Occurrence and Distribution of Molybdenum in the Surface Water of Colorado

GEOLOGICAL SURVEY WATER-SUPPLY PAPER 1535-N

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By PAUL T. VOEGELI, SR., *and* ROBERT U. KING

GEOCHEMISTRY OF WATER

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A report on the molybdenum contents of water from all the principal Colorado streams and their chief tributaries and from a few reservoirs and lakes

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GEOCHEMISTRY OF WATER

OCCURRENCE AND DISTRIBUTION OF MOLYBDENUM IN THE SURFACE WATER OF COLORADO

By PAUL T. VOEGELI, SR., and ROBERT U. KING

ABSTRACT

Molybdenum was detected in 89 percent of the samples collected from all the principal Colorado streams and their chief tributaries and from a few reservoirs and lakes. Amounts detected ranged from 1 to 3,800 micrograms per liter. The greatest amounts of molybdenum detected were in samples from the Colorado River at and below Kremmling, the Dillon Reservoir, the Blue River below Dillon Dam, the Eagle River, and Tenmile Creek.

INTRODUCTION

The literature lists little information on the occurrence and the distribution of molybdenum in surface waters within major drainage basins or within geographic units as large as a State. Most investigations of the occurrence of molybdenum in surface waters have been limited to streams and lakes in the vicinity of known molybdenum deposits. Kleinkopf's (1955, 1960) measurements of molybdenum and other trace-elements content of Maine lake waters probably represent the first regional study of the occurrence and distribution of molybdenum in a large number of surface-water bodies.

Information on the occurrence of molybdenum in surface waters is of practical value as an aid in prospecting for the metal and also as an aid in hydrologic and geochemical studies. The distribution of molybdenum in a stream system is another tool that may be used to better understand the geochemical events related to stream behavior. In addition, this information would probably be of use to scientists studying the molybdenum content of soils and plants.

The demand for molybdenum will probably increase (Holliday, 1965, p. 605). Therefore, information on the distribution of molybdenum in streams is of interest to companies looking for new deposits or studying methods that better define the parameters of known deposits. Malyuga (1958, p. 320) stated, "There is no doubt that the composition of the waters of a district where a reconnaissance for molybdenum

is being carried on, is among the principal aids in evaluating the prospecting possibilities. Experience shows, however, that it is not easy to interpret the many metallic anomalies, for many metals, that may be discovered by the hydrogeologic method." The sampling of several streams within a large geographic unit on a reconnaissance basis provides data that can be used as a starting point for study. Since the ultimate source of dissolved metals in streams is the metal deposits in areas traversed by the streams, any evaluation of such sample data requires a general knowledge of the mineral deposits of the area sampled.

Colorado is the major producer of molybdenum and is well endowed with streams. Also, a unique situation exists in the Colorado Rockies in that virtually all the drainage originates within the State.

SAMPLING PROGRAM

The selection of sampling points was primarily based on the requirement of obtaining a water sample for molybdenum analysis from all the principal Colorado streams and their chief tributaries. The location of the sampling points and the outlines of the watersheds upstream from the sampling points are shown on plate 1. In addition to streams, a few reservoirs and lakes were sampled. About 60 percent of the sample points were visited only once during either high or low flow. More than half the sampling points are at U.S. Geological Survey gaging stations. At more than 40 percent of the sampling points, a sample was collected both during high-flow conditions and during low-flow conditions. Designations "high" and "low" represent relative flow conditions only and should not be interpreted as exact periods of high or low flow for the year. Detailed data on flow rates for the streams sampled at the U.S. Geological Survey gaging stations may be found in the U.S. Geological Survey Water-Supply Paper series "Surface-Water Supply of the United States," Parts 6–B, 7, 8, and 9.

At the time of collection, the pH, specific conductance, and temperature of the water were measured. These data and laboratory measurements of pH and specific conductance are presented in table 1. Differences between field and laboratory determinations of pH and specific conductance of the samples may be attributed to the various techniques of measurement used in the field and laboratory and to the behavior of the water between the time of sampling and the time of laboratory analysis. The problem of differences between field and laboratory determinations of pH and specific conductance were described by Roberson, Feth, Seaber, and Anderson (1963).

Additional data from a sampling program conducted in the upper Clear Creek basin as part of a laboratory evaluation of the different techniques of molybdenum analysis are included in this study.

METHODS OF ANALYSIS

Molybdenum content of samples obtained during the study was determined in the Analytical Methods—Water Chemistry Laboratory of the Water Resources Division, Denver, Colo. Methods of analysis included: (1) Spectrographic method, (2) thiocyanate method, and (3) dithiol methods (spectrophotometric and atomic absorption). These methods were described by Fishman and Mallory (1968). Comparable results were attained from all the methods used and are based on a clear-water sample obtained at the point of collection.

MOLYBDENUM CONTENT OF SURFACE WATER

Knowledge of the quantity of molybdenum transported by the streams of Colorado can be obtained only by very detailed studies of each stream basin. Reconnaissance studies, such as the one reported by Kleinkopf (1955, 1960), serve as a foundation for future detailed studies. Complex hydrologic, geochemical, climatological, and other natural phenomena influence the quantity of molybdenum transported. The molybdenum content of waters of a stream will differ between high- and low-flow conditions. In some of the streams sampled, the molybdenum content of the water was greater during low flow than during high flow. In other streams, opposite conditions prevailed. Therefore, data from this sampling reconnaissance are indicators only of the general occurrence of molybdenum within a stream.

Only by detailed geologic and geochemical studies of a stream basin can the reasons for differences in molybdenum content of the water be learned. Results from a reconnaissance study provide only limited data from an environment that has not been fully evaluated.

Molybdenum was detected in 89 percent of the samples from the streams, lakes, and reservoirs sampled. Molybdenum contents of the water from the principal streams and their tributaries are given in table 1. The amounts ranged from 1 to 3,800 μg/l (micrograms per liter). The minimum and maximum molybdenum contents of water from streams in different basins are presented in table 2. The distribution of molybdenum concentration in the water of most of the basins sampled is shown in the histograms of figure 1. The wide range of values of molybdenum concentration in the waters of the Colorado River at and below Kremmling, the Dillon Reservoir, the Blue River below Dillon Dam, the Eagle River, and Tenmile Creek make it impractical to show values for these basins.

The amount of molybdenum, in grams per second, passing a sampling point at the time of sample collection is given in table 1. If the natural conditions, including the rate of stream discharge, under which the molybdenum arrives at the sampling point were to remain constant, it would be possible to calculate an accurate total

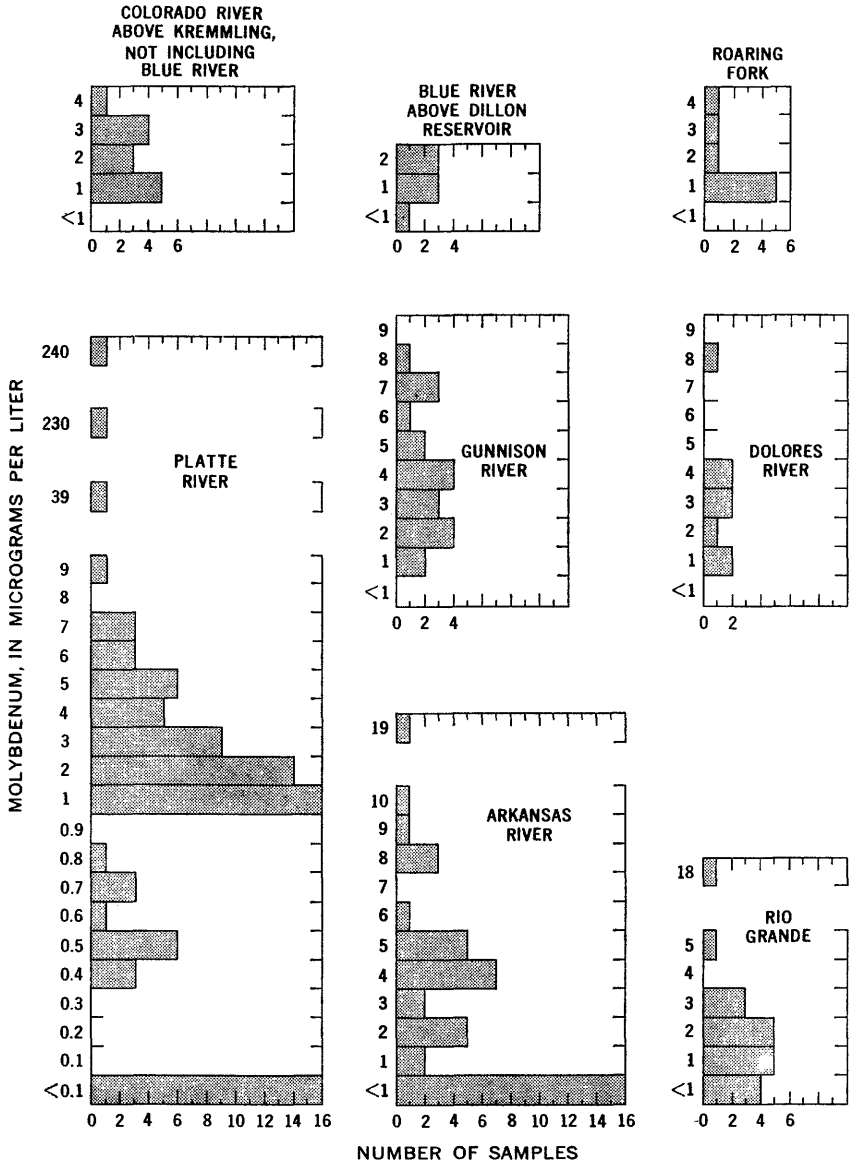

FIGURE 1.—Molybdenum concentration in selected river basins.

weight of molybdenum carried past the sampling point per minute, hour, day, and year. However, the natural conditions vary greatly, and the quantity of molybdenum in the water changes. Only through constant monitoring of the molybdenum content in the water and of the stream discharge can accurate weight totals of molybdenum for unit time be determined. This reconnaissance sampling affords the opportunity to calculate approximate values that are of general use.

PRINCIPAL MOLYBDENUM DEPOSITS OF COLORADO

Molybdenum makes up only about 0.00025 percent of the earth's crust. Therefore, a mineral deposit containing 0.25 percent molybdenum, a good workable ore grade, represents a concentration of about 1,000 fold. Trace amounts of the element are present igneous, metamorphic, and sedimentary rocks; in soils, ground and surface waters, oceans, and hot springs; and in plant and animal tissues, where the element apparently plays a vital part in certain organic processes. Deposits of commercial interest, however, occur chiefly in igneous rocks of granitic composition or in sedimentary rocks closely related to granitic rocks. Molybdenum has not been found in its pure (native) state; rather, it occurs in nature only in combination with other elements, such as iron, tungsten, lead, calcium, sulfur, and oxygen. Some 12 minerals that contain molybdenum as an essential element are known, but only two—molybdenite (molybdenum disulfide) and wulfenite (lead molybdate)—are the sources of most of the molybdenum produced to date. Other molybdenum minerals that are noteworthy either for their possible economic molybdenum content or for their geochemical-geologic significance are ferrimolybdite, powellite, jordisite, and ilsemannite.

Molybdenum deposits are widespread in Colorado. They have been found in 28 of the counties in the western half of the State (pl. 1; King, 1966, p. 102–108). Although anomalous molybdenum concentrations have been detected in soils and surface waters in the plains region, no molybdenum deposits have been found there. Table 3 lists the principal molybdenum deposits of the State and gives brief descriptions of the mineralogy, the nature of the deposits, and a measure of their surface exposure. Of 71 deposits shown on the map (pl. 1), only the deposits at Climax and Urad have been of major economic significance. The Nye, Gold Hill, California, Lamphere Lakes, Redskin, Bighorn, and Mountain Lion deposits have yielded small quantities of molybdenum ore.

SUMMARY

The molybdenum content in Colorado streams is greatest in those streams that drain areas of known molybdenum deposits or areas where molybdenum ore is processed. The greatest molybdenum con-

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tents in streams of Colorado occur in the upper reaches of the Eagle River and of Tenmile Creek, which drain the principal part of the Climax area. Below its confluence with the Blue River, the Colorado River contains a greater quantity of molybdenum than most of the other streams of the State. This greater concentration may be associated with the molybdenum deposits and their processing at the headwaters of Tenmile Creek.

In some of the streams sampled, the molybdenum content of the water was greater during low flow than high flow. In other streams, opposite conditions prevailed.

Surface water containing greater than 5 μg/l molybdenum in the mountainous areas of Colorado may be considered anomalous and may warrant extensive sampling and study to ascertain the source of the molybdenum. In some places the source of molybdenum is readily apparent; however, in other places an explanation for anomalous values is not so apparent.

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TABLES 1–3

TABLE 1.—*Molybdenum content of water samples from the principal*

[Method of analyses; D, dithiol;

Sample point No. on pl. 1	Stream, lake, or reservoir	Section, township, range, county	Latitude	Longitude	U.S.G.S. gaging station	Drainage area (sq mi)	Land surface elevation at point of collection (ft)	Average discharge (cfs per yr)
1	North Fork Michigan River near Gould.	NE¼NE¼ sec. 27, T. 7 N., R. 77 W., Jackson Co.	40°33′10″	106°00′36″	6-6160	20.2	8,848	17.2
2	North Platte River near Northgate.	SW¼SE¼ sec. 11, T. 11 N., R. 80 W., Jackson Co.	40°56′10″	106°20′21″	6-6200	1,431	7,810	436
3	Middle Fork South Platte River at Fairplay.	NW¼SW¼SW¼ sec. 34, T. 9 S., R. 77 W., Park Co.	39°13′20″	105°59′33″	----------	82	9,850	---------
4	South Fork South Platte River.	SE¼SE¼NW¼ sec. 8, T. 12 S., R. 75 W., Park Co.	39°01′17″	105°48′09″	----------	384	8,875	---------
5	North Fork South Platte River.	NE¼NE¼SE¼ sec. 36, T. 7 S., R. 71 W., Jefferson Co.	39°23′38″	105°16′45″	----------	380	6,650	---------
6	North Fork South Platte River below Geneva Creek at Grant.	NW¼ sec. 10, T. 7 S., R. 74 W., Park Co.	39°27′28″	105°39′28″	6-7060	127	8,559	73.8
7	North Fork South Platte River.	SW¼SW¼SW¼ sec. 4, T. 7 S., R. 74 W., Park Co.	39°27′40″	105°40′43″	----------	47.8	8,675	---------
8	Buffalo Creek	SE¼NE¼SE¼ sec. 1, T. 8 S., R. 71 W., Jefferson Co.	39°22′10″	105°16′44″	----------	41	6,730	---------
9	North Fork South Platte River at South Platte.	SW¼ sec. 25, T. 7 S., R. 70 W., Jefferson Co.	39°24′30″	105°10′30″	6-7070	479	6,091	115
10	Wigwam Creek	NW¼NW¼NE¼ sec. 30, T. 9 S., R. 70 W., Jefferson Co.	39°14′33″	105°16′00″	----------	35.8	6,600	---------
11	South Platte River at Lone Rock Campground.	NW¼SE¼NW¼ sec. 21, T. 9 S., R. 70 W., Jefferson Co.	39°15′10″	105°14′00″	----------	1,773	6,420	---------
12	South Platte River.	NE¼SE¼ sec. 12, T. 8 S., R. 70 W., Jefferson	39°21′46″	105°10′00″	----------	2,058	6,200	---------
13	South Platte River at South Platte.	SE¼ sec. 25, T. 7 S., R. 70 W., Jefferson Co.	39°24′30″	105°10′10″	6-7075	2,579	6,078	356
14	Bear Creek at Morrison.	SE¼SW¼ sec. 35, T. 4 S., R. 70 W., Jefferson Co.	39°39′11″	105°11′43″	6-7105	164	5,780	53.7
15	Cherry Creek near Melvin.	SE¼SE¼ sec. 19, T. 5 S., R. 66 W., Arapahoe Co.	39°35′42″	104°48′44″	6-7125	336	5,630	13.2
16	Cherry Creek Reservoir.	SW¼ sec. 11, T. 5 S., R. 67 W., Arapahoe Co.	39°37′36″	104°51′37″	----------	385	5,600	---------
17	do	NW¼ sec. 1, T. 5 S., R. 67 W., Arapahoe Co.	39°39′07″	104°50′45″	----------	385	5,600	---------
18	West Fork Clear Creek at south portal Vasquez Tunnel.	Clear Creek Co	39°46′12″	105°51′05″	----------	5.9	10,320	---------
19	West Fork Clear Creek.	do	39°46′47″	105°49′13″	----------	8.9	9,960	---------

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S, spectrographic; T, thiocyanate]

Date collected	Discharge at time of collection (cfs)	Water temperature (°C)	pH		Specific conductance (micromhos per cm at 25° C)		Method of analysis	Molybdenum (µg/l)	Molybdenum passing sampling point at time of sample collection (grams per sec)	Remarks
			Field	Lab.	Field	Lab.				
11- 1-63	4	2.8	7.0	-------	180	150	T	0	----------	
5-15-64	73	1.1	7.2	6.9	200	163	T	0	----------	
11- 1-63	80	1.1	8.4	----------		298	T	4	0.007	
5-15-64	628	13.9	8.4	7.0	240	239	T	1	.01	
11-17-65	----------	5.0	8.0	8.0	280	279	D	0	----------	
12-10-65	----------	0.0±	8.0	8.0	1,200	1,270	D	5	----------	
9-24-65	----------	4.4	7.0	7.5	95	76	T	3	----------	
9-24-65	210	5.0	7.0	7.2	80	74	T	1	.005	
9-24-65	----------	4.4	7.0	7.6	118	95	T	0	----------	
9-24-65	----------	4.4	7.0	7.7	90	77	T	0	----------	
9-24-65	228	9.4	7.6	7.8	95	81	T	6	.03	
9-24-65	7	8.9	7.2	7.8	87	73	T	1	.0001	
9-24-65	----------	15.6	8.8	7.9	425	458	T	1	----------	
9-24-65	----------	14.4	8.4	8.1	420	438	T	2	----------	
12-12-63	71	0.0±	7.8	-------	690	-------	T	5	.01	
5- 6-64	429	8.3	8.4	7.3	375	329	T	2	.02	
9-24-65	449	10.0	7.9	7.4	200	176	T	4	.05	
12-12-63	7	0.0±	7.2	-------	160	-------	T	4	.0007	
5- 6-64	40	7.2	7.4	7.0	105	87	T	2	.0002	
4-14-66	<1	8.3	8.2	7.4	500	538	D	5	.0001	
4-14-66	----------	11.1	8.2	7.6	390	402	D	5	----------	
4-14-66	----------	11.1	8.2	7.6	390	405	D	4	----------	
10- 6-65	7	2.8	7.0	7.4	50	46	T	0	----------	
5- 3-65	----------	3.9	8.2	----------			S	<.5	----------	Sample filtered at time of collection.

TABLE 1.—*Molybdenum content of water samples from the principal*

Sample point No. on pl. 1	Stream, lake, or reservoir	Section, township, range, county	Latitude	Longitude	U.S.G.S. gaging station	Drainage area (sq. mi.)	Land surface elevation at point of collection (ft)	Average discharge (cfs per yr.)
20	West Fork Clear Creek.	Clear Creek Co.	39°45'09"	105°49'00"		9.2	9,830	
21	Woods Creek	do	39°45'10"	105°49'41"		6.7	10,220	
22	do	do	39°45'54"	105°49'03"		9.6	9,960	
23	do	do	39°46'08"	105°48'52"		10.0	9,830	
24	West Fork Clear Creek.	do	39°45'09"	105°48'38"		19.2	9,820	
25	do	do	39°46'24"	105°47'54"		20.8	9,670	
26	West Fork Clear Creek at Clear Creek Campground.	do	39°46'45"	105°45'55"		27.4	9,440	
27	West Fork Clear Creek at Empire Guard Station.	NE¼ sec. 25, T. 3 S., R. 75 W., Clear Creek Co.	39°45'46"	105°43'37"		32.7	8,880	
28	Mad Creek	SW¼SE¼NW¼ sec. 29, T. 3 S., R. 74 W., Clear Creek Co.	39°45'40"	105°42'00"		3.8	8,630	
29	West Fork Clear Creek.	NW¼NW¼SE¼ sec. 27, T. 3 S., R. 74 W., Clear Creek Co.	39°45'32"	105°39'00"		59.1	8,230	
30	Dry Gulch	Clear Creek Co.	39°41'48"	105°52'24"		3.1	10,480	
31	Clear Creek at Bethel Campground.	do	39°41'45"	105°52'15"		10.1	10,440	
32	Herman Gulch	do	39°42'10"	105°51'21"		3.1	10,320	
33	Clear Creek at Silver Plume Campground.	do	39°41'58"	105°50'33"		15.2	10,120	
34	Watrous Gulch	do	39°42'05"	105°50'26"		1.7	10,160	
35	Kearney Gulch	do	39°41'32"	105°49'12"		2.9	9,840	
36	Clear Creek at Bakersville.	do	39°41'30"	105°48'25"		23.9	9,780	
37	Quayle Creek at Bakersville.	do	39°41'27"	105°48'18"		9.4	9,800	
38	Clear Creek	NW¼NW¼NE¼ sec. 22, T. 4 S., R. 75 W., Clear Creek Co.	39°41'47"	105°46'15"		40.1	9,520	
39	Clear Creek at Silver Plume.	SW¼SW¼SE¼ sec. 13, T. 4 S., R. 75 W., Clear Creek Co.	39°41'45"	105°43'56"		44.9	9,120	
40	South Clear Creek above Georgetown.	NW¼SE¼ sec. 17, T. 4 S., R. 74 W., Clear Creek Co.	39°42'08"	105°41'41"		29.3	8,680	
41	Clear Creek below Georgetown.	SW¼NW¼NW¼ sec. 4, T. 4 S., R. 74 W., Clear Creek Co.	39°42'37"	105°41'05"		82.6	8,400	
42	Clear Creek	NW¼NW¼SE¼ sec. 33, T. 3 S., R. 74 W., Clear Creek Co.	39°44'43"	105°40'38"		83.8	8,320	
43	Clear Creek near Lawson.	SE¼NE¼ sec. 27, T. 3 S., R. 74 W., Clear Creek Co.	39°45'40"	105°39'06"	6-7165	145	8,194	139
44	North Clear Creek, north of Central City.	NE¼SW¼NW¼ sec. 1, T. 3 S., R. 73 W., Gilpin Co.	39°49'08"	105°30'48"		19.0	8,430	

Colorado streams, their tributaries, and some reservoirs and lakes—Continued

Date collected	Discharge at time of collection (cfs)	Water temperature (°C)	pH		Specific conductance (micromhos per cm at 25° C)		Method of analysis	Molybdenum (µg/l)	Molybdenum passing sampling point at time of sample collection (grams per sec)	Remarks
			Field	Lab.	Field	Lab.				
10- 6-65		2.2	7.0	7.6	60	58	T	2		
5- 3-65		1.1	8.1				S	3.3		Do.
5- 3-65		3.9	7.4				S	3.1		Do.
10- 6-65		2.8	7.2	7.3	150	151	T	6		
10- 6-65		2.8	7.0	7.5	70	68	T	2		
5-17-65		6.1	7.2				S	1.3		Do.
10- 6-65	10	2.2	7.0	7.4	70	69	T	3	0.0008	
10- 6-65		3.3	7.0	7.6	70	69	T	2		
10- 6-65	6	6.7	7.0	7.3	<50	31	T	2	.0003	
4- 8-64		1.7	7.2	6.9	160	156	T	3		
5-27-64		5.6	7.2	6.4	60	56	T	2		
10- 6-65		4.4	7.0	7.0	90	90	T	1		
6-16-65		3.9	7.5				S	.4		Do.
6-16-65		3.9	7.8				S	.5		Do.
6-16-65		2.8	7.7				S	.4		Do.
6-16-65		3.9	8.0				S	.6		Do.
6-16-65		3.9	7.8				S	.4		Do.
6-16-65		3.9	7.7				S	.5		Do.
6-16-65		5.0	8.0				S	.7		Do.
6-16-65		2.8	7.3				S	.5		Do.
6-16-65		5.0	8.2				S	.7		Do.
6-16-65		6.1	7.5				S	.7		Sample filtered at time of collection.
6-16-65		6.1	7.3				S	.5		Do.
4- 8-64		0.6	7.2	6.5	185	136	T	1		
5-27-64		5.6	7.2	6.4	70	63	T	3		
5- 4-65		3.9	8.2				S	1		Do.
10- 6-65		4.4	7.2	7.2	115	114	T	2		
6-16-65		5.0	7.4				S	.5		Do.
4- 8-64	21	0.6	7.2	6.6	200	128	T	2	.001	
10- 6-65		4.4	7.1	7.5	115	113	T	1		
11-24-65	6	0.6	7.0	7.5	60	64	D	0		

TABLE 1.—*Molybdenum content of water samples from the principal*

Sample point No. on pl. 1	Stream, lake, or reservoir	Section, township, range, county	Latitude	Longitude	U.S.G.S. gaging station	Drainage area (sq. mi.)	Land surface elevation at point of collection (ft)	Average discharge (cfs per yr.)
45	North Clear Creek below Black Hawk.	NW¼SE¼SE¼ sec. 17, T. 3 S., R. 72 W., Gilpin Co.	39°46′59″	105°27′50″	----------	37.5	7,735	----------
46	North Clear Creek.	NW¼SW¼ sec. 36, T. 3 S., R. 72 W., Gilpin Co.	39°44′55″	105°23′58″	----------	59.5	6,950	----------
47	Clear Creek	NW¼SE¼SW¼ sec. 31, T. 3 S., R. 70 W., Jefferson Co.	39°44′32″	105°16′11″	----------	393	6,000	----------
48	Clear Creek near Golden.	NE¼ sec. 32, T. 3 S., R. 70 W., Jefferson Co.	39°45′05″	105°14′55″	6–7195	399	5,735	230
49	South St. Vrain near Ward.	NW¼SE¼ sec. 20, T. 2 N., R. 72 W., Boulder Co.	40°07′10″	105°28′35″	----------	35.5	8,540	----------
50	Middle Boulder Creek east of Eldora.	NW¼NW¼SW¼ sec. 22, T. 1 S., R. 73 W., Boulder Co.	39°56′45″	105°33′24″	----------	27.3	8,600	----------
51	Barker Reservoir.	SE¼NW¼NE¼ sec. 18, T. 1 S., R. 72 W., Boulder Co.	39°58′03″	105°29′20″	----------	41.5	8,200	----------
52	Middle Boulder Creek.	SW¼NE¼SW¼ sec. 36, T. 1 N., R. 72 W., Boulder Co.	40°00′15″	105°22′21″	----------	47.8	6,880	----------
53	North Boulder Creek.	NW¼NE¼SW¼ sec. 36, T. 1 N., R. 72 W., Boulder Co.	40°00′17″	105°24′17″	----------	39.8	6,900	----------
54	Bummers Gulch.	SE¼NW¼SE¼ sec. 33, T. 1 N., R. 71 W., Boulder Co.	40°00′21″	105°20′38″	----------	4.2	6,020	----------
55	Keystone Gulch.	NE¼SE¼SW¼ sec. 33, T. 1 N., R. 71 W., Boulder Co.	40°00′13″	105°20′56″	----------	2	6,120	----------
56	Boulder Creek near Orodell.	NE¼SW¼ sec. 34, T. 1 N., R. 71 W., Boulder Co.	40°00′23″	105°19′49″	6–7270	102	5,826	91.8
57	South Boulder Creek at Rollinsville.	SE¼SE¼ sec. 36, T. 1 S., R. 73 W., Gilpin Co.	39°54′53″	105°30′05″	----------	38.3	8,390	----------
58	Coal Creek near Plainview.	SE¼NE¼ sec. 13, T. 2 S., R. 9 71 W., Jefferson Co.	39°52′40″	105°16′36″	6–7303	15.1	6,540	3.89
59	St. Vrain Creek at mouth, near Platteville.	SE¼NW¼ sec. 3, T. 3 N., R. 67 W., Weld Co.	40°15′29″	104°52′45″	6–7310	976	4,740	194
60	Big Thompson River at Estes Park.	NW¼NW¼ sec. 30, T. 5 N., R. 72 W., Larimer Co.	40°22′42″	105°30′48″	6–7330	137	7,493	128
61	Big Thompson River at mouth of canyon near Drake.	NW¼ sec. 10, T. 5 N., R. 70 W., Larimer Co.	40°25′20″	105°13′35″	6–7380	304	5,297	----------

Colorado streams, their tributaries, and some reservoirs and lakes—Continued

Date collected	Discharge at time of collection (cfs)	Water temperature (°C)	pH		Specific conductance (micromhos per cm at 25° C)		Method of analysis	Molybdenum (µg/l)	Molybdenum passing sampling point at time of sample collection (grams per sec)	Remarks
			Field	Lab.	Field	Lab.				
11-24-65	7	3.3	6.6	4.4	325	341	D	0	----------	
11-24-65	3	4.4	6.6	5.1	380	380	D	0	----------	
5- 3-65	----------	11.1	7.8	----------	----------		S	.8	----------	Do.
12-12-63	24	0.0±	7.2	-------	310	321	T	2	0.001	
5-26-64	565	8.3	7.2	6.4	80	77	T	1	.01	
10- 6-65	----------	6.7	7.2	6.9	150	149	T	1	----------	
12-13-63	2.5	0.0±	6.8	-------	60	36	T	2	.0001	
5-26-64	100	9.4	7.2	7.0	55	-------	T	1	.002	
11-24-65	8	0.6	7.0	7.5	<50	44	D	0	----------	
11-24-65	----------	5.6	7.0	7.4	<50	42	D	0	----------	
11-24-65	----------	2.2	7.6	7.8	160	161	D	0	----------	
11-24-65	4	1.7	7.6	8.0	125	128	D	0	----------	
11-24-65	.5	6.1	8.6	8.3	420	416	D	240	.003	
10- 2-66	----------	15.0	8.0	7.8	590	599	D	230	----------	Discharge 3 gallons per minute.
11-24-65	.05	5.6	7.2	7.4	240	238	D	0	----------	
12-13-63	2.3	0.0±	7.2	-------	300	-------	T	39	.002	
5-26-64	179	8.9	7.2	6.7	<50	46	T	3	.01	
11-24-65	3	4.4	7.6	7.8	170	168	D	6	.0005	
11-24-65	12	0.6	7.0	6.7	<50	58	D	0	----------	
12-12-63	.2	0.0±	7.0	-------	160	115	T	2	>.0000	
5- 6-64	7.1	4.4	7.0	6.7	100	78	T	1	.0002	
7-28-66	----------	28.3	8.2	7.7	1,600	1,670	D	7	----------	
12-13-63	12	0.0±	7.2	-------	60	-------	T	3	.001	
5-26-64	449	6.1	7.2	6.1	<50	20	T	1	.01	
12-13-63	31	0.0±	7.2	-------	90	-------	T	2	.001	
5-26-64	237	10.6	7.2	6.4	<50	36	T	1	.006	

TABLE 1.—*Molybdenum content of water samples from the principal*

Sample point No. on pl. 1	Stream, lake, or reservoir	Section, township, range, county	Latitude	Longitude	U.S.G.S. gaging station	Drainage area (sq. mi.)	Land surface elevation at point of collection (ft)	Average discharge (cfs per yr.)
62	North Fork Cache la Poudre River near Livermore.	NW¼SE¼ sec. 33, T. 9 N., R. 70 W., Larimer Co.	40°42′15″	105°14′10″	6-7515	568	5,380	44.9
63	Cache la Poudre River at mouth of canyon, near Fort Collins.	NW¼NW¼ sec. 15, T. 8 N., R. 70 W., Larimer Co.	40°39′55″	105°13′26″	6-7520	1,055	5,240	393
64	Cache la Poudre River near Greeley.	NW¼ sec. 11, T. 5 N., R. 65 W., Weld Co.	40°25′04″	104°38′22″	6-7525	1,877	4,610	96.8
65	South Platte River near Kersey.	NW¼SW¼ sec. 9, T. 5 N., R. 64 W., Weld Co.	40°24′44″	104°33′46″	6-7540	9,598	4,576	730
66	South Platte River near Weldona.	SW¼SW¼ sec. 7, T. 4 N., R. 58 W., Morgan Co.	40°19′20″	103°55′15″	6-7585	13,245	4,307	439
67	South Platte River at Balzac.	NE¼NE¼ sec. 13, T. 5 N., R. 55 W., Morgan Co.	40°24′24″	103°27′58″	6-7600	16,852	4,091	358
68	South Platte River at Julesburg.	NE¼ sec. 33, T. 12 N., R. 44 W., Sedgwick. Co.	40°58′46″	102°15′15″	6-7640	23,138	3,446	458
69	South Fork Republican River near Idalia.	SE¼SW¼ sec. 13, T, 5 S., R. 44 W., Yuma Co.	39°37′00″	102°14′30″	6-8250	1,300	3,680	33.7
70	Landsman Creek near Hale.	SW¼ sec. 36, T. 5 S., R. 44 W., Yuma Co.	39°34′40″	102°14′50″	6-8255	450	3,720	4.84
71	Tennessee Creek.	NE¼SW¼NE¼ sec. 28, T. 8 S., R. 80 W., Lake Co.	39°19′09″	106°20′00″	----------	16.8	9,950	---------
72	East Fork Arkansas River.	NW¼NE¼NW¼ sec. 14, T. 9 S., R. 80 W., Lake Co.	39°16′23″	106°18′14″	----------	49.8	9,900	---------
73	Lake Fork above Sugar Loaf Reservoir.	NW¼ sec. 13, T. 9 S., R. 81 W., Lake Co.	39°16′11″	106°23′40″	7-820	18	9,800	42.7
74	Halfmoon Creek near Malta.	NW¼ sec. 18, T. 10 S., R. 80 W., Lake Co.	39°11′10″	106°22′55″	7-830	23	9,470	29.5
75	Lake Crrek above Twin Lakes Reservoir.	Sec. 26, T. 11 S., R. 81 W., Lake Co.	39°03′45″	106°24′20″	7-845	75	9,300	164
76	Arkansas River at Granite.	SW¼ sec. 31, T. 11 S., R. 79 W., Chaffee Co.	39°02′38″	106°15′55″	7-860	427	8,915	354
77	Clear Creek above Clear Creek Reservoir.	SE¼ sec. 12, T. 12 S., R. 80 W., Chaffee Co.	39°01′05″	106°16′40″	7-865	59	8,890	71.3
78	South Cottonwood Creek.	Chaffee Co.	38°46′35″	106°18′14″	----------	23.3	9,680	---------
79	Cottonwood Lake Creek.	----do----------	38°46′55″	106°16′45″	----------	26.6	9,552	---------
80	Middle Cottonwood.	----do----------	38°48′20″	106°14′47″	----------	34.1	8,900	---------
81	Cottonwood Creek below Hot Springs, near Buena Vista.	SE¼SE¼ sec. 21, T. 14 S., R. 79 W., Chaffee Co.	38°48′46″	106°13′18″	7-890	65	8,532	59
82	Trout Creek	SE¼SW¼SW¼ sec. 18, T. 14 S., R. 77 W., Chaffee Co.	38°49′27″	106°03′00″	----------	52	8,280	---------

Colorado streams, their tributaries, and some reservoirs and lakes—Continued

Date collected	Discharge at time of collection (cfs)	Water temperature (°C)	pH		Specific conductance (micromhos per cm at 25° C)		Method of analysis	Molybdenum (µg/l)	Molybdenum passing sampling point at time of sample collection (grams per sec)	Remarks
			Field	Lab.	Field	Lab.				
12-13-63	3.9	0.0±	8.0	-------	465	404	T	4	0.0004	
5-26 64	70	12.2	8.4	8.0	400	387	T	3	.005	
12-13-63	16	0.0±	7.2	-------	180	155	T	0	----------	
5-26-64	1,610	7.2	7.2	6.4	55	46	T	1	.04	
7-27-66	----------	23.9	7.6	7.5	1,750	1,870	D	5	----------	
7-27-66	----------	26.1	8.4	7.9	1,700	1,790	D	5	----------	
7-27-66	----------	29.4	8.4	7.7	1,700	1,800	D	7	----------	
7-27-66	----------	32.8	8.4	7.5	1,600	1,670	D	9	----------	
7-27-66	----------	30.6	8.4	7.4	1,300	1,320	D	7	----------	
12-28-63	36	1.1	8.0	-------	580	382	T	6	.006	
12-28-63	1.2	2.2	8.0	-------	580	397	T	5	.0001	
9-30-65	----------	1.7	7.0	7.9	<50	39	T	1	----------	
9-30-65	----------	1.7	7.6	7.3	300	296	T	19	----------	
10-30-63	8.7	1.1	6.8	-------	50	-------	T	2	.0004	
5-28-64	----------	7.2	7.0	6.1	<50	22	T	0	----------	
10-29-63	6.6	6.1	7.6	-------	110	85	T	2	.0003	
5-28-64	50	8.9	7.4	6.7	60	52	T	3	.004	
10-29-63	33	4.4	7.2	-------	144	116	T	4	.003	
5-28-64	758	5.0	7.0	6.7	55	49	T	1	.02	
10-29-63	189	8.3	8.0	-------	185	-------	T	2	.01	
5-28-64	1,590	10.0	7.4	6.3	100	90	T	2	.08	
11-17-65	----------	4.4	7.4	6.7	220	217	D	0	----------	
11-17-65	----------	5.0	7.2	7.8	140	138	D	4	----------	
11-17-65	----------	2.2	7.2	8.0	100	101	D	0	----------	
11-17-65	----------	2.8	7.2	7.5	100	95	D	4	----------	
11-17-65	----------	2.8	7.2	7.7	100	103	D	0	----------	
10-29-63	31	8.3	7.4	-------	150	128	T	0	----------	
5-28-64	108	8.9	7.6	6.8	90	82	T	3	.009	
11-17-65	----------	4.4	7.4	7.6	120	119	D	0	----------	
11-17-65	5	5.0	8.4	8.2	500	519	D	0	----------	

TABLE 1.—*Molybdenum content of water samples from the principal*

Sample point No. on pl. 1	Stream, lake, or reservoir	Section, township, range, county	Latitude	Longitude	U.S.G.S. gaging station	Drainage area (sq. mi.)	Land surface elevation at point of collection (ft)	Average discharge (cfs per yr.)
83	Chalk Creek	SW¼NW¼NW¼ sec. 25, T. 15 S., R. 79 W., Chaffee Co.	38°43′16″	106°10′47″	----------	78.8	8,300	---------
84	Arkansas River at Salida.	NE¼ sec. 31, T. 50 N., R. 9 E., Chaffee Co.	38°32′45″	106°00′36″	7-915	1,218	7,050	626
85	Middle Fork South Arkansas River near Garfield.	Chaffee Co	38°33′10″	106°17′47″	----------	9.3	9,750	---------
86	South Arkansas River near Garfield.	do	38°32′58″	106°15′28″	----------	21.9	9,000	---------
87	North Fork South Arkansas River.	NE¼SE¼ sec. 28, T. 50 N., R. 7 E., Chaffee Co.	38°33′15″	106°11′45″	----------	20.8	8,560	---------
88	South Arkansas River at Poncha Springs.	NE¼SW¼SW¼ sec. 10, T. 49 N., R. 8 E., Chaffee Co.	38°30′38″	106°04′04″	----------	138.4	7,460	---------
89	Poncha Creek near Poncha Springs.	NE¼NE¼ sec. 16, T. 49 N., R. 8 E., Chaffee Co.	38°30′11″	106°04′50″	----------	97.5	7,520	---------
90	Arkansas River near Wellsville.	NE¼ sec. 14, T. 49 N., R. 9 E., Chaffee Co.	38°30′10″	105°56′21″	7-937	1,485	6,897	---------
91	Grape Creek	SW¼SW¼SW¼ sec. 10, T. 19 S., R. 71 W., Fremont Co.	38°24′10″	105°19′30″	----------	500	5,840	---------
92	Arkansas River at Canon City.	SE¼SE¼ sec. 31, T. 18 S., R. 70 W., Fremont Co.	38°26′02″	105°15′24″	7-960	3,117	5,344	721
93	Arknasas River near Pueblo.	SW¼NW¼ sec. 34, T. 20 S., R. 65 W., Pueblo Co.	38°16′00″	104°39′00″	7-995	4,686	4,690	713
94	Fountain Creek above Manitou Springs.	SW¼NW¼SW¼ sec. 25, T. 13 S., R. 68 W., El Paso Co.	38°53′13″	104°57′11″	----------	68.2	7,128	---------
95	Fountain Creek at Pueblo.	SE¼SW¼ sec. 30, T. 20 S., R. 64 W., Pueblo Co.	38°16′28″	104°36′00″	7-1065	926	4,663	53
96	Apishapa River near Fowler.	SE¼NW¼ sec. 35, T. 22 S., R. 59 W., Otero Co.	38°05′28″	103°58′52″	7-1195	1,125	4,317	34.9
97	Arkansas River at Las Animas.	SW¼SW¼ sec. 35, T. 22 S., R. 52 W., Bent Co.	38°05′08″	103°12′50″	7-1240	14,417	3,875	23
98	Purgatoire River near Las Animas.	SE¼NE¼ sec. 23, T. 23 S., R. 52 W., Bent Co.	38°02′02″	103°12′00″	7-1285	3,503	3,878	139
99	Arkansas River at Lamar.	NW¼SE¼ sec. 30, T. 22 S., R. 46W., Prowers Co.	38°06′15″	102°37′08″	7-1330	19,780	3,600	231
100	Arkansas River near Coolidge, Kans.	SW¼NW¼ sec. 26, T. 23 S., R. 43W., Hamilton Co., Kans.	38°01′33″	102°01′00″	7-1375	25,410	3,334	229
101	Rio Grande at Wagonwheel Gap.	NE¼ sec. 35, T. 41 N., R. 1 E., Mineral Co.	37°46′00″	106°49′50″	8-2175	780	8,431	497

Colorado streams, their tributaries, and some reservoirs and lakes—Continued

Date collected	Discharge at time of collection (cfs)	Water temperature (°C)	pH		Specific conductance (micromhos per cm at 25° C)		Method of analysis	Molybdenum (μg/l)	Molybdenum passing sampling point at time of sample collection (grams per sec)	Remarks
			Field	Lab.	Field	Lab.				
11-17-65	18	4.4	7.0	7.4	115	112	D	0	----------	
10-29-63	304	10.6	8.0	-------	310	266	T	0	----------	
5-28-64	1,940	11.7	7.4	6.6	110	107	T	6	0.3	
11-16-65	----------	7.8	7.8	7.5	280	276	D	0	----------	
11-17-65	8	1.1	7.1	7.4	105	107	D	5	.001	
11-17-65	20	2.8	7.2	7.8	150	149	D	0	----------	
11-17-65	14	2.8	7.0	6.9	85	84	D	0	----------	
11-16-65	----------	5.0	7.9	8.0	240	242	D	2	----------	
11-16-65	10	4.4	7.6	7.7	145	147	D	0	----------	
10-29-63	301	10.0	8.4	-------	285	265	T	5	.04	
5-28-64	2,200	12.2	7.6	6.7	110	106	T	4	.2	
11-16-65	----------	7.2	8.0	7.7	240	245	D	0	----------	
11-16-65	----------	5.0	8.4	8.1	380	368	D	0	----------	
12-27-63	300	0.0±	8.0	-------	410	342	T	5	.04	
5-28-64	2,670	13.9	7.8	6.8	125	129	T	4	.3	
11-16-65	----------	6.7	8.2	7.5	320	323	D	0	----------	
12-27-63	176	0.0±	8.4	-------	875	739	T	8	.03	
5-29-64	2,050	13.9	7.8	7.3	240	253	T	4	.2	
12-10-65	3	2.8	7.4	7.5	220	218	D	5	.0004	
12-27-63	34	0.0±	8.4	-------	2,300	1,950	T	8	.007	
12-27-63	5.3	3.9	7.8	-------	1,800	-------	T	8	.001	
12-27-63	31	2.8	8.0	-------	2,500	2,590	T	4	.003	441 sq mi of drainage area, probably noncontributing.
12-27-63	4.7	2.8	8.4	-------	4,500	4,105	T	9	.001	
12-28-63	2.3	0.6	8.4	-------	4,400	4,580	T	10	.0006	950 sq mi of drainage area, probably noncontributing.
12-27-63	34	0.6	8.4	-------	5,000	4,390	T	5	.004	1,708 sq mi of drainage area, probably noncontributing.
3-13-64	100	0.0±	7.0	7.2	140	120	T	3	.008	
5-12-64	568	5.0	7.4	6.9	90	78	T	3	.04	

TABLE 1.—*Molybdenum content of water samples from the principal*

Sample point No. on pl. 1	Stream, lake, or reservoir	Section, township, range, county	Latitude	Longitude	U.S.G.S. gaging station	Drainage area (sq. mi.)	Land surface elevation at point of collection (ft)	Average discharge (cfs per yr.)
102	Goose Creek at Wagonwheel Gap.	SW¼SE¼ sec. 35, T. 41 N., R. 1 E., Mineral Co.	37°45′07″	106°49′46″	8–2185	90	8,483	58.4
103	Rio Grande near Del Norte.	NW¼ sec. 29, T. 40 N., R. 5 E., Rio Grande Co.	37°41′20″	106°27′40″	8–2200	1,320	7,980	915
104	Rio Grande near Monte Vista.	Sec. 19, T. 39 N., R. 8 E., Rio Grande Co.	37°36′30″	106°08′50″	8–2215	1,590	7,654	325
105	Kerber Creek	Sec. 7, T. 46 N., R. 8 E., Saguache Co.	38°15′	106°08′	8–2245	38	8,950	12.9
106	Alamosa Creek above Terrace Reservoir.	Sec. 8, T. 36 N., R. 6 E., Conejos Co.	37°23′	106°21′	8–2360	107	8,600	115
107	Conejos River near Mogote.	SE¼ sec. 34, T. 33 N., R. 7 E., Conejos Co.	37°03′20″	106°11′10″	8–2465	282	8,272	340
108	Conejos River near La Sauses.	Sections 2 & 3 (two channels), T. 35 N., R. 11 E., Conejos Co.	37°18′	105°45′	8–2490	887	7,495	191
109	Culebra Creek at San Luis.	Beaubien Grant, Costilla Co.	37°11′	105°26′	8–2500	220	8,000	49.9
110	Rio Grande near Lobatos.	Sec. 22, T. 33 N., R. 11 E., Conejos Co.	37°05′	105°45′	8–2515	7,700	7,428	616
111	Colorado River below Baker Gulch.	SW¼NE¼NW¼ sec. 12, T. 4 N., R. 76 W., Grand Co.	40°19′33″	105°51′22″	9–105	53	8,750	56.5
112	Colorado River near Grand Lake.	NE¼SW¼ sec. 13, T. 3 N., R. 76 W., Grand Co.	40°13′08″	105°51′25″	9–110	103	8,380	95
113	Colorado River near Granby.	SW¼NW¼ sec. 22, T. 2 N., R. 76 W., Grand Co.	40°07′15″	105°54′00″	9–195	322	7,960	----------
114	Fraser River Winter Pakr.	NE¼ sec. 4, T. 2 S., R. 75 W., Grand Co.	39°54′00″	105°46′35″	9–240	27.6	8,906	40.5
115	Williams Fork near Parshall.	SW¼ sec. 31, T. 1 N., R. 78 W., Grand Co.	40°00′01″	106°10′45″	9–375	186	7,809	----------
116	Muddy Creek near Kremmling.	SE¼ sec. 20, T. 4 N., R. 81 W., Grand Co.	40°17′37″	106°28′59″	9–410	74.2	7,856	53.1
117	Blue River	NE¼NE¼ sec. 1, T. 8 S., R. 78 W., Summit Co.	39°23′18″	106°02′04″	----------	10	10,500	----------
118	Blue River above Breckenridge.	SE¼NE¼ sec. 7, T. 7 N., R. 77 W., Summit Co.	39°27′24″	106°02′00″	----------	42.5	9,840	----------
119	Blue River near Valdora.	SE¼SE¼SW¼ sec. 7, T. 6 S., R. 77 W., Summit Co.	39°32′20″	106°02′28″	----------	80.7	9,200	----------
120	Swan River	NE¼SW¼SE¼ sec. 7, T. 6 S., R. 77 W., Summit Co.	39°32′30″	106°02′13″	----------	37.5	9,175	----------
121	Blue River	NE¼SW¼SE¼ sec. 31, T. 5 S., R. 77 W., Summit Co.	39°34′09″	106°02′54″	----------	122	9,035	----------

Colorado streams, their tributaries, and some reservoirs and lakes—Continued

Date collected	Discharge at time of collection (cfs)	Water temperature (°C)	pH		Specific conductance (micromhos per cm at 25° C)		Method of analysis	Molybdenum (μg/l)	Molybdenum passing sampling point at time of sample collection (grams per sec)	Remarks
			Field	Lab.	Field	Lab.				
3-13-64	13	0.0±	7.0	7.0	150	122	T	2	0.0007	
5-12-64	75	1.1	7.2	6.8	100	79	T	0	----------	
3-14-64	160	0.0±	7.0	6.9	115	121	T	1	.004	
5-12-64	848	5.6	7.2	7.0	70	76	T	0	----------	
3-14-64	----------	0.0±	7.0	7.5	195	150	T	1	----------	
5-11-64	114	11.7	7.4	6.7	125	110	T	18	.05	
11-16-65	4.5	5.0	7.0	6.5	260	289	D	0	----------	
3-14-64	9.5	0.0±	7.0	6.9	390	315	T	1	.0002	
5-11-64	165	10.6	7.2	6.2	200	183	T	0	----------	
3-14-64	40	0.0±	7.0	.2	135	93	T	2	.002	
5-11-64	300	11.1	8.4	6.9	95	71	T	1	.008	
3-14-64	45	6.7	8.4	7.0	200	174	T	1	.001	Discharge includes flow from two channels.
5-11-64	5.5	16.1	7.6	6.7	200	193	T	2	.0003	Do.
3-14-64	11	7.2	8.0	6.7	270	244	T	3	.0009	
5-11-64	28	15.0	8.2	7.5	240	222	T	2	.001	
3-14-64	200	0.0±	8.4	7.3	275	220	T	2	.1	Drainage area includes 2,940 sq mi in closed basin in northern part of San Luis Valley.
5-11-64	40	17.8	8.6	7.3	550	578	T	5	.005	Do.
11- 1-63	14	0.0±	7.0	-------	90	-------	T	3	.001	
5-27-64	435	6.1	7.0	6.6	<50	-------	T	1	.01	
11- 1-63	28	0.6	7.0	-------	100	77	T	3	.002	
5-27-64	566	5.6	7.2	6.8	<50	38	T	1	.01	
11- 1-63	23	0.0±	7.0	-------	185	-------	T	3	.001	
5-27-64	69	8.9	7.2	6.6	130	126	T	2	.003	
11- 1-63	3.2	4.4	7.0	-------	125	86	T	1	>.0000	
3-10-64	3.7	0.0±	7.2	7.2	125	107	T	2	.0002	
5-15-64	2.7	5.6	7.4	6.4	95	73	T	4	.0003	
10-31-63	39	5.0	7.4	-------	130	107	T	1	.001	
5-27-64	325	8.3	7.2	6.6	60	54	T	1	.009	
10-31-63	4.8	5.6	8.4	-------	350	412	T	2	.0002	
5-15-64	183	5.6	8.0	7.3	210	206	T	3	.01	
9-29-65	8	2.2	7.6	7.5	120	112	T	1	.0002	
9-29-65	----------	3.9	7.8	7.6	160	156	T	2	----------	
9-29-65	----------	6.1	7.6	7.5	120	139	T	2	----------	
9-29-65	----------	4.4	7.6	7.5	115	125	T	1	----------	
9-29-65	74	5.0	7.7	7.5	140	137	T	2	.004	

TABLE 1.—*Molybdenum content of water samples from the principal*

Sample point No. on pl. 1	Stream, lake, or reservoir	Section, township, range, county	Latitude	Longitude	U.S.G.S. gaging station	Drainage area (sq. mi.)	Land surface elevation at point of collection (ft)	Average discharge (cfs per yr.)
122	Snake River at Dillon (old Dillon).	SW¼ sec. 17, T. 5 S., R. 77 W., Summit Co.	39°36′45″	106°02′30″	9-480	92	8,870	64
123	Tenmile Creek	NE¼SW¼ sec. 13, T. 7 S., R. 79 W., Summit Co.	39°26′20″	106°10′15″	.....	20.6	10,400	.....
124	do	NE¼ sec. 7, T. 7 S., R. 78 W., Summit Co.	39°27′35″	106°08′30″	.....	30	10,200	.....
125	West Tenmile Creek.	SE¼SE¼SE¼ sec. 19, T. 6 S., R. 78 W., Summit Co.	39°30′32″	106°08′34″	.....	27.6	9,675	.....
126	Tenmile Creek	NW¼NW¼ sec. 29, T. 6 S., R. 78 W., Summit Co.	39°30′15″	106°08′27″	.....	39.9	9,690	.....
127	Tenmile Creek below North Fork at Frisco.	SW¼NE¼ sec. 34, T. 5 S., R. 78 W., Summit Co.	39°34′35″	106°06′30″	9-501	93.3	9,090	90.7
128	Dillon Reservoir.	SW¼SW¼NE¼ sec. 31, T. 5 S., R. 77 W., Summit Co.	39°34′25″	106°03′13″	.....	335	9,017	.....
129	do	SE¼NE¼SE¼ sec. 13, T. 5 S., R. 78 W., Summit Co.	39°36′45″	106°03′20″	.....	335	9,017	.....
130	do	SE¼SE¼NE¼ sec. 21, T. 5 S., R. 77 W., Summit Co.	39°36′12″	106°00′45″	.....	335	9,017	.....
131	Blue River above Green Mountain Reservoir.	S½ sec. 34, T. 2 S., R. 79 W., Summit Co.	39°49′55″	106°13′20″	9-535	514	7,947	433
132	Colorado River near Kremmling.	NE¼SW¼ sec. 23, T. 1 N., R. 81 W., Grand Co.	40°02′12″	106°26′22″	9-580	2,360	7,320	.....
133	Colorado River near Radium.	SW¼ sec. 7, T. 2 S., R. 82 W., Eagle Co.	39°53′	106°37′	.....	2,514	.....	.....
134	Colorado River at State Bridge.	NE¼ sec. 26, T. 2 S., R. 83 W., Eagle Co.	39°52′	106°39′	.....	2,656	.....	.....
135	Big Alkali Creek near Burns.	NE¼ sec. 28, T. 2 S., R. 84 W., Eagle Co.	39°51′	106°48′	9-608	16	7,200	.85
136	Colorado River below Big Alkali Creek.	SW¼ sec. 18, T. 2 S., R. 84 W., Eagle Co.	39°53′	106°50′	.....	2,965	.....	.....
137	Cedar Creek	NE¼ sec. 15, T. 2 S., R. 85 W., Eagle Co.	39°52′	106°53′	.....	64.5	.....	.....
138	Colorado River near Sylvan Station.	NW¼ sec. 5, T. 3 S., R. 85 W., Eagle Co.	39°50′	106°57′	.....	3,148	.....	.....
139	Colorado River near Sweetwater.	SW¼ sec. 3, T. 4 S., R. 86 W., Eagle Co.	39°43′	107°01′	.....	3,244	.....	.....
140	Sweetwater Creek.	SW¼ sec. 4, T. 4 S., R. 86 W., Eagle Co.	39°43′	107°03′	.....	93	.....	.....
141	Deep Creek	SE¼ sec. 30, T. 4 S., R. 86 W., Eagle Co.	39°40′	107°04′	.....	48.8	.....	.....

Colorado streams, their tributaries, and some reservoirs and lakes—Continued

Date collected	Discharge at time of collection (cfs)	Water temperature (°C)	pH		Specific conductance (micromhos per cm at 25° C)		Method of analysis	Molybdenum (μg/l)	Molybdenum passing sampling point at time of sample collection (grams per sec)	Remarks
			Field	Lab.	Field	Lab.				
10-31-63	16	3.3	7.0	-------	185	141	T	0	----------	Gaging station discontinued 4-30-64. Station to be inundated by water of Dillon Reservoir.
5-27-64	----------	8.3	7.0	6.4	85	81	T	1	----------	Do.
9-29-65	----------	5.6	7.6	7.4	440	428	T	550	----------	
9-29-65	----------	3.3	7.6	7.3	265	255	T	400	----------	
9-29-65	----------	5.0	7.6	8.0	150	148	T	8	----------	
9-29-65	----------	3.9	7.6	7.3	200	197	T	330	----------	
10-31-63	21	1.7	7.8	-------	240	-------	T	390	0.2	
5-27-64	617	7.8	7.0	6.3	245	241	T	1,200	20.9	
9-29-65	45	4.4	7.6	7.8	195	188	T	260	.3	
9-29-65	----------	4.4	7.2	7.6	150	139	T	270	----------	Reservoir contained 255,500 acre-feet of water.
9-30-65	----------	10.6	7.2	7.6	140	139	T	290	----------	Do.
9-30-65	----------	8.9	7.2	7.4	140	135	T	260	----------	Do.
10-31-63	40	6.7	8.4	-------	240	222	T	44	.04	
5-27-64	444	8.3	7.4	6.7	90	86	T	48	.6	
10-31-63	244	7.8	7.2	-------	300	278	T	78	.5	
5-15-64	918	11.1	7.8	7.2	450	487	T	9	.2	
12- 8-65	----------	0.0±	7.2	7.5	165	169	D	62	----------	
12- 8-65	----------	0.0±	7.4	7.6	165	173	D	63	----------	
12- 8-65	----------	0.0±	7.9	7.9	1,150	1,250	D	7	----------	
12- 8-65	----------	0.0±	7.9	8.0	750	740	D	33	----------	
12- 8-65	----------	0.0±	8.4	8.1	725	752	D	6	----------	
12- 8-65	----------	0.0±	7.8	7.5	210	208	D	40	----------	
12- 9-65	----------	0.0±	7.6	7.6	220	225	D	49	----------	
12- 9-65	8	0.0±	8.0	8.0	380	398	D	2	.0004	
12- 9-65	7	0.6	8.0	8.1	540	547	D	1	.0001	

TABLE 1.—*Molybdenum content of water samples from the principal*

Sample point No. on pl. 1	Stream, lake, or reservoir	Section, township, range, county	Latitude	Longitude	U.S.G.S. gaging station	Drainage area (sq. mi.)	Land surface elevation at point of collection (ft)	Average discharge (cfs per yr.)
142	Colorado River above confluence with the Eagle River.	NE¼ sec 31, T. 4 S., R. 86 W., Eagle Co.	39°39′	107°04′	----------	3,417	----------	----------
143	East Fork Eagle River.	SW¼SE¼ sec. 19, T. 7 S., R. 79 W., Eagle Co.	39°25′07″	106°15′39″	----------	9.1	9,700	----------
144	East Fork Eagle River.	NE¼SE¼SW¼ sec. 24, T. 7 S., R. 80 W., Eagle Co.	39°25′12″	106°17′04″	----------	13.8	9,400	----------
145	Mitchell Creek	NE¼SW¼SE¼ sec. 27, T. 7 S., R. 80 W., Eagle Co.	39°24′30″	106°18′34″	----------	14.9	9,600	----------
146	Eagle River	SE¼NE¼SW¼ sec. 15, T. 7 S., R. 80 W., Eagle Co.	39°26′15″	106°19′17″	----------	38	9,225	----------
147	Resolution Creek.	SE¼SW¼SW¼ sec. 10, T. 7 S., R. 80 W., Eagle Co.	39°26′54″	106°19′07″	----------	11.9	9,460	----------
148	Eagle River at Red Cliff.	SE¼ sec. 19, T. 6 S., R. 80 W., Eagle Co.	39°30′35″	106°22′00″	9–630	72.2	8,648	53.2
149	Turkey Creek near Red Cliff.	NW¼SW¼ sec. 16, T. 6 S., R. 80 W., Eagle Co.	39°31′20″	106°20′15″	9–634	23.9	8,885	----------
150	Homestake Creek near Red Cliff.	NE¼NE¼ sec. 6, T. 7 S., R. 80 W., Eagle Co.	39°28′25″	106°22′00″	9–645	58.9	8,783	87.9
151	Eagle River below Gypsum.	NW¼ sec. 5, T. 5 S., R. 85 W., Eagle Co.	39°39′	106°57′	9–700	957	6,270	582
152	Colorado River near Dotsero.	Sec. 6, T. 5 S., R. 86 W., Eagle Co.	39°38′40″	107°04′40″	9–705	4,390	6,130	2,130
153	Colorado River at Glenwood Springs.	NE¼SE¼NE¼ sec. 9, T. 6 S., R. 89 W., Garfield Co.	39°33′00″	107°19′20″	9–725	4,560	5,721	2,717
154	Fryingpan River at Ruedi.	NW¼ sec. 18, T. 8 S., R. 84 W., Eagle Co.	39°21′40″	106°49′10″	9–802	223	7,500	----------
155	Crystal River at Placita.	SE¼ sec. 31 T. 10 S., R. 88 W., Pitkin Co.	39°08′30″	107°15′20″	9–815.5	107	7,380	212
156	Crystal River near Redstone.	NE¼ sec. 9, T. 9 S., R. 88 W., Pitkin Co.	39°18′	107°13′	9–825	220	6,484	353
157	Roaring Fork at Glenwood Springs.	NW¼SW¼SE¼ sec. 9, T. 6 S., R. 89 W., Garfield Co.	39°32′50″	107°19′50″	9–850	1,460	5,721	1,388
158	Rifle Creek near Rifle.	NE¼NW¼ sec. 18, T. 5 S., R. 92 W., Garfield Co.	39°17′10″	107°45′45″	9–920	140	5,810	25.1
159	Colorado River near De Beque.	SW¼SW¼ sec. 23, T. 8 S., R. 97 W., Mesa Co.	39°21′	108°12′	----------	7,440	4,910	3,852

Colorado streams, their tributaries, and some reservoirs and lakes—Continued

Date collected	Discharge at time of collection (cfs)	Water temperature (°C)	pH		Specific conductance (micromhos per cm at 25° C)		Method of analysis	Molybdenum (μg/l)	Molybdenum passing sampling point at time of sample collection (grams per sec)	Remarks
			Field	Lab.	Field	Lab.				
12- 9-65		0.0±	7.6	7.6	570	567	D	35		
9-30-65		1.7	7.7	6.8	600	581	T	3,800		
9-30-65		2.8	7.6	7.1	440	528	T	3,000		
9-29-65		4.4	7.4	7.6	75	75	T	2		
9-30-65		2.8	7.7	7.5	380	376	T	1,800		
9-30-65		1.7	8.0	8.0	230	224	T	1		
10-30-63	11	2.8	8.4		290	252	T	24	0.007	
5-15-64	72	0.6	7.8	7.3	195	161	T	64	.1	
9-29-65	38	5.0	8.0	7.8	300	291	T	920	.9	
9-29-65	10	2.8	8.2	8.4	260	251	T	0		
10-30-63	11	0.6	7.0		60		T	3	.0009	
5-27-64	442	6.1	7.2	6.0	<50	25	T	1	.01	
9-29-65	70	4.4	7.0	7.6	<50	34	T	1	.001	
10-30-63	167	7.8	8.4		1,240	1,145	T	6	.02	
5-15-64	710	7.8	8.0	7.3	390	436	T	9	.1	
10-30-63	802	8.3	8.4		660	558	T	54	1.2	
5-15-64	2,030	10.6	8.0	7.6	350	345	T	18	1.0	
12- 9-65		0.0±	7.8	7.6	380	386	D	28		
10-31-63	916	8.9	7.2		1,600	1,670	T	56	1.4	
5-15-64	1,910	12.8	7.8	7.4	840	882	T	10	.5	
10-30-63	51	6.7	8.0		310	270	T	1	.001	
5-28-64	1,060	3.3	7.4	6.5	85	78	T	1	.02	
10-30-63	46	9.4	8.4		490	438	T	4	.005	
5-28-64	884	3.3	7.6	7.3	165	163	T	1	.02	
10-30-63	75	8.9	8.4		550	516	T	1	.002	
5-28-64	1,500	4.4	7.8	6.8	180	182	T	1	.04	
10-31-63	523	8.3	8.4		700		T	3	.04	
5-28-64	4,790	6.1	7.8	6.9	195	195	T	2	.2	
1-14-64	5	0.0±	8.4		1,700	1,430	T	2	.0002	
5-14-64	30	17.8	8.6	7.4	750	736	T	2	.001	
1-14-64	750	0.0±	8.4		2,000	1,800	T	33	.7	Discharge figures given based on discharge of Colorado River at Cameo less discharge of Roan Creek near De Beque.
5-14-64	2,570	15.6	8.4	7.2	800	827	T	11	.8	Do.

TABLE 1.—*Molybdenum content of water samples from the principal*

Sample point No. on pl. 1	Stream, lake, or reservoir	Section, township, range, county	Latitude	Longitude	U.S.G.S. gaging station	Drainage area (sq. mi.)	Land surface elevation at point of collection (ft)	Average discharge (cfs per yr.)
160	Plateau Creek near Cameo.	NW¼SW¼ sec. 18, T. 10 S., R. 97 W., Mesa Co.	39°11′00″	108°16′10″	9-1050	604	4,836	187
161	Taylor River at Almont.	Sec. 22, T. 51 N., R. 1 E., Gunnison Co.	38°40′	106°51′	9-1100	477	8,011	340
162	East River at Almont.	Sec. 22, T. 51 N., R. 1 E., Gunnison Co.	38°40′	106°51′	9-1125	295	8,006	344
163	Gunnison River near Gunnison.	SE¼SE¼ sec. 34, T. 50 N., R. 1 W., Gunnison Co.	38°32′50″	106°57′00″	9-1145	1,010	7,670	786
164	Tomichi Creek near Sargents.	NW¼ sec. 9, T. 48 N., R. 5 E., Saguache Co.	38°24′10″	106°21′30″	----------	91.6	8,470	---------
165	Quartz Creek near Parlin.	NW¼NE¼SW¼ sec. 8, T. 49 N., R. 3 E., Gunnison Co.	38°31′19″	106°40′15″	----------	116.9	8,184	---------
166	Alder Creek near Parlin.	NW¼NE¼NE¼ sec. 13, T. 49 N., R. 2 E., Gunnison Co.	38°30′53″	106°41′14″	----------	17	8,075	---------
167	Cochetopa Creek.	NW¼SE¼SW¼ sec. 33, T. 49 N., R. 2 E., Gunnison Co.	38°27′08″	106°46′08″	----------	387	7,935	---------
168	Tomichi Creek at Gunnison.	NE¼SW¼ sec. 11, T. 49 N., R. 1 W., Gunnison Co.	38°31′20″	106°56′25″	9-1190	1,020	7,629	172
169	Tongue Creek at Cory.	S½ sec. 34, T. 14 S., R. 95 W., Delta Co.	38°47′	108°00′	9-1442	200	5,030	27.9
170	Uncompahgre River at Colona.	NW¼ sec. 17, T. 47 N., R. 8 W., Ouray Co.	38°19′50″	107°46′40″	9-1475	437	6,319	271
171	Uncompahgre River at Delta.	SW¼ sec. 13, T. 15 S., R. 96 W., Delta Co.	38°45′	108°05′	9-1495	1,110	4,930	276
172	Gunnison River near Grand Junction.	Near center of sec. 14, T. 2 S., R. 1 E., Ute Meridian, Mesa Co.	38°59′	108°27′	9-1525	7,870	4,628	2,611
173	Colorado River near Fruita.	SE¼SW¼ sec. 20, T. 1 N., R. 2 W., Ute Meridian, Mesa Co.	39°08′	108°44′	----------	17,200	---------	5,815
174	Dolores River below Rico.	SW¼ sec. 15, T. 39 N., R. 11 W., Montezuma Co.	37°38′25″	108°03′05″	9-1650	105	8,422	132
175	Dolores River at Dolores.	Sec. 16, T. 37 N., R. 15 W., Montezuma Co.	37°28′	108°30′	9-1665	556	6,919	435
176	San Miguel River at Naturita.	SE¼SW¼ sec. 19, T. 46 N., R. 15 W., Montrose Co.	38°13′10″	108°34′00″	9-1755	1,080	5,393	352
177	San Miguel River at Uravan.	SW¼NE¼ sec. 2, T. 47 N., R. 17 W., Montrose Co.	38°21′25″	108°42′40″	9-1770	1,550	5,000	347

Colorado streams, their tributaries, and some reservoirs and lakes—Continued

Date collected	Discharge at time of collection (cfs)	Water temperature (°C)	pH		Specific conductance (micromhos per cm at 25° C)		Method of analysis	Molybdenum (µg/l)	Molybdenum passing sampling point at time of sample collection (grams per sec)	Remarks
			Field	Lab.	Field	Lab.				
1-14-64	40	0.0±	8.6	-------	1,000	832	T	7	0.007	
5-14-64	490	12.8	8.4	7.3	300	305	T	3	.04	
12- 9-65	----------	0.0±	7.2	7.6	115	105	D	2	----------	
12- 9-65	----------	0.0±	7.6	8.0	300	299	D	2	----------	
3-11-64	110	0.0±	8.0	7.6	350	291	T	2	.006	
5-14-64	850	3.9	8.0	7.0	210	175	T	1	.02	
12- 9-65	----------	0.0±	7.4	7.5	160	162	D	4	----------	
12- 9-65	----------	0.0±	7.0	7.6	115	114	D	5	----------	
12- 9-65	----------	0.0±	7.5	7.4	200	196	D	4	----------	
12- 9-65	----------	0.0±	7.2	7.3	170	173	D	4	----------	
12- 9-65	----------	0.0±	7.4	7.6	250	250	D	7	----------	
3-11-64	55	0.0±	7.6	-------	350	280	T	3	.004	
5-14-64	179	7.2	8.0	7.1	250	238	T	3	.01	
12- 9-65	----------	0.0±	7.6	7.6	270	269	D	5	----------	
3-11-64	14	0.0±	8.4	7.8	2,100	1,880	T	8	.003	
5-14-64	10	13.9	8.4	7.9	1,900	1,880	T	7	.001	
3-11-64	72	3.2	8.4	7.8	1,200	985	T	2	.004	
5-13-64	524	12.8	8.4	7.2	400	381	T	1	.01	
3-11-64	91	0.0±	8.4	7.5	3,000	2,730	T	6	.01	
5-14-64	741	11.1	8.4	7.1	1,000	1,010	T	4	.08	
1-14-64	500	0.0±	8.4	-------	1,900	1,530	T	7	.09	
5-14-64	4,800	13.3	8.4	7.3	640	627	T	3	.4	
1-14-64	1,570	0.0±	8.4	-------	2,100	1,930	T	26	1.1	Discharge figures given are for gaging station 9-1635 near Colorado-Utah line.
5-14-64	5,310	15.6	8.4	7.2	875	939	T		1.0	Do.
3-12-64	11	0.0±	6.8	6.5	1,000	828	T	3	.0009	
5-13-64	210	3.9	7.8	-------	265	-------	T	1	.0005	
3-12-64	30	0.0±	8.0	7.7	800	643	T	0	----------	
5-13-64	1,000	3.9	8.0	-------	250	-------	T	1	.02	
3-11-64	58	10.0	8.4	-------	600	629	T	4	.006	
5-13-64	566	13.3	8.4	7.3	305	300	T	3	.04	
3-11-64	65	10.0	8.6	6.8	825	786	T	4	.007	Gaging station discontinued in 1962. Discharge estimated from records obtained at gaging station 9-1755.
5-13-64	600	13.9	8.4	7.3	350	337	T	2	.03	Do.

TABLE 1.—*Molybdenum content of water samples from the principal*

Sample point No. on pl. 1	Stream, lake, or reservoir	Section, township, range, county	Latitude	Longitude	U.S.G.S. gaging station	Drainage area (sq. mi.)	Land surface elevation at point of collection (ft)	Average discharge (cfs per yr.)
178	Dolores River	NE¼ sec. 36, T. 48 N., R. 18 W., Montrose Co.	38°22'30"	108°48'00"	----------	2,100	----------	----------
179	Yampa River at Steamboat Springs.	Sec. 17, T. 6 N., R. 84 W., Routt Co.	40°29'	106°50'	9-2395	604	6,695	468
180	Elk River at Clark.	Sec. 28, T. 9 N., R. 85 W., Routt Co.	40°43'00"	106°54'50"	9-2410	206	7,268	340
181	Yampa River near Maybell.	NW¼ sec. 2, T. 6 N., R. 95 W., Moffat Co.	40°30'10"	108°01'45"	9-2510	3,410	5,900	1,554
182	Little Snake River near Lily.	NW¼NE¼ sec. 20, T. 7 N., R. 98 W., Moffat Co.	40°32'50"	108°25'25"	9-2600	3,730	5,685	563
183	White River at Buford.	NW¼ sec. 9, T. 1 S., R. 91 W., Rio Blanco Co.	39°59'	107°37'	9-3030	254	7,010	316
184	White River near Meeker.	NE¼ sec. 30, T. 1 N., R. 93 W., Rio Blanco Co.	40°02'00"	107°51'35"	9-3045	762	6,320	629
185	White River below Meeker.	Center of sec. 31, T. 1 N., R. 95 W., Rio Blanco Co.	40°00'30"	108°06'00"	9-3048	1,040	5,900	---------
186	White River near Watson, Utah.	Sec. 2, T. 10 S., R. 24 E., Salt Lake Meridian, Uintah Co., Utah	39°59'	109°11'	9-3065	4,020	4,947	711
187	San Juan River at Pagosa Springs.	S½ sec. 13, T. 35 N., R. 2 W., Archuleta Co.	37°15'50"	107°00'40"	9-3425	298	7,052	375
188	Navajo River at Edith.	NW¼ sec. 24, T. 32 N., R. 1 W., Archuleta Co.	37°00'10"	106°54'25"	9-3460	172	7,033	158
189	San Juan River near Carracas.	SE¼SW¼ sec. 17, T. 32 N., R. 4 W., Archuleta Co.	37°00'47"	107°18'39"	9-3464	1,230	6,090	---------
190	Piedra River near Piedra.	NW¼NW¼ sec. 17, T. 34 N., R. 4 W., Archuleta Co.	37°13'20"	107°20'30"	9-3495	371	6,510	317
191	Piedra River near Arboles.	NE¼SW¼ sec. 21, T. 33 N., R. 5 W., Archuleta Co.	37°05'17"	107°23'52"	9-3498	629	6,148	---------
192	Vallecito Creek near Bayfield.	NW¼ sec. 16, T. 37 N., R. 6 W., La Plata Co.	37°28'45"	107°32'35"	9-3529	72.1	7,906	---------
193	Animas River at Durango.	SW¼ sec. 20, T. 35 N., R. 9 W., La Plata Co.	37°16'45"	107°52'47"	9-3615	692	6,502	855
194	Florida River at Bondad.	S½ sec. 31, T. 33 N., R. 9 W., La Plata Co.	37°03'20"	107°52'10"	9-3632	221	6,000	77.8
195	Animas River near Cedar Hill, N. Mex.	Sec. 7, T. 32 N., R. 9 W., La Plata Co.	37°02'15"	107°52'25"	9-3635	1,090	5,960	902
196	Mancos River near Towaoc.	NW¼ sec. 18, T. 32 N., R. 17 W., Montezuma Co.	37°02'	108°43'	9-3710	550	5,056	52.2
197	McElmo Creek near Colorado-Utah line.	NW¼NE¼ sec. 2, T. 35 N., R. 20 W., Montezuma Co.	37°19'	109°01'	9-3720	350	4,890	39.3

Colorado streams, their tributaries, and some reservoirs and lakes—Continued

Date collected	Discharge at time of collection (cfs)	Water temperature (°C)	pH		Specific conductance (micromhos per cm at 25° C)		Method of analysis	Molybdenum (μg/l)	Molybdenum passing sampling point at time of sample collection (grams per sec)	Remarks
			Field	Lab.	Field	Lab.				
5-13-64		19.4	8.4		1,300		T	8		
1-12-64	55	0.0±	7.4		340	249	T	3	0.004	
5- 6-64	360	7.8	7.4	6.5	165	151	T	2	.02	
1-12-64	34	0.0±	7.2		150	109	T	4	.003	
5- 6-64	171	4.4	7.0	6.8	125	105	T	1	.004	
1-13-64	150	0.0±	8.0		500	529	T	4	.01	
5- 7-64	1,700	6.7	8.0	7.0	350	330	T	2	.09	
1-13-64	44	0.0±	8.0		900	726	T	5	.006	
5- 7-64	826	5.6	8.0	7.3	360	376	T	3	.07	
1-14-64	120	0.0±	8.4		480	396	T	3	.01	
5- 7-64	196	6.1	8.6	8.4	350	340	T	1	.005	
1-14-64	200	0.0±	8.4		520	524	T	3	.01	
5- 7-64	393	10.0	8.6	8.4	440	420	T	1	.01	
1-14-64	270	0.0±	8.4		1,050	961	T	3	.02	
5- 7-64	400	10.6	8.4		700	688	T	2	.02	
1-13-64	240	0.0±	8.4	8.0	1,300	1,140	T	4	.02	
5- 7-64	438	9.4	8.4	8.3	850	830	T	2	.02	
3-13-64	36	2.2	7.0		350	301	T	1	.001	
5-12-64	555	3.3	7.2	6.9	120	102	T	1	.01	
3-13-64	30	1.1	7.4	7.1	300	243	T	2	.001	
5-12-64	123	4.4	7.4	7.2	140	130	T	0		
3-13-64	90	0.6	8.0		525	427	T	2	.005	
5-12-64	1,330	10.6	7.8	6.9	160	177	T	0		
3-13-64	41	0.0±	8.0	8.0	625	518	T	2	.002	
5-12-64	478	7.8	8.0	7.2	160	146	T	6	.08	
3-13-64	37	1.1	8.2		625	517	T	2	.002	
5-12-64	526	11.1	8.2	7.2	190	175	T	0		
5-12-64	173	7.2	7.4		85		T	2	.009	
3-12-64	132	2.2	8.0	8.0	850	751	T	2	.007	
5-13-64	999	8.3	7.6	6.9	340	344	T	2	.05	
3-12-64	5	0.0±	8.4	8.0	600	469	T	3	.0004	Gaging station discontinued in 1963.
5-12-64	23	21.1	8.4	7.7	450	461	T	2	.001	
3-12-64	131	4.4	8.4	7.6	825	731	T	2	.007	
5-12-64	1,080	14.4	8.0	7.4	390	398	T	3	.09	
3-12-64	7.4	5.6	8.4	7.8	2,500	2,300	T	2	.0004	
5-13-64	15	10.0	8.6	7.6	2,000	2,070	T	4	.001	
3-12-64	22	6.7	8.6	7.5	4,100	4,060	T	5	.003	

TABLE 2.—*Minimum and maximum molybdenum content of water from the river basins of Colorado*

[Includes samples collected during low- and high-flow conditions]

Basin	Number of samples analyzed	Molybdenum concentration/(μg/l)	
		Minimum	Maximum
Platte River	90	0	240
Kansas River	2	5	6
Arkansas River	44	0	19
Rio Grande	18	0	18
Colorado River above Kremmling, not including Blue River	13	1	4
Blue River above point where river discharges into Dillon Reservoir	7	0	2
Blue River (including Dillon Reservoir), not including area above point where river discharges into Dillon Reservoir	12	8	1, 200
Colorado River between Kremmling and Dotsero	13	1	87
Eagle River	14	0	3, 800
Colorado River between Dotsero and Glenwood Springs	5	10	54
Roaring Fork	8	1	4
Colorado River below Glenwood Springs	8	2	33
Gunnison River	20	1	8
Dolores River	9	0	8
Green River	16	1	5
San Juan River	20	0	6

TABLE 3.—*Principal molybdenum deposits of Colorado*

Deposit (name or location)	Drainage	Surface [1] exposure	Mineralogy and nature of deposit
Boulder County			
Clyde	Sherwood Creek, Tributary to North Boulder Creek.	Small	Molybdenite with torbernite in quartz veins.
Conger-Grayback	do	do	Molybdenite in veinlets in schist and pegmatite.
Bighorn	North Boulder Creek	do	Molybdenite and pyrite in quartz vein in mica schist.
Mountain Lion	Keystone Gulch, -Tributary to Boulder Creek.	do	Molybdenite in pegmatite.
Mogul	Middle Boulder Creek	do	Molybdenite in gold telluride veins, ilsemannite.
Sunday	South Boulder Creek	do	Molybdenite, pyrite, and chalcopyrite in veins.
Bell Gulch	Lefthand and James Creeks	do	Molybdenite in veins.
Chaffee County			
Banker	Clear Creek	Medium	Molybdenite, bismuthinite, and pyrite in quartz veins in quartz monzonite.
California	Browns Creek, tributary to Arkansas River.	do	Molybdenite, ferrimolybdite, and beryl in quartz vein in quartz monzonite.

See footnote at end of table, p. N32.

TABLE 3.—*Principal molybdenum deposits of Colorado*—Continued

Deposit (name or location)	Drainage	Surface [1] exposure	Mineralogy and nature of deposit
Chaffee County—Continued			
Geneva	South Cottonwood Creek	Small	Molybdenite in tactite.
Hope Mountain	Little Willis Gulch, tributary to Lake Creek.	Medium	Molybdenite, pyrite, and ferrimolybdite along fault zone.
Crescent	Clear Creek	Small	Molybdenite, ferrimolybdite in quartz veins in granite.
East Red Mountain	Lake Creek	Large	Molybdenite in quartz veins in rhyolite and granite, four deposits.
Royal Purple	Middle Fork South Arkansas River.	Small	Molybdenite and pyrite in quartz veins in quartz monzonite.
Sea Chest	North Fork Clear Creek	Large	Molybdenite disseminated in altered granite and in veins.
Wagner	do	Medium	Molybdenite in quartz veins in granite.
DMD	Chalk Creek	Small	Molybdenite in quartz vein.
Clear Creek County			
Clifford	Fall River	Small	Molybdenite in quartz vein in gneiss.
Doctor No. 2	West Fork Clear Creek	do	Do.
Urad	do	Large	Molybdenite disseminated in altered granite.
Conejos County			
Merrimec	Conejos River	Small	Molybdenite in quartz vein in granite gneiss.
Alum Creek	Alamosa Creek	Large	Molybdenite in altered quartz monzonite.
Custer County			
Knight	Grape Creek	Small	Molybdenite, pyrite, and chalcopyrite in quartz vein in diorite.
Larsen	Hardscrabble Creek	do	Molybdenite in veins.
Douglas County			
West Creek	West Creek and South Platte River.	Small	Molybdenite in basic dike in granite.
Eagle County			
Cross City	Homestake and Fall Creeks	Small	Molybdenite in quartz veins in schist.
Fremont County			
Copper Girl	Copper Gulch and Bear Creek	Small	Molybdenite with chalcopyrite in schist.
Liberty Bond	Grape Creek	do	Molybdenite with calcite and pyrite along contact of diabase dike and granite.

See footnote at end of table, p. N32.

TABLE 3.—*Principal molybdenum deposits of Colorado*—Continued

Deposit (name or location)	Drainage	Surface [1] exposure	Mineralogy and nature of deposit
Gilpin County			
Anchor	South Willis Gulch, tributary to North Clear Creek.	Small	Molybdenite, pyrite, fluorite in quartz veins in gneiss.
Nye	North Clear Creek and South Boulder Creek.	Large	Molybdenite in veins and fracture zones in quartz monzonite porphyry.
Tolland	South Boulder Creek	Small	Molybdenite in pegmatite.
Perigo	South Boulder and North Clear Creeks.	do	Molybdenite in veins.
Columbia	Freeman Gulch and North Clear Creek.	do	Do.
Grand County			
Iron Creek	St. Louis Creek	Small	Molybdenite in fault zone.
Gunnison County			
Copper Hill	Tomichi Creek	Large	Molybdenite and copper sulfides disseminated in quartz monzonite.
Copper King	Willow Creek	Small	Molybdenite, chalcopyrite, and pyrite in veins in quartz monzonite.
Gold Hill	Quartz Creek	Large	Molybdenite, chalcopyrite, pyrite, huebnerite, and scheelite in quartz veins in gneiss.
Lamphere Lakes	Gold Creek	Medium	Molybdenite and ferrimolybdite in breccia zone in quartzite and schist.
Paradise Pass	Rock Creek and Slate River	Large	Molybdenite disseminated in altered quartz monzonite.
Yule Creek	Crystal River	Small	Molybdenite and ferrimolybdite in quartz veins.
Hinsdale County			
Matterhorn Peak	Cimarron Creek	Large	Molybdenite in altered volcanic rocks.
Huerfano County			
Mosca Pass	Huerfano River	Small	Molybdenite in pegmatite.
Jackson County			
Fluorspar	North Platte River	Small	Ilsemannite incrustation.
Kings Canyon	do	do	Molybdenite and chalcopyrite in pegmatite.

See footnote at end of table, p. N32.

TABLE 3.—*Principal molybdenum deposits of Colorado*—Continued

Deposit (name or location)	Drainage	Surface[1] exposure	Mineralogy and nature of deposit
Jefferson County			
Schwartzwalder	Ralston Creek	Medium	Molybdenite with uranium minerals in vein in gneiss and schist.
Conifer	Turkey Creek and Deer Creek	Small	Molybdenite in migmatite.
Lake County			
Climax	Tenmile Creek and Arkansas River.	Large	Molybdenite and ferrimolybdite disseminated in silicified granite and quartz monzonite.
Turquoise Lake	Lake Fork, Arkansas River	Small	Molybdenite in quartz veins.
La Plata County			
East Silver Mesa	Vallecito River and Florida River.	Medium	Molybdenite in quartz veins and disseminated in granite.
Chicago Basin	Needle Creek, Animas River	do	Sparse molybdenite in veins and disseminated in altered Precambrian crystalline rocks.
Rockwood	Animas River	Small	Molybdenite in veins.
Larimer County			
Iron King	Rabbit Creek	Small	Molybdenite, magnetite, chalcopyrite, sphalerite, and uranium in pegmatite and skarn.
Mesa County			
Gavette	Unaweep Canyon	Small	Molybdenite in quartz vein in schist.
Glade Park	No Thoroughfare Canyon, Colorado River.	do	Molybdenite in pegmatite.
Moffatt County			
Maybell	Yampa River	Medium	Jordisite and ilsemannite with uranium in sandstone.
Ouray County			
Blowout	Skyrocket Creek, tributary to Uncompahgre River.	Large	Molybdenite with pyrite and copper sulfides disseminated in altered granodiorite.
Irene	Uncompahgre River	Small	Molybdenite in quartz vein in andesite tuff.
Park County			
Redskin	Tarryall Creek	Small	Molybdenite in greissen pipes in granite.
White Swan	South Platte River	do	Molybdenite in veins.

See footnote at end of table, p. N32.

TABLE 3.—*Principal molybdenum deposits of Colorado*—Continued

Deposit (name or location)	Drainage	Surface [1] exposure	Mineralogy and nature of deposit
Pitkin County			
Greenhorn	Lincoln Creek	Large	Molybdenite and ferrimolybdite in breccia zone.
Routt County			
Farwell Mountain	King Solomon and Willow Creeks	Small	Molybdenite and chalcopyrite in pegmatite and gneiss.
Saguache County			
Kerber Creek	Kerber Creek	Small	Molybdenite disseminated in quartz monzonite.
San Miguel County			
Black King No. 5	San Miguel River	Medium	Jordisite and ilsemannite with uranium in sandstone.
Nevada Gulch	Howard Fork	do	Molybdenite and ferrimolybdite in quartz veins in quartz monzonite; six deposits.
San Juan County			
Chattanooga	Animas River	Small	Molybdenite and pyrite in veins in andesite and rhyolite.
Summit County			
D & G	Tenmile Creek	Medium	Molybdenite in tactite.
Governor	Blue River	Small	Molybdenite with lead, zinc, and silver in quartz vein in sandstone and shale.
Humbug	Tenmile Creek	Large	Molybdenite and ferrimolybdite in quartz monzonite.
Salamander	Blue River	Small	Molybdenite and ferrimolybdite in pegmatite.
North Star	do	do	Molybdenite with tungsten minerals in veins.
Sawmill Gulch	do	do	Molybdenite.

[1] Small indicates less than 1,000 sq ft. Medium indicates between 1,000 sq ft and ¼ sq mi. Large indicates greater than ¼ sq mi.

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