-term water-quality characteristics.

For ground water, a single sample generally was collected and analyzed from each site in the Statewide network during the year. Ground-water quality generally does not change significantly during short periods of time; infrequent sampling and analysis of ground water adequately defines ground-water quality at a given site. For a few irrigation wells, however, a sample was collected immediately before and immediately after the irrigation season to determine possible water-quality changes during the season. At some of the network wells, data were collected in previous years; these data are included in this report. Methods of collecting and analyzing water samples are given in Rainwater and Thatcher (1960).

Temperature

Water temperatures were measured at most of the water-quality stations. For daily stations, the water temperatures were taken at about the same time each day in order that the data would be relatively unaffected by diurnal variations in temperature. Most large, swiftly flowing streams probably have a small diurnal variation in water temperature, whereas sluggish or shallow streams may have a daily range of several degrees and may follow closely the changes in air temperature. The thermometers used for determining the water temperature were accurate to plus or minus 0.5°F.

At stations where thermographs are located, the records consist of maximum and minimum temperatures for each day and the monthly averages of maximum daily and minimum daily temperatures.

Sediment

Suspended-sediment samples generally were collected periodically with U.S. depth-integrating cable-suspended or hand samplers at many verticals in the stream cross-section.

Although data collected periodically may represent conditions only at the time of observation, such data are useful in establishing seasonal relations between water quality and streamflow and in predicting long-term sediment discharge characteristics of streams.

At a few sites on ephemeral streams, suspended-sediment samples were collected daily during periods of flow. Daily sediment loads were computed by standard methods. For periods when no samples were collected, daily loads were estimated.

In addition to the records of the quantities of suspended sediment, records of periodic measurements of the particle-size distribution of the suspended sediment and the bed material are included.

REFERENCES

The following publications are available for background information on the methods for collecting, analyzing and evaluating the chemical and physical properties of surface waters:

Clarke, F. W., 1924, The composition of the river and lake waters of the United States: U.S. Geol. Survey Prof. Paper 135, 199 p.

Colby, B. R., 1963, Fluvial sediments--a summary of source, transportation, deposition, and measurements of sediment discharge: U.S. Geol. Survey Bulletin 1181-A, 47 p.

Colby, B. R., and Hubbell, D. W., 1961, Simplified methods for computing total sediment discharge with the modified Einstein procedure: U.S. Geol. Survey Water-Supply Paper 1593, 17 p.

Collins, W. D., and Howard, C. S., 1928, Quality of water of Colorado River in 1925-26: U.S. Geol. Survey Water-Supply Paper 596-B, p. 33-43.

Gregg, D. O., and others, 1961, Public Water Supplies of Colorado (1959-60), Colorado State University Agric. Exp. Station, General Series 757, 128 p.

Hem, John D., 1959, Study and interpretation of the chemical characteristics of natural water: U.S. Geol. Survey Water-Supply Paper 1473, 269 p.

Howard, C. S., 1955, Quality of water of the Colorado River, 1925-40; U.S. Geol. Survey open-file report, 103 p.

Iorns, W. V., and others, 1964, Water resources of the Upper Colorado River Basin--basic data: U.S. Geol. Survey Prof. Paper 442, 1,036 p. 4 pls., 1 fig.

_____1965, Water resources of the Upper Colorado River Basin--technical report: U.S. Geol. Survey Prof. Paper 441, 370 p. 9 pls., 147 figs.

Lane, E. W. and others, 1947, Report of Subcommittee on terminology: Am. Geophy. Union Trans., v. 28, p. 937.

Langbein, W. B., and Iseri, K. T., 1960, General introduction and hydrologic definitions: U.S. Geol. Survey Water-Supply Paper 1541-A, 29 p.

McGuinness, C. L., 1963, The role of ground water in the national water situation: U.S. Geol. Survey Water-Supply Paper 1800, 1,121 p.

Meinzer, O. E., 1923, The occurrence of ground water in the United States: U.S. Geol. Survey Water-Supply Paper 489, 321 p.

_____1923, Outline of ground-water hydrology, with definitions: U.S. Geol. Survey Water-Supply Paper 494, 71 p.

Rainwater, F. H., and Thatcher, L. L., 1960, Methods for collection and analysis of water samples: U.S. Geol. Survey Water-Supply Paper 1454, 301 p.

Stabler, Herman, 1911, Some stream waters of the Western United States: U.S. Geol. Survey Water-Supply Paper 274, 188 p.

U.S. Geol. Survey, 1964, Quality of surface waters in Colorado, October 1962 to September 1963: Open-file release, 83 p.

U.S. Inter-Agency Committee on Water Resources, A study of methods used in measurement and analysis of sediment loads in streams:

Report 11, 1957, The development and calibration of visual accumulation tube: St. Anthony Falls Hydraulic Lab., Minneapolis, Minn., 109 p., 43 figs.

Report 12, 1957, Some fundamentals of particle-size analysis: Washington, U.S. Govt. Printing Office, 55 p. 9 figs.

Report AA, 1959, Federal Inter-agency sedimentation instruments and reports: St. Anthony Falls Hydraulic Lab., Minneapolis, Minn., 41 p. 27 figs.

Report 13, 1961, The single-stage sampler for suspended sediment: Washington, U.S. Govt. Printing Office, 105 p. 51 figs.

Report 14, 1963, Determinations of fluvial sediment discharge: Washington, U.S. Govt. Printing Office, 151 p. 70 figs.

Annual Series of Water-Supply Papers for Quality of Surface Waters

The table below shows the annual series of Water-Supply Papers that give information on quality of surface waters in Colorado. Data for the Missouri River basin are given in parts 5-6; for the Arkansas River and Rio Grande basins, in parts 7-8 and for the Colorado River basin, in parts 9-14.

Water-supply paper numbers and parts, water year 1941-63.

Report year	Parts 1-14 (1941-47)	Parts 5-6	Parts 7-8	Parts 9-14	Irrigation (1951-63)[a]
1941.....	942	----	----	----	----
1942.....	950	----	----	----	----
1943.....	970	----	----	----	----
1944.....	1022	----	----	----	----
1945.....	1030	----	----	----	----
1946.....	1050	----	----	----	----
1947.....	1102	----	----	----	----
1948.....	----	b1132	c1133	----	----
1949.....	----	b1162	c1163	----	----
1950.....	----	1187	1188	1189	----
1951.....	----	1198	1199	1200	1264
1952.....	----	1251	1252	1253	1362
1953.....	----	1291	1292	1293	1380
1954.....	----	1351	1352	1353	1430
1955.....	----	1401	1402	1403	1465
1956.....	----	1451	1452	1453	1485
1957.....	----	1521	1522	1523	1524
1958.....	----	1572	1573	1574	1575
1959.....	----	1643	1644	1645	1699
1960.....	----	d1743	d1744	d1745	d1746
1961.....	----	d1883	d1884	d1885	d1886
1962.....	----	1943	1944	1945	1946
1963.....	----	d1949	d1950	d1951	d1952

a Annual series, "Quality of Surface Waters for Irrigation, Western States."
b Includes parts 1-6.
c Includes parts 7-14.
d In preparation.

PART 6. MISSOURI RIVER BASIN

PLATTE RIVER BASIN

6-7142. BURLINGTON DITCH BELOW HEADGATE AT DENVER, COLO.

LOCATION.--At York Street bridge in Denver, Denver County, about 0.7 mile below headgate.
RECORDS AVAILABLE.--Chemical analyses: June 1962 to September 1964.
REMARKS.--Discharge data supplied by the State Engineer of Colorado.

Chemical analyses, in parts per million, water year October 1963 to September 1964

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 16, 1963.....	30	17	0.48	91	27	142	9.2	460		127	125	2.1	1.5	0.49	754	1.03		340	0	3.4	1250	7.3
Nov. 15.....	A 100	15	.29	77	28	170	9.1	598		42	170	2.0	1.3	.30	778	1.06		308	0	4.2	1440	7.8
Dec. 17.....	A 175	16	--	66	28	157	10	393		118	172	2.7	.4	.41	743	1.01		280	0	4.1	1340	7.6
Jan. 14, 1964.....	--	14	.15	66	24	175	15	188		105	191	1.2	--	.28	859	1.17		264	110	4.7	1340	7.2
Feb. 24.....	77	18	.44	45	29	189	15	194		160	209	1.5	3.9	.57	811	1.10		232	73	5.4	1500	7.5
Mar. 19.....	232	18	.42	54	9.0	94	7.0	186		91	98	1.1	1.7	.22	476	.65		172	19	3.1	775	7.4
Apr. 17.....	253	16	.40	59	18	130	9.2	222		93	132	2.1	--	.32	646	.88		219	37	3.8	997	7.2
May 15.....	27	14	--	57	18	122	7.5	228		98	126	2.3	19	.29	594	.81		215	28	3.6	959	7.3
June 16.....	27	13	.19	64	18	99	6.1	190		157	84	1.3	22	.23	565	.77		232	76	2.8	869	7.8
July 15.....	36	12	.15	69	19	108	6.1	216		157	96	1.3	22	.25	602	.82		250	73	3.0	941	7.4
Aug. 10.....	26	8.5	.20	53	21	85	3.7	172		119	98	.7	6.0	.12	488	.66		221	80	2.5	799	7.4
Sept. 18.....	--	16	.24	61	23	160	11	369		104	146	2.3	.5	.54	712	.97		247	0	4.4	1210	7.1

A Daily mean discharge.

6-7205. SOUTH PLATTE RIVER AT HENDERSON, COLO.

LOCATION.--At bridge on State Highway 22, 1,200 feet downstream from gaging station, and 0.2 mile west of Henderson, Adams County.
DRAINAGE AREA.--4,713 square miles.
RECORDS AVAILABLE.--Chemical analyses: July 1955 to September 1957, June 1962 to September 1964.

Chemical analyses, in parts per million, water year October 1963 to September 1964

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 16, 1963.....	94	17	0.78	87	28	149	9.3	450		130	140	2.1	1.4	0.39	778	1.06		334	0	3.5	1310	7.2
Nov. 15.....	21	17	.21	129	31	140	6.7	311		263	150	1.3	--	.30	956	1.30		450	195	2.9	1420	7.8
Dec. 17.....	73	18	.85	102	28	157	9.1	292		249	140	1.9	15	.41	906	1.23		368	129	3.6	1430	7.0
Jan. 14, 1964.....	65	17	.80	114	26	146	9.9	310		285	112	1.6	--	.44	924	1.26		390	136	3.2	1330	7.4
Feb. 24.....	103	18	.34	88	28	185	9.2	253		223	198	.7	14	.32	931	1.27		336	129	4.4	1450	7.8
Mar. 19.....	222	16	.68	88	21	118	9.8	332		162	103	1.3	.3	.39	698	.95		305	33	2.9	1080	7.6
Apr. 17.....	31	18	.96	117	34	160	9.2	287		293	154	.6	13	.34	980	1.33		430	195	3.4	1430	7.8
May 15.....	164	12	.44	70	19	100	7.5	200		170	102	1.3	10	.27	600	.82		252	88	2.8	950	7.2
June 16.....	268	14	1.2	63	19	98	6.6	204		175	81	1.5	.6	.31	584	.79		235	68	2.8	868	7.0
July 15.....	225	13	.57	71	19	109	7.0	208		169	104	1.3	18	.28	622	.85		252	82	3.0	968	7.5
Aug. 10.....	663	8.9	.50	61	21	90	4.6	170		147	108	.9	9.8	.10	548	.75		240	101	2.5	855	7.4
Sept. 18.....	A 96	15	.07	95	24	128	9.1	266		224	121	1.5	--	.30	796	1.08		335	117	3.0	1190	7.5

A Daily mean discharge.

6-7525. CACHE LA POUDRE RIVER NEAR GREELEY, COLO.

LOCATION.--At gaging station at highway bridge, 3 miles east of courthouse in Greeley, Weld County, and 3 miles upstream from mouth.
DRAINAGE AREA.--1,877 square miles.
RECORDS AVAILABLE.--Chemical analyses: November 1951 to September 1952, August 1954 to August 1956, December 1963 to September 1964.

Chemical analyses, in parts per million, December 1963 to September 1964

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Dec. 17, 1963.....	94	20	0.41	170	103	132	16	1060	0	323	38	0.7	0.6	0.42	1360	1.85		850	0	2.0	2110	8.0
Jan. 21, 1964.....	90	17	.52	210	96	170	17	763	0	547	104	.8	13	.29	1600	2.18		920	294	2.4	2080	8.1
Feb. 20.....	56	17	1.4	186	98	164	7.5	398	0	772	88	1.2	18	.27	1670	2.27		870	544	2.4	2000	7.9
Mar. 18.....	86	14	.47	184	106	170	7.2	405	0	816	87	1.0	10	.30	1730	2.35		895	563	2.5	2040	7.9
Apr. 16.....	94	11	.78	181	134	172	7.0	336	0	964	64	.5	5.1	.31	1840	2.50		1000	728	2.4	2120	7.5
May 14.....	6.4	11	.32	180	83	138	6.9	368	0	730	40	.6	8.9	.26	1450	1.97		790	488	2.1	1740	7.8
June 16.....	62	12	.72	144	74	120	5.4	294	0	614	57	.7	3.6	.24	1240	1.69		665	424	2.0	1560	7.8
July 15.....	9.0	15	.10	190	77	137	7.5	409	0	714	37	.6	13	.26	1460	1.99		790	455	2.1	1750	8.1
Aug. 13.....	45	3.5	.34	169	100	199	6.8	283	28	759	142	.2	11	.29	1670	2.27		834	556	3.0	2080	8.5
Sept. 19.....	A 46	8.2	.16	158	79	138	5.3	339	0	648	70	.8	5.1	.23	1360	1.85		720	442	2.2	1710	8.1

A Daily mean discharge.

6-7540. SOUTH PLATTE RIVER NEAR KERSEY, COLO.

LOCATION.--At gaging station, at bridge on State Highway 37, 1.9 miles north of railroad in Kersey, Weld County, and 2.5 miles downstream from Cache La Poudre River.
DRAINAGE AREA.--9,598 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1949 to September 1953, August 1954 to August 1957, June 1962 to September 1964.

Chemical analyses, in parts per million, water year October 1963 to September 1964

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 16, 1963.....	402	14	0.11	220	55	152	8.3	350		706	49	1.0	7.3	0.25	1430	1.94		775	488	2.4	1890	7.4
Nov. 19.....	420	15	.31	168	92	148	9.2	411		682	44	1.0	2.7	.30	1420	1.93		800	463	2.3	1820	7.2
Dec. 17.....	420	16	.58	170	80	142	9.2	454		625	48	.8	4.4	.31	1380	1.88		755	383	2.2	1770	7.5
Jan. 21, 1964.....	462	15	.24	172	78	150	9.7	454		622	71	.6	5.6	.34	1420	1.93		750	378	2.4	1820	7.8
Feb. 20.....	529	15	.49	132	63	163	7.2	344		523	97	1.3	13	.35	1190	1.62		590	308	2.9	1640	7.6
Mar. 18.....	378	13	.12	152	75	174	6.1	354		674	84	.7	9.3	.32	1420	1.93		690	400	2.9	1820	7.7
Apr. 16.....	391	9.8	.07	156	92	182	6.3	352		762	79	.7	4.5	.38	1530	2.08		770	481	2.9	1920	7.5
May 14.....	55	14	.34	168	73	148	7.4	312		726	46	.8	11	.25	1410	1.92		720	464	2.4	1740	7.9
June 25.....	203	15	1.1	152	68	131	6.4	312		620	40	.8	12	.23	1240	1.69		660	404	2.2	1580	7.6
July 15.....	90	17	.13	172	71	142	7.0	334		693	42	.9	11	.24	1360	1.85		720	446	2.3	1720	7.6
Aug. 13.....	121	5.8	.20	156	88	142	6.8	355		706	39	.6	3.2	.25	1430	1.94		750	459	2.3	1730	7.5
Sept. 19.....	A 179	11	.00	168	78	134	6.1	348		680	41	.8	10	.24	1340	1.82		740	455	2.1	1670	7.6

A Daily mean discharge.

Periodic determinations of suspended-sediment discharge and particle-size analyses of suspended sediment, water year October 1963 to September 1964
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Water temperature (°F)	Sampling point	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters											Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Oct. 16, 1963.....	1505	62		402	65	71												
Nov. 6.....	1515	53		467	123	160						36	42	63	95	100		V
Nov. 6.....	1535	53		467	134	170												
Nov. 19.....	1130	43		420	146	170												
Dec. 2.....	1525	43		358	206	200												
Jan. 6, 1964.....	1305	34		394	126	130												
Jan. 21.....	1530	43		462	156	190												
Feb. 8.....	1305	38		529	227	320												
Feb. 17.....	1015	34		419	209	240												
Mar. 7.....	1515	42		447	116	140												
Mar. 18.....	1620	56		378	60	61												
Apr. 16.....	1610	64		391	84	89												
May 1.....	1520	65		234	100	63												
June 2.....	1210	59		1270	503	1700												
July 30.....	1150	74		155	132	55												
Aug. 13.....	1450	78		121	62	20												
Sept. 29.....	1600	66		176	64	30												

6-7540. SOUTH PLATTE RIVER NEAR KERSEY, COLO.--Continued

Particle-size analyses of bed material, water year October 1963 to September 1964
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Water temperature (°F)	Sampling point	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Bed material: Percent finer than size indicated, in millimeters										Method of analysis
							0.062	0.125	0.250	0.500	1.000	2.000	4.000	8.000	16.00	32.00	64.00	
Nov. 6, 1963.....			14	467			--	0	3	16	36	54	72	86	97	100		S
May 14, 1964.....			12	55			--	0	2	12	26	52	77	90	97	100		S
June 30.....			12	115			--	0	5	29	52	71	86	93	99	100		S
July 30.....			12	155			0	1	5	22	38	55	74	87	96	100		S
Aug. 25.....			12	188			0	1	5	21	39	58	76	90	98	100		S
Sept. 29.....			12	176			--	0	3	16	34	54	72	84	92	98	100	S

6-7580. KIOWA CREEK AT ELBERT, COLO.

LOCATION.--At gaging station 0.2 mile southeast of Elbert, Elbert County, and 0.5 mile upstream from West Kiowa Creek.
DRAINAGE AREA.--28.6 square miles.
RECORDS AVAILABLE.--Sediment records: April 1956 to September 1964.
EXTREMES, 1956-64.--Sediment concentrations: Maximum daily, 6,500 ppm July 31, 1957; minimum daily, no flow on many days each year.
Sediment loads: Maximum daily, 1,400 tons Mar. 24, 1960; minimum daily, 0 ton on many days each year.
REMARKS.--No flow during 1964 water year.

6-7581. WEST KIOWA CREEK AT ELBERT, COLO.

LOCATION.--At gaging station 260 feet downstream from bridge on State Highway 217, 0.2 mile south of Elbert, Elbert County, and 0.5 mile upstream from mouth.
DRAINAGE AREA.--35.9 square miles.
RECORDS AVAILABLE.--Sediment records: October 1962 to September 1964.
EXTREMES, 1963-64.--Sediment concentrations: Maximum daily, not determined; minimum daily, no flow on many days.
Sediment loads: Maximum daily, (estimated) 50 tons Aug. 4; minimum daily, 0 tons on many days.
EXTREMES, 1962-64.--Sediment concentrations: Maximum daily, 2,700 ppm Sept. 7, 1963; minimum daily, no flow on many days.
Sediment loads: Maximum daily, 980 tons Aug. 13, 1963; minimum daily, 0 ton on many days.

Suspended sediment, water year October 1963 to September 1964
(Where no concentrations are reported, loads are sstimated)

Day	OCTOBER			NOVEMBER			DECEMBER		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1				0		0	0.1		T
2				0		0	.1		T
3				0		0	.2		T
4				0		0	.1		T
5				0		0	.1		T
6				0		0	.2		T
7				0		0	.1		T
8				0		0	.1		T
9				0		0	.2		T
10				0		0	.1		T
11				0		0	.1		T
12				0		0	.1		T
13				.1		T	.1		T
14				.1		T	.1		T
15				.1		T	.1		T
16				.1		T	.1		T
17				.2		T	.1		T
18				.2		T	.1		T
19				.2		T	.1		T
20				.2		T	.1		T
21				.2		T	.1		T
22				.2		T	.1		T
23				.2		T	.1		T
24				.2		T	.1		T
25				.2		T	.1		T
26				.2		T	.1		T
27				.2		T	.1		T
28				.2		T	.1		T
29				.1		T	.1		T
30				.2		T	.2		T
31				--		--	.2		T
Total	0		0	3.1	--	.4	3.6	--	.2

T Less than 0.05 ton.

6-7581. WEST KIOWA CREEK AT ELBERT, COLO.--Continued

Suspended sediment, water year October 1963 to September 1964--Continued

Day	JANUARY			FEBRUARY			MARCH		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	0.2		T	0.2		T	0		0
2	.2		T	.1		T	.1		T
3	.2		T	.1		T	.1		T
4	.2		T	.3		.1	.1		T
5	.2		T	.2		T	.1		T
6	.2		T	.3		.1	.1		T
7	.1		T	.3		.1	.1		T
8	.1		T	.3		.1	.1		T
9	.1		T	.2		T	.2		T
10	.1		T	.2		T	.1		T
11	.1		T	.3		.1	.2		T
12	.1		T	.3		.1	.2		T
13	.1		T	.3		.1	.2		T
14	.1		T	.2		T	.2		T
15	.1		T	.2		T	.2		T
16	.1		T	.2		T	.4		.2
17	.1		T	.1		T	.6		.7
18	.1		T	.1		T	1.1		3
19	.1		T	.1		T	1.1		3
20	.2		T	.1		T	.9		2
21	.2		T	.1		T	.2		T
22	.2		T	0		0	.8		1
23	.2		T	0		0	.9		2
24	.2		T	.1		T	.6		.7
25	.2		T	.1		T	.5		.4
26	.2		T	0		0	.3		.1
27	.2		T	0		0	.4		.2
28	.2		T	0		0	.3		.1
29	.2		T	0		0	.8		1
30	.2		T	--		--	.9		2
31	.2		T	--		--	.6	43	.7
Total	4.9		.5	4.4		.9	12.4	--	17.3

	APRIL			MAY			JUNE		
1	0.3		0.1	0.1		T	0.3		0.1
2	.3		.1	.1		T	.4		.2
3	.4		.2	.1		T	.3		.1
4	.4		.2	.1		T	.3		.1
5	.3		.1	.1		T	.2		T
6	.3		.1	.1		T	.1		T
7	.2		T	.1		T	.1		T
8	.3		.1	.1		T	.1		T
9	.3	120	.1	.1		T	0		0
10	.4		.2	.1		T	0		0
11	.4		.2	.1		T	0		0
12	.3		.1	.2		T	0		0
13	.3		.1	.1		T	0		0
14	.3		.1	.2		T	.5		.4
15	.3		.1	.1		T	.1		T
16	.2		T	.1		T	0		0
17	.1		T	.1		T	0		0
18	.1		T	0		0	0		0
19	.1		T	0		0	0		0
20	.1		T	0		0	0		0
21	.1		T	0		0	0		0
22	.1		T	0		0	0		0
23	.1		T	0		0	0		0
24	.1		T	0		0	0		0
25	.1		T	0		0	0		0
26	.1		T	0		0	0		0
27	.1		T	.1		T	0		0
28	.1		T	.1		T	0		0
29	.1		T	.2		T	0		0
30	.1		T	.8		1	0		0
31	--		--	.4		.2	--		
Total	6.4	--	1.9	3.5	--	1.3	2.4	--	.9

T Less than 0.05 ton.

6-7581. WEST KIOWA CREEK AT ELBERT, COLO.--Continued

Suspended sediment, water year October 1963 to September 1964--Continued

Day	JULY			AUGUST			SEPTEMBER		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1				0		0			
2				0		0			
3				0		0			
4				3.7		E 50			
5				.1		T			
6				0		0			
7				0		0			
8				0		0			
9				0		0			
10				0		0			
11				0		0			
12				0		0			
13				0		0			
14				0		0			
15				0		0			
16				0		0			
17				0		0			
18				0		0			
19				0		0			
20				0		0			
21				0		0			
22				0		0			
23				0		0			
24				0		0			
25				0		0			
26				0		0			
27				0		0			
28				0		0			
29				0		0			
30				0		0			
31				0		0			
Total	0		0	3.8	--	50	0		0

Total discharge for year (cfs-days)..... 44.5
Total load for year (tons)..... 73.4

T Less than 0.05 ton.
E Estimated.

6-7581. WEST KIOWA CREEK AT ELBERT, COLO.--Continued

Periodic determinations of suspended-sediment discharge and particle-size analyses, water year October 1963 to September 1964

(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Water temperature (°F)	Sampling point	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment											Method of analysis
							Percent finer than size indicated, in millimeters											
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Mar. 31, 1964.....	1405	58		0.6	470	0.8						87	88	97	100			V
Apr. 9.....	1500	59		.2	46	T												

T Less than 0.05 ton.

6-7582. KIOWA CREEK AT KIOWA, COLO.

LOCATION.--At gaging station at cableway, 0.7 mile upstream from bridge on State Highway 86, and 0.7 mile south of Kiowa, Elbert County.
DRAINAGE AREA.--111 square miles.
RECORDS AVAILABLE.--Sediment records: April 1956 to September 1964.
EXTREMES, 1963-64.--Sediment concentrations: Maximum daily, 4,600 ppm Aug. 5; minimum daily, no flow on many days.
Sediment loads: Maximum daily, 480 tons Aug. 4; minimum daily, 0 ton on many days.
EXTREMES, 1956-64.--Sediment concentrations: Maximum daily, 15,000 ppm Aug. 1, 1956; minimum daily, no flow on many days each year.
Sediment loads: Maximum daily, 43,000 tons July 31, 1956; minimum daily, 0 ton on many days.
REMARKS.--Flow affected by ice Dec. 25 to Jan. 3, Jan. 7, 8, Jan. 18 to Feb. 1, Feb. 5-14, Mar. 5, 6, 11-22.

Suspended sediment, water year October 1963 to September 1964
(Where no concentrations are reported, loads are estimated)

Day	OCTOBER			NOVEMBER			DECEMBER		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1				0		0	C 0.1		T
2				0		0	C .1		T
3				0		0	C .1		T
4				0		0	C .1		T
5				0		0	C .1		T
6				0		0	C .1		T
7				0		0	C .1		T
8				0		0	C .1		T
9				0		0	C .1		T
10				0		0	C .1		T
11				0		0	C .1		T
12				0		0	C .1		T
13				0		0	C .1		T
14				0		0	C .1		T
15				0		0	C .1		T
16				0		0	C .1		T
17				.2		T	C .1		T
18				.1		T	C .1		T
19				0		--	C .1		T
20				.1		T	C .1		T
21				.1		T	C .1		T
22				.1		T	C .1		T
23				.1		T	C .1		T
24				.2		T	C .1		T
25				.1		T	C .1		T
26				.1		T	C .1		T
27				.2		T	C .1		T
28				.1		T	C .1		T
29				.1		T	C .1		T
30				.1		T	C .1		T
31				--		--	C .1		T
Total	0		0	1.6	--		3.1	--	

T Less than 0.05 ton.
C Composite period.

6-7582. KIOWA CREEK AT KIOWA, COLO.--Continued

Suspended sediment, water year October 1963 to September 1964--Continued

Day	JANUARY			FEBRUARY			MARCH		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	C 0.1		T	C 0.1		T	2.3		0.4
2	C .1		T	C .1		T	2.3		.4
3	C .1		T	C .1		T	1.2		.1
4	C .1		T	C .1		T	1.0		.1
5	C .1		T	C .1		T	1.0		.1
6	C .1		T	C .1		T	.8		T
7	C .1		T	C .1		T	.6		T
8	C .1		T	C .1		T	.6		T
9	C .1		T	C .1		T	.4		T
10	C .1		T	C .1		T	.5		T
11	C .1		T	C .1		T	.8		T
12	C .1		T	C .1		T	3.4		1.2
13	C .1		T	C .1		T	4.0		1.7
14	C .1		T	C .1		T	3.8		1.5
15	C .1		T	C .1		T	3.6		1.3
16	C .1		T	C .1		T	3.6		1.3
17	C .1		T	C .1		T	10		17
18	C .1		T	C .1		T	13		34
19	C .1		T	C .1		T	13		34
20	C .1		T	C .1		T	6.8		6.6
21	C .1		T	C .1		T	8.6		12
22	C .1		T	C .1		T	12		28
23	C .1		T	C .1		T	9.0		13
24	C .1		T	C .1		T	7.0		7.0
25	C .1		T	C .1		T	5.8		4.4
26	C .1		T	C .1		T	6.4		5.6
27	C .1		T	C .1		T	6.8		6.6
28	C .1		T	C .1		T	10		17
29	C .1		T	C .1		T	14		40
30	C .1		T	--		--	17		65
31	C .1		T	--		--	16	1300	56
Total	3.1	--	T	2.9	--	T	185.3	--	354.4

Day	APRIL			MAY			JUNE		
1	12		28	1.4		0.1	3.2		1.0
2	7.5		8.4	1.2		.1	4.1		1.9
3	7.0		7.0	1.1		.1	4.1		1.9
4	6.6		6.0	.8		T	3.4		1.2
5	5.9		4.6	.5		T	3.0		.8
6	7.5		8.4	.8		T	3.2		1
7	7.5		8.4	.8		T	2.5		.5
8	6.3		5.5	1.1		.1	2.1		.3
9	5.2	240	3.4	.4		T	.8		T
10	5.6		4.0	.1		T	.7		T
11	5.2		3.4	0		0	.7		T
12	3.4		1.2	.1		T	.8		T
13	3.4		1.2	0		0	1.9		.3
14	4.1		1.9	0		0	2.1		.3
15	3.8		1.5	0		0	.7		T
16	3.8		1.5	0		0	.2		T
17	4.1		1.9	0		0	0		0
18	4.1		1.9	0		0	0		0
19	3.4		1.2	0		0	0		0
20	3.8		1.5	0		0	0		0
21	4.5		2.3	0		0	0		0
22	3.4		1.2	0		0	0		0
23	2.7		.6	0		0	0		0
24	3.0		.8	0		0	0		0
25	2.3		.4	0		0	0		0
26	2.5		.5	0		0	0		0
27	2.5		.5	0		0	0		0
28	2.1		.3	0		0	0		0
29	2.1		.3	3.3	110	1	0		0
30	1.6		.2	6.3		5.5	0		0
31	--		--	4.1		1.9	--		
Total	136.9	--	108.0	22.0	--	8.9	33.5	--	9.3

T Less than 0.05 ton.
C Composite period.

6-7582. KIOWA CREEK AT KIOWA, COLO.--Continued

Suspended sediment, water year October 1963 to September 1964--Continued

Day	JULY			AUGUST			SEPTEMBER		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1				0	--	0			
2				0	--	0			
3				0	--	0			
4				12	3300	S 480			
5				31	4600	380			
6				5.9	--	4.6			
7				2.3	--	.4			
8				.7	--	T			
9				0	--	0			
10				0	--	0			
11				0	--	0			
12				0	--	0			
13				0	--	0			
14				0	--	0			
15				0	--	0			
16				0	--	0			
17				0	--	0			
18				0	--	0			
19				0	--	0			
20				0	--	0			
21				0	--	0			
22				0	--	0			
23				0	--	0			
24				0	--	0			
25				0	--	0			
26				0	--	0			
27				0	--	0			
28				0	--	0			
29				0	--	0			
30				0	--	0			
31				0	--	0			
Total	0		0	51.9	--	865.0	0		0

Total discharge for year (cfs-days)..... 440.3
Total load for year (tons)..... 1,345.6

S Computed by subdividing day.
T Less than 0.05 ton.

6-7582. KIOWA CREEK AT KIOWA, COLO.--Continued

Periodic determinations of suspended-sediment discharge and particle-size analyses, water year October 1963 to September 1964

(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Water temperature (°F)	Sampling point	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Mar. 31, 1964.....	1240	--		D 16	1460	63	--	--		--		--	--	--	--			
Mar. 31.....	1300	59		D 16	1320	57	46	55		--		90	95	99	100			VPWC
Apr. 9.....	1405	66		5.6	282	4	--	--		--		--	--	--	--			
May 29.....	1930	--		12	1370	44	--	--		--		78	87	97	100			V
Aug. 4.....	1830	58		41	7640	850	56	59		80		95	98	100	--			VPWC
Aug. 4.....	1905	58		30	5890	480	58	63		83		97	98	100	--			VPWC
Aug. 4.....	2000	57		40	8850	960	66	70		81		96	97	100	--			VPWC
Aug. 5.....	0030	57		65	20600	3600	64	69		80		87	94	98	100			VPWC
Aug. 5.....	0700	--		50	3570	480	75	83		90		96	98	100	--			VPWC
Aug. 5.....	1555	--		31	1450	120	--	--		--		--	--	--	--			
Aug. 5.....	1945	--		26	1280	90	--	--		--		--	--	--	--			

D Daily mean discharge.

6-7600. SOUTH PLATTE RIVER AT BALZAC, COLO.

LOCATION.--At gaging station, just upstream from highway bridge at Balzac siding, Morgan County, 2.8 miles northeast of Union, and 7.0 miles downstream from Beaver Creek.
DRAINAGE AREA.--16,852 square miles.
RECORDS AVAILABLE.--Chemical analyses: January 1950 to September 1951, August 1954 to September 1957, June 1962 to September 1964.

Chemical analyses, in parts per million, water year October 1963 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 17, 1963.....	30	17	0.16	194	68	160	9.8	316		754	61	0.8	2.0	0.23	1480	2.01		765	506	2.5	1890	7.3
Nov. 18.....	15	13	.19	182	69	158	8.9	286		750	59	.8	1.2	.25	1450	1.97		740	505	2.5	1830	7.4
Dec. 16.....	23	20	.07	198	69	163	10	346		784	60	.8	4.1	.25	1560	2.12		780	496	2.5	1940	8.2
Jan. 21, 1964.....	14	13	.13	180	63	157	8.1	306		705	62	.6	.2	.25	1420	1.43		710	459	2.6	1750	7.7
Feb. 20.....	13	18	.61	180	62	159	8.4	292		744	58	.6	.9	.19	1440	1.96		705	466	2.6	1790	7.5
Mar. 18.....	10	11	.55	160	62	155	8.4	232		724	56	.2	.4	.20	1350	1.84		655	465	2.6	1690	7.8
Apr. 14.....	20	21	1.2	164	64	155	8.6	242		733	56	.8	1.6	.21	1380	1.88		675	477	2.6	1720	7.4
May 14.....	140	16	.51	202	69	170	10	328		806	62	.8	2.3	.24	1570	2.14		790	521	2.6	1930	7.7
June 16.....	264	14	.08	154	68	146	8.3	272		676	50	.8	4.5	.24	1330	1.81		665	442	2.5	1680	8.1
July 15.....	118	14	.44	176	75	182	11	280		831	64	.8	1.9	.27	1570	2.14		750	520	2.9	1910	7.8
Aug. 13.....	180	4.8	.12	160	78	174	9.7	262		803	60	.8	.3	.25	1480	2.01		720	505	2.8	1830	8.0
Sept. 19.....	165	13	.04	184	73	162	9.2	314		777	57	.8	2.2	.21	1480	2.01		760	503	2.6	1820	7.5

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 1964.
Water temperatures: October 1945 to September 1964.
EXTREMES, 1963-64.--Dissolved solids: Maximum, 1,720 ppm Jan. 1-31; minimum, 1,420 ppm July 9-31.
Hardness: Maximum, 852 ppm Dec. 1-31; minimum, 662 ppm July 9-31.
Specific conductance: Maximum daily, 2,300 micromhos Jan. 14; minimum daily, 1,440 micromhos July 9.
Water temperatures: Maximum, 88°F July 26; minimum, freezing point Dec. 7, 14, 16.
EXTREMES, 1945-64.--Dissolved solids: Maximum, 1,860 ppm Apr. 13, 1955; minimum, 429 ppm June 16, 1956.
Hardness: Maximum, 860 ppm Dec. 1, 1960; minimum, 173 ppm Mar. 1-12, 1947.
Specific conductance: Maximum daily, 3,000 micromhos Dec. 28, 30, 1962; minimum daily, 617 micromhos Aug. 19, 1953.
Water temperatures: Maximum (1946-49, 1950-64), 93°F July 28, Aug. 1, 1953, July 7, 18, 1963; minimum, freezing point on many days during winter months.
REMARKS.--Records of specific conductance of daily samples available in district office at Lincoln, Nebr.

Chemical analyses, in parts per million, water year October 1963 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1-31, 1963...	200	--	--	--	--	186	--	320	0	--	--	--	--	--	1560	2.12	842	761	498	2.9	2000	7.5
Nov. 1-30.....	211	--	--	--	--	196	--	349	0	--	--	--	--	--	1660	2.26	946	796	510	3.0	2110	7.5
Dec. 1-31.....	217	29	0.01	92	151	200	18	377	0	810	75	0.6	4.0	0.26	A1560	2.12	914	852	543	3.0	2130	7.5
Jan. 1-31, 1964...	250	--	--	--	--	196	--	410	0	--	--	--	--	--	1720	2.34	1160	850	514	2.9	2180	7.5
Feb. 1-11.....	259	--	--	--	--	196	--	396	0	--	--	--	--	--	1700	2.31	1190	830	505	3.0	2140	7.7
Feb. 12-29.....	248	--	--	--	--	196	--	330	0	--	--	--	--	--	1660	2.26	1110	793	522	3.0	2100	7.7
Mar. 1-31.....	194	27	.03	210	60	195	14	311	0	792	76	.7	3.7	.26	A1530	2.08	801	769	514	3.1	2050	7.9
Apr. 1-30.....	196	--	--	--	--	204	--	278	0	--	--	--	--	--	1640	2.23	868	752	524	3.2	2070	8.2
May 1-31.....	60.9	--	--	--	--	191	--	261	0	--	--	--	--	--	1560	2.12	256	722	508	3.1	1980	8.0
June 1-30.....	49.9	15	.04	196	56	195	16	259	0	775	73	.6	.7	.25	A1450	1.97	195	720	508	3.0	1970	7.4
July 1-7.....	28.6	--	--	--	--	180	--	268	0	--	--	--	--	--	1520	2.07	117	709	489	2.9	1910	7.2
July 8.....	40	30	.00	197	50	182	18	252	0	760	74	.7	.0	.23	A1440	1.96	156	698	491	3.0	1910	7.4
July 9-31.....	48.7	--	--	--	--	169	--	249	0	--	--	--	--	--	1420	1.93	187	662	458	2.9	1810	7.5
Aug. 1-31.....	14.1	--	--	--	--	191	--	257	0	--	--	--	--	--	1530	2.08	58.2	716	505	3.1	1930	7.0
Sept. 1-30.....	9.5	29	.00	198	57	192	18	264	0	768	75	.6	.0	.25	A1470	2.00	37.7	729	512	3.1	1960	7.8
Weighted average	--	--	--	--	--	195	--	337	--	--	--	--	--	--	1610	2.19	614	791	515	3.0	2080	7.6
Time-weighted average.....	141	--	--	--	--	193	--	308	--	--	--	--	--	--	1570	--	--	762	510	3.0	2030	7.5
Tons per day....	--	--	--	--	--	74	--	129	--	--	--	--	--	--	--	--	--	--	--	--	--	--

A Calculated from determined constituents.

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

Temperature (°F) of water, water year October 1963 to September 1964

Month	Day																													Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
October....	63	67	68	69	68	68	70	68	65	67	65	64	65	65	64	66	66	65	65	65	68	65	64	62	64	60	59	59	60	57	50	64
November...	50	--	51	52	59	54	53	49	52	53	53	47	41	44	49	49	48	47	43	44	38	39	40	44	44	42	43	--	41	40	--	47
December...	42	43	41	42	40	39	32	34	37	33	33	34	33	32	--	32	33	35	35	33	33	38	37	38	--	38	36	37	38	38	40	36
January....	--	39	39	37	37	35	35	33	33	33	33	33	35	35	36	36	39	39	38	43	41	37	37	35	37	41	42	38	38	39	39	37
February...	37	37	36	40	40	36	36	38	34	42	37	37	36	34	34	--	39	35	34	34	34	35	38	43	33	34	35	35	39	--	--	36
March.....	45	46	35	38	39	36	33	35	45	41	41	42	42	44	44	49	52	54	39	35	36	48	47	35	36	--	45	47	39	59	60	43
April.....	58	48	38	43	53	44	44	54	61	62	61	46	50	57	63	67	55	54	54	52	62	62	62	63	62	48	41	62	65	67	--	55
May.....	64	55	--	53	61	64	68	61	65	61	65	68	68	70	73	71	81	64	67	77	74	74	74	68	76	59	56	63	55	54	60	66
June.....	61	73	65	58	62	78	72	71	68	69	--	72	69	72	74	72	77	72	69	76	72	63	72	82	82	67	74	76	73	79	--	71
July.....	80	76	80	--	77	79	82	84	74	81	75	80	79	77	76	80	76	82	78	75	72	75	73	70	64	88	78	75	71	81	71	77
August.....	74	73	82	78	72	79	--	74	73	66	59	69	70	71	69	70	76	68	70	68	62	65	68	66	63	78	61	62	60	--	69	69
September..	72	65	62	62	65	72	79	68	73	60	61	65	61	69	60	63	68	62	68	58	--	61	57	59	61	64	52	57	57	58	--	63

MISCELLANEOUS ANALYSES OF STREAMS IN PLATTE RIVER BASIN

Periodic determinations of suspended-sediment discharge, water year October 1963 to September 1964
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Water temperature (°F)	Sampling point	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters											Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
6-7070. NORTH FORK SOUTH PLATTE RIVER AT SOUTH PLATTE, COLO.																		
July 14, 1964	1530	70		122	8	3												
July 28	1520	68		190	10	5												
Aug. 12	1330	59		265	17	12												
Aug. 24	1145	55		236	13	8												
Sept. 14	1250	52		244	10	7												
6-7075. SOUTH PLATTE RIVER AT SOUTH PLATTE, COLO.																		
Oct. 15, 1963	1155	50		135	7	3												
Nov. 5	1050	40		135	4	1												
Nov. 20	1040	33		103	8	2												
Dec. 3	1125	32		56	11	2												
Dec. 18	1210	33		143	14	5												
Apr. 13, 1964	1320	48		145	6	2												
Apr. 13	1340	48		145	4	2												
Apr. 30	1430	56		416	16	18												
May 9	1220	50		441	12	14												
June 15	1155	63		350	13	12												
July 14	1320	70		421	9	10												
July 28	1320	67		565	15	23												
Aug. 12	1050	70		510	15	21												
Aug. 24	1000	55		357	9	9												
Sept. 14	1100	53		276	7	5												
6-7520. CACHE LA POUDRE RIVER AT MOUTH OF CANYON, NEAR FORT COLLINS, COLO.																		
Nov. 6, 1963	1115	40		49	8	1												
Nov. 19	1410	37		19	10	.5												
Dec. 2	1120	32		22	5	.3												
Mar. 18, 1964	1215	40		24	5	.3												
Apr. 17	1345	46		59	5	.8												
May 1	1245	57		62	2	.3												
May 23	1450	50		1260	40	140												
June 2	1400	53		809	10	22												
June 16	1120	49		1230	6	20												
June 30	1305	54		1270	17	58												
July 15	1140	63		382	4	4												
July 30	1510	67		306	6	5												
Aug. 13	1120	67		104	3	.8												

Particle-size analyses of bed material, water year October 1963 to September 1964
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Water temperature (°F)	Sampling point	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Bed material: Percent finer than size indicated, in millimeters											Method of analysis
							0.062	0.125	0.250	0.500	1.000	2.000	4.000	8.000	16.00	32.00	64.00	
6-7075. SOUTH PLATTE RIVER AT SOUTH PLATTE, COLO.																		
Oct. 15, 1963			6	135			0	1	2	6	11	21	39	64	94	100		S
Apr. 13, 1964			12	145			0	2	7	15	25	36	50	69	90	100		S
June 15			12	350			0	1	5	10	19	30	44	59	81	88	90	S

MISCELLANEOUS ANALYSES OF STREAMS IN KANSAS RIVER BASIN

Periodic determinations of suspended-sediment discharge and particle-size analyses, water year October 1963 to September 1964

(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Water temperature (°F)	Sampling point	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters											Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
6-8220. NORTH FORK REPUBLICAN RIVER NEAR WRAY, COLO.																		
Aug. 1, 1963.....	1050	70		20	154	8	21	27	32	37	49	76	94	100				VBWC
Oct. 1.....	1200	62		22	152	9												
Oct. 17.....	1200	58		22	49	3												
Nov. 18.....	1135	47		24	52	3												
Dec. 16.....	1300	39		23	42	3												
Jan. 2, 1964.....	--	--		24	42	3												

Particle-size analyses of bed material, water year October 1963 to September 1964

(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Water temperature (°F)	Sampling point	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Bed material: Percent finer than size indicated, in millimeters											Method of analysis
							0.062	0.125	0.250	0.500	1.000	2.000	4.000	8.000	16.00	32.00	64.00	
May 31, 1963.....			4	22			10	19	34	74	95	98	99	100				S
June 26.....			6	20			4	8	23	75	97	99	100	--				S
Aug. 1.....			6	19			3	7	22	71	96	99	100	--				S
Aug. 28.....			6	20			1	4	21	70	94	98	99	100				S
Oct. 1.....			7	22			7	18	41	80	97	99	100	--				S
Oct. 17.....			7	22			3	11	31	74	96	98	100	--				S
Nov. 18.....			6	24			6	14	36	79	97	99	100	--				S

ARKANSAS RIVER BASIN

7-960. ARKANSAS RIVER AT CANON CITY, COLO.

LOCATION.--At gaging station 800 feet upstream from Sand Creek, 0.7 mile downstream from Grape Creek, and 0.7 mile upstream from First Street bridge in Canon City, Fremont County.
DRAINAGE AREA.--3,117 square miles.
RECORDS AVAILABLE.--Chemical analyses: November 1963 to September 1964.

Chemical analyses, in parts per million, November 1963 to September 1964

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (calculated)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Nov. 26, 1963.....	229	15		42	11	14	1.9	159		38	10	0.6	0.9	--	212	0.29		149	19	0.5	337	7.6
Jan. 9, 1964.....	196	15		43	10	15	2.5	163		41	10	.7	1.4	--	219	.30		151	17	.5	338	7.5
Feb. 19.....	165	13		40	10	15	1.5	152		39	10	.6	1.6	0.02	207	.28		142	17	.5	321	8.1
Mar. 18.....	220	13		39	11	16	1.5	149		37	12	.6	1.3	.00	206	.28		144	22	.6	326	8.0
Apr. 14.....	199	14		41	13	18	2.3	166		39	15	.5	.3	.01	226	.31		158	22	.6	354	8.1
May 12.....	254	12		37	9.7	15	1.8	133		43	11	.5	.0	.02	196	.27		133	24	.6	316	7.9
June 10.....	1600	6.8		18	5.4	4.5	.9	62		23	2.6	.5	.0	.00	92	.13		67	16	.2	140	7.7
July 7.....	1290	6.7		20	6.3	4.8	1.0	67		21	4.0	.4	.0	.01	98	.13		75	20	.2	149	7.6
Aug. 6.....	795	10		29	7.3	7.8	1.7	112		25	5.5	.5	.0	.01	142	.19		103	11	.3	232	7.8
Sept. 3.....	254	11		34	9.2	11	1.7	128		36	6.8	.4	.2	.05	A 170	.23		122	17	.4	285	7.4

A Residue at 180°C.

7-995. ARKANSAS RIVER NEAR PUEBLO, COLO.

LOCATION --At gaging station at intake of south-side waterworks, 1.6 miles upstream from Dry Creek, and 2.5 miles west of city hall in Pueblo, Pueblo County.
DRAINAGE AREA.--4,686 square miles.
RECORDS AVAILABLE.--Chemical analyses: November 1963 to September 1964.

Chemical analyses, in parts per million, November 1963 to September 1964

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Nov. 26, 1963.....	146	11		82	30	41	3.1	198		229	15	0.8	1.1	--	A 510	0.69		326	164	1.0	736	7.4
Jan. 9, 1964.....	188	14		87	31	42	2.9	204		236	15	.7	3.4	--	A 532	.72		342	175	1.0	777	7.5
Jan. 23.....	207	13		78	27	39	2.9	188		217	14	.7	2.7	--	A 487	.66		306	152	1.0	713	7.4
Feb. 19.....	110	14		87	30	49	3.2	192		268	14	.6	.5	0.07	596	.81		342	185	1.2	805	8.2
Mar. 19.....	130	11		83	34	50	3.1	176		274	10	.4	.3	.08	A 592	.81		344	200	1.2	807	8.0
Apr. 14.....	74	14		79	26	41	3.4	182		230	13	.5	1.3	.09	536	.73		304	155	1.0	733	7.8
May 12.....	46	7.2		93	44	63	3.9	176		369	16	.6	.3	.13	740	1.01		412	268	1.4	959	8.1
June 10.....	1510	8.2		41	8.5	11	1.4	102		73	5.0	.5	1.4	.01	A 203	.28		137	53	.4	313	7.8
July 7.....	1150	7.6		39	8.8	14	.8	107		63	6.0	.4	.0	.00	A 193	.26		134	46	.5	300	7.8
Aug. 6.....	716	12		58	13	18	2.5	148		106	5.8	.5	1.0	.08	311	.42		196	75	.6	449	7.6
Sept. 2.....	164	9.1		71	23	34	3.0	162		200	11	.5	.2	.08	425	.58		270	137	.9	626	7.4

A Calculated from sum of determined constituents.

7-1065. FOUNTAIN CREEK AT PUEBLO, COLO.

LOCATION.--At gaging station at Eighth Street Bridge in Pueblo, Pueblo County, and 1.6 miles upstream from mouth.
DRAINAGE AREA.--926 square miles.
RECORDS AVAILABLE.--Chemical analyses: November 1963 to September 1964.

Chemical analyses, in parts per million, November 1963 to September 1964

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Nov. 26, 1963.....	7.8	12		240	106	271	6.8	312	0	1250	62	2.5	41	--	A 2140	2.91		1040	779	3.7	2610	7.4
Jan. 9, 1964.....	22	13		200	72	204	5.0	307	0	802	52	2.4	21	--	A 1520	2.07		795	543	3.1	2050	7.4
Jan. 23.....	29	13		206	71	204	5.2	319	0	881	54	2.3	17	--	A 1610	2.19		805	543	3.1	2060	7.5
Feb. 19.....	29	13		188	64	197	5.8	308	0	807	49	2.4	20	0.23	1560	2.12		735	482	3.2	1920	7.4
Mar. 19.....	64	3.9		166	60	167	5.9	236	30	679	49	2.4	14	.22	1350	1.84		660	417	2.8	1670	8.7
Apr. 14.....	6.0	8.9		214	110	276	6.9	264	0	1210	67	2.2	30	.36	2190	2.98		988	771	3.8	2520	7.7
May 12.....	3.2	5.7		235	133	311	7.8	260	23	1390	78	.7	74	.36	2550	3.47		1140	884	4.0	2850	8.6
June 10.....	1.6	10		231	137	298	7.8	292	0	1310	76	2.1	75	.38	2540	3.45		1140	903	3.8	2820	7.4
July 7.....	1.0	1.9		182	86	222	7.6	196	0	1020	60	2.2	19	.24	1840	2.50		810	649	3.4	2240	7.8
Aug. 6.....	1.0	.1		182	97	254	7.9	155	0	1100	66	2.2	29	.25	1980	2.69		855	728	3.8	2420	7.6
Sept. 2.....	.7	12		244	95	252	8.3	310	0	1170	64	2.2	51	.23	2120	2.88		1000	746	3.5	2510	7.8

A Calculated from sum of determined constituents.

7-1170. ARKANSAS RIVER NEAR NEPESTA, COLO.

LOCATION.--At gaging station 85 feet downstream from diversion dam of Oxford Farmers Company canal, 1.3 miles northwest of Nepesta, Pueblo County, and 7.3 miles downstream from Huerfano River.
DRAINAGE AREA.--9,345 square miles, of which 54 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: November 1963 to September 1964.
REMARKS.--Discharges include diversion into Oxford Farmers Company canal.

Chemical analyses, in parts per million, November 1963 to September 1964

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Nov. 26, 1963.....	256	11		111	38	63	5.2	194		361	28	1.0	9.9	--	A 724	0.98		432	273	1.3	1020	7.5
Dec. 28.....	434	13		112	44	70	3.7	205		378	26	1.0	10	--	A 760	1.03		460	292	1.4	1060	7.3
Jan. 22, 1964.....	300	12		115	41	71	4.3	204		368	28	1.2	8.8	--	A 750	1.02		456	289	1.4	1090	7.0
Feb. 19.....	338	12		124	40	79	5.4	204		418	31	1.2	11	0.14	908	1.23		475	308	1.6	1140	7.6
Mar. 19.....	338	10		122	49	89	5.3	192		476	28	1.1	9.2	.11	931	1.27		505	348	1.7	1200	7.7
Apr. 15.....	232	13		112	36	64	6.3	188		373	25	.8	8.6	.15	775	1.05		428	274	1.3	1020	7.4
May 12.....	94	9.3		120	53	85	6.2	194		490	26	1.1	12	.15	957	1.30		516	357	1.6	1200	7.5
June 11.....	1407	9.3		64	13	20	2.2	162		109	9.0	.5	2.2	.06	320	.44		212	79	.6	485	7.8
July 7.....	707	8.5		51	16	25	2.0	124		119	10	.6	1.9	.04	A 296	.40		194	92	.8	433	7.9
Aug. 7.....	1799	14		150	27	47	8.3	220		404	7.4	.6	1.5	.15	817	1.11		484	304	.9	1020	7.6
Sept. 2.....	259	9.9		78	23	34	3.5	164		206	14	.9	3.5	.12	460	.63		288	153	.9	662	7.4

A Calculated from sum of determined constituents.

7-1195. APISHAPA RIVER NEAR FOWLER, COLO.

LOCATION.--At gaging station, on county highway bridge, 4 miles southeast of Fowler, Otero County, and 5.4 miles upstream from mouth.
DRAINAGE AREA.--1,125 square miles.
RECORDS AVAILABLE.--Chemical analyses: November 1963 to September 1964.

Chemical analyses, in parts per million, November 1963 to September 1964

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Nov. 16, 1963.....	8.5	12		208	58	82	5.2	208		730	29	0.8	8.9	--	A 1240	1.69		760	589	1.3	1570	7.2
Dec. 28.....	4.1	13		311	81	108	4.0	247		1010	38	.9	7.4	--	A 1690	2.30		1110	907	1.4	2080	7.3
Jan. 23, 1964.....	1.8	15		473	117	152	4.3	292		1620	46	.6	4.7	--	A 2580	3.51		1660	1420	1.6	2830	7.3
Feb. 19.....	6.8	12		224	66	100	6.0	226		793	32	.8	9.1	0.16	1430	1.94		830	645	1.5	1660	7.9
Mar. 19.....	2.4	12		337	96	132	5.7	247		1190	41	.8	6.2	.19	2100	2.86		1240	1030	1.6	2220	7.9
Apr. 14.....	2.3	13		411	123	146	5.6	276		1530	49	.7	2.1	.40	2630	3.58		1530	1300	1.6	2660	7.6
May 13.....	.9	5.7		507	146	169	4.6	227		1940	53	.5	..6	.46	3190	4.34		1860	1680	1.7	3060	7.7
June 10.....	17	8.8		81	18	24	2.6	154		185	9.0	.6	1.6	.07	426	.58		278	152	.6	599	7.9
July 7.....	.6	12		523	118	136	5.0	186		1780	43	1.0	5.0	.45	2990	4.07		1790	1640	1.4	2880	7.5
Aug. 7.....	3.8	8.1		242	40	52	6.9	150		732	14	.6	2.1	.11	1280	1.74		770	647	.8	1420	7.1
Sept. 2.....	.7	15		521	126	136	4.6	194		1850	38	.4	8.9	.22	3000	4.08		1820	1660	1.4	2930	7.4

A Calculated from sum of determined constituents.

7-1220. ARKANSAS RIVER NEAR LA JUNTA, COLO.

LOCATION.--At diversion of Fort Lyon Canal, 0.5 mile above headgate, and approximately 3 miles west of LaJunta, Otero County.
DRAINAGE AREA.--12,210 square miles.
RECORDS AVAILABLE.--Chemical analyses: January to September 1964.
REMARKS.--Discharges obtained by adding mean daily flow in the Fort Lyon Canal to the mean daily flow in the Arkansas River at LaJunta.

Chemical analyses, in parts per million, January to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Jan. 23, 1964.....	219	13		176	66	120	6.5	271		686	38	1.0	4.8	--	A 1240	1.69		710	488	2.0	1610	7.0
Feb. 19.....	276	12		176	71	124	6.6	280		702	31	1.0	2.4	0.19	1320	1.80		730	500	2.0	1620	7.7
Mar. 19.....	188	12		192	73	148	7.5	256		828	36	1.2	11	.17	1510	2.05		780	570	2.3	1700	7.7
Apr. 15.....	188	12		182	67	136	7.9	254		764	34	1.0	11	.18	1390	1.89		730	522	2.2	1690	8.1
May 13.....	53	11		281	105	207	8.1	282		1250	59	1.2	9.9	.36	2240	3.05		1130	899	2.7	2440	7.7
June 11.....	656	13		86	19	35	3.2	186		199	9.4	.7	2.5	.10	491	.67		294	141	.9	685	8.1
July 7.....	313	12		102	32	59	5.2	158		344	16	.6	5.2	.14	696	.95		384	254	1.3	920	7.9
Aug. 7.....	687	15		131	29	52	6.0	196		378	11	.6	3.5	.15	767	1.04		444	283	1.1	987	8.0
Sept. 1.....	109	12		180	61	115	6.2	222		703	32	.8	7.2	.22	1260	1.71		700	518	1.9	1560	7.4

A Calculated from sum of determined constituents.

7-1240. ARKANSAS RIVER AT LAS ANIMAS, COLO.

LOCATION.--At gaging station 0.4 mile downstream from bridge on U.S. Highway 50, 1.5 miles north of courthouse in Las Animas, Bent County, and 3.5 miles upstream from Purgatoire River.
DRAINAGE AREA.--14,417 square miles, of which 441 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: November 1963 to September 1964.

Chemical analyses, in parts per million, November 1963 to September 1964

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Nov. 27, 1963.....	8.0	13		361	126	343	5.1	308		1770	98	0.8	5.9	--	A 2870	3.90		1420	1170	4.0	3310	7.2
Dec. 27.....	B 31	13		261	91	242	5.2	265		1190	77	.8	6.8	--	A 2020	2.75		1020	808	3.3	2470	7.4
Jan. 22, 1964.....	24	13		313	109	319	5.0	289		1480	93	.9	5.4	--	A 2480	3.37		1230	993	4.0	2970	7.4
Feb. 19.....	13	13		363	139	400	5.1	328		1890	118	.9	4.7	0.57	3320	4.52		1480	1210	4.5	3530	7.9
Mar. 18.....	12	9.3		335	133	400	5.7	242		1870	116	.9	2.0	.57	3190	4.34		1380	1180	4.7	3430	7.7
Apr. 15.....	24	10		285	112	300	6.7	252		1480	97	1.1	1.7	.47	2600	3.54		1170	963	3.8	2880	7.6
May 13.....	9.0	12		375	126	377	6.3	316		1850	102	1.0	5.3	.59	3230	4.39		1460	1200	4.3	3430	7.8
June 10.....	11	11		273	91	273	6.1	208		1360	77	.8	5.3	.46	2360	3.21		1060	884	3.7	2660	7.6
July 8.....	72	11		148	55	127	5.0	184		659	34	.8	5.6	.15	1200	1.63		595	444	2.3	1500	7.7
Aug. 6.....	190	14		152	40	87	7.0	248		496	18	.7	1.0	.25	974	1.32		545	342	1.6	1240	7.6
Sept. 1.....	35	10		192	71	174	6.4	172		898	58	.9	4.3	.27	1570	2.14		770	629	2.7	1880	7.4

A Calculated from sum of determined constituents.
B Daily mean discharge.

7-1285. PURGATOIRE RIVER NEAR LAS ANIMAS, COLO.

LOCATION.--At gaging station on State Highway 101, 2.3 miles southwest of courthouse in Las Animas, Bent County, and 4.5 miles upstream from mouth.
DRAINAGE AREA.--3,503 square miles.
RECORDS AVAILABLE.--Chemical analyses: November 1963 to September 1964.

Chemical analyses, in parts per million, November 1963 to September 1964

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Nov. 27, 1963.....	5.8	9.2		385	246	539	6.8	318		2540	112	0.7	1.1	--	A 4000	5.44		1970	1710	5.3	4420	7.4
Dec. 28.....	B 6.0	12		365	216	559	6.2	343		2390	115	.6	3.2	--	A 3840	5.22		1800	1520	5.7	4410	7.6
Jan. 23, 1964.....	B 26	12		264	109	272	5.8	279		1320	95	.8	1.1	0.50	2390	3.25		1100	876	3.6	2680	7.6
Feb. 18.....	7.5	11		341	178	412	6.4	302		2050	104	.7	3.1	.29	3570	4.86		1580	1330	4.5	3690	7.4
Mar. 18.....	6.6	8.8		357	265	688	6.8	221		3070	147	.8	3.9	.37	5090	6.92		1980	1800	6.7	5010	7.5
Apr. 14.....	13	6.2		361	238	545	8.1	230		2650	110	.7	4.7	.30	4470	6.08		1880	1690	5.5	4410	7.5
May 13.....	3.0	9.7		397	238	621	5.9	341		2830	137	.8	4.2	.39	4810	6.54		1970	1690	6.1	4800	7.5
June 10.....	9.4	.1		263	198	450	7.8	187		2120	93	.7	.5	.49	3560	4.84		1470	1310	5.1	3690	8.1
July 7.....	1.5	9.0		361	182	463	5.3	254		2290	117	.8	3.1	.39	3850	5.24		1650	1440	5.0	3940	7.5
Aug. 7.....	154	12		161	51	75	7.4	245		547	12	.7	1.2	.11	1040	1.41		610	409	1.3	1270	7.5
Sept. 1.....	.8	5.0		361	182	509	5.9	221		2410	116	.8	.0	.38	3920	5.33		1650	1470	5.5	4050	7.7

A Calculated from sum of determined constituents.
B Daily mean discharge.

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 1964.
Water temperatures: January 1951 to September 1964.
EXTREMES, 1963-64.--Dissolved solids: Maximum, 4,460 ppm Jan. 1-31; minimum, 636 ppm May 27.
Hardness: Maximum, 1,880 ppm Jan. 1-31; minimum, 390 ppm May 25, 26.
Specific conductance: Maximum daily, 4,640 micromhos Dec. 16; minimum daily, 848 micromhos May 27.
Water temperatures: Maximum, 76°F July 7; minimum, 34°F Dec. 10.
EXTREMES, 1951-64.--Dissolved solids: Maximum, 4,510 ppm Nov. 3-13, 1961; minimum, 470 ppm July 6, 1960.
Hardness: Maximum, 1,910 ppm Aug. 8, 1955; minimum, 224 ppm July 6, 1960.
Specific conductance: Maximum daily, 5,180 micromhos Apr. 21, 1955; minimum daily, 643 micromhos July 6, 1960.
Water temperatures: Maximum, 85°F Aug. 6, 1951; minimum, freezing point on several days during winter months.
REMARKS.--Additional samples were collected to further define the quality of water at this station. Records of specific conductance of daily samples available in district office at Salt Lake City, Utah.

Chemical analyses, in parts per million, water year October 1963 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1-31, 1963...	37.5	--		--	--	398	--	234	0	1860	125	--	--		3300	4.49	334	1440	1248	4.6	3600	7.5
Nov. 1-30.....	39.4	--		--	--	427	--	256	0	1970	118	--	--		3350	4.56	356	1500	1290	4.8	3590	7.4
Dec. 1-31.....	9.9	--		--	--	569	--	266	0	2500	140	--	--		4280	5.82	114	1780	1562	5.9	4360	8.0
Jan. 1-31, 1964...	2.9	--		--	--	578	--	255	0	2590	165	--	--		4460	6.07	34.9	1880	1671	5.8	4540	7.9
Feb. 1-29.....	2.5	--		--	--	535	--	280	0	2460	165	--	--		4360	5.93	29.4	1860	1630	5.4	4510	7.7
Mar. 1-31.....	2.9	--		--	--	540	--	244	0	2380	168	--	--		4310	5.86	33.8	1740	1540	5.6	4490	8.1
Apr. 1-30.....	185	--		--	--	506	--	242	0	2230	128	--	--		3810	5.18	1903	1600	1401	5.5	3990	8.0
May 1-20.....	38.0	--		--	--	491	--	258	0	2170	126	--	--		3720	5.06	382	1580	1368	5.4	3890	8.0
May 21-24.....	104	--		--	--	318	--	263	7	1520	87	--	--		2670	3.63	750	1240	1013	3.9	2940	8.3
May 25,26.....	390	--		--	--	129	--	202	0	449	26	--	--		904	1.23	952	390	224	2.8	1190	8.2
May 27.....	556	--		--	--	8.3	--	192	0	291	16	--	--		636	.86	955	465	307	.2	848	7.0
May 28,29.....	721	--		--	--	120	--	243	0	664	25	--	--		1250	1.70	2433	665	466	2.0	1500	7.5
May 30,31.....	10.8	--		--	--	322	--	226	0	1440	90	--	--		2520	3.43	73.5	1110	925	4.2	2800	7.3
June 1,2.....	4.2	--		--	--	490	--	217	0	2140	141	--	--		3700	5.03	42.0	1540	1362	5.4	3900	7.4
June 3-18.....	42.9	--		--	--	588	--	276	0	2520	155	--	--		4280	5.82	496	1790	1564	6.0	4420	7.2
June 19-24.....	939	--		--	--	136	--	153	0	636	34	--	--		1130	1.54	2865	540	414	2.5	1440	7.1
June 25.....	125	--		--	--	345	--	318	0	1620	91	--	--		2850	3.88	962	1320	1059	4.1	3080	6.6
June 26-28.....	145	--		--	--	131	--	184	0	646	40	--	--		1210	1.65	474	595	444	2.3	1510	7.2
June 29,30.....	85.5	--		--	--	240	--	224	0	1130	72	--	--		2010	2.73	464	940	756	3.4	2320	7.4
July 1.....	202	9.5		172	49	140	5.2	216	0	685	45	0.2	3.9		1300	1.77	709	630	453	2.4	1620	7.7
July 2-8.....	269	8.2		119	49	81	4.8	208	0	464	28	.9	3.2		868	1.18	630	500	329	1.6	1150	8.0
July 9-16.....	44.0	8.9		226	90	283	8.2	198	0	1280	79	.9	1.1		2220	3.02	264	935	773	4.0	2520	8.0
July 17-20.....	264	9.9		293	140	400	7.6	216	0	1830	115	--	.3		3130	4.26	2231	1300	1123	4.8	3370	8.0
July 21,22.....	186	13		183	51	82	8.5	262	0	621	19	.3	.1		1150	1.56	578	665	450	1.4	1440	8.0
July 23,24.....	24.5	11		240	88	220	9.0	216	0	1190	63	.4	3.0		2170	2.95	144	960	783	3.1	2320	8.1
July 25,26.....	38.0	12		311	130	375	8.7	244	0	1760	103	.8	1.1		3040	4.13	312	1310	1110	4.5	3240	8.1
July 27,28.....	39.5	8.3		181	72	227	10	188	0	981	60	.5	.1		1720	2.34	183	750	596	3.6	2050	8.0
July 29-31.....	14.7	8.1		289	131	391	7.5	228	0	1750	110	1.0	.0		3030	4.12	120	1260	1073	4.8	3270	8.0
Aug. 1-5.....	19.2	--		--	--	424	--	239	0	1880	134	--	--		3360	4.57	174	1420	1224	4.9	3580	8.2
Aug. 6,7.....	523	--		--	--	101	--	263	0	670	40	--	--		1410	1.92	1991	750	534	1.6	1740	7.7

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

Chemical analyses, in parts per million, water year October 1963 to September 1964--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Aug. 8-13	454	--		--	--	92	--	204	0	566	26	--	--		1090	1.48	1336	592	425	1.6	1350	7.6
Aug. 14-17	152	--		--	--	119	--	231	0	844	64	--	--		1900	2.58	780	900	711	1.7	2220	8.0
Aug. 18,19	114	--		--	--	143	--	212	0	724	45	--	--		1350	1.84	416	680	506	2.4	1670	7.8
Aug. 20-31	38.8	--		--	--	259	--	232	0	1290	89	--	--		2400	3.26	251	1100	910	3.4	2720	7.8
Sept. 1-20	50.0	--		--	--	256	--	229	0	1330	84	--	--		2360	3.21	319	1140	952	3.3	2670	8.0
Sept. 21-30	43.6	--		--	--	400	--	279	0	1830	125	--	--		3280	4.46	386	1440	1211	4.6	3530	7.9
Weighted average	82.5	--		--	--	267	--	218	--	1250	73	--	--		2220	3.02	494	1000	823	3.4	2470	7.4
Time-weighted average	--	--		--	--	427	--	246	--	1940	122	--	--		3400	--	--	1460	1260	4.7	3610	7.6
Tons per day	--	--		--	--	59	--	49	--	279	16	--	--		--	--	--	--	--	--	--	--
Analyses of additional samples (instantaneous discharges shown)																						
Nov. 27, 1963	36	12	0.00	341	148	376	5.9	328	0	1760	115	0.8	4.0	0.45	3200	4.35		1460	1190	4.3	3550	7.4
Dec. 28	3.0	24	--	445	195	561	6.2	267	0	2560	162	.7	4.8	--	4090	5.56		1910	1690	5.6	4600	7.1
Jan. 22, 1964	3.0	21	.00	425	195	577	6.1	300	0	2540	150	.7	4.7	.85	4320	5.88		1860	1610	5.8	4520	7.6
Feb. 18	1.6	22	--	427	174	610	7.0	313	0	2520	153	.7	5.6	.91	4300	5.85		1780	1520	6.3	4440	7.6
Mar. 18	2.6	13	--	325	181	436	7.9	328	0	2010	133	.7	.1	.55	3570	4.86		1560	1290	4.8	3730	8.1
Apr. 14	49	11	--	353	170	410	6.9	332	0	2030	118	.9	2.1	.49	3540	4.81		1580	1310	4.5	3680	7.8
May 12	35	9.7	--	361	170	465	7.0	294	0	2140	124	1.1	.7	.57	3630	4.94		1600	1360	5.1	3850	7.8
June 10	2.6	13	--	357	182	508	7.2	311	0	2170	150	.8	1.3	.51	3870	5.26		1640	1380	5.5	4070	7.8
July 7	206	10	--	122	43	97	4.3	181	0	493	26	.7	5.2	.15	912	1.24		480	332	1.9	1210	7.6
Aug. 7	820	18	--	182	71	115	7.2	340	0	687	22	.4	.4	.28	1330	1.81		748	469	1.8	1540	7.6
Sept. 1	34	11	--	244	117	291	7.0	180	0	1430	87	.9	2.2	.40	2430	3.30		1090	942	3.8	2730	7.2

Temperature (°F) of water, water year October 1963 to September 1964

Month	Day																													Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
October	61	63	63	61	59	58	59	60	59	59	60	60	59	58	56	60	60	58	59	59	58	57	57	58	55	54	55	54	51	52	53	58
November	45	46	47	48	48	48	49	48	47	47	48	45	44	43	43	46	47	45	44	43	45	43	42	42	43	40	41	43	39	38	--	45
December	36	36	36	37	36	38	35	36	36	34	47	47	48	48	46	43	49	47	50	45	40	46	47	49	46	49	49	48	48	48	50	44
January	50	50	49	47	47	47	47	46	47	50	48	47	47	47	47	47	49	49	45	48	50	50	48	47	49	48	48	48	49	49	50	48
February	48	45	44	46	47	45	48	48	47	48	42	47	46	46	47	47	47	48	47	48	48	47	49	48	47	47	43	48	49	--	--	47
March	46	50	43	47	49	50	45	47	49	48	47	50	50	49	50	49	52	52	50	45	47	53	52	47	48	50	51	50	52	53	51	49
April	54	55	51	46	53	53	52	48	48	51	53	52	46	47	53	59	53	52	55	58	54	55	56	57	52	53	52	51	55	56	--	53
May	60	60	57	58	54	53	57	52	56	50	55	54	58	61	63	67	65	65	64	66	63	65	65	67	70	68	65	58	60	54	58	60
June	60	58	58	61	63	62	61	56	62	58	67	65	64	62	63	65	65	63	70	70	70	71	69	68	67	70	70	70	69	68	71	65
July	73	71	72	74	70	74	76	74	72	75	75	72	70	71	72	74	73	73	73	73	68	74	74	75	75	75	71	72	69	67	68	72
August	70	73	73	67	73	75	75	72	73	73	72	70	72	69	70	70	70	68	70	68	64	65	65	66	64	65	67	63	64	64	68	69
September	70	69	68	66	66	67	67	72	69	68	59	60	58	62	60	60	59	61	60	55	57	61	60	59	62	60	58	55	58	59	--	62

7-1330. ARKANSAS RIVER AT LAMAR, COLO.

LOCATION.--At gaging station 450 feet upstream from bridge on U.S. Highways 50 and 287, and 1.2 miles north of city hall in Lamar, Powers County.
DRAINAGE AREA.--19,780 square miles, of which 950 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: November 1963 to September 1964.

Chemical analyses, in parts per million, November 1963 to September 1964

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Nov. 27, 1963.....	2.6	16		361	207	567	8.4	269		2470	152	0.9	6.6	--	A 3920	5.33		1750	1530	5.9	4380	7.6
Dec. 28.....	2.3	15		389	195	580	7.8	314		2440	155	1.0	7.2	--	A 3940	5.36		1770	1510	6.0	4470	7.4
Jan. 23, 1964.....	1.7	15		405	199	604	7.1	314		2520	160	1.1	7.5	--	A 4070	5.54		1830	1570	6.1	4640	7.5
Feb. 18.....	14	15		377	190	654	7.9	256		2580	166	.9	5.5	0.83	4450	6.05		1720	1510	6.9	4550	7.6
Mar. 18.....	3.6	16		393	204	635	8.4	306		2610	163	1.3	8.6	.95	4480	6.09		1820	1570	6.5	4600	7.7
Apr. 14.....	5.0	13		381	165	633	14	295		2450	157	1.0	4.0	.66	4230	5.75		1630	1390	6.8	4360	7.7
May 12.....	2.8	11		377	193	643	8.6	242		2560	171	.9	4.5	.87	4480	6.09		1740	1540	6.7	4610	7.6
June 10.....	8.2	13		373	190	622	8.5	274		2540	155	.9	5.5	.89	4300	5.85		1710	1490	6.5	4450	7.7
July 8.....	9.8	13		236	109	300	6.4	230		1380	84	.8	3.6	.50	2440	3.32		1040	851	4.0	2760	7.7
Aug. 7.....	72	14		184	58	162	7.2	236		793	43	.8	5.0	.21	1430	1.94		700	506	2.7	1750	7.6
Sept. 1.....	.8	9.8		353	182	600	8.7	190		2550	146	1.1	2.0	.77	4120	5.60		1630	1470	6.5	4350	7.6

A Calculated from sum of determined constituents.

7-1375. ARKANSAS RIVER NEAR COOLIDGE, KANSAS

LOCATION.--At gaging station, 1,560 feet upstream from highway bridge, 1 mile south of Coolidge, Hamilton County, and 1.5 miles downstream from Colorado-Kansas state line.
DRAINAGE AREA.--25,410 square miles, of which 1,708 square miles is probably noncontributing.
RECORDS AVAILABLE.--Chemical analyses: November 1963 to September 1964.
REMARKS.--Records of specific conductance of daily samples available in district office at Salt Lake City, Utah.

Chemical analyses, in parts per million, November 1963 to September 1964

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Nov. 27, 1963.....	46	17		369	178	539	9.9	246	0	2290	162	0.8	6.1	--	3690	5.02		1650	1450	5.8	4320	7.6
Dec. 28.....	A 38	17		405	180	580	9.2	298	0	2410	170	.6	6.7	--	3930	5.34		1750	1510	6.0	4410	7.3
Jan. 23, 1964.....	65	16		385	165	533	9.1	284	0	2210	152	.6	5.5	0.51	3910	5.32		1640	1410	5.7	4190	8.0
Feb. 18.....	76	16		395	150	629	10	310	0	2380	168	.8	7.3	.64	4160	5.66		1600	1350	6.8	4300	7.8
Mar. 18.....	37	15		389	153	626	10	243	0	2420	175	1.0	4.3	.68	4160	5.66		1600	1400	6.8	4380	7.4
Apr. 14.....	95	14		377	175	506	10	277	0	2340	140	.8	1.3	.56	3860	5.25		1660	1430	5.4	4080	8.0
May 1-10.....	A 8.5	--		--	--	592	--	248	0	2530	225	--	--	--	--	--		1620	1420	6.4	4510	7.7
May 11.....	A 55	--		--	--	197	--	210	0	910	85	--	--	--	--	--		720	548	3.2	2010	7.2
May 12.....	4.9	12		403	159	566	12	218	0	2420	201	.8	2.4	.54	4110	5.59		1660	1480	6.0	4260	7.5
May 22, 23.....	A 120	--		--	--	286	--	292	0	1250	105	--	--	--	--	--		950	711	4.0	2580	7.9
May 24.....	A 9.8	--		--	--	456	--	250	0	1970	185	--	--	--	--	--		1380	1170	5.3	3670	7.5
May 25-29.....	A 145	--		--	--	573	--	204	0	2420	215	--	--	--	--	--		1580	1410	6.3	4310	7.6
May 30, 31.....	A9395	--		--	--	28	--	132	0	143	12	--	--	--	--	--		194	86	.9	512	7.6
June 10.....	151	14		373	176	540	11	244	0	2260	168	1.0	3.7	.60	4020	5.47		1660	1450	5.8	4200	7.4
July 8.....	10	13		405	165	582	10	237	0	2420	208	.8	4.8	.51	4150	5.64		1690	1500	6.2	4380	7.5
July 18.....	A 399	--		--	--	27	--	212	0	116	7.7	--	--	--	--	--		240	66	.8	661	7.5
July 19.....	A 175	--		--	--	159	--	161	0	640	46	--	--	--	--	--		520	388	3.0	1460	7.5
July 20.....	A 38	--		--	--	348	--	207	0	1400	104	--	--	--	--	--		990	820	4.8	2780	7.6
July 21-28.....	A 4.8	--		--	--	564	--	233	0	2320	208	--	--	--	--	--		1560	1370	6.2	4310	7.7
July 29.....	A 7.0	--		--	--	321	--	178	0	1260	105	--	--	--	--	--		890	744	4.7	2640	7.3
July 30, 31.....	A 2.4	--		--	--	646	--	191	7	2570	228	--	--	--	--	--		1690	1520	6.8	4580	8.3
Aug. 6.....	1.6	13		397	163	582	11	179	0	2510	219	.7	2.1	.57	4250	5.78		1660	1510	6.3	4500	7.6
Sept. 1.....	.1	12		409	165	600	11	150	0	2560	216	.7	.4	.52	4200	5.71		1700	1580	6.3	4480	7.6

A Daily mean discharge.

RIO GRANDE BASIN

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 1964.
Water temperatures: July to September 1964.
EXTREMES, 1963-64.--Dissolved solids: Maximum, 452 ppm May 1-8; minimum, 116 ppm Nov. 10-13.
Hardness: Maximum, 200 ppm June 17-19; minimum, 55 ppm Nov. 10-13.
Specific conductance: Maximum daily, 692 micromhos June 18; minimum daily, 152 micromhos Nov. 9.
EXTREMES, 1946-64.--Dissolved solids: Maximum, 805 ppm Sept. 21, 1959; minimum, 100 ppm Nov. 10-12, 14, 1960.
Hardness: Maximum, 346 ppm June 9-14, 1953; minimum, 44 ppm Nov. 10-12, 14, 1960.
Specific conductance: Maximum daily, 1,110 micromhos Sept. 21, 1959; minimum daily, 122 micromhos June 1, 1949.
REMARKS.--Values reported for sodium (Na) are determined by analysis and do not include potassium (K). Records of specific conductance of daily samples available in district office at Albuquerque, N. Mex. 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, in parts per million, water year October 1963 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1-14, 1963...	16.8	37	0.04	37	8.8	47	7.4	204		51	12	0.8	0.0	0.10	308	0.42	14.0	127	0	1.8	448	7.9
Oct. 15-31.....	37.1	--	--	33	6.7	32	--	166		--	--	--	--	--	245	.33	24.5	110	0	1.3	356	7.7
Nov. 1-4.....	41.8	--	--	34	6.1	32	--	166		--	--	--	--	--	249	.34	28.1	110	0	1.3	356	8.2
Nov. 5-9.....	55.4	--	--	30	5.1	24	--	140		--	--	--	--	--	211	.29	31.6	96	0	1.1	295	7.1
Nov. 10-13.....	258	--	--	18	2.4	11	--	72		15	1.5	--	--	--	116	.16	80.8	55	0	.6	155	7.1
Nov. 14-16.....	65.3	--	--	28	4.4	23	--	130		--	--	--	--	--	198	.27	34.9	88	0	1.1	277	7.9
Nov. 17-30.....	44.0	--	--	33	6.0	30	--	160		--	--	--	--	--	242	.33	28.8	107	0	1.3	342	8.2
Dec. 1.....	43.0	--	--	47	6.9	34	--	232		--	--	--	--	--	282	.38	32.8	146	0	1.2	416	7.9
Dec. 2-15.....	45.9	--	--	36	6.3	32	--	166		--	--	--	--	--	250	.34	31.0	116	0	1.3	365	7.9
Dec. 16-18.....	50.0	--	--	41	6.4	34	--	158		--	--	--	--	--	284	.39	38.3	129	0	1.3	407	7.4
Dec. 19-24.....	59.0	--	--	35	5.0	27	--	134		--	--	--	--	--	236	.32	37.6	108	0	1.1	340	7.5
Dec. 25-31.....	103	--	--	30	3.2	17	--	112		--	--	--	--	--	188	.26	52.3	88	0	.8	263	7.4
Jan. 1-31, 1964...	114	--	--	29	3.0	16	--	112		--	--	--	--	--	176	.24	54.2	85	0	.8	245	7.4
Feb. 1-29.....	129	33	.06	27	2.6	15	5.3	106		22	4.8	.3	.6	.06	169	.23	58.9	78	0	.7	234	7.3
Mar. 1-10.....	171	--	--	24	3.4	16	--	102		--	--	--	--	--	166	.23	76.6	74	0	.8	228	7.4
Mar. 11-29.....	242	--	--	28	3.6	19	--	104		--	--	--	--	--	186	.25	122	85	0	.9	261	7.2
Mar. 30, 31.....	217	--	--	31	4.5	23	--	115		--	--	--	--	--	209	.28	122	96	2	1.0	302	7.1
Apr. 1-10.....	163	--	--	34	6.3	25	--	130		--	--	--	--	--	234	.32	103	111	4	1.0	339	7.2
Apr. 11-24.....	60.5	--	--	46	7.8	41	--	161		--	--	--	--	--	326	.44	53.2	147	15	1.5	474	7.4
Apr. 25-30.....	22.3	--	--	55	10	53	--	190		--	--	--	--	--	407	.55	24.5	180	24	1.7	588	7.3
May 1-8.....	33.2	32	.17	60	11	61	10	193		142	22	.9	2.1	.24	452	.61	40.5	194	36	1.9	644	7.3
May 9, 10.....	33.5	--	--	42	7.5	40	--	191		--	--	--	--	--	310	.42	28.0	136	0	1.5	443	7.4
May 11-15.....	57.6	--	--	35	6.2	32	--	178		--	--	--	--	--	276	.38	42.9	113	0	1.3	377	7.3
May 16-20.....	119	--	--	31	5.0	24	--	142		--	--	--	--	--	226	.31	72.6	98	0	1.1	311	7.2
May 21-23.....	52.7	--	--	37	7.7	36	--	210		--	--	--	--	--	283	.38	40.3	124	0	1.4	404	7.4
May 24-31.....	112	--	--	33	6.4	30	--	182		--	--	--	--	--	246	.33	74.4	109	0	1.3	352	7.3
June 1-6.....	49.5	--	--	34	5.6	26	--	182		--	--	--	--	--	224	.30	29.9	108	0	1.1	328	7.5
June 7, 8.....	40.5	--	--	38	7.5	31	--	196		--	--	--	--	--	256	.35	28.0	126	0	1.2	389	7.2
June 9, 10.....	51.0	--	--	37	6.2	26	--	194		--	--	--	--	--	237	.32	32.6	118	0	1.0	343	7.2
June 11-16.....	31.8	--	--	41	7.7	30	--	204		--	--	--	--	--	261	.35	22.4	134	0	1.1	390	7.4

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

Chemical analyses, in parts per million, water year October 1963 to September 1964--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
June 17-19, 1964..	27.3	--	--	59	13	60	--	210		--	--	--	--	--	436	0.59	32.1	200	28	1.8	648	7.9
June 20-29.....	14.8	--	--	50	9.5	53	--	204		--	--	--	--	--	385	.52	15.4	164	0	1.8	557	7.6
June 30.....	15.0	--	--	49	9.1	39	--	244		--	--	--	--	--	316	.43	12.8	160	0	1.3	472	7.6
July 1-4.....	13.8	--	--	46	9.0	39	--	236		--	--	--	--	--	304	.41	11.3	152	0	1.4	458	7.4
July 5-31.....	7.8	40	0.07	40	9.7	61	7.6	210		82	17	1.1	0.8	0.27	356	.48	7.50	140	0	2.2	537	7.8
Aug. 1-15.....	8.6	--	--	37	8.4	57	--	207		--	--	--	--	--	342	.47	7.94	127	0	2.2	503	7.8
Aug. 16-23.....	24.4	--	--	55	12	62	--	223		--	--	--	--	--	421	.57	27.7	186	3	2.0	629	7.7
Aug. 24-31.....	26.9	--	--	42	8.5	54	--	204		--	--	--	--	--	328	.45	23.8	140	0	2.0	498	7.3
Sept. 1-20.....	8.9	--	--	40	9.0	56	--	204		--	--	--	--	--	335	.46	8.05	137	0	2.1	507	7.7
Sept. 21-30.....	11.9	--	--	43	9.4	61	--	216		--	--	--	--	--	356	.48	11.4	146	0	2.2	539	7.5
Weighted average	71.0	--	--	31	4.7	26	--	129		--	--	--	--	--	213	0.29	41.0	97	1	1.1	302	7.3
Time-weighted average.....	--	--	--	36	6.6	39	--	164		--	--	--	--	--	270	--	--	118	2	1.5	392	7.4
Tons per day....	--	--	--	6.0	0.9	5.0	--	25		--	--	--	--	--	--	--	--	--	--	--	--	--

Temperature (°F) of water, July to September 1964

Month	Day																													Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
July.....	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	72	66	68	66	67	68	72	86	72	72	80	64	--
August.....	71	68	73	71	74	74	73	72	74	63	64	60	69	74	59	76	75	70	67	62	72	76	66	72	67	76	65	58	60	70	67	69
September.....	68	63	66	55	68	78	60	72	67	68	75	68	65	70	65	60	73	71	59	54	57	69	74	68	60	61	57	69	63	--	--	66

COLORADO RIVER MAIN STEM

9-345. COLORADO RIVER AT HOT SULPHUR SPRINGS, COLO.

LOCATION.--At bridge at Hot Sulphur Springs, Grand County, 1 mile downstream from gaging station, and 3.5 miles upstream from Beaver Creek.
DRAINAGE AREA.--782 square miles upstream from gaging station.
RECORDS AVAILABLE.--Chemical analyses: April 1947 to September 1964.
Water temperatures: April 1949 to September 1964.
EXTREMES, 1963-64.--Dissolved solids: Maximum, 113 ppm June 22-30; minimum, 68 ppm May 16-31.
Hardness: Maximum, 72 ppm June 12-21; minimum, 34 ppm May 16-31.
Specific conductance: Maximum daily, 190 micromhos Aug. 12; minimum daily, 74 micromhos May 23-25.
Water temperatures: Maximum, 72°F June 25; minimum, freezing point on many days during winter months.
EXTREMES, 1947-64.--Dissolved solids (1947-50, 1952-64): Maximum, 132 ppm July 16, 1962; minimum, 38 ppm June 21-30, 1947.
Hardness (1947-50, 1952-64): Maximum, 82 ppm May 17, 18, 1963; minimum, 20 ppm June 21-30, 1947.
Specific conductance: Maximum daily, 210 micromhos Apr. 13, 1958; minimum daily, 48 micromhos June 27, 1947.
Water temperatures (1949-64): Maximum, 75°F Aug. 8, 1957; minimum, freezing point on many days during winter months.
REMARKS.--Additional samples were collected to further define the quality of water at this station. Records of specific conductance of daily samples available in district office at Salt Lake City, Utah.

Chemical analyses, in parts per million, water year October 1963 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1-31, 1963...	64.6			20	4.1	9.3		92		4.9	4.0				98	0.13	17.1	66	0	0.5	150	7.3
Nov. 1-30.....	66.2			17	3.9	9.7		86		7.0	1.6				97	.13	17.3	59	0	.6	147	7.9
Dec. 1-2.....	48.5			16	4.1	15		91		10	3.1				111	.15	14.5	56	0	.9	168	7.7
Dec. 3.....	47			15	2.4	9.8		72		8.2	1.2				74	.10	9.39	48	0	.6	116	7.7
Dec. 4-31.....	52.9			15	4.1	13		87		7.2	3.4				104	.14	14.8	55	0	.8	162	8.0
Jan. 1-31, 1964...	57.8			14	1.5	17		84		6.4	2.7				93	.13	14.5	42	0	1.2	154	7.5
Feb. 1-29.....	56.5			16	3.9	9.8		82		7.0	1.9				101	.14	15.4	56	0	.6	153	7.6
Mar. 1-31.....	55.6			--	--	9.7		78		5.6	2.4				95	.13	14.3	52	0	.6	150	7.4
Apr. 1-30.....	157			--	--	8.7		80		5.6	2.5				99	.13	42.0	56	0	.5	151	7.4
May 1-15.....	287			--	--	5.8		71		5.4	2.0				91	.12	70.5	54	0	.3	130	7.1
May 16-31.....	560			--	--	4.2		46		3.9	1.0				68	.09	103	34	0	.3	86	7.4
June 1-11.....	381			15	2.7	8.1		72		3.9	1.8				76	.10	78.1	48	0	.5	118	7.5
June 12-21.....	256			20	5.1	3.6		89		4.1	1.9				94	.13	65.0	72	0	.2	156	7.7
June 22-30.....	233			22	4.1	6.7		97		3.3	1.9				113	.15	71.1	71	0	.3	166	7.5
July 1-31.....	183			21	3.4	11		106		1.6	1.9				105	.14	52.0	67	0	.6	162	7.6
Aug. 1-31.....	109			22	3.2	13		112		1.0	2.4				110	.15	32.4	68	0	.7	162	7.6
Sept. 1-30.....	52.6			20	3.6	8.6		94		2.7	3.5				97	.13	13.8	66	0	.5	160	7.5
Weighted average	132			--	--	8.4		80		4.2	2.0				92	0.13	33.0	55	0	0.4	137	7.4
Time-weighted average.....	--			--	--	10.0		87		4.8	2.5				98	--	--	58	0	0.6	150	7.5
Tons per day....	--			--	--	3.0		29		1.5	0.7				--	--	--	--	--	--	--	--
Analyses of additional samples (instantaneous discharges shown)																						
Dec. 11, 1963.....	50	11	0.17	18	3.6	6.6	1.1	82		5.6	3.0	0.3	1.2	0.00	84	.11		61	0	.4	131	7.4
Apr. 21, 1964.....	225	9.8	.38	18	3.9	5.1	4.9	76		8.2	3.0	.7	.4	.04	95	.13		60	0	.3	134	7.1
June 7.....	392	11	.03	14	3.2	5.4	.7	60		5.6	2.8	.5	.3	.00	83	.11		48	0	.3	102	7.5

COLORADO RIVER MAIN STEM--Continued

9-345. COLORADO RIVER AT HOT SULPHUR SPRINGS, COLO.--Continued

Temperature (°F) of water, water year October 1963 to September 1964

Month	Day																													Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
October	59	57	57	58	61	62	62	57	54	55	58	57	50	53	53	53	53	54	53	50	48	47	47	48	52	48	50	49	44	43	43	53
November	43	43	42	42	42	42	39	39	39	40	42	41	52	41	42	36	32	32	32	32	32	32	32	32	32	32	32	32	32	32	--	37
December	32	32	32	32	32	32	32	32	32	32	32	32	33	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
January	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
February	32	32	32	32	32	32	32	32	32	33	33	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	--	--	32
March	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
April	32	32	32	33	32	32	32	32	32	32	33	32	32	33	33	40	32	42	32	42	32	40	44	40	40	38	38	42	44	48	--	36
May	44	42	42	44	44	45	48	48	51	54	48	54	55	54	56	54	54	54	55	54	55	55	56	54	55	49	52	52	54	53	51	51
June	54	52	50	52	54	59	59	59	56	56	59	61	62	62	63	62	64	62	--	59	59	68	67	68	72	67	67	67	70	68	--	61
July	68	68	68	67	68	68	67	67	68	68	68	70	67	68	66	67	68	68	68	68	65	67	67	68	70	71	69	71	65	64	64	68
August	67	67	67	67	68	68	71	68	70	70	71	71	70	71	71	66	71	64	61	61	61	62	65	64	61	62	62	61	61	62	61	66
September	68	65	67	68	65	68	64	59	59	58	58	59	59	57	56	62	62	54	52	53	52	56	59	59	56	56	58	56	59	60	--	59

9-690. EAGLE RIVER AT GYPSUM, COLO.

LOCATION.--At bridge at Gypsum, Eagle County, about 400 feet upstream from Gypsum Creek, about 520 feet upstream from bridge on U.S. Highways 6 and 24, and about 550 feet upstream from gaging station.
DRAINAGE AREA.--844 square miles.
RECORDS AVAILABLE.--Chemical analyses: April 1947 to September 1964.
Water temperatures: April 1949 to September 1964.
EXTREMES, 1963-64.--Dissolved solids: Maximum, 829 ppm Dec. 1-31; minimum, 120 ppm June 7-18.
Hardness: Maximum, 454 ppm Dec. 1-31; minimum, 84 ppm May 19-31.
Specific conductance: Maximum daily, 1,330 micromhos Dec. 9; minimum daily, 159 micromhos May 23.
Water temperatures: Maximum, 70°F July 26; minimum, freezing point on many days during winter months.
EXTREMES, 1947-64.--Dissolved solids: Maximum, 1,370 ppm Aug. 11, 12, 1952; minimum, 102 ppm May 26-31, 1961.
Hardness (1947-50, 1957-64): Maximum, 558 ppm Oct. 11-20, 1957; minimum, 70 ppm June 23, 1957.
Specific conductance: Maximum daily, 1,850 micromhos Aug. 6, 1949; minimum daily, 155 micromhos May 23, 1958.
Water temperatures (1949-64): Maximum, 76°F Aug. 24, 1949; minimum, freezing point on many days during winter months.
REMARKS.--Additional samples were collected to further define the quality of water at this station. Records of specific conductance of daily samples available in district office at Salt Lake City, Utah.

Chemical analyses, in parts per million, water year October 1963 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1-31, 1963...	144			--	--	93		192		298	130				802	1.09	312	448	290	1.9	1180	7.5
Nov. 1-30.....	195			--	--	72		186		293	98				747	1.02	393	438	285	1.5	1100	7.9
Dec. 1-31.....	156			137	27	93		190		312	125				829	1.13	349	454	298	1.9	1200	7.9
Jan. 1-31, 1964...	150			133	26	84		188		300	110				779	1.06	316	438	284	1.7	1140	8.0
Feb. 1-29.....	142			--	--	91		180		272	130				754	1.03	289	416	268	1.9	1120	7.9
Mar. 1-31.....	139			--	--	83		172		262	115				734	1.00	275	396	255	1.8	1060	7.8
Apr. 1-16.....	171			--	--	65		171		229	98				680	.92	314	376	236	1.5	997	7.8
Apr. 17-30.....	242			--	--	41		138		161	60				473	.64	309	276	163	1.1	713	7.7
May 1-13.....	269			--	--	36		126		121	49				375	.51	272	220	117	1.1	582	7.7
May 14-18.....	953			--	--	3.2		131		46	14				206	.28	530	168	61	.1	327	7.5
May 19-31.....	2102			--	--	4.1		72		26	5.1				122	.17	692	84	25	.2	190	7.6
June 1-6.....	1245			--	--	3.9		86		29	10				157	.21	528	106	35	.2	259	7.6
June 7-18.....	1932			--	--	2.8		73		21	8.6				120	.16	626	88	28	.1	204	7.5
June 19-30.....	1368			--	--	11		79		40	17				168	.23	620	107	42	.5	276	7.5
July 1-8.....	1154			--	--	18		84		55	23				184	.25	573	119	50	.7	318	7.6
July 9-21.....	656			--	--	31		117		93	38				292	.40	517	179	83	1.0	473	7.6
July 22-28.....	431			--	--	43		140		128	54				392	.53	456	231	116	1.2	620	7.6
July 29-31.....	348			--	--	56		163		171	75				507	.69	476	296	162	1.4	767	7.6
Aug. 1-12.....	412			--	--	57		164		155	67				462	.63	514	266	131	1.5	721	7.7
Aug. 13-20.....	332			--	--	71		182		203	92				604	.82	541	336	187	1.7	913	7.6
Aug. 21-24.....	379			--	--	55		158		177	74				524	.71	536	298	168	1.4	788	7.8
Aug. 25-31.....	304			--	--	71		182		206	95				606	.82	497	344	195	1.7	918	7.8
Sept. 1-30.....	209			--	--	84		193		242	90				696	.95	393	354	196	1.9	1030	7.6
Weighted average	427			--	--	33		117		112	44				345	0.47	398	204	108	0.8	526	7.6
Time-weighted average.....	--			--	--	64		161		213	86				596	--	--	335	203	1.4	885	7.7
Tons per day....	--			--	--	38		135		129	51				--	--	--	--	--	--	--	--

9-690. EAGLE RIVER AT GYPSUM, COLO.--Continued

Analyses of additional samples (instantaneous discharges shown)

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids: Parts per million	Dissolved solids: Tons per acre-foot	Dissolved solids: Tons per day	Hardness as $CaCO_3$: Calcium, Magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
Dec. 11, 1963.....	161	10	0.01	140	29	73	2.8	200		286	112	0.0	2.2	0.03	790	1.07		468	304	1.5	1160	7.5
Mar. 24, 1964.....	134	8.5	.21	111	27	65	2.8	168		258	92	.2	1.2	.06	675	.92		386	248	1.4	1000	7.6
June 6.....	1420	6.1	.11	28	5.8	8.0	.7	72		40	12	.3	.9	.01	150	.20		94	35	.4	229	7.4
Sept. 10.....	230	7.3	.00	119	22	65	2.9	185		251	93	.2	.3	.11	675	.92		388	236	1.4	1070	7.7

Temperature (°F) of water, water year October 1963 to September 1964

Month	Day 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Average
October.....	45	61	62	60	45	61	48	48	45	51	52	59	55	55	54	55	58	57	50	49	56	54	52	54	52	55	53	52	56	51	47	53
November.....	45	45	46	46	45	46	47	44	50	45	46	44	43	48	47	44	45	41	44	46	47	47	34	36	39	37	34	38	41	32	--	43
December.....	34	32	34	33	35	33	34	32	34	33	32	32	32	32	34	32	32	33	32	32	32	32	32	32	33	32	33	33	34	32	32	33
January.....	32	33	32	33	32	32	32	32	32	32	32	32	32	32	32	33	32	33	32	35	32	32	33	32	33	33	32	32	33	32	32	32
February.....	32	33	32	32	32	33	32	34	32	33	35	34	32	32	33	34	32	33	32	32	32	32	33	33	34	32	32	32	32	--	--	33
March.....	33	34	33	32	32	33	32	32	32	32	33	35	34	34	33	34	35	32	36	33	38	40	35	34	33	33	40	43	42	44	45	35
April.....	46	42	42	45	44	42	44	45	51	45	54	49	50	51	51	54	53	49	52	49	53	55	58	55	54	53	45	54	50	54	--	50
May.....	53	45	45	50	51	52	50	42	51	50	54	51	58	56	55	53	52	56	54	52	50	54	55	55	50	50	51	52	53	46	49	51
June	50	49	51	57	49	48	54	47	59	57	48	48	48	48	57	48	50	48	53	56	53	47	57	51	51	50	49	58	54	52	--	52
July.....	53	55	50	50	55	55	56	58	53	55	59	60	56	54	56	57	56	56	56	56	57	57	58	60	59	70	56	55	60	60	60	57
August.....	61	61	62	57	58	55	58	58	66	67	57	56	59	56	56	58	52	55	58	55	50	50	53	51	54	52	52	46	53	49	51	56
September.....	53	55	51	52	54	54	55	54	55	55	50	51	62	51	51	47	47	42	50	45	48	41	43	--	45	49	57	43	45	44	--	50

MISCELLANEOUS ANALYSES OF STREAMS IN EAGLE RIVER BASIN

Chemical analyses, in parts per million, water year October 1963 to September 1964

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
9-699. GYPSUM CREEK AT GYPSUM, COLO.																						
Dec. 11, 1963.....	17	12	0.00	128	28	6.3	1.1	243	0	225	4.0	0.1	3.2	0.05	542	0.74		436	237	0.1	743	7.6
Mar. 24, 1964.....	28.4	10	.01	111	21	5.2	1.1	202	0	188	2.2	.2	1.1	.04	472	.64		362	196	.1	668	7.7
June 6.....	2	16	.00	337	51	11	3.6	320	0	809	3.5	.0	4.0	.05	1520	2.07		1050	786	.1	1650	7.7
Sept. 10.....	11.3	16	.03	221	42	11	3.4	310	0	478	7.4	.4	.5	.05	975	1.33		724	470	.2	1180	7.4

Periodic determinations of suspended-sediment discharge, water year October 1963 to September 1964
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Water temperature (°F)	Sampling point	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters											Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
9-700. EAGLE RIVER BELOW GYPSUM, COLO.																		
Mar. 24, 1964.....	1615	40		134	49	18												
June 6.....	1630	53		1420	61	230												
Sept. 10.....	1025	.54		230	32	20												

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

LOCATION.--At Shoshone powerplant, 6 miles upstream from gaging station at Glenwood Springs, Garfield County, and 6.5 miles upstream from Roaring Fork.
DRAINAGE AREA.--4,560 square miles, approximately, upstream from gaging station.
RECORDS AVAILABLE.--Chemical analyses: October 1941 to September 1964.
Water temperatures: May 1949 to September 1964.
EXTREMES, 1963-64.--Dissolved solids: Maximum, 636 ppm July 14-24; minimum, 186 ppm May 24-31.
Hardness: Maximum, 347 ppm July 14-24; minimum, 122 ppm May 24-31, June 1-18.
Specific conductance: Maximum daily, 1,150 micromhos Jan. 15; minimum daily, 276 micromhos May 29.
Water temperatures: Maximum, 69°F July 21; minimum, freezing point on several days during winter months.
EXTREMES, 1941-64.--Dissolved solids: Maximum, 2,030 ppm Aug. 10, 1947; minimum, 105 ppm June 1-10, 1942.
Hardness: Maximum, 1,480 ppm Aug. 10, 1947; minimum, 72 ppm June 1-20, 1942.
Specific conductance: Maximum daily, 2,260 micromhos Aug. 10, 1947; minimum daily, 153 micromhos May 24, 1948.
Water temperatures (1949-64): Maximum, 71°F July 31, 1954, Aug. 19, 1955; minimum, freezing point on many days during winter months.
REMARKS.--Additional samples were collected to further define the quality of water at this station. Records of specific conductance of daily samples available in district office at Salt Lake City, Utah.

Chemical analyses, in parts per million, water year October 1963 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1-16, 1963...	1251					71		132		93	96				396	0.54	1338	187	79	2.3	685	7.2
Oct. 17-31.....	772					97		158		136	132				536	.73	1117	247	117	2.7	901	7.5
Nov. 1-25.....	948					79		153		127	103				473	.64	1211	232	106	2.3	784	8.0
Nov. 26-30.....	733					105		166		151	145				589	.80	1166	270	134	2.8	977	8.1
Dec. 1-31.....	622					109		167		144	150				591	.80	992	262	125	2.9	991	8.0
Jan. 1-31, 1964...	585					114		163		134	162				590	.80	932	253	119	3.1	994	7.9
Feb. 1-29.....	576					115		156		113	170				574	.78	893	236	108	3.3	968	7.5
Mar. 1-31.....	642					101		146		90	160				522	.71	905	220	100	3.0	885	7.3
Apr. 1-20.....	965					92		143		113	125				484	.66	1261	212	95	2.7	799	8.1
Apr. 21-30.....	1305					65		133		80	90				390	.53	1374	178	69	2.1	647	7.6
May 1-15.....	1406					61		132		80	84				372	.51	1412	178	70	2.0	616	8.0
May 16-23.....	4810					17		156		30	20				222	.30	2883	151	23	.6	355	8.1
May 24-31.....	5759					15		120		28	19				186	.25	2892	122	24	.6	300	7.6
June 1-18.....	4200					23		100		44	31				211	.29	2393	122	40	.9	341	7.4
June 19-30.....	2743					37		107		68	51				251	.34	1859	150	62	1.3	455	7.7
July 1-13.....	1927					55		129		96	72				363	.49	1889	187	81	1.8	606	8.0
July 14-24.....	1317					78		164		234	98				636	.86	2262	347	212	1.8	965	8.0
July 25-31.....	1497					60		156		124	76				436	.59	1762	234	106	1.7	709	8.1
Aug. 1-31.....	1422					74		150		118	96				452	.61	1735	220	97	2.2	745	7.9
Sept. 1-30.....	1212					78		140		105	104				437	.59	1430	202	87	2.4	735	7.9
Weighted average	1393					60		136		88	81				376	0.51	1420	188	77	1.8	624	7.6
Time-weighted average.....	--					81		146		109	112				464	--	--	216	97	2.3	773	7.6
Tons per day....	--					224		511		331	305				--	--	--	--	--	--	--	--

Analyses of additional samples (instantaneous discharges shown)

Dec. 11, 1963.....	402	12	0.02	82	18	91	2.9	175		139	140	0.3	1.4	0.03	578	0.79		276	132	2.4	948	7.5
Mar. 24, 1964.....	813	10	.54	62	15	87	2.5	140		107	130	.2	.6	.04	480	.65		216	101	2.6	822	7.7
June 6.....	4320	8.4	.16	36	8.3	24	1.3	103		52	31	.4	.3	.01	225	.31		124	40	.9	351	7.4
Sept. 9.....	1330	8.9	.00	58	11	69	2.5	133		96	94	.2	.6	.06	409	.56		190	81	2.2	678	7.4

Temperature (°F) of water, water year October 1963 to September 1964

Month	Day																													Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
October.....	56	--	56	56	--	56	54	54	54	53	53	53	54	53	50	50	50	51	52	51	49	--	48	48	48	50	49	46	46	46	46	51
November.....	43	43	43	44	43	42	42	42	42	43	--	43	41	41	41	43	--	34	33	33	33	32	--	32	32	33	32	34	32	32	--	38
December.....	32	32	32	32	32	32	32	32	32	32	32	32	32	32	33	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
January.....	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
February.....	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	--	--	32
March.....	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	34	32
April.....	35	36	36	36	--	38	39	38	38	40	34	41	41	38	47	48	48	47	47	46	46	46	47	48	48	45	41	46	50	47	--	43
May.....	52	50	--	44	46	45	46	47	47	47	52	50	51	53	55	55	--	52	55	54	54	51	--	54	50	48	48	50	49	50	50	50
June.....	--	52	53	54	55	56	--	51	52	55	54	53	--	53	54	54	54	54	54	--	53	52	52	55	58	58	58	58	58	58	--	55
July.....	60	60	60	60	60	62	62	63	63	62	62	62	64	63	66	66	66	65	66	68	69	68	68	67	68	--	67	65	67	66	68	64
August.....	67	--	--	67	65	65	65	65	65	64	66	66	66	66	65	64	60	62	62	60	57	56	--	60	61	58	60	56	--	--	57	62
September.....	59	58	58	58	58	--	58	58	57	58	58	58	--	56	56	56	56	56	55	--	53	51	54	54	54	--	54	52	53	54	--	56

9-850. ROARING FORK AT GLENWOOD SPRINGS, COLO.

LOCATION.--At gaging station at Glenwood Springs, Garfield County, and 1,500 feet upstream from mouth.
DRAINAGE AREA.--1,460 square miles, approximately.
RECORDS AVAILABLE.--Chemical analyses: November 1958 to August 1961; May 1962 to September 1964.
Water temperatures: May 1962 to September 1964.
EXTREMES, 1963-64.--Dissolved solids: Maximum, 490 ppm Oct. 1-31; minimum, 136 ppm May 17-31.
Hardness: Maximum, 320 ppm Oct. 1-31; minimum, 105 ppm May 17-31.
Specific conductance: Maximum daily, 820 micromhos Oct. 1; minimum daily, 189 micromhos May 26.
Water temperatures: Maximum, 69°F July 22, 25-27; minimum, freezing point Dec. 12, 13, Jan. 13, 14.
EXTREMES, 1962-64.--Dissolved solids: Maximum, 492 ppm Sept. 20-30, 1963; minimum, 136 ppm May 17-31, 1964.
Hardness: Maximum, 320 ppm Oct. 1-31, 1963; minimum, 105 ppm May 17-31, 1964.
Specific conductance: Maximum daily, 825 micromhos Dec. 27, 1962; minimum daily, 189 micromhos May 26, 1964.
Water temperatures: Maximum, 71°F July 24, 1963; minimum, freezing point on many days during winter months.
REMARKS.--Additional samples were collected to further define the quality of water at this station. Records of specific conductance of daily samples available in district office at Salt Lake City, Utah.

Chemical analyses, in parts per million, water year October 1963 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1-31, 1963...	366					40		198		163	54				490	0.67	484	320	158	1.0	766	7.3
Nov. 1-30.....	438					29		192		147	36				447	.61	529	298	140	.7	677	7.3
Dec. 1-31.....	338					33		194		167	35				468	.64	427	310	151	.8	700	7.8
Jan. 1-31, 1964...	320					35		191		167	37				464	.63	401	306	149	.9	692	7.8
Feb. 1-29.....	272					34		169		165	36				434	.59	319	288	149	.9	656	8.0
Mar. 1-31.....	273					28		168		151	36				440	.60	324	284	146	.7	654	7.6
Apr. 1-15.....	363					19		174		129	29				414	.56	406	276	133	.5	613	7.8
Apr. 16-30.....	503					14		152		107	19				335	.46	455	232	107	.4	501	7.5
May 1-13.....	570					17		146		107	15				307	.42	472	215	95	.5	475	8.1
May 14-16.....	1653					9.2		144		56	6.9				226	.31	1009	166	48	.3	352	8.0
May 17-31.....	4283					2.5		85		35	3.3				136	.18	1573	105	35	.1	222	8.0
June 1-30.....	3540					4.8		90		42	5.1				150	.20	1434	114	40	.2	243	7.8
July 1-18.....	2320					12		116		62	8.4				194	.26	1215	145	50	.4	320	8.1
July 19-31.....	1175					18		144		90	19				280	.38	888	200	82	.6	450	8.2
Aug. 1-31.....	906					28		172		109	29				346	.47	846	234	93	.8	542	8.1
Sept. 1-30.....	511					41		186		143	50				444	.60	612	282	129	1.1	683	8.2
Weighted average	977					15		126		79	16				251	0.34	663	176	73	0.4	394	7.8
Time-weighted average.....	--					26		164		126	30				375	--	--	251	117	0.6	573	7.7
Tons per day....	--					39		333		209	43				--	--	--	--	--	--	--	--
Analyses of additional samples (instantaneous discharges shown)																						
Dec. 10, 1963.....	394	11	0.00	92	17	26	1.6	188		143	33	0.1	2.0	0.02	440	0.60		299	145	0.7	662	7.7
Mar. 23, 1964.....	280	9.7	.05	83	21	28	1.6	168		160	35	.1	.3	.04	416	.57		296	158	.7	642	8.0
June 6.....	3260	6.1	.31	34	6.3	4.8	.8	82		41	6.0	.3	.7	.02	148	.20		110	43	.2	237	7.6
Sept. 9.....	558	11	.00	87	16	34	1.8	193		134	42	.1	.4	.07	435	.59		280	122	.9	665	7.9

9-850. ROARING FORK AT GLENWOOD SPRINGS, COLO.--Continued

Periodic determinations of suspended-sediment discharge, water year October 1963 to September 1964
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Water temperature (°F)	Sampling point	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Dec. 10, 1963.....	1645	35		394	22	23												
Mar. 23, 1964.....	1630	39		280	13	10												
June 6.....	1045	50		3260	83	730												
Sept. 9.....	1500	57		558	30	45												

Temperature (°F) of water, water year October 1963 to September 1964

Month	Day																													Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
October.....	61	60	60	58	56	58	60	59	57	59	56	55	54	56	55	55	54	55	54	52	56	54	52	52	52	53	53	51	51	51	--	55
November.....	48	48	47	48	48	49	49	48	49	50	48	47	44	47	57	46	41	42	39	40	41	42	42	40	40	40	40	39	38	37	--	44
December.....	36	36	35	36	36	36	35	34	34	35	33	32	32	33	34	34	34	36	34	34	36	36	34	34	34	33	35	36	36	33	33	34
January.....	34	34	34	34	34	34	33	34	33	33	33	33	32	32	33	34	34	34	34	34	34	35	34	34	34	35	35	34	34	34	34	34
February.....	34	34	34	34	34	34	34	34	35	39	38	38	35	37	35	37	36	37	37	38	37	38	38	37	38	35	36	36	38	--	--	36
March.....	38	39	39	38	38	38	38	40	36	39	39	37	40	39	41	44	45	45	41	43	44	40	39	41	44	43	43	47	48	48	49	41
April.....	48	48	42	48	49	49	47	47	51	46	53	59	47	53	55	54	51	49	52	47	51	53	55	55	46	43	49	55	57	56	--	50
May.....	53	47	48	49	51	48	53	48	57	54	58	56	55	58	59	55	46	52	55	53	51	52	52	52	50	48	49	60	53	49	50	52
June.....	52	55	52	55	54	53	54	49	54	55	55	53	52	54	56	54	54	53	54	55	55	56	57	59	59	59	59	57	58	57	--	55
July.....	59	59	61	60	62	63	63	61	62	63	64	66	64	65	65	64	63	66	66	67	66	69	66	68	69	69	69	66	68	66	64	65
August.....	63	68	63	64	64	66	66	68	68	68	66	62	66	68	68	62	65	68	64	62	61	63	64	64	64	64	62	62	62	62	63	65
September.....	64	63	63	64	62	62	61	60	60	66	68	63	60	59	58	63	62	62	57	61	57	61	61	62	61	61	61	61	58	60	--	61

9-955. COLORADO RIVER NEAR CAMEO, COLO.

LOCATION.--At Grand Valley project diversion dam, 3.7 miles upstream from Cameo, Mesa County, 0.4 mile upstream from Plateau Creek, and 5.9 miles downstream from gaging station.
DRAINAGE AREA.--8,050 square miles, approximately, upstream from gaging station.
RECORDS AVAILABLE.--Chemical analyses: October 1933 to September 1964.
Water temperatures: April 1949 to September 1964.
EXTREMES, 1963-64.--Dissolved solids: Maximum, 970 ppm Dec. 1-31; minimum, 224 ppm May 22-31.
Hardness: Maximum, 350 ppm Dec. 1-31; minimum, 130 ppm June 1-19.
Specific conductance: Maximum daily, 1,860 micromhos Jan. 16; minimum daily, 335 micromhos May 28.
Water temperatures: Maximum, 72°F July 23, 28-30; minimum, freezing point on many days during winter months.
EXTREMES, 1933-64.--Dissolved solids (1933-43, 1950-64): Maximum, 1,080 ppm Sept. 22, 1962; minimum, 143 ppm June 11-20, 1935.
Hardness (1933-35, 1957-64): Maximum, 474 ppm Sept. 22, 1962; minimum, 98 ppm June 21-30, 1935.
Specific conductance (1941-64): Maximum daily, 1,860 micromhos Jan. 16, 1964; minimum daily, 244 micromhos July 2, 1947, July 3, 1957.
Water temperatures (1949-64): Maximum, 76°F Aug. 16, 1962; minimum, freezing point on many days during winter months.
REMARKS.--Additional samples were collected to further define the quality of water at this station. Records of specific conductance of daily samples available in district office at Salt Lake City, Utah.

Chemical analyses, in parts per million, water year October 1963 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1-18, 1963...	1638			72	16	148		164		147	198				658	0.89	2910	246	111	4.1	1130	7.5
Oct. 19-31.....	1462			91	21	194		198		191	265				846	1.15	3340	314	152	4.8	1430	7.5
Nov. 1-30.....	1518			87	24	169		194		185	235				805	1.09	3299	316	157	4.1	1340	7.4
Dec. 1-31.....	1153			93	29	207		204		222	285				970	1.32	3020	350	183	4.8	1580	7.5
Jan. 1-31, 1964...	940			--	--	230		202		234	305				952	1.29	2416	338	172	5.4	1620	7.8
Feb. 1-29.....	957			--	--	198		190		195	280				878	1.19	2269	322	166	4.8	1510	7.9
Mar. 1-31.....	1084			--	--	191		162		172	275				832	1.13	2435	284	151	4.9	1430	7.6
Apr. 1-18.....	1582			73	22	154		184		139	220				753	1.02	3216	272	121	4.1	1230	7.8
Apr. 19-30.....	2052			65	16	114		158		117	160				588	.80	3258	229	99	3.3	976	7.7
May 1-15.....	2240			63	14	119		158		112	162				576	.78	3484	215	85	3.5	961	7.7
May 16-18.....	6247			62	10	50		177		59	69				374	.51	6308	196	51	1.6	598	7.6
May 19-21.....	7570			55	5.8	20		164		19	37				273	.37	5580	162	27	.7	435	7.7
May 22-31.....	12070			43	6.8	24		130		35	32				224	.30	7300	136	29	.9	361	7.5
June 1-19.....	8642			40	7.3	32		114		40	46				244	.33	5693	130	36	1.2	406	7.6
June 20-30.....	6405			44	7.8	42		112		53	61				288	.39	4980	142	50	1.5	484	7.4
July 1-9.....	5218			46	9.2	52		116		71	70				324	.44	4565	154	59	1.8	535	7.4
July 10-14.....	3616			59	11	74		136		92	102				426	.58	4159	190	78	2.3	713	7.7
July 15-31.....	2792			85	15	98		164		154	134				598	.81	4508	272	137	2.6	965	7.6
Aug. 1-31.....	2489			77	17	116		178		144	155				597	.81	4012	262	116	3.1	1000	7.6
Sept. 1-30.....	1944			--	--	136		171		146	182		1.4		635	.86	3333	254	114	3.7	1080	7.7
Weighted average	2600			--	--	95		152		106	132		--		501	0.68	3520	213	88	2.6	836	7.5
Time-weighted average.....	--			--	--	145		172		153	200		--		688	--	--	266	125	3.7	1154	7.6
Tons per day....	--			--	--	670		1070		745	924		--		--	--	--	--	--	--	--	--
Analyses of additional samples (instantaneous discharges shown)																						
Dec. 10, 1963.....	1070	10	0.06	98	27	176	4.9	216		200	260	0.4	6.7	0.05	916	1.25		354	177	4.1	1500	7.4
Mar. 23, 1964.....	1200	7.3	.02	75	23	179	5.0	182		172	250	.4	3.5	.08	831	1.13		282	133	4.7	1380	7.6
June 5.....	7500	8.1	.23	39	8.5	37	1.3	110		57	47	.4	.8	.02	264	.36		132	42	1.4	433	7.8
Sept. 9.....	2030	8.0	.00	73	17	134	4.0	171		139	179	.3	.4	.08	644	.88		250	110	3.7	1070	7.6

9-955. COLORADO RIVER NEAR CAMEO, COLO.--Continued

Temperature (°F) of water, water year October 1963 to September 1964

Month	Day																													Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
October	58	58	58	58	58	56	56	56	56	56	56	56	55	55	54	54	54	54	54	55	54	53	53	53	52	52	52	51	--	50	48	54
November	46	46	46	46	46	46	46	47	47	44	44	44	44	44	44	40	40	38	37	37	37	37	37	37	36	36	36	35	35	34	--	41
December	35	35	33	33	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
January	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
February	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	--	--	32
March	33	33	33	33	33	33	32	32	32	32	32	32	32	32	32	32	33	33	34	35	35	36	36	36	37	38	38	38	42	44	45	35
April	42	42	42	42	42	41	40	40	40	44	45	46	47	45	44	50	50	50	50	49	47	50	50	49	48	45	45	47	51	52	--	46
May	52	52	49	47	47	47	47	47	48	55	52	55	55	51	52	58	57	55	54	55	54	54	53	52	53	52	50	50	51	51	51	52
June	52	53	55	54	57	56	57	54	52	54	56	55	55	56	56	57	57	55	55	55	57	55	55	57	60	61	61	61	61	60	--	56
July	60	62	64	64	64	64	65	66	66	66	66	68	68	--	68	70	70	68	68	68	70	71	72	71	70	71	70	72	72	72	71	68
August	70	69	70	68	67	69	69	70	70	70	70	70	68	69	70	68	66	65	67	65	66	63	64	64	64	64	64	63	62	58	62	67
September	62	61	60	63	63	65	65	63	64	64	63	62	62	62	61	61	60	60	60	59	58	55	56	56	--	--	--	--	--	--	--	61

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 1964.
Water temperatures: April 1949 to September 1964.
EXTREMES, 1963-64.--Dissolved solids: Maximum, 2,100 ppm Oct. 1-22; minimum, 203 ppm May 22-26.
Hardness: Maximum, 1,060 ppm Oct. 1-22; minimum, 130 ppm May 22-26.
Specific conductance: Maximum daily, 2,470 micromhos Oct. 11; minimum daily, 296 micromhos May 25.
Water temperatures: Maximum, 73°F July 21; minimum, freezing point on many days during winter months.
EXTREMES, 1931-64.--Dissolved solids: Maximum, 2,820 ppm Sept. 11-20, 1934; minimum, 203 ppm May 11-20, 1944, May 22-26, 1964.
Hardness (1931-35, 1943-64): Maximum, 1,370 ppm Sept. 1-20, 1934; minimum, 130 ppm May 22-26, 1964.
Specific conductance (1941-64): Maximum daily, 2,730 micromhos Sept. 10, 1956; minimum daily, 280 micromhos May 23, 1948.
Water temperatures (1949-64): Maximum, 86°F Aug. 13, 1958; minimum, freezing point on many days during winter months.
REMARKS.--Additional samples were collected to further define the quality of water at this station. Records of specific conductance of daily samples available in district office at Salt Lake City, Utah.

Chemical analyses, in parts per million, water year October 1963 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1-22, 1963...	769			--	--	174		262		1140	27				2100	2.86	4360	1060	845	2.3	2370	7.4
Oct. 23-31.....	1183			--	--	109		266		751	19				1460	1.99	4663	790	572	1.7	1770	7.4
Nov. 1-30.....	1101			--	--	116		244		640	18				1250	1.70	3716	640	440	2.0	1560	7.7
Dec. 1-31.....	798			143	63	138		200		695	18				1240	1.69	2672	614	450	2.4	1500	7.9
Jan. 1-31, 1964...	706			135	60	125		216		629	17				1160	1.58	2211	584	407	2.3	1420	8.0
Feb. 1-29.....	788			--	--	106		226		554	20				1110	1.51	2362	560	375	1.9	1390	7.9
Mar. 1-31.....	692			--	--	111		211		572	21				1120	1.52	2093	556	383	2.0	1420	7.6
Apr. 1-17.....	1078			--	--	99		216		464	17				905	1.23	2634	468	291	2.0	1160	8.0
Apr. 18-27.....	1818			--	--	37		174		228	12				567	.77	2783	316	173	.9	775	8.2
Apr. 28-30.....	897			--	--	56		174		345	17				753	1.02	1824	404	261	1.2	983	7.9
May 1.....	2320			--	--	77		210		411	16				822	1.12	5149	456	284	1.6	1100	7.5
May 2-5.....	2660			--	--	41		180		232	12				549	.75	3943	316	168	1.0	752	7.9
May 6-12.....	1461			--	--	73		182		396	15				783	1.06	3089	424	275	1.5	1020	7.7
May 13-16.....	5210			--	--	26		172		163	5.5				410	.56	5767	262	121	.7	589	7.7
May 17-21.....	10960			--	--	13		128		76	2.6				242	.33	7161	159	54	.4	358	7.9
May 22-26.....	12340			--	--	10		100		64	2.8				203	.28	6764	130	48	.4	303	7.9
May 27-31.....	10010			--	--	16		108		100	2.8				260	.35	7027	162	73	.5	380	7.7
June 1-21.....	6060			--	--	24		120		142	4.2				341	.46	5579	200	102	.7	497	7.8
June 22-30.....	3540			--	--	43		138		231	5.0				471	.64	4502	268	155	1.1	666	7.9
July 1-8.....	2079			--	--	51		163		336	5.7				665	.90	3733	380	246	1.1	891	7.7
July 9-14.....	1148			--	--	62		183		423	14				892	1.21	2765	476	326	1.2	1130	7.8
July 15-17.....	1044			--	--	80		228		664	19				1350	1.84	3805	730	543	1.3	1620	7.7
July 18-22.....	1108			--	--	92		214		548	14				1060	1.44	3171	566	390	1.7	1300	7.8
July 23.....	990			--	--	73		340		270	12				774	1.05	2069	418	139	1.6	987	7.4
July 24,25.....	1120			--	--	107		229		656	17				1210	1.65	3659	662	474	1.8	1480	7.8

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

Chemical analyses, in parts per million, water year October 1963 to September 1964--Continued

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
July 26-31	1059			--	--	72		212		497	13				979	1.33	2799	552	378	1.3	1220	7.6
Aug. 1-3	1383			--	--	65		246		536	16				1150	1.56	4294	640	438	1.1	1450	7.9
Aug. 4	1940			--	--	130		256		882	17				1650	2.24	8643	870	660	1.9	1900	7.7
Aug. 5-26	1660			--	--	55		234		584	14				1140	1.55	5109	700	508	.9	1420	7.6
Aug. 27-31	893			--	--	114		224		768	17				1390	1.89	3351	760	576	1.8	1670	7.9
Sept. 1-30	1000			--	--	138		244		849	25				1460	1.99	3942	820	620	2.1	1740	8.0
Weighted average	1856			--	--	59		169		353	10				714	0.97	3580	393	254	1.1	915	7.7
Time-weighted average	--			--	--	97		209		566	16				1080	--	--	573	402	1.7	1338	7.7
Tons per day	--			--	--	295		847		1170	52				--	--	--	--	--	--	--	--
Analyses of additional samples (instantaneous discharges shown)																						
Dec. 9, 1963	840	17	0.01	168	66	116	4.5	259		658	18	0.6	6.8	0.18	1250	1.70		690	478	1.9	1590	7.5
Mar. 23, 1964	728	13	.19	123	57	111	4.5	211		576	18	.4	4.7	.14	1080	1.47		542	369	2.1	1360	7.9
June 5	4920	13	.12	56	18	28	1.9	110		173	5.0	.2	1.7	.05	366	.50		212	122	.8	516	7.8
Sept. 9	930	15	.03	197	69	127	4.9	234		805	17	.6	5.1	.23	1410	1.92		774	582	2.0	1680	7.7

Temperature (°F) of water, water year October 1963 to September 1964

Month	Day																													Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
October	60	60	60	58	63	60	60	61	62	60	57	60	58	55	57	55	57	57	57	54	57	54	57	54	57	54	54	54	54	54	56	57
November	48	46	47	48	52	49	50	49	47	47	46	47	44	45	46	45	46	44	41	44	41	40	39	38	38	37	37	37	32	35	--	44
December	--	34	--	32	--	34	--	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
January	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	34	34	35	34	33	33	32	32	33	34	33	32	32
February	--	--	34	34	33	33	33	33	34	34	33	32	32	32	--	--	34	--	34	--	34	--	--	33	--	32	--	35	--	--	--	--
March	--	35	--	38	--	35	--	--	37	--	39	--	41	--	--	45	--	46	--	39	--	--	34	--	39	--	42	--	--	40	--	--
April	49	47	45	45	46	45	44	43	43	46	46	45	46	47	50	56	55	47	47	48	46	49	51	51	48	45	44	48	53	55	--	48
May	56	53	46	47	43	43	47	50	48	52	54	54	55	55	55	55	54	54	53	55	55	54	57	54	54	53	56	56	54	53	52	52
June	55	57	53	55	58	59	60	57	55	57	60	59	60	60	60	61	60	56	60	60	60	61	65	63	68	65	68	66	66	65	--	60
July	64	65	66	67	66	67	72	69	68	69	71	71	72	71	71	72	69	70	70	72	73	71	69	72	69	71	71	72	71	71	72	70
August	71	69	69	70	68	68	69	70	70	72	71	70	70	69	67	67	65	65	67	65	62	65	67	64	65	65	67	64	62	64	63	67
September	64	67	65	67	69	63	64	62	65	64	63	63	62	64	60	62	61	60	60	57	56	55	56	59	59	57	59	57	58	58	--	61

Periodic determinations of suspended-sediment discharge, water year October 1963 to September 1964
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Water temperature (°F)	Sampling point	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Dec. 9, 1963	1655	32		840	127	290												
Mar. 23, 1964	0915	41		740	75	150												
June 5	1040	60		4940	226	3000												
Sept. 9	0830	64		940	147	370												

MISCELLANEOUS ANALYSES OF STREAMS IN GUNNISON RIVER BASIN

Chemical analyses, in parts per million, water year October 1963 to September 1964

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
9-1495. UNCOMPAHGRE RIVER AT DELTA, COLO.																						
Dec. 9, 1963.....	148	18	--	297	131	287	5.6	312	0	1560	30	0.9	28	0.35	2630	3.58		1280	1020	3.5	2950	7.4
Mar. 24, 1964.....	121	14	0.23	236	103	231	6.0	288	0	1240	29	.6	12	.24	2110	2.87		1010	776	3.2	2400	7.6
June 5.....	517	17	.17	196	56	119	3.7	222	0	765	16	.5	8.9	.18	1350	1.84		720	538	1.9	1610	7.8
Sept. 8.....	187	19	.81	234	69	147	4.4	250	0	951	15	.9	6.5	.45	1630	2.22		870	665	2.2	1890	7.6

Periodic determinations of suspended-sediment discharge and particle-size analyses, water year October 1963 to September 1964

(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Water temperature (°F)	Sampling point	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
9-1495. UNCOMPAHGRE RIVER AT DELTA, COLO.																	
Dec. 9, 1963.....	1430	37		148	160	64											
Mar. 22, 1964.....	1800	43		121	440	140											
June 4.....	1920	68		421	370	420	37	49		74		94	98	100				VPWC
Sept. 8.....	1815	65		187	114	58											

9-1635.3. COLORADO RIVER BELOW COLORADO-UTAH STATE LINE

LOCATION.--At Westwater, Grand Count, Utah, 9.5 miles downstream from gaging station, and about 4 miles downstream from Colorado-Utah State line.
DRAINAGE AREA.--17,900 square miles, approximately, upstream from gaging station.
RECORDS AVAILABLE.--Chemical analyses: May 1962 to September 1964.
Water temperatures: May 1962 to September 1964.
EXTREMES, 1963-64.--Dissolved solids: Maximum, 1,870 ppm Aug. 1; minimum, 295 ppm May 21-31.
Hardness: Maximum, 1,050 ppm Aug. 1; minimum, 178 ppm May 21-31.
Specific conductance: Maximum daily, 2,170 micromhos Jan. 15; minimum daily, 398 micromhos May 24.
Water temperatures: Maximum, 80°F July 24; minimum, 33°F on many days during winter months.
EXTREMES, 1962-64.--Dissolved solids: Maximum, 2,100 ppm July 31, 1962; minimum, 295 ppm May 21-31, 1964.
Hardness: Maximum, 910 ppm Aug. 1-8, 1963; minimum, 164 ppm May 10-18, 1962.
Specific conductance: Maximum daily, 3,020 micromhos Aug. 8, 1962; minimum daily, 372 micromhos May 14, 1962.
Water temperatures: Maximum, 80°F July 24, 1964; minimum, 33°F on many days during winter months.
REMARKS.--Additional samples were collected to further define the quality of water at this station. Records of specific conductance of daily samples available in district office at Salt Lake City, Utah. Records of daily discharge data given for Colorado River near Colorado-Utah State line.

Chemical analyses, in parts per million, water year October 1963 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1-31, 1963...	2186			--	--	196		223	0	723	150				1510	2.05	8912	720	537	3.2	1990	7.5
Nov. 1-30.....	2924			--	--	146		222	0	512	135				1170	1.59	9237	588	406	2.6	1630	7.4
Dec. 1-31.....	2048			--	--	147		231	0	441	175				1250	1.70	6912	575	386	2.7	1760	7.7
Jan. 1-15, 1964...	1772			144	57	207		244	0	547	195				1340	1.82	6411	595	395	3.7	1900	8.0
Jan. 16-31.....	1964			123	49	200		218	0	503	172				1140	1.55	6045	510	331	3.9	1660	7.8
Feb. 1-29.....	1815			--	--	191		214	0	455	185				1120	1.52	5488	494	318	3.7	1670	7.7
Mar. 1-31.....	1984			--	--	188		198	0	424	190				1110	1.51	5946	464	302	3.8	1600	7.5
Apr. 1-14.....	2784			--	--	153		182	0	366	138				950	1.29	7141	392	243	3.4	1360	7.6
Apr. 15-30.....	3153			--	--	106		158	0	296	94				736	1.00	6266	344	214	2.5	1060	7.7
May 1-11.....	3134			--	--	114		180	0	352	86				829	1.13	7015	388	240	2.5	1170	7.7
May 12,13.....	3570			--	--	59		186	0	213	52				586	.80	5648	320	167	1.4	859	7.8
May 14,15.....	6125			--	--	112		206	0	357	73				816	1.11	13495	400	231	2.4	1130	7.8
May 16.....	9400			--	--	45		170	0	190	43				538	.73	13645	300	161	1.1	794	7.6
May 17-20.....	16600			--	--	32		193	0	93	24				352	.48	15777	220	62	.9	537	7.7
May 21-31.....	23490			--	--	28		144	0	89	20				295	.40	18710	178	60	.9	454	8.0
June 1-30.....	12600			--	--	45		128	0	150	37				392	.53	13336	216	111	1.3	601	7.6
July 1-9.....	6687			--	--	77		147	0	250	64				599	.81	10815	304	183	1.9	890	7.7
July 10-31.....	3398			--	--	131		196	0	474	101				1040	1.41	9542	512	351	2.5	1410	7.8
Aug. 1.....	4200			--	--	151		352	0	931	86				1870	2.54	21206	1050	761	2.0	2150	8.0
Aug. 2-9.....	4150			--	--	101		246	0	445	97				1080	1.47	12101	582	380	1.8	1440	8.2
Aug. 10.....	2950			--	--	34		182	0	106	29				392	.53	3122	226	77	1.0	555	8.2
Aug. 11-31.....	3356			--	--	135		218	0	551	108				1180	1.60	10692	612	433	2.4	1560	8.2
Sept. 1-30.....	2556			--	--	172		208	4	638	134				1450	1.97	10007	656	479	2.9	1770	8.3
Weighted average	4287			--	--	98		176	--	315	85				768	1.04	8890	380	235	2.0	1081	7.7
Time-weighted average.....	--			--	--	144		201	--	445	129				1060	--	--	498	333	2.7	1464	7.6
Tons per day....	--			--	--	1140		2040	--	3650	985				--	--	--	--	--	--	--	--

9-1635.3. COLORADO RIVER BELOW COLORADO-UTAH STATE LINE--Continued

Analyses of additional samples (instantaneous discharges shown)

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 18, 1963.....	1800	9.6	0.14	200	58	186	5.9	266	0	705	162	0.6	7.4	0.20	1480	2.01		740	555	3.0	1960	7.7
Jan. 23, 1964.....	2150	11	.28	122	50	181	4.9	220	0	471	170	.3	9.3	.15	1160	1.58		510	330	3.5	1640	7.4
Apr. 24.....	3220	12	.21	80	29	98	4.5	160	0	282	92	.5	4.9	.08	693	.94		320	189	2.4	1030	7.8
July 6.....	6340	7.6	.45	80	24	67	2.6	140	0	252	62	.3	1.1	.11	594	.81		300	185	1.7	873	7.6
Sept. 17.....	5480	12	.01	162	55	164	5.8	212	0	623	118	.5	4.4	.21	1240	1.69		630	456	2.8	1700	7.7

Temperature (°F) of water, water year October 1963 to September 1963

Month	Day																													Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
October.....	63	63	63	63	63	63	62	62	62	61	61	61	61	60	60	59	59	59	58	58	57	57	56	56	57	57	55	55	54	54	53	59
November.....	53	51	51	51	50	50	50	50	50	49	49	49	50	48	47	47	46	45	43	43	42	42	41	41	41	40	40	40	40	39	--	46
December.....	39	38	38	37	37	36	36	35	35	34	34	33	34	34	34	34	35	35	34	34	35	35	35	35	34	34	34	34	34	35	35	35
January.....	35	35	34	34	34	34	34	34	34	33	33	33	34	34	34	34	33	33	33	33	33	34	33	33	33	33	33	34	34	34	33	34
February.....	33	33	33	33	33	33	33	33	33	33	33	33	34	34	34	34	34	34	35	35	36	36	36	36	36	36	36	35	35	--	--	34
March.....	34	35	35	35	34	34	34	35	35	36	36	37	38	38	39	39	40	40	41	42	42	44	46	47	47	47	48	50	51	51	51	41
April.....	51	50	50	50	50	50	50	50	51	51	51	51	51	51	51	51	51	51	52	52	52	52	53	53	53	53	57	57	58	59	--	52
May.....	56	55	53	52	51	51	52	53	55	55	57	58	58	58	59	59	59	59	60	60	60	59	59	59	58	58	59	58	57	57	57	57
June.....	51	58	58	59	59	60	60	61	62	62	63	64	64	64	65	55	56	58	58	60	60	61	62	64	65	65	67	68	68	69	--	62
July.....	69	70	71	73	73	74	74	75	75	76	76	76	77	77	77	76	75	76	77	77	77	78	78	80	79	78	76	78	79	79	78	76
August.....	75	76	76	76	75	75	75	75	76	76	75	75	74	74	73	74	73	73	71	70	69	69	68	69	69	69	67	67	67	67	67	72
September.....	67	68	67	65	66	66	67	67	68	68	68	69	69	69	69	69	64	63	64	62	64	61	61	60	61	61	59	60	62	60	--	65

MISCELLANEOUS ANALYSES OF STREAMS IN COLORADO RIVER MAIN STEM

Chemical analyses, in parts per million, water year October 1963 to September 1964

Date of collection	Discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C): Parts per million	Dissolved solids (residue at 180°C): Tons per acre-foot	Dissolved solids (residue at 180°C): Tons per day	Hardness as $CaCO_3$: Calcium, Magnesium	Hardness as $CaCO_3$: Noncarbonate	Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
9-705. COLORADO RIVER NEAR DOTSERO, COLO.																						
Dec. 11, 1963.....	620	12	--	74	17	42	2.5	163	0	123	59	0.3	1.5	0.05	417	0.57		254	120	1.1	669	7.2
Mar. 24, 1964.....	635	10	0.89	59	15	33	2.8	136	0	99	48	.1	.6	.03	326	.44		208	96	1.0	535	7.8
June 6.....	3910	8.3	.13	35	7.8	11	1.4	94	0	49	12	.4	.7	.04	181	.25		120	43	.4	278	7.6
Sept. 10.....	1020	7.0	--	63	12	33	2.2	138	0	109	40	.2	.1	.07	346	.47		204	91	1.0	541	7.8
9-725. COLORADO RIVER AT GLENWOOD SPRINGS, COLO.																						
Dec. 10, 1963.....	722	12	--	90	23	182	4.7	187	0	155	300	0.3	1.6	0.02	870	1.18		318	165	4.4	1490	7.5
Mar. 23, 1964.....	49	11	0.28	97	21	629	15	196	0	186	960	.1	.8	.08	2010	2.73		328	167	15	3480	7.3
June 5.....	4400	8.3	.33	37	7.8	34	1.6	103	0	48	51	.3	.7	.02	249	.34		124	40	1.3	407	7.7
Sept. 9.....	1330	8.0	--	62	12	150	4.5	144	0	107	218	.2	.1	.05	646	.88		202	84	4.6	1110	7.6

Periodic determinations of suspended-sediment discharge, water year October 1963 to September 1964
(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Water temperature (°F)	Sampling point	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters: 0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	Method of analysis
9-705. COLORADO RIVER NEAR DOTSERO, COLO.																		
Dec. 11, 1963.....	0830	33		D 620	33	55												
Mar. 24, 1964.....	1330	36		635	21	36												
June 6.....	1430	58		3910	186	2000												
Sept. 10.....	0850	56		1020	27	74												
9-725. COLORADO RIVER AT GLENWOOD SPRINGS, COLO.																		
Dec. 10, 1963.....	1415	35		722	32	62												
Mar. 23, 1964.....	1430	42		49	128	17												
Mar. 24.....	1145	37		813	73	160												
June 5.....	1510	57		4400	139	1700												
Sept. 9.....	1330	64		685	42	78												

D Daily mean discharge.

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 1964.
Water temperatures: November 1950 to September 1964.
Sediment records: December 1950 to May 1958.
EXTREMES, 1963-64.--Dissolved solids: Maximum, 499 ppm Dec. 1-18; minimum, 64 ppm June 13.
Hardness: Maximum, 234 ppm Dec. 1-18; minimum, 48 ppm June 13.
Specific conductance: Maximum daily, 837 micromhos Dec. 9; minimum daily, 108 micromhos June 1, 2, 17, 18.
Water temperatures: Maximum, 80°F July 28; minimum, freezing point Dec. 1.
EXTREMES, 1950-64.--Dissolved solids: Maximum, 545 ppm Sept. 21-30, 1956; minimum, 64 ppm June 13, 1964.
Hardness: Maximum, 271 ppm Dec. 27-31, 1962; minimum, 43 ppm June 1-21, 1959.
Specific conductance: Maximum daily, 947 micromhos Sept. 24, 1955; minimum daily, 94 micromhos June 14, 1959.
Water temperatures: Maximum, 85°F Aug. 5, 1963; minimum, freezing point on many days during winter months.
REMARKS.--Additional samples were collected to further define the quality of water at this station. Records of specific conductance of daily samples available in district office at Salt Lake City, Utah.

Chemical analyses, in parts per million, water year October 1963 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1-31, 1963...	117					80		200	0	88	62				402	0.55	127	170	6	2.7	671	7.8
Nov. 1-30.....	201					68		210	0	87	53				389	.53	211	190	18	2.1	644	7.6
Dec. 1-18.....	134					96		277	0	114	69				499	.68	180	234	7	2.7	805	8.1
Dec. 19-31.....	142					54		209	0	73	34				339	.46	130	179	8	1.8	542	7.9
Jan. 1-31, 1964...	137					52		204	0	70	29				318	.43	118	167	0	1.8	511	8.0
Feb. 1-29.....	160					64		200	0	68	27				307	.42	133	134	0	2.4	508	8.0
Mar. 1-31.....	221					45		192	0	69	26				314	.43	187	168	10	1.5	501	7.8
Apr. 1-10.....	450					41		144	0	73	37				308	.42	374	156	38	1.4	495	7.7
Apr. 11-28.....	1469					28		158	0	92	8.0				293	.40	1162	176	46	.9	449	7.6
Apr. 29,30.....	1455					16		140	0	60	6.2				230	.31	904	150	35	.6	354	7.7
May 1-16.....	2663					13		138	0	41	4.9				202	.27	1452	135	22	.5	318	7.8
May 17-21.....	8412					5.5		104	0	14	1.6				128	.17	2907	90	5	.3	196	7.5
May 22-31.....	8359					4.8		64	0	11	1.7				87	.12	1964	56	3	.3	134	7.2
June 1-9.....	5822					3.0		54	0	9.1	1.6				72	.10	1132	50	6	.2	112	7.3
June 10-12.....	5620					6.0		68	0	14	2.0				94	.13	1426	60	4	.3	145	7.4
June 13.....	4920					3.4		52	0	9.9	1.8				64	.09	850	48	5	.2	111	7.1
June 14-16.....	5037					7.4		70	0	17	2.0				98	.13	1333	62	5	.4	153	7.4
June 17-30.....	4157					4.6		61	0	13	1.6				83	.11	932	56	6	.3	130	7.3
July 1,2.....	4025					17		92	0	24	8.2				133	.18	1445	76	1	.8	206	7.7
July 3.....	3420					8.3		64	0	14	2.3				92	.13	850	52	0	.5	126	7.7
July 4,5.....	2885					14		88	0	22	7.4				139	.19	1083	76	4	.7	206	7.9
July 6-31.....	944					22		126	4	40	9.9				193	.26	492	118	8	.9	307	8.4
Aug. 1-31.....	317					34		166	0	58	15				247	.34	211	144	8	1.2	403	8.1
Sept. 1-7.....	241					36		158	0	53	19				237	.32	154	134	4	1.4	392	8.2
Sept. 8-30.....	158					56		193	0	86	29				319	.43	136	166	8	1.9	542	8.2
Weighted average	1192					14		99	--	29	6.7				148	0.20	476	91	10	0.5	232	7.4
Time-weighted average.....	--					45		171	--	65	27				285	--	--	148	10	1.5	462	7.7
Tons per day....	--					45		317	--	93	21				--	--	--	--	--	--	--	--

Analyses of additional samples (instantaneous discharges shown)

Oct. 23, 1963.....	132	1.5	0.09	44	17	85	3.1	211	0	102	64	0.2	0.1	0.17	417	0.57		181	8	2.8	690	7.9
Jan. 22, 1964.....	170	13	.18	40	16	46	2.0	202	0	67	27	.3	1.0	.15	309	.42		166	0	1.6	499	7.5
Apr. 8.....	1000	8.7	.20	37	19	40	3.1	157	0	115	19	.3	2.0	.04	320	.44		172	43	1.3	497	7.7
July 20.....	670	8.5	.47	26	8.8	19	1.6	115	0	30	16	.5	.3	.08	181	.25		102	8	.8	291	7.8
Sept. 24.....	174	1.9	.68	38	19	55	2.8	199	0	95	25	.4	.4	.09	339	.46		172	9	1.8	539	7.7

Temperature (°F) of water, water year October 1963 to September 1964

Month	Day																													Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
October.....	64	51	62	63	59	62	63	63	62	59	62	58	58	59	58	61	57	59	58	52	57	55	52	53	46	49	52	47	52	53	47	57
November.....	51	53	49	49	48	49	51	50	44	49	49	44	49	49	48	47	49	35	47	43	34	40	34	40	40	34	41	34	37	39	--	44
December.....	32	34	34	34	34	35	35	34	34	34	34	34	35	35	35	35	35	35	35	36	36	36	36	36	35	35	36	36	36	36	36	35
January.....	34	35	36	36	35	35	35	35	34	34	34	35	35	35	35	34	34	34	34	34	35	35	34	33	33	33	33	33	33	33	34	34
February.....	33	33	33	33	34	33	33	33	33	33	33	34	33	33	33	33	34	33	33	33	33	33	33	33	33	33	33	33	33	--	--	33
March.....	33	33	33	34	34	34	33	33	33	33	33	33	34	34	33	33	33	33	33	33	33	34	34	34	34	34	34	34	34	33	--	33
April.....	34	34	34	34	35	35	36	37	--	34	--	--	38	--	35	--	37	39	40	40	37	37	37	39	35	48	40	50	39	39	--	38
May.....	49	49	52	53	49	--	53	51	49	54	49	53	54	49	50	50	49	49	51	51	51	54	49	49	50	49	49	49	50	49	50	50
June.....	50	54	50	54	50	54	51	--	58	59	57	56	59	54	55	53	60	61	63	62	64	65	61	60	58	60	62	62	63	62	--	58
July.....	51	67	60	60	51	51	61	61	54	62	51	55	55	64	51	65	68	54	71	73	73	56	55	74	53	54	76	80	75	51	70	61
August.....	73	75	76	69	70	68	70	78	69	68	75	72	67	72	68	69	71	68	64	66	65	69	70	65	69	65	65	64	68	67	67	69
September.....	67	65	68	65	65	62	60	58	56	54	52	50	48	63	66	64	64	65	65	63	65	64	63	63	62	62	59	57	58	62	--	61

9-2599.5. LITTLE SNAKE RIVER ABOVE LILY, COLO.

LOCATION.--At bridge on State Highway 318, about 6 miles upstream from gaging station, about 10 miles northeast of Lily, Moffat County, and 16 miles upstream from mouth.
DRAINAGE AREA.--3,730 square miles, approximately, upstream from gaging station.
RECORDS AVAILABLE.--Chemical analyses: December 1950 to September 1964.
Water temperatures: December 1950 to Septemher 1960, October 1961 to September 1964.
Sediment records: May 1958 to September 1964 (discontinued).
EXTREMES, 1963-64.--Dissolved solids: Maximum, 1,110 ppm Sept. 6-30; minimum, 108 ppm June 1-21.
Hardness: Maximum, 340 ppm Aug. 30, 31; minimum, 85 ppm July 1-8.
Specific conductance: Maximum daily, 1,820 micromhos Sept. 11; minimum daily, 165 micromhos June 19.
Water temperatures: Maximum, 86°F July 27; minimum, freezing point on many days during winter months.
Sediment concentrations: Maximum daily, 40,000 ppm Aug. 16; minimum daily, not determined.
Sediment loads: Maximum daily, 81,000 tons Apr. 21; minimum daily, less than 0.50 ton on many days.
EXTREMES, 1950-64.--Dissolved solids (1950-51, 1952-64): Maximum, 2,330 ppm July 24, 1955; minimum, 108 ppm June 1-21, 1964.
Hardness (1950-51, 1952-64): Maximum, 1,340 ppm July 24, 1955; minimum, 64 ppm July 1-8, 1957, June 1-14, 1958, Mar. 11, 1960.
Specific conductance (1950-51, 1952-64): Maximum daily, 3,150 micromhos Aug. 16, 1961; minimum daily, 135 micromhos June 10, 1958.
Water temperatures (1950-51, 1952-60, 1961-64): Maximum, 88°F July 17, 1955; minimum, freezing point on many days during winter months.
Sediment concentrations (1958-64): Maximum daily, 69,000 ppm Aug. 22, 1963; minimum daily, no flow on many days.
Sediment loads (1958-64): Maximum daily, 481,000 tons Mar. 28, 1962; minimum daily, 0 ton on many days.
REMARKS.--Additional samples were collected to further define the quality of water at this station. Records of specific conductance of daily samples available in district office at Salt Lake City, Utah. Records of discharge data given for Little Snake River near Lily, Colo.

Chemical analyses, in parts per million, water year October 1963 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 1-15, 1963...	6.6					169		251	0	277	55				698	0.95	12.4	204	0	5.1	1060	7.9
Oct. 16-Nov. 30...	35.7					93		244	0	141	33				459	.62	44.2	192	0	2.9	720	7.6
Dec. 1-31, 1963, Jan. 1-21, 1964.	44.2					106		306	0	171	33				580	.79	69.2	246	0	2.9	868	8.0
Jan. 22-Mar. 26...	62.8					71	1.8	238	0	130	23				430	.58	72.9	199	4	2.2	655	7.8
Mar. 27-31.....	117					51		188	0	60	24				308	.42	97.3	140	0	1.9	459	7.6
Apr. 1.....	200					80		194	0	95	32				326	.44	176	128	0	3.1	544	7.6
Apr. 2, 3.....	185					154		226	0	186	74				573	.78	286	148	0	5.5	909	8.2
Apr. 4-6.....	150					91		213	0	98	31				372	.51	151	122	0	3.6	604	8.1
Apr. 7, 8.....	140					118		237	7	134	50				475	.65	180	160	0	4.1	764	8.5
Apr. 9-20.....	212					80		233	0	116	22				394	.54	226	170	0	2.7	628	7.8
Apr. 21,22.....	1050					98		231	15	123	30				446	.61	1264	172	0	3.3	702	8.6
Apr. 23-30.....	722					47		193	0	95	13				314	.43	612	174	16	1.6	498	7.9
May 1-4.....	1164					36		189	0	79	6.8				288	.39	905	169	14	1.2	449	8.0
May 5-17.....	1219					25		169	0	56	8.3				241	.33	793	154	15	.9	380	7.8
May 18-21.....	4010					13		160	0	26	.6				179	.24	1938	130	0	.5	291	8.0
May 22-31.....	3593					9.5		116	0	17	1.4				129	.18	1251	94	0	.4	211	--
June 1-21.....	2098					12		112	0	16	2.8				108	.15	612	86	0	.6	212	7.9

June 22-30.....	1497						17		116	0	21	4.0				124	.17	501	108	13	.7	227	7.9
July 1-8.....	777						20		114	0	27	4.7				136	.18	285	85	0	.9	238	7.9
July 9-15.....	261						34		145	0	55	5.2				203	.28	143	110	0	1.4	346	8.0
July 16-20.....	126						67		204	0	109	18				344	.47	117	161	0	2.3	563	8.0
July 21-26.....	60.5						92		241	0	155	28				450	.61	73.5	199	1	2.8	708	8.2
July 27-Aug. 2....	18.7						109		249	0	205	32				536	.73	27.1	226	22	3.2	826	8.2
Aug. 3-14.....	12.2						121		201	0	333	42				719	.98	23.7	308	143	3.0	1020	7.9
Aug. 15, 16.....	80.1						88		440	0	119	20				556	.76	120	322	0	2.1	709	7.6
Aug. 17-29.....	23.2						184		240	0	432	65				919	1.25	57.6	338	141	4.4	1320	8.0
Aug. 30, 31.....	4.0						227		228	0	503	87				1050	1.43	11.3	340	153	5.4	1510	7.9
Sept. 1-5.....	2.2						163		252	0	358	62				812	1.10	4.82	312	105	4.0	1170	7.8
Sept. 6-30.....	4.5						246		216	0	539	96				1110	1.51	13.5	338	161	5.8	1570	7.8
Weighted average	438						24	--	143	--	40	6.3				186	0.25	220	118	4	0.8	309	7.9
Time-weighted average.....	--						93	--	223	--	173	32				489	--	--	204	25	2.6	738	7.8
Tons per day....	--						28	--	169	--	48	7.4				--	--	--	--	--	--	--	--
Analyses of additional samples (instantaneous discharges shown)																							
Jan. 22, 1964.....	50	17	0.29	55	15	71	1.8	238	0	130	23	0.3	0.5	0.10	430	.58		199	4	2.2	655	7.8	
Apr. 8.....	200	11	.81	30	6.3	146	2.6	204	0	151	73	.5	1.2	.08	510	.69		102	0	6.3	810	7.8	
July 20.....	103	14	.59	51	18	67	4.9	226	0	123	28	.5	.5	.12	421	.57		202	17	2.1	636	7.8	
Sept. 24.....	5.5	4.3	.36	74	26	242	7.2	232	0	485	90	.5	.1	.18	1040	1.41		290	100	6.2	1510	7.6	

Temperature (°F) of water, water year October 1963 to September 1964

Month	Day																													Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
October																																
November	33	34	34	35	34	50	46	45	48	51	48	--	45	47	46	--	--	--	34	34	35	34	33	--	34	34	34	35	35	34	--	39
December	34	34	34	34	34	34	33	33	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
January.....	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
February.....	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	--	--	32
March.....	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
April.....	32	32	32	33	34	34	34	34	39	40	47	44	45	50	51	51	52	49	52	46	47	51	55	52	44	44	47	55	60	57	--	45
May.....	59	50	44	49	45	--	--	--	--	--	--	--	--	--	--	--	--	59	61	58	62	59	59	58	59	58	59	58	56	51	57	--
June	59	59	59	64	62	64	61	58	60	58	61	62	62	65	65	64	58	--	59	62	54	55	61	67	69	73	--	67	73	73	--	63
July.....	76	74	75	72	74	74	79	75	77	81	79	83	64	--	--	82	79	84	83	84	81	77	--	84	85	81	86	--	79	83	80	79
August.....	--	--	--	--	--	--	--	--	--	--	--	--	74	80	--	55	53	78	74	72	72	81	81	70	74	67	67	68	65	72	71	--
September.....	66	69	71	69	72	65	50	55	73	72	72	69	72	59	52	74	74	62	65	51	67	62	67	68	68	61	64	63	72	64	--	66

9-2599.5. LITTLE SNAKE RIVER ABOVE LILY, COLO.--Continued

Suspended sediment, water year October 1963 to September 1964
(Where no concentrations are reported, loads are estimated)

Day	OCTOBER			NOVEMBER			DECEMBER		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1..	13		6	17	--	10	36	410	40
2..	9.9		3	26	--	30	40		50
3..	9.9		3	27	--	30	40		50
4..	7.7		2	38	--	60	40		50
5..	6.0		1	53	--	100	36		40
6..	5.1		1	51	--	100	34		30
7..	5.1		1	49	830	110	36		40
8..	5.1		1	58	770	120	38		50
9..	5.5		1	78	1000	210	40		50
10..	6.0		1	78	1000	210	40		50
11..	6.0		1	78	1000	210	38		50
12..	5.1		1	76	830	170	36		40
13..	4.8		1	74	700	140	34		30
14..	4.8		1	76	830	170	36		40
15..	4.8		1	76	830	170	38		50
16..	5.1		1	82	720	160	40		50
17..	5.1		1	34	320	29	40		50
18..	4.4		1	26	240	17	40		50
19..	5.1		1	40	370	40	40		50
20..	7.2		2	70	740	140	38		50
21..	7.7		2	60	800	130	36		40
22..	6.0		1	60	1400	230	34		30
23..	5.1		1	32	500	43	36		40
24..	6.6		1	50	960	130	40		50
25..	7.2		2	40	590	64	44		70
26..	7.2		2	40	590	64	46		80
27..	8.8		3	36	550	53	46		80
28..	9.9		3	34	500	46	46		80
29..	10		3	34	500	46	44		70
30..	12		5	30	480	39	44		70
31..	14		7	--	--	--	48		90
Total	220.2	--	61	1523	--	3071	1224	--	1610
	JANUARY			FEBRUARY			MARCH		
1..	50		100	60		200	60		200
2..	55		100	55		100	60		200
3..	50		100	55		100	60		200
4..	50		100	60		200	60		200
5..	50		100	65		200	65		200
6..	50		100	65		200	70		200
7..	50		100	60		200	70		200
8..	50		100	55		100	65		200
9..	55		100	60		200	65		200
10..	55		100	65		200	70		200
11..	50		100	60		200	75		300
12..	46		80	55		100	80		300
13..	40		50	55		100	80		300
14..	40		50	50		100	75		300
15..	44		70	50		100	70		200
16..	48		90	55		100	70		200
17..	50		100	55		100	75		300
18..	55		100	60		200	75		300
19..	60		200	65		200	80		300
20..	65		200	65		200	85		400
21..	60		200	60		200	90		500
22..	55		100	60		200	90		500
23..	50		100	55		100	85		400
24..	50		100	55		100	80		300
25..	46		80	50		100	75		300
26..	50		100	50		100	80		300
27..	55		100	50		100	90		500
28..	50		100	55		100	95		500
29..	50		100	55		100	110		800
30..	50		100	--		--	130		1300
31..	55		100	--		--	160		2200
Total	1584	--	3220	1660	--	4200	2495	--	12500

9-2599.5. LITTLE SNAKE RIVER ABOVE LILY, COLO.--Continued

Suspended sediment, water year October 1963 to September 1964--Continued

Day	APRIL			MAY			JUNE		
	Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment		Mean discharge (cfs)	Suspended sediment	
		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day		Mean concentration (ppm)	Tons per day
1	200	--	4000	817	5600	12000	2400	1300	8400
2	200	--	4000	1090	6900	20000	2190	1200	7100
3	170	--	2600	1310	6500	23000	1990	1100	5900
4	160	5300	2300	1440	5300	21000	1950	1100	5800
5	150	5800	2300	994	3500	9400	1990	1200	6400
6	140	7100	2700	790	2200	4700	2100	1200	6800
7	140	9500	3600	799	1500	3200	2250	1300	7900
8	140	12000	4500	817	1200	2600	2580	1600	11000
9	130	11000	3900	722	1200	2300	3080	1900	16000
10	120	8600	2800	730	1300	2600	3050	2000	16000
11	110	7100	2100	722	1900	3700	2300	1900	12000
12	150	7000	2800	817	2800	6200	2090	1800	10000
13	150	6500	2600	1100	3100	9200	1960	1600	8500
14	140	5000	1900	1050	4300	12000	1820	1500	7400
15	130	4100	1400	1770	6700	32000	1890	1300	6600
16	140	4500	1700	2510	7500	51000	1880	1100	5600
17	200	7200	3900	3020	6700	55000	1770	910	4300
18	350	11000	10000	3630	5700	56000	1820	830	4100
19	420	10000	11000	4140	4900	55000	1760	770	3700
20	500	8500	11000	4070	4300	47000	1670	740	3300
21	1200	25000	81000	4200	3800	43000	1520	840	3400
22	899	14000	34000	4360	3400	40000	1560	1100	4600
23	657	6300	11000	4360	3100	36000	1610	1400	6100
24	730	5200	10000	4220	2800	32000	1940	1600	8400
25	782	6000	13000	3770	2500	25000	1710	1200	5500
26	853	6100	14000	3610	2200	21000	1450	760	3000
27	890	4200	10000	3650	2000	20000	1350	580	2100
28	673	2500	4500	3290	1800	16000	1330	510	1800
29	595	2100	3400	3160	1700	15000	1270	440	1500
30	595	3200	5100	2910	1600	13000	1250	370	1200
31	--	--	--	2600	1400	9800	--	--	--
Total	11714	--	267100	72468	--	698700	57530	--	194400

Day	JULY			AUGUST			SEPTEMBER		
1	1120	340	1000	13	--	T	2.9	--	1
2	1020	330	910	36	--	1	2.5	--	T
3	956	430	1100	37	--	1	1.8	--	T
4	835	520	1200	8.8	--	T	1.8	--	T
5	697	430	810	9.4	--	T	1.8	--	T
6	610	300	490	9.9	--	T	1.8	--	T
7	529	260	370	9.9	--	T	9.9	370	10
8	450	210	260	9.9	--	T	9.4	390	10
9	375	140	140	10	--	T	4.8	150	2
10	321	92	80	8.8	--	T	3.3	54	T
11	274	76	56	7.7	--	T	2.5	44	T
12	246	68	45	10	--	140	2.2	51	T
13	229	70	43	12	5600	180	1.8	410	2
14	206	69	38	13	5700	200	1.7	650	3
15	179	64	31	7.2	4100	80	7.2	1300	25
16	152	56	23	153	40000	17000	4.8	620	8
17	132	47	17	189	24000	12000	4.0	370	4
18	121	50	16	28	1200	91	2.5	300	2
19	121	57	19	17	1300	60	17	1000	46
20	105	48	14	13	850	30	6.6	340	6
21	82	38	8	8.2	320	7	4.0	180	2
22	72	98	19	6.0	250	4	3.3	110	1
23	68	170	31	12	250	8	4.8	150	2
24	62	110	18	8.8	200	5	5.1	220	3
25	44	44	5	4.4	130	2	4.8	150	2
26	35	31	3	3.6	130	1	2.9	130	1
27	24	26	2	3.3	--	1	2.5	65	T
28	18	21	1	4.0	--	1	1.7	39	T
29	13	16	1	4.0	--	1	2.2	56	T
30	12	12	T	2.9	--	1	2.2	56	T
31	15	10	T	5.1	--	2	--	--	--
Total	9123	--	6751	664.9	--	29818	123.8	--	132

Total discharge for year (cfs-days)..... 160,329.9
Total load for year (tons).....1,221,563

T Less than 0.50 ton.

9-2599.5. LITTLE SNAKE RIVER ABOVE LILY, COLO.--Continued

Periodic determinations of suspended-sediment discharge and particle-size analyses, water year October 1963 to September 1964

(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Water temperature (°F)	Sampling point	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters											Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Apr. 4, 1964.....	1710	33		D 160	5230	2300	58	68		95		100	--	--	--	--		SPWC
Apr. 5.....	2200	34		D 150	5170	2100	47	61		93		100	--	--	--	--		SPWC
Apr. 6.....	2245	34		D 140	8780	3300	34	43		73		84	93	98	100	--		VPWC
Apr. 8.....	1430	35		D 140	12500	4700	--	--		--		--	--	--	--	--		
Apr. 19.....	2300	52		D 420	9400	16000	32	39		56		64	66	68	84	100		VPWC
Apr. 21.....	2245	47		1100	20200	60000	45	54		78		92	97	100	--	--		VPWC
May 1.....	2045	59		946	5950	15000	43	49		72		93	97	99	100	--		VPWC
May 3.....	1400	44		1260	6230	21000	38	47		67		91	97	100	--	--		VPWC
May 15.....	2230	--		2100	7660	43000	31	33		51		89	97	99	100	--		VPWC
May 22.....	1745	59		4720	3420	44000	21	25		32		60	84	94	98	100		VPWC
June 17.....	1830	61		1900	853	4400	--	--		--		--	--	--	--	--		
June 23.....	1715	61		1670	1290	5800	25	27		36		52	68	86	100	--		VPWC
July 20.....	2200	83		92	52	13	--	--		--		--	--	--	--	--		
July 23.....	2315	77		66	279	50	59	80		--		100	--	--	--	--		SPWC
Aug. 14.....	0215	74		27	8290	600	52	73		100		--	--	--	--	--		PWC
Aug. 16.....	2300	55		543	46700	71000	38	51		89		99	100	--	--	--		VPWC
Aug. 18.....	0400	53		28	1090	82	59	77		100		--	--	--	--	--		PWC
Sept. 7.....	1900	59		26	1340	94	60	83		98		100	--	--	--	--		SPWC
Sept. 19.....	2345	65		13	815	29	67	83		100		--	--	--	--	--		PWC

D Daily mean discharge

9-3529. VALLECITO CREEK NEAR BAYFIELD, COLO.

LOCATION.--At gaging station, 60 feet upstream from Fall Creek, 0.7 mile downstream from Bear Creek, 7 miles north of Vallecito Dam, and 18 miles north of Bayfield, La Plata County.
DRAINAGE AREA.--72.1 square miles.
RECORDS AVAILABLE.--Chemical analyses: October 1963 to September 1964.
Water temperatures: November 1962 to September 1964.
EXTREMES, 1963-64.--Water temperatures: Maximum, 57°F July 25, 29, 30; minimum, freezing point on many days during winter months.
EXTREMES, 1962-64.--Water temperatures: Maximum, 62°F July 21, 1963; minimum, freezing point on many days during winter months.

Chemical analyses, in parts per million, water year October 1963 to September 1964

Date of collection	Mean discharge (cfs)	Silica (SiO_2)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)			Hardness as $CaCO_3$		Sodium adsorption ratio	Specific conductance (micromhos at 25°C)	pH
															Parts per million	Tons per acre-foot	Tons per day	Calcium, Magnesium	Noncarbonate			
Oct. 3, 1963	50.0	3.3	--	14	1.9	0.9	0.5	36		14	1.5	0.2	0.3	0.02	44	0.06		43	13	0.1	81	7.5
Oct. 17	31.4	3.6	0.15	14	1.9	.9	.6	38		12	1.3	.1	.3	.03	50	.07		42	11	.1	82	7.4
Nov. 15	25.9	3.6	--	10	3.2	1.3	.2	38		10	1.5	.2	.9	.01	54	.07		39	8	.1	84	7.5
Dec. 4	21.8	4.0	.00	13	2.4	1.2	.6	43		8.8	1.5	.2	1.2	.03	54	.07		42	7	.1	91	7.4
Jan. 8, 1964	14.3	--	--	--	--	6.0	--	42		9.9	3.0	--	--	--	47	.06		36	2	.4	92	7.0
Jan. 29	12.3	--	--	--	--	5.0	--	42		7.4	2.0	--	--	--	48	.07		34	0	.4	91	7.2
Mar. 12	10.0	--	--	--	--	6.7	--	42		9.5	3.0	--	--	--	47	.06		34	0	.5	99	7.3
Apr. 8	14.0	--	--	--	--	.4	--	40		7.0	.6	--	--	--	53	.07		40	7	.0	87	6.9
May 7	64.7	--	--	--	--	1.0	--	34		6.2	.6	--	--	--	46	.06		33	5	.1	76	7.1
May 17	738	--	--	--	--	.3	--	22		3.1	.9	--	--	--	34	.05		22	4	.0	50	6.6
June 12	346	--	--	--	--	1.3	--	22		5.6	.7	--	--	--	32	.04		22	4	.1	52	6.9
July 1	138	--	--	--	--	2.1	--	24		5.6	.7	--	--	--	29	.04		22	2	.2	48	7.2
Aug. 19	95.0	--	--	--	--	.9	--	32		8.2	1.6	--	--	--	71	.10		35	9	.1	76	7.2
Sept. 4	44.3	--	--	--	--	1.2	--	31		9.1	1.9	--	--	--	75	.10		35	10	.1	71	7.2

9-3529. VALLECITO CREEK NEAR BAYFIELD, COLO.--Continued

Temperature (°F) of water, water year October 1963 to September 1964

Month	Day																													Average
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
October																																
Maximum	49	48	48	48	47	48	48	48	47	47	46	47	47	46	44	45	46	46	45	45	45	45	44	43	43	43	43	43	43	43	42	46
Minimum	46	46	46	44	44	44	45	45	45	44	44	46	45	42	42	42	44	44	45	44	44	43	43	42	41	42	42	41	42	42	42	44
November																																
Maximum	42	39	39	39	40	40	40	40	40	39	39	38	39	39	38	38	37	34	34	34	34	34	34	34	34	34	34	34	34	34	--	37
Minimum	38	38	38	39	39	38	39	39	39	38	38	37	38	38	37	37	34	34	34	34	34	34	34	34	34	34	34	34	34	34	--	36
December																																
Maximum	34	34	34	34	34	34	34	34	34	34	34	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	32	33
Minimum	34	34	34	34	34	34	34	34	34	34	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	32	32	33
January																																
Maximum	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
Minimum	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32
February																																
Maximum	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	--	--	32
Minimum	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	--	--	32
March																																
Maximum	32	32	32	32	32	32	32	32	32	32	32	32	33	33	32	33	33	33	33	33	33	33	33	33	33	33	33	33	34	34	34	33
Minimum	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33
April																																
Maximum	34	33	33	34	34	34	34	33	35	35	36	36	36	36	37	38	36	36	39	39	39	41	40	38	38	40	41	43	41	38	--	37
Minimum	33	33	33	33	34	33	33	33	34	34	34	34	34	34	34	34	34	35	35	35	35	36	35	35	35	34	36	36	37	37	--	34
May																																
Maximum	42	41	41	40	40	39	38	40	42	43	44	44	44	42	44	43	45	42	44	43	42	43	44	45	44	42	43	43	40	40	42	42
Minimum	38	38	36	37	37	37	37	36	37	38	37	36	36	37	37	37	37	38	38	38	38	38	38	38	39	40	39	38	38	38	38	38
June																																
Maximum	44	44	44	48	44	46	46	42	48	48	48	48	46	48	49	47	43	46	48	48	48	48	49	50	47	48	51	51	50	50	--	47
Minimum	38	40	40	39	40	40	40	39	38	40	40	38	39	39	39	40	39	38	39	39	39	40	39	41	43	43	44	45	45	46	--	40
July																																
Maximum	51	51	54	52	52	54	52	53	53	54	52	53	54	53	54	52	52	56	54	54	54	53	55	54	57	56	55	54	57	57	54	54
Minimum	44	45	45	46	48	47	48	47	48	48	48	47	47	47	49	49	48	48	50	49	50	49	50	52	50	50	51	49	51	51	51	48
August																																
Maximum	52	52	54	53	54	53	52	55	55	54	54	52	52	51	52	50	51	54	54	52	50	51	51	51	50	50	52	50	52	52	51	52
Minimum	50	50	50	49	50	49	49	50	50	50	50	50	50	47	46	47	46	47	50	48	43	44	45	46	46	46	48	44	48	47	47	48
September																																
Maximum	50	51	50	51	51	52	52	51	50	51	51	50	50	48	46	48	49	48	47	44	44	48	48	48	47	46	47	47	46	46	--	49
Minimum	49	49	45	46	50	49	48	48	49	46	48	46	45	46	45	43	43	44	44	41	42	40	42	43	45	43	44	42	42	41	--	45

Periodic determinations of suspended-sediment discharge and particle-size analyses of suspended sediment, water year October 1963 to September 1964

(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Water temperature (°F)	Sampling point	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters										Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
Oct. 3, 1963	1300	46		50	6	0.8												
Nov. 15	1510	38		26	0	0												
Dec. 4	1345	34		22	0	0												
Jan. 8, 1964	1245	32		15	0	0												
Jan. 29	1125	32		12	2	.1												
Mar. 12	1130	32		10	1	T												
Apr. 8	1100	33		14	3	.1												
May 7	0930	37		65	2	.4												
May 17	1700	44		752	37	75												
June 12	1400	46		305	3	2.5												
July 1	1200	48		138	1	.4												
Aug. 19	0925	51		95	23	5.9												
Sept. 4	1000	46		44	1	.1												

T Less than 0.05 ton.

MISCELLANEOUS ANALYSES OF STREAMS IN SAN JUAN RIVER BASIN

Periodic determinations of suspended-sediment discharge and particle-size analyses
water year October 1963 to September 1964

(Methods of analysis: B, bottom withdrawal tube; C, chemically dispersed; D, decantation; N, in native water; P, pipet; S, sieve; V, visual accumulation tube; W, in distilled water)

Date of collection	Time (24 hour)	Water temperature (°F)	Sampling point	Discharge (cfs)	Sediment concentration (ppm)	Sediment discharge (tons per day)	Suspended sediment: Percent finer than size indicated, in millimeters											Method of analysis
							0.002	0.004	0.008	0.016	0.031	0.062	0.125	0.250	0.500	1.000	2.000	
9-3430. RIO BLANCO NEAR PAGOSA SPRINGS, COLO.																		
Nov. 4, 1963	1130	42		17.0	3	0.14	--	--		--		--	--	--	--			
Dec. 3	1445	38		14.1	15	.57	--	--		--		--	--	--	--			
Jan. 7, 1964	1500	32		11.5	8	.25	--	--		--		--	--	--	--			
Feb. 3	1120	32		9.0	8	.20	--	--		--		--	--	--	--			
Mar. 9	1620	32		10.1	18	.49	--	--		--		--	--	--	--			
Apr. 15	1100	32		66.5	82	15	--	--		--		--	--	--	--			
May 4	1430	46		76.3	22	4.5	--	--		--		--	--	--	--			
May 19	1440	47		517	1350	1880	9	11		21		51	78	93	100			VPWC
May 27	1330	49		376	212	215	11	13		20		48	65	91	100			VPWC
June 19	1010	51		71.6	9	1.7	--	--		--		--	--	--	--			
July 8	--	60		25.7	2	.14	--	--		--		--	--	--	--			
Aug. 5	0750	57		83.9	38	8.6	--	--		--		--	--	--	--			
Sept. 8	1030	54		24.4	7	.46	--	--		--		--	--	--	--			
9-3443. NAVAJO RIVER ABOVE CHROMO, COLO.																		
Nov. 4, 1963	1430	44		30.7	6	0.50	--	--		--		--	--	--	--			
Dec. 3	1100	32		19.6	6	.32	--	--		--		--	--	--	--			
Jan. 7, 1964	1230	32		26.3	4	.28	--	--		--		--	--	--	--			
Feb. 3	1650	32		25.6	12	.83	--	--		--		--	--	--	--			
Mar. 9	1400	32		37.8	71	7.2	--	--		--		--	--	--	--			
Apr. 15	1340	34		75.8	477	98	43	47		68		92	97	100	--			VPWC
May 4	1320	46		105	48	14	--	--		--		--	--	--	--			
May 19	0945	44		418	297	335	15	21		32		64	86	99	100			VPWC
May 28	1020	44		431	215	250	12	16		32		64	88	99	100			VPWC
June 19	1220	52		122	11	3.6	--	--		--		--	--	--	--			
July 6	--	74		33.2	16	1.4	--	--		--		--	--	--	--			
Aug. 3	1345	72		197	2350	1250	11	15		26		50	68	90	100			VPWC
Sept. 8	1530	64		35.7	57	5.5	--	--		--		--	--	--	--			

CHEMICAL ANALYSES OF GROUND WATER IN COLORADO

Concentrations of dissolved constituents, dissolved solids, and hardness given in parts per million

Well number	Geologic source 1/	Depth of well	Date of collection	Temperature (°F)	Silica (SiO_2)	Iron (Fe) 2/	Manganese (Mn) 2/	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$		Percent sodium	Sodium-adsorption ratio (SAR)	Specific conductance (micromhos at 25°C)	pH
																				Ca, Mg	Noncarbonate				
DENVER AREA (SURFICIAL DEPOSITS)																									
(C-1-67)26aadd	Qb,Q1	41	9-13-56	--	--	--		--	--	--	--	--	--	--	99	--	--	--	--	--	--	--	--	1330	--
			9- 1-64	55	23	0.03		131	29	114	3.4	315	0	233	114	0.9	44	0.18	867	446	188	25	2.4	1260	7.7
36ccc	Qb,Q1	45	10- 2-62	56	26	--		132	24	102	2.3	377	0	184	81	1.3	43	.17	788	430	121	34	2.1	1200	7.5
			9-26-63	55	25	A .00		131	42	118	2.8	400	0	221	123	1.3	46	.13	919	500	172	34	2.3	1380	7.4
			9- 1-64	54	23	.03		128	41	119	4.5	352	0	224	143	.9	42	.19	928	490	201	34	2.3	1360	7.7
(C-2-67)7ddb	Qpp,Q1	40	10- 2-62	55	17	--		146	8.3	80	1.7	410	0	195	17	.9	7.8	.14	670	398	62	30	1.7	1000	7.5
			9-26-63	57	17	A .00		172	27	114	4.2	411	0	321	53	.4	73	.60	992	542	205	31	2.1	1410	7.2
			9- 1-64	57	16	.05		111	30	84	4.5	324	0	230	37	.5	48	.13	740	398	132	31	1.8	1040	7.4
9dadc	Qb,Q1	50	9-15-55	54	23	--		228	65	158	3.9	313	0	373	371	1.6	21	.33	1480	836	579	29	2.4	2250	7.4
			6- 3-56	53	--	--		--	--	--	--	--	--	--	720	--	--	--	--	--	--	--	--	3160	--
			9- 1-64	56	23	.03		240	67	294	5.1	318	0	305	665	1.3	19	.31	1950	875	614	42	4.3	2910	7.5
20addd	Qb,Q1	20	8-12-64	56	20	.03		142	25	79	5.5	366	0	189	92	.5	21	.11	770	458	157	27	1.6	1140	7.8
30dcbc	Qpp,Q1	--	8-12-64	56	20	.17		160	28	144	6.2	338	0	339	139	1.0	25	.24	1060	516	239	37	2.8	1500	7.5
(C-3-67)18abcd	Qpp,Qb, Q1	32	8-12-64	59	21	.05		188	51	198	15	536	0	460	136	.9	42	.48	1390	680	240	38	3.3	1690	7.6
(C-3-68)3cddc	Qb,Q1	33	8-12-64	59	19	.14		111	24	100	3.2	348	0	214	57	1.3	18	.19	749	375	90	36	2.2	1040	8.1
14acbc-2	Qb,Q1	34	8-12-64	61	22	.22		136	32	213	12	519	0	144	245	1.3	22	.46	1070	470	44	49	4.3	1700	7.8
(C-3-69)20acc	Qpp,Qb, Q1	32	8-12-64	60	15	.11		57	14	20	2.3	133	0	99	11	.3	21	.05	320	199	90	18	.6	465	7.5
(C-4-68)11daad-2	Qb,Q1	38	8-11-64	62	27	.11		164	25	89	10	347	0	293	74	.6	43	.89	911	512	227	27	1.7	1240	7.8
22ccab	Qpp,Qb, Q1	28	8-11-64	53	18	.07		220	35	148	5.0	238	0	532	146	.9	101	.42	1360	695	500	31	2.4	1800	7.4
(C-4-69)34bbba	Qpp,Qb, Q1	32	8-11-64	57	19	.06		71	10	45	.9	300	0	65	7.0	.8	4.5	.10	376	220	0	31	1.3	577	7.6
(C-5-66)19ddcd	Qp,Qb, Q1	109	8-24-64	54	22	.22		47	6.8	19	3.7	163	0	39	9.1	.6	.1	.05	241	145	11	22	.7	349	7.1
(C-6-66)9aabb	Qp,Qb, Q1	44	8-24-64	66	26	.16		83	9.7	27	5.2	244	0	67	17	.8	21	.04	395	246	46	19	.7	564	7.9
(C-6-69)11aada	Qp,Q1	48	8-24-64	55	16	.10		93	22	37	1.7	242	0	137	46	.3	4.1	.06	512	322	124	20	.9	723	7.5

DENVER AREA (BEDROCK)																										
(C-1-66)4cdcd	Kdlc	360	9- 1-64	63	8.3	0.22		4.0	0.2	160	1.1	406	0	12	5.8	3.2	0.7	0.06	397	11	0	97	21	624	8.1
4dcad	Kdmc	188	9- 1-64	61	12	.02		71	17	139	3.4	330	0	218	44	.3	5.5	.09	670	246	0	55	3.9	997	7.9
21cddc	Kdmc	230	9- 1-64	62	7.7	.22		18	3.9	266	1.6	158	0	457	27	1.3	1.8	.09	857	60	0	90	15	1270	7.9
(C-1-67)3dccb	Klb,Kla Kfm	1100	9- 2-64	70	11	.02		1.2	.2	226	1.3	528	8	1.6	46	1.6	1.1	.20	568	4	0	99	49	901	8.3
(C-2-67)22aabb	Tkdu	180	8-12-64	63	8.6	.28		5.2	.7	112	.7	182	0	38	56	2.2	.3	.07	332	16	0	94	12	536	7.7
(C-2-68)33abdb-2	Klb, Kla Kfm	1560	9-19-60	81	14	.05		1.3	.7	260	--	544	0	3.0	90	3.1	.0	--	640	6	0	97	46	1100	8.2
			8-12-64	82	12	.10	0.00	1.6	.7	267	1.7	558	0	4.1	88	3.2	.5	.43	663	7	0	98	44	1060	8.0
(C-3-67)35adda	Kdmc, Kdlc	1100	8-11-64	77	12	.05		5.6	.2	64	1.6	159	0	16	2.3	1.6	.3	.05	188	15	0	89	7.2	280	7.5
(C-3-68)6dccb	Kdmc	105	8-12-64	57	18	.29		354	39	454	1.7	406	0	1650	27	1.6	12	.32	2820	1040	712	50	6.1	3170	7.5
7cabb	Kdlc	616	8-12-64	62	9.5	.22		8.4	.2	142	1.3	291	0	84	5.1	1.4	.1	.07	404	22	0	93	13	613	7.7
(C-3-69)30abab	Tkdu	100	8-12-64	57	23	.07		86	23	101	4.3	176	0	360	14	.2	4.3	.09	721	307	163	41	2.5	956	7.6
(C-5-66)6dbbd	Klb,Kla Kfm	2182	8-24-64	86	12	.13		8.4	1.9	69	2.4	186	0	14	2.8	1.8	.1	.07	211	29	0	82	5.6	315	7.5
(C-5-68)24ddab	Klb,Kla Kfm	2100	8-11-64	72	11	.12		19	1.0	38	2.6	141	0	18	2.2	.8	.3	.05	168	52	0	60	2.3	253	7.5
28bccc	Tkdu	693	8-11-64	66	9.2	.20		8.8	.7	53	1.2	148	0	18	2.0	1.2	.6	.04	181	25	0	81	4.6	268	7.7
(C-6-65)18adaa	Tkdu	409	8-24-64	64	33	.28		37	2.4	13	3.3	147	0	10	5.0	.2	.4	.02	182	102	0	21	.6	253	7.3
(C-6-68)4abaa	Kdmc	392	8-11-64	67	9.5	.39		13	1.0	45	1.3	139	0	20	1.8	1.0	.5	.05	199	37	0	72	3.2	257	7.4
(C-6-69)1bbbc	Kdlc	264	8-11-64	65	8.2	.18		53	6.8	175	5.0	278	0	255	33	.7	.0	.14	681	160	0	69	6.0	997	7.5
(C-7-67)27bdcb	Tkdu	300	8-24-64	57	19	1.2		53	3.4	15	3.1	166	0	43	3.0	.8	.0	.06	233	146	10	18	.5	334	7.6
SOUTHERN TRIBUTARY AREA																										
(B-1-63)2bbb	Qal	--	10- 2-62	56	25	--		281	50	115	5.8	321	0	724	108	0.2	16	0.22	B1480	905	642	22	1.7	1930	7.7
			9-24-63	55	25	A0.00	--	295	56	129	6.3	334	0	787	120	.2	21	.22	B1600	965	691	22	1.8	2080	7.2
			9- 3-64	55	23	.03	--	385	66	170	6.7	346	0	1090	132	1.5	19	.27	2150	1230	946	23	2.1	2440	7.7
(B-1-65)11aaa	Qvf	42	4-21-60	54	22	.03	--	316	17	256	--	457	0	722	202	.4	20	--	B1850	858	483	39	3.8	2460	7.4
			10- 2-62	54	26	.03	0.00	212	35	213	5.1	578	0	443	155	1.0	11	.36	B1390	675	201	40	3.6	1990	7.7
			9-26-63	54	26	.10	--	285	67	252	5.5	636	0	658	218	.3	14	.34	B1840	985	463	36	3.5	2540	7.6
			9- 3-64	56	27	.02	--	248	51	249	5.7	538	0	641	189	.1	22	.38	1730	830	389	39	3.8	2290	7.8
(B-2-59)31dc-1	Qal	38	5-26-64	55	21	.16	--	159	28	92	7.7	244	0	476	15	.7	.3	.08	944	512	312	28	1.8	1210	--
(B-2-63)15ddc	Qvf	82	10- 2-62	54	21	--	--	591	106	473	8.2	430	0	2120	288	.1	20	.18	B3840	1910	1560	35	4.7	4510	7.4
			9-26-63	53	20	.00	--	557	131	512	8.3	454	0	2110	375	.3	23	.15	B3960	1930	1560	36	5.1	4540	7.2
			9- 3-64	54	21	.02	--	565	114	273	8.2	306	0	1910	192	.2	27	.18	3400	1880	1630	24	2.7	3550	7.6
23cd	Qvf	117	9- 3-64	54	21	.02	--	418	71	164	6.9	242	0	1260	136	.6	18	.11	2300	1340	1140	21	2.0	2540	7.3
(B-2-65)24dcc	Qvf	70	10- 2-62	55	23	--	--	359	62	296	6.2	334	0	1260	172	1.2	6.8	.15	B2350	1150	876	36	3.8	2930	8.1
			9-26-63	65	24	.00	--	317	63	274	6.1	345	0	1120	160	.4	10	.15	B2140	1050	767	36	3.7	2720	7.1
			9- 2-64	61	24	.02	--	353	75	290	4.6	380	0	1220	170	.4	9.3	.19	2360	1190	878	35	3.7	2820	7.4
(B-3-56)27a	Qds	114	10- 5-60	59	18	.01	.07	26	5.1	8.6	--	111	0	20	1.0	.6	.0	--	142	86	0	16	.4	213	7.1
			9-25-62	57	16	.00	.05	30	5.4	8.7	3.2	119	0	19	2.0	.5	.7	.04	140	98	0	16	.4	224	7.5
			9-24-63	65	16	.43	--	27	6.3	8.9	3.1	119	0	16	2.5	.8	2.2	.04	B 142	94	0	16	.4	220	7.5
			5-26-64	60	16	.00	--	18	12	10	3.4	124	0	17	1.6	.6	.2	.04	145	96	0	18	.4	215	7.6
			9- 3-64	56	15	.07	--	27	6.1	8.6	3.8	119	0	17	1.6	.6	.0	.03	138	92	0	16	.4	213	7.7
(B-3-62)10abb	Qvf	60	10- 2-62	54	20	--	--	46	9.5	41	2.2	167	0	88	7.0	.6	7.1	.05	294	155	18	36	1.4	465	7.3
			9-24-63	54	19	A .00	--	44	9.5	40	2.4	171	0	83	8.5	.8	4.0	.06	287	150	10	36	1.4	450	7.2
			9- 3-64	54	18	.05	--	43	9.6	40	2.8	173	0	84	6.8	.8	5.9	.06	300	148	6	37	1.4	446	7.3
(B-3-64)8cdd	Qvf	53	9- 2-64	53	22	.03	--	312	58	256	5.8	336	0	1080	126	.3	15	.15	2080	1020	739	35	3.5	2500	7.8
(C-1-65)26dcdc	Qv	64	9- 1-64	54	24	.05	--	37	13	37	4.7	223	0	113	29	.3	14	.06	461	270	83	23	1.0	644	7.4
NORTHERN TRIBUTARY AREA																										
(B-11-51)6ba-1	To	240	5-25-64	59	43	0.02		63	17	18	9.9	189	0	46	39	0.6	39	0.07	387	228	173	14	0.5	542	7.6

See footnotes at end of table on page 82.

Well number	Geologic source 1/	Depth of well	Date of collection	Temperature (°F)	Silica (SiO_2)	Iron (Fe) 2/	Manganese (Mn) 2/	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Ca, Mg	Hardness as $CaCO_3$: Noncarbonate	Percent sodium	Sodium-adsorption ratio (SAR)	Specific conductance (micromhos at 25°C)	pH
SOUTH PLATTE RIVER VALLEY AREA																									
(B-1-65)30ccc	Qvf	70	9- 3-64	--	17	0.16	--	107	42	124	3.4	342	0	239	116	1.7	23	0.25	854	442	162	38	2.6	1270	7.7
(B-1-66)6abd	Qal	50	10- 1-62	64	21	.06	0.00	139	25	137	7.0	325	0	301	116	.8	31	.24	922	450	183	39	2.8	1400	7.5
			9-26-63	58	19	A .00	--	115	34	124	3.1	309	0	260	110	1.3	34	.15	866	426	173	39	2.6	1300	7.2
			9- 2-64	59	19	.06	--	123	36	145	6.5	332	0	288	126	1.0	35	.26	968	458	185	40	2.9	1400	7.8
(B-1-67)14dda	Qvf	30	10- 1-62	60	20	--	--	135	47	142	2.9	432	0	349	76	.4	16	.28	B1000	528	174	37	2.7	1460	7.6
			9-26-63	60	20	.00	--	120	68	161	3.6	474	0	395	96	1.4	13	.31	B1110	580	191	37	2.9	1630	7.5
			9- 1-64	59	18	.07	--	105	68	155	3.8	426	0	363	104	1.4	13	.30	1070	540	191	38	2.9	1530	7.8
36dcc	Qvf	26	9- 2-64	58	17	.14	--	149	47	231	5.8	374	0	543	130	1.5	46	.30	1370	565	258	47	4.2	1860	7.8
(B-3-57)6bdd	Qal	175	11-25-49	54	28	.10	--	213	51	58	5.2	245	0	586	46	.5	9.6	--	B1120	741	540	14	.9	1480	7.6
			9-25-62	59	21	.01	.00	287	50	101	8.7	314	0	758	49	.6	19	.06	B1450	920	662	19	1.4	1820	7.5
			9-24-63	58	21	.03	--	275	56	107	8.6	323	0	782	53	.6	20	.06	B1480	915	650	20	1.5	1870	7.3
			5-26-64	58	19	.21	--	228	56	109	9.7	184	0	775	51	.4	18	.08	1410	800	649	23	1.7	1670	7.6
			9- 3-64	58	19	.32	--	272	55	110	9.7	316	0	773	48	.6	18	.06	1520	905	646	21	1.6	1800	7.8
(B-3-66)18cdc	Qal	53	10- 1-62	57	26	--	--	106	21	132	6.5	276	0	232	96	.9	42	.21	802	350	124	44	3.1	1210	7.4
			9-26-63	57	27	A .00	--	135	15	117	7.8	325	0	245	97	.9	17	.25	819	400	133	38	2.5	1240	7.1
18cba-3	Qal	55	9- 2-64	57	18	.06	--	103	48	117	5.2	324	0	282	108	.8	16	.22	892	455	189	36	2.4	1290	7.9
(B-4-56)12aab	Qal	--	9-25-62	55	29	--	--	307	88	171	16	359	0	1040	82	.5	31	.34	B1940	1120	826	25	2.2	2390	7.5
			9-19-63	56	33	.16	--	309	97	183	19	366	0	1130	86	.4	15	.28	B2050	1170	870	25	2.3	2520	7.3
			9- 3-64	56	31	.03	--	289	92	182	18	324	0	1110	83	.2	20	.30	2060	1100	834	26	2.4	2320	7.7
32bdd	Qal	110	5-26-64	55	17	.33	--	212	85	192	13	290	0	975	66	.7	.5	.24	1820	880	642	32	2.8	2110	7.7
33bbb	Qal	90	9-25-62	55	20	--	--	301	72	223	12	410	0	1060	75	.9	9.3	.26	B1980	1040	704	31	3.0	2479	7.6
			9-24-63	54	19	.78	.93	285	50	209	12	304	0	989	70	2.2	.4	.23	B1790	915	666	33	3.0	2190	7.6
			9- 3-64	55	18	.03	--	222	79	190	13	350	0	918	63	.7	.0	.22	1730	880	593	32	2.8	2080	7.6
(B-4-60)5ccc	Qal	100	9-25-62	56	20	--	--	257	95	233	12	294	0	1140	68	1.8	23	.31	B2000	1030	789	33	3.2	2480	7.4
			9-24-63	55	20	.56	--	289	100	266	14	300	0	1330	82	1.8	21	.33	B2270	1130	884	34	3.4	2750	7.3
			9- 3-64	56	19	.04	--	265	92	252	14	307	0	1240	73	1.8	21	.32	2210	1040	788	34	3.6	2500	7.8
24cc	Qal	225	10-29-47	56	23	.02	--	121	18	90	4.0	232	0	340	6.0	.9	7.6	.21	724	376	186	34	2.0	985	7.6
			9-25-62	56	20	--	--	178	20	78	8.1	304	0	342	28	.8	85	.06	912	528	279	24	1.5	1250	7.8
			9-24-63	55	23	.38	--	257	38	109	9.8	403	0	555	40	.9	110	.06	B1340	795	464	23	1.7	1760	7.4
24dcc	Qal	243	5-26-64	56	18	.32	--	175	29	106	9.2	232	0	463	34	.7	121	.06	1100	555	365	29	2.0	1400	7.6
			9- 3-64	56	19	.02	--	176	26	108	9.9	258	0	441	32	.8	107	.08	1070	548	336	30	2.0	1380	7.8
(B-4-62)24bdd	Qal	110	5-26-64	56	16	.66	--	96	40	90	6.1	276	0	339	27	.8	1.1	.11	774	405	179	32	1.9	1070	7.9
(B-4-63)4abb	Qvf	90	10- 1-62	55	32	--	--	291	64	239	6.0	472	0	978	88	.3	15	.36	B1950	990	603	34	3.3	2450	7.6
			9-24-63	54	31	3.2	--	313	85	309	6.3	552	0	1210	98	.4	19	.35	B2350	1130	677	37	4.0	2900	7.4
			9- 2-64	--	25	.02	--	208	71	238	6.0	352	0	908	84	.1	14	.30	1770	810	521	39	3.6	2180	7.7
(B-4-64)1dcc	Qvf	76	5-26-64	52	20	.41	--	228	75	249	5.1	278	0	928	175	.8	6.3	.20	1900	880	652	38	3.7	2370	7.7
			9- 2-64	53	20	.01	--	251	89	256	5.8	324	0	981	192	.7	5.8	.26	2040	990	724	36	3.5	2530	7.7
16abb	Qvf	39	10- 1-62	55	20	--	--	194	71	261	5.5	322	0	765	205	1.4	17	.27	1700	775	511	42	4.1	2360	7.6
			9-24-63	54	17	A .00	--	120	64	223	4.2	336	0	533	158	1.5	19	.22	1300	565	289	46	4.1	1890	7.4
			9- 2-64	53	19	.03	--	154	79	282	5.0	290	0	792	207	1.2	16	.25	1770	710	472	46	4.6	2300	7.7
(B-4-65)14bdd	Qvf	78	9- 4-64	56	21	.11	--	180	83	239	5.2	390	0	724	161	1.0	17	.31	1660	790	470	39	3.7	2170	7.8
(B-4-66)28adc	Qal	98	4-20-60	56	20	.02	--	134	56	121	--	366	0	316	107	1.1	75	--	B1010	563	263	31	2.2	1510	7.3
			10- 1-62	57	18	.04	.00	147	50	124	3.6	329	0	335	105	1.2	75	.12	B1020	570	300	32	2.3	1500	7.6
			9-20-63	57	18	.23	.00	149	46	129	4.2	337	0	333	108	1.2	70	.16	B1020	562	286	33	2.4	1480	7.7
			9- 2-64	58	17	.34	--	131	61	120	3.8	340	0	330	104	.8	78	.13	1050	575	296	31	2.2	1460	7.8
30acc	Qvf	61	9- 2-64	56	18	.36	--	120	30	113	5.6	278	0	230	92	.6	47	.13	864	423	195	36	3.4	1230	7.6
(B-4-67)11abd	Qal	35	4-28-60	54	17	.09	.00	186	88	177	--	376	0	758	29	.7	24	--	1620	825	517	32	2.7	1950	7.3
			9- 2-64	57	18	.15	--	220	107	185	3.6	404	0	988	33	.3	16	.30	1820	990	659	29	2.6	2120	7.8

SOUTH PLATTE RIVER VALLEY AREA--Continued

(B-5-54)2bdd	Qvf	80	9-25-62	--	18	--	--	160	44	143	10	232	0	621	58	0.7	0.3	0.25	B1170	580	390	34	2.6	1570	7.7
			9-19-63	60	17	0.73	0.55	151	38	151	9.7	130	0	657	58	1.0	.1	.24	B1150	532	425	38	2.9	1520	7.3
			9- 4-64	55	17	.17	--	164	61	137	9.9	246	0	668	53	1.0	.2	.19	1250	660	458	31	2.3	1590	7.7
(B-5-54)20ccd	Qal	90	9-25-62	55	35	--	--	248	60	160	17	388	0	798	60	.4	1.8	.25	B1570	865	547	28	2.4	2010	7.5
			9-19-63	53	30	.81	.04	246	57	173	17	379	0	800	55	.6	5.4	.22	B1570	850	539	30	2.6	1950	7.4
			5-25-64	54	32	.03	--	200	71	149	17	368	0	721	48	.6	6.6	.20	1500	790	488	29	2.3	1800	7.7
			9- 4-64	54	34	.02	--	192	66	137	17	360	0	681	47	.4	8.9	.17	1380	750	455	28	2.2	1720	7.6
(B-5-64)21bbc	Qal	67	5- 4-60	45	21	.01	--	170	59	188	6.0	367	0	623	59	1.7	14	--	B1410	668	367	38	3.2	1810	7.6
			10- 1-62	56	22	.11	.00	184	78	167	5.6	394	0	695	64	1.4	13	.30	B1420	780	457	32	2.6	1920	7.6
			9-20-63	57	22	.43	.00	224	61	184	5.6	417	0	700	75	1.4	20	.27	B1500	810	468	33	2.8	1930	7.5
			9- 2-64	57	21	.11	--	169	87	177	5.7	372	0	705	74	1.2	31	.28	1520	780	475	33	2.8	1880	7.8
(B-5-65)24ccc	Qvf	68	9- 3-64	57	19	.10	--	152	81	213	4.7	372	0	752	78	1.4	13	.36	1520	715	410	39	3.5	1940	7.7
31dba	Qvf	63	10- 1-62	58	20	.06	.00	143	38	114	4.0	356	0	316	75	1.2	33	.13	932	512	220	32	2.2	1360	7.6
			9-20-63	61	19	.04	.00	149	46	132	4.4	389	0	348	88	1.6	32	.22	B1010	560	241	34	2.4	1450	7.5
			9- 2-64	58	19	.02	--	130	57	120	5.2	366	0	367	77	1.0	37	.19	1030	558	257	32	2.2	1400	7.9
(B-5-66)36abc	Qvf	25	9- 2-64	59	15	.24	--	178	123	177	6.5	388	0	909	39	1.1	35	.41	1760	950	632	29	2.5	2070	7.8
(B-6-54)13dad	Qal	76	11-21-49	54	25	.07	--	183	55	125	12	286	12	646	50	.7	6.1	--	B1260	683	429	28	2.1	1720	8.3
			10- 5-60	56	27	.02	.00	222	59	179	--	333	0	811	62	.7	5.5	--	B1530	798	525	32	2.8	2030	7.1
			9-25-62	57	26	.12	.00	223	58	168	16	340	0	793	65	.2	4.9	.26	B1520	795	516	31	2.6	1960	7.6
			9-19-63	65	26	.25	.00	244	51	176	16	346	0	793	62	.7	6.3	.20	B1550	820	536	31	2.7	1930	7.4
			5-25-64	59	24	.09	--	218	67	177	17	325	0	832	63	.6	6.6	.23	1630	820	531	31	2.7	1970	7.7
			9- 4-64	59	24	.09	--	215	64	176	17	348	0	808	60	.6	27	.24	1590	800	515	32	2.7	1930	7.5
B-7-53)18bd	Qal	48	8- 3-48	--	54	.20	--	176	44	128	6.8	326	0	556	39	.5	12	--	1180	620	353	31	2.2	1550	7.5
			5-25-64	52	36	.01	--	167	54	128	17	320	0	574	50	.5	28	.20	1250	640	378	30	2.2	1580	7.8
24cca	Qal	90	5-25-64	54	28	.02	--	235	73	182	26	360	0	908	64	.3	6.4	.24	1770	885	590	30	2.7	2110	7.7
(B-8-52)9bbb	Qal	69	9-25-62	56	44	--	--	257	64	166	22	361	0	869	75	.6	9.2	.24	B1690	905	609	28	2.4	2130	7.4
			9-19-63	55	46	.34	--	240	72	187	24	352	0	916	72	.5	13	.21	B1740	895	606	31	2.7	2160	7.8
			9- 4-64	55	44	.03	--	253	75	191	19	354	0	971	74	.5	12	.23	1860	940	650	30	2.7	2160	7.6
34abb	Qal,Qds	--	9- 4-64	--	35	--	--	142	33	100	8.4	272	0	442	34	.4	2.0	.12	956	490	267	30	2.0	1240	7.8
(B-8-53)25bd	Qal	80	9-25-62	57	39	1.0	.00	200	52	112	15	289	0	607	60	.5	9.1	.17	1240	715	478	25	1.8	1620	7.6
			9-19-63	56	39	.03	.01	228	39	122	16	306	0	625	62	.7	13	.17	B1290	730	479	26	2.0	1660	7.5
(B-9-51)31bbb	Qal	79	5-25-64	52	17	.26	--	186	49	153	6.6	198	0	756	51	.2	.0	.14	1360	665	503	33	2.6	1680	7.6
(B-9-52)25ddd	Qal	79	9-24-62	55	16	--	--	143	23	86	3.1	168	0	430	45	.4	.4	.13	830	450	312	29	1.8	1150	7.9
			9-19-63	53	15	.87	--	118	27	77	3.9	159	0	377	46	.6	1.7	.11	750	405	275	29	1.7	1050	7.7
			9- 4-64	52	18	.11	--	225	59	194	12	278	0	924	62	.5	.0	.22	1680	805	577	34	3.0	2010	7.6
(B-10-49)11bcd	Qal	55	10- 6-60	54	38	.03	.00	229	39	200	--	309	0	790	96	.7	2.9	--	B1550	732	479	36	3.2	2110	7.0
			9-24-62	--	39	.04	.00	248	32	183	14	305	0	766	95	.6	3.6	.27	B1530	750	500	34	2.9	1980	7.4
			9-19-63	54	37	.04	--	228	44	200	15	304	0	796	95	.6	6.4	.22	B1570	750	501	36	3.2	2030	7.4
			9- 4-64	55	34	.36	--	229	46	206	16	308	0	826	90	.4	4.5	.25	1630	760	507	36	3.2	2030	7.6
12db	Qal	42	5-25-64	52	16	.20	--	313	119	493	16	315	0	1830	140	1.0	4.5	.51	3140	1270	1010	45	6.0	3560	7.5
(B-10-51)14dcd	Qvf	65	9-24-62	56	50	--	--	291	44	110	18	251	0	774	95	.4	8.2	.18	B1510	905	699	20	1.6	1910	7.4
			9-19-63	55	49	.01	.01	349	32	121	18	283	0	864	95	.2	15	.17	B1680	1000	768	20	1.7	2020	7.4
			9- 4-64	57	45	.04	--	285	41	119	18	280	0	799	79	.4	10	.20	1630	880	650	22	1.7	1880	7.6
(B-11-45)5ba	Qal	52	8- 4-48	--	27	.08	--	249	64	213	2.8	314	0	892	79	.5	14	.35	1700	884	627	34	3.1	2120	7.5
			5-25-64	54	43	.02	--	267	62	203	26	319	0	999	84	.1	16	.27	1910	920	658	32	2.9	2250	7.7
(B-11-46)18db	Qal	67	9-23-49	--	52	.03	--	279	46	261	28	372	0	1050	91	.4	14	.40	2000	885	585	38	3.8	2300	7.5
			5-25-64	54	50	.01	--	295	57	233	26	330	0	1040	105	.5	11	.40	2170	970	699	34	3.3	2520	7.4
19da	Qvf	21	10- 6-60	64	52	.00	.00	57	9.7	16	--	188	0	29	13	.4	22	--	332	182	28	16	.5	454	7.1
(3 wells)			9-24-62	58	50	.01	.00	61	9.7	17	6.6	193	0	31	16	.3	24	.03	313	192	34	16	.5	455	7.4
			9-19-63	73	51	.12	.02	68	5.4	18	6.9	192	0	33	16	.3	25	.05	320	191	34	16	.6	447	7.4
			9- 4-64	57	46	.11	--	59	10	16	7.1	191	0	33	15	.2	22	.03	321	190	33	15	.5	442	7.6

See footnotes at end of table on page 82.

CHEMICAL ANALYSES OF GROUND WATER IN COLORADO--Continued

Well number	Geologic source 1/	Depth of well	Date of collection	Temperature (°F)	Silica (SiO_2)	Iron (Fe) 2/	Manganese (Mn) 2/	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$: Ca, Mg	Hardness as $CaCO_3$: Noncarbonate	Percent sodium	Sodium-adsorption ratio (SAR)	Specific conductance (micromhos at 25°C)	pH
CACHE LA POUDRE AREA (BEDROCK)																									
(B-6-64)2dda	Kl(?)	295	8-24-60	63	11	0.07	0.00	2.9	0.2	222	1.2	349	0	190	14	0.9	0.0	0.07	626	8	0	98	34	979	7.5
			5-21-64	62	6.4	.20	.00	3.8	.1	227	1.2	358	0	191	14	.9	.3	.05	622	10	0	98	31	957	7.9
			9- 9-64	62	8.2	.25	--	3.6	1.7	224	1.4	362	0	193	15	1.1	1.3	.09	619	16	0	96	24	957	8.1
(B-6-65)3aad	Kl(?)	300	8-24-60	62	11	.11	.00	4.5	.7	210	1.3	294	0	202	19	.3	.0	.08	603	14	0	97	24	947	6.9
			5-21-64	59	7.1	.44	.00	5.0	.6	211	1.3	300	0	206	18	.5	.6	.07	607	15	0	97	24	955	7.9
			9- 9-64	62	8.8	.10	--	4.6	.6	216	1.1	308	0	201	20	.3	.7	.07	594	14	0	97	25	921	8.1
32bab	Kl	512	8-25-60	65	8.7	.56	.00	5.8	1.1	274	1.6	270	0	317	51	1.2	.1	.06	796	19	0	97	27	1270	7.1
			5-21-64	58	5.0	.00	.00	8.0	1.0	270	1.5	268	0	339	42	.8	.4	.05	812	24	0	96	24	1260	7.8
			9- 9-64	63	7.5	.03	--	7.8	.9	284	1.6	282	0	315	54	.8	1.3	.06	793	23	0	96	26	1240	7.9
(B-6-66)19dcb	Kfh	487	5-21-64	58	9.3	.07	--	6.4	2.4	322	1.6	236	0	483	34	1.1	.3	.11	975	26	0	96	27	1470	7.5
(B-7-66)7add	Kl	150	5-20-64	50	8.8	.71	--	75	33	37	4.3	276	0	178	7.5	.7	.1	.12	500	322	96	20	.9	713	7.7
(B-8-68)7ccd	Kprr(?)	669	5-25-60	56	10	--	.02	12	3.2	801	1.2	203	0	1580	24	.2	.6	.18	2580	43	0	98	53	3590	8.2
			5-19-64	56	8.8	.16	--	11	3.4	809	1.3	185	0	1590	22	.3	2.0	.19	2530	42	0	98	54	3400	7.5
			9- 9-64	64	10	.01	--	12	2.7	808	1.4	206	0	1570	20	.1	2.8	.15	2560	41	0	98	55	3370	7.7
(B-8-69)12bdd	Kprr	206	8-26-60	54	11	.78	.04	64	8.9	1160	10	276	0	2480	12	.0	2.2	.28	3950	196	0	92	36	5100	7.3
			5-19-64	56	9.3	.12	--	18	2.9	704	1.2	192	0	1410	15	.3	.9	.17	2260	58	0	96	40	3080	7.3
			9- 9-64	58	10	.06	--	40	2.4	865	1.4	280	0	1720	10	.0	1.7	.17	2810	110	0	94	36	3670	7.8
30acc	TRj(?)	44	8-31-60	57	12	.03	.00	66	32	11	1.5	221	0	65	19	.3	58	.03	417	297	116	7	.3	600	7.4
			5-19-64	56	10	.67	--	77	39	11	1.9	253	0	74	31	.2	71	.02	465	352	145	6	.3	679	7.8
			9- 9-64	60	11	.01	--	75	39	11	.8	256	0	66	31	.1	62	.02	454	345	135	6	.3	673	8.0
(B-9-68)8dcd	Kpl(?)	700	8-26-60	55	14	.39	.18	48	36	363	2.1	158	0	923	7.0	.3	.0	.18	1500	266	136	75	9.7	2080	7.0
			5-20-64	59	13	.35	--	59	46	350	2.5	152	0	949	4.1	.3	2.1	.16	1510	335	210	69	8.3	1990	7.4
			9- 9-64	56	13	.11	--	52	45	357	2.6	154	0	936	7.0	.3	4.0	.17	1510	315	189	71	8.7	1990	7.6
CACHE LA POUDRE AREA (SURFICIAL DEPOSITS)																									
(B-5-65)2bbb	Qt	123	5-27-60	52	34	0.02	--	228	54	114	9.0	311	0	675	32	0.4	41	0.24	1420	790	535	--	1.8	1740	7.2
			5-21-64	54	31	.04	--	234	52	119	9.6	331	0	711	32	.4	33	.16	1410	796	525	24	1.8	1680	7.7
(B-6-64)24daa	Qal	37	5-27-60	51	39	.09	0.01	263	86	375	16	425	0	1350	75	1.2	21	.54	2580	1010	661	44	5.1	3060	7.2
			5-21-64	51	32	.21	.00	273	107	417	16	466	0	1440	85	.7	10	.41	2660	1120	738	44	5.4	3150	8.0
			9- 9-64	52	38	.02	--	160	55	439	15	386	0	1170	51	.2	39	.52	2190	625	308	60	7.6	2750	7.7
31ccd	Qt(?)	100	5-27-60	56	28	.02	--	186	59	125	8.7	286	0	667	30	.7	28	.22	1340	708	473	27	2.0	1680	7.3
			5-21-64	55	24	.12	.00	186	69	126	11	304	0	706	28	.4	19	.22	1340	750	501	26	2.0	1700	8.0
			9- 9-64	55	28	.00	--	194	69	129	11	282	0	726	30	.6	30	.22	1400	770	539	26	2.0	1660	7.7
32dab	Qt	43	5-27-60	53	24	.16	.02	267	130	206	11	417	0	1130	55	2.0	37	.42	2300	1200	858	26	2.5	2610	7.2
			5-21-64	52	20	.23	.00	261	158	213	9.8	434	0	1290	65	1.6	23	.46	2370	1300	944	26	2.6	2720	7.9
			9- 9-64	53	24	.00	--	244	144	213	9.1	348	0	1250	59	1.0	43	.43	2290	1200	915	28	2.7	2560	7.7
35baa	Qal	42	9- 7-57	55	31	.80	--	325	552	1600	23	478	0	5740	274	3.3	3.2	.66	9270	3080	2690	53	13	9440	7.7
			5-21-64	46	30	.27	--	317	618	1250	15	516	0	5100	189	1.8	.1	.60	8730	3330	2910	45	9.4	7900	7.7
			9- 9-64	55	31	.06	--	251	395	1090	15	510	0	3880	189	.3	2.6	.63	6620	2250	1830	51	10	6570	7.8
35ddb	Qal	41	5-27-60	55	34	.01	.03	492	112	652	22	449	0	2510	143	.5	22	.46	4450	1690	1320	45	6.9	4880	7.2
			5-21-64	55	30	.08	.00	437	143	640	25	423	0	2550	145	.6	7.7	.45	4410	1680	1330	45	6.8	4760	7.9
			9- 9-64	55	35	.01	--	442	122	700	27	388	0	2560	141	.1	19	.47	4370	1600	1290	48	7.6	4650	7.5
(B-6-65)4baa-1	Qal	42	5-26-60	51	25	.00	--	204	96	181	30	387	0	928	46	1.3	44	.32	1860	905	588	29	2.6	2200	7.0
			5-21-64	52	28	.03	.00	242	67	150	12	384	0	812	32	.4	24	.43	1600	880	565	27	2.2	1960	7.8
			9- 9-64	53	31	.12	--	240	66	158	11	314	0	872	38	.2	41	.41	1670	870	613	28	2.3	1950	7.6
22cbb	Qt	64	5-26-60	50	35	.05	--	286	54	139	11	351	0	816	37	.3	32	.16	1710	936	648	24	2.0	2010	7.2
			5-21-64	49	27	.00	.00	234	52	125	10	334	0	765	28	.0	8.5	.19	1460	800	526	25	1.9	1770	7.8
			9- 9-64	57	33	.01	--	305	64	150	13	398	0	947	38	.3	34	.20	1850	1020	699	24	2.0	2120	7.8
35bba	Qt	28	5-26-60	60	35	.01	--	185	68	105	31	330	0	575	24	1.7	28	.32	1390	741	429	33	1.7	1620	7.2
35bbb	Qt(?)	57	5-21-64	54	29	.13	.00	212	73	106	7.3	362	0	718	28	.2	18	.21	1410	830	533	22	1.6	1730	7.7
			9- 9-64	54	31	.00	--	194	72	118	7.4	296	0	714	31	.8	29	.22	1400	780	537	25	1.8	1650	7.6

(B-6-66)2aaa	Qal(?)	31	5-26-60	48	20	.09	.00	353	258	295	4.1	508	0	2000	39	1.4	27	.99	3670	1940	1520	25	2.9	3680	7.1
			5-20-64	48	20	.39	--	393	292	228	3.7	466	0	2190	32	1.0	19	.96	3620	2180	1800	19	2.1	3510	7.4
29abb	Qt	36	5-21-64	53	16	.00	--	160	233	178	1.9	449	0	1280	44	2.1	19	.31	2240	1360	992	22	2.1	2570	7.5
36acc	Qal	39	5-21-64	52	11	.03	--	178	101	165	3.6	383	0	852	35	.6	3.4	.28	1640	860	546	29	2.4	1930	7.7
19dbc	Qt	29	5-25-60	53	16	.00	.02	283	283	265	1.7	460	0	1850	69	2.9	39	.37	3410	1870	1490	24	2.7	3540	7.2
			9- 9-64	53	16	.02	--	175	172	183	1.8	366	0	1100	40	1.9	30	.31	2030	1140	845	26	2.4	2290	7.9
28daa	Qt	44	5-25-60	52	20	.04	--	129	113	111	1.3	381	0	663	22	1.9	20	.27	1360	788	476	23	1.7	1690	7.1
			5-21-64	53	16	.00	--	136	119	116	1.9	390	0	685	23	1.2	30	.20	1340	830	510	23	1.8	1670	7.7
			9-29-64	54	18	.03	--	142	125	123	2.5	388	0	714	28	1.2	33	.26	1410	870	552	23	1.8	1730	7.9
(B-6-67)1bbc	Qal	51	5-20-64	53	17	.32	--	88	95	96	1.6	432	0	420	16	2.2	13	.38	976	610	256	25	1.7	1330	7.8
7cbd	Qt	29	5-25-60	53	--	--	--	--	--	88	--	364	0	--	19	--	--	--	1330	820	522	19	1.3	1750	7.3
			5-21-64	58	13	.00	--	156	66	68	3.5	366	0	469	15	.9	13	.14	1010	660	360	18	1.7	1290	7.8
			9- 9-64	58	16	.02	--	151	68	74	3.7	350	0	484	16	.7	17	.17	1040	656	369	20	1.3	1310	7.9
26aba	Qt	33	5-25-60	--	19	.02	--	276	175	208	5.9	433	0	1370	31	.8	24	.36	2610	1410	1060	24	2.4	2830	7.2
			5-21-64	51	19	.02	--	232	162	197	5.1	432	0	1230	36	.6	17	.31	2240	1240	891	26	2.4	2410	7.8
			9- 9-64	55	17	.02	--	227	171	202	6.2	382	0	1280	39	.6	26	.35	2330	1270	957	26	2.5	2530	7.8
(B-6-68)9bbd	Qp	18	5-19-64	54	9.4	.81	--	74	27	25	3.0	272	0	118	8.4	.9	2.3	.05	411	294	71	15	.6	628	7.6
(B-7-65)15bba	Qal	29	5-26-60	50	30	.00	--	201	45	97	8.7	387	0	500	24	.5	30	.17	1190	685	368	23	1.6	1510	7.3
			5-20-64	50	27	.37	--	218	49	103	9.7	428	0	544	25	.3	38	.17	1280	745	394	23	1.6	1580	7.5
			9-10-64	54	29	.04	--	184	51	97	10	318	0	532	30	.3	44	.17	1190	670	409	24	1.6	1490	7.7
(B-7-66)1bbb-2	Qal	35	5-26-60	51	24	.09	.00	129	23	49	4.3	345	0	172	32	.4	28	.15	666	417	134	20	1.0	960	7.2
			5-20-64	52	21	.21	--	152	34	47	5.2	340	0	263	23	.6	37	.10	760	520	241	16	.9	1030	7.7
			9-10-64	54	23	.12	--	129	31	49	5.4	290	0	256	27	.5	34	.15	712	448	210	19	1.0	969	7.7
3aad	Qal	42	5-20-64	54	22	.03	--	143	42	67	5.4	299	1	389	18	.4	16	.25	869	530	284	21	1.3	1170	8.3
36cbb	Qal	60	5-20-64	53	22	.32	--	255	173	172	4.2	428	0	1270	24	.7	16	.57	2270	1340	944	22	2.0	2480	7.8
			9-10-64	53	21	.04	--	226	166	167	4.2	374	0	1200	24	.6	22	.55	2150	1240	938	22	2.1	2340	7.8
(B-7-68)5dbc	Qal	75	5-20-64	53	14	.43	--	423	168	224	4.2	324	0	1870	38	.7	12	.55	3150	1740	1480	22	2.3	3120	7.7
20bcc	Qp(?)	25	5-21-60	52	16	.02	--	67	41	24	.4	373	0	62	3.8	1.6	12	.14	422	336	30	13	.6	686	7.3
			5-19-64	56	15	.18	--	79	46	30	1.9	424	0	83	5.6	1.0	16	.10	486	388	40	14	.7	749	7.7
			9- 9-64	55	15	.02	--	58	44	35	.5	358	0	85	7.5	1.4	21	.16	448	325	31	19	.8	696	7.8
22aba-2	Qal	55	5-21-60	50	13	.04	--	219	89	121	6.2	277	0	864	19	.6	5.3	.26	1630	912	685	22	1.7	1860	7.1
			5-19-64	48	14	.25	--	143	79	102	5.6	339	0	558	45	.7	18	.27	1180	684	406	24	1.7	1500	7.6
			9-11-64	62	16	.11	--	289	119	144	8.9	326	0	1150	30	.6	35	.32	2100	1210	943	20	1.8	2280	7.6
35abc	Qal(?)	35	5-19-64	52	16	.07	--	295	140	168	4.7	384	0	1250	32	.4	31	.30	2230	1310	995	22	2.0	2420	7.6
(B-7-69)24daa	Qp	31	5-21-60	53	17	.15	--	94	31	45	.6	423	0	98	5.0	.6	9.4	.16	518	364	17	21	1.0	818	7.2
			5-19-64	56	15	.10	--	95	33	46	1.9	442	0	97	7.2	.5	16	.17	549	375	13	21	1.0	805	7.9
			9- 9-64	63	14	.02	--	97	35	48	.8	433	0	111	7.5	.1	17	.18	562	385	30	21	1.1	817	8.0
(B-8-65)29bbb	Qal	22	5-20-64	49	29	.05	--	167	58	90	8.0	426	0	462	14	.5	19	.21	1090	652	303	23	1.5	1380	7.7
			9-10-64	53	28	.03	--	232	96	156	9.4	404	0	906	46	.5	17	.30	1800	975	644	26	2.2	2110	7.6
35cda	Qal(?)	22	5-20-64	47	36	.26	--	303	94	441	18	498	0	1470	108	.7	.1	.45	2800	1140	732	45	5.7	3200	7.8
(B-8-66)22aab	Qal	38	5-26-60	53	23	.10	--	79	14	25	3.7	225	0	43	16	.4	65	.09	410	253	68	18	.7	606	7.4
			8-31-60	52	28	.01	--	73	13	30	4.8	258	0	53	14	.4	28	.08	378	234	22	21	.9	587	7.4
			5-20-64	53	25	.57	--	73	15	32	5.2	259	0	50	21	.2	31	.07	391	242	30	22	.9	578	7.4
			9-29-64	53	24	.09	--	74	14	32	2.2	256	0	49	21	.1	34	.08	388	240	30	22	.9	579	7.8
(B-8-68)15bcb	Qal	52	5-24-60	52	20	.01	.00	255	75	145	2.9	359	0	855	17	.7	25	.46	1670	944	650	25	2.1	1990	7.0
			5-20-64	53	18	.04	--	306	95	110	4.4	326	0	1060	19	.5	18	.40	1940	1160	888	17	1.4	2090	7.6
			9- 9-64	53	17	.01	--	293	93	109	4.2	266	0	1070	20	.5	21	.32	1880	1120	897	17	1.4	2060	7.5
28bbb-																									
1 and 2	Qal	72	5-20-64	55	17	.12	--	445	137	152	4.1	327	0	1650	30	.8	14	.59	2800	1680	1410	16	1.6	2800	7.8
32aba-1	Qal	90	5-23-60	52	19	.02	--	441	148	184	3.6	302	0	1720	30	1.0	15	.62	3130	1710	1460	19	1.9	3070	7.0
			5-20-64	53	17	.08	--	445	182	197	3.8	362	0	1880	36	.9	14	.68	3150	1860	1560	19	2.0	3090	7.2
			9- 9-64	53	18	.00	--	459	186	211	4.5	276	0	2010	36	.3	20	.65	3380	1910	1680	19	2.1	3180	7.6
33dab-1	Qal	25	5-21-60	49	--	--	--	--	--	156	--	379	0	1570	24	--	--	--	2810	1690	1380	17	1.7	2870	7.5
			5-20-64	49	18	.63	--	411	156	145	3.4	339	0	1620	27	.8	25	.50	2770	1660	1390	16	1.5	2770	7.5
			9- 9-64	53	19	.00	--	407	171	156	3.8	280	0	1720	25	.6	28	.49	2880	1720	1490	16	1.6	2860	7.6

See footnotes at end of table on page 82.

CHEMICAL ANALYSES OF GROUND WATER IN COLORADO--Continued

Well number	Geologic source 1/	Depth of well	Date of collection	Temperature (°F)	Silica (SiO_2)	Iron (Fe) 2/	Manganese (Mn) 2/	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Fluoride (F)	Nitrate (NO_3)	Boron (B)	Dissolved solids (residue at 180°C)	Hardness as $CaCO_3$		Percent sodium	Sodium-adsorption ratio (SAR)	Specific conductance (micromhos at 25°C)	pH
																				Ca, Mg	Noncarbonate				
CACHE LA POUDRE AREA (SURFICIAL DEPOSITS)--Continued																									
(B-8-69)27dbb	Qal	38	5-19-64	56	12	0.18	--	109	49	13	1.3	334	0	227	3.3	0.7	3.5	0.08	607	474	200	6	0.3	854	7.6
(B-9-66)33cac	Qal	40	8-23-60	54	24	.05	0.00	81	12	25	--	193	0	45	9.0	.5	126	--	448	252	94	17	.7	621	7.1
			5-20-64	54	23	.02	--	92	16	23	5.7	196	0	57	13	.4	143	.04	518	298	137	14	.6	673	7.7
			9-10-64	56	22	.12	--	98	17	23	2.7	198	0	62	14	.1	146	.04	556	312	150	14	.6	702	7.7
(B-9-68)8cab	Qal	80	5-20-64	52	18	.38	--	296	104	70	4.6	280	0	1070	18	.7	8.9	.26	1840	1170	936	11	.9	2010	6.4
19bbb	Qp	41	5-19-64	51	14	.37	--	118	48	69	2.4	354	0	318	9.0	.8	12	.24	787	492	202	23	1.4	1080	7.6
26bcc	Qal	43	5-24-60	50	16	.02	.01	201	170	270	6.9	518	0	1220	51	1.4	56	.40	2500	1200	775	33	3.4	2800	7.2
			5-20-64	70	14	.27	--	188	190	329	5.1	449	0	1460	31	.9	42	.67	2670	1250	882	36	4.0	2960	7.6
			9- 9-64	60	16	.01	--	164	165	300	6.5	434	0	1270	36	.8	52	.37	2400	1090	734	37	4.0	2660	8.0
36cab-																									
1 and 2 (2 wells)	Qal	65, 90	5-20-64	53	18	.35	--	320	106	85	4.6	241	0	1160	22	.6	26	.24	1970	1230	1030	13	1.1	2110	7.6
			9- 9-64	53	17	.03	--	328	105	90	5.0	224	0	1180	18	.6	32	.25	2000	1250	1070	13	1.1	2130	7.6
(B-9-69)14ada-1 (2 wells)	Qp	22	5-25-60	48	14	.01	.01	111	41	85	1.3	342	0	295	13	.9	21	.26	807	445	165	29	1.8	1110	7.3
			5-19-64	47	12	.27	--	95	44	73	2.1	358	0	252	14	.7	14	.22	700	415	121	28	1.6	978	7.7
			9- 9-64	54	14	.00	--	87	44	75	2.4	330	0	253	14	.9	18	.28	675	398	127	29	1.6	948	7.8

1/ Qal, alluvial deposits; Qds, dune sand; Qvf, valley fill deposits; Qt, terrace deposits; Qpd, pediment deposits; Qv, Verdos Alluvium; Ql, Louviers Alluvium; Qb, Broadway Alluvium; Qp, Piney Creek Alluvium; Qpp, post-Piney Creek Alluvium; To, Ogallala Formation; TRj, Jelm Formation; Kprr, Rocky Ridge Sandstone Member of the Pierre Shale; Kpl, Larimer Sandstone Member of the Pierre Shale; Kfh, Fox Hills Sandstone; Kl, Laramie Formation; Kfm, Milliken Sandstone Member of the Fox Hills Sandstone; Kla, A sandstone of the Laramie Formation; Klb, B sandstone of the Laramie Formation; Kdlc, lower conglomerate of tbe Dawson Formation; Klmc, middle conglomerate of the Dawson Formation; Tkdv, upper part of the Dawson Formation.

2/ In solution at time of sampling, unless otherwise indicated.

A In solution at time of analysis.

B Calculated from determined constituents.

INDEX