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STATE OF ARKANSAS  
ARKANSAS DEPARTMENT OF COMMERCE  
ARKANSAS GEOLOGICAL COMMISSION

WATER RESOURCES SUMMARY NUMBER 8

FLOODS OF DECEMBER 1971 IN WESTERN ARKANSAS

By R. C. Gilstrap  
U.S. Geological Survey



Prepared by the U.S. Geological Survey in cooperation with the  
Arkansas State Highway Commission and Arkansas Geological Commission  
Little Rock, Arkansas

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STATE OF ARKANSAS

Dale Bumpers, Governor

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Arkansas Department of Commerce  
Donald V. Allen, Director of Commerce

Arkansas Geological Commission  
Norman F. Williams, State Geologist

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## FLOODS OF DECEMBER 1971 IN WESTERN ARKANSAS

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By R. C. Gilstrap

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### ABSTRACT

Heavy rains of December 1971 in western Arkansas caused record-breaking floods on many streams. Heavy rains began on December 8 and continued to December 10. The heaviest rain fell from the afternoon of December 9 to the early morning of December 10. Maximum accumulated rainfall for the 40-hour period exceeded 13 inches at Vandervoort.

Most notable of the floods was on Ouachita River near Mount Ida, where there is a continuous record since 1941. The peak stage of 38.62 feet was 6.44 feet higher than the previous known maximum, which occurred in 1960, and the corresponding discharge of 95,500 cubic feet per second was 67 percent greater than the previous known maximum. Lake Ouachita near Hot Springs and Nimrod Lake near Nimrod had the maximum computed peak inflows of 160,000 cubic feet per second and 80,000 cubic feet per second, respectively, for periods of record. No lives were lost as a result of the floods, but property damage was about \$2,780,000.

## INTRODUCTION

Heavy rains of December 8-10 in western Arkansas caused outstanding floods on many streams. The storm centered on the high elevations of the Ozark and Ouachita Mountains. The towns of Fort Smith, Winslow, Boxley, Buffalo City, Marshall, Russellville, Perryville, Hot Springs, Malvern, Mount Ida, Nashville, Ashdown, DeQueen, and Cauthron are on the outer fringe of the storm area. Flood damage was estimated by the U.S. Army Corps of Engineers at \$2,780,000. Fortunately, no lives were lost.

This report was prepared by the U.S. Geological Survey in cooperation with the Arkansas State Highway Commission and the Arkansas Geological Commission. The purpose of the report is to supplement, in more detail, data of stage and discharge published in the annual Geological Survey surface-water records and includes precipitation and runoff data, and estimates of property damage.

Heavy rains, which were fairly uniform throughout the report area, began in the afternoon of December 8 and continued until early in the morning of December 10—a 40-hour period. Streams rose rapidly after as much as 13.02 inches of rain fell in the 40-hour period. Rainfall at the 66 precipitation stations averaged 6.65 inches. New record peak stages were recorded at 11 gaging stations. Buffalo River near St. Joe had the highest known peak stage since the flood of August 1915. Nimrod Lake and Lake Ouachita had the maximum computed inflow for the period of record.

## PRECIPITATION

For 3 months prior to December 1, 1971, precipitation throughout the report area was below normal. However, total amounts of rain during December 1-7 ranged from 1.01 inches, at Captenter Dam, to 3.95 inches, at Ashdown. Rainfall at the 66 precipitation stations averaged 2.20 inches. All the precipitation consisted of rain, except a trace to 3.0 inches of snow which was reported at seven precipitation stations. Very little runoff resulted from these rains, but wetting of the soil set the stage for high rates of runoff the next 3 days. Total amounts of precipitation are shown in table 1. Figure 1 is a map of the report area that shows isohyets for the period December 1-10, the locations of precipitation stations, and the locations of flood-determination sites.

The primary cause of the precipitation was a vigorous low-pressure center that moved across the State on December 9 and 10. Figure 2 shows the hourly accumulated rainfall at four recording precipitation stations, fairly evenly distributed throughout the report area. The most intense rain fell in the afternoon of December 9 to the early morning of December 10. Total amounts of rain for the 40-hour storm period ranged from 1.44 inches, at Okay, to 13.02 inches, at Vandervoort. Rainfall at the 66 precipitation stations averaged 6.65 inches. The maximum of



Table 1.—*Precipitation, in inches, at National Weather Service stations in western Arkansas, December 1-10, 1971*

Map no.	Precipitation station	December 1971				
		1-7	8	9	10	1-10
1	Abbott-----	1.60	0	1.82	3.37	6.79
2	Aly-----	2.46	.63	7.27	.46	10.82
3	Aplin 1W-----	1.36	0	2.92	2.61	6.89
4	Ashdown-----	3.95	0	1.35	.47	5.77
5	Athens-----	2.92	T	1.63	5.37	9.92
6	Big Fork-----	3.23	0	1.94	4.85	10.02
7	Blakely Mountain Dam-----	2.3	.7	1.4	.2	4.6
8	Blue Mountain Dam-----	1.89	T	1.45	5.03	8.37
9	Bog Springs-----	2.72	0	2.88	9.42	15.02
10	Bonnerdale-----	2.10	0	1.30	.75	4.15
11	Booneville-----	1.75	1.52	4.15	1.45	8.87
12	Buffalo Tower-----	1.49	0	1.76	5.41	8.66
13	Carpenter Dam-----	1.01	0	2.07	.52	3.60
14	Centerville-----	2.20	0	1.70	5.51	9.41
15	Clarksville-----	1.96	.03	2.75	4.10	8.84
16	Clarksville 6NNE-----	1.81	1.78	2.82	3.00	9.41
17	Coal Hill-----	1.60	0	2.38	4.80	8.78
18	Compton-----	1.10	2.01	1.89	2.95	7.95
19	Cove-----	3.17	T	2.20	7.75	13.12
20	Danville-----	1.60	0	1.65	6.67	9.92
21	Danville SCS-----	2.24	.57	7.30	.88	10.99
22	Dardanelle-----	2.04	0	1.07	5.53	8.64
23	DeQueen-----	3.61	0	1.86	3.25	8.72
24	Dierks-----	3.47	0	1.97	1.95	7.39
25	Foreman-----	3.83	.20	3.80	.60	8.43
26	Fort Smith WSO-----	1.25	1.90	3.61	2.23	8.99
27	Fort Smith WP-----	1.64	0	2.19	5.35	9.18
28	Gilbert-----	1.40	1.40	2.26	3.18	8.24
29	Gillham Dam-----	3.2	.3	5.7	1.0	10.2
30	Gravelly-----	2.08	0	2.15	7.60	11.83
31	Greenwood-----	1.70	.33	4.60	4.27	10.90
32	Hector-----	1.63	.70	4.50	.85	7.68
33	Horatio-----	3.82	0	1.60	3.58	9.00
34	Hot Springs 1NNE-----	2.04	T	1.81	1.32	5.17
35	Jasper-----	1.77	0	1.67	6.04	9.48
36	Jessieville-----	2.30	0	1.65	2.10	6.05
37	Lock and dam No. 12-----	1.45	0	2.35	4.72	8.52
38	Lock and dam No. 13-----	1.47	0	2.47	5.94	9.88

Table 1.—Precipitation, in inches, at National Weather Service stations in western Arkansas, December 1-10, 1971--Continued

Map no.	Precipitation station	December 1971				
		1-7	8	9	10	1-10
39	Long Pool-----	1.95	0	1.56	5.22	8.73
40	Lurton 2NE-----	2.09	0	2.39	6.20	10.68
41	Malvern-----	2.51	0	3.18	.40	6.09
42	Marshall-----	1.70	0	.90	4.00	6.60
43	Mena-----	2.39	1.45	7.10	.75	11.69
44	Midland-----	1.47	0	2.49	6.35	10.31
45	Millwood Dam-----	3.36	.25	0	1.30	4.91
46	Mount Ida-----	2.7	.5	5.7	.5	9.4
47	Mulberry 6NNE-----	1.22	0	2.32	5.45	8.99
48	Nashville Experiment Station---	3.43	0	1.63	1.17	6.23
49	Nimrod Dam-----	1.99	.50	6.33	.27	9.09
50	Oden 2W-----	2.71	0	2.33	7.20	12.24
51	Okay-----	3.41	T	1.44	0	4.85
52	Ozark-----	1.45	0	2.32	4.99	8.76
53	Ozone-----	1.98	0	2.07	6.18	10.23
54	Paris-----	1.88	0	2.94	3.28	8.10
55	Parks-----	2.00	1.98	2.88	3.30	10.16
56	Parthenon-----	1.54	1.48	2.65	3.90	9.57
57	Perry-----	1.70	0	1.70	3.91	7.31
58	Pine Ridge-----	2.85	0	2.28	8.15	13.28
59	Ratcliff-----	2.19	T	.97	3.53	6.69
60	Remmel Dam-----	2.05	0	3.36	.73	6.14
61	Subiaco-----	2.06	0	1.84	4.60	8.50
62	Vandervoort-----	3.57	0	2.80	10.22	16.59
63	Vegetable substation, Van Buren	1.32	.17	3.04	4.94	9.47
64	Waldron-----	2.15	1.32	4.05	1.11	8.63
65	Washita-----	2.30	0	2.00	5.70	10.00
66	Wing-----	1.86	.53	7.67	.39	10.45

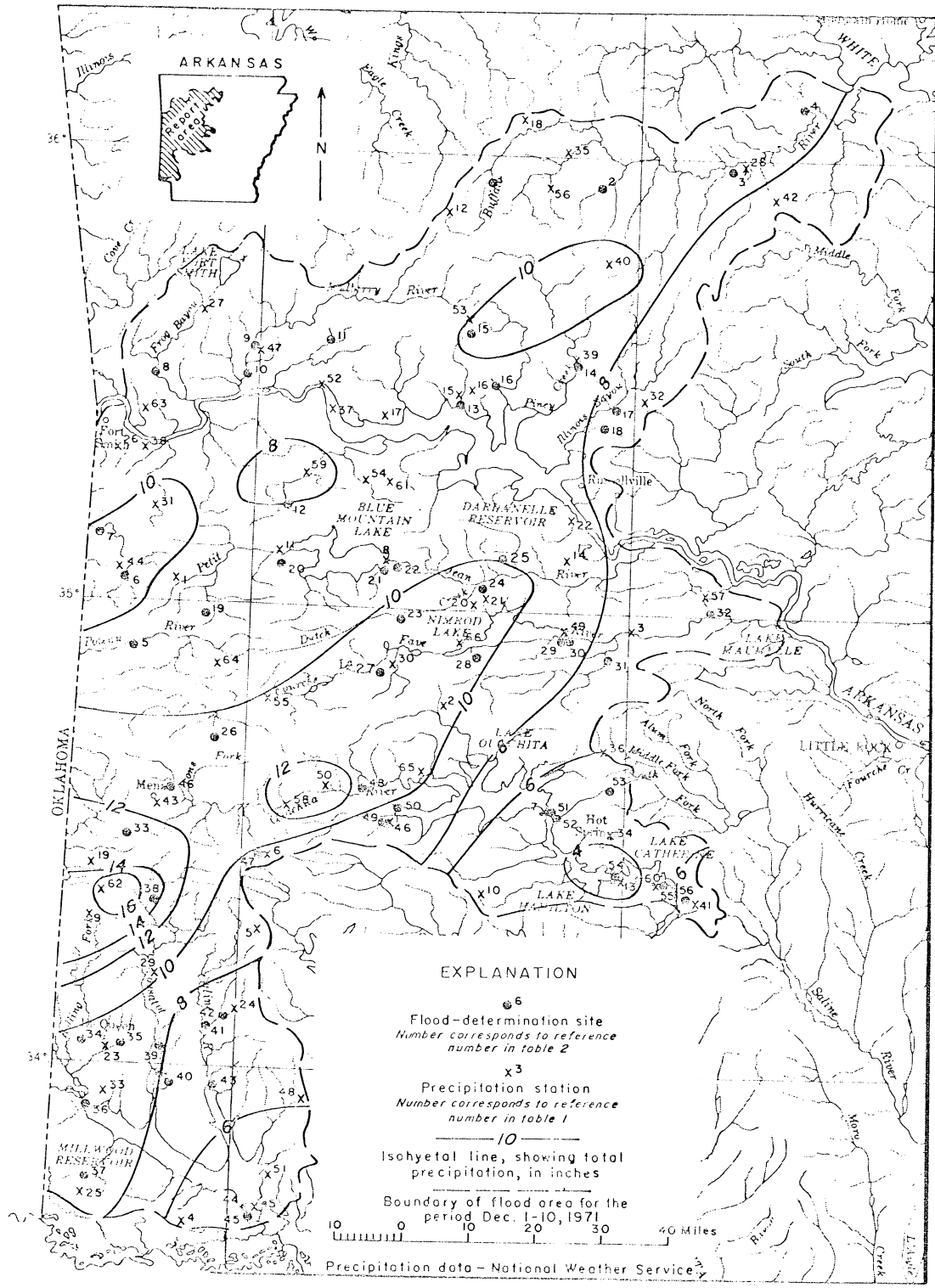


Figure 1.—Locations of flood-determination sites and precipitation stations.

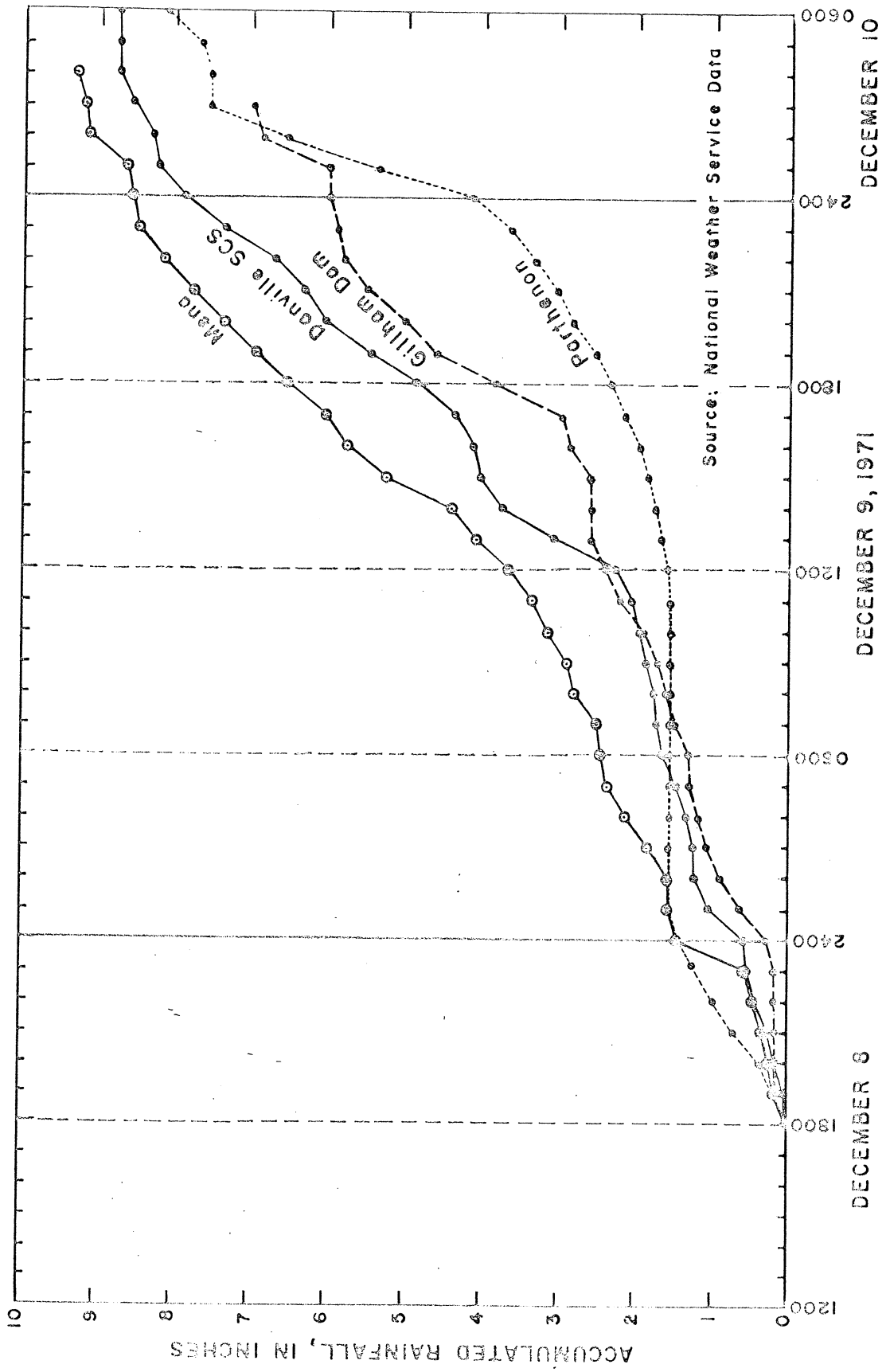


Figure 2. Cumulative precipitation in western Arkansas.

10.22 inches for a 24-hour period was reported at Vandervoort, and more than 5.00 inches of rain for 24 hours was reported at 28 of the 66 precipitation stations. The amounts of rain were greater in the upper reaches than in the lower reaches of the larger streams. Rainfall was relatively light along the Ouachita River downstream from Mount Ida and along the Little River downstream from Horatio.

### FLOOD FREQUENCY

This report discusses a flood in terms of its recurrence interval, which is defined as the average interval of time in which the peak discharge can be expected to be exceeded. A peak discharge that has a recurrence interval of 50 years may be expected to be exceeded as an annual maximum on the average of once in 50 years. The probability of exceedence is the reciprocal of the recurrence interval; thus, a flood having a recurrence interval of 50 years has a 2-percent chance of being exceeded during any year ( $1/50 = 0.02$ , or 2 percent).

Recurrence intervals shown in this report are based on a report by Patterson (1971). Flood-frequency relations are defined only to a recurrence interval of 50 years. Where the peak discharge exceeds that of the 50-year flood, its ratio to the 50-year flood is shown.

## FLOODS

Details of floods in the various river basins are discussed in the following sections. A summary of peak discharge data at flood-determination sites is given in table 2.

### White River Basin

Severe flooding in the White River basin was confined to the Buffalo River and its tributaries. Rainfall in the basin for the 40-hour period December 8-10 ranged from 4.90 inches, at Marshall, to 8.59 inches, at Lurton. Rainfall at the seven precipitation stations in the basin averaged 6.16 inches. The peak discharge of 105,000 cfs (cubic feet per second), which had a recurrence interval of 47 years at the gaging station Buffalo River near St. Joe, is the maximum discharge for the periods 1927 and 1936-71 and is the greatest known flood since 1915. Figure 3 is a discharge, rainfall, and runoff hydrograph for the station near St. Joe. Daily mean discharges at the station were used in developing the discharge hydrograph. The rainfall upstream from this station was determined by averaging the rainfall at five precipitation stations in the basin, two of which are recording precipitation stations. Runoff, in inches, was computed for December 1971 from daily mean discharge records at the station.

Table 2.—Summary of flood stages and discharges

Map no.	Station no.	Stream and place of determination	Drainage area (sq mi)	Maximum previously known			Maximum in December 1971			Recurrence interval (yr)			
				Period of record	Year	Gage height (ft)	Discharge (cfs)	Day	Gage height (ft)		Discharge (cfs)		
White River basin													
1	07055550	Smith Creek near Boxley	8.35	1963-71	1969	11.06	3,510	10	21.82	22,300	110	523	20
2	07055900	Dry Branch near Vendor	5.30	1962-71	1969	13.10	2,900	10	13.68	3,500	556	556	19
3	07056000	Buffalo River near St. Joe	825	1915-1936-1915	1945	50.5	100,000	10	43.40	105,000	127	127	47
4	07057000	Buffalo River near Rush	1,091	1915-1915	1915	45.5	164,000	10	37.44	113,000	104	104	30
Arkansas River basin													
5	07247000	Poteau River at Cauthron	203	1935-1939-71	1935	27.4	32,200	10	21.82	22,300	110	110	7
6	07245300	James Fork near Midland	44.0	1963-71	1968	13.49	25,400	9	12.15	18,000	427	427	25
7	07249400	James Fork near Hackett	147	1958-1945-71	1945	23.00	30,000	10	22.24	17,500	119	119	10
8	07251500	Frog Bayou at Rudy	216	1945-71	1945	18.5	39,500	10	16.40	23,000	106	106	10
9	07252000	Mulberry River near Mulberry	373	1927-1961-	1927	22.0	59,000	10	20.51	52,200	141	141	50
10	07252000	Mulberry River at I-40, near Mulberry	398	1961-	1964	10.66	729	10	7.57	56,100	141	141	50
11	07252200	North Fork White Oak Creek tributary near Matulula	.27	1964-	1964	10.66	729	10	7.57	56,100	141	141	50
12	07254000	Sixmile Creek subwatershed No. 5 near Chismville	2.76	1954-	1958	27.07	2679	10	23.17	2,500	---	---	25
13	07256500	Spadra Creek at Clarksville	61.1	1927-	1957	16.1	15,300	10	16.54	18,000	295	295	42
14	07257000	Big Piney Creek near Dover	274	1949-	1949	25.6	53,800	10	28.70	74,600	274	274	50
15	07257060	Mikes Creek tributary near Ozone	.19	1964-	1966	5.23	77	10	7.80	122	642	642	4
16	07257100	Minnow Creek tributary near Hagarville	.20	1962-	1970	6.62	176	10	5.53	102	510	510	3
17	07257500	Illinois Bayou near Scottsville	241	1943-	1943	24.60	77,000	10	20.45	35,000	145	145	10
18	07257700	McCoy Creek near Dover	7.05	1961-	1968	11.79	4,750	10	7.27	1,240	176	176	2
19	07258200	Pack Saddle Creek tributary near Waldron	.92	1961-	1968	9.42	689	10	5.58	228	248	248	2
20	07258300	Petit Jean River near Booneville	241	1938-	1939	23.42	43,200	10	22.48	30,000	129	129	17
21	07259000	Blue Mountain Lake near Waveland	488	1947-	1957	1422.57	2,298,560	16	1406.28	1,379,970	66	66	---
22	07259500	Petit Jean River near Waveland	516	1939-	1939	29.95	62,600	10	24.62	6,320	---	---	---
23	07260000	Dutch Creek at Waitbreak	61.4	1927-	1969	22.38	24,500	10	19.16	13,700	168	168	14
24	07260500	Petit Jean River at Danville	764	1916-	1939	31.82	70,800	10	26.37	27,500	---	---	---
25	07260630	Jake Creek near Chickasha	1.85	1961-	1969	8.78	815	9	8.60	765	478	478	5
26	07261300	Tan-a-hill Creek near Boles	2.33	1960-	1960	12.3	1,660	10	12.58	1,960	841	841	38
27	07261500	Fourche La Fave River near Gravelly	410	1939-	1960	30.30	69,400	10	30.10	67,200	164	164	40
28	07261800	Progan Creek near Rover	1.04	1963-	1966	9.59	1,010	10	9.03	890	856	856	20
29	07262000	Nimrod Lake near Nimrod	680	1942-	1945	1374.80	2,369,700	17	1370.11	2,285,670	118	118	---
30	07262500	Fourche La Fave River near Nimrod	684	1935-	1935	28.8	39,000	11	5.06	1,390	---	---	---
31	07263000	South Fourche La Fave River near Hollis	210	1941-	1945	19.47	54,400	10	16.74	35,000	167	167	7
32	07263100	Fourche La Fave River tributary near Perryville	1.47	1962-	1966	9.51	662	9	8.48	306	306	306	4

See footnotes at end of table.

Table 2.—Summary of flood stages and discharges--Continued

Map no.	Station no.	Stream and place of determination	Drainage area (sq mi)	Maximum previously known			Maximum in December 1971			Recurrence interval (yr)		
				Period of record	Year	Gage height (ft)	Discharge (cfs)	Day	Gage height (ft)		Discharge (cfs)	Cfsm
Red River basin												
33	07338700	Twomile Creek near Hatfield	.61	1963-	1966	11.89	6,260	10	12.44	6,110	360	11
34	07339500	Rolling Fork near DeQueen	.81	1947-	1947	25.6	110,000	10	24.23	70,000	387	41.6
35	07339800	Pepper Creek near DeQueen	6.43	1961-	1968	9.39	6,240	10	6.77	1,700	264	3
36	07340000	Little River near Horatio	2.674	1915-	1915	38.0	124,000	10	32.84	65,100	24	4
37	07340200	West Flat Creek near Foreman	10.6	1962-	1969	12.40	3,400	10	12.07	2,800	264	13
38	07340300	Cossatot River near Vandervoort	89.4	1961-	1961	23.0	48,000	10	19.35	31,500	352	25
39	07340500	Cossatot River near DeQueen	361	1933-	1968	22.60	122,000	10	21.88	103,000	285	41.2
40	07340530	Mill Slough tributary near Lockesburg	.64	1964-	1968	8.44	552	10	6.54	304	475	4
41	07341000	Saline River near Dierks	124	1920-	1968	22.95	59,200	10	20.24	24,400	197	10
42	07341100	Rock Creek near Dierks	9.48	1961-	1961	12.6	9,390	10	9.15	3,500	368	8
43	07341200	Saline River near Lockesburg	260	1961-	1961	25.7	64,700	10	18.88	36,400	140	18
44	07341300	Millwop Lake near Ashdown	4,144	1966-	1968	1282.59	21,457,000	17	1276.95	21,047,310	3120,000	29
45	07341301	Little River at Millwood Dam, near Ashdown	4,144	1966-	1968	1282.59	21,457,000	12	1276.95	21,047,310	3120,000	29
46	07355800	Lewis Creek tributary near Mena	.64	1961-	1968	3.94	235	9	4.05	248	368	3
47	07355900	Big Fork tributary at Big Fork	.16	1964-	1968	8.21	66	9	9.05	92	575	3
48	07356000	Ouachita River near Mount Ida	410	1941-	1960	32.18	57,300	10	38.62	95,500	233	41.4
49	07356500	South Fork Ouachita River at Mount Ida	64	1949-	1968	15.00	20,000	10	14.70	19,000	297	28
50	07356700	Barnes Branch near Mount Ida	1.85	1961-	1969	13.76	1,000	10	14.50	1,140	616	13
51	07357500	Lake Ouachita near Hot Springs	1,105	1952-	1968	1588.63	22,609,300	16	1580.36	22,247,200	145	13
52	07357501	Ouachita River at Blakely Mountain Dam, near Hot Springs	1,105	1965-	1968	1588.63	22,609,300	16	1580.36	22,247,200	145	13
53	07357700	Glazypeau Creek at Mountain Valley	3.82	1961-	1969	12.25	2,120	10	8.20	47	11	2
54	07358500	Lake Hamilton near Hot Springs	1,441	1930-	1945	1402.28	2208,100	12	1396.15	2164,805	11	2
55	07359000	Lake Catherine at Jones Mill	1,516	1924-	1927	1315.75	259,160	13	1303.80	232,975	11	2
56	07359500	Ouachita River near Maiverm	1,562	1903-5, 1922-	1923	30.3	140,000	9	10.48	13,200	11	2

1 Elevation, in feet.

2 Contents, in acre-feet.

3 Computed ratio of peak inflow.

4 Ratio of peak discharge to 50-year flood.



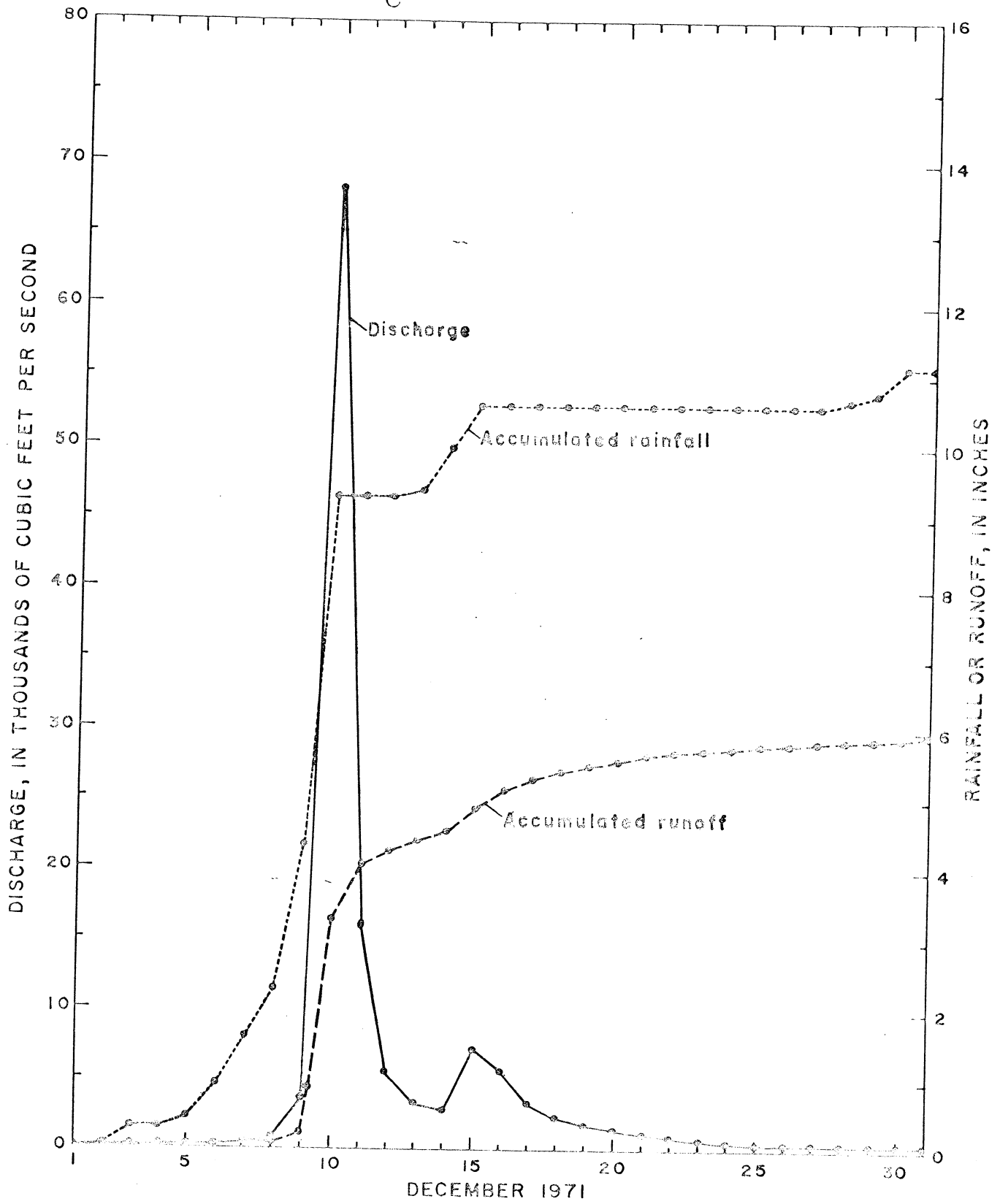


Figure 3. Daily discharges and accumulated rainfall and runoff for Buffalo River near St. Joe.

New maximum discharges and stages for the periods of record occurred at both crest-stage gaging stations Smith Creek near Boxley and Dry Branch near Vendor; however, from information by local residents higher peak stages had occurred at both stations before the gages were installed in 1963 and 1962, respectively.

#### Arkansas River Basin

Floods on the Arkansas River tributaries in the report area were the highest, or among the highest, known. The principal tributaries to the Arkansas River in the report area are Poteau River, Frog Bayou, Mulberry River, Spadra Creek, Big Piney Creek, Illinois Bayou, Petit Jean River, and Fourche La Pave River. The drainage basins of these streams vary from rolling hills to rugged, mountainous terrain. Rainfall totals, which were fairly uniform throughout the report area in the Arkansas River basin for the 40-hour storm period, ranged from 4.50 to 9.75 inches. Rainfall at the 34 precipitation stations in the basin averaged 7.27 inches.

The peak stage of 21.82 feet (discharge, 22,300 cfs) at the gaging station Poteau River at Cauthron was 1.94 feet lower than the 1960 maximum, which is the highest for the period 1939-72. Since September 1971, flow from 70.4 (revised) square miles of the 203-square-mile drainage basin upstream from this

station is partly controlled by 12 flood-detention reservoirs that have a total capacity of 32,660 acre-feet below the flood spillway crests. The U.S. Soil Conservation Service estimated that peak discharge was reduced 22 percent at the Cauthron station. Had the 12 flood-detention reservoirs not been in operation, the peak stage at Cauthron would have been 23.1 feet, the peak discharge, 28,700 cfs; and the recurrence interval, 22 years.

Both gaging stations on James Fork had the second highest peak stages and discharges for the periods of record (10 and 14 years).

Frog Bayou at Rudy experienced the third highest known peak stage for the period beginning in 1945. The peak stage was 1.64 feet lower than the 1957 flood and 2.1 feet lower than the 1945 flood. The two lakes on Frog Bayou had some effect on the peak discharge. Since January 1, 1956, flow from 74.2 square miles of the 216-square-mile drainage basin upstream from the station has been partly controlled by Lake Fort Smith and Lake Shepherd Springs, which have a total capacity of 29,000 acre-feet below the spillway crests.

Mulberry River near Mulberry experienced the second highest known peak stage, which was 1.49 feet lower than that of the 1927 flood. An indirect measurement of peak discharge was made at the miscellaneous site Mulberry River at Interstate Highway 40

near Mulberry. Considerable scour and fill had occurred through the bridge and along the channel. Also, the upstream end of the right-bank spur dike was scoured out.

The maximum observed rate of runoff was 1,185 cfs per square mile from a drainage area of 0.27 square mile at the crest-stage gaging station North Fork White Oak Creek tributary near Watalula; however, the peak discharge of 320 cfs was the fourth largest at this station.

A new maximum stage and discharge for the period beginning in 1927 occurred at the gaging station Spadra Creek at Clarksville. A levee along the right bank confined the flow through Clarksville and prevented severe flood damage.

A record-breaking flood occurred on Big Piney Creek near Dover. The peak stage was 3.1 feet higher than the 1949 flood, which was the previous maximum. Figure 4 shows the discharge, rainfall, and runoff at this site for December 1971. Daily mean discharges at the station were used in developing the discharge hydrograph. The rainfall upstream from this station was determined by averaging the rainfall at two nearby precipitation stations. Runoff, in inches, was computed for December 1971 from daily mean discharge records at the station.

The peak stage and discharge at the crest-stage gaging station Mikes Creek tributary near Ozone exceeded the record maximum. Water overtopped the gage. The peak stage, which was

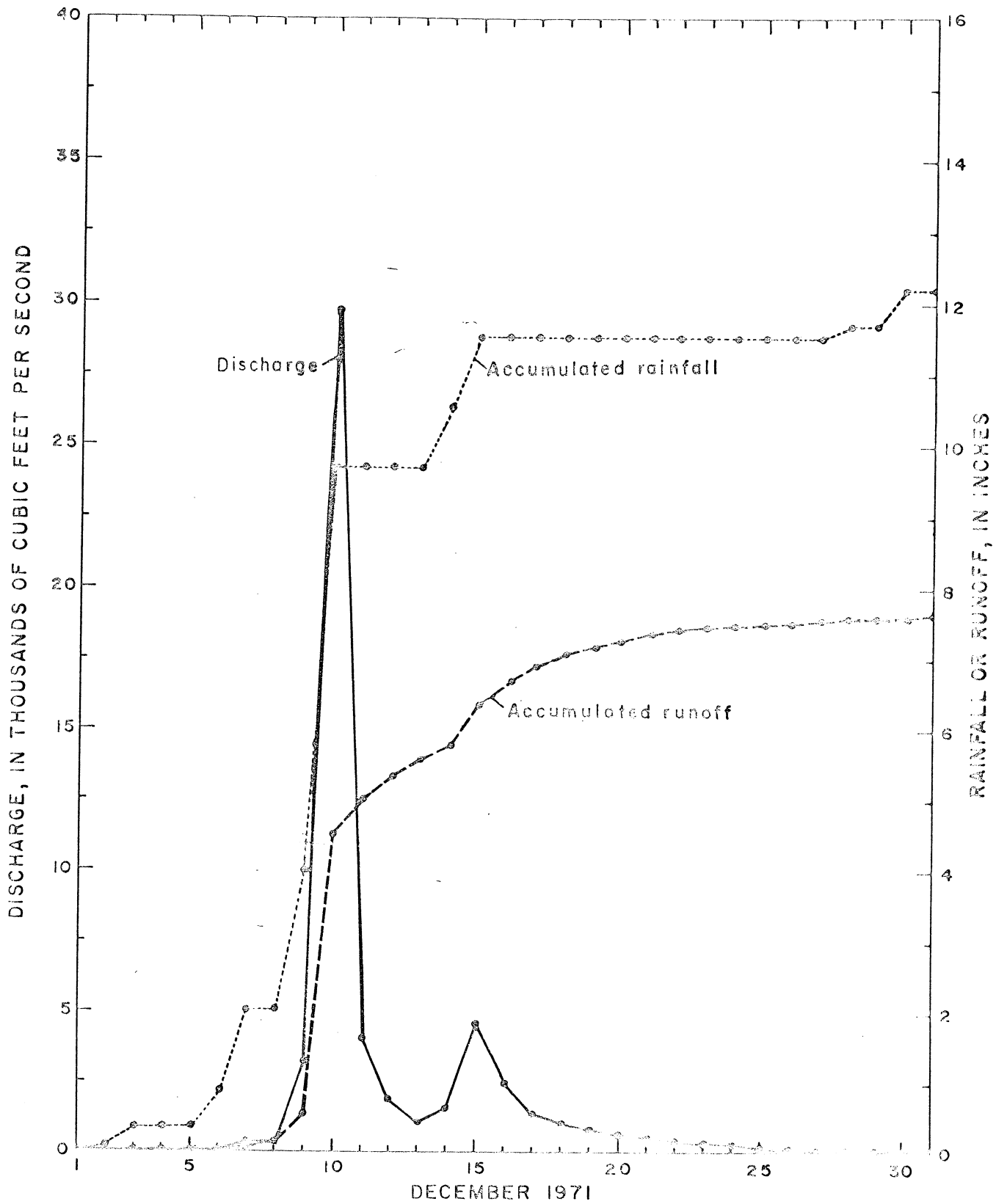


Figure 4. Daily discharges and accumulated rainfall and runoff for Big Piney Creek near Dover.

determined from floodmarks, was 2.57 feet higher than the previous maximum. Illinois Bayou near Scottsville experienced the third highest known peak stage since 1943.

Flooding in the Petit Jean River drainage basin was extensive, but none of the peak stages exceeded the record maximums. Petit Jean River near Booneville experienced the third highest peak for the period of record 1938-72. The peak discharge of 27,500 cfs at the gaging station Petit Jean River at Danville was the maximum since regulation began by Blue Mountain Dam on May 7, 1946; but the peak stage was the second highest because the channel has been dredged. The second highest peak for the 11 years of record was recorded at the crest-stage gaging station Jake Creek near Chickalah.

Floods in the Fourche La Fave River drainage basin were among the highest known, but only at the crest-stage gaging station Tan-a-hill Creek near Boles was the record maximum exceeded. Water overtopped the gage, flowed over U.S. Highway 71, and scoured out the downstream road embankment. The other two crest-stage gaging stations Brogan Creek near Rover and Fourche La Fave River tributary near Perryville experienced the second highest stage for the periods of records beginning in 1963 and 1962, respectively. Fourche La Fave River near Gravelly recorded a peak stage of 30.10 feet, which was 0.20 foot lower than the previous maximums in 1960 and 1969. Water flowed over State Highway 28 and scoured out the downstream road embankment in places.

The peak elevation of 370.11 feet, which is the fourth highest for the period of record beginning in 1942, was recorded at Nimrod Lake near Nimrod. However, the computed peak inflow of 80,000 cfs into Nimrod Lake on December 11 was the maximum for the period of record beginning in May 1942. Previously, the greatest flood since 1935 at the gaging station in operation from 1936 to 1972 near this location was 39,000 cfs in June 1935. The records, however, are not entirely comparable because the peak discharge at the gaging-station site in 1935 represented the peak of a flood wave moving down a natural stream channel; whereas, the rate of peak flow into the lake represents inflow to the lake throughout its length. Normally, the peak inflow to the lake would be greater than the natural peak streamflow.

#### Red River Basin

Floods in the Red River basin occurred on the Little River and its tributaries and the Ouachita River and its tributaries.

#### Little River Basin

The part of the Little River drainage basin in Arkansas along the main stem varies from rolling hills to relatively flat terrain; however, the drainage basins of the larger tributaries to the Little River, especially in the upper reaches,

are very rugged and mountainous. Rolling Fork, Cossatot River, and Saline River are the principal tributaries to the Little River in Arkansas. Reports of the National Weather Service show that for the period December 8-9 from 7.00 to 13.02 inches of rain fell in the upper reaches of the Rolling Fork and the Cossatot River drainage basins. In the Saline River drainage basin, rainfall ranged from 3.92 to 7.00 inches. In the lower part of the drainage basins, which is along the main stem of the Little River in Arkansas, rainfall ranged from 1.44 to 5.18 inches.

At the crest-stage gaging station Twomile Creek near Hatfield, the peak stage of 12.44 feet was 0.55 foot higher than the record maximum but the discharge of 6,110 cfs was 2 percent less.

Rolling Fork near DeQueen experienced the second highest peak stage and discharge for the period beginning in 1947.

The second highest peaks for the periods of known floods were recorded at the gaging stations on the Cossatot River near Vandervoort and near DeQueen. The stage was 1.22 feet higher near Vandervoort and 0.72 foot lower near DeQueen than the stages in 1968. Gillham Dam, which was under construction in 1971 in the reach between the two Cossatot River stations, had little or no effect on the peak flow.



At Millwood Lake near Ashdown, the second highest peak stage since 1966 was recorded and the computed peak inflow of 120,000 cfs equaled the previous record maximum that occurred in 1968.

The peak discharge of 2,800 cfs at the crest-stage gaging station West Flat Creek near Foreman was the second highest for the period of record beginning in 1962. Floods at the crest-stage gages on Mill Slough tributary near Lockesburg, Pepper Creek near DeQueen, and Rock Creek near Dierks were the third highest for the periods of record (8-11 years).

#### Ouachita River Basin

The Ouachita River drainage basin is rugged and mountainous from its source to Malvern. Records of the National Weather Service for the 40-hour storm show that from 6.7 to 10.43 inches of rain fell on the drainage basin upstream from Blakely Mountain Dam, and from 2.05 to 4.09 inches, from Blakely Mountain Dam to Malvern.

Record-breaking floods occurred in the Ouachita River basin upstream from Blakely Mountain Dam. The peak discharges at the three crest-stage gaging stations Lewis Creek tributary near Mena, Big Fork tributary at Big Fork, and Barnes Branch near Mount Ida were the maximums for the periods of record (8-11 years).

South Fork Ouachita River at Mount Ida experienced the second highest peak stage, which was 0.30 foot lower than the maximum in 1968, for the period of record beginning in 1949.

Most notable of the December 1971 floods occurred on the Ouachita River near Mount Ida. The peak stage of 38.62 feet, determined from floodmarks, was 6.44 feet higher than the previous maximum in 1960. Water submerged the gage shelter and was 6 feet deep over U.S. Highway 270, which is 350 feet downstream from the gage. The peak discharge of 95,500 cfs was 67 percent greater than the previous maximum of 57,300 cfs in 1960 and was 1.4 times that of the 50-year flood. Figure 5 shows the discharge, rainfall, and runoff on the Ouachita River near Mount Ida for December 1971. Daily mean discharges at the station were used in developing the discharge hydrograph.

The rainfall upstream from Ouachita River near Mount Ida was determined by averaging the rainfall at four precipitation stations in the basin, one of which is a recording precipitation station. Runoff, in inches, was computed for December 1971 from the records of the daily mean discharge at the gaging station.

The computed maximum inflow of 160,000 cfs into Lake Ouachita near Hot Springs was 18 percent greater than the previous maximum inflow in 1968, but the peak stage was 8.27

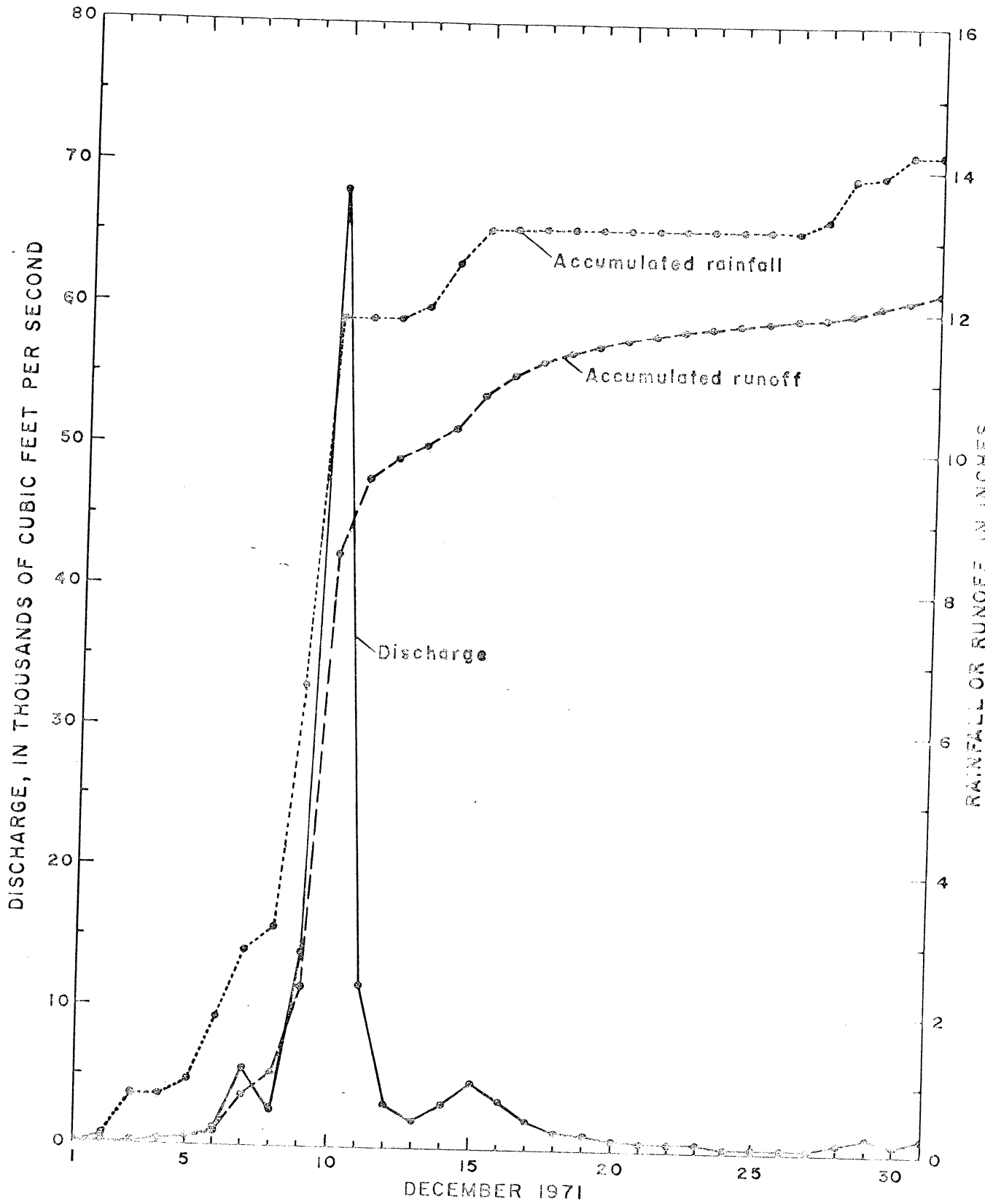


Figure 5. Daily discharges and accumulated rainfall and runoff for Ouachita River near Mount Ida.

feet lower. Prior to 1968, the greatest flood since 1923 at the gaging station in operation near this location from 1937 to 1950 was 123,000 cfs on March 30, 1945. However, the records are not entirely comparable, because the peak discharge recorded in 1945 represents the peak of a flood wave moving down a natural stream channel; whereas, peak inflow to the lake represents inflow to the lake throughout its length. Normally, the peak inflow to the lake would be greater than the natural peak streamflow.

Flow in the Ouachita River is controlled by three reservoirs: Lake Ouachita, formed by Blakely Mountain Dam; Lake Hamilton, formed by Carpenter Dam; and Lake Catherine, formed by Rempel Dam. Runoff upstream from Blakely Mountain Dam was stored in Lake Ouachita. The daily mean discharge from the lake on December 8, 9, and 10 was 38, 20, and 613 cfs, respectively.

The 457-square-mile drainage area between Blakely Mountain Dam and Ouachita River near Malvern is fan-shaped, rugged, hilly terrain. Because of the relatively small amount of rain (2.05-4.09 inches) that fell on this area, the floods were not outstanding. Ouachita River near Malvern had only a moderate peak discharge of 13,200 cfs. The Corps of Engineers estimated that without storage in Lake Ouachita the peak stage at Malvern would have been about 27 feet instead of the recorded 10.48 feet.

## FLOOD DAMAGE

Flood damages along Petit Jean River downstream from Blue Mountain Dam and along Fourche La Fave River downstream from Nimrod Dam, estimated by the Corps of Engineers, are shown in table 3. The Corps estimated that flood damages prevented by the operations of Blue Mountain Dam and Nimrod Dam were \$5,000 and \$8,000, respectively.

Flood damages, estimated at \$2,750,000 by the Corps of Engineers, along Rolling Fork, Cossatot River, Saline River, and Little River in Arkansas are shown in table 3.

Fortunately, no lives were lost during the December 1971 floods.

Flood damages estimated at \$203,260 by the Farmers Home Administration were: \$29,500 in the upper part of the Buffalo River drainage basin; \$42,760, a small part of which may be included in the Corps of Engineers estimate, in the part of the Arkansas River basin in the report area; and \$131,000, a part or all of which may be included in the Corps of Engineers estimate, in that part of the Red River basin in the report area.

Table 3.—*Estimated flood damage in report area*

[Furnished by the U.S. Army Corps of Engineers]

River basin	Acres flooded	Flood damage, in dollars
Arkansas River basin:		
Petit Jean River, downstream from Blue Mountain Dam-----	-----	14,000
Fourche La Fave River, down- stream from Nimrod Dam-----	-----	<u>13,000</u>
Total-----	-----	<u>27,000</u>
Red River basin:		
Rolling Fork-----	11,700	1,120,000
Cossatot River-----	18,400	1,000,000
Saline River-----	15,400	420,000
Little River in Arkansas-----	<u>15,300</u>	<u>210,000</u>
Total-----	<u>60,800</u>	<u>2,750,000</u>
Grand total-----	-----	<u>2,777,000</u>

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