

INTRODUCTION

This is one of a series of maps that describe the geology and related natural resources of the Manti 30 x 60-minute quadrangle. Streamflow records used in this map were collected by the U.S. Geological Survey in cooperation with the Utah Department of Natural Resources, Division of Water Rights, and the Utah Department of Transportation. The general geology is shown on the map were delineated from a work map (scale 1:250,000) compiled to estimate water yields in Utah (Bagley and others, 1964). Sources of information about recorded floods resulting from cloudbursts included Woodcock (1946) and Butler and Marsal (1972); sources of information about the chemical quality of streamflow included Hahl and Cabell (1965) and Mundorf and Thompson (1982).

DRAINAGE BASINS

The Manti 30 x 60-minute quadrangle encompasses 1,990 square miles. About 55 percent of the area is in the Great Basin and is drained by tributaries of the Sevier River. The remaining 45 percent of the area is in the Colorado River Basin and is drained chiefly by tributaries of the San Pitch River. There are 11 small transmountain diversions along the drainage divide between the Great Basin and Colorado River Basins; they divert water from headwater tributaries of the San Pitch River to headwater tributaries of the San Pitch River. According to Eakin and others (1971, table 6), the total annual diversion is less than 15,000 acre-feet.

SURFACE-WATER SUPPLY

The principal source of surface water in the area is the Sevier River, which enters the area near Redmond. According to Price (1981), annual inflow to the area through the Sevier River and canals leading from the river averages at least 120,000 acre-feet. Inflows also occur in the San Pitch River and Huntington Creek. These inflows probably average less than 40,000 acre-feet per year. A large percent of the surface-water supply for the area is derived from precipitation that falls within the area. As shown on the map, theoretical mean annual runoff along the drainage divide between the Great Basin and Colorado River Basin is as much as 20 inches, or about 1,070 acre-feet per square mile. As indicated in the following table, most of this runoff occurs during May, June, and July. Average annual discharge in these streams for the respective periods of record at sites 8, 9, 18, and 21 totaled more than 160,000 acre-feet.

Total annual runoff in the area varies considerably from year to year depending on the available precipitation. For example, total annual discharge in Ferron Creek at site 9 ranged from less than 13,000 acre-feet during the 1977 water year to about 95,000 acre-feet during the 1952 water year. (See the annual discharge graph on map for that site.) Most runoff generally occurs during May and June as shown by the graphs of average monthly discharges on the map for Ferron, Oak, Manti, and Twelvemile Creeks (sites 9, 15, 18, and 21). These seasonal peaks result chiefly from the melting of winter snowpacks at the higher altitudes.

Most discharge in the intermittent and ephemeral streams, and a significant volume of discharge in the perennial streams results from summer cloudbursts. Although these storms usually are localized and generally last less than 1 hour, the rainfall intensity is great enough to produce floodflows of more than 1,000 cubic feet per second from drainage basins of only a few square miles. As shown in the following table, a discharge of 1,050 cubic feet per second was recorded at the crest-stage gage at site 14. The drainage area upstream from that gage is only 29 square miles, and the cloudburst that caused the flood probably passed over only a part of that drainage area.

Floods resulting from cloudbursts have occurred or will occur in most drainage basins in the area at one time or another. Because of their large volumes of water, rapid velocities, and large erosive power, they commonly cause damage to the natural environment. They also can cause considerable property damage in populated areas. As shown on the map, at least one flood resulting from cloudbursts has been recorded in virtually every community center in the area since 1850.

The small scale of this map precludes delineation of flood-prone areas within the communities, however, large-scale maps showing such areas are published and distributed by the U.S. Department of Housing and Urban Development. Alluvial plains and channels of most streams (including dry washes) may be considered as flood-prone areas, which are subject to flooding during cloudbursts. Travelers especially need to avoid deep, narrow canyons during cloudbursts. Several reservoirs in the area provide flood control as well as storage of runoff for irrigation and other uses. The largest of these reservoirs and their approximate usable storage capacities are:

Reservoir	Stream	Usable capacity (acre-feet)
Sevier Bridge	Sevier River	236,000
Jose Valley	Cottonwood Creek	54,610
Gunnison	San Pitch River	18,220
Millsite (Mill Site)	Ferron Creek	16,700

The U.S. Geological Survey under its cooperative program with the Utah Department of Natural Resources collects continuous records of the contents of Sevier Bridge, Jose Valley, and Gunnison Reservoirs as well as continuous streamflow records at many of the gaging stations listed in the following table. These records are available in the files of the U.S. Geological Survey, Salt Lake City, Utah, and in the U.S. Geological Survey report series "Water Resources Data for Utah", of which the most recent edition (1981) is included in the list of references cited.

SURFACE-WATER QUALITY

Surface water in the area ranges from fresh to moderately saline according to the following classification commonly used by the U.S. Geological Survey:

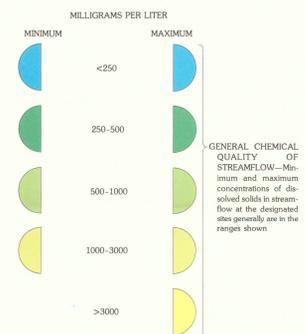
Classification	Dissolved-solids concentration (milligrams per liter)
Fresh	Less than 1,000
Slightly saline	1,000 to 3,000
Moderately saline	3,000 to 10,000
Very saline	10,000 to 35,000
Briny	More than 35,000

As indicated on the map, runoff generated in the principal runoff-producing areas is fresh, generally containing less than 250 mg/l. (milligrams per liter) of dissolved solids. The Sevier River, where it enters the area, ranges from fresh to slightly saline. Where it leaves Sevier Bridge Reservoir about 1.5 miles west of the area, the river generally is slightly saline. This probably is due chiefly to mixing of the water in the reservoir. Similar mixing also is evidenced in Gunnison Reservoir where the San Pitch River changes from fresh to moderately saline upstream from the reservoir to generally slightly saline downstream from the reservoir.

The principal causes of salinity in the Sevier and San Pitch Rivers and the lower reaches of other streams in the area are irrigation-return flows, inflows of saline ground water, and contact with rocks that contain soluble salt. Evaporation from reservoirs and evapotranspiration along water courses increase the salinity of streams in the area.

Considerably more water-quality data are available than can be shown on this map. Readers interested in more detailed information about the chemical quality of surface water in that part of the area that drains to the Great Basin are referred to Hahl and Cabell (1965) and Hahl and Mundorf (1968). Readers interested in more detailed information about surface-water quality, including biological quality and suspended sediment, in that part of the area that drains to the Colorado River are referred to Waddell, Vickers, Upton, and Contratto (1978), Waddell, Contratto, Sumston, and Butler (1981), Mundorf and Thompson (1982), and Danielson, ReMillard, and Fuller (1981).

EXPLANATION



Base from U.S. Geological Survey 1:100,000 metric topographic series, 1981

SELECTED DATA FOR STREAMFLOW-GAGING STATIONS IN THE MANTI 30 x 60-MINUTE QUADRANGLE

Site No.: See map.
Station No.: U.S. Geological Survey downstream-order number; see U.S. Geological Survey (1981, p. 21) for explanation of numbering system.
Recorded extremes: d, daily value; otherwise instantaneous or observed values.
Remarks: Crest-stage gage indicates record from a gage installed to record annual-peak discharges, the gaged stream in most cases is intermittent or ephemeral.

Site No.	Station No.	Station name	Drainage area (square miles)	Period of record (years)	Average annual discharge			Recorded extremes (cubic feet per second)			Remarks	
					Cubic feet per second	Acre-feet per year	Years of record	Maximum	Date	Minimum		Date
COLORADO RIVER BASIN												
1	09317919	Crandell Canyon at mouth, near Huntington	5.7	1978-80	-	-	-	285	May 31, 1980	0.24	Mar. 10, 1979	Seasonal records only.
2	09317820	Tie Fork Canyon near Huntington	11.7	1978-80	-	-	-	294	May 30, 31, 1980	0.17	Mar. 10, 1979	Do.
3	09317897	Huntington Creek near Huntington	181	1978-80	-	-	-	1,020	June 7-8, 1980	3.2	Apr. 1, 1980	-
4	09318000	Huntington Creek near Huntington	190	1909-17, 1918-20, 1921-79	98.3	69,770	60	2,500	Aug. 2 or 3, 1930	8.7	Nov. 28, 1978	Peaks only 1973-77; records in part provided by Utah Power & Light Co. Minimum, due to icing, not determined. Recorded total annual discharge ranged from 41,840 to 97,030 acre-feet. Seasonal records only.
5	09319800	Becks Creek near Ephraim	5.0	1931-32	-	-	-	125	May 17, 1931	-	Mar. 14, 1987	-
6	09324000	Selly Creek near Orangeville	150	1953-57	-	-	-	2,110	Aug. 26, 1957	11	Mar. 14, 1987	-
7	09324200	Cottonwood Creek above Straight Canyon, near Orangeville	21.8	1978-80	-	-	-	224	June 5, 1980	0.09	Oct. 5, 1979	-
8	09324800	Cottonwood Creek near Orangeville	208	1909-27, 1932-70, 1976-80	95.4	69,100	60	7,220	Aug. 1, 1964	1.2	Apr. 8, 1966	Records soon flow regulated by Jose Valley Reservoir.
9	09326800	Ferron Creek (upper station) near Ferron	138	1911-23, 1947-80	66.6	48,250	45	4,180	Aug. 27, 1952	0	Oct. 19-21, 1978	Monthly discharge only for some periods. Discharge affected by diversions for irrigation. Crest-stage gage.
10	09327000	Ferron Creek near Ferron	159	1909-11	-	-	-	3,000	Sept. 1, 1909	(1)	-	-
11	09327800	Ferron Creek tributary near Ferron	-	1959-71	-	-	-	600	Sept. 9, 1967	-	-	-
GREAT BASIN												
12	10208000	Sevier River near Gunnison	3,890	1900-17	292	21,200	17	2,240	May 28, 1906	0	Apr. 30, 1911	Considerable regulation upstream from station for irrigation. Discharge includes transmountain diversion from Colorado River Basin.
13	10211000	Twin Creek near Mount Pleasant	6.9	1954-66	8.37	8,000	12	488	July 31, 1965	1.8	Mar. 18, 1955	-

Site No.	Station No.	Station name	Drainage area (square miles)	Period of record (years)	Average annual discharge			Recorded extremes (cubic feet per second)			Remarks		
					Cubic feet per second	Acre-feet per year	Years of record	Maximum	Date	Minimum		Date	
GREAT BASIN													
14	10213300	Sierle Creek near Sterling	29	1959-73	8.0	1954-74	10	1,050	Aug. 1, 1975	-	0.93	Mar. 6, 1969	Crest-stage gage. No diversions upstream from station.
15	10215700	Oak Creek near Spring City	8.0	1954-74	-	-	-	300	July 23, 1965	-	-	Aug. 1965	Crest-stage gage; day of peak discharge not determined.
16	10215855	Maple Canyon, north tributary near Manti	2.6	1970-73	-	-	-	365	-	-	-	-	-
17	10215865	Maple Canyon, south tributary near Manti	1.6	1970-73	-	-	-	-	-	-	-	-	-
18	10215900	Manti Creek below Dugway Creek, near Manti	26.4	1984-74, 1978-80	29.7	21,520	12	882	June 9, 1973	0.90	Nov. 3, 1968	Discharge includes small transmountain diversion from Colorado River Basin. Records available only for August-December, 1900.	
19	10216000	Manti Creek near Manti	-	1900	-	-	-	17	Aug. 5, 1900	6	Sept. 7, 1900	-	
20	10216210	San Pitch River near Sterling	672	1964-80	44.8	32,530	16	5124	Mar. 12, 1974	(1)	-	-	
21	10216400	Twelvemile Creek near Mayfield	59.4	1959-80	30.9	22,380	21	1,350	Aug. 10, 1965	1.6	Mar. 16, 1978	Record poor; flow regulated by several small reservoirs. Station discontinued, 1980.	
22	10216500	San Pitch River near Gunnison	886	1900-05, 1912-18	47.7	34,560	5	720	Aug. 28, 1905	(1)	-	-	
23	10217000	Sevier River below San Pitch River, near Gunnison	4,921	1912-80	224	162,300	68	2,820	June 1, 1922	5.6	July 17-21, 1977	No flow due to regulation in Gunnison Reservoir. Station discontinued, 1980.	
24	10217500	Sevier River at Clarke's bridge, near Fayette	4,860	1914-16	-	-	-	2,090	June 8, 1914	734	July 12, 13, 1915	Do.	
25	10218000	Sevier River at Clark's bridge, near Fayette	5,020	1914-15	-	-	-	864	Dec. 3, 1914	85	July 20, 1915	Do.	
26	10219000	Sevier River near Juab	9,165	1911-80	224	162,300	69	2,140	June 2, 1922	(1)	-	Station 0.5 mile downstream from Sevier Bridge Reservoir (2 miles west of indicated site).	

* No flow recorded on several to many days during period of record.
† Partially no flow at times when reservoir gates are closed.

CONVERSION TABLE

MULTIPLY INCH-POUND UNIT	BY	TO OBTAIN SI UNIT
acre-foot	0.001233	cubic hectometer
acre-foot per square mile	0.00047	cubic hectometer per square kilometer
cubic foot per second	0.02832	cubic meter per second
inch	2.540	centimeter
mile	1.609	kilometer
square mile	2.590	square kilometer

MAP SHOWING SELECTED SURFACE-WATER DATA FOR THE MANTI 30 x 60-MINUTE QUADRANGLE, UTAH

By
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