

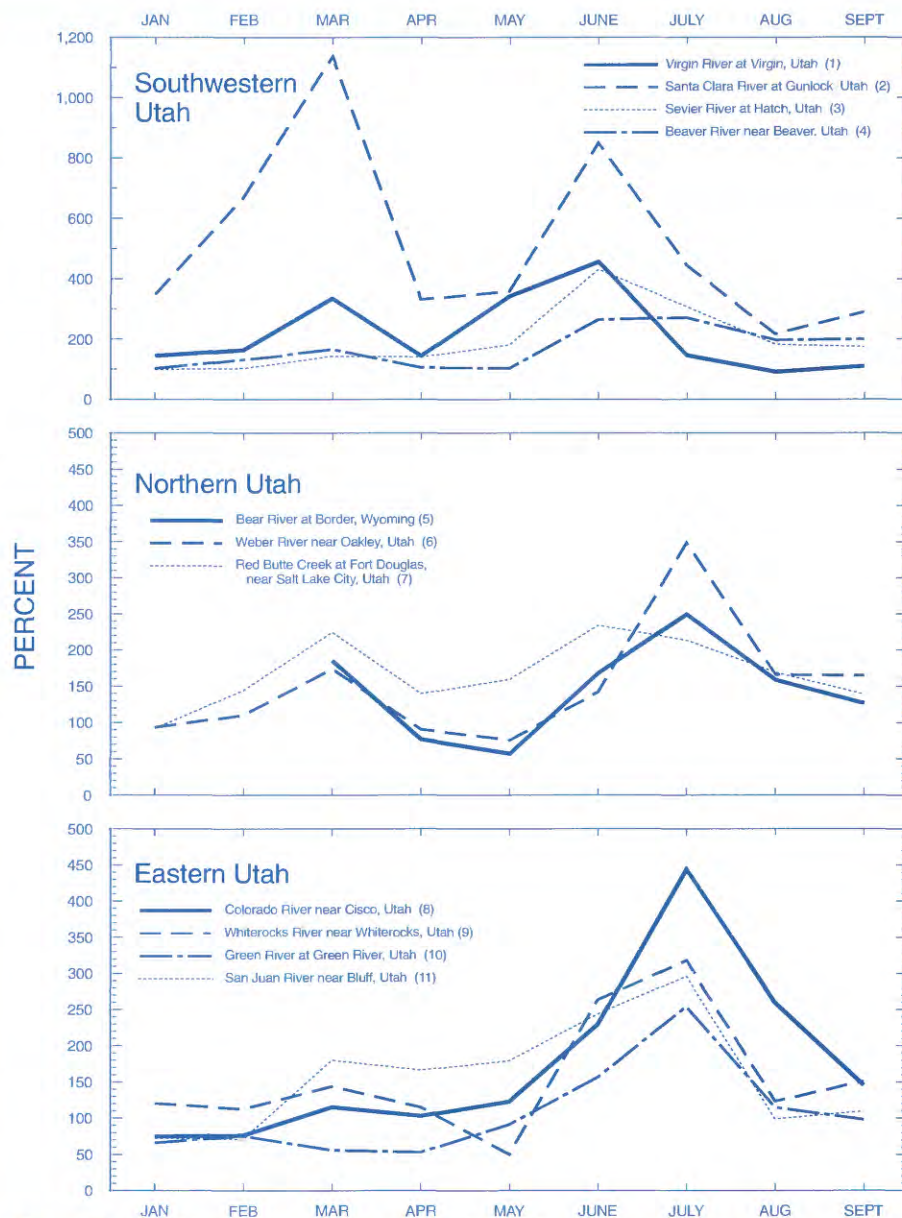
Utah, like other States in the western United States, has experienced several rapid and extreme changes between wet and dry precipitation cycles during recent years. During the 1995 water year (October 1994 to September 1995), most areas of Utah experienced greater-than-normal precipitation (1961-90), which was reflected in greater-than-average snowpack, moderate flooding, a landslide in southwestern Utah, and prolonged high runoff in northern and eastern Utah. Preliminary monthly streamflow data for January to June 1995 from 11 sites gaged by the U.S. Geological Survey were grouped into three regions of the State and compared with snow-water equivalent data from 6 selected SNOTEL (SNOWpack TELemetered) sites operated by the Natural Resources Conservation Service (fig. 1).



**Figure 1.** Location of surface-water discharge and SNOTEL sites.

## Southwestern Utah

Hydrologic conditions in southwestern Utah were wetter at the beginning of January than they were in northern and eastern Utah, with both streamflows and snowpack above average. A series of winter storms and intermittent warm temperatures increased streamflow, which ranged from 103 percent to 164 percent of the 30-year monthly



**Figure 2.** Monthly mean flow as percent of the 30-year monthly median flow (1961-90) for January to September 1995.

median (1961-90) flows in the upper Sevier River and Virgin River drainages, to about 1,140 percent of the median at the Santa Clara River at Gunlock gaging station (fig. 2). During February 11 to 14, a major winter storm moved through the State from north to south, with snow accumulations in the higher elevations exceeding 20 inches at many sites Statewide. In the Pine Valley Mountains north of St. George, however, the storm was characterized by warm temperatures and heavy rains. On February

14, as much as 4 inches of rain fell in the headwaters of the Santa Clara River and caused the flow at Gunlock to increase from 27 cubic feet per second to 1,220 cubic feet per second between 7:00 a.m. and 8:00 a.m. The flow peaked at almost 2,400 cubic feet per second by late afternoon that day. This peak flow has a 5-percent chance of occurring in any given year.

Wet conditions continued during early March, when wet snow, rain on existing



snowpack, and intense rains at lower elevations caused the Santa Clara River and nearby streams to overflow their banks on March 11. Runoff, enhanced by already saturated soils, caused Gunlock Reservoir to overflow the spillway. Flooding downstream of the reservoir washed out a sewer line and inundated the sewage treatment plant, temporarily closed several roads, and caused a reported 1.4 million dollars in property damage (fig. 3).

in the higher elevations. Saturated soils likely caused a landslide 500 feet long and 150 feet wide in Zion National Park on April 12 that temporarily blocked the North Fork Virgin River and destroyed the access road to part of the park. Monthly mean streamflows in southwestern Utah ranged from 264 to 849 percent of the median in June because of melt from the persistent high-elevation snowpack, which was 1,164 percent of average on June 26 (table 1).

median by the end of March (fig. 2). Statewide storms during February and March deposited large amounts of snow in the higher elevations of the mountains, and intervening warmer-than-normal temperatures melted much of the snowpack at elevations below 7,000 feet above sea level.

May was very wet and cool, Statewide. According to the National Weather Service, many areas received record amounts of precipitation during the month, some with more than three times the normal amount. The precipitation fell as snow in the high mountain areas. The effects were a delay in melting of the high-elevation snowpack, and in some areas, an increase in the amount of water in the snowpack. During May 1 to June 1 the snow-water equivalent of the snowpack at Chepeta decreased only 1.3 inches and at Trial Lake increased 2.7 inches.

In eastern Utah, streamflows were slightly below to slightly above average until June, when the average for the four sites increased to 223 percent of the median. Runoff in the Whiterocks River near Whiterocks peaked on June 30 at about 2,820 cubic feet per second, an amount that has a 2.5 percent chance of occurring in any given year, but was much less than the historic maximum of 4,640 cubic feet per second on June 22, 1983. Monthly mean discharge for July at Whiterocks River (573 cubic feet per second) was 318 percent of the median and the greatest ever recorded at this site for July. At Colorado River near Cisco, the July monthly mean discharge was 30,080 cubic feet per second, about 443 percent of the median and the second highest July discharge in 81 years of record (fig. 2).

—D.V. Allen

### Acknowledgment

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**Figure 3.** Roadway flooded by Santa Clara River south of St. George, March 12, 1995.

Cooler-than-normal temperatures and greater-than-normal precipitation Statewide combined to maintain above-average streamflows in southwestern Utah during April and May and added to the snowpack

### Northern and Eastern Utah

In northern Utah, streamflow in the Bear River, Weber River, and Red Butte Creek were near average in January but increased to between 174 and 225 percent of the

**Table 1.** Snowpack as percent of average snow-water equivalent (1961-90)  
[Elevation in feet above sea level; —, no data]

Area of Utah	Southwestern		Northern		Eastern	
Site	Midway Valley (A)	Harris Flat (B)	Trial Lake (C)	Smith & Morehouse (D)	Chepeta (E)	Rock Creek (F)
Elevation	9,800	7,700	9,960	7,600	10,300	7,900
Date	Percent of average					
1/3	102	156	68	77	132	71
2/6	147	209	77	108	131	93
3/6	166	218	83	108	135	92
4/1	165	172	99	91	150	80
5/1	203	0	125	131	198	100
6/1	511	0	272	—	605	—
6/26	1,164	0	654	—	380	—