

Flood of June 17-18, 1965
in the Rio Hondo valley in southeastern
New Mexico

By

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Open-file report

U.S. Geological Survey
Water Resources Division
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ABSTRACT

On June 17 and 18, 1965, severe flooding occurred in the upper Rio Hondo valley and tributary areas west of Roswell in southeastern New Mexico. Intense and sustained rainfall occurred in the upper reaches, progressed downstream, and compounded a floodwave on Alamo Canyon near Tinnie which reached a magnitude six times that of a 50-year flood. Most measurements exceeded peaks of record, and all those whose recurrence interval was definable were above the 50-year flood in the drainage basin from the mouth of Devils Canyon to the gaging station Rio Hondo at Diamond A. Ranch.

No lives were lost, but property damage was nearly \$2 million. The City of Roswell and vicinity were spared damage estimated at \$635,000 inasmuch as the entire flood runoff was easily contained in Two Rivers Reservoir, a flood control project completed in July 1963.

INTRODUCTION

Purpose and Scope

A record-breaking flood during the middle of June 1965 occurred on the Rio Hondo, a Pecos River tributary, and some of its tributaries. Ordinarily the Rio Hondo is fordable on foot or by horseback; however, it was reported to have been 30-35 feet deep in places during this flood, at the peak stage. Figure 1 is a location map of the flood area.

This report was written to supplement in more detail the records of stage and discharge ordinarily published in the annual streamflow reports of the U.S. Geological Survey. Information, other than stages and discharges, necessary to an analysis and understanding of the hydrology of the flood have been collected and are included. Flood damages as well as a description of the storm are discussed, and a comparison of the magnitude of this flood to known floods of the past has been made.

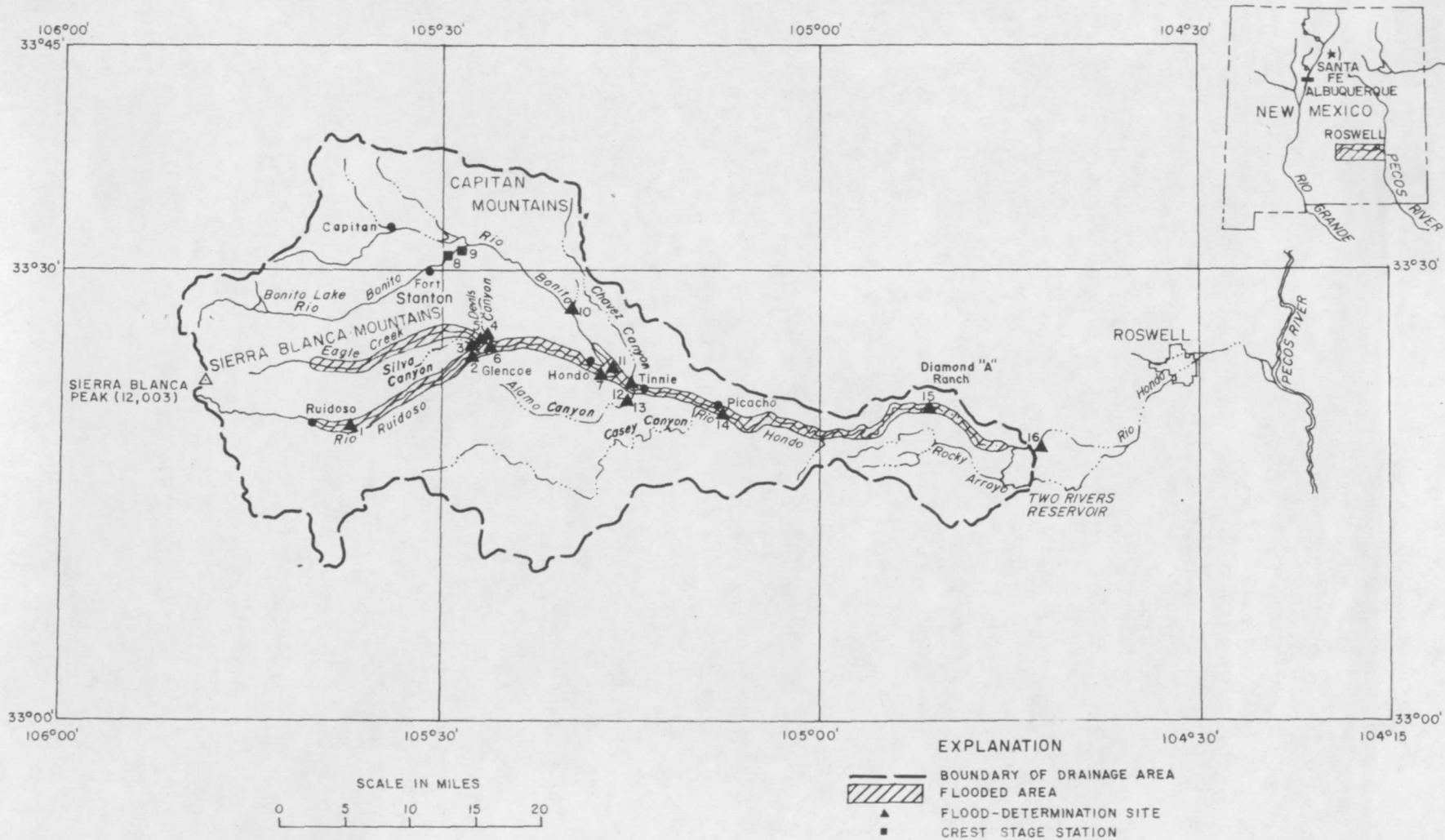


FIGURE 1.-- Flood area and flood-measurement sites June, 1965 in the Rio Hondo valley, New Mexico. Modified from map furnished by U. S. Army, Corps of Engineers.

ACKNOWLEDGMENTS

Records of discharge in the area covered by this report were collected as part of the cooperative programs between the U.S. Geological Survey and various agencies of the State of New Mexico, the U.S. Army Corps of Engineers and other Federal and local agencies. The U.S. Weather Bureau, the U.S. Soil Conservation Service, and several state, municipal and private organizations furnished some data or information included herein.

The data were collected and compiled by personnel of the U.S. Geological Survey Water Resources Division in New Mexico under the supervision of William E. Hale, District Chief and Wilbur L. Heckler, Assistant District Chief.

DESCRIPTION OF THE STORM

On June 16-17 the upper-level wind flow from the Gulf of Alaska that had prevailed for at least 4 months, was exceptionally cold. At the same time warm moist air was drawn in from the Gulf of Mexico by a combination of increased surface pressures from this cold pattern and low pressure south of the Texas-Mexico border. This unstable atmospheric condition coupled with the influence of topographic lifting resulted in phenomenal rains accompanied by severe hail.

The area of precipitation extended from Ruidoso to Picacho in a region approximately parallel to and centered over the Rio Ruidoso. Greatest amount of rainfall occurred in the vicinity of Ruidoso with an official measurement of 5.11 inches and an unofficial measurement of 8.0 inches. Damage was sustained in this area by hailstones reported to be as large as golf balls. In the Fort Stanton area the most intense rainfall occurred around 1430 hours on June 17. Rainfall was light in the upper watershed of the Rio Bonito, a major tributary of the Rio Hondo. In the lower parts of the Rio Bonito near Hondo the Soil Conservation Service measured 4.78 and 5.36 inches in two USWB 8-inch nonrecording rain gages.

The recording rain gages at both Ruidoso and Hondo were inoperative during the storm so no intensities were obtained. The result of a "bucket" survey made by the Soil Conservation Service indicated the maximum storm duration to be 3 hours or less at any place. Within 6 hours approximately 200 square miles received 3 inches or greater precipitation. Table 1 is a list of precipitation values at selected stations obtained in the "bucket" survey made by the Soil Conservation Service. Figure 2 is an isohyetal map for the storm period.

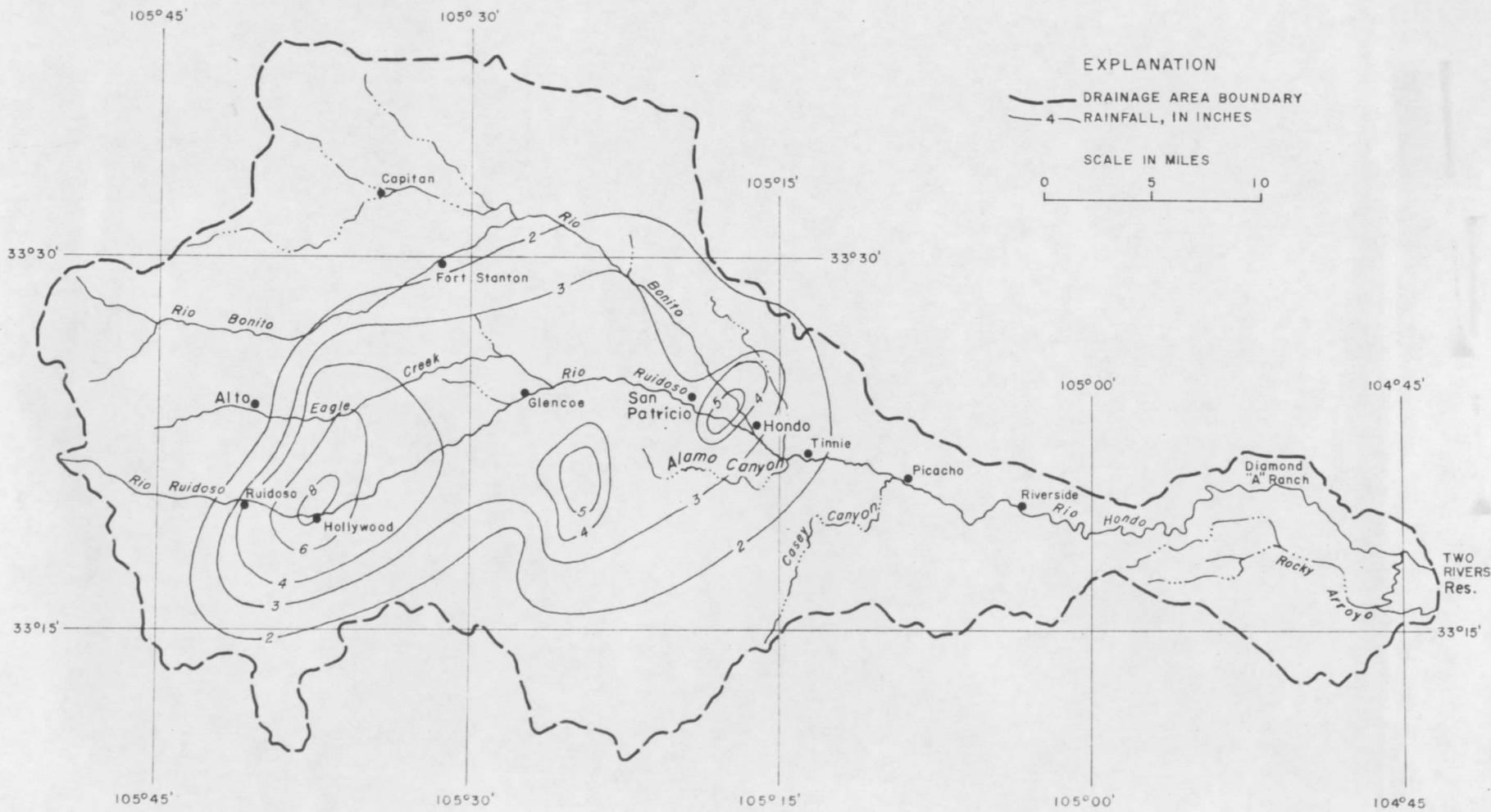


FIGURE 2. — Isohyetal map for the storm of June 17, 1965, in the Rio Hondo valley, New Mexico.
Map furnished by the U. S. Army Corps of Engineers.

Table 1.--Precipitation at selected stations during the storm
of June 17, 1965. Data furnished by the U.S. Soil
Conservation Service

Gage location (shown on Fig.2)	Depth in inches	Time of occurrence (hours)
Ruidoso Chamber of Commerce	5.11	1330 - 1630
Alto, N. Mex.	.90	-
Near Hollywood, N. Mex.	8.00	-
Fort Stanton, N. Mex.	1.85	
McDaniels Ranch south of Glencoe, N. Mex.	1.75 to 5.00	-
Hondo Post Office	3.50	1615 - 1915
SCS - Lower Bonito near Hondo	4.78	-
SCS - Lower Bonito near Hondo	5.36	-
2 miles east San Patricio, N. Mex.	5.25	-
Tinnie, N. Mex.	2.25	-
Picacho, N. Mex.	.66	1900 - 2130

TOPOGRAPHY

Between the Two Rivers Reservoir and Hondo (figure 1), the topography is rolling hills covered with sparse desert-type vegetation. Westward from Hondo, where the precipitation was mainly concentrated, the terrain is mountainous with the cover varying from heavy coniferous forest at higher altitudes to junipers and pinon in the lower altitudes.

DESCRIPTION OF THE FLOOD

The fact that the storm front moved downstream nearly simultaneously with the flood wave produced peaks that were unequaled within the memory of residents in the valley. The runoff pattern of this flood was unusual in that the peaks from the tributary streams apparently coincided with the floodwave of the main stream as it passed their respective mouths. At 1540 hours on June 17 a peak discharge of 1,340 cfs was recorded at the gaging station Rio Ruidoso at Hollywood. As the Hollywood peak moved downstream through the next 26 miles of channel it was supplemented by tributary and sheet inflow producing a peak of 42,700 cfs about 1800 hours at the crest-stage gage at Hondo. Just below this gage the Rio Bonito joins the Rio Ruidoso to form the Rio Hondo.

The flood wave of 42,700 cfs at Hondo, supplemented by flow from the Rio Bonito, Chaves Canyon, Alamo Canyon, and sheet inflow combined to produce a peak of 115,000 cfs near Picacho. This tremendous increase in discharge occurred in a reach of approximately 10 miles.

The peak discharge near Picacho reached a magnitude of about five times that of a 50-year flood (table 3). From this point to the gaging station Rio Hondo at Diamond A Ranch, a meandering reach of about 30 miles, the peak or flood wave subsided to about half its maximum. This large decrease in flow resulted from very substantial channel storage and subsurface infiltration. The peak at Diamond A Ranch of 54,800 cfs occurred at 0040 hours June 18, showing a reduction in the rate of flood-wave travel in this lower reach.

Discharge hydrographs for the gaging stations Rio Ruidoso at Hollywood and Rio Hondo at Diamond A Ranch are shown in figure 3. Figure 4 shows a relationship of the flood peaks to the 50-year flood.

The entire flood was intercepted and easily contained in the Two Rivers flood-control reservoir, constructed and maintained by the Corps of Engineers. The reservoir was empty prior to the storm, but the capacity is such that it could have retained and released twice the flood flow without endangering the downstream areas. Maximum storage was 7,400 acre-feet at 1500 hours on June 18 with a maximum release of 750 cfs. The Corps of Engineers estimated that the Roswell area was spared damages that would have totaled approximately \$635,000.

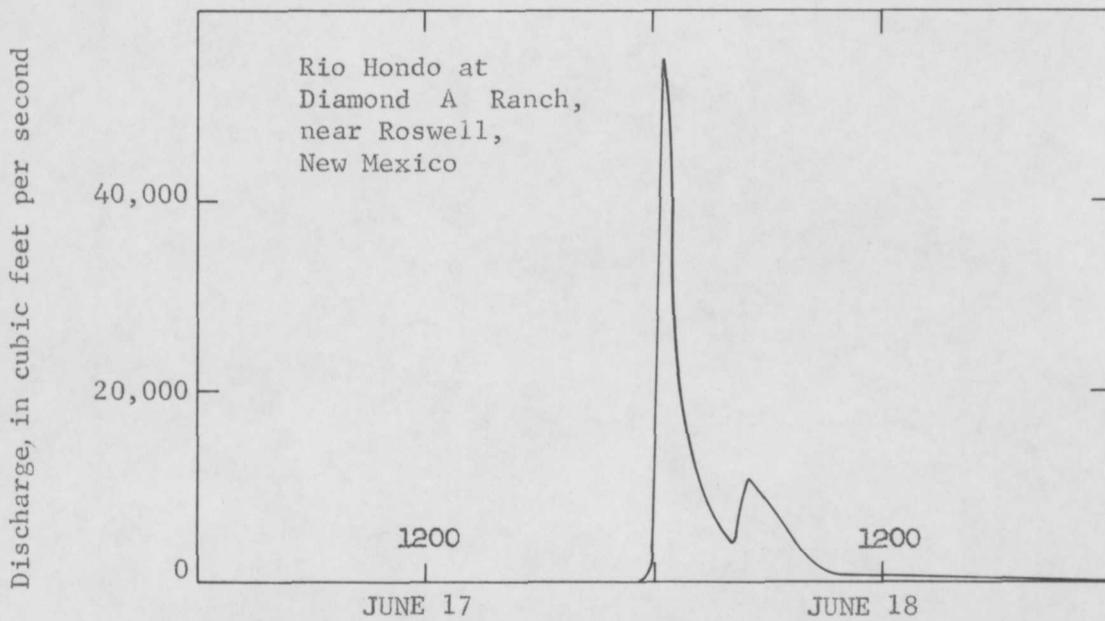
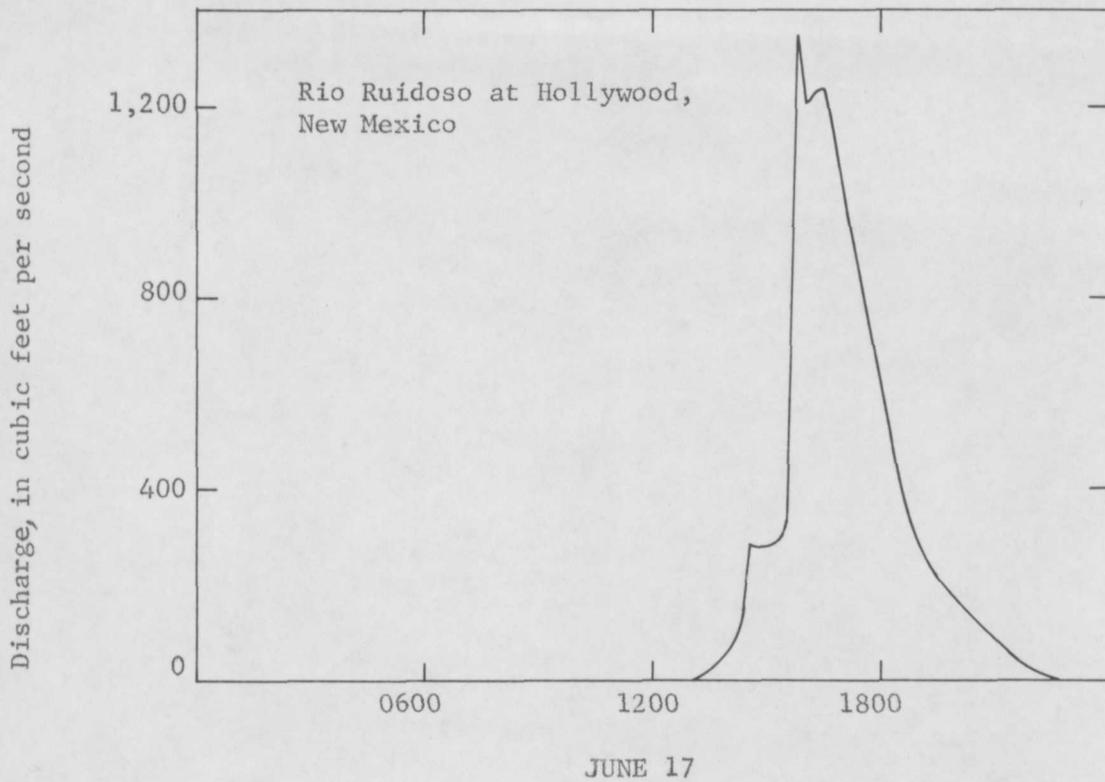


Figure 3.--Discharge hydrographs for Rio Ruidoso at Hollywood and Rio Hondo at Diamond A Ranch near Roswell, for 1965.

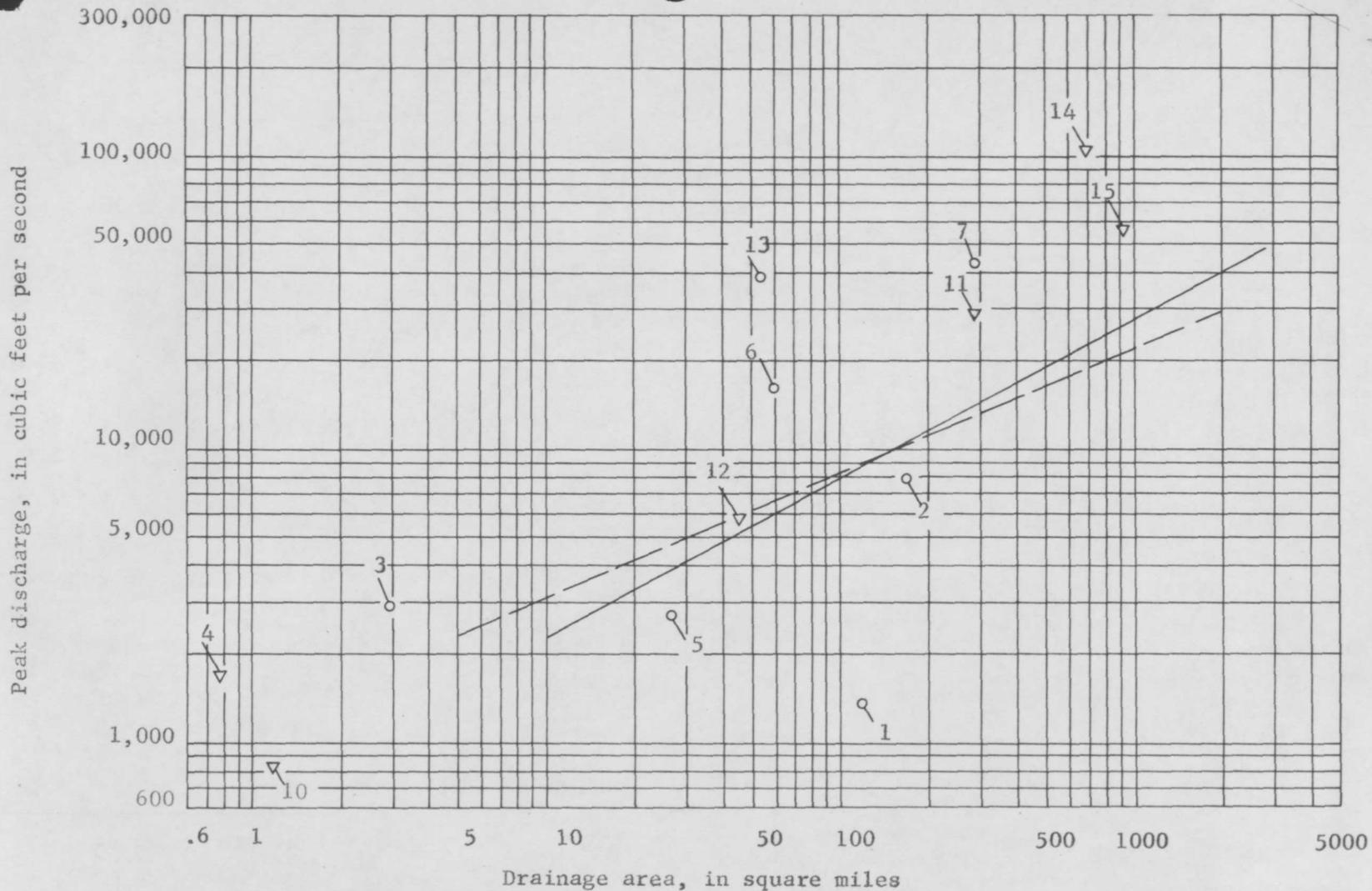


Figure 4.--Relation of peak discharge to drainage area as compared to the 50-year flood at selected points in the Rio Hondo valley, N. Mex.

EXPLANATION (See WSP 1682 "Magnitude and Frequency of Floods in the U.S., Part 8, Western Gulf flood of Mexico Basins", by James L. Patterson.)

- 50-year flood for region L and hydrologic area 13.
- - - - - 50-year flood for region K and hydrologic area 12.
- Peak discharge in region K and hydrologic area 12.
- ▽ Peak discharge in region L and hydrologic area 13.

FLOOD DAMAGE

Because the floodwater in the Rio Hondo valley was constricted, it nearly demolished everything within its path. This was due to the mountainous terrain where the storm principally occurred, and the fact that the flood plain within the valley consists of narrow strips of land averaging less than a quarter of a mile in width.

The towns in the valley, situated for the most part above the flood plain, sustained little damage as compared to the rural areas. Damage in agricultural areas was high because it received the full force of the flood wave, and because the flood occurred after the land had been planted and the orchard trees were in full foliage. Approximately 3,000 acres of irrigated land were flooded and about 300 acres of orchards were destroyed. Numerous rural structures, farm equipment, and irrigation facilities were demolished, and about 75 head of livestock were lost. About 1,000 acres of irrigated land needed to be re-leveled owing to sediment deposition. Several miles of road repairs were necessary and more than 10 bridges needed repair or replacement.

The above items do not include the business and financial setbacks that were sustained as a result of the floods. No apple production for a number of years because of the destroyed orchards, and crop losses due to the damage of irrigation systems are some of the examples of this loss of income.

Personnel of the Corps of Engineers and the Soil Conservation Service assembled most of the flood-damage data. They did not, however, obtain any estimate of hail damage which was of disastrous proportions in several areas. Table No. 2 lists damages assigned to various categories.

Table 2.--Summary of flood damage, June 17-18, 1965

(Table furnished by U.S. Army Corps of Engineers.)

Item	Damages
Urban and suburban	\$170,000
Rural	954,000
Transportation facilities	260,000
Business and financial losses	426,000
Emergency costs	<u>40,000</u>
Total	<u>\$1,850,000</u>

SUMMARY

The largest flood in the Rio Hondo valley for which discharges have been determined occurred on June 17-18, 1965. A number of factors are responsible. The storm was primarily concentrated and centered over mountainous terrain of the drainage area, and was of such short duration, but high intensity, that little time was allowed for the water to infiltrate into the soil. Also, the storm did not occur over the entire area at once but apparently moved downstream adding to the flood crest. The maximum discharge of the major tributary evidently met the crest of the flood in the main channel.

STREAMFLOW DATA

The following section presents streamflow data for the floods of June 17-18, 1965, together with data on past floods for comparative purposes, and a description of each flood measurement site.

Table 3 is a summary of flood stages and discharges at each flood measurement site. These sites are shown by identifying station number on the location map in figure 1. The entries in the columns under "maximum previously known" are those floods prior to June 1965 with the first being the maximum flood occurring during the period of gaging station record, and the subsequent entries those that correspond to other known floods outside the period of record. The ratios shown in the last column of the table were computed from Water-Supply Paper 1682, "Magnitude and Frequency of Floods in the United States, Part 8, Western Gulf of Mexico Basins", by James L. Patterson. If the peak discharge was less than the 50-year flood, the recurrence interval is given in years. The last section, Station Data, contains a description of each site where a peak flow measurement was obtained. Within these station descriptions, the gage-height record applies only to the period of the flood, and under the maxima heading, information is given of the present flood, the maximum flood within the period of record, and whatever historical information is available. Tables of daily mean discharges for the flood period, and detailed data for the flood hydrographs in figure 3 are shown for the two regular gaging stations, Rio Ruidoso at Hollywood and Rio Hondo at Diamond A. Ranch.

Table 3.--Flood stages and discharges in the Rio Hondo valley, New Mexico

No.	Permanent station number	Stream and place of determination	Drainage area (sq mi)	Period of record	Maximum previously known		Maximum June 1965				
					Year	Gage height (ft)	Dis-charge (cfs)	Date	Gage height (ft)	Discharge cfs	Ratio to 50-year flood
1	8-3870	Rio Ruidoso at Hollywood, N. Mex.	120	1954-65	1957 1941	7.80 111.50	1,070 (c)	17	9.05	1,340	a 3
2	(d)	Rio Ruidoso at Buckhorn Courts, near Glencoe, N. Mex.	169	-	-	-	-	17	-	7,920	a28
3	(d)	Silva Canyon near Glencoe, N. Mex.	3.0	-	-	-	-	17	-	2,940	a10
4	(d)	Devils Canyon near Glencoe, N. Mex.	.8	-	-	-	-	17	-	1,740	a10
5	(d)	Eagle Creek near Glencoe, N. Mex.	26.6	-	-	-	-	17	-	2,700	a16
6	(d)	Devils Canyon at Glencoe, N. Mex.	60	-	-	-	-	17	-	16,200	2.5
7	8-3880	Rio Ruidoso at Hondo, N. Mex.	290	1931-65	1941	21.13	12,400	17	24.4	42,700	3.2
8	8-3890	Rio Bonito near Fort Stanton, N. Mex.	85	1956-65	1957	6.69	(c)	17	6.35	(c)	-
9	8-3890.6	Rio Bonito tributary near Fort Stanton, N. Mex.	.72	1955-65	1955	4.80	240	17	4.63	(c)	-
10	(d)	Rio Bonito tributary near Hondo, N. Mex.	1.2	-	-	-	-	17	-	850	a -

20 and 21

Table 3.--Flood stages and discharges in the Rio Hondo valley, New Mexico-- Concluded

No.	Permanent station number	Stream and place of determination	Drainage area (sq mi)	Period of Record	Maximum previously known		Maximum June 1965				
					Year	Gage height (ft)	Dis-charge (cfs)	Date	Gage height (ft)	Discharge cfs	Ratio to 50-year flood
11	8-3895	Rio Bonito at Hondo	g295	1931-65	1941	f20.92	h11,000	17	21.1	28,200	2.0
12	(d)	Chaves Canyon near Tinnie,	46.4	-	-	-	-	17	-	5,710	1.1
13	(d)	Alamo Canyon near Tinnie,	54.6	-	-	-	-	17	-	38,400	6.0
14	8-3901	Rio Hondo at Picacho	715	1957-65	1958 1954 1941	13.30 18.1 30	3,510 6,600 (c)	17	26.9	115,000	5.0
15	8-3905	Rio Hondo at Diamond A Ranch near Roswell	g947	1940-65	1941	28.78	h27,000	18	26.4	54,800	2.0
16	8-3906	Two Rivers Reservoir near Roswell	1,030	1964-65	1964	j3969 3953.1	j k42 k466	18	-	k7,400	-

a - Recurrence interval, in years

b - Probably greatest since at least 1904

c - Discharge not determined

d - Miscellaneous site

f - From flood mark

g - Contributing area

h - Greatest since about 1900

i - See station description

j - Upper figure refers to Rio Hondo Reservoir,
lower figure to Rocky Arroyo Reservoir

k - Contents in acre-feet

STATION DATA

RIO GRANDE BASIN

(1) 8-3870 Rio Ruidoso at Hollywood

Location.--Lat 33°19'50", long 105°36'25", in NE¼ sec.30, T.11 S., R.14 E., on right upstream end of bridge on road leading to Ruidoso Downs, 0.9 mile east of Hollywood, 2-3/4 miles downstream from Carrizo Creek, and 2½ miles east of Ruidoso.

Drainage area.--120 sq mi, approximately.

Gage-height record.--Digital recorder tape punched at 15-minute intervals. Datum of gage is 6,366.42 ft above mean sea level, datum of 1929.

Discharge record.--Stage-discharge relation defined by current-meter measurements below 130 cfs and by slope-area measurements at 1,070 and 1,340 cfs.

Maxima.--June 16-25, 1965: Discharge, 1,340 cfs 1540 hours June 17 (gage height, 9.05 ft, from floodmarks in well).
1953 to May 1965: Discharge, 1,070 cfs July 26, 1957 (gage height, 7.80 ft).
Maximum stage known since at least 1904, 11.5 ft Sept. 29, 1941.

Rio Ruidoso at Hollywood (Cont.)

Mean discharge, in cubic feet per second, June 16-25, 1965

June 16	.....	5.5
17	.....	161
18	.....	13
19	.....	13
20	.....	8.7
21	.....	6.9
22	.....	7.1
23	.....	7.5
24	.....	7.6
25	.....	7.2

Gage height, in feet, and discharge, in cubic feet per second
at indicated time, 1965

Hour	Gage height	Discharge
<hr/>		
<u>June 16</u>		
2400	0.67	5.4
<u>June 17</u>		
1300	0.69	4.8
1400	1.58	64
1430	3.19	286
1500	3.17	282
1530	3.42	325
1540	9.05	1,340
1600	8.35	1,210
1630	8.52	1,240
1700	7.46	1,040
1730	6.04	785
1800	5.22	638
1830	3.93	405
1900	3.20	279
2100	1.94	96
2200	.98	14
2400	.28	5.7

NOTE.--Daily means computed from data in
addition to figures shown.

RIO GRANDE BASIN

(2) Rio Ruidoso at Buckhorn Courts, near Glencoe
(Miscellaneous site)

Location.--SW $\frac{1}{4}$ sec.33, T.10 S., R.15 E., 3 miles west of junction of
U.S. Highway 70 and State Highway 214 near Glencoe.

Drainage area.--169 sq mi.

Discharge record.--Peak discharge by slope-area measurement.

Maximum.--June 16-25, 1965: Discharge, 7,920 cfs June 17.

(3) Silva Canyon near Glencoe
(Miscellaneous site)

Location.--NW $\frac{1}{4}$ sec.33, T.10 S., R.15 E., 0.6 mile above mouth, and 2 miles west
of junction of U.S. Highway 70 and State Highway 124 near Glencoe.

Drainage area.--3.0 sq mi.

Discharge record.--Peak discharge by slope-area measurement.

Maximum.--June 16-25, 1965: Discharge, 2,940 cfs June 17.

(4) Devils Canyon near Glencoe
(Miscellaneous site)

Location.--NW $\frac{1}{4}$ sec.16, T.10 S., R.15 E., 0.4 mile above Little Creek and, 3 miles
west of Glencoe.

Drainage area.--0.8 sq mi.

Discharge record.--Peak discharge by slope-area measurement.

Maximum.--June 16-25, 1965: Discharge, 1,740 cfs June 17.

RIO GRANDE BASIN

(5) Eagle Creek near Glencoe,
(Miscellaneous site)

Location.--NE $\frac{1}{4}$ sec.20, T.10 S., R.15 E., 1 mile above mouth, and 3.5 miles northwest of Glencoe.

Drainage area.--26.6 sq mi.

Discharge record.--Peak discharge by slope-area measurement.

Maximum.--June 16-25, 1965: Discharge, 2,700 cfs June 17.

(6) Devils Canyon at Glencoe,
(Miscellaneous site)

Location.--NE $\frac{1}{4}$ sec.26, T.10 S., R.15 E., 0.2 mile above U.S. Highway 70, and 0.3 mile above mouth.

Drainage area.--60 sq mi.

Discharge record.--Peak discharge by slope-area measurement.

Maximum.--June 16-25, 1965: Discharge, 16,200 cfs June 17.

RIO GRANDE BASIN

(7) 8-3880. Rio Ruidoso at Hondo
(Gaging station discontinued 1955, crest-stage station)

Location.--NE $\frac{1}{2}$ SW $\frac{1}{2}$ sec.4, T.11 S., R.17 E., $\frac{1}{2}$ mile above confluence with Rio Bonito and $\frac{1}{2}$ mile southwest of Hondo.

Drainage area.--290 sq mi.

Gage-height record.--Gage destroyed by flood. Datum of gage is 5,181.38 ft above mean sea level, datum of 1929.

Discharge record.--Stage-discharge relation defined by current-meter measurements below 540 cfs and extended above on basis of velocity-area study and slope-area measurements at 4,060 and 42,700 cfs.

Maxima.--June 16-25, 1965: Discharge, 42,700 cfs June 17 (gage height, 24.4 ft, from floodmarks).

1930 to May 1965: Discharge, 12,400 cfs Sept. 29, 1941 (gage height, 21.13 ft, from floodmarks).

Flood in 1941 was probably greatest since at least 1904, prior to June 17, 1965.

(8) 8-3890. Rio Bonito near Fort Stanton
(Crest-stage station)

Location.--SW $\frac{1}{2}$ sec.16, T.9 S., R.15 E., at bridge on U.S. Highway 380, 2.5 miles northeast of Fort Stanton.

Drainage area.--85 sq mi, approximately.

Gage-height record.--Crest stages only.

Discharge record.--Stage-discharge relation undefined.

Maxima.--June 16-25, 1965: Gage height, 6.35 ft, June 17; discharge, not determined.
1955-May 1965: Gage height, 6.69 ft, Sept. 9, 1957; discharge, not determined.

RIO GRANDE BASIN

(9) 8-3890.6. Rio Bonito tributary near Fort Stanton
(Crest-stage station)

Location.--SW $\frac{1}{2}$ SW $\frac{1}{2}$ sec.15, T.9 S., R.15 E., at culvert on U.S. Highway 380, 150 ft above mouth, and 3.5 miles northeast of Fort Stanton.

Drainage area.--0.72 sq mi.

Gage-height record.--Crest stages only.

Discharge record.--Stage-discharge relation undefined.

Maxima.--June 16-25, 1965: Gage height, 4.63 ft, June 17; discharge, not determined.
1955-May 1965: Discharge, 240 cfs Sept. 24, 1955 (gage height, 4.80 ft).

(10) Rio Bonito tributary near Hondo
(Miscellaneous site)

Location.--SE $\frac{1}{2}$ sec.12, T.10 S., R.16 E., 0.3 mile above mouth at U.S. Highway 380, and 5.5 miles northwest of Hondo.

Drainage area.--1.2 sq mi.

Discharge record.--Peak discharge by slope-area measurement.

Maximum.--June 16-25, 1965: Discharge, 850 cfs June 17.

RIO GRANDE BASIN

(11) 8-3895. Rio Bonito at Hondo
(Gaging station discontinued 1955, crest-stage station)

Location.--NE $\frac{1}{4}$ NW $\frac{1}{4}$ sec.4, T.11 S., R.17 E., at bridge on U.S. Highway 70 at Hondo.

Drainage area.--295 sq mi (contributing area).

Gage-height record.--Crest stages only. Datum of gage is 5,205.17 ft above mean sea level, datum of 1929.

Discharge record.--Stage-discharge relation defined by current-meter measurements below 500 cfs and by five slope-area measurements at various discharges and a contracted opening measurement at 28,200 cfs.

Maxima.--June 16-25, 1965: Discharge, 28,200 cfs June 17 (gage height, 21.1 ft).
1930 to May 1965: Discharge, 11,000 cfs Sept. 28 or 29, 1941 (gage height, 20.92 ft, from floodmarks).

Remarks.--Since Sept. 1958, peak discharges have been affected by a flood-retarding structure on Salado Creek.

(12) Chavez Canyon near Tinnie
(Miscellaneous site)

Location.--SE $\frac{1}{4}$ NE $\frac{1}{4}$ sec.10, T.11 S., R.17 E., 0.4 mile above mouth, and 1.3 miles west of Tinnie.

Drainage area.--46.4 sq mi.

Discharge record.--Peak discharge determined from flow through culvert.

Maximum.--June 16-25, 1965: Discharge, 5,710 cfs June 17.

RIO GRANDE BASIN

(13) Alamo Canyon near Tinnie
(Miscellaneous site)

Location.--SW $\frac{1}{4}$ NW $\frac{1}{4}$ sec.14, T.11 S., R.17 E., 0.6 mile above mouth, and 1.3 miles southwest of Tinnie.

Drainage area.--54.6 sq mi.

Discharge record.--Peak discharge by slope-area measurement.

Maximum.--June 16-25, 1965: Discharge, 38,400 cfs June 17.

(14) 8-3901. Rio Hondo at Picacho
(Gaging station discontinued 1962, crest-stage station)

Location.--W $\frac{1}{2}$ W $\frac{1}{2}$ sec.15, T.11 S., R.18 E., by road bridge just off U.S. Highway 70, 1.3 miles northwest of Picacho.

Drainage area.--715 sq mi.

Gage-height record.--Crest stages only. Datum of gage is 4,945.49 ft above mean sea level, datum of 1929.

Discharge record.--Stage-discharge relation defined by current-meter measurements below 1,200 cfs and by slope-area measurements at 3,510 and 115,000 cfs.

Maxima.--June 16-25, 1965: Discharge, 115,000 cfs June 17 (gage height, 26.9 ft).
1956 to May 1965: Discharge, 3,510 cfs May 14, 1958 (gage height, 13.30 ft).
A stage of 18.1 ft, present datum (discharge, about 6,600 cfs), was observed on Oct. 6, 1954. A stage of at least 30 ft occurred in Sept. 1941.

RIO GRANDE BASIN

(15) 8-3905. Rio Hondo at Diamond A Ranch, near Roswell

Location.--Lat 33°20'55", long 104°51'05", in NE¹/₄ sec.20, T.11 S., R.21 E., on left bank on downstream side of road bridge at Diamond A Ranch, 21 miles upstream from mouth of Rocky Arroyo and 18 miles west of Roswell.

Drainage area.--947 sq mi (contributing area).

Gage-height record.--Water-stage recorder graph except 0230 hours June 18 to 1110 hours June 19, for which graph was estimated on basis of recorded range in stage and record before and after this period. Altitude of gage is 4,185 ft (from topographic map).

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

Maxima.--June 16-25, 1965: Discharge, 54,800 cfs 0040 hours June 18 (gage height, 26.40 ft, from recorder graph, 27.1 ft from floodmarks).

1939 to May 1965: Discharge, 27,000 cfs Sept. 22, 1941 (gage height, 28.78 ft).

The flood in 1941 was greatest since about 1900 prior to June 18, 1965. A flood on June 1, 1937, reached a discharge of 24,900 cfs at Riverside about 13 miles upstream. Other major floods occurred Oct. 31, 1901, Sept. 29-30, 1904 and July 25, 1905.

Rio Hondo at Diamond A Ranch (Cont.)

Mean discharge, in cubic feet per second, June 16-25, 1965

June 16	.....	0
17	.....	19
18	.....	4,270
19	.....	60
20	.....	26
21	.....	26
22	.....	15
23	.....	10
24	.....	7
25	.....	6

Gage height, in feet, and discharge in cubic feet per second, at indicated time, 1965

Hour	Gage height	Discharge
<hr/>		
<u>June 16</u>		
2400	3.61	0
<hr/>		
<u>June 17</u>		
2330	3.61	0
2400	23.00	3,370
<hr/>		
<u>June 18</u>		
0040	26.40	54,800
0100	26.18	35,400
0130	25.85	20,800
0200	25.56	14,600
0230	25.38	12,000
0400	23.90	4,110
0500	25.30	11,000
0900	13.00	1,115
1100	10.00	701
1300	8.50	505
1500	7.80	407
1700	7.30	337
2000	6.90	281
2400	6.65	246

NOTE.--Daily means computed from data in addition to figures shown.

RIO GRANDE BASIN

(16) 8-3906. Two Rivers Reservoir near Roswell

Location.--Lat 33°17'55", long 104°43'22", in SW¼SE¼NE¼ sec.4, T.12 S., R.22 E., near center of Diamond A Dam on Rio Hondo, 13 miles southwest of Roswell, N. Mex., and lat 33°16'20", long 104°43'20", in NW¼SE¼NE¼ sec.16, T.12 S., R.22 E., at left end of Rocky Dam on Rocky Arroyo, 14 miles southwest of Roswell.

Drainage area.--1,030 sq mi (Rio Hondo, 963 sq mi; Rocky Arroyo, 64 sq mi).

Gage-height record.--Water-stage recorder graph and once daily staff gage readings at 0800 hours. Datum of gage is at mean sea level, datum of 1929.

Maxima.--June 16-25, 1965: Contents (combined), 7,400 acre-ft 1500 hours June 18. 1963 to May 1965: Contents, Rio Hondo Reservoir 42 acre-ft June 19 (elevation, 3,969 ft); Rocky Arroyo Reservoir 466 acre-ft Sept. 17, 1964 (elevation, 3,953.1 ft).

Remarks.--Reservoir, completed July 16, 1963, is formed by earthfill dams on Rio Hondo, which form Rio Hondo Reservoir, and Rocky Arroyo, which forms Rocky Arroyo Reservoir. Above elevation 3,980.0 ft the pools of Rio Hondo Reservoir and Rocky Arroyo Reservoir combine to form Two Rivers Reservoir, total capacity, 167,900 acre-ft at elevation 4,032.0 ft (ungated spillway crest). Capacity of Rio Hondo Reservoir, 550 acre-ft between elevation 3,957.0 ft (sill of outlet gate) and 3,980.0 ft. Capacity of Rocky Arroyo Reservoir, 14,240 acre-ft between elevation, 3,945.0 ft (sill of outlet gate) and 3,980.0 ft. No appreciable dead storage in Rio Hondo Reservoir. Dead storage, 39 acre-ft, in Rocky Arroyo Reservoir. Reservoir build for flood control. Outlet conduits in Rocky Dam remain open. Capacity table furnished by Corps of Engineers. Figures given herein represent total contents. Records of elevation and contents furnished by Corps of Engineers.

Gage height and contents, at 0800 hours, June 16-25, 1965

June	Rio Hondo Reservoir		Rocky Arroyo Reservoir	
	Elevation (feet)	Contents acre-feet	Elevation (feet)	Contents acre-feet
16	-	0	-	0
17	-	0	-	0
18	3982.0	767	3970.7	6,086
19	3975.5	214	3968.8	4,984
20	3960.0	42	3966.9	4,037
21	3971.6	68	3964.8	3,137
22	3971.9	73	3962.6	2,354
23	-	0	3959.5	1,532
24	-	0	3956.1	877
25	-	0	3951.3	292