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Floods of September 1952 in the Colorado and Guadalupe River Basins, Central Texas

GEOLOGICAL SURVEY WATER-SUPPLY PAPER 1260-A

*Prepared in cooperation with the
Texas State Board of Water Engineers
and other agencies within the State*



Errata slip for Water-Supply Paper 1260-A

The name Guadalupe is erroneously spelled
Guadelupe on the cover and title page and
at the top of page 1.

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By S. D. BREEDING and J. H. MONTGOMERY

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UNITED STATES DEPARTMENT OF THE INTERIOR

Douglas McKay, *Secretary*

GEOLOGICAL SURVEY

W. E. Wrather, *Director*

PREFACE

This report on the floods of September 1952 in the Colorado and Guadalupe River basins of central Texas was prepared in the Water Resources Division, C. G. Paulsen, chief, under the general direction of J. V. B. Wells, chief, Surface Water Branch, and C. E. Ellsworth, district engineer, Austin, Tex.

Records of discharge were collected and compiled in cooperation with the Texas State Board of Water Engineers, H. A. Beckwith, chairman, and with other agencies within the State.

The isohyetal map of the storm of September 9-11 is based upon rainfall records of the U. S. Weather Bureau, including supplemental data obtained through field "bucket surveys", rainfall records of the Lower Colorado River Authority, and from field information collected by personnel of the Austin district, Surface Water Branch.

The report was prepared by S. D. Breeding, assistant district engineer, and J. H. Montgomery, hydraulic engineer. Personnel of the Austin district, and E. G. Barron and J. L. Patterson, hydraulic engineers detailed from the Louisville, Ky., and Fort Smith, Ark., districts respectively, assisted in the collection and compilation of data presented in this report, under the general supervision of the senior author.

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FLOODS OF 1952

FLOODS OF SEPTEMBER 1952 IN THE COLORADO AND GUADALUPE RIVER BASINS, CENTRAL TEXAS

By S. D. BREEDING and J. H. MONTGOMERY

ABSTRACT

Following a severe drought floods of exceptional size occurred in the central Texas "hill country" as a result of heavy rains during the period September 9-11, 1952. As much as 26 inches of rain fell in the Guadalupe River basin and in the central and lower Colorado River basin and broke the extended drought. The belt of the heavy rainfall was about 60 miles wide and extended northwest from New Braunfels for a distance of about 200 miles. The greatest concentration occurred along the divide between the Colorado and Guadalupe River basins.

Record floods occurred on many large and small streams. Inflow into Lake Travis on the Colorado River reached 803,000 cfs from a 6,650 square mile contributing area.

Five persons were killed and 454 homes damaged. The total flood damage in the Colorado and Guadalupe River basins was nearly 12 million dollars.

INTRODUCTION

The central Texas "hill country" floods of September 1952 exceeded all known previous floods at many points on streams in the upper Guadalupe and central Colorado River basins. Exceptionally large discharges occurred in the basins of the San Saba, lower Llano, and Pedernales Rivers, and Sandy Creek--all tributary basins of the Colorado River. Record floods occurred also on tributaries of the Guadalupe River in Blanco, Comal, and Kendall Counties.

The great size of the floods made the collection and preservation of data very desirable for future purposes of study and design. Current-meter measurements could not be obtained at all the gaging stations; furthermore, measurements at gaging stations, only, would have been insufficient to evaluate the discharge. Therefore, immediately after the floods receded, and before floodmarks

became obliterated, three survey parties were in the field collecting data to make indirect determinations of discharge. Measurements of discharge were made at 42 points other than gaging stations--3 by current-meter and 39 by indirect methods.

This report presents records of stage and discharge for the flood period at 22 gaging stations and records of contents at 3 major reservoirs, and a summary of peak discharges at 64 points in the flood area. An inset map on plate 1 shows the area covered by this report.

GENERAL FEATURES OF THE STORM AND FLOODS

Antecedent Conditions

Before the flood, central Texas was suffering from one of the most severe and prolonged droughts it had ever known. The overall runoff for the whole flood area before the flood was the lowest of record. The topsoil was exceedingly dry, stock tanks were empty or nearly so, and storage in reservoirs was at a very low point. Lake Travis, on the Colorado River, held 374,000 acre-feet of usable water, or only 30 percent of conservation capacity and 18 percent of flood capacity. The upper reaches of major streams across Texas from the Sabine to the Pecos Rivers and their tributary streams throughout central and west Texas were dry or nearly so. During August 1952 the spring-fed Comal River at New Braunfels had its smallest known discharge--135 cubic feet per second.

Precipitation

In the 60 days preceding the floods the weather stations at Blanco and Boerne reported total rainfall of only 1.55 and 0.62 inches respectively. During the period September 9-11, 1952, from 2 to 26 inches of rain fell on an area of 25,000 square miles, over a belt 100 miles wide extending from Corpus Christi, on the Gulf of Mexico, northwestward for 250 miles. The rain covered essentially all the basin of the Guadalupe River and the lower part of the basin of the Colorado River as far as Ballinger. The heaviest rainfall was centered in the vicinity of Hye, Bankersmith, and Blanco (pl. 1 and figs. 1, 2, and 3), along the divide between the basins.

Description of the Floods

The heavy rains caused tremendous floods far exceeding any known at many points. The steep slopes, narrow channels, and small flood plains were factors that contributed to the height of the

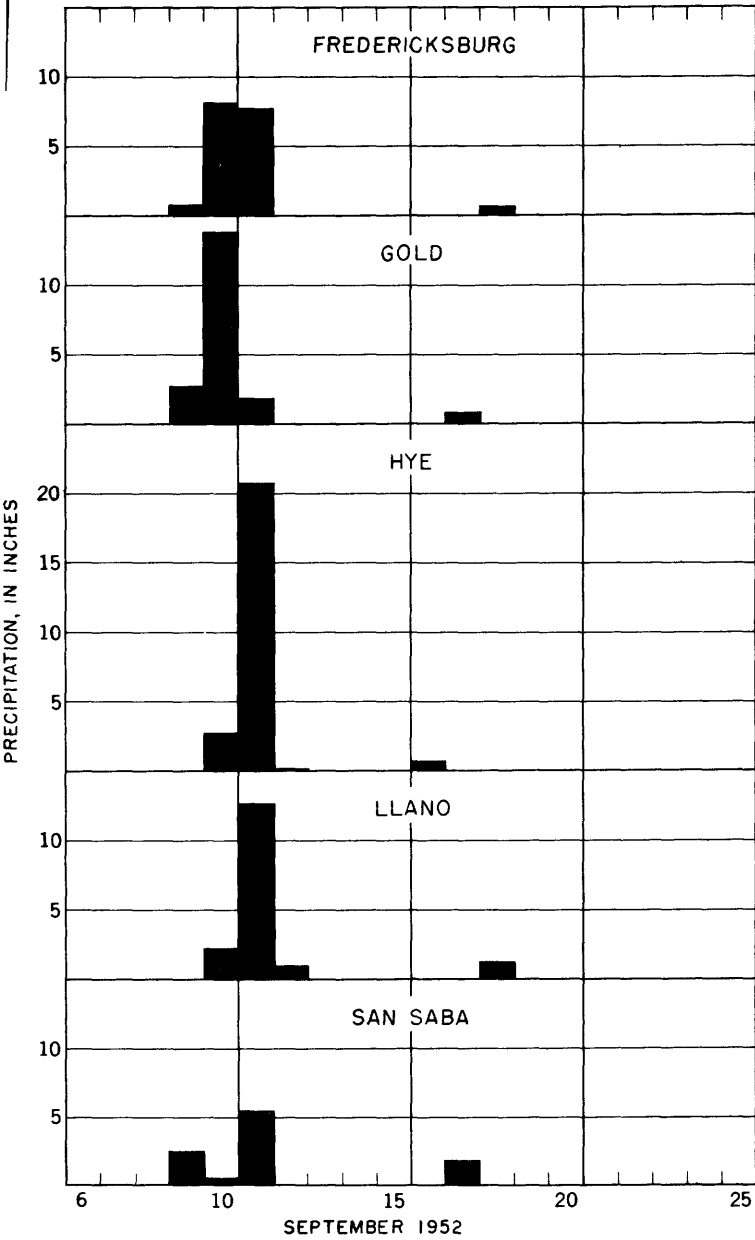


Figure 1. -- Bar graph of precipitation at selected weather stations in Colorado River basin, September 1952.

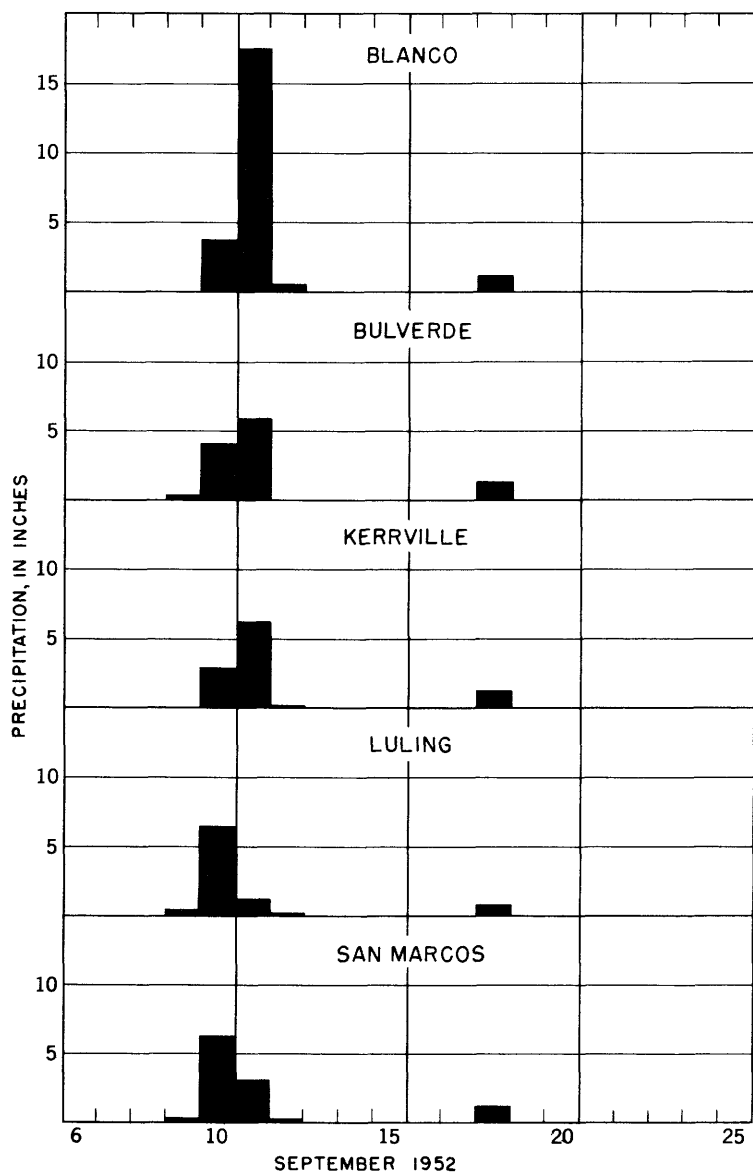


Figure 2. -- Bar graph of precipitation at selected weather stations in Guadalupe River basin, September 1952.

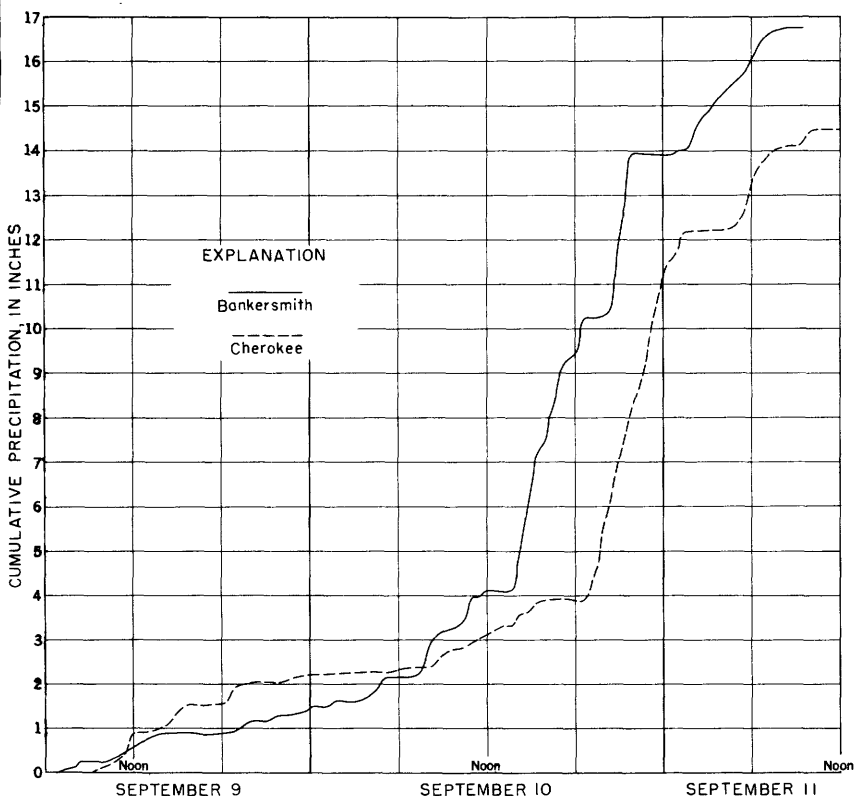


Figure 3. --Graph of accumulated rainfall, in inches, at two weather stations, September 1952.

flood crests. Peak discharges in some of the smaller basins were equivalent in depth to about 3 inches of runoff per hour.

The peak stages in the area of the most intense rainfall occurred during the afternoon and night of September 10. Many highways were submerged in the vicinity of stream crossings, and many major highways were damaged in the flood area. Roads were covered by water estimated to be as much as 60 feet deep (Hamilton Pool road on Pedernales River) having flow velocity as much as 15 and 20 feet per second.

The greatest runoff occurred along the divide between the Colorado and Guadalupe River watersheds in the Johnson City and Blanco regions. Flows were not excessive in the upper Guadalupe and upper Pedernales River basins. Flood peaks on the Guadalupe River below San Marcos River rapidly diminished as they spread out over a wide flood plain on their way to the Gulf of Mexico. On the upper Colorado River above Ballinger and on the Llano River

above Junction, floodwaters were insignificant. Buchanan Reservoir and Lake Travis on the Colorado River stored floodwater originating upstream, and rises downstream from Lake Travis were only moderate.

At Johnson City the Pedernales River swept away the bridge and several piers at the crossing of U. S. Highway 281 (fig. 4). When floodwaters subsided this modern steel structure was left a ruin in place several hundred yards downstream. The peak discharge of 441,000 cfs at this point cannot be fully appreciated unless it is noted that this discharge was more than double that of the flood of 1869--the greatest known before 1952. U. S. Highway 290, the main artery from Austin west through Fredericksburg, was closed to traffic because of washed-out fills and flooded pavement.

The floods stripped the valleys of valuable pecan groves and shade trees. In the Pedernales valley, cypress trees 5 feet in diameter were broken off like match sticks; pecan trees 2 feet in diameter were uprooted and washed away. As an indication of the depth and velocity of the floodwaters in the Pedernales River valley a truck loaded with 19 tons of structural steel was washed from U. S. Highway 290 near Stonewall, east of Fredericksburg (fig. 5).

Spectacular rescue work by helicopters from the San Marcos Air Force Base saved several lives and removed marooned people. A helicopter was used to string emergency power lines across the Pedernales River near Johnson City, thereby restoring electrical power to Blanco and Johnson City.

FLOOD DAMAGE

Five persons lost their lives and three were injured. The U. S. Weather Bureau reported 17 homes as destroyed and 454 homes as damaged.

Table 1, furnished by the Corps of Engineers, Department of the Army, summarizes estimated damages.

Destruction of roads, bridges, and power lines paralyzed business in large parts of Blanco, Gillespie, Kendall, Hays, and Comal Counties for several days after the floods (figs. 4 and 6). People turned from normal activities to aid in rescue and clean-up work, help displaced persons, and salvage what was left of damaged property.



Figure 4. --Pedernales River near Johnson City, Tex., showing destruction of bridge on U. S. Highway 281.
Photo by Neal Douglas, Austin, Tex.



Figure 5. --Truck, loaded with 19 tons of structural steel, washed from U. S. Highway 290 near Stonewall, Tex., by floodwaters of the Pedernales River, Sept. 10, 1952. Photograph by Fredericksburg Publishing Co., Fredericksburg Tex.

FLOOD DAMAGE

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Table 1.--Summary of estimated damages in dollars, from central Texas floods of September 1952

Stream and location	Direct damages					Total damages
	Agricultural property	Rural non-agricultural property	Transportation facilities	Utilities	Urban and suburban property	
Central Colorado River basin						
San Saba River.....	440,000	----	200,000	7,000	25,000	672,000
Brady Creek.....	190,000	----	35,000	1,000	5,000	231,000
Colorado River between mouth of San Saba River and Lake Buchanan.....	40,000	----	----	----	----	40,000
Cherokee Creek.....	165,000	----	55,000	2,000	5,000	227,000
Llano River.....	80,000	----	30,000	----	----	110,000
Pedernales River in Gillespie County.....	574,000	150,000	158,000	4,000	50,000	936,000
Pedernales River in Blanco County.....	431,000	200,000	575,000	5,000	----	1,211,000
Barrons, Palo Alto, and South Grape Creeks.....	85,000	10,000	37,000	3,000	10,000	145,000
Total.....	2,005,000	360,000	1,090,000	22,000	95,000	3,572,000
Guadalupe River and San Antonio River basins						
Guadalupe River above New Braunfels and Big Joshua Creek.....	61,000	16,000	128,000	2,000	----	207,000
Guadalupe River below New Braunfels.....	2,374,000	571,000	251,000	5,000	477,000	3,678,000
Comal River, Dry Comal Creek, and Blidlers Creek.....	126,000	----	75,000	11,000	267,000	479,000
Blanco River and San Marcos River.....	838,000	20,500	54,000	8,500	70,500	991,500
San Antonio River and Cibolo Creek.....	102,000	----	50,000	2,000	100,000	254,000
Total.....	3,501,000	607,500	558,000	28,500	914,500	5,609,500
Grand total.....	5,506,000	967,500	1,648,000	50,500	1,009,500	9,181,500
						2,773,000
						11,954,500



Figure 6. --Floodwaters of the Comal River submerge Landa Street bridge at New Braunfels, Tex., Sept. 11, 1952. Photograph by Seidel Studio, New Braunfels, Tex.

DETERMINATION OF FLOOD DISCHARGES

Indirect determinations of peak discharge were made at 44 sites where current-meter **measurements** could not be obtained. Of the indirect determinations, 40 were made by the slope-area method, 3 by the contracted-opening method, and 1 by measurement of flow

over highway embankment. Several current-meter measurements were made at or near peak stage on the lower reaches of the Guadalupe River.

On September 13 and 14, immediately after the flood had subsided and before highways were opened to traffic, S. D. Breeding and J. H. Montgomery inspected the flood area by chartered plane. By flying along the channels at about 1,000 feet altitude, it was possible to locate the points of greatest flooding, find the straightest possible slope-area reaches, and spot access roads on county maps. About 900 miles of stream channels were inspected from the air. Many crooked and undesirable reaches of channel were thereby eliminated. The most suitable-appearing reaches for slope-area determinations were given further inspection from the ground.

STAGES AND DISCHARGES AT STREAM GAGING STATIONS

Explanation of Data

The data given for each gaging station are as follows: a station description, a tabulation of daily discharge for the month of September, and a tabulation of stage and discharge at selected times of the day for the period of flood runoff.

The station description gives information about the type and location of gage, size of drainage area, length of record, nature of gage-height record obtained during the flood period, definition of the stage-discharge relation, the maximum stage and discharge during the present flood and previous maxima of record, and other pertinent information.

Daily mean discharge is tabulated for the month of September. A summary gives the monthly mean discharge in cubic feet per second, the runoff in acre-feet, and the runoff in inches for gaging stations where the discharge records are not affected by regulation.

The tabulation of stage and discharge at indicated time for the flood period is presented in sufficient detail to permit delineation of the instantaneous stage and discharge for the flood period.

A record of the flood was obtained on a water-stage recorder graph at most gaging stations. As 2 recording gages were destroyed and 1 submerged, these records had to be based on observations by local residents, on floodmarks, or on gage readings made by local gage observers.

The stage-discharge relation at many gaging stations was previously well defined by current-meter measurements to the peak stage of the present flood. At those gaging stations where the peak

stage far exceeded previously measured discharge and an extension could not be reliably made the peak discharge was obtained by indirect methods. These methods, such as contracted-opening or slope-area method, or measurement of flow over highway embankments, were used to determine peak discharges at 38 points other than gaging stations.

Figures 7, 8 and 9 are graphs of discharge at selected gaging stations.

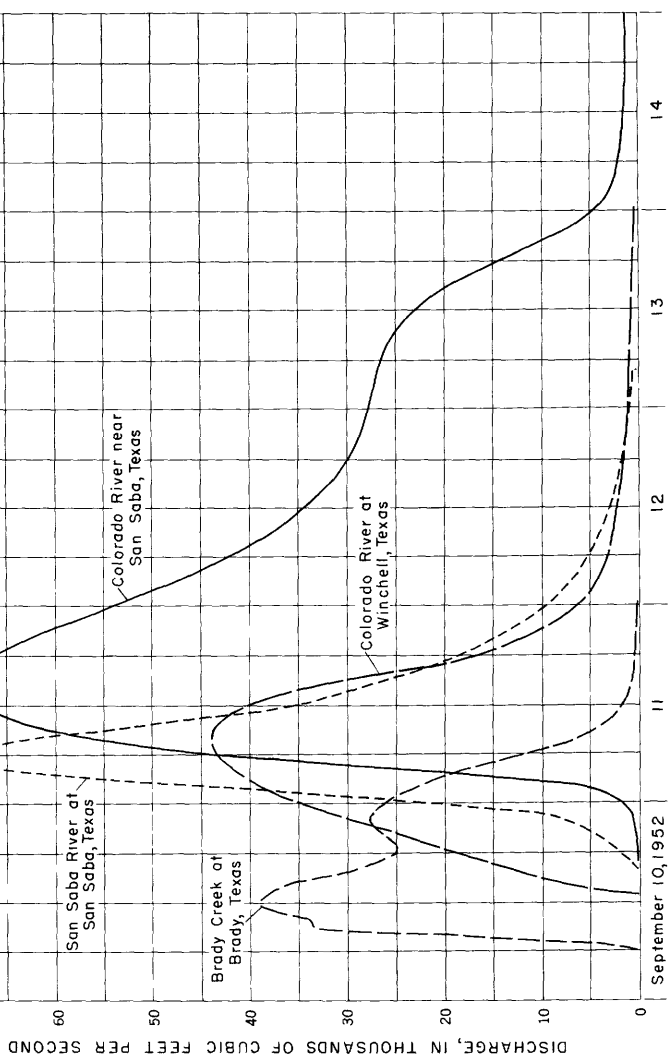


Figure 7. --Graph of discharge at selected gaging stations in Colorado River basin above Buchanan Reservoir.

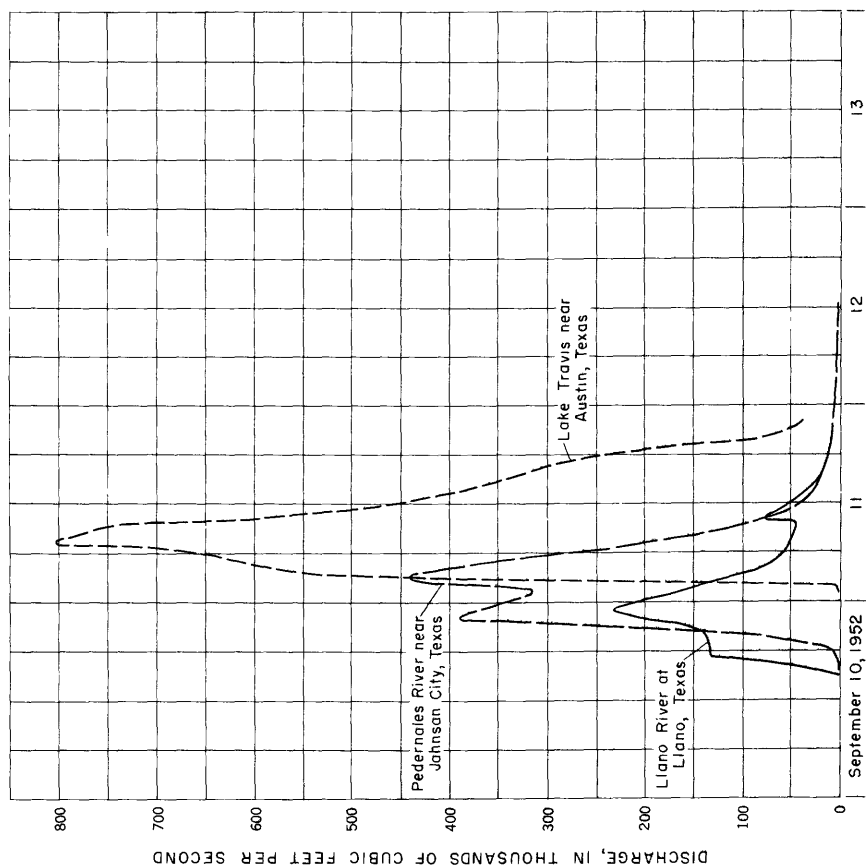


Figure 8. --Graph of discharge for Llano and Pedernales Rivers and of inflow into Lake Travis.

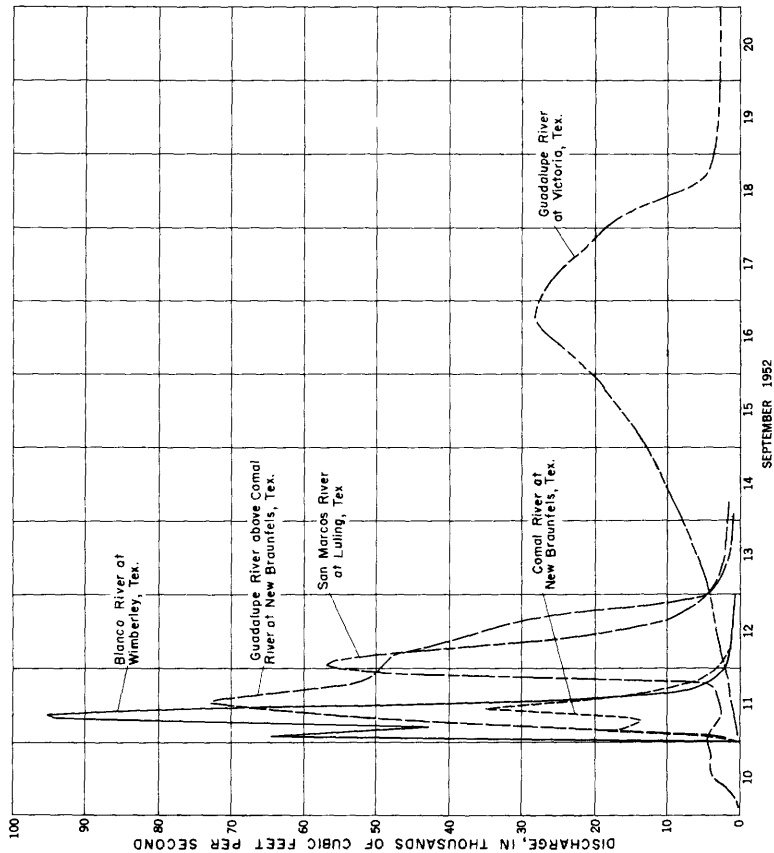


Figure 9. --Graph of discharge at selected gaging stations in Guadalupe River basin.

FLOODS OF 1952 IN CENTRAL TEXAS

Colorado River Basin

Colorado River at Winchell, Tex.

Location.--Lat 31°28'05", long 99°09'45", near left bank on downstream side of pier of bridge on U. S. Highway 377, 0.3 mi south of Winchell, Brown County, 6.2 miles upstream from Home Creek, and at mile 561. Datum of gage is 1,264.86 ft above mean sea level, datum of 1929.

Drainage area.--24,580 sq mi, approximately, of which 11,900 sq mi is probably non-contributing.

Gage-height record.--Water-stage recorder graph.

Discharge record.--Stage-discharge relation defined by current-meter measurements. Shifting-control method used Sept. 20-30.

Maxima.--September 1952: Discharge, 44,000 cfs 8 a.m. Sept. 11 (gage height, 38.92 ft). 1923-34, 1939 to August 1952: Discharge, 76,100 cfs Oct. 15, 1930 (gage height, 51.8 ft, present site and datum). Stage known, 62.2 ft Sept. 19, 1936, present site and datum, from information by Gulf, Colorado & Santa Fe Railway Co.

Remarks.--Flow slightly regulated by Lake Nasworthy (capacity, 10,290 acre-ft), San Angelo Reservoir (capacity, 391,490 acre-ft), Lake Colorado City (capacity, 30,800 acre-ft), and by Lake J. B. Thomas (capacity, 204,000 acre-ft). Practically all the flood runoff occurred below these reservoirs.

Mean discharge, in cubic feet per second, September 1952

Day	Discharge	Day	Discharge	Day	Discharge	Day	Discharge	Day	Discharge	Day	Discharge
1	0	6	0	11	30,900	16	158	21	52	26	20
2	0	7	0	12	2,660	17	112	22	52	27	16
3	0	8	0	13	915	18	299	23	40	28	184
4	0	9	0	14	430	19	143	24	31	29	201
5	0	10	8,810	15	245	20	69	25	25	30	132
Monthly mean discharge, in cubic feet per second.....										1,517	
Runoff, in acre-feet										90,240	

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1952

Hour	Gage height	Discharge	Hour	Gage height	Discharge	Hour	Gage height	Discharge	Hour	Gage height	Discharge
12	September 8	0	1	2.38	6.0	6	38.75	43,600	2	September 12	
	0.97	8	2	11.54	5,590	7	38.88	43,900	2	10.50	4,650
	September 9	3	3	16.08	10,000	8	38.92	44,000	4	9.57	3,820
N	.97	0	4	18.82	12,800	9	38.95	43,800	6	8.98	3,320
12	2.02	0	5	21.35	15,600	10	38.55	43,100	8	8.47	2,910
	September 10	6	6	23.81	18,200	11	38.00	41,800	10	8.02	2,550
1	2.10	0	7	25.90	21,200	N	37.40	40,400	N	7.66	2,280
2	2.16	0	8	27.70	23,700	1	36.35	38,000	6	6.80	1,660
3	2.30	2.2	9	29.30	26,000	2	35.00	35,100	12	6.27	1,320
4	2.42	8.4	10	31.10	28,700	3	32.60	31,100		September 13	
5	2.61	23	11	33.10	31,900	4	30.00	27,000	N	5.53	876
6	2.64	26	12	35.00	35,100	5	25.00	20,000	12	4.98	591
7	2.61	23		September 11		6	22.70	17,200		September 14	
8	2.55	18	1	35.70	36,500	7	20.00	14,000	N	4.56	412
9	2.49	13	2	36.60	38,500	8	18.20	12,100	12	4.22	305
10	2.44	9.8	3	37.25	40,000	9	16.60	10,500		September 15	
11	2.41	7.7	4	37.65	41,400	10	14.90	8,840	N	3.96	243
N	2.39	6.5	5	38.35	42,600	11	13.20	7,150	12	3.73	194
						12	12.20	6,200			

San Saba River at Menard, Tex.

Location.--Lat 30°55', long 99°48', on right bank at bridge on U. S. Highway 83 in Menard, Menard County, 0.7 mile downstream from Las Moras Creek. Datum of gage is 1,863.05 ft above mean sea level, datum of 1929.

Drainage area.--1,151 sq mi.

Gage-height record.--Water-stage recorder graph.

Discharge record.--Stage-discharge relation defined by current-meter measurements. Shifting-control method used Sept. 17-26.

Maxima.--September 1952: Discharge, 535 cfs 10:30 a.m. Sept. 10 (gage height, 5.81 ft). 1915 to August 1952: Discharge, 117,000 cfs July 23, 1938 (gage height, 22.2 ft, present site and datum, from floodmark), from rating curve extended above 60,000 cfs on basis of slope-area determinations at gage heights 21.0 and 22.2 ft. Stage known, 23.3 ft June 5 or 6, 1899, present site and datum, from information by local resident.

Remarks.--Some diversion into Noyes Canal at point 4 miles upstream during month, but maximum flow on Sept. 10 not greatly affected.

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Day	Discharge	Day	Discharge	Day	Discharge	Day	Discharge	Day	Discharge	Day	Discharge
1	0	6	0	11	11	16	0.9	21	0.2	26	5.1
2	0	7	0	12	5.6	17	.7	22	.	27	9.7
3	0	8	0	13	2.2	18	.	23	.6	28	12
4	0	9	0	14	1.6	19	.1	24	.7	29	14
5	0	10	85	15	1.2	20	.2	25	.4	30	14
Monthly mean discharge, in cubic feet per second.....										5.39	
Runoff, in acre-feet										321	

Hour	Gage height	Discharge	Hour	Gage height	Discharge	Hour	Gage height	Discharge	Hour	Gage height	Discharge
	September 8		10	5.33	346		September 11			September 14	
12	1.13	0	10:30	5.81	535		2.63	17	N	1.96	1.6
	September 9		11	5.69	486	4	2.49	11	12	1.93	1.3
N	1.13	0	N	5.11	273	N	2.39	8.2		September 15	
12	1.13	0	1	4.56	163	6	2.27	5.7	N	1.92	1.2
	September 10		2	4.18	119	12	2.21	4.7	12	1.90	1.0
1	1.13	0	3	3.87	92		September 12			September 16	
2	1.13	0	4	3.62	73	N	2.12	3.5	N	1.89	.9
3	1.13	0	5	3.50	66	12	2.06	2.7	12	1.88	.8
4	1.13	0	6	3.46	63		September 13			September 17	
5	1.13	0	7	3.62	73	N	2.01	2.1	N	1.87	.7
6	1.13	0	8	3.53	67	12	1.97	1.7	12	1.85	.5
7	1.13	0	9	3.54	55						
8	1.87	.8	10	3.14	44						
9	2.65	18	11	3.00	36						
			12	2.89	30						

[illegible][illegible]

FLOODS OF 1952 IN CENTRAL TEXAS

San Saba River at San Saba, Tex.

Location.--Lat 31°12'10", long 98°42'15", on left bank at downstream side of pier of bridge on San Saba-Chadwick Mill Highway, three-quarters of a mile northeast of San Saba, San Saba County, and 15 miles upstream from mouth. Datum of gage is 1,153.32 ft above mean sea level, datum of 1929.

Drainage area.--3,046 sq mi.

Gage-height record.--Water-stage recorder graph except Sept. 10, 11, when graph was drawn on basis of several gage readings, and Sept. 16, 17, 23-30 when only a fragmentary water-stage recorder graph was available.

Discharge record.--Stage-discharge relation defined by current-meter measurements below 41,000 cfs and extended to peak stage on basis of logarithmic plotting and slope-area determination at gage height 45.18 ft. Discharge for Sept. 16, 17, 23-30 estimated on basis of fragmentary recorder record and weather records. Shifting-control method used Sept. 11-15, 18-22.

Maxima.--September 1952: Discharge, 70,400 cfs 6 a.m. Sept. 11 (gage height, 36.90 ft, from floodmark).

1904-6, 1915 to August 1952: Discharge, 203,000 cfs July 23, 1938 (gage height, 45.18 ft, from floodmarks), from rating curve extended as described above.

Flood of July 23, 1938 is highest known since at least 1899. Flood of June 6, 1899, reached a stage of 42.6 ft, from information by local resident.

Remarks.--Low flow affected by diversions for irrigation and municipal use.

Mean discharge, in cubic feet per second, September 1952

Day	Discharge	Day	Discharge	Day	Discharge	Day	Discharge	Day	Discharge	Day	Discharge
1	3.0	6	3.5	11	36,300	16	200	21	194	26	112
2	4.0	7	4.2	12	3,840	17	650	22	228	27	106
3	3.7	8	9.2	13	799	18	1,510	23	132	28	100
4	4.2	9	12	14	436	19	903	24	126	29	93
5	4.7	10	2,130	15	295	20	344	25	119	30	86
Monthly mean discharge, in cubic feet per second.....										1,625	
Runoff, in acre-feet										96,700	

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1952

Hour	Gage height	Discharge	Hour	Gage height	Discharge	Hour	Gage height	Discharge	Hour	Gage height	Discharge
12	September 8		3	4.25	168	2	33.6	28,800	1	16.4	2,820
	2.99	9.2	4	5.30	335	3	33.0	25,800	2	15.8	2,640
	September 9		5	9.40	1,220	4	32.5	23,300	3	15.0	2,400
	N 2.88	8.2	6	13.20	2,340	5	32.0	21,200	4	14.0	2,130
2	2.89	8.7	7	16.50	3,370	6	31.4	19,000	5	13.2	1,920
4	2.91	9.9	8	19.10	4,260	7	30.8	16,900	6	12.5	1,740
6	2.95	13	9	22.00	5,800	8	30.2	15,300	7	11.8	1,560
8	3.07	22	10	25.00	8,100	9	29.5	13,400	8	11.3	1,450
10	3.15	29	11	28.00	12,500	10	28.9	12,100	9	11.0	1,390
12	3.16	30	12	31.30	21,600	11	28.3	11,000	10	10.7	1,330
1	September 10		September 11			12	27.6	9,780	11	10.4	1,280
	3.17	31	1	33.5	30,300	September 12			12	10.1	1,220
	3.17	31	2	35.0	42,000	1	26.8	8,740	September 13		
	3.20	34	3	35.9	54,600	2	26.1	8,010	4	9.15	984
4	3.45	60	4	36.5	64,000	3	25.3	7,250	8	8.50	855
5	3.90	117	5	36.8	68,800	4	24.5	6,650	N	8.01	768
6	4.40	190	6	36.9	70,400	5	23.7	6,080	4	7.63	685
7	4.80	220	7	36.7	67,200	6	22.9	5,480	8	7.30	616
8	4.68	233	8	36.4	62,400	7	22.0	4,950	12	7.00	556
9	4.67	231	9	35.9	54,800	8	21.2	4,560	September 14		
10	4.59	218	10	35.4	47,800	9	20.2	4,120	N	6.30	423
11	4.50	205	11	35.0	40,800	10	19.1	3,740	12	5.85	344
N	4.42	193	N	34.5	35,100	11	18.2	3,440	September 15		
1	4.35	182	1	34.1	31,800	N	17.2	3,070	N	5.55	292
2	4.30	175							12	5.30	252

COLORADO RIVER BASIN

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COLORADO RIVER BASIN

Colorado River near San Saba, Tex.

Location.--Lat 31°13'05", long. 98°33'50", on left bank at downstream side of pier of bridge on U. S. Highway 190, 5.2 miles downstream from San Saba River, 9.2 miles east of San Saba, San Saba County, and at mile 474. Datum of gage is 1,096.22 ft above mean sea level, datum of 1929.

Drainage area.--30,600 sq mi, approximately, of which 11,900 sq mi is probably noncontributing.

Gage-height record.--Water-stage recorder graph.

Discharge record.--Stage-discharge relation defined by current-meter measurements. Shifting-control method used Sept. 14-30.

Maxima.--September 1952: Discharge, 69,000 cfs 2:30 p.m. Sept. 11 (gage height, 38.36 ft). 1915-22, 1925 to August 1952: Discharge, 224,000 cfs July 23, 1938 (gage height, 63.2 ft, present site, based on floodmarks at site then in use). Flood of July 23, 1938 is highest known since at least 1878. Flood of Sept. 25, 1900, reached a stage of 58.4 ft, present site, from floodmarks at former site (discharge, 184,000 cfs).

Remarks.--Flow partly regulated by Lake J. B. Thomas, Lake Colorado City, Lake Nasworthy, San Angelo Reservoir, Hords Creek Reservoir, and Brownwood Reservoir, having a combined capacity of 786,000 acre-ft. Practically all flood runoff occurred below these reservoirs.

Mean discharge, in cubic feet per second, September 1952

Day	Discharge	Day	Discharge	Day	Discharge	Day	Discharge	Day	Discharge
1	4.7	6	6.3	11	51,200	16	718	21	485
2	4.0	7	6.3	12	36,600	17	617	22	856
3	4.0	8	5.8	13	20,100	18	2,240	23	420
4	5.1	9	28	14	1,920	19	1,560	24	238
5	5.8	10	429	15	1,030	20	748	25	206
								26	180
								27	169
								28	149
								29	134
								30	131
Monthly mean discharge, in cubic feet per second.....									4,007
Runoff, in acre-feet									238,400

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1952

Hour	Gage height	Discharge	Hour	Gage height	Discharge	Hour	Gage height	Discharge	Hour	Gage height	Discharge
	September 8		4	2.56	294	6	37.35	66,200	8	20.47	25,800
12	1.30	5.8	6	2.84	420	7	36.75	64,600	10	19.90	24,700
	September 9		8	3.08	540	8	36.00	62,600	N	19.07	23,100
2	1.30	5.8	10	3.34	677	9	35.27	60,600	2	17.78	20,800
4	1.30	5.8	12	4.60	1,520	10	34.50	58,600	4	16.04	17,900
6	1.30	5.8		September 11		11	33.62	56,200	6	13.90	14,400
8	1.30	5.8	1	6.24	3,160	12	32.85	54,200	8	11.63	10,700
10	1.30	5.8	2	8.20	5,560		September 12		10	9.34	7,120
N	1.31	6.3	3	13.10	13,100	2	31.08	49,600	12	7.52	4,680
2	1.32	6.8	4	19.30	23,600	4	29.50	45,600		September 14	
4	1.43	14	5	24.50	34,000	6	28.12	42,300	2	6.36	3,240
6	1.47	18	6	28.70	43,700	8	26.78	39,100	4	5.66	2,470
8	1.58	30	7	31.50	50,000	10	25.60	36,400	6	5.28	2,100
10	1.79	58	8	33.80	56,700	N	24.60	34,300	8	5.07	1,900
12	2.66	337	9	35.40	61,000	2	23.73	32,400	10	4.88	1,730
	September 10		10	36.55	64,100	4	23.09	31,100	N	4.76	1,620
1:30	3.25	816	11	37.30	66,100	6	22.51	29,900	4	4.58	1,470
2	3.18	590	N	37.84	67,600	8	22.09	29,000	8	4.42	1,340
4	2.78	391	1	38.20	68,600	10	21.76	28,300	12	4.31	1,260
6	2.59	306	2	38.33	68,900	12	21.47	27,700		September 15	
8	2.50	270	2:30	38.36	69,000		September 13		N	3.99	1,000
10	2.42	238	3	38.31	68,900	2	21.27	27,300	12	3.75	850
N	2.38	222	4	38.10	68,300	4	21.07	26,900		September 16	
2	2.39	226	5	37.82	67,500	6	20.83	26,500	N	3.54	704
									12	3.38	616

FLOODS OF 1952 IN CENTRAL TEXAS

Buchanan Reservoir near Burnet, Tex.

Location.--Lat 30°45'05", long 98°25'00", in powerhouse at Buchanan Dam on Colorado River, 1 mile upstream from bridge on State Highway 29, 10 miles west of Burnet, Burnet County, and at mile 413. Datum of gage is 0.48 ft above mean sea level, datum of 1929 (levels by Lower Colorado River Authority).

Drainage area.--31,250 sq mi, approximately, of which 11,900 sq mi is probably noncontributing.

Gage-height record.--Hourly readings of Selsyn indicator.

Maxima.--September 1952: Contents, 623,000 acre-ft Sept. 23-30 (gage height, 1,002.0 ft).

1937 to August 1952: Contents, 1,004,000 acre-ft July 27, 1938 (gage height, 1,020.5 ft).

Remarks.--Reservoir is formed by two reinforced concrete multiple-arch sections, three banks of tainter gates, and a 1,088-ft reinforced concrete spillway section. Dam completed and storage began May 20, 1937. Total capacity, 992,000 acre-ft (gage height, 1,020.0 ft, top of spillway section). Usable capacity for power development, 955,000 acre-ft between gage heights 937.0 ft (sill of powerhouse penstock) and 1,020.0 ft (top of spillway section). Water below gage height 937.0 ft can be withdrawn through two 5-ft Bunger gates (emergency) down to gage height of 890.0 ft. Figures given herein represent total contents. Water used for power development and irrigation of rice in several districts below Columbus.

Contents, in acre-feet, 12 p.m. September 1952

Day	Contents	Day	Contents	Day	Contents	Day	Contents	Day	Contents	Day	Contents
1	350,600	6	342,000	11	441,000	16	605,000	21	619,400	26	623,000
2	345,600	7	342,000	12	537,000	17	606,800	22	621,200	27	623,000
3	344,400	8	340,800	13	588,800	18	610,400	23	623,000	28	623,000
4	343,200	9	340,800	14	601,400	19	615,800	24	623,000	29	623,000
5	343,200	10	340,800	15	603,200	20	617,600	25	623,000	30	623,000
Change in contents during month										+272,400	

Llano River near Junction, Tex.

Location.--Lat 30°30', long. 99°44', on right bank 250 ft north of old Kerrville-Junction road, about half a mile downstream from point where slough diverts floodwater from main channel, 3 miles east of Junction, Kimble County, 4 miles downstream from confluence of North Llano and South Llano Rivers, and 4-3/4 miles upstream from Johnson Fork. Datum of gage is 1,630.32 ft above mean sea level, datum of 1929.

Drainage area.--1,762 sq mi.

Gage-height record.--Water-stage recorder gage.

Discharge record.--Stage-discharge relation defined by current-meter measurements.

Maxima.--September 1952: Discharge, 24 cfs 1 p.m. Sept. 11 (gage height, 1.01 ft).

1915 to August 1952: Discharge, 319,000 cfs June 14, 1935 (gage height, 43.3 ft, present site and datum, from floodmarks), from rating curve extended above 54,000 cfs on basis of slope-area determinations at gage heights 32.2 and 43.3 ft.

Flood of June 14, 1935 is highest known since at least 1888.

Mean discharge, in cubic feet per second, September 1952

Day	Discharge	Day	Discharge	Day	Discharge	Day	Discharge	Day	Discharge	Day	Discharge
1	14	6	15	11	23	16	19	21	19	26	21
2	15	7	15	12	23	17	19	22	18	27	20
3	15	8	15	13	22	18	19	23	19	28	20
4	15	9	16	14	20	19	19	24	20	29	19
5	15	10	21	15	20	20	19	25	21	30	18
Monthly mean discharge, in cubic feet per second										18.5	
Runoff, in acre-feet										1,100	

COLORADO RIVER BASIN

Llano River at Llano, Tex.

Location.--Lat 30°45', long 98°40', on right bank in Llano, Llano County, 0.4 mile downstream from State Highway 16 bridge, 2,290 ft downstream from City of Llano dam, 0.7 mile upstream from Otman Creek, 3.8 miles downstream from Johnson Creek, 7.0 miles upstream from Little Llano River. Datum of gage is 970.0 ft above mean sea level, datum of 1929.

Drainage area.--4,000 sq mi.

Gage-height record.--Water-stage recorder graph.

Discharge record.--Stage-discharge relation defined by current-meter measurements below 129,000 cfs and extended above on basis of slope-area determination at peak stage. Shifting-control method used Sept. 18.

Maxima.--September 1952: Discharge, 232,000 cfs 11 p.m. Sept. 10 (gage height, 32.6 ft). 1939 to August 1952: Discharge, 108,000 cfs June 25, 1948 (gage height, 22.90 ft, from floodmark).

Stage known, 41.5 ft June 14, 1935 (discharge, 380,000 cfs, from rating extended above 129,000 cfs as explained above), from information by local resident.

Mean discharge, in cubic feet per second, September 1952

Day	Discharge	Day	Discharge	Day	Discharge	Day	Discharge	Day	Discharge	Day	Discharge
1	0	6	0	11	51,400	16	288	21	224	26	114
2	0	7	0	12	3,000	17	384	22	164	27	112
3	0	8	0	13	1,070	18	5,120	23	132	28	99
4	0	9	0	14	582	19	915	24	137	29	81
5	0	10	52,000	15	386	20	339	25	119	30	72
Monthly mean discharge, in cubic feet per second.....										3,891	
Runoff, in acre-feet										231,500	

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1952

Hour	Gage height	Discharge	Hour	Gage height	Discharge	Hour	Gage height	Discharge	Hour	Gage height	Discharge
	September 10		10	50.60	202,000	2	12.10	25,100		September 13	
6	1.61	0.8	11	32.60	232,000	3	11.24	19,900	N	5.53	1,230
7	1.63	1.0	12	31.10	210,000	4	10.52	15,900	N	5.28	1,020
8	1.64	1.1	September 11			5	10.00	13,100	6	5.12	905
9	1.68	1.4	1	28.60	175,000	6	9.55	11,000	12	4.87	736
10	1.73	2.0	2	26.40	147,000	7	9.20	9,400	September 14		
11	1.80	3.0	3	23.60	116,000	8	8.90	8,220	N	4.59	570
N	1.88	4.8	4	20.10	81,900	9	8.65	7,320	12	4.36	452
1	2.03	10	5	18.00	64,000	10	8.44	6,630	September 15		
2	2.34	37	6	16.80	55,600	11	8.24	6,040	N	4.19	379
3	2.45	54	7	16.05	50,400	12	8.04	5,500	12	4.08	336
4	14.80	42,800	8	15.45	46,400	September 12			September 16		
5	22.60	106,000	9	15.10	44,200	4	7.50	4,240	N	3.92	279
6	25.30	134,000	10	19.20	75,800	6	7.08	3,350	12	3.86	259
7	25.15	133,000	11	17.80	62,600	N	6.82	2,860			
8	25.60	138,000	N	16.00	50,000	4	6.42	2,220			
9	27.00	154,000	1	13.80	35,700	8	6.12	1,820			
						12	5.87	1,550			

FLOODS OF 1952 IN CENTRAL TEXAS

Pedernales River near Johnson City, Tex.

Location.--Lat 30°16', long 98°24', on right bank at upstream side of pier of bridge on U. S. Highway 281, 0.2 mile downstream from Flat Creek, 1.2 miles northeast of Johnson City, Blanco County, and 3.5 miles downstream from Buffalo Creek. Datum of gage is 1,096.70 ft above mean sea level, datum of 1929, supplementary adjustment of 1942.

Drainage area.--947 sq mi.

Gage-height record.--From graph based on gage readings, readings from reference points and floodmarks.

Discharge record.--Stage-discharge relation defined by current-meter measurements below 42,000 cfs and extended above on basis of slope-area determinations at gage heights 27.6 and 42.5 ft. Shifting-control method used Sept. 12-30.

Maxima.--September 1952: Discharge, 441,000 cfs 3 a.m. Sept. 11 (gage height, 42.5 ft, from floodmark).

1939 to August 1952: Discharge, 128,000 cfs (revised) Aug. 30, 1944 (gage height, 27.6 ft from floodmarks), from rating curve extended as explained above. Stage known, that of Sept. 11, 1952. A stage of about 33 ft occurred in July 1869, from information by local residents.

Remarks.--The concrete recording gage structure was overtopped and destroyed by the flood of September 1952.

Mean discharge, in cubic feet per second, September 1952

Day	Discharge	Day	Discharge	Day	Discharge	Day	Discharge	Day	Discharge	Day	Discharge
1	0	6	0	11	129,000	16	244	21	156	26	97
2	0	7	0	12	2,190	17	329	22	134	27	88
3	0	8	0	13	661	18	962	23	125	28	82
4	0	9	0	14	587	19	552	24	117	29	76
5	0	10	54,300	15	292	20	198	25	103	30	68
Monthly mean discharge, in cubic feet per second.....										6,532	
Runoff, in acre-feet.....										376,800	

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1952

Hour	Gage height	Discharge	Hour	Gage height	Discharge	Hour	Gage height	Discharge	Hour	Gage height	Discharge
September 9											
12	1.40	0	6	9.2	9,230	1	15.0	29,700	4	4.60	1,340
			7	17.5	42,200	2	13.5	23,600	6	4.45	1,180
			8	25.2	101,000	3	12.5	19,800	8	4.35	1,080
1	1.40	0	9	33.4	218,000	4	11.6	16,600	10	4.25	978
2	1.40	0	10	40.8	390,000	5	10.8	13,800	12	4.15	885
3	1.40	0	11	40.1	369,000	6	10.1	11,600	September 13		
4	1.4	0	12	39.0	341,000	7	9.5	9,920	6	3.92	772
5	1.4	0	September 11			8	9.0	8,800	N	3.76	645
6	1.4	0	1	38.0	316,000	9	8.5	7,770	6	3.62	544
7	1.4	0	2	39.7	358,000	10	8.1	7,000	12	3.52	478
8	1.5	0	3	42.5	441,000	11	7.6	6,060	September 14		
9	1.8	.2	4	41.2	402,000	12	7.3	5,520	N	3.35	379
10	2.3	8.0	5	39.0	341,000	September 12			12	3.22	313
11	2.6	33	6	36.4	281,000	2	6.7	4,440	September 15		
N	3.0	137	7	32.8	206,000	4	6.2	3,590	N	3.18	294
1	3.3	257	8	29.2	149,000	6	5.8	2,930	12	3.12	266
2	3.6	406	9	26.1	110,000	8	5.4	2,310	September 16		
3	4.0	675	10	22.9	79,200	10	5.20	2,010	N	3.08	248
4	4.5	1,120	11	19.0	50,800	N	4.88	1,700	12	3.0	214
5	5.0	1,730	N	16.8	38,400	2	4.75	1,520			

Lake Travis near Austin, Tex.

Location.--Lat 30°23'20", long 97°54'35", in powerhouse at Mansfield Dam on Colorado River, 7.3 miles downstream from Sandy Creek, 12 miles northwest of Austin, Travis County, and at mile 318. Datum of gage is 0.12 ft above mean sea level, datum of 1929 (levels by Bureau of Reclamation).

Drainage area.--37,900 sq mi, approximately, of which 11,900 sq mi is probably non-contributing. During the flood period the inflow into Lake Travis originated below Buchanan Reservoir from the intervening area of 6,650 sq mi.

Gage-height record.--Graph based on float gage readings.

Discharge record.--Inflow rates computed from gage readings at 15-minute intervals and change in contents.

Maxima.--September 1952: Contents, 1,111,000 acre-ft Sept. 18 (gage height, 677.7 ft). Rate of inflow, 803,000 cfs 7:30 a.m. Sept. 11.

1940 to August 1952: Contents, 1,377,000 acre-ft Oct. 23, 1942 (gage height, 691.2 ft).

Remarks.--Reservoir is formed by concrete gravity-type dam. Storage began Sept. 9, 1940; dam completed early in 1942. Total capacity, 1,950,000 acre-ft (gage height, 714.0 ft, top of spillway). Capacity between gage heights 681.0 and 714.0 ft is 778,000 acre-ft, and is reserved for flood control. Usable capacity, 1,144,000 acre-ft between gage heights 535.8 (bottom of 24 8½ ft diameter Paradox gates) and 681.0 ft (maximum power pool). Bottom of penstocks, gage height 552.0 ft. Figures given herein represent total contents in acre-feet and rate of inflow in cubic feet per second.

COLORADO RIVER BASIN

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COLORADO RIVER BASIN

Lake Travis near Austin, Tex.--Continued

Contents, in acre-feet, at 12 p. m., September 1952

Day	Contents	Day	Contents	Day	Contents	Day	Contents	Day	Contents	Day	Contents
1	383,000	6	374,400	11	1,073,000	16	1,094,000	21	1,109,000	26	1,105,000
2	381,300	7	374,400	12	1,085,000	17	1,084,000	22	1,107,000	27	1,103,000
3	380,500	8	371,900	13	1,085,000	18	1,111,000	23	1,105,000	28	1,102,000
4	373,600	9	372,700	14	1,085,000	19	1,110,000	24	1,105,000	29	1,100,000
5	376,200	10	373,600	15	1,089,000	20	1,109,000	25	1,105,000	30	1,100,000
Change in contents during month.....										+715,200	

Rate of inflow, in cubic feet per second, at indicated time, 1952

Hour	Gage height	Inflow	Hour	Gage height	Inflow	Hour	Gage height	Inflow	Hour	Gage height	Inflow
12	September 10	7			757,000	2		372,000	10		38,000
	600	7:15									
1	September 11	7:30			803,000	3		344,000	10:30	11	34,000
	600	7:45									
2	800	8			782,000	4		313,000	11:30		26,000
2:15	1,620	8:30			770,000	4:30		297,000			
2:30	442,900	9			758,000	5		277,000	1		17,000
2:45	480,000	9:30			717,000	5:30		255,000			
3	495,000	10			603,000	6		231,000	2		14,000
3:15	505,000	10:30			577,000	6:30		202,000			
3:30	528,000	11			530,000	7		151,000	3		12,000
4	562,000	11:30			490,000	7:30		109,000			
4:30	590,000	N			454,000	8		83,000	4		9,000
5	315,000	12:30			426,000	8:30		62,000			
5:30	341,000	1			405,000	9		51,000	5		10,000
6	365,000	1:30			388,000	9:30		42,000			
6:30	589,000								6	N	5,000

Colorado River at Austin, Tex.

Location.--Lat 30°14'40", long 97°41'20", on right bank just upstream from Montopolis Bridge on U. S. Highway 183 at southeast edge of Austin, Travis County, 2.8 miles upstream from Walnut Creek, 3.8 miles downstream from Waller Creek, 5 miles downstream from Barton Creek, and at mile 290. Datum of gage is 407.28 ft above mean sea level, datum of 1929.

Drainage area.--38,160 sq mi, approximately, of which 11,900 sq mi is probably noncontributing.

Gage-height record.--Water-stage recorder graph.

Discharge record.--Stage-discharge relation defined by current-meter measurements.

Maxima.--September 1952: Discharge, 3,720 cfs 12 p.m. Sept. 17 (gage height, 4.59 ft). 1898 to August 1952: Discharge, 481,000 cfs June 15, 1935 (gage height, 45.0 ft, from floodmark).

Stage known since 1843, 46.0 ft July 7, 1869, present site and datum (adjusted to present site on basis of record for flood of June 15, 1935).

Remarks.--Flow regulated by Buchanan Reservoir (see p.), Lake Travis (see p.), and other smaller reservoirs, having a combined capacity of 3,939,600 acre-ft.

Mean discharge, in cubic feet per second, September 1952

Day	Discharge	Day	Discharge	Day	Discharge	Day	Discharge	Day	Discharge	Day	Discharge
1	746	6	730	11	1,820	16	2,080	21	710	26	269
2	1,370	7	570	12	1,090	17	1,950	22	920	27	235
3	1,390	8	866	13	675	18	1,830	23	645	28	209
4	847	9	741	14	363	19	1,870	24	302	29	235
5	916	10	484	15	1,010	20	1,480	25	276	30	402
Monthly mean discharge, in cubic feet per second.....										901	
Runoff, in acre-feet										53,620	

FLOODS OF 1952 IN CENTRAL TEXAS

Guadalupe River Basin

Guadalupe River at Comfort, Tex.

Location.--Lat 29°58', long 98°54', on left bank at downstream side of pier of bridge on U. S. Highway 87, a quarter of a mile downstream from Cypress Creek, half a mile east of Comfort, Kendall County, and at mile 397. Datum of gage is 1,372.03 ft above mean sea level, datum of 1929.

Drainage area.--990 sq mi, approximately.

Gage-height record.--Water-stage recorder graph except for Sept. 13-17, 20, during which only the peaks on Sept. 16, 17 were indicated. Recorder graph corrected on basis of outside gage readings and floodmark on Sept. 11, 12.

Discharge record.--Stage-discharge relation defined by current-meter measurements below 13,000 cfs and extended to peak stage on basis of logarithmic plotting. Discharge for Sept. 13-17, 20 interpolated or computed from graph estimated on basis of normal recession and indicated peaks. Shifting-control method used Sept. 18, 19, 21-30.

Maxima.--September 1952: Discharge, 38,600 cfs 6:30 p.m. Sept. 10 (gage height, 25.44 ft, from floodmark).

1917-32, 1939 to August 1952: Discharge, 182,000 cfs July 1, 1932 (gage height, 38.4 ft, from floodmarks, from data furnished by Texas Highway Department), by slope-area method.

Stage known since at least 1848, that of July 1, 1932; flood of July 16, 1900, reached about the same stage, from information by local residents.

Mean discharge, in cubic feet per second, September 1952

Day	Discharge	Day	Discharge	Day	Discharge	Day	Discharge	Day	Discharge	Day	Discharge
1	0	6	0	11	2,810	16	80	21	80	26	65
2	0	7	0	12	292	17	87	22	72	27	65
3	0	8	0	13	105	18	176	23	71	28	61
4	0	9	0	14	65	19	149	24	71	29	60
5	0	10	6,900	15	55	20	97	25	67	30	58
Monthly mean discharge, in cubic feet per second.....										382	
Runoff, in acre-feet										22,740	

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1952

Hour	Gage height	Discharge	Hour	Gage height	Discharge	Hour	Gage height	Discharge	Hour	Gage height	Discharge
N	September 8		10	9.70	2,320		September 11		7	5.58	803
12	2.38	0	11	12.72	4,670	1	10.90	2,940	8	5.34	719
	2.38	0	N	13.14	5,170	2	9.65	2,300	9	5.14	649
	September 9		1	12.87	4,840	3	8.50	1,850	10	4.98	593
N	2.38	0	2	12.65	4,600	4	7.92	1,630	11	4.88	558
12	2.41	0	3	15.50	8,850	5	7.90	1,620	12	4.80	531
	September 10		4	18.00	13,900	6	9.60	2,280		September 12	
1	2.41	0	5	21.00	21,800	7	13.00	5,000	6	4.32	371
2	2.69	17	6	24.50	34,800	8	15.35	8,600	N	3.97	264
3	2.71	19	6:30	25.44	38,600	9	15.54	8,920	6	3.72	193
4	2.73	21	7	23.50	30,800	10	14.60	7,330	12	3.53	147
5	2.73	21	8	18.00	13,900	11	13.85	6,180		September 13	
6	2.77	26	9	13.50	5,660	N	12.30	4,210	N	3.29	98
7	2.84	34	10	12.30	4,210	1	10.34	2,600	12	3.15	76
8	3.43	125	11	11.95	3,830	2	8.60	1,890		September 14	
9	6.50	1,120	12	11.72	3,600	3	7.44	1,460	N	3.07	64
						4	6.76	1,220	12	3.02	57
						5	6.24	1,030		September 15	
						6	5.82	887	N	3.00	54
									12	3.00	54

GUADALUPE RIVER BASIN

Guadalupe River near Spring Branch, Tex.

Location.--Lat 29°51'40", long 98°23'00", on right bank at downstream side of pier of bridge on county highway, 4 miles southeast of Spring Branch, Comal County, 6 miles downstream from Curry Creek, and at mile 334. Datum of gage is 948.13 ft above mean sea level, datum of 1925.

Drainage area.--1,432 sq mi.

Gage-height record.--Water-stage recorder graph except Sept. 16, 17, 19-22, when there was no gage-height record.

Discharge record.--Stage-discharge relation defined by current-meter measurements. Discharge for periods of no gage-height record estimated on basis of recorded range in stage and weather records. Shifting-control method used Sept. 23-30.

Maxima.--September 1952: Discharge, 66,900 cfs 4:30 a.m. Sept. 11 (gage height, 35.83 ft). 1922 to August 1952: Discharge, 121,000 cfs July 3, 1932 (gage height, 42.10 ft), from rating curve extended above 70,000 cfs.
Stage known since at least 1859, about 53 ft in 1869; flood of July 1900 reached a stage of about 49 ft, from information by local resident.

Mean discharge, in cubic feet per second, September 1952

Day	Discharge	Day	Discharge	Day	Discharge	Day	Discharge	Day	Discharge	Day	Discharge
1	0	6	0	11	44,600	16	318	21	204	26	150
2	0	7	0	12	10,900	17	286	22	190	27	142
3	0	8	0	13	892	18	414	23	184	28	132
4	0	9	0	14	528	19	343	24	175	29	124
5	0	10	3,100	15	382	20	225	25	161	30	119
Monthly mean discharge, in cubic feet per second.....										2,119	
Runoff, in acre-feet.....										126,100	

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1952

Hour	Gage height	Discharge	Hour	Gage height	Discharge	Hour	Gage height	Discharge	Hour	Gage height	Discharge
N	September 9			September 11		5	31.14	44,500	N	7.53	3,200
12	0.82	0	1	29.06	37,300	6	30.65	42,700	2	6.55	2,410
	.84	0	2	30.65	42,700	7	30.20	41,100	4	6.05	2,040
	September 10		3	31.20	44,800	8	29.70	39,400	6	5.70	1,780
N	.88	0	4	35.40	64,600	9	29.20	37,700	8	5.40	1,560
1	1.63	0	4:30	35.83	66,900	10	28.70	36,100	10	5.15	1,400
2	2.00	36	5	35.50	65,100	11	28.15	34,400	12	4.96	1,280
3	2.20	63	6	34.15	58,000	12	27.70	33,100	September 13		
4	2.33	87	7	32.80	51,500	September 12			6	4.53	1,020
5	2.39	99	8	31.35	45,300	1	27.14	31,600	N	4.23	846
6	3.43	434	9	30.20	41,100	2	26.55	30,100	12	3.85	638
7	7.92	3,530	9:30	30.12	40,800	3	25.81	28,400	September 14		
8	13.15	8,480	10	30.14	40,900	4	24.85	26,300	N	3.62	520
9	16.90	13,300	11	30.45	42,000	5	23.90	24,300	12	3.43	434
10	19.00	16,100	N	30.99	44,000	6	22.70	22,100	September 15		
11	19.80	17,200	1	31.37	45,400	7	21.10	19,300	N	3.29	376
12	26.60	30,200	2	31.60	46,300	8	18.95	16,000	12	3.20	340
			2:30	31.65	46,500	9	14.40	10,000			
			3	31.60	46,300	10	11.60	6,870			
			4	31.45	45,700	11	9.18	4,660			

FLOODS OF 1952 IN CENTRAL TEXAS

Guadalupe River above Comal River at New Braunfels, Tex.

Location.--Lat 29°42'55", long 98°06'40", on right bank at New Braunfels, Comal County, 1.1 miles upstream from Comal River, and at mile 281. Datum of gage is 586.65 ft above mean sea level, datum of 1929.

Drainage area.--1,666 sq mi.

Gage-height record.--Water-stage recorder graph.

Discharge record.--Stage-discharge relation defined by current-meter measurements.

Shifting-control method used Sept. 1-9. Backwater from Comal River 3 a.m. to 11 p.m. Sept. 11.

Maxima.--September 1952: Discharge, 72,900 cfs 1 p.m. Sept. 11; maximum gage height, 30.70 ft 12:30 p.m. Sept. 11 (affected by backwater from Comal River).

1927 to August 1952: Discharge, 101,000 cfs June 15, 1935 (gage height, 32.95 ft). Stage known, 38 ft in 1869 and in December 1913, from information by local residents.

Mean discharge, in cubic feet per second, September 1952

Day	Discharge	Day	Discharge	Day	Discharge	Day	Discharge	Day	Discharge	Day	Discharge
1	5.4	6	4.4	11	46,500	16	820	21	630	26	370
2	4.6	7	4.6	12	32,800	17	694	22	536	27	347
3	4.3	8	4.6	13	2,540	18	751	23	472	28	329
4	4.6	9	9.0	14	1,400	19	843	24	429	29	312
5	4.6	10	138	15	1,020	20	698	25	396	30	293
Monthly mean discharge, in cubic feet per second.....										3,079	
Runoff, in acre-feet										183,200	

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1952

Hour	Gage height	Discharge	Hour	Gage height	Discharge	Hour	Gage height	Discharge	Hour	Gage height	Discharge
N	September 9		6	25.55	36,500	3	24.50	48,400	September 13		
	0.81 9.6		7	25.84	41,800	4	24.33	47,600	2	4.92	3,750
12	.87 12		8	26.75	47,200	5	24.12	46,600	4	4.57	3,240
	September 10		9	28.35	55,300	6	23.78	45,000	6	4.34	2,910
2	.91 15		10	29.55	61,800	7	23.50	43,800	8	4.18	2,680
4	.93 17		11	30.35	67,000	8	23.09	42,000	10	4.02	2,440
6	.92 16		N	30.62	70,700	9	22.70	40,400	N	3.92	2,300
8	.98 22		1	30.65	72,900	10	22.27	38,800	6	3.69	1,980
10	1.14 39		2	30.40	71,300	11	21.84	37,400	12	3.48	1,680
N	1.13 38		3	29.90	68,900	N	21.40	35,000	September 14		
2	1.14 39		4	29.20	64,600	1	20.90	34,500	N	3.25	1,580
4	1.24 51		5	28.50	60,700	2	20.25	32,600	12	3.06	1,160
6	1.35 66		6	27.50	56,600	3	19.60	30,800	September 15		
8	1.89 164		7	26.65	53,800	4	18.90	28,900	N	2.91	1,000
10	2.81 784		8	25.95	52,000	5	17.94	26,400	12	2.80	900
12	2.82 794		9	25.37	50,900	6	16.75	23,500	September 16		
	September 11		10	25.08	50,200	7	14.99	19,500	N	2.71	814
1	3.15 1,190		11	24.85	49,900	8	12.47	14,900	12	2.64	751
2	5.00 3,860		12	24.74	49,500	9	9.70	10,700	September 17		
3	11.40 9,660		September 12			10	7.94	8,130	N	2.57	690
4	17.65 17,300		1	24.67	49,200	11	6.68	6,300	12	2.52	647
5	23.50 26,900		2	24.60	48,800	12	5.72	4,910			

GUADALUPE RIVER BASIN

Comal River at New Braunfels, Tex.

Location.--Lat 29°42'05", long 98°07'10", on right bank 200 ft upstream from San Antonio Street viaduct in New Braunfels, Comal County, and 1.1 miles upstream from mouth. Datum of gage is 582.80 ft above mean sea level, datum of 1929.

Drainage area.--117 sq mi (revised).

Gage-height record.--Water-stage recorder graph except for period 3:20 a.m. Sept. 11 to 6:15 p.m. Sept. 16. Graph drawn on basis of outside gage reading Sept. 12-16.

Discharge record.--Stage-discharge relation defined by current-meter measurements below 1,800 cfs and extended to peak stage on basis of slope-area determinations at gage heights 14.87 and 36.14 ft. Discharge for Sept. 11 estimated on basis of partial gage-height record, floodmark, and records for Guadalupe River above Comal River at New Braunfels. Backwater from Guadalupe River Sept. 12, 13. Shifting-control method used Sept. 17-23.

Maxima.--September 1952: Discharge, 35,000 cfs 11 a.m. Sept. 11 (gage height, 36.14 ft, from floodmark).

1927 to August 1952: Gage height, 30.71 ft June 15, 1935, from floodmarks, backwater from Guadalupe River (discharge not determined).

Stage known since at least 1869, 37.65 ft Oct. 17, 1870, from floodmark about half a mile downstream (may have been affected by backwater from Guadalupe River).

Mean discharge, in cubic feet per second, September 1952

Day	Discharge	Day	Discharge	Day	Discharge	Day	Discharge	Day	Discharge	Day	Discharge
1	132	6	150	11	13,900	16	195	21	205	26	208
2	132	7	120	12	988	17	197	22	208	27	210
3	120	8	135	13	202	18	196	23	210	28	210
4	128	9	145	14	180	19	205	24	210	29	208
5	135	10	177	15	192	20	202	25	213	30	205
Monthly mean discharge, in cubic feet per second.....										663	
Runoff, in acre-feet										39,470	

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1952

Hour	Gage height	Discharge	Hour	Gage height	Discharge	Hour	Gage height	Discharge	Hour	Gage height	Discharge			
12	September 8		10	2.5	216	2	September 12		4	September 15				
	2.10	110	12	2.6	245		18.2	2,460	2.32	166				
2	September 9		1	September 11		4	17.8	1,890	8	2.33	169			
	2.10	110		6.5	1,790		17.6	1,450		N	2.53	225		
4	2.10	110	2	11.3	4,480	8	17.4	1,090	4	2.48	210			
6	2.10	110	3	17.9	9,010	10	17.2	854	8	2.45	202			
8	2.12	115	4	26.0	17,800	N	17.0	642	12	2.43	196			
10	2.38	183	5	24.3	15,500	2	16.7	502	September 16					
N	2.34	172	6	23.4	14,400	4	16.1	410	4	2.41	191			
2	2.30	161	7	22.4	13,400	6	13.8	312	8	2.38	183			
4	2.33	169	8	24.0	15,200	8	11.1	277	N	2.53	225			
6	2.27	153	9	28.3	21,200	10	8.1	245	4	2.37	180			
8	2.33	169	10	33.0	29,200	12	5.5	216	8	2.44	199			
10	2.31	164	11	36.14	35,000	September 13			12	2.42	194			
12	2.19	132	N	34.0	31,000	2	4.52	213	September 17					
2	September 10		1	31.0	25,600	4	3.87	210	4	2.42	188			
	2.30	161	2	28.0	20,700	6	3.45	208	8	2.45	188			
4	2.27	153	3	25.2	16,700	8	3.10	205	N	2.51	199			
6	2.21	138	4	22.3	13,100	10	2.82	202	4	2.49	194			
8	2.34	172	5	21.1	11,000	N	2.77	199	8	2.46	185			
10	2.46	205	6	20.2	9,010	6	2.60	199	12	2.71	258			
N	2.4	188	7	19.7	7,320	12	2.48	191	September 14					
2	2.4	188	8	19.3	6,180	N	September 14							
4	2.3	161	9	19.1	5,200		2.37	180						
6	2.3	161	10	18.9	4,480	12	2.33	169						
8	2.4	188	11	18.7	3,830									
			12	18.5	3,250									

FLOODS OF 1952 IN CENTRAL TEXAS

Blanco River at Wimberley, Tex.

Location.--Lat 29°59', long 98°04', on left bank 800 ft downstream from Cypress Creek, 1,200 ft upstream from bridge on State Highway 12, and a quarter of a mile south of Wimberley, Hays County. Datum of gage is 802.23 ft above mean sea level, datum of 1929.

Drainage area.--364 sq mi.

Gage-height record.--Water-stage recorder graph except for period Sept. 1-22. Graph for period Sept. 10-22 was drawn on basis of frequent staff-gage readings and flood-mark of peak.

Discharge record.--Stage-discharge relation defined by current-meter measurements below 30,000 cfs and extended above on basis of slope-area determination at peak stage. Discharge for Sept. 1-9 estimated on basis of discharge measurement and weather records. Shifting-control method used Sept. 10, 26-30. Backwater from debris Sept. 11-15.

Maxima.--September 1952: Discharge, 95,000 cfs 8:30 a.m. Sept. 11 (gage height, 30.1 ft, from floodmark).

1924-26, 1928 to August 1952: Discharge, 113,000 cfs May 28, 1929 (gage height, 31.10 ft, from floodmarks), by slope-area method.

Stage known since at least 1869, that of May 28, 1929, from information by local residents.

Mean discharge, in cubic feet per second, September 1952

Day	Discharge	Day	Discharge	Day	Discharge	Day	Discharge	Day	Discharge	Day	Discharge
1	7.5	6	7.5	11	36,900	16	266	21	182	26	122
2		7		12	1,260	17	222	22	162	27	116
3		8		13	658	18	332	23	139	28	108
4		9		14	427	19	279	24	133	29	103
5		10	168	15	330	20	196	25	125	30	98
Monthly mean discharge, in cubic feet per second.....										1,413	
Runoff, in acre-feet										84,090	

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1952

Hour	Gage height	Discharge	Hour	Gage height	Discharge	Hour	Gage height	Discharge	Hour	Gage height	Discharge	
12	September 9		3	23.80	58,000	10	6.68	3,050	4	2.06	580	
	0.50	11	4	22.00	49,500	11	6.28	2,700	8	1.93	530	
2	September 10		5	20.50	42,800	12	5.94	2,400	12	1.84	495	
4	.50	11	6	23.60	57,000	September 12			September 14			
6	.50	11	7	27.60	78,600	2	5.30	1,950	6	1.73	455	
8	.65	30	8	29.92	93,700	4	4.82	1,670	N	1.64	420	
10	.95	84	8:30	30.10	95,000	6	4.40	1,460	6	1.58	400	
	1.85	430	9	29.90	93,600	8	4.08	1,300	12	1.52	372	
10:30	2.11	589	10	28.90	86,800	10	3.86	1,210	September 15			
N	1.60	304	11	26.00	69,500	N	3.70	1,150	N	1.40	332	
2	1.35	200	N	22.00	49,500	2	3.55	1,080	12	1.29	286	
4	1.35	200	1	18.30	33,100	4	3.26	980	September 16			
5	1.55	282	2	15.85	23,400	6	3.08	920	N	1.24	266	
6	1.48	251	3	13.80	15,900	8	2.96	890	12	1.19	246	
8	1.25	166	4	12.00	11,100	10	2.84	850	September 17			
10	1.10	121	5	10.20	7,500	12	2.74	820	N	1.11	217	
12	1.25	166	6	9.20	6,000	September 13			12	1.08	206	
September 11		7	8.36	4,780	4	2.66	790					
1	15.00	24,000	8	7.70	4,050	8	2.50	740				
2	25.10	64,600	9	7.15	3,500	N	2.26	650				

GUADALUPE RIVER BASIN

29

GUADALUPE RIVER BASIN

San Marcos River at Luling, Tex.

Location.--Lat 29°39'55", long 97°39'05", on left bank 390 ft downstream from bridge on State Highway 80, 1 mile south of Luling, Caldwell County, and 8 miles upstream from Plum Creek. Datum of gage is 322.05 ft above mean sea level, datum of 1929.

Drainage area.--833 sq mi.

Gage-height record.--Water-stage recorder graph.

Discharge record.--Stage-discharge relation defined by current-meter measurements. Shifting-control method used Sept. 1-10.

Maxima.--September 1952: Discharge, 57,000 cfs 1:30 a.m. Sept. 12 (gage height, 34.95 ft). 1939 to August 1952: Discharge, 29,500 cfs July 5, 1942 (gage height 32.93 ft). Stage known, 40.4 ft in 1869 and 1870, from information by State Highway Department.

Mean discharge, in cubic feet per second, September 1952

Day	Discharge	Day	Discharge	Day	Discharge	Day	Discharge	Day	Discharge	Day	Discharge
1	92	6	81	11	9,420	16	560	21	401	26	265
2	84	7	62	12	25,000	17	482	22	382	27	275
3	84	8	96	13	2,020	18	686	23	358	28	267
4	82	9	109	14	930	19	620	24	312	29	249
5	81	10	2,610	15	693	20	482	25	299	30	242

Monthly mean discharge, in cubic feet per second.....										1,577
Runoff, in acre-feet										95,820

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1952

Hour	Gage height	Discharge	Hour	Gage height	Discharge	Hour	Gage height	Discharge	Hour	Gage height	Discharge
September 9			September 11			September 13			September 15		
6	3.15	85	1	23.03	4,350	7	33.74	39,500	2	10.85	1,090
7	3.10	62	2	22.90	4,290	8	33.27	34,500	3	10.56	1,040
8	3.08	61	3	22.60	4,140	9	32.64	28,900	4	10.28	995
9	3.12	65	4	21.90	3,860	10	32.00	24,100	5	10.14	972
10	3.20	68	5	21.15	3,600	11	31.40	20,400	6	9.97	948
11	3.15	65	6	20.20	3,290	N	30.82	17,700	7	9.81	922
12	3.30	76	7	19.20	2,990	1	30.20	15,400	8	9.64	896
September 10			8	18.38	2,750	2	29.55	13,400	9	9.47	870
1	3.62	104	9	17.80	2,580	3	28.92	11,700	4	9.31	846
2	3.88	124	10	17.68	2,550	4	28.25	10,000	5	9.16	824
3	4.10	146	11	17.85	2,600	5	27.76	9,000	6	9.04	806
4	4.45	183	N	18.15	2,680	6	27.25	8,090	7	8.91	786
5	5.40	302	1	18.70	2,840	7	26.72	7,390	September 16		
6	7.60	594	2	19.35	3,040	8	26.15	6,700	1	7.60	594
7	9.70	905	3	19.93	3,210	9	25.50	6,010	2	7.47	576
8	12.60	1,400	4	20.38	3,350	10	24.85	5,460	3	7.34	558
9	15.00	1,870	5	20.74	3,470	11	24.13	4,960	4	7.22	541
10	17.40	2,470	6	21.70	3,800	12	23.35	4,520	5	7.12	527
11	19.85	3,180	7	23.35	4,520	September 17			6	7.04	516
N	21.25	3,640	8	28.70	11,100	1	21.35	3,670	September 18		
1	22.20	3,980	9	32.65	29,000	2	19.40	3,050	1	7.60	594
2	22.60	4,140	10	33.97	42,300	3	17.55	2,510	2	7.47	576
3	22.75	4,220	11	34.50	49,800	4	16.00	2,110	3	7.34	558
4	22.78	4,230	12	34.85	55,400	5	14.76	1,820	4	7.22	541
5	22.70	4,190	September 12			6	13.87	1,640	5	7.12	527
6	22.50	4,100	1	34.94	56,800	7	13.15	1,500	6	7.04	516
7	22.33	4,030	1:30	34.95	57,000	8	12.56	1,390	September 19		
8	22.36	4,040	2	34.90	56,200	9	12.12	1,310	1	7.60	594
9	22.50	4,100	3	34.75	55,800	10	11.73	1,240	2	7.47	576
10	22.65	4,160	4	34.55	50,600	11	11.40	1,180	3	7.34	558
11	22.85	4,260	5	34.32	47,100	12	11.12	1,150	4	7.22	541
12	22.98	4,330	6	34.05	43,400	September 20			5	7.12	527

FLOODS OF 1952 IN CENTRAL TEXAS

Plum Creek near Luling, Tex.

Location.--Lat 29°42', long 97°37', near left bank on downstream side of pier of bridge on county road, 1 mile downstream from West Fork Plum Creek, 2 miles upstream from Texas & New Orleans Railroad bridge, and 3 miles northeast of Luling, Caldwell County. Datum of gage is 326.57 ft above mean sea level, datum of 1929.

Drainage area.--356 sq mi.

Gage-height record.--Water-stage recorder graph.

Discharge record.--Stage-discharge relation defined by current-meter measurements.

Maxima.--September 1952: Discharge, 1,060 cfs 10-11 p.m. Sept. 10 (gage height, 10.17 ft). 1950 to August 1952: Discharge, 78,500 cfs July 1, 1956 (gage height, 25.7 ft, from floodmarks), from rating curve extended above 54,000 cfs.
Stage known, that of July 1, 1956; flood of December 1913 reached about same stage, from information by local residents.

Mean discharge, in cubic feet per second, September 1952

Day	Discharge	Day	Discharge	Day	Discharge	Day	Discharge	Day	Discharge	Day	Discharge
1	0	6	0	11	555	16	5.1	21	11	26	2.2
2	0	7	0	12	344	17	3.9	22	6.7	27	2.0
3	0	8	0	13	25	18	319	23	4.5	28	1.8
4	0	9	.4	14	13	19	237	24	3.1	29	1.8
5	0	10	496	15	7.8	20	26	25	2.5	30	1.7
Monthly mean discharge, in cubic feet per second.....											69.0
Runoff, in acre-feet.....											4,100

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1952

Hour	Gage height	Discharge	Hour	Gage height	Discharge	Hour	Gage height	Discharge	Hour	Gage height	Discharge
	September 9		N	5.20	482	1	3.94	370	1	4.36	405
2	-0.63	0	1	6.75	646	2	4.76	441	2	3.80	359
4	-.63	0	2	7.71	752	3	5.46	508	3	3.10	305
6	-.63	0	3	8.17	804	4	6.03	567	4	2.36	253
8	-.63	0	4	8.43	836	5	6.55	624	5	1.64	187
10	-.13	0	5	8.66	863	6	7.00	674	6	1.04	107
N	-.12	0	6	8.94	897	7	7.33	710	7	.79	59
2	-.04	.1	7	9.24	935	8	7.51	730	8	.73	49
4	.11	1.4	8	9.51	971	9	7.55	734	9	.69	43
6	.09	1.1	9	9.89	1,020	10	7.50	729	10	.67	40
8	.08	1.0	10	10.17	1,060	11	7.31	708	11	.64	36
10	.08	1.0	11	10.17	1,060	12	6.84	656	12	.62	33
12	.06	.8	12	10.05	1,050		September 12			September 13	
	September 10			September 11		1	5.96	560	N	.54	24
1	.06	.8	1	9.60	984	2	5.04	467	12	.49	18
2	.05	.7	2	8.65	862	3	4.21	392		September 14	
3	.07	.9	3	7.52	731	3:30	4.27	381	N	.42	13
4	.14	1.8	4	6.30	597	4	4.27	397	12	.37	9.7
5	.27	5.2	5	5.06	468	5	5.10	472		September 15	
6	.37	9.7	6	4.00	375	6	5.78	540	N	.33	7.7
7	1.24	140	7	3.23	314	7	6.07	572	12	.30	6.2
7:30	1.39	160	8	2.67	275	8	6.12	577		September 16	
8	1.10	118	9	2.35	252	9	6.06	571	N	.26	4.8
9	1.55	178	10	2.21	242	10	5.83	545	12	.25	4.5
10	2.50	263	11	2.40	256	11	5.50	512		September 17	
11	3.45	351	N	3.10	305	N	4.99	462	N	.23	3.8
									12	.22	3.5

GUADALUPE RIVER BASIN

Guadalupe River at Victoria, Tex.

Location.--Lat 28°47', long 97°01', on left bank just upstream from pier of bridge on U. S. Highway 59 in Victoria, Victoria County, 1,300 ft upstream from Texas & New Orleans Railroad bridge, 10 miles upstream from Coletto Creek, and at mile 51. Datum of gage is 29.23 ft above mean sea level, datum of 1929.

Drainage area.--5,511 sq mi.

Gage-height record.--Water-stage recorder graph except Sept. 1-11, during which graph was drawn on basis of once-daily outside gage readings by U. S. Weather Bureau.

Discharge record.--Stage-discharge relation defined by current-meter measurements. Shifting-control method used Sept. 1-11, 15-30.

Maxima.--September 1952: Discharge, 28,400 cfs 7 p.m. Sept. 16 (gage height, 29.46 ft).
1934 to August 1952: Discharge, 179,000 cfs July 3, 1936 (gage height, 31.22 ft).
Stage known, that of July 3, 1936.

Mean discharge, in cubic feet per second, September 1952

Day	Discharge	Day	Discharge	Day	Discharge	Day	Discharge	Day	Discharge	Day	Discharge
1	123	6	115	11	1,110	16	25,500	21	2,840	26	1,450
2	123	7	121	12	3,350	17	23,700	22	2,140	27	1,360
3	119	8	121	13	6,040	18	9,550	23	1,900	28	1,250
4	117	9	229	14	10,400	19	3,130	24	1,740	29	1,180
5	115	10	417	15	16,400	20	2,640	25	1,580	30	1,180
Monthly mean discharge, in cubic feet per second.....										3,995	
Runoff, in acre-feet.....										237,600	

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1952

Hour	Gage height	Discharge	Hour	Gage height	Discharge	Hour	Gage height	Discharge	Hour	Gage height	Discharge
September 9											
6	2.20	155	6	11.31	3,390	4	29.00	22,000	4	10.05	2,600
N	2.58	240	12	12.13	3,780	8	28.82	20,400	8	10.24	2,680
6	2.82	298	12	13.18	4,310	12	28.48	18,700	12	10.46	2,770
12	2.93	326	September 13		September 18		September 21				
			6	14.50	5,020	2	28.20	17,600	4	10.66	2,860
			N	16.10	5,950	4	27.60	16,200	8	10.80	2,920
4	2.91	320	6	17.67	6,960	6	26.50	14,400	N	10.81	2,930
8	2.92	323	12	19.20	8,160	8	25.00	12,500	4	10.69	2,870
N	3.07	362	September 14		10	23.15	10,500	8	10.44	2,760	
4	3.59	502	6	20.64	9,340	N	20.75	8,280	12	10.04	2,600
8	3.83	569	N	21.77	10,300	2	18.45	6,230	September 22		
12	3.69	530	6	23.02	11,400	4	16.40	5,190	6	9.52	2,310
September 11			12	24.41	12,700	6	15.00	4,530	N	8.70	2,080
2	3.62	510	September 15		8	13.99	4,120	6	8.54	1,940	
4	3.58	499	6	26.00	14,400	10	13.24	3,840	12	8.16	1,870
6	3.59	502	N	27.30	16,400	12	12.67	3,610	September 23		
8	3.79	558	6	28.12	18,300	September 19		6	8.17	1,890	
10	4.50	1,62	12	28.64	20,300	4	12.00	3,360	N	8.27	1,930
N	6.00	1,270	September 16		8	11.60	3,250	6	8.25	1,920	
2	6.47	1,420	6	29.01	23,100	N	11.30	3,120	12	8.04	1,840
4	6.62	1,480	N	29.29	25,900	4	11.00	3,010	September 24		
6	6.68	1,500	6	29.45	28,200	8	10.69	2,870	6	7.80	1,750
8	7.00	1,620	7	29.46	28,400	12	10.39	2,740	N	7.81	1,750
10	7.70	1,890	12	29.41	27,600	September 20		6	7.76	1,730	
12	8.35	2,130	September 17		4	10.15	2,640	12	7.56	1,660	
September 12			6	29.33	26,400	8	9.99	2,580			
6	10.34	2,940	N	29.14	23,900	N	9.95	2,560			

FLOODS OF 1952 IN CENTRAL TEXAS

Medina Lake near San Antonio, Tex.

Location.--Lat 29°32', long 98°56', at gate operating platform, 578 ft from left end of Medina Dam on Medina River, 4 miles upstream from Medina diversion dam, 13 miles north of Castroville, and about 28 miles west of San Antonio, Bexar County. Datum of gage is 7.5 ft below mean sea level (levels by Corps of Engineers).

Drainage area.--587 sq mi.

Gage-height record.--Wire-weight gage read once-daily when stage is changing materially, otherwise intermittently.

Maxima.--September 1952: Contents observed, 26,170 acre-ft Sept. 23-27 (gage height, 996.4 ft).
1913 to August 1952: Contents observed, 288,800 acre-ft Sept. 16, 1919 (gage height, 1,078.0 ft).

Remarks.--Reservoir is formed by gravity-type concrete dam. Dam completed and storage began May 7, 1913. Spillway section is located near right end of dam and is of natural rock, 880 ft long, with a 3-ft wide cut-off wall. Total capacity, 254,000 acre-ft (gage height, 1,072.0 ft, top of spillway section). Water for irrigation is supplied by three 60-inch pipes equipped with vertical lift gates, at gage height 966.5 ft (capacity, 4,780 acre-ft). Reservoir can be emptied by two 30-inch sluice pipes equipped with vertical lift gates, at gage height 920.0 ft. Water used for irrigation of lands in Bexar, Medina, Atascosa Counties Water Control and Improvement District No. 1, which has a permit from the Texas Board of Water Engineers to divert 300,000 acre-ft of water to irrigate 150,000 acres. There is no power developed. Gage heights and capacity table furnished by Bexar, Medina, Atascosa Counties Water Control and Improvement District No. 1.

Contents, in acre-feet, September 1952

Day	Contents	Day	Contents	Day	Contents	Day	Contents	Day	Contents	Day	Contents
1	-	6	14,080	11	20,660	16	-	21	-	26	-
2	-	7	-	12	24,190	17	24,630	22	-	27	26,170
3	-	8	-	13	24,410	18	24,630	23	26,170	28	-
4	-	9	-	14	24,520	19	-	24	-	29	-
5	-	10	14,080	15	-	20	26,060	25	26,170	30	26,060
Change in contents during month										+11,800	

San Antonio River near Falls City, Tex.

Location.--Lat 28°57'05", long. 98°03'55", on left bank 23 ft downstream from bridge on Farm to Market Highway 791, 0.9 mile upstream from Scared Dog Creek, and 3.6 miles southwest of Falls City, Karnes County. Datum of gage is 285.49 ft above mean sea level, datum of 1925.

Drainage area.--2,071 sq mi.

Gage-height record.--Water-stage recorder graph.

Discharge record.--Stage-discharge relation defined by current meter measurements. Shifting-control method used Sept. 1-11, 23-30.

Maxima.--September 1952: Discharge, 857 cfs 4 a.m. to noon Sept. 13 (gage height, 2.51 ft, from floodmark).
1925 to August 1952: Discharge, 47,400 cfs Sept. 29, 1946 (gage height, 33.80 ft, from floodmark).
Stage known since at least 1875, that of Sept. 29, 1946, from information by local residents.

Remarks.--Flow partly regulated by Medina Lake (see preceding page) and Olmos flood-control reservoir, having a combined capacity of 269,500 acre-ft. Storage began in Medina Lake in 1913, and Olmos Dam was completed in 1926. Diversions above station for irrigation.

Mean discharge, in cubic feet per second, September 1952

Day	Discharge	Day	Discharge	Day	Discharge	Day	Discharge	Day	Discharge	Day	Discharge
1	73	6	67	11	522	16	145	21	167	26	115
2	70	7	70	12	813	17	122	22	126	27	115
3	61	8	67	13	845	18	274	23	112	28	112
4	61	9	75	14	507	19	206	24	112	29	112
5	64	10	107	15	201	20	278	25	115	30	108
Monthly mean discharge, in cubic feet per second.....										194	
Runoff, in acre-feet										11,550	

GUADALUPE RIVER BASIN

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GUADALUPE RIVER BASIN

San Antonio River near Falls City, Tex.--Continued

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1952

Hour	Gage height	Discharge	Hour	Gage height	Discharge	Hour	Gage height	Discharge	Hour	Gage height	Discharge
12	September 8		1	September 11		7	2.15	622	12	2.42	798
	0.94	67	2	1.03	95	8	2.16	629		September 14	
	September 9		1	1.03	95	9	2.20	655	4	2.32	733
4	.96	73	3	1.03	95	10	2.25	688	8	2.15	622
8	.96	73	4	1.08	112	11	2.29	714	N	1.94	491
N	.96	73	5	1.19	151	12	2.33	740	4	1.73	374
4	.96	73	6	1.62	321		September 12		8	1.57	299
8	.96	73	7	1.92	479	4	2.41	792	12	1.45	250
10	.96	73	8	2.01	534	8	2.43	804		September 15	
11	1.08	105	9	2.09	584	N	2.44	811	6	1.35	210
12	1.07	108	10	2.20	655	4	2.47	830	N	1.32	198
	September 10		11	2.29	714	6	2.49	844	6	1.29	186
4	1.04	98	N	2.33	740	12	2.50	850	12	1.25	170
8	1.01	89	1	2.35	752		September 13			September 16	
N	1.10	119	2	2.35	752	4	2.51	857	N	1.17	140
4	1.08	112	3	2.31	726	8	2.51	857	12	1.14	129
8	1.12	126	4	2.26	694	N	2.51	857		September 17	
12	1.03	95	5	2.21	662	4	2.49	844	N	1.11	119
			6	2.17	636	8	2.47	830	12	1.11	119

Cibolo Creek near Bulverde, Tex.

Location.--Lat 29°43'35", long 98°25'40", on left bank at William Classen ranch house, 1.6 miles downstream from bridge on U. S. Highway 281, 2 miles southeast of Bulverde, Comal County, and 4.7 miles upstream from Dripping Springs Creek. Altitude of gage is about 1,015 ft (from topographic map).

Drainage area.--198 sq mi.

Gage-height record.--Water-stage recorder graph except for two short periods totaling 11 hours on Sept. 11, during which floodmarks were used to complete gage-height graph.

Discharge record.--Stage-discharge relation defined by current-meter measurements below 4,400 cfs and extended above on basis of slope-area determination at peak stage.

Maxima.--September 1952: Discharge, 11,700 cfs 3 p.m. Sept. 11 (gage height, 15.16 ft, from floodmark).

1946 to August 1952: Discharge, 8,510 cfs Sept. 27, 1946 (gage height, 12.50 ft, from floodmark), from rating curve extended above 4,400 cfs as described above.

Remarks.--The purpose of this station is to determine the streamflow losses during periods of medium and low flow. There are no surface diversions, but much of the surface flow enters sink holes and caverns in the Glen Rose limestone above station.

Mean discharge, in cubic feet per second, September 1952

Day	Discharge	Day	Discharge	Day	Discharge	Day	Discharge	Day	Discharge	Day	Discharge
1	0	6	0	11	4,720	16	0.1	21	0	26	0
2	0	7	0	12	319	17	0	22	0	27	0
3	0	8	0	13	60	18	.2	23	0	28	0
4	0	9	0	14	15	19	0	24	0	29	0
5	0	10	24	15	2.4	20	0	25	0	30	0
Monthly mean discharge, in cubic feet per second.....										171	
Runoff, in acre-feet.....										10,200	

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1952

Hour	Gage height	Discharge	Hour	Gage height	Discharge	Hour	Gage height	Discharge	Hour	Gage height	Discharge
12	September 8		6	1.36	0	4	13.80	10,100		September 13	
	1.11	0	7	1.38	0	5	11.50	7,350	6	3.00	78
N	September 9		8	2.12	11	6	9.18	4,800	N	2.83	57
12	1.11	0	9	2.85	59	7	9.27	4,900	6	2.68	41
	September 10		10	3.64	186	8	9.20	4,820	12	2.53	29
1	1.11	0	11	3.80	220	9	8.18	3,700		September 14	
2	1.11	0	12	3.74	207	10	7.10	2,540	6	2.36	20
3	1.11	0		September 11		11	6.30	1,750	N	2.21	14
4	1.48	.2	1	4.36	399	12	5.78	1,280	6	2.06	9.0
5	1.36	0	2	10.70	6,470		September 12		12	1.96	6.2
6	1.39	0	3	14.20	10,600	2	5.11	767		September 15	
7	1.37	0	4	12.50	8,510	4	4.63	510	6	1.66	3.7
8	1.34	0	5	10.64	6,400	6	4.34	391	N	1.77	2.0
9	1.35	0	6	8.90	4,490	8	4.11	308	6	1.67	.8
10	1.33	0	7	7.66	3,130	10	3.87	238	12	1.57	.4
11	1.32	0	8	6.60	2,040	N	3.73	205		September 16	
N	1.33	0	9	5.90	1,390	2	3.60	178	6	1.48	.2
1	1.33	0	10	5.48	1,030	4	3.50	159	N	1.39	0
2	1.32	0	11	5.28	886	6	3.40	141	6	1.32	0
3	1.31	0	N	5.62	1,150	8	3.32	127	12	1.28	0
4	1.42	0	1	9.10	4,710	10	3.23	113		September 17	
5	1.37	0	2	13.40	9,590	12	3.17	103	N	1.23	0
			3	15.16	11,700				11	1.34	0
									12	1.56	.4

FLOODS OF 1952 IN CENTRAL TEXAS

Cibolo Creek at Selma, Tex.

Location.--Lat 29°35'35", long 98°18'40", on right bank 0.6 mile downstream from Missouri-Kansas-Texas Railroad bridge and 0.8 mile upstream from bridge on U. S. Highway 81 at Selma, Bexar County. Datum of gage is 728.34 ft above mean sea level, datum of 1929.

Drainage area.--280 sq mi.

Gage-height record.--Water-stage recorder graph.

Discharge record.--Stage-discharge relation defined by current-meter measurements below 7,000 cfs and extended above on basis of slope-area determination at peak stage.

Maxima.--September 1952: Discharge, 36,400 cfs 8 a.m. Sept. 11 (gage height, 19.37 ft). 1946 to August 1952: Discharge, 7,240 cfs Sept. 27, 1946 (gage height, 10.48 ft). Stage known since at least 1869, about 26 ft in 1889; flood of 1913 was probably about 2 ft lower, from information by local residents.

Remarks.--There are no surface diversions, but part of the flow enters Edwards limestone in the Balcones fault zone which crosses the basin between this station and the station upstream near Bulverde (see preceding page).

Mean discharge, in cubic feet per second, September 1952

Day	Discharge	Day	Discharge	Day	Discharge	Day	Discharge	Day	Discharge	Day	Discharge
1	0	6	0	11	8,970	16	16	21	1.6	26	0.9
2	0	7	0	12	1,760	17	6.2	22	1.4	27	.8
3	0	8	0	13	208	18	12	23	1.3	28	.8
4	0	9	0	14	86	19	5.0	24	1.1	29	.7
5	0	10	0	15	36	20	2.4	25	1.0	30	.6
Monthly mean discharge, in cubic feet per second.....										370	
Runoff, in acre-feet										22,040	

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1952

Hour	Gage height	Discharge	Hour	Gage height	Discharge	Hour	Gage height	Discharge	Hour	Gage height	Discharge
12	September 8		8	19.37	36,400	2	September 12		N	September 14	
	0.36	0	9	17.60	28,600		9.22	5,130		3.71	82
N	September 9		10	14.83	18,000	4	7.58	3,050	12	3.51	52
	.36	0	11	12.25	10,900		6.63	2,030		September 15	
12	.36	0	N	10.10	6,480	6	6.09	1,490	N	3.34	34
	September 10		1	8.43	4,060		10	5.72		1,140	12
N	.36	0	2	7.62	3,090	N	5.41	874	September 16		
	.38	0	3	7.08	2,500		5.21	718		12	3.12
12	September 11		4	6.62	2,020	4	5.01	582	12	3.02	9.3
	.38	0	5	6.30	1,700		6.484	474		September 17	
1	.40	0	6	6.06	1,460	8	4.74	419	N	2.94	5.9
	.41	0	7	7.30	2,740		10	4.64		370	12
3	.42	0	8	9.80	6,000	12	4.55	331	12		
	10.50	7,200	9	12.19	10,800		September 13				
6	14.40	16,600	10	12.93	12,500	6	4.33	248	12		
	17.50	28,200	11	12.44	11,400		6	4.18		198	
7			12	11.58	9,380	6	4.04	158	12		
							12	3.92		127	

GUADALUPE RIVER BASIN

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GUADALUPE RIVER BASIN

Cibolo Creek near Falls City, Tex.

Location.--Lat 29°01', long 97°56', on right bank at downstream side of pier of bridge on State Highway 123, 5.5 miles northeast of Falls City, Karnes County, and 9 miles upstream from mouth. Datum of gage is 264.28 ft above mean sea level, datum of 1929, Houston supplementary adjustment of 1943.

Drainage area.--831 sq mi.

Gage-height record.--Water stage recorder graph.

Discharge record.--Stage-discharge relation defined by current-meter measurements. Shifting-control method used Sept. 1-10, 21-30.

Maxima.--September 1952: Discharge, 16,200 cfs 2 p.m. Sept. 11 (gage height, 27.93 ft). 1930 to August 1952: Discharge, 33,600 cfs July 6, 1942 (gage height, 34.45 ft). Flood in October 1913 reached a stage about half a foot higher than that of July 6, 1942.

Remarks.--There are no surface diversions, but much of the surface flow of Cibolo Creek enters sink holes and caverns in Glen Rose limestone and in Edwards limestone in the Balcones fault zone which crosses the basin above station at Selma (see preceding page).

Mean discharge, in cubic feet per second, September 1952

Day	Discharge	Day	Discharge	Day	Discharge	Day	Discharge	Day	Discharge	Day	Discharge
1	4.9	6	5.3	11	9,380	16	253	21	65	26	34
2	6.2	7	4.9	12	7,440	17	108	22	51	27	32
3	6.6	8	5.3	13	4,790	18	806	23	43	28	31
4	6.2	9	7.6	14	521	19	194	24	39	29	30
5	5.3	10	283	15	323	20	87	25	35	30	30
Monthly mean discharge, in cubic feet per second.....										821	
Runoff, in acre-feet.....										48,850	

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1952

Hour	Gage height	Discharge	Hour	Gage height	Discharge	Hour	Gage height	Discharge	Hour	Gage height	Discharge
September 8			September 11			September 12			September 14		
12	0.85	5.7	1	6.31	854	2	19.00	6,850	4	5.70	708
N	September 9		2	6.31	854	4	17.90	5,930	8	5.00	550
	6.9	7.4	3	6.32	857	6	17.62	5,730	N	4.53	456
12	.94	9.8	4	6.90	1,000	8	17.94	5,960	4	4.18	392
September 10			5	8.50	1,480	10	18.55	6,440	8	3.91	348
1	.94	9.8	6	10.60	2,210	N	19.30	7,120	12	3.67	312
2	.94	9.8	7	13.10	3,190	2	20.10	7,900	September 15		
3	.94	9.8	8	15.80	4,500	4	20.73	8,530	6	3.39	273
4	.94	9.8	9	18.40	6,320	6	21.10	8,910	N	3.15	239
5	.96	11	10	21.30	9,130	7	21.15	8,960	2	3.08	229
6	1.04	15	11	25.00	13,500	8	21.12	8,930	4	3.02	221
7	1.45	45	N	26.50	15,700	10	20.80	8,600	6	3.05	225
8	2.58	163	1	27.55	17,500	12	20.20	8,000	8	3.90	346
9	2.96	213	2	27.93	18,200	September 13			10	5.50	660
10	3.29	259	3	27.84	18,000	2	19.52	7,320	12	6.36	866
11	2.95	212	4	27.45	17,300	4	19.02	6,670	September 16		
N	3.50	288	5	26.88	16,300	6	18.73	6,610	2	5.30	616
1	4.30	414	6	26.15	15,100	8	18.45	6,360	4	4.00	362
2	4.16	389	7	25.30	13,900	10	17.95	5,960	6	3.28	257
3	3.93	351	8	24.50	12,800	N	17.06	5,340	8	2.94	210
4	3.43	278	9	23.60	11,700	2	15.82	4,510	10	2.75	186
5	3.01	219	10	22.64	10,600	4	14.20	3,660	N	2.64	171
6	3.10	232	11	21.65	9,520	6	12.40	2,910	6	2.44	145
7	4.15	387	12	20.66	8,460	8	10.25	2,080	12	2.32	130
8	5.15	583				10	8.26	1,400	September 17		
9	5.57	677				12	7.00	1,030	N	2.11	105
10	5.80	732							12	1.98	92
11	6.25	840									
12	6.50	900									

FLOODS OF 1952 IN CENTRAL TEXAS

San Antonio River at Goliad, Tex.

Location.--Lat 28°39', long 97°22', on right bank at upstream side of pier of bridge on U. S. Highway 183, 1.3 miles southeast of courthouse in Goliad, Goliad County, and 10 miles upstream from Manahuilla Creek. Datum of gage is 91.08 ft above mean sea level, datum of 1929, Houston supplementary adjustment of 1943.

Drainage area.--3,918 sq mi.

Gage-height record.--Water-stage recorder graph except for period Sept. 10-14, when graph was estimated on basis of floodmark of peak and observer's gage readings and estimates of gage heights (after outside gage was destroyed).

Discharge record.--Stage-discharge relation defined by current-meter measurements. Shifting-control method used Sept. 1-9, 15-18, 21-30.

Maxima.--September 1952: Discharge, 23,900 cfs about 11 a.m. Sept. 14 (gage height, 39.82 ft, from floodmark).
1924-29, 1939 to August 1952: Discharge, 33,800 cfs July 9, 1942 (gage height, 44.9 ft).

Floods of October 1913 and June 15, 1935, reached about same stage as that of July 9, 1942.

Remarks.--Flow partly regulated by Medina Lake and Olmos flood-control reservoir, having a combined capacity of 269,500 acre-ft. Storage began in Medina Lake in 1913, and Olmos Dam was completed in 1926.

Mean discharge, in cubic feet per second, September 1952

Day	Discharge	Day	Discharge	Day	Discharge	Day	Discharge	Day	Discharge	Day	Discharge
1	81	6	69	11	8,070	16	5,060	21	702	26	252
2	86	7	71	12	15,200	17	946	22	547	27	238
3	89	8	74	13	21,100	18	860	23	396	28	238
4	82	9	80	14	23,400	19	1,840	24	315	29	230
5	79	10	993	15	15,800	20	1,800	25	275	30	222
Monthly mean discharge, in cubic feet per second.....										3,306	
Runoff, in acre-feet.....										196,800	

Gage height, in feet, and discharge, in cubic feet per second, at indicated time, 1952

Hour	Gage height	Discharge	Hour	Gage height	Discharge	Hour	Gage height	Discharge	Hour	Gage height	Discharge
12	September 8		8	23.00	6,800	N	35.90	15,800		September 19	
	2.59	77	10	24.15	7,440	4	34.50	13,100	1	7.65	996
	September 9		N	25.30	8,170	8	32.94	11,100	2	7.68	1,000
N	2.59	77	2	26.30	8,760	12	31.06	9,700	4	7.98	1,070
12	2.66	89	4	27.25	9,390		September 16		6	8.62	1,210
	September 10		6	28.15	10,000	2	29.95	9,020	8	9.52	1,420
1	2.66	89	8	29.00	10,800	4	28.68	8,090	10	10.48	1,660
2	2.66	89	10	29.80	11,500	6	27.33	7,150	N	11.52	1,940
3	2.66	89	12	30.40	12,100	8	25.86	6,230	4	12.94	2,320
4	2.66	89		September 12		10	24.31	5,360	8	13.74	2,550
5	2.67	91	4	31.70	13,100	N	22.50	4,600	11	13.91	2,590
6	2.67	91	8	32.90	14,200	2	20.63	3,960	12	13.90	2,590
7	2.68	N	N	33.90	15,200	4	18.78	3,390		September 20	
8	2.69	95	4	34.80	16,300	6	16.94	2,860	4	13.46	2,470
9	2.69	95	8	35.64	17,400	8	15.12	2,400	8	12.51	2,200
10	2.78	111	12	36.40	18,500	10	13.45	2,000	N	11.14	1,840
11	3.53	234		September 13		12	11.74	1,600	4	9.57	1,440
N	4.69	416	4	37.10	19,600		September 17		8	8.12	1,100
1	5.51	561	8	37.70	20,400	4	9.27	1,110	12	7.12	885
2	6.32	718	N	38.21	21,200	8	8.20	902		September 21	
3	7.50	965	4	38.70	22,000	N	7.90	860	4	6.59	763
4	8.50	1,180	8	39.10	22,600	4	7.67	833	8	6.24	692
5	9.74	1,480	12	39.45	23,200	8	7.44	805	N	6.13	670
6	10.90	1,770		September 14		12	7.07	728	4	6.10	664
7	11.80	2,010	4	39.70	23,700		September 18		8	6.08	660
8	12.90	2,370	8	39.80	23,800	1	6.92	718	12	6.01	646
9	13.90	2,700	11	39.82	23,900	2	6.95	724		September 22	
10	14.90	3,070	N	39.80	23,800	4	6.98	730	N	5.51	543
11	15.90	3,460	4	39.78	23,800	6	7.00	734	12	5.03	457
12	16.90	3,920	8	39.30	22,900	8	7.02	736		September 23	
	September 11		12	38.70	21,900	10	7.13	782	4	4.68	589
2	18.30	4,640		September 15		N	7.27	833	12	4.44	548
4	20.00	5,310	4	38.00	20,500	6	7.82	1,030		September 24	
6	21.50	6,010	8	37.00	18,300	12	7.67	1,000	N	4.24	309
									12	4.13	293

SUMMARY OF FLOOD STAGES AND DISCHARGES

Table 2 is a summary of flood discharges for the flood of 1952 and comparative data for previous floods at stream-gaging stations and at locations where no systematic streamflow records have been collected on streams in the area covered by this report. Dated entries in the column "Period of record" identify gaging stations in the table. Locations are plotted on plate 1, showing all points at which maximum discharge during the flood was determined.

Figure 10, embodying data from table 2, shows the flood discharges in cubic feet per second per square mile for the floods of 1952 plotted against the corresponding drainage areas.

Table 2. --Summary of flood stages and discharges in Colorado and Guadalupe River basins in central Texas, September 1952

[Maximum discharges were obtained from gaging station records or by discharge measurement near crest except as indicated by the following symbols: C, contracted-opening determination; F, computed flow over highway embankment; R, inflow to reservoir, based on rate of change of contents in reservoir; S, slope-area determination]

No. on pl 1	Stream and place of determination	Drainage area (square miles)	Period of record	Maximum flood previously known				Maximum during present flood					
				Date	Gage height (feet)	Discharge (cfs)	Cfs per square mile	Date and hour	Gage height (feet)	Discharge (cfs)	Cfs per square mile		
COLORADO RIVER BASIN													
1	Colorado River at Ballinger, Tex.	a 5,240	1907-52	--- Aug. 6, 1906 Sept. 18, 1936	b 36 d 32.0 28.6	--- --- 75,400	--- --- 14.4	Sept. 10	c 9.20	1,900	0.36		
2	Elm Creek at Ballinger, Tex.	458	1932-52	August May 14, 1946	b,c 14.6 10.84	--- 29,200	--- 63.8	Sept. 10, 2 p.m.	7.36	8,600	18.8		
3	Concho River near Paint Rock, Tex.	a 5,263	1915-52	August August 1906 Sept. 17, 1936	b 39.9 e 39.5 f 43.4	--- --- 301,000	--- --- 57.2	Sept. 10, 6:30 p.m.	13.97	1,370	.27		
4	Colorado River at Winchell, Tex.	a 12,680	1923-34, 1939-52	Oct. 15, 1930 Sept. 19, 1936	51.8 g 62.2	76,100 ---	6.00 ---	Sept. 11, 8 a.m.	38.92	44,000	3.77		
5	Pecan Bayou at Brownwood, Tex.	1,614	1917-18, 1923-52	September 1900 Oct. 14, 1930 July 3, 1932	g 21.7 16.92 ---	--- 52,700 h 235,000	--- 32.6 146	Sept. 11, 7 a.m.	.70	5.0	0		
6	San Saba River at Menard, Tex.	1,151	1915-52	June 5 or 6, 1899 July 23, 1938	e 23.3 f 22.2	--- 117,000	--- 102	Sept. 10, 10:30 a.m.	5.81	535	.46		
7	Brady Creek at Brady, Tex.	575	1939-52	July 23, 1938 Apr. 27, 1941	i 29.1 16.81	j 86,000 13,900	150 24.2	Sept. 10, 12 m.	24.80	39,100	68.0		
8	San Saba River at San Saba, Tex.	3,046	1904-6, 1915-52	June 6, 1899 July 23, 1938	e 42.6 f 45.18	--- 203,000	--- 66.6	Sept. 11, 6 a.m.	f 36.90	70,400	23.1		
9	Colorado River at San Saba, Tex.	a 18,700	1915-22, 1923-52	Sept. 25, 1900 July 23, 1938	k 58.4 k 63.2	184,000 224,000	9.83 12.0	Sept. 11, 2:30 p.m.	38.36	69,000	3.69		
10	Bee Water Hole Branch near Cherokee, Tex.	4.74	---	---	---	---	---	Sept. 10	---	2,850C	601		
11	Cherokee Creek near Chappel, Tex.	162	---	(m)	---	---	---	Sept. 11, 5 a.m.	---	m 46,000S	284		

SUMMARY OF FLOOD STAGES AND DISCHARGES

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		1915-52	June 14, 1935	f, 143.3	319,000	181	No runoff from flood		
12	Llano River near Junction, Tex.	1,762	---	---	---	---	Sept. 10, 1-2 p.m.	---	26,700S
13	Llano River near Mason, Tex.	2,599	---	1935 1948	---	---	Sept. 10, 7-9 p.m.	---	50,300S
14	Hickory Creek near Castell, Tex.	157	---	1935p	---	---	Sept. 10	---	10,500S
15	Six Mile Creek near Llano, Tex.	24.5	---	---	---	---	Sept. 11, early a.m.	---	12,200C
16	Johnson Creek near Llano, Tex.	48.5	---	1935	---	---	Sept. 11, early a.m.	---	11,900S
17	Pecan Creek near Llano, Tex.	47.7	---	---	---	---	Sept. 10, 11 p.m.	---	232,000S
18	Llano River at Llano, Tex.	4,000	1939-52	June 14, 1935 June 25, 1948	e 41.5 f 22.9	95.0 27.0	Sept. 11, early a.m.	---	9,960S
19	Oatman Creek near Llano, Tex.	22.1	---	1935	(r)	---	Sept. 11, 2 a.m.	---	6,580
20	Wright's (Mitchell) Creek near Llano, Tex.	14.3	---	1935	(s)	---	Sept. 10, 11 p.m.	---	21,800S
21	Little Llano River at Lone Grove, Tex.	52.0	---	---	---	---	Sept. 11, 12:30 a.m.	---	t 27,600S
22	Honey Creek near Kingsland, Tex.	29.0	---	1935	(t)	---	Sept. 10	---	3,470S
23	Hog Branch near Llano, Tex.	5.90	---	---	---	---	Sept. 10	---	482C
24	Hog Branch tributary near Llano, Tex.	.38	---	---	---	---	Sept. 10, 10-11 p.m.	---	23,800S
25	Coal Creek near Willow City, Tex.	15.4	---	---	---	---	Sept. 10, 10 p.m.	---	18,900S
26	Comanche Creek near Click, Tex.	12.9	---	---	---	---	Sept. 11, 5 a.m.	---	163,000S
27	Sandy Creek near Round Mountain, Tex.	332	---	1869 Sept. 15, 1936	(u) (u)	---	Sept. 10, 10 p.m.	---	16,400S
28	Walnut Creek near Round Mountain, Tex.	19.6	---	---	---	---	Sept. 10, 10:30 a.m.	---	35,200S
29	Pedernales River at Morris Ranch, Tex.	206	---	1900	(v)	---	Sept. 10, 3 p.m.	---	25,200S
30	Wolf Creek near Morris Ranch, Tex.	33.8	---	1919, 1935	(w)	---	Sept. 10, 5 p.m.	---	21,000S
31	Bear Creek near Fredericksburg, Tex.	30.5	---	1900, 1937	(x)	---	Sept. 10, 5-6 p.m.	---	21,300S
32	Live Oak Creek near Fredericksburg, Tex.	46.2	---	---	---	---	Sept. 10, 6 p.m.	---	22,000S
33	Palo Alto Creek near Fredericksburg, Tex.	36.9	---	1900, 1935	(y)	---			

See footnotes at end of table.

FLOODS OF 1952 IN CENTRAL TEXAS

Table 2. --Summary of flood stages and discharges in Colorado and Guadalupe River basins in central Texas, September 1952.--Continued

No. on pl 1	Stream and place of determination	Drainage area (square miles)	Period of record	Maximum flood previously known				Maximum during present flood			
				Date	Gage height (feet)	Discharge (cfs)	Cfs per square mile	Date and hour	Gage height (feet)	Discharge (cfs)	Cfs per square mile
COLORADO RIVER BASIN--Continued											
34	South Grape Creek near Stonewall, Tex.	61.0	---	--- 1913	(z)	---	---	Sept. 10, 9:30 p. m.	---	30,500S	500
35	Pedernales River at Stonewall, Tex.	647	---	--- 1876	27.3	---	---	Sept. 11, 12:30 a. m.	28.4	170,000S	263
36	Rocky Creek near Hye, Tex.	28.1	---	---	---	---	---	Sept. 11, 2 a. m.	(aa)	38,700S	1,380
37	North Grape Creek near Sandy, Tex.	85.7	---	---	---	---	---	Sept. 10, 11-12 p. m.	(ab)	117,000S	1,370
38	Pedernales River near Johnson City, Tex.	947	1939-52	July Aug. 30, 1944	b 33 27.6	---	128,000	Sept. 11, 3 a. m.	f 42.5	441,000S	466
39	Millers Creek near Johnson City, Tex.	51.3	---	May 28, 1929	(ac)	22,900	446	Sept. 10, 10 p. m.	(ac)	34,700S	676
40	Cypress Creek at Cypress Mill, Tex.	52.1	---	---	---	---	---	Sept. 10, 10 p. m.	---	6,210F	119
41	Pedernales River near Spicewood, Tex.	1,260	---	---	---	---	---	Sept. 11, about 6 a. m.	---	452,000S	359
42	Lake Travis near Austin, Tex.	a 6,650	1940-52	---	---	---	---	Sept. 11, 7:30 a. m.	---	803,000R	121
43	Colorado River at Austin, Tex.	ad 36,160	1898-1952	July 7, 1869 June 15, 1935	ae 46.0 f 45.0	---	---	Sept. 17, 12 p. m.	4.59	3,720	---
GUADALUPE RIVER BASIN											
44	Johnson Creek near Ingram, Tex.	150	1941-52	July 2, 1932 June 14, 1935 June 23, 1947	b 35 b 31 or 32 11.76	af 138,000	920	Sept. 10, 6 p. m.	5.08	1,120	7.47
45	Guadalupe River at Comfort, Tex.	990	1917-32, 1939-52	July 16, 1900 July 1, 1932	b 38.4 ag 38.4	---	---	Sept. 10, 6:30 p. m.	f 25.44	38,600	39.0
46	Big Joshua Creek near Waring, Tex.	17.8	---	---	---	---	---	Sept. 10, 4:45 p. m.	---	30,900S	1,740
47	Little Joshua Creek near Welfare, Tex.	8.94	---	---	---	---	---	Sept. 10, 5 p. m.	---	12,800S	1,430
48	Guadalupe River near Spring Branch, Tex.	1,432	1922-52	--- 1869 July 1900 July 3, 1932	ah 53 b 49 42.10	---	---	Sept. 11, 4:30 a. m.	35.83	66,900	46.7
							121,000				
							84.5				

SUMMARY OF FLOOD STAGES AND DISCHARGES

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49	Guadalupe River above Comal River at New Braunfels, Tex.	1,666	1927-52	--- December 1913 June 15, 1935	e 38 e 38 32.95	---	---	---	Sept. 11, 1 p.m.	ai 30.70	72,900	43.8
50	Comal Creek at New Braunfels, Tex.	17.9	---	---	1882 (aj)	---	---	---	Sept. 11, 4 a.m.	---	8,480S	474
51	Dry Comal Creek at New Braunfels, Tex.	94	---	---	1882 (aj)	---	---	---	Sept. 11, 11 a.m.	---	35,000S	372
52	Comal River at New Braunfels, Tex.	117	1882-1952 ak	Oct. 17, 1870 June 15, 1935	am 37.65 c, f 30.71	---	---	---	Sept. 11, 11 a.m.	f 36.14	35,000S	299
53	Blanco River near Blanco, Tex.	93.5	---	---	1929 (ap)	---	---	---	Sept. 11, 1:30 a.m.	---	61,900S	663
54	Hines Creek near Blanco, Tex.	2.92	---	(aq)	---	---	---	---	Sept. 10, 8 p.m.	(aq)	5,430S	1,860
55	Little Blanco River above Twin Sisters, Tex.	21.8	---	---	1919 (ar)	---	---	---	Sept. 10, 9 p.m.	---	19,900S	909
56	Little Blanco River below Twin Sisters, Tex.	60.3	---	---	---	---	---	---	Sept. 10, 9 p.m.	---	41,000S	680
57	Blanco River at Wimberley, Tex.	364	1924-26, 1928-52	May 28, 1929	as 31.10	113,000	310	---	Sept. 11, 8:30 a.m.	f 30.1	95,000S	261
58	Blanco River at San Marcos, Tex.	432	---	May 28, 1929	(at)	---	---	---	Sept. 11, 12 m.	---	96,400	223
59	San Marcos River at Luling, Tex.	833	1939-52	---	1869 au 40.4 1870 au 40.4 July 5, 1942 32.93	---	---	---	Sept. 12, 1:30 a.m.	34.95	57,000	68.4
60	Plum Creek near Luling, Tex.	356	1930-52	December 1913 July 1, 1936	b 25.7 f 25.7	---	---	---	Sept. 10, 10-11 p.m.	10.17	1,060	2.98
61	Guadalupe River near Gonzales, Tex.	3,603	1915-22	Dec. 4, 1913 Oct. 18, 1919 May 29, 1929	av 38.1 av 34.1 av 38.32	---	---	---	Sept. 12, 8-9 p.m.	av 34.38	90,900	25.2
62	Guadalupe River at Cuero, Tex.	5,073	1903-6, 1915-52	Mar. 1, 1903 July 2, 1936	aw 43.0 av 43.2	71,300	14.1	---	Sept. 15, 2:15 a.m.	av 3.10	44,700	8.81
63	Guadalupe River at Victoria, Tex.	5,311	1934-52	July 3, 1936	31.22	179,000	33.7	---	Sept. 16, 7 p.m.	29.46	28,400	5.35
64	Coletto Creek near Victoria, Tex.	514	1939-52	July 1, 1936 Oct. 16, 1946	ax 27.2 ay 31.64	---	---	---	Sept. 12, 2 a.m.	13.71	13,200	26.8
65	San Antonio River at San Antonio, Tex.	a 42	1915-29, 1939-52	July 5, 1919 June 10, 1921	(az) f 20.14	---	---	---	Sept. 18, 1 a.m.	3.47	363	8.64

See footnotes at end of table.

FLOODS OF 1952 IN CENTRAL TEXAS

Table 2.--Summary of flood stages and discharges in Colorado and Gaudalupe River basins in central Texas, September 1952--Continued

No. on pl 1	Stream and place of determination	Drainage area (square miles)	Period of record	Maximum flood previously known				Maximum during present flood					
				Date	Gage height (feet)	Discharge (cfs)	Cfs per square mile	Date and hour	Gage height (feet)	Discharge (cfs)	Cfs per square mile		
GUADALUPE RIVER BASIN--Continued													
66	Medina River near San Antonio, Tex.	1,225	1929-30, 1939-52	(ba) Aug. 29, 1946 Sept. 27, 1946	ba 55 --- c 41.57	--- 31,800 ---	--- 25.9 ---	Sept. 12, 1:30 a.m.	9.11	801	0.65		
67	San Antonio River near Falls City, Tex.	2,071	1925-52	Sept. 29, 1946	bb 33.80	47,400	22.9	Sept. 13, 4 a.m. to 12 m.	f 2.51	857	.41		
68	Cibolo Creek near Boerne, Tex.	77.6	---	June 1, 1937	(bc)	---	---	Sept. 10, 5 p.m.	---	27,900S	360		
69	Cibolo Creek near Bulverde, Tex.	198	1946-52	--- Sept. 27, 1946	1913 (bd) f 12.50	--- 8,510	--- 43.0	Sept. 11, 3 p.m.	f 15.16	11,700S	59.1		
70	Cibolo Creek at Selma, Tex.	280	1946-52	--- Sept. 27, 1946	1889 b 26 1913 b 24 10.48	--- 7,240	--- 25.8	Sept. 11, 8 a.m.	19.37	36,400S	130		
71	Cibolo Creek near Falls City, Tex.	831	1930-52	October July 6, 1942	1913 be 35.0 34.45	--- 33,600	--- 40.5	Sept. 11, 2 p.m.	27.93	18,200	21.9		
72	San Antonio River at Goliad, Tex.	3,918	1924-29, 1939-52	October June 15, 1935 July 9, 1942	1913 be 44.9 be 44.9 44.9	--- --- 33,800	--- --- 8.63	Sept. 14, about 11 a.m.	f 39.82	23,900	6.10		

- a Contributing area only.
- b About, from information by local residents.
- c Affected by backwater.
- d About, from floodmarks; affected by backwater.
- e From information by local residents.
- f From floodmarks.
- g Maximum known; from information by Gulf, Colorado & Santa Fe Railway Co.
- h About; computed flow into Brownwood Reservoir, based on rate of change of contents in reservoir; data furnished by engineers of Brown County Water Improvement District No. 1.
- i Present site and datum.
- j Determined at site 5 miles downstream.
- k Present site, based on floodmarks at site then in use.
- m Flood of 1952 was second highest since 1854 and was 4 ft higher than flood of 1936.
- n Flood of 1882 was 2 or 3 ft higher than flood of 1952.
- p Two peaks occurred; the first was due to Hickory Creek flow and was 3.3 ft lower than in 1952, the second was due to backwater from Llano River and was 6.9 ft higher than in 1952. These are highest floods in past 50 years.
- q Said to have been 6 ft lower than flood of 1952 but the highest in 20 years previous to 1952.
- r Peak stage was 1.7 ft higher than that of 1952.
- s Peak stage was 1.4 ft higher than in 1952, and the highest since at least 1929.
- t Flood of 1952 was the highest in the past 64 years and about 1 ft higher than flood of 1935.
- u Flood of 1952 was 8 ft higher than that of 1869 and 13 ft higher than flood of 1936.
- v Two floods occurred in 1900, the higher of which was about 10 ft higher than flood of 1952 and was the highest since 1880.
- w Floods of 1919 and 1935 reached about same height, or 1.3 ft higher than flood of 1952, and were highest in past 65 years.
- x Floods of 1900 and 1937 were lower than flood of 1952 by 1.5 and 4 ft respectively.
- y Maximum stage known occurred in 1900; flood of 1935 reached about same stage as flood of 1952.
- z The flood of 1952 was highest since 1870 and 1 ft higher than flood of 1913.
- aa Highest known in 25 years.
- ab Highest known since 1881.
- ac Flood of 1952 was 2.4 ft higher than that of 1929.
- ad Includes noncontributing area.
- ae Highest stage since at least 1843 (adjusted to present site and datum on basis of record for flood of 1935), from information concerning stage at former site furnished by Dean T. U. Taylor.
- af Determined at point half a mile downstream from State Fish Hatchery, about 6 or 7 miles above gage. Stage is maximum known since at least 1852.
- ag From floodmark, highest known since at least 1848; data furnished by Texas Highway Department.
- ah About; highest known since at least 1859.
- aj Occurred at 12:30 p.m.; affected by backwater.
- ak Floods of 1882 and 1952 reached about same stage and are the maximum known.
- al Only discharge measurements available prior to 1927.
- am From floodmark about half a mile downstream. May have been affected by backwater from Guadalupe River. At a point about 1½ miles downstream the flood of 1870 was 3.80 ft higher than flood of 1952.
- an Discharge not determined.
- ap Flood of 1929 was 5.1 ft lower than flood of 1952.
- aq Flood of 1952 was 2 ft higher than highest flood in past 50 or 60 years.
- ar Flood of 1919 was 5½ to 6 ft lower than flood of 1952.
- as From floodmark. Highest known since at least 1869, from information by local residents.
- at Flood of May 28, 1929 was 1.3 ft higher than flood of 1952.
- au Maximum known, from information by State Highway Department.
- av Gage height from U. S. Weather Bureau records.
- aw U. S. Geological Survey gage at powerhouse 3 miles north of Cuero, at datum then in use.
- ax Stage at Texas & New Orleans Railroad bridge 100 ft downstream, from information by railroad company.
- ay Highest stage known since at least 1875.
- az Flood of 1819 equaled or exceeded that of 1921. Flood of 1921 is highest known since 1819.
- ba Maximum known, occurred sometime prior to construction of Medina Dam in 1913.
- bb From floodmark. Highest stage known since at least 1875, from information by local residents.
- bc Flood of June 1, 1937 was 0.71 ft higher than flood of 1952 in Boerne, Tex.
- bd The highest known flood occurred in 1913 (stage not determined).
- be About.

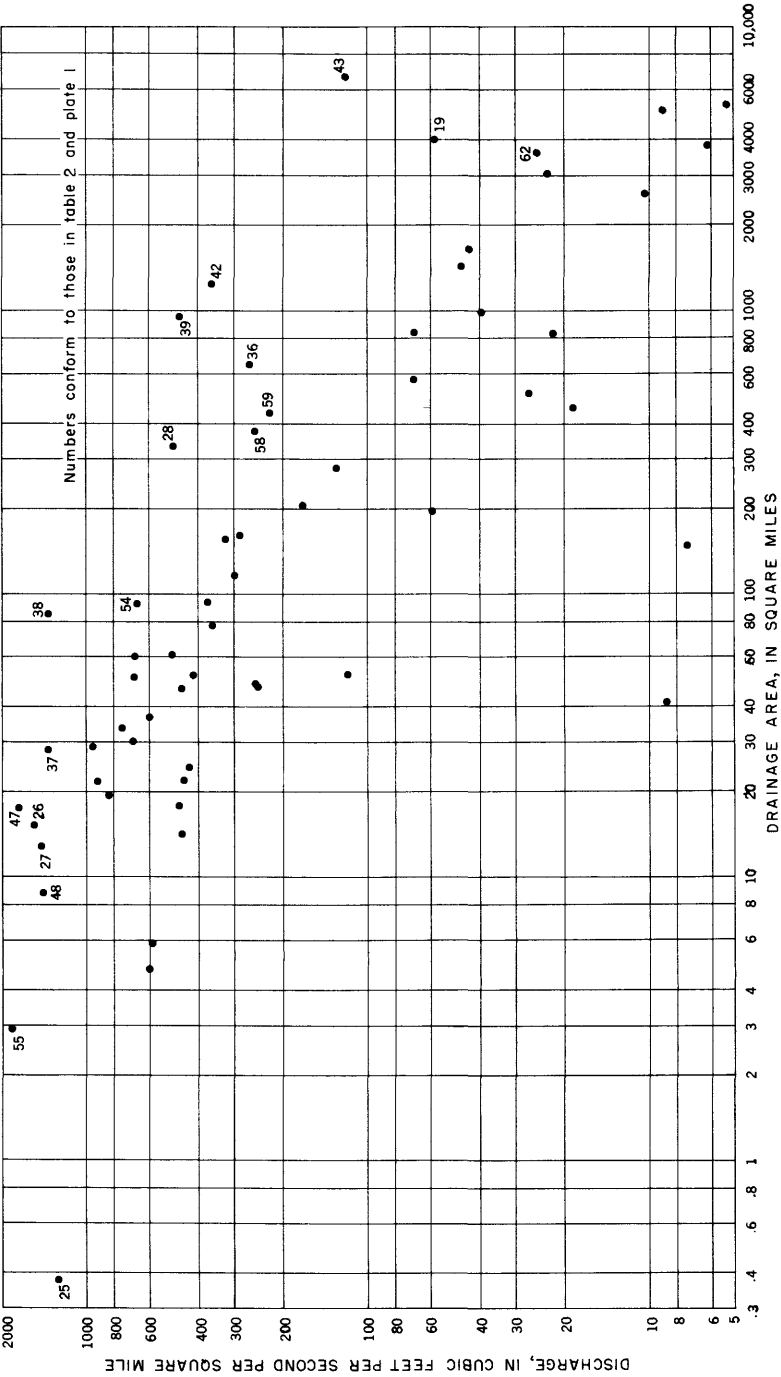


Figure 10. --Relation of unit discharge to size of drainage basin.

STORAGE

The storage reservoirs on the Colorado River--Buchanan Reservoir and Lake Travis--discharged no water during the flood period. The smaller reservoirs--Inks, Granite Shoals, Marble Falls, and Austin--are "run-of-the-river" intended principally for power generation. These small reservoirs had little regulatory effect on discharges.

The closing of the gates during the flood period on the dams at Buchanan Reservoir and Lake Travis effectively divided the Colorado River basin into three independent parts: above Buchanan Reservoir, between Buchanan Reservoir and Lake Travis, and below Lake Travis.

Lake Travis effectively controlled the flow of the Colorado River below the lake. Without this control it would be difficult to estimate the resultant damage to the present building developments in the flood plain at Austin, for Lake Travis stored water at a peak rate of 803,000 cfs.

RECORDS OF PREVIOUS FLOODS

At all points where discharges were determined for the flood of 1952, investigations were made to obtain information on historical floods. Table 2 contains data on the greatest flood previously known at each point where records are collected systematically. More detailed information on historical floods in the Guadalupe and Colorado River basins can be found in U. S. Geological Survey reports listed in the bibliography at the end of this report. Available information on floods prior to 1921 is summarized in Water-Supply Paper 488.

The flood of July 1869 was the highest known on the Colorado River at Austin. According to Taylor (1900, p. 34) the stage of that flood was 43 feet (46 feet, present site and datum). The flood of June 1935 reached a stage of 45 feet, present site and datum, and was only a foot lower than the flood of July 1869.

The greatest floods on Colorado River prior to 1935 for which there are authentic records occurred in 1900 and 1913. A study of all available information shows that those floods were of about the same size. The Austin dam failed during the flood of 1900.

The greatest flood of record on the Pedernales River prior to 1952 was in July 1869 when the maximum discharge was about one-half of that of September 11, 1952.

The flood of December 1913 was one of the greatest floods of the Guadalupe River for which any records are available. At New Braunfels, a stage of about 38 feet was reached in December 1913 and in 1869, which was about 5 feet higher than the flood of June 1935 and more than 7 feet higher than the flood of September 1952. Downstream at Gonzales, the flood of December 1913 reached a stage of 38.1 feet and the flood of May 1929, a stage of 38.32 feet according to gage readings made by the Weather Bureau. These are the highest stages known at Gonzales, and are about 4 feet higher than the stage of the flood of September 1952. At New Braunfels, the flood of 1929 was not exceptional.

With one exception the flood of September 1921, which covered a large area in south-central Texas, was the highest on the San Antonio River at San Antonio of which there is any information. The flood of July 1819 probably equaled if not exceeded it and washed away buildings in San Antonio that had stood for nearly 200 years. Flood runoff was comparatively light on the San Antonio River in September 1952.

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