UNITED STATES DEPARTMENT OF THE INTERIOR

FLOODS IN THE CANADIAN AND PECOS RIVER BASINS OF NEW MEXICO

MAY AND JUNE 1937

With Summary of Flood Discharges in New Mexico

GEOLOGICAL SURVEY WATER-SUPPLY PAPER 842

UNITED STATES DEPARTMENT OF THE INTERIOR
Harold L. Ickes, Secretary

GEOLOGICAL SURVEY
W. C. Mendenhall, Director

Water-Supply Paper 842

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TATE DALRYMPLE AND OTHERS

UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON: 1939

For sale by the Superintendent of Documents, Washington, D. C. - - - - Price 20 cents (paper cover)

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FLOODS IN CANADIAN AND PECOS RIVER BASINS OF NEW MEXICO MAY AND JUNE 1937

WITH SUMMARY OF FLOOD DISCHARGES IN NEW MEXICO

By Tate Dalrymple and others

ABSTRACT

In May and June floods occurred in the Canadian and Pecos River Basins of New Mexico that were unusually high and in many places were record breaking.

The floods were caused by heavy rains that occurred over the eastern part of the State from May 23 to June 4 in a series of intense and intermittent storms. During these storms of the cloudburst type as much as 12 inches of rain fell in the 13-day period, and a fall of 7 inches in 2 hours and 40 minutes was reported from the vicinity of Clayton. Heavy rains also fell in the mountainous region west of Roswell, amounting to as much as 10 inches at some places.

Much of the region that had excessive rainfall is relatively flat and has no well-defined drainage system. From these areas there was very little run-off and practically no water was contributed to the major streams.

Hail fell at many places in eastern New Mexico, causing damage to crops, livestock, and other property. Hail fell somewhere in the Canadian and Pecos River Basins almost every day during the storm period, but the duration of the fall was generally short. The largest hailstones were reported from Clayton, where one stone measured 8 inches in circumference and weighed 9 ounces; at Centerville, where reports state that some stones were 9 to 10 inches in circumference; and near Roswell, where it was reported that six stones would fill a gallon bucket.

The Canadian River flood reached a peak at Logan of 110,000 second-feet, which has been exceeded in this century only by the floods of 1904, 1909, and 1914. The total run-off at Logan for the flood period has been computed as 633,600 acre-feet.

At Santa Rosa the Pecos River reached a maximum discharge of 55,200 second-feet, which is greater than any previously recorded. This flood was partly stored in the Alamogordo Reservoir; the peak below the reservoir was only 23,200 second-feet.

The Pecos River flood at Roswell reached a maximum discharge of more than 50,000 second-feet. This water came mostly from tributaries that have their sources in the mountainous area west of Roswell. The Cienaga del Macho, ordinarily a small dry creek, discharged about 49,500 second-feet at its peak. The Rio Hondo experienced several flood peaks, the largest at Roswell probably being near 20,000 second-feet. Berrendo Creek, which enters the Rio Hondo near Roswell, had a computed peak discharge of 37,700 second-feet.

Roswell was subjected to several floods that inundated large areas of the town. Considerable damage was done by the water, which covered nearly all the area occupied by the town.

Lake McMillan, an artificial reservoir on the Pecos River about 12 miles above Carlsbad, was put to a severe strain by the large quantity of water passing through it, but no serious damage resulted. The capacity of the lake at spillway level is about 39,000 acre-feet, but at the peak of the flood the lake held about 86,000 acre-feet. The total quantity of water passing through the lake during the flood period was more than 440,000 acre-feet.

This report presents data pertinent to the floods of May and June 1937, including results of peak discharge determinations made at about 14 miscellaneous places, records of peak stages and discharges and of mean daily discharges during the flood period at 23 regular river-measurement stations, records of rainfall at about 190 places, an isohyetal map showing rainfall over the entire State and two isohyetal maps showing rainfall over the Canadian and Pecos River Basins, and a discussion of the weather conditions during the flood period, including an upper-air wind and pressure chart of the United States for May 28, 1937. In addition to the information listed above the report includes a summary of records of past floods at all places in New Mexico at which authentic records were available.

INTRODUCTION

Heavy rains in the later part of May and the early part of June 1937 caused floods of unusual, and in many places record-breaking, magnitudes in the Canadian and Pecos River Basins. Most large floods in New Mexico, including those of May and June 1937, are caused by rainfall of the cloudburst type. These intense rains fall in a comparatively short time over a small area and may or may not be a part of larger meteorologic disturbances. In this region a cloudburst flood comes and is gone within a few hours at most, and thus, owing to the difficulties of transportation in flood time and other obstacles, little opportunity is afforded for measuring discharges at the time of the flood by current meter or other means. Discharges must generally be determined by some indirect means, most commonly the slope-area method.

Reliable information about cloudburst floods, inadequate though it may be, is of great value in devising means of flood protection on the creeks and small rivers on which such floods are likely to occur.

This report deals with the storms of May and June 1937 and the resultant floods in the Canadian and Pecos River Basins. In these floods many streams in New Mexico experienced record-breaking stages, but rain that fell after the flood peaks had receded obliterated highwater marks from which discharge determinations could be made. On the upper portions of some streams a cloudburst caused an unusually high flood, whereas a few miles below that place the flood peak flattened to an ordinary stage. Floods in many tributaries did not reach the main streams; although many of the flood peaks were high the total volume of water involved was comparatively small. The effect of cloudburst storms is so localized that frequently a substantial flood occurred in one stream while the flow in an adjacent stream was not increased.

The flood on the Canadian River was unusually high but did not approach that of 1904 in magnitude. The heaviest rain was in the lower part of the basin, where the topography is relatively flat and the runoff not so rapid as in the upper and mountainous part.

The Pecos River experienced stages greater than any previously known in the upper part of the river, but below Roswell the stages did not exceed those of 1904. Many tributaries to the Pecos River experienced the highest stage known. Maximum discharges of a number of tributaries were determined by the slope-area or contracted-opening methods.

In the Rio Grande Basin a number of small streams experienced floods

caused by cloudburst storms. Several towns in the valley along the river were partly flooded, but there was not a great amount of damage.

The total damage caused by the floods of May and June in New Mexico, as listed by the United States Weather Bureau in "Climatological Data for May and June 1937" was approximately $2,000,000. Nine lives were reported to have been lost.

This report presents discharge records for the flood period, a discussion of the storm that produced the floods, a summary of past floods for most of the streams of New Mexico, and other pertinent information.

DEFINITION OF TERMS

The volume of water flowing in a stream -- the "run-off" or "discharge" -- is expressed in various terms, each of which has become associated with a certain class of work. These terms may be divided into two groups -- (1) those that represent a rate of flow, as second-feet, gallons a minute, miner's inches, and discharge in second-feet per square mile; and (2) those that represent the actual quantity of water, as run-off in inches of depth on the drainage basin, acre-feet, and millions of cubic feet. The principal terms used in this report are "second-feet" and "acre-feet". They may be defined as follows:

"Second-feet" is an abbreviation for "cubic feet per second". A second-foot is a rate of flow of 1 cubic foot per second or the rate of discharge of water flowing in a channel when the cross-sectional area is 1 square foot and the average velocity is 1 foot per second. It is a fundamental unit from which other units are generally computed.

An "acre-foot", equivalent to 43,560 cubic feet, is the quantity required to cover an acre to the depth of 1 foot. The term is commonly used in connection with storage for irrigation.

"Stage-discharge relation" is an abbreviation for the term "relation of stage or gage height to discharge".

"Control" is a term used to designate the natural section, reach of the channel or artificial structure below the gage, which determines the stage-discharge relation at the gage.

ADMINISTRATION AND PERSONNEL

The field and office work incident to the preparation of this report was done by the Water Resources Branch of the Geological Survey under the general direction of N. C. Grover, chief hydraulic engineer, and C. G. Paulsen, chief of the division of surface water. The field work and

collection of the basic information with respect to stages and discharges were done under the immediate direction of Berkeley Johnson, district engineer. The special technical studies, the work of assembling and tabulating the material of the report and the preparation of the text were done by Tate Dalrymple and others under the direction of R. W. Davenport, chief of the division of water utilization.

ACKNOWLEDGMENTS

The river-measurement work of the Geological Survey, United States Department of the Interior, in New Mexico is carried on in cooperation with the State Engineer, Thomas M. McClure.

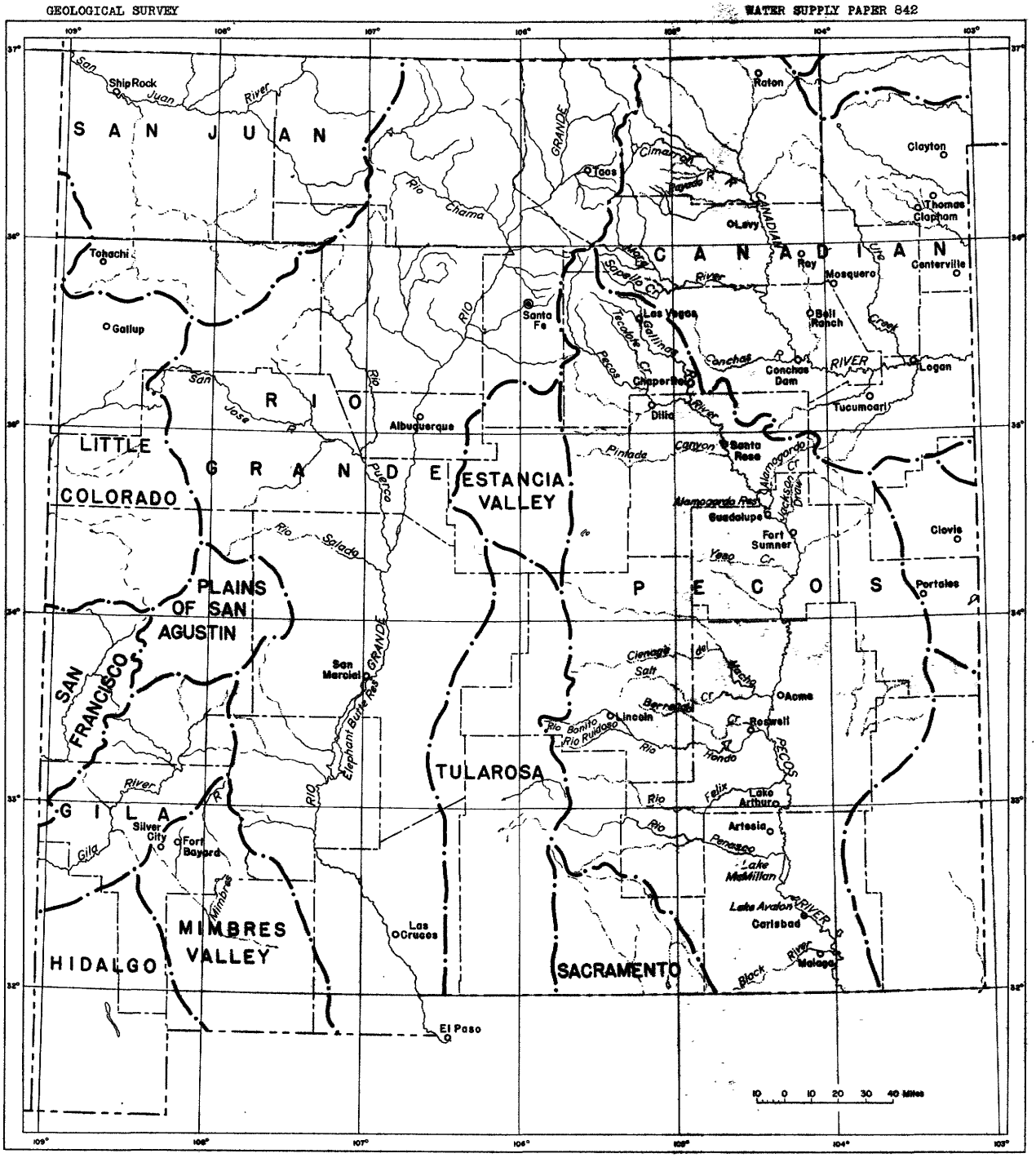
Acknowledgments are due the United States Weather Bureau for the data on precipitation and the discussion of weather conditions during the storm period; to the Corps of Engineers, United States Army, for information on the Canadian River flood, to the Soil Conservation Service, United States Department of Agriculture, for data on the storm and floods in the Canadian River Basin near Clayton, and to the Bureau of Reclamation, United States Department of the Interior, for records of the floods on the Pecos River.

The information that appears in this report has been obtained from many sources, including individuals, corporations, city officials, and published reports of the United States Weather Bureau and the Geological Survey.

Insofar as practicable, acknowledgments for individual contributions of information are given at appropriate places in the report.

PHYSICAL FEATURES OF CANADIAN AND PECOS RIVER BASINS IN NEW MEXICO

New Mexico ranges in altitude from about 2,800 to 13,000 feet and contains mountain, plateau, and plains regions. In the plateau and plains regions there are wide areas of comparatively level country and numerous more or less extensive upland valleys and mesas that contain thousands of acres of fertile land. Considerable timber grows upon the mountain slopes and most of the high plateau country is covered to a variable extent with dwarf pine, piñon and cedar; the low plateau country and the plains are largely barren. Over the lowlands of the southwestern portion of the State desert conditions prevail, and stock grazing is about the only agricultural pursuit, except in a few areas with ground water at shallow depths where irrigation by pumping is done. The mountain



MAP OF NEW MEXICO SHOWING STREAMS AND TOWNS MENTIONED IN TEXT AND MAJOR DRAINAGE BASINS.

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valleys are generally steep and narrow with the slopes covered with native vegetation. There are many closed basins within the State from which no surface run-off is passed to larger streams.

The map of New Mexico in plate 1 shows the principal streams, drainage basins and towns mentioned in the text and the location of the Canadian and Pecos River Basins with respect to the rest of the State.

The part of the Canadian River Basin in New Mexico comprises an area of about 12,500 square miles, of which 3,900 square miles is classified as mountainous, 4,600 as plateau, and 4,000 as plains. The mountainous part ranges in altitude from 8,000 to 12,000 feet. The high plateaus are deeply cut by canyons of varying width with numerous side canyons from which small streams emerge. These canyons become deeper and wider with the descent until plains and scattered high mesas become dominant topography. The Canadian River cuts through the plains in a canyon about 100 feet deep and from 600 to 800 feet wide. Vegetation is sparse throughout the basin, with the exception of the high mountains of the Sangre de Cristo Range. Grass covers the plains and the tops of the mesas. The canyons are generally barren. Farming is practiced only in the plains areas adjacent to the foot of the mountains and in areas contiguous to the streams. The remainder of the basin is used only for grazing stock.

The Pecos River joins the Rio Grande after it leaves New Mexico. The drainage area in the State is about 23,000 square miles. The upper Pecos flows as a typical mountain stream through narrow valleys and deeply cut gorges, but below Fort Sumner the canyonlike walls change to low rolling hills and prairie. The mountain tributaries of the upper Pecos rise at altitudes of about 11,000 feet; at the New Mexico-Texas line the river has an altitude of about 2,800 feet. It is a notable feature that the lower half of the Pecos River receives practically no tributaries from the east, probably because of the pervious character of the soil of the Staked Plains, upon which there is generally no surface drainage system. Irrigation has reached a high stage of development in the lower Pecos Valley, the irrigated district beginning a short distance above Roswell and continuing almost to the State line.

DETERMINATION OF FLOOD DISCHARGES

The general method employed in the determination of discharge at river-measurement stations consists of the determination of a stage-discharge rating by means of current-meter measurements of discharge at various stages from low water to high water and the application of this rating

to the records of stage. Determinations of flood discharges in most situations are very difficult, and their accuracy usually depends upon surveys, analyses, and computations by various more or less indirect methods for extending the curve of stage-discharge relation beyond the range covered by current-meter measurements.

At places other than regular river-measurement stations peak discharges are nearly always determined by some indirect method. It is usually impossible at such places to obtain sufficient basic information from which the total quantity of water discharged during the flood may be computed.

In determining maximum discharge close attention must be paid to the possible influence of the movement of debris* and of the scour and fill of channels during floods. In New Mexico cloudburst floods coming from the narrow, steep canyons at times carry large amounts of debris, and many of the streams have very unstable channels. A scour of a depth of more than 20 feet was determined at one place by soundings. At another place the discharge as measured by a current meter on two visits a few weeks apart varied from 1,100 to 11,000 second-feet with an increase in stage of only 0.01 foot. Channels scour on the rising stage and fill on the falling stage, and usually end with about the same cross section as at the start of the flood. In some channels, as noted above, scour takes place on an increase in discharge with cross section increasing but the stage remaining practically constant.

The methods employed in determining the maximum discharge of a flood are (1) extension of rating curves for river-measurement stations, (2) computations of flow over dams, (3) computations of flow through contracted openings, and (4) computation of flow by slope-area determinations. These methods are described in engineering text books and manuals. General information in reference to their use in studies of the flood of May and June in New Mexico is given below.

Extension of rating curves

The use of this method requires a thorough analysis of fundamental flow factors, a knowledge of the channel conditions at the river-measurement station, and an understanding of the peculiar characteristics of streams of the region. Pertinent conditions, such as backwater, deposition of debris on control, and shifting of channel, must be visualized

*For a discussion of movement of debris, see Troxell, H. C., and Peterson, J. Q., Floods in La Cañada Valley California, January 1, 1934: U. S. Geol. Survey Water-Supply Paper 796-C, 1937.

and their effects appraised as accurately as possible from available information.

Logarithmic plotting of stage and discharge with appropriate adjustment has been found helpful and is generally used in defining and extending the rating curve. The graph representing the stage-discharge relation, when drawn to logarithmic scales, usually tends to be a straight line or a much flatter curve than when drawn to rectangular coordinates, and therefore may be extended with less danger of great error.

The results obtained by extension of the rating curve may be subject to considerable error if the extension is carried considerably beyond the range defined by discharge measurements.

Flow over dams

The basic formula for the computation of flow over dams is commonly expressed as $Q = CLH^n$, where Q = discharge in second-feet, C = coefficient for the dam, L = effective length of crest in feet, H = head in feet on the crest measured far enough above the dam to avoid surface draw-down, and n = the exponent of H. The exponent n may be assumed as 1.5, in which case the coefficient C will ordinarily vary with the head and with differences in the shapes of crest. The velocity of approach in the channel above the dam affects the discharge over the dam and practically increases the head on the crest by an amount equivalent to the corresponding velocity head.

For the 1937 floods, discharge over dams was computed at several places on the Pecos River by engineers of the Bureau of Reclamation.

Flow through contracted openings

The discharge of Berrendo Creek at Roswell was computed by the contracted-opening method at a section where the flow passed through a pile-trestle railroad bridge. At this section the area of cross section of the opening was much less than that of the channel above, resulting in an increase in velocity through the contracted section. This increase in velocity could be produced only by converting head into velocity, and the head so used caused a sharp drop in the water surface through the opening. The flow through the opening is the product of the area of the contracted cross section and the velocity at that section. The net area of the most contracted section was used, the area of all piles and bracing being deducted. The velocity was computed by the formula $V = C\sqrt{2gh}$ where V = velocity in feet per second, C = pile-trestle coefficient,

g = acceleration of gravity (32.15), and h = head at most contracted section (drop through opening plus velocity of approach). The value of C, the pile trestle coefficient, was based on experiments of Yarnell.*

Slope-area determinations

In determining discharges by the slope-area method the velocity was computed by the Manning formula, $V = \frac{1.486}{n} r^{2/3} s^{1/2}$, in which V = average velocity in feet per second, n = coefficient of roughness, r = hydraulic radius in feet, and s = slope.

The selection of values of n has been guided by the Geological Survey's background of experience in the use of the slope-area method, and the values chosen were checked by comparisons with available data.

Cross sections were divided into parts whose relative conveyance capacities varied, owing to different depths and different roughness. At many places, because of difference in the area of upstream and downstream cross sections, it was necessary to consider the velocity head and to correct the surface slope to a value representing the energy grade line.**

Detailed examples of slope-area and other indirect discharge computations, showing all pertinent data, have been presented in previous water-supply papers. See:

The New York State flood of July 1935; U. S. Geol. Survey Water-Supply Paper 773-E.

Major Texas floods of 1935: U. S. Geol. Survey Water-Supply Paper 796-G.

The floods of March 1936: U. S. Geol. Survey Water-Supply Papers 798, 799, and 800.

Major Texas floods of 1936: U. S. Geol. Survey Water-Supply Paper 816.

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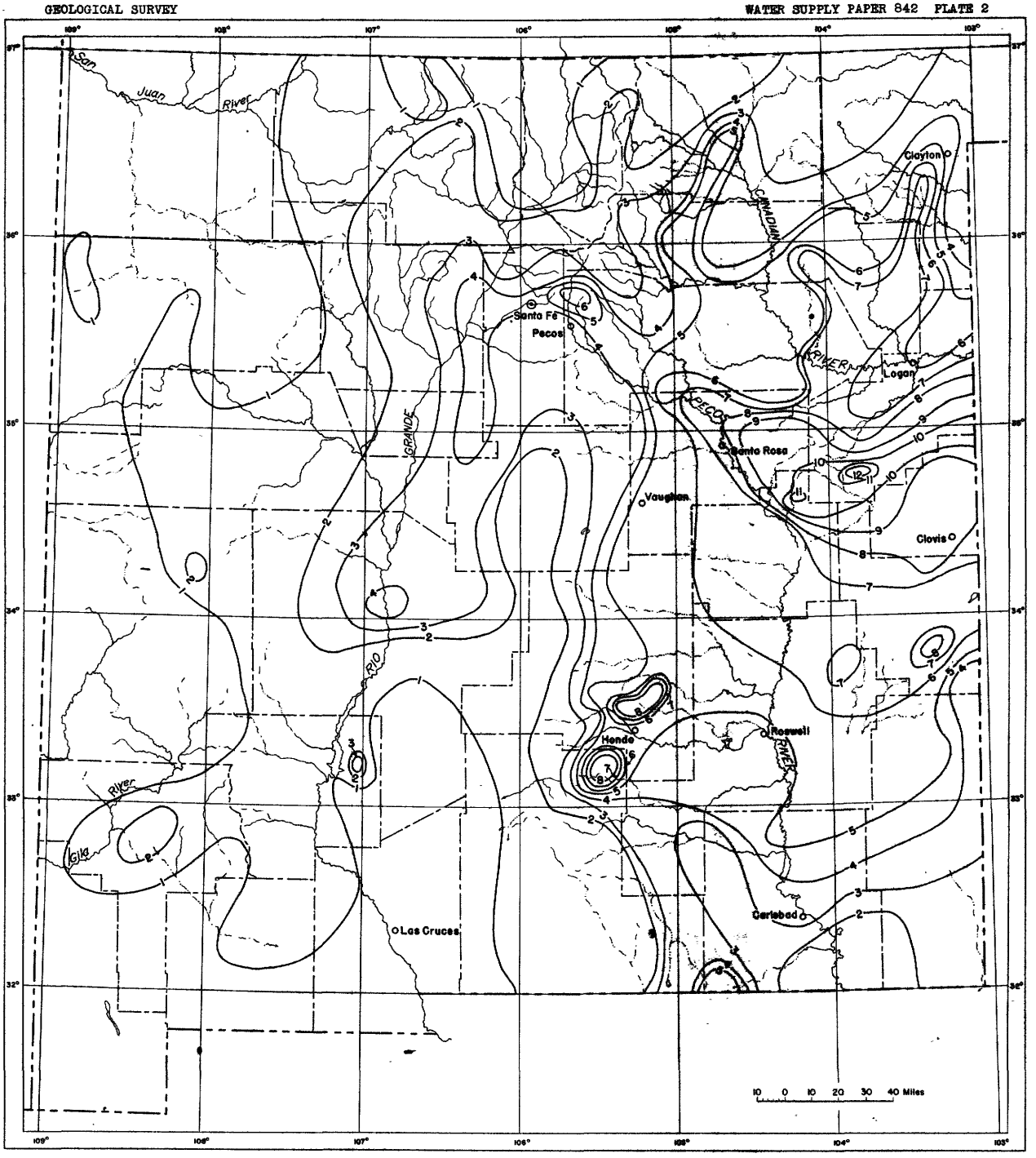
*Yarnell, D. L., Pile trestles as channel obstructions: U. S. Dept. Agr. Tech. Bull. 429, July 1934.

**See O'Brien, M. P., and Johnson, J. W., Velocity head corrections for hydraulic flow: Eng. News-Record, vol. 113, p. 214, Aug. 16, 1934.



ISOHYETAL MAP OF NEW MEXICO SHOWING TOTAL RAINFALL, IN INCHES, MAY 23 TO JUNE 4.

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WEATHER CONDITIONS AND PRECIPITATION

Weather of the New Mexico flood*

The synoptic situation accompanying the New Mexico floods was one devoid of significant frontal activity. A persistent anticyclonic circulation aloft, over the middle Gulf States, brought in a continuous stream of moist, unstable tropical air over Texas and New Mexico. Another anticyclone was maintained aloft, over the southern Pacific coast, and the trough between these two highs remained relatively stationary over New Mexico. The circulation pattern shown in figure 1 for 5 a.m. E.S.T., May 28, 1937, at 6,000 feet above sea level, is typical for the entire period.

The crowding of isobars and increased wind velocities over western Texas and eastern New Mexico suggest the possibility of very active horizontal convergence in that region. An attempt was made to identify convergence by means of isentropic charts† for several elevations in this area. The distance between potential temperature surfaces seems to be greater over the flood area than over adjoining areas, which definitely would indicate convergence, but the vertical temperature lapse rates were so steep during the period that computations of this nature could not be made exactly. However, the steep lapse rates and high relative humidities shown at El Paso definitely indicate convergence to have taken place in the tropical current.

The airplane flights at San Antonio and El Paso, Tex., during the period, all showed layers of air that were either conditionally or convectively unstable.‡ Most of the rain occurred at elevations near the 5,000 foot plane, which indicates that orographic effects were significant.

The precipitation during the flood period therefore seems to have been caused by the combination of several factors. Moist tropical air with convectively or conditionally unstable layers was lifted orographically by a strong converging current and probably gained heat by insolation during the process. The above combination of causes led to scattered areas of instability and showers and thunderstorms of varying intensity.

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*Prepared by A. K. Showalter, of the U. S. Weather Bureau.

†Osmun, J. W. W., An introductory discussion of the isentropic chart: U. S. Weather Bureau, October, 1937. Rossby, C. G., Isentropic analysis: Am. Meteorol. Soc. Bull., vol. 18, June-July 1937.

‡Byers, H. R., Synoptic and aeronautical meteorology, McGraw-Hill, 1937.

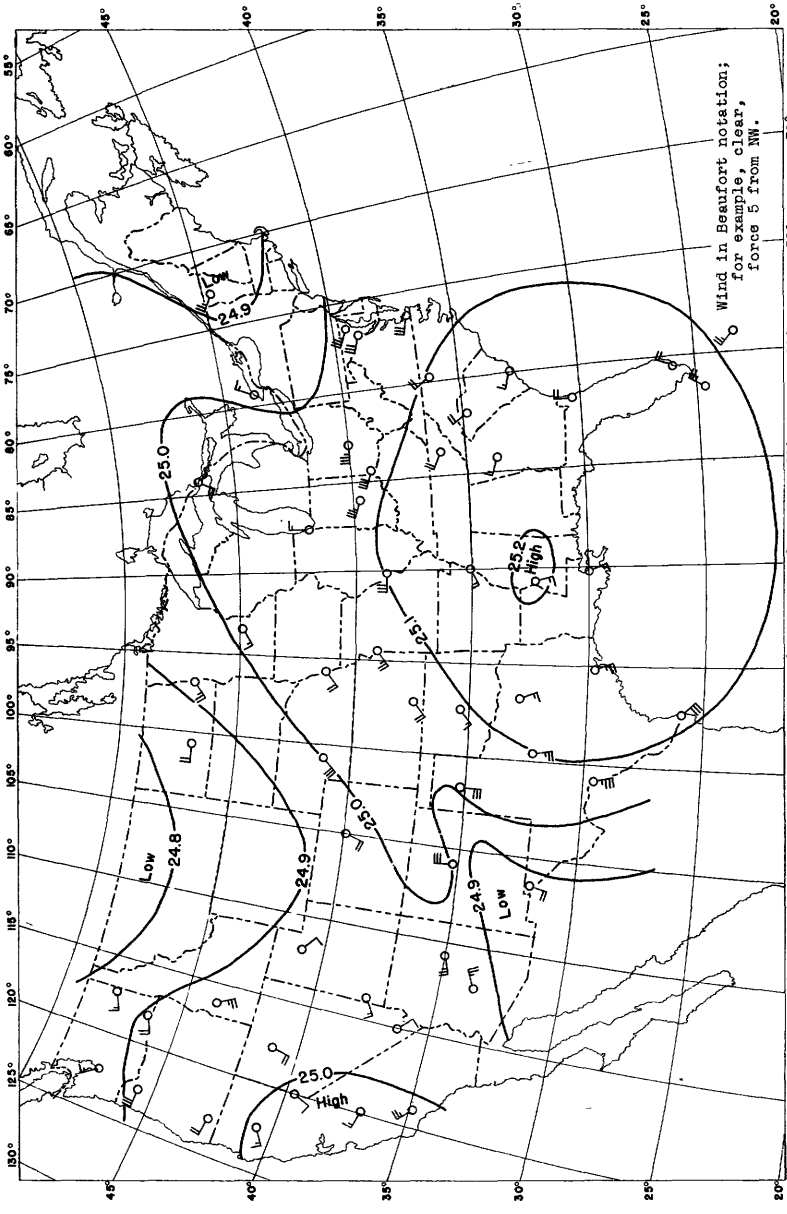

Figure 1.--Upper-air wind and pressure chart of the United States and adjacent territory 5 a.m. E.S.T., May 28, 1937

This condition persisted over New Mexico until an active disturbance developed over the Middle West and caused the moist tropical current to be deflected farther to the east and brought a current of modified polar maritime air over New Mexico. The primary causes behind the development and persistence of such a circulation pattern cannot definitely be explained until more is known regarding the general circulation of the atmosphere as a whole and the cause of large-scale abnormalities in that circulation.

Rainfall

Table 1 lists the precipitation at all Weather Bureau gages in the State as published in "Climatological data, New Mexico section" for May and June 1937; it also lists several supplementary precipitation records obtained from other sources. The map of New Mexico given in plate 2 shows isohyetals for the total rainfall May 23 to June 4, prepared from data presented in table 1.

Hail

Considerable hail accompanied the storms, causing damage to crops, automobiles, roofs of buildings, window glass, and livestock. The following reports of hail were obtained from E. L. Hardy, meteorologist, United States Weather Bureau, Albuquerque.

Albuquerque: May 23, stones from 0.8 to 1.2 inches in diameter fell; $75,000 damage done.

Dona Ana County: May 24, stones the size of marbles fell; $75,000 damage to crops.

Near Arabela: May 26, some cattle killed by hail.

Tohatchi area: May 27, stones as large as 1 inch in diameter fell over an area 25 miles wide.

San Marcial: May 27-28, stones from the size of marbles to others 1½ inches in diameter fell; windows and roofs damaged, some loss of sheep and calves.

Artesia: May 28, maximum size of stones, 1¼ inches in diameter.

Capitan Mountains: May 30, some sheep killed by hail stones.

Near Lincoln: May 31, very heavy hail over area 2 miles wide and 11 miles long; stones fell the size of pigeon eggs. Entire fruit crop gone, gardens ruined, and grain had to be replanted. Composition and shingle roofs damaged and much window glass broken. Automobiles had fabric tops ruined and hoods and steel tops badly dented. Worst hailstorm in history of this section.

Table 1.--Precipitation, in inches, for days shown, 1937

Station	County	Elev. (feet)	Lat.	Long.	May									June				Total
					23	24	25	26	27	28	29	30	31	1	2	3	4	
U. S. Weather Bureau																		
Canadian and Northeast																		
Abbott	Harding	5,771	36°10'	104°18'	0.56	-	T	-	-	0.64	0.54	-	-	0.15	0.42	1.53	-	3.84
Amistad	Union	4,500	35 52	103 07	-	0.50	-	0.30	0.24	.72	1.10	-	T	.67	-	.47	-	4.00
Aurora	Colfax	8,849	36 19	105 07	.34	.36	-	-	.22	.75	.12	-	-	.53	.15	.77	-	3.24
Bell Ranch	San Miguel	4,500	35 42	104 07	.78	.03	-	.51	.81	2.29	.08	-	-	.99	-	.40	-	5.89
Black Lake	Colfax	8,348	36 17	105 14	.50	.11	-	-	-	.20	.93	-	0.10	.30	.05	.25	-	2.44
Blakely Ranch	Colfax	6,200	36 27	104 40	.50	.25	T	-	-	.22	.04	-	.03	1.19	.97	3.46	-	6.66
Bueyeros	Harding	4,930	35 58	103 42	-	.98	-	.35	.90	1.00	.05	-	.71	.26	.78	.37	-	5.40
Chacon	Mora	8,510	36 10	105 18	.52	.27	-	-	-	.48	.68	0.23	.12	.12	.26	.46	0.06	3.20
Cimarron	Colfax	6,427	36 35	104 53	.01	.15	0.04	-	-	T	.45	-	.33	.21	.12	.90	-	2.21
Clayton	Union	5,054	36 23	103 07	.02	-	-	-	-	.26	.41	.45	-	2.70	.81	-	.29	-	4.94
Cuervo*	Guadalupe	4,849	35 01	104 24	-	.78	.25	.35	1.70	3.11	1.23	-	-	1.22	-	.83	-	9.47
Dawson†	Colfax	6,396	36 40	104 48	**	.20	-	-	-	.08	-	-	.25	**	.75	.70	-	1.98
Des Moines	Union	6,622	36 44	103 47	-	.04	.02	.02	-	.57	-	-	.16	.46	.77	.14	-	2.18
Elizabethtown	Colfax	8,465	36 34	105 16	-	T	T	-	-	1.12	.30	-	T	.25	.20	.70	-	2.57
Hayden (near)†	Union	4,500	36 02	103 15	-	.72	-	.95	.73	.95	.75	-	-	.49	-	.40	T	4.99
Hoosier Ranch	Harding	5,680	35 52	103 14	-	1.18	.15	-	-	1.80	-	-	1.00	.42	.40	.51	.10	5.56
Ione	Union	4,850	35 42	103 20	-	.70	-	1.31	.90	2.05	-	-	-	1.32	-	.38	-	6.56
Isidore	Guadalupe	-	35 12	104 14	.62	.90	1.00	.30	.20	1.30	-	-	-	-	.80	.52	-	5.64
Lake Alice (near)	Colfax	6,950	36 58	104 20	-	-	-	-	-	.60	-	-	1.00	-	-	.64	-	2.24
Levy†	Mora	6,252	36 06	104 20	.50	-	-	-	-	.70	.35	.10	.05	-	.84	1.11	-	3.65
Logan (near)†	Quay	3,851	35 26	103 23	-	.53	.08	.98	.05	1.40	1.46	-	-	-	.98	.48	-	5.96
Miami	Colfax	6,000	36 22	104 52	.05	T	T	-	.05	.03	T	-	.70	1.05	1.55	.01	-	3.44
Mosquero	Harding	5,579	35 46	103 57	1.00	-	-	.25	-	1.43	1.45	.65	-	1.80	.45	.05	-	7.08
Nara Visa (near)†	Quay	4,000	35 28	103 12	-	.55	-	-	.80	.45	2.50	-	-	-	.65	.40	.30	5.65
Palo Verde	Harding	5,880	35 58	104 10	T	1.48	T	T	T	1.71	.85	-	1.27	T	.56	.26	-	6.13
Pasamonte	Union	5,650	36 16	103 45	.70	-	.05	-	-	1.27	.27	-	-	.73	.58	.14	T	3.74
Pennington (near)	Union	5,500	36 17	103 34	.42	-	.30	-	.10	.85	.10	-	1.20	.96	1.05	-	-	4.98
Porter (near)†	Quay	3,950	35 17	103 13	.25	.56	-	1.34	.87	**	2.30	-	.06	1.08	-	1.29	-	7.75
Quay	Quay	4,300	34 56	103 47	.32	1.05	.03	.18	1.01	1.84	1.61	-	-	T	.69	.85	T	7.58
Raton (near)	Colfax	6,660	36 52	104 24	-	-	-	-	-	.22	-	-	.58	.48	-	.45	-	1.73

Roy	Harding	5,884	35 57	104 10	1.60	-	-	.10	1.05	1.10	.50	.15	1.40	.60	.30	.05	-	6.85
San Jon	Quay	4,300	35 06	103 20	.19	.85	-	-	1.73	1.54	1.23	-	-	-	1.83	1.11	.09	8.57
Solano	Harding	5,622	35 52	104 03	-	1.16	.03	-	.26	1.45	1.11	-	.84	1.98	.80	.50	-	8.13
Springer†	Colfax	5,857	36 23	104 36	-	.35	-	-	-	.23	.18	-	-	1.66	.60	.93	-	3.95
Therma	Colfax	8,219	36 29	105 16	.09	-	.02	-	-	.04	**	.55	-	.49	.30	.46	-	1.95
Tucumcari No. 1†	Quay	4,200	35 11	103 46	-	.64	.11	T	.10	.73	3.23	-	-	**	.46	.88	-	6.15
Valmora	Mora	6,200	35 48	104 55	.82	T	-	.02	.51	.88	.65	T	-	.44	1.04	.16	-	4.52
Vance (near)	Union	4,825	36 14	103 10	-	.30	-	.25	-	.56	1.00	-	.10	.20	.59	.42	-	3.42
Yates (near)	Harding	5,000	36 06	103 51	-	1.35	-	T	-	.63	1.00	-	1.20	-	1.05	.50	-	5.73
Pecos and Southeast																		
Alamogordo No. 1	Otero	4,250	32 56	105 58	.30	.26	-	-	-	.74	T	-	-	-	-	-	-	1.30
Anoho	Lincoln	6,112	35 59	105 48	.05	-	-	-	.50	.10	.78	-	-	-	-	-	-	1.43
Arabela (near)	Lincoln	5,800	33 38	105 12	.48	1.70	-	-	2.93	1.55	1.25	-	.75	-	.20	-	-	8.76
Artesia†	Eddy	3,350	32 48	104 25	.90	1.00	-	-	-	3.14	-	-	-	-	-	-	-	5.04
Bellview†	Curry	4,200	34 50	103 08	1.40	.57	.55	.25	3.93	-	-	-	.66	1.01	-	1.63	-	10.00
Boaz†	Chaves	4,154	34 45	103 55	2.20	.93	-	-	-	-	-	-	3.75	.43	-	.28	-	7.59
Capitan†	Lincoln	6,348	33 34	105 32	-	.88	.18	-	.31	2.16	.87	-	-	.17	-	-	-	4.57
Carlsbad	Eddy	3,120	32 24	104 10	**	.99	.72	.90	-	.30	.68	-	T	-	-	-	-	3.59
Carlsbad Cavern	Eddy	4,250	32 12	104 28	.05	.78	.07	.06	-	.24	.82	-	.04	-	-	.03	-	2.09
Carrizozo	Lincoln	5,438	33 40	105 52	.24	.20	-	-	.15	1.07	.02	-	-	-	.01	-	-	1.69
Carson Seep (near)	Eddy	6,500	32 06	104 50	.48	-	.56	-	2.63	1.40	-	-	.68	-	-	T	-	5.75
Cloudcroft	Otero	8,650	32 57	105 43	-	1.30	-	.02	.06	.32	.20	-	-	-	.08	-	-	1.98
Clovis†	Curry	4,262	34 24	103 11	1.70	.58	-	.15	.07	.28	2.27	-	-	.89	.75	-	2.05	8.74
Corona	Lincoln	6,666	34 16	105 38	.01	1.31	-	-	.25	.18	1.68	-	-	T	T	-	-	3.43
Crossroads	Lea	4,260	33 31	103 21	1.90	.67	1.46	-	-	-	-	-	-	-	-	-	-	4.03
Doretta	San Miguel	6,381	35 25	105 23	.25	.75	.60	1.47	.23	.40	.42	.04	-	-	.15	.10	.08	4.49
Elida	Roosevelt	4,345	33 56	103 41	.78	1.83	-	-	-	1.46	-	-	1.25	-	-	.89	-	6.21
Elk (near)	Chaves	5,350	32 55	105 19	.59	.52	-	T	T	1.60	.60	-	-	T	-	T	-	3.31
Felix	Chaves	-	33 01	105 13	.48	.42	-	.10	.80	2.02	-	-	-	-	-	-	-	3.82
Floyd	Roosevelt	4,100	34 13	103 36	.41	2.48	.13	-	-	.80	1.52	-	-	1.47	.39	.18	.21	7.59
Fort Stanton†	Lincoln	6,231	33 39	105 31	.46	.27	-	.26	1.97	.35	.07	-	-	T	-	-	-	3.38
Fort Sumner	DeBaca	4,028	34 28	104 15	.47	.15	-	.34	.35	3.05	1.26	.18	-	T	.30	.28	.32	6.70
Gallinas Ranger Station	Lincoln	6,636	34 08	105 41	.07	.50	-	.02	-	.41	1.35	.01	-	.01	.08	.10	.04	2.59
Grady (near)	Curry	-	34 48	103 18	-	1.67	.33	-	.70	.27	2.85	-	-	.56	1.28	-	1.34	9.00
Hagerman†	Chaves	3,414	32 37	104 24	1.10	1.35	2.00	-	-	-	-	-	-	-	-	.25	-	4.70

T Trace, or less than 0.01 inch.
* Measured at midnight.

† Measured in the morning.
** Included in next measurement.

168828 O—39——2

Table 1.--Precipitation, in inches, for days shown, 1937--Continued

Station	County	Elev. (feet)	Lat.	Long.	May									June				Total
					23	24	25	26	27	28	29	30	31	1	2	3	4	
U. S. Weather Bureau--Contd.																		
Pecos and Southeast--Continued																		
Hassell	Quay	5,000	34°41'	104°01'	-	.15	1.21	.58	.79	.41	1.50	1.78	-	.97	1.90	1.45	-	10.74
Hope	Eddy	4,000	32 45	103 10	.40	.47	.25	-	-	1.05	.25	-	-	-	-	-	-	2.42
Irvin's Ranch	San Miguel	9,200	32 50	104 46	.34	.61	T	T	.28	.50	1.42	T	.05	2.45	.64	.06	-	6.35
Lake Avalon†	Eddy	3,200	32 28	104 11	1.22	.86	T	.58	T	.72	-	-	-	.15	-	-	T	3.53
Las Vegas†	San Miguel	6,400	35 36	105 14	-	.46	.13	.01	.37	.65	.31	T	.03	1.20	.11	.37	-	3.64
Loving	Eddy	3,045	32 18	104 05	.31	.18	-	.10	-	.50	.24	-	-	-	-	-	-	1.33
Lovington†	Lea	3,900	33 56	103 31	.23	.75	.35	-	-	-	1.50	-	-	.08	-	.70	.40	4.01
Mayhill Ranger Station	Otero	6,400	32 53	105 35	.10	.14	-	.14	.94	.07	.33	-	-	.08	-	-	-	1.80
Mescalero†	Otero	6,627	33 10	105 48	.28	.35	-	-	T	.27	1.61	-	-	T	-	-	-	2.51
Mountain Park†	Otero	6,720	32 57	104 47	-	.58	-	-	.30	.55	-	-	-	-	-	-	-	1.43
Onava	San Miguel	6,700	35 42	105 04	.29	.40	.05	-	.16	.64	.65	-	-	.43	.32	.47	-	3.41
Orogrande	Otero	4,171	32 22	106 04	.26	.60	-	-	-	.62	-	-	-	-	-	-	-	1.48
Palma	Torrance	7,000	34 56	105 26	-	.50	.25	1.20	.10	.50	.80	-	-	.01	.25	.03	-	3.64
Pastura	Guadalupe	5,285	34 47	104 56	.20	1.20	-	-	.55	1.60	1.22	-	-	T	.03	.25	-	5.05
Pearl (near)†	Lea	3,700	32 32	103 21	-	1.00	.17	-	-	-	1.89	-	-	-	-	-	.34	3.40
Pecos Ranger Station	San Miguel	6,900	35 36	105 46	.53	.69	.25	.01	-	.34	.38	.94	-	**	.73	.03	-	3.90
Portales	Roosevelt	4,004	34 12	103 22	.53	2.37	.40	-	-	.15	1.80	-	-	1.12	-	.17	-	6.54
Portales Evap. Station	Roosevelt	4,070	34 13	103 25	2.30	.65	-	-	.08	3.05	-	-	.74	.80	**	.83	-	8.45
Ragland	Quay	4,921	34 47	103 46	.34	1.03	-	1.78	2.02	2.45	1.45	-	.28	.28	.65	1.76	-	12.04
Richland (near)	Roosevelt	4,000	33 48	103 24	1.40	2.22	.22	-	-	.06	1.50	-	-	2.23	-	.15	.55	8.33
Roswell*	Chaves	3,564	33 25	104 26	1.38	.66	-	-	T	1.21	.29	-	.19	T	-	.86	-	4.59
St. Vrain (near)	Curry	4,250	34 27	103 26	.64	1.09	.27	-	.21	1.34	1.98	-	-	.56	.33	2.18	.13	8.73
Santa Rosa	Guadalupe	4,624	34 55	104 40	T	.83	T	T	.52	2.10	2.20	.07	-	-	.50	.80	.15	7.17
Tatum	Lea	3,950	33 18	103 20	.21	2.03	.80	-	-	.07	1.36	-	-	-	-	.55	.30	5.32
Tularosa	Otero	4,436	33 07	106 03	.94	T	-	-	.22	T	.46	-	-	-	-	-	-	1.62
Valley View	Roosevelt	4,400	33 48	103 41	2.80	1.42	-	-	-	1.30	-	-	-	.95	-	-	-	6.47
Vaughn	Guadalupe	5,930	34 46	105 20	T	.94	-	.40	1.10	-	1.60	.50	-	-	-	.50	-	5.04
White Tail	Otero	7,000	33 14	105 34	1.20	1.57	.57	2.03	1.80	.33	-	.56	-	.67	.20	T	-	8.93
Winsors	San Miguel	8,000	35 47	105 40	.35	-	.28	-	.47	.36	.33	.90	-	.75	-	.12	.28	3.84

Northern Rio Grande																		
Alamos Ranch	Sandoval	7,800	35	53	106	26	-	.33	.02	-	.19	1.05	.42	-	.45	.10	.19	.75	.02	3.52
Aspen Grove Ranch	Rio Arriba	9,000	36	39	106	10	.41	.20	-	-	-	.14	.28	-	-	.08	.24	.03	-	1.38
Bateman's Ranch	Rio Arriba	8,900	36	33	106	17	.50	.10	.03	-	-	.55	.30	-	-	.70	.10	.38	-	2.66
Cerro	Taos	7,668	36	46	105	33	.07	-	-	-	-	-	1.27	-	-	.04	-	-	-	1.38
Chama	Rio Arriba	7,851	36	51	106	35	T	.20	.20	-	-	.15	.45	-	-	-	-	-	-	1.00
El Rito	Rio Arriba	-	36	20	106	10	.04	-	.02	-	-	.42	.12	.22	-	.09	.12	-	-	1.03
El Vado Dam†	Rio Arriba	6,424	35	47	106	16	.02	-	-	-	-	.38	.75	-	-	-	-	-	-	1.15
Frijoles Canyon	Sandoval	-	35	50	106	16	-	.21	-	-	.12	.98	.54	1.40	-	.01	.28	.66	T	4.20
Jemez Springs	Sandoval	6,100	35	47	106	42	.29	-	-	-	.24	1.54	.81	.10	-	-	-	-	-	2.98
Lee Ranch	Sandoval	9,000	35	47	106	32	.18	-	-	-	.27	1.90	.86	-	-	**	.40	-	-	3.61
Penasco	Taos	7,500	36	10	105	43	-	-	-	-	-	.71	1.02	-	-	.35	.16	.06	-	2.30
Red River Canyon	Taos	8,956	36	42	105	24	T	.25	-	-	T	-	.50	.29	.10	.09	.17	.62	-	2.02
Regina†	Sandoval	7,450	36	13	106	57	.38	-	-	-	.39	.37	.75	-	-	-	-	.38	-	2.27
Rencona (near)	San Miguel	7,100	35	21	105	40	.35	.48	-	-	-	.65	1.10	-	-	.85	-	T	-	3.43
Santa Fe*	Santa Fe	6,994	35	41	105	57	.44	.38	T	-	.27	.99	1.86	-	-	.36	T	T	T	4.30
Selsor Ranch	Sandoval	8,500	35	56	106	48	.05	-	-	-	-	1.20	.90	.52	-	-	-	T	-	2.67
Stanley (near)	Santa Fe	6,317	35	09	105	59	T	1.37	-	.42	1.33	.06	.01	-	-	T	T	T	-	3.19
Taos	Taos	6,983	36	25	105	35	-	-	-	-	-	.07	.77	-	-	-	-	-	-	.84
Taos Canyon	Taos	8,959	36	28	105	25	-	.34	-	-	-	.14	1.50	-	-	.43	.31	-	-	2.72
Tierra Amarilla	Rio Arriba	7,466	36	43	106	35	.19	.06	.10	-	-	-	.56	-	-	-	-	-	-	.91
Tijeras Ranger Station†	Bernalillo	6,450	35	05	106	24	1.10	.54	-	-	1.04	.88	.76	-	-	-	-	.18	-	4.50
Tres Piedras	Taos	8,076	36	38	105	59	-	.05	-	.03	-	-	-	.07	-	.09	-	-	-	.24
Truchas	Rio Arriba	7,935	36	03	105	46	.10	.13	T	-	.10	.17	2.10	-	-	.25	-	.11	-	2.96
Southern Rio Grande																				
Agricultural College*	Dona Ana	3,863	32	15	106	45	.03	.11	-	-	-	-	-	-	-	-	-	-	-	.14
Albuquerque*	Bernalillo	5,101	35	05	106	43	.76	.12	T	-	.53	.77	.54	-	-	T	-	T	T	2.72
Bluewater	Valencia	6,732	35	16	107	59	.01	-	-	-	.05	.20	.15	-	-	-	-	-	.01	.42
Chloride Ranger Station	Sierra	6,500	33	21	107	42	-	-	-	-	-	.75	.92	-	-	-	-	-	-	1.67
Elephant Butte Dam	Sierra	4,265	33	10	107	10	-	-	-	-	-	.53	.48	-	-	-	-	-	-	1.01
Engle	Sierra	4,750	33	10	107	02	.91	-	-	-	.06	1.84	.34	-	-	-	-	T	-	3.15
Estancia	Torrance	6,140	34	45	106	04	.06	.46	-	-	.26	.25	.65	-	-	T	-	.05	T	1.73
Hatch	Dona Ana	4,042	32	36	107	10	.04	.41	-	-	-	.63	.10	-	-	-	-	-	-	1.18
Jornada Experimental Range	Dona Ana	4,150	32	35	106	46	.02	.67	-	-	-	.09	.07	-	-	-	-	-	-	.85
Kingston	Sierra	6,500	32	55	107	40	.15	T	-	-	**	.50	.40	-	-	-	-	-	-	1.05

T Trace, or less than 0.01 inch.
† Measured in the morning.
** Included in next measurement.
* Measured at midnight.

Table 1.--Precipitation, in inches, for days shown, 1937--Continued

Station	County	Elev. (feet)	Lat.	Long.	May									June				Total
					23	24	25	26	27	28	29	30	31	1	2	3	4	
U. S. Weather Bureau--Contd																		
Southern Rio Grande--Continued																		
Laguna	Valencia	5,840	35 02'	107 24'	.03	.12	-	-	**	.77	.31	-	-	-	-	-	-	1.23
Lake Valley	Sierra	5,412	32 41	107 34	.14	T	-	-	.80	.33	.15	-	-	-	-	-	-	1.42
Los Lunas (near)	Valencia	4,900	34 42	106 48	.42	.16	-	-	1.02	.22	.65	-	-	-	T	.22	T	2.69
Magdalena	Socorro	6,556	34 08	107 17	.17	T	-	-	T	.85	1.90	-	-	-	-	T	-	2.92
McIntosh (near)	Torrance	6,300	34 56	106 06	.10	.80	-	-	.15	1.47	.56	-	-	-	.08	.01	-	3.17
Monte Prieto	Socorro	-	34 03	106 08	.10	.30	.42	-	-	-	1.26	.26	-	T	.02	.03	T	2.39
Mountainair	Torrance	6,475	34 31	106 15	.14	.14	T	-	-	.84	-	1.15	-	-	-	-	T	2.27
San Fidel	Valencia	6,100	35 01	107 41	.28	.03	-	-	.05	.45	.70	-	-	-	-	.03	-	1.54
San Marcial	Socorro	4,447	33 42	106 59	.03	.19	-	-	.15	1.00	.22	-	-	-	-	-	-	1.59
Socorro†	Socorro	4,600	34 04	106 54	.22	-	-	-	1.45	2.53	.74	-	-	-	-	-	-	4.94
Tajique (near)	Torrance	7,100	34 47	106 15	.12	.20	-	T	.38	2.26	.74	.10	-	.03	T	.03	T	3.86
Gila and Southwest																		
Animas†	Hidalgo	4,405	31 57	108 48	-	-	-	-	-	.30	-	-	-	-	-	-	-	.30
Augustine	Catron	6,700	34 15	108 00	.21	-	-	-	-	.90	1.00	-	-	-	-	-	-	2.11
Cliff	Grant	4,470	32 57	108 37	-	-	-	-	-	.47	1.14	-	-	-	-	-	-	1.61
Columbus	Luna	4,054	31 47	107 37	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Datil	Catron	7,500	34 09	107 49	.09	-	-	-	.35	.30	.49	-	-	-	-	-	-	1.23
Deming	Luna	4,331	32 16	107 45	-	.68	-	-	T	.32	-	.10	-	-	-	-	-	1.10
Eick's Ranch	Hidalgo	5,400	31 23	108 56	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Fort Bayard	Grant	6,152	32 48	108 10	-	.28	-	-	-	.18	1.10	-	-	-	-	T	-	1.56
Gage†	Luna	4,480	32 13	108 05	-	-	-	-	T	T	.97	-	-	-	-	-	-	.97
Hachita	Grant	4,504	31 55	108 19	-	-	-	-	T	.60	.25	-	-	-	-	-	-	.85
Hermanes (near)	Luna	4,460	31 51	107 58	-	-	-	-	.03	.20	.10	-	-	-	-	-	-	.33
Jewett Ranger Station	Catron	7,400	33 59	108 39	-	.12	-	-	-	.27	.35	-	-	-	-	-	-	.74
Lordsburg	Hidalgo	4,245	32 22	108 42	-	-	-	-	-	.28	.64	-	-	-	-	-	-	.92
Luna Ranger Station	Catron	7,300	33 48	108 57	-	-	-	-	-	.15	.20	-	-	-	-	.08	-	.43
Mimbres (near)	Grant	6,250	32 50	108 00	.20	-	-	-	-	T	1.10	-	-	-	-	T	-	1.30
Mogollin	Catron	6,566	33 24	108 47	-	-	-	-	-	.53	.41	-	-	-	-	-	-	.94
Pinos Altos (near)†	Grant	7,000	32 51	108 15	-	-	-	-	-	1.41	.60	-	-	-	-	-	-	2.01
Quemado (near)	Catron	6,600	34 15	108 35	.04	-	-	-	-	.33	.23	-	-	-	-	.04	-	.64
Redrock	Grant	4,150	32 43	108 44	-	-	-	-	T	.68	.62	-	-	-	-	-	-	1.30
Rodeo	Hidalgo	4,118	31 51	109 02	-	-	-	-	-	-	-	-	-	-	-	-	-	0

Silver City	Grant	5,937	32 46	108 15	.03	-	-	-	.04	1.27	.77	-	-	-	-	-	-	2.11
San Juan and Northwest																		
Atarque (near)	Valencia	7,218	34 37	108 43	-	-	-	-	-	.42	.20	-	-	-	-	-	-	.62
Aztec	San Juan	5,590	36 48	108 04	T	-	-	-	T	T	.17	.13	-	-	-	-	-	.30
Blackrock	McKinley	6,455	35 04	108 46	-	-	-	T	-	.36	.13	.25	-	-	-	-	-	.74
Bloomfield	San Juan	5,500	36 43	108 00	T	-	-	-	-	T	.12	-	-	-	-	-	-	.12
Chaco Canyon	San Juan	6,000	36 05	107 58	.10	.03	.10	-	T	.05	.11	-	-	-	-	-	-	.39
Crownpoint	McKinley	6,800	35 40	108 13	.08	.03	.01	-	T	.12	.91	-	-	-	-	T	-	1.15
Dulce	Rio Arriba	6,767	36 55	107 01	.32	-	.30	-	-	.26	.41	-	-	-	.07	-	-	1.36
Farmington	San Juan	-	36 43	108 12	-	.05	-	-	-	.09	.05	.12	-	-	-	-	-	.31
Gameroo †	McKinley	6,785	35 36	108 43	.04	.05	-	-	.45	.82	.27	-	-	-	-	T	T	1.63
Gavilan (near)	Rio Arriba	7,000	36 26	106 48	.03	.03	.11	-	-	.32	1.30	-	-	.01	-	.22	T	2.02
Governador	Rio Arriba	6,300	36 41	107 24	.03	.04	.06	-	T	T	.88	.28	-	-	.08	T	-	1.37
McGaffey Ranger Station†	McKinley	8,000	35 23	108 28	-	-	-	-	-	-	.45	-	-	-	-	-	-	.45
Navajo Experimental Station†	McKinley	6,300	35 50	108 51	T	T	-	-	.51	.35	.16	-	-	-	-	.06	-	1.08
Ramah	McKinley	7,200	35 09	108 30	-	-	-	-	**	**	1.10	-	-	-	-	-	T	1.10
Ship Rock	San Juan	4,950	36 46	108 44	.05	-	-	-	-	.12	-	-	-	-	-	-	-	.17
Tohatchi	McKinley	6,800	35 49	108 49	.06	-	-	-	-	.62	.07	-	-	-	-	-	-	.75
Supplementary																		
Canadian River Basin																		
Conchas Dam (a)	San Miguel	-	35 23	104 12	-	.81	.04	1.02	.55	2.07	1.80	.02	T	-	.43	.64	T	7.38
A. W. Tanner farm (b)	Union	-	36 18	103 21	-	-	-	-	.42	1.18	.28	-	c7.00	.85	.25	.25	-	d10.23
J. R. Heaton farm (b)	Union	-	36 12	103 20														

Date	Began	Ended	Amount	Date	Began	Ended	Amount	
May 24	6 a.m.	8 a.m.	0.56	May 30	2:30 p.m.	3 p.m.	3.00	
25	-	-	-	31	6 p.m.	8 p.m.	1.11	
26	5 p.m.	6:30 p.m.	.15	June 1	6 p.m.	8 p.m.	.24	
27	8 p.m.	10 p.m.	.52	2	-	-	-	
28	10 a.m.	-	-	3	3:30 a.m.	7 a.m.	.40	
29	-	6 a.m.	1.14					7.12

T Trace, or less than 0.01 inch.
† Measured in the morning.
** Included in next measurement.

a Record furnished by U. S. Engineer Office, Conchas Dam, N. Mex.
b Record furnished by Soil Conservation Service, Clayton, N. Mex.
c Measured 6 inches and estimated outflow as 1 inch. 2 inches fell in 15 minutes; 7 inches fell in 2 hours and 40 minutes.
d Not used in drawing isohyetals.

Table 1.--Precipitation, in inches, for days shown, 1937--Continued

Station	County	Elev. (feet)	Lat.	Long.	May									June				Total
					23	24	25	26	27	28	29	30	31	1	2	3	4	
Pecos River Basin																		
McReed Ranch, near Fort Sumner	DeBaca	-	34°37'	104°20'	12 inches of rain in 5 days. Maximum rate was 2 inches in 1 hour early on morning of June 3. (A few miles northeast, 6 to 8 inches of rain was reported as falling in 2 hours on morning of June 3)													12
Butts ranch, near Fort Sumner	DeBaca	-	34 39	104 18	10 inches of rain in 3 days. Maximum rate was 4 inches in 30 minutes on morning of June 3, just after daybreak. (Mr. Butts stated that a few miles farther north it rained 6 inches in 30 minutes.													10
Fred Weaver, near Fort Sumner	DeBaca	-	34 45	104 14	9 inches of rain during period.													9
Lysle ranch, near Fort Sumner	DeBaca	-	34 39	104 22	9½ inches of rain fell in 3 days. Maximum rate was 2 inches in 1 hour about daybreak June 3.													9.5

Clayton: May 31, heavy hail over path 5 miles wide; one stone measured 8 inches in circumference and weighed 9 ounces; stones averaged about the size of golf balls.

Near Roy: May 31, stones from the size of marbles to the size of hen eggs fell.

Near Roswell: June 3, considerable damage to crops; reported that 6 stones would fill a gallon bucket.

Centerville: June 7, scattered hail over area 25 miles wide; some stones 9 to 10 inches in circumference. Sheep and lambs killed.

Levy: June 12, some stones larger than hen eggs.

Plate 3 shows hail that fell at Trinidad, Colorado, between 3:57 and 4:23 p.m., June 14, 1937. Trinidad is about 25 miles north of Raton, N. Mex., and is subject to the same kind of storms as occur in New Mexico.

FLOOD DISCHARGES

Canadian River Basin

Flood-producing rains, amounting to over 10 inches in some places, fell from May 23 to June 4 over the Canadian River Basin in New Mexico. The heaviest precipitation was over a relatively small area near Clayton. At the A. W. Tanner farm, about 15 miles southwest of Clayton, 10.23 inches of rain was reported to have fallen from May 27 to June 3, with 2 inches falling in 15 minutes and 7 inches falling in 2 hours and 40 minutes on May 31.

Several small streams in the area of heaviest rainfall were unusually high, but the Canadian River did not closely approach past flood stages. The following notes, taken mostly from newspapers, may aid in giving a clearer understanding of the floods:

May 23: General rains over eastern part of the basin in Mexico.

May 27: General rains, very heavy in some places, over area near Tucumcari.

May 28: Torrential rains reported over northern and eastern part of State. 3.23 inches of rain in 24 hours reported at Tucumcari. Canadian River reached peak of 9.2 feet in night at Conchas Dam.

May 29: Tucumcari isolated, highways blocked, and trains stopped. Some communities reported 5 to 6 inches of rain in 2 days.

May 30: Skies clearing after eastern New Mexico's heaviest rainstorm in 23 years.

May 31: Heavy hail at Clayton; one stone measured 8 inches in circumference and weighed 9 ounces.

June 2: Cofferdam at Conchas Dam intentionally flooded, to lessen damage from the rapidly rising Canadian and Conchas Rivers after heavy rains in night; stream reached peak of 11 feet about 7 a.m.

June 3: Peak stage of Canadian River at Conchas Dam 12.80 feet about 5 p.m.

June 4: Clear at Clovis; precipitation 10 inches in past 10 days. United States Weather Bureau reported statewide fair weather.

The flooding of the highway between Logan and Mosquero is shown in plate 4, A. Plate 4, B, shows damage to State Highway 18 at a creek near Clayton, due to inadequate capacity of a culvert.

The peak discharge and the run-off for the flood period were computed at all river-measurement stations on the Canadian River and at the

HAIL AT TRINIDAD, COLO., JUNE 14, 1937.
Courtesy of E. L. Hardy.

A. FLOODED HIGHWAY BETWEEN LOGAN AND MOSQUERO.
Flood caused by rain of May 28, 1937.

B. STATE HIGHWAY 18 NEAR CLAYTON.
Damage caused by rains of May 1937. Courtesy of A. M. Easterday.

lowest station on tributaries to the Canadian River. At certain other places only the peak discharge was determined. Peak discharges are given in table 2. The map of the Canadian River Basin in New Mexico (fig. 2) shows isohyetals for total rainfall May 23 to June 4 and places at which flood records were obtained.

Hydrographs of discharge at river-measurement stations on the Canadian River near Roy, at Garmes Bridge, at Conchas Dam, and at Logan are shown in figure 4 and at stations on the Cimarron River near Springer, Mora River near Shoemaker, and Conchas River at Variadero in figure 5.

Stage and discharge records of the flood at river-measurement stations in the Canadian River Basin, including data from which figures 4 and 5 were plotted, are presented in a succeeding section of this report entitled "Stages and discharges".

Pecos River Basin

Heavy rains fell over the Pecos River Basin the last week of May and the first few days of June. For a period of more than ten days heavy rains fell successively over one small area and then another. Record-breaking floods were produced in the Pecos River at Santa Rosa and above, and in a number of the tributaries to the river; at Guadalupe and below, the Pecos River did not exceed maximum known stages.

The Pecos River flood at Santa Rosa on May 27 was almost entirely held by the Alamogordo Dam near Guadalupe. The larger flood of June 2 filled the reservoir and flowed over the spillway of the partly completed dam.

The maximum stage of the Pecos River near Roswell occurred May 28 and was caused mostly by the flood in the Cienaga del Macho, which enters the Pecos through Salt Creek, about 15 miles above Roswell.

The flow at Carlsbad and below was affected by storage in Lake McMillan and Lake Avalon, 12 and 6 miles, respectively, above Carlsbad.

The following accounts of the flood in the Pecos River Basin have been taken mostly from newspapers.

May 23: 1.79 inches of rain reported at Roswell.

May 24: General rains as much as 3 inches in places reported in areas around Portales.

May 27: Very heavy rain in area between Las Vegas and Santa Rosa.

May 28: Rains continued over Las Vegas-Santa Rosa area. 3-1/2 inches of rain unofficially reported at Fort Sumner for 24-hour period.

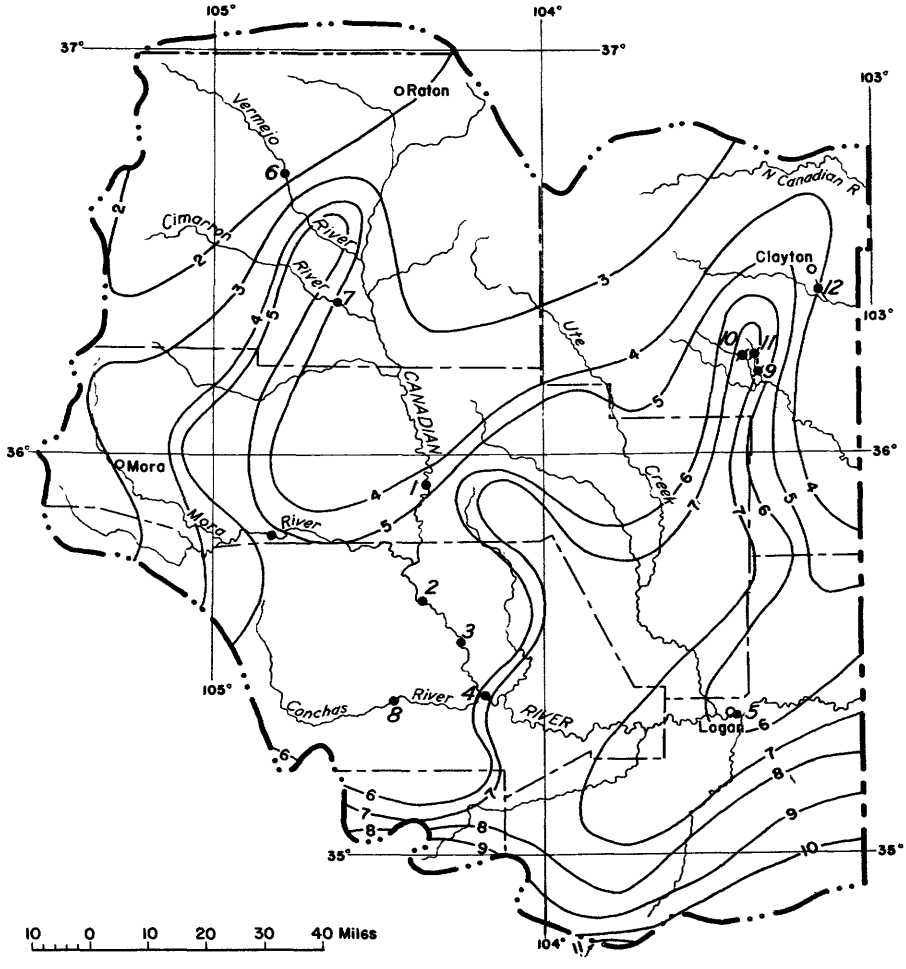

Figure 2.--Map of Canadian River Basin in New Mexico showing isohyetals for total rainfall, in inches, May 23 to June 4, and location of discharge measuring places.

New Alamogordo Dam near Fort Sumner threatened; dam credited with having averted a flood in lower valley. West part of Roswell flooded from 2 to 5 feet by waters of the Rio Hondo.

May 30: Skies clearing. Pecos River dropping rapidly between Roswell and Artesia.

May 31: Torrential rains during night reported in upper Rio Hondo Basin.

June 1: Heavy rains fell at Las Vegas and surrounding area. Santa Rosa reported 1.57 inches of rain. Roswell flooded by unusually dry Rio Hondo for second time in four days. Berrendo Creek flood struck Roswell without warning 14 hours before Rio Hondo flood. Flood greater than on May 29. The Rio Hondo flood was caused by a storm on the upper part of the stream in general between the Rio Bonito and Rio Ruidoso. The storm was accompanied by rain, hail, and winds of tornado proportions; precipitation estimated at 7 inches in less than 2 hours.

June 2: A 31-foot flood crest reported at Santa Rosa in early morning. At 4:20 p.m. water was flowing over the spillway of the three-fourths completed Alamogordo Dam. Roswell digging out of debris.

June 3: Second flood fed by torrential rains during night, sweeping down river toward the Alamogordo Dam. All streams feeding into the Pecos River above the dam were reported bank full, and engineers were prepared to remove a temporary dike if spillway proved inadequate. A sudden rain and hailstorm forced the Rio Hondo out of its banks, flooding the lower part of Roswell as much as 15 inches. Heavy hail 5 miles southeast of Roswell; reports that 6 stones would fill a gallon bucket.

June 4: Fair weather over basin. River dropping above Alamogordo Dam. Leaks stopped in McMillan Dam above Carlsbad.

Plate 5, A, shows remains of bridge over the Pecos River near Dilia, on the Santa Rosa-Las Vegas highway, and plate 5, B, shows traffic delayed by high water on Jackson Draw near Fort Sumner.

Plate 6, A, shows Highway 66 about 1-1/2 miles north of Santa Rosa flooded by the Pecos River June 2; plate 6, B, shows damage to bridge across the Pecos River near Acme, about 15 miles northeast of Roswell, caused by the flood of May 28. Plates 7 and 8 show parts of Roswell and vicinity flooded by the Rio Hondo on June 1.

Figure 3 is a map of the Pecos River Basin in New Mexico showing isohyetals for the total rainfall May 23 to June 4 and showing places at which flood records were obtained. The peak discharge and the run-off for

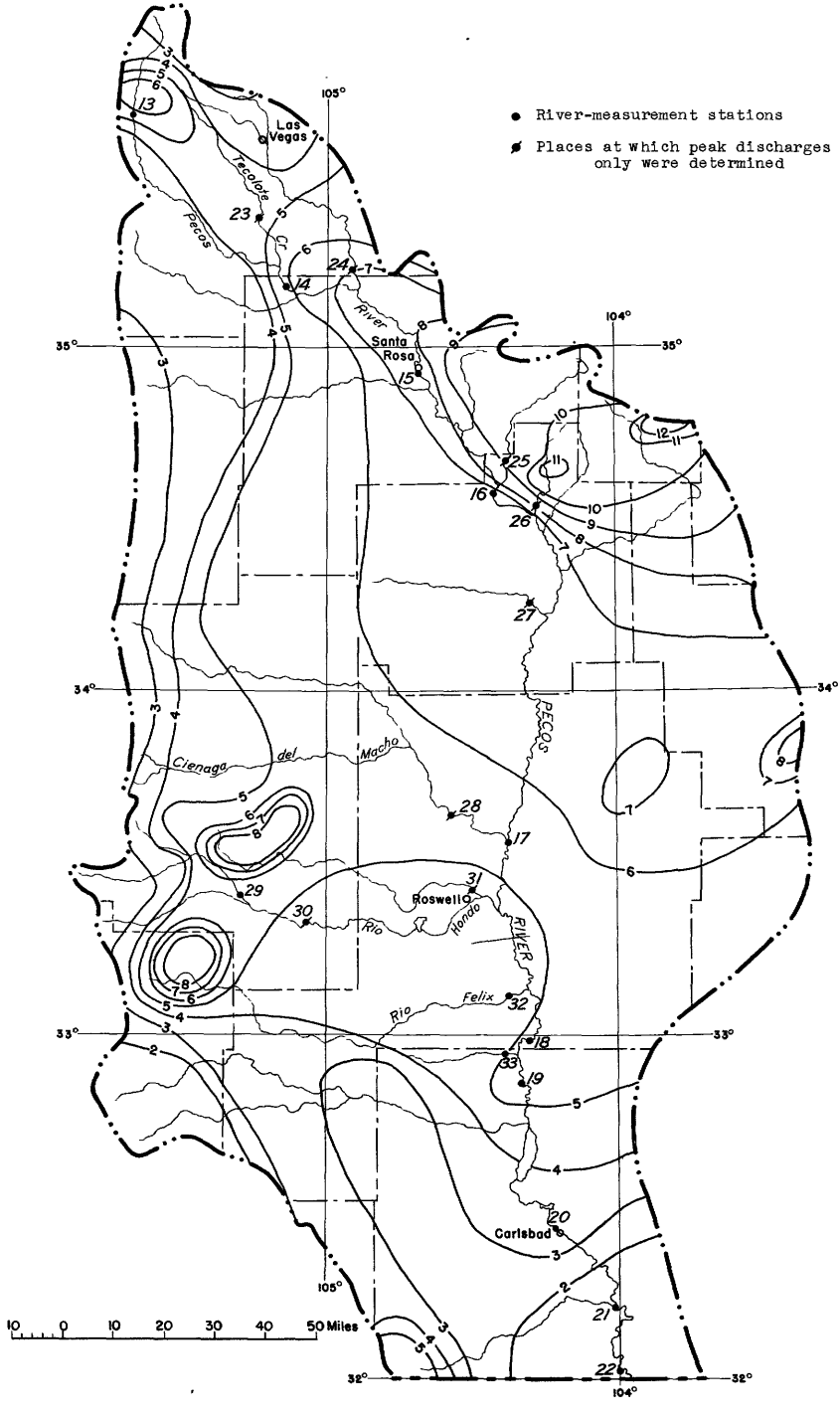

Figure 3.--Map of Pecos River Basin in New Mexico showing isohyetals for total rainfall, in inches, May 23 to June 4, and location of discharge measuring places.

A. PECOS RIVER NEAR DELIA.
Remains of highway bridge after flood of June 1, 1937.

B. JACKSON DRAW NEAR FORT SUMNER.
Traffic delayed by flooded crossing.

A. UNITED STATES HIGHWAY 66 NEAR SANTA ROSA, JUNE 2, 1937.
Highway flooded by the Pecos River.

B. PECOS RIVER NEAR ACME.
Showing damage to highway bridge done by flood of May 28, 1937.

A. MAIN STREET IN BUSINESS SECTION.

B. FLOOD ON WEST SECOND STREET.

ROSWELL FLOODED BY RIO HONDO, JUNE 1, 1937.

A ROSWELL FLOODED BY RIO HONDO, JUNE 1, 1937.
Lea Street at about peak of flood.

B. FLOOD OF JUNE 1, 1937, NEAR ROSWELL.
Farms flooded by Rio Hondo and Pecos River.

the period of the flood were computed at river-measurement stations at which sufficient data for such computations were obtained. At certain other places only the peak discharges were determined; these discharges are given in table 2.

Figure 6 shows hydrographs of discharge at river-measurement stations on the Pecos River near Pecos, at Santa Rosa, near Guadalupe, near Artesia, at Carlsbad, near Malaga, and near Angeles. Figure 7 shows hydrographs of discharge at river-measurement stations on the Rio Bonito at Hondo and the Rio Felix near Hagerman.

Stage and discharge records of the flood at river-measurement stations in the Pecos River Basin, including data from which figures 6 and 7 were plotted, are presented under "Stages and discharges". There are also included records of storage in Alamogordo and McMillan reservoirs.

Stages and discharges

Stage and discharge records are presented on the following pages for the river-measurement stations in the general flood area, including some stations which did not experience unusually high stages. These records consist essentially of a station description, a table of mean daily discharges and the total run-off for the flood period, and a table of stages and the corresponding discharges at indicated times during the flood in sufficient detail for reasonably reliable reproduction of the hydrograph. The latter table is not presented for river-measurement stations not experiencing unusual floods and for some stations at which a complete record of stage was not obtained.

The station description gives the location of gage, kind of gage-height record obtained, and the refinement to which gage heights were used in their application to the rating table for ascertaining discharges. Drainage areas are shown for stations where available; at other stations no figure has been determined because of inadequate maps, poorly defined watersheds, and the wide range of contribution of different parts of the basin. A statement is added regarding the stage-discharge relation, which shows the definition of the rating curve over the range in stage occurring in the floods. The maximum stage and discharge at the gaging station are given for the floods of 1937 and for the period of continuous record prior to 1937, or, at some stations, for a period in which it is known no flood occurred greater than that given.

The table of daily discharges gives the mean daily rate of flow, the total daily discharge for each day, and the total discharge for the flood period.

The table of stages and discharges at indicated times shows the rise and recession of the flood in detail.

Peak discharges as determined at all places are presented in table 2.

Table 2.- Maximum discharge at localities in the Canadian and Pecos River Basins, May and June 1937

No. on figs. 2 or 3	Stream	Latitude	Longitude	Drainage area (sq. mi.)	Maximum discharge		Method*
					Date	Sec.-ft.	
	Canadian River Basin						
1	Canadian River near Roy (a)	35°58'	104°21'	4,005	June 3	49,800	A
2	Canadian River at Garmes Bridge (a)	35 38	104 23	6,005	June 3	48,200	A
3	Canadian River near Bell Ranch	35 32	104 15	6,400	June 3	47,800	B
4	Canadian River at Conchas Dam (a)	35 23	104 09	7,350	June 3	94,000	A
5	Canadian River at Logan	35 21	103 26	11,200	June 3	110,000	C
6	Vermejo River near Dawson	36 42	104 47	250	June 3	128	C
7	Cimarron River near Springer	36 22	104 37	985	June 3	3,690	A
8	Conchas River at Variadero (a)	35 23	104 27	690	June 3	51,800	C
9	Tanner Draw near Clapham (b)	36 12	103 20	20.3	(c)	11,200	B
10	Draw No. 1 near Thomas (b)	36 16	103 22	.044	(c)	48.4	B
11	Draw No. 2 near Thomas (b)	36 16	103 22	.266	(c)	41.0	B
12	Draw near Clayton (b)	36 23	103 10	2.66	(c)	2,550	B
	Pecos River Basin						
13	Pecos River at Irvin ranch near Pecos	35 42	105 41	175	June 3	738	A
14	Pecos River near Anton Chico	35 11	105 08	1,080	June 1	40,300	B
15	Pecos River at Santa Rosa	34 56	104 42	2,880	June 2	55,200	C
16	Pecos River near Guadalupe	34 36	104 24	4,470	June 3	23,200	A
17	Pecos River near Acme	33 34	104 23	-	May 28	53,300	B
18	Pecos River near Lake Arthur (d)	32 59	104 18	-	May 30	51,500	B
19	Pecos River near Artesia (e)	32 50	104 20	-	May 30	51,500	-
20	Pecos River at Carlsbad (e)	32 25	104 13	-	May 31	41,000	A
21	Pecos River near Malaga (e)	32 12	104 02	-	June 1	38,200	A
22	Pecos River near Angeles	32 02	104 00	-	June 1	38,900	A
23	Tecolote Creek near Chapelle	35 22	105 19	-	(c)	20,500	B
24	Gallinas River near Chaperito	35 13	104 55	-	(c)	21,400	B
25	Alamogordo Creek near Guadalupe	34 40	104 22	-	June 3	24,800	B
26	Jackson Draw near Fort Sumner	34 32	104 17	-	June 3	12,000	B
27	Yeso Creek near Fort Sumner	34 15	104 18	-	June 3	8,720	B
28	Cienaga del Macho near Roswell	33 38	104 34	-	May 28	49,500	B
29	Rio Bonito at Hondo	33 23	105 16	233	May 31	9,270	B
30	Rio Hondo at Riverside	33 19	105 04	-	May 31	24,900	B
31	Berrendo Creek at Roswell	33 25	104 30	-	June 1	37,700	D
32	Rio Felix near Hagerman	33 07	104 20	-	May 29	26,500	B
33	Cottonwood Creek near Lake Arthur	32 57	104 22	-	May 29	635	C

* Methods of determining the discharge are designated by letters, as follows:
A From rating curve defined by current-meter measurements.
B By slope-area.
C From extension of rating curve.
D By contracted-opening.

a Data furnished by Corps of Engineers, U. S. Army.
b Data furnished by Soil Conservation Service, U. S. Department of Agriculture.
c Date of maximum not known.
d Measurements used for peak discharge near Artesia.
e Part of data furnished by Bureau of Reclamation, U. S. Department of the Interior.

Canadian River near Roy, N. Mex.

Location.- Lat. 35°58', long. 104°21', in sec. 26, T. 20 N., R. 24 E., in Mora County, 11.7 miles west of Roy via State Highway 120.
Drainage area.- 4,005 square miles.
Gage-height record.- Water-stage recorder graph. Gage heights used to hundredths.
Stage-discharge relation.- Defined by current-meter measurements.
Maximum.- 1937: Discharge, 49,800 second-feet 8:30 a.m. June 3 (gage height, 12.20 feet).
Remarks.- Flood discharge not affected by storage or diversions. Records furnished by Corps of Engineers, U. S. Army.

Mean discharge, in second-feet, and run-off, in acre-feet, 1937

Day	Sec.-ft.	Acre-feet	Day	Sec.-ft.	Acre-feet	Day	Sec.-ft.	Acre-feet
May			June			10	196	389
23	29	58	1	2,030	4,030	11	150	298
24	188	373	2	4,500	8,930	12	165	327
25	226	448	3	18,700	37,090	13	265	526
26	130	258	4	3,420	6,780	14	125	248
27	116	230	5	718	1,420	15	97	192
28	383	760	6	598	1,190	16	77	153
29	383	760	7	402	797	17	63	125
30	101	200	8	364	722	18	44	87
31	515	1,020	9	336	666	19	36	71
Run-off, in acre-feet, for period May 23 to June 19.								68,150

Gage height, in feet, and discharge, in second-feet, at indicated time, 1937

Time	Feet	Sec.-ft.	Time	Feet	Sec.-ft.	Time	Feet	Sec.-ft.
May 23			12N	2.00	320	8am	4.00	4,090
12M	1.60	31	6pm	1.84	194	9:30	3.97	4,020
May 24			12M	1.75	135	12N	3.62	3,200
3am	1.64	46	May 30			1:30pm	3.64	3,390
5	1.78	112	12N	1.73	101	2	3.48	2,880
7	1.80	124	12M	1.71	84	6	3.40	2,710
8	2.03	284	May 31			12M	3.37	2,640
12N	2.08	329	12N	1.70	74	June 3		
4pm	2.04	293	6pm	1.70	74	1am	3.35	2,600
5	1.90	187	6:25	1.80	129	1:15	4.00	3,780
10	1.90	187	6:50	3.65	3,180	1:30	6.00	8,750
12M	2.16	405	8	2.70	1,160	2:20	7.38	13,800
May 25			8:15	3.52	2,880	3:25	7.00	12,200
6am	2.10	293	9:30	2.80	1,340	4:30	6.35	9,860
12N	1.97	204	10	3.25	2,290	5	6.70	11,000
6pm	1.90	148	12M	2.65	1,080	6	8.50	19,200
12M	1.88	135	June 1			7	11.10	38,200
May 26			12:50am	2.60	1,100	8	12.00	47,600
6am	1.90	118	1	2.42	817	8:30	12.20	49,800
2pm	1.90	118	2	2.23	561	9	11.95	47,100
4	2.08	238	5	2.16	477	10	11.50	42,100
6	1.92	129	6	2.04	356	12N	10.15	29,700
12M	1.84	84	9:30	2.02	338	3pm	8.04	16,900
May 27			10	3.90	3,900	6	6.24	9,700
12N	1.80	135	10:50	4.10	4,380	8:50	5.23	6,670
12M	1.73	95	12N	3.97	4,070	9:30	5.65	7,740
May 28			3pm	3.53	3,040	10:20	6.07	9,060
6am	1.70	58	6	3.16	2,220	12M	5.60	7,600
12N	1.84	129	11:25	3.00	1,870	June 4		
6pm	2.10	320	11:35	5.00	6,670	6am	4.40	5,010
8	2.53	832	12M	6.40	10,900	12N	3.26	2,330
10	3.07	1,800	June 2			6pm	2.90	1,550
12N	2.77	1,220	12:15am	6.65	11,700	12M	2.70	1,180
May 29			2	6.18	10,100	June 5		
3am	2.32	678	4	5.10	6,870	12N	2.43	625
6	2.08	395	6	4.43	5,160	12M	2.30	465

Note.- Discharge determined by shifting control method.

Canadian River at Garmes Bridge, N. Mex.

Location.- Lat. 35°38' long. 104°23', at bridge on State Highway 65, in San Miguel County, about 35 miles by road southwest of Roy.
Drainage area.- 6,005 square miles.
Gage-height record.- Water-stage recorder graph. Gage heights used to hundredths.
Stage-discharge relation.- Defined by current-meter measurements.
Maximum.- 1937: Discharge, 48,200 second-feet 1:30 p.m. June 3 (gage height, 13.32 feet).
Remarks.- Flood discharge not affected by storage or diversions. Records furnished by Corps of Engineers, U. S. Army.

Mean discharge, in second-feet, and run-off, in acre-feet, 1937

Day	Sec.-ft.	Acre-feet	Day	Sec.-ft.	Acre-feet	Day	Sec.-ft.	Acre-feet
May			June			11	615	1,220
23	52	103	1	2,610	5,180	12	475	942
24	732	1,450	2	6,910	13,710	13	466	924
25	385	764	3	21,100	41,850	14	421	835
26	234	464	4	8,000	15,870	15	250	496
27	250	496	5	1,890	3,750	16	209	415
28	1,110	2,200	6	1,410	2,800	17	104	206
29	1,920	3,810	7	1,300	2,580	18	57	113
30	925	1,830	8	1,100	2,180	19	33	65
31	362	718	9	1,080	2,140	20	20	40
			10	814	1,610	21	21	42
Run-off, in acre-feet, for period May 23 to June 21								108,800

Gage height, in feet, and discharge, in second-feet, at indicated time, 1937

Time	Feet	Sec.-ft.	Time	Feet	Sec.-ft.	Time	Feet	Sec.-ft.
May 23			9pm	3.55	2,460	4:25am	7.25	12,600
12M	1.20	55	11	4.09	3,340	6	6.93	11,300
May 24			12M	3.93	3,060	9	5.90	7,870
4am	1.22	55	May 29			12N	5.03	5,520
6	1.43	137	2:20am	4.32	3,820	12:50pm	4.90	5,200
8	1.50	176	6	3.65	2,640	1	5.10	5,690
9	1.70	349	9	3.08	1,820	3	4.75	4,860
10	1.70	349	12N	2.75	1,420	3:50	5.00	5,320
11:40	2.00	624	2pm	2.65	1,300	6	4.64	4,500
12N	2.60	1,210	3	2.90	1,600	12M	3.70	2,740
12:35pm	3.08	1,780	4	2.65	1,300	June 3		
2	2.98	1,660	6	2.40	1,040	1:30	4.03	2,820
3:50	2.70	1,320	9	2.46	1,100	2:30	3.80	2,500
5	2.83	1,480	11	2.35	986	3	4.00	2,820
6	2.68	1,300	12M	2.70	1,360	5:10	4.00	2,820
9	2.30	910	May 30			5:30	5.00	4,310
12M	2.03	653	2am	2.55	1,210	6	7.50	11,200
May 25			3:20	2.64	1,310	6:15	8.87	17,400
6am	1.67	313	5:20	2.46	1,120	7	8.70	16,400
12N	1.64	286	6:30	2.57	1,230	8	8.63	16,000
3pm	1.80	439	12N	2.25	910	9	9.00	17,900
6	1.78	439	6pm	2.00	672	10	10.20	24,500
12M	1.60	295	12M	1.80	484	11	11.35	31,900
May 26			May 31			12N	12.50	41,300
6am	1.60	295	12N	1.60	322	1:25pm	13.32	48,200
12N	1.50	209	12M	1.60	322	2	13.00	45,000
6pm	1.50	209	June 1			4	11.90	35,600
12M	1.48	193	2am	1.60	322	6	10.85	28,300
May 27			3	3.00	1,730	9	9.50	21,900
6am	1.42	153	3:20	3.15	1,920	12M	8.20	15,900
8	1.50	201	6	3.00	1,730	June 4		
11	1.78	430	9	2.60	1,260	1:30am	7.90	15,800
1pm	1.70	349	1pm	2.12	776	3	7.82	15,400
6	1.60	250	4:40	2.02	682	6	7.00	11,800
12M	1.53	193	5	3.00	1,730	9	6.00	8,370
May 28			5:30	4.00	3,240	12N	5.20	6,120
3am	1.65	340	6	4.10	3,420	3pm	4.65	4,790
6	1.70	385	7	4.68	4,590	6	4.40	4,250
8	1.70	385	8:10	4.20	3,600	9	4.20	3,840
10	2.00	662	9	4.60	4,420	12M	3.92	3,300
12N	2.12	776	10	5.00	5,320	June 5		
12:20pm	2.14	796	10:15	7.00	11,400	3am	3.70	2,820
1:45	2.02	682	10:50	7.70	14,300	6	3.54	2,350
2:30	2.20	852	12M	7.10	11,800	9	3.40	2,060
3:35	2.72	1,390	June 2			12N	3.34	1,920
5	2.60	1,260	1am	7.20	12,400	3pm	3.20	1,670
6	2.62	1,280	2	6.70	10,400	6	3.08	1,430
7	3.10	1,830	3	6.00	8,160	9	3.02	1,310
8	3.42	2,250	3:30	5.70	7,300	12M	2.90	1,200
8:30	3.38	2,200	4	6.30	9,080			

Note.- Discharge determined by shifting-control method.

Canadian River near Bell Ranch, N. Mex.

Location.- Lat. 35°32', long. 104°15', in Montoya Grant, 1 mile above mouth of Pena Creek and about 9 miles southwest of Bell Ranch.
Drainage area.- 6,400 square miles.
Gage-height record.- Water-stage recorder graph except May 30 to June 6, when discharge was estimated on basis of a slope-area determination of peak discharge, observer's notes, precipitation records, and comparison with record of Concho River at Conchas Dam. Gage heights used to half tenths between 4.5 and 6.5 feet; hundredths below and tenths above these limits.
Stage-discharge relation.- Defined by current-meter measurements below 7,500 second-feet; extended logarithmically to peak stage on basis of a slope-area measurement of the peak discharge.
Maxima.- 1937: Discharge, 47,800 second-feet June 3 (gage height, 15.8 feet, from floodmarks).
1915-17, 1927-36: Discharge, 26,100 second-feet (revised). June 27, 1935 (gage height, 11.7 feet).
Remarks.- Flood flow not affected by storage or diversions.

Mean discharge, in second-feet, and run-off, in acre-feet, 1937

Day	Sec.-ft.	Acre-feet	Day	Sec.-ft.	Acre-feet	Day	Sec.-ft.	Acre-feet
May			2	5,000	9,920	14	500	992
23	75	149	3	14,000	27,770	15	390	774
24	528	1,050	4	20,000	39,670	16	358	710
25	512	1,020	5	4,000	7,930	17	319	633
26	332	659	6	1,250	2,480	18	245	486
27	181	359	7	875	1,740	19	202	401
28	1,280	2,540	8	831	1,650	20	165	327
29	3,360	6,660	9	675	1,340	21	139	276
30	1,100	2,180	10	567	1,120	22	154	305
31	500	992	11	549	1,090	23	157	311
June			12	476	944	24	120	238
1	2,000	3,970	13	390	774	25	99	196
Run-off, in acre-feet, for period May 23 to June 25								121,700

Canadian River at Conchas Dam, N. Mex.

Location.- Lat. 35°23', long. 104°09', in sec. 34, T. 14 N., R. 26 E., in Pablo Montoya Grant, San Miguel County, about 3.5 miles downstream from mouth of Conchas River and Conchas Dam.
Drainage area.- 7,350 square miles.
Gage-height record.- Water-stage recorder graph. Gage heights used to hundredths.
Stage-discharge relation.- Defined by current-meter measurements.
Maximum.- 1937: Discharge, 94,000 second-feet 5:40 p.m. June 3 (gage height, 12.80 feet).
Remarks.- Flood discharges not materially affected by storage or diversions. Records furnished by Corps of Engineers, U. S. Army.

Mean discharge, in second-feet, and run-off, in acre-feet, 1937

Day	Sec.-ft.	Acre-feet	Day	Sec.-ft.	Acre-feet	Day	Sec.-ft.	Acre-feet
May			June			11	377	748
23	63	125	1	1,130	2,240	12	269	534
24	1,440	2,860	2	23,300	46,210	13	232	460
25	2,300	4,560	3	36,300	72,000	14	250	496
26	3,220	6,390	4	8,940	17,730	15	220	436
27	3,270	6,490	5	1,800	3,570	16	180	357
28	17,700	35,110	6	820	1,630	17	144	286
29	12,600	24,990	7	1,660	3,290	18	113	224
30	3,000	5,950	8	732	1,450	19	88	175
31	576	1,140	9	503	998	20	68	135
			10	431	855	21	49	97
Run-off, in acre-feet, for period May 23 to June 21								241,500

Gage height, in feet, and discharge, in second-feet, at indicated time, 1937

Time	Feet	Sec.-ft.	Time	Feet	Sec.-ft.	Time	Feet	Sec.-ft.
May 23			2pm	8.20	22,000	4am	9.10	32,300
12M	3.15	552	3	7.95	20,000	5	10.05	44,100
May 24			5	7.70	18,100	6	10.80	55,600
4am	3.15	552	6	7.93	19,900	6:30	11.00	59,000
5	3.20	596	8	8.83	28,100	7	10.87	56,800
7	3.68	1,140	9:25	9.20	32,100	9	10.36	48,100
9	3.75	1,240	12M	8.80	27,800	12N	9.40	35,500
10	4.67	2,950	May 29			1pm	8.80	28,600
10:30	4.86	3,420	3am	8.50	25,100	2	7.80	19,400
11	4.74	3,120	6	7.72	18,400	3	7.05	13,800
12N	4.40	2,340	9	6.70	11,200	4	6.70	11,400
3pm	4.03	1,650	12N	6.36	9,220	6	6.00	7,700
6	3.77	1,260	3pm	5.88	6,960	9	5.32	4,930
11	3.75	1,240	3:50	6.12	8,020	10	5.18	4,470
11:10	4.30	2,130	4:10	5.93	7,170	12M	5.10	4,230
12M	4.62	2,840	5	6.11	7,980	June 3		
May 25			6:30	5.50	5,410	3am	4.62	2,980
1:30am	4.78	3,370	8:20	5.94	7,220	4	4.65	3,050
4	4.60	3,030	11	5.37	4,930	6:20	4.40	2,470
8	4.25	2,290	12M	6.37	9,280	7	4.25	2,150
2pm	4.15	2,090	May 30			8	4.96	3,840
6	4.10	1,940	12:25am	6.63	11,000	9	6.00	7,700
12M	3.96	1,640	2	6.11	8,210	10:15	7.15	14,500
May 26			3	5.80	6,830	11:05	7.12	14,200
6am	3.81	1,400	5	5.00	3,950	11:30	8.00	21,000
12N	3.75	1,320	7	4.60	2,930	12N	9.00	30,800
2pm	3.86	1,480	10	4.30	2,250	1pm	10.75	54,200
4	3.93	1,590	2pm	4.03	1,750	2	11.40	65,800
5	4.48	2,650	6	3.70	1,250	3	11.90	75,300
6	5.00	3,950	9	3.55	1,040	4	12.40	85,400
6:30	5.80	6,830	12M	3.42	884	5:10	12.80	94,000
7	5.70	6,410	May 31			6	12.47	86,900
8	6.40	9,710	3am	3.24	690	6:45	12.70	91,800
8:15	6.60	10,800	6	3.11	569	7:20	12.30	83,300
9	6.37	9,550	9	3.08	544	8	11.75	72,400
11:45	5.73	6,540	12N	3.10	560	9	11.20	62,100
12M	5.83	6,960	6pm	3.06	528	10	10.25	46,500
May 27			12M	3.04	512	11	9.25	33,700
12:30am	6.10	8,310	June 1			12M	8.70	27,600
1:20	6.26	9,120	6am	3.00	480	June 4		
3	5.70	6,540	1:50pm	3.00	480	2am	7.72	19,700
5	5.10	4,320	2:10	3.50	1,020	4	7.03	15,400
6	5.00	4,030	3	3.86	1,600	6	6.25	11,600
7	4.93	3,840	3:45	3.96	1,770	7	5.94	10,100
10	4.25	2,210	5	3.82	1,540	10	5.66	8,970
2pm	4.15	2,010	9	3.60	1,220	11	5.30	7,730
5	4.00	1,750	9:40	3.63	1,260	1pm	4.87	6,430
5:45	4.08	1,890	10	3.95	1,750	3	4.47	5,380
7	4.02	1,780	10:30	3.80	1,510	5	3.95	4,120
12M	3.86	1,520	11	4.60	3,170	8	3.55	3,290
May 28			11:10	5.20	4,860	12M	3.10	2,540
3am	3.80	1,420	11:40	5.87	7,570	June 5		
4	6.00	7,390	12M	5.74	7,000	4am	2.84	2,360
4:40	7.20	14,300	June 2			8	2.60	2,000
6	7.40	15,800	12:35am	5.55	6,200	12N	2.40	1,720
8	7.40	15,800	1:35	6.00	7,840	6pm	2.16	1,430
10	7.55	16,900	3	6.75	11,900	12M	1.95	1,200
12N	7.84	19,100	3:30	8.00	21,300			

Note.- Discharge determined by shifting control method May 23-25, 27-29, June 1 to 7 a.m. 2, 5.

Canadian River at Logan, N. Mex.

Location.- Lat. 35°21', long. 103°26', in sec. 15, T. 13 N., R. 33 E., half a mile south of Logan, Quay County, three-quarters of a mile above Chicago, Rock Island & Pacific Railway bridge, 5 miles below Ute Creek and 5 miles above Tucumcari Creek.
Drainage area.- 11,200 square miles.
Gage-height record.- Water-stage recorder graph to June 2; June 3 and after graph based on one daily reading of staff gage and record at Conchas Dam. Gage heights used to half tenths between 4.5 and 6.5 feet; hundredths below and tenths above these limits.
Stage-discharge relation.- Defined by current-meter measurements.
Maxima.- 1937: Discharge, 110,000 second-feet 4:30 a.m. June 3 (gage height, 18.91 feet).
1885-1936: Discharge, 278,000 second-feet Sept. 30, 1904 (gage height, 36.55 feet, Chicago, Rock Island & Pacific Railway gage).
Remarks.- Flood flow not affected by storage or diversions.

Mean discharge, in second-feet, and run-off, in acre-feet, 1937

Day	Sec.-ft.	Acre-feet	Day	Sec.-ft.	Acre-feet	Day	Sec.-ft.	Acre-feet
May			June			11	920	1,820
23	45	89	1	15,800	31,340	12	560	1,110
24	102	202	2	56,400	111,900	13	380	754
25	861	1,710	3	51,100	101,400	14	500	992
26	1,430	2,840	4	45,900	91,040	15	340	674
27	16,500	32,730	5	9,500	18,840	16	1,360	2,700
28	36,400	72,200	6	2,470	4,900	17	300	595
29	57,500	114,000	7	4,040	8,010	18	160	317
30	9,590	19,020	8	1,590	3,150	19	100	198
31	2,500	4,960	9	2,080	4,130	20	110	218
			10	830	1,650	21	60	119
Run-off, in acre-feet, for period May 23 to June 21								633,600

Gage height, in feet, and discharge, in second-feet, at indicated time, 1937

Time	Feet	Sec.-ft.	Time	Feet	Sec.-ft.	Time	Feet	Sec.-ft.
May 23			9pm	14.28	59,000	3:45am	13.90	59,900
12M	2.31	55	12M	14.90	64,700	6	10.80	33,700
May 24			May 29			6:30	9.50	25,300
6am	2.31	55	3am	16.50	80,600	8	10.00	28,300
11	2.65	128	5	16.70	82,600	10	11.70	40,500
12N	2.85	195	8	18.00	95,900	11:30	14.00	60,900
1pm	2.84	191	12N	16.35	79,600	2pm	14.6	66,700
3	2.63	125	2pm	13.75	54,400	4	14.9	69,600
4	2.71	148	4	11.25	33,000	6	15.2	72,600
11	2.67	146	6	9.65	23,000	8	15.6	76,600
12M	2.89	209	11	7.86	14,700	10	16.3	83,600
May 25			12M	7.83	14,300	12M	17.3	93,900
2am	3.14	330	May 30			June 3		
3	4.06	1,190	3am	7.63	13,400	2am	18.1	102,000
6	3.60	658	9:30	6.60	9,500	4:30	18.91	110,000
7	4.22	1,440	12:30pm	7.06	11,400	6	17.3	92,800
8pm	3.38	483	8	5.33	5,330	8	14.8	65,700
9	4.39	1,710	10	5.28	5,180	10	12.1	39,700
12M	4.27	1,510	12M	5.13	4,740	12:40pm	9.3	20,300
May 26			May 31			2	9.5	20,800
1am	4.33	1,610	8am	4.11	2,210	6	10.2	24,100
6	3.88	952	12N	4.06	2,110	9	11.2	29,000
8pm	3.43	525	2pm	4.06	2,110	10	12.0	33,000
9	3.73	790	3	3.91	1,840	12M	13.8	45,500
10	3.98	1,090	10	3.96	930	June 4		
10:30	6.38	8,910	12M	3.68	1,460	2am	15.2	58,000
May 27			June 1			4	16.4	74,600
1:30am	6.64	10,300	3am	3.54	1,260	6	17.03	90,800
3	12.64	43,800	4	14.70	67,600	8	16.2	73,600
7	10.04	25,300	7:30	10.50	31,600	10	15.0	56,200
11	7.70	13,800	8.10	10.25	29,600	12N	13.8	42,100
1pm	7.70	13,800	8:15	9.80	27,100	3pm	11.7	27,100
7	5.64	6,260	10	6.82	12,200	6	10.2	20,800
9	5.74	6,580	12:30pm	5.10	5,940	9	9.1	16,500
11	9.64	23,000	3:30	4.90	5,330	12M	8.2	14,300
May 28			6	4.70	4,740	June 5		
1am	7.95	14,700	7	5.60	7,570	4am	7.3	12,600
3	8.85	18,900	10	5.40	6,900	8	6.45	10,200
5	8.85	18,900	11	6.20	9,870	12N	5.8	9,500
7	9.95	25,300	June 2			6pm	5.0	7,400
9	9.15	20,800	1:30am	5.40	6,900	12M	4.4	4,310
3pm	13.25	49,000	2	7.00	13,000	June 6		
7	13.18	49,000	3	11.00	35,200	8:30am	3.85	2,470

Note.- Discharge determined by shifting-control method May 23 to 1:30 a.m. 27, June 1-6.

Vermejo River near Dawson, N. Mex.

Location.- Lat. 36°42', long. 104°47', about T. 28 N., R. 20 E., in Maxwell Grant, 2¼ miles north of Dawson, Colfax County.
Drainage area.- 250 square miles.
Gage-height record.- Water-stage recorder graph. Gage heights used to half tenths between 5.5 and 7.5 feet; hundredths below and tenths above these limits.
Stage-discharge relation.- Defined by current-meter measurements below 70 second-feet; extended logarithmically to cover range in stage.
Maxima.- May and June 1937: Discharge, 128 second-feet 7 a.m. June 3 (gage height, 3.09 feet).
1915-36: Discharge, 17,900 second-feet Aug. 2, 1921 (discharge estimated, subject to very large error).
Remarks.- Diversions for irrigation above station.

Mean discharge, in second-feet, and run-off, in acre-feet, 1937

Day	Sec.-ft.	Acre-feet	Day	Sec.-ft.	Acre-feet	Day	Sec.-ft.	Acre-feet
May			30	68	135	7	58	115
23	48	95	31	69	137	8	56	111
24	48	95	June			9	52	103
25	48	95	1	71	141	10	51	101
26	47	93	2	68	135	11	47	93
27	45	89	3	102	202	12	46	91
28	55	109	4	79	157	13	45	89
29	60	119	5	69	137	14	44	87
			6	63	125	15	44	87
Run-off, in acre-feet, for period May 23 to June 15 2,740								

Gage height, in feet, and discharge, in second-feet, at indicated time, 1937

Time	Feet	Sec.-ft.	Time	Feet	Sec.-ft.	Time	Feet	Sec.-ft.
May 22			9pm	2.77	68	June 5		
12M	2.65	50	11	2.89	87	12N	2.77	69
May 23			12M	2.90	89	12M	2.76	68
12N	2.64	48	June 1			June 6		
12M	2.65	50	2am	2.83	77	12N	2.73	63
May 24			4	2.79	71	12M	2.72	62
12N	2.64	48	12N	2.76	66	June 7		
12M	2.64	48	4pm	2.77	68	12N	2.70	58
May 25			8	2.80	72	12M	2.70	58
12N	2.64	48	12M	2.78	69	June 8		
12M	2.64	48	June 2			12N	2.68	55
May 26			12N	2.76	68	12M	2.68	55
12N	2.64	48	12M	2.78	71	June 9		
12M	2.63	47	June 3			12N	2.66	52
May 27			1am	2.95	100	12M	2.66	52
12N	2.62	46	2	3.07	124	June 10		
12M	2.61	45	3	3.01	112	12N	2.65	51
May 28			4	2.84	80	12M	2.64	50
4am	2.61	45	5	2.91	93	June 11		
12N	2.72	59	6	2.99	108	12N	2.64	48
4pm	2.73	60	7	3.09	128	12M	2.63	47
12M	2.73	60	8	3.04	118	June 12		
May 29			9	2.98	106	12N	2.62	46
12N	2.71	59	10	3.02	114	12M	2.62	46
12M	2.73	62	11	3.05	120	June 13		
May 30			12N	3.02	114	12N	2.61	45
12N	2.79	71	2pm	2.96	102	12M	2.60	44
12M	2.79	71	3	2.94	98	June 14		
May 31			7	2.94	98	12N	2.60	44
12N	2.76	66	12M	2.88	87	12M	2.61	45
5pm	2.75	65	June 4			June 15		
6	2.89	87	12N	2.83	79	12N	2.60	44
7	2.85	80	12M	2.78	71	12M	2.60	44

Note.- Discharge determined by shifting-control method.

Cimarron River at Springer, N. Mex.

Location.- Lat. 36°22', long. 104°37', in sec. 33, T. 25 N., R. 22 E., 300 feet below highway bridge, one-eighth mile west of Springer, Colfax County, 6 miles below mouth of Rayado River and 6 miles above confluence with Canadian River.
Drainage area.- 985 square miles.
Gage-height record.- Water-stage recorder graph. Gage heights used to half tenths between 4.5 and 7.5 feet; hundredths below and tenths above these limits.
Stage-discharge relation.- Defined by current-meter measurements below 381 second-feet; extended logarithmically to 3,700 second-feet.
Maxima.- 1937: Discharge, about 3,690 second-feet about 1 a.m. June 3 (gage height, 9.15 feet).
1907-9, 1921-36: Discharge, about 15,000 second-feet June 11, 1913.
Remarks.- Flood flow probably not affected by diversions for irrigation.

Mean discharge, in second-feet, and run-off, in acre-feet, 1937

Day	Sec.-ft.	Acre-feet	Day	Sec.-ft.	Acre-feet	Day	Sec.-ft.	Acre-feet
May			2	331	657	9	45	89
27	4.5	9	3	1,610	3,190	10	31	61
28	5.3	11	4	315	625	11	32	63
29	8.2	16	5	209	415	12	27	54
30	14	28	6	157	311	13	22	44
31	38	75	7	90	179	14	20	40
June			8	56	111	15	16	32
1	429	851						
Run-off, in acre-feet, for period May 27 to June 15								6,860

Gage height, in feet, and discharge, in second-feet, at indicated time, 1937

Time	Feet	Sec.-ft.	Time	Feet	Sec.-ft.	Time	Feet	Sec.-ft.
May 27			June 2			June 5		
12M	1.50	4.2	2am	2.74	111	12N	3.32	205
May 28			4	2.48	73	12M	3.27	193
12N	1.53	5.0	6	2.30	53	June 6		
12M	1.57	6.2	10	2.10	36	12N	3.22	184
May 29			12N	2.16	41	2pm	3.01	140
6am	1.64	8.5	4pm	2.23	47	7	2.94	127
12N	1.68	10	5	3.30	229	8	2.88	116
6pm	1.60	7.2	6	4.48	590	12M	2.86	112
12M	1.65	8.9	7	4.30	516	June 7		
May 30			8	4.60	630	12N	2.82	109
8am	1.75	13	9	4.90	758	4pm	2.55	69
9	1.97	26	10	5.85	1,240	12M	2.44	56
10	1.96	26	11	7.00	1,910	June 8		
12N	1.89	21	12M	8.10	2,730	12N	2.43	58
6pm	1.75	13	June 3			12M	2.36	51
12M	1.68	10	1am	9.15	3,690	June 9		
May 31			2	8.80	3,330	12N	2.30	45
12N	1.66	9.3	3	8.20	2,810	12M	2.19	36
7pm	1.62	7.8	4	7.38	2,190	June 10		
8	1.82	16	5	7.51	2,260	12N	2.13	31
9	2.40	65	6	7.76	2,490	12M	2.10	28
10	2.10	36	7	7.67	2,410	June 11		
11	3.80	363	8	7.22	2,050	7pm	2.10	28
12M	3.62	309	9	6.75	1,770	8	2.76	104
June 1			10	6.30	1,470	9	2.25	41
2am	3.00	159	11	6.05	1,320	10	2.15	32
4	2.45	68	12N	5.99	1,290	12M	2.14	32
6	2.14	38	2pm	5.97	1,260	June 12		
8	1.99	27	3	6.00	1,290	12N	2.07	27
11	1.89	20	4	5.82	1,180	12M	2.03	24
1pm	2.04	31	6	5.20	870	June 13		
2	2.40	65	8	4.69	650	12N	2.01	22
3	5.80	1,240	10	4.41	534	12M	1.98	21
4	7.70	2,410	12M	4.24	474	June 14		
5	6.60	1,650	June 4			12N	1.97	20
6	6.00	1,290	2am	4.10	428	12M	1.97	20
7	5.54	1,040	4	4.06	414	June 15		
8	4.95	780	6	3.92	369	12N	1.94	19
9	4.35	526	12N	3.67	294	12M	1.80	12
10	3.82	360	12M	3.44	232			
11	3.43	258						
12M	3.15	188						

Note.- Discharge determined by shifting-control method.

Mora River near Shoemaker, N. Mex.

Location.- Lat. 35°48', long. 104°48', in sec. 10, T. 18 N., R. 20 E., 5.5 miles east of Shoemaker, Mora County, and about 23 miles above confluence with Canadian River.
Drainage area.- 1,160 square miles.
Gage-height record.- Water-stage recorder graph. Gage heights used to half tenths between 4.0 and 6.5 feet; hundredths below and tenths above these limits.
Stage-discharge relation.- Defined by current-meter measurements below 2,800 second-feet; extended logarithmically to 5,000 second-feet.
Maxima.- 1937: Stage, 10.41 feet 7:10 a.m. June 3 (discharge not determined).
1914-36: Stage, 10.6 feet June 4, 1921 (discharge not determined).
Remarks.- Flood flow not affected by storage or diversions.

Mean discharge, in second-feet, and run-off, in acre-feet, 1937

Day	Sec.-ft.	Acre-feet	Day	Sec.-ft.	Acre-feet	Day	Sec.-ft.	Acre-feet
May			June					
23	27	54	1	312	619	11	154	305
24	47	93	2	966	1,720	12	132	262
25	80	159	3	4,140	8,210	13	112	222
26	84	167	4	743	1,470	14	97	192
27	76	151	5	452	897	15	93	184
28	77	153	6	358	710	16	74	147
29	171	339	7	312	619	17	54	107
30	185	367	8	264	524	18	44	87
31	228	452	9	218	432	19	40	79
			10	180	357	20	33	65
Run-off, in acre-feet, for period May 23 to June 20								19,140

Gage height, in feet, and discharge, in second-feet, at indicated time, 1937

Time	Feet	Sec.-ft.	Time	Feet	Sec.-ft.	Time	Feet	Sec.-ft.
May 22			10am	2.89	386	June 5		
12M	1.22	29	12N	2.69	318	12N	3.04	452
May 23			4pm	2.61	294	12M	2.91	400
12N	1.18	26	8	2.60	291	June 6		
12M	1.15	23	12M	2.65	306	12N	2.80	362
May 24			June 2			12M	2.72	334
4am	1.13	22	1am	2.68	315	June 7		
8	1.41	47	2	4.62	297	12N	2.65	312
12N	1.37	43	3	5.10	1,920	12M	2.57	288
4pm	1.52	59	4	5.35	2,190	June 8		
8	1.57	65	5	5.14	1,970	12N	2.50	267
12M	1.64	73	6	4.48	1,360	12M	2.42	243
May 25			7	4.10	1,040	June 9		
12N	1.67	79	8	3.99	975	12N	2.33	220
12M	1.72	86	10	3.72	804	12M	2.23	195
May 26			12N	3.54	696	June 10		
12N	1.71	84	4pm	3.33	580	12N	2.18	182
12M	1.70	83	8	3.12	476	12M	2.10	163
May 27			12M	3.03	440	June 11		
12N	1.66	77	June 3			12N	2.06	154
12M	1.60	69	2am	3.00	428	12M	2.02	144
May 28			3	3.70	792	June 12		
12N	1.64	74	4	4.58	1,440	12N	1.96	132
12M	1.71	84	5	5.20	2,020	12M	1.90	119
May 29			6	8.50	-	June 13		
8am	1.78	95	7	10.26	-	12N	1.87	114
12N	1.76	92	7:10	10.41	-	12M	1.81	103
1pm	1.80	98	8	9.95	-	June 14		
2	2.10	158	9	9.62	-	12N	1.75	93
3	2.70	321	10	8.80	-	12M	1.75	93
4	3.34	585	11	8.28	-	June 15		
5	2.95	408	12N	8.50	-	12N	1.77	97
6	2.70	321	1pm	8.22	-	12M	1.68	83
8	2.29	205	2	7.54	-	June 16		
12M	2.08	154	3	6.86	4,300	12N	1.65	79
May 30			4	6.42	3,570	12M	1.53	63
8am	2.12	163	6	6.18	3,220	June 17		
4pm	2.31	210	8	5.50	2,410	12N	1.46	56
12M	2.35	220	10	4.65	1,540	12M	1.37	46
May 31			12M	4.28	1,200	June 18		
8am	2.33	215	June 4			12N	1.34	43
4pm	2.43	240	6am	3.80	864	12M	1.34	43
12M	2.44	243	8	3.83	884	June 19		
June 1			10	3.70	804	12N	1.31	40
5am	2.38	228	12N	3.49	678	12M	1.25	35
6	2.98	420	6pm	3.27	560	June 20		
7	3.16	495	12M	3.17	510	12N	1.23	33
8	3.11	472				12M	1.20	30

Note.- Discharge determined by shifting-control method.

Conchas River at Variadero, N. Mex.

Location.- Lat. 35°23', long. 104°27', at bridge on State Highway 67, about 14 miles east of Conchas Dam, San Miguel County.
Drainage area.- 690 square miles.
Gage-height record.- Water-stage recorder graph. Gage heights used to hundredths.
Stage-discharge relation.- Defined by current-meter measurements below 600 second-feet; extended above by application of Manning's formula.
Maximum.- 1937: Discharge, 51,800 second-feet 8 a.m. June 3 (gage height, 21.20 feet).
Remarks.- Flood discharge not affected by storage or diversions. Records furnished by Corps of Engineers, U. S. Army.

Mean discharge, in second-feet, and run-off, in acre-feet, 1937

Day	Sec.-ft.	Acre-feet	Day	Sec.-ft.	Acre-feet	Day	Sec.-ft.	Acre-feet
May			May			4	175	347
24	221	438	30	654	1,300	5	29	58
25	96	190	31	53	105	6	13	26
26	199	395	June			7	6	12
27	247	490	1	2,350	4,660	8	5	10
28	2,030	4,030	2	8,000	15,870	9	4	8
29	2,030	4,030	3	9,040	17,930			
Run-off, in acre-feet, for period May 24 to June 9								49,900

Gage height, in feet, and discharge, in second-feet, at indicated time, 1937

Time	Feet	Sec.-ft.	Time	Feet	Sec.-ft.	Time	Feet	Sec.-ft.
May 23			7pm	6.42	3,990	2am	18.65	36,600
12M	1.00	0	9	5.65	3,010	3	16.40	26,600
May 24			12M	4.72	2,020	4	13.00	15,600
11:30am	1.22	0	May 29			5	11.40	12,000
11:30	2.15	130	2am	3.96	1,330	6	8.80	7,700
12N	2.22	161	3	3.72	1,130	7	7.10	5,350
1pm	2.34	227	6:20	3.48	945	8	6.45	4,440
1:15	2.45	290	7	3.58	1,020	9	5.35	3,070
2	2.30	205	9	3.70	1,110	10	4.80	2,410
4	2.16	134	10:20	3.88	1,260	12N	4.00	1,630
4:30	3.15	714	12:50pm	3.55	998	3pm	3.20	923
5:20	3.35	850	2	3.90	1,280	6	2.73	590
6:30	3.19	740	3	3.74	1,150	9	2.31	360
9	2.80	500	4	3.88	1,260	11	2.04	248
12M	2.48	308	5	3.80	1,190	12M	2.03	232
May 25			5:30	5.60	2,960	June 3		
4am	2.17	126	6	6.75	4,380	1am	1.98	210
8	2.04	78	7	8.20	6,280	4	1.78	146
12N	2.00	66	8	7.73	5,650	4:20	2.00	192
6pm	1.98	60	10	5.97	3,390	4:40	2.92	560
12M	1.90	39	12M	4.60	1,910	5:35	2.80	478
May 26			May 30			6	3.40	815
6am	1.82	27	12:30am	4.60	1,910	6:30	9.50	8,000
12N	1.73	12	1:20	4.70	2,020	7	15.00	19,900
6pm	1.69	7	2	4.60	1,950	7:30	20.20	45,200
7:40	1.68	6	4	4.00	1,400	8	21.20	51,800
8	2.70	428	7	3.20	781	9	20.00	43,800
8:30	3.70	1,100	11	2.50	382	10	18.80	35,600
9	4.10	1,430	3pm	2.09	229	11	15.50	21,200
10	3.86	1,230	7	1.85	158	12N	12.00	12,000
11	3.65	1,060	12M	1.64	107	1pm	9.20	7,550
12M	3.26	774	May 31			2	7.60	5,350
May 27			4am	1.50	78	3	6.36	3,750
2am	2.93	504	8	1.41	65	4	5.55	2,780
5	2.60	320	12N	1.29	51	6	4.50	1,720
9	2.25	201	4pm	1.15	38	9	3.49	886
1pm	2.10	172	8	1.06	31	12M	2.83	504
6	2.00	158	12M	1.03	29	June 4		
12M	2.00	158	June 1			4am	2.32	302
May 28			6am	.90	21	8	2.00	195
9am	2.00	158	12N	.88	20	12N	1.65	108
9:35	2.02	164	6pm	.79	16	6pm	1.42	71
10	2.28	258	9	.77	15	12M	1.30	56
11	3.50	960	9:30	3.60	1,040	June 5		
11:15	3.90	1,320	10	9.00	7,400	6am	1.15	35
12N	4.12	1,540	11	17.00	27,800	12N	1.06	28
1pm	5.30	2,730	12M	20.00	44,500	6pm	.95	22
2	6.60	4,310	June 2			12M	.88	18
3	7.42	5,350	12:40am	20.20	45,500			
3:40	7.65	5,610	1	20.00	44,500			
5	7.20	5,020						

Note.- Discharge determined by shifting-control method May 25-28, 30, 12M June 1 to 5.

Pecos River at Irvin ranch, near Pecos, N. Mex.

Location.- Lat. 35°42', long. 105°41', in NE¼NE¼ sec. 17, T. 17 N., R. 12 E., at private road bridge on Irvin ranch, 600 feet above mouth of Indian Creek, 2 miles below Canon Espiritu Santo, and 11 miles north of Pecos, San Miguel County.
Drainage area.- 175 square miles.
Gage-height record.- Water-stage recorder graph. Gage heights used to hundredths.
Stage-discharge relation.- Defined by current-meter measurements.
Maxima.- 1937: Discharge, 738 second-feet 4 to 6 p.m. June 3 (gage height, 3.40 feet).
1910-36: Discharge, greater than 2,000 second-feet, Sept. 22, 1929.
Remarks.- Diversions for irrigation above station.

Mean discharge, in second-feet, and run-off, in acre-feet, 1937

Day	Sec.-ft.	Acre-feet	Day	Sec.-ft.	Acre-feet	Day	Sec.-ft.	Acre-feet
May			3	708	1,400	12	291	577
27	362	718	4	657	1,300	13	267	530
28	394	781	5	586	1,160	14	251	498
29	450	893	6	515	1,020	15	230	456
30	613	1,220	7	460	912	16	212	420
31	580	1,150	8	412	817	17	196	389
June			9	376	746	18	183	363
1	602	1,190	10	335	664	19	174	345
2	674	1,340	11	315	625	20	163	323
Run-off, in acre-feet, for period May 27 to June 20								19,840

Gage height, in feet, and discharge, in second-feet, at indicated time, 1937

Time	Feet	Sec.-ft.	Time	Feet	Sec.-ft.	Time	Feet	Sec.-ft.
May 26			June 3			June 11		
12M	2.67	358	2am	3.32	690	12N	2.58	315
May 27			5	3.37	720	12M	2.55	303
12N	2.65	348	9	3.32	690	June 12		
9pm	2.75	394	4pm	3.40	738	12N	2.53	295
12M	2.70	371	6	3.40	738	12M	2.48	275
May 28			12M	3.35	708	June 13		
6am	2.67	358	June 4			12N	2.48	275
2pm	2.84	435	12N	3.25	652	12M	2.43	255
6	2.77	402	12M	3.21	630	June 14		
9	2.84	435	June 5			12N	2.42	251
May 29			12N	3.14	591	12M	2.40	244
5am	2.83	430	12M	3.07	552	June 15		
3pm	2.79	412	June 6			12N	2.38	233
9	3.04	536	12N	3.02	520	12M	2.33	216
May 30			12M	2.96	490	June 16		
3am	3.16	602	June 7			12N	2.33	216
2pm	3.16	602	12N	2.90	460	12M	2.28	199
6	3.29	674	12M	2.85	435	June 17		
12M	3.21	630	June 8			12N	2.29	202
May 31			12N	2.81	416	12M	2.24	186
12N	3.11	574	12M	2.76	394	June 18		
12M	3.08	558	June 9			12N	2.26	193
June 1			12N	2.72	376	12M	2.20	174
12N	3.05	542	12M	2.67	353	June 19		
6pm	3.32	690	June 10			12N	2.22	180
12M	3.36	714	12N	2.64	340	12M	2.17	166
June 2			12M	2.60	323	June 20		
6am	3.30	679				12N	2.17	166
12M	3.25	652				12M	2.13	154

Note.- Discharge determined by shifting-control method.

Pecos River near Anton Chico, N. Mex.

Location.- Lat. 35°11', long. 105°08' in Anton Chico Grant, 1½ miles southeast of Anton Chico, Guadalupe County, and 4 miles below mouth of Tecolote Creek.
Drainage area.- 1,080 square miles.
Discharge record.- Based on a slope-area determination of peak discharge, two current-meter measurements, and weather records, and on a comparison with flow at river-measurement stations near Pecos and at Santa Rosa.
Maxima.- 1937: Discharge, 40,300 second-feet about 6 p.m. June 1 (gage height, 20.34 feet).
1930-36: Discharge, 12,900 second-feet July 16, 1933 (gage height, 8.0 feet).
1910-1937: Discharge, that of June 1, 1937.
Remarks.- Records poor.

Mean discharge, in second-feet, and run-off, in acre-feet, 1937

Day	Sec.-ft.	Acre-feet	Day	Sec.-ft.	Acre-feet	Day	Sec.-ft.	Acre-feet
May			June					
24	600	1,190	1	7,300	14,480	11	350	694
25	700	1,390	2	10,000	19,830	12	350	694
26	1,500	2,980	3	2,000	3,970	13	300	595
27	2,200	4,360	4	1,200	2,380	14	300	595
28	3,500	6,940	5	1,300	2,580	15	300	595
29	1,500	2,980	6	1,400	2,780	16	250	496
30	1,000	1,980	7	800	1,590	17	250	496
31	800	1,590	8	500	992	18	250	496
			9	450	893	19	200	397
			10	400	793	20	200	397
Run-off, in acre-feet, for period May 24 to June 20								79,150

Pecos River at Santa Rosa, N. Mex.

Location.- Lat. 34°56', long. 104°42', in sec. 3, T. 8 N., R. 21 E., at Santa Rosa, Guadalupe County, a quarter of a mile above highway bridge and 1¼ miles above mouth of Rio Agua Negro Chiquita.
Drainage area.- 2,880 square miles.
Gage-height record.- Water-stage recorder graph to 9:15 p.m. June 1; graph drawn on basis of numerous observations of stage 9:15 p.m. June 1 to June 5. Gage heights used to half tenths between 4.0 and 6.0 feet prior to June 1 and between 3.5 and 5.0 feet June 2 and after; hundredths below and tenths above these limits.
Stage-discharge relation.- Defined by current-meter measurements below 32,000 second-feet; extended logarithmically to 55,200 second-feet.
Maxima.- 1937: Discharge, 55,200 second-feet 4 a.m. June 2 (gage height, 25.7 feet).
1903-36: Discharge, 46,500 second-feet by slope-area Sept. 30, 1904 (gage height, about 23 feet).
Remarks.- Flood flow not affected by storage or diversions. Discharge estimated June 2-11 and 13-22 on basis of partial gage-height record and by comparison with other stations.

Mean discharge, in second-feet, and run-off, in acre-feet, 1937

Day	Sec.-ft.	Acre-feet	Day	Sec.-ft.	Acre-feet	Day	Sec.-ft.	Acre-feet
May			June			10	900	1,790
24	1,080	2,140	1	700	1,390	11	700	1,390
25	1,020	2,020	2	18,600	36,890	12	570	1,130
26	1,050	2,080	3	9,970	19,780	13	500	992
27	4,000	7,930	4	2,710	5,380	14	400	793
28	5,750	11,400	5	1,520	3,010	15	350	694
29	4,790	9,500	6	1,700	3,370	16	300	595
30	1,860	3,690	7	3,200	6,350	17	250	496
31	1,040	2,060	8	1,500	2,980	18	200	397
			9	1,000	1,980	19	180	357
						20	160	317
Run-off, in acre-feet, for period May 24 to June 20								130,900

Gage height, in feet, and discharge, in second-feet, at indicated time, 1937

Time	Feet	Sec.-ft.	Time	Feet	Sec.-ft.	Time	Feet	Sec.-ft.
May 23			2pm	4.28	1,980	7pm	7.45	7,200
12M	2.15	267	6	3.90	1,550	8	6.85	5,990
May 24			10	3.65	1,310	9	7.10	6,380
3am	2.15	267	12M	3.85	1,510	10	5.64	3,800
5	2.31	346	May 28			12M	5.22	3,200
8	2.20	290	1am	3.85	1,510	May 30		
11	2.25	315	2	5.00	2,850	1am	5.60	3,720
3pm	2.22	300	3	5.50	3,570	2	5.50	3,570
4	6.35	5,060	4	6.50	5,240	4	4.90	2,720
5	5.38	3,420	5	7.57	7,410	8	4.37	2,100
7	4.64	2,400	6	7.73	7,630	12N	3.82	1,480
9	4.30	1,980	7	7.35	6,990	6pm	3.60	1,260
12M	3.78	1,440	8	6.65	5,610	12M	3.23	952
May 25			9	6.88	5,990	May 31		
3am	3.45	1,130	10	6.75	5,800	1am	3.24	960
8	3.16	896	11	6.05	4,540	2	3.61	1,280
10	3.20	928	12N	5.85	4,120	3	3.67	1,330
11	3.50	1,180	2pm	6.45	5,240	4	3.57	1,240
2pm	3.28	992	3	7.08	6,380	7	3.54	1,220
3	3.58	1,250	4	6.67	5,610	12N	3.37	1,060
6	3.28	992	5	7.00	6,180	6pm	3.18	912
12M	2.98	763	6	7.30	6,780	12M	3.05	812
May 26			7	8.47	9,450	June 1		
6am	2.83	658	8	8.20	8,750	6am	3.00	777
12N	2.81	644	9	7.60	7,410	12N	2.86	672
8pm	2.76	610	10	6.90	5,990	9pm	2.72	584
9	2.91	719	11	7.04	6,380	12M	2.70	572
10	4.50	2,220	12M	7.15	6,580	June 2		
11	6.80	5,800	May 29			1am	7.7	9,510
12M	6.90	5,990	1am	7.05	6,380	2	11.5	17,600
May 27			2	5.90	4,200	3	23.0	47,300
1am	6.20	4,710	4	5.70	3,880	4	25.7	55,200
2	5.75	3,960	5	5.80	4,040	5	24.9	52,800
3	7.50	7,200	6	5.60	3,720	6	22.9	47,000
4	9.50	12,000	10	5.00	2,850	7	20.6	40,600
5	10.17	13,900	12N	6.35	5,060	8	18.1	33,800
6	9.40	11,700	2pm	7.00	6,180	10	13.5	22,300
8	7.60	7,410	4	7.38	6,990	12N	10.0	14,200
9	6.00	4,370	5	7.17	6,580	2pm	7.6	9,310
11	5.10	2,990	6	7.78	7,850	4	6.3	6,870

Note.- Discharge determined by shifting-control method May 23 to June 1.

Alamogordo Reservoir near Guadalupe, N. Mex.

Location.- Lat. 34°37', long. 104°24', at Alamogordo Dam on Pecos River, 4 miles north of Guadalupe, De Baca County.
Drainage area.- 4,470 square miles.
Gage-height record.- Gage read to tenths at frequent intervals during flood period.
Remarks.- Total capacity at spillway level, about 70,000 acre-feet. Records furnished by Bureau of Reclamation.

Gage height, in feet, and contents, in acre-feet, 1937

Time	Feet	Acre-feet	Time	Feet	Acre-feet	Time	Feet	Acre-feet
May 27			June 1			2pm	4,256.7	86,600
6am	4,160.0	250	4am	4,236.1	41,900	4	4,258.6	92,600
May 28			8	4,235.6	40,600	6	4,260.0	97,000
6am	4,218.0	19,450	12N	4,234.9	39,300	8	4,260.8	99,500
10	4,225.2	27,275	4pm	4,234.0	38,000	9	4,260.9	99,800
2pm	4,230.7	33,800	8	4,233.0	36,800	10	4,260.8	99,500
6	4,233.9	38,600	12M	4,233.3	37,200	12M	4,260.3	97,800
10	4,236.1	41,900	June 2			June 4		
12M	4,237.3	45,700	4am	4,235.1	39,600	4am	4,259.2	94,200
May 29			6	4,235.4	40,300	8	4,257.9	90,200
4am	4,239.8	47,450	7	4,236.3	41,400	12N	4,256.7	87,000
8	4,241.0	49,850	8	4,238.0	44,000	4pm	4,255.7	84,200
12N	4,241.5	50,900	9	4,240.5	48,300	8	4,254.8	80,900
4pm	4,242.0	51,950	10	4,241.0	49,000	12M	4,254.0	79,000
8	4,243.0	54,050	11	4,243.8	53,800	June 5		
12M	4,243.9	55,940	12N	4,246.1	56,800	12M	4,250.20	67,800
May 30			1pm	4,248.0	62,700	June 6		
4am	4,244.1	56,360	2	4,249.2	65,300	12M	4,246.76	60,000
8	4,243.8	55,730	3	4,250.1	67,800	June 7		
12N	4,243.5	55,100	4	4,250.7	69,500	12M	4,242.71	53,000
4pm	4,243.0	54,050	5	4,251.1	70,400	June 8		
8	4,242.4	52,790	6	4,251.4	71,300	12M	4,237.83	44,000
12M	4,241.8	51,530	9	4,251.8	72,200	June 9		
May 31			12M	4,251.8	72,200	12M	4,232.15	36,000
4am	4,241.0	49,850	June 3			June 10		
8	4,240.3	48,380	5am	4,251.5	71,500	12M	4,266.40	28,000
12N	4,239.5	47,000	6	4,252.1	73,100			
4pm	4,238.9	46,100	8	4,253.5	77,500			
8	4,238.1	44,900	10	4,254.3	79,800			
12M	4,237.3	43,700	12N	4,255.2	82,300			

Pecos River near Guadalupe, N. Mex.

Location.- Lat. 34°36', long. 104°24', in sec. 2, T. 4 N., R. 24 E., half a mile below Alamogordo Dam and 3½ miles north of Guadalupe, De Baca County.
Drainage area.- 4,470 square miles.
Gage-height record.- Water-stage recorder graph. Gage heights used to half tenths between 3.0 and 6.0 feet; hundredths below and tenths above these limits.
Stage-discharge relation.- Defined by current-meter measurements.
Maxima.- 1937: Discharge, 23,200 second-feet 9 p.m. June 3 (gage height, 11.86 feet).
1912-37: Discharge, 42,000 second-feet May 1, 1914 (gage height, 15.5 feet), from extension of rating curve.
Remarks.- Flood flow affected by storage in Alamogordo Reservoir, half a mile upstream; capacity of lake at spillway level, about 70,000 acre-feet.

Mean discharge, in second-feet, and run-off, in acre-feet, 1937

Day	Sec.-ft.	Acre-feet	Day	Sec.-ft.	Acre-feet	Day	Sec.-ft.	Acre-feet
May			June					
24	338	670	1	3,940	7,810	9	4,670	9,260
25	390	774	2	14,220	8,370	10	4,400	8,730
26	606	1,200	3	12,100	24,000	11	4,060	8,050
27	1,420	2,820	4	13,300	26,380	12	3,260	6,470
28	4,020	7,970	5	6,420	12,730	13	2,680	5,320
29	4,320	8,570	6	5,040	10,000	14	2,220	4,400
30	4,220	8,370	7	4,850	9,620	15	1,590	3,150
31	4,120	8,170	8	4,760	9,440	16	523	1,040
Run-off, in acre-feet, for period May 24 to June 16								193,300

Gage height, in feet, and discharge, in second-feet, at indicated time, 1937

Time	Feet	Sec.-ft.	Time	Feet	Sec.-ft.	Time	Feet	Sec.-ft.
May 23			June 2			June 9		
12M	2.17	294	7am	5.73	3,940	6am	5.24	4,670
May 24			12N	5.93	4,320	6pm	5.19	4,580
10pm	2.32	353	4pm	6.00	4,410	June 10		
12M	3.16	799	9	6.19	4,810	6am	5.12	4,400
May 25			12M	6.20	4,810	6pm	5.09	4,400
2am	3.42	986	June 3			June 11		
4	3.50	1,050	5am	6.16	4,710	6am	5.01	4,230
12N	3.47	1,030	10	7.30	7,420	2pm	4.95	4,140
6pm	3.32	910	1pm	8.26	10,300	6	4.77	3,810
12M	3.30	895	3	9.58	14,600	12M	4.64	3,650
May 26			5	10.71	18,600	June 12		
6am	3.13	780	7	11.62	22,000	6am	4.49	3,410
12N	2.81	586	9	11.86	23,200	12N	4.43	3,340
6pm	2.53	444	12M	11.20	20,700	4pm	4.38	3,260
12M	2.32	353	June 4			8	4.20	2,960
May 27			4am	10.39	17,900	12M	4.20	2,960
5am	2.28	337	6	10.00	16,600	June 13		
6	3.15	792	9	9.36	14,700	6am	4.15	2,890
11	3.94	1,450	12N	8.64	12,400	12N	4.03	2,750
8pm	4.70	2,300	6pm	7.68	9,980	6pm	3.90	2,540
12M	5.00	2,710	12M	6.92	8,050	12M	3.81	2,410
May 28			June 5			June 14		
8am	5.83	4,120	7am	6.40	6,930	6am	3.74	2,340
4pm	5.99	4,410	12N	6.05	6,100	12N	3.64	2,220
12M	6.00	4,410	6pm	5.78	5,700	6pm	3.56	2,100
May 29			12M	5.58	5,320	12M	3.42	1,920
12N	5.97	4,320	June 6			June 15		
12M	5.95	4,320	6am	5.47	5,040	6am	3.30	1,810
May 30			12N	5.45	5,040	12N	3.14	1,640
12N	5.93	4,320	6pm	5.43	5,040	6pm	2.90	1,390
12M	5.88	4,220	12M	5.41	4,940	12M	2.54	1,150
May 31			June 7			June 16		
12N	5.85	4,120	6am	5.39	4,940	4am	2.33	884
12M	5.82	4,030	6pm	5.36	4,850	6	2.16	752
June 1			June 8			8	1.85	545
12N	5.76	3,940	6am	5.32	4,760	10	1.65	428
12M	5.70	3,850	6pm	5.30	4,760	12N	1.58	390
						6pm	1.47	335
						12M	1.48	340

Pecos River near Artesia, N. Mex.

Location.- Lat. 32°50'00", long. 104°19'35", in W½ sec. 18, T. 17 S., R. 27 E., at Artesia-Lovington highway bridge 4.2 miles east of Artesia, Eddy County, 6.5 miles above Penasco River, and 16⅔ miles above McMillan Dam.
Gage-height record.- Water-stage recorder graph. Gage heights used to half tenths between 3.0 and 4.5 feet; hundredths below and tenths above these limits.
Stage-discharge relation.- Defined by current-meter measurements below 5,400 second-feet; extended logarithmically to peak discharge on basis of slope-area measurement at the peak.
Maxima.- 1937: Discharge, 51,500 second-feet May 30 (gage height, 14.7 feet).
1905-36: Stage, 15.9 feet Sept. 18, 1919 (at former location near Dayton, 6 miles downstream; discharge probably greater than in 1937).
Remarks.- Flood flows partly regulated by storage in Alamogordo Reservoir. Gage-height record furnished by Bureau of Reclamation.

Mean discharge, in second-feet, and run-off, in acre-feet, 1937

Day	Sec.-ft.	Acre-feet	Day	Sec.-ft.	Acre-feet	Day	Sec.-ft.	Acre-feet
May			2	8,660	17,180	14	3,330	6,600
23	485	962	3	6,560	13,010	15	3,210	6,370
24	842	1,670	4	6,560	13,010	16	2,970	5,890
25	2,670	5,300	5	7,010	13,900	17	2,020	4,010
26	1,920	3,810	6	7,510	14,900	18	1,390	2,760
27	1,970	3,910	7	5,800	11,500	19	825	1,640
28	2,520	5,000	8	5,200	10,310	20	685	1,360
29	10,000	19,830	9	4,750	9,420	21	615	1,220
30	29,400	58,310	10	4,750	9,420	22	545	1,080
31	33,400	66,250	11	4,420	8,770	23	485	962
June			12	4,570	9,060	24	455	902
1	15,700	31,140	13	4,180	8,290	25	410	813
Run-off, in acre-feet, for period May 23 to June 25								368,600

Gage height, in feet, and discharge, in second-feet, at indicated time, 1937

Time	Feet	Sec.-ft.	Time	Feet	Sec.-ft.	Time	Feet	Sec.-ft.
May 23			May 29			June 10		
12M	3.70	580	3am	12.22	9,320	10am	11.09	4,750
May 24			12N	12.36	10,000	4pm	11.14	4,750
4am	4.57	895	8	12.45	10,800	12M	11.00	4,570
8	4.40	842	12M	12.70	13,500	June 11		
3pm	4.20	772	May 30			8am	10.90	4,280
7	4.35	825	5am	12.85	14,600	12M	10.95	4,300
11	4.93	1,040	9	13.00	16,900	June 12		
12M	4.91	1,040	12N	13.57	25,700	6am	10.96	4,570
May 25			4pm	14.32	40,400	12M	10.84	4,290
3am	4.82	1,000	7	14.71	51,500	June 13		
5	6.00	1,400	12M	14.50	45,700	12N	10.64	4,080
7	8.00	2,020	May 31			12M	10.34	3,820
9	9.50	2,790	12N	13.98	33,400	June 14		
12N	10.90	3,670	12M	13.46	22,400	12N	10.00	3,330
3pm	11.10	3,820	June 1			12M	9.64	3,190
5	11.00	3,740	12N	12.94	15,700	June 15		
8	10.30	3,270	12M	12.40	10,000	12N	9.20	3,040
12M	9.20	2,620	June 2			12M	8.73	2,980
May 26			9am	12.02	8,060	June 16		
4am	7.94	2,420	8pm	12.07	8,260	12N	8.25	2,900
10	6.90	1,920	12M	12.12	8,460	12M	7.75	2,690
4pm	6.26	1,650	June 3			June 17		
12M	5.71	1,390	4am	12.00	7,510	12N	7.22	1,970
May 27			12N	11.56	5,800	12M	6.62	1,700
1am	5.66	1,310	12M	11.57	5,800	June 18		
3	6.00	1,430	June 4			12N	5.78	1,390
8	7.00	1,880	12N	11.68	6,560	12M	5.00	1,070
11	7.23	2,020	12M	11.75	7,010	June 19		
3pm	7.18	1,970	June 5			12N	4.48	790
5	7.48	2,120	2pm	11.80	7,010	12M	4.15	685
11	8.38	2,570	12M	11.74	6,560	June 20		
12M	8.36	2,570	June 6			6am	4.03	702
May 28			12N	11.99	8,060	12M	3.81	615
4am	7.80	2,220	12M	11.60	6,560	June 21		
7	7.50	2,100	June 7			12M	3.55	598
9	7.55	2,140	12N	11.50	5,800	June 22		
12N	7.44	2,070	12M	11.40	5,480	12M	3.35	515
8pm	7.06	1,800	June 8			June 23		
9	9.00	2,750	12M	11.25	4,960	12M	3.16	455
10	11.50	5,440	June 9					
12M	12.03	7,490	12M	11.12	4,750			

Note.- Discharge determined by shifting-control method.

Lake McMillan near Lakewood, N. Mex.

Location.- Lat. 32°35', long. 104°20', at McMillan Dam, on Pecos River, 3½ miles southeast of Lakewood and 12 miles above Carlsbad, Eddy County.
Remarks.- Total capacity at spillway level, about 39,000 acre-feet. Records furnished by Bureau of Reclamation.

Contents, in acre-feet, 1937

Time	Acre-feet	Time	Acre-feet	Time	Acre-feet
May 27		9am	61,300	7am	48,000
12M	21,500	12N	59,500	3pm	48,000
May 28		4pm	57,800	7	46,000
6am	22,500	8	56,900	12M	46,000
6pm	22,500	12M	56,400	June 10	
12M	19,000	June 3		12N	45,800
May 29		4am	56,500	12M	45,400
6am	15,300	8	57,400	June 11	
6pm	15,300	12N	58,400	12N	45,000
12M	18,900	7pm	60,700	6pm	44,600
May 30		10	62,500	12M	44,600
6am	22,500	12M	60,600	June 12	
3pm	25,000	June 4		12M	44,600
6	27,700	6am	59,600	June 13	
12M	41,000	12N	59,000	6am	44,600
May 31		5pm	57,900	3pm	44,000
1am	44,000	7	57,300	12M	43,700
2	53,000	12M	56,700	June 14	
5	67,700	June 5		6am	43,500
6	70,800	8am	55,000	6pm	42,800
7	73,800	8pm	55,000	12M	42,200
8	76,000	12M	55,200	June 15	
9	78,000	June 6		8am	41,600
10	79,400	6am	56,000	4pm	40,900
11	80,700	12N	57,700	12M	40,200
12N	81,700	5pm	60,000	June 16	
2pm	83,800	10	61,600	6am	39,600
4	86,000	12M	61,600	12N	39,000
8	86,000	June 7		6pm	38,300
12M	83,700	6am	61,600	12M	37,500
June 1		12N	59,300	June 17	
5am	80,900	6pm	57,100	6am	36,700
8	79,500	12M	55,100	12N	36,100
10	77,900	June 8		6pm	35,500
11	76,600	2am	54,700	12M	35,600
2pm	74,900	8	52,500	June 18	
9	71,000	2pm	51,000	6am	35,700
12M	67,900	12M	49,600	12N	36,500
June 2		June 9		6pm	37,300
3am	65,200	3am	49,000		
6	63,200	5	48,600		

Note.- Data taken from graph drawn by engineers of the Bureau of Reclamation.

Pecos River at Carlsbad, N. Mex.

Location.- Lat. 32°24'50", long. 104°13'25", in SE¼SE¼ sec. 6, T. 22 S., R. 27 E., at Green Street Bridge (U. S. Highway 62), in Carlsbad, Eddy County.
Gage-height record.- Water-stage recorder graph. Gage heights used to half tenths between 2.3 and 4.1 feet; hundredths below and tenths above these limits.
Stage-discharge relation.- Defined by current-meter measurements.
Maxima.- 1937: Discharge, 41,000 second-feet 11:30 p.m. May 31 (gage height, 16.84 feet).
1893-1936: Discharge, about 85,700 second-feet Aug. 7, 1916 (gage height, about 21.0 feet).
Remarks.- Flood flow affected by storage in McMillan Reservoir, 12 miles upstream (capacity of lake at spillway level 39,000 acre-feet), and by Avalon Reservoir 6 miles upstream (capacity of reservoir at spillway level 6,500 acre-feet). Gage-height record furnished by Bureau of Reclamation.

Mean discharge, in second-feet, and run-off, in acre-feet, 1937

Day	Sec.-ft.	Acre-feet	Day	Sec.-ft.	Acre-feet	Day	Sec.-ft.	Acre-feet
May			3	14,600	28,960	15	4,330	8,590
24	107	212	4	16,600	32,930	16	541	1,070
25	82	163	5	12,900	25,590	17	335	664
26	118	234	6	13,700	27,170	18	910	1,800
27	79	157	7	16,600	32,930	19	513	1,020
28	1,400	2,780	8	11,200	22,210	20	395	783
29	9,800	19,440	9	8,090	16,050	21	803	1,590
30	2,370	4,700	10	6,730	13,350	22	1,150	2,280
31	20,600	40,860	11	6,110	12,120	23	699	1,390
June			12	5,810	11,520	24	351	696
1	36,000	71,400	13	4,980	9,880	25	372	738
2	20,400	40,460	14	4,980	9,880	26	143	284
Run-off, in acre-feet, for period May 24 to June 26								443,900

Gage height, in feet, and discharge, in second-feet, at indicated time, 1937

Time	Feet	Sec.-ft.	Time	Feet	Sec.-ft.	Time	Feet	Sec.-ft.
May 27			June 1			10pm	6.85	6,730
12M	0.58	65	2am	16.75	41,000	12M	7.27	7,560
May 28			6	16.53	39,400	June 10		
6am	.59	68	12N	16.00	36,800	6am	7.11	7,220
8	.64	82	6pm	15.20	32,800	12N	7.00	7,050
4pm	.65	86	12M	14.25	28,300	4pm	6.90	6,890
6	.95	209	June 2			6	5.64	4,980
8	4.31	3,350	6am	13.15	24,100	8	6.30	5,960
10	7.22	7,390	12N	12.10	20,000	10	6.47	6,260
12M	8.00	8,830	6pm	11.00	16,300	12M	6.48	6,260
May 29			12M	10.35	14,500	June 11		
2am	8.50	9,830	June 3			2am	6.49	6,260
4	9.92	13,100	7am	9.97	13,400	12N	6.46	6,260
5	10.30	14,200	12N	10.19	14,000	12M	6.40	6,110
6	9.98	13,400	6pm	10.78	15,700	June 12		
7	10.27	14,200	12M	11.24	16,900	6am	6.36	6,110
8	9.87	13,100	June 4			8	6.30	5,960
9	9.50	12,100	2am	11.33	17,200	9	6.13	5,670
10	9.25	11,400	4	11.36	17,600	11	6.08	5,670
12N	8.50	9,830	6	11.34	17,200	4pm	6.12	5,670
2pm	8.00	8,830	9	11.24	16,900	6	6.10	5,670
4	7.60	8,090	12N	11.11	16,600	12M	5.80	5,250
6	7.30	7,560	6pm	10.86	16,000	June 13		
8	6.90	6,890	12M	10.54	14,800	10am	5.26	4,590
10	6.60	6,410	June 5			2pm	5.40	4,720
12M	6.27	5,960	6am	10.12	13,700	4	5.86	5,390
May 30			12N	9.80	12,900	6	5.88	5,390
2am	5.90	5,390	6pm	9.52	12,100	8	5.65	4,980
4	5.56	4,980	9	9.40	11,900	10	5.46	4,850
6	5.30	4,590	12M	9.46	12,100	12M	5.45	4,720
8	4.80	3,950	June 6			June 14		
10	3.00	1,930	6am	9.62	12,400	7am	5.47	4,850
12N	1.85	835	12N	10.00	13,400	4pm	5.45	4,720
4pm	1.21	346	6pm	10.56	15,100	12M	5.42	4,720
8	1.00	220	12M	11.14	16,600	June 15		
10	1.50	550	June 7			2pm	5.34	4,590
12M	4.30	3,350	4am	11.40	17,600	4	4.92	4,070
May 31			8	11.60	18,200	8	4.12	3,110
2am	4.54	3,590	12N	11.30	17,200	12M	3.20	2,130
6	4.78	3,950	6pm	10.90	16,000	June 16		
8	5.50	4,850	12M	10.20	14,000	6am	2.10	1,060
10	8.20	9,220	June 8			12N	1.38	461
12N	11.40	17,600	6am	9.60	12,400	3pm	.58	49
2pm	14.40	29,200	12N	9.06	11,200	12M	.78	112
4	15.40	33,800	6pm	8.57	10,000	June 17		
6	16.20	37,800	12M	8.13	9,020	8am	.91	171
8	16.60	39,900	June 9			10	1.65	665
10	16.80	41,000	8am	7.81	8,450	12N	1.82	808
11:30	16.84	41,000	4pm	7.50	7,910	4pm	1.72	722
12M	16.83	41,000	6	7.35	7,730	8	1.23	360
			8	6.69	6,570	12M	1.17	322

Pecos River near Malaga, N. Mex.

Location.- Lat. 32°12'30", long. 104°01'30", in NW¼NW¼ sec. 19, T. 24 S., R. 29 E., 3 miles southeast of Malaga, Eddy County, and 3 miles below moth of Black River.
Gage-height record.- Water-stage recorder graph except June 5-10. Gage heights used to half tenths between 2.0 and 5.0 feet; hundredths below and tenths above these limits.
Stage-discharge relation.- Defined by current-meter measurements.
Maxima.- 1937: Discharge, 38,200 second-feet 6 a.m. June 1 (gage height, 25.7 feet). 1919-36: Discharge, 40,400 second-feet September 1919 (gage height, 26.4 feet).
Remarks.- Discharge estimated June 5-10 by comparison with other stations. Flood flow affected by storage in reservoirs upstream. Gage-height record furnished by Bureau of Reclamation.

Mean discharge, in second-feet, and run-off, in acre feet, 1937

Day	Sec.-ft.	Acre-feet	Day	Sec.-ft.	Acre-feet	Day	Sec.-ft.	Acre-feet
May			2	22,400	44,430	14	5,080	10,080
23	105	208	3	15,300	30,350	15	5,410	10,730
24	135	268	4	16,200	32,130	16	3,950	7,830
25	284	563	5	13,500	26,780	17	3,050	6,050
26	252	500	6	13,500	26,780	18	1,870	3,710
27	238	472	7	16,000	31,740	19	810	1,610
28	161	319	8	12,100	24,000	20	830	1,650
29	6,900	13,690	9	8,700	17,260	21	850	1,690
30	6,290	12,480	10	7,000	13,880	22	661	1,310
31	5,400	10,710	11	5,740	11,390	23	730	1,450
June			12	5,410	10,730	24	252	500
1	34,100	67,640	13	4,670	9,260	25	287	569
Run-off, in acre-feet, for period May 23 to June 25								432,800

Gage height, in feet, and discharge, in second-feet, at indicated time, 1937

Time	Feet	Sec.-ft.	Time	Feet	Sec.-ft.	Time	Feet	Sec.-ft.
May 23			1pm	12.00	8,460	June 12		
12M	1.83	129	2	11.80	8,200	6am	9.66	5,630
May 24			6	9.60	5,520	12N	9.60	5,520
10am	1.69	103	9	7.95	3,900	8pm	9.19	5,080
4pm	1.91	145	12M	7.00	3,050	12M	9.22	5,080
10	2.14	194	May 31			June 13		
12M	2.10	185	6am	6.35	2,590	6am	8.49	4,370
May 25			9	5.41	1,910	12N	8.68	4,570
4am	1.90	143	12N	7.60	3,540	8pm	8.84	4,670
8	1.78	120	4pm	9.10	4,970	12M	9.49	5,410
12N	2.00	163	8	13.00	9,870	June 14		
2pm	2.10	185	12M	17.30	17,200	1am	9.53	5,410
4	3.00	420	June 1			6	9.10	4,970
7	3.52	582	6am	25.7	38,200	4pm	9.00	4,870
12M	3.10	450	June 2			12M	9.40	5,300
May 26			6am	19.2	25,600	June 15		
6am	2.63	312	12N	17.7	22,000	8am	9.90	5,850
12N	2.28	226	6pm	16.1	18,100	4pm	9.83	5,740
5pm	2.09	183	12M	14.9	16,200	8	9.60	5,520
8	2.15	196	June 3			12M	6.10	2,380
12M	2.09	183	6am	13.90	14,500	June 16		
May 27			10	13.38	13,600	1am	5.85	2,170
6am	1.97	157	12N	13.29	13,400	6	8.00	3,900
8	2.53	288	6pm	13.49	13,800	10	9.82	5,740
10	2.74	340	12M	13.71	14,100	12N	9.54	5,410
12N	2.59	302	June 4			6pm	8.00	3,900
5pm	2.32	235	6am	14.00	15,200	11	6.38	2,590
7	2.39	252	12N	15.50	18,300	12M	6.39	2,590
12M	2.14	194	June 5			June 17		
May 28			-	-	-	6am	6.54	2,660
6am	1.88	139	June 6			12N	6.64	2,730
11	2.12	189	-	-	-	4pm	7.50	3,450
4pm	1.96	155	June 7			7	7.76	3,720
10	1.95	153	-	-	-	9	7.70	3,630
12M	2.00	163	June 8			12M	7.28	3,250
May 29			-	-	-	June 18		
4am	2.00	178	June 9			6am	7.00	3,050
6	5.25	1,460	-	-	-	10	5.90	2,310
10	11.80	7,940	June 10			2pm	3.46	910
12N	13.60	10,600	12N	10.70	6,800	12M	3.44	900
2pm	14.70	12,400	6pm	10.54	6,560	June 19		
4	15.00	13,000	12M	10.30	6,320	4am	3.44	870
6	14.00	11,400	June 11			6	3.49	880
9	12.80	9,580	4am	9.56	5,520	8	3.45	850
12M	11.87	8,330	10	9.75	5,740	12N	3.44	870
May 30			6pm	9.72	5,630	12M	3.12	700
6am	9.80	5,740	9	9.74	5,630			
12N	11.00	7,160	12M	9.69	5,630			

Note.- Discharge determined by shifting-control method May 23-29, June 2-4, 18, 19.

Pecos River near Angeles, Tex.

Location.- Lat. 32°02', long. 104°00', in T. 26 S., R. 29 E., half a mile below mouth of Delaware Creek, in Eddy County, 2 miles north of Texas-New Mexico State line and 8⅝ miles northwest of Angeles. Zero of gage is 2,831.2 feet above mean sea level.
Gage-height record.- Water-stage recorder graph; due to backwater from dam below gage, after June 13 discharge estimated on basis of temporary staff gage located 6 miles upstream. Gage heights used to half tenths between 2.4 and 4.5 feet; hundredths below and tenths above these limits.
Stage discharge relation.- Defined by current-meter measurements below 30,000 second-feet; extended above to cover range in stage experienced.
Maxima.- 1937: Discharge, 38,900 second-feet 5 p.m. June 1 (gage height, 22.3 feet).
1914-36: Stage, 22.5 feet (present datum) Aug. 8, 1916 (discharge not determined; capacity of channel has been reduced since 1916 by heavy growth of salt cedars).
Remarks.- Flood flow affected by storage in reservoirs upstream.

Mean discharge, in second-feet, and run-off, in acre-feet, 1937

Day	Sec.-ft.	Acre-feet	Day	Sec.-ft.	Acre-feet	Day	Sec.-ft.	Acre-feet
May								
28	296	587	6	12,800	25,390	16	4,600	9,120
29	1,810	3,590	7	15,200	30,150	17	3,800	7,540
30	8,210	16,280	8	15,500	30,740	18	2,800	5,550
31	2,070	4,110	9	10,900	21,620	19	1,600	3,170
June			10	8,030	15,930	20	1,000	1,980
1	28,400	56,330	11	6,680	13,250	21	910	1,800
2	29,200	57,920	12	5,280	10,470	22	720	1,430
3	16,800	33,320	13	4,600	9,120	23	690	1,370
4	15,600	30,940	14	4,800	9,520	24	560	1,110
5	15,700	31,140	15	5,000	9,920	25	400	793
Run-off, in acre-feet, for period May 28 to June 25								444,200

Gage height, in feet, and discharge, in second-feet, at indicated time, 1937

Time	Feet	Sec.-ft.	Time	Feet	Sec.-ft.	Time	Feet	Sec.-ft.
May 28			9pm	3.90	1,980	6pm	13.10	14,900
1am	1.50	305	10	4.20	2,250	12M	12.60	14,100
3	1.55	329	12M	5.10	3,170	June 6		
12N	1.45	282	June 1			6am	12.20	13,100
5pm	1.35	240	2am	6.80	5,280	12N	11.90	12,600
6:30	1.85	484	4	9.80	9,680	4pm	11.80	12,500
8	1.60	353	5	12.00	13,100	12M	12.10	13,000
11	1.30	220	6	14.50	17,400	June 7		
May 29			8	18.10	25,600	6am	12.60	13,800
1am	1.85	484	10	20.40	32,500	12N	12.50	15,100
3	1.76	436	12N	21.60	36,500	6pm	14.50	16,600
4	2.68	1,000	2pm	22.15	38,600	12M	14.90	17,200
5:30	2.26	726	5	22.30	38,900	June 8		
6	2.77	1,040	8	22.10	38,200	6am	14.70	16,600
9	1.95	541	12M	21.70	26,900	12N	14.20	15,600
12N	1.82	468	June 2			6pm	13.60	14,400
1pm	2.30	750	6am	20.70	33,500	12M	13.00	13,000
3	2.00	570	12N	19.40	29,400	June 9		
4	3.10	1,280	6pm	17.90	25,000	6am	12.50	11,700
5	4.20	2,250	12M	16.50	21,600	12N	11.90	10,400
6	4.75	2,840	June 3			6pm	11.65	9,680
8	5.75	4,000	6am	15.10	18,600	12M	11.45	9,080
12M	8.15	7,280	12N	13.90	16,200	June 10		
May 30			6pm	13.00	14,800	6am	11.30	8,630
2am	9.20	8,780	12M	12.70	14,300	12N	11.10	8,030
4	9.80	9,680	June 4			6pm	10.95	7,580
7	10.10	10,100	3am	12.60	14,100	12M	11.10	7,430
12N	9.40	9,080	6	12.90	14,600	June 11		
6pm	8.10	7,130	12N	13.60	15,800	6am	11.20	7,280
12M	6.60	5,020	6pm	14.15	16,800	12N	11.10	6,830
May 31			10	14.20	16,800	6pm	11.00	6,400
6am	4.50	2,540	June 5			12M	11.10	6,120
12N	2.90	1,140	6am	14.00	16,400	June 12		
8pm	2.50	870	12N	13.50	15,600	12N	11.00	5,420

Note.- Gage heights affected by backwater from Red Bluff Dam after June 6.

Gallinas River at Montezuma, N. Mex.

Location.- Lat. 35°39', long. 105°18', in Las Vegas Grant, at highway bridge, half a mile below Montezuma, San Miguel County.
Drainage area.- 89 square miles.
Gage-height record.- Water-stage recorder graph. Gage heights used to hundredths.
Stage-discharge relation.- Defined by current-meter measurements.
Maxima.- 1937: Discharge not determined (less than in 1904).
1903-36: Discharge, 11,600 second-feet Sept. 30, 1904.
Remarks.- Flood flow affected by a number of small ice ponds just above station which act as detention reservoirs, reducing peak flow.

Mean discharge, in second-feet, and run-off, in acre-feet, 1937

Day	Sec.-ft.	Acre-feet	Day	Sec.-ft.	Acre-feet	Day	Sec.-ft.	Acre-feet
May			June					
23	24	47.6	1	58	115	9	40	79.3
24	44	87.3	2	93	184	10	35	69.4
25	40	79.3	3	131	260	11	30	59.5
26	30	59.5	4	127	252	12	30	59.5
27	26	51.6	5	100	198	13	30	59.5
28	28	55.5	6	75	149	14	25	49.6
29	41	81.3	7	55	109	15	25	49.6
30	62	123	8	48	95.2	16	20	39.7
31	61	121						
Run-off, in acre-feet, for period May 23 to June 16								2,530

Rio Bonito at Hondo, N. Mex.

Location.- Lat. 33°23', long. 105°16', in NE¼NW¼ sec. 4, T. 11 S., R. 17 E., at Hondo, Lincoln County, half a mile above confluence with Rio Ruidoso.
Drainage area.- 233 square miles.
Gage-height record.- Graph based on staff-gage readings and peak stage determined by observer. Gage heights used to half tenths between 2.5 and 4.5 feet; hundredths below and tenths above these limits.
Stage-discharge relation.- Defined by current-meter measurements below 15 second-feet; extended logarithmically to peak discharge on basis of slope-area measurement at the peak.
Maxima.- 1937: Discharge, 9,270 second-feet 2 p.m. May 31 (gage height, 19 feet).
1930-36: Discharge, 5,640 second-feet Aug. 28, 1934 (gage height, 14.12 feet).
1868-1937: Discharge, that of May 31, 1937.
Remarks.- Flood flows not affected by diversions.

Mean discharge, in second-feet, and run-off, in acre-feet, 1937

Day	Sec.-ft.	Acre-feet	Day	Sec.-ft.	Acre-feet
May			June		
27	800	1,590	1	300	595
28	130	258	2	50	99
29	50	99	3	40	79
30	50	99	4	30	60
31	1,630	3,230	5	20	40
Run-off, in acre-feet, for period May 27 to June 5, 6,150					

Gage-height, in feet, and discharge, in second-feet, at indicated time, 1937

Time	Feet	Sec.-ft.	Time	Feet	Sec.-ft.	Time	Feet	Sec.-ft.
May 26			6pm	1.25	82	10pm	2.60	380
12M	0.95	25	12M	1.07	57	12M	2.10	255
May 27			May 29			June 1		
7am	.95	25	12N	1.02	51	4am	1.40	106
8	5.50	1,340	12M	.98	47	5	4.40	960
9:30	14.0	5,830	May 30			7	3.50	650
10	12.0	4,620	12N	.95	44	9	2.90	470
11	8.0	2,480	12M	.90	38	12N	2.30	305
12N	5.9	1,540	May 31			6pm	1.70	165
2pm	4.00	820	12N	.95	38	12M	1.45	82
4	3.00	500	1pm	10.0	3,500	June 2		
8	2.10	255	2	19.0	9,270	6am	1.23	55
12M	1.50	125	3	17.5	8,180	12N	1.12	42
May 28			4	15.7	6,940	12M	1.05	35
5am	1.00	49	5	14.0	5,830	June 3		
6	2.60	380	6	8.0	2,480	12N	1.00	30
8	2.15	268	7	4.40	960	12M	1.00	30
12N	1.65	155	8	3.40	620			

Note.- Discharge determined by shifting-control method 12 M to 8 a.m. May 27 and 12M June 1 to June 3.

Rio Felix near Hagerman, N. Mex.

Location.- Lat. 33°07', long. 104°20', in sec. 3, T. 14 S., R. 26 E., a quarter of a mile below State Highway 2, 1.5 miles north of Hagerman, Chaves County, and 1.6 miles above mouth.

Gage-height record.- Water-stage recorder graph except from May 24 to 10 a.m. May 25, when recorder clock was stopped; 2 p.m. May 26 to 9:30 p.m. May 27, when intakes were stopped; and 2 p.m. May 29 to 10 a.m. June 2, when there was backwater from the Pecos River. Gage height graph estimated for these periods on basis of range in stage from recorder, staff-gage readings by engineer, and discharge measurements made during period of backwater. Gage heights used to half tenths between 4.8 and 9.0 feet; hundredths below and tenths above these limits.

Stage-discharge relation.- Defined by current-meter measurements below 227 second-feet; extended logarithmically to peak discharge on basis of slope-area measurement at the peak.

Maxima.- 1937: Discharge, 26,500 second-feet 5 a.m. May 29 (gage height, 20.25 feet).
1932-36: Discharge, 23,600 second-feet (revised) Sept. 24, 1932 (gage height, 19.5 feet).

Remarks.- Flood flow not affected by diversions.

Mean discharge, in second-feet, and run-off, in acre-feet, 1937

Day	Sec.-ft.	Acre-feet	Day	Sec.-ft.	Acre-feet	Day	Sec.-ft.	Acre-feet
May								
23	9	17.9	3	50	99.2	15	14	27.8
24	60	119	4	25	49.6	16	14	27.8
25	1,800	3,570	5	25	49.6	17	14	27.8
26	70	139	6	20	39.7	18	14	27.8
27	60	119	7	21	41.7	19	14	27.8
28	486	964	8	20	39.7	20	14	27.8
29	13,800	27,370	9	20	39.7	21	14	27.8
30	1,400	2,780	10	17	33.7	22	14	27.8
31	70	139	11	15	29.8	23	13	25.8
June			12	14	27.8	24	13	25.8
1	25	49.6	13	14	27.8	25	13	25.8
2	100	198	14	14	27.8			
Run-off, in acre-feet, for period May 23 to June 25								36,270

Gage height, in feet, and discharge, in second-feet, at indicated time, 1937

Time	Feet	Sec.-ft.	Time	Feet	Sec.-ft.	Time	Feet	Sec.-ft.
May 23			12N	3.18	98	May 30		
12M	2.14	9	3pm	3.04	75	4am	7.50	2,880
May 24			4	3.33	128	8	6.45	1,790
11pm	2.14	9	5	4.35	625	12N	5.60	1,040
12M	10.00	6,180	6	4.65	838	4pm	5.00	590
May 25			7	5.25	1,300	8	4.57	325
1am	10.45	6,710	8	5.60	1,580	12M	4.24	182
2	10.00	6,180	9	5.08	1,180	May 31		
4	7.80	3,630	10	5.30	1,340	6am	3.90	100
6	6.80	2,640	11	5.53	1,540	12N	3.64	59
8	6.00	1,920	12M	5.35	1,380	6pm	3.49	42
10	5.25	1,300	May 29			12M	3.40	34
12N	4.75	912	2am	4.92	1,040	June 1		
6pm	3.88	335	3	14.00	12,400	12N	3.30	26
9	3.78	286	4	19.07	23,500	12M	3.24	22
12M	3.60	210	5	20.25	26,500	June 2		
May 26			6	19.92	25,600	10am	3.20	20
6am	3.04	75	7	19.60	24,800	10	4.68	388
12N	2.86	52	8	19.80	25,300	12N	4.49	285
12M	2.60	29	9	19.40	24,300	4pm	4.16	159
May 27			10	19.00	23,300	8	3.98	116
12N	2.40	18	11	17.80	20,400	12M	3.84	89
9pm	2.25	12	12N	16.70	17,900	June 3		
10	3.70	250	2pm	14.80	14,000	6am	3.67	63
11	4.30	590	4	14.16	12,800	12N	3.54	47
12M	4.10	460	6	12.00	9,020	6pm	3.44	38
May 28			9	10.30	6,430	12M	3.37	32
6am	3.53	186	12M	8.95	4,670			

Note.- Gage-height graph partly estimated May 24-27, 29 to June 2, owing to poor record and backwater from Pecos River.

Cottonwood Creek near Lake Arthur, N. Mex.

Location.- Lat. 32°57', long. 104°22', in NE¼NW¼NE¼ sec. 22, T. 16 S., R. 26 E., in Eddy County, 1.8 miles above mouth and 3.5 miles south of Lake Arthur.
Gage-height record.- Water-stage recorder graph. Gage heights used to half tenths between 3.0 and 9.0 feet; hundredths below and tenths above these limits. Gage datum lowered 0.74 foot Aug. 6, 1936.
Stage-discharge relation.- Defined by current-meter measurements below 15 second-feet; extended logarithmically to 1,100 second-feet.
Maxima.- 1937: Discharge, 635 second-feet 6-7 a.m. May 29 (gage height, 8.99 feet).
Stage, 14.1 feet May 30 (backwater from Pecos River).
1932-36: Discharge, about 1,100 second-feet June 13, 1935 (gage height, 9.86 feet).
Remarks.- Flood flow not affected by diversions above station. Mean daily discharge estimated May 29 to June 9 owing to backwater from Pecos River and poor gage-height record; estimates based on partial gage-height record, rainfall record, and knowledge of local conditions.

Mean discharge, in second-feet, and run-off, in acre-feet, 1937

Day	Sec.-ft.	Acre-feet	Day	Sec.-ft.	Acre-feet	Day	Sec.-ft.	Acre-feet
May			31	50	99.2	8	20	39.7
23	5.9	11.7	June			9	20	39.7
24	7.2	14.3	1	40	79.3	10	17	33.7
25	13	25.8	2	30	59.5	11	16	31.7
26	6.3	12.5	3	50	99.2	12	16	31.7
27	5.8	11.5	4	40	79.3	13	13	25.8
28	44	87.3	5	30	59.5	14	13	25.8
29	490	972	6	30	59.5	15	11	21.8
30	150	298	7	20	39.7	16	10	19.8
Run-off, in acre-feet, for period May 23 to June 16								2,280

Gage height, in feet, and discharge, in second-feet, at indicated time, 1937

Time	Feet	Sec.-ft.	Time	Feet	Sec.-ft.	Time	Feet	Sec.-ft.
May 20			4pm	2.55	13	1pm	4.80	-
12M	1.56	4.5	5	3.25	27	12M	5.56	-
May 21			6	3.65	35	June 5		
6am	1.52	4.3	7	4.05	46	6am	6.20	-
12N	1.51	4.2	8	5.10	91	12N	6.57	-
4pm	1.55	4.5	10	6.60	210	6pm	6.85	-
12M	1.53	4.3	12M	7.55	328	12M	7.06	-
May 22			May 29			June 6		
7am	1.54	4.4	1am	8.10	430	4am	6.95	-
4pm	1.61	4.8	2	8.50	510	6	6.81	-
May 23			5	8.95	610	8	6.47	-
1am	1.54	4.4	7	8.99	635	12N	5.21	-
4	1.56	4.5	9	8.90	610	6pm	4.29	-
5	1.82	6.2	12N	8.54	520	12M	3.76	-
8	1.75	5.7	4pm	8.11	440	June 7		
4pm	1.84	6.4	6	8.04	420	6am	3.53	-
12M	1.91	6.8	12M	8.36	-	12N	3.35	-
May 24			May 30			12M	3.09	-
9am	2.00	7.5	1am	9.90	-	June 8		
5pm	1.91	6.8	3	11.91	-	12N	3.00	-
12M	1.93	7.0	4	-	-	12M	2.83	-
May 25			May 31			June 9		
4am	1.94	7.0	-	-	-	12N	2.61	-
8	1.97	7.3	June 1			12M	2.41	-
10	2.17	8.9	-	-	-	June 10		
12N	2.53	13	June 2			6am	2.40	17
3pm	2.75	16	2pm	-	-	12M	2.37	16
5	2.70	16	2:30	7.08	-	June 11		
10	1.94	7.0	8	7.04	-	5pm	2.37	16
12M	1.88	6.6	June 3			8	2.46	18
May 26			1am	7.39	-	June 12		
12N	1.83	6.3	3	7.31	-	4am	2.36	16
12M	1.79	6.0	12N	6.31	-	3pm	2.36	16
May 27			6pm	5.50	-	12M	2.26	15
12M	1.72	5.5	12M	4.88	-	June 13		
May 28			June 4			12N	2.14	13
4am	1.72	5.5	6am	4.82	-	12M	2.11	12
3pm	1.74	5.7						

Note.- Discharge determined by shifting-control method. No gage-height record 4 a.m. May 30 to 2 p.m. June 2. Gage heights affected by backwater from Pecos River May 29 to June 9.

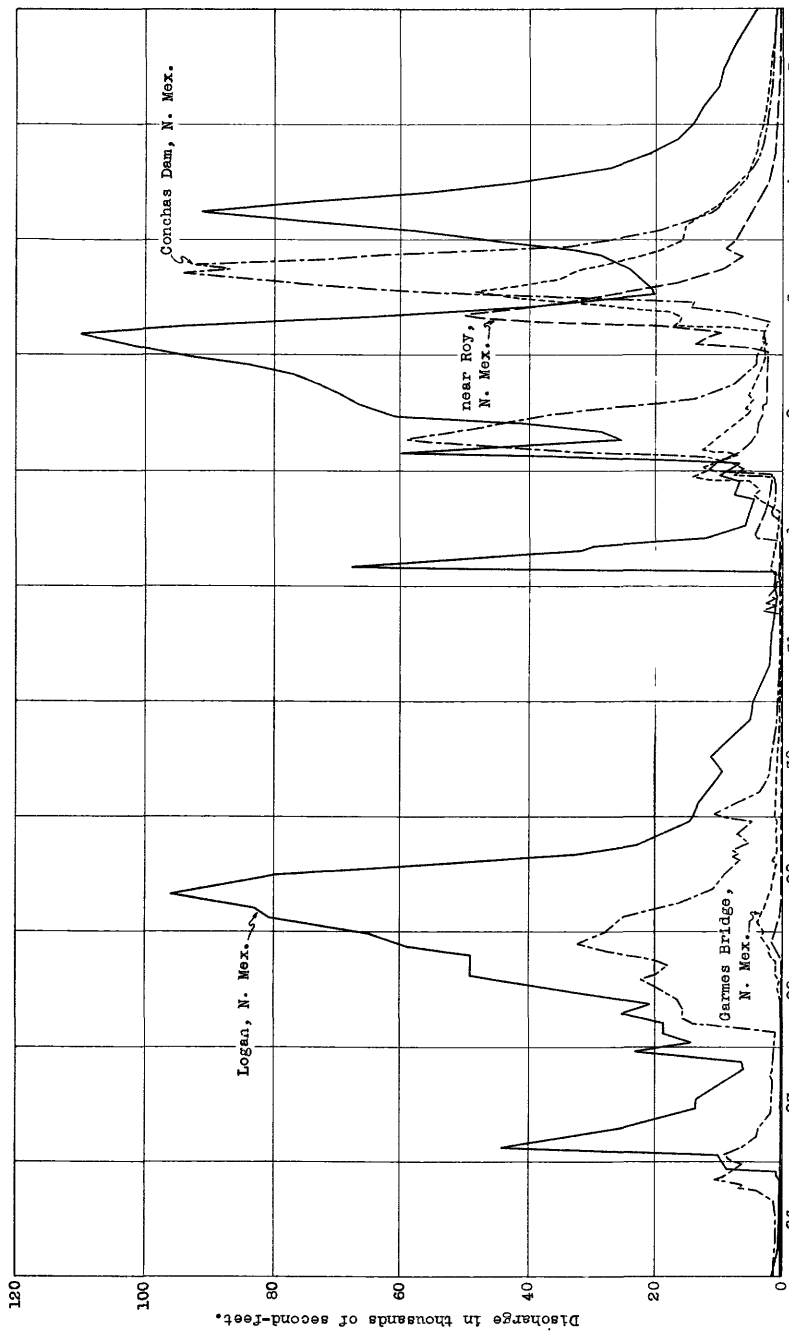

Figure 4.--Hydrographs of discharge at river-measurement stations on the Canadian River, May 26 to June 5, 1937.

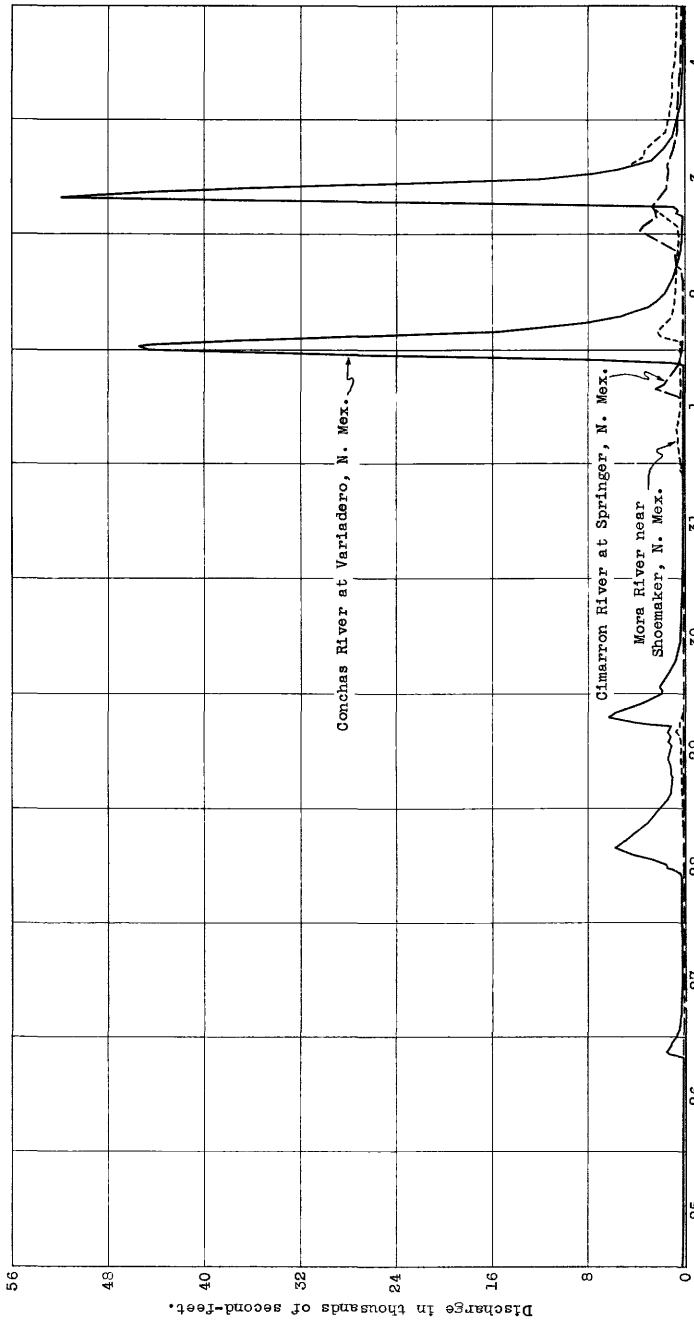

Figure 5.--Hydrographs of discharge at river-measurement stations on tributaries to the Canadian River, May 25 to June 4, 1937.

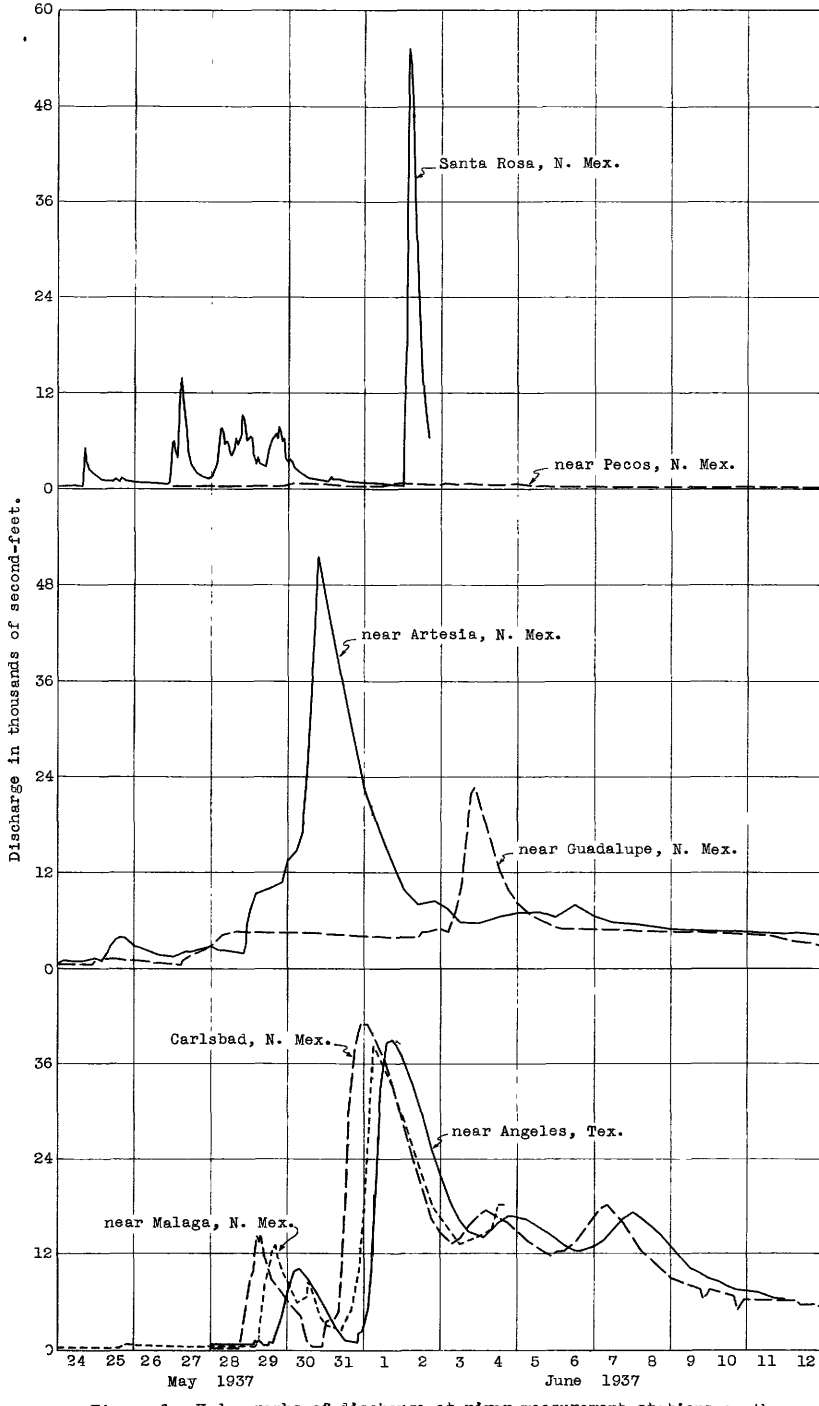

Figure 6.--Hydrographs of discharge at river-measurement stations on the Pecos River, May 24 to June 12. 1937.

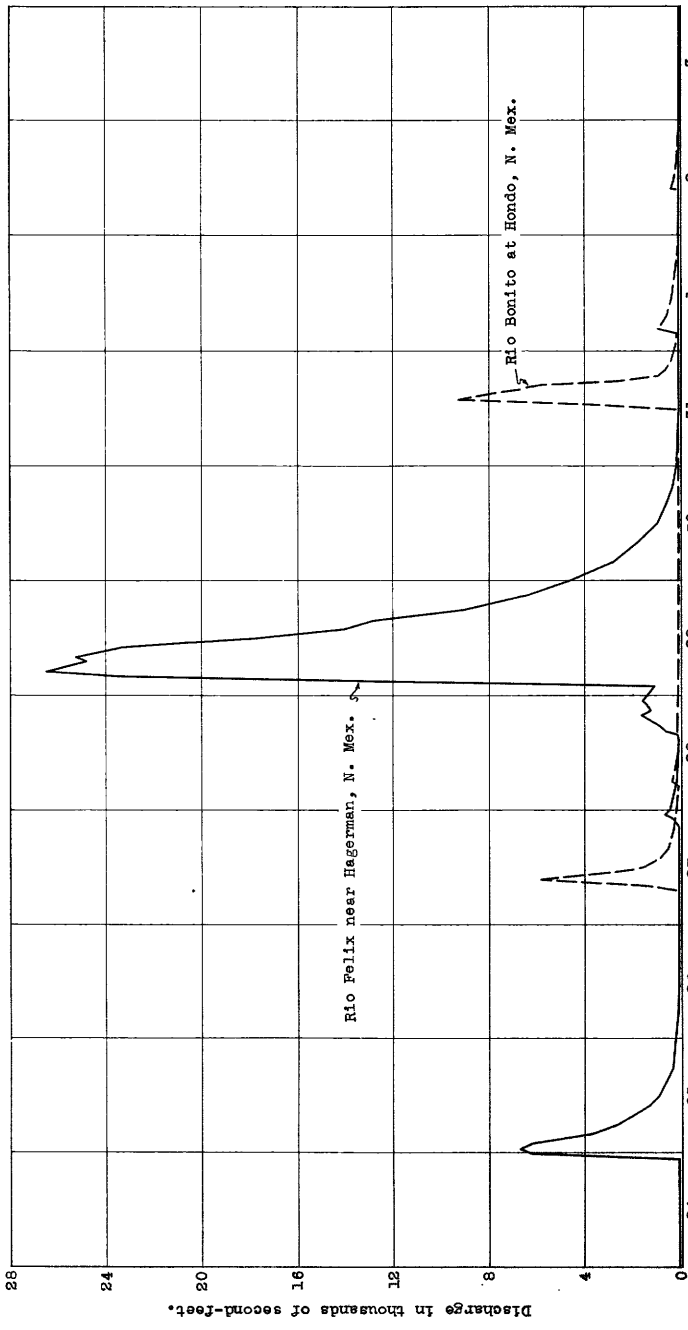

Figure 7.--Hydrographs of discharge at river-measurement stations on tributaries to the Pecos River, May 24 to June 3, 1937.

PREVIOUS FLOODS

Several record-breaking floods, produced by rains over large areas of the State, are briefly described below. Little information is available concerning floods prior to 1900 and those that occurred in years other than those listed.

1904 - During the last part of September and the first part of October exceptionally large floods occurred in the Canadian, Pecos, and Rio Grande Basins. The flood in the Canadian River was the greatest ever known, reaching a maximum discharge at Logan of 278,000 second-feet. In the Pecos River the 1904 flood was almost as large above Roswell as the 1937 flood and was greater than that flood below Roswell. The maximum discharge of the Pecos River at McMillan Dam was estimated as 82,000 second-feet. The flood in the Rio Grande was the greatest of record at several river-measurement stations. At San Marcial the peak discharge of 50,000 second-feet was the greatest that has occurred since 1828 at least; an unusual flood was experienced in 1828, but its magnitude is unknown.

The 1904 floods are described more fully in Water-Supply Paper 147, "Destructive floods in the United States in 1904."

1905 - In the later part of July a flood occurred in the Pecos River that approached closely in magnitude the high flood of 1904 in that part of the river below Roswell. Above Roswell the stream was not unusually high. Although in the lower part of the river the flood approached in magnitude that of 1904, it was of shorter duration and the total quantity of water in the stream was much less.

From May 15 to June 20 the Rio Grande below Albuquerque was in flood due to the rapid melting of an exceptionally large winter accumulation of snow on the mountains. The maximum rate of flow in October 1904 was much greater than occurred in 1905.

The 1905 floods are discussed in Water-Supply Paper 162, "Destructive Floods in the United States in 1905."

1911 - From September 25 to October 6 a general rain fell over the headwaters of the San Juan and adjacent river basins. On October 5 at Gladstone, Colo., the United States Weather Bureau reports a rainfall of 8.05 inches. Severe floods occurred on the San Juan River and its tributaries. It has been estimated that the maximum discharge of the San Juan River at Shiprock was 150,000 second-feet. A report concerning these floods is given in Water-Supply Paper 309, "Surface Water Supply of Colorado River Basin, 1911."

1913 - General rains fell over the Canadian River Basin the first half of June with rains of cloudburst proportions falling in the later part of the period. Unusually large floods occurred on tributaries to the Canadian River, principally on the Cimarron, Rayado, and Mora Rivers and on the Chicorica, Uracca, and Sapello Creeks.

In the Mimbres River Basin precipitation from August 10 to 14 produced record-breaking stages in the Rio Arena and Cameron Creek drainages.

These floods are discusssed in the State Engineer's "Report on the Surface Water Supply of New Mexico, 1913."

1929 - In August and again in September unusual floods occurred on the Rio Grande and its tributaries. The Rio Puerco, the Rio Salado, and other smaller streams experienced the highest stages of record. An account of these floods is published in the "Ninth Biennial Report, State Engineer of New Mexico, 1928-30."

Table 3 shows the maximum annual discharges for certain years of the Canadian River at Logan. These data prior to 1928 are taken from the "Ninth Biennial Report, State Engineer of New Mexico, 1928-1930" (p. 205).

Table 3.- Maximum annual discharges for certain years, Canadian River at Logan, N. Mex.

Date	Second-feet	Date	Second-feet
Sept. 30, 1904	278,000	July 30, 1927	18,500
Sept. 6, 1909	141,000	Oct. 14, 1928	60,000
May 30, 1911	37,000	Oct. 11, 1930	102,000
Aug. 21, 1912	19,800	June, 1932	23,100
June 12, 1913	97,000	Sept. 1, 1934	32,400
May 1, 1914	207,000	Aug. 4, 1935	52,200
Apr. 17, 1915	89,200	July 13, 1936	65,700
June 19, 1926	40,000	June 3, 1937	110,000

SUMMARY OF FLOOD DISCHARGES IN NEW MEXICO

Table 4, entitled "Records of floods in New Mexico", shows the peak stages and discharges that have occurred at gaging stations and other places on streams over the entire State.

Except as otherwise noted, figures for discharge are taken from published reports of the Geological Survey or have been computed from unpublished data in the file of the Geological Survey or of the State Engineer of New Mexico at Santa Fe. From about 1915 to 1930 all stream-flow records in New Mexico were obtained by the State Engineer, and records and reports of that office have been reviewed with a view to make the flood-flow information complete.

The drainage area is given for some river-measurement stations. In many parts of New Mexico topographic maps are not available for an accurate determination of the drainage areas. Because of inadequate maps, large areas that probably never contribute to the run-off of streams, as well as indeterminate watersheds, no drainage areas are given for many stations. For these reasons and because of the wide areal variation of the rainfall the drainage areas that are given should be used with caution in making rainfall and run-off studies.

The period of record shows the period for which information regarding floods is available and does not always indicate the period for which continuous and systematic records of flow have been kept. Some of the earlier records are based on information obtained from local residents and are believed to be reliable.

The gage heights given refer to the particular gage in use at the time the maximum discharge occurred. These gage heights may not be the highest that have occurred in reference to a uniform datum, as channels are often unstable, and gage and gage datums have at times been changed without obtaining the relation to the previous datum.

The peak discharge is given for the period of record, and the remarks column shows the method by which it was determined.

The reference number assigned to each peak discharge item may be used to locate the place of determination on the map shown in plate 9.

The latitude and longitude of each place are given to define the location more closely; because of the limitations of available maps these data are for many places only approximate.

Table 4.- Records of floods in New Mexico

No. on pl. 9	Stream and place of determination	Lati-tude	Longi-tude	Drainage area (sq. mi.)	Period of record	Peak stage and discharge			Remarks
						Date	Stage (feet)	Discharge (sec.-ft.)	
	Canadian River Basin								
1	Canadian River at French	36°28'	104°34'	1,480	-	Sept. 1904	-	156,000	Discharge by slope-area method. Greatest flood known to local residents.
2	Canadian River at Taylor Springs	36 20	104 30	2,830	-	Sept. 1904	-	91,100	Do.
3	Canadian River near Roy	35 58	104 21	4,005	-	June 3, 1937	12.20	49,800	Discharge from rating curve. From Corps of Engineers, U. S. Army.
4	Canadian River near Sanchez	35 41	104 23	-	1912-1915	June 12, 1913	25.0	82,700	Discharge by slope-area method.
5	Canadian River at Garmes Bridge	35 38	104 23	6,005	-	June 3, 1937	13.32	48,200	Discharge from rating curve. From Corps of Engineers, U. S. Army.
6	Canadian River near Bell Ranch	35 32	104 15	6,400	1915-1917 1927-1937	June 3, 1937	15.8	47,800	Discharge by slope-area method.
7	Canadian River at Conchas Dam	35 23	104 09	7,350	-	June 3, 1937	12.80	94,000	Discharge from rating curve. From Corps of Engineers, U. S. Army.
8	Canadian River at Logan	35 21	103 26	11,200	1885-1937	Sept.30,1904	36.55	278,000	Discharge from extension of rating curve. From report of State Engineer.
9	Chicorica Creek near Raton	36 49	104 23	84	1910-1927	June 12, 1913	11.2	6,120	Discharge by slope-area method.
10	Una del Gato Creek near Raton	36 49	104 14	80	1910-1913	July 20, 1911	6.50	2,000	Do.
11	Vermejo River near Dawson	36 42	104 47	250	1915-1937	Aug. 2, 1921	-	17,900	Discharge estimated; subject to very large error.
					1930-1937	Aug. 7, 1936	7.99	4,630	Discharge from extension of rating curve.
12	Cieneguilla Creek near Eagle Nest (Therma)	36 30	105 14	-	1928-1937	Aug. 23, 1935	4.65	310	Discharge from rating curve.
13	Cimarron River at Ute Park	36 34	105 04	235	1907-1929	May 11, 1916	-	-	Peak discharge not known; daily discharge, 747 second-feet.
					1930-1937	July 4, 1934	2.92	175	Discharge from rating curve.
14	Cimarron River above Rayado River, near Springer	36 24	104 42	-	-	June 11, 1913	-	8,830	Discharge by slope-area method.
15	Cimarron River at Springer	36 22	104 37	985	1907-1913 1930-1937	June 11, 1913	-	15,000	Discharge partly by slope-area method and partly estimated.
16	Ponil Creek near Cimarron	36 34	104 56	130	1915-1929	Aug. 1929	-	5,200	Discharge estimated. From report of State Engineer.

17	Sixmile Creek near Eagle Nest (Therma)	36 32	105 16	-	1928-1937	Apr. 11,1937	-	250	Discharge from extension of rating curve
18	Moreno Creek at Eagle Nest (Therma)	36 34	105 15	-	1928-1937	Apr. 15,1937	-	146	Discharge from rating curve.
19	Rayado River at Sauble ranch, near Cimarron	36 22	104 56	30	1911-1937	June 10, 1913	-	2,000 to 3,000	Discharge estimated.
20	Rayado River above Uracca Creek, near Springer	36 24	104 47	151	-	June 11, 1913	-	3,050	Discharge by slope-area method.
21	Rayado River at mouth, near Springer	36 24	104 42	197	-	June 11, 1913	-	5,710	Do.
22	Uracca Creek near Cimarron	36 25	105 00	6.3	1912-1915	June 10, 1913	5.1	-	Discharge not determined.
23	Uracca Creek at mouth, near Springer	36 24	104 47	37	-	June 11, 1913	-	2,660	Discharge by slope-area method. From report of State Engineer.
24	East Fork of Ocate River at Ocate	36 11	105 01	35	1914-1928	May 23, 1919	-	-	Peak discharge not known; maximum daily discharge, 111 second-feet. From report of State Engineer.
25	Ocate River at Ocate	36 10	105 00	121	-	May 22, 1914	3.2	-	Discharge not determined.
26	West Fork of Ocate River at Ocate	36 11	105 01	86	1914-1928	Apr. 26, 1922	-	-	Peak discharge not known; maximum daily discharge, 178 second-feet. From report of State Engineer.
27	Sweetwater Creek near Colmor	36 14	104 48	-	1914-1918	May 22, 1914 July 2, 1914	3.70	-	Discharge not determined.
28	Mora River at La Cueva	35 56	105 14	210	1903-1911	Sept. 29, 1904	-	-	Peak discharge not known; maximum flood known.
					1931-1937	Sept. 19, 1936	6.31	1,000	Discharge from extension of rating curve.
29	Mora River near Golondrinas (Weber)	35 53	105 07	320	1904	Sept. 29, 1904	-	-	Peak discharge not known; maximum flood known.
					1931-1937	June 1, 1937	8.10	1,250	Discharge from extension of rating curve.
30	Mora River at Loma Parda	35 50	105 05	585	-	June 11, 1913	-	34,500	Discharge estimated.
31	Mora River near Watrous	35 47	104 58	-	-	Oct. 2, 1904	-	76,000	Discharge by slope-area method.
32	Mora River near Shoemaker	35 48	104 48	1,160	1914-1937	June 4, 1921	10.6	-	Discharge not determined.
33	Cebolla Creek at mouth, near La Cueva	35 53	105 13	-	-	Oct. 1904	-	600	Discharge estimated.
34	Coyote Creek near Golondrinas	35 54	105 07	250	1928-1937	Sept. 22, 1929	9.25	3,500	Discharge from extension of rating curve.

Table 4.- Records of floods in New Mexico--Continued

No. on pl. 9	Stream and place of determination	Latitude	Longitude	Drainage area (sq. mi.)	Period of record	Peak stage and discharge			Remarks
						Date	Stage (feet)	Discharge (sec.-ft.)	
	Canadian River Basin--Continued								
35	Sapello Creek at Sapello	35°46'	105°15'	-	1915-1928	Apr. 1919	-	-	Peak discharge not known; maximum daily discharge, 769 second-feet. From report of State Engineer.
36	Sapello Creek at Los Alamos	35 44	105 07	144	1903-1913	June 11, 1913	-	11,400	Discharge partly estimated.
37	Sapello Creek at mouth, near Watrous	35 47	104 59	284	-	Sept. 29, 1904	-	62,900	Discharge by slope-area method.
38	Conchas River at Variadero	35 23	104 27	690	-	June 3, 1937	21.20	51,800	Discharge from extension of rating curve. From Corps of Engineers, U. S. Army.
39	Pajarito Creek near Hanley	35 09	103 56	310	1911-1913	Aug. 27, 1911	11.5	4,520	Discharge by slope-area method.
40	Ute Creek near Logan	35 23	103 30	2,010	1904-1914	May 1, 1914	22.95	100,000	Discharge from extension of rating curve.
41	Tanner Draw near Clapham	36 12	103 20	20.3	-	May-June, 1937	-	11,200	Discharge by slope-area method. From Soil Conservation Service, U. S. Department of Agriculture.
42	Draw No. 1 near Thomas	36 16	103 22	.044	-	May-June, 1937	-	48.4	Do.
43	Draw No. 2 near Thomas	36 16	103 22	.266	-	May-June, 1937	-	41.0	Do.
44	Draw near Clayton	36 23	103 10	2.66	-	May-June, 1937	-	2,550	Do.
	Rio Grande Basin								
45	Rio Grande below Taos Junction bridge, near Taos	36 19	105 46	a9,730	1925-1937	July 4, 1927	11.0	8,700	Discharge from extension of rating curve.
46	Rio Grande at Embudo	36 12	105 57	a10,400	1889-1937	May 13, 1916	-	16,000	Do.
47	Rio Grande at Otowi bridge, near San Ildefonso	35 52	106 09	a14,300	1895-1937	Sept. 29, 1904	-	30,900	Discharge by surface float method.
48	Rio Grande at Cochiti	35 38	106 19	a14,600	1925-1937	Aug. 20, 1935	8.97	20,500	Discharge from extension of rating curve.
49	Rio Grande at San Felipe	35 26	106 26	a16,100	1925-1937	Aug. 21, 1935	9.86	42,100	Do.
50	Rio Grande at Isleta	34 56	106 41	a18,010	1925-1929 1936-1937	May 26, 1929	-	17,700	Mean discharge for day; maximum may have been greater. From report of State Engineer.
51	Rio Grande at San Acacia	34 15	106 53	a23,830	1925-1937	Sept. 23, 1929	-	48,000 to 67,000	Discharge estimated. From report of State Engineer.
52	Rio Grande at San Marcial	33 41	106 58	b28,900	1829-1937	Oct. 11, 1904	-	50,000	From reports of International Boundary Commission.

53	Rio Grande below Elephant Butte Dam	33 09	107 11	-	1916-1937	July 29 to Aug. 3, 1917	-	3,200	Discharge from well-defined rating curve.
54	Costilla Creek near Costilla	36 58	105 32	-	1936-1937	Apr. 13, 1937	3.96	892	Discharge from extension of rating curve.
55	Rio Colorado near Questa	36 42	105 33	112	1912-1937	June 15, 1921	-	872	Discharge from staff gage reading; maximum may have been greater. From report of State Engineer.
56	Rio Colorado below Questa	36 41	105 36	190	1910-1928	June 8, 1920	-	775	Do.
57	Rio Hondo near Valdez	36 32	105 34	38	1934-1937	May 17, 1937	-	350	Mean discharge for day; maximum may have been greater.
58	Rio Hondo at Arroyo Hondo	36 32	105 42	-	1910-1928 1932-1937	Aug. 25, 1935	-	2,510	Discharge from extension of rating curve.
59	Rio Pueblo de Taos at Taos	36 25	105 34	-	1910-1916 1936-1937	May 22, 1912	4.55	440	Mean discharge for day; maximum may have been greater.
60	Rio Taos at Los Cardovas	36 23	105 39	359	1910-1937	May 15, 1915	3.50	920	Discharge from staff gage reading; maximum may have been greater. A higher stage may have occurred in May 1920.
61	Rio Lucero near Arroyo Seco	36 30	105 32	-	1910-1916 1933-1937	May 17, 1937	2.37	190	Discharge from rating curve.
62	Rio Ranchos de Taos near Ranches of Taos	36 21	105 37	-	1920-1926	May 22, 1920	-	375	Discharge from staff gage reading; maximum may have been greater. From report of State Engineer.
63	Embudo Creek at Dixon	36 12	105 55	305	1923-1937	July 8, 1936	6.95	-	Discharge not determined.
64	Pueblo Creek near Penasco	36 11	105 40	-	1936-1937	Aug. 20, 1936	2.52	717	Discharge from extension of rating curve.
65	Rio Chama near Chama	36 53	106 35	-	1912-1917	May 9, 1916	-	2,020	Mean discharge for day; maximum may have been greater.
66	Rio Chama at Park View	36 43	106 34	405	1912-1916 1925-1937	Apr. 16, 1937	7.15	8,530	Discharge from extension of rating curve.
67	Rio Chama near Tierra Amarilla (El Vado)	36 35	106 44	-	1913-1924 1935-1937	May 10, 1916	9.1	4,860	Discharge from extension of rating curve. Peak discharge May 6, 1922, may have been greater.
68	Rio Chama near Chamita	36 06	106 08	3,320	1912-1937	Aug. 12, 1929	8.20	15,600	Discharge from extension of rating curve. From report of State Engineer.
69	Brazos River near Brazos	36 43	106 31	-	1913-1917	May 14, 1915	4.39	3,240	Discharge from extension of rating curve.

a Includes 2,940 square miles in closed basin.

b Includes 4,200 square miles in closed basins.

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Table 4.- Records of floods in New Mexico—Continued

No. on pl. 9	Stream and place of determination	Latitude	Longitude	Drainage area (sq. mi.)	Period of record	Peak stage and discharge			Remarks
						Date	Stage (feet)	Discharge (sec.-ft.)	
	Rio Grande Basin—Continued								
70	Little Brazos River near Brazos	36°44'	106°29'	-	1914-1915	May 23, 1914	1.90	227	Discharge from rating curve.
71	Nutritus Creek near Tierra Amarilla	36 41	106 33	-	-	May 24, 1914	5.25	91	Discharge from extension of rating curve.
72	Willow Creek near Park View	36 40	106 41	-	1936	Aug. 3, 1936	3.73	400	Discharge from extension of rating curve.
73	Nutrias Creek near Cebolla	36 37	106 23	-	1914	May 13, 1914	1.95	156	Discharge from rating curve.
74	El Rito Creek near El Rito	36 23	106 13	12	1931-1937	Apr.16-20,1937	-	400	Estimated discharge for period; maximum probably greater.
75	Rio Ojo Caliente at La Madera	36 21	106 03	-	1932-1937	Apr. 16, 1937	-	2,570	Discharge from extension of rating curve.
76	Rio Vallecitos at Vallecitos	36 30	106 07	-	1911-1914	May 21, 1912	4.65	970	Discharge from staff gage reading; maximum may have been greater.
77	Rio Santa Cruz at Cundiyo	35 58	105 55	-	1915-1937	Sept. 24, 1931	8.20	2,610	Discharge from extension of rating curve.
78	Santa Clara Creek near Espanola	35 58	106 11	-	1936-1937	July 28, 1936	2.32	68	Discharge by slope-area method.
79	Nambe Creek near Nambe	35 52	105 57	-	1932-1937	Aug. 23, 1935	6.43	878	Discharge estimated.
80	Nambe Creek at Pojoaque Bridge, near Nambe	35 54	106 01	-	1936-1937	Aug. 20, 1936	5.18	2,400	Discharge by slope-area method.
81	Rio Tesuque above diversions, near Santa Fe	35 44	105 54	-	1936-1937	Sept. 7, 1936	4.0	370	Do.
82	Rio Tesuque at Tesuque Bridge, near Santa Fe	35 45	105 56	-	1936-1937	Sept. 7, 1936	1.62	660	Do.
83	Rito Tesuque near Sante Fe	35 44	105 53	-	1936-1937	Aug. 4, 1937	-	95	Do.
84	Santa Fe Creek near Santa Fe	35 41	105 50	22	1913-1937	Aug. 15, 1921	5.10	3,200	Discharge from extension of rating curve.
85	Santa Fe Creek at mouth, near Pena Blanca	35 35	106 20	-	-	Sept. 1929	-	6,500	Discharge estimated. From report of State Engineer.
86	Arroyo Hondo near Santa Fe	35 37	105 53	13.5	1913-1922	June 16, 1914	5.40	2,830	Discharge by slope-area method.
87	Galisteo Creek at mouth, near Domingo	35 31	106 21	-	-	Sept. 1929	-	5,000	Discharge estimated. From report of State Engineer.
88	Jemez Creek near Jemez	35 39	106 44	-	1936-1937	Sept. 26, 1936	9.35	3,000	Discharge by slope-area method.
89	Jemez Creek at mouth, near Bernalillo	35 22	106 30	-	-	Sept. 1929	-	5,000	Discharge estimated. From report of State Engineer.
90	Tuerto Arroyo at mouth, near San Felipe	35 28	106 25	-	-	Sept. 1929	-	900	Do.

91	Tonque Arroyo at mouth, near San Felipe	35 27	106 26	-	-	Sept. 1929	-	1,450	Discharge estimated. From report of State Engineer.
92	Embudo Arroyo, 6 miles east of Menaul School	35 06	106 34	18	-	Sept. 21, 1929	-	3,350	Discharge by slope-area method. From report of State Engineer.
93	Embudo Arroyo, 1/2 mile east of Menaul School	35 06	106 40	31	-	Sept. 21, 1929	-	2,490	Do.
94	Rio Puerco at Rio Puerco	34 47	107 00	-	1910-1937	Sept. 23, 1929	-	40,000	Discharge estimated.
95	Bluewater Creek near Bluewater	35 18	108 01	235	1912-1937	Mar. 28, 1926	8.25	4,000	Discharge from extension of rating curve.
96	San Jose River (Bluewater Creek) near Grants	35 04	107 44	-	1913-1926	Aug. 31, 1925	-	-	Peak discharge not known; maximum daily discharge, 417 second-feet. From report of State Engineer.
					1936-1937	Sept. 29, 1937	2.48	177	Discharge from extension of rating curve.
97	San Jose River near San Fidel	35 04	107 40	-	1936-1937	June 27, 1937	3.52	160	Do.
98	San Jose River near Casa Blanca	35 02	107 27	-	1936-1937	July 26, 1937	5.60	1,110	Do.
99	Rio Salado at mouth, near San Acacia	34 15	106 54	-	-	Aug. 1929	-	27,400	Discharge by slope-area method. From report of State Engineer.
100	Alamosa River near Monticello	33 35	107 36	470	1931-1937	Aug. 21, 1936	13.6	-	Discharge not determined.
101	Pecos River at Irvin ranch, near Pecos	35 42	105 41	175	1910-1937	Sept. 22, 1929	-	-	Discharge greater than 2,000 second-feet.
102	Pecos River near Anton Chico	35 11	105 08	1,080	1910-1937	June 1, 1937	20.34	40,300	Discharge by slope-area method.
103	Pecos River at Santa Rosa	34 56	104 42	2,880	1903-1937	June 2, 1937	25.7	55,200	Discharge from extension of rating curve.
104	Pecos River near Guadalupe	34 36	104 24	4,470	1912-1937	May 1, 1914	15.5	42,000	Do.
105	Pecos River near Fort Sumner	34 30	104 16	-	1904-1913 1921-1923	Sept. 30, 1904	17.95	45,200	Discharge by slope-area method.
106	Pecos River near Acme	33 34	104 23	-	1904 1921-1937	May 28, 1937	14.82	53,300	Do.
107	Pecos River near Roswell	33 21	104 24	-	1903-1906	Oct. 1, 1904	17.40	55,700	Do.
108	Pecos River near Lake Arthur	32 59	104 18	-	-	May 30, 1937	-	51,500	Do.
109	Pecos River near Artesia	32 50	104 20	-	1936-1937	May 30, 1937	14.7	51,500	Do.
110	Pecos River near Dayton	32 45	104 19	-	1905-1936	July 25, 1905 Sept. 18, 1919	- 15.9	50,300 -	Discharge computed from flow over McMillan Dam. Discharge not determined; probably exceeded that of July 25, 1905, and May 1937.

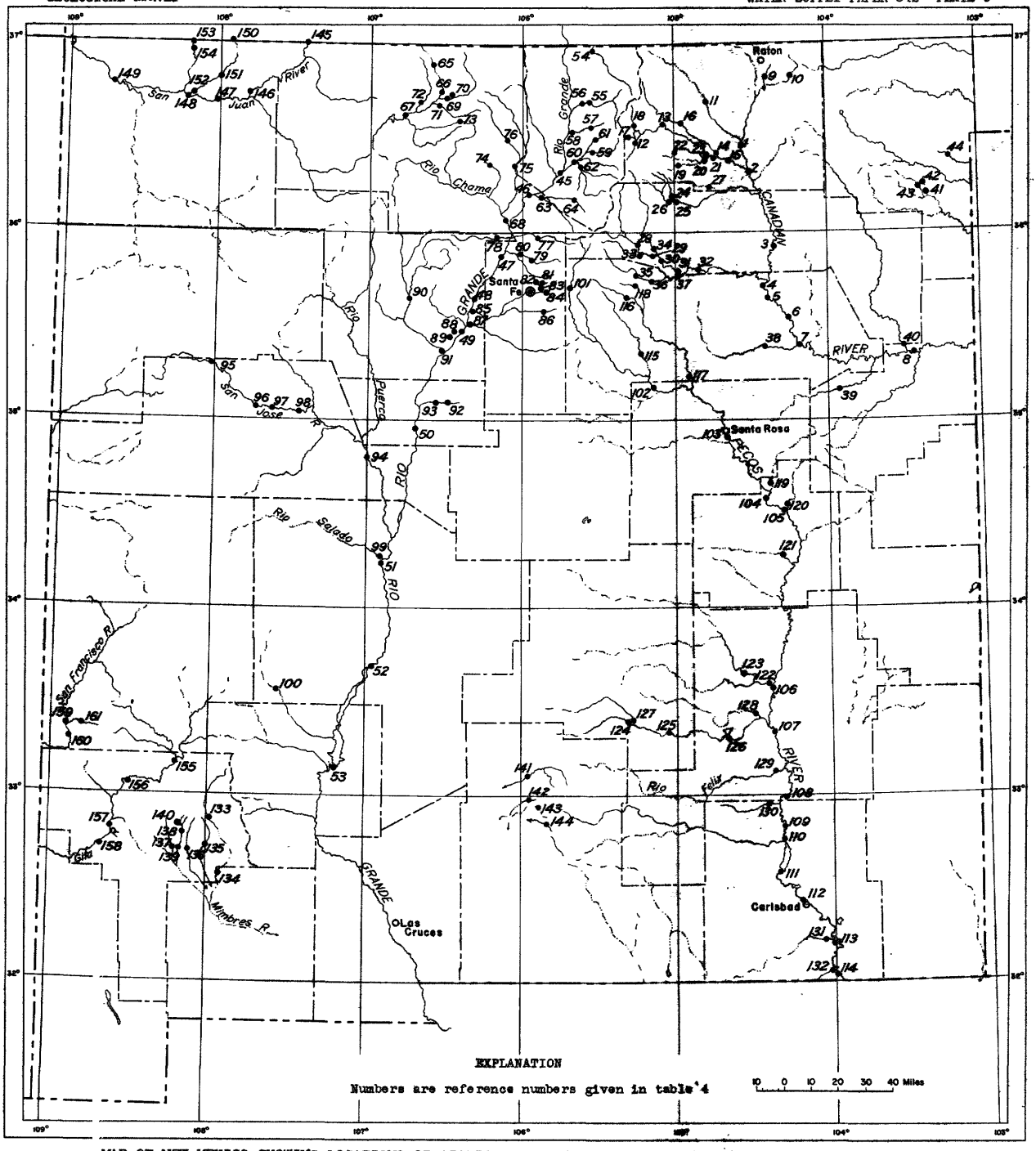
Table 4.-- Records of floods in New Mexico—Continued

No. on pl.9	Stream and place of determination	Latitude	Longitude	Drainage area (sq. mi.)	Period of record	Peak stage and discharge			Remarks
						Date	Stage (feet)	Discharge (sec.-ft.)	
	Rio Grande Basin--Continued								
111	Pecos River at McMillan Dam	32°35'	104°20'	-	1904-1915 1917-1937	Oct. 2, 1904	-	82,000	Discharge estimated.
112	Pecos River at Carlsbad	32 25	104 13	-	1893-1937	Aug. 7, 1916	21.0	85,700	Discharge at Avalon Dam reported by engineers of Bureau of Reclamation.
113	Pecos River near Malaga	32 12	104 02	-	1919-1937	Sept. 1919	26.4	40,400	Discharge from rating curve.
114	Pecos River near Angeles	32 02	104 00	-	1914-1937	Apr. 17, 1915 Aug. 8, 1916	15.45 22.5	54,900 -	Discharge from extension of rating curve. Discharge not determined.
115	Tecolote Creek near Chapelle	35 22	105 19	-	-	May-June, 1937	-	20,500	Discharge by slope-area method.
116	Gallinas River at Montezuma	35 39	105 18	89	1903-1937	Sept. 30, 1904	-	11,600	Discharge unreliable.
117	Gallinas River near Chaperito	35 13	104 55	-	-	May-June, 1937	-	21,400	Discharge by slope-area method.
118	South Fork of Gallinas River near El Porvenir	35 45	105 17	25	1911-1920	July 27, 1915	-	540	Discharge from staff gage reading; maximum may have been greater.
119	Alamogordo Creek near Guadalupe	34 40	104 22	-	-	June 3, 1937	-	24,800	Discharge by slope-area method.
120	Jackson Draw near Fort Sumner	34 32	104 17	-	-	June 3, 1937	-	12,000	Do.
121	Yeso Creek near Fort Sumner	34 15	104 18	-	-	June 3, 1937	-	8,720	Do.
122	Salt Creek at mouth, near Roswell	33 35	104 23	-	-	Oct. 1904	-	12,400	Do.
123	Cienaga del Macho near Roswell	33 38	104 34	-	-	May 28, 1937	-	49,500	Discharge by slope-area method. A higher stage has been reported.
124	Rio Ruidoso at Hondo	33 23	105 17	278	1930-1937	July 23, 1933 May 31, 1937	7.90 11.9	1,140 -	Discharge from extension of rating curve. Discharge not determined.
125	Rio Hondo at Riverside	33 19	105 04	-	-	May 31, 1937	-	24,900	Do.
126	Rio Hondo at Reservoir, near Roswell	33 18	104 40	1,390	1903-1906	Oct.1 or 8. 1904 July 25, 1905	- -	6,320 -	Do. Stage higher than in 1904; discharge not determined.
127	Rio Bonito at Hondo	33 23	105 16	233	1868-1937	May 31, 1937	19	9,270	Discharge by slope-area method.
128	Berrendo Creek at Roswell	33 25	104 30	-	-	June 1, 1937	-	37,700	Discharge by contracted-opening method. Maximum stage known.

129	Rio Felix near Hagerman	33 07	104 20	—	1932-1937	May 29, 1937	20.25	26,500	Discharge by slope-area method. Maximum stage known.
130	Cottonwood Creek near Lake Arthur	32 57	104 22	—	1932-1937	June 13, 1935	9.86	1,100	Discharge by slope-area method.
131	Black River near Malaga	32 13	104 03	—	1914-1915	Apr. 17, 1915	11.0	660	Discharge from extension of rating curve.
132	Delaware River near Malaga	32 00	104 06	—	1912-1915	June 11, 1912	11.6	2,400	Do.
	Mimbres River Basin								
133	Mimbres River near Mimbres	32 52	107 59	183	1921-1937	July 17, 1933	4.51	2,060	Do.
134	Mimbres River near Faywood	32 36	107 53	485	1908-1937	Aug. 10, 1931	6.62	6,900	Do.
135	Lambright Draw near Santa Rita	32 44	108 00	—	1912-1922	July 20, 1914	6.1	-	Peak discharge not known; maximum daily discharge, 500 second-feet.
136	Whitewater Creek at Hurley	32 43	108 07	35	1913-1914	Aug. 24, 1914	5.70	-	Discharge not determined.
137	Rio de Arenas near Hurley	32 43	108 12	16	1913-1914	July 16, 1914 July 18, 1914	10.10 11.00	2,660 -	Discharge by slope-area method. Discharge not determined.
138	Cameron Creek at Fort Bayard	32 47	108 09	—	1907-1914	Aug. 14, 1913	8.50	-	Discharge not determined.
139	Cameron Creek near Hurley	32 45	108 09	46	1913-1914	Aug. 14, 1913	5.50	5,490	Discharge by slope-area method.
140	Stevens Creek near Fort Bayard	32 50	108 09	—	1912-1914	Aug. 14, 1913	2.9	-	Discharge not determined.
	Tularosa Valley Basin								
141	Rio Tularosa near Tularosa	33 07	105 57	—	1913-1917	July 2, 1914	8	-	Discharge not determined.
					1931-1937	Aug. 27, 1935	7.54	2,480	Discharge from rating curve.
142	Rio La Luz at La Luz	32 59	105 55	74	1910-1913 1931-1932	Aug. 29, 1932	8.00	3,220	Do.
143	Rio Fresnal near Mountain Park	32 57	105 53	44	1911-1912	Sept. 28, 1911	3.65	-	Discharge not determined.
144	Alamo Creek at Wood ranch, near Alamogordo	32 51	105 50	—	1931-1937	July 17, 1933	1.55	7.7	Discharge from rating curve.
	San Juan River Basin								
145	San Juan River at Rosa (Arboles)	37 01	107 24	1,990	1895-1899 1910-1937	Oct. 5, 1911	-	40,000	Discharge estimated.
146	San Juan River near Blanco	36 44	107 49	3,320	1908-1910 1927-1937	Aug. 11, 1929	8.70	18,600	Discharge from extension of rating curve.
147	San Juan River at Bloomfield	36 41	108 01	4,830	1909-1937	Oct. 6, 1911	12.0	80,000	Discharge estimated.

Table 4.- Records of floods in New Mexico—Continued

No. on pl. 9	Stream and place of determination	Latitude	Longitude	Drainage-area (sq. mi.)	Period of record	Peak stage and discharge: Date	Peak stage and discharge: Stage (feet)	Peak stage and discharge: Discharge (sec.-ft.)	Remarks
	San Juan River Basin—Continued								
148	San Juan River at Farmington	36°43'	108°13'	6,580	1904-1937	Oct. 1911	-	97,000	Discharge estimated. From report of State Engineer.
149	San Juan River at Ship Rock	36 47	108 44	12,800	1911-1937	Oct. 6, 1911	22.0	150,000	Discharge estimated.
150	Animas River near Cedar Hill	37 02	107 52	-	1933-1937	June 16, 1935	7.62	9,540	Discharge from rating curve.
151	Animas River at Aztec	36 49	108 00	1,300	1904 1907-1915	Oct. 6, 1911	13.5	30,000	Discharge estimated.
152	Animas River at Farmington	36 43	108 12	1,360	1912-1937	Sept. 11, 1927	8.54	17,300	Discharge from extension of rating curve.
153	La Plata River at Colorado-New Mexico State line	37 00	108 11	331	1920-1937	Aug. 24, 1927	10.9	4,750	Discharge by slope-area method.
154	La Plata River at La Plata	36 58	108 11	335	1905-1934 1936-1937	Sept. 5, 1909, Aug. 12, 1910	7.6	7,000	Do.
	Gila River Basin								
155	Gila River near Silver City	33 10	108 12	-	1912-1919	Oct. 14, 1916	-	9,620	Mean discharge for day; maximum may have been greater. From report of State Engineer.
156	Gila River near Gila	33 03	108 32	1,780	1914 1927-1937	Feb. 16, 1937	10.12	6,110	Discharge from extension of rating curve.
157	Gila River near Cliff	32 50	108 36	2,450	1904-1907	Nov. 27, 1905	-	-	Peak discharge not known; maximum daily discharge, 13,600 second-feet.
158	Gila River near Red Rock	32 45	108 40	2,840	1908-1937	July 23, 1911	22.0	18,000	Discharge by slope-area method. Backwater.
						Feb. 16, 1937	13.67	18,200	Discharge from extension of rating curve.
159	San Francisco River at Alma	33 22	108 54	1,670	1904-1907 1909-1914	Dec. 3, 1906	13.40	21,000	Discharge from float measurement.
160	San Francisco River near Glenwood	33 18	108 53	1,500	1927-1937	Feb. 7, 1937	8.07	5,730	Discharge from extension of rating curve.
161	Whitewater Creek near Mogollon	33 22	108 48	34	1909-1910 1912-1923	Mar. 23, 1916	-	440	Discharge from staff gage reading; maximum may have been greater.



MAP OF NEW MEXICO SHOWING LOCATIONS OF STATIONS AT WHICH DATA PRESENTED IN TABLE 4 WERE OBTAINED

U. S. GOVERNMENT PRINTING OFFICE: 1939—O-108828

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