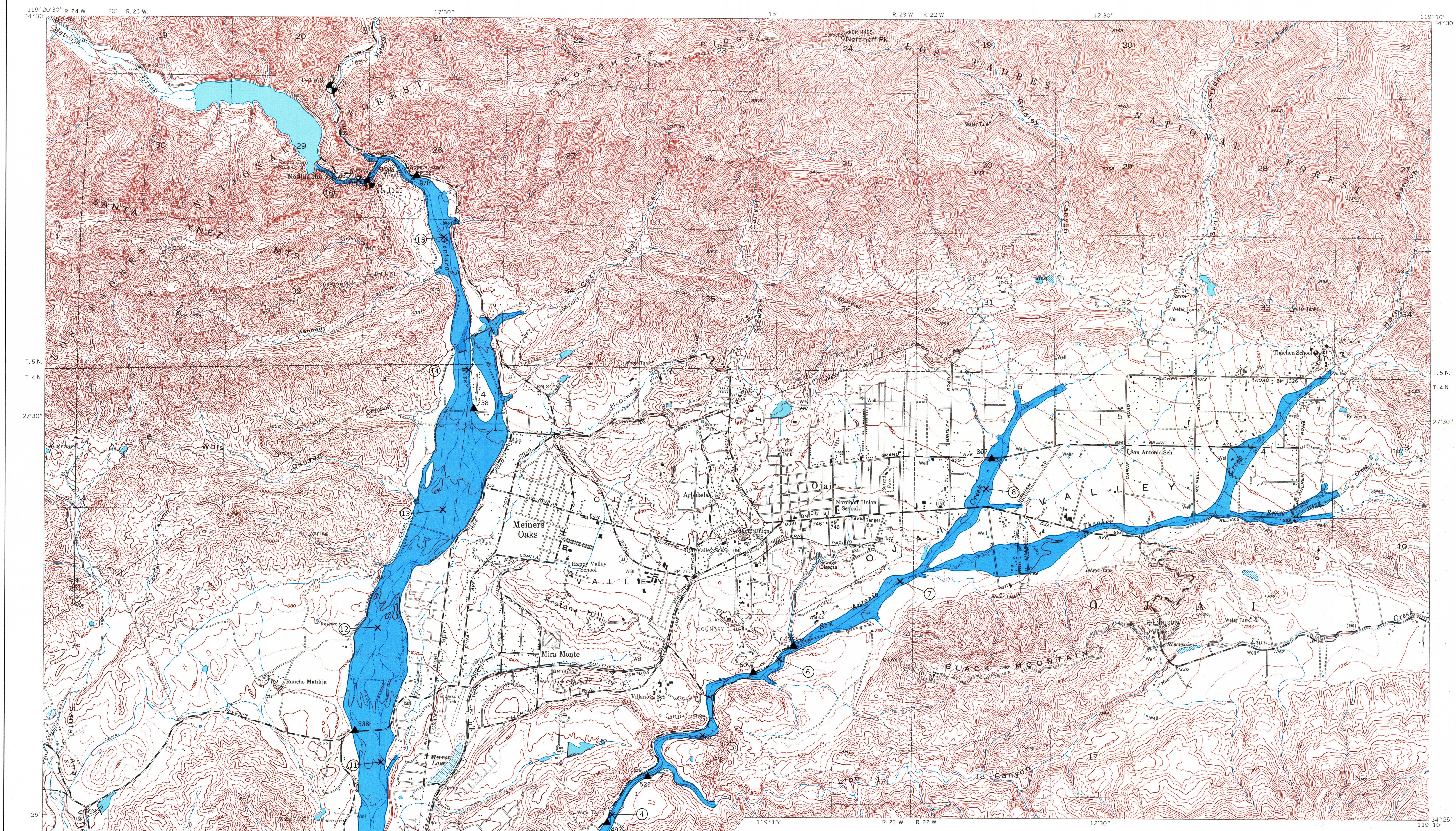
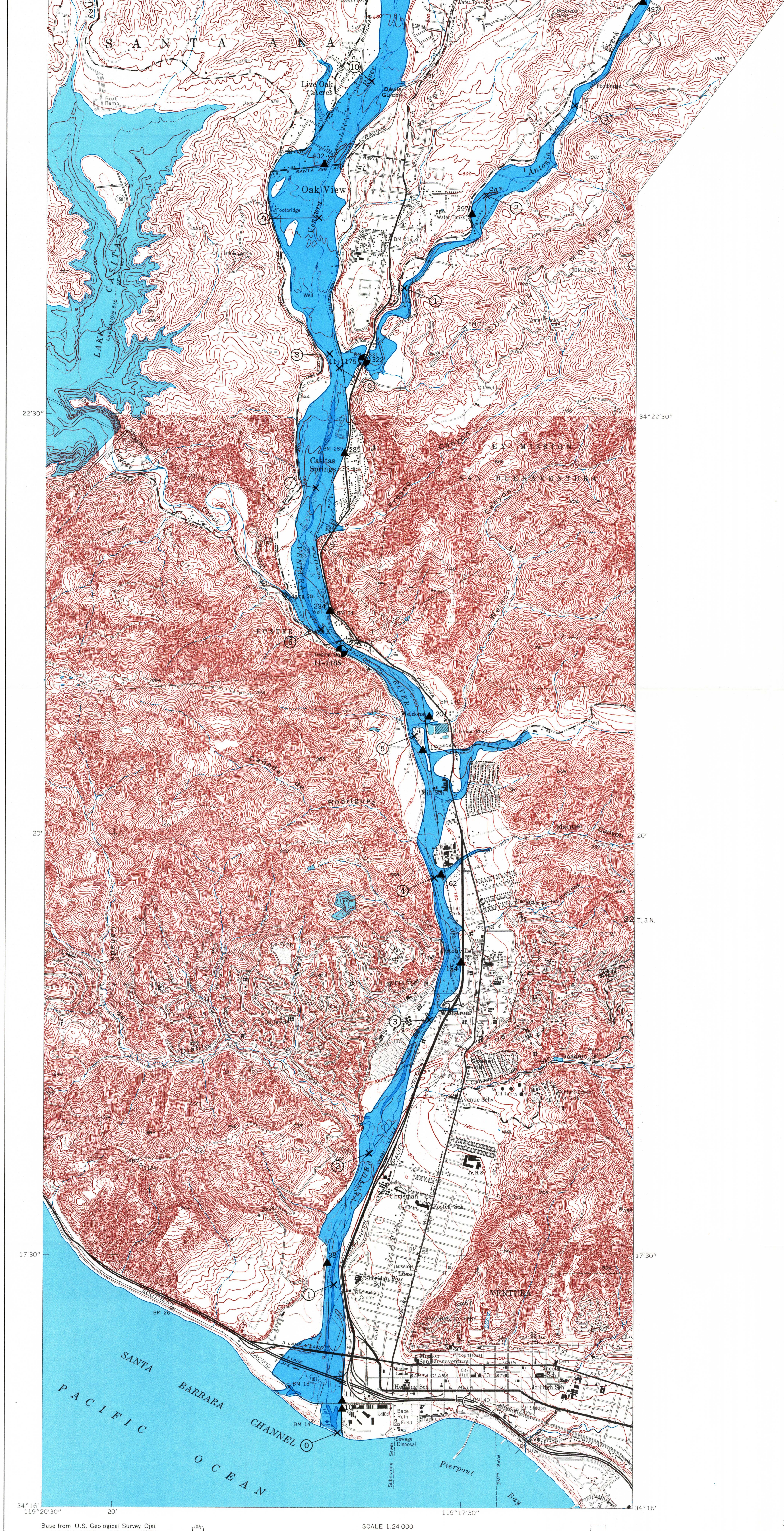
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

HYDROLOGIC INVESTIGATIONS
ATLAS HA-423





Base from U.S. Geological Survey Ojai and Matilija,1952; and Ventura,1951. Photorevised 1967

SCALE 1:24 000

CONTOUR INTERVALS 20 AND 40 FEET
DOTTED LINES REPRESENT HALF-INTERVAL CONTOURS
DATUM IS MEAN SEA LEVEL

INDEX MAP SHOWING AREA OF THIS REPORT

FLOOD OF JANUARY 1969 NEAR VENTURA, CALIFORNIA

Unprecedented floodflows occurred in the Ventura River basin on January 25, 1969, as a result of heavy storms. The approximate areas inundated along the Ventura River and San Antonio Creek are described in this atlas. The map and graphs show the results of analyses of data on the extent and frequency of the flood. These data provide a basis for making decisions concerning development of the flood plain.

The Ventura River basin is an area of about 226 square miles about 25 miles east of Santa Barbara. The Ventura River flows south 16 miles from the confluence of Matilija and North Fork Matilija Creeks to Ventura at the coast. It has two principal tributaries, San Antonio Creek on the east side, and Coyote Creek on the west side. Flow in Coyote Creek basin is controlled by Lake Casitas. Elevations in the basin range from sea level at Ventura to about 6,000 feet above sea level in the Santa Ynez Mountains.

The storms of January 18–21 and 24–26 produced extremely heavy precipitation in the mountain areas. Total precipitation during the storm periods averaged 25 inches over the basin, but ranged from 10 inches in the coastal area to more than 40 inches in the Matilija Creek canyon 5 miles northwest of Matilija Hot Springs. The precipitation quantities for the two storm periods were comparable. The crest stage of 24.30 feet on January 25, 1969, at the gaging station on Ventura River near Ventura (11–1185) was 5.1 feet higher than the previous maximum recorded stage which occurred on March 2, 1938; the corresponding discharge was 1.5 times the prior maximum flow of record.

Storm runoff was rapid and heavy, and caused numerous earthslides in the headwater areas. Roads were washed out, bridges were destroyed (fig. 1), many culverts were destroyed or filled with debris, and large deposits of sediment and other debris were left on parts of the flood plain. Many houses on the flood plain were damaged or destroyed. Flood damage along the Ventura River and in the San Antonio Creek basin was in excess of $1 million.

FIGURE 1.—*Santa Ana road crossing of Ventura River at river mile 9.35 north of Ventura, January 25, 1969. Bridge was overtopped at peak of flood. Photograph, courtesy Ventura County Flood Control District.*

The extent of inundation along the Ventura River main stem and along San Antonio and Thacher Creeks is shown on a topographic map base. The limits of flooding were identified from aerial photographs taken after the flood and from field inspection. Elevations of floodmarks were determined by leveling to bench marks. The Coyote Creek basin was not included in the atlas as Coyote Creek flows were stored in Lake Casitas and did not contribute to the flooding downstream.

Acknowledgments.—This atlas was prepared under the general direction of R. Stanley Lord, district chief in charge of water resources investigations in California, and under the immediate supervision of James L. Cook, chief of the Garden Grove subdistrict. Technical assistance was provided by Howard F. Matthai, hydraulic specialist, and Arvi O. Waananen, hydrologist. The atlas is one of four prepared to describe the floods of January 1969 in selected areas in southern California as part of the U.S. Geological Survey program to document information in areas inundated by major floods.

Flood height.—The height of a flood at a gaging station is usually stated in terms of the gage height or stage, which is the elevation of the water surface above a selected datum plane. Elevations shown on the map are in feet above mean sea level. Gage heights for the gaging stations shown can be converted to elevation above mean sea level by adding the gage height to the appropriate datum of gage as listed in the following table. The size of drainage area for each station is also shown.

Gaging station No.	Gaging station Site	Datum of gage above mean sea level (feet)	Drainage area (sq mi)
11–1155	Matilija Creek at Matilija Hot Springs	[a]900	54.6
11–1160	North Fork Matilija Creek at Matilija Hot Springs	1,142.02	15.6
11–1175	San Antonio Creek at Casitas Springs	307.25	51.2
11–1185	Ventura River near Ventura	201.23	188

[a]Altitude from topographic map.

Flood discharge.—Discharge is the rate at which water flows, expressed as volume per unit time, usually cubic feet per second (cfs). Peak discharge is the maximum value of the discharge attained during a flood and generally occurs at the time of the maximum gage height (stage) of the flood.

The discharge and year of annual floods (highest peak discharge in each calendar year) exceeding 12,000 cfs at the gaging station on Ventura River near Ventura (11–1185) during the period 1933–69 are shown in figure 2. Not shown are secondary peaks greater than 12,000 cfs which occurred in 1933, 1941, and 1952. The erratic time distribution of floods is demonstrated by the graph. The 14 peaks exceeding 12,000 cfs occurred in just 11 of the 37 years; 9 of these occurred in the period 1933–45, but only 5 in the period 1946–January 1969.

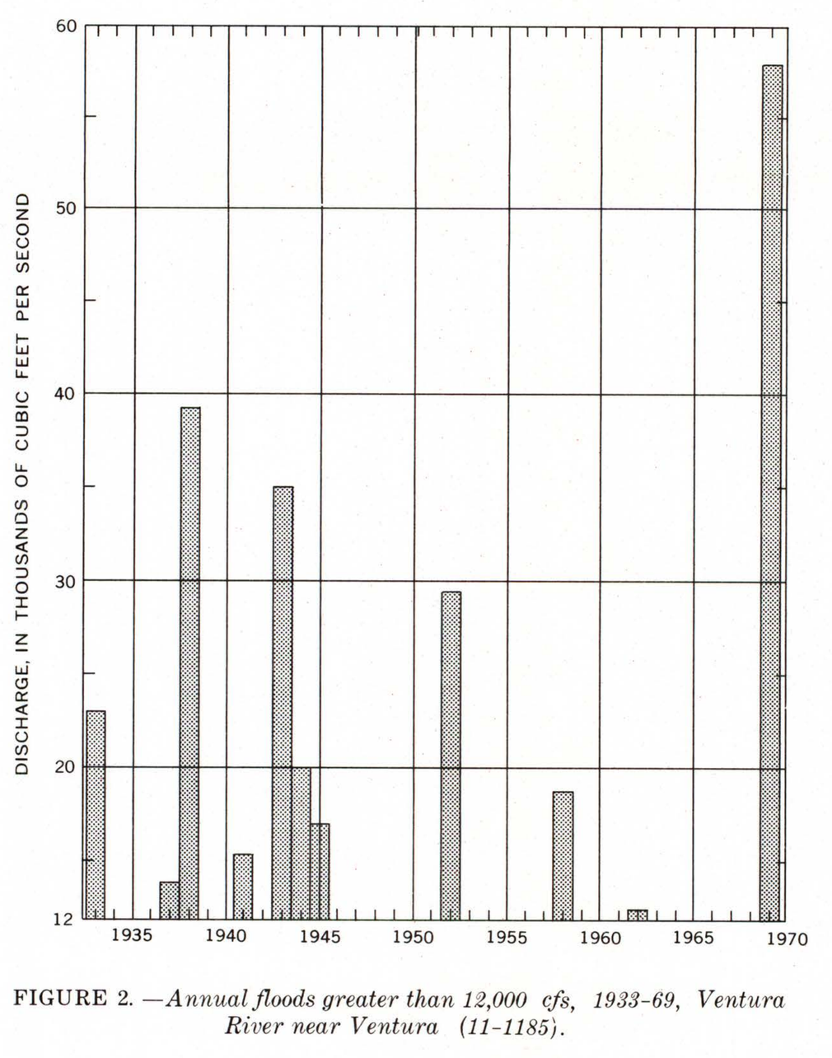


FIGURE 2.—*Annual floods greater than 12,000 cfs, 1933-69, Ventura River near Ventura (11-1185).*

The three greatest floods of record occurred in March 1938, January 1943, and January 1969. The peak discharge of 58,000 cfs January 25, 1969, at the Ventura gaging station was the greatest since at least January 1914. During a year in which an outstanding flood occurs, a separate major flood is not an uncommon event. Such a flood occurred in 1969, when the peak discharge on February 25 was 40,000 cfs, the second highest in the period of record through February 1969.

Record floodflows occurred in 1969 also in the Ventura River basin upstream from the station near Ventura, as shown by the data in the following table of flood stages and discharges. Data for the station near Ventura (11–1185) are included for comparison. Each station listed has three entries under maximum floods; the first two pertain to the floods in 1969, and the third to the previous maximum known flood during the period of record. The rank on basis of magnitude of each peak discharge in relation to the floods during the period of record is also shown.

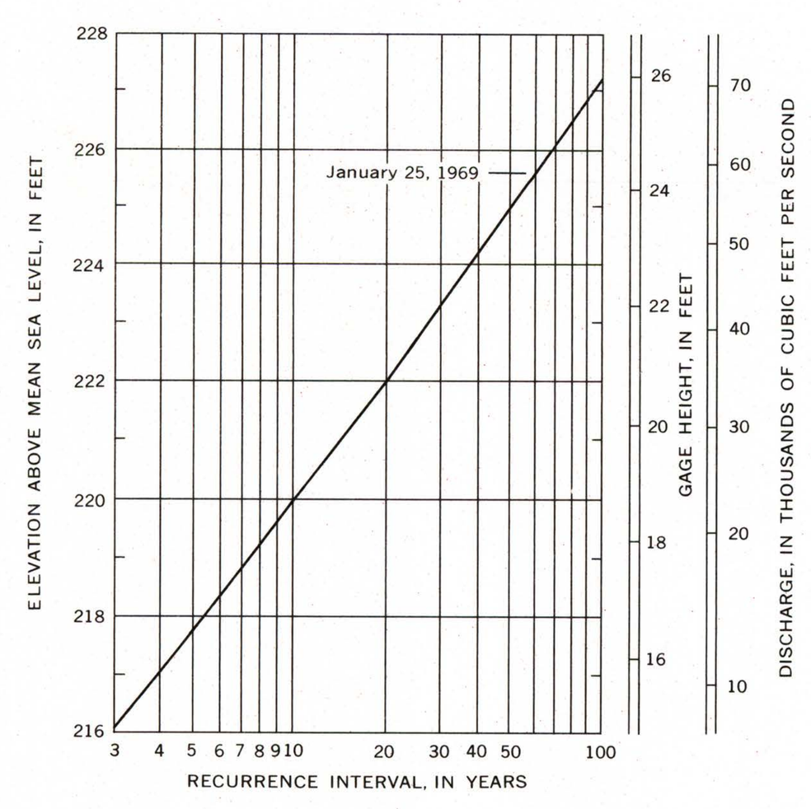


FIGURE 5.—*Frequency of floods on Ventura River near Ventura (11-1185).*

The relation between stage and frequency usually is comparable to that between the associated discharge and frequency. Changes in the physical condition of channels, flood plains, and structures constricting the streams, however, will affect the stage-discharge and stage-frequency relations. The flood-frequency curves of figures 3–5 are based on channel conditions existing at the time of the January 1969 flood.

The recurrence interval, in relation to flood events, is the average interval of time within which a given flood will be exceeded once. Flood frequency can also be stated as a probability, which is virtually the reciprocal of the recurrence interval for floods greater than the 10-year flood. Thus, a 50-year flood would have one chance in 50, or a 2-percent chance, of being exceeded in any given year. Because the 50-year flood can occur in any year or even in successive years, any inference that such a flood will occur only once during a 50-year period or at regular intervals would be misleading.

The flood of January 1969 is a rare event, as indicated by the frequency curves in figures 3–5. The recurrence interval for this flood may be estimated as 70–80 years on two Ventura River tributaries and about 50 years along the main stem of the Ventura River near Ventura.

Station number	Stream and place of determination	Drainage area (sq mi)	Period of record	Maximum floods: Date	Gage height (ft)	Discharge: Cfs	Discharge: Rank
11–1155	Matilija Creek at Matilija Hot Springs	54.6	1927–69	Jan. 25, 1969	16.5	20,000	1
				Feb. 25, 1969	13.25	15,000	3
				Mar. 2, 1938	--------	15,900	2
11–1160	North Fork Matilija Creek at Matilija Hot Springs	15.6	1928–32, 1933–69	Jan. 25, 1969	10.0	8,440	2
				Feb. 25, 1969	11.0	9,440	1
				Mar. 2, 1938	--------	5,580	3
11–1175	San Antonio Creek at Casitas Springs	51.2	1949–69	Jan. 25, 1969	14.30	16,200	1
				Feb. 25, 1969	10.7	11,500	2
				Dec. 6, 1966	11.02	7,280	3
11–1185	Ventura River near Ventura	188	1911–14, 1929–69	Jan. 25, 1969	24.3	58,000	1
				Feb. 25, 1969	21.2	40,000	2
				Mar. 2, 1938	19.2	39,200	3

Flood frequency.—Frequency of flooding at the gaging stations on North Fork Matilija Creek at Matilija Hot Springs (11–1160), San Antonio Creek at Casitas Springs (11–1175), and Ventura River near Ventura (11–1185) have been derived from a statistical evaluation of annual flood peaks. The relations between recurrence interval, stage, and discharge at these stations are shown in figures 3–5. The curves are limited to a recurrence interval of 100 years. Large errors may result if the frequency curves are extrapolated beyond the limits shown.

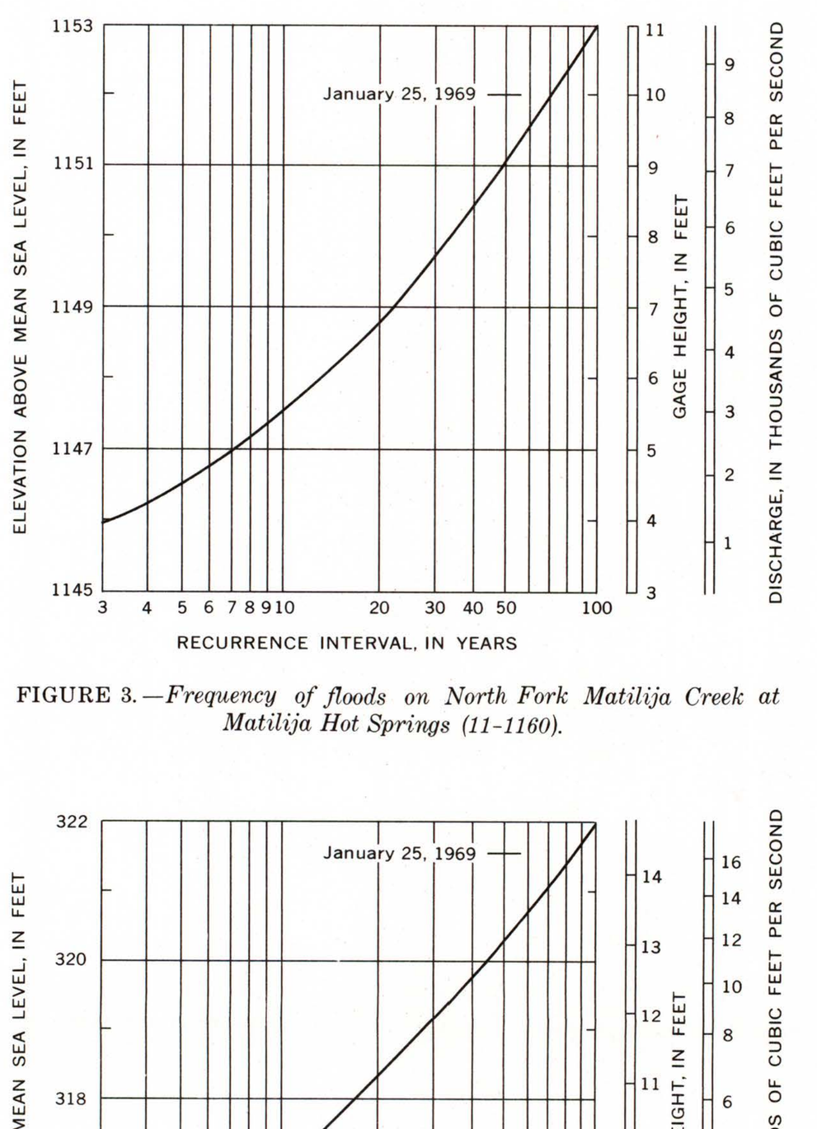


FIGURE 3.—*Frequency of floods on North Fork Matilija Creek at Matilija Hot Springs (11-1160).*

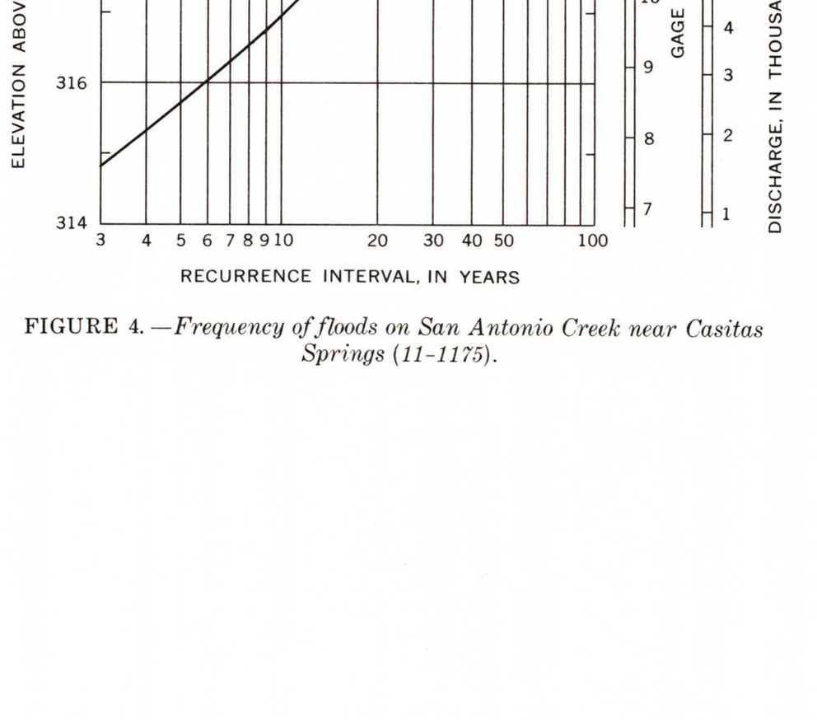


FIGURE 4.—*Frequency of floods on San Antonio Creek near Casitas Springs (11-1175).*

Flood depths and elevations.—Depth of flooding at any specific point can be estimated by subtracting the ground elevation from the water-surface elevation at that point. The water-surface elevation can be estimated from floodmark elevations and from intersections of ground-level contours with flood boundaries as delineated on the map. The depth of flooding and the areas inundated in future floods of the same magnitude, however, may not be the same because of changes in control structures and channel conditions and the effects of debris deposits and landslides. In some instances in January 1969 sandbags and other barriers placed to prevent flooding of buildings and other structures may have influenced the extent of the flooding.

Regulation.—Matilija Reservoir (capacity, 7,020 acre-feet) on Matilija Creek filled and spilled on January 21; therefore, flows in Matilija Creek and Ventura River during the flood of January 25 were virtually unaffected by storage in the reservoir.

Lake Casitas (capacity, 267,000 acre-feet) on Coyote Creek stored all flood inflow from 41 square miles. The reservoir contents increased 34,900 acre-feet January 17–26, and the peak inflow rate probably was greater than 16,000 cfs. Thus, the floodflow in Ventura River downstream from Coyote Creek was reduced significantly, and additional flood damage was prevented.

Additional data.—Other information pertaining to floods on the Ventura River and its tributaries can be obtained at the office of the U.S. Geological Survey, 855 Oak Grove Avenue, Menlo Park, Calif. 94025, and from the following reports:

Waananen, A. O., 1969, Floods of January and February 1969 in central and southern California: U.S. Geol. Survey open-file rept., 233 p.

Young, L. E., and Cruff, R. W., 1967, Magnitude and frequency of floods in the United States, Part 11, Pacific slope basins in California, Volume 1, Coastal basins south of the Klamath River basin and Central Valley drainage from the west: U.S. Geol. Survey Water-Supply Paper 1685, 272 p.

EXPLANATION

Area flooded

Boundary of 1969 flood

Gaging station — 11–1185

Floodmark elevation above mean sea level, in feet — ▲10

River mile measured upstream from mouth — (10)——×

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By

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1971