



U.S. Department of the Interior
U.S. Geological Survey

Flood of January 1997 in the Walker River Basin, California and Nevada

Background

Northern California and western Nevada were devastated by floods during January 1-3, 1997. Flood waters in the Walker River Basin (fig. 1) contributed to \$19.5 million in projected damages in Lyon County (Reno Gazette-Journal, 1997). Flooding was extensive throughout the Walker River Canyon, to the town of Yerington, and to local highways.

In late December 1996, storms built up a large snowpack (more than 180 percent of normal) in the higher altitudes of the Sierra Nevada (Daniel Greenlee, Natural Resource Conservation Service, oral commun., 1997) and also covered the valleys along the eastern Sierra Nevada. Then, a subtropical storm system originating in the central Pacific Ocean near the Hawaiian Islands brought heavy, unseasonably warm rain to the Sierra Nevada from December 30, 1996, through January 3, 1997. During this period, the Natural Resource Conservation Service recorded 11.1 inches (provisional data; Daniel Greenlee, oral commun., 1997) of precipitation at Sonora Pass, Calif. (8,800 feet above sea level), and the National Weather Service recorded 3.1 inches (National Oceanic and Atmospheric Administration, National Climate Data Center, written commun., 1997) at Topaz Lake (5,580 feet above sea level). Rain falling below 10,000 feet depleted 20 percent of the high-altitude snowpack and melted about 80 percent of the snowpack below about 7,000 feet.



Figure 1. Geographic and hydrologic features of the Walker River Basin, California and Nevada. Gaging-station site numbers refer to table 1.



Figure 2. Flooded residential area, Yerington, Nevada, as seen from the air on January 4, 1997. Walker River at top of photograph. (Photograph by Rich Johnston, Nevada Department of Transportation.)

Data Collection

The U.S. Geological Survey (USGS) operates more than 20 stream-flow and lake-level monitoring stations in the Walker River Basin. Most of these stations are funded by partnerships with the USGS by other Federal, State, and local agencies, and Indian tribes. Data from these stations are crucial for water-supply planning; flood monitoring and emergency response; dam and reservoir system operation; establishing flood-insurance rates; and engineering and maintenance of bridges, roads, and other structures.

Several stations provide real-time data through satellite relay or ground-communication links. Data from these stations are used by the National Weather Service and other agencies to maintain water supplies, forecast floods, and issue flood warnings. USGS field crews obtained some of the highest river stage (depth) and discharge (flow) measurements ever recorded at several gaging stations at or near the peak of the January 1997 flood. At stations where field crews were unable to obtain discharge measurements, hydraulic surveys were made after the flood to determine peak discharge. These data contribute to understanding flood behavior, enhance efforts to minimize the destruction by floods, and provide for water-resource management.

Flood Magnitude of January 1997

The magnitude of peak discharges for selected gaging stations in the Walker River Basin is shown in table 1. Table 1 also includes the

site number (used in fig. 1); gaging station number and name; January 1997 peak discharge, stage, and recurrence interval; 100-year peak discharge; years of peak-flow record; and date and magnitude of the largest historical peak discharge prior to January 1997. The 100-year peak discharge is one that, statistically, has a 1-percent chance of happening in any given year (Garcia, 1997).

Several technical methods can be used to determine the recurrence interval of floods. For this analysis, flood-frequency characteristics for stations with at least 10 years of record through January 1997 were computed by fitting the logarithms of annual peaks to a Pearson Type III frequency distribution. This technique follows guidelines recommended by the U.S. Interagency Advisory Committee on Water Data (1982). For stations where flow is regulated, the procedures recommend that periods of consistent regulation be used in the analysis. For the mainstem Walker River stations, all the annual peak discharges for period of record were used in the analysis.

The January 1997 peak discharge was larger than recorded for previous floods at many stations on the Walker River. The peak discharge in January 1997 was greater than the 100-year peak discharge at six Walker River Basin gaging stations (table 1). Flood-frequency analysis for West Walker River near Coleville (site 6) and Walker River near Wabuska (site 9) determined that the 100-year peak discharges were 7,680 and 6,490 cubic feet per second, respectively.

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Table 1. Information on January 1997 flood for selected sites, Walker River Basin, California and Nevada

[Abbreviations and symbols: ft³/s, cubic feet per second; e, estimated; <, less than; >, greater than; —, not determined]

Site number (fig. 1)	Gaging station		January 1997			100-year peak discharge ¹ (ft ³ /s)	Years of record	Largest recorded historical flood peak prior to January 1997	
	Number	Name	Peak discharge (ft ³ /s)	Peak stage (feet)	Recurrence interval (years)			Date	Magnitude (ft ³ /s)
1	10291500	Buckeye Creek near Bridgeport, Calif.	2,750	7.49	>100	1,160	² 1911-14, 1954-79, 1996-97	Feb. 1, 1963	947
2	10293000	East Walker River near Bridgeport, Calif.	1,810	6.74	>50	2,210	² 1922-97	June 19, 1963	1,390
3	10293500	East Walker River above Strosnider Ditch, near Mason, Nev.	2,600	9.61	>25	4,510	² 1947-97	Feb. 1, 1963	2,380
4	10295500	Little Walker River near Bridgeport, Calif.	2,540	5.70	>100	2,230	1910, 1945-86, 1996-97	Jan. 31, 1963	1,510
5	10296000	West Walker River below Little Walker River, near Coleville, Calif.	12,300	10.11	>100	8,680	1938-97	Nov. 20, 1950	6,220
6	10296500	West Walker River near Coleville, Calif.	e12,500	—	>100	7,680	² 1903-10, 1915-38, 1957-97	Dec. 11, 1937	6,500
7	10297500	West Walker River at Hoye Bridge, near Wellington, Nev.	11,500	13.68	>100	7,260	1910, ² 1920-32, 1958-97	July 11, 1995	2,600
8	10300000	West Walker River near Hudson, Nev.	11,400	12.18	>100	7,350	1914-25, 1947-78, ² 1979-97	Dec. 24, 1955	2,700
9	10301500	Walker River near Wabuska, Nev.	2,600	10.92	<25	6,490	² 1902-08, 1920-35, 1939-97	July 10, 1906	3,280

¹ Determined from U.S. Interagency Advisory Committee on Water Data (1982) guidelines.

² Does not include periods of broken record.

References Cited

- Garcia, K.T., 1997, *January 1997 Flooding in northern Nevada—Was this a “100-year” flood?*: U.S. Geological Survey Fact Sheet FS-077-97, 4 p.
- Reno Gazette-Journal, 1997, *Flood damage hits \$1 billion mark*: Reno Gazette-Journal, May 30, 1997, p. 1A.
- U.S. Interagency Advisory Committee on Water Data, 1982, *Guidelines for determining flood flow frequency, Bulletin 17B of the Hydrology Subcommittee*: Reston, Va., U.S. Geological Survey, Office of Water Data Coordination, 183 p.

For More Information

For more information on water resources in Nevada

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