PROFILE OF SACRAMENTO RIVER, FREEPORT TO VERONA, CALIFORNIA, FLOOD OF FEBRUARY 1986

By *J.C. Blodgett* and *J.B. Lucas*

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For readers who prefer to use metric (International System) units rather than inch-pound units, the conversion factors for the terms used in this report are listed below:

Multiply inch-pound unit	By	To obtain metric unit
foot (ft)	0.3048	meter
cubic foot per second (ft^3/s)	0.3048	cubic meter per second
inch	25.40	millimeter
mile (mi)	1.609	kilometer

DEFINITIONS

Sea level: In this report, sea level refers to the National Geodetic Vertical Datum of 1929 (NGVD of 1929)--A geodetic datum derived from a general adjustment of the first-order level nets of both the United States and Canada, formerly called mean sea level of 1929.

Water year: The 12-month period ending September 30 each year is termed the "water year"; for example, the year that ended September 30, 1986, was the "1986 water year."

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ABSTRACT

A major storm in February 1986 caused record flooding in the Sacramento River and other nearby basins in north-coastal and central California. As part of an effort to document this flood, the peak water-surface profile of a 33-mile reach of the Sacramento River was surveyed between Freeport and Verona, California. Supplementary profiles in this reach include elevations of the approximate top of levee, flood plain, and the water surface on March 17, 1987. On the Sacramento River at Sacramento, the peak discharge of 117,000 cubic feet per second occurred February 19 and 20, 1986. The peak stage of 30.58 feet on February 19 is the highest of record, including the period prior to construction of large flood-control dams in the Sacramento River basin beginning with Shasta Dam in 1942. The February 1986 flood profile of the Sacramento River between the mouth of the American River and the Sacramento Weir (located upstream from the American River) shows a reverse water-surface slope with a corresponding drop of about 0.13 foot. On the Sacramento River at Verona, upstream from Sacramento, a peak stage of 39.11 feet occurred February 20 (peak discharge 92,900 cubic feet per second) due to runoff from upstream tributaries. The February 1986 peak stage is the highest of record for 1914-87 (no record for years 1918-20, 1922-25). The previous peak stage of record at Verona, March 1, 1940, was 38.20 feet, with a discharge of 79,200 cubic feet per second.

INTRODUCTION

A major storm system caused widespread flooding in north-coastal and central California during February 1986. The area most affected by this storm extends from Eureka south to Santa Cruz (fig. 1). The intensity of the storm is indicated by 24-hour precipitation totals ranging from about 5 inches in the Coast Ranges to over 8 inches in the Sierra Nevada (National Oceanic and Atmospheric Administration, 1986).

Basins significantly affected by the storm include the lower Russian, Yuba, Feather, Napa, Cosumnes, Mokelumne, American, and Sacramento Rivers. Peaks-of-record occurred in the Napa, lower Russian, Cosumnes, American, and Sacramento Rivers. On the North Fork American River near Auburn, a coffer dam failed on February 18 at the site of the proposed Auburn Dam; the uncontrolled flow was contained in Folsom Lake a few miles downstream. The flood of February 1986 on the Sacramento River in the vicinity of Sacramento is the highest of record, including the period prior to construction of large flood-control dams in the Sacramento River basin beginning with Shasta Dam in 1942.

This report documents the February 19 and 20, 1986, peak water-surface profile of the Sacramento River, peak discharges of the Sacramento and American Rivers, and datum for five gaging stations located in a 33-mi reach between Freeport and Verona (fig. 1). Flows of the Sacramento River are measured at the downstream end (Freeport gage) and at the upstream end of the study reach (Verona gage) about 1 mi downstream from the Fremont Weir. This weir controls the combined overflow to Yolo Bypass from the Sacramento River, Sutter Bypass, and Feather River (pl. 1). The major tributaries in the study reach are the cross canal (near Verona), Natomas east main drainage canal, and American River (pl. 1). Flows of the American River (fig. 1), a major tributary of the Sacramento River, are measured at the American River at Fair Oaks gage. Major drains that are pumped into the Sacramento or American Rivers in the study reach are the north drainage canal, Natomas main drainage canal, and several storm drains in the city of Sacramento and suburbs.

A water-surface profile of a minor flood was surveyed March 17, 1987 (discharge 37,000 ft^3/s), which shows a typical profile in the reach without the effect of overflow across the Sacramento Weir to Yolo Bypass. To indicate the elevation of the levees and flood plain, approximate profiles of the top of levee and flood plain are shown on plate 1. A flood plain is a nearly flat alluvial lowland bordering a stream, formed by stream processes, that is subject to inundation by floods (Brice and Blodgett, 1978, p. 161).

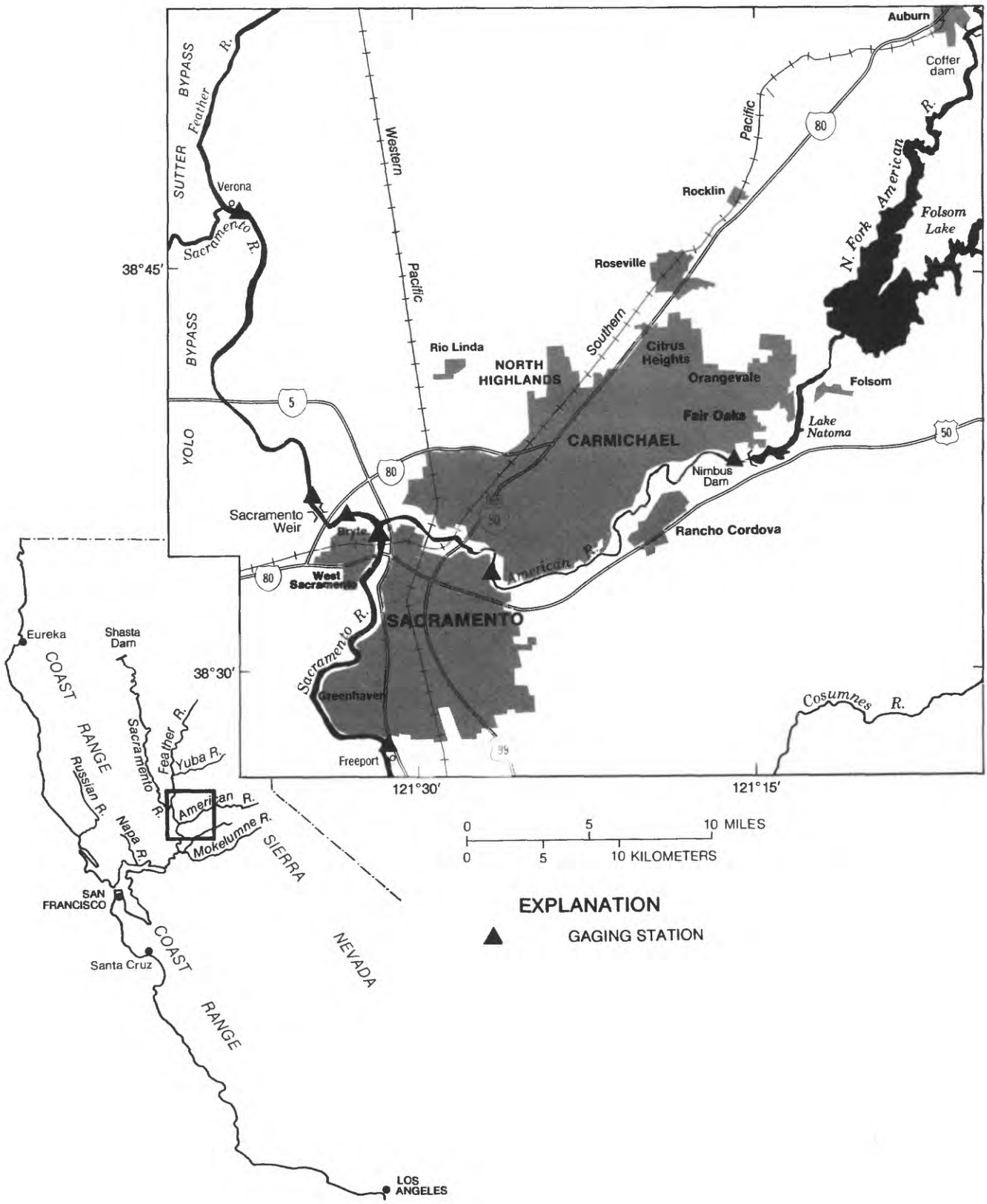

FIGURE 1. Location of study area in vicinity of Sacramento.

SOURCES OF DATA

Flood-profile data of the Sacramento River were obtained at several gaging stations (table 1) and miscellaneous sites in the study reach. One of the gages, Sacramento River near Freeport (auxiliary water-stage recorder), has been discontinued; however, high-water marks were found in the gage structure. Flood-profile data at other sites were obtained from high-water marks and flood elevations observed by local residents. The miscellaneous sites were selected to provide elevations in sufficient detail so that local-channel effects on the water-surface profile could be determined between the various gaging stations.

Flood stage and discharge data for Geological Survey gaging stations were assembled and processed by Robert Simpson of the Sacramento field office. All photographs were furnished by Brian Yost of the Sacramento project office. Flood data for the gages American River at Sacramento; Sacramento River at Bryte Laboratory, near Bryte; Sacramento River above Sacramento Weir near Sacramento; and Sacramento Weir spill to Yolo Bypass were furnished by California Department of Water Resources (H.W. Wolber, written commun., 1987).

VERTICAL CONTROL

All vertical control established in the study reach is based on sea level (see definition on page IV). During field surveys along the Sacramento River, it was found that some bench marks had settled. In those cases, datum adjustments, as shown in table 1, were applied to stages recorded at gaging stations. All gages in the reach between Sacramento River at Sacramento and Sacramento Weir are included in a network using a bench mark (known as TIDAL 3) near the Sacramento River at Sacramento gage as the reference elevation. All high-water marks, top of levee, the crest of the Sacramento Weir, and flood-plain elevations are based on bench-mark elevations established by levels conducted in 1960, 1976, and 1987.

PEAK STAGE AND DISCHARGE

Annual peak stage and discharge data for gages on the Sacramento River at Verona, American River at Fair Oaks, and Sacramento River at Sacramento are given in tables 2, 3, and 4. The peak stage of 39.11 ft (92,900 ft^3/s) on the Sacramento River at Verona, February 20, 1986, (table 2) was the highest for the period of record 1914-87 (no data for years 1918-20 and 1922-25). The previous peak gage height at Verona was 38.20 ft on March 1, 1940. To reduce the flow of the Sacramento River in the vicinity of Sacramento, the Sacramento Weir (fig. 2, pl. 1), located 3 mi upstream from the mouth of the American River and 15.4 mi downstream from Verona, was opened February 15, 1986. On February 20, a peak of 128,000 ft^3/s was discharged across the Sacramento Weir to the Yolo Bypass (table 5).

FIGURE 2. Sacramento Weir spill to Yolo Bypass near Sacramento. February 18, 1986. View from left bank at downstream side of weir. Length of weir 1,830 feet. Note weir gates floating in stream.

The peak of record on the American River at Fair Oaks (table 3) prior to completion of Folsom Dam occurred on November 21, 1950 (discharge 180,000 ft^3/s). The highest peak flow (discharge 134,000 ft^3/s, table 5) since construction of Folsom Dam in 1953 was recorded on February 19, 1986, at the American River at Fair Oaks gage. The previous maximum flow since completion of Folsom Dam was 115,000 ft^3/s on December 23, 1964 (table 3).

The peak flow of the Sacramento River at Sacramento (table 4) was 117,000 ft^3/s, on February 19, 1986, caused by high inflow from the American River (table 5). A similar flow occurred on February 20, although the gage height was 0.04 ft lower than on February 19 (table 5). High flows on February 20 were the result of tributary inflow to the Sacramento River upstream from Sacramento, as recorded at the Verona gage on February 20. Stages on the Sacramento River at Sacramento gage less than about 13 ft are affected by backwater from the tide. The February 1986 peak stage of 30.58 ft at the Sacramento River at Sacramento gage (fig. 3, table 4) was the highest of record since January 1862 (U.S. Geological Survey, 1959). The peak stage recorded between 1862 and 1949 was 29.6 ft on January 17, 1909 (discharge 103,000 ft^3/s). Gage heights collected at this site from November 1879 to May 1888 and from December 1890 to September 1950 are contained in reports of the U.S. Weather Bureau (U.S. Geological Survey, 1959).

FIGURE 3. Sacramento River at Sacramento gage, February 18, 1986. View downstream along left bank. Gage height 29.1 feet. Peak gage height during flood, 30.6 feet on February 19, 1986.

FLOOD PROFILES

The profile of the February 1986 flood in the reach between gaging stations at Freeport and Verona is shown on plate 1. The influence of flood releases to the Yolo Bypass at the Sacramento Weir is indicated by the reverse water-surface slope and a corresponding drop in elevation of 0.13 ft in the short reach between the mouth of the American River and the upstream (north) side of the Sacramento Weir. Peak stages on the reach between Freeport and Sacramento occurred on February 19, and preceded peak stages on the reach upstream from Sacramento, as shown in table 5. A water-surface profile surveyed on March 17, 1987 (which was about 0.2 ft lower than the peak for the 1987 water year at the Sacramento River at Verona gage, old site), is generally parallel to the February 1986 flood profile except in the vicinity of the Sacramento Weir (pl. 1). The crest of the Sacramento Weir varies in elevation from 19.9 ft at the north end to 20.6 ft at the south end.

Approximate profiles of the top of levee and flood plain on either bank, depending where the level lines were run, are shown on plate 1. Those profiles indicate the approximate free board (clearance above the water surface to the top of levee) and height of water above the adjacent flood plain (bankfull stage) on the shoreward side of the levee during the flood.

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_____1932d, Stream flow data for flood season of 1931-32: November 1932, 99 p.

_____1933a, Stream flow data for flood season of 1925-26: May 1933, 102 p.

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TABLE 1.--*Gaging stations in study reach*

[USGS, U.S. Geological Survey; DWR, California Department of Water Resources]

Station	Number	River mile[1]	Datum adjustment (feet)	Operating agency	Period of record
Sacramento River at Verona (old site)	11425500 [2]A02150	78.9	-3.00	USGS DWR	1914-date
Sacramento River at Verona (new site)	11425500	78.1	-3.00	USGS	1986-date
Sacramento River above Sacramento Weir, near Sacramento	[2]A02108	63.5	[3]-.28	DWR	1963-date
Sacramento Weir spill to Yolo Bypass, near Sacramento	11426000 [2]A02903	63.5	([4])	DWR	1926-date
Sacramento River near Bryte (at Bryte Laboratory)	[2]A02104	62.1	[3]-.54	DWR	1960-date
American River at Fair Oaks	11446500 [2]A07175	([4])	71.53	USGS	1904-date
American River at Sacramento	[2]A07140	([4])	-3.07	DWR	1921,24 1925-date
Sacramento River at Sacramento	[5]11447500 [2]A02100	59.6	[3]-.15	USGS	[6]1904-05, 1921, 1948-87
Sacramento River near Freeport (auxiliary water-stage recorder)	11447650	48.6	0	USGS	1955-81
Sacramento River at Freeport (acoustic velocity meter site)	11447650 [2]B9-1850	46.0	0	USGS	1980-date

[1]River mile distances computed on basis of river mile location shown on U.S. Geological Survey maps (plate 1).

[2]California Department of Water Resources station number.

[3]Adjustment to sea level based on levels in 1987. Adjustment applied for water years 1986 and 1987 only.

[4]Not applicable.

[5]Gage heights collected in vicinity of "at Sacramento" gage November 1879 to May 1888, and December 1890 to September 1963 are contained in reports of the National Weather Service.

[6]Gage heights only for water years 1980-87.

TABLE 2.--*Annual peak stage and discharge of the Sacramento River at Verona (old site)*

[Data for years 1914-29 obtained from California Department of Public Works, 1914-25, 1932a; 1926, 1933a; 1927, 1932b; 1928, 1928; 1929, 1932c. Gage heights adjusted to sea level]

Water year	Date	Gage height (feet)	Peak discharge (cubic feet per second)
1914	Jan. 4, 1914	[1] [2]33.6	
1915	Feb. 5, 1915	[1] [2]32.9	
1916	Feb. 14, 1916	[1] [2]31.5	
1917	Mar. 2, 1917	[1] [2]31.3	
1918-20	No data		
1921	Feb. 2, 1921	32.6	
1922-25	No data		
1926	Feb. 7, 1926	[3]32.4	
1927	Feb. 22, 1927	35.3	
1928	Mar. 28, 1928	34.75	
1929	Feb. 8, 1929	25.2	
1930	Dec. 17, 1929	31.79	57,400
1931	Jan. 25, 1931	19.77	26,600
1932	Dec. 30, 1931	30.77	53,300
1933	Mar. 31, 1933	22.51	34,000
1934	Jan. 4, 1934	30.34	47,900
1935	Apr. 10, 1935	32.75	55,800
1936	Feb. 25, 1936	33.62	61,800
1937	Mar. 25, 1937	31.66	52,900
1938	Dec. 14, 1937	35.23	68,400
1939	Mar. 16, 1939	20.37	30,600
1940	Mar. 1, 1940	38.20	79,200
1941	Feb. 13, 1941	35.65	68,900
1942	Feb. 8, 1942	37.80	78,000
1943	Jan. 25, 1943	34.75	67,400
1944	Mar. 6, 1944	26.42	47,100
1945	Feb. 6, 1945	32.77	56,200
1946	Dec. 31, 1945	33.83	61,200
1947	Feb. 25, 1947	28.05	47,000
1948	Apr. 19, 1948	31.07	56,600
1949	Mar. 14, 1949	30.56	56,200
1950	Feb. 7, 1950	32.18	59,500
1951	Nov. 22, 1950	34.06	64,300
1952	Feb. 4, 1952	32.83	61,800
1953	Jan. 15, 1953	33.44	66,300
1954	Feb. 19, 1954	31.82	61,500

TABLE 2.--*Annual peak stage and discharge of the Sacramento River at Verona (old site)*--Continued

Water year	Date	Gage height (feet)	Peak discharge (cubic feet per second)
1955	Dec. 11, 1954	22.89	36,900
1956	Dec. 23, 1955	36.81	71,400
1957	Feb. 26, 1957	31.61	65,500
1958	Feb. 26, 1958	35.47	69,200
1959	Feb. 19, 1959	32.26	62,900
1960	Feb. 9, 1960	32.45	64,500
1961	Feb. 13, 1961	27.05	48,300
1962	Feb. 16, 1962	32.55	62,300
1963	Feb. 1, 1963	35.14	69,400
1964	Jan. 23, 1964	28.36	50,500
1965	Dec. 25, 1964	36.65	74,200
1966	Jan. 10, 1966	27.90	50,800
1967	Feb. 1, 1967	33.88	67,100
1968	Feb. 28, 1968	30.48	58,600
1969	Jan. 26, 1969	34.11	68,500
1970	Jan. 26, 1970	36.21	77,800
1971	Dec. 5, 1970	31.00	63,200
1972	Mar. 2, 1972	18.74	30,000
1973	Jan. 20, 1973	[4]31.0	65,800
1974	Jan. 20, 1974	34.90	74,900
1975	Mar. 26, 1975	31.17	63,700
1976	Dec. 8, 1975	17.80	27,100
1977	Jan. 5, 1977	11.52	14,200
1978	Jan. 17, 1978	32.52	68,300
1979	Feb. 24, 1979	29.63	57,100
1980	Feb. 22, 1980	35.12	80,900
1981	Jan. 31, 1981	26.89	53,300
1982	Dec. 21, 1981	36.72	72,200
1983	Mar. 4, 1983	35.82	79,400
1984	Dec. 28, 1983	35.42	78,100
1985	Nov. 30, 1984	21.08	35,400
1986	Feb. 20, 1986	39.11	92,900
1987	Mar. 16, 1987	21.35	37,400

[1]Staff readings from gage located on right bank of Feather River 60 ft upstream from junction with Sacramento River.
[2]Once daily staff readings.
[3]Peak on April 9, 1926, at 31.8 ft.
[4]Gage height is an estimate based on daily average discharge.

TABLE 3.--*Annual peak stage and discharge of the American River at Fair Oaks*

[Datum of gage is 71.53 feet above sea level. Prior to Nov. 7, 1930, non-recording gages or water-stage recorders at several sites 2.2 miles downstream all at datum 5.74 feet lower; from Nov. 7, 1930, to Dec. 31, 1957, at site 2.2 miles downstream at datum 6.74 feet lower. Dec. 31, 1957, to July 15, 1970, at datum 6.00 feet higher]

Water year	Date	Gage height (feet)	Peak discharge (cubic feet per second)
1862	1862	38.00	
1905	Mar. 19, 1905	11.20	24,200
1906	Jan. 18, 1906		59,700
1907	Mar. 19, 1907	31.4	156,000
1908	Dec. 27, 1907		10,300
1909	Jan. 14, 1909	26.70	119,000
1910	Dec. 2, 1909		47,000
1911	Jan. 31, 1911	21.90	81,300
1912	June 2, 1912		12,100
1913	May 18, 1913	8.80	12,700
1914	Jan. 1, 1914	16.00	74,100
1915	May 12, 1915	15.04	47,900
1916	Jan. 3, 1916	13.70	40,700
1917	Feb. 25, 1917	13.98	42,300
1919	Feb. 11, 1919	18.50	67,500
1920	Apr. 16, 1920	10.70	20,100
1921	Jan. 18, 1921	14.10	39,200
1922	Feb. 20, 1922	12.50	31,600
1923	Dec. 13, 1922	14.20	39,000
1924	Feb. 8, 1924	7.75	14,000
1925	Feb. 6, 1925	25.00	99,500
1926	Apr. 6, 1926	11.60	27,400
1927	Feb. 21, 1927	19.40	67,700
1928	Mar. 25, 1928	31.45	163,000
1929	June 16, 1929	11.30	26,000
1930	Mar. 5, 1930	11.33	24,400
1931	Mar. 18, 1931	8.87	9,900
1932	Feb. 7, 1932	12.60	21,100
1933	May 30, 1933	11.52	16,500
1934	Jan. 1, 1934	13.50	22,600

TABLE 3.--*Annual peak stage and discharge of the American River at Fair Oaks*--Continued

Water year	Date	Gage height (feet)	Peak discharge (cubic feet per second)
1970	Jan. 19, 1970	12.82	56,700
1971	Jan. 15, 1971	3.73	8,270
1972	Feb. 9, 1972	2.89	6,060
1973	Jan. 14, 1973	9.42	32,700
1974	Jan. 17, 1974	8.46	27,600
1975	Mar. 25, 1975	3.85	8,450
1976	Oct. 17, 1975	1.19	3,770
1977	Dec. 6, 1976	.56	1,920
1978	May 5, 1978	3.92	8,660
1979	Feb. 23, 1979	6.14	16,500
1980	Jan. 15, 1980	17.27	84,800
1981	June 9, 1981	2.42	5,140
1982	Feb. 16, 1982	17.92	91,100
1983	Dec. 22, 1982	10.14	36,200
1984	Dec. 28, 1983	12.18	48,500
1985	Dec. 7, 1984	1.57	5,200
1986	Feb. 19, 1986	27.96	134,000

TABLE 4.--*Selected annual peak stage and discharge of the Sacramento River at Sacramento*

[Data for years 1920-48 obtained from California Department of Public Works, 1920-25, 1932a; 1926, 1933a; 1927, 1932b; 1928, 1928; 1929-31, 1932c; 1932, 1932d; 1933, 1933b; 1934, 1934; 1935-42, 1943; 1943-44, 1944; 1945-46, 1946; 1947-48, 1948. Peak discharge data for 1920-48 not available. Gage heights for years 1963-85 may be higher than actual peak stages by about 0.1 ft because of variable settlement of reference bench marks]

Water year	Date	Gage height (feet)	Peak discharge (cubic feet per second)
1909	Jan. 17, 1909	29.6	103,000
1920	Apr. 18, 1920	20.8	
1921	Jan. 19, 1921	26.4	
1922	Feb. 21, 1922	24.3	
1923-24	No data		
1925	Feb. 6, 1925	27.9	
1926	Apr. 9, 1926	24.7	
1927	Feb. 18, 1927	26.9	
1928	Mar. 26, 1928	29.5	
1929	Feb. 7, 1929	17.0	
1930	Mar. 6, 1930	24.3	
1931	Mar. 21, 1931	10.8	
1932	Dec. 29, 1931	23.0	
1933	Apr. 1, 1933	14.0	
1934	Jan. 4, 1934	21.2	
1935	Apr. 8, 1935	28.6	
1936	Feb. 22, 1936	28.7	
1937	Mar. 22, 1937	26.3	
1938	Feb. 11, 1938	27.7	
1939	Mar. 17, 1939	[1]11.6	
1940	Feb. 27, 1940	28.5	
1941	Dec. 28, 1940	27.25	
1942	Jan. 27, 1942	28.25	
1943	Jan. 22, 1943	28.85	
1944	Mar. 5, 1944	17.60	
1945	Feb. 2, 1945	27.64	
1946	Dec. 29, 1945	27.28	
1947	Feb. 15, 1947	18.18	
1948	Apr. 18, 1948	22.50	
1949	Mar. 14, 1949	20.36	61,300
1950	Feb. 7, 1950	24.55	80,200
1951	Nov. 21, 1950	30.14	104,000
1952	Jan. 15, 1952	26.84	87,400
1953	Jan. 21, 1953	25.46	80,000
1954	Mar. 11, 1954	23.73	76,800

TABLE 4.--*Selected annual peak stage and discharge of the Sacramento River at Sacramento*--Continued

Water year	Date	Gage height (feet)	Peak discharge (cubic feet per second)
1955	Dec. 10, 1954	13.89	44,000
1956	Dec. 23, 1955	28.67	95,300
1957	Mar. 6, 1957	25.75	84,700
1958	Apr. 7, 1958	27.62	88,900
1959	Feb. 20, 1959	21.64	67,400
1960	Feb. 10, 1960	21.39	69,600
1961	Feb. 14, 1961	15.89	49,800
1962	Feb. 16, 1962	22.85	70,500
1963	Feb. 1, 1963	28.52	98,100
1964	Jan. 23, 1964	17.31	52,800
1965	Dec. 25, 1964	29.36	99,700
1966	Jan. 10, 1966	16.80	53,000
1967	Jan. 31, 1967	27.40	90,900
1968	Feb. 29, 1968	20.80	66,800
1969	Jan. 21, 1969	28.18	95,500
1970	Jan. 24, 1970	28.24	94,100
1971	Dec. 5, 1970	21.79	73,700
1972	Mar. 6, 1972	10.29	33,300
1973	Jan. 19, 1973	26.74	93,400
1974	Jan. 21, 1974	27.18	95,000
1975	Mar. 26, 1975	21.85	74,400
1976	Dec. 8, 1975	9.19	30,600
1977	Jan. 5, 1977	[2]5.18	13,700
1978	Mar. 9, 1978	23.70	79,300
1979	Feb. 24, 1979	21.43	71,300
1980	Jan. 15, 1980	[3]27.83	[4]94,600
1981	Jan. 31, 1981	[5]15.68	[4]54,100
1982	Feb. 16, 1982	27.70	[4]103,000
1983	Dec. 24, 1982	[6]27.20	[4]97,800
1984	Dec. 26, 1983	27.40	[4]94,500
1985	Nov. 30, 1984	12.17	[4]42,000
1986	Feb. 19, 1986	[7]30.58	[4]117,000
1987	Mar. 17, 1987	[7 8] 10.78	[4]39,400

[1]Daily mean gage height.
[2]Maximum elevation Jan. 2, 1977.
[3]Maximum elevation Jan. 14, 1980.
[4]Discharge determined at Sacramento River at Freeport gaging station.
[5]Maximum elevation Feb. 1, 1981.
[6]Maximum elevation Dec. 23, 1982
[7]Gage height for years 1986-87 corrected for settlement of reference bench marks based on level surveys in 1987.
[8]Maximum elevation March 16, 1987.

TABLE 5.--*February 1986 peak stage and discharge at selected gaging stations on the American and Sacramento Rivers*

[All gage heights referenced to sea level]

Station	Day	Time (hours P.s.t.)	Gage height (feet)	Discharge (cubic feet per second)
Sacramento River at Verona (old site)	20	0215	39.11	92,900
Sacramento Weir spill to Yolo Bypass, near Sacramento[1]	20	0115	30.56	128,000
Sacramento River near Bryte[1]	20	0015	30.65	(2)
American River at Fair Oaks	19	1315	99.49	134,000
American River at Sacramento[1]	19	0215-0230	40.32	(2)
Sacramento River at Sacramento	19	1530	30.58	[3]117,000
	20	0400	30.54	[3]117,000
Sacramento River at Freeport	19	1900	25.11	117,000

[1]Peak stage and discharge data furnished by California Department of Water Resources.
[2]Not available.
[3]Discharge considered same as Sacramento River at Freeport gage.

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